

## **01 01 01 CONSTRUCTION MANAGER AT RISK SERVICES**

### **1.00 GENERAL**

#### **1.01 SERVICES INCLUDED**

- A. Provide the Construction Manager at Risk (CMAR) Services (the "Services") (CMAR) for the development and construction of the Project in accordance with the terms of the Contract Documents.
- B. Provide the Services in accordance with the applicable sections of Texas Government Code Chapter 2269 and any applicable Laws and Regulations.
- C. Coordinate with various local and state agencies as required, obtain permits and arrange for inspections by building officials.
- D. Support the materials testing and quality assurance activities of the Owner. Manage quality control on the Project to see that the construction meets the intent of the Contract Documents.
- E. Provide bonds and insurance.
- F. Provide safe working conditions at the Site meeting OSHA standards as a minimum.
- G. Assist Owner and Engineer in resolving any issues or conflicts.
- H. Coordinate and manage transition of Project to Owner operations.
- I. Provide follow up to correct defects during the warranty period.
- J. Provide CMAR Services in accordance with professional standards of skill, care and diligence in a timely manner in accordance with the Project schedule and so that the Project shall be completed as expeditiously and economically as possible within the Owner's Budget and in the best interest of the Owner.

#### **1.02 PERSONNEL AND CONSULTANTS**

- A. Provide the services of the Key Personnel identified in the Proposal for the duration of the Project. Substitution of other individuals for the Key Personnel and Alternate Key Personnel identified in the Proposal or individuals previously approved can only be made with the written consent of the Owner. Not providing the Key Personnel or Alternate Key Personnel proposed may be the grounds for termination of this Agreement.
- B. Provide the services of other personnel identified in the Proposal by position for the Project as well as other personnel needed for the Project as determined by the CMAR.
- C. The CMAR may provide Services through one or more CMAR Team Members employed by the CMAR provided, however, the CMAR shall remain responsible to the Engineer and the Owner for all duties and obligations of the CMAR under this Agreement. Require CMAR Team Member to comply with all terms and conditions of these Contract Documents unless a written waiver is authorized by the Owner. The Services provided by the any CMAR Team Member identified in the Proposal must be provided for the duration of the Project. Substitution of other CMAR team members for CMAR Team Members identified in the

Proposal or previously approved can only be made with the written consent of the Owner. Not providing the CMAR Team Members proposed may be the grounds for termination of this Agreement.

#### 1.03 LIMITATIONS OF AUTHORITY

- A. The CMAR shall have authority to act on behalf of the Engineer and the Owner only to the extent provided in the Contract Documents. The CMAR does not have authority to bind the Engineer or the Owner for the payment of any costs or expenses without the express written approval of the Engineer or the Owner except as indicated by these Contract Documents. In the event of an emergency affecting the safety of persons, the Project or adjacent property, the CMAR, without special instruction or authorization, shall act reasonably to prevent or minimize any threatened damage, injury or loss. The CMAR's authority to act on behalf of the Engineer or the Owner shall be modified only by Change Order or Amendment.

#### 1.04 QUALITY OF SERVICES

- A. The Engineer, with the concurrence of the Owner, has the right to reject or disapprove any portion of the CMAR's Services for the Project. Written notice stating the reason for the rejection or disapproval will be provided by the Engineer. Proceed with revisions to the Services to attempt to satisfy the objections when requested by the Engineer. The CMAR acknowledges that any review or approval by the Engineer and the Owner of any Services performed by the CMAR pursuant to this Agreement shall not relieve the CMAR of the CMAR's responsibility to properly and timely perform such Services.

#### 2.00 PRE-CONSTRUCTION SERVICES

##### 2.01 PROJECT MANAGEMENT

- A. Attend general progress review and coordination meetings (assume weekly) with Owner and Engineer.
- B. Attend periodic design meetings (assume 2 such meeting per month) to provide consultation on aspects of the design that will impact the budget, schedule and quality of the completed Project.
  - 1. Advise, assist, and provide recommendations on all aspects of the planning and design of the Work: Consult with the Engineer and Owner regarding Site use and improvements, and the selection of materials, building systems and equipment.
  - 2. Provide recommendations on construction feasibility; actions designed to minimize adverse effects of labor or material shortages; time requirements for procurement, installation and construction completion; and factors related to construction cost including estimates of alternative designs or materials, preliminary budgets and possible opportunities for savings.
  - 3. Provide recommendations on construction schedule for possible opportunities for time savings.

- C. Provide input to the Owner and Engineer regarding current construction market, bidding climate, status of key Subcontractor and Supplier markets, and other local economic conditions. Develop Subcontractor and Supplier interest in the Project, consistent with Laws and Regulations. Furnish Owner and Engineer a list of possible Subcontractors and Suppliers, from whom Bids will be requested for each principal portion of the Work. Identify preferred providers based on CMAR's previous experience for quality of work, on time delivery and ability to complete work within bid amounts. Submission of this list is for information and discussion purposes only and not for prequalification. The review of this list will not require the Owner or Engineer to investigate the qualifications of proposed Subcontractors and Suppliers, nor shall it waive the right of the Owner or Engineer to later object to or reject any proposed Subcontractor or Supplier when Bids are considered.
- D. Recommend a schedule for procurement of long-lead time items and other Work required to meet the Project schedule to the Owner and Engineer. Determine if these items must be procured before execution of the GMP Amendment or if such procurement must occur before that time to meet the Project schedule. Assist the Owner and Engineer with the procurement by obtaining competitive bids for these items.
- E. Identify critical elements of the Work that may require special procurement processes, such as prequalification of Subcontractors or Suppliers who may have certain prior experience which is necessary for the Subcontractor or Supplier to be able to perform the Work, requirement of certified or pre-qualified installers or alternative contracting methods.
- F. In conjunction with the Owner and Engineer, identify the appropriate Bid packages from the Contract Documents for distribution to prospective Bidders for providing all elements of Work not included in the General Conditions. Appropriate Bid packages shall generally mean scopes of work that will maximize the competition for those Bid packages. Bid packages will also be identified with appropriate scopes of work should the Owner have any goals for involvement of the local and/or small contracting communities.

## 2.02 TIME MANAGEMENT

- A. Provide a preliminary master schedule including design and construction for the Project based on the design existing at the time of Agreement execution. If preliminary master schedule does not meet Owner's Contract Times, CMAR shall provide reasons why and recommendations on how to meet Contract Times. Update master schedule when preliminary design is completed and when design development documents have been completed. Incorporate the Engineer's schedule for design into the preliminary master schedule and include allowances provided by Engineer and Owner for reasonable periods required for the review and approval of items by the Engineer and the Owner and for approvals of governmental authorities having jurisdiction over the Project. Prepare the preliminary master schedule in a way that the detailed Progress Schedule can be incorporated into the master schedule as the Project becomes better defined. For any master schedule updates, if Owner's Contracts Times cannot be met, CMAR will provide recommendations on how to meet Contract Times.
- B. Identify critical design Milestones that must be met in order to keep the Project on schedule. Coordinate and integrate the preliminary master schedule with the activities of the Owner, Engineer, and CMAR. Update the preliminary master schedule as design

progresses to indicate proposed activity sequences and durations, Milestone dates for receipt and approval of pertinent information, submittal of a Guaranteed Maximum Price Amendment(s) preparation and processing of Shop Drawings and Samples, delivery of materials or equipment requiring long-lead time procurement, and Owner's occupancy requirements.

- C. Make appropriate recommendations to the Owner and Engineer if preliminary master schedule updates indicate that previously approved schedules may not meet Contract Time requirements.
- D. Revise the master schedule after each Amendment and the Amendment when the Guaranteed Maximum Price for the entire Work is established.
- E. Prepare schedules in accordance with the requirements of Section 01 32 16 "Construction Progress Schedules".

## 2.03 COST MANAGEMENT

- A. Provide a preliminary evaluation based on the existing design as of the date of Agreement execution of the Owner's program and budget requirements to determine that CMAR will be able to construct the Project described in that program within the Owner's Budget using conceptual estimating techniques. Discuss this preliminary appraisal with the Engineer and Owner. If preliminary evaluation results in Owner's Budget being exceeded, the CMAR will describe the reasons why and identify the Owner's Budget cost categories or cost items that deviate from CMAR's evaluation. CMAR shall provide recommendations on how to meet Owner's Budget.
- B. Prepare a detailed estimate with supporting data for review by the Owner and Engineer when preliminary design has been completed and when design development documents have been completed by the Engineer and approved by the Owner. Update and refine this estimate at appropriate intervals agreed to by the Owner, Engineer and CMAR during the preparation of the Construction Documents. If estimates do not meet Owner's Budget CMAR shall provide recommendations on how to meet Owner's Budget.
- C. Prepare a pre-Bid line item estimate to be used for comparison of Bids received at the Bid opening(s). Include a line item in the estimate for each anticipated Bid package, as well as line items for general conditions, contingencies and other cost that will be incorporated into the Guaranteed Maximum Price for the entire Work for Project.
- D. Make appropriate recommendations to the Owner and Engineer if any estimate exceeds previously approved Owner Budgets or if volatility in the cost of selected materials or equipment may drive cost above the Owner's Budget when Bids are received for Work. Identify areas where costs may be lower than original estimates and cost savings may be used to balance the budget. Report to the Owner the cost of various design and construction alternatives, including CMAR's assumptions in preparing its analysis, a variance analysis between budget and preliminary estimate, and recommendations for any adjustments to the budget. Consider costs relating to efficiency, usable life, maintenance, energy, and operation as part of the cost analysis.

- E. Revise the construction cost estimate to reflect actual cost as determined by Bid amounts. Use this revised estimate to establish the Schedule of Values used for periodic Applications for Payment.
- F. Notify the Owner and Engineer immediately if any construction cost estimate exceeds the Owner's Budget.
- G. Work with the Owner and Engineer at each stage in the design process to develop a GMP within the Owner's Budget and a master schedule within Owner's schedule.

## 2.04 QUALITY MANAGEMENT / DESIGN REVIEW

- A. Review in-progress design documents, including at a minimum the documents generally described as preliminary design existing at the time of Agreement execution, preliminary design completion, design development documents, and the final draft of the Construction Documents and provide input and advice on constructability, materials and equipment selections, and availability. Provide timely suggestions for modifications to improve:
  - 1. Constructability, including sequencing or coordination issues, to enable Work to be completed with a minimum of RFI's and change orders:
    - a. Adequacy of details for construction.
    - b. Potential conflicts during construction.
    - c. Feasibility of construction.
    - d. Construction sequencing.
    - e. Ability to coordinate among Subcontractors and Suppliers.
    - f. Coordination between Contract Documents.
    - g. Elimination of ambiguities, conflicts, discrepancies or lack of clarity in the Contract Documents.
  - 2. Operability:
    - a. Ability to minimize disruptions to existing operations, if applicable.
    - b. Ability to complete construction connections to existing facilities or utilities.
    - c. Ability of Owner to operate/maintain the Project in a safe and time and cost efficient manner when completed.
  - 3. Risk Management Plan:
    - a. Analyze Project and construction risk to assess risk impact and develop appropriate risk management strategies to minimize associated costs and schedule impacts.
    - b. Provide recommendations for appropriate allocation of Project and construction risks.
    - c. Identify additional information that will assist with risk assessment and management.
    - d. Suggest procurement strategies to minimize risk.

4. Construction schedule acceleration
    - a. Provide estimating and scheduling services to enable Owner to evaluate construction acceleration options based on expected receipt of Army 404 permit.
  5. Possible use of patented or copyrighted products.
  6. Legal requirements for Subcontractor and equipment procurement.
  7. Construction cost.
  8. Construction duration.
  9. Completeness, consistency and clarity.
  10. Provide review comments in writing using the processes or procedures prescribed by the Engineer.
- B. Development of the quality control plan for the Project.
- C. Standardization of Specifications (See Agreement)
- D. The CMAR is not responsible for design of the Project. The CMAR does not control the Project design or contents of the Contract Documents and does not assume responsibility or liability for the Project design by performing these reviews. The CMAR's review of the Project design and Contract Documents and providing recommendations are only advisory to the Engineer and Owner.
- 3.00 PROCUREMENT SERVICES
- 3.01 ASSEMBLE BID PACKAGES
- A. Assemble appropriate Bid packages from the Contract Documents for distribution to prospective Bidders for providing all elements of Work not included in the General Conditions. Appropriate Bid packages shall generally mean scopes of work that will maximize the competition for those Bid packages. Bid packages will be assembled with appropriate scopes of work should the Owner have any goals for involvement of the local and/or small contracting community.
- 3.02 ADVERTISE FOR BIDS
- A. Publicly advertise the Project soliciting Bids from Subcontractors and Suppliers for providing all elements of Work not included in the General Conditions in accordance with provisions of Texas Government Code 2269 for competitive bidding method or competitive sealed proposals method.
1. Include a notice in the advertisement for Bids that:
    - a. Describes the Work.
    - b. States the location at which Bidding Documents, Drawings, Specifications, and other documents made available to the CMAR can be examined by all bidders.
    - c. States the time and place for submitting Bids.
    - d. States the time and place Bids will be opened.

2. Publish the advertisement in a manner that meets the requirements placed on the Owner by Laws and Regulations.
    - a. Publish the advertisement at least twice in one or more newspapers of general circulation in the county in which the Work is to be performed.
    - b. Publish the second notice on or before the 10th day before the first date Bids may be submitted.
  3. Mail notices to Subcontractor and Suppliers identified in accordance with Paragraph 2.01.B or any organization that requests in advance that notices for Bids be sent to it on or before the date the first newspaper advertisement is published.
  4. Send notices to at least two selected plan rooms that serve the area of the Project. Digital copies of the Contract Documents will be provided for use in internet based systems for procurement.
- B. Maintain a list of all entities that have requested Bid documents for any portion of the Project (plan holders) until Bids are received. Provide weekly updates of the plan holders list to the Engineer and Owner.
- C. Encourage multiple Subcontractors and Suppliers to submit Bids on the Project so that a minimum of three Bids are received for each trade or Bid package.
- D. Submit a Bid complying with the requirements for Bids from other Subcontractors and Suppliers for any portion of the Work that the CMAR may wish to perform. The CMAR may self-perform this portion of the Work if the Owner determines that the Bid of the CMAR provides the best value to the Owner.

### 3.03 PRE-BID CONFERENCES

- A. Conduct a pre-Bid conference with prospective Subcontractor and Suppliers to familiarize them with:
1. Bid opportunities.
  2. Special requirements of the Contract Documents.
  3. Small, minority and women-owned business requirements.
  4. Equal employment opportunity requirements.
  5. Prevailing wage requirements.
- B. Obtain responses from the Engineer to all questions at pre-Bid conferences which require a modification to the Contract Documents. Prepare a record of the discussions at the pre-Bid conference to assist the Engineer in preparing Addenda as appropriate. Review and comment on Addenda prepared by the Engineer to incorporate responses to questions raised during or as a result of the conference.

### 3.04 CMAR SELF-PERFORMANCE AND CMAR TEAM MEMBER WORK

- A. For any Bid packages that the CMAR or a CMAR Team Member will submit a Bid, the CMAR shall notify the Owner prior to any advertisement. The CMAR and Owner shall decide on the

protocol for advertisement, pre-Bid conferences and opening of Bids. All Bids will be submitted directly to the Owner or the Engineer.

### 3.05 ADDENDA

- A. Receive Addenda prepared by the Engineer. Review Addenda for clarity, consistency and coordination. CMAR is not acting in a manner to assume responsibility or liability, in whole or in part, for all or any part of the Project design or the content of the Contract Documents by performing these reviews. Distribute Addenda regarding any changes in the Bid process or Contract Documents to all plan holders. Require verification from plan holders that Addenda have been received.

### 3.06 OPENING BIDS

- A. Open bids submitted by Subcontractors and Suppliers for all elements of Work not included in the General Conditions at the time and location so indicated in the advertisement for Bid or as altered by addendum sent to all plan holders.
- B. Require sealed Bids submitted to Engineer for all Work which the CMAR proposes to perform with their own resources. CMAR must also submit to Engineer a sealed Bid for this work to be opened at the same time that other Bids for this Work are to be opened. CMAR will be allowed to self-perform that Work for which they demonstrate best value in terms of cost, schedule and quality of Work.
- C. Review all Bids submitted in the presence of the Owner and Engineer in a way that does not disclose the contents of the bid during the selection process to any entity other than the Owner, Engineer and CMAR.
- D. Compare Bids received to the line item budget prepared for the Project prior to the opening of Bids in accordance with Paragraph 2.03.D. Resolve discrepancies or overlaps in Bid packages to eliminate duplications or the omission of elements of the Work that are not included in the General Conditions. Discuss each Bid received with the Owner and Engineer and recommend which Bid received will provide best value for the Owner.
- E. Evaluate any substitutions or alternate Bids submitted by Bidders. Engineer will evaluate the substitute or alternate Bids to determine the technical merit and to determine that the modifications offered are consistent with the intent of the Contract Documents. The Engineer will determine if the substitution or alternate is acceptable. Substitutions will be evaluated in accordance with provisions of Section 01 33 00 "Submittal Procedures."
- F. Owner will adjust the Guaranteed Maximum Price if the Owner requires the CMAR to contract with a Subcontractor or Supplier different from the entity submitting the Bid on which the Guaranteed Maximum Price is based. This adjustment will be made in the Guaranteed Maximum Price or by Change Order if the Guaranteed Maximum Price has already been established by Amendment.
- G. Fulfill the contract requirements of any Subcontractor or Supplier that defaults in the performance of the Work or fails to execute a contract after being selected. The Work of this Subcontractor or Supplier may be performed directly by the CMAR or through a replacement Subcontractor or Supplier at the discretion of the CMAR and Owner. The Owner may direct the CMAR to obtain Bids for this Work if the cost proposed by the CMAR



or substitute Subcontractor or Supplier for this Work differs from the line item estimate by more than ten percent of the line item amount. The CMAR will not be required to advertise for this Work as required in Paragraph 3.01.

- H. Make all Bids public after the award of contracts or not later than 7 days after the date of the final selection of bids or proposals.

### 3.07 OPTIONS FOR GMP PROPOSALS EXCEEDING THE PROJECT BUDGET

- A. Advise the Owner of market conditions, bid issues, design issues or other factors which may have an impact causing GMP Proposals to be higher than estimated in the Owner's Budget. Discuss opportunities for bringing the Project within Owner's Budget with the Owner and Engineer to assist with making a decision on how to proceed.
- B. Proceed with the Project if the option described in the Agreement Section 9.08 A is selected. Provide CMAR services as described in these Contract Documents without additional compensation for Pre-Construction Services or Procurement Services. Other fees and expenses related to the cost of Work will be adjusted in accordance with the new cost of Work.
- C. Proceed with re-Bidding portions of the Project if the option described in the Agreement Section 9.08 A. is selected. Determine if restructuring Bid packages may lead to lower Bid prices. Re-Bid selected original bid packages or restructured Bid packages for portions of the Work identified as having the potential to reduce the overall cost of construction to the Owner's Budget if re-Bid. Advise the Owner and Engineer of impact to the schedule resulting from re-Bidding portions of the Project. Provide CMAR Services for re-Bidding these portions of the Project without additional compensation.
- D. Assist Engineer and Owner in studies to revise the scope of the Project to bring the Project cost within the Owner's Budget. Provide research and cost estimates to evaluate the potential cost savings of each proposed change in scope. Advise the Owner and Engineer of impact to the schedule resulting from re-Bidding portions of the Project and changes in Contract Time that will result from the changed scope of Work. Provide CMAR services for consultation in modifying the Project scope and rebidding these portions of the Project without additional compensation.
- E. Revise the Project master schedule incorporating delays caused by actions taken to Project within the Owner's Budget.

### 4.00 CONSTRUCTION SERVICES

#### 4.01 SERVICES INCLUDED

- A. Provide administration and management of the Project, schedule Work and coordination of the Subcontractors and Suppliers, and manage construction Site safety and all other duties and obligations that would be customary for a General Contractor to construct the Project in accordance with the Contract Documents. Undertake and complete the Work through self-performed Work, Subcontractors Work and Suppliers Work in accordance with the Contract Documents. Maintain a competent, full-time staff at the Project at all times that Work is in preparation or progress on the Project and establish and implement on-Site organization

and authority so that the Work on the Project may be accomplished on-time and within the Guaranteed Maximum Price.

- B. The CMAR fee provides compensation for all Services not specifically identified as being included in the Cost of Work related to providing construction phase and post construction phase services.

#### 4.02 TIME MANAGEMENT

- A. Update the master schedule for the Project. Incorporate the schedules of Subcontractors and Suppliers into the master schedule and include allowances mutually agreeable to Owner, Engineer and CMAR for reasonable periods required for the review and approval of items by the Engineer and the Owner and for approvals of governmental authorities having jurisdiction over the Project. Prepare schedules in accordance with the requirements of Section 01 32 16 "Construction Progress Schedules."
- B. Require each Subcontractor and Supplier to provide records for any materials that require long lead-time and to certify to the CMAR that such materials have been ordered for timely delivery to the Project. Review the sufficiency of the Subcontractor's and Suppliers' workforce and the number and types of equipment assigned and provided by each to the Project. Manage Subcontractors and Suppliers to maintain adequate workforce and equipment to complete the Project within the Contract Time.
- C. Comply with the requirements for time management included in the Contract Documents.

#### 4.03 COST MANAGEMENT

- A. Provide a revised anticipated cash flow based on the construction schedule that is consistent with the Guaranteed Maximum Price. Provide an Earned Value Report each month with the Application for Payment in the format prescribed by the Engineer. Maintain and audit report based on the preliminary base line cost breakdown developed during Procurement Services to show initial estimate, bids received, bid selected, amount awarded and amount drawn against that amount each month. Show all funds used from contingency funds, and the current total for this amount.
- B. Comply with the requirements for cost management included in the Contract Documents.

#### 4.04 QUALITY MANAGEMENT

- A. Manage the quality of construction on the Project so that the completed Project will meet the requirements of the Contract Documents. Inspect the Work of each Subcontractor or Supplier for conformance with the Contract Documents. Correct defective Work performed by the CMAR, Subcontractors or Suppliers. Report defective Work to the Engineer.
- B. Comply with the requirements for quality management included in the Contract Documents.

#### 4.05 RISK MANAGEMENT

- A. Manage implementation of risk management plan.

4.06 WARRANTY CORRECTION WORK

- A. Provide Services with adequate number of personnel for the correction of defects in the Work during the warranty period and subsequent follow up on warranty items.

**END OF SECTION**

## **01 11 00 SUMMARY OF WORK**

### **1.00 GENERAL**

#### **1.01 PROGRAM MANAGER**

- A. Wherever the term Program Manager is used in the Specifications, Program Manager shall mean Freese and Nichols, Inc.

#### **1.02 WORK INCLUDED**

- A. Construct Work as described in the Contract Documents.
  - 1. Provide the materials, equipment, and incidentals required to make the Project completely operable.
  - 2. Provide the labor, equipment, tools, and consumable supplies required for a complete Project.
  - 3. Provide the civil, architectural, structural, mechanical, electrical, instrumentation and all other Work required for a complete and operable Project.
  - 4. Test and place the completed Project in operation.
  - 5. Provide the special tools, spare parts, lubricants, supplies, or other materials as indicated in Contract Documents for the operation and maintenance of the Project.
  - 6. Install Owner provided products and place in operation.
  - 7. Drawings and Specifications do not indicate or describe all of the Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Engineer.

#### **1.03 JOB CONDITIONS**

- A. The General Conditions and General Requirements apply to each Section of the Specifications.
- B. Comply with all applicable state and local codes and regulations pertaining to the nature and character of the Work being performed.

#### **1.04 DESCRIPTION OF WORK**

- A. Work is described in general, non-inclusive terms as:
  - 1. Lower Bois d' Arc Creek Reservoir Program – Raw Water Pipeline and Treated Water Pipeline from the Leonard Water Treatment Plant to McKinney No. 4 Project.

#### **1.05 WORK UNDER OTHER CONTRACTS**

- A. The Owner will have work under the other Lower Bois d' Arc Creek Reservoir Program CMAR contracts that may impact construction scheduling, testing, and startup. Contractor will coordinate efforts for the Work with the Owner.

1.06 WORK BY OWNER

- A. The Owner does not plan to perform Work that may impact construction scheduling, testing, and startup.
- B. Owner will provide normal operation and maintenance of the existing facilities during construction, unless otherwise stated.

1.07 OWNER-SELECTED PRODUCTS

- A. There may be products pre-selected by Owner for this Project. Unless notified by Owner of such, it is anticipated that all products will be purchased by the CMAR.

1.08 OWNER-PROVIDED PRODUCTS

- A. There may be products to be provided directly by Owner for this Project. Unless notified by Owner, it is anticipated that all products will be purchased by the CMAR.

1.09 CONSTRUCTION OF UTILITIES

- A. Utility companies or their contractors will provide new or enhanced utilities for this Project. Coordinate with others performing work connected to this Project. Cost associated with providing permanent power will be included in the Cost of Work.
- B. Power and Electrical Services:
  - 1. Owner will provide permanent power connections for the Site through the power utility.
  - 2. Cost for providing permanent power will be paid for by the Owner.
  - 3. Contractor is required to coordinate and cooperate with others performing this Work.
  - 4. Power company will provide the construction to the property line or other point shown on the Drawings.
  - 5. Provide conduit, conductors, pull boxes, manholes, and other appurtenances for the installation of power cable between the property line and the transformer and between the transformer and the main power switch.
  - 6. Test conductors in accordance with Section 01 40 00 "Quality Requirements" and coordinate with the power company to energize the system when ready.
  - 7. Pay for temporary power, including but not limited to construction cost, meter connection, fees and permits.
  - 8. When permanent power is available at the Site, the Contractor may use this power source in lieu of temporary power source he has been using.
    - a. Notify Engineer and Owner of intent to use the permanent power source.
    - b. Arrange with the power utility and pay the charges for connections and monthly charges for use of this power.
  - 9. Pay for the temporary power consumed until the Project has been accepted as substantially complete.

C. Telephone Services:

1. Owner will provide permanent telephone service for the Site through the telephone utility.
2. Cost for providing permanent telephone service will be paid for by the Owner as a Cost of Work.
3. Coordinate and cooperate with others performing this Work.
4. Telephone company will provide construction to the property line or other point shown on the Drawings.
5. Provide conduit, cable, pull boxes, manholes, and other appurtenances for the installation of telephone cable between the property line or other point shown on the Drawings and the main telephone terminal board.
6. Test all cable and connections in accordance with Section 01 40 00 "Quality Requirements" and coordinate with the telephone company to ring out all lines on the system when ready.
7. Pay for temporary service, including, but not limited to construction cost, telephones and equipment, connection fees and permit.
8. When permanent telephone is available at the Site, the Contractor may use this system in lieu of temporary lines he has been using.
  - a. Notify Engineer and Owner of intent to use the permanent telephone system.
  - b. Arrange with the Telephone Utility and pay the charges for connections and monthly charges for use of this service.
9. Pay for the service until the Project has been accepted as substantially complete.

1.10 NOMINATED SUBCONTRACTOR

- A. There are no Subcontractors nominated by Owner for this project. It is anticipated that all subcontractors will be provided by the CMAR.

1.11 OCCUPANCY

- A. As soon as any portion of the structure and equipment are ready for use, the Owner shall have the right to operate the portion upon written notice to the Contractor.
- B. Testing of equipment and appurtenances including specified test periods, training, and startup does not constitute acceptance for operation.
- C. Owner may accept the facility for continued use after startup and testing at the option of the Owner. If acceptance is delayed at the option of the Owner, shut down facilities per approved Operation and Maintenance procedures.
- D. The execution of bonds is understood to indicate the consent of the surety to these provisions.
- E. Provide an endorsement from the insurance carrier permitting occupancy of the structures and use of equipment during the remaining period of construction.

F. Conduct operations to insure the least inconvenience to the Owner and general public.

**2.00 PRODUCTS**

**2.01 MATERIALS**

A. Provide materials and products per the individual Sections of the Specifications.

**END OF SECTION**

## **01 29 00      PAYMENT PROCEDURES**

### **1.00    GENERAL**

#### **1.01    WORK INCLUDED**

- A. Payments for Work shall conform to the provisions of the General Conditions, the Agreement, and this Section.
- B. Submit Applications for Payment at the prices indicated in the Agreement.
  - 1. Prices for each item in the Agreement shall include but not be limited to cost for:
    - a. Mobilization, demobilization, cleanup, bonds, and insurance.
    - b. Professional services including but not limited to engineering and legal fees.
    - c. The products to be permanently incorporated into the Project.
    - d. The products consumed during the construction of the Project.
    - e. The labor and supervision to complete the Project.
    - f. The equipment, including tools, machinery, and appliances required to complete the Project.
    - g. The field and home office administration and overhead costs related directly or indirectly to the Project.
    - h. Any and all kinds, amount or class of excavation, backfilling, pumping or drainage, sheeting, shoring and bracing, disposal of any and all surplus materials, permanent protection of all overhead, surface or underground structures; removal and replacement of any poles, conduits, pipelines, fences, appurtenances and connections, cleaning up, overhead expense, bond, public liability and compensation and property damage insurance, patent fees, and royalties, risk due to the elements, and profits, unless otherwise specified.
  - 2. Provide Work not specifically set forth as an individual payment item but required to provide a complete and functional system. These items are a subsidiary obligation of the Contractor and are to be included in the Contract Price.
  - 3. Payment will be made for materials on hand.
    - a. Store materials properly on-Site per Section 01 31 00 "Project Management and Coordination."
      - 1). Payment will be made for the invoice amount less the specified retainage.
      - 2). Provide invoices at the time materials are included on the materials-on-hand tabulation.
    - b. Provide documentation of payment for materials on hand with the next payment request. Adjust payment to the amount actually paid if this differs from the invoice amount. Remove items from the materials on hand tabulation if this documentation is not provided so payment will not be made.



- c. Payment for materials on hand is provided for the convenience of the Contractor and does not constitute acceptance of the product.
- 4. The Work covered by progress payments becomes the property of the Owner at the time of payment.

## 1.02 SCHEDULE OF VALUES AND PAYMENTS

### A. Submit a detailed Schedule of Values for the Work to be performed on the Project.

- 1. Submit schedule within 10 days prior to submitting the first Application for Payment.
- 2. Line items in the Agreement are to be used as line items in the schedule.
- 3. Payment will be made on the quantity of Work completed per Contract Documents during the payment period and as measured per this Section.
  - a. Payment amount is the Work quantity measured multiplied by the unit prices for that line item in the Agreement.
  - b. Payment on a unit price basis will not be made for Work outside finished dimensions shown in the Contract Documents.
  - c. Partial payments will be made for lump sum line items in the Agreement.
    - 1). Lump sum line items in the Agreement are to be divided into smaller unit prices to allow more accurate determination of the percentage of the item that has been completed.
      - a). Provide adequate detail to allow more accurate determination of the percentage of Work completed for each item.
      - b). Provide prices for items that do not exceed \$50,000.00. An exception may be made for equipment packages that cannot be subdivided into units or subassemblies.
      - c). Separate product costs and installation costs.
        - (1). Product costs include cost for product, delivery and unloading costs, royalties and patent fees, taxes, and other cost paid directly to the Subcontractor or Supplier.
        - (2). Installation costs include cost for the supervision, labor and equipment for field fabrication, erection, installation, startup, initial operation and Contractor's overhead and profit.
    - d). Lump sum items may be divided into an estimated number of units.
      - (1). The estimated number of units times the cost per unit must equal the lump sum amount for that line item.
      - (2). Contractor will receive payment for all of the lump sum line item.
    - e). Include a directly proportional amount of Contractor's overhead and profit for each line item.

- f). Divide principal subcontract amounts into an adequate number of line items to allow determination of the percentage of Work completed for each item.
    - 2). These line items may be used to establish the value of Work to be added or deleted from the Project.
    - 3). Correlate line items with other administrative schedules and forms:
      - a). Progress Schedule.
      - b). List of Subcontractors.
      - c). Schedule of allowances.
      - d). Schedule of alternatives.
      - e). List of products and principal Suppliers.
      - f). Schedule of Submittals.
    - 4). Costs for mobilization shall be listed as a separate line item and shall be actual cost for:
      - a). Bonds and insurance.
      - b). Transportation and setup for equipment.
      - c). Transportation and/or erection of all field offices, sheds and storage facilities.
      - d). Salaries for preparation of submittals required before the first Application for Payment.
      - e). Salaries for field personnel assigned to the Project related to the mobilization of the Project.
        - (1). Mobilization may not exceed 3 percent of the total Contract Price. Cost for mobilization may be submitted only for Work completed.
    - 5). The sum of all values listed in the schedule must equal the total Contract amount.
  4. Submit a schedule indicating the anticipated schedule of payments to be made by the Owner. Schedule shall indicate:
    - a. The Application for Payment number.
    - b. Date the request is to be submitted.
    - c. Anticipated amount of payment to be requested.
  5. Update the Schedule of Values quarterly or more often if necessary to provide a reasonably accurate indication of the funds that the Owner will need to have available to make payment to the Contractor for the Work performed.
- B. Provide written approval of the Schedule of Values, Application for Payment form, and method of payment by the Surety Company providing performance and payment bonds prior to submitting the first Application for Payment. Payment will not be made without this approval.

### 1.03 PAYMENT PROCEDURES

- A. Submit Applications for Payment per the procedures indicated in Section 01 33 00 "Submittal Procedures." Submit a Schedule of Values in the Application for Payment format to be used.
- B. Applications for Payment may be submitted on a pre-printed form as indicated in Section 01 31 13.13 "Forms" or may be generated by computer. Computer generated payment requests must have the same format and information indicated in the pre-printed form and be approved by the Engineer.
  - 1. Indicate the total Contract Price and the Work completed to date on the Tabulation of Values for Original Contract Performed (Attachment "A".)
  - 2. Include only approved Change Order items in the Tabulation of Extra Work on Approved Change Orders (Attachment "B".)
  - 3. List all materials on hand that are presented for payment on the Tabulation of Materials on Hand (Attachment "C".) Once an item has been entered on the tabulation it is not to be removed.
  - 4. Include the Project Summary Report (Attachment "D") with each Application for Payment. Data included in the Project Summary Report are to be taken from the other tabulations. Include a completed summary as indicated in with each Applications for Payment submitted.
    - a. Number each application sequentially and indicate the payment period.
    - b. Show the total amounts for value of original Contract performed, extra work on approved Change Orders, and materials on hand on the Project Summary Report. Show total amounts that correspond to totals indicated on the attached tabulation for each.
    - c. Note the number of pages in tabulations in the blank space on the Project Summary Report to allow a determination that all sheets have been submitted.
    - d. Execute Contractor's certification by the Contractor's agent of authority and notarize for each Application for Payment.
  - 5. Do not alter the Schedule of Values and the form for the submission of requests without the written approval of the Engineer once these have been approved by the Engineer.
  - 6. Final payment requires additional procedures and documentation per Section 01 70 00 "Execution and Closeout Requirements."
- C. Progress payments shall be made as the Work progresses on a monthly basis.
  - 1. End the payment period on the day indicated in the Agreement and submit an Application for Payment for Work completed and materials received since the end of the last payment period.
  - 2. At the end of the payment period, submit a draft copy of the Application for Payment for that month to the Owner. Agreement is to be reached on:
    - a. The percentage of Work completed for each lump sum item.

- b. The quantity of Work completed for each unit price item.
- c. The percentage of Work completed for each approved Change Order item.
- d. The amount of materials on hand.
- 3. On the basis of these agreements the Contractor is to prepare a final copy of the Application for Payment and submit it to the Owner for approval.
- 4. The Engineer will review the payment request and if appropriate will recommend payment of the request to the Owner.
- D. Provide a revised and up-to-date Progress Schedule per Section 01 32 16 "Construction Progress Schedules" with each Application for Payment.
- E. Provide Project photographs per Section 01 32 34 "Video and Photographic Documentation" with each Application for Payment.

#### 1.04 ALTERNATES AND ALLOWANCES

- A. If applicable, include amounts for specified Alternate Work in the Agreement in accordance with Section 01 23 10 "Alternates and Allowances."
- B. If applicable, include amounts for specified Allowances for Work in the Agreement in accordance with 01 23 10 "Alternates and Allowances."

#### 1.05 MEASUREMENT PROCEDURES

- A. Measure the Work described in the Agreement for payment. Payment will be made only for the actual measured and/or computed length, area, solid contents, number and weight, unless otherwise specifically provided. No extra or customary measurements of any kind will be allowed.

**END OF SECTION**

## **01 31 00 PROJECT MANAGEMENT AND COORDINATION**

### **1.00 GENERAL**

#### **1.01 WORK INCLUDED**

- A. Furnish equipment, manpower, products, and other items necessary to complete the Project with an acceptable standard of quality and within the Contract Time. Construct Project in accordance with current safety practices.
- B. Manage Site to allow access to Site and control construction operations.
- C. Provide labor, materials, equipment and incidentals necessary to construct temporary facilities to provide and maintain control over environmental conditions at the Site. Remove temporary facilities when no longer needed.
- D. Remove temporary controls at the end of the Project.

#### **1.02 QUALITY ASSURANCE**

- A. Employ competent workmen, skilled in the occupation for which they are employed. Provide Work meeting quality requirements of the Contract Documents as determined by the Engineer.
- B. Remove defective Work from the Site immediately unless provisions have been made and approved by the Engineer to allow repair of the product at the Site. Clearly mark the Work as "defective" until it is removed or allowable repairs have been completed.

#### **1.03 SUBMITTALS**

- A. Provide submittals in accordance with Section 01 33 00 "Submittal Procedures":
  - 1. Provide copies of Supplier's printed storage instructions prior to furnishing materials or products and installation instructions prior to beginning the installation. Maintain one copy of these documents at the Site until the Project is complete. Incorporate this information into submittals.
  - 2. Incorporate field notes, sketches, recordings, and computations made by the Contractor in record drawings.

#### **1.04 STANDARDS**

- A. Perform Work to comply with local, State and Federal ordinances and regulations.

#### **1.05 PERMITS**

- A. The Owner will obtain construction permits and licenses for highway and railroad crossings and other permits
- B. Retain copies of permits and licenses at the Site and observe and comply with all regulations and conditions of the permit or license, including additional insurance requirements.

- C. Obtain and pay for all other necessary permits including any and all necessary highway, street and road permits for transporting pipe and/or heavy equipment necessary for construction of the Project.
- D. Obtain and pay for other permits necessary to conduct any part of the Work.
- E. Arrange for inspections and certification by agencies having jurisdiction over the Work.
- F. Make arrangements with private utility companies and pay for fees associated with obtaining services, or for inspection fees.

#### 1.06 COORDINATION

- A. Coordinate the Work of various trades having interdependent responsibilities for installing, connecting to, and placing equipment in service.
- B. Coordinate requests for substitutions to provide compatibility of space, operating elements, effect on the Work of other trades, and on the Work scheduled for early completion.
- C. Coordinate the use of Project space and the sequence of installation of equipment, walks, mechanical, electrical, plumbing, or other Work that is indicated diagrammatically on the Drawings.
  - 1. Follow routings shown for tubes, pipes, ducts, conduits, and other items as closely as practical, with due allowance for available physical space.
  - 2. Utilize space efficiently to maximize accessibility for Owner's maintenance and repairs.
  - 3. Schematics are diagrammatic in nature. Adjust routing of piping, ductwork, utilities, and location of equipment as needed to resolve spatial conflicts between the various trades. Document changes in the indicated routings on the record drawings.
- D. Conceal ducts, pipes, wiring, and other non-finish items within construction in finished areas, except as otherwise shown. Coordinate locations of concealed items with finish elements.
- E. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in sequence required to obtain best results.
- F. Make adequate provisions to accommodate items scheduled for later installation, including:
  - 1. Accepted alternates.
  - 2. Installation of products purchased with allowances.
  - 3. Work by others.
  - 4. Owner-supplied, Contractor-installed items.
- G. Sequence, coordinate, and integrate the various elements of mechanical, electrical, and other systems, materials, and equipment. Comply with the following requirements:
  - 1. Coordinate mechanical and electrical systems, equipment, and materials installation with other components.
  - 2. Verify all dimensions by field measurements.

3. Arrange for chases, slots, and openings during progress of construction.
4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components as they are constructed.
5. Install systems, materials, and equipment as permitted by codes to provide the maximum headroom possible where mounting heights are not detailed or dimensioned.
6. Coordinate the connection of systems with exterior underground and overhead utilities and services. Comply with the requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
7. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to the greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Adjust routing of piping, ductwork, utilities, and location of equipment as needed to resolve spatial conflicts between the various trades at no additional cost. Document changes in the indicated routings on the record drawings.
8. Install systems, materials, and equipment level and plumb, parallel and perpendicular to structure's surfaces.
9. Install systems, materials, and equipment to facilitate servicing, maintenance, and repair or replacement of components. As much as practical, connect for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to accessible locations.
10. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

#### 1.07 ACCESS FOR WATER TREATMENT PLANT

- A. Access to the Leonard Water Treatment Plant construction site shall be maintained at all times for persons authorized by the Owner and Leonard Water Treatment Plant CMAR.
- B. Use of state, county, or city roadways for construction traffic shall be subject to approval of the appropriate representatives of each entity. All state, county, or city roadways may not be approved for construction traffic. No additional compensation will be considered because the Contractor is unable to gain access to the easement from all public roadways.
- C. The Contractor shall obtain written approval to use state, county, city or private roads to deliver pipe and/or heavy equipment to the Site. Copies of the written approvals must be furnished to the Owner before Work begins.

#### 1.08 SECURITY FOR WATER TREATMENT PLANT

- A. The Leonard Water Treatment Plant construction site is a secure facility that requires proper authorization and photo identification to access this site. Photo identification badges must be presented at the gate to the security guard for authorization to enter the site. The Contractor shall provide at his/her expense identification badges for all employees.

- B. The identification badge shall contain the following:
  - 1. Photograph of the employee.
  - 2. Name of the employee.
  - 3. Company for which the employee works.
- C. The security badges shall be a minimum size of normal HID security badge. The badge shall be worn in the vertical position with a current photo of the employee and have legible wording. The badges shall be worn above the waist on the outer most layer of clothing and visible at all times while on NTMWD property.
- D. A list of Subcontractors (companies) and their employees shall be provided to the Leonard Water Treatment Plant CMAR and NTMWD for authorization to enter the construction site.
- E. All employees of the Contractor or Subcontractors are required to wear identification badges while on the construction site. Failure to present a proper identification badge to security or display a badge will result in the individual being removed from the site. Contractor's employees are only authorized to enter and leave the plant site via the entrance gate as marked by the Leonard Water Treatment Plant CMAR.
- F. The Contractor shall provide the Leonard Water Treatment Plant CMAR with a communication device (handheld radio, phone, etc.) that will allow the CMAR to communicate with the Leonard Water Treatment Plant CMAR so that deliveries can be authorized to enter the construction site. Deliveries will not be allowed to enter the site without such approval from an authorized representative of the Leonard Water Treatment Plant CMAR.
- G. The Contractor and his Subcontractors shall confine their activities to the immediate Project location. Contractor and his Subcontractors are not allowed outside of the limits of their construction project shown on the Drawings.

#### 1.09 SAFETY REQUIREMENTS

- A. Assume sole responsibility for safety at the Site. Protect the safety and welfare of persons at the Site.
- B. Provide safe access to move through the Site. Provide and maintain barricades, guard rails, covered walkways, and other protective devices to warn and protect from hazards at the Site.
- C. Comply with latest provisions of the Occupational Health and Safety Administrations and other regulatory agencies in performing Work.
- D. Cooperate with accident investigations related to the Site. Provide two copies of all reports prepared concerning accidents, injury, or death on the Site to the Engineer as Record Data per Section 01 33 00 "Submittal Procedures."
- E. If applicable, a risk management program emergency response map and narrative to access sites containing chlorine gas will be distributed during the pre-construction conference. The Contractor's personnel will be required to abide by the plan in the event of an emergency.



#### 1.10 CONTRACTOR'S USE OF SITE

- A. Limit the use of Site for Work and storage to those areas designated on the Drawings or approved by the Engineer. Coordinate the use of the premises with the Engineer and Program Manager.
- B. Repair or correct any damage to existing facilities, including contamination, caused by the Contractor's personnel, visitors, materials, or equipment.
- C. Do not permit alcoholic beverages or illegal substances on the Site. Do not allow persons under the influence of alcoholic beverages or illegal substances to enter or remain on the Site at any time. Persons on Site under the influence of alcoholic beverages or illegal substances will be permanently prohibited from returning to the Site. Criminal or civil penalties may also apply.
- D. Park construction equipment in designated areas only and provide spill control measures as discussed in Paragraph 1.23 "Pollution Control."
- E. Park employees' vehicles in designated areas only.
- F. Obtain written permission of the Owner before entering privately-owned land outside of the Owner's property, rights-of-way, or easements.
- G. Do not allow the use of loud radios, obnoxious, vulgar or abusive language, or sexual harassment in any form. These actions will cause immediate and permanent removal of the offender from the premises. Criminal or civil penalties may apply.
- H. Require Workers to wear clothing that is inoffensive and meets safety requirements. Do not allow sleeveless shirts, shorts, exceedingly torn, ripped or soiled clothing to be worn on the Project.
- I. Do not allow firearms or weapons of any sort to be brought on to the Site under any conditions. No exception is to be made for persons with concealed handgun permits. Remove any firearms or weapons and the person possessing these firearms or weapons permanently and immediately from the Site.

#### 1.11 POINTS OF ACCESS TO THE SITE

- A. Restrict entry into Site to points where the easements cross state and county roads and highways or other publicly owned roads and streets. Keep operations within the easement.
- B. Use state, county, or city roadways for construction traffic only with written approval of the appropriate representatives of each entity. State, county, or city roadways may not all be approved for construction traffic. Obtain written approval to use state, county, city or private roads to deliver pipe and/or heavy equipment to the Site. Copies of the written approvals must be furnished to the Owner as Record Data before Work begins. No additional compensation will be paid because the Contractor is unable to gain access to the easement from public roadways.
- C. Maintain access to the Site at all times. Do not obstruct roads, pedestrian walks, or access to the various buildings, structures, stairways, or entrances. Provide safe temporary walks or other structures to allow access for normal operations during construction.

- D. Provide adequate and safe access for inspections. Leave ladders, bridges, scaffolding and protective equipment in place until inspections have been completed. Construct additional safe access if required for inspections.
- E. Provide security at the construction Site as necessary to protect against vandalism and loss by theft.
- F. Maintain security of the Site and access leading to it.
  - 1. Close gates and keep locked.
  - 2. Obtain permission of any landowners whose property must be crossed in gaining access to the Site.
  - 3. Install a gate lock consisting of a chain with two locks. Give one lock and key to the landowner. Use one lock for the Contractor, Engineer and Owner. Provide keys to the Contractor's lock to Owner and Engineer.
  - 4. At the end of the Project, remove the Contractor's lock from the assembly or leave Owner's lock on gate and give all keys to the Owner.

#### 1.12 PROPERTY PROVISIONS

- A. Make adequate provisions to maintain the flow of storm sewers, drains and water courses encountered during the construction. Restore structures which may have been disturbed during construction to their original position as soon as construction in the area is completed.
- B. Protect trees, fences, signs, poles, guy wires, and all other property unless their removal is authorized. Restore any property damaged to equal or better condition per Paragraph 1.11.
- C. Provide temporary fencing, with gates, to restrain livestock in areas where livestock are pastured unless the Contractor makes satisfactory arrangements with the property owner and/or tenant. Install temporary fence on the easement lines and removed after the trench has been backfilled. Pay damages for losses resulting from failure to maintain such barriers or failure of barriers to exclude livestock. Install temporary fencing on any tract in order to contain construction activities within easement limits if directed by the Owner.

#### 1.13 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

- A. The Drawings show existing piping, valves, manholes, electrical conduits, utility poles, and other facilities based on information from available records. Examine the Site and review the available information concerning the Site.
  - 1. Verify the type, size and location of all existing piping, valves, electrical conduit, telephone cable, and other utilities in the construction area prior to preparation of pipe Shop Drawings. Advise the Engineer of any utilities not shown or incorrectly shown.
  - 2. Verify the type size and location of streets, driveways, fences, drainage structures, sidewalks, curbs, and gutters. Verify the elevations of the structures adjacent to excavations. Report discrepancies between these elevation and elevations shown on the Drawings to the Engineer before beginning construction.

- B. Determine if existing structures, poles, piping, or other utilities at excavations will require relocation or replacement. Prepare a Plan of Action per Section 01 35 00 "Special Procedures." Coordinate Work with Engineer, local utility company and others. Include cost of demolition and replacement, restoration or relocation of these structures in the Contract Price.
- C. Protect buildings, utilities, street surfaces, driveways, sidewalks, curb and gutter, fences, wells, drainage structures, piping, valves, manholes, electrical conduits, and other systems or structures unless they are shown to be replaced or relocated on the Drawings. Restore damage to items to be protected to the satisfaction of the Engineer, Program Manager, utility owner or governing city without additional compensation from the Owner.
- D. Carefully support and protect all structures and/or utilities so that there will be no failure or settlement where excavation or demolition endangers adjacent structures and utilities. Do not take existing utilities out of service unless shown in the Contract Documents or approved by the Engineer. Notify and cooperate with the utility owner if it is necessary to move services, poles, guy wires, pipelines or other obstructions. Include the cost of relocation of existing utilities in the Contract Price.
- E. Protect existing trees and landscaping at the Site.
  - 1. Visit Site with Engineer to identify trees that may be removed during construction.
  - 2. Mark trees to be removed with paint.
  - 3. Protect trees to remain from damage by wrapping trunks with 2 x 4 timbers around the perimeter, securely wired in place, where machinery must operate around existing trees. Protect branches and limbs from damage by equipment.

#### 1.14 DISRUPTION TO SERVICES / CONTINUED OPERATIONS

- A. Existing facilities are to continue in service as usual during the construction unless noted otherwise. Owner or utilities must be able to operate and maintain the facilities. Disruptions to existing utilities, piping, process piping, or electrical services shall be kept to a minimum.
  - 1. Do not restrict access to critical valves, operators, or electrical panels.
  - 2. Do not store materials or products inside structures.
  - 3. Limit operations to the minimum amount of space needed to complete the specified Work.
  - 4. Maintain storm sewers and sanitary sewers in service at all times. Provide temporary service around the construction or otherwise construct the structure in a manner that the flow is not restricted.
- B. Provide a Plan of Action to Engineer and Program Manager in accordance with Section 01 35 00 "Special Procedures" if facilities must be taken out of operation.

#### 1.15 CLEARING AND GRUBBING

- A. Perform all clearing and grubbing necessary for the construction operations within the pipeline easements. Keep clearing of easements to within 2000 feet of the pipe laying operation or as directed by Owner or indicated on the Drawings.
- B. Avoid damage to existing trees outside the permanent easement that are larger than 3 inches in diameter (measured 4 feet above the ground). Protect trees per Paragraph 1.12 of this Section. Obtain approval from the Engineer before removing or trimming any tree larger than 3 inches in diameter located outside the permanent easement.
- C. Remove and dispose of trees, branches, limbs, and roots leaving the right-of-way in a neat and presentable condition. Perform clearing and grubbing without injury or damage to adjacent property. Maintain the blade of equipment used for clearing and grubbing slightly above the ground surface to protect grass roots.
- D. Remove all trees, stumps, slashing, grindings, brush or other debris removed from the Site before beginning construction. Select locations for dumping, acquire required permits and properly dispose of excess material. Do not allow burning without written approval of Engineer.

#### 1.16 FIELD MEASUREMENTS

- A. Perform complete field measurements for products required to fit existing conditions prior to purchasing products or beginning construction.
- B. Verify property lines, control lines, grades, and levels indicated on the Drawings.
- C. Verify pipe class, equipment capacities, existing electrical systems and power sources for existing conditions.
- D. Check Shop Drawings and indicate the actual dimensions available where products are to be installed.
- E. Include field measurements in record drawings as required in Section 01 31 13 "Project Coordination."

#### 1.17 REFERENCE DATA AND CONTROL POINTS

- A. The Engineer or Program Manager will provide the following control points:
  - 1. Base line or grid reference points for horizontal control.
  - 2. Benchmarks for vertical control.
  - 3. Designated control points may be on an existing structure or monument.
- B. Locate and protect control points prior to starting the Work and preserve permanent reference points during construction. Do not change or relocate points without prior approval of the Engineer and Program Manager. Notify Engineer when the reference point is lost, destroyed, or requires relocation. Replace Project control points on the basis of the original survey.
- C. Provide complete engineering layout of the Work needed for construction.

1. Provide competent personnel. Provide equipment including accurate surveying instruments, stakes, platforms, tools, and materials.
2. Provide surveying with accuracy meeting the requirements established for Category 5 Construction Surveying as established in the Manual of Practice of Land Surveying in Texas published by the Texas Society of Professional Surveyors, latest revision.
3. Record Data and measurements per standards.

#### 1.18 CHANGE OF PIPELINE LOCATION

- A. The alignment of the pipeline is shown on the Drawings, and no change is contemplated. It may be necessary to change the alignment due to utility conflicts, unanticipated variations in existing conditions, or for any other reason prior to the time pipe is actually installed.
- B. No additional compensation will be paid to the Contractor except as provided by unit prices, unless excessive cost is incurred that is directly applicable to such changes and this cost is documented in accordance with the General / Supplemental Conditions. No compensation will be paid for specials, field cuts, field welds, or other incurred costs resulting from failure to locate existing utilities prior to manufacture of pipe.

#### 1.19 DELIVERY AND STORAGE

- A. Deliver products and materials to the Site in time to prevent delays in construction.
- B. Deliver packaged products to Site in original undamaged containers with identifying labels attached. Open cartons as necessary to check for damage and to verify invoices. Reseal cartons and store until used. Leave products in packages or other containers until installed.
- C. Deliver products that are too large to fit through openings to the Site in advance of the time enclosing walls and roofs are erected. Set in place, raised above floor on cribs.
- D. Assume full responsibility for the protection and safekeeping of products stored at the Site.
- E. Store products at locations acceptable to the Engineer and Program Manager and to allow Owner access to maintain and operate existing facilities.
- F. Store products in accordance with the Supplier's storage instructions immediately upon delivery. Leave seals and labels intact. Arrange storage to allow access for maintenance of stored items and for inspection. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.
- G. Obtain and pay for the use of any additional storage areas as needed for construction. Store products subject to damage by elements in substantial weather-tight enclosures or storage sheds. Provide and maintain storage sheds as required for the protection of products. Provide temperature, humidity control and ventilation within the ranges stated in the Supplier's instructions. Remove storage facilities at the completion of the Project.
- H. Protect the pipe interior. Keep all foreign materials such as dirt, debris, animals, or other objects out of the pipe during the Work. Cap or plug ends of installed pipe in an approved manner when pipe is not being installed. Wash out pipe sections that become contaminated before continuing with installation. Take precautions to prevent the pipe from floating or moving out of the proper position during or after laying operations. Immediately correct any pipe that moves from its correct positions.

- I. Provide adequate exterior storage for products that may be stored out-of-doors.
  - 1. Provide substantial platforms, blocking, or skids to support materials and products above ground; slope to provide drainage. Protect products from soiling or staining.
  - 2. Cover products subject to dislocation or deterioration from exposure to the elements, with impervious sheet materials. Provide ventilation to prevent condensation below covering.
  - 3. Store loose, granular materials on clean, solid surfaces, or on rigid sheet materials, to prevent mixing with foreign matter.
  - 4. Provide surface drainage to prevent erosion and ponding of water.
  - 5. Prevent mixing of refuse or chemically injurious materials or liquids with stored materials.
  - 6. Pipes and conduits stored outdoors are to have open ends sealed to prevent the entrance of dirt, moisture, and other injurious materials. Protect PVC pipe from ultraviolet light exposure.
  - 7. Store light weight products to prevent wind damage.
- J. Protect and maintain mechanical and electrical equipment in storage.
  - 1. Provide Supplier's service instructions on the exterior of the package.
  - 2. Service equipment on a regular basis as recommended by the Supplier. Maintain a log of maintenance services. Submit the log as Record Data at the completion of the Project.
  - 3. Provide power to and energize space heaters for all equipment for which these devices are provided.
  - 4. Provide temporary enclosures for all electrical equipment, including electrical systems on mechanical devices. Provide and maintain heat in the enclosures until equipment is energized.
- K. Maintain storage facilities. Inspect stored products on a weekly basis and after periods of severe weather to verify that:
  - 1. Storage facilities continue to meet specified requirements.
  - 2. Supplier's required environmental conditions are continually maintained.
  - 3. Surfaces of products exposed to the elements are not adversely affected.
- L. Replace any stored item damaged by inadequate protection or environmental controls.
- M. Payment may be withheld for any products not properly stored.

## 1.20 BLASTING

- A. Blasting for excavations is not allowed. Should blasting be permitted by Owner and the local agency of jurisdiction due to specific circumstances:

1. The Contractor shall assume responsibility for any damage resulting from blasting operations and restore any damaged area to its original condition.
2. The Contractor shall provide provisions in insurance policies specifically covering blasting operations.
3. Blasting shall not be permitted once concrete has been placed in any structure at the Site.
4. Blasting shall be in strict compliance with the local, State and Federal ordinances, laws and safety regulations.

1.21 ARCHAEOLOGICAL AND INADVERTENT DISCOVERY OF NATIVE AMERICAN REMAINS OR UNMARKED BURIALS REQUIREMENTS

- A. Cease operations immediately and contact the Owner for instructions if an historical or archaeological find is made during construction.
- B. Conduct all construction activities to avoid adverse impact on the Sites where significant historical or archaeological sites have been identified at the Site.
  1. Obtain details for working in these areas.
  2. Maintain confidentiality regarding the Site.
  3. Adhere to the requirements of the Texas Historical Commission.
- C. Do not disturb archaeological sites.
  1. Obtain the services of a qualified archaeological specialist to instruct construction personnel on how to identify and protect archaeological finds on an emergency basis.
  2. Coordinate activities to permit archaeological work to take place within the area.
    - a. Attempt to archaeologically clear areas needed for construction as soon as possible.
    - b. Provide a determination of priority for such areas.
- D. Assume responsibility for any unauthorized destruction that might result to such sites by construction personnel, and pay all penalties assessed by the State or Federal agencies for non-compliance with these requirements.
- E. Contract Time will be modified to compensate for delays caused by such archaeological finds. No additional compensation shall be paid for delays.
- F. The CMAR will follow the provisions and requirements of Article 21 of the Agreement-Inadvertent Discovery of Native American Remains or Unmarked Burials.

1.22 STORM WATER POLLUTION CONTROL

- A. Comply with the current requirements of TPDES General Permit No. TXR15000 (General Storm Water Permit) set forth by the Texas Commission on Environmental Quality for the duration of the Project:
  1. Develop a Storm Water Pollution Prevention Plan meeting all requirements of the General Storm Water Permit.

2. Submit of a Notice of Intent to the Texas Commission on Environmental Quality.
  3. Develop and implement appropriate Best Management Practices as established by local agencies of jurisdiction.
  4. Provide all monitoring and/or sampling required for reporting to the Texas Commission on Environmental Quality
  5. Submit reports to the Texas Commission on Environmental Quality as required as a condition of the permit
  6. Submit copies of the reports to the Engineer as Record Data in accordance with Section 01 33 00 "Submittal Procedures."
  7. Retain copies of these documents on-Site at all times for review and inspection by the Owner or regulatory agencies. Post a copy of the permit as required by regulations.
  8. Pay all costs associated with complying with the provisions of the General Storm Water Permit. Assume sole responsibility for implementing, updating, and modifying the General Storm Water Permit per regulatory requirements the Storm Water Pollution Prevention Plan and Best Management Practices.
- B. Use forms required by the Texas Commission on Environmental Quality to file the Notice of Intent. Submit the Notice of Intent at least 2 days prior to the start of construction. Develop the Storm Water Pollution Prevention Plan prior to submitting the Notice of Intent. Provide draft copies of the Notice of Intent, Storm Water Pollution Prevention Plan, and any other pertinent Texas Commission on Environmental Quality submittal documents to Owner for review prior to submittal to the Texas Commission on Environmental Quality.
- C. Return any property disturbed by construction activities to either specified conditions or pre-construction conditions as set forth in the Contract Documents. Provide an overall erosion and sedimentation control system that will protect all undisturbed areas and soil stockpiles/spoil areas. Implement appropriate Best Management Practices and techniques to control erosion and sedimentation and maintain these practices and techniques in effective operating condition during construction. Permanently stabilize exposed soil and fill as soon as practical during the Work.
- D. Assume sole responsibility for the means, methods, techniques, sequences, and procedures for furnishing, installing, and maintaining erosion and sedimentation control structures and procedures and overall compliance with the General Storm Water Permit. Modify the system as required to effectively control erosion and sediment.
- E. Retain copies of reports required by the General Storm Water Permit for 3 years from date of final completion.

#### 1.23 POLLUTION CONTROL

- A. Prevent the contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations. Provide adequate measures to prevent the creation of noxious air-borne pollutants. Prevent dispersal of pollutants into the atmosphere. Do not dump or otherwise discharge noxious or harmful fluids into drains or sewers, nor allow noxious liquids to contaminate public waterways in any manner.



- B. Provide equipment and personnel and perform emergency measures necessary to contain any spillage.
  - 1. Contain chemicals in protective areas and do not dump on soil. Dispose of such materials at off-Site locations in an acceptable manner.
  - 2. Excavate contaminated soil and dispose at an off-Site location if contamination of the soil does occur. Fill resulting excavations with suitable backfill and compact to the density of the surrounding undisturbed soil.
  - 3. Provide documentation to the Owner which states the nature and strength of the contaminant, method of disposal, and the location of the disposal site.
  - 4. Comply with local, State and Federal regulations regarding the disposal of pollutants.
- C. Groundwater or run-off water which has come into contact with noxious chemicals, sludge, or sludge-contaminated soil is considered contaminated. Contaminated water must not be allowed to enter streams or water courses, leave the Site in a non-contained form or enter non-contaminated areas of the Site.
  - 1. Pump contaminated water to holding ponds constructed by the Contractor for this purpose, or discharge to areas on the interior of the Site, as designated by the Engineer.
  - 2. Construct temporary earthen dikes or take other precautions and measures as required to contain the contaminated water and pump to a designated storage area.
  - 3. Wash any equipment used for handling contaminated water or soil within contaminated areas three times with uncontaminated water prior to using such equipment in an uncontaminated area. Dispose of wash water used to wash such equipment as contaminated water.

#### 1.24 EARTH CONTROL

- A. Remove excess soil, spoil materials and other earth not required for backfill at the time of generation within 4 weeks of completing excavation work. Control stock pile material to eliminate interference with Contractor and Owner's operations.
- B. Dispose of excess earth off the Site. Pay cost for disposal unless otherwise noted. Provide written approval by the property owner for all disposal on private property, and approval by the Owner if such disposal affects the use of the easements.
- C. Place excess excavated material and neatly spread on tracts of land on which the pipeline is being constructed and where the property owner requests such material and the Engineer approves.

#### 1.25 MANAGEMENT OF WATER

- A. Manage water resulting from rains or ground water at the Site. Maintain trenches and excavations free of water at all times.
- B. Lower the water table in the construction area by acceptable means if necessary to maintain a dry and workable condition at all times. Provide drains, sumps, casings, well points, and other water control devices as necessary to remove excess water.

- C. Provide continuous operation of water management actions. Maintain standby equipment to provide proper and continuous operation for water management.
- D. Ensure that water drainage does not damage adjacent property. Divert water into the same natural watercourse in which its headwaters are located, or other natural stream or waterway as approved by the Owner. Assume responsibility for the discharge of water from the Site.
- E. Remove the temporary construction and restore the Site in a manner acceptable to the Engineer and to match surrounding material at the conclusion of the Work.

#### 1.26 CLEANING DURING CONSTRUCTION

- A. Provide positive methods to minimize raising dust from construction operations and provide positive means to prevent air-borne dust from discharging into the atmosphere. Control dust and dirt from demolition, cutting, and patching operations.
- B. Clean the Project as Work progresses and dispose of waste materials, keeping the Site free from accumulations of waste or rubbish. Provide containers on the Site for waste collection. Do not allow waste materials or debris to blow off of the Site. Control dust from waste materials. Transport waste materials with as few handlings as possible.
- C. Comply with codes, ordinances, regulations, and anti-pollution laws. Do not burn or bury waste materials. Remove waste materials, rubbish and debris from the Site and legally dispose of these at public or private dumping areas.

#### 1.27 MAINTENANCE OF ROADS, DRIVEWAYS, AND ACCESS

- A. Maintain roads and streets in a manner that is suitable for safe operations of public vehicles during all phases of construction unless the Owner approves a street closing. Submit a written request for Owner's approval of a street closing. The request shall state:
  1. The reason for closing the street.
  2. How long the street will remain closed.
  3. Procedures to be taken to maintain the flow of traffic.
  4. Do not close public roads overnight.
- B. Construct temporary detours, including by-pass roads around construction, with adequately clear width to maintain the free flow of traffic at all times. Maintain barricades, signs, and safety features around the detour and excavations.
- C. Maintain road and driveway access to occupied buildings. Coordinate temporary closures or blockage with property owners, utilities, emergency service providers, Owner and Engineer. Property owners must be notified a minimum of 2 weeks or other time established by Owner prior to closure. Limit the time road or driveways are out of service to that established in the Contract Documents.
- D. Maintain barricades, signs, and safety features around the Work in accordance with all provisions of the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD.)
- E. Assume responsibility for any damage resulting from construction along roads or drives.

## 1.28 CUTTING AND PATCHING

- A. Perform cutting, fitting, and patching required to complete the Work or to:
  - 1. Uncover Work to provide for installation of new Work or the correction of defective Work.
  - 2. Provide routine penetrations of non-structural surfaces for installation of mechanical, electrical, and plumbing work.
  - 3. Uncover Work that has been covered prior to observation by the Engineer.
- B. Submit written notification to the Engineer in advance of performing any cutting which affects:
  - 1. Work of any other contractors or the Owner.
  - 2. Structural integrity of any structure or system of the Project.
  - 3. Integrity or effectiveness of weather exposed or moisture resistant structure or systems.
  - 4. Efficiency, operational life, maintenance, or safety of any structure or system.
  - 5. Appearance of any structure or surfaces exposed occasionally or constantly to view.
- C. The notification shall include:
  - 1. Identification of the Project.
  - 2. Location and description of affected Work.
  - 3. Reason for cutting, alteration, or excavation.
  - 4. Effect on the work of any separate contractor or Owner.
  - 5. Effect on the structural or weatherproof integrity of the Project.
  - 6. Description of proposed Work, including:
    - a. Scope of cutting, patching, or alteration.
    - b. Trades that will perform the Work.
    - c. Products proposed for use.
    - d. Extent of refinishing to be performed.
    - e. Cost proposal, when applicable.
  - 7. Alternatives to cutting and patching.
  - 8. Written authorization from any separate contractor whose work would be affected.
  - 9. Date and time Work will be uncovered or altered.
- D. Examine the existing conditions, including structures subject to damage or to movement during cutting or patching.
  - 1. Inspect conditions affecting installation of products or performance of the Work after uncovering the Work.
  - 2. Provide a written report of unacceptable or questionable conditions to the Engineer.  
The Contractor shall not proceed with Work until Engineer has provided further

instructions. Beginning Work will constitute acceptance of existing conditions by the Contractor.

- E. Protect the structure and other parts of the Work and provide adequate support to maintain the structural integrity of the affected portions of the Work. Provide devices and methods to protect adjacent Work and other portions of the Project from damage. Provide protection from the weather for portions of the Project that may be exposed by cutting and patching Work.
- F. Execute cutting and demolition by methods which will prevent damage to other Work, and will provide proper surfaces to receive installation of repairs.
- G. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
- H. Cut, remove, and legally dispose of selected mechanical equipment, components, and materials as indicated, including but not limited to, the removal of mechanical piping, heating units, plumbing fixtures and trim, and other mechanical items made obsolete by the modified Work.
- I. Restore Work which has been cut or removed. Install new products to provide completed Work per the Contract Documents.
- J. Fit Work air-tight to pipes, sleeves, ducts, conduit, and other penetrations through the surfaces. Where fire rated separations are penetrated, fill the space around the pipe or insert with materials with physical characteristics equivalent to fire resistance requirements of penetrated surface.
- K. Patch finished surfaces and building components using new products specified for the original installation.
- L. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
  - 1. For continuous surfaces, refinish to the nearest intersection.
  - 2. For an assembly, refinish the entire unit.

#### 1.29 PRELIMINARY OCCUPANCY

- A. Owner may deliver, install and connect equipment, furnishings, or other apparatus in buildings or other structures. These actions do not indicate acceptance of any part of the building or structure and does not affect the start of warranties or correction periods.
- B. Protect the Owner's property after installation is complete.
- C. Owner or Engineer may use any product for testing or determine that the product meets the requirements of the Contract Documents. This use does not constitute acceptance by either the Owner or Engineer. These actions do not indicate acceptance of any part of the product and does not affect the start of warranties or correction periods.

#### 1.30 INITIAL MAINTENANCE

- A. Maintain equipment until the Project is accepted by the Owner. Ensure that mechanical equipment is properly maintained as recommended by the Supplier.

- B. Prior to acceptance of equipment, provide maintenance and startup services per Section 01 75 00 "Starting and Adjusting."
- C. Remove and clean screens and strainers in piping systems.
- D. Clean insects from intake louver screens.

**2.00 PRODUCTS**

2.01 MATERIALS

- A. Provide materials in accordance with the requirements of the individual Sections of the Specifications.

**3.00 EXECUTION**

3.01 PERFORMANCE OF THE WORK

- A. Perform the Work per the Supplier's published instructions. Do not omit any preparatory step or installation procedure unless specifically exempted or modified by Field Order.

**END OF SECTION**

## **01 31 13 PROJECT COORDINATION**

### **1.00 GENERAL**

#### **1.01 WORK INCLUDED**

- A. Administer Contract requirements to construct the Project. Provide documentation per the requirements of this Section. Provide information as requested by the Engineer, Program Manager or Owner.

#### **1.02 SUBMITTALS**

- A. Provide submittals in accordance with Section 01 33 00 "Submittal Procedures."

#### **1.03 COMMUNICATION DURING THE PROJECT**

- A. The Engineer is to be the first point of contact for all parties on matters concerning this Project.
- B. The Engineer will coordinate correspondence concerning:
  - 1. Submittals, including Applications for Payment.
  - 2. Clarification and interpretation of the Contract Documents.
  - 3. Contract modifications.
  - 4. Observation of work and testing.
  - 5. Claims.
- C. The Engineer will normally communicate only with the Contractor. Any required communication with Subcontractors or Suppliers will only be with the direct involvement of the Contractor.
- D. Direct written communications to the Engineer at the address indicated at the Pre-Construction Conference. Include the following with communications as a minimum:
  - 1. Name of the Owner.
  - 2. Project name.
  - 3. Contract title.
  - 4. Project number.
  - 5. Date.
  - 6. A reference statement.
- E. Submit communications on the forms referenced in this Section or in Section 01 33 00 "Submittal Procedures."

#### **1.04 PROJECT MEETINGS**

- A. Pre-construction Conference:
  - 1. Attend a pre-construction meeting.

2. The location of the conference will be determined by the Engineer.
3. The time of the meeting will be determined by the Engineer but will be after the Notice of Award is issued and not later than 15 days after the Notice to Proceed is issued.
4. The Owner, Engineer, representatives of utility companies, the Contractor's project manager and superintendent, and representatives from major Subcontractors and Suppliers may attend the meeting.
5. Provide and be prepared to discuss:
  - a. Preliminary construction schedule per Section 01 32 16 "Construction Progress Schedule."
  - b. Preliminary submittal schedule per Section 01 33 00 "Submittal Procedures."
  - c. Schedule of Values and anticipated schedule of payments per Section 01 29 00 "Payment Procedures."
  - d. List of Subcontractors and Suppliers.
  - e. Contractor's organizational chart as it relates to this Project.
  - f. Letter indicating the agents of authority for the Contractor and the limit of that authority with respect to the execution of legal documents, Contract modifications and payment requests.

**B. Progress Meetings**

1. Attend meetings with the Engineer and Owner.
  - a. Meet on a monthly basis or as requested by the Engineer to discuss the Project.
  - b. Meet at the Site or other location as designated by the Engineer.
  - c. Contractor's superintendent and other key personnel are to attend the meeting. Other individuals may be requested to attend to discuss specific matters.
2. Provide information as requested by the Engineer or Owner concerning this Project.
  - a. Prepare to discuss:
    - 1). Status of overall Project schedule.
    - 2). Contractor's detailed schedule for the next month.
    - 3). Anticipated delivery dates for equipment.
    - 4). Coordination with the Owner.
    - 5). Status of submittals.
    - 6). Information or clarification of the Contract Documents.
    - 7). Claims and proposed modifications to the Contract.
    - 8). Field observations, problems, or conflicts.
    - 9). Maintenance of quality standards.
  - b. Notify the Engineer of any specific items to be discussed a minimum of 1 week prior to the meeting.

3. Review minutes of meetings and notify the Engineer of any discrepancies within 10 days of the date of the memorandum.
  - a. Following that date, the minutes will stand as shown or as corrected.
  - b. Corrections will be reflected in the minutes of the following meeting. Issues discussed will be documented and old issues will remain on minutes of subsequent meetings until the issue is resolved.
- C. Pre-submittal and Pre-Installation Meetings:
  1. Attend pre-submittal and pre-installation meetings as required in the individual technical Specification Sections or as determined necessary by the Engineer (for example, instrumentation, roofing, concrete mix design, etc.).
  2. The location of the meeting will be determined by the Engineer.
  3. The time of the meeting will be determined by the Contractor when ready to proceed with the associated work, subject to submission of a Notification by Contractor (NBC) on the form shown in Section 01 31 13.13 "Forms" and acceptance by the Engineer and Owner of the proposed time.
  4. The Owner, Engineer, the Contractor's project manager and superintendent, and representatives from affected Subcontractors and Suppliers shall attend the meeting.

#### 1.05 REQUESTS FOR INFORMATION

- A. Submit Request for Information (RFI) to the Engineer to obtain additional information or clarification of the Contract Documents.
  1. Submit a separate RFI for each item on the form shown in Section 01 31 13.13 "Forms."
  2. Attach adequate information to permit a written response without further clarification. Engineer will return requests that do not have adequate information to the Contractor for additional information. Contractor is responsible for all delays resulting from multiple submittals due to inadequate information.
  3. A response will be made when adequate information is provided. Response will be made on the RFI form or in attached information.
- B. Response to an RFI is given to provide additional information, interpretation, or clarification of the requirements of the Contract Documents, and does not modify the Contract Documents.
- C. Engineer will initiate a Contract Modification Request per Paragraph 1.07 if the RFI indicates that a Contract modification is required.

#### 1.06 NOTIFICATION BY CONTRACTOR

- A. Notify the Engineer of:
  1. Need for testing.
  2. Intent to work outside regular working hours.
  3. Request to shut down facilities or utilities.



4. Proposed utility connections.
  5. Required observation by Engineer or inspection agencies prior to covering Work.
  6. Training.
- B. Provide notification a minimum of 2 weeks in advance in order to allow Owner and Engineer time to respond appropriately to the notification.
- C. Use "Notification by Contractor" form shown in Section 01 31 13.13 "Forms."

#### 1.07 REQUESTS FOR MODIFICATIONS

- A. Submit a request to the Engineer for any change in the Contract Documents.
1. Use the "Contract Modification Request" (Contract Modification Request) form shown in Section 01 31 13.13 "Forms."
  2. Assign a number to the Contract Modification Request when issued.
  3. Include with the Contract Modification Request:
    - a. A complete description of the proposed modification.
    - b. The reason the modification is requested.
    - c. A detailed breakdown of the cost of the change (necessary only if the modification requires a change in Contract Price). The itemized breakdown is to include:
      - 1). List of materials and equipment to be installed.
      - 2). Man hours for labor by classification.
      - 3). Equipment used in construction.
      - 4). Consumable supplies, fuels, and materials.
      - 5). Royalties and patent fees.
      - 6). Bonds and insurance.
      - 7). Overhead and profit.
      - 8). Field office costs.
      - 9). Home office cost.
      - 10). Other items of cost.
    - d. Provide the level of detail outlined in the paragraph above for each Subcontractor or Supplier actually performing the Work if Work is to be provided by a Subcontractor or Supplier. Indicate appropriate Contractor mark ups for Work provided through Subcontractors and Suppliers. Provide the level of detail outlined in the paragraph above for self-performed Work.
    - e. Provide a revised schedule indicating the effect on the critical path for the Project and a statement of the number of days the Project may be delayed by the modification.
  4. Submit a Contract Modification Request to the Engineer to request a field change.

5. A Contract Modification Request is required for all substitutions or deviations from the Contract Documents.
  6. Engineer will evaluate the request for a Contract modification.
- B. Owner will initiate changes through the Engineer.
1. Engineer will prepare a description of proposed modifications to the Contract Documents.
  2. Engineer will use the Contract Modification Request form. Engineer will assign a number to the Contract Modification Request when issued.
  3. Return Contract Modification Request with a proposal to incorporate the requested change. Include a breakdown of costs into materials and labor in the detail outline above to allow evaluation by the Engineer.
- C. Engineer will issue a Field Order or a Change Order per the General Conditions if a Contract modification is appropriate.
1. Modifications to the Contract can only be made by a Field Order or a Change Order.
  2. Changes in the Project will be documented by a Field Order or by a Change Order.
  3. Field Orders may be issued by the Engineer for Contract modifications that do not change the Contract Price or Contract Time.
  4. Any modifications that require a change in Contract Price or Contract Time can only be approved by Change Order.
    - a. Proposals issued by the Contractor in response to a Contract Modification Request will be evaluated by the Engineer.
    - b. If a Change Order is recommended, the Engineer will prepare the Change Order.
    - c. The Change Order will be sent to the Contractor for execution with a copy to the Owner recommending approval.
    - d. Change Orders can only be approved by the Owner.
      - 1). Work performed on the proposed Contract modifications prior to the approval of the Change Order will be performed at the Contractor's risk.
      - 2). No payment will be made for Work on Change Orders until approved by the Owner.
- D. The Contractor may be informed that the Contract Modification Request is not approved and construction is to proceed in accordance with the Contract Documents.

#### 1.08 RECORD DRAWINGS

- A. Maintain at the Site one complete record copy of:
1. Drawings.

2. Specifications.
  3. Addenda.
  4. Contract modifications.
  5. Approved Shop Drawings and Record Data.
  6. One set of construction photographs.
  7. Test records.
  8. Clarifications and other information provided in Request for Information responses.
  9. Reference standards.
- B. Store documents and Samples in the Contractor's field office.
1. Documents are to remain separate from documents used for construction. Do not use these documents for construction.
  2. Provide files and racks for the storage of documents.
  3. Provide a secure storage space for the storage of Samples.
  4. Maintain documents in clean, dry, legible conditions, and in good order.
  5. Make documents and Samples available at all times for inspection by the Engineer and Owner.
- C. Marking Drawings:
1. Label each document as "Project Record" in large printed letters.
  2. Record information as construction is being performed.
    - a. Do not conceal any Work until the required information is recorded.
    - b. Mark Drawings to record actual construction, including the following:
      - 1). Depths of various elements of the foundation in relation to finished first floor datum or the top of walls.
      - 2). Horizontal and vertical locations of underground utilities and appurtenances constructed and existing utilities encountered during construction.
      - 3). Location of internal utilities and appurtenances concealed in the construction. Refer measurements to permanent structure on the surface. Include the following equipment:
        - a). Piping.
        - b). Ductwork.
        - c). Equipment and control devices requiring periodic maintenance or repair.
        - d). Valves, unions, traps, and tanks.
        - e). Services entrance.
        - f). Feeders.
        - g). Outlets.

- 4). Changes of dimension and detail.
  - 5). Changes made by Field Order and Change Order.
  - 6). Details not on the original Drawings. Include field verified dimensions and clarifications, interpretations, and additional information issued in response to Requests for Information.
- c. Mark Specifications and Addenda to identify products provided.
    - 1). Record product name, trade name, catalog number, and each Supplier (with address and phone number) of each product and item of equipment actually installed.
    - 2). Record changes made by Field Order and Change Order.
  - d. Mark additional Work or information in erasable pencil.
    - 1). Use red for new or revised indication.
    - 2). Use purple for Work deleted or not installed (lines to be removed).
    - 3). Highlight items constructed per the Contract Documents in yellow.
  - e. Submit record documents to Engineer for review and acceptance 30 days prior to final completion of the Project.
    - 1). Provide one set of marked up Drawings.
- D. Applications for Payment will not be recommended for payment if record documents are found to be incomplete or not in order. Final payment will not be recommended without complete record documents.

**END OF SECTION**

## **01 31 13.13 FORMS**

### **1.00 GENERAL**

#### **1.01 WORK INCLUDED**

- A. Use the forms shown in this Section for Contract administration, submittals and documentation of test results. A disk with these forms in Microsoft Word or Excel will be provided to the Contractor before or at the pre-construction conference. Forms included are listed below:
- B. Contract Administration Forms:
  - 1. Request for Information.
  - 2. Notification by Contractor.
  - 3. Contractor's Modification Request.
- C. Application for Payment Forms:
  - 1. Consent of Surety Company to Payment Procedures.
  - 2. Application for Payment forms.
- D. Submittal Forms:
  - 1. Submittal Transmittal.
  - 2. Shop Drawing Deviation Request.
  - 3. Concrete Mix Design.
    - a. Attachment "A" – Basis for Mix Design – Field Strength Test Record.
    - b. Attachment "B" – Basis for Mix Design – Trial Mixture.
  - 4. Authorization request for System Shut-Down and Tie-In.
- E. Testing Forms:
  - 1. Medium Voltage Cable Test Report.
  - 2. Motor Start Up Report.
  - 3. Pipeline Test Report Exfiltration Test Report.
  - 4. Pressure Pipe Test Report.
  - 5. Protective Coating Test Report.
  - 6. Switchgear Test Report.
  - 7. Transformer Test Report.
  - 8. 600 Volt Cable Test Report.
- F. Equipment Installation and Documentation Forms:
  - 1. Equipment Installation Report.

2. O&M Manual Review Report.
- G. Project Closeout Forms:
1. Consent of Surety Company to Final Payment.
  2. Consent of Surety Company to Reduction of or Partial Release of Retainage.
  3. Contractor's Affidavit of Payment of Debts and Claims.
  4. Contractor's Affidavit of Release of Liens.

**END OF SECTION**

## **01 32 16 CONSTRUCTION PROGRESS SCHEDULE**

### **1.00 GENERAL**

#### **1.01 REQUIREMENTS**

- A. Prepare and submit to Engineer and Program Manager a Progress Schedule for the Work and update the schedule on a monthly basis for the duration of the Project.
- B. Provide schedule in adequate detail to allow Owner to monitor the Work progress, to anticipate the time and amount of Applications for Payment, and to relate submittal processing to sequential activities of the Work.
- C. Incorporate and specifically designate the dates of anticipated submission of submittals and the dates when submittals must be returned to the Contractor into the schedule.
- D. Assume complete responsibility for maintaining the progress of the Work per the submitted schedule.
- E. Take all requirements of Section 01 35 00 "Special Procedures" into consideration when preparing schedule.

#### **1.02 SUBMITTALS**

- A. Submit Progress Schedules in accordance with Section 01 33 00 "Submittal Procedures." Submit schedules within the following times:
  - 1. Preliminary schedule within 10 days after the Notice of Award. The schedule is to be available at the pre-construction conference.
  - 2. Detailed schedule at least 10 days prior to the first payment request.
- B. Submit Progress Schedules with Applications for Payment. Schedules may be used to evaluate the Applications for Payment. Failure to submit the schedule may cause delay in the review and approval of Applications for Payment.

#### **1.03 SCHEDULE REQUIREMENTS**

- A. Schedule is to be in adequate detail to:
  - 1. Assure adequate planning, scheduling, and reporting during the execution of the Work.
  - 2. Assure the coordination of the Work of the Contractor and the various Subcontractors and Suppliers.
  - 3. Assist in monitoring the progress of the Work.
  - 4. Assist in evaluating proposed changes to Contract Time and Project schedule.
  - 5. Assist the Owner in review of Contractor's Application for Payment.
- B. Provide personnel with 5 years minimum experience in scheduling construction work comparable to this Project.
- C. Provide the schedule in the form of a time scaled horizontal bar chart which indicates graphically the Work scheduled at any time during the Project. The graph is to indicate:

1. Complete sequence of construction by activity.
  2. Identification of the activity by structure, location, and type of Work.
  3. Chronological order of the start of each item of Work.
  4. The activity start and stop dates.
  5. The activity duration.
  6. Successor and predecessor relationships for each activity. Group related activities or use lines to indicate relationships.
  7. A clearly indicated critical path. Indicate only one critical path on the schedule. The subsystem with the longest time of completion is the critical path where several subsystems each have a critical path. Float time is to be assigned to other subsystems.
  8. Projected percentage of completion, based on dollar value of the Work included in each activity as of the day Applications for Payment are due, for each month.
- D. Submit to Engineer and Program Manager a separate submittal schedule indicating the dates when the submittals are to be sent to the Engineer.
1. List specific dates submittal is to be sent to the Engineer.
  2. List specific dates submittal must be processed in order to meet the proposed schedule.
  3. Allow a reasonable time to review submittals, taking into consideration the size and complexity of the submittal, the submission of other submittals, and other factors that may affect review time.
  4. Allow time for re-submission of the submittals for each item. Contractor is responsible for delays associated with additional time required to review incomplete or erroneous submittals and for the time lost when submittals are submitted for products that do not meet the requirements of the Specifications.
- E. Update the schedule at the end of each monthly partial payment period to indicate the progress made on the Project to that date.

#### 1.04 SCHEDULE REVISIONS

- A. Submit to Engineer and Program Manager a written report if the schedule indicates that the Project is more than 30 days behind schedule. The report is to include:
1. Number of days Project is behind schedule.
  2. Narrative description of the steps to be taken to bring the Project back on schedule.
  3. Anticipated time required to bring the Project back on schedule.
- B. Submit to Engineer and Program Manager a revised schedule indicating the action that the Contractor proposes to take to bring the Project back on schedule.
- C. Revise the schedule to indicate any adjustments in Contract Time approved by Change Order.



1. Revised schedule is to be included with Contract Modification Request for which an extension of time is requested.
  2. Failure to submit a revised schedule indicates that the modification shall have no impact on the ability of the Contractor to complete the Project on time and that the cost associated with the change of additional plant or work force have been included in the cost proposed for the modification.
- D. Updating the Project schedule to reflect actual progress is not considered a revision to the Project schedule.
- E. Applications for Payment will not be recommended for payment without a revised schedule, and if required, the report indicating the Contractor's plan for bringing the Project back on schedule.

#### 1.05 FLOAT TIME

- A. Define float time as the amount of time between the earliest start date and the latest start date of a chain of activities on the construction schedule.
- B. Float time is not for the exclusive use or benefit of either the Contractor or Owner.
- C. Contract Time cannot be changed by the submission of this schedule. Contract Time can only be modified by approved Change Order.
- D. Schedule completion date must be the same as the Contract completion date. Time between the end of construction and the Contract completion date is to be indicated as float time.

**END OF SECTION**

## **01 32 34 VIDEO AND PHOTOGRAPHIC DOCUMENTATION**

### **1.00 GENERAL**

#### **1.01 WORK INCLUDED**

- A. Provide a video recording of the Site prior to the beginning of construction.
  - 1. Record the condition of all existing facilities in or abutting the construction area (right-of-way) including but not limited to streets, curb and gutter, utilities, driveways, fencing, landscaping, etc. per Paragraph 2.02.
  - 2. Record after construction staking is complete but prior to any clearing.
  - 3. Provide one copy of the recording, dated and labeled to the Engineer before the start of construction. Provide additional recording as directed by the Engineer if the recording provided is not considered suitable for the purpose of recording pre-existing conditions. The submitted video must be approved by the Engineer prior to start of any clearing operations.
- B. Furnish an adequate number of photographs of the Site to clearly depict the completed Project.
  - 1. Provide a minimum of ten different views.
  - 2. Photograph a panoramic view of the entire Site.
  - 3. Photograph all significant areas of completed construction.
  - 4. Completion photographs are not to be taken until all construction trailers, excess materials, trash and debris have been removed.
  - 5. Employ a professional photographer approved by the Engineer to photograph the Project.
  - 6. Provide one aerial photograph of the Site from an angle and height to include the entire Site while providing adequate detail.
- C. All photographs, video recordings and a digital copy of this media are to become the property of the Owner. Photographs or recordings may not be used for publication, or public or private display without the written consent of the Owner.

#### **1.02 QUALITY ASSURANCE**

- A. Provide clear photographs and recordings taken with proper exposure. View photographs and recordings in the field and take new photographs or recordings immediately if photos of an adequate print quality cannot be produced or video quality is not adequate. Provide photographs with adequate quality and resolution to permit enlargements.

#### **1.03 SUBMITTALS**

- A. Submit two DVDs of the video recording as Record Data in accordance with Section 01 33 00 "Submittal Procedures."

- B. Submit Photographic Documentation as Record Data in accordance with Section 01 33 00 "Submittal Procedures."

## **2.00 PRODUCTS**

### **2.01 PHOTOGRAPHS**

- A. Provide photographs in digital format with a minimum resolution of 1280 x 960, accomplished without a digital zoom.
- B. Take photographs at locations acceptable to the Engineer.
- C. Provide two color prints of each photograph and a digital copy on a DVD of the photographs taken.
- D. Identify each print on back with:
  - 1. Project name.
  - 2. Date, time, location, and orientation of the exposure.
  - 3. Description of the subject of photograph.
- E. Submit photograph in clear plastic sheets designed for photographs. Place only one photograph in each sheet to allow the description on the back to be read without removing the photograph.
- F. Final photographs are to include two 8-by-10-inch glossy color prints for each of ten photographs selected by the Owner. These photographs are in addition to normal prints.

### **2.02 VIDEO RECORDING**

- A. Provide digital format on DVD that can be played with Windows Media Player in common format in full screen mode.
- B. Identify Project on video by audio or visual means.
- C. Video file size should not exceed 400 MB.
- D. Video resolution shall be 1080p.
- E. The quality of the video must be sufficient to determine the existing conditions of the construction area. Camera panning must be performed while at rest, do not pan the camera while walking or driving. Camera pans should be performed at intervals sufficient to clearly view the entire construction area (100-foot maximum interval).
- F. DVD shall be labeled with construction stationing and stationing should be called out, voice recorded, in the video.
- G. The entire construction area recording shall be submitted at once. Sections submitted separately will not be accepted.
- H. Pipeline projects should be recorded linearly from beginning to end.
- I. Pump Stations, Ground Storage tanks, water treatment plants and other Site components shall be video recorded in an organized sequential order with major components identified.

- J. Submit DVD in a hard plastic case, clearly label the date(s) the DVD was made, the Project name and Owner's Project number. If there is more than one DVD, then indicate number as 1 of 2, 2 of 2, etc.

**END OF SECTION**

**01 33 00 SUBMITTAL PROCEDURES**

**1.00 GENERAL**

**1.01 WORK INCLUDED**

- A. Submit documentation as required by the Contract Documents and as reasonably requested by the Owner or Engineer to:
  - 1. Record the products incorporated into the Project for the Owner.
  - 2. Provide information for operation and maintenance of the Project.
  - 3. Provide information for the administration of the Contract.
  - 4. Allow the Engineer to advise the Owner if products proposed for the Project by the Contractor conform, in general, to the design concepts of the Contract Documents.
- B. Submittals of documentation to the Program Manager is also required where specifically indicated.
- C. Contractor's responsibility for full compliance with the Contract Documents is not relieved by the Engineer's review of submittals. Contract modifications may only be approved by Change Order or Field Order.

**1.02 CONTRACTOR'S RESPONSIBILITIES**

- A. Review all submittals prior to submission.
- B. Determine and verify:
  - 1. Field measurements.
  - 2. Field construction requirements.
  - 3. Location of all existing structures, utilities and equipment related to the submittals.
  - 4. Submittals are complete for their intended purpose.
  - 5. Conflicts between the submittals related to the various Subcontractors and Suppliers have been resolved.
  - 6. Quantities and dimensions shown on the submittals.
- C. Submit information per the procedures described in this Section and the detailed Specifications.
- D. Furnish the following submittals:
  - 1. As specified in the Section 01 33 00.01 Table of Required Submittals and as revised during detailed design. The preliminary Table of Required Submittals is provided to allow the CMAR to estimate the level of effort required in determining fees. Provision are to be made for some variation is the actual list of submittals and CMAR should include allowances for these variations in the Contract Price.
  - 2. Schedules, data and other documentation as described in detail in this Section or referenced in the General Conditions.

3. Documentation required for the administration of the Contract per Section 01 31 13 "Project Coordination."
  4. Shop Drawings required for consideration of a Contract modification per Paragraph 1.08.
  5. Submittals as required in the Specifications.
  6. Submittals not required will be returned without Engineer's review.
- E. Submit a schedule indicating the date submittals will be sent to the Engineer and proposed dates that the product will be incorporated into the Project. Make submittals promptly in accordance with the schedule so as to cause no delay in the Project.
1. Send submittals to the Engineer allowing a reasonable time for delivery, review and marking submittals. Include time for review of a resubmission if necessary. Allow adequate time for the submittal review process, ordering, fabrication, and delivery of the product so as to not delay progress on the Project.
  2. Schedule submittal to provide all information for interrelated Work at one time. No review will be performed on submittals requiring coordination with other submittals. Engineer will return submittals for resubmission as a complete package.
- F. Submit information for all of the components and related equipment required for a complete and operational system in the same submittal.
1. Include electrical, mechanical, and other information required to indicate how the various components of the system function.
  2. Provide certifications, warranties, and written guarantees with the submittal package for review when they are required.
- G. Fabrication or installation of any products prior to the approval of Shop Drawings is done at the Contractor's risk. Products not meeting the requirements of Contract Documents are defective and may be rejected at the Owner's option.
- H. Payment will not be made for products for which submittals are required until the submittals have been received. Payment will not be made for products for which Shop Drawings or Samples are required until these are approved by the Engineer.

### 1.03 QUALITY ASSURANCE

- A. Submit legible, accurate, complete documents presented in a clear, easily understood manner. Submittals not meeting these criteria will be returned without review.
- B. Demonstrate that the proposed products are in full and complete compliance with the design criteria and requirements of the Contract Documents including Drawings and Specifications as modified by Addenda, Field Orders, and Change Orders.
- C. Furnish and install products that fully comply with the information included in the submittal.
- D. Review and approve submittals prior to submitting them to the Engineer for review. Submittals will not be accepted from anyone other than the Contractor.

#### 1.04 SUBMITTAL PROCEDURES

- A. Deliver submittals to the Engineer to the address provided at the pre-construction conference. Deliver submittals to the Program Manager to the address below:
- Freese and Nichols, Inc.  
Attention: Jane Jenks  
2711 N. Haskell Ave., Suite 3300  
Dallas, TX 75204  
Reference Project: NTD14624
- B. Transmit all submittals, with a properly completed Submittal Transmittal Form as indicated in Section 01 31 13.13 "Forms."
1. Use a separate transmittal form for each specific product, class of material, and equipment system.
  2. Submit items specified in different Sections of the Specifications separately unless they are part of an integrated system.
- C. Assign a Contractor's submittal number to the documents originated to allow tracking of the submittal during the review process.
1. Assign the number consisting of a prefix, a sequence number, and a letter suffix. Prefixes shall be as follows:

<b>Prefix</b>	<b>Description</b>	<b>Originator</b>
AP	Application for Payment	Contractor
CO	Change Order	Engineer
CMR	Contract Modification Request	Contractor
CTR	Certified Test Report	Contractor
EIR	Equipment Installation Report	Contractor
FO	Field Order	Engineer
NBC	Notification by Contractor	Contractor
O&M	Operation & Maintenance Manuals	Contractor
PD	Photographic Documentation	Contractor
RD	Record Data	Contractor
RFI	Request for Information	Contractor
SAM	Sample	Contractor
SD	Shop Drawing	Contractor
SCH	Schedule of Progress	Contractor

2. Issue sequence numbers in chronological order for each type of submittal.

3. Issue numbers for resubmittals that have the same number as the original submittal followed by an alphabetical suffix indicating the number of times the same submittal has been sent to the Engineer for processing. For example: SD 025 A represents a shop drawing that is the twenty-fifth submittal of this type and is the second time this submittal has been sent for review.
  4. Clearly note the submittal number on each page or sheet of the submittal.
  5. Correct assignment of numbers is essential since different submittal types are processed in different ways.
- D. Submit documents with uniform markings and page sizes.
1. Paper size shall allow for ease of reproduction.
    - a. Submit documents on 8-1/2 x 11 paper where practical.
    - b. Use 11 x 17 paper for larger drawings and schematics.
    - c. Use full size sheets for fabrications and layout drawings. Reproducible drawings may be submitted in lieu of prints.
  2. Mark submittals to:
    - a. Indicate Contractor's corrections in green.
    - b. Highlight items pertinent to the products being furnished in yellow and delete items that are not pertinent when the Supplier's standard drawings or information sheets are provided.
    - c. Cloud items and highlight in yellow where selections by the Engineer or Owner are required.
    - d. Mark dimensions with the prefix FD to indicate field verified dimensions on the Drawings.
    - e. Provide a blank 8-by-3-inch space for Contractor's and Engineer's stamp.
  3. Define abbreviations and symbols used in Shop Drawings.
    - a. Use terms and symbols in Shop Drawings consistent with the Drawings.
    - b. Provide a list of abbreviations and their meaning as used in the Shop Drawings.
    - c. Provide a legend for symbols used on Shop Drawings.
- E. Mark submittals to reference the Drawing number and/or Section of the Specifications, detail designation, schedule or location that corresponds with the data submitted. Other identification may also be required, such as layout drawings or schedules to allow the reviewer to determine where a particular product is to be used.
- F. Deliver Samples required by the Specifications to the Site. Provide a minimum of two Samples.
- G. Construct mock-ups from the actual products to be used in construction per the Specifications.



- H. Submit color charts and Samples for every product requiring color, texture or finish selection.
1. Submit all color charts and Samples at one time.
  2. Do not submit color charts and Samples until all Record Data have been submitted or Shop Drawings for the products have been approved.
  3. Submit color charts and Samples not less than 30 days prior to when these products are to be ordered or released for fabrication to comply with the schedule for construction of the Project.
- I. Submit Contract Modification Request per Section 01 31 13 "Project Coordination" to request modifications to the Contract Documents.
- J. The number of copies of each submittal to be sent by the Contractor and the number of copies of each submittal to be returned are:

<b>Prefix</b>	<b>Description</b>	<b>No. of Copies Sent</b>	<b>No. of Copies Returned</b>
AP	Application for Payment	4	1
CMR	Contract Modification Request	4	1
CTR	Certified Test Report	3	0
EIR	Equipment Installation Report	3	0
NBC	Notification by Contractor	3	1
O&M	Preliminary O&M Manuals	4	1
O&M	Final O&M Manuals	4	0
PD	Photographic Documentation	2	0
RD	Record Data	3	0
RFI	Request for Information	3	1
SAM	Sample	2	0
SD	Shop Drawings	4	1
SCH	Schedule of Progress	3	0

- K. Submit an electronic copy of each submittal to Engineer. Submit an electronic copy of those submittals specifically required for the Program Manager. Further directions as the procedures for the submittals and location of where to send the submittals shall be provided at the pre-construction conference. The complete contents of each submittal, including associated drawings, Product Data, etc. shall be submitted in Adobe Acrobat PDF format or other format approved by Engineer.

#### 1.05 REVIEW PROCEDURES

- A. Shop Drawings are reviewed in the order received, unless Contractor request that a different priority be assigned.

- B. Mark a submittal as "Priority" to place the review for this submittal ahead of submittals previously delivered. Priority submittals will be reviewed before other submittals for this Project which have been received but not reviewed. Use discretion in the use of "Priority" submittals as this may delay the review of submittals previously submitted. Revise the Schedule of Contractor's Submittals for substantial deviations from the previous schedule.
- C. Review procedures vary with the type of submittal as described in Paragraph [1.06].

#### 1.06 SUBMITTAL REQUIREMENTS

- A. Shop Drawings are required for those products that cannot adequately be described in the Contract Documents to allow fabrication, erection or installation of the product without additional detailed information from the Supplier.
  - 1. Shop Drawings are requested so that the Engineer can:
    - a. Assist the Owner in selecting colors, textures or other aesthetic features.
    - b. Compare the proposed features of the product with the specified features so as to advise the Owner that the product does, in general, conform to the Contract Documents.
    - c. Compare the performance features of the proposed product with those specified so as to advise the Owner that it appears that the product will meet the designed performance criteria.
    - d. Review required certifications, guarantees, warranties, and service agreements for compliance with the Contract Documents.
  - 2. Certify that Contractor has reviewed the Shop Drawings and made all necessary corrections such that the products, when installed, will be in full compliance with the Contract Documents per Section 00 73 00 "Supplementary Conditions." Shop Drawings submitted without this certification will be returned without review.
- B. Furnish the following Submittals:
  - 1. Products as indicated in Section 01 33 00.01 "Table of Required Submittals."
  - 2. When a substitution or equal product is proposed in accordance with Paragraph 1.08 of this Section.
  - 3. Shop Drawings required for consideration of a Contract modification per Paragraph 1.07.
  - 4. When a substitution or equal product is proposed in accordance with Paragraph 1.08 of this Section.
- C. Include a complete description of the material or equipment to be furnished. Information is to include:
  - 1. Type, dimensions, size, arrangement, model number, and operational parameters of the components.
  - 2. Weights, gauges, materials of construction, external connections, anchors, and supports required.

3. Performance characteristics, capacities, engineering data, motor curves, and other information necessary to allow a complete evaluation of mechanical components.
  4. All applicable standards such as ASTM or Federal specification numbers.
  5. Fabrication and installation drawings, setting diagrams, manufacturing instructions, templates, patterns, and coordination drawings.
  6. Wiring and piping diagrams and related controls.
  7. Mix designs for concrete, asphalt, or other materials proportioned for the Project.
  8. Complete and accurate field measurements for products which must fit existing conditions. Indicate on the submittal that the measurements represent actual dimensions obtained at the Site.
- D. Provide all required statements of certification, guarantees, extended service agreements, and other related documents with the Shop Drawing. The effective date of these documents shall be the date of acceptance of the Work by the Owner.
- E. Comments will be made on items called to the attention of the Engineer for review and comment. Any marks made by the Engineer do not constitute a blanket review of the submittal or relieve the Contractor from responsibility for errors or deviations from the Contract requirements.
1. Submittals that are reviewed will be returned with one or more of the following designations:
    - a. Approved: Submittal is found to be acceptable as submitted.
    - b. Approved as Noted: Submittal is acceptable with corrections or notations made by Engineer and may be used as corrected.
    - c. Revise and Resubmit: Submittal has deviations from the Contract Documents, significant errors, or is inadequate and must be revised and resubmitted for subsequent review.
    - d. Not Approved: Products are not acceptable.
  2. Drawings with a significant or substantial number of markings by the Contractor may be marked "Approved as Noted" and "Revise and Resubmit". These drawings are to be revised to provide a clean record of the submittal.
  3. Dimensions or other data that do not appear to conform to the Contract Documents will be marked as "At Variance With" (AVW) the Contract Documents or other information provided. The Contractor is to make revisions as appropriate to comply with Contract Documents.
- F. Certifications, Warranties and Service Agreements include documents as specified in the detailed Specifications, as shown in the submittal schedule or as follows:
1. Certified Test Reports (CTR): A report prepared by an approved testing agency giving results of tests performed on products to indicate their compliance with the specifications (refer to Section 01 40 00 "Quality Requirements").

2. Certification of Local Field Service (CLS): A certified letter stating that field service is available from a factory or Supplier approved service organization located within a 300 mile radius of the Site. List names, addresses, and telephone numbers of approved service organizations on or attach to the certificate.
  3. Extended Warranty (EW): A guarantee of performance for the product or system beyond the normal 1 year correction period described in the General Conditions. Issue the warranty certificate in the name of the Owner.
  4. Extended Service Agreement (ESA): A Contract to provide maintenance beyond that required to fulfill requirements for warranty repairs, or to perform routine maintenance for a definite period of time beyond the warranty period. Issue the service agreement in the name of the Owner.
  5. Certification of Adequacy of Design (CAD): A certified letter from the manufacturer of the equipment stating that they have designed the equipment to be structurally stable and to withstand all imposed loads without deformation, failure, or adverse effects to the performance and operational requirements of the unit. The letter shall state that mechanical and electrical equipment is adequately sized to be fully operational for the conditions specified or normally encountered by the product's intended use.
  6. Certification of Applicator/Subcontractor (CSQ): A certified letter stating that the Subcontractor or Supplier proposed to perform a specified function is duly designated as factory authorized and trained for the application of the specified product.
- G. Submit Record Data to provide information to allow the Owner to adequately identify the products incorporated into the Project and allow replacement or repair at some future date.
1. Provide Record Data for all products. Record Data is not required for items for which Shop Drawings and/or operations and maintenance manuals are required.
  2. Provide information only on the specified products. Submit a Contract Modification Request for approval of deviations or substitutions and obtain approval by Field Order or Change Order prior to submitting Record Data.
  3. Provide the same information required for Shop Drawings.
  4. Record Data will be received by the Engineer, logged, and provided to Owner for the Project record.
    - a. Record Data may be reviewed to see that the information provided is adequate for the purpose intended. Inadequate drawings will be returned as unacceptable.
    - b. Record Data is not reviewed for compliance with the Contract Documents. Comments may be returned if deviations from the Contract Documents are noted during the cursory review performed to see that the information is adequate.
- H. Provide Samples for comparison with products delivered to the Site for use on the Project.
1. Samples shall be of sufficient size and quantity to clearly illustrate the functional characteristics of the product, with integrally related parts and attachment devices.
  2. Indicate the full range of color, texture, and patterns.

3. Dispose of Samples when related Work has been completed and approved, and disposal is requested by the Engineer. At Owner's option Samples will become the property of the Owner.
- I. Construct mock-ups for comparison with the Work being performed.
    1. Construct mock-ups of the size or area indicated in the detailed Specifications.
    2. Construct mock-ups complete with texture and finish to represent the finished product.
    3. Protect mock-ups until Work has been completed and accepted by the Owner.
    4. Dispose of mock-ups when related Work has been completed and disposal is approved by the Engineer.
  - J. Submit Operation and Maintenance manuals (O&M) for all equipment, mechanical devices, or components described in the Contract Documents per Section 01 78 23 "Operation and Maintenance Data." Include copies of approved Shop Drawings in the manual.
  - K. Submit Request for Information (RFI) in accordance with Section 01 31 13 "Project Coordination."
  - L. Submit a Schedule of Values and Application for Payment (AP) in accordance with Section 01 29 00 "Payment Procedures."
  - M. Submit Progress Schedules (SCH) in accordance with Section 01 32 16 "Construction Progress Schedules."
  - N. Submit Certified Test Reports (CTR) from independent testing laboratories in accordance with Section 01 40 00 "Quality Requirements."
    1. Submit test reports for material fabricated for this Project with Shop Drawings for that product.
    2. Submit test reports produced at the point of production for standard production products with the Record Data for that product.
  - O. Submit a list of Suppliers and Subcontractors as Record Data in accordance with Section 01 31 13 "Project Coordination."
  - P. Submit Equipment Installation Reports (EIR) in accordance with Section 01 75 00 "Starting and Adjusting."
  - Q. Submit Notifications by Contractor (NBC) in accordance with Section 01 31 13 "Project Coordination."
  - R. Submit Photographic Documentation (PD) in accordance with Section 01 32 34 "Video and Photographic Documentation."
  - S. Submit Process Performance Bonds (PPB) in accordance with Section 00 73 00 "Supplementary Conditions" and the detailed equipment Specifications.

#### 1.07 REQUESTS FOR DEVIATION

- A. Submit requests for deviations from the Contract Documents for any product that does not fully comply with the Contract Documents.

- B. Submit request for deviations by Contract Modification Request (CMR) per Section 01 31 13 "Project Coordination." Identify the deviations and the reason the change is requested.
- C. Include the amount if cost savings to the Owner for deviations that result in a reduction in cost. A Change Order or Field Order will be issued by the Engineer for deviations approved by the Owner if deviations are requested after the Guaranteed Maximum Price has been established.
- D. . Deviations from the Contract Documents may only be approved by Change Order or Field Order.

#### 1.08 SUBMITTALS FOR EQUAL NON SPECIFIED PRODUCTS

- A. The products of the listed Suppliers are to be furnished where detailed Specifications list several manufacturers but do not specifically list "or equal" or "or approved equal" products. Use of any products other than those specifically listed is a substitution and must be approved per Paragraph 1.09.
- B. Contractor may submit other manufacturers' products that are in full compliance with the Specifications where the detailed Specifications list one or more manufacturers followed by the phrase "or equal" or "or approved equal".
  - 1. Submit Shop Drawings of adequate detail to document that the proposed product is equal or superior to the specified product.
  - 2. Prove that the product is equal. It is not the Engineer's responsibility to prove the product is not equal.
    - a. Indicate on a point by point basis for each specified feature that the product is equal to the Contract Document requirements.
    - b. Make a direct comparison with the specified manufacturer's published data sheets and available information. Provide this printed material with the submittal.
    - c. The decision of the Engineer regarding the acceptability of the proposed product is final.
  - 3. Provide a typewritten certification that, in furnishing the proposed product as an equal, the Contractor:
    - a. Has thoroughly examined the proposed product and has determined that it is equal or superior in all respects to the product specified.
    - b. Has determined that the product will perform in the same manner as the specified product.
    - c. Will provide the same warranties and/or bonds as for the product specified.
    - d. Will assume all responsibility to coordinate any modifications that may be necessary to incorporate the product into the Work and will waive all claims for additional materials or effort which may be necessary to incorporate the product into the Project.
    - e. Will maintain or improve the delivery and installation schedule as for the specified product.

4. A modification request is not required for any product that is in complete compliance with the Contract Documents.

#### 1.09 SUBMITTALS FOR SUBSTITUTIONS

- A. Substitutions are defined as any product that the Contractor proposes to provide for the Project in lieu of the specified product.
- B. Submit the following for consideration of approval of a Supplier or product which is not specified:
  1. Contract Modification Request for deviation from the Contract Documents per Paragraph 1.07.
  2. Prove that the product is acceptable as a substitute. It is not the Engineer's responsibility to prove the product is not acceptable as a substitute.
    - a. Indicate on a point by point basis for each specified feature that the product is acceptable to meet Contract Documents requirements.
    - b. Make a direct comparison with the specified Supplier's published data sheets and available information. Provide this printed material with the submittal.
    - c. The decision of the Engineer and Program Manager regarding the acceptability of the proposed substitute product is final.
  3. Provide a typewritten certification that, in making the substitution request, the Contractor:
    - a. Has determined that the substituted product will perform in substantially the same manner and result in the same ability to meet the specified performance as the specified product.
    - b. Will provide the same warranties and/or bonds for the substituted product as specified or as would be provided by the manufacturer of the specified product.
    - c. Will assume all responsibility to coordinate any modifications that may be necessary to incorporate the substituted product into the Project and will waive all claims for additional Work which may be necessary to incorporate the substituted product into the Project which may subsequently become apparent.
    - d. Will maintain the same time schedule as for the specified product.
- C. Pay engineering cost for review of substitutions.
  1. Cost for additional review time will be billed to the Owner by the Engineer for the actual hours required for the review and marking of Shop Drawings by Engineer and in accordance with the rates listed if this request is made after the Guaranteed Maximum Price has been established.
  2. Cost for the additional review shall be paid to the Owner by the Contractor on a monthly basis.

#### 1.10 WARRANTIES AND GUARANTEES

- A. Submit warranties and guarantees required by the Contract Documents with the Shop Drawings or Record Data.
- B. Provide additional copies for equipment and include this additional copy in the Operation and Maintenance Manuals. Refer to Section 01 78 23 "Operation and Maintenance Data."
- C. Provide a separate manual for warranties and guarantees.
  - 1. Provide a log of all products for which warranties or guarantees are provided, and for all equipment. Index the log by Specification Section number on forms provided by the Engineer.
  - 2. Indicate the start date, warranty or guarantee period and the date upon which the Warranty or guarantee expires for product or equipment which a warranty or guarantee is required.
  - 3. Indicate the date for the start of the correction period specified in the General Conditions for each piece of equipment and the date on which the specified correction period expires.
  - 4. Provide a copy of the warrantee or guarantee under a tab indexed to the log.

#### 1.11 RESUBMISSION REQUIREMENTS

- A. Make all corrections or changes in the submittals required by the Engineer and resubmit until approved.
- B. For Shop Drawings:
  - 1. Revise initial drawings or data and resubmit as specified for the original submittal.
  - 2. Highlight in yellow those revisions which have been made in response to the first review by the Engineer.
  - 3. Highlight in blue any new revisions which have been made or additional details of information that has been added since the previous review by the Engineer.
- C. For Samples:
  - 1. Submit new Samples as required for the initial Sample.
  - 2. Remove Samples which have been rejected.
- D. For mock ups:
  - 1. Construct a new mock up as initially required.
  - 2. Dispose of mock ups which have been rejected.
- E. Engineering cost for excessive review of Shop Drawings will be paid by the Contractor.
  - 1. Excessive review of Shop Drawings is defined as any review required after the original review has been made and the first resubmittal has been checked to see that corrections have been made.



2. Cost for additional review time will be billed to the Owner by the Engineer for the actual hours required for the review and marking of Shop Drawings by Engineer and in accordance with the rates listed
3. Pay cost for the additional review to the Owner on a monthly basis as billed by the Owner.
4. Need for more than one resubmission or any other delay of obtaining Engineer's review of submittals, will not entitle the Contractor to an extension of Contract Time. All costs associated with such delays shall be at the Contractor's expense.

1.12 ENGINEER'S DUTIES

- A. Review the submittals and return with reasonable promptness.
- B. Affix stamp, indicate approval, rejection, and the need for resubmittal.
- C. Distribute documents

**END OF SECTION**

## **01 33 00.01 TABLE OF REQUIRED SUBMITTALS**

### **1.00 GENERAL**

#### **1.01 REQUIRED SUBMITTALS**

- A. The following tabulation list the submittals required for each Submittal Section. Each Section of the Specifications may provide more detailed information regarding the data to be provided for each product, materials, equipment or component required by the Section. Provide additional documentation as required by the Contract Documents in accordance with Section 01 33 00 "Submittal Procedures" and each Section and as reasonably requested by the Owner, Engineer and Program Manager.
- B. Incorporate each submittal in the Construction Schedule and Indicate the date each submittal is anticipated to be submitted.
- C. The tabulation list of the submittals required will be provided prior to the initiation of Work at the preconstruction conference.

<b>SUBMITTAL SCHEDULE</b>	
<b>Spec Number</b>	<b>Description</b>
	Shop Drawing
	Sample
	Certified Test Report
	Certification of Local Field Service
	Extended Warranty
	Extended Service Agreement
	Certificate of Adequacy of Design
	Certification of Applicator/Subcontractor
	Record Data
	Operation and Maintenance Manuals
	Equipment Installation Report
	Process Performance Bond

**END OF SECTION**

**01 35 00 SPECIAL PROCEDURES**

**1.00 GENERAL**

**1.01 CONSTRUCTION SEQUENCE**

A. Perform the Work as required to complete the entire Project within the Contract Time.

**1.02 SHUT DOWNS AND PLANS OF ACTION**

A. Shut downs of operations or equipment must be planned and scheduled.

1. Submit a written plan of action for approval for shutting down essential services. These include:
  - a. NTMWD Pipelines.
  - b. Electrical power.
  - c. Control power.
  - d. Process piping.
  - e. Treatment equipment.
  - f. Communications equipment.
  - g. Other designated functions.
2. Describe the following in the Plan of Action:
  - a. Construction necessary.
  - b. Utilities, piping, or services affected.
  - c. Length of time the service or utility will be disturbed.
  - d. Procedures to be used to carry out the Work.
  - e. Plan of Action to handle emergencies.
  - f. Contingency plan that will be used if the original schedule cannot be met.
3. Plan must be received by the Owner 2 weeks prior to beginning the Work.

**1.03 CRITICAL OPERATIONS**

- A. The Owner will identify "Critical Operations" that must not be out of service longer than the designated maximum out of service time and/or must be performed only during the designated times.
- B. Submit a written plan of action for approval for Critical Operation.
  1. Describe the following in the Plan of Action:
    - a. Construction necessary.
    - b. Utilities, piping, or services affected.
    - c. Length of time the service or utility will be disturbed.
    - d. Procedures to be used to carry out the Work.

- e. Plan of Action to handle emergencies.
  - f. Contingency plan that will be used if the original schedule cannot be met.
  - g. List of manpower, equipment, and ancillary supplies. Identify backups for key pieces of equipment such as excavators and pumps and key personnel such as welders.
2. Plan must be received by the Owner 2 weeks prior to beginning the Work.
- C. Work affecting "Critical Operations" is to be performed on a 24-hour a day basis until Owner's normal operations have been restored.
  - D. Provide additional work force and equipment as required to complete the Work affecting "Critical Operations" within the allotted time.
  - E. Include the cost for Work affecting "Critical Operations" in the Proposal.
  - F. Liquidated damages will be assessed if Work on "Critical Operations" is not completed within the time indicated.
    - 1. These items are critical to the plant operation, operation of the existing distribution system or other critical operations.
    - 2. Loss of plant operation, operation of the existing distribution system or other critical operations can subject the Owner to loss of revenue, additional operations cost, and fines from regulatory agencies.
    - 3. Liquidated damages have been established for each critical operation:
  - G. Designated Critical Operations will be described in more detail in the design documents.
  - H. The Owner will assist the Contractor in draining the existing pipelines as much as possible through existing blow-off valves. The Contractor will be responsible for providing dewatering pumps, etc. required to completely dewater the facilities and handle any leakage past closed valves.
  - I. Due to the need to restore pipelines to service as quickly as possible, verification of welds is impractical. Therefore, one of the following welders must be on-Site at all times during tie-ins to existing pipelines and must confirm all welds are adequate:

Name	Phone Number
Forterra Pressure Pipe	972-260-3600
Barry Fuller	817-946-5458
Scott Fowler	972-978-7865
Eddie Pierce	817-909-6089
Nash Williams	801-255-5959

**END OF SECTION**

## **01 40 00      QUALITY REQUIREMENTS**

### **1.00      GENERAL**

#### **1.01      CONTRACTOR'S RESPONSIBILITIES**

- A. Control the quality of the Work and verify that the Work meets the standards of quality established in the Contract Documents.
  - 1. Inspect the Work of the Contractor, Subcontractors and Suppliers. Correct defective Work.
  - 2. Inspect products and materials to be incorporated into the Project. Ensure that Suppliers of raw materials, parts, components, assemblies, and other products have adequate quality control system to ensure that quality products are produced. Provide only products that comply with the Contract Documents.
  - 3. Provide and pay for the services of an approved professional materials testing laboratory acceptable to the Owner to ensure that products proposed for use fully comply with the Contract Documents.
  - 4. Provide all facilities and calibrated equipment required for quality control tests.
  - 5. Provide consumable construction materials of adequate quality to provide a finished product that complies with the Contract Documents.
  - 6. Perform tests as indicated in this and other Sections of the Specifications. Schedule the time and sequence of testing with the Owner's Resident Representative. All quality control testing is to be observed by the Owner's Resident Representative or designated representative.
  - 7. Maintain complete inspection and testing records at the Site and make them available to Owner, Engineer and Program Manager.
- B. Designate a quality control manager before Work begins with authority to monitor the Work effectively and to prepare implement and enforce a Quality Management Plan as described in Paragraph 1.11.
- C. Should requirements of this Section conflict with the requirements of the technical Specifications, the technical Specifications shall govern.

#### **1.02      QUALITY ASSURANCE ACTIVITIES BY THE OWNER**

- A. Owner may perform its own quality assurance test independent of the Contractor's Quality Control Program or as otherwise described in the Contract Documents. Provide labor, materials, tools, equipment, and related items for testing by the Owner including, but not limited to temporary construction required for testing and operation of new and existing utilities. Assist the Owner, Engineer, Owner's Resident Representative, and testing organizations in performing quality assurance activities.
  - 1. Provide access to the Work and to the Supplier's operations at all times Work is in progress.
  - 2. Cooperate fully in the performance of sampling, inspection, and testing.

3. Furnish labor and facilities to:
    - a. Provide access to the Work to be tested.
    - b. Obtain and handle Samples for testing at the Site or at the source of the product to be tested.
    - c. Provide calibrated scales and measuring devices for the Owner's use.
    - d. Facilitate inspections and tests.
    - e. Provide adequate lighting to allow Owner observations.
    - f. Store and cure test Samples.
  4. Furnish copies of the tests performed on materials and products.
  5. Provide adequate quantities of representative product to be tested to the laboratory at the designated location.
  6. Give the Owner's Resident Representative adequate notice before proceeding with Work that would interfere with testing.
  7. Notify the Owner's Resident Representative and the testing laboratory prior to the time that testing is required. Lead time is to be adequate to allow arrangements to be made for testing.
  8. Do not proceed with any Work until testing services have been performed and results of tests indicate that the Work is acceptable.
  9. Provide complete access to the Site and make Contract Documents available.
  10. Provide personnel and equipment needed to perform sampling or to assist in making the field tests.
  11. Quality assurance testing performed by the Owner will be paid for by the Owner, except for verification testing performed by the Owner, which shall be paid for by the Contractor as described in Paragraph 1.06.
- B. Quality assurance activities of the Owner or Engineer through their own forces or through contracts with materials testing laboratories and survey crews are for the purpose of monitoring the results of the Contractor's Work to see that it is in compliance with the requirements of the Contract Documents.
- C. Quality assurance activities of the Owner and Engineer or non-performance of quality assurance activities:
1. Do not relieve the Contractor of its responsibility to perform Work and furnish materials and products and constructed Work conforming to the requirements of the Contract Documents.
  2. Do not relieve the Contractor of its responsibility for providing adequate quality control measures.
  3. Do not relieve the Contractor of responsibility for damage to or loss of the material, product or Work before Owner's acceptance.
  4. Do not constitute or imply Owner's acceptance.

- 5. Do not affect the continuing rights of the Owner after Owner's acceptance of the completed Work.
- D. The presence or absence of the Owner's Resident Representative or Engineer does not relieve the Contractor from any contract requirement, nor is the Owner's Resident Representative or Engineer authorized to change any term or condition of the Contract Documents without the Owner's written authorization in a Field Order or Change Order.
- E. Failure on the part of the Owner or Engineer to perform or test products or constructed works in no way relieves the Contractor of the obligation to perform Work and furnish materials conforming to the Contract Documents.
- F. All materials and products are subject to Owner's quality assurance observations or testing at any time during preparation or use. Material or products which have been tested or observed or approved by Owner at a supply source or staging area may be re-observed or re-tested by Owner before or during or after incorporation into the Work, and rejected if they do not comply with the Contract Documents.

### 1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
  - 1. A written Quality Management Plan that establishes the methods of assuring compliance with the Contract Documents. Submit this program as Record Data
  - 2. A Statement of Qualification for the proposed testing laboratory. The statement of qualifications is to include a list of the engineers and technical staff that will provide testing services on the Project, descriptions of the qualifications of these individuals, list of tests that can be performed, equipment used with date of last certification and a list of recent projects for which testing has been performed with references for those projects.
  - 3. Test reports per Paragraph 1.07. Reports are to certify that products or constructed works are in full compliance with the Contract Documents or indicate that they are not in compliance and describe how they are not in compliance.
  - 4. Provide Certified Test Reports on materials or products to be incorporated into the Project. Reports are to indicate that material or products are in full compliance with the Contract Documents or indicate that they are not in compliance and describe how they are not in compliance.

### 1.04 STANDARDS

- A. Provide a testing laboratory that complies with the ACIL (American Council of Independent Laboratories) "Recommended Requirements for Independent Laboratory Qualifications".
- B. Perform testing per recognized test procedures as listed in the various sections of the Specifications, standards of the State Department of Highways and Public Transportation, American Society of Testing Materials (ASTM), or other testing associations. Perform tests in accordance with published procedures for testing issued by these organizations.

### 1.05 DELIVERY AND STORAGE



- A. Handle and protect test specimens of products and construction materials at the Site in accordance with recognized test procedures.

#### 1.06 VERIFICATION TESTING

- A. Provide verification testing when tests indicate that materials or the results of construction activities are not in conformance with Contract Documents.
- B. Verification testing is to be provided at the Contractor's expense to verify products or constructed works are in compliance after corrections have been made.
- C. Tests must comply with recognized methods or with methods recommended by the testing laboratory and approved by the Engineer.

#### 1.07 TEST REPORTS

- A. Test reports are to be prepared for all tests.
  - 1. Tests performed by testing laboratories may be submitted on their standard test report forms. These reports must include the following:
    - a. Name of the Owner, Project title and number, equipment installer and general Contractor.
    - b. Name of the laboratory, address, and telephone number.
    - c. Name and signature of the laboratory personnel performing the test.
    - d. Description of the product being sampled or tested.
    - e. Date and time of sampling, inspection, and testing.
    - f. Date the report was issued.
    - g. Description of the test performed.
    - h. Weather conditions and temperature at time of test or sampling.
    - i. Location at the Site or structure where the test was taken.
    - j. Standard or test procedure used in making the test.
    - k. A description of the results of the test.
    - l. Statement of compliance or non-compliance with the Contract Documents.
    - m. Interpretations of test results, if appropriate.
  - 2. Submit reports on tests performed by Contractor or his suppliers or vendors on the forms provided in Section 01 31 13.13 "Forms."
  - 3. Engineer will prepare test reports on tests performed by the Engineer.
- B. Distribute copies of the test reports to the Owner's Resident Representative within 24 hours of completing the test. Flag tests reports with results that do not comply with Contract Documents for immediate attention. Hard copies of test reports are to be distributed to individuals designated at the pre-construction conference:

<b>Recipient</b>	<b>No. of Copies</b>
Owner	2
Engineer	1
Owner's Resident Representative	1
Contractor	1

- C. Payment for Work subject to testing may be withheld until the Contractor's quality control test reports of the Work are submitted to the Owner's Resident Representative.

#### 1.08 NON-CONFORMING WORK

- A. Immediately correct any Work that is not in compliance with the Contract Documents or submit a written explanation of why the Work is not to be corrected immediately and when corrective Work will be performed.
- B. Payment for non-conforming Work shall be withheld until Work is brought into compliance with the Contract Documents.

#### 1.09 LIMITATION OF AUTHORITY OF THE TESTING LABORATORY

- A. The testing laboratory representatives are limited to providing consultation on the test performed and in an advisory capacity.
- B. The testing laboratory is not authorized to:
1. Alter the requirements of the Contract Documents.
  2. Accept or reject any portion of the Work.
  3. Perform any of the duties of the Contractor.
  4. Stop the Work.

#### 1.10 QUALITY CONTROL PLAN

- A. Submit Contractor's Quality Control Plan that identifies personnel, procedures, control, instructions, tests, records, and forms to be used. Construction will be permitted to begin only after acceptance of the Quality Control Plan or acceptance of an interim plan applicable to the particular feature of Work to be started. Work outside of the features of Work included in an accepted interim plan will not be permitted to begin until acceptance of a Quality Control Plan or another interim plan containing the additional features of Work to be started.
- B. Content of the Quality Control Plan: The Quality Control Plan shall include, as a minimum, the following to address all construction operations, both on-Site and off-Site, including Work by Subcontractors and Suppliers:
1. A description of the quality control organization, including a chart showing lines of authority and acknowledgement that the quality control staff shall implement the quality control program for all aspects of the Work specified.

2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a quality control function.
  3. A copy of the letter to the Quality Control Manager signed by an authorized official of the CMAR which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the Quality Control Manager, including authority to stop Work which does not comply with the Contract Documents or will result in Work that does not comply with the Contract Documents. The Quality Control Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Owner's Resident Representative.
  4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of Subcontractors and Suppliers.
  5. Control, verification, and acceptance testing procedures for each specific test to include the test name, Specification paragraph requiring test, feature of Work to be tested, test frequency, person responsible for each test, applicable industry testing standards and laboratory facilities to be used for the test.
  6. Procedures for tracking phases of quality control, verification, and acceptance tests including documentation.
  7. Procedures for tracking construction deficiencies from identification through acceptable corrective action. Indicate how verification that identified deficiencies have been corrected is to be documented.
  8. Reporting procedures, including proposed reporting formats
  9. The name of the proposed testing laboratory along with documentation of qualifications, a list of tests that can be performed, and a list of recent projects for which testing has been performed with references from those projects.
- C. Notification of Changes: After submittal of the Quality Control Plan, the Contractor shall notify the Owner in writing of any proposed changes.
- D. Coordination Meeting: After the Pre-Construction Meeting and before start of construction, the Contractor shall meet with the Owner, Engineer and Owner's Resident Representative to discuss the Contractor's Quality Control Plan. The Quality Control Plan shall be submitted a minimum of 14 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the Quality Control operations, testing, administration of the system for both on-Site and off-Site Work, and the interrelationship of Contractor's management and control with the Owner's Quality Assurance. Revise the Quality Management Plan to reflect comments and recommended changes resulting from this meeting.

#### 1.11 QUALITY CONTROL ORGANIZATION

- A. Provide a designated Quality Control Manager and an Alternate Quality Control manager to serve in the absence of the Quality Control Manager. The Quality Control Manager and Alternate Quality Control Manager shall be persons other than the Contractor's site superintendent or project manager. No Work shall take place without the Contractor's Quality Control Manager, Alternate Quality Control Manager or appropriate specialist to

observe and inspect the Work. Substitutions of the Contractor's quality control staff will not be allowed without prior written approval from the Owner. Any substitution in the Contractor's quality control staff must meet or exceed the qualifications and experience requirements of those individuals proposed in the Contractor's statement of qualifications. Owner has absolute discretion in determining the acceptability of the Contractor's quality control staff.

- B. Personnel Requirements: The requirements for the quality control organization are a quality control manager, alternate and sufficient number of additional qualified personnel to ensure Contract compliance. Provide personnel identified in the Contract Documents as requiring specialized qualifications and skills to ensure Work is being properly performed as part of the quality control organization. The Contractor's quality control staff shall maintain a presence at the Site at all times during progress of the Work and have complete authority and responsibility to take any action necessary to ensure Contract compliance.
1. Quality Control Manager: Designate an individual in the Quality Control Plan as the quality control manager who shall be responsible for overall management of quality and have the authority to act in all quality matters for the Contractor. An Alternate Quality Control Manager shall be identified in the Quality Control Plan to serve in the event of the Quality Control Manager's absence. The Quality Control Manager shall be assigned no other duties. The Quality Control Manager and alternate quality control manager shall have the qualifications stated in the Instructions to Bidders.
  2. Quality Control Personnel: Provide specialized personnel to assist the Quality Control Manager with quality control of such specialty Work as electrical, mechanical, civil, structural, environmental, materials, and testing as part of the quality control organization. These individuals shall be directly responsible to the Quality Control Manager; be physically present at the construction site during Work on their areas of responsibility; and have the necessary education and/or experience to effectively manage the quality of the Work being performed.
  3. Organizational Changes: Maintain adequate quality control staff at all times to ensure that quality Work is being performed. Revise the Quality Control Plan to reflect the changes when it is necessary to make changes to the quality control staff. Submit the changes to the Owner for approval.

## **2.00 PRODUCTS**

### **2.01 TESTING APPARATUS**

- A. Furnish testing apparatus and related accessories necessary to perform the tests.

## **3.00 EXECUTION**

### **3.01 QUALITY CONTROL PROGRAM**

- A. Perform quality control observations and testing as required in each Section of the Specifications and where indicated on the Drawings.
- B. Provide a quality control program that includes the following phases for each definable Work task. A definable Work task, one which is separate and distinct from other tasks, has

separate control requirements, may be provided by different trades or disciplines, or may be work by the same trade in a different environment.

1. Planning Phase: Perform the following before beginning each definable Work task:
  - a. Review the Drawings.
  - b. Review submittals and determine that they are complete in accordance with the Contract Documents.
  - c. Check to assure that all materials and/or equipment have been tested, submitted, and approved.
  - d. Examine the work area to assure that all required preliminary Work has been completed and is in compliance with the Contract Documents.
  - e. Examine required materials, equipment, and Sample Work to assure that they are on hand, conform to submittals, and are properly stored.
  - f. Review requirements for quality control inspection and testing.
  - g. Discuss procedures for controlling quality of the Work. Document construction tolerances and workmanship standards for the Work task.
  - h. Check that the portion of the plan for the Work to be performed incorporates submittal comments.
  - i. Discuss results of planning with the Owner's Resident Representative. Conduct a meeting attended by the Quality Control Manager, the Owner's Resident Representative, superintendent, other quality control personnel as applicable, and the foreman responsible for the Work task. Instruct applicable workers as to the acceptable level of workmanship required in order to meet the requirements of the Contract Documents. Document the results of the preparatory phase actions by separate meeting minutes prepared by the Quality Control Manager and attached to the quality control report.
  - j. Do not move to the next phase unless results of investigations required for the planning phase indicate that requirements have been met.
2. Work Phase: Complete this phase after the Planning Phase.
  - a. Notify the Owner's Resident Representative at least 24 hours in advance of beginning the Work and discuss the review of the planning effort to indicate that requirements have been met.
  - b. Check the Work to ensure that it is in full compliance with the Contract Documents.
  - c. Verify adequacy of controls to ensure full compliance with Contract Documents. Verify required control inspection and testing is performed.
  - d. Verify that established levels of workmanship meet acceptable workmanship standards. Compare with required Sample panels as appropriate.
  - e. Repeat the initial phase for each new crew to work on-Site, or any time acceptable specified quality standards are not being met.

3. Follow-up Phase: Perform daily checks to assure control activities, including control testing, are providing continued compliance with Contract requirements.
  - a. Make checks daily and record observations in the quality control documentation.
  - b. Conduct follow-up checks to correct all deficiencies prior to the start of additional Work tasks that may be affected by the defective Work. Do not build upon nor conceal non-conforming Work.
  - c. Conduct a review of the Work 1 month prior to the expiration of the correction period prescribed in the General Conditions with the Owner and Owner's Resident Representative. Correct defects noted during the review.
- C. Conduct additional planning and review if:
  1. The quality of on-going Work is unacceptable.
  2. Changes are made in applicable quality control staff, onsite production supervision or work crew.
  3. Work on a task is resumed after a substantial period of inactivity.
  4. Other quality problems develop.

#### 3.02 CAST-IN-PLACE CONCRETE TESTING

- A. Test cast-in-place concrete in accordance with Section 03 30 00 "Cast-In-Place Concrete."

#### 3.03 PROTECTIVE COATINGS

- A. Test protective coatings per Section 09 96 00 "High-Performance Coatings" and Section 09 91 00 "Painting."

#### 3.04 LEAKAGE TESTS FOR STRUCTURES

- A. Test structures that will contain water on a full time or intermittent basis for leaks. Perform tests prior to installing equipment or materials within the structure. In the event that the structure fails to pass the test, drain the structure, repair the leaks, re-fill, and re-test the structure. Repeat tests until the structure passes the test. The Owner may repeat the test at any time during the correction period established in the General Conditions.
- B. Test the structure for leakage using the following procedure:
  1. Determine the evaporation allowance for loss of water.
    - a. Use a standard circular pan procedure established by the U.S. Weather Bureau to measure evaporation rate.
    - b. Calculate evaporation allowance by multiplying the evaporation rate in gallons per 24 hours per square foot of surface area by the open surface area of the water in the structure.
  2. Calculate the allowable leakage for the structure. Allowable leakage is calculated as 0.03 gallons per square foot of concrete area in contact with the water per 24 hours.
  3. Fill the structure to the overflow level with water at a rate not to exceed 2 feet per hour.

4. Allow the structure to set for 3 days.
  5. Observe the perimeter of the structure and identify all leaks.
  6. Repair structure walls and floors where leaks have been identified.
  7. Mark the water level at the structure wall. Measure the fall in water level over a 24-hour period to the nearest 1/8 inch at least twice a day to determine the quantity of water lost. Provide a stilling well for measurement if required to allow accurate measurement.
  8. Calculate the amount of water lost during this time period.
  9. Compare the amount of water lost to the allowable loss.
- C. Drain the structure, determine the sources of leakage and repair if the amount of water lost exceeds the allowable leakage plus the evaporation allowance.

### 3.05 PIPING SYSTEMS

#### A. Test Requirements:

1. Perform test on piping systems including piping installed between or connected to existing pipe.
2. Conduct tests on buried pipe to be hydrostatically tested after the trench is completely backfilled. If field conditions permit and if approved by the Engineer, partially backfill the trench and leave the joints open for inspection and conducting of the initial service leak test. Do not conduct the acceptance test until backfilling is complete.
3. Pneumatically test the buried piping and expose joints of the buried piping for the acceptance test.
4. Conduct the test on exposed piping after the piping is completely installed, including supports, hangers, and anchors, but prior to insulation and coating application.
5. Do not perform testing on pipe with concrete thrust blocking until the concrete has cured at least 5 days.
6. Determine and remedy the cause of the excessive leakage for any pipe failing to meet the specified requirements for water or air tightness.
7. Tests must be successfully completed and reports filed before piping is accepted.
8. Submit a comprehensive plan and schedule for testing to the Engineer for review at least 10 days prior to starting each type of testing.
9. Remove and dispose of temporary blocking material and equipment after completion and acceptance of the piping test.
10. Repair any damage to the pipe coating.
11. Clean pipelines so they are totally free flowing prior to final acceptance.
12. Test piping independently from tests on structures.
  - a. Test method and test pressure depend upon the application of the piping.

- b. Pressure pipe is defined as piping that is part of a pumped or pressurized system. Perform test for pressure pipe per the procedures indicated in Paragraph 3.05.B.
  - c. Gravity pipe is defined as piping that depends upon the force of gravity for flow through the pipe, with the exception of process piping described in paragraph 3.05.A.12.d. Perform test for gravity pipe per the procedures indicated in Paragraph 3.05.C, 3.05.D, or 3.05.E.
  - d. Chemical processing lines are to be tested as pressure pipe regardless of the operating conditions. The test pressure is to be 1.5 times the pressure rating of the pipe.
  - e. Process piping between hydraulic structures is to be considered as pressure pipe. Perform the test for this pipe per Paragraph 3.05.B. The test pressure is to be the maximum hydrostatic head plus 10 feet. The maximum hydrostatic head is the difference in elevation of the pipe at its lowest point and the maximum top of the wall
- B. Pressure and Leakage Tests of Pressure Piping:
- 1. Perform hydrostatic pressure and leakage tests in accordance with Section 01 45 16.16 "Hydrostatic Testing."
- C. Tests for Plumbing Drainage and Vent Systems:
- 1. Plug openings as necessary.
  - 2. Test drainage and venting systems by filling piping with water to the level of the highest vent stack for 30 minutes.
  - 3. Make the examination for leakage at joints and connections.
  - 4. Test fail if there is any drop in water level.

### 3.06 ELECTRICAL TESTING

- A. Qualifications:
- 1. Perform testing using qualified personnel with a minimum of 5 years' experience installing and testing electrical equipment and machinery, unless otherwise specified.
  - 2. Use testing firms or individuals to perform tests that have not provided services or materials used on the Project or are otherwise related or affiliated with other Contractors or Suppliers for this Project unless permitted by the Owner.
- B. Report Forms: Complete appropriate test report neatly and in ink for the items being tested. Note listed data that is not applicable or cannot be obtained as "N/A" or document with an explanation for the omission. Incomplete test forms will not be witnessed by the Owner's Resident Representative. Repeat tests not accepted. Substitute forms recording similar data and test equipment as that specified may be used if approved by the Engineer.
- C. Test Equipment:
- 1. Provide test equipment and materials necessary to perform the requested tests.
  - 2. Test equipment and apparatus shall be appropriate for the full range and duration of the test to be performed.



3. Demonstrate that the test equipment is functioning properly, prior to the commencement of the test. Suspend the test and repair or replace the equipment if test equipment fails during any portion of a test. Repeat the test in its entirety or as otherwise required by the Owner's Resident Representative.
  4. Provide a copy of the test equipment calibration certificate to the Owner's Resident Representative prior to the commencement of the test. Provide test equipment that has been calibrated with 6 months of the date of the test using methods approved by the National Institute of Standards and Technology.
- D. Execution:
1. Make appropriate repairs or replacements if the circuit, equipment or machinery being tested does not pass. Repeat test as directed by the Owner's Resident Representative.
  2. The more rigid requirement prevails if test procedures or equipment conflicts occur between the various sections and/or Supplier's recommendations.
- E. Electrical Cable:
1. Communication Cable and Conductors: Submit test forms to the Owner's for approval prior to performing the following tests:
  2. Test shielded pair, telephone, paging, signaling and computer cables for continuity, short circuits and grounds with a low voltage source, not to exceed the insulation rating of the conductors or jacket.
  3. Test fiber-optic cable between terminating ends for each circuit per the Supplier's recommendation. Cables, splices (where permitted), and connectors shall be tested for continuity, band width (maximum), and attenuation losses.
- F. 600 Volt Cable and Conductors:
1. Test power and control conductors rated at 600 volts with an insulation resistance tester at 1000 volts, with respect to ground, and at 1000 volts with respect to all other conductors in each circuit.
  2. Verify suitable ground connections are provided and maintained throughout the test.
  3. Perform tests and record results as required by the "600 Volt Cable Test Report" or form provided by the Engineer.
  4. Test each circuit and record the results for continuity between terminating ends with a low voltage source.
- G. 5 kV Cable and Conductors:
1. Perform insulation resistance test on 5 kV cable for insulation resistance tested at 2500 volts with respect to ground and at 2500 volts with respect to all other conductors in each circuit.
  2. H-Pot test 5 kV cables incrementally to 25 kV DC for 15 minutes per ANSI/IEE STD 400. Record leakage current in the spaces provided, at the time intervals shown, on the "Medium Voltage Cable Test Report." Do not exceed the cable Supplier's maximum test values or procedures.

3. Perform Individual conductor resistance tests and recorded results. Test each circuit for continuity between terminations ends and record the test results. Provide additional tests and checks as requested by the Supplier.

H. 15kV Cable and Conductors:

1. Perform insulation resistance test on 15 kV cable at 2500 volts with respect to all other conductors in each circuit.
2. H-Pot test 15 kV cable incrementally to 55 kV DC for 15 minutes per ANSI/IEE STD. 400. Record leakage current at the time interval, shown, on the "Medium Voltage Cable Test Report." Do not exceed the cable Supplier's recommended maximum test values or procedures. Perform individual conductor resistance tests and record the results. Test each circuit for continuity between terminating ends and record the results. Provide additional tests and checks as required by the Supplier.

I. Switchgear:

1. Test electrical switchgear and electrical devices and controls mounted on or in the switchgear in accordance with the "Switchgear Test Report" form.
2. Record the following information and attach to the test report:
  - a. Resistance reading across joints of each horizontal and vertical bus.
  - b. Verify proper operation of electrical, mechanical and keyed interlocking systems.
  - c. Operate devices to both their open and close states. Operate stored energy devices mechanically and electrically as applicable. Operate remotely controlled devices from their remote location.
  - d. Verify proper operation of draw-out circuit breakers and switches. Remove and re-install each unit. Verify proper operation of shutters and barriers.
  - e. Disconnect electrical and electronic sensing and protective devices not rated to withstand insulation resistance test potentials. Reconnect the devices before energizing the switchgear.
  - f. Perform insulation resistance tests at the test voltages shown below for the following equipment. Do not exceed the Supplier's recommended maximum test values or procedures.

<b>Equipment Rating</b>	<b>Test Voltage</b>
0-250 volts	500 volts
251-600 volts	1000 volts
601-5000 volts	2500 volts
5001-15,000 volts	2500 volts
15,001-39,000 volts	5000 volts

- g. Provide additional tests and checks as recommended by the Supplier before energizing.

- h. Energize switchgear. Measure and record instrument indications for no load and connected load conditions.

J. Transformers:

1. Test single-phase and three-phase, liquid filled and dry transformers rated 5 kVA and larger in accordance with the "Transformer Test Report," form.
2. Record the following information and attach to the test report.
  - a. Verify proper operation of all fans, alarms, and other auxiliary and monitoring devices.
  - b. Verify "tap changer" operation, if applicable, in all positions. Set and secure "tap changer" to position recommended by the Owner's Resident Representative or Engineer.
  - c. Obtain insulating liquid Sample from all liquid filled transformers. Submit Sample to testing laboratory, approved by the Owner for analysis. Perform standard insulating liquid tests as required by the Owner's Resident Representative or Engineer. Deliver test results to the Owner within 30 days after sampling.
  - d. Perform insulation resistance tests at the test values shown below for the following equipment.
  - e. Perform tests from each winding to ground and winding to winding. Primary and secondary sections shall be tested separately.
  - f. Do not exceed the Supplier's recommended maximum test values or procedures.

<b>Transformer Coil Rating</b>	<b>Test Voltage</b>
0-600 volts	1000 volts
601-5000 volts	2500volts
5001-15,000volts	5000 volts
15,001-39,000 volts	10,000 volts

- g. Provide additional tests and checks as recommended by the Supplier before energizing.
- h. Energize transformer. Measure and record primary and secondary volts and amps under no load and connected load conditions.

K. Motors:

1. Test electric motors in accordance with the "Motor Startup Report" form.
2. Check and record motor winding continuity phase to phase with a low voltage source.
3. Check and record motor winding insulation resistance, each phase with respect to ground, at the test values shown below for A.C. induction motors per REF. IEEE Standard 43.
4. Do not exceed the Supplier's recommended maximum test values or procedures.

<b>Motor Voltage Rating</b>	<b>Test Voltage</b>
250 V and below	500
above 250 V	1000
2360 V, 3 Phase	Per manufacturer's startup instructions or as otherwise directed by the Engineer.
4160 V, 3 Phase	Per manufacturer's startup instructions or as otherwise directed by the Engineer.

5. Check and record motor circuit voltage before starting motor.
6. Verify operation of motor space heater if applicable.
7. Provide additional tests and checks as recommended by the Supplier before energizing.
8. Start motor and verify immediately correct shaft rotation.
9. Check and record motor running volts and amps.
10. Verify correct operation of all interlocking and protective devices.

**END OF SECTION**

**01 45 16.16 HYDROSTATIC TESTING**

**1.00 GENERAL**

**1.01 WORK INCLUDED**

- A. Perform a hydrostatic pressure test on each valved or plugged section of newly laid pipe after the pipe has been backfilled. Perform hydrostatic pressure test by raising the pressure in the pipe section to the required test pressure for the duration defined in Paragraph 3.02.
- B. Plugs may be installed in concrete cylinder or steel pipe at intermediate locations for the purpose of testing shorter lengths of pipe at the Contractor’s option. No additional compensation will be paid to the Contractor for testing at intermediate locations if Contractor uses this option.
- C. Obtain water from the Owner for filling the pipeline for the hydrostatic test. Provide the necessary piping, connection, pressure reducing and backflow prevention equipment required to conduct the test. Fill the new pipeline through a backflow prevention device. Leave the pipeline full of water upon completion of the hydrostatic test, unless internal test plugs must be removed to allow construction to continue or where pipe will gravity drain.
- D. Purchase water required for re-testing of the pipeline from the Owner. Water will be sold to the Contractor at published rates.

**1.02 SUBMITTALS**

- A. Submit Hydrostatic Pipe Test Reports per Section 01 33 00 “Submittal Procedures.”

**1.03 STANDARDS**

- A. The applicable provisions of the following standards shall apply as if written here in their entirety:

<b>American Water Works Association (AWWA)</b>	
AWWA M9	Concrete Pressure Pipe
AWWA M11	Steel Pipe – A Guide for Design and Installation

**2.00 PRODUCTS (NOT APPLICABLE)**

**3.00 EXECUTION**

**3.01 GENERAL**

- A. Perform hydrostatic test on bar-wrapped, concrete cylinder pipe in accordance with AWWA M9 and the pipe Supplier’s recommendations.
- B. Perform hydrostatic test on steel pipe in accordance with AWWA M11 and the pipe Supplier’s recommendations.

### 3.02 TEST CONDITIONS

- A. Test pipe at the test pressure for the duration as indicated below for the various pipe materials:

	<b>Pipe Type</b>	<b>Duration (hours)</b>	<b>Test Pressure (psi)</b>
A	Bar-wrapped concrete cylinder pipe	8	
B	Pre-stressed concrete cylinder pipe	8	
C	Steel pipe	8	

### 3.03 PROCEDURE

- A. Bar-Wrapped Concrete Cylinder Pipe, Pre-stressed Concrete Cylinder Pipe, and Steel Pipe:

1. Hydrostatically test the pipe after backfill over the test section of pipe has been completed for 7 days. Slowly fill the line with water and vent all air from the pipeline during filling.
2. Allow the pipe to stand under a slight pressure for at least 48 hours to allow the mortar lining to become saturated and/or to allow the escape of remaining air trapped in the line. Examine bulkheads, valves, manholes, flanges, and connections for leaks during this period.
3. Stop leaks before continuing with the test.
4. Measure water volume during the test if existing valves in the main line leak during the test. Measure the water volume leaking from the valve through a meter or by other means approved by the Owner's Resident Representative. Furnish all necessary equipment and include the cost for this effort in the Contract Price.
5. Expel all air from the pipe before applying the specified test pressure. Provide taps in the line to expel air from high points where air valves are not provided. These taps must be made by the pipe manufacturer and approved by the Engineer. Tightly plug the tap after tests are complete. Include the cost for these taps in the Contract Price.

### 3.04 EXAMINATION UNDER PRESSURE

- A. Inspect the pipe during the test to locate any leaks or breaks, defective joints, cracked or defective pipe, fittings, or valves. Correct defective Work identified during the pressure test.
- B. Correct all identified leaks even if leakage is within the parameters for permissible make up water per Paragraph 3.05.
- C. Test the pipe again after defective Work has been corrected. Repeat the test and correction of defective Work until satisfactory test results are obtained.

### 3.05 PERMISSIBLE MAKEUP WATER

- A. Measure make up water required for the section of pipe being tested. Makeup water is the volume of water pumped into the test section of pipe necessary to maintain the specified test pressure after the pipe has been filled with water and the air expelled.
- B. The maximum acceptable volume of makeup water for steel or bar-wrapped pipe installations is 10 gallons per inch of pipe diameter per mile of pipe tested per 24 hours. Calculate the maximum acceptable volume of makeup water using the following equation:

$$V_m = \frac{10DL}{5280}$$

Where:

$V_m$  is the maximum acceptable volume of makeup water in gallons for 24 hours

$D$  is the nominal pipe diameter in inches

$L$  is the length of the pipe test section in feet

As an example the allowable amount of makeup water for a test section of 2500 feet of 60 inch diameter pipe would be:

$$10 \times 60 \times 2500 / 5280 = 284 \text{ gallons}$$

**END OF SECTION**

## **01 50 00      TEMPORARY FACILITIES AND CONTROLS**

### **1.00      GENERAL**

#### **1.1      WORK INCLUDED**

- A. Furnish temporary facilities, including the Contractor's field offices, storage sheds, and temporary utilities needed to complete the Work.
- B. Furnish, install, and maintain temporary Project identification signs. Provide temporary on-site informational signs to identify key elements of the construction facilities. Do not allow other signs to be displayed.

#### **1.2      QUALITY ASSURANCE**

- A. Testing: Inspect and test each service before placing temporary utilities in use. Arrange for all required inspections and tests by regulatory agencies, and obtain required certifications and permits for use.

#### **1.3      DELIVERY AND STORAGE**

- A. Arrange transportation, loading, and handling of temporary buildings and sheds.

#### **1.4      JOB CONDITIONS**

- A. Locate buildings and sheds at the Site as indicated or as approved by the Owner.
- B. Prepare the Site by removing trees, brush, or debris and performing demolition or grubbing needed to clear a space adequate for the structures.
- C. Pay for the utilities used by temporary facilities during construction.
- D. Provide each temporary service and facility ready for use at each location when the service or facility is first needed to avoid delay in the performance of the Work.
- E. Maintain, expand as required, and modify temporary services and facilities as needed throughout the progress of the Work.
- F. Do not remove services and facilities until they are no longer needed.
- G. Operate temporary facilities in a safe and efficient manner.
  - 1. Do not overload temporary services or facilities.
  - 2. Do not let temporary services or facilities interfere with the progress of the Work.
  - 3. Do not allow unsanitary conditions, public nuisance, or hazardous conditions to develop or exist at the Site.
  - 4. Do not permit freezing of pipes, flooding, or the contamination of water.
  - 5. Maintain Site security and protection of the facilities.

#### **1.5      OPTIONS**

- A. Storage sheds may be prefabricated buildings on skids or truck trailers.



2.00 PRODUCTS

2.1 SIGN MATERIALS

- A. Provide new or used signs, wood or metal with structure and framing in sound condition. Materials are to be structurally adequate and suitable for the indicated finish.
- B. Provide 3/4-inch exterior grade A/D face veneer plywood with medium density overlay for sign surface.
- C. Bolts, brackets, fasteners, and other hardware are to be galvanized or stainless steel.
- D. Provide exterior quality coatings.

2.2 TEMPORARY OFFICES

- A. Not used.

2.3 TEMPORARY STORAGE BUILDINGS

- A. Furnish storage buildings of adequate size to store any materials or equipment delivered to the Site that might be affected by weather.

2.4 TEMPORARY SANITARY FACILITIES

- A. Provide sanitary facilities at the Site from the Notice to Proceed until Project conclusion. Maintain these facilities in a clean and sanitary condition at all times and comply with the requirements of the local health authority. On large sites, provide portable toilets at such locations that no point in the Site shall be more than 600 feet from a toilet.
- B. Use these sanitary facilities. Do not use rest rooms within existing or Owner-occupied buildings.

2.5 TEMPORARY HEAT

- A. Provide heating devices needed to protect the building during construction.
  - 1. Provide fuel needed to service the heating devices.
  - 2. Attend heating devices at all times.
  - 3. Do not allow heaters to operate overnight without someone in attendance.

2.6 TEMPORARY UTILITIES

- A. Provide all temporary utilities needed during construction, testing, disinfection, and startup of the Work, including electrical power, water, and telephone. Include costs associated with furnishing temporary utilities in the Contract Price.
  - 1. Provide a source of temporary electrical power of adequate size for the construction procedures.

- a. Provide electrical pole and service that complies with OSHA and other safety requirements and the requirements of the power company.
  - b. Make the electrical power available to the trades as needed.
  - c. Provide extensions to the various parts of the buildings as needed.
  - d. Provide junction boxes in such an arrangement that distribution boxes are available within 75 feet of any part of the structure.
- 2. Provide for temporary water. Extend water to the Site and maintain source until such time that the permanent water supply can be extended to the Site. Include the cost of water, costs for construction, testing, disinfection, and startup of the Work in the Contract Price.
  - 3. Provide telephone service to the Site and install telephones inside the Contractor's and the Engineer's office.
- B. Make arrangements with the local utility company, comply with utility company's requirements and pay for the utility costs during construction, testing disinfection, and startup of the Work.
  - C. Make utilities available to the trades during construction, testing, disinfection, and startup.

### 3.00 EXECUTION

#### 3.1 LOCATION OF TEMPORARY FACILITIES

- A. Locate all temporary facilities in an area that will not interfere with any Work to be performed under this Contract.
- B. Construct and install signs at locations as required by applicable regulatory agencies or as selected by the Owner. Install informational signs at the height of optimum visibility, on ground-mounted poles or attached to temporary structural surfaces.

#### 3.2 PROJECT IDENTIFICATION AND SIGNS

- A. Provide Project identification signs of the size, lettering, and construction indicated by the Owner and in accordance with specified requirements.

#### 3.3 TEMPORARY LIGHTING

- A. Once a building envelope is complete and waterproof, provide temporary lighting inside the building.
  - 1. Lighting shall be adequate to perform Work within any space.
  - 2. Lights shall be left in position in such a manner that every space has temporary light at all times.
  - 3. Temporary lights may be removed once the permanent lighting is in service.
- B. Provide portable flood lights at any time that Work will be performed outside the structure at night. Provide adequate lighting to provide sufficient light at any location Work is being performed.

3.4 DRINKING WATER

- A. Provide field offices with potable water for the Owner's and the Engineer's office. Bottled drinking water is to be provided with a dispenser and cooling apparatus.
- B. Pay for services and maintain daily.

3.5 CONSTRUCTION FENCE

- A. Install and maintain a construction fence around the Site and/or around the storage yard as indicated. Fence may be wood picket or chain link construction. Provide gates with padlocks.

3.6 REMOVAL OF TEMPORARY FACILITIES

- A. Remove temporary buildings, sheds, and utilities at the conclusion of the Project and restore the Site to original condition or finished in accordance with the Contract Documents.
- B. Remove informational signs upon completion of construction.
- C. Remove Project identification signs, framing, supports, and foundations upon completion of the Project.

3.7 MAINTENANCE AND JANITORIAL SERVICE

- A. Maintain signs and supports in a neat, clean condition. Repair damage to structures, framings, or signs.
- B. Repair any damage to permanent structures or finishes caused by placement or removal of temporary signage.

**END OF SECTION**

## **01 57 00      TEMPORARY CONTROLS**

### **1.00    GENERAL**

#### **1.01    WORK INCLUDED**

- A. Provide labor, materials, equipment and incidentals necessary to construct temporary facilities to provide and maintain control over environmental conditions at the Site. Remove temporary facilities when no longer needed.
- B. Construct temporary impounding works, channels, diversions, furnishing and operation of pumps, installing piping and fittings, and other construction for control of conditions at the Site. Remove temporary controls at the end of the Project.
- C. Provide a Storm Water Pollution Prevention Plan in accordance with TCEQ General Permit TXR150000, file required legal notices and obtain required permits prior to beginning any construction activity.
- D. Provide labor, materials, equipment, and incidentals necessary to prevent storm water pollution for the duration of the Project. Provide and maintain erosion and sediment control structures as required to prevent sediment and other pollutants from the Site from entering any storm water system, including open channels. Remove pollution control structures when no longer required to prevent storm water pollution.

#### **1.02    QUALITY ASSURANCE**

- A. Construct storm water pollution prevention measures prior to the beginning of construction and maintain these during construction until final stabilization has been achieved for the area protected.
- B. Plan and conduct all land-disturbing activities to minimize the area to be exposed at any one time. Minimize the time of exposure, off-Site erosion, sedimentation, and adverse water quality impacts.
- C. Manage surface water runoff originating upgrade of an exposed area to minimize erosion and sediment loss during the period of exposure.
- D. Install measures to control both the velocity and rate of release so as to minimize erosion and sedimentation of the receiving water body (i.e., ditch, channel, stream) in accordance with regulatory requirements and as directed by the Owner, Engineer.
- E. Periodically clean out and dispose of all sediment and other pollutants as necessary to maintain the treatment capacity of each pollution control feature. Clean out and properly dispose of all sediment and other storm water pollutants at the time of completion of the Work.

#### **1.03    SUBMITTALS**

- A. Provide copies of notices, records and reports required by Paragraph 1.05 as Record Data in accordance with Section 01 33 00 "Submittal Procedures."

#### 1.04 STANDARDS

- A. Provide a Storm Water Pollution Prevention Plan that complies with Local, State, and Federal requirements. Comply with all requirements of the Texas Commission on Environmental Quality General Permit (TXR150000) for storm water discharges from construction activities under the Texas Pollutant Discharge Elimination System (TPDES) program.
- B. Perform Work to comply with "Best Practice" as established by the North Central Texas Council Of Governments (NCTCOG) integrated Storm Water Management (iSWM) Design Manual for Construction or the local agency of jurisdiction.

#### 1.05 PERMITS

- A. Submit the following to the TCEQ and the Operator of any Municipal Separate Storm Sewer System (MS4) receiving construction site discharge from the Site:
  - 1. Notice of Intent (NOI) at least 48 hours prior to beginning construction activity. Construction activity may commence 24 hours after the submittal of an electronic NOI.
  - 2. Notice of Change (NOC) letter when relevant facts or incorrect information was submitted in the NOI, or if relevant information in the NOI changes during the course of construction activity.
  - 3. Notice of Termination (NOT) when the Project has been completed and stabilized.
- B. Post a copy of the NOI at the Site in a location where it is readily available for viewing by the general public and Local, State, and Federal authorities prior to starting construction activities and maintain the posting until completion of the construction activities.
- C. Maintain copies of a schedule of major construction activities, inspection reports, and revision documentation with the Storm Water Pollution Prevention Plan (SWPPP) required under the TPDES General Permit (TXR150000) for Storm Water Discharges from Construction Activities for all projects.

#### 1.06 POLLUTION CONTROL

- A. Prevent the contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations. Provide adequate measures to prevent the creation of noxious air-borne pollutants. Prevent dispersal of pollutants into the atmosphere. Do not dump or otherwise discharge noxious or harmful fluids into drains or sewers, nor allow noxious liquids to contaminate public waterways in any manner.
- B. Provide equipment and personnel and perform emergency measures necessary to contain any spillage.
- C. Contain chemicals in protective areas and do not dump on soil. Dispose of such materials at off-Site locations in an acceptable manner.
- D. Excavate contaminated soil and dispose at an off-Site location if contamination of the soil does occur. Fill resulting excavations with suitable backfill and compact to the density of the surrounding undisturbed soil.

- E. Provide documentation to the Owner which states the nature and strength of the contaminant, method of disposal, and the location of the disposal site.
- F. Comply with local, State and Federal regulations regarding the disposal of pollutants.
- G. Groundwater or run-off water which has come into contact with noxious chemicals, sludge, or sludge-contaminated soil is considered contaminated. Contaminated water must not be allowed to enter streams or water courses, leave the Site in a non-contained form or enter non-contaminated areas of the Site.
- H. Pump contaminated water to holding ponds constructed by the Contractor for this purpose, or discharge to areas on the interior of the Site, as designated by the Engineer.
- I. Construct temporary earthen dikes or take other precautions and measures as required to contain the contaminated water and pump to a designated storage area.
- J. Wash any equipment used for handling contaminated water or soil within contaminated areas three times with uncontaminated water prior to using such equipment in an uncontaminated area. Dispose of wash water used to wash such equipment as contaminated water.

#### 1.07 EARTH CONTROL

- A. Remove excess soil, spoil materials and other earth not required for backfill at the time of generation within 4 weeks of completing excavation work. Control stock pile material to eliminate interference with Contractor's and Owner's operations.
- B. Dispose of excess earth off the Site. Pay cost for disposal unless otherwise noted. Provide written approval by the property owner for all disposal on private property, and approval by the Owner if such disposal affects the use of Site or other easements.
- C. Place excess excavated material and neatly spread on tracts of land on which the pipeline is being constructed and where the property owner requests such material and the Engineer approves.

#### 1.08 MAINTENANCE OF WATER

- A. Manage water resulting from rains or ground water at the Site. Maintain trenches and excavations free of water at all times. Provide and maintain pumps as necessary to remove excess water. Direct water away from the Site to prevent damage to surrounding property.

### 2.00 PRODUCTS

#### 2.01 MATERIALS

- A. Provide materials meeting regulatory requirements.

### 3.00 EXECUTION

#### 3.01 CONSTRUCTING, MAINTAINING AND REMOVING TEMPORARY CONTROLS

- A. Construct temporary controls in accordance with regulatory requirements.

- B. Maintain controls in accordance with regulatory requirements were applicable, or in accordance with the requirements of the Contract Documents.
- C. Remove temporary controls when no longer required, but before the Project is complete. Correct any damage or pollution that occurs as the result of removing controls before the point where they are no longer required.

**END OF SECTION**

## **01 60 00      PRODUCT REQUIREMENTS**

### **1.00    GENERAL**

#### **1.01    WORK INCLUDED**

- A. Provide products for this Project that comply with the requirements of this Section. Specific requirements of the detailed equipment Specifications govern in the case of a conflict with the requirements of this Section.
- B. Comply with applicable specifications and standards.
- C. Comply with size, make, type, and quality specified or as modified per Section 01 31 13 "Project Coordination."

#### **1.02    QUALITY ASSURANCE**

- A. Design Criteria:
  - 1. Assume responsibility for the design of the products to include structural stability and operational capability.
  - 2. Design members to withstand all loads imposed by installation, erection, and operation of the product without deformation, failure, or adversely affecting the operational requirements of the product. Size and strength of materials for structural members are specified as minimums only.
  - 3. Design mechanical and electrical components for all loads, currents, stresses, and wear imposed by startup and normal operations of the equipment without deformation, failure, or adversely affecting the operation of the unit. Mechanical and electrical components specified for equipment are specified as the minimum acceptable for the equipment.
- B. Coordination:
  - 1. Provide coordination of the entire Project, including verification that structures, piping, and equipment components to be furnished and installed for this project are compatible.
  - 2. Determine that the equipment furnished for this Project is compatible with the Contract Document requirements and with the equipment and materials furnished by others.
  - 3. Electrical components provided for equipment shall comply with all provisions of the Contract Documents.
  - 4. Protective coatings and paints applied to equipment shall be fully compatible with the final coatings to be field applied in accordance with the Contract Documents.
- C. Adaptation of Equipment:
  - 1. Drawings and Specifications are prepared for the specified products. Make modifications to incorporate the products into the Project at no cost to the Owner, if a substitution for a product is requested and approved in accordance with Section 01 31 13 "Project Coordination."



2. Do not provide a product with a physical size that exceeds the available space. Consideration may be given to the acceptance of these products or equipment if the CMAR assumes all costs necessary to incorporate the item and the Engineer approves such revisions.
3. Coordinate electrical requirements for the products to be installed in the Project, including revisions in electrical equipment components wiring and other factors necessary to incorporate the component.

#### 1.03 SUBMITTALS

- A. Provide Submittals in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
  1. Certificates of Adequacy of Design as described in Section 01 33 00 "Submittal Procedures."
  2. Equipment Installation Reports per Section 01 75 00 "Starting and Adjusting."
  3. Other documentation as required by detailed equipment Specifications.

#### 1.04 STANDARDS

- A. The applicable industry standards referenced in the Specifications shall apply as if written here in its entirety.
- B. Except where otherwise indicated, structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute of Steel Construction (AISC).

#### 1.05 GUARANTEES AND WARRANTIES

- A. Guarantee and or warranty products furnished by the CMAR under this Contract against:
  1. Faulty or inadequate design.
  2. Improper assembly or erection.
  3. Defective workmanship or materials.
  4. Leakage, breakage, or other failure.
- B. Guarantee and or warranty the products installed under this Contract, including products furnished by the Owner, against leakage, breakage, or other failure due to improper assembly or erection and against improper installation of the equipment. The guarantee and or warranty period shall be as defined in the General Conditions. Individual Sections of the Specifications may have more stringent warranty requirements than stated in the General Conditions. The most stringent warranty will be required in the event of any difference in the two aforementioned locations.

## 2.00 PRODUCTS

### 2.01 MATERIALS

- A. Design, fabricate, assemble, deliver and install according to normally accepted engineering and shop practices, except where a higher standard of quality is required by the Contract Documents.
- B. Manufacture like parts of duplicate units to standard sizes and gages. Like parts are to be interchangeable.
- C. Two or more items of the same kind are to be identical and made by the same Supplier.
- D. Provide products suitable for the intended service.
- E. Adhere to the equipment capacities, sizes, and dimensions indicated by the Contract Documents.
- F. Do not use products for any purpose other than that for which it is designed.
- G. Provide new products unless previously used products are specifically allowed in the Contract Documents.
- H. Equipment shall not have been in service at any time prior to delivery, except as required by tests.
- I. Materials shall be suitable for service conditions.
- J. Iron castings shall be tough, close-grained gray iron free from blowholes, flaws, or excessive shrinkage and shall conform to ASTM A48.
- K. Structural members shall be considered as subject to shock or vibratory loads.
- L. Unless otherwise indicated, steel which will be submerged, all or in part, during normal operation of the equipment shall be at least 1/4 inch thick. All edges are to be chamfered to preclude any sharp exposed edges.

### 2.02 ELECTRIC MOTORS

- A. Unless otherwise required by the detailed equipment Specifications, motors furnished with equipment shall comply with the following requirements:
  - 1. Motors shall be designed and applied in compliance with NEMA, ANSI, IEEE, and AFBMA standards and the NEC for the specific duty imposed by the driven equipment.
  - 2. Where frequent starting occurs, motors shall be designed for frequent starting duty equivalent to the duty service required by the driven equipment.
  - 3. Unless recognized and defined by the standards and codes for intermittent duty as a standard industry practice, motors shall be rated for continuous duty at 40 C ambient. Motor temperature rise above 40 C ambient on continuous operation at nameplate horsepower shall not exceed the NEMA limit.
  - 4. Motors shall be designed to start with appropriate starter or variable speed drive.
  - 5. Motor bearing life shall be based upon the actual operating load conditions imposed by the driven equipment.

6. Motors shall be sized for the altitude at the location where the equipment is to be installed.
  7. Motors with 1.0 service factor shall not be loaded more than 87 percent of the nameplate horsepower. Motors with a 1.15 service factor shall not be loaded more than 100 percent of the nameplate horsepower.
  8. Where the detailed equipment Specifications call for encapsulated motor windings, the following process shall be used:
    - a. After stator assembly, the stator assembly shall be sealed vacuum-pressure impregnation (VPI) of epoxy resin. The stator shall receive two VPI treatments, each treatment consisting of a dip followed by an oven bake. After the final cure, the stator assembly shall receive a final (third) coating of a durable epoxy varnish to further protect against dust, moisture, and a chemical degradation. The windings shall comply with the latest applicable provisions of NEMA MG1.
  9. Motors shall have a clamp-type grounding terminal inside the motor conduit box.
  10. Motors with external conduit boxes shall have oversized conduit boxes.
  11. Maximum starting current shall be per NEMA MG1, Class H.
  12. Efficiency shall be per NEMA MG1 for Premium efficiency motors.
  13. Minimum insulation shall be Type F.
  14. Motors shall be random wound with copper coils.
  15. Motors located in a hazardous location shall be rated for the appropriate classification.
- B. It is intended that the Supplier use his standard motor on integrally constructed motor driven equipment such as appliances, hand tools, etc., which would otherwise require redesign of the complete unit in order to provide a motor having the specified features.
- C. Unless otherwise required by the detailed equipment Specifications, motors within the horsepower ranges indicated below shall be rated and constructed as follows:
1. Below 1/2 HP:
    - a. 115-Volt, 60-Hertz, 1-phase.
    - b. Dripproof in clean and dry locations; TEFP in all other locations.
    - c. Permanently lubricated sealed bearings.
    - d. Built-in manual-reset thermal protector; or furnished with integrally mounted stainless steel enclosed manual motor-overload switch.
  2. 1/2 to 1 HP:
    - a. 230/460-Volt, 60-Hertz, 3-phase.
    - b. Dripproof in clean and dry locations; TEFC in all other locations.
    - c. Permanently lubricated sealed bearings.
  3. 1-1/2 HP and Above:
    - a. 230/460-Volt, 60-Hertz, 3-phase.

- b. Dripproof in clean and dry locations; TEFC in all other locations.
  - c. Oil or grease lubricated anti-friction or oil lubricated sleeve bearings.
  - d. Vertical motors shall have 15-year average life thrust bearings.
- D. Motors with horsepower ratings of 15 horsepower or greater shall be provided with space heaters to operate on 120-Volt, single-phase service.

#### 2.03 EQUIPMENT APPURTENANCES

- A. Cover belt or chain drives, fan blades, couplings, and other moving or rotating parts on all sides by a safety guard.
1. Fabricate safety guards from 16 USS gage or heavier galvanized or aluminum-clad sheet steel or 1/2-inch mesh galvanized expanded metal.
  2. Design guards for easy installation and removal.
  3. Provide galvanized supports and accessories for each guard.
  4. Provide stainless steel bolts and hardware.
  5. Provide safety guards in outdoor locations designed to prevent the entrance of rain and dripping water.

#### 2.04 ANCHOR BOLTS

- A. Provide suitable anchor bolts for each product.
- B. Provide anchor bolts, with templates or setting drawings, sufficiently early to permit setting the anchor bolts when the structural concrete is placed.
- C. Provide two nuts for each bolt.
- D. Provide anchor bolts for products mounted on baseplates that are long enough to permit 1 - 1/2 inches of grout beneath the baseplate and to provide adequate anchorage into structural concrete.
- E. Provide stainless steel anchor bolts, nuts, and washers.

#### 2.05 SPECIAL TOOLS AND ACCESSORIES

- A. Furnish tools, instruments, lifting and handling devices, and accessories necessary for proper maintenance and adjustment that are available only from the Supplier or are not commonly available.

#### 2.06 EQUIPMENT IDENTIFICATION PLAQUES

- A. Provide a plaque for each piece of equipment in accordance with Section 40 05 53 "Identification for Process Piping and Equipment."

#### 2.07 LUBRICATION SYSTEMS FOR EQUIPMENT

- A. Provide equipment lubricated by systems which:
1. Require attention no more frequently than weekly during continuous operation.

2. Do not require attention during startup or shutdown.
  3. Do not waste lubricants.
- B. Provide lubricants to fill lubricant reservoirs and to replace lubricant consumed during testing, startup, and operation prior to acceptance of equipment by the Owner.

**2.08 INSULATION OF PIPING**

- A. Insulate all piping on or related to equipment as required to prevent freezing under any condition. Insulate piping per the Supplier's written instruction or per Section 23 07 19 "HVAC Piping Insulation," whichever is more stringent.

**3.00 EXECUTION**

**3.01 INSTALLATION**

- A. Install equipment including equipment pre-selected or furnished by the Owner as part of this Project as if this equipment had been selected and purchased by the CMAR. Assume responsibility for proper installation, startup and making the necessary adjustments so that the equipment is placed in proper operating condition per Section 01 75 00 "Starting and Adjusting."

**3.02 LUBRICATION**

- A. Lubricate all products provided or installed for this Project, including products furnished by the Owner, per the Supplier's written recommendations until the product is accepted by the Owner.

**END OF SECTION**

## **01 70 00 EXECUTION AND CLOSEOUT REQUIREMENTS**

### **1.00 GENERAL**

#### **1.01 WORK INCLUDED**

- A. Comply with requirements of the General Conditions and specified administrative procedures in closing out the construction Contract.

#### **1.02 SUBMITTALS**

- A. Submit affidavits and releases on forms shown in Section 01 31 13.13 "Forms."

#### **1.03 SUBSTANTIAL COMPLETION**

- A. Submit written notification that the Work or designated portion of the Work is substantially complete to the Engineer when the Work is considered to be substantially complete per the General Conditions. Include a list of the items remaining to be completed or corrected before the Project will be considered to be complete.
- B. Engineer shall visit the Site to observe the Work within a reasonable time after notification is received to determine the status of completion.
- C. Engineer shall issue notification to the Contractor that the Work is either substantially complete or that additional Work must be performed before the Project may be considered substantially complete.
  - 1. Engineer shall notify the Contractor in writing of items that must be completed before the Project can be considered substantially complete.
    - a. Correct the noted deficiencies in the Work.
    - b. Issue a second written notice with a revised list of deficiencies when Work has been completed.
    - c. Engineer shall revisit the Site and the procedure shall begin again.
  - 2. Engineer shall issue a tentative Certificate of Substantial Completion to the Owner when the Project is considered to be substantially complete. Certificate shall include a tentative list of items to be corrected before final payment.
    - a. Owner will review and revise the list of items and notify the Engineer of any objections or other items that are to be included in the list.
    - b. Engineer shall prepare and send to the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be corrected or completed.
    - c. Review the list and notify the Engineer in writing of any objections within 10 days of receipt of Certificate of Substantial Completion.

#### 1.04 FINAL INSPECTION

- A. Submit written certification in the form indicated in Section 01 31 13.13 "Forms" when the Project is complete and:
  - 1. Contract Documents have been reviewed.
  - 2. Work has been completed in compliance with the Contract Documents.
  - 3. Equipment and systems have been tested per Contract Documents and are fully operational.
  - 4. Final Operations and Maintenance Manuals have been provided to the Owner and all operators training has been completed.
  - 5. Specified spare parts and special tools have been provided.
  - 6. Work is complete and ready for final inspection.
- B. Engineer shall make an inspection with the Owner and appropriate regulatory agencies to determine the status of completeness within a reasonable time after the receipt of the Certificate.
- C. Engineer shall issue notice that the Project is complete or notify the Contractor that Work is not complete or is defective.
  - 1. Submit the request for final payment with Closeout submittals described in Paragraph 1.07 if notified that the Project is complete and the Work is acceptable.
  - 2. Upon receipt of notification from the Engineer that Work is incomplete or defective, take immediate steps to remedy the stated deficiencies. Send a second certification to the Engineer when Work has been completed or corrected.
  - 3. Engineer shall re-visit the Site and the procedure will begin again.

#### 1.05 RE-INSPECTION FEES

- A. Pay fees to the Owner to compensate the Engineer for re-inspection of the Work required by the failure of the Work to comply with the claims of status of completion made by the Contractor.
- B. Owner may withhold the amount of these fees from the Contractor's final payment.
- C. Cost for additional inspections will be billed to the Owner by the Engineer for the actual hours required for the inspection and preparation of related reports in accordance with the rates in the Supplemental Conditions

#### 1.06 CLOSEOUT SUBMITTALS TO THE ENGINEER

- A. Record drawings per Section 01 31 00 "Project Coordination."
- B. Keys and keying schedule.
- C. Warranties and bonds.
- D. Evidence of payment or release of liens on the form indicated in Section 01 31 13.13 "Forms" and as required by the General Conditions.

- E. Releases from property owners of land outside the easement which were used by the Contractor.
- F. Consent from Surety to Final Payment.
- G. Equipment Installation Reports on equipment.
- H. Shop Drawings, Record Data, Operations and Maintenance Manuals, and other submittals as required by the Contract Documents.
- I. Specified spare parts and special tools.
- J. Certificates of Occupancy, operating certificates, or other similar releases required to allow the Owner unrestricted use of the Work and access to services and utilities.
- K. Evidence of final, continuing insurance, and bond coverage as required by the Contract Documents.

#### 1.07 FINAL PAYMENT REQUEST

- A. Submit a preliminary final payment request. This request is to include adjustments to the Contract Amount for:
  - 1. Approved Change Orders.
  - 2. Allowances not previously adjusted by Change Order.
  - 3. Unit prices.
  - 4. Deductions for defective Work that has been accepted by the Owner.
  - 5. Penalties and bonuses.
  - 6. Deductions for liquidated damages.
  - 7. Deductions for re-inspection payments per Paragraph 1.05.
  - 8. Other adjustments.
- B. Owner or Engineer shall prepare a final Change Order, reflecting the approved adjustments to the Contract amount which have not been covered by previously approved Change Orders.
- C. Submit the final Application for Payment per the General Conditions, including the final Change Order.

#### 1.08 TRANSFER OF UTILITIES

- A. Transfer utilities to the Owner when the Substantial Completion has been issued, final cleaning has been completed and the Work has been accepted by the Owner.
- B. Submit final meter readings for utilities and similar data as of the date the Owner occupied the Work.



## 1.09 WARRANTIES, BONDS, AND SERVICES AGREEMENTS

- A. Provide warranties, bonds, and service agreements required by Section 01 33 00 "Submittal Procedures" or by the individual Sections of the Specifications.
- B. The date for the start of warranties, bonds, and service agreements is established per the General Conditions.
- C. Compile warranties, bonds, and service agreements and review these documents for compliance with the Contract Documents.
  - 1. Each document is to be signed by the respective manufacturer, Supplier, and Subcontractor.
  - 2. Each document is to include:
    - a. The product or Work item description.
    - b. The firm, with the name of the principal, address, and telephone number.
    - c. Scope of warranty, bond or services agreement.
    - d. Date, duration, and expiration date for each warranty bond and service agreement.
    - e. Procedures to be followed in the event of a failure.
    - f. Specific instances that might invalidate the warranty or bond.
- D. Submit two copies of each document to the Engineer for review and transmittal to the Owner.
  - 1. Submit duplicate sets.
  - 2. Documents are to be submitted on 8-1/2 x 11 paper, punched for a standard three-ring binder.
  - 3. Submit each set in a commercial quality three-ring binder with a durable and cleanable plastic cover. The title "Warranties, Bonds, and Services Agreements", the Project name and the name of the Contractor are to be typed and affixed to the cover.
- E. Submit warranties, bonds and services agreements:
  - 1. At the time of final completion and before final payment.
  - 2. Within 10 days after inspection and acceptance for equipment or components placed in service during the progress of construction.

## 1.10 CLAIMS AND DISPUTES

- A. Claims and disputes must be resolved prior to recommendations of final payment. Acceptance and final payment by the Contractor will indicate that any outstanding Claims or disputed issues have been resolved to the full satisfaction of the Contractor.

**END OF SECTION**

## **01 74 23 FINAL CLEANING**

### **1.00 GENERAL**

- A. This Section specifies administrative and procedural requirements for final cleaning at Substantial Completion.

### **1.02 WORK INCLUDED**

- A. Perform a thorough cleaning of the Site, buildings, or other structures prior to Owner occupancy of the buildings, and prior to final completion. Leave the Project clean and ready for occupancy.

### **1.03 SUBMITTALS**

- A. Provide data for maintenance per Section 01 78 23 "Operation and Maintenance Data."

### **1.04 QUALITY CONTROL**

- A. Use experienced workmen or professional cleaners for final cleaning.

## **2.00 PRODUCTS**

### **2.01 MATERIALS**

- A. Furnish the labor and products needed for cleaning and finishing as recommended by the manufacturer of the surface material being cleaned.
- B. Use cleaning products only on the surfaces recommended by the Supplier.
- C. Use only those cleaning products which will not create hazards to health or property and which will not damage surfaces.

## **3.00 EXECUTION**

### **3.01 FINAL CLEANING**

- A. Thoroughly clean the entire Site and make ready for occupancy.
  - 1. Remove construction debris, boxes, and trash from the Site.
  - 2. Remove construction storage sheds and field offices.
  - 3. Restore grade to match surrounding condition and remove excess dirt.
  - 4. Sweep all drives and parking lots clean of dirt and debris. Use water truck or hose down paved site to like new appearance.
- B. Clean floors and inspect for damage.
  - 1. Remove oil, grease, paint drippings, and other contaminants from floors, then mop repeatedly until thoroughly clean. Replace damaged flooring.

2. Clean resilient flooring with an approved cleaner and apply one coat liquid floor polish as recommended by the flooring Supplier. Polish to a buffed appearance with powered floor buffer.
  3. Vacuum all carpets with powered floor sweeper to remove dirt and dust. Remove glue or other substances from nap of carpet.
- C. Clean and polish inside and outside glass surfaces. Wash with window cleaner and water, apply a coat of high quality glass polish and wipe clean. Do not scratch or otherwise mar glass surfaces.
  - D. Clean wall surfaces to remove dirt or scuff marks. Remove excess adhesive along top edges of wall base. Remove adhesive from surfaces of vinyl wall coverings.
  - E. Align tile to fit properly in grid and replace cracked or damaged tile. Remove smear marks and other dirt from tile and clean surface of grid system.
  - F. Spot paint nicks and other damage. If spot-painting does not blend into the existing color and texture of the surrounding surfaces, repaint wall from inside corner to inside corner. Touch up damaged surfaces on factory finished equipment using special paint furnished by the manufacturer.
  - G. Clean plumbing fixtures, valves, and trim. Clean toilet seats and covers. Remove labels and adhesive from fixtures. Remove floor drains and clean baskets or buckets. Polish strainers and exposed chrome or brass.
  - H. Remove dirt, oil, grease, dust and other contaminants from floors, equipment and apparatus in mechanical and electrical rooms with vacuum.
  - I. Clean and polish ceramic tile floors and wall surfaces to remove mildew or other stains. Tuck point defective joints.
  - J. Inspect exterior painted surfaces. Spot paint any damaged surfaces.
  - K. Clean permanent filters and replace disposable filters on heating, ventilating, and air conditioning systems. Clean ducts, blowers, and coils if units were operated without filters during construction.
  - L. Clean roof areas of debris; flush roof drainage systems with water until clear.
  - M. Broom clean exterior paved surfaces and rake clean other surfaces of the grounds.
  - N. Clean and polish all electrical equipment and exposed conduits. Remove paint overspray. Provide a blemish free appearance on all exposed equipment and conduits.

## END OF SECTION

## **01 75 00      STARTING AND ADJUSTING**

### **1.00    GENERAL**

#### **1.01    WORK INCLUDED**

- A. Provide step-by-step procedures for starting provided systems, including equipment, pumps and processes.
- B. Provide pre-startup inspections by equipment manufacturers.
- C. Provide instruction and demonstration of operation, adjustment, and maintenance of each system and the component parts.
- D. Place each system in service and operate the system to prove performance and to provide for initial correction of defects in workmanship, calibration, and operation.
- E. Provide for initial maintenance and operation.

#### **1.02    SUBMITTALS**

- A. Provide Submittals in accordance with Section 01 33 00 "Submittal Procedures."
  - 1. Provide a Plan of Action for testing, checking, and starting major equipment and process piping systems. Submit reports as required by this Section.
  - 2. Provide Equipment Installation Reports on form shown in Section 01 31 13.13 "Forms" per Section 01 33 00 "Submittal Procedures."
  - 3. Provide Operation and Maintenance Manuals per Section 01 78 23 "Operation and Maintenance Data."

#### **1.03    STANDARDS**

- A. Comply with any standards associated with the testing or startup of equipment, as listed in the various Sections of the Specifications.

#### **1.04    SPECIAL JOB CONDITIONS**

- A. Do not start or test any apparatus until the complete unit has been installed and thoroughly checked.
- B. Furnish the services of a representative of the Supplier to witness tests and startup procedures as required by the Specifications.

### **2.00    PRODUCTS**

#### **2.01    TESTING INSTRUMENTATION**

- A. Furnish any instrumentation or other testing devices needed to conduct tests.

### **3.00 EXECUTION**

#### **3.01 SERVICES OF SUPPLIER'S REPRESENTATIVES**

- A. Provide the services of a Supplier's representative for inspection, supervision of installation, and training. Supervisor's representative must be an experienced and competent technical (not sales) representative of the Supplier.
- B. Perform installation, adjustment, and testing of the equipment under the direct supervision of the Supplier's representative where specified.
- C. Provide the services of the Supplier's representative to instruct the Owner or his authorized personnel on operational procedures and maintenance requirements.
- D. Include the cost of the services of the Supplier's representative in the equipment price which is included in the Contract Price.

#### **3.02 INSPECTION AND STARTUP**

- A. Inspect equipment prior to placing any equipment or system into operation. Make adjustments as necessary for proper operation.
  - 1. Check for adequate and proper lubrication.
  - 2. Determine that parts or components are free from undue stress from structural members, piping or anchorage.
  - 3. Adjust equipment for proper balance and operations.
  - 4. Determine that vibrations are within acceptable limits.
  - 5. Determine that equipment operates properly under full load conditions.
  - 6. Determine that the equipment is in true alignment.
- B. Have the Supplier's representative present when the equipment is placed in operation.
  - 1. The Supplier is to be on-Site as often as necessary for proper and trouble free operation.
  - 2. Ensure that the proper procedure is employed in startup of systems.
- C. Provide Equipment Installation Reports for Equipment on the form indicated in Section 01 31 13.13 "Forms."
  - 1. Certify that the equipment and related appurtenances have been thoroughly examined and approved for startup and operation.
  - 2. Include the date when Owner's personnel were instructed in the proper operation and maintenance of the equipment in the report.

#### **3.03 STARTING REQUIREMENTS**

- A. Refer to the individual Sections of the Specifications for specific startup procedures.

### 3.04 INITIAL OPERATION

- A. Start, test, and place equipment and systems into operation for 30 days to allow the Owner and Engineer to observe the operation and overall performance of the equipment and to determine that controls function as intended.
- B. Equipment which operates on a limited or part-time basis shall be operated in the presence of the Engineer to demonstrate that controls function as specified.
- C. Perform acceptance test as specified in individual Sections of the Specifications. Demonstrate that equipment and systems meet the specified performance criteria.
- D. Unless specifically stated otherwise in the individual equipment Specifications, equipment and systems are not Substantially Complete until the end of this initial operation period. If an exception to this requirement is specifically noted in an individual equipment Specification, the exception shall only apply to that particular piece of equipment and not to the remaining components provided under the Project.

### 3.05 OPERATOR TRAINING

- A. Provide instruction and demonstration of the care and operation of the equipment to the Owner's personnel. Instruction is to include classroom and hands-on training.
- B. Provide training in adequate detail to ensure that the trainees who complete the program will be qualified and capable of operating and maintaining the equipment, products, and systems provided.
- C. Operations training is to include but not be limited to:
  - 1. Orientation to provide an overview of system/subsystem configuration and operation
  - 2. Terminology, nomenclature, and display symbols.
  - 3. Operations theory.
  - 4. Equipment appearance, functions, concepts, and operation.
  - 5. Operating modes, practices and procedures under normal, diminished, and emergency conditions.
  - 6. Startup and shutdown procedures.
  - 7. Safety precautions.
  - 8. On-the-job operating experience for monitoring functions, supervisory, or command activities. Include functions and activities associated with diminished operating modes, failure recognition, and responses to system/subsystem and recovery procedures.
  - 9. Content and use of Operation and Maintenance manuals and related reference materials.
- D. Provide training for performing on-Site routine, preventive, and remedial maintenance of the equipment, product, or system. Maintenance training is to include but not be limited to:
  - 1. Orientation to provide an overview of system/subsystem concept, configuration, and operation.

2. Operations theory and interfaces.
  3. Instructions necessary to ensure a basic theoretical and practical understanding of equipment appearance, layout and functions.
  4. Safety precautions.
  5. Use of standard and special tools and test equipment.
  6. Adjustment, calibration, and use of related test equipment.
  7. Detailed preventive maintenance activities.
  8. Troubleshooting, diagnostics, and testing.
  9. Equipment assembly and disassembly.
  10. Repair and parts replacement.
  11. Parts ordering practices and storage.
  12. Failure and recovery procedures.
  13. Cabling and/or interface connectors.
  14. Content and use of Operation and Maintenance Manuals and related reference materials.
  15. Procedures for warranty repairs.
  16. Lubrication.
  17. Procedures, practices, documentation, and materials required to commence system maintenance.
- E. Provide a training plan that indicates the schedule and sequence of the training programs. The training plan is to include for each course:
1. Number of hours for the course.
  2. Agenda and narrative description, including the defined objectives for each lesson.
  3. Draft copy of training handbooks.
  4. A descriptive listing of suggested reference publications.
  5. Audio-visual equipment required for training.
  6. Type and number of tools or test equipment required for each training session.
- F. Provide and use training aids to complement the instruction and enhance learning.
1. Provide training handbooks for use in both the classroom and the hands-on phases of training for each course.
  2. Provide instructional materials which include references to the Operation and Maintenance Manuals and identify and explain the use of the manual.
  3. Provide a copy of all audio/visual training materials used in the presentations.
- G. Provide qualified instructors to conduct the training.

1. Provide instructors with knowledge of the theory of operation and practical experience with the equipment, product, or system.
  2. Provide instructors that have successfully conducted similar training courses.
- H. Training may be recorded by the Owner or its consultants for use in future training. Provide legal releases or pay additional fees required to allow training by the Supplier to be recorded.
- I. Schedule for training is to be approved by Owner.
1. Schedule training and startup operations for no more than one piece of equipment or system at a time.
  2. Owner may require re-scheduling of training if operations personnel are not available for training on a scheduled date.
  3. Provide a minimum of 2 weeks' notice if training must be rescheduled.
  4. Training is to be limited to 24 hours per week.
  5. Time required for training is to be considered in the development of the Project schedule.
- J. Schedule and coordinate training for equipment, products, or systems which depend upon other equipment or systems for proper operation so that trainees can be made familiar with the operation and maintenance of the entire operating system.
- K. Conduct a training course for the equipment products and systems provided. Training is to be adequate to meet the training objectives described above and is to be for at least the minimum time indicated.

### 3.06 INITIAL MAINTENANCE

- A. Maintain equipment until the Project is accepted by the Owner.
1. Insure that mechanical equipment is properly greased, oiled, or otherwise cared for as recommended by the Supplier.
  2. Operate air handling equipment only when filters are in place and are clean. Change filters weekly during construction.
- B. Service equipment per the Supplier's instructions immediately before releasing the equipment to the Owner.
1. Replace replaceable filters and clean permanent filters associated with air handling units or other packaged equipment.
  2. Remove and clean screens at strainers in piping systems.
  3. Clean insects from intake louver screens.

**END OF SECTION**



## **01 78 23      OPERATION AND MAINTENANCE DATA**

### **1.00    GENERAL**

#### **1.01    WORK INCLUDED**

- A. Prepare a complete and detailed Operation and Maintenance Manual for each type and model of equipment or product furnished and installed under this Contract.
- B. Prepare the manuals in the form of an instruction manual for the Owner. The manual is to be suitable for use in providing operation and maintenance instruction as required by Section 01 75 00 "Starting and Adjusting."
- C. Provide complete and detailed information specifically for the products or systems provided for this Project. Include the information required to operate and maintain the product or system.
- D. Manuals are to be in addition to any information packed with or attached to the product when delivered. This information is to be taken from the product and provided as an attachment to the manual.

#### **1.02    SUBMITTALS**

- A. Submit manuals in accordance with Section 01 33 00 "Submittal Procedures." Attach to each manual a copy of the Operation and Maintenance Manual Review Form as shown in Section 01 31 13.13 "Forms" with pertinent information completed.

#### **1.03    GUARANTEES**

- A. Provide copies of the manufacturer's warranties, guarantees, or service agreements in accordance with Section 01 70 00 "Execution and Closeout Requirements."

### **2.00    PRODUCTS**

#### **2.01    MATERIALS**

- A. Print manuals on heavy, first quality paper.
  - 1. Paper shall be 8-1/2 x 11 paper.
    - a. Reduce drawings and diagrams to 8-1/2 x 11 paper size.
    - b. When reduction is not practical, fold drawings and place each separately in a clear, super heavy weight, top loading polypropylene sheet protector designed for ring binder use. Provide a typed identification label on each sheet protector.
  - 2. Punch paper for standard three-ring binders.
- B. Place manuals in Wilson Jones 385 Line D-Ring Dlublock Presentation Binders.
  - 1. Binders are to have clear front, back, and spine covers.
  - 2. Sheet lifters are to be provided.
  - 3. Minimum size is 2-inch capacity. Maximum size is 3-inch capacity.

- C. Provide tab indexes for each section of the manual.
  - 1. Indexes are to be constructed of heavy-duty paper with a reinforced binding edge and punched with 9/32-inch holes to fit the binders.
  - 2. Index is to have clear insertable tabs for a typed insert.
- D. Provide indexed PDF version of manual on a CD.
- E. Provide a parts list on a CD in Microsoft Excel format which includes all information required by Paragraph 3.02.

### **3.00 EXECUTION**

#### **3.01 MANUAL ORGANIZATION AND CONTENTS**

- A. Provide a Table of Contents listing each section of the manual for each product or system.
  - 1. Identify each product or system using the nomenclature shown in the Contract Documents.
  - 2. Assign a number and letter to each section in the manual.
    - a. Assign a number to each product or system. The number is to correspond to the Owner's equipment numbering system or other system designated by the Engineer.
    - b. A cross reference is to be provided for the Owner's numbering system and designations for equipment indicated in the Contract Documents.
    - c. The letter assigned will represent the part of the manual, consistent with the manual contents as required by Paragraph 3.02.
  - 3. Provide index tabs for each section in the manual.
  - 4. The designation on each index tab is to correspond to the number and letter assigned in the Table of Contents.
- B. Include only the information that pertains to the product described. Annotate each sheet to:
  - 1. Clearly identify the specific product or component installed.
  - 2. Clearly identify the data applicable to the installation.
  - 3. Delete reference to inapplicable information.
- C. Supplement manual information with drawings as necessary to clearly illustrate relations of component parts of equipment and systems, and control and flow diagrams.
- D. Identify each manual by placing a printed cover sheet in the front cover of the binder and as the first page in the manual. The first page is to be placed in a clear polypropylene sheet protector. The information on first page and the cover page are to include:
  - 1. Name of Owner.
  - 2. Project name.
  - 3. Volume number.

4. The Table of Contents for that volume.
- E. Insert the Table of Contents into the spine of each manual.
- F. Manuals for several products or systems may be provided in the same binder.
  1. Sections for each product or system must be included in the same binder.
  2. Sections must be in numerical order from volume to volume.
- G. Correlate the data into related groups when multiple binders are used.
- H. Fill binders to only three/fourths of its indicated capacity to allow for addition of materials to each binder by the Owner.

### 3.02 EQUIPMENT AND SYSTEMS MANUAL CONTENT

- A. Manual shall provide the following information:
  1. A description of the unit and component parts.
  2. Operating instructions for startup, normal operations, regulation, control, shutdown, emergency conditions, and limiting operating conditions.
  3. Maintenance instructions including assembly, installation, alignment, adjustment, and checking instructions.
  4. Lubrication schedule and lubrication procedures. Include a cross reference for recommended lubrication products.
  5. Troubleshooting guide.
  6. Schedule of routine maintenance requirements.
  7. Description of sequence of operation by the control manufacturer.
  8. Warnings for detrimental maintenance practices.
  9. Parts lists including:
    - a. Part numbers for ordering new parts.
    - b. Assembly illustrations showing an exploded view of the complex parts of the product.
    - c. Predicted life of parts subject to wear.
    - d. List of the manufacturer's recommended spare parts, current prices with effective date and number of parts recommended for storage.
    - e. Directory of a local source of supply for parts with company name, address, and telephone number.
    - f. Complete nomenclature and list of commercial replacement parts.
  10. Outline cross-section and assembly drawings, engineering data, test data, and performance curves.
  11. Control schematics and point to point wiring diagrams prepared for field installation, including circuit directories of panel boards and terminal strips.

12. Other information as may be required by the individual sections of the Specifications.

3.03 LIST OF SERVICE ORGANIZATIONS

- A. Provide a directory of authorized service organizations with company name, address, telephone number, and the contact person for warranty repair.

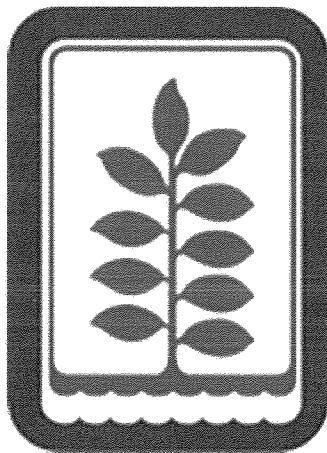
**END OF SECTION**

## **APPENDIX A**

### **AVAILABLE BACKGROUND INFORMATION**



Innovative approaches  
Practical results  
Outstanding service



# **Design Report for Lower Bois d'Arc Creek Reservoir Raw Water Pipeline (Project No. 317)**

Prepared for:

North Texas Municipal Water District

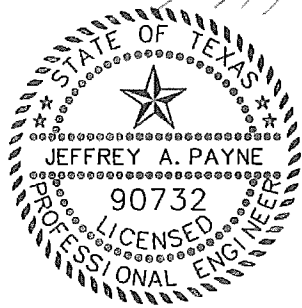
Prepared by:

**FREESE AND NICHOLS, INC.**  
2711 North Haskell Avenue, Suite 3300  
Dallas, Texas 75204  
214-217-2200  
NTD13136

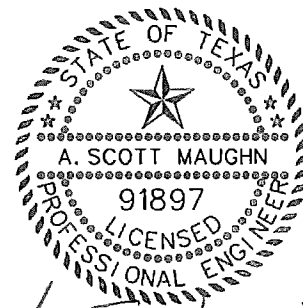
# Design Report for Lower Bois d'Arc Creek Reservoir Raw Water Pipeline (Project No. 317)


Prepared for: North Texas Municipal Water District

2/13/14 



FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
ENGINEERING FIRM  
F-2144



 2/13/14

FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
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NTD13136

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## INTRODUCTION

The North Texas Municipal Water District (NTMWD) will be constructing raw water transmission facilities as part of the Lower Bois d'Arc Creek Reservoir (LBCR) Project. These facilities include a raw water intake pump station at the proposed Lower Bois d'Arc Creek Reservoir, a terminal storage reservoir located near Leonard, Texas, and approximately 36 miles of 90-inch raw water pipeline. These raw water transmission projects will be part of an overall system of raw water storage and transmission facilities that will be included in the United States Army Corps of Engineers (USACE) 404 Permit required for the for the construction of LBCR.

By contract dated January 30, 2013, the NTMWD authorized Freese and Nichols, Inc. (FNI) to perform raw water transmission studies and to identify locations for various raw water facilities for Project No. 317 which is the LBCR Final Pipeline Alignment Study and referred to as the "The Project" in this report. Final design and construction will require a separate NTMWD Board Authorization in the future. The purpose of this Preliminary Design Report (PDR) is to summarize the raw water transmission studies, document the technical decisions that were made, and provide FNI's recommendation for the LBCR Raw Water Pipeline alignment. The LBCR Raw Water Pipeline alignment has been split into three design sections that are labeled as Section A, B and C. Section A begins at the proposed LBCR dam and continues south to State Highway (SH) 56. Section B spans from SH 56 to Farm to Market Road (FM) 68. Section C continues from FM 68 to the proposed North Water Treatment Plant (NWTP) site near Leonard, Texas.

This PDR is organized into three primary sections. These sections and their content are summarized below;

- Section 1.0 – Corridor Study – Section A North of 82: This section summarizes the corridor analysis performed for the portion of Section A affected by the decision to move the pump station to the LBCR Dam. This section directs the reader to the Appendices discussing the details of the corridor selection process.
- Section 2.0 – Pipeline Alignment: This section summarizes the overall alignment of the pipeline and directs the reader to the Appendices and a series of technical alignment selection memorandums discussing the details of the alignment selection process.
- Section 3.0 – Preliminary System Hydraulics and Pipe Diameters: This section discusses the

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various hydraulic scenarios that were analyzed to determine pipe diameters, interconnections, and design flow rates. This section also discusses sending water from the North Water Treatment Plant near Leonard to Wylie.

## **1.0 CORRIDOR STUDY – SECTION A NORTH OF US 82**

### **1.1 SECTION A – NORTH OF US 82**

#### **1.1.1 Introduction**

The corridor for Section A, north of US Highway 82 (US 82), of the LBCR Raw Water Pipeline is defined as a 1,000 foot wide path following a possible pipeline centerline. Once the corridor is selected, the final alignment of the proposed pipeline will be selected from within the chosen corridor. This memo discusses the overall project constraints used to determine the recommended corridor. Selection of the preferred corridor was based on a “desktop” analysis of economic and non-economic factors for various route options. The recommended corridor, documented herein, is used to identify parcels needed for Right-of-Entry (ROE) and is used as a baseline for the first stages of field work and alignment development. The following general parameters were adopted to generate acceptable corridors:

1. Avoid or minimize environmental permitting potential.
2. Align beginning with the proposed Pump Station Site Options.
3. Align end with beginning of Section B.
4. Minimize pipeline length where it does not impact other parameters
5. Minimize impact to landowners along corridor.

This portion of Section A of the LBCR Pipeline is being rerouted due to a decision by the NTMWD to move the pump station site to a location at or near the proposed dam. The shift in the proposed pump station site is also why this Corridor Study is being included in the PDR. Moving the pump station site caused the original Corridor north of US 82 that had been documented and approved via the Technical Memorandum titled “LBCR Conceptual Raw Water Transmission Facilities Design: 404 Permitting Pipeline Route Study, Recommended Pipeline Routes” dated March 11, 2008 to be shifted. The corridors documented and approved via that same Technical Memorandum for south of US 82 on Section A and all of Sections B and C were not affected. The proposed dam will be located approximately 9 miles north-northwest of Honey Grove, Texas. With Section A now beginning at the dam, there are two feasible approaches for the corridor study. The first approach crosses the Honey

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Grove Creek arm of the reservoir and the other would be to travel around that arm of the reservoir. The pipeline will begin by heading southeast around the main body of the reservoir. Generally speaking, the pipeline will then head southwest towards the connection point with Section B just east of the intersection of FM 867 and SH 56.

### 1.1.2 Corridor Alternatives

Five corridors were developed north of US 82 to access the pump station site. The five corridors selected are shown on **Figure 1**. Corridor A1 is shown in dark green, Corridor A2 is shown in red, Corridor A3A is shown in purple and Corridor A3 is shown in teal. Corridor B is shown in lime green. All five corridors share a similar path heading southeast around the main body of the reservoir until

Corridor A1 begins heading south to join up with Corridor A2. Corridor A2 diverges from Corridor B and then heads southwest to cross the Honey Grove Creek arm of the reservoir. Corridor A2 continues heading southwest for approximately five miles where it converges with Corridor B just south of US 82. Corridor A3A continues heading south where Corridor A1 converges with Corridor A2. Corridor A3A then crosses the reservoir at a narrower point than Corridor A2. After crossing the reservoir Corridor A3A turns and heads southwest and converges with Corridor A3. Corridor A3 separates from Corridor A2 shortly after Corridor A2 crosses the reservoir. Corridor A3 then heads on a more south-southwesterly heading than Corridor A2 in order to by-pass a large swath of densely wooded areas with numerous creek crossings and several



Figure 1 – Overall Segment A Corridor Map



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potential environmentally sensitive areas. Corridor A2 then converges with Corridor B just south of the US 82. Corridor B begins by heading southeast around the main body and the Honey Grove Creek arm of the reservoir that the other corridors cut across. Once Corridor B clears the large arm of the reservoir, it heads due south for approximately two miles crossing a smaller finger of the reservoir. Corridor B then turns and begins heading southwest for approximately five miles where it converges with Corridor A2 just south of US 82. The final portion of Section A is approximately five miles long and heads southwest towards the connection point with Section B. The location shown for the pump station represents the approximate pump station site selected by the NTMWD on the service spillway.

### **1.1.3 Detailed Corridor Analysis**

The shared beginning of these corridors has only minor issues and is partially contained in land that will be purchased for the reservoir and spillway. The corridor begins by heading southwest from the pump station site. The corridor travels through mostly open cultivated land before going through a densely wooded area. After coming out of the densely wooded area the terrain opens up to uncultivated land with a few abandoned structures. The corridor then crosses County Road (CR) 2725 and it is at this point where Corridors A1 and B diverge. Overall this portion of the corridor has no apparent environmentally sensitive areas, or major transportation and known utility crossings.

As Corridor A1 heads south it follows along the west side of CR 2725/2730 traveling through sparsely wooded open land. As it follows along CR 2725/2730 the corridor comes upon three houses with cultivated lands. Corridor A1 then crosses CR 2730 before traveling into a densely wooded area where it joins up with Corridor A2. Overall this possible corridor has no apparent environmentally sensitive areas that can be identified at this level of analysis. Corridor A1 cuts off about 2,000 feet of corridor as a shortcut to connect with Corridor A2.

As Corridor A2 heads southwest after separating from Corridor B it comes in close proximity (approximately 500') to a family cemetery. It is near this point where Corridor A2 encounters a densely wooded area. After clearing the wooded area the terrain opens back up to cultivated land. In this area Corridor A2 also crosses CR 2740 just before crossing the Honey Grove Creek arm of the reservoir. Corridor A2 has two possible methods of installation within this corridor to cross the reservoir. One option is to install this section of pipeline by open cut with a casing or tunnel liner plate, and the other option is an aerial crossing, which will be discussed in subsequent sections. This arm of the reservoir is

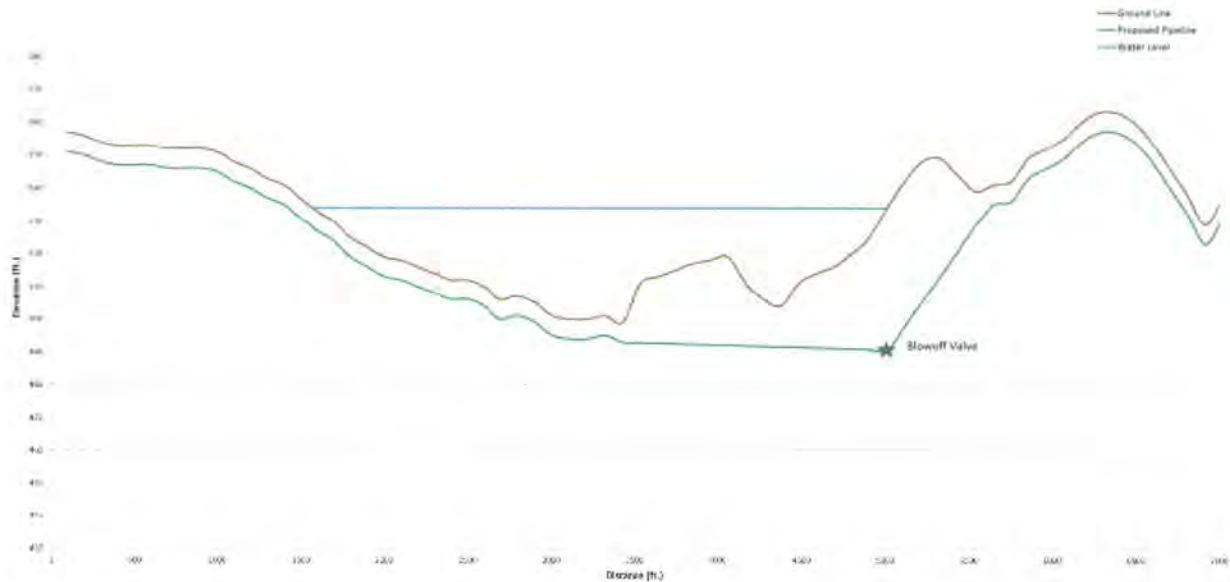
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approximately 4,600 feet wide based on the spillway elevation of the reservoir which is at the 534 foot reservoir contour shown in **Figure 1**.

Both options include additional costs beyond the standard installation price per linear foot. These costs are shown in detail in **Tables 4 & 5**.

After the reservoir crossing, Corridor A2 continues to travel southwest and crosses CR 2745 and FM 1396. Immediately after crossing FM 1396, there are five abandoned structures in a wooded area that shows signs of being a potential forested wetland. The environmental analysis performed for the corridor study will be discussed later in **Section 1.1.4 "Environmental Analysis"** of this report. The corridor continues through this wooded area passing through two small plots of cultivated land with houses on each. After this, the corridor heads into a large densely wooded area which Yoakum Creek is located. This area shows signs of potential environmental issues associated with the creek and wooded area. The terrain then briefly opens up into a small cultivated area. In this clearing the corridor also crosses an electrical transmission corridor before entering a sparsely wooded area around Ward Creek that has been flagged as a possible forested wetland. The corridor then crosses through a clearing of uncultivated land before it encounters another sparsely wooded area. As the corridor continues southwest out of the sparsely wooded area, the terrain once again opens up into a clearing. In this clearing the corridor crosses an Atmos 10" transmission gas line. As the corridor continues it passes in between two houses and a small stock tank. There is approximately 900 feet between the two houses. The corridor then crosses US 82 and converges with Corridor B just after crossing FM 1743.

For the portion of the corridor crossing the reservoir, the buried option has inherent maintenance and design concerns. The maintenance issue associated with a long submerged crossing like this is access to the pipe to perform repairs and maintenance throughout the life of the pipeline. With access being the biggest maintenance concern, FNI has provided a conceptual profile view of the reservoir crossing showing a blow-off valve to drain this section of pipe. Along with a manway for access, this would allow for maintenance and repairs on the pipe to be performed from the inside. Also, the annular space between the liner plate and pipe would be grouted for increased stiffness and protection. The constructability issues with this method are that the blow-off valve would be over 40 feet deep and there would be about 1,200 feet of pipe that would be buried deeper than 20 feet. The profile is shown in **Figure 2**.



**Figure 2 – Corridor A2 LBCR Crossing Profile**

Another possible design concern with a submerged pipe is floating of the pipe. This would be of concern while the reservoir is being impounded or when the pipe is dewatered for maintenance. This buoyancy issue has been analyzed with the following assumptions being made. The weight of the pipe, liner plate and the grout in the void between the pipe and liner plate were ignored as an additional factor of safety. The buoyancy force used in the calculations is the air volume for the cross section of the liner plate and not the carrier pipe. All of the above assumptions were used to provide a conservative answer for the required depth of cover. The analysis indicated that with the suggested factor of safety of greater than 1.47 the pipe would need to be buried with a minimum of six feet of cover. For reference, the buoyancy calculations have been included in **Appendix A**.

The aerial crossing option would also have inherent maintenance and design concerns. The maintenance issues associated with an aerial crossing are that the exterior of the pipe would be exposed to a wider array of elements than if it was buried, and the pipe is more vulnerable to major weather events. The constant exposure to the elements could cause accelerated deterioration of the exterior pipe coating, resulting in additional work, in the form of recoating to maintain the exterior coating in order to avoid negatively affecting the design life of the pipe. The aerial crossing developed for this corridor option was a 24 foot wide bridge with vehicle access for maintenance and 100 foot spans.

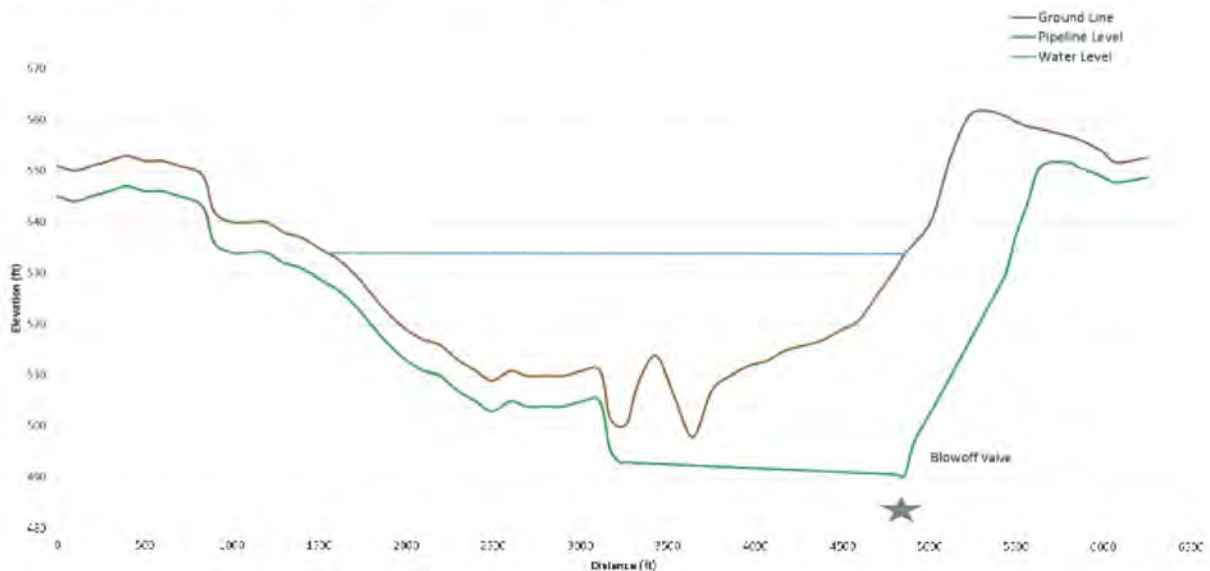
The aerial crossing is significantly more expensive than the buried option, approximately \$15 million. If



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the corridor crossing the reservoir is chosen, FNI would recommend the buried option for two reasons. It would be less expensive both in the construction phase and maintenance phase of the pipeline and the previously mentioned design and maintenance concerns that the aerial option presents.

Another option for crossing the proposed reservoir is Corridor A3A which continues south at the convergence of Corridor A1 and A2. Corridor A3A then crosses the reservoir arm south of the Corridor A2 reservoir crossing location. After crossing the reservoir, Corridor A3A travels through open uncultivated land before turning southwest. Shortly after turning southwest, Corridor A3A crosses through a wooded area that does not appear to present any environmental issues. During this wooded area the corridor encounters several small ponds, abandoned structures and one house. After passing through the wooded area, the terrain opens up into uncultivated land and converges with Corridor A3 just west of FM 1396. Overall this alignment avoids environmental concerns, shortens the reservoir crossing by approximately 1,000 feet and shallows out the conceptual pipe profile in comparison to Corridor A2. The profile can be seen below in **Figure 3**.



**Figure 3 – Corridor A3A LBCR Crossing Profile**

Corridor A3 separates from Corridor A2 south of the reservoir crossing and then heads south following through mostly open fields before crossing FM 1396. After crossing FM 1396, the corridor follows just to the west of FM 1396 to avoid the houses near the road. The corridor then travels through sparsely wooded areas before crossing CR 2980. After crossing CR 2980, the terrain changes to a mix of uncultivated and cultivated land and the corridor turns heading southwest. While in this open land the

corridor crosses an Oncor electrical transmission corridor. The A3 corridor continues to head southwest crossing Yoakum Creek and associated riparian zone. This crossing at Yoakum Creek shows signs of potential environmental issues. After crossing the creek the corridor continues southwest across open and cultivated fields. Corridor A3 then crosses Ward Creek near its headwaters, which also shows signs of potential environmental issues. The corridor then continues through open land where it crosses an Atmos 10" transmission gas line. The corridor then crosses CR 2992 shortly before converging with Corridor B. Overall Corridor A3 travels mostly through open and cultivated fields. The locations where it does cross creeks is upstream of Corridor A2 and the riparian zones of the creeks are smaller therefore minimizing the possible environmental impact of the pipeline.

As Corridor B separates from Corridor A1 and continues to head southeast, it travels through a small patch of densely wooded area before crossing through a cultivated field. The corridor then encounters a house and barn located within a densely wooded area just south of the junction of Corridors A2 and B. As the corridor continues heading southeast, it conflicts with a house and several small sheds as well as several ponds before turning to head south. Soon after turning south and going through a clearing, the corridor crosses a small tributary that feeds the reservoir. After clearing the small tributary, the corridor continues through open land and cultivated fields for another mile until crossing a tributary of Honey Grove Creek and turning and to head southwest. Shortly after this change in direction the corridor crosses Honey Grove Creek. These creek crossings may have some environmentally sensitive areas. The corridor then crosses an Oncor electrical transmission corridor as it travels through open land. Shortly after crossing the Oncor electrical transmission corridor, the corridor runs between a house and a large stock tank that has approximately 350 feet of clearance between the two obstacles. The corridor continues heading southwest through mostly open land. Then, just before crossing FM 1396 the corridor crosses three small tributaries and their respective riparian zones. Initial analysis indicates this area may be environmentally sensitive. The corridor then crosses FM 1396 traveling mostly through open and cultivated land before crossing Ward Creek near its headwaters and its corresponding riparian zone. The corridor then travels through open land and cultivated fields. During this portion of the corridor, Corridor B crosses an Atmos 10" transmission gas line before converging with Corridor A3. Soon after converging with Corridor A3, Corridor B encounters two houses and several sheds which shall be avoided. The corridor then crosses US 82 at the CR 2989 intersection. Shortly after this the corridor converges with Corridor A2 just south of FM 1743. Overall Corridor B travels through mostly open lands

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or cultivated fields; however, the corridor does include several creek crossings due to Corridor B intersecting the creeks before they converge with one another downstream. This also means that the crossing of the creeks and the respective riparian zones are not as wide as after they converge.

The Shared Southern Corridor has not changed significantly since it was first proposed. At this point the corridors have converged just south of FM 1743. Shortly after they converge, the shared corridor crosses a 3" Atmos distribution line supplying the town of Windom. The corridor then travels through a sparsely wooded area to a more densely wooded area that contains a seasonally flooded creek bed. The shared corridor continues heading southwest through mostly open land with a minor creek crossing. The corridor travels between two adjacent homes with the centerline of the shared corridor approximately 200 feet from either house. Shortly after passing between the houses, there is a creek crossing with associated riparian zones that are not believed to be wetlands. The corridor then travels across open pasture land with a barn and holding pens. Shortly after passing the barn, the shared corridor then crosses Bullard creek just downstream of where Burnett Creek and Bullard Creek converge. The shared corridor then travels through mostly open land and some sporadically wooded areas as the corridor parallels a small creek approximately 400 feet from the centerline of the corridor. The shared corridor then turns and heads due south towards SH 56 to make the connection with Section B. Overall the shared southern corridor travels mostly through open pastures and cultivated land with limited environmental concerns

#### **1.1.4 Environmental Analysis**

During the preliminary environmental analysis of the proposed corridors, several areas of concern were identified related to Section 404 permitting. These areas consisted of crossings through potential forested wetland areas as well as areas where the proposed corridor appears to be within, and run parallel to, existing stream beds and crossings at locations where two or more streams converge. The types of data utilized to identify these sites included existing aerial photography, the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data, and U.S. Geological Survey (USGS) 7.5-minute topographic maps. It should be noted that these areas were identified at a desktop level with no field work or on-site verification. A more definitive assessment of these sites would require on-site investigations by qualified biologists/environmental scientists to determine if these sites are wetlands (as defined by the USACE) and if the proposed corridor would be within, and parallel to, existing streams, or cross at the confluence of two or more streams.

### 1.1.5 Opinion of Probable Construction Cost

Below is a summary table of the Opinion of Probable Construction Cost (OPCC). **Table 1** shows length, landowner count, linear feet of pipe in a potential environmentally sensitive area, number of creek crossings, linear feet of pipe crossing under LBCR and the costs associated with the project: construction, land, and total corridor cost. Potential environmentally sensitive areas were defined as any low lying wooded areas and riparian zones in a specific corridor. Corridor A1 is shorter than Corridor A1-A3A by about 2,500 feet but it is only slightly less expensive. Corridor A1's reservoir crossing is 1,000 feet longer than Corridor A1-A3A's crossing and it travels through greater amounts of wooded areas resulting in an increased installation cost. Corridor A2-Aerial is the most expensive due to the cost associated with constructing a 24 foot wide bridge with vehicle access for maintenance and 100 foot spans. While Corridor B is significantly longer (approximately 11,000 feet on average) than the other corridors, it is not proportionally more expensive. Corridor B is roughly 15-20% longer than the other corridors but yields a cost only about 5-6% more than the other corridors (excluding the aerial crossing option). This is due to the substantial length of reservoir that the other corridors must cross.

**Table 1 – Analysis for Section A North of US 82 Conflict Areas**

Segment	Corridor A1	Corridor A2	Corridor A2 Aerial	Corridor A3	Corridor A1-A3	Corridor A1-A3A	Corridor B
Length	66,220	68,345	68,345	69,885	68,035	68,830	78,849
Landowner Count	47	56	56	54	45	48	62
Pipe in Potential Environmentally Sensitive Areas (ft)	22,273	22,827	22,698	13,434	12,662	13,861	18,022
Creek Crossings	9	8	8	5	6	7	11
Pipe Crossing under LBCR (ft)	4,485	4,485	0	4,485	4,485	3,677	0
Construction Cost	\$68,860,000	\$70,690,000	\$85,860,000	\$71,090,000	\$69,440,000	\$68,810,000	\$72,000,000
Land Cost	\$ 5,000,000	\$ 5,310,000	\$ 5,310,000	\$ 5,350,000	\$ 5,020,000	\$ 5,100,000	\$ 5,790,000
Total Corridor Cost	\$73,830,000	\$76,000,000	\$91,170,000	\$76,440,000	\$74,460,000	\$73,910,000	\$77,790,000

\*For further cost analysis data see **Tables 3-9**.

### 1.1.6 Recommendation Summary

FNI recommends Corridor B, as it avoids several possible forested wetland areas by crossing creeks farther upstream and eliminates crossing any large portion of the reservoir with minimal additional cost.

Per our discussion on June 21, 2013 with the NTMWD the additional operations and maintenance concerns associated with crossing under the reservoir outweigh the additional length and cost

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associated with this corridor. Corridor A2-Aerial also does not cross underneath the reservoir but the additional cost and recurring maintenance associated with the aerial crossing led to the ultimate selection of Corridor B.

**1.1.7 Corridor Crossings**

All known utility, transportation and creek crossings for Corridor B are listed below in **Table 2**.

**Table 2 – Major Transportation, Utility, and Creek Crossings**

<b>Road</b>
Fannin CR 2725
Fannin CR 2720
Fannin CR 2710
Fannin CR 2730
Fannin CR 2770
Fannin CR 2765
Farm to Market 1396
Fannin CR 2992
United States Route 82
Fannin CR 2989
Farm to Market 1743
<b>Utility</b>
Oncor Overhead Electric Transmission Lines
Atmos 10" Gas Distribution Line
<b>Waterbody</b>
Tributary of Honey Grove Creek
LBCR Finger (Fox Creek)
Tributary of Honey Grove Creek (2)
Honey Grove Creek
Tributary of Honey Grove Creek
Allen’s Creek
Tributary of Allen’s Creek (2)
Tributary of Ward Creek
Ward Creek



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### 1.1.8 Conflict Area Cost Analysis

Tables 3-9 on the following pages show a detailed breakdown of how the costs for each alternate were calculated. Land classification can be either rural or urban but for all of Section A it is rural which is shown as an "R" in the tables. The installation class coincides with the type of land the pipe is traveling through. For instance, Installation Class 1 is "Type 1-Open" which is used when the pipeline is traveling through open land and Installation Class 2 is "Type 2-Wooded" which is used when the pipeline is traveling through wooded land and the same relationship between type and installation class are true for the other installation classes. The line item described as "NTMWD Easement Land Cost Reduction" is meant to show the amount of easement that is to be subtracted from the total land costs because this portion of the line is on property that is already owned by the NTMWD.

**Table 3 – Corridor A1 Cost Analysis**

ORIGINAL ALIGNMENT	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST	
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	Appurtenances & Miscellaneous <sup>1</sup> [\$]
Type 1- Open	43,621	R	1	53.72	771	2,343,320	33,631,791	909,030
Type 2- Wooded	19,952	R	2	53.72	786	1,071,821	15,682,272	415,785
Type 3 - Creek Crossings	2,321	R	3	53.72	1211	124,684	2,810,731	48,368
Type 4 - Road/Parking Lot Crossings	126	R	4	53.72	1166	6,769	146,916	2,626
Type 5 - Bore or Tunnel Crossings	200	R	5	53.72	2015	10,744	403,000	4,168
Type 6 - Deep Cut (10-15' cover)	-	R	6	53.72	858	-	-	-
Type 7 - Open Cut With Liner	4,485	R	7	53.72	1436	240,934	6,440,460	93,464
Landowner Count Count <sup>2</sup>	47	EA		25000	\$/EA	1,175,000		
<b>Totals:</b>	<b>66,220</b>					<b>\$4,973,273</b>	<b>\$59,115,170</b>	<b>\$1,473,442</b>
							CONSTRUCTION COST	<b>\$60,588,612</b>
							CONTINGENCY 20%	<b>\$12,117,722</b>
							TOTAL CONSTRUCTION COST:	<b>\$72,710,000</b>
							TOTAL LAND COST	<b>\$4,970,000</b>
							TOTAL ROUTE COST	<b>\$77,680,000</b>

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

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**Table 4 – Corridor A2 Cost Analysis**

ORIGINAL ALIGNMENT	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$/ft]	Appurtenances & Miscellaneous <sup>1</sup> [\$/ft]
Type 1- Open	45,160	R	1	53.72	771	2,425,995	34,818,360	941,102	
Type 2- Wooded	20,695	R	2	53.72	786	1,111,735	16,266,270	431,269	
Type 3 - Creek Crossings	2,132	R	3	53.72	1211	114,531	2,581,852	44,429	
Type 4 - Road/Parking Lot Crossings	158	R	4	53.72	1166	8,488	184,228	3,293	
Type 5 - Bore or Tunnel Crossings	200	R	5	53.72	2015	10,744	403,000	4,168	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	858	-	-	-	
Type 7 - Open Cut With Liner	4,485	R	7	53.72	1436	240,934	6,440,460	93,464	
Landowner Count Count <sup>2</sup>	56	EA		25000	\$/EA	1,400,000			
<b>Totals:</b>						<b>68,345</b>	<b>\$5,312,428</b>	<b>\$60,694,170</b>	<b>\$1,517,725</b>
						CONSTRUCTION COST	<b>\$62,211,895</b>		
						CONTINGENCY 20%	<b>\$12,442,379</b>		
						<b>TOTAL CONSTRUCTION COST:</b>	<b>\$74,650,000</b>		
						TOTAL LAND COST	<b>\$5,310,000</b>		
						TOTAL ROUTE COST	<b>\$79,960,000</b>		

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

**Table 5 – Corridor A2-Aerial Cost Analysis**

ORIGINAL ALIGNMENT	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$/ft]	Appurtenances & Miscellaneous <sup>1</sup> [\$/ft]
Type 1- Open	45,309	R	1	53.72	771	2,433,999	34,933,239	944,207	
Type 2- Wooded	20,566	R	2	53.72	786	1,104,806	16,164,876	428,581	
Type 3 - Creek Crossings	2,132	R	3	53.72	1211	114,531	2,581,852	44,429	
Type 4 - Road/Parking Lot Crossings	138	R	4	53.72	1166	7,413	160,908	2,876	
Type 5 - Bore or Tunnel Crossings	200	R	5	53.72	2015	10,744	403,000	4,168	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	858	-	-	-	
Type 7 - Open Cut With Liner		R	7	53.72	1436	-	-	-	
Type 8 - Aerial Crossing	4,485	R	8	53.72	1436	240,934	6,440,460	93,464	
Landowner Count Count <sup>2</sup>	56	EA		25000	\$/EA	1,400,000			
<b>Totals:</b>						<b>68,345</b>	<b>\$5,312,428</b>	<b>\$60,684,335</b>	<b>\$1,517,725</b>
						CONSTRUCTION COST	<b>\$62,202,060</b>		
						CONTINGENCY 20%	<b>\$12,440,412</b>		
						<b>TOTAL CONSTRUCTION COST:</b>	<b>\$74,640,000</b>		
						TOTAL LAND COST	<b>\$5,310,000</b>		
						TOTAL ROUTE COST	<b>\$79,950,000</b>		

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs



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**Table 6 – Corridor A3 Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	Appurtenances & Miscellaneous <sup>1</sup> [\$]	
Type 1 - Open	56,100	R	1	53.72	771	3,013,692	43,253,100	1,169,084	
Type 2 - Wooded	12,916	R	2	53.72	786	693,848	10,151,976	269,160	
Type 3 - Creek Crossings	518	R	3	53.72	1211	27,827	627,298	10,795	
Type 4 - Road/Parking Lot Crossings	151	R	4	53.72	1166	8,112	176,066	3,147	
Type 5 - Bore or Tunnel Crossings	200	R	5	53.72	2015	10,744	403,000	4,168	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	858	-	-	-	
Type 7 - Open Cut With Liner	4,485	R	7	53.72	1436	240,934	6,440,460	93,464	
Landowner Count Count <sup>2</sup>	54	EA		25000	\$/EA	1,350,000			
<b>Totals:</b>						<b>69,885</b>	<b>\$5,345,156</b>	<b>\$61,051,900</b>	<b>\$1,549,818</b>
							CONSTRUCTION COST	<b>\$62,601,718</b>	
							CONTINGENCY 20%	<b>\$12,520,344</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$75,120,000</b>	
							TOTAL LAND COST	<b>\$5,350,000</b>	
							TOTAL ROUTE COST	<b>\$80,470,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

**Table 7 – Corridor A1-A3 Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	Appurtenances & Miscellaneous <sup>1</sup> [\$]	
Type 1 - Open	55,017	R	1	53.72	771	2,955,513	42,418,107	1,146,515	
Type 2 - Wooded	12,144	R	2	53.72	786	652,376	9,545,184	253,072	
Type 3 - Creek Crossings	518	R	3	53.72	1211	27,827	627,298	10,795	
Type 4 - Road/Parking Lot Crossings	131	R	4	53.72	1166	7,037	152,746	2,730	
Type 5 - Bore or Tunnel Crossings	225	R	5	53.72	2015	12,087	453,375	4,689	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	858	-	-	-	
Type 7 - Open Cut With Liner	4,485	R	7	53.72	1436	240,934	6,440,460	93,464	
Landowner Count Count <sup>2</sup>	45	EA		25000	\$/EA	1,125,000			
<b>Totals:</b>						<b>68,035</b>	<b>\$5,020,774</b>	<b>\$59,637,170</b>	<b>\$1,511,265</b>
							CONSTRUCTION COST	<b>\$61,148,435</b>	
							CONTINGENCY 20%	<b>\$12,229,687</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$73,380,000</b>	
							TOTAL LAND COST	<b>\$5,020,000</b>	
							TOTAL ROUTE COST	<b>\$78,400,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

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**Table 8 – Corridor A1-A3A Cost Analysis**

ORIGINAL ALIGNMENT	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\\$]	Appurtenances & Miscellaneous <sup>1</sup> [\\$]
Type 1- Open	54,616	R	1	53.72	771	2,933,972	42,108,936	1,138,158	
Type 2- Wooded	13,343	R	2	53.72	786	716,786	10,487,598	278,059	
Type 3 - Creek Crossings	518	R	3	53.72	1211	27,827	627,298	10,795	
Type 4 - Road/Parking Lot Crossings	128	R	4	53.72	1166	6,876	149,248	2,667	
Type 5 - Bore or Tunnel Crossings	225	R	5	53.72	2015	12,087	453,375	4,689	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	858	-	-	-	
Type 7 - Open Cut With Liner	3,677	R	7	53.72	1436	197,528	5,280,172	76,626	
Landowner Count <sup>2</sup>	48	EA		25000	\$/EA	1,200,000			
<b>Totals:</b>						<b>68,830</b>	<b>\$5,095,076</b>	<b>\$59,106,627</b>	<b>\$1,510,994</b>
							CONSTRUCTION COST	<b>\$60,617,621</b>	
							CONTINGENCY 20%	<b>\$12,123,524</b>	
							TOTAL CONSTRUCTION COST:	<b>\$72,740,000</b>	
							TOTAL LAND COST	<b>\$5,100,000</b>	
							TOTAL ROUTE COST	<b>\$77,840,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
 2. This is for ROE and acquisition related costs

**Table 9 – Corridor B Cost Analysis**

ORIGINAL ALIGNMENT	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\\$]	Appurtenances & Miscellaneous <sup>1</sup> [\\$]
Type 1- Open	60,406	R	1	53.72	771	3,245,010	46,573,026	1,258,818	
Type 2- Wooded	16,857	R	2	53.72	786	905,558	13,249,602	351,288	
Type 3 - Creek Crossings	1,165	R	3	53.72	1211	62,584	1,410,815	24,278	
Type 4 - Road/Parking Lot Crossings	196	R	4	53.72	1166	10,529	228,536	4,085	
Type 5 - Bore or Tunnel Crossings	225	R	5	53.72	2015	12,087	453,375	4,689	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	858	-	-	-	
Type 7 - Open Cut With Liner		R	7	53.72	1436	-	-	-	
Landowner Count <sup>2</sup>	62	EA		25000	\$/EA	1,550,000			
<b>Totals:</b>						<b>78,849</b>	<b>\$5,785,768</b>	<b>\$61,915,354</b>	<b>\$1,643,157</b>
							CONSTRUCTION COST	<b>\$63,558,511</b>	
							CONTINGENCY 20%	<b>\$12,711,702</b>	
							TOTAL CONSTRUCTION COST:	<b>\$76,270,000</b>	
							TOTAL LAND COST	<b>\$5,790,000</b>	
							TOTAL ROUTE COST	<b>\$82,060,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
 2. This is for ROE and acquisition related costs

## 2.0 PIPELINE ALIGNMENT

### 2.1 SECTION A - NORTH

#### 2.1.1 Introduction

Section A of the LBCR Raw Water Pipeline project was split into two portions, because the location of the LBCR pump station was yet to be determined during preliminary phases of the pipeline alignment analysis. It was determined the southern portion of Section A would be common to both pump station locations being considered and therefore could be analyzed before the pump station location was determined. However, the northern portion of Section A was dependent on the pump station location and thus the alignment evaluation was postponed until the pump station location was determined in the meeting held on April 24, 2013. The dividing point between the southern and northern alignment studies is FM 1743, which is slightly south of US 82. The end point of the southern alignment study for Section A is the proposed connection to LBCR Pipeline



Figure 4 – Evaluated Corridor

Section B located at SH 56. The northern portion of Section A is approximately 11.1 miles and begins by heading southeast around the Honey Grove Arm of the reservoir before heading southwest to the beginning of the southern portion of Section A at FM 1743.

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The analysis described below was used to determine the recommended alignment for the northern portion of the LBCR Pipeline Section A alignment. The southern portion of Section A was presented in the "Pipeline Alignment Selection Memorandum" dated 19 July 2013 and was accepted by NTMWD at the Alignment review meeting that took place on 8 August 2013. The Technical Memorandum for the southern portion of Section A has been incorporated in this PDR as **Section 2.2**. The following general parameters were adopted to generate acceptable alignments, from the preliminary alignment corridor, for analysis: avoid or minimize environmental permitting potential, align beginning with the proposed Pump Station site and ending with the beginning of the southern portion of Section A, minimize pipeline length where it does not impact other parameters, minimize impact to landowners along route, minimize constructability concerns, and avoid significant terrain that negatively affects hydraulics.



Figure 5 – Overall Segment A – North Alignments

### 2.1.2 Evaluation of Corridors

The corridor which these alternates are based on is presented in red on **Figure 4** and was originally presented in the "Pipeline Section A Corridor Selection Technical Memorandum" dated June 28, 2013 and incorporated in this PDR as **Section 1.0 – Corridor Study – Section A North of US 82**.

### 2.1.3 Route Alternatives

The northern Section A corridor was analyzed in further detail to identify conflicts and develop

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alignment alternatives. Conflict areas were determined based upon aerial imagery and field work. Initial conflict development revealed five conflict areas and are shown in **Figure 5**. The five conflict areas are labeled in descending order from North to South starting at six and going to two. These conflict areas were numbered from South to North in order to keep the numbers in sequence with the established conflict area of the southern portion of Section A. For purposes of this discussion we will cover the conflict areas from North to South which will be in descending order. The reason for covering them from North to South is because this is the order the other sections have used during analysis of their conflict areas.

**Figures 5-10** all have a consistent color scheme to show each alternate for the individual conflict areas. The original alignment corridor centerline is shown in blue for each conflict area figure and described as Alternate A in this memorandum. The rest of the alternates are shown in the figures as follows; Alternate B's are magenta, Alternate C's are teal and Alternate D's are pink.

Conflict Area #6 is a house and barn that is directly north of a densely wooded area. Conflict Area #5 is a confluence of several creeks which will form a small finger of LBCR. Conflict Area #4 is a large conflict area that involves avoiding two large stock ponds and crossing an Oncor Electrical Transmission Line and a meandering Honey Grove Creek. Conflict Area #3 is a diversion around a small stock pond and associated creek drainage area along with a 10" Atmos Gas Line that will be crossed in this area. Conflict Area #2 is a tight cluster of buildings that includes two homes, several small sheds and two barn structures. The rest of the terrain in this corridor consists of primarily open and cultivated land with all possible alignment alternatives sharing three major creek crossings. The alignments shown have had an initial field environmental study performed and there are no anticipated wetland concerns. From the localized analysis of each conflict area, alignment alternatives were developed.

The preferred alternative was determined by analysis that compared the total length, number of parcels affected, open cut length, wooded length, tunnel length, construction cost, and land acquisition cost. The recommended alignment was chosen based on the overall cost analysis and engineering judgment. The detailed route analysis of these alignment alternatives is discussed below.

#### **2.1.4 Detailed Route Analysis**

Installation cost factors were developed to take into account the varying costs of pipeline construction through different land classifications. Cost data was updated in order to closely coincide with recent bid

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information. Routes were classified by the type of land in which they would be installed: open, wooded, open cut creek crossings, open cut road crossings, or tunneled crossings. A construction cost and land acquisition cost was associated with each classification in order to estimate the total route cost per linear foot. This allowed a cost to be generated for each alternate based upon the linear footage of the land classification. From this, a cost comparison was performed for the alternates in order to determine the most cost effective route.

Conflict Area #6 was identified because of the close proximity of two homesteads to a densely wooded area along CR 2730. The two homesteads are located to the north and south of the densely wooded area and both include uninhabited structures as well



Figure 6 – Aerial View of Conflict Area #6

as small ponds. The densely wooded area also has several ponds visible from aerial imagery. Four alternatives have been proposed to provide a compromise between landowner impact, constructability, and cost. All of the alternatives diverge at the same point approximately 1300 feet northwest of the house that is north of the densely wooded area. Alternate A was the original centerline of the preliminary alignment corridor and provides a compromise between going around the homes and wooded area or going through the wooded area west of CR 2710. Alternate B was developed to provide a route that avoids the conflict area. Alternate C was developed to show a straight line between the limits of the conflict area. Alternate D shows a slight bend in order to provide adequate spacing from the existing ponds. Conflict Area #6 and the four alternatives can be seen in Figure 6.



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All of the alternates are similar in cost. Only \$150K separates all of the options, as shown in **Table 10** below. Alternates C and D are the two least expensive options but they cross through over 2,000 feet of forested land. While Alternate A eliminates two-thirds of the wooded crossing, it comes within 150 feet of the homes to the north and south of the densely wooded area. Alternate B is the most expensive but it also has the least amount of pipe in a wooded area and allows for more space between the pipeline and the homes in this conflict while affecting the least amount of parcels. Alternate B is the preferred alignment because it minimizes environmental and land owner impact.

**Table 10 – Analysis for Conflict Area #6**

Option	Alternate A	Alternate B	Alternate C	Alternate D
Length (ft.)	5,944	6,121	5,873	5,902
Number of Parcels	7	7	8	8
Open Length (ft.)	5,153	5,898	3,759	3,786
Wooded Length (ft.)	791	223	2,114	2,116
Tunnel/Bore Length	0	0	0	0
Construction Cost	\$ 4,880,000	\$ 5,000,000	\$ 4,830,000	\$ 4,860,000
Land Acquisition Cost	\$ 490,000	\$ 500,000	\$ 520,000	\$ 500,000
Total Cost	\$ 5,370,000	\$ 5,500,000	\$ 5,350,000	\$ 5,360,000

\*For further cost analysis data see **Tables 30-33**.

Conflict Area #5 is the confluence of several branches of Fox Creek as well as a small finger of LBCR. Due to environmental and constructability concerns, proceeding directly through the creek confluence was not considered within the alignment options. Four alternatives were developed for proceeding through this conflict area. Alternate A crosses a small finger of LBCR slightly west and downstream of the Fox Creek Confluence. Alternate B swings east of the Fox Creek Confluence and the finger of LBCR. Alternate C was developed to provide a shorter alternative that also traveled east around the Fox Creek Confluence and finger of LBCR. Alternate D takes a more direct route closely hugging the Fox Creek Confluence then continuing in open land as oppose to forested land as shown for Alternates B and C. Conflict Area #5 and the four alternatives can be seen in **Figure 7** to the right.



**Figure 7 – Aerial View of Conflict Area #5**

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All of the alternates cross Fox Creek. Alternate A is the shortest most direct route to navigate this conflict and therefore the least expensive. It also goes through less wooded areas than the other three alternates; however, it crosses under approximately 500 feet of LBCR when it is at the 534 foot pool elevation. All of the other alternates are similar in cost as shown in **Table 11** on the next page and have multiple creek crossings because they cross upstream of the Fox Creek Confluence. Alternate A is the preferred route through this conflict area because it minimizes the number of creek crossings, parcels and has the lowest cost.

**Table 11 – Analysis for Conflict Area #5**

Option	Alternate A	Alternate B	Alternate C	Alternate D
Length (ft.)	10,198	10,700	10,673	10,609
Number of Parcels	4	5	5	6
Open Length (ft.)	8,279	7,328	7,327	8,028
Wooded Length (ft.)	1,923	3,372	3,346	2,581
Tunnel/Bore Length	0	0	0	0
Construction Cost	\$ 8,570,000	\$ 8,850,000	\$ 8,840,000	\$ 8,800,000
Land Acquisition Cost	\$ 260,000	\$ 430,000	\$ 410,000	\$ 360,000
Total Cost	\$ 8,830,000	\$ 9,280,000	\$ 9,250,000	\$ 9,160,000

\*For further cost analysis data see **Tables 26-29**.

Conflict Area #4 was identified because of two large private ponds that are in close proximity to each other. This conflict area is very large due to the Honey Grove Creek Confluence near the northern boundary of this conflict area and the string of four houses along CR 2765 that are in the immediate area of the two large ponds near the southern boundary of this conflict area. Four alternatives have been proposed to traverse this conflict area. Alternate A crosses Honey Grove Creek downstream of the confluence and then cuts through open land offset from a tributary by 180 feet at its closest point until crossing between a house and the northernmost pond. Alternate B closely parallels Alternate A to the North hugging CR 2765 at a slight bend to squeeze between a mobile home and the road. Alternate C goes farther south and crosses in between the two ponds. Alternate D is an off shoot of Alternate B providing a route around the mobile home and a house to the North. Conflict Area #4 and the four alternatives can be seen in **Figure 8**.

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All of the alternates in this conflict will cross Honey Grove Creek, an Oncor Transmission Corridor and two County Roads. Due to the high steep banks of Honey Grove Creek in the area that all of these alignments cross the creek, the pipeline would be installed by bore or tunnel to cross Honey Grove Creek. Alternate C is the longest and most expensive option as it travels upstream and south of the Honey Grove Creek Confluence. This allows it to cross smaller creeks and stay on a ridge line between the

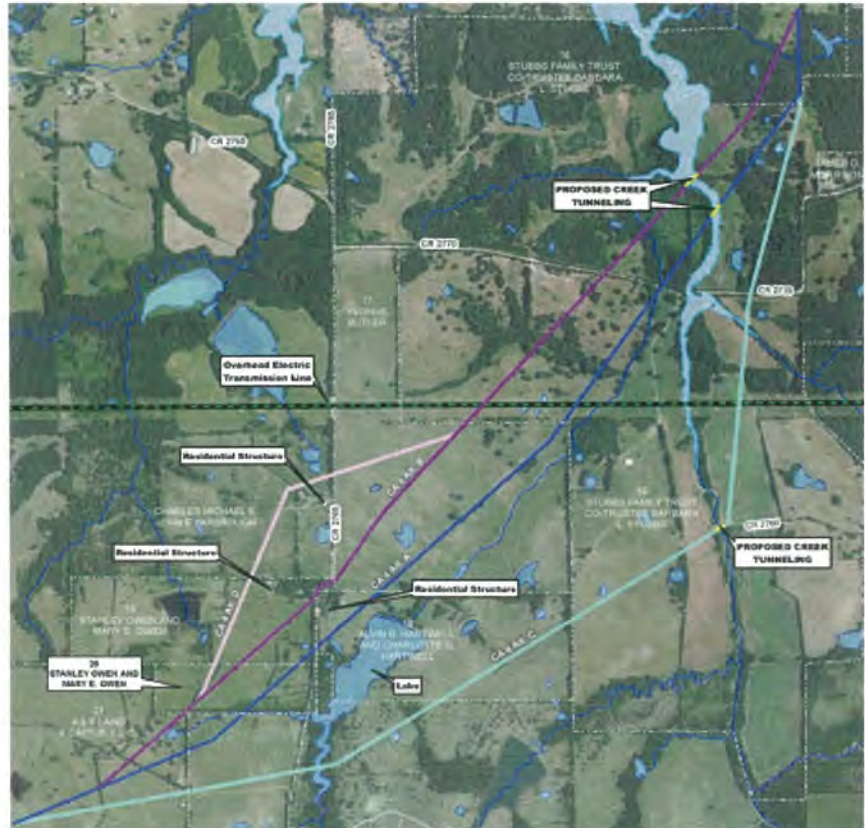


Figure 8 – Aerial View of Conflict Area #4

two large ponds near CR 2765. Alternates A, B and D follow similar paths crossing Honey Grove Creek downstream of the confluence. Alternate A then follows a tributary of Honey Grove Creek before it crosses in between the northern large pond and a home. It is approximately 140 feet from both the home and the water's edge. Alternate B is the shortest and least expensive route. As it crosses CR 2765 it passes in between two homes, 120 feet from a mobile home and 200 feet from a house. Alternate D follows Alternate B with the exception of the crossing of CR 2765. Alternate D goes around the homes that Alternate B splits which causes Alternate D to be slightly longer. **Table 12** details each alternate below. Alternate B is the preferred route through this conflict area because it is not only the least expensive but also minimizes landowner impact and length of pipe in wooded land.

**Table 12 – Analysis for Conflict Area #4**

Option	Alternate A	Alternate B	Alternate C	Alternate D
Length (ft.)	13,347	13,006	14,826	13,395
Number of Parcels	7	6	5	6
Open Length (ft.)	10,073	10,204	6,611	10,692
Wooded Length (ft.)	3,079	2,592	8,095	2,493
Tunnel/Bore Length	195	210	120	210
Construction Cost	\$ 11,270,000	\$ 11,020,000	\$ 12,510,000	\$ 11,330,000
Land Acquisition Cost	\$ 830,000	\$ 780,000	\$ 860,000	\$ 800,000
Total Cost	\$ 12,100,000	\$ 11,800,000	\$ 13,370,000	\$ 12,130,000

\*For further cost analysis data see **Tables 22-25**.

Conflict Area #3 was identified because of a stock pond that feeds a small creek and there is also 10" Atmos gas line that runs east-west in this area. Two alternatives have been proposed to travel around this conflict area. Alternate A travels to the north of the pond and creek. Alternate B heads south around the pond and creek. Conflict Area #3 and the two alternatives can be seen in **Figure 9** below.



**Figure 9 – Aerial View of Conflict Area #3**

Both alternates will cross Ward Creek and the 10" Atmos gas line. The crossing of Ward Creek will be installed by bore or tunnel. This is due to the steep banks of Ward Creek. Alternate B heads south of the pond and then parallels the Atmos gas line until shortly after crossing Ward Creek. Alternate A stays north of the pond and is least expensive option and our preferred route, for specific numbers see **Table 13** below.

**Table 13 – Analysis for Conflict Area #3**

Option	Alternate A	Alternate B
Length (ft.)	5,469	5,691
Number of Parcels	5	6
Open Length (ft.)	4,075	5,013
Wooded Length (ft.)	1,294	578
Tunnel/Bore Length	100	100
Construction Cost	\$ 4,610,000	\$ 4,780,000
Land Acquisition Cost	\$ 420,000	\$ 460,000
Total Cost	\$ 5,030,000	\$ 5,240,000

\*For further cost analysis data see **Tables 20 & 21**.

Conflict Area #2 consists of two homesteads that are very close to each other. This conflict area includes two houses as well as a barn and several sheds. Three alternatives were developed for this conflict area. Alternate A goes south around the cluster of buildings while Alternate C goes north around the cluster of buildings. Alternate B also goes south around the houses but it is a more direct route than Alternate A. Conflict Area #2 and the three alternatives can be seen in **Figure 10**.



**Figure 10 – Aerial View of Conflict Area #2**

Alternate C is the longest and most expensive alternate and also crosses a small creek which the other two alternates do not. Alternate B is the least expensive option as it is the shortest route. Alternate B’s direct route does encounter two small drainage features that may present maintenance concerns as the scours in the drainage features change after construction. One drainage feature is an old borrow pit that has had a channel scoured out over time connecting it to a small pond to the north. The other drainage feature is an erosion area that has scoured out over time but does not seem to drain to a distinguishable water body. Alternate A is slightly longer and more expensive than Alternate B, for specific numbers see **Table 14**. Alternate A however avoids one of the erosion areas that Alternate B travels through and it passes through a smaller section of the borrow pit than Alternate B.

**Table 14 – Analysis for Conflict Area #2**

Option	Alternate A	Alternate B	Alternate C
Length (ft.)	5,310	5,235	5,485
Number of Parcels	3	3	3
Open Length (ft.)	5,145	5,055	5,055
Wooded Length (ft.)	165	180	430
Tunnel/Bore Length	0	0	0
Construction Cost	\$ 4,350,000	\$ 4,280,000	\$ 4,500,000
Land Acquisition Cost	\$ 360,000	\$ 360,000	\$ 370,000
Total Cost	\$ 4,710,000	\$ 4,640,000	\$ 4,870,000

\*For further cost analysis data see **Tables 17-19**.

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### 2.1.5 Opinion of Probable Construction Cost

The Opinion of Probable Construction Cost (OPCC) for the northern portion of the Section A recommended alignment as described above is \$60,653,050. A detailed breakdown of the OPCC for the preferred alignment is shown in **Table 15** below.

**Table 15 – Opinion of Probable Construction Costs**

NTMWD - Lower Bois d'Arc Creek Reservoir Raw Water Pipeline		FREESE NICHOLS AND ASSOCIATES		REGULATORY APPROVALS ENGINEERING RESULTS CONSTRUCTION SERVICES	
1701 N Market St., #500, LB51 • Dallas, Texas 75203 • 214-217-2200 • fax 214-217-2201		www.freese-nichols.com			
OPINION OF PROBABLE CONSTRUCTION COSTS (INCLUDING EASEMENTS)					November 25, 2013
ESTIMATOR		CHECKED BY		ACCOUNT NO	
WRS		ASM		NTD13138	
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	90-INCH PIPELINE	58,005	LF	\$650.00	\$ 37,703,250
2	TUNNELED CROSSINGS	230	LF	\$1,970.00	\$ 453,100
3	PIPELINE ROW CLEARING	350	AC	\$5,000.00	\$ 800,000
4	TRENCH SAFETY	58,005	LF	\$1.00	\$ 58,005
5	AIR RELEASE VALVES	17	EA	\$25,000.00	\$ 425,000
6	BUTTERFLY VALVES	2	EA	\$165,000.00	\$ 330,000
7	BLOW OFF VALVES	17	EA	\$25,000.00	\$ 425,000
8	PAVEMENT RESTORATION	940	SY	\$70.00	\$ 65,800
9	CREEK CROSSINGS	1,053	LF	\$445.00	\$ 468,585
10	REVEGETATION	360	AC	\$3,160.00	\$ 1,155,600
11	FIBER OPTIC CONDUIT	58,235	LF	\$3.00	\$ 174,705
12	FIBER	58,235	LF	\$2.00	\$ 116,470
13	CATHODIC PROTECTION	58,235	LF	\$2.00	\$ 116,470
14	ACCESS MAINWAYS	17	EA	\$10,000.00	\$ 166,000
15	TESTING	58,235	LF	\$2.00	\$ 116,470
16	MOBILIZATION	1	LS	\$2,079,223.00	\$ 2,079,223
<b>CONSTRUCTION SUBTOTAL</b>					\$ 43,660,000
<b>CONSTRUCTION CONTINGENCY</b>				15%	\$ 6,549,000
<b>CONSTRUCTION TOTAL</b>					\$ 50,209,000
<b>ESTIMATED EASEMENT/PROPERTY COSTS</b>					
<b>PERMANENT EASEMENT W/ ASSOCIATED TEMPORARY <sup>1</sup></b>		2,188,900	SF	\$1.00	\$2,188,900.00
<b>TOTAL ESTIMATED COSTS (INCLUDING EASEMENT)</b>					\$52,397,900.00

1. Estimated Easement Costs Based on a 50' Perm Easement & 70' Temp Easement for Section A Northern Portion excluding easement on NTMWD land

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**2.1.6 Recommendation Summary**

The recommended alignment for Section A is Alternate A for Conflict Area #2, #3 and #5 and Alternate B for Conflict Area #4 and #6. Although not all options are the least expensive, all of the routes were chosen based on a balance between landowner impact, constructability and cost. Based on the recommended routes the total length of the preferred alignment for the northern portion of Section A is 11.07 miles.

**2.1.7 Pipeline Crossings**

Table 16 presents identified utility, roadway, and creek crossings associated with the recommended route.

**Table 16 – Major Transportation, Utility, and Creek Crossings**

<b>Road</b>
Fannin CR 2725
CR 2710
CR 2730
CR 2735
CR 2770
CR 2765
Farm to Market 1396
CR 2992
United States Route 82
CR 2989
Farm to Market 1793
<b>Utility</b>
Oncor Overhead Electric Transmission Lines
Atmos 10" Gas Distribution Line
<b>Waterbody</b>
Tributary of Honey Grove Creek
LBCR Finger (Fox Creek)
Tributary of Honey Grove Creek (2)
Honey Grove Creek
Tributary of Honey Grove Creek
Allen’s Creek
Tributary of Allen’s Creek (2)
Tributary of Ward Creek
Ward Creek



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**Table 17 - Conflict Area #2 Alt A Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous <sup>1</sup> [\$]	
Type 1 - Open	5,125	R	1	53.72	656	275,315	3,362,000	106,801	
Type 2 - Wooded	125	R	2	53.72	669	6,715	83,625	2,605	
Type 3 - Creek Crossings	40	R	3	53.72	1094	2,149	43,760	834	
Type 4 - Road/Parking Lot Crossings	20	R	4	53.72	1047	1,074	20,940	417	
Type 5 - Bore or Tunnel Crossings		R	5	53.72	1900	-	-	-	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-	
NTMWD Easement Land Cost Reduction <sup>2</sup>		R		53.72		-	-	-	
Parcel Count <sup>3</sup>	3	EA		25000	\$/EA	75,000			
<b>Totals:</b>						<b>5,310</b>	<b>\$360,253</b>	<b>\$3,510,325</b>	<b>\$110,657</b>
							CONSTRUCTION COST	<b>\$3,620,982</b>	
							CONTINGENCY 20%	<b>\$724,196</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$4,350,000</b>	
							TOTAL LAND COST	<b>\$360,000</b>	
							<b>TOTAL ROUTE COST</b>	<b>\$4,710,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount

**Table 18 - Conflict Area #2 Alt B Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous <sup>1</sup> [\$]	
Type 1 - Open	5,035	R	1	53.72	656	270,480	3,302,960	104,926	
Type 2 - Wooded	150	R	2	53.72	669	8,058	100,350	3,126	
Type 3 - Creek Crossings	30	R	3	53.72	1094	1,612	32,820	625	
Type 4 - Road/Parking Lot Crossings	20	R	4	53.72	1047	1,074	20,940	417	
Type 5 - Bore or Tunnel Crossings		R	5	53.72	1900	-	-	-	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-	
NTMWD Easement Land Cost Reduction <sup>2</sup>		R		53.72		-	-	-	
Parcel Count <sup>3</sup>	3	EA		25000	\$/EA	75,000			
<b>Totals:</b>						<b>5,235</b>	<b>\$356,224</b>	<b>\$3,457,070</b>	<b>\$109,094</b>
							CONSTRUCTION COST	<b>\$3,566,164</b>	
							CONTINGENCY 20%	<b>\$713,233</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$4,280,000</b>	
							TOTAL LAND COST	<b>\$360,000</b>	
							<b>TOTAL ROUTE COST</b>	<b>\$4,640,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount

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**Table 19 - Conflict Area #2 Alt C Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous <sup>1</sup> [\$]	
Type 1- Open	5,015	R	1	53.72	656	269,406	3,289,840	104,509	
Type 2- Wooded	390	R	2	53.72	669	20,951	260,910	8,127	
Type 3 - Creek Crossings	40	R	3	53.72	1094	2,149	43,760	834	
Type 4 - Road/Parking Lot Crossings	40	R	4	53.72	1047	2,149	41,880	834	
Type 5 - Bore or Tunnel Crossings		R	5	53.72	1900	-	-	-	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-	
NTMWD Easement Land Cost Reduction <sup>2</sup>		R		53.72		-	-	-	
Parcel Count <sup>3</sup>	3	EA		25000	\$/EA	75,000			
<b>Totals:</b>						<b>5,485</b>	<b>\$369,654</b>	<b>\$3,636,390</b>	<b>\$114,303</b>
							CONSTRUCTION COST	<b>\$3,750,693</b>	
							CONTINGENCY 20%	<b>\$750,139</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$4,500,000</b>	
							TOTAL LAND COST	<b>\$370,000</b>	
							<b>TOTAL ROUTE COST</b>	<b>\$4,870,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount

**Table 20 - Conflict Area #3 Alt A Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous <sup>1</sup> [\$]	
Type 1- Open	4,070	R	1	53.72	656	218,640	2,669,920	84,816	
Type 2- Wooded	1,299	R	2	53.72	669	69,782	869,031	27,070	
Type 3 - Creek Crossings	-	R	3	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings		R	4	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings	100	R	5	53.72	1900	5,372	190,000	2,084	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-	
NTMWD Easement Land Cost Reduction <sup>2</sup>		R		53.72		-	-	-	
Parcel Count <sup>3</sup>	5	EA		25000	\$/EA	125,000			
<b>Totals:</b>						<b>5,469</b>	<b>\$418,795</b>	<b>\$3,728,951</b>	<b>\$113,970</b>
							CONSTRUCTION COST	<b>\$3,842,921</b>	
							CONTINGENCY 20%	<b>\$768,584</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$4,610,000</b>	
							TOTAL LAND COST	<b>\$420,000</b>	
							<b>TOTAL ROUTE COST</b>	<b>\$5,030,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount

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**Table 21 - Conflict Area #3 Alt B Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous <sup>1</sup> [\$]	
Type 1 - Open	4,983	R	1	53.72	656	267,687	3,268,848	103,842	
Type 2 - Wooded	608	R	2	53.72	669	32,662	406,752	12,670	
Type 3 - Creek Crossings	-	R	3	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	-	R	4	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings	100	R	5	53.72	1900	5,372	190,000	2,084	
Type 6 - Deep Cut (10-15' cover)	-	R	6	53.72	735	-	-	-	
NTMWD Easement Land Cost Reduction <sup>2</sup>	-	R	-	53.72	-	-	-	-	
Parcel Count <sup>3</sup>	6	EA	-	25000	\$/EA	150,000	-	-	
<b>Totals:</b>						<b>5,691</b>	<b>\$455,721</b>	<b>\$3,865,600</b>	<b>\$118,596</b>
							CONSTRUCTION COST	<b>\$3,984,196</b>	
							CONTINGENCY 20%	<b>\$796,839</b>	
							TOTAL CONSTRUCTION COST:	<b>\$4,780,000</b>	
							TOTAL LAND COST	<b>\$460,000</b>	
							TOTAL ROUTE COST	<b>\$5,240,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount

**Table 22 - Conflict Area #4 Alt A Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous <sup>1</sup> [\$]	
Type 1 - Open	10,073	R	1	53.72	656	541,122	6,607,888	209,914	
Type 2 - Wooded	2,901	R	2	53.72	669	155,842	1,940,769	60,455	
Type 3 - Creek Crossings	138	R	3	53.72	1094	7,413	150,972	2,876	
Type 4 - Road/Parking Lot Crossings	40	R	4	53.72	1047	2,149	41,880	834	
Type 5 - Bore or Tunnel Crossings	195	R	5	53.72	1900	10,475	370,500	4,064	
Type 6 - Deep Cut (10-15' cover)	-	R	6	53.72	735	-	-	-	
NTMWD Easement Land Cost Reduction <sup>2</sup>	1,104	R	-	53.72	-	(59,307)	-	-	
Parcel Count <sup>3</sup>	7	EA	-	25000	\$/EA	175,000	-	-	
<b>Totals:</b>						<b>13,347</b>	<b>\$832,694</b>	<b>\$9,112,009</b>	<b>\$278,142</b>
							CONSTRUCTION COST	<b>\$9,390,151</b>	
							CONTINGENCY 20%	<b>\$1,878,030</b>	
							TOTAL CONSTRUCTION COST:	<b>\$11,270,000</b>	
							TOTAL LAND COST	<b>\$830,000</b>	
							TOTAL ROUTE COST	<b>\$12,100,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount



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**Table 23 - Conflict Area #4 Alt B Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST	
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous <sup>1</sup> [\$]
Type 1 - Open	10,204	R	1	53.72	656	548,159	6,693,824	212,644
Type 2 - Wooded	2,392	R	2	53.72	669	128,498	1,600,248	49,848
Type 3 - Creek Crossings	160	R	3	53.72	1094	8,595	175,040	3,334
Type 4 - Road/Parking Lot Crossings	40	R	4	53.72	1047	2,149	41,880	834
Type 5 - Bore or Tunnel Crossings	210	R	5	53.72	1900	11,281	399,000	4,376
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-
NTMWD Easement Land Cost Reduction <sup>2</sup>	1,229	R		53.72		(66,022)	-	-
Parcel Count <sup>3</sup>	6	EA		25000	\$/EA	150,000		
<b>Totals:</b>		<b>13,006</b>				<b>\$782,660</b>	<b>\$8,909,992</b>	<b>\$271,036</b>
							CONSTRUCTION COST	<b>\$9,181,028</b>
							CONTINGENCY 20%	<b>\$1,836,206</b>
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$11,020,000</b>
							TOTAL LAND COST	<b>\$780,000</b>
							TOTAL ROUTE COST	<b>\$11,800,000</b>

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount

**Table 24 - Conflict Area #4 Alt C Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST	
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous <sup>1</sup> [\$]
Type 1 - Open	6,611	R	1	53.72	656	355,143	4,336,816	137,769
Type 2 - Wooded	7,765	R	2	53.72	669	417,136	5,194,785	161,817
Type 3 - Creek Crossings	290	R	3	53.72	1094	15,579	317,260	6,043
Type 4 - Road/Parking Lot Crossings	40	R	4	53.72	1047	2,149	41,880	834
Type 5 - Bore or Tunnel Crossings	120	R	5	53.72	1900	6,446	228,000	2,501
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-
NTMWD Easement Land Cost Reduction <sup>2</sup>	1,118	R		53.72		(60,059)	-	-
Parcel Count <sup>3</sup>	5	EA		25000	\$/EA	125,000		
<b>Totals:</b>		<b>14,826</b>				<b>\$861,394</b>	<b>\$10,118,741</b>	<b>\$308,963</b>
							CONSTRUCTION COST	<b>\$10,427,704</b>
							CONTINGENCY 20%	<b>\$2,085,541</b>
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$12,510,000</b>
							TOTAL LAND COST	<b>\$860,000</b>
							TOTAL ROUTE COST	<b>\$13,370,000</b>

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount

**Table 25 - Conflict Area #4 Alt D Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST	
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous 1 [\$]
Type 1- Open	10,692	R	1	53.72	656	574,374	7,013,952	222,814
Type 2- Wooded	2,293	R	2	53.72	669	123,180	1,534,017	47,784
Type 3 - Creek Crossings	160	R	3	53.72	1094	8,595	175,040	3,334
Type 4 - Road/Parking Lot Crossings	40	R	4	53.72	1047	2,149	41,880	834
Type 5 - Bore or Tunnel Crossings	210	R	5	53.72	1900	11,281	399,000	4,376
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-
NTMWD Easement Land Cost Reduction <sup>2</sup>	1,229	R		53.72		(66,022)	-	-
Parcel Count <sup>3</sup>	6	EA		25000	\$/EA	150,000		
<b>Totals:</b>								
						<b>\$803,558</b>	<b>\$9,163,889</b>	<b>\$279,142</b>
						CONSTRUCTION COST		<b>\$9,443,031</b>
						CONTINGENCY 20%		<b>\$1,888,606</b>
						TOTAL CONSTRUCTION COST:		<b>\$11,330,000</b>
						TOTAL LAND COST		<b>\$800,000</b>
						TOTAL ROUTE COST		<b>\$12,130,000</b>
<p>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</p> <p>2. This is for easements that will be required on NTMWD owned land</p> <p>3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount</p>								

**Table 26 - Conflict Area #5 Alt A Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST	
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous 1 [\$]
Type 1- Open	8,279	R	1	53.72	656	444,748	5,431,024	172,528
Type 2- Wooded	1,411	R	2	53.72	669	75,799	943,959	29,404
Type 3 - Creek Crossings	508	R	3	53.72	1094	27,290	555,752	10,586
Type 4 - Road/Parking Lot Crossings		R	4	53.72	1047	-	-	-
Type 5 - Bore or Tunnel Crossings		R	5	53.72	1900	-	-	-
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-
NTMWD Easement Land Cost Reduction <sup>2</sup>	7,211	R		53.72		(387,375)	-	-
Parcel Count <sup>3</sup>	4	EA		25000	\$/EA	100,000		
<b>Totals:</b>								
						<b>\$260,462</b>	<b>\$6,930,735</b>	<b>\$212,519</b>
						CONSTRUCTION COST		<b>\$7,143,254</b>
						CONTINGENCY 20%		<b>\$1,428,651</b>
						TOTAL CONSTRUCTION COST:		<b>\$8,570,000</b>
						TOTAL LAND COST		<b>\$260,000</b>
						TOTAL ROUTE COST		<b>\$8,830,000</b>
<p>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</p> <p>2. This is for easements that will be required on NTMWD owned land</p> <p>3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount</p>								

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**Table 27 - Conflict Area #5 Alt B Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous 1 [\$]	
Type 1- Open	7,328	R	1	53.72	656	393,660	4,807,168	152,710	
Type 2- Wooded	3,162	R	2	53.72	669	169,863	2,115,378	65,894	
Type 3 - Creek Crossings	210	R	3	53.72	1094	11,281	229,740	4,376	
Type 4 - Road/Parking Lot Crossings		R	4	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings		R	5	53.72	1900	-	-	-	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-	
NTMWD Easement Land Cost Reduction <sup>2</sup>	5,016	R		53.72		(269,460)	-	-	
Parcel Count <sup>3</sup>	5	EA		25000	\$/EA	125,000			
<b>Totals:</b>						<b>10,700</b>	<b>\$430,344</b>	<b>\$7,152,286</b>	<b>\$222,980</b>
							CONSTRUCTION COST	<b>\$7,375,266</b>	
							CONTINGENCY 20%	<b>\$1,475,053</b>	
1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.							TOTAL CONSTRUCTION COST:	<b>\$8,850,000</b>	
2. This is for easements that will be required on NTMWD owned land							TOTAL LAND COST	<b>\$430,000</b>	
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount							TOTAL ROUTE COST	<b>\$9,280,000</b>	

**Table 28 - Conflict Area #5 Alt C Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous 1 [\$]	
Type 1- Open	7,327	R	1	53.72	656	393,606	4,806,512	152,689	
Type 2- Wooded	3,106	R	2	53.72	669	166,854	2,077,914	64,727	
Type 3 - Creek Crossings	240	R	3	53.72	1094	12,893	262,560	5,001	
Type 4 - Road/Parking Lot Crossings		R	4	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings		R	5	53.72	1900	-	-	-	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-	
NTMWD Easement Land Cost Reduction <sup>2</sup>	5,448	R		53.72		(292,667)	-	-	
Parcel Count <sup>3</sup>	5	EA		25000	\$/EA	125,000			
<b>Totals:</b>						<b>10,673</b>	<b>\$405,687</b>	<b>\$7,146,986</b>	<b>\$222,418</b>
							CONSTRUCTION COST	<b>\$7,369,404</b>	
							CONTINGENCY 20%	<b>\$1,473,881</b>	
1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.							TOTAL CONSTRUCTION COST:	<b>\$8,840,000</b>	
2. This is for easements that will be required on NTMWD owned land							TOTAL LAND COST	<b>\$410,000</b>	
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount							TOTAL ROUTE COST	<b>\$9,250,000</b>	

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**Table 29 - Conflict Area #5 Alt D Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST	
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous 1 [\$]
Type 1 - Open	8,028	R	1	53.72	656	431,264	5,266,368	167,298
Type 2 - Wooded	2,293	R	2	53.72	669	123,180	1,534,017	47,784
Type 3 - Creek Crossings	288	R	3	53.72	1094	15,471	315,072	6,002
Type 4 - Road/Parking Lot Crossings		R	4	53.72	1047	-	-	-
Type 5 - Bore or Tunnel Crossings		R	5	53.72	1900	-	-	-
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-
NTMWD Easement Land Cost Reduction <sup>2</sup>	6,738	R		53.72		(361,965)	-	-
Parcel Count <sup>3</sup>	6	EA		25000	\$/EA	150,000		
<b>Totals:</b>		<b>10,609</b>				<b>\$357,950</b>	<b>\$7,115,457</b>	<b>\$221,084</b>
							CONSTRUCTION COST	<b>\$7,336,541</b>
							CONTINGENCY 20%	<b>\$1,467,308</b>
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$8,800,000</b>
							TOTAL LAND COST	<b>\$360,000</b>
							<b>TOTAL ROUTE COST</b>	<b>\$9,160,000</b>

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount

**Table 30 - Conflict Area #6 Alt A Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST	
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous 1 [\$]
Type 1 - Open	5,068	R	1	53.72	656	272,253	3,324,608	105,614
Type 2 - Wooded	791	R	2	53.72	669	42,493	529,179	16,484
Type 3 - Creek Crossings		R	3	53.72	1094	-	-	-
Type 4 - Road/Parking Lot Crossings	85	R	4	53.72	1047	4,566	88,995	1,771
Type 5 - Bore or Tunnel Crossings		R	5	53.72	1900	-	-	-
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-
NTMWD Easement Land Cost Reduction <sup>2</sup>		R		53.72		-	-	-
Parcel Count <sup>3</sup>	7	EA		25000	\$/EA	175,000		
<b>Totals:</b>		<b>5,944</b>				<b>\$494,312</b>	<b>\$3,942,782</b>	<b>\$123,869</b>
							CONSTRUCTION COST	<b>\$4,066,651</b>
							CONTINGENCY 20%	<b>\$813,330</b>
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$4,880,000</b>
							TOTAL LAND COST	<b>\$490,000</b>
							<b>TOTAL ROUTE COST</b>	<b>\$5,370,000</b>

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount

**Table 31 - Conflict Area #6 Alt B Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous 1 [\$]	
Type 1- Open	5,848	R	1	53.72	656	314,155	3,836,288	121,868	
Type 2- Wooded	223	R	2	53.72	669	11,980	149,187	4,647	
Type 3 - Creek Crossings		R	3	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	50	R	4	53.72	1047	2,686	52,350	1,042	
Type 5 - Bore or Tunnel Crossings		R	5	53.72	1900	-	-	-	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-	
NTMWD Easement Land Cost Reduction <sup>2</sup>		R		53.72		-	-	-	
Parcel Count <sup>3</sup>	7	EA		25000	\$/EA	175,000			
<b>Totals:</b>						<b>6,121</b>	<b>\$503,820</b>	<b>\$4,037,825</b>	<b>\$127,557</b>
							CONSTRUCTION COST	<b>\$4,165,382</b>	
							CONTINGENCY 20%	<b>\$833,076</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$5,000,000</b>	
							TOTAL LAND COST	<b>\$500,000</b>	
							<b>TOTAL ROUTE COST</b>	<b>\$5,500,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount

**Table 32 - Conflict Area #6 Alt C Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous 1 [\$]	
Type 1- Open	3,729	R	1	53.72	656	200,322	2,446,224	77,710	
Type 2- Wooded	2,079	R	2	53.72	669	111,684	1,390,851	43,325	
Type 3 - Creek Crossings	35	R	3	53.72	1094	1,880	38,290	729	
Type 4 - Road/Parking Lot Crossings	30	R	4	53.72	1047	1,612	31,410	625	
Type 5 - Bore or Tunnel Crossings		R	5	53.72	1900	-	-	-	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-	
NTMWD Easement Land Cost Reduction <sup>2</sup>		R		53.72		-	-	-	
Parcel Count <sup>3</sup>	8	EA		25000	\$/EA	200,000			
<b>Totals:</b>						<b>5,873</b>	<b>\$515,498</b>	<b>\$3,906,775</b>	<b>\$122,389</b>
							CONSTRUCTION COST	<b>\$4,029,164</b>	
							CONTINGENCY 20%	<b>\$805,833</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$4,830,000</b>	
							TOTAL LAND COST	<b>\$520,000</b>	
							<b>TOTAL ROUTE COST</b>	<b>\$5,350,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for easements that will be required on NTMWD owned land  
3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount



**Table 33 - Conflict Area #6 Alt D Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length	Land Class	Instl. Class	Land	M&I		Material & Installation	& Miscellaneous <sup>1</sup>	
	[ft]			[\$/ft]	[\$/ft]		[\$]	[\$]	
Type 1 - Open	3,756	R	1	53.72	656	201,772	2,463,936	78,272	
Type 2 - Wooded	2,081	R	2	53.72	669	111,791	1,392,189	43,367	
Type 3 - Creek Crossings	35	R	3	53.72	1094	1,880	38,290	729	
Type 4 - Road/Parking Lot Crossings	30	R	4	53.72	1047	1,612	31,410	625	
Type 5 - Bore or Tunnel Crossings		R	5	53.72	1900	-	-	-	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-	
NTMWD Easement Land Cost Reduction <sup>2</sup>	250	R		53.72		(13,430)	-	-	
Parcel Count <sup>3</sup>	8	EA		25000	\$/EA	200,000			
<b>Totals:</b>						<b>5,902</b>	<b>\$503,625</b>	<b>\$3,925,825</b>	<b>\$122,993</b>
						CONSTRUCTION COST		<b>\$4,048,818</b>	
						CONTINGENCY 20%		<b>\$809,764</b>	
						TOTAL CONSTRUCTION COST:		<b>\$4,860,000</b>	
						TOTAL LAND COST		<b>\$500,000</b>	
						TOTAL ROUTE COST		<b>\$5,360,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.

2. This is for easements that will be required on NTMWD owned land

3. This is for ROE and acquisition related costs - NTMWD parcels crossed are not included in this amount

## 2.2 SECTION A - SOUTH

### 2.2.1 Introduction

Section A of the LBCR Raw Water Pipeline project was split into two portions as described in **Section 2.1.1**. The dividing point between the southern and northern alignment studies is FM 1743, which is slightly south of US 82. The end point of the southern alignment study is the proposed connection to LBCR Pipeline Section B located at SH 56. The southern portion of Section A is approximately 3.8 miles and is characterized by a general southwesterly bearing.

The analysis described below was used to determine the recommended alignment for the southern portion of the LBCR Pipeline Section A alignment. The alignment selection for the northern portion of Section A has been included in this PDR as **Section 2.1**. The following general parameters were adopted to generate acceptable alignments from the preliminary alignment corridor for analysis: avoid or minimize environmental permitting potential, align beginning with the proposed Section A northern corridor (North of FM 1743), align end with beginning of Section B, minimize pipeline length where it does not impact other parameters, minimize impact to landowners along route, minimize constructability concerns, and avoid significant terrain that negatively affects hydraulics.

### 2.2.2 Evaluation of Corridors

The preliminary alignment for the southern portion of Section A from FM 1743 to SH 56 is shown in **Figure 11** below as the “Shared Southern Corridor”. This corridor was originally presented in the “Conceptual Facilities Design Route Study Memorandum” dated March 11, 2008. Corridors north of FM 1743 were discussed in the “Section A Corridor Selection Technical Memorandum” dated June 10, 2013.



**Figure 11 – Evaluated Corridor**

### 2.2.3 Route Alternatives

The southern Section A corridor was analyzed in further detail to identify conflicts and develop alignment alternatives. Conflicts were determined based upon aerial imagery and field work. Initial conflict development revealed two conflicts. The first conflict area was a string of several houses along CR 2998 and the second conflict area was the Burnett/Bullard creek confluence area. The rest of the terrain in this corridor consists of primarily open and cultivated land with all possible alignment

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alternatives sharing three creek crossings. The alignments shown have had an initial field environmental study performed and there are no anticipated wetland concerns. Alternate B was set outside of the original corridor and therefore direct field investigations within portions of this alignment were not executed. However, the areas investigated within the corridor near Alternate B and desktop reviews did not provide evidence of environmental impact; therefore, no environmental impacts would be expected along alternate B.

From this analysis, four alignment alternatives were developed to navigate the conflict areas. Due to the size and close proximity between the two conflict areas, merging the alignment alternatives between them was not a beneficial option. The alignment alternatives were evaluated based on the parameters listed in the introduction and are shown in

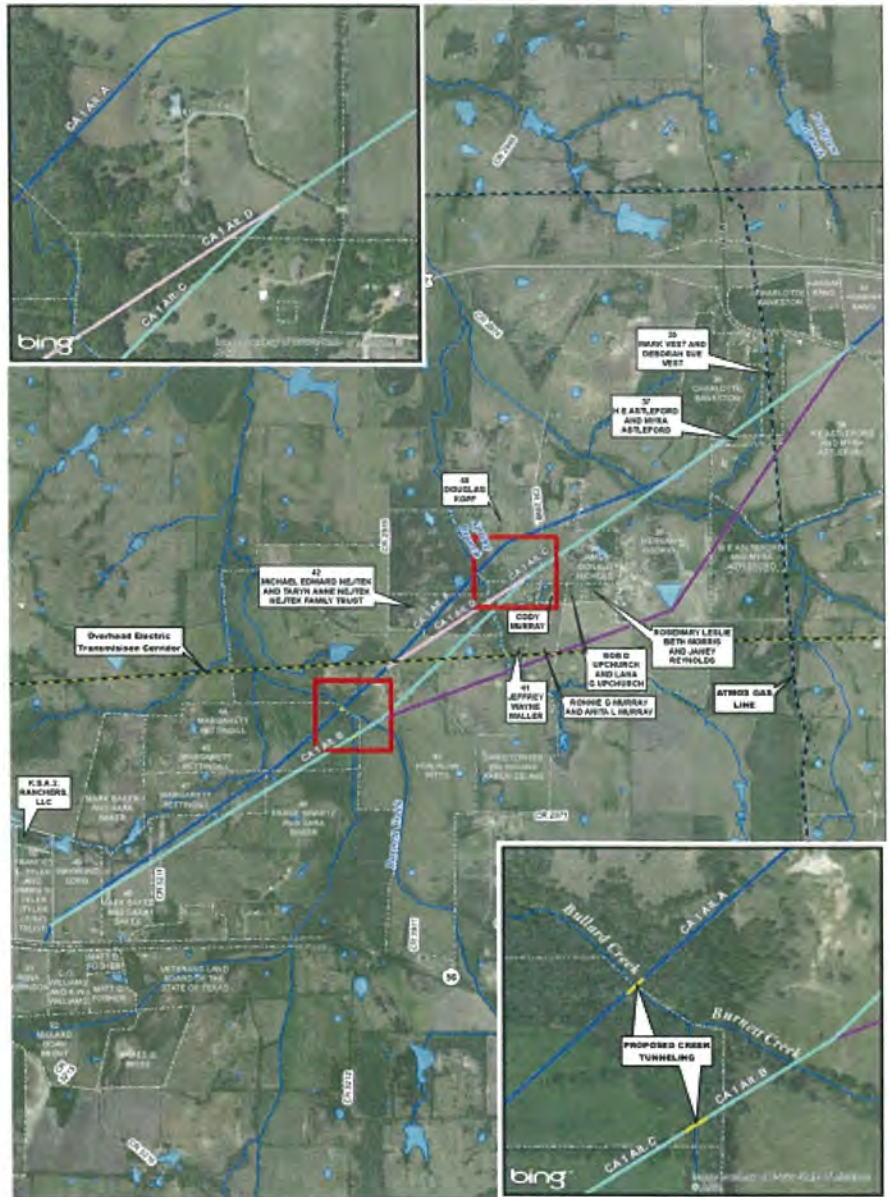


Figure 12 – Overall Segment A – South Alignments

The preferred alternative was determined by analysis that compared the total length, number of parcels affected, open cut length, wooded length, tunnel length, construction cost, and land acquisition cost. The recommended alignment was chosen based on the completed cost analysis and engineering

judgment. The detailed route analysis of these four alignment alternatives is discussed below.

Conflict Area #1 was identified because of the close proximity of the string of houses along CR 2998 to each other. The seven homesteads run mainly east-west across the general southwest direction of the alignment alternatives. Four alignments have been proposed to provide a compromise between landowner impact, constructability, and cost. Three alternatives were developed to cross through this conflict area. Two alternatives diverged either north or south of the conflict area, adding additional length while minimizing the impact to the land owners. The third option aligned between two homesteads as a more direct route. Conflict Area #1 and the three alternatives can be seen in **Figure 13**.



**Figure 13 – Aerial View of Conflict Area #1**

Conflict Area #2 is the Bullard/Burnett Creek confluence. **Figure 14** on the next page shows a close up view of the conflict area and the possible alignments through the area. Due to environmental and constructability concerns, proceeding directly through the creek confluence was not considered within the alignment options. Two alternatives were developed for proceeding through this conflict area. One option would be to cross Bullard Creek northwest and downstream of the confluence. This option

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would result in a larger creek and riparian area crossing, but only crosses the creek once. A second option would be to cross Bullard and Burnett Creeks separately southeast and upstream of their confluence. This option would yield much smaller creek and riparian area crossings; however, two creek crossings would be required which may cause access issues for maintenance and operation of the pipeline. The crossing associated with Bullard Creek would be installed by bore or tunnel due to its deep channel and steep banks. The pipeline crossing at Burnett Creek would be installed by open cut because its creek channel is shallower with more gently sloped banks.



Figure 14 – Aerial View of Conflict Area #2

#### 2.2.4 Detailed Route Analysis

Installation cost factors were developed to take into account the varying costs of pipeline construction through different land classifications. Cost data was updated in order to closely coincide with recent bid information. Routes were classified by the type of land they would be installed in: open, wooded, open

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cut creek crossings, open cut road crossings, or tunneled crossings. A construction and land acquisition cost was associated with each classification in order to estimate the total route cost per linear foot. This allowed a cost to be generated for each alternate based upon the linear feet of the land classification. From this, a cost comparison was performed for the alternates in order to determine the most cost effective route.

Alternate A begins at the common starting point along FM 1743. From there, the alignment proceeds southwest crossing a small seasonal tributary of Cottonwood Creek and its associated riparian area. The alignment continues into a field where a slight northern deviation occurs before crossing Cottonwood Creek. Alternate A then crosses CR 2998 before nearing the northern edge of the previously mentioned Conflict Area #1. The alignment centerline at its closest point is 150 feet away from a non-residential structure and 450 feet away from the property's residential structure further to the south. While near the property's non-residential structure, the alignment makes an approximate 30 degree bend to the south where it proceeds to cross Spring Branch and its riparian area. After crossing the branch, the alignment nears a half acre pond before crossing an overhead electrical distribution line and CR 2975. The alignment then declines down a hill towards Conflict Area #2, the Bullard and Burnett Creek Confluence. Alternate A crosses Bullard Creek downstream and to the north of the confluence before traveling between a small pond and a seasonal tributary for Bullard Creek. The alignment then crosses CR 3211 while continuing in a southwest bearing. The alignment ends by taking a 60 degree southern turn just after traveling past a residential and non-residential structure. The alternate has approximately 270 feet and 200 feet of clearance between the residential and non-residential structures, respectively. Shortly after turning south, the alignment reaches SH 56 and the beginning of Section B.

Alternate B begins at the common starting point along FM 1743. From there, the alignment proceeds southwest crossing Cottonwood Creek and its riparian areas. The alignment proceeds southwest around a large pond before turning approximately 45 degrees to the west and crossing the intersection of CRs 2998 and 2970. Alternate B then nears the southern edge of the previously mentioned Conflict Area #1. The alignment centerline at its closest point is 165 feet away from a non-residential structure and 330 feet away from the property's residential structure further to the northwest. The alignment proceeds southwest through open pasture land before crossing an overhead electric distribution line and Spring

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Branch and its riparian area. Alternate B then crosses CR 2975 before approaching Conflict Area #2. Alternate B crosses the creek confluence upstream and to the southeast to cross the two creeks individually. The alignment crosses the shallower and narrower Burnett Creek before crossing the larger Bullard Creek to the southwest. Alternate B then passes through primarily open land before crossing CR 3211. Alternate B then merges with Alternate A and turns south toward SH 56 and the beginning of Section B. It should be noted that part of Alternate B is outside of the proposed corridor set in the "Conceptual Facilities Design Route Study Memo" dated March 11, 2008. Therefore, there are four parcels that the alignment crosses that were not included in the original ROE mailing list. Also, the desktop review and initial environmental study conducted was in the general area of Alternate B and did not yield any areas of environmental concern.

Alternate C begins merged with Alternate A until just before the Cottonwood Creek crossing. At this point, Alignment C continues on from the previous bearing and crosses CR 2998 and enters the previously mentioned Conflict Area #1. Alignment C proceeds between two of the homesteads as to keep a more direct route to the beginning of Section B. The alignment splits these houses with approximately 200 feet from centerline to either residential structure. Alternate C then crosses Spring Branch along with its associated riparian area before continuing through open pasture land to cross an overhead electric distribution line and CR 2975. After crossing CR 2975, the alignment merges with the previously stated Alternate B before crossing Burnett and Bullard Creeks separately upstream and to the southeast of the creek confluence. The alignment continues along the same route as Alternate B to SH 56 and the beginning of Section B.

Alternate D begins merged with Alternate A until just before the Cottonwood Creek crossing. At this point, the alignment continues with Alternate C until splitting the two residential structures to the southwest. At this point, the alignment proceeds in a more continuous bearing and is approximately 165 feet from the northern structure and 215 feet from the southern structure at their closest points. Alternate D then crosses through approximately 650 feet of wooded area before crossing Spring Branch. The alignment then continues south and connects to Alternate A after crossing an overhead electric distribution line and CR 2975. This alignment crosses Bullard Creek downstream and to the northwest of the Bullard/Burnett Creek Confluence and continues along Alternate A to SH 56 and the beginning of Section B.

In order to properly analyze the various alternatives developed for the conflict areas, data was collected and is summarized in **Table 34**. The weighted route scores analysis was utilized in determining the preferred route across the southern portion of Section A. **Table 35** shows a breakdown of these scores. This analysis utilized various factors such as length, parcel crossings, environmental crossings and transportation right-of-way crossings. These factors were weighted in relevance to their general impact throughout the project. For example, route length is the highest weighted factor due to its general correlation with cost, landowner easement acquisition quantity, and construction time. Through the summation and analysis of the weighted factors a preferred alignment can be chosen.

Preliminary cost estimating spreadsheets were utilized in determining the associated costs of the four evaluated alignments. These cost estimating spreadsheets incorporate bid data from recent pipeline projects to develop the costs for the type of pipe, pipe installation, relevant appurtenances, and easement acquisition costs. The cost analysis for the conflict areas is shown below in **Table 34**.

**Table 34 – Analysis for Section A Conflict Areas**

Option	Alternate A	Alternate B	Alternate C	Alternate D
Length (ft.)	20,040	20,438	19,919	19,863
Number of Parcels	18	17	17	19
Open Length (ft.)	14,122	16,858	14,429	13,893
Wooded Length (ft.)	5,768	3,480	5,390	5,820
Tunnel/Bore Length	150	100	100	150
Construction Cost	\$16,800,000	\$17,060,000	\$16,650,000	\$16,670,000
Land Acquisition Cost	\$1,530,000	\$1,520,000	\$1,500,000	\$1,540,000
Total Cost	\$18,330,000	\$18,580,000	\$18,150,000	\$18,210,000

\*For further cost analysis data see **Tables 38-41**.

The pipeline route evaluation criteria spreadsheet that was mentioned previously to analyze the characteristics of the alignments from FM 1743 to SH 56 can be seen on the next page in **Table 35**. FNI filled in the weights based on our engineering judgment and input from the NTMWD.



**Table 35 – Weighted Route Scores**

Raw Quantities (Low is Best)					
Item Description	Item Weight (High = Most Important) (0 = Not Considered)	Routes			
		Proposed A	Proposed B	Proposed C	Proposed D
Route Length, ft	40	20,040	20,438	19,919	19,863
Parcel Count, ea	15	18	17	17	19
Wooded Crossing, ft	10	5,358	2,965	4,905	5,370
Perennial Stream Crossing, ea	10	-	-	-	-
Intermittent Stream Crossing, ea	9	4	4	5	4
Hydric Soil Crossing, ft	9	-	-	-	-
Bored Crossing (TXDOT & RR), ea	7	1	1	1	1
<b>Total</b>	<b>100</b>				
Normalized Score (Low is Best)					
Item Description	Item Weight	Proposed A	Proposed B	Proposed C	Proposed D
Route Length, ft	40.00	34.85	35.54	34.64	34.54
Parcel Count, ea	15.00	9.00	8.50	8.50	9.50
Wooded Crossing, ft	10.00	2.23	1.23	2.04	2.23
Perennial Stream Crossing, ea	10.00	1.00	1.00	1.00	1.00
Intermittent Stream Crossing, ea	9.00	4.00	4.00	5.00	4.00
Hydric Soil Crossing, ft	9.00	1.00	1.00	1.00	1.00
Bored Crossing (TXDOT & RR), ea	7.00	1.00	1.00	1.00	1.00
<b>Total</b>	<b>100.00</b>	<b>53.08</b>	<b>52.28</b>	<b>53.18</b>	<b>53.28</b>
Weighted Score (Low is Best)					
Item Description	Item Weight	Proposed A	Proposed B	Proposed C	Proposed D
Route Length, ft	40.00	13.94	14.22	13.86	13.82
Parcel Count, ea	15.00	1.35	1.28	1.28	1.43
Wooded Crossing, ft	10.00	0.22	0.12	0.20	0.22
Perennial Stream Crossing, ea	10.00	0.10	0.10	0.10	0.10
Intermittent Stream Crossing, ea	9.00	0.36	0.36	0.45	0.36
Hydric Soil Crossing, ft	9.00	0.09	0.09	0.09	0.09
Bored Crossing (TXDOT & RR), ea	7.00	0.07	0.07	0.07	0.07
<b>Total</b>	<b>100.00</b>	<b>16.13</b>	<b>16.24</b>	<b>16.05</b>	<b>16.09</b>

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Based on the analysis, Alternate C was selected as the recommended alignment due to a number of factors such as: length, parcel count, wooded areas, stream crossings, and number of bored locations (**Table 35**). From the analysis, it can be seen that the scores presented a small variance; however, Alternate C presented the best score in regards to the Section A alignment analysis and therefore is the recommended route.

A summary of costs for Alternates A-D is shown in **Table 34**. This summary of costs does not take into account the pipe length between FM 1743 and US 82. The OPCC for the northern portion of Section A has been included in this PDR as **Section 2.1.5**.

### **2.2.5 Opinion of Probable Construction Cost**

The OPCC for the Section A southern recommended alignment (Alternative C) is \$20,902,450. A detailed breakdown of the OPCC for Alternate C is shown in **Table 36**.

**Table 36 – Opinion of Probable Construction Costs**

NTMWD Lower Bois d'Arc Creek Reservoir Raw Water Pipeline				PROPOSING: ESTIMATING PROPERTY COSTS SURVEILLANCE SERVICES	
1701 N Market St., #500, LB51 • Dallas, Texas 75202 • 214-217-2200 • fax 214-217-2201					
<b>OPINION OF PROBABLE CONSTRUCTION COSTS (INCLUDING EASEMENTS)</b>					November 25, 2013
<b>ESTIMATOR</b> WRS		<b>CHECKED BY</b> ASM		<b>ACCOUNT NO</b> NTD13136	
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	90-INCH PIPELINE	19,919	LF	\$650.00	\$ 12,947,950
2	TUNNELLED CROSSINGS	0	LF	\$1,970.00	\$ -
3	PIPELINE ROW CLEARING	50	AC	\$5,000.00	\$ 250,000
4	TRENCH SAFETY	19,919	LF	\$1.00	\$ 19,919
5	AIR RELEASE VALVES	6	EA	\$25,000.00	\$ 142,500
6	BUTTERFLY VALVES	1	EA	\$165,000.00	\$ 165,000
7	BLOW OFF VALVES	6	EA	\$25,000.00	\$ 142,500
8	PAVEMENT RESTORATION	440	SY	\$70.00	\$ 30,800
9	CREEK CROSSINGS	455	LF	\$445.00	\$ 202,475
10	REVEGETATION	50	AC	\$1,160.00	\$ 58,000
11	FIBER OPTIC CONDUIT	19,919	LF	\$3.00	\$ 59,757
12	FIBER	19,919	LF	\$2.00	\$ 39,838
13	CATHODIC PROTECTION	19,919	LF	\$2.00	\$ 39,838
14	ACCESS MANWAYS	6	EA	\$10,000.00	\$ 57,000
15	TESTING	19,919	LF	\$2.00	\$ 39,838
16	Mobilization	1	LS	\$709,741.00	\$ 709,741
<b>CONSTRUCTION SUBTOTAL</b>					\$ 14,900,000
<b>CONSTRUCTION CONTINGENCY</b>				15%	\$ 2,235,000
<b>CONSTRUCTION TOTAL</b>					\$ 17,135,000
<b>ESTIMATED EASEMENT/PROPERTY COSTS</b>					
<b>PERMANENT EASEMENT W/ ASSOCIATED TEMPORARY (Note 1)</b>		995,950	SF	\$1.00	\$995,950.00
<b>TOTAL ESTIMATED COSTS (INCLUDING EASEMENT)</b>					\$18,130,950.00

1. Estimated Easement Costs Based on a 50' Perm Easement & 70' Temp Easement for the Entire Route

### 2.2.6 Recommendations Summary

The proposed Alternate C is the recommended alignment selection for this specific corridor between FM 1743 and SH 56. Alternate C is the shortest route through the Conflict Area #1 and therefore will reduce cost and length of pipe while still providing a reasonable distance from the nearby structures. The southeast crossing of Conflict Area #2 by Alternate C also provides an additional benefit over the other route at this crossing. Alternate C's creek crossings in this area are narrower and shallower and provide significantly less wooded area to cross than the other alternates. It is because of these advantages and the numerical analysis shown in **Table 35** that FNI recommends Alternate C for the alignment of the

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southern portion of Section A.

### 2.2.7 Pipeline Crossings

**Table 37** below presents identified utility, roadway, and creek crossings associated with the recommended route.

**Table 37 – Major Transportation, Utility, and Waterbody Crossings**

<b>Road</b>
Fannin CR 2998
Fannin CR 2970
Fannin CR 2975
Fannin CR 3211
<b>Utility</b>
Atmos 3.5" Gas Distribution Line
Oncor Overhead Electric Distribution Lines
<b>Waterbody</b>
Cottonwood Creek
Spring Branch
Bullard Creek
Burnett Creek



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**Table 38 - Conflict Area #1 Alt A Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous 1 [\$]	
Type 1 - Open	14,122	R	1	53.72	656	758,634	9,264,032	294,292	
Type 2 - Wooded	5,358	R	2	53.72	669	287,832	3,584,502	111,657	
Type 3 - Creek Crossings	350	R	3	53.72	1094	18,802	382,900	7,294	
Type 4 - Road/Parking Lot Crossings	60	R	4	53.72	1047	3,223	62,820	1,250	
Type 5 - Bore or Tunnel Crossings	150	R	5	53.72	1900	8,058	285,000	3,126	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-	
Parcel Count <sup>2</sup>	18	EA		25000	\$/EA	450,000			
<b>Totals:</b>						<b>20,040</b>	<b>\$1,526,549</b>	<b>\$13,579,254</b>	<b>\$417,619</b>
						CONSTRUCTION COST		<b>\$13,996,873</b>	
						CONTINGENCY 20%		<b>\$2,799,375</b>	
						<b>TOTAL CONSTRUCTION COST:</b>		<b>\$16,800,000</b>	
						TOTAL LAND COST		<b>\$1,530,000</b>	
						<b>TOTAL ROUTE COST</b>		<b>\$18,330,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

**Table 39 - Conflict Area #1 Alt B Cost Analysis**

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous 1 [\$]	
Type 1 - Open	16,858	R	1	53.72	656	905,612	11,058,848	351,309	
Type 2 - Wooded	2,965	R	2	53.72	669	159,280	1,983,585	61,788	
Type 3 - Creek Crossings	455	R	3	53.72	1094	24,443	497,770	9,482	
Type 4 - Road/Parking Lot Crossings	60	R	4	53.72	1047	3,223	62,820	1,250	
Type 5 - Bore or Tunnel Crossings	100	R	5	53.72	1900	5,372	190,000	2,084	
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-	
Parcel Count <sup>2</sup>	17	EA		25000	\$/EA	425,000			
<b>Totals:</b>						<b>20,438</b>	<b>\$1,522,929</b>	<b>\$13,793,023</b>	<b>\$425,913</b>
						CONSTRUCTION COST		<b>\$14,218,936</b>	
						CONTINGENCY 20%		<b>\$2,843,787</b>	
						<b>TOTAL CONSTRUCTION COST:</b>		<b>\$17,060,000</b>	
						TOTAL LAND COST		<b>\$1,520,000</b>	
						<b>TOTAL ROUTE COST</b>		<b>\$18,580,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

**Table 40 - Conflict Area #1 Alt C Cost Analysis**

ORIGINAL ALIGNMENT	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST	
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]
Type 1 - Open	14,429	R	1	53.72	656	775,126	9,465,424	300,690
Type 2 - Wooded	4,905	R	2	53.72	669	263,497	3,281,445	102,217
Type 3 - Creek Crossings	405	R	3	53.72	1094	21,757	443,070	8,440
Type 4 - Road/Parking Lot Crossings	80	R	4	53.72	1047	4,298	83,760	1,667
Type 5 - Bore or Tunnel Crossings	100	R	5	53.72	1900	5,372	190,000	2,084
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-
Parcel Count <sup>2</sup>	17	EA		25000	\$/EA	425,000		
<b>Totals:</b>		<b>19,919</b>				<b>\$1,495,049</b>	<b>\$13,463,699</b>	<b>\$415,098</b>
							CONSTRUCTION COST	<b>\$13,878,797</b>
							CONTINGENCY 20%	<b>\$2,775,759</b>
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$16,650,000</b>
							TOTAL LAND COST	<b>\$1,500,000</b>
							<b>TOTAL ROUTE COST</b>	<b>\$18,150,000</b>
<p>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</p> <p>2. This is for ROE and acquisition related costs</p>								

**Table 41 - Conflict Area #1 Alt D Cost Analysis**

ORIGINAL ALIGNMENT	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST	
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]
Type 1 - Open	13,893	R	1	53.72	656	746,332	9,113,808	289,520
Type 2 - Wooded	5,370	R	2	53.72	669	288,476	3,592,530	111,907
Type 3 - Creek Crossings	350	R	3	53.72	1094	18,802	382,900	7,294
Type 4 - Road/Parking Lot Crossings	100	R	4	53.72	1047	5,372	104,700	2,084
Type 5 - Bore or Tunnel Crossings	150	R	5	53.72	1900	8,058	285,000	3,126
Type 6 - Deep Cut (10-15' cover)		R	6	53.72	735	-	-	-
Parcel Count <sup>2</sup>	19	EA		25000	\$/EA	475,000		
<b>Totals:</b>		<b>19,863</b>				<b>\$1,542,040</b>	<b>\$13,478,938</b>	<b>\$413,931</b>
							CONSTRUCTION COST	<b>\$13,892,869</b>
							CONTINGENCY 20%	<b>\$2,778,574</b>
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$16,670,000</b>
							TOTAL LAND COST	<b>\$1,540,000</b>
							<b>TOTAL ROUTE COST</b>	<b>\$18,210,000</b>
<p>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</p> <p>2. This is for ROE and acquisition related costs</p>								

## **2.3 SECTION B**

### **2.3.1 Introduction**

Section B of the LBCR Raw Water Pipeline connects with Section A approximately 1 mile east of Dodd City at the north right of way line of SH 56. The route crosses the highway and the adjacent Texas Northeastern Railroad (TNER) track and generally routed to the southwest for approximately 9.89 miles terminating at Section C on the southwest corner of FM 68 and FM 3115.

The original preliminary pipeline corridor was determined in “NTMWD Preliminary Pipeline Routing Study and Conceptual Pump Station Design Report” by completing a high level analysis of pipeline corridors from the proposed LBCR pump station to the proposed NWTP site. The pump station was relocated as a portion of this project, but this did not change the pipeline corridor for Section B. The preliminary alignment corridor was reviewed for modifications to shorten the route but minimize additional tree loss and not intrude on forested wetlands, while minimizing overall construction costs. Since this area has typical large tracts paralleling property lines was not a high priority in the analysis. Various options were examined at identified conflict areas and additional analysis was completed to take into account costs associated with easements, road crossings, and construction. The analysis discussed in this PDR details the process of determining the final pipeline alignment from the preliminary corridor and various alternatives developed during this phase of the pipeline route selection.

### **2.3.2 Route Alternatives**

The preliminary pipeline alignment corridor was investigated further in order to identify potential conflict areas along the route. Conflicts were determined based upon aerial imagery and field work walking the potential pipeline routes. A detailed evaluation of localized alternatives was performed to optimize the pipeline alignment and avoid potential conflicts in land acquisition and construction. Environmental constraints such as stream crossings, perennial water bodies, and possible wetlands along with impacts to property owners were taken into account during the analysis.

The original alignment corridor centerline is shown in blue and in each conflict area and described as Alternate A in this memorandum. On all figures, Conflict Area Alternate B's are magenta, Alternate C's are teal and Alternate D's are pink.

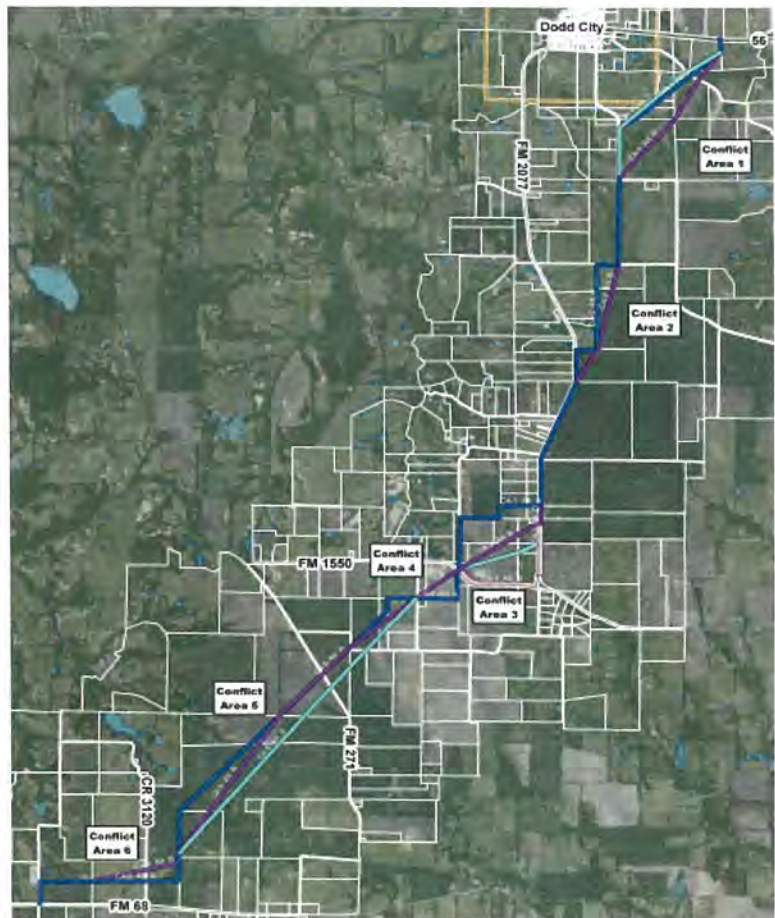
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Six conflict areas were identified on the potential pipeline route of Section B. Conflict Area #1 begins in the first parcel south of SH 56 and the TNER tracks and comes back to the original alignment at CR 3200. The Conflict Area #2 is located between CR 3205 and FM 2077. The alternates for this conflict area either parallel property lines or cut across country. Conflict Area #3 is between FM 2077 and FM 1550 and again the alternates either parallel property lines or cut across country. The Conflict Area #4 is between FM1550 and CR 3302 and again an alternate was developed to cut across country instead of following property lines. Conflict Area #5 is from the end of Conflict Area #4 at CR 3302 to CR 3120. Alternates involve routing to reducing pipeline length, along with one stream crossing or reducing the number of property owners impacted by the construction. Conflict Area #6 is between CR 3120 and FM 3115. The alternate parallels a 36 inch natural gas line rather than paralleling a property line. The overall route is shown in **Figure 15**.

The preferred alternatives were determined by analysis that compared the total length, number of parcels crossed, open cut length, wooded length, tunnel length, construction cost, and land acquisition cost. The recommended alignment was chosen based on the cost analysis and engineering judgment of the above mentioned impacts. The detailed route analysis of these six conflict areas is discussed below.

### 2.3.3 Detailed Route Analysis

In order to properly analyze the various alternatives developed for the conflict areas, data was collected and input into a pipeline route evaluation criteria



**Figure 15 – Overall Segment B Alignment**

spreadsheet. Cost data was updated to estimate future pipeline construction costs based on recent bid information. Routes were classified by the type of land the pipeline would be installed in: open area,



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wooded, open cut creek crossings, open cut road crossings, or tunneled crossings. A construction cost and land acquisition cost was associated with each classification in order to estimate the total route cost per linear foot. This allowed a cost to be generated for each alternate based upon the linear feet of the land classification. A cost comparison was performed for the alternates of each conflict area to determine the most cost effective route. The route with the lowest cost was generally selected as the preferred route; however, engineering judgment was also used to ensure that potential complications were also evaluated.

Conflict Area #1 was identified because of the potential to reduce the number of properties affected and shorten the route while maintaining creek crossing construction viability as seen in **Figure 16**. Three alternatives were analyzed for this conflict area.

Alternate A was the original preliminary alignment corridor. Alternate B was developed to minimize the number of parcels crossed, along with providing the

shortest pipeline route. Alternate C was developed to minimize the pipeline wooded length and provide a more favorable creek crossing scenario. The creek crossings for each alternate can be done by open cut method with bank restoration in compliance with Nationwide Permit 12 crossing parameters. Analysis of Conflict Area #1 is shown in **Table 42**.



**Figure 16 – Aerial View of Conflict Area #1**

**Table 42 – Analysis for Conflict Area #1**

Option	Alternate A	Alternate B	Alternate C
Length	7622	7034	7626
Number of Parcels	5	4	6
Open Length (ft.)	6577	5487	6825
Wooded Length (ft.)	1045	1547	697
Tunnel/Bore Length	0	0	0
Construction Cost	\$6,260,000	\$5,850,000	\$6,260,000
Land Acquisition Cost	\$530,000	\$480,000	\$560,000
Total Cost	\$6,790,000	\$6,330,000	\$6,820,000

\*For further cost analysis data see **Tables 50-52**.

From the analysis performed, Alternate A and C are very similar in construction cost, but Alternate B is recommended. Alternate B is considerably cheaper due to the reduced length and parcel crossings. In addition, the main property owner, Millard Brent owns three of the four parcels in Alternate B.

Conflict Area #2 was identified because of the potential to reduce the overall length, avoid a small pond, and potential forested wetland area in the vicinity of the property corner between two of the properties. The two alternatives analyzed for this conflict area can be seen in **Figure 17**.

Alternate A routed the pipeline parallel to the south side of CR 3205 before crossing south and following property lines. Alternate B crossed CR 3205 and routed the pipe across an open field, bisecting three properties.



**Figure 17 – Aerial View of Conflict Area #2**

**Table 43 – Analysis for Conflict Area #2**

Option	Alternate A	Alternate B
Length	6965	5578
Number of Parcels	3	3
Open Length (ft.)	5806	5500
Wooded Length (ft.)	1082	78
Tunnel/Bore Length	77	0
Construction Cost	\$5,810,000	\$4,530,000
Land Acquisition Cost	\$450,000	\$370,000
Total Cost	\$6,260,000	\$4,900,000

\*For further cost analysis data see **Tables 53 & 54.**

Alternate B is the recommended route due to the fact it is the shorter alternate, considerably cheaper, and eliminates potential issues with the pond and wetland area. Both alternate alignments cross the same number of parcels. Alternate B bisects properties but avoids the pond and wetland area by approximately 75 feet, while Alternate A crosses very close to the pond and through the wetland area.

Conflict Area #3 was evaluated in order to shorten the pipeline alignment and reduce the number of bends required. Four alternatives were analyzed for this conflict area and can be seen in **Figure 18**. Alternate A proposed to align the pipe parallel to property lines and traveled due west or due south through the conflict area. Alternates B and C route through open land, bisecting several properties in order to reduce the pipeline length. Alternate D follows the right of



**Figure 18 – Aerial View of Conflict Area #3**

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way of FM 2077 and FM 1550. Alternates B, C, and D all cross creeks at select locations, but the proposed crossings can be accomplished with open cut methods and bank restoration in compliance with Nationwide Permit 12 requirements. Analysis of Conflict Area #3 is shown in **Table 44**.

**Table 44 – Analysis for Conflict Area #3**

Option	Alternate A	Alternate B	Alternate C	Alternate D
Length	6170	4757	5266	7084
Number of Parcels	5	6	6	5
Open Length (ft.)	5763	4458	5054	6890
Wooded Length (ft.)	297	195	112	58
Tunnel/Bore Length	110	105	100	100
Construction Cost	\$5,180,000	\$4,030,000	\$4,430,000	\$5,920,000
Land Acquisition Cost	\$460,00	\$410,000	\$430,000	\$510,000
Total Cost	\$5,660,000	\$4,440,000	\$4,840,000	\$6,430,000

\*For further cost analysis data see **Tables 55-58**.

Alternate B is the recommended route because it is the shortest option and the least expensive of the alternatives. Alternate A, C, and D are all longer and therefore have a greater construction cost and land acquisition cost than Alternate B. In addition, Alternate C and D pass an old barn structure that has been preliminarily flagged as a potential historical structure. These routes should still miss the structure, but will require further historical investigation. Alternate B veers westward cross country prior to this structure, therefore avoiding any further investigation of the structure.

Conflict Area #4 was identified due to potential savings for cutting cross country rather than paralleling property lines between FM 1550 and CR 3302. Two alternates were analyzed for this conflict area shown in **Figure 19**.

Alternate A paralleled property lines to head south after crossing FM 1550. Alternate B routed cross country between FM 1550 and CR 3302. Analysis of Conflict Area #4 is shown in **Table 45**.



**Figure 19 – Aerial View of Conflict Area #4**

**Table 45 – Analysis for Conflict Area #4**

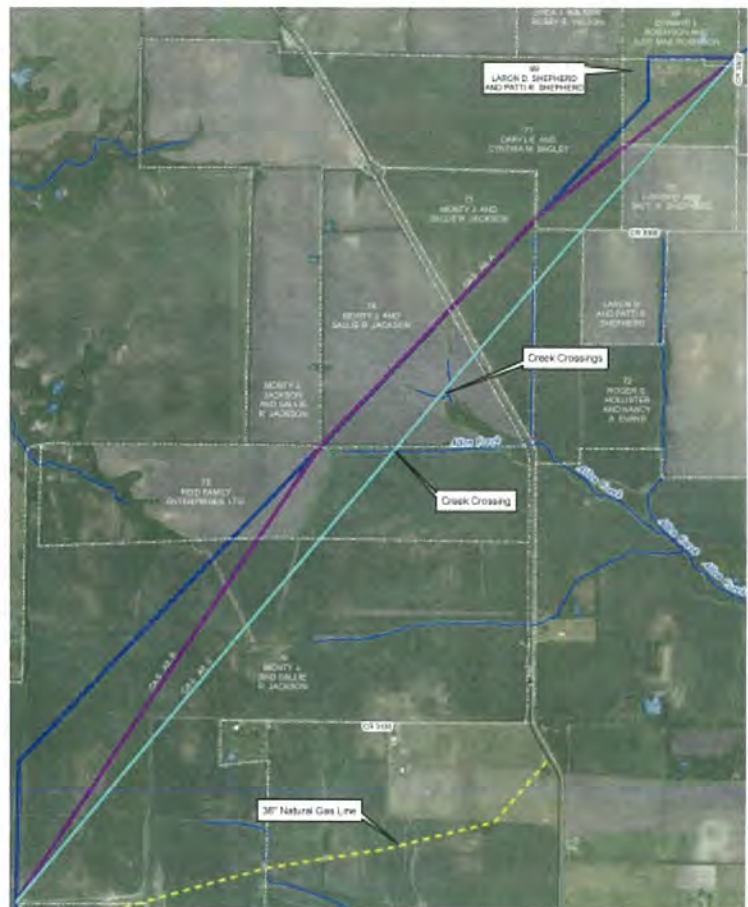
Option	Alternate A	Alternate B
Length	3023	2155
Number of Parcels	2	2
Open Length (ft.)	2862	2016
Wooded Length (ft.)	53	39
Tunnel/Bore Length	108	101
Construction Cost	\$2,620,000	\$1,910,000
Land Acquisition Cost	\$210,000	\$170,000
Total Cost	\$2,830,000	\$2,080,000

\*For further cost analysis data see **Tables 59 & 60.**

Alternate B was selected as the recommended route since it is significantly shorter and less expensive than Alternate A.

Conflict Area #5 was identified due to potential savings for cutting cross country with slightly different alignments at the end of Conflict Area #4, between CR 3302 and CR 3120. Three alternatives were considered for this conflict area shown below in **Figure 20.**

The original preliminary alignment, Alternate A, paralleled property lines at the north and south ends of the conflict area, but routed through open land for most of the conflict area. Alternate B and C routed cross country between CR 3302 and CR 3120. Analysis of Conflict Area #5 is shown in **Table 46.**



**Table 46 – Analysis for Conflict Area #5**

Option	Alternate A	Alternate B	Alternate C
Length	16062	15169	15054
Number of Parcels	7	8	9
Open Length (ft.)	15883	14999	14724
Wooded Length (ft.)	104	96	98
Tunnel/Bore Length	50	52	54
Construction Cost	\$13,130,000	\$12,410,000	\$12,400,000
Land Acquisition Cost	\$1,010,000	\$1,010,100	\$1,030,000
Total Cost	\$14,140,000	\$13,420,000	\$13,430,000

\*For further cost analysis data see **Tables 61-63**.

Alternate C is the recommended route because it is the shortest route and the least expensive.

Alternate A crosses the least number of parcels, but is approximately 1,000 feet longer than Alternate C and the most costly. Alternate C has two creek crossings, but they do not have wetlands associated with them and can be accomplished with open cut methods and bank restoration in compliance with Nationwide Permit 12 requirements.

Conflict Area #6 was identified due to potential savings for cutting cross country rather than paralleling property lines between CR 3120 and CR 3116. Two alternates were analyzed for this conflict area shown in **Figure 21**.

Alternate A was the preliminary alignment and paralleled property lines. Alternate B routed cross country aligning with an existing cross country 36 inch natural gas line. Analysis of Conflict Area #6 is shown in **Table 47**.



**Figure 21 – Aerial View of Conflict Area #6**

**Table 47 – Analysis for Conflict Area #6**

Option	Alternate A	Alternate B
Length	4357	3655
Number of Parcels	1	1
Open Length (ft.)	4255	3594
Wooded Length (ft.)	85	42
Tunnel/Bore Length	0	0
Construction Cost	\$3,550,000	\$2,980,000
Land Acquisition Cost	\$260,000	\$220,000
Total Cost	\$3,810,000	\$3,200,000

\*For further cost analysis data see **Tables 64 & 65**.

Alternate B is recommended because of the reduced length and cost savings associated with it. Even though the Alternate B bisects properties, the alignment would be following an existing pipeline. Also, Alternate A crosses the gas pipeline twice, which would result in a greater construction cost.

#### **2.3.4 Opinion of Probable Construction Cost**

The Opinion of Probable Construction Cost (OPCC) for the Section B recommended alignment is \$55,104,900. A detailed breakout of this OPCC is shown in **Table 48**.

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**Table 48 – Opinion of Probable Construction Costs**

NTMWD Lower Bois d'Arc Creek Reservoir Raw Water Pipeline (Section B)		FREESE AND NICHOLS Registered Architects Professional Engineers Civil/Structural/Utility		1701 N Market St., #500, LB51 • Dallas, Texas 75202 • 214-217-2200 • fax 214-217-2201	
OPINION OF PROBABLE CONSTRUCTION COSTS (INCLUDING EASEMENTS)					September 16, 2013
ESTIMATOR		CHECKED BY		ACCOUNT NO	
DWH		JB		NTD13136	
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	90-INCH PIPELINE	51,688	LF	\$650.00	\$ 33,597,264
2	TUNNELLED CROSSINGS	551	LF	\$1,970.00	\$ 1,084,520
3	PIPELINE ROW CLEARING	340	AC	\$5,000.00	\$ 700,000
4	TRENCH SAFETY	51,688	LF	\$1.00	\$ 51,688
5	AIR RELEASE VALVES	15	EA	\$25,000.00	\$ 372,500
6	BUTTERFLY VALVES	2	EA	\$165,000.00	\$ 330,000
7	BLOW OFF VALVES	15	EA	\$25,000.00	\$ 372,500
8	PAVEMENT RESTORATION	830	SY	\$70.00	\$ 58,100
9	CREEK CROSSINGS	468	LF	\$445.00	\$ 208,273
10	REVEGETATION	340	AC	\$1,160.00	\$ 162,400
11	FIBER OPTIC CONDUIT	51,688	LF	\$3.00	\$ 155,064
12	FIBER	51,688	LF	\$2.00	\$ 103,376
13	CATHODIC PROTECTION	51,688	LF	\$2.00	\$ 103,376
14	ACCESS MHWAYS	15	LF	\$10,000.00	\$ 149,000
15	TESTING	51,688	LF	\$2.00	\$ 103,376
16	MOBILIZATION	1	LS	\$1,877,572.00	\$ 1,877,572
<b>CONSTRUCTION SUBTOTAL</b>					<b>\$ 39,430,000</b>
<b>CONSTRUCTION CONTINGENCY</b>					<b>15%</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$ 45,344,500</b>
<b>ESTIMATED EASEMENT/PROPERTY COSTS</b>					
<b>PERMANENT EASEMENT W/ ASSOCIATED TEMPORARY (Note 3)</b>		<b>2,584,405</b>	<b>SF</b>	<b>\$1.00</b>	<b>\$2,584,400.00</b>
<b>TOTAL ESTIMATED COSTS (INCLUDING EASEMENT)</b>					<b>\$47,928,900.00</b>

1. Estimated Easement Costs Based on a 50' Perm Easement & 70' Temp Easement for the Entire Route

### 2.3.5 Recommendations Summary

The recommended alignment for Section B is Alternate B for Conflict Area #1, #2, #3, #4, and #6, and Alternate C for Conflict Area #5. Each of these routes is expected to be the least expensive option for their corresponding conflict area. All conflict areas avoid potential complications in land acquisition and construction. Based on the recommended routes the proposed Section B alignment has been shortened from 11.02 miles to 9.89 miles, a savings of 1.13 miles of 90 inch pipeline.



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### 2.3.6 Pipeline Crossings

Table 49 below presents identified utility, roadway, and creek crossings associated with the recommended route.

**Table 49– Major Transportation, Utility, and W Crossings**

<b>Road</b>
State Highway 56
Fannin CR 3210
Fannin CR 3200
Fannin CR 3205
Farm to Market 2077
Farm to Market 1550
Fannin CR 3302
Fannin CR 3300
Farm to Market 271
Fannin CR 3120
Fannin CR 3115
Farm to Market 68
<b>Railroad</b>
Texas Northeastern Railroad (TNER) - Genesee & Wyoming Inc.
<b>Utility</b>
36" Natural Gas Pipeline - Energy Transfer Company
<b>Waterbody</b>
Bullard Creek Tributary
Long Branch Creek Tributary
Pot Creek
Allen Creek

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**Table 50 – Conflict Area #1 Alt A Cost Analysis**

ALTERNATE A	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
		[ft]			[\$/ft]		[\$/ft]		
Type 1 - Open	6,547	R	1	53.72	656	351,705	4,294,832	136,435	
Type 2 - Wooded	974	R	2	53.72	669	52,323	651,606	20,297	
Type 3 - Creek Crossings	70	R	4	53.72	1094	3,760	76,580	1,459	
Type 4 - Road/Parking Lot Crossings	30	R	5	53.72	1047	1,612	31,410	625	
Type 5 - Bore or Tunnel Crossings	-	R	6	53.72	1900	-	-	-	
Parcel Count <sup>2</sup>	5	EA		25000	\$/EA	125,000			
<b>Totals:</b>						<b>7,621</b>	<b>\$534,400</b>	<b>\$5,054,428</b>	<b>\$158,816</b>
							CONSTRUCTION COST	<b>\$5,213,244</b>	
							CONTINGENCY 20%	<b>\$1,042,649</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$6,260,000</b>	
							TOTAL LAND COST	<b>\$530,000</b>	
							TOTAL ROUTE COST	<b>\$6,790,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

**Table 51 – Conflict Area #1 Alt B Cost Analysis**

ALTERNATE B	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
		[ft]			[\$/ft]		[\$/ft]		
Type 1 - Open	5,481	R	1	53.72	656	293,365	3,582,416	113,803	
Type 2 - Wooded	1,340	R	2	53.72	669	71,985	896,460	27,925	
Type 3 - Creek Crossings	207	R	4	53.72	1094	11,120	226,458	4,314	
Type 4 - Road/Parking Lot Crossings	26	R	5	53.72	1047	1,397	27,222	542	
Type 5 - Bore or Tunnel Crossings	-	R	6	53.72	1900	-	-	-	
Parcel Count <sup>2</sup>	4	EA		25000	\$/EA	100,000			
<b>Totals:</b>						<b>7,034</b>	<b>\$477,866</b>	<b>\$4,732,556</b>	<b>\$146,584</b>
							CONSTRUCTION COST	<b>\$4,879,140</b>	
							CONTINGENCY 20%	<b>\$975,828</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$5,850,000</b>	
							TOTAL LAND COST	<b>\$480,000</b>	
							TOTAL ROUTE COST	<b>\$6,330,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

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**Table 52 – Conflict Area #1 Alt C Cost Analysis**

ALTERNATE C	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
		[ft]			[\$/ft]		[\$/ft]		
Type 1 - Open	6,825	R	1	53.72	656	366,639	4,477,200	142,228	
Type 2 - Wooded	697	R	2	53.72	669	37,443	466,293	14,525	
Type 3 - Creek Crossings	74	R	4	53.72	1094	3,975	80,956	1,542	
Type 4 - Road/Parking Lot Crossings	30	R	5	53.72	1047	1,612	31,410	625	
Type 5 - Bore or Tunnel Crossings	-	R	6	53.72	1900	-	-	-	
Parcel Count <sup>2</sup>	6	EA		25000	\$/EA	150,000			
<b>Totals:</b>		<b>7,626</b>				<b>\$559,669</b>	<b>\$5,055,859</b>	<b>\$158,920</b>	
							CONSTRUCTION COST	<b>\$5,214,779</b>	
							CONTINGENCY 20%	<b>\$1,042,956</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$6,260,000</b>	
							TOTAL LAND COST	<b>\$560,000</b>	
							TOTAL ROUTE COST	<b>\$6,820,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

**Table 53 – Conflict Area #2 Alt A Cost Analysis**

ALTERNATE A	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
		[ft]			[\$/ft]		[\$/ft]		
Type 1 - Open	5,806	R	1	53.72	656	311,898	3,808,736	120,993	
Type 2 - Wooded	1,034	R	2	53.72	669	55,546	691,746	21,548	
Type 3 - Creek Crossings	48	R	4	53.72	1094	2,579	52,512	1,000	
Type 4 - Road/Parking Lot Crossings	-	R	5	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings	77	R	6	53.72	1900	4,136	146,300	1,605	
Parcel Count <sup>2</sup>	3	EA		25000	\$/EA	75,000			
<b>Totals:</b>		<b>6,965</b>				<b>\$449,160</b>	<b>\$4,699,294</b>	<b>\$145,146</b>	
							CONSTRUCTION COST	<b>\$4,844,440</b>	
							CONTINGENCY 20%	<b>\$968,888</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$5,810,000</b>	
							TOTAL LAND COST	<b>\$450,000</b>	
							TOTAL ROUTE COST	<b>\$6,260,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

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**Table 54 – Conflict Area #2 Alt B Cost Analysis**

ALTERNATE B	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material &	& Miscellaneous
								Installation	<sup>1</sup>
Type 1 - Open	5,500	R	1	53.72	656	295,460	3,608,000	114,616	
Type 2 - Wooded	78	R	2	53.72	669	4,190	52,182	1,625	
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	-	R	5	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings	-	R	6	53.72	1900	-	-	-	
Parcel Count <sup>2</sup>	3	EA		25000	\$/EA	75,000			
<b>Totals:</b>						<b>5,578</b>	<b>\$374,650</b>	<b>\$3,660,182</b>	<b>\$116,242</b>
							CONSTRUCTION COST	<b>\$3,776,424</b>	
							CONTINGENCY 20%	<b>\$755,285</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$4,530,000</b>	
							TOTAL LAND COST	<b>\$370,000</b>	
							TOTAL ROUTE COST	<b>\$4,900,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

**Table 55 – Conflict Area #3 Alt A Cost Analysis**

ALTERNATE A	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material &	& Miscellaneous
								Installation	<sup>1</sup>
Type 1 - Open	5,763	R	1	53.72	656	309,588	3,780,528	120,097	
Type 2 - Wooded	297	R	2	53.72	669	15,955	198,693	6,189	
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	-	R	5	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings	110	R	6	53.72	1900	5,909	209,000	2,292	
Parcel Count <sup>2</sup>	5	EA		25000	\$/EA	125,000			
<b>Totals:</b>						<b>6,170</b>	<b>\$456,452</b>	<b>\$4,188,221</b>	<b>\$128,578</b>
							CONSTRUCTION COST	<b>\$4,316,799</b>	
							CONTINGENCY 20%	<b>\$863,360</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$5,180,000</b>	
							TOTAL LAND COST	<b>\$460,000</b>	
							TOTAL ROUTE COST	<b>\$5,640,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

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**Table 56 – Conflict Area #3 Alt B Cost Analysis**

ALTERNATE B	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [S]	& Miscellaneous <sup>1</sup> [S]
Type 1- Open	4,458	R	1	53.72	656	239,484	2,924,448	92,902	
Type 2- Wooded	180	R	2	53.72	669	9,670	120,420	3,751	
Type 3 - Creek Crossings	15	R	4	53.72	1094	806	16,410	313	
Type 4 - Road/Parking Lot Crossings	-	R	5	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings	105	R	6	53.72	1900	5,641	199,500	2,188	
Parcel Count <sup>2</sup>	6	EA		25000	\$/EA	150,000			
<b>Totals:</b>		<b>4,758</b>				<b>\$405,600</b>	<b>\$3,260,778</b>	<b>\$99,153</b>	
							CONSTRUCTION COST	<b>\$3,359,931</b>	
							CONTINGENCY 20%	<b>\$671,986</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$4,030,000</b>	
							TOTAL LAND COST	<b>\$410,000</b>	
							<b>TOTAL ROUTE COST</b>	<b>\$4,440,000</b>	
<p>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</p> <p>2. This is for ROE and acquisition related costs</p>									

**Table 57 – Conflict Area #3 Alt C Cost Analysis**

ALTERNATE C	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [S]	& Miscellaneous <sup>1</sup> [S]
Type 1- Open	5,054	R	1	53.72	656	271,501	3,315,424	105,322	
Type 2- Wooded	112	R	2	53.72	669	6,017	74,928	2,334	
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	-	R	5	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings	100	R	6	53.72	1900	5,372	190,000	2,084	
Parcel Count <sup>2</sup>	6	EA		25000	\$/EA	150,000			
<b>Totals:</b>		<b>5,266</b>				<b>\$432,890</b>	<b>\$3,580,352</b>	<b>\$109,740</b>	
							CONSTRUCTION COST	<b>\$3,690,092</b>	
							CONTINGENCY 20%	<b>\$738,018</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$4,430,000</b>	
							TOTAL LAND COST	<b>\$430,000</b>	
							<b>TOTAL ROUTE COST</b>	<b>\$4,860,000</b>	
<p>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</p> <p>2. This is for ROE and acquisition related costs</p>									

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**Table 58 – Conflict Area #3 Alt D Cost Analysis**

ALTERNATE D	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]	& Miscellaneous 1 [\$]
Type 1- Open	6,890	R	1	53.72	656	370,131	4,519,840	143,583	
Type 2- Wooded	58	R	2	53.72	669	3,116	38,802	1,209	
Type 3 - Creek Crossings	36	R	4	53.72	1094	1,934	39,384	750	
Type 4 - Road/Parking Lot Crossings	-	R	5	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings	100	R	6	53.72	1900	5,372	190,000	2,084	
Parcel Count <sup>2</sup>	5	EA		25000	\$/EA	125,000			
<b>Totals:</b>						<b>7,084</b>	<b>\$505,552</b>	<b>\$4,788,026</b>	<b>\$147,626</b>
							CONSTRUCTION COST	<b>\$4,935,652</b>	
							CONTINGENCY 20%	<b>\$987,130</b>	
							TOTAL CONSTRUCTION COST:	<b>\$5,920,000</b>	
							TOTAL LAND COST	<b>\$510,000</b>	
							TOTAL ROUTE COST	<b>\$6,430,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

**Table 59 – Conflict Area #4 Alt A Cost Analysis**

ALTERNATE A	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]	& Miscellaneous 1 [\$]
Type 1- Open	2,850	R	1	53.72	656	153,102	1,869,600	59,392	
Type 2- Wooded	53	R	2	53.72	669	2,847	35,457	1,104	
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	12	R	5	53.72	1047	645	12,564	250	
Type 5 - Bore or Tunnel Crossings	108	R	6	53.72	1900	5,802	205,200	2,251	
Parcel Count <sup>2</sup>	2	EA		25000	\$/EA	50,000			
<b>Totals:</b>						<b>3,023</b>	<b>\$212,396</b>	<b>\$2,122,821</b>	<b>\$62,997</b>
							CONSTRUCTION COST	<b>\$2,185,818</b>	
							CONTINGENCY 20%	<b>\$437,164</b>	
							TOTAL CONSTRUCTION COST:	<b>\$2,620,000</b>	
							TOTAL LAND COST	<b>\$210,000</b>	
							TOTAL ROUTE COST	<b>\$2,830,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

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**Table 60 – Conflict Area #4 Alt B Cost Analysis**

ALTERNATE B	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST	
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]
Type 1- Open	2,003	R	1	53.72	656	107,601	1,313,968	41,741
Type 2- Wooded	39	R	2	53.72	669	2,095	26,091	813
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-
Type 4 - Road/Parking Lot Crossings	13	R	5	53.72	1047	698	13,611	271
Type 5 - Bore or Tunnel Crossings	101	R	6	53.72	1900	5,426	191,900	2,105
Parcel Count <sup>2</sup>	2	EA		25000	\$/EA	50,000		
<b>Totals:</b>	<b>2,156</b>					<b>\$165,820</b>	<b>\$1,545,570</b>	<b>\$44,930</b>
							CONSTRUCTION COST	<b>\$1,590,500</b>
							CONTINGENCY 20%	<b>\$318,100</b>
<b>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</b>							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$1,910,000</b>
<b>2. This is for ROE and acquisition related costs</b>							TOTAL LAND COST	<b>\$170,000</b>
							TOTAL ROUTE COST	<b>\$2,080,000</b>

**Table 61 – Conflict Area #5 Alt A Cost Analysis**

ALTERNATE A	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST	
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]
Type 1- Open	15,883	R	1	53.72	656	853,235	10,419,248	330,990
Type 2- Wooded	104	R	2	53.72	669	5,587	69,576	2,167
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-
Type 4 - Road/Parking Lot Crossings	24	R	5	53.72	1047	1,289	25,128	500
Type 5 - Bore or Tunnel Crossings	50	R	6	53.72	1900	2,686	95,000	1,042
Parcel Count <sup>2</sup>	7	EA		25000	\$/EA	175,000		
<b>Totals:</b>	<b>16,061</b>					<b>\$1,037,797</b>	<b>\$10,608,952</b>	<b>\$334,700</b>
							CONSTRUCTION COST	<b>\$10,943,652</b>
							CONTINGENCY 20%	<b>\$2,188,730</b>
<b>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</b>							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$13,130,000</b>
<b>2. This is for ROE and acquisition related costs</b>							TOTAL LAND COST	<b>\$1,040,000</b>
							TOTAL ROUTE COST	<b>\$14,170,000</b>

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**Table 62 – Conflict Area #5 Alt B Cost Analysis**

ALTERNATE B	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]	& Miscellaneous 1 [\$]
Type 1- Open	14,999	R	1	53.72	656	805,746	9,839,344	312,568	
Type 2- Wooded	96	R	2	53.72	669	5,157	64,224	2,001	
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	22	R	5	53.72	1047	1,182	23,034	458	
Type 5 - Bore or Tunnel Crossings	52	R	6	53.72	1900	2,793	98,800	1,084	
Parcel Count <sup>2</sup>	8	EA		25000	\$/EA	200,000			
<b>Totals:</b>		<b>15,169</b>				<b>\$1,014,879</b>	<b>\$10,025,402</b>	<b>\$316,111</b>	
							CONSTRUCTION COST	<b>\$10,341,513</b>	
							CONTINGENCY 20%	<b>\$2,068,303</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$12,410,000</b>	
							TOTAL LAND COST	<b>\$1,010,000</b>	
							TOTAL ROUTE COST	<b>\$13,420,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

**Table 63 – Conflict Area #5 Alt C Cost Analysis**

ALTERNATE C	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]	& Miscellaneous 1 [\$]
Type 1- Open	14,724	R	1	53.72	656	790,973	9,658,944	306,838	
Type 2- Wooded	98	R	2	53.72	669	5,265	65,562	2,042	
Type 3 - Creek Crossings	162	R	4	53.72	1094	8,703	177,228	3,376	
Type 4 - Road/Parking Lot Crossings	16	R	5	53.72	1047	860	16,752	333	
Type 5 - Bore or Tunnel Crossings	54	R	6	53.72	1900	2,901	102,600	1,125	
Parcel Count <sup>2</sup>	9	EA		25000	\$/EA	225,000			
<b>Totals:</b>		<b>15,054</b>				<b>\$1,033,701</b>	<b>\$10,021,086</b>	<b>\$313,715</b>	
							CONSTRUCTION COST	<b>\$10,334,801</b>	
							CONTINGENCY 20%	<b>\$2,066,960</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$12,400,000</b>	
							TOTAL LAND COST	<b>\$1,030,000</b>	
							TOTAL ROUTE COST	<b>\$13,430,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs





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**Table 64 – Conflict Area #6 Alt A Cost Analysis**

ALTERNATE A	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
		[ft]			[\$/ft]		[\$/ft]		
Type 1 - Open	4,255	R	1	53.72	656	228,579	2,791,280	88,671	
Type 2 - Wooded	85	R	2	53.72	669	4,566	56,865	1,771	
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	17	R	5	53.72	1047	913	17,799	354	
Type 5 - Bore or Tunnel Crossings	-	R	6	53.72	1900	-	-	-	
Parcel Count <sup>2</sup>	1	EA		25000	\$/EA	25,000			
<b>Totals:</b>		<b>4,357</b>				<b>\$259,058</b>	<b>\$2,865,944</b>	<b>\$90,797</b>	
							CONSTRUCTION COST	<b>\$2,956,741</b>	
							CONTINGENCY 20%	<b>\$591,348</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$3,550,000</b>	
							TOTAL LAND COST	<b>\$260,000</b>	
							TOTAL ROUTE COST	<b>\$3,810,000</b>	
<p>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</p> <p>2. This is for ROE and acquisition related costs</p>									

**Table 65 – Conflict Area #6 Alt B Cost Analysis**

ALTERNATE B	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
		[ft]			[\$/ft]		[\$/ft]		
Type 1 - Open	3,594	R	1	53.72	656	193,070	2,357,664	74,896	
Type 2 - Wooded	42	R	2	53.72	669	2,256	28,098	875	
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	19	R	5	53.72	1047	1,021	19,893	396	
Type 5 - Bore or Tunnel Crossings	-	R	6	53.72	1900	-	-	-	
Parcel Count <sup>2</sup>	1	EA		25000	\$/EA	25,000			
<b>Totals:</b>		<b>3,655</b>				<b>\$221,347</b>	<b>\$2,405,655</b>	<b>\$76,168</b>	
							CONSTRUCTION COST	<b>\$2,481,823</b>	
							CONTINGENCY 20%	<b>\$496,365</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$2,980,000</b>	
							TOTAL LAND COST	<b>\$220,000</b>	
							TOTAL ROUTE COST	<b>\$3,200,000</b>	
<p>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</p> <p>2. This is for ROE and acquisition related costs</p>									

## **2.4 SECTION C**

### **2.4.1 Introduction**

Section C of the LBCR Raw Water Pipeline connects with Section B approximately 2.5 miles north of Bailey. The connection is near the intersection of FM 68 and CR 3700, which is slightly less than a mile due east of SH 78. The pipeline alignment ends at the proposed site of the North Water Treatment Plant (NWTP) on the west side of Leonard. Section C is approximately 11 miles long and runs generally southwest.

The original preliminary pipeline corridor was determined in “NTMWD Preliminary Pipeline Routing Study and Conceptual Pump Station Design Report” by completing a high level analysis of pipeline corridors from the proposed LBCR pump station to the proposed NWTP site. The pump station was relocated as a portion of this project, but this did not change the pipeline corridor for Section C. The preliminary alignment was modified to generally parallel existing roads and property lines. Various options were examined at identified conflict areas and additional analysis was completed to take into account costs associated with easements, road crossings, and construction. The analysis discussed in this report details the process of determining the final pipeline alignment from the preliminary alignment and various alternatives developed during this phase of the pipeline route selection.

### **2.4.2 Evaluation of Corridors**

The preliminary alignment corridor for Section C of the LBCR Pipeline northeast of Leonard routed the pipe south along the east side of SH 78 until just before crossing CR 4850 where the pipeline routed west. While investigating potential conflicts, a family cemetery was identified to be in the path of the preliminary alignment. In order to avoid the cemetery and several other potential conflicts along the preliminary alignment, alternates to the West of SH 78 were investigated. The new proposed route alternatives were developed by first finding a SH 78 crossing north of the cemetery, and then determining where was the best location for the new route to connect back with the preliminary pipeline alignment. An alignment was routed around a house on the west side of SH 78 and then traveled through mostly open land before ending at the preliminary alignment. The preliminary alignment was named Proposed Route A and the western cross-country alternative Proposed Route B.

Figure 22, below, shows a map of both proposed routes.



Figure 22 – Map of Proposed Routes

The two corridors developed were compared using a High Level Analysis shown below in **Table 66**. The routes were evaluated based on length, parcel count, wooded crossings length, number of stream crossings, hydric soil crossings, and number of bored crossings. Each item was weighted, and the routes were scored and compared. Proposed Route B is approximately 100 feet shorter than Proposed Route A, crosses fewer parcels, fewer wooded areas, and does not cross a perennial stream. Also, Proposed Route A travels through the family cemetery, within 20 feet of a pond, and within 30 feet of a house. Proposed Route B scored the lowest (Best) in this analysis and was selected as the preferred route.

**Table 66 – Weighted High Level Route Scores**

Raw Quantities (Low is Best)			
Item Description	Item Weight (High = Most Important) (0 = Not Considered)	Routes	
		Proposed A	Proposed B
Route Length, ft	40	7,863	7,668
Parcel Count, ea	15	9	5
Wooded Crossing, ft	10	523	313
Perennial Stream Crossing, ea	10	1	-
Intermittent Stream Crossing, ea	9	2	2
Hydric Soil Crossing, ft	9	-	-
Bored Crossing (TXDOT & RR), ea	7	1	1
<b>Total</b>	<b>100</b>		
Normalized Score (Low is Best)			
Item Description	Item Weight	Proposed A	Proposed B
Route Length, ft	40.00	40.34	39.34
Parcel Count, ea	15.00	2.25	1.25
Wooded Crossing, ft	10.00	2.49	1.49
Perennial Stream Crossing, ea	10.00	1.00	-
Intermittent Stream Crossing, ea	9.00	1.00	1.00
Hydric Soil Crossing, ft	9.00	1.00	1.00
Bored Crossing (TXDOT & RR), ea	7.00	1.00	1.00
<b>Total</b>	<b>100.00</b>	<b>49.07</b>	<b>45.07</b>
Weighted Score (Low is Best)			
Item Description	Item Weight	Proposed A	Proposed B
Route Length, ft	40.00	16.14	15.74
Parcel Count, ea	15.00	0.34	0.19
Wooded Crossing, ft	10.00	0.25	0.15
Perennial Stream Crossing, ea	10.00	0.10	-
Intermittent Stream Crossing, ea	9.00	0.09	0.09
Hydric Soil Crossing, ft	9.00	0.09	0.09
Bored Crossing (TXDOT & RR), ea	7.00	0.07	0.07
<b>Total</b>	<b>100.00</b>	<b>17.07</b>	<b>16.32</b>

### **2.4.3 Route Alternatives**

The preliminary pipeline alignment corridor was investigated further in order to identify potential conflict areas along the route. Conflicts were determined based upon aerial imagery and field work walking the potential pipeline routes. A detailed evaluation of localized alternatives was performed to optimize the pipeline alignment and avoid potential conflicts in land acquisition and construction. Environmental constraints such as stream crossings, perennial water bodies, and possible wetlands along with impacts to property owners were taken into account during the analysis.

Four main conflict areas were identified on the potential pipeline route. The first conflict area is south of FM 68 along CR 3700, which is the beginning of Section C. The preliminary pipeline alignment routed in front of a house. An alternate was included to route the pipeline on the other side of the road to avoid complications with land acquisition. The second conflict area is near the intersection of CR 3700 and FM 1552. The original alignment routed close to a house and would require several fittings to follow property lines. A new alternative was developed to shorten up the alignment and avoid passing close by to the house. The third conflict area is located directly south of Bailey where the pipeline travels between FM 816 and SH 78. The preliminary alignment heads due west following property lines. Other alternatives were evaluated to travel through open land and avoid a large wooded creek area just east of SH 78. Also, this conflict area was used to determine the best location to cross to the west side of SH 78. The fourth conflict area is located between FM 1553 and CR 4670. The preliminary pipeline follows property lines and existing overhead electric lines. An alternate route was developed to cross through open land and minimize the pipeline route.

The preferred alternatives were determined by analysis that compared the total length, number of parcels crossed, open cut length, wooded length, tunnel length, construction cost, and land acquisition cost. The recommended alignment was chosen based on the cost analysis completed and engineering judgment. The detailed route analysis of these four conflict areas is discussed below.

### **2.4.4 Detailed Route Analysis**

In order to properly analyze the various alternatives developed for the conflict areas, data was collected and input into a pipeline route evaluation criteria spreadsheet. Cost data was updated to estimate future pipeline construction costs based on recent bid information. Routes were classified by the type

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of land they would be installed in: open area, wooded, open cut creek crossings, open cut road crossings, or tunneled crossings. A construction cost and land acquisition cost was associated with each classification in order to estimate the total route cost per linear foot. This allowed a cost to be generated for each alternate based upon the linear feet of the land classification. A cost comparison was performed for the alternates of each conflict area to determine the most cost effective route. The route with the lowest cost was selected as the preferred route; however, engineering judgment was also used to ensure that potential complications with an unknown cost were also evaluated.

Conflict Area #1 was identified because of the proximity of the pipeline alignment to a house on the east side of CR 3115 as seen in **Figure 23**. Two alternatives were analyzed for this conflict area.

Alternate A paralleled the east side of CR 3700. Alternate B paralleled the west side of CR 3700. Analysis of Conflict Area #1 is shown in **Table 67**.



**Figure 23 – Aerial View of Conflict Area #1**

**Table 67 – Analysis for Conflict Area #1**

Option	Alternate A	Alternate B
Length	8435	8328
Number of Parcels	8	6
Open Length (ft.)	8435	8192
Wooded Length (ft.)	0	136
Tunnel/Bore Length	0	0
Construction Cost	\$6,860,000	\$6,780,000
Land Acquisition Cost	\$650,000	\$600,000
Total Cost	\$7,510,000	\$7,380,000

\*For further cost analysis data see **Tables 73 & 74**

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From the analysis performed, Alternate A and B are very similar in construction cost, but Alternate B is recommended. Alternate B is approximately 100 feet shorter than Alternate A and has a lower total cost. Also, Alternate B avoids construction near the house on the east side of CR 3700.

Conflict Area #2 was identified because of the possibility to minimize pipeline fittings and move the route a greater distance from the house on FM 1552. Two alternatives were analyzed for this conflict area and can be seen in **Figure 24**.

Alternate A routed the pipeline parallel to the north side of FM 1552 before crossing south and following property lines. Alternate B crossed FM 1552 on the west side of the intersection with CR 3700 and routed the pipe across an open field, bisecting two properties. Analysis of Conflict Area #2 is shown in **Table 68**.



Figure 24 – Aerial View of Conflict Area #2

Table 68 – Analysis for Conflict Area #2

Option	Alternate A	Alternate B
Length	3759	2879
Number of Parcels	3	3
Open Length (ft.)	3485	2777
Wooded Length (ft.)	223	52
Tunnel/Bore Length	51	50
Construction Cost	\$3,160,000	\$2,440,000
Land Acquisition Cost	\$280,000	\$230,000
Total Cost	\$3,440,000	\$3,670,000

\*For further cost analysis data see **Tables 75 & 76**.

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Alternate B was selected as the recommended route due to the fact it is the shorter alternative and would give the contractor more distance from the house on FM 1552. Alternate B is the less expensive approach even though it bisects two parcels, while Alternate A follows property lines. In addition to being longer, Alternate A would require land acquisition from three landowners, while only two would be required for Alternate B.

Conflict Area #3 was investigated to determine the best route to align the pipe south of the city of Bailey. As shown in **Figure 25**, the area has several creek crossings, large wooded areas, and structures within a close distance to the SH 78 right-of-way. Five route alternatives were analyzed for this conflict area.



**Figure 25 – Aerial View of Conflict Area #3**

Alternate A proposed to align the pipe along property lines heading due west before crossing a creek and large wooded area in order to parallel the east side of SH 78. Alternate B traveled through open land on two properties before following property lines while heading due west to parallel the east side of SH 78. Alternate C routed through open land, bisecting several properties in order to avoid conflicts



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along SH 78. Alternate D followed the first half of Alternate A before crossing to the west side of SH 78 to avoid a house on the east ROW line. Alternate E crossed through open land and then followed the alignment of Alternate D. Analysis of Conflict Area #3 is shown in **Table 69**.

**Table 69 – Analysis for Conflict Area #3**

Option	Alternate A	Alternate B	Alternate C	Alternate D	Alternate E
Length	18859	19312	18671	18787	17251
Number of Parcels	19	18	18	16	16
Open Length (ft.)	16546	18270	17358	16947	16583
Wooded Length (ft.)	1944	678	1079	1674	504
Tunnel/Bore Length	369	364	234	165	164
Construction Cost	\$16,300,000	\$16,410,000	\$15,730,000	\$15,790,000	\$14,490,000
Land Acquisition Cost	\$1,490,000	\$1,490,000	\$1,450,000	\$1,410,000	\$1,330,000
Total Cost	\$17,790,000	\$17,900,000	\$17,180,000	\$17,200,000	\$15,820,000

\*For further cost analysis data see **Tables 77-81**.

Alternate E is the recommended route because it is the shortest option, the least expensive, and successfully bypasses the majority of the conflicts. Alternate D is one of the shorter options and follows property lines, but is more expensive than Alternate E. Alternate C is the second shortest alternative, but has a high potential increase in land acquisition cost due to bisecting smaller properties. Neither Alternate A nor B avoids the house on the east ROW line, which could result in higher construction and land acquisition costs.

Conflict Area #4 was identified in order to find the best route around the north side of Leonard and avoid several houses in the area. Two alternates were analyzed for this conflict area and can be found in **Figure 26**.



**Figure 26 – Aerial View of Conflict Area #4**

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Alternate A traveled through open farmland, followed the edge of a field, and then aligned parallel to CR 4670 as it headed west. Alternate B routed west parallel to property lines to the north and then angled south parallel to overhead electric lines until just north of CR 4670. Analysis of Conflict Area #4 is shown in **Table 70**.

**Table 70 – Analysis for Conflict Area #4**

Option	Alternate A	Alternate B
Length	6940	8593
Number of Parcels	4	7
Open Length (ft.)	6817	8463
Wooded Length (ft.)	44	0
Tunnel/Bore Length	80	130
Construction Cost	\$5,770,000	\$7,170,000
Land Acquisition Cost	\$470,000	\$640,000
Total Cost	\$6,240,000	\$7,810,000

\*For further cost analysis data see **Tables 82 & 83**.

Alternate A is the recommended route since it is significantly shorter and maintains a greater distance from houses in the area than Alternate B. Alternate B follows property lines and overhead electric lines, but routes within 50 feet of a pond, 150 feet of a house, and adds length to follow property lines. Alternate B crosses three more parcels, but Alternate A bisects several properties.

#### **2.4.5 Opinion of Probable Construction Cost**

The Opinion of Probable Construction Cost (OPCC) for the Section C recommended alignment is \$61,243,100. A detailed breakout of this OPCC is shown in **Table 71**.

**Table 71 – Opinion of Probable Construction Costs**

NTMWD Lower Bois d'Arc Creek Reservoir Raw Water Pipeline		CONSULTING ENGINEERS PROJECT MANAGERS DISTRIBUTION SERVICE 1701 N Market St., #500, IRIS1 • Dallas, Texas 75202 • 214-217-2200 • fax 214-217-2201
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**OPINION OF PROBABLE CONSTRUCTION COSTS (INCLUDING EASEMENTS)** September 10, 2013

<b>ESTIMATOR</b> EJE	<b>CHECKED BY</b> JVW	<b>ACCOUNT NO</b> NTD13136
-------------------------	--------------------------	-------------------------------

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	90-INCH PIPELINE	56,462	LF	\$650.00	\$ 36,700,300
2	TUNNELED CROSSINGS	749	LF	\$1,970.00	\$ 1,475,530
3	PIPELINE ROW CLEARING	350	AC	\$5,000.00	\$ 750,000
4	TRENCH SAFETY	56,462	LF	\$1.00	\$ 56,462
5	AIR RELEASE VALVES	16	EA	\$25,000.00	\$ 407,500
6	BUTTERFLY VALVES	5	EA	\$165,000.00	\$ 825,000
7	BLOW OFF VALVES	16	EA	\$25,000.00	\$ 407,500
8	PAVEMENT RESTORATION	1,360	SY	\$70.00	\$ 81,200
9	CREEK CROSSINGS	752	LF	\$445.00	\$ 334,640
10	REVEGETATION	350	AC	\$1,160.00	\$ 174,000
11	FIBER OPTIC CONDUIT	56,462	LF	\$3.00	\$ 169,386
12	FIBER	56,462	LF	\$2.00	\$ 112,924
13	CATHODIC PROTECTION	56,462	LF	\$2.00	\$ 112,924
14	ACCESS MHWAYS	16	EA	\$10,000.00	\$ 160,000
15	TESTING	56,462	LF	\$2.00	\$ 112,924
16	MOBILIZATION	1	LS	\$2,094,165.00	\$ 2,094,165
<b>CONSTRUCTION SUBTOTAL</b>					<b>\$ 43,980,000</b>
<b>CONSTRUCTION CONTINGENCY</b>					<b>15%</b>
					<b>\$ 6,597,000</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$ 50,577,000</b>
<b>ESTIMATED EASEMENT/PROPERTY COSTS</b>					
<b>PERMANENT EASEMENT W/ ASSOCIATED TEMPORARY (Note 3)</b>		<b>2,823,100</b>	<b>SF</b>	<b>\$1.00</b>	<b>\$2,823,100.00</b>
<b>TOTAL ESTIMATED CONSTRUCTION COSTS (INCLUDING EASEMENT)</b>					<b>\$53,400,100.00</b>

1. Estimated Easement Costs Based on a 50' Perm Easement & 70' Temp Easement for the Entire Route
2. Estimated Butterfly Valves includes valves for the Terminal Storage Reservoir

### 2.4.6 Recommendations Summary

The recommended alignment for Section C is Alternate B for Conflict Area #1 and #2, Alternate D for Conflict Area #3, Alternate A for Conflict Area #4, and Proposed Route B for the two high level corridors evaluated. Each of these routes is expected to be the least expensive option for their corresponding Conflict Area and also avoid potential complications in land acquisition and construction.

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### 2.4.7 Pipeline Crossings

Table 72 below presents identified utility, roadway, and creek crossings associated with the recommended route.

**Table 72 – Major Transportation, Utility, and Creek Crossings**

<b>Road</b>
Farm to Market 1552
Fannin CR 3725
State Highway 11
Farm to Market 816
Fannin CR 4845
State Highway 78
Fannin CR 4827
Fannin CR 4825
Fannin CR 4830
Farm to Market 1553
Fannin CR 4720
Farm to Market 896
Fannin CR 4670
State Highway 69
Fannin CR 4965
<b>Railroad</b>
M. K. & T. Railroad – Union Pacific
<b>Utility</b>
28" Petroleum Pipeline - Explorer Pipeline Company
Sanitary Sewer Line - City of Bailey
<b>Waterbody</b>
Spring Creek
Loring Creek
Mustang Creek
South Sulphur River



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**Table 73 – Conflict Area #1 Alt A Cost Analysis**

ALTERNATE A	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
		[ft]			[\$/ft]		[\$/ft]		
Type 1 - Open	8,420	R	1	53.72	656	452,322	5,523,520	175,467	
Type 2 - Wooded	-	R	2	53.72	669	-	-	-	
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	15	R	5	53.72	1047	806	15,705	313	
Type 5 - Bore or Tunnel Crossings	-	R	6	53.72	1900	-	-	-	
Parcel Count <sup>2</sup>	8	EA		25000	\$/EA	200,000			
<b>Totals:</b>		<b>8,435</b>				<b>\$653,128</b>	<b>\$5,539,225</b>	<b>\$175,779</b>	
							CONSTRUCTION COST	<b>\$5,715,004</b>	
							CONTINGENCY 20%	<b>\$1,143,001</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$6,860,000</b>	
							TOTAL LAND COST	<b>\$650,000</b>	
							TOTAL ROUTE COST	<b>\$7,510,000</b>	
1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.									
2. This is for ROE and acquisition related costs									

**Table 74 – Conflict Area #1 Alt B Cost Analysis**

ALTERNATE B	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
		[ft]			[\$/ft]		[\$/ft]		
Type 1 - Open	8,165	R	1	53.72	656	438,624	5,356,240	170,153	
Type 2 - Wooded	136	R	2	53.72	669	7,306	90,984	2,834	
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	28	R	5	53.72	1047	1,504	29,316	584	
Type 5 - Bore or Tunnel Crossings	-	R	6	53.72	1900	-	-	-	
Parcel Count <sup>2</sup>	6	EA		25000	\$/EA	150,000			
<b>Totals:</b>		<b>8,329</b>				<b>\$597,434</b>	<b>\$5,476,540</b>	<b>\$173,570</b>	
							CONSTRUCTION COST	<b>\$5,650,110</b>	
							CONTINGENCY 20%	<b>\$1,130,022</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$6,780,000</b>	
							TOTAL LAND COST	<b>\$600,000</b>	
							TOTAL ROUTE COST	<b>\$7,380,000</b>	
1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.									
2. This is for ROE and acquisition related costs									

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**Table 75 – Conflict Area #2 Alt A Cost Analysis**

ALTERNATE A	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]	& Miscellaneous <sup>1</sup> [\$]
Type 1 - Open	3,485	R	1	53.72	656	187,214	2,286,160	72,625	
Type 2 - Wooded	174	R	2	53.72	669	9,347	116,406	3,626	
Type 3 - Creek Crossings	49	R	4	53.72	1094	2,632	53,606	1,021	
Type 4 - Road/Parking Lot Crossings	-	R	5	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings	51	R	6	53.72	1900	2,740	96,900	1,063	
Parcel Count <sup>2</sup>	3	EA		25000	\$/EA	75,000			
<b>Totals:</b>		<b>3,759</b>				<b>\$276,933</b>	<b>\$2,553,072</b>	<b>\$78,335</b>	
							CONSTRUCTION COST	<b>\$2,631,407</b>	
							CONTINGENCY 20%	<b>\$526,281</b>	
1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.							TOTAL CONSTRUCTION COST:	<b>\$3,160,000</b>	
2. This is for ROE and acquisition related costs							TOTAL LAND COST	<b>\$280,000</b>	
							TOTAL ROUTE COST	<b>\$3,440,000</b>	

**Table 76 – Conflict Area #2 Alt B Cost Analysis**

ALTERNATE B	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]	& Miscellaneous <sup>1</sup> [\$]
Type 1 - Open	2,777	R	1	53.72	656	149,180	1,821,712	57,871	
Type 2 - Wooded	-	R	2	53.72	669	-	-	-	
Type 3 - Creek Crossings	52	R	4	53.72	1094	2,793	56,888	1,084	
Type 4 - Road/Parking Lot Crossings	-	R	5	53.72	1047	-	-	-	
Type 5 - Bore or Tunnel Crossings	50	R	6	53.72	1900	2,686	95,000	1,042	
Parcel Count <sup>2</sup>	3	EA		25000	\$/EA	75,000			
<b>Totals:</b>		<b>2,879</b>				<b>\$229,660</b>	<b>\$1,973,600</b>	<b>\$59,996</b>	
							CONSTRUCTION COST	<b>\$2,033,596</b>	
							CONTINGENCY 20%	<b>\$406,719</b>	
1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.							TOTAL CONSTRUCTION COST:	<b>\$2,440,000</b>	
2. This is for ROE and acquisition related costs							TOTAL LAND COST	<b>\$230,000</b>	
							TOTAL ROUTE COST	<b>\$2,670,000</b>	

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**Table 77 – Conflict Area #3 Alt A Cost Analysis**

ALTERNATE A	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
Type 1 - Open	16,329	R	1	53.72	656	877,194	10,711,824	340,285	
Type 2 - Wooded	1,368	R	2	53.72	669	73,489	915,192	28,508	
Type 3 - Creek Crossings	576	R	4	53.72	1094	30,943	630,144	12,003	
Type 4 - Road/Parking Lot Crossings	218	R	5	53.72	1047	11,711	228,246	4,543	
Type 5 - Bore or Tunnel Crossings	369	R	6	53.72	1900	19,823	701,100	7,690	
Parcel Count <sup>2</sup>	19	EA		25000	\$/EA	475,000			
<b>Totals:</b>		<b>18,860</b>				<b>\$1,488,159</b>	<b>\$13,186,506</b>	<b>\$393,029</b>	
							CONSTRUCTION COST	<b>\$13,579,535</b>	
							CONTINGENCY 20%	<b>\$2,715,907</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$16,300,000</b>	
							TOTAL LAND COST	<b>\$1,490,000</b>	
							TOTAL ROUTE COST	<b>\$17,790,000</b>	
<p>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</p> <p>2. This is for ROE and acquisition related costs</p>									

**Table 78 – Conflict Area #3 Alt B Cost Analysis**

ALTERNATE B	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
Type 1 - Open	18,125	R	1	53.72	656	973,675	11,890,000	377,712	
Type 2 - Wooded	483	R	2	53.72	669	25,947	323,127	10,065	
Type 3 - Creek Crossings	195	R	4	53.72	1094	10,475	213,330	4,064	
Type 4 - Road/Parking Lot Crossings	144	R	5	53.72	1047	7,736	150,768	3,001	
Type 5 - Bore or Tunnel Crossings	364	R	6	53.72	1900	19,554	691,600	7,586	
Parcel Count <sup>2</sup>	18	EA		25000	\$/EA	450,000			
<b>Totals:</b>		<b>19,311</b>				<b>\$1,487,387</b>	<b>\$13,268,825</b>	<b>\$402,427</b>	
							CONSTRUCTION COST	<b>\$13,671,252</b>	
							CONTINGENCY 20%	<b>\$2,734,250</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$16,410,000</b>	
							TOTAL LAND COST	<b>\$1,490,000</b>	
							TOTAL ROUTE COST	<b>\$17,900,000</b>	
<p>1. Appurtenances &amp; Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.</p> <p>2. This is for ROE and acquisition related costs</p>									

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**Table 79 – Conflict Area #3 Alt C Cost Analysis**

ALTERNATE C	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
Type 1 - Open	17,242	R	1	53.72	656	926,240	11,310,752	359,311	
Type 2 - Wooded	794	R	2	53.72	669	42,654	531,186	16,546	
Type 3 - Creek Crossings	285	R	4	53.72	1094	15,310	311,790	5,939	
Type 4 - Road/Parking Lot Crossings	116	R	5	53.72	1047	6,232	121,452	2,417	
Type 5 - Bore or Tunnel Crossings	234	R	6	53.72	1900	12,570	444,600	4,876	
Parcel Count <sup>2</sup>	18	EA		25000	\$/EA	450,000			
<b>Totals:</b>		<b>18,671</b>				<b>\$1,453,006</b>	<b>\$12,719,780</b>	<b>\$389,090</b>	
							CONSTRUCTION COST	<b>\$13,108,870</b>	
							CONTINGENCY 20%	<b>\$2,621,774</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$15,730,000</b>	
							TOTAL LAND COST	<b>\$1,450,000</b>	
							TOTAL ROUTE COST	<b>\$17,180,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

**Table 80 – Conflict Area #3 Alt D Cost Analysis**

ALTERNATE D	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
Type 1 - Open	16,852	R	1	53.72	656	905,289	11,054,912	351,184	
Type 2 - Wooded	1,246	R	2	53.72	669	66,935	833,574	25,966	
Type 3 - Creek Crossings	428	R	4	53.72	1094	22,992	468,232	8,919	
Type 4 - Road/Parking Lot Crossings	96	R	5	53.72	1047	5,157	100,512	2,001	
Type 5 - Bore or Tunnel Crossings	165	R	6	53.72	1900	8,864	313,500	3,438	
Parcel Count <sup>2</sup>	16	EA		25000	\$/EA	400,000			
<b>Totals:</b>		<b>18,787</b>				<b>\$1,409,238</b>	<b>\$12,770,730</b>	<b>\$391,508</b>	
							CONSTRUCTION COST	<b>\$13,162,238</b>	
							CONTINGENCY 20%	<b>\$2,632,448</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$15,790,000</b>	
							TOTAL LAND COST	<b>\$1,410,000</b>	
							TOTAL ROUTE COST	<b>\$17,200,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs





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**Table 81 – Conflict Area #3 Alt E Cost Analysis**

ALTERNATE E	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
		[ft]			[\$/ft]		[\$/ft]	[\$]	[\$]
Type 1 - Open	16,494	R	1	53.72	656	886,058	10,820,064	343,723	
Type 2 - Wooded	138	R	2	53.72	669	7,413	92,322	2,876	
Type 3 - Creek Crossings	366	R	4	53.72	1094	19,662	400,404	7,627	
Type 4 - Road/Parking Lot Crossings	89	R	5	53.72	1047	4,781	93,183	1,855	
Type 5 - Bore or Tunnel Crossings	164	R	6	53.72	1900	8,810	311,600	3,418	
Parcel Count <sup>2</sup>	16	EA		25000	\$/EA	400,000			
<b>Totals:</b>		<b>17,251</b>				<b>\$1,326,724</b>	<b>\$11,717,573</b>	<b>\$359,499</b>	
							CONSTRUCTION COST	<b>\$12,077,072</b>	
							CONTINGENCY 20%	<b>\$2,415,414</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$14,490,000</b>	
							TOTAL LAND COST	<b>\$1,330,000</b>	
							TOTAL ROUTE COST	<b>\$15,820,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

**Table 82 – Conflict Area #4 Alt A Cost Analysis**

ALTERNATE A	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS	CONSTRUCTION COST		
	Type & Description	Length	Land Class	Instll. Class	Land		M&I	Material & Installation	& Miscellaneous <sup>1</sup>
		[ft]			[\$/ft]		[\$/ft]	[\$]	[\$]
Type 1 - Open	6,794	R	1	53.72	656	364,974	4,456,864	141,582	
Type 2 - Wooded	44	R	2	53.72	669	2,364	29,436	917	
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-	
Type 4 - Road/Parking Lot Crossings	23	R	5	53.72	1047	1,236	24,081	479	
Type 5 - Bore or Tunnel Crossings	80	R	6	53.72	1900	4,298	152,000	1,667	
Parcel Count <sup>2</sup>	4	EA		25000	\$/EA	100,000			
<b>Totals:</b>		<b>6,941</b>				<b>\$472,871</b>	<b>\$4,662,381</b>	<b>\$144,645</b>	
							CONSTRUCTION COST	<b>\$4,807,026</b>	
							CONTINGENCY 20%	<b>\$961,405</b>	
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$5,770,000</b>	
							TOTAL LAND COST	<b>\$470,000</b>	
							TOTAL ROUTE COST	<b>\$6,240,000</b>	

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

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**Table 83 – Conflict Area #4 Alt B Cost Analysis**

ALTERNATE B Type & Description	SEGMENT PARAMETERS			UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST	
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]	M&I [\$/ft]		Material & Installation [\$]	& Miscellaneous <sup>1</sup> [\$]
Type 1- Open	8,463	R	1	53.72	656	454,632	5,551,728	176,363
Type 2- Wooded	-	R	2	53.72	669	-	-	-
Type 3 - Creek Crossings	-	R	4	53.72	1094	-	-	-
Type 4 - Road/Parking Lot Crossings	-	R	5	53.72	1047	-	-	-
Type 5 - Bore or Tunnel Crossings	130	R	6	53.72	1900	6,984	247,000	2,709
Parcel Count <sup>2</sup>	7	EA		25000	\$/EA	175,000		
<b>Totals:</b>		<b>8,593</b>				<b>\$636,616</b>	<b>\$5,798,728</b>	<b>\$179,072</b>
							CONSTRUCTION COST	<b>\$5,977,800</b>
							CONTINGENCY 20%	<b>\$1,195,560</b>
							<b>TOTAL CONSTRUCTION COST:</b>	<b>\$7,170,000</b>
							TOTAL LAND COST	<b>\$640,000</b>
							<b>TOTAL ROUTE COST</b>	<b>\$7,810,000</b>

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.  
2. This is for ROE and acquisition related costs

## 2.5 LBCR RAW WATER PIPELINE FINAL ALIGNMENT

### 2.5.1 Alignment Summary

The entire recommended alignment for the LBCR Raw Water Pipeline from the Proposed Pump Station to the Terminal Storage Reservoir is shown in **Figure 27**. Although not all alternates selected for the various conflict areas are the least expensive, all of the routes were chosen based on a balance between landowner impact, constructability and cost. Based on the recommended routes the total length of the preferred alignment for the LBCR Raw Water Pipeline is 36.08 miles.

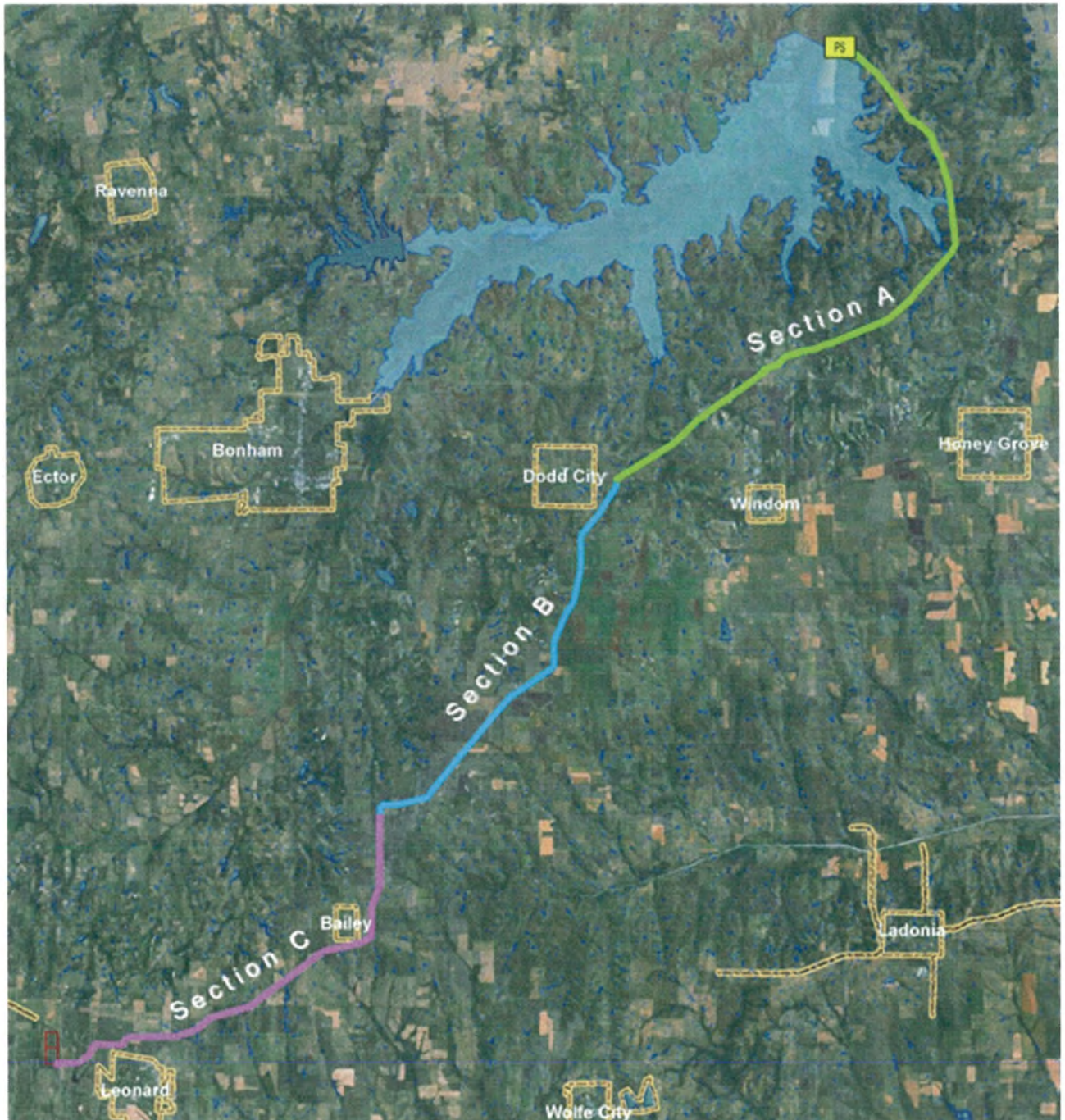



Figure 27 – LBCR Overall Recommended Alignment

## 2.5.2 Opinion of Probable Construction Cost

The OPCC for the entire recommended alignment of the LBCR Raw Water Pipeline as described below is \$197,926,510. A detailed breakdown of the OPCC for the recommended alignment is shown below in Table 84.

Table 84 – Final Alignment Opinion of Probable Costs

NTMWD Lower Bois d'Arc Creek Reservoir Raw Water Pipeline		 <small>Proven/true approaches Proven results Outstanding service</small>			
<small>1701 N Market St., #500, LB51 • Dallas, Texas 75202 • 214-217-2200 • fax 214-217-2201</small>		<small>www.freese.com</small>			
OPINION OF PROBABLE CONSTRUCTION COSTS (INCLUDING EASEMENTS)					
		November 25, 2013			
ESTIMATOR		CHECKED BY			
ABC		ASM			
ACCOUNT NO		NTD13136			
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	90-INCH PIPELINE	186,267	LF	\$650.00	\$ 121,073,550
2	TUNNELED CROSSINGS	1,530	LF	\$1,970.00	\$ 3,014,100
3	PIPELINE ROW CLEARING	500	AC	\$5,000.00	\$ 2,500,000
4	TRENCH SAFETY	186,267	LF	\$1.00	\$ 186,267
5	AIR RELEASE VALVES	54	EA	\$25,000.00	\$ 1,350,000
6	BUTTERFLY VALVES	10	EA	\$165,000.00	\$ 1,650,000
7	BLOW OFF VALVES	54	EA	\$25,000.00	\$ 1,350,000
8	PAVEMENT RESTORATION	3,370	SY	\$70.00	\$ 235,900
9	CREEK CROSSINGS	2,728	LF	\$445.00	\$ 1,213,960
10	BEVEGETATION	500	AC	\$1,160.00	\$ 580,000
11	FIBER OPTIC CONDUIT	186,267	LF	\$3.00	\$ 558,801
12	FIBER	186,267	LF	\$2.00	\$ 372,534
13	CATHODIC PROTECTION	186,267	LF	\$2.00	\$ 372,534
14	ACCESS MANNWAYS	54	EA	\$10,000.00	\$ 540,000
15	TESTING	186,267	LF	\$2.00	\$ 372,534
16	MOBILIZATION	1	LS	\$6,768,509.00	\$ 6,768,509
<b>CONSTRUCTION SUBTOTAL</b>					<b>\$ 142,140,000</b>
<b>CONSTRUCTION CONTINGENCY</b>					<b>15%</b>
<b>CONSTRUCTION TOTAL</b>					<b>\$ 163,461,000</b>
<b>ESTIMATED EASEMENT/PROPERTY COSTS</b>					
<b>PERMANENT EASEMENT W/ ASSOCIATED TEMPORARY (Note 1)</b>		<b>8,602,005</b>	<b>SF</b>	<b>\$1.00</b>	<b>\$8,602,010</b>
<b>TOTAL ESTIMATED COSTS (INCLUDING EASEMENT)</b>					<b>\$172,063,010</b>

1. Estimated Easement Costs are based on a 50' Permanent Easement & 70' Temporary Easement for the entire route. This total excludes the length of pipe on land currently owned by NTMWD.

### **3.0 PRELIMINARY SYSTEM HYDRAULICS AND PIPE DIAMETERS**

An initial hydraulic analysis was conducted to determine the required pipeline diameter and potential pump station sizing for the project. Hydraulic grade lines (HGLs) were developed for various pipe diameters and flow rates using the routes described in **Section 2.0** and TNRIS 10-foot interval contour data. A 50-year Life Cycle Cost Analysis (LCCA) was performed to determine the most economical pipe diameter.

#### **3.1 FLOW RATE ANALYSIS**

##### **3.1.1 LBCR Permitted Diversions**

The Lower Bois d'Arc Creek Reservoir is permitted expected to be with an annual yield of 123,200 acre-feet per year in 2060. Converted into an annual average, this equates to a pumping rate of approximately 110 million gallons per day (MGD). The maximum permitted diversion amount is 175,000 acre-feet per year (157 MGD annual average).

##### **3.1.2 Design Flow Rates**

The raw water pumping facilities will be designed with the capacity to pump the full yield of the reservoir with additional capacity to account for seasonal peak demands. For design purposes, a 1.5 peaking factor was applied to the maximum permitted diversion amount. This results in sizing the raw water transmission facilities for an ultimate peak flow rate of 236 MGD.

##### **3.1.3 Life Cycle Analysis Flow Rates**

The North Water Treatment Plant will be constructed with an ultimate capacity of 280 MGD. For the purposes of the life cycle cost analysis, the plant was assumed to be constructed in four 70 MGD phases (**Table 84**). Pumping rates were assumed to be 3% above these values to account for losses in the terminal storage reservoir and treatment processes.

**Table 85 – North Water Treatment Plant Phasing**

Year	Maximum (MGD)	Average (MGD)
2021	70	40
2026	140	80
2030	210	120
2035	280	165

Seasonal variations in flow were accounted for in the life cycle analysis. A 1.4 peaking factor was applied to the average annual flow for 4 months out of the year, and a 0.8 factor applied for the remaining 8 months. These values were based on the ratio of monthly average to annual average flows in the existing NTMWD system between 2007 and 2012.

In the first phase of the plant, the annual flow was assumed to be the same in year 1 as in year 5. For the subsequent expansions, the flow increases annually with the flow rate matching current plant capacity in the expansion year (i.e. expand from 140 MGD to 210 MGD in 2030 and hit peak flow of 140 MGD in 2030). Of the 280 MGD ultimate capacity, a future connection to the Texoma-Wylie raw water pipeline will supply 70-80 MGD of the needed raw water supply for the plant. This future connection to the Texoma-Wylie raw water line is discussed further in the Technical Memorandum titled "NTWP Terminal Storage Reservoir Analysis".

### **3.2 DESIGN ASSUMPTIONS**

Friction losses through the pipeline were calculated using the Hazen-Williams equation with a long-term roughness coefficient (C-value) of 120. This C-value is typical for aged raw water pipelines. It is assumed that all maintenance required to maintain this value will be conducted by the NTMWD, including cleaning the pipeline as necessary. Velocity in the pipe was limited to 9 feet per second under all flows to limit surge potential and maintain headloss in an acceptable range.

A 420 million gallon Terminal Storage Reservoir (TSR) will be constructed north of the proposed treatment plant site. Several locations were considered with a final recommendation made for a site west of Leonard, off of CR 4965. This site will have a normal water surface elevation of 731 and a minimum elevation of 714. The water surface elevation for the treatment plant headworks was assumed to be 711. Evaluation of the hydraulics from the TSR to the WTP determined that dual 102"

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pipes are required for the peak flow of 236 MGD. Further information regarding the TSR, site selection, and pipe sizing can be found in the “NWTP Terminal Storage Reservoir Analysis” technical memorandum that was submitted on the same day as this report.

### 3.3 PIPE DIAMETER OPTIMIZATION

The required pipe diameter was determined using a life cycle cost analysis. As pipe diameter decreases, the capital cost to construct the line also decreases. However, the power required to push a given flow through a smaller pipe is greater due to increased friction losses within the pipe. The purpose of the life cycle cost analysis was to balance the capital and power costs to determine an optimum pipe diameter. The flows used in the analysis are shown above in **Table 85**, and the other variables used are included in **Table 86**.

**Table 86 – Life Cycle Analysis Variables**

Variable	Value
Analysis Duration	50 years
Bond Interest Rate	4.5%
Bond Term	25 Years
Inflation Rate	3%
Discount Rate	5%
Electricity Rate (2013)	5.5¢/kW-hr

The total annual cost was determined for each year of the analysis period and included debt service and inflated power cost. These future values were returned to present values and summed to determine the total present worth. This analysis was performed for 78- through 108-inch pipe and can be found in **Appendix B**. A summary of the results are shown in **Figure 28** and **Table 87**.

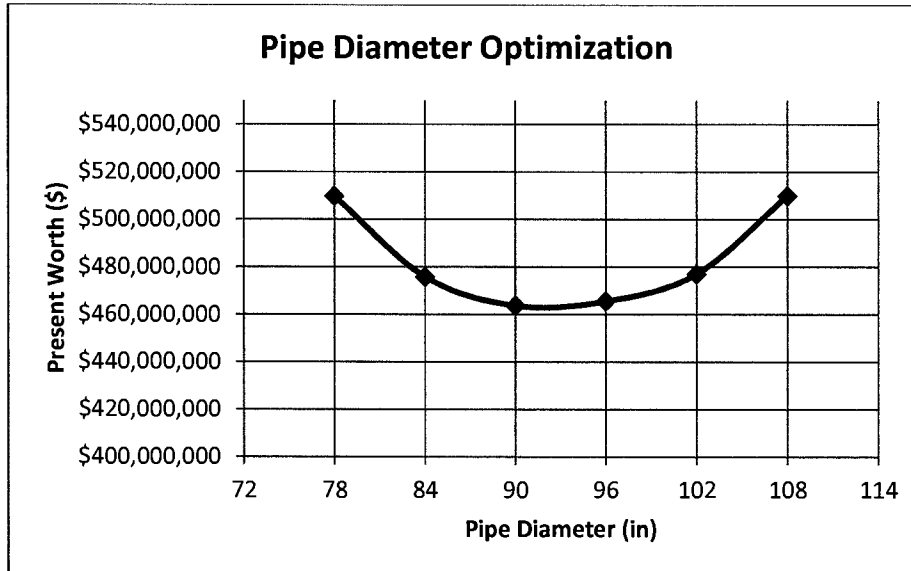


Figure 28 – Pipe Diameter Optimization

Table 87 – Pipe Diameter Present Worth Comparison

Diameter (in)	Total Present Worth (50 yr LCCA)
78	\$509,616,901
84	\$475,802,222
90	\$463,620,281
96	\$465,470,732
102	\$476,890,428
108	\$509,799,096

Both the 78-inch and 84-inch lines were inadequate since the velocity in the pipe (9.44 fps) at the ultimate peak flow of 236 MGD was beyond the 9 feet per second limit, and were removed from consideration. Also, a 78 or 84-inch line would cause the pressure near the pump station to exceed 300 psi, which is not desirable by the NTMWD. Hydraulic grade lines were developed for both 90-inch and 96-inch pipelines (Figure 29 and Figure 30, respectively). Both the 90-inch and 96-inch lines have velocities and pressures at acceptable levels during normal flows. The 90-inch line causes peak flow pressure to exceed 250 psi near the pump station, but was determined to have the lowest present worth (as seen in Table 87). Pressures exceeding 250 psi can be significant because it requires special



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valve castings and pushes the pipeline pressure class up to 300 psi, which may be able to be reduced somewhat during final design. The 102 and 108-inch lines were determined to require high capital cost for limited energy savings.

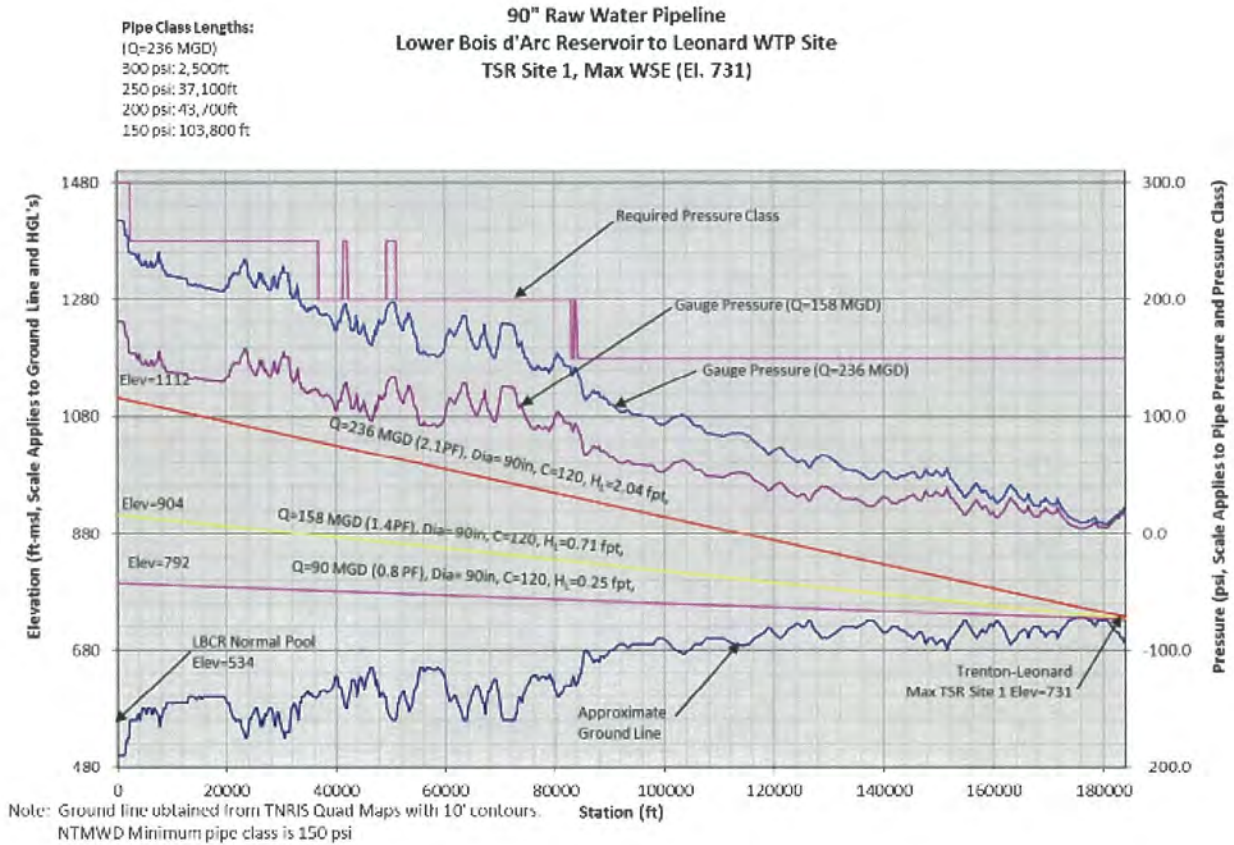
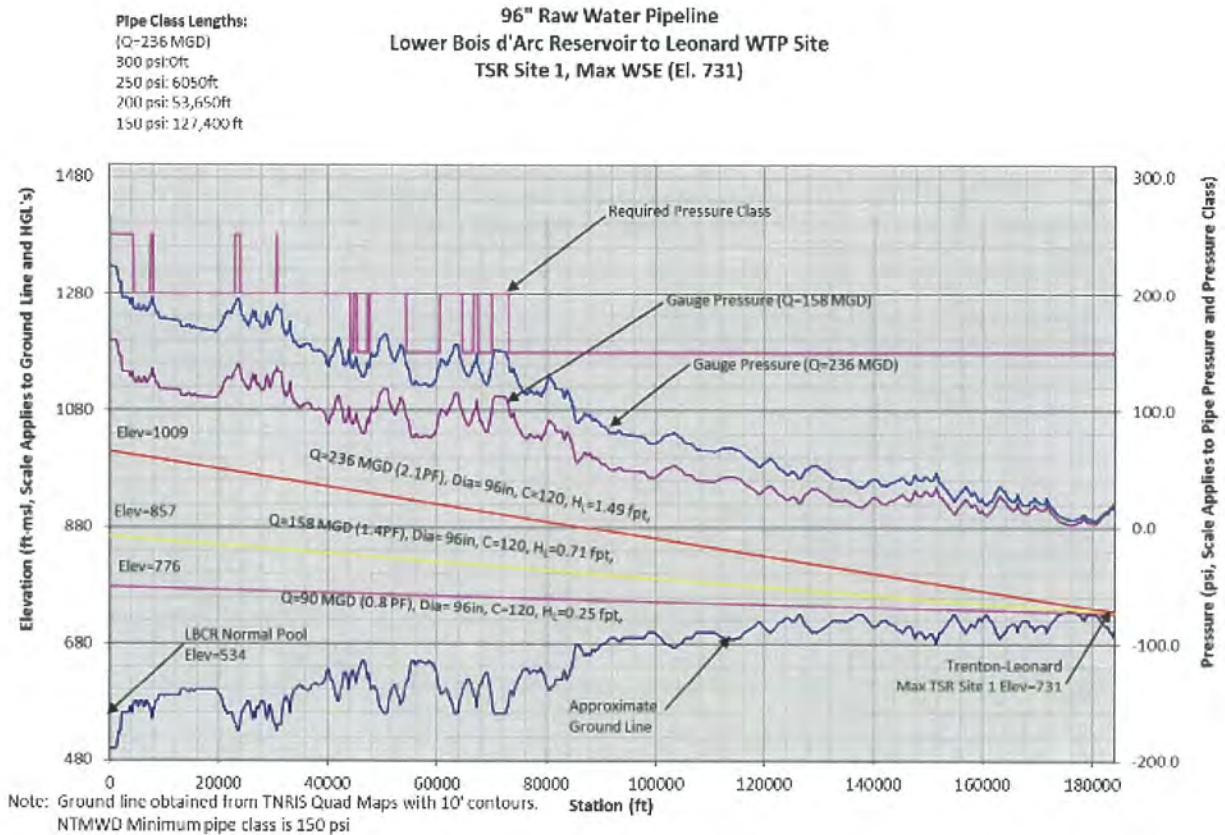


Figure 29 – 90-inch Pipeline HGL

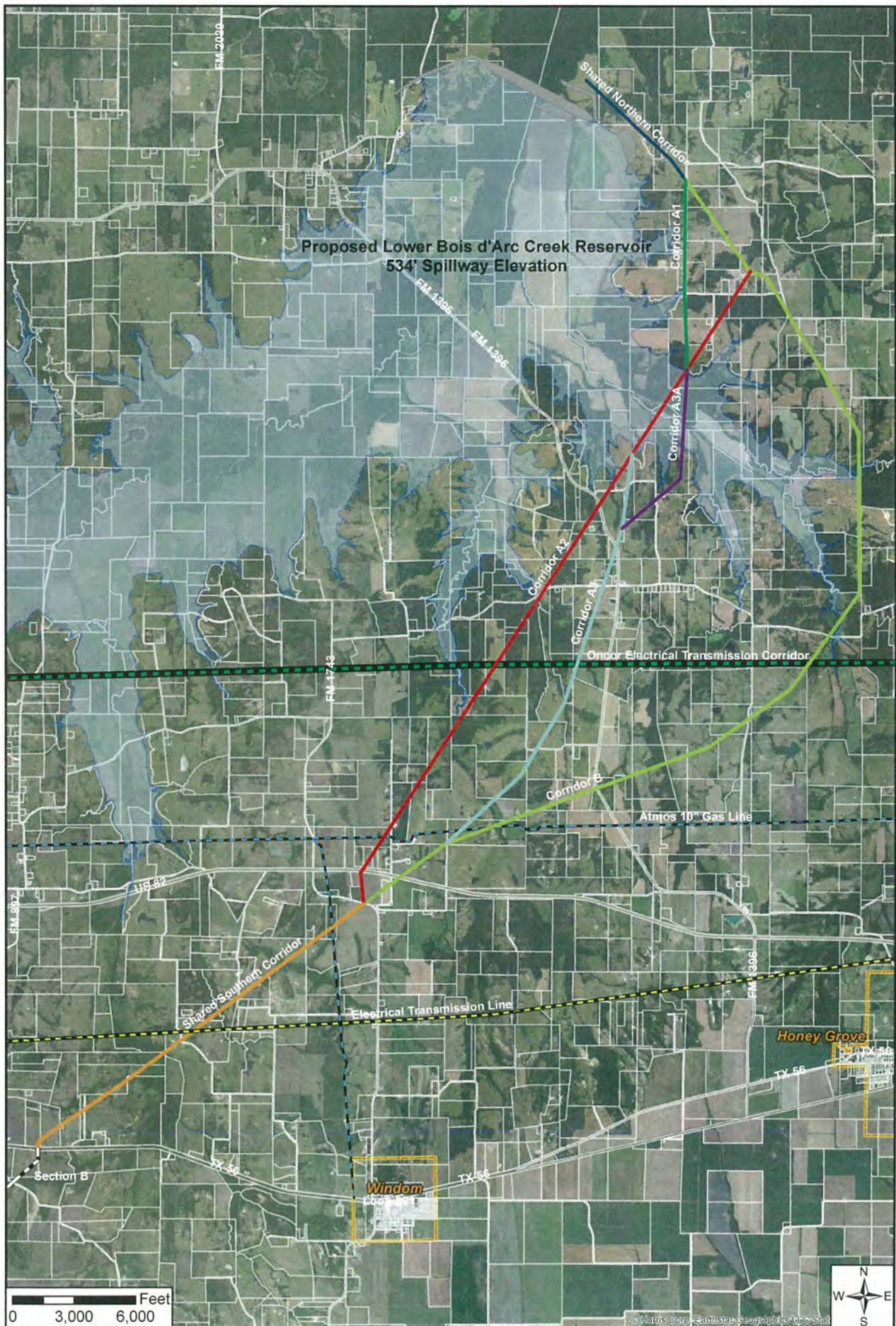
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**Figure 30 – 96-inch Pipeline HGL**

Based on this analysis, the pipeline between LBCR and the TSR is recommended to be 90 inches in diameter. This size provides the lowest total present worth and effectively balances the capital and power costs through the life of the project. The additional capital cost necessary for constructing a 96 inch diameter pipeline is more significant than the increased cost of fabricating 90 inch 300 psi pressure class pipe and valves.

**APPENDIX A  
DESIGN REPORT FIGURES**



PROJECT NO.	NTD13103
DATE CREATED	Date: 10/24/2013
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet), Texas North Central
FILE NAME	LBR_6_28_2013 Cost Estimate Section A.mxd
PREPARED BY	WNS



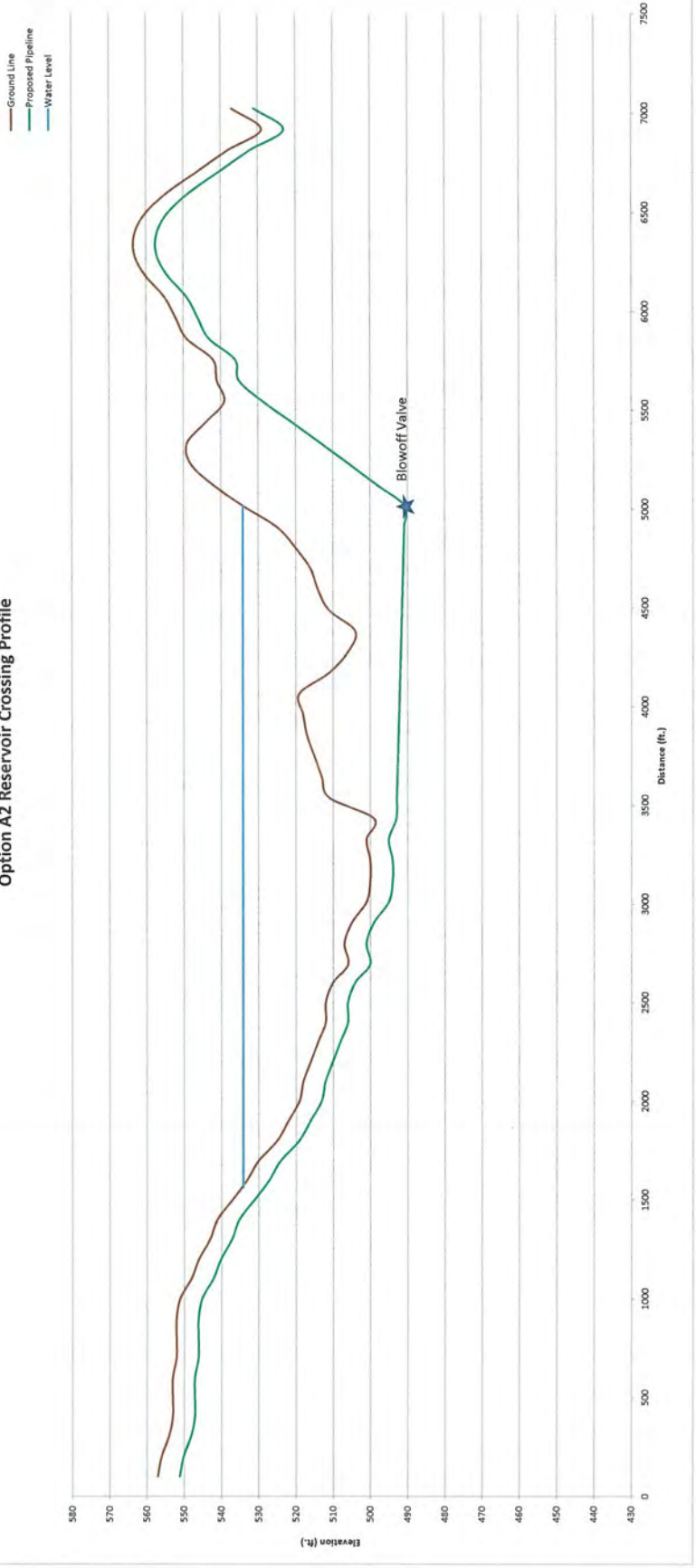
**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section A Corridor**

**FREESE NICHOLS**  
 2711 NORTH HASKELL AVENUE  
 SUITE 3300  
 DALLAS, TEXAS 75204  
 P: 214-217-2200  
 F: 214-217-2201

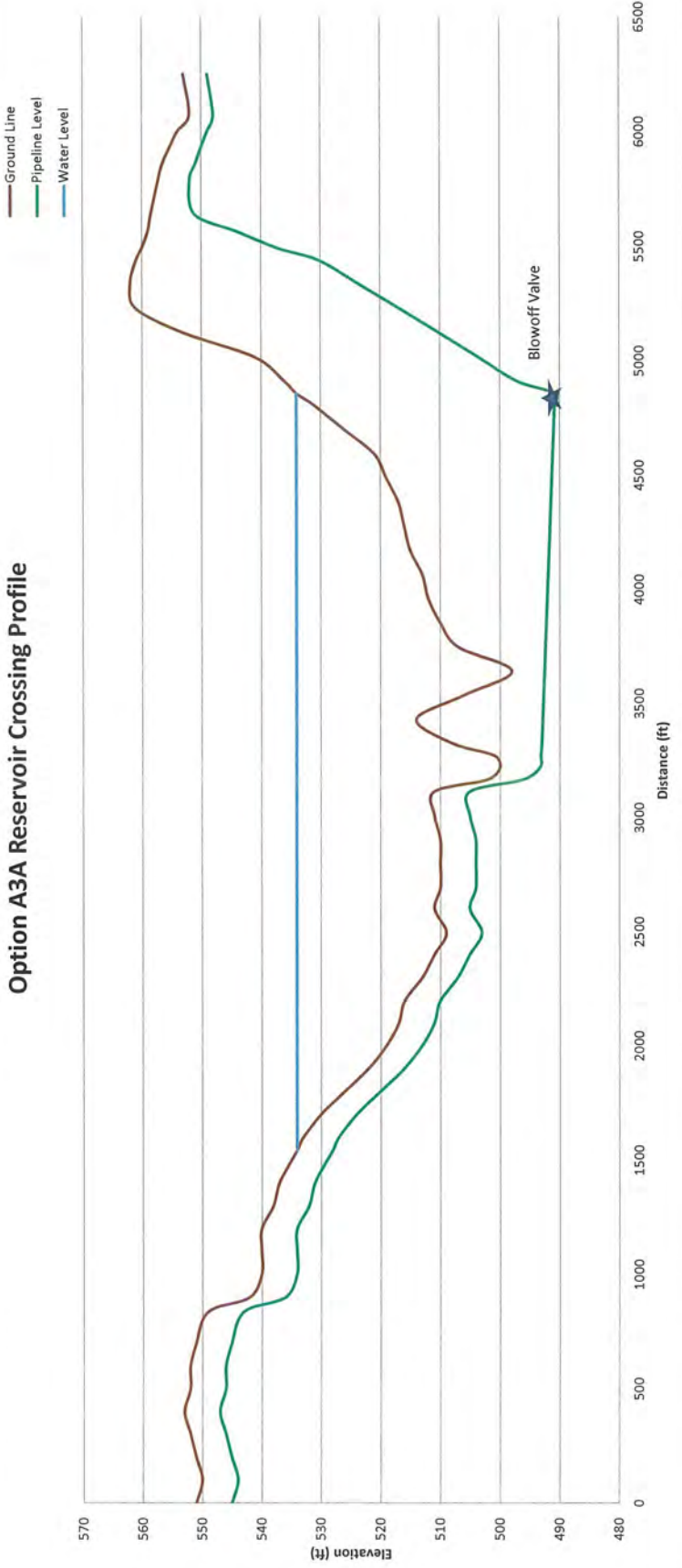
Section  
 A  
 Exhibit  
 1

Job No: NTD13103  
 Location: H:\PUPES\_PUMP\BIBOR\NDC\LBR\_Agriement\_NWTP\Section A Exhibit\Cost Estimate\LBR\_6\_28\_2013 Cost Estimate Section A.mxd  
 Updated: Thursday, October 24, 2013 1:36:31 PM

### Option A2 Reservoir Crossing Profile



### Option A3A Reservoir Crossing Profile



**PIPE BUOYANCY DESIGN PROCESS—FLOTATION OF PIPES  
SIMPLIFIED, WORST CASE EXAMPLE**

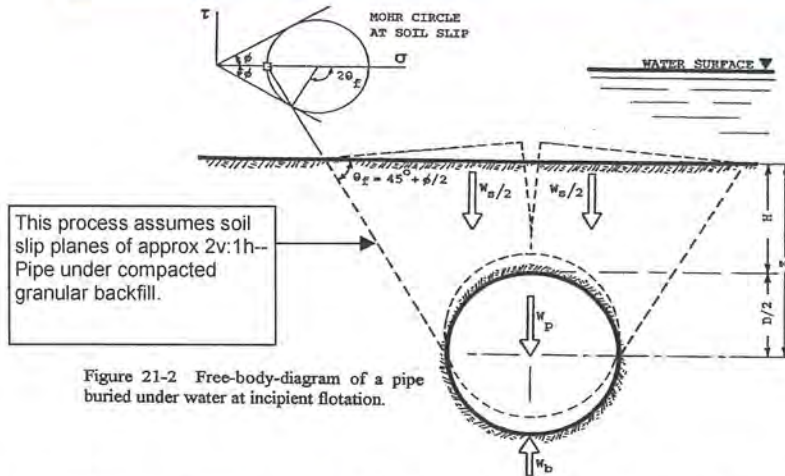


Figure 21-2 Free-body-diagram of a pipe buried under water at incipient flotation.

Reference: "Structural Mechanics of Buried Pipes" by Watkins & Anderson

**VARIABLES:**   = user input        = constant or calculated

$W_p =$	<span style="background-color: yellow; border: 1px solid black; padding: 2px;">0.00</span>	lb/lf (Weight of empty pipe per unit length)	
$W_c =$	<span style="background-color: yellow; border: 1px solid black; padding: 2px;">0.00</span>	lb/lf (Weight of pipe contents per unit length, set to zero for worst case)	
OD =	<span style="background-color: yellow; border: 1px solid black; padding: 2px;">116.00</span>	inches (outside pipe diameter)	<span style="background-color: #cccccc; border: 1px solid black; padding: 2px;">9.67</span> feet
ID =	<span style="background-color: yellow; border: 1px solid black; padding: 2px;">114.00</span>	inches (inside pipe diameter)	<span style="background-color: #cccccc; border: 1px solid black; padding: 2px;">9.50</span> feet
$\gamma_w =$	<span style="background-color: yellow; border: 1px solid black; padding: 2px;">62.40</span>	lb/ft <sup>3</sup> (unit weight of water, or other liquid pipe is immersed in)	

**CALCULATED VALUES:**

$W = W_c + W_p =$  0.00 lb/lf (Weight of Pipe & Contents)

$\gamma_b =$  62.40 lb/ft<sup>3</sup> (buoyant unit weight of soil)--see embedded comment

$D =$  115.00 inches (mean diameter)      9.58 feet

$W_s =$  Buoyant weight of soil wedges above a buried pipe per (lb/lf)  
Assumes soil slip planes of approximately 2v:1h

$W_s = \gamma_b [Z(D + 0.5Z) - \pi D^2 / 8]$       See below for values

$W_b =$  Buoyant (uplift force) on pipe (lb/lf) = weight of liquid displaced

$W_b = \pi(OD)^2 \gamma_w / 4$       4577.28 lb/ft

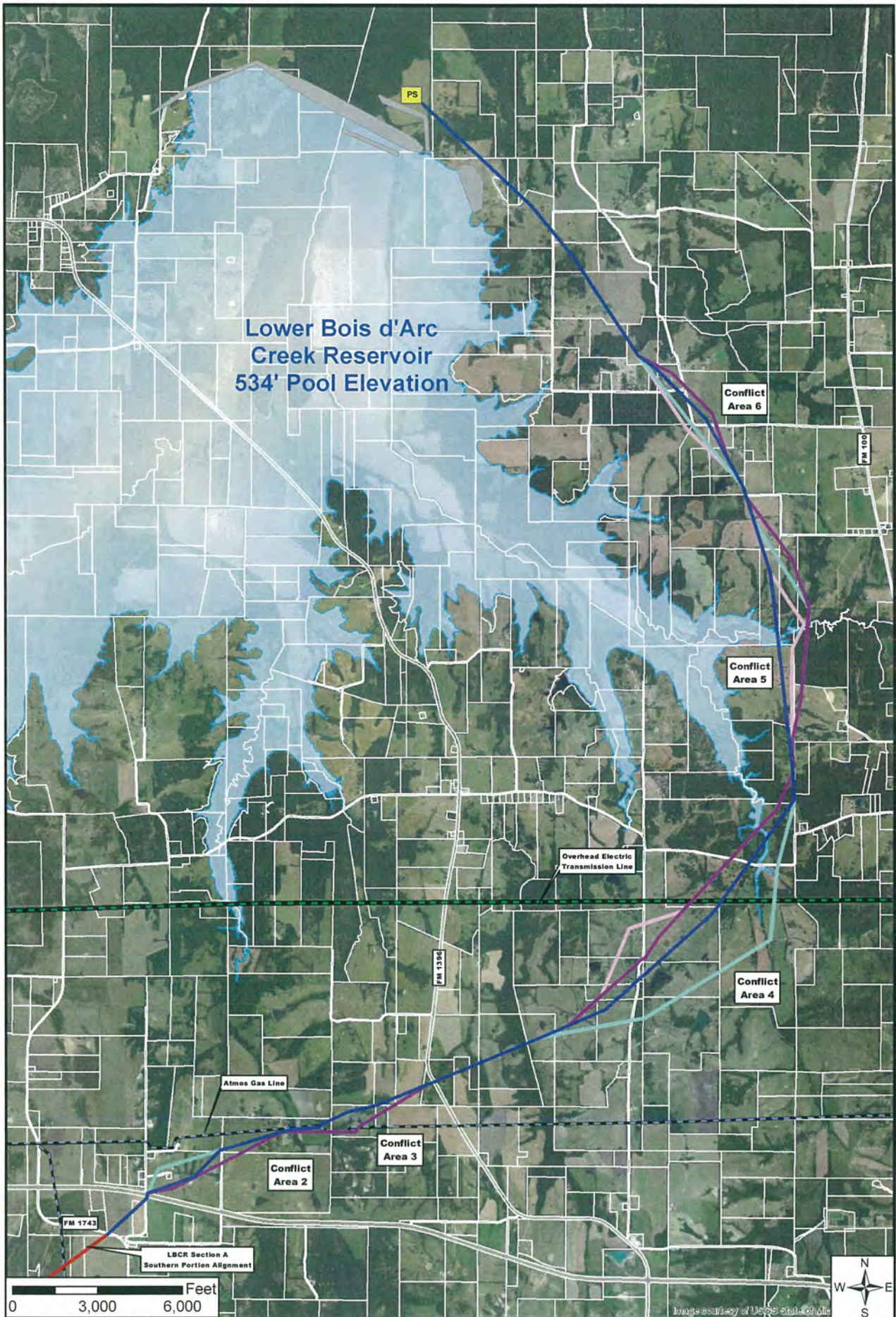
$fs =$   $fs = \frac{ABS(W_T)}{W_b}$       safety factor (see below for values)

H (ft)	Z (ft)	fs	$W_s$ (lb/ft)	$W$ (lb/ft)	$W_T$ (lb/ft)	$W_b$ (lb/ft)
1	5.79	0.49	-2260.62	0.00	-2260.62	4577.28
2	6.79	0.71	-3251.22	0.00	-3251.22	4577.28
3	7.79	0.94	-4304.22	0.00	-4304.22	4577.28
4	8.79	1.18	-5419.62	0.00	-5419.62	4577.28
5	9.79	1.44	-6597.42	0.00	-6597.42	4577.28
6	10.79	1.71	-7837.62	0.00	-7837.62	4577.28
7	11.79	2.00	-9140.22	0.00	-9140.22	4577.28
8	12.79	2.30	-10505.2	0.00	-10505.22	4577.28
9	13.79	2.61	-11932.6	0.00	-11932.62	4577.28
10	14.79	2.93	-13422.4	0.00	-13422.42	4577.28
11	15.79	3.27	-14974.6	0.00	-14974.62	4577.28
12	16.79	3.62	-16589.2	0.00	-16589.22	4577.28
13	17.79	3.99	-18266.2	0.00	-18266.22	4577.28
14	18.79	4.37	-20005.6	0.00	-20005.62	4577.28
15	19.79	4.76	-21807.4	0.00	-21807.42	4577.28
16	20.79	5.17	-23671.6	0.00	-23671.62	4577.28
17	21.79	5.59	-25598.2	0.00	-25598.22	4577.28
18	22.79	6.03	-27587.2	0.00	-27587.22	4577.28
19	23.79	6.48	-29638.6	0.00	-29638.62	4577.28
20	24.79	6.94	-31752.4	0.00	-31752.42	4577.28
H >= 0.5D		fs >= 1.47222				
H < 0.5D		fs < 1.47222				

According to Watkins & Anderson, the height of cover should be at least half the pipe diameter. This correlates to a factor of safety of approximately 1.47222. This only applies when you have granular embedment or better compacted to at least 90% density. Also, if the designer has specified all welded joints, this added resistance is sufficient to resist uplift with only half the diameter of cover.

If the designer is unsure of the control of backfill or the embedment material is something other than granular, then a conservative rule of thumb would be to specify soil cover equal to pipe diameter.





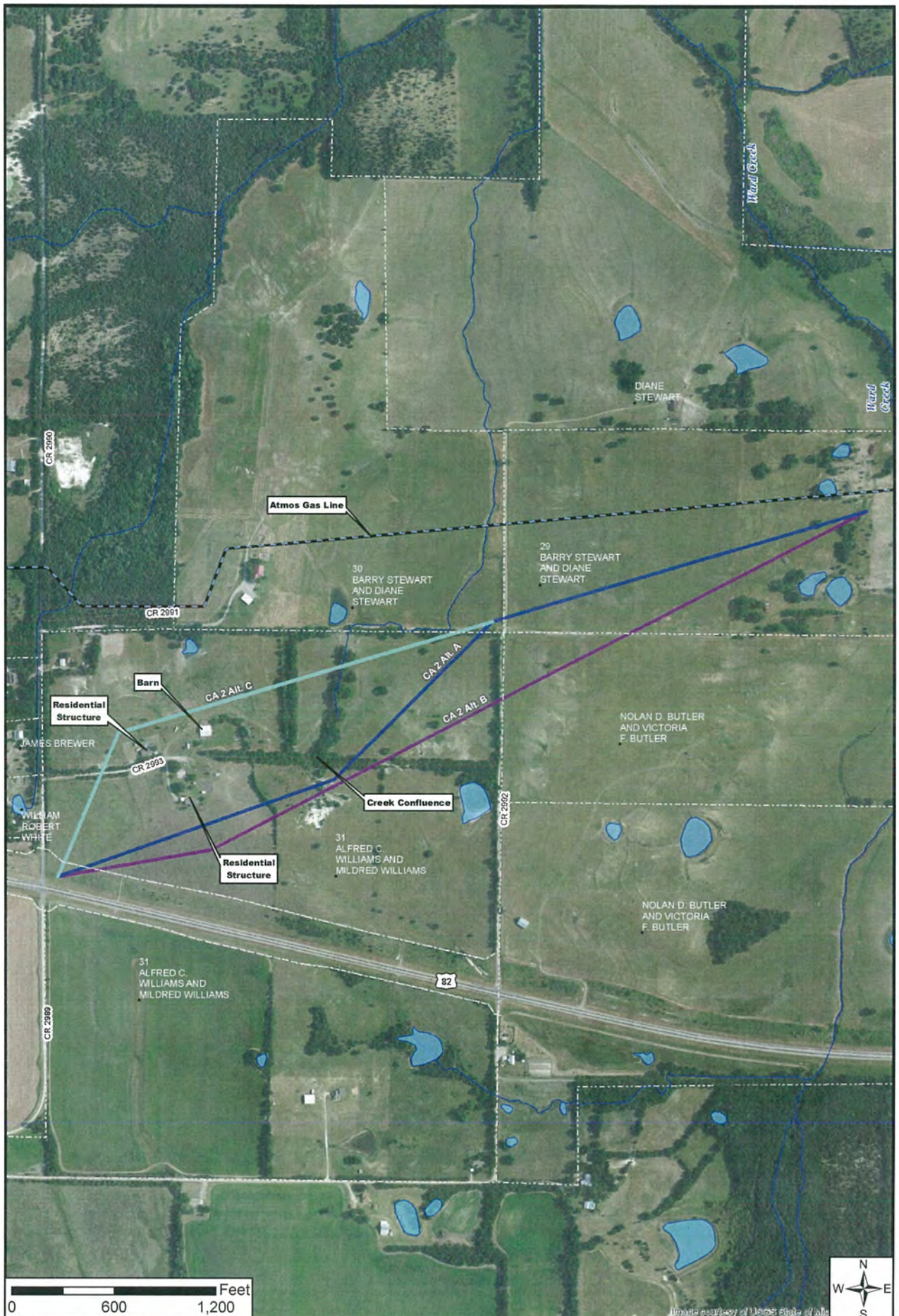
PROJECT NO.	NTD19135
DATE CREATED	Dec 11 2020
SITING & COORDINATE SYSTEM	NAD83 State Plane (North Texas North Central)
FILE NAME	LBCR Section A Alignment APP.dwg
PREPARED BY	WAR

**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section A Corridor**

**FREESE NICHOLS**  
 2711 NORTH HASKELL AVENUE  
 SUITE 3300  
 DALLAS, TEXAS 75204  
 P: 214-217-2200  
 F: 214-217-2201

Section  
 A  
 Exhibit  
 5





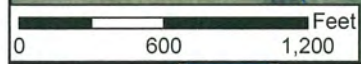
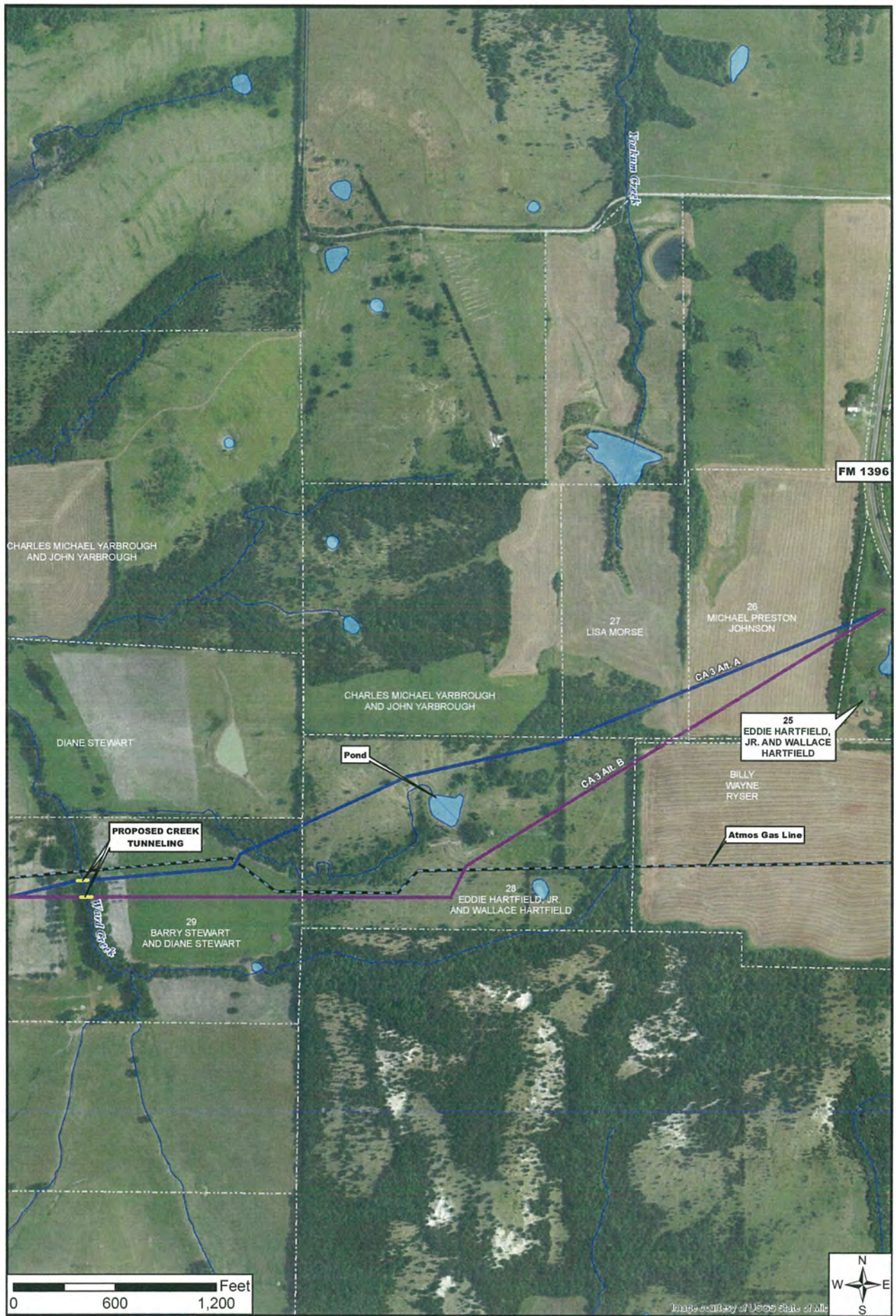
PROJECT NO.	NTD13104
DATE CREATED	Date: 11/05/20
DATUM & COORDINATE SYSTEM	NAD83 State Plane (ft) Texas North Central
FILE NAME	CADAPP.mxd
PREPARED BY	WSS



NORTH TEXAS MUNICIPAL WATER DISTRICT  
 Lower Bois d'Arc Creek Reservoir Raw Water Pipeline  
**Section A Corridor - Conflict Area #2**

**FREESE NICHOLS**  
 2711 NORTH HASKELL AVENUE  
 SUITE 3300  
 DALLAS, TEXAS 75204  
 P: 214-217-2200  
 F: 214-217-2201

Section  
 A  
 Exhibit  
 6



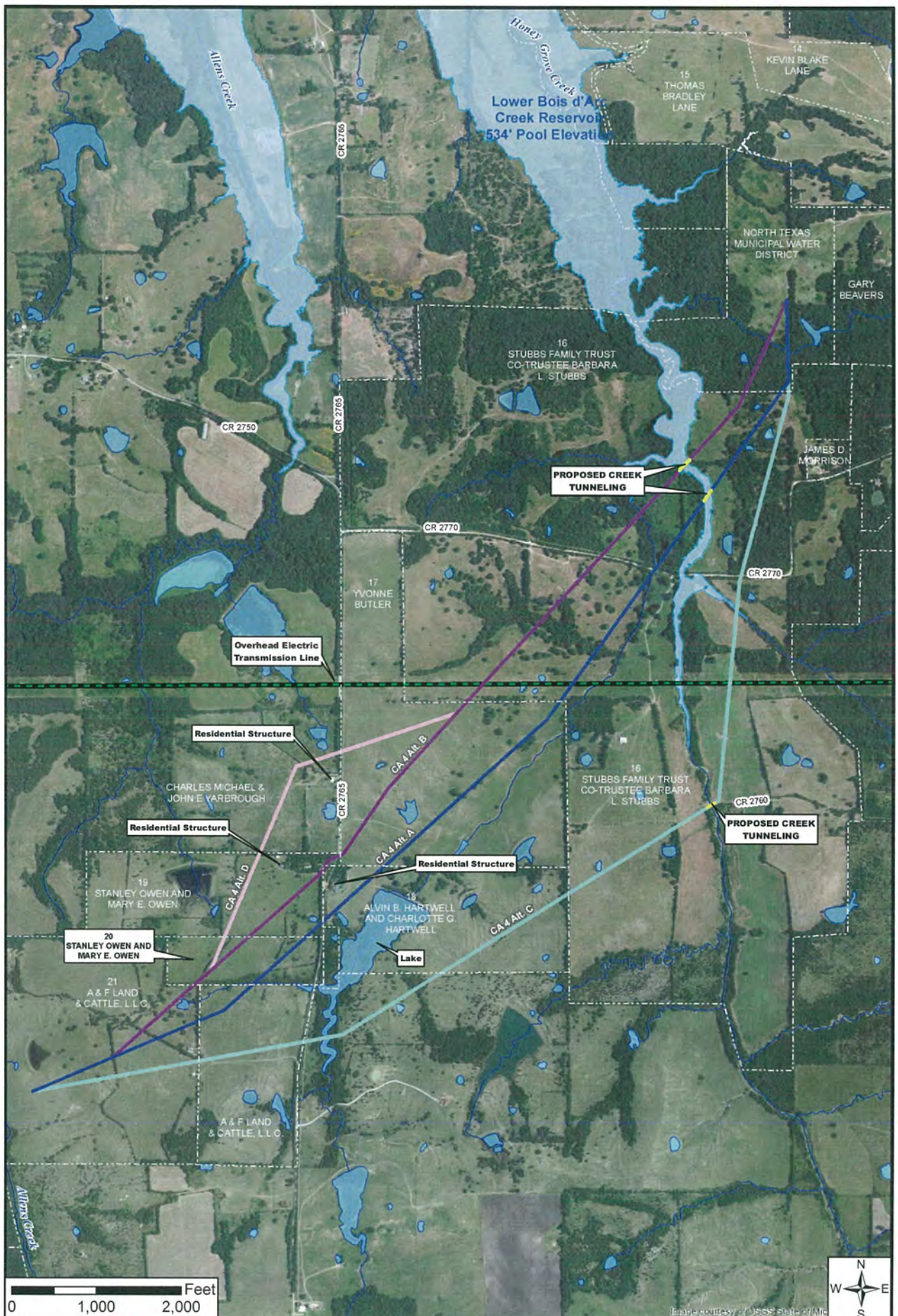
PROJECT NO.	NTD13124
DATE CREATED	Date: 11/05/20
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas North Central
FILE NAME	CA3 AP#02
PREPARED BY	WAL



NORTH TEXAS MUNICIPAL WATER DISTRICT  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section A Corridor - Conflict Area #3**

**FREESE NICHOLS**  
 2711 NORTH HASKELL AVENUE  
 SUITE 3300  
 DALLAS, TEXAS 75204  
 P: 214-217-2200  
 F: 214-217-2201

Section  
 A  
 Exhibit  
 7

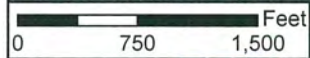
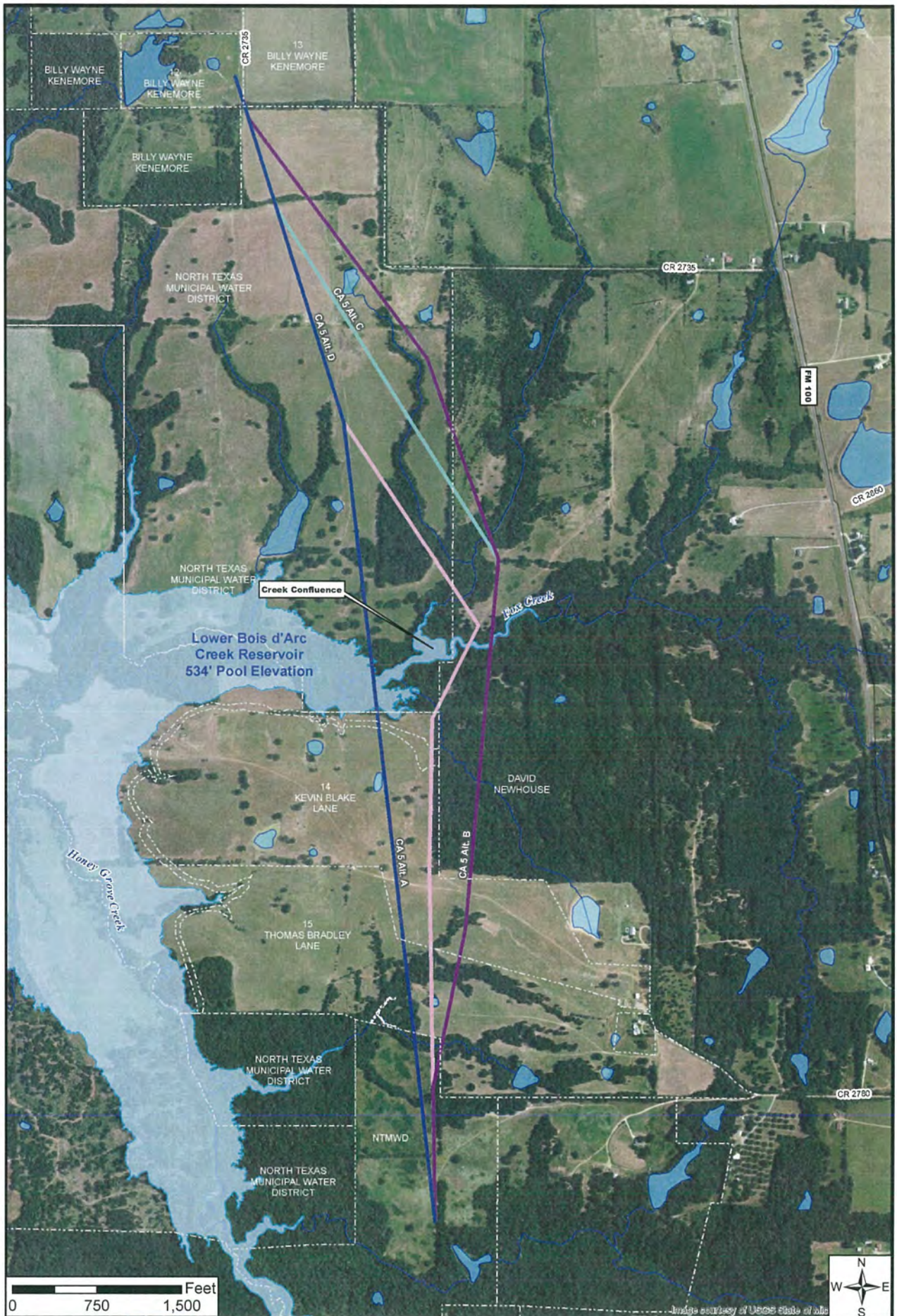


PROJECT NO.	NTD13133
DATE CREATED	Date: 11/29/20
DATA & COORDINATE SYSTEM	NAD83 State Plane (North Texas North Central)
FILE NAME	CA-APP.mxd
PREPARED BY	WRI

NORTH TEXAS MUNICIPAL WATER DISTRICT  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section A Corridor - Conflict Area #4**

**FREESE NICHOLS**  
 2711 NORTH HASKELL AVENUE  
 SUITE 3300  
 DALLAS, TEXAS 75204  
 P: 214-217-2200  
 F: 214-217-2201

Section  
 A  
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PROJECT NO.	NTD1313
DATE CREATED	DATE: 11/02/20
DATUM & COORDINATE SYSTEM	NAD83 State Plane (North Texas North Central)
FILE NAME	CAD-APP102
PREPARED BY	WEL

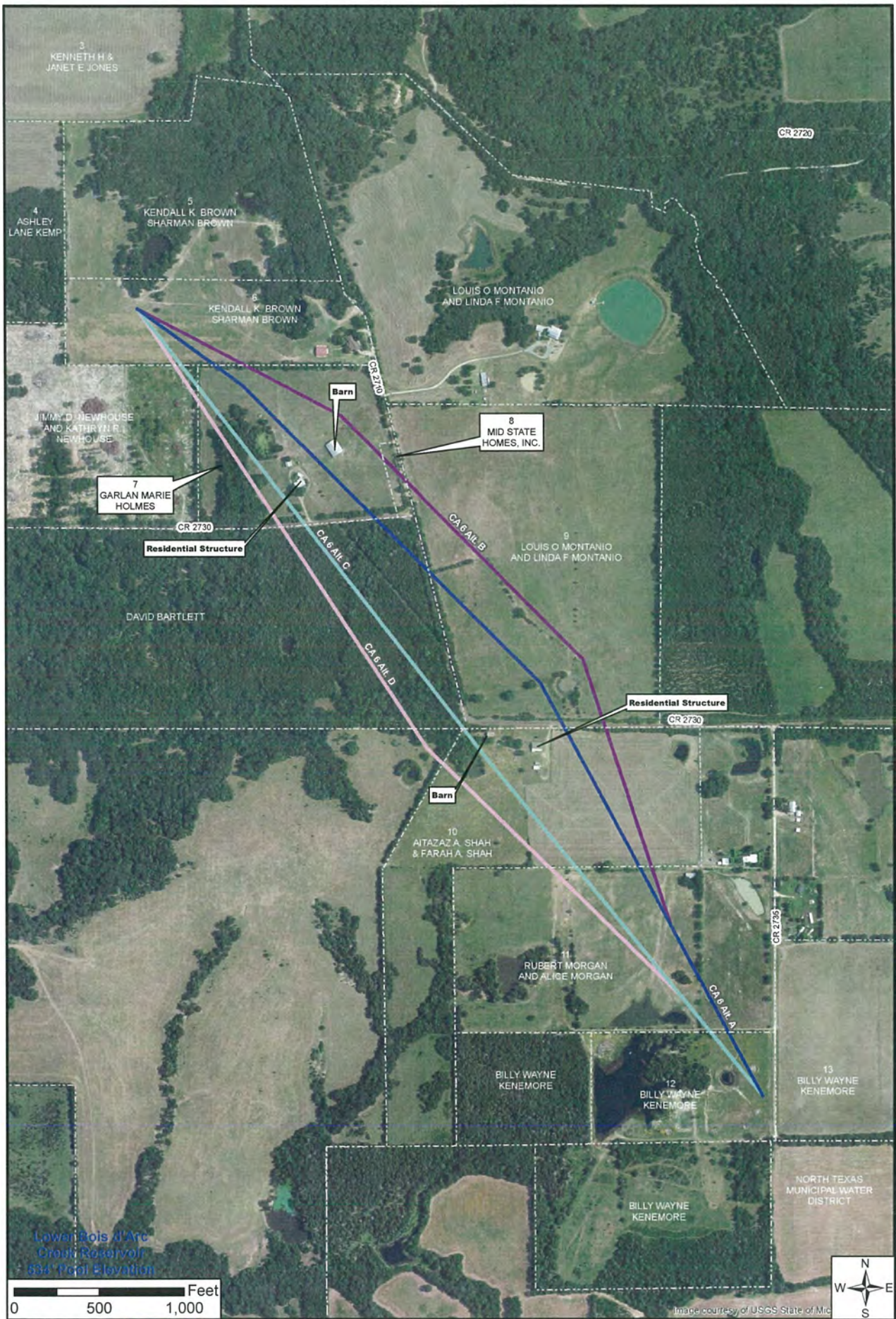


**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section A Corridor - Conflict Area #5**

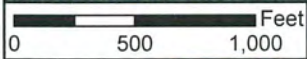
**FREESE NICHOLS**  
 2711 NORTH HASKELL AVENUE  
 SUITE 3300  
 DALLAS, TEXAS 75204  
 P: 214-217-2200  
 F: 214-217-2201

Section  
 A  
 Exhibit  
 9

Image courtesy of USGS State of Ark



Lower Bois d'Arc  
Creek Reservoir  
654' Top Elevation



PN PROJECT NO	NTD13104
DATE CREATED	04/11/2021
SAPM & COORDINATE SYSTEM	NAD83 State Plane (North Texas North Central)
FILE NAME	CAB_APP.mxd
PREPARED BY	WPL



NORTH TEXAS MUNICIPAL WATER DISTRICT  
Lower Bois d'Arc Creek Reservoir Raw Water Pipeline

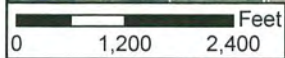
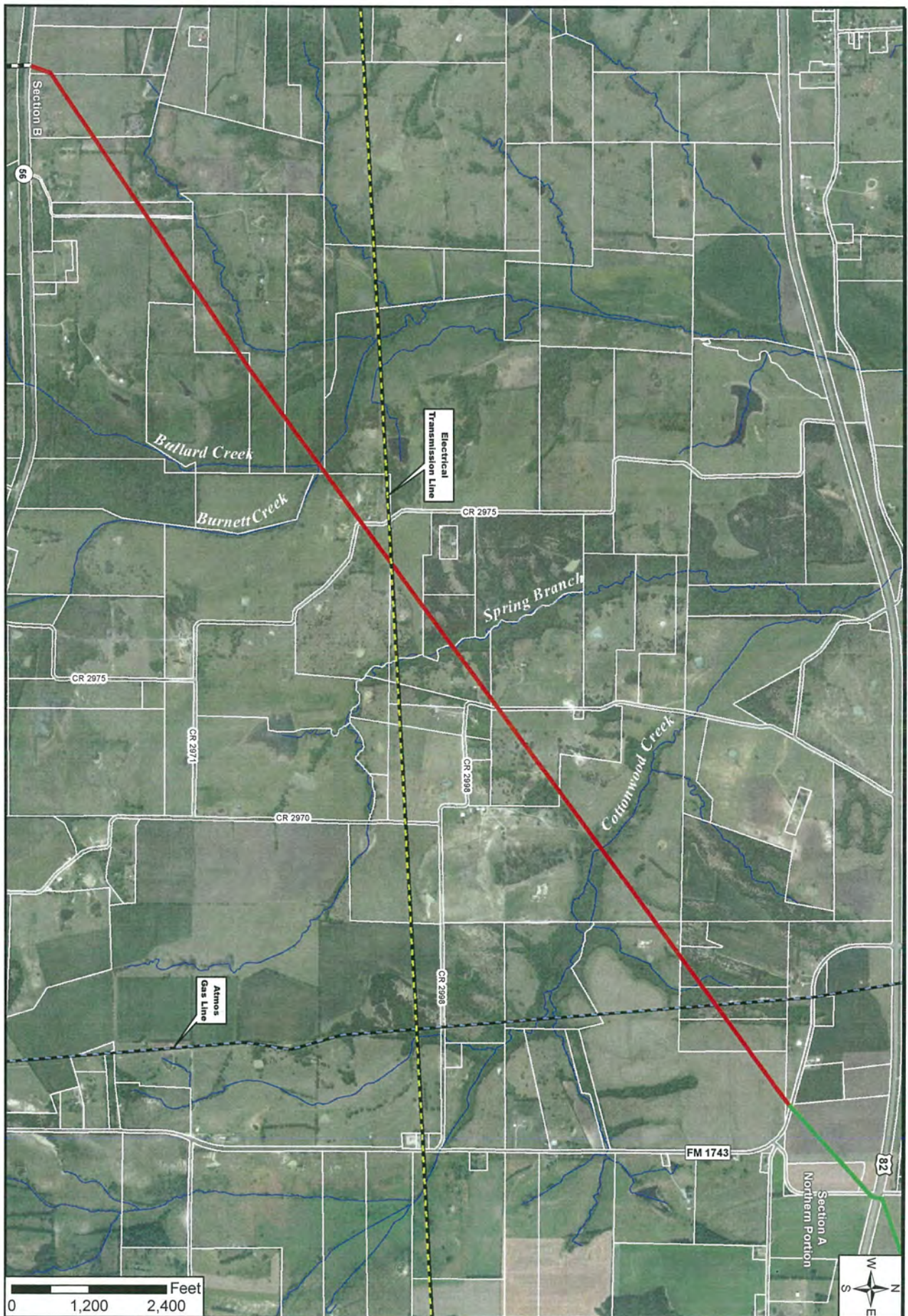
**Section A Corridor - Conflict Area #6**

**FREESE NICHOLS**  
2711 NORTH HASKELL AVENUE  
SUITE 3300  
DALLAS, TEXAS 75204  
P: 214-217-2200  
F: 214-217-2201



Section  
A  
Exhibit  
10

Image courtesy of USGS State of MG



PN PROJECT NO	N7013138
DATE CREATED	Date: 11/08/2013
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas North Central
FILE NAME	Attachment 1 - Corridor Map1.mxd
PREPARED BY	WRC



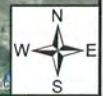
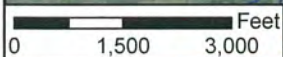
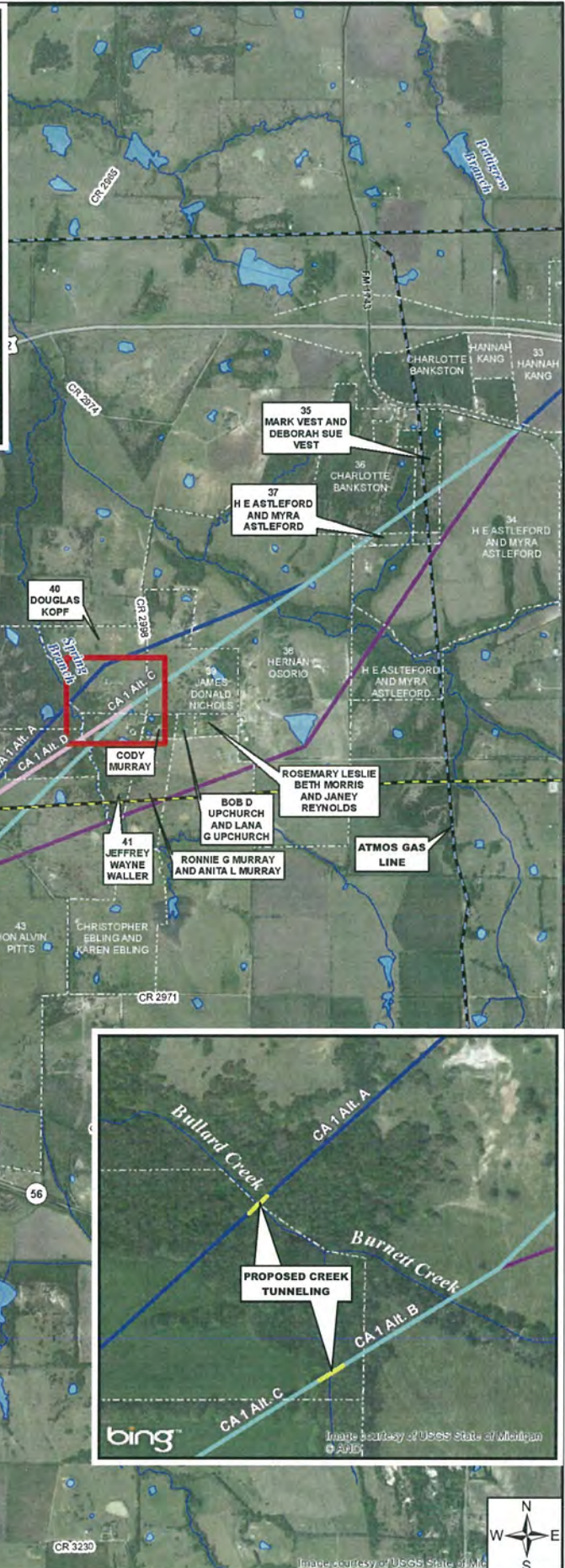
NORTH TEXAS MUNICIPAL WATER DISTRICT  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**

**Section A Corridor**

**FREESSE NICHOLS**  
 2711 NORTH HASKELL AVENUE  
 SUITE 3300  
 DALLAS, TEXAS 75204  
 P: 214-217-2200  
 F: 214-217-2201

Section  
 A  
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 11

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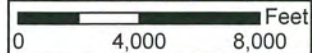
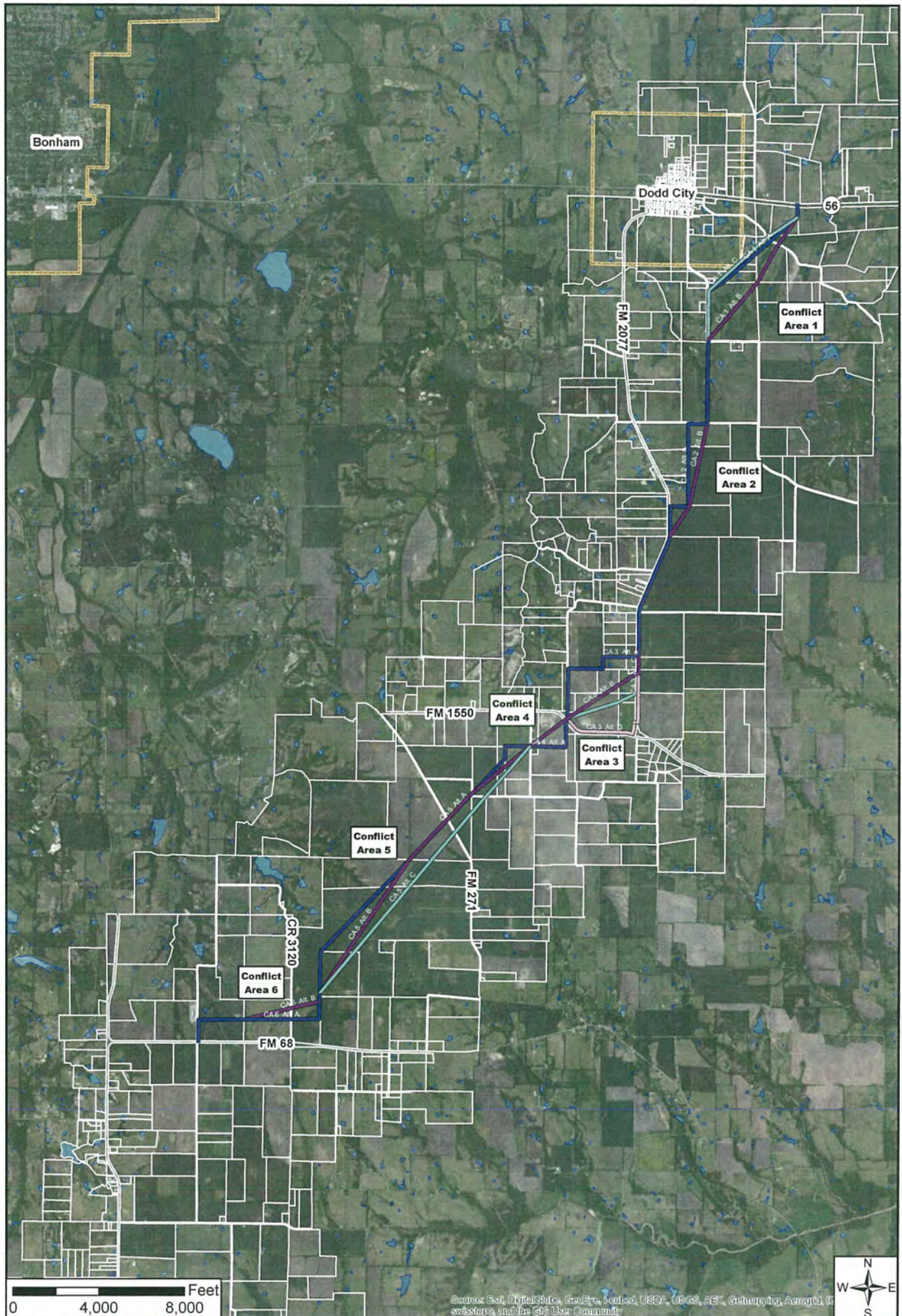
PROJECT NO.	NTD13136
DATE CREATED	Date: 11/26/2013
DATA & COORDINATE SYSTEM	NAD83 State Plane (484) Texas North Central
FILE NAME	CA1-APP.dwg
PREPARED BY	WML

**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section A Corridor - Conflict Area #1**

**FREESE NICHOLS**  
 2711 NORTH HASKELL AVENUE  
 SUITE 3300  
 DALLAS, TEXAS 75204  
 P: 214-217-2200  
 F: 214-217-2201

Section  
**A**  
 Exhibit  
**12**





Source: Esri, DigitalGlobe, GeoEye, AeroGRID, USDA, USGS, AeroGRID, IGN, and the GIS User Community



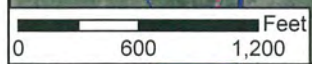
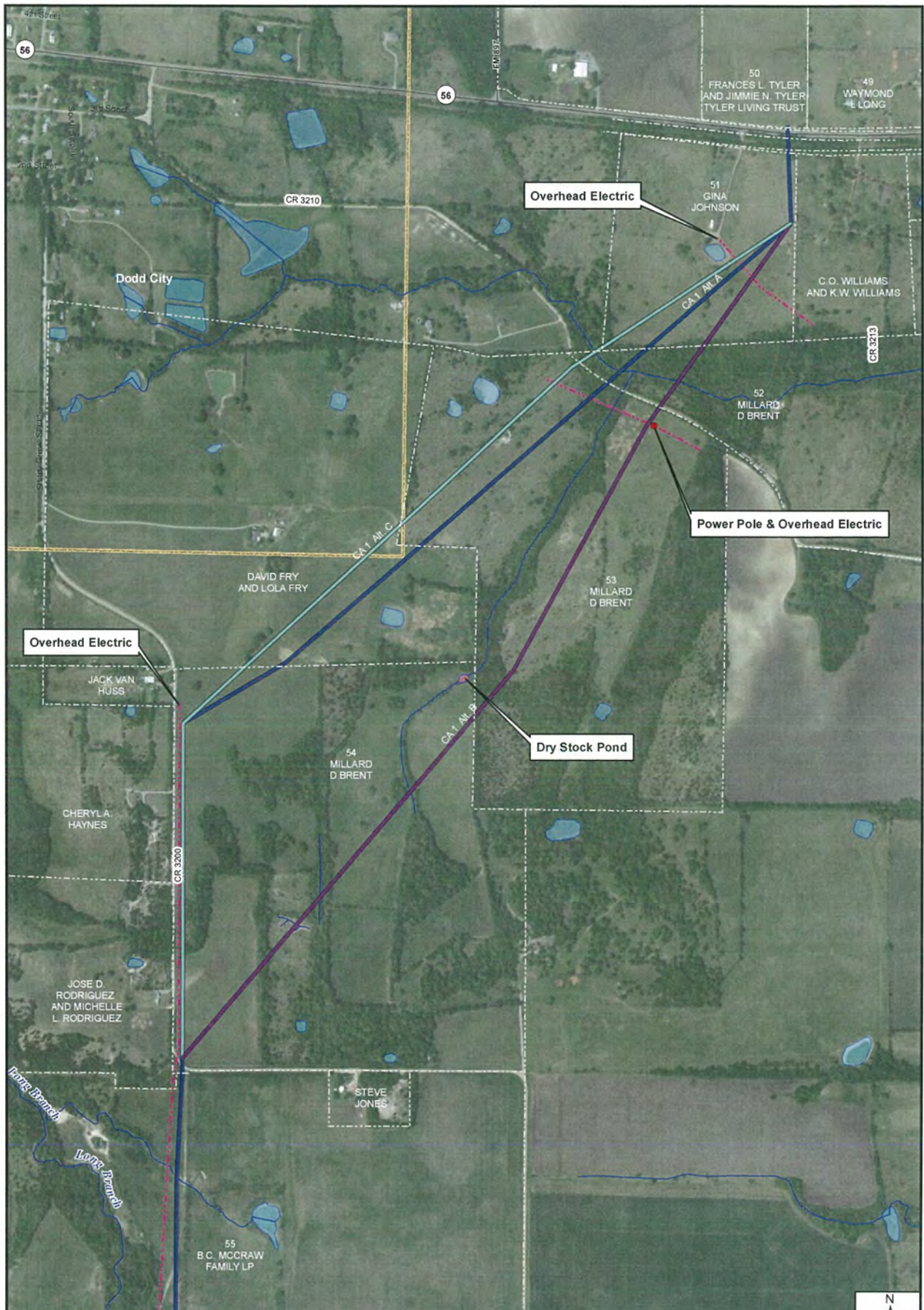
PROJECT NO: NTD13108  
 DATE CREATED: Date: 10/29/2013  
 DATUM & COORDINATE SYSTEM: NAD83 State Plane (North Texas North Central)  
 FILE NAME: Section\_B\_corridor.mxd  
 PREPARED BY: EP



NORTH TEXAS MUNICIPAL WATER DISTRICT  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section B Corridor**

**FREESSE NICHOLS**  
 10497 TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-6800  
 F: 713-600-6801

Section  
 B  
 Exhibit  
 1



Source: Esri, DigitalGlobe, GeoEye, IGN, USDA, USGS, AeroGRID, IGN, and the GIS User Community



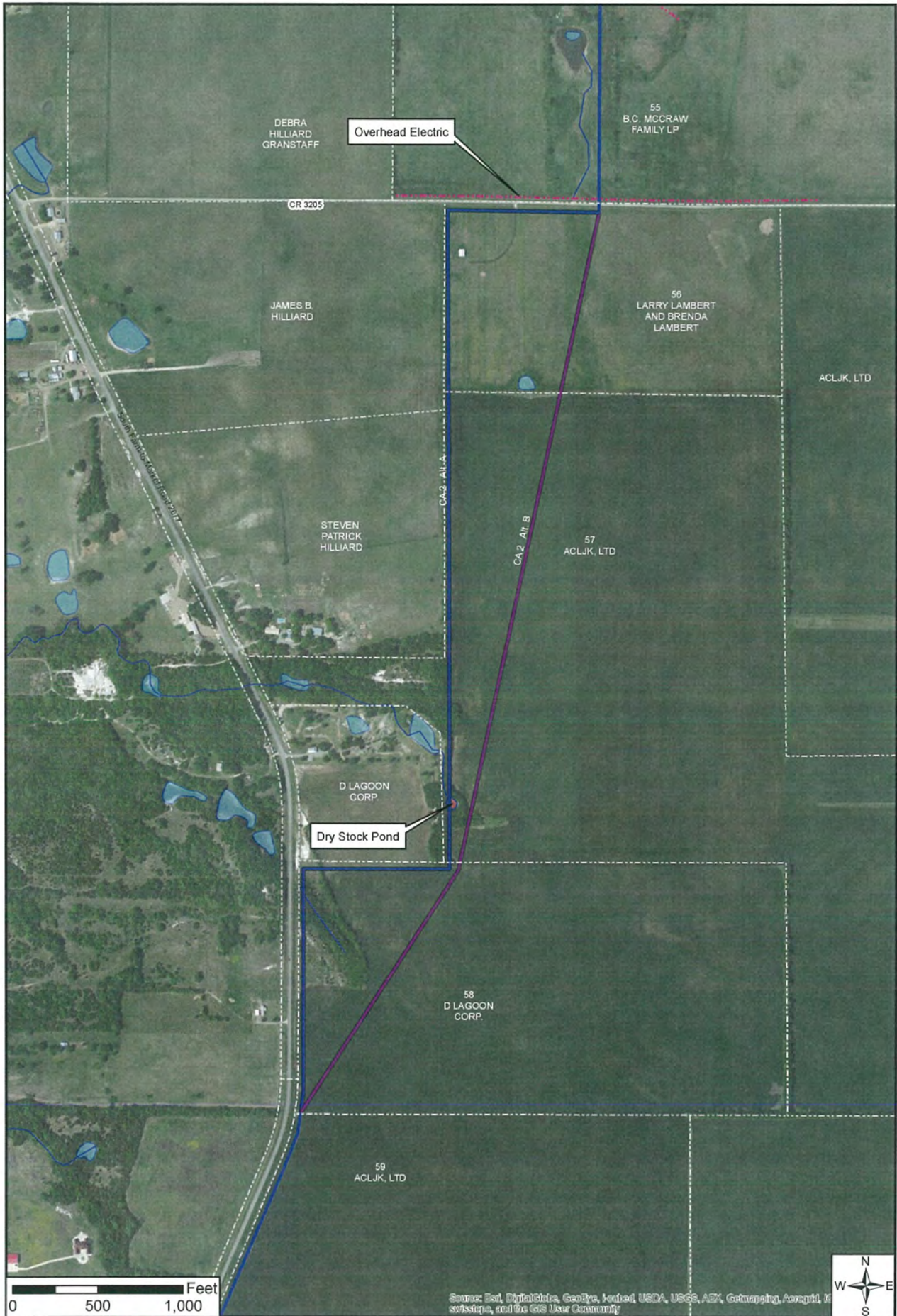
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DATE CREATED	Date: 11/02/2013
PROJECT COORDINATOR	STEWART
UTM Zone	18Q UTM Zone (North)
FILE NAME	SectionB_CA1.mxd
PREPARED BY	BP



**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section B Corridor - Conflict Area #1**

**FREES NICHOLS**  
 10497 TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-6800  
 F: 713-600-6801

Section B  
 Exhibit 2



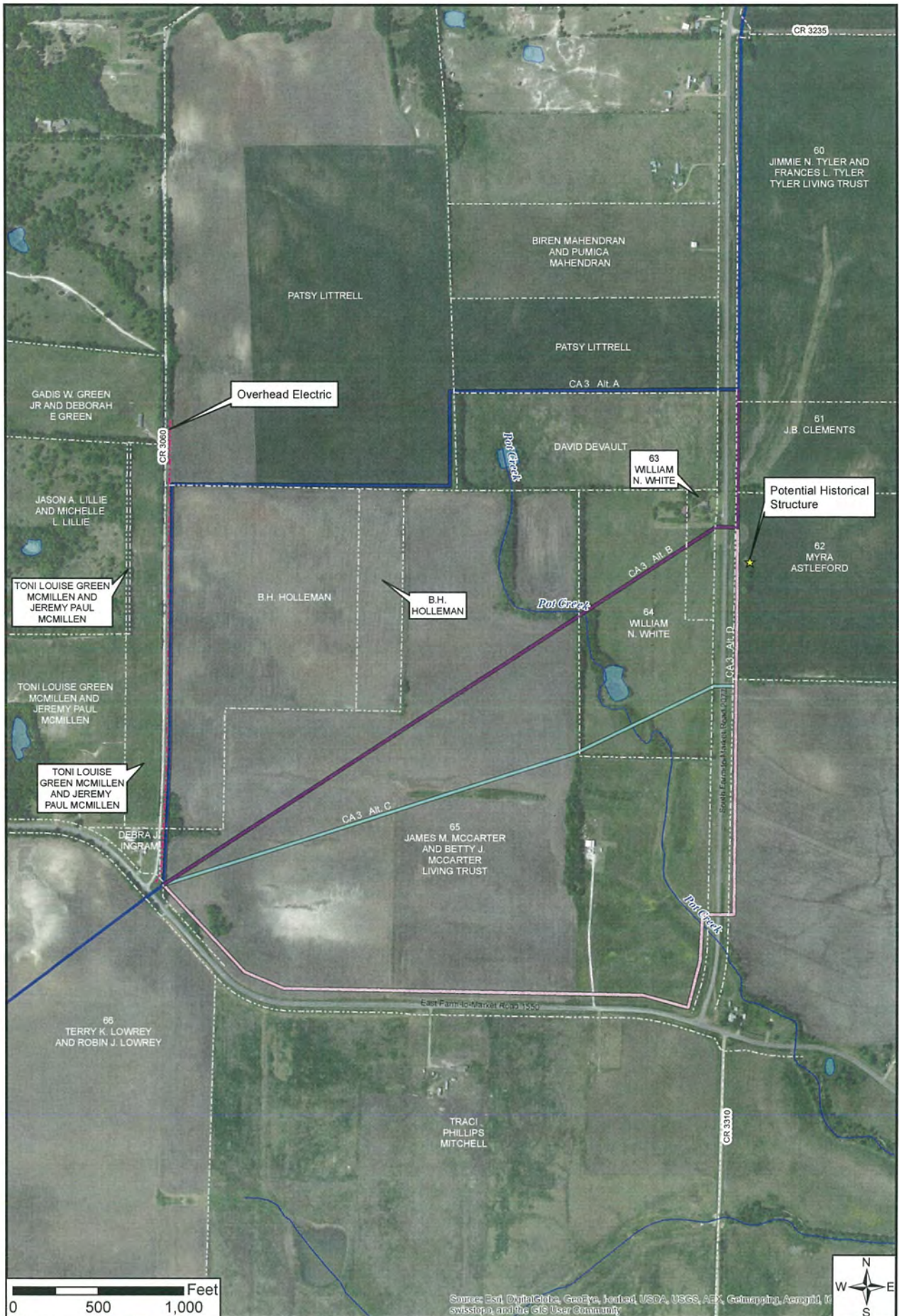
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DATE CREATED	Date: 11/02/2013
SYSTEM & COORDINATE SYSTEM	WGS84 State Plane (feet) Texas North Central
FILE NAME	SectionB_CA2.mxd
PREPARED BY	RP



**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section B Corridor - Conflict Area #2**

**FREES NICHOLS**  
 10497 TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-6300  
 F: 713-600-6303

Section  
**B**  
 Exhibit  
**3**



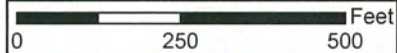
PROJECT NO.	NTD13108
DATE CREATED	04/11/2017
DRAWN & COORDINATED BY	BP
UCED Date Plane (feet) Texas North Central	
FILE NAME	Section_B_CA3.mxd
REVIEWED BY	BP

**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section B Corridor - Conflict Area #3**


**FREES NICHOLS**  
 (847) TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-6800  
 F: 713-600-6801

Section  
 B  
 Exhibit  
 4

Source: Esri, DigitalGlobe, GeoEye, IGN, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Source: Esri, DigitalGlobe, GeoEye, Earthstar (USA), USGS, AeroGRID, IGN, and the GIS User Community



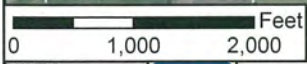
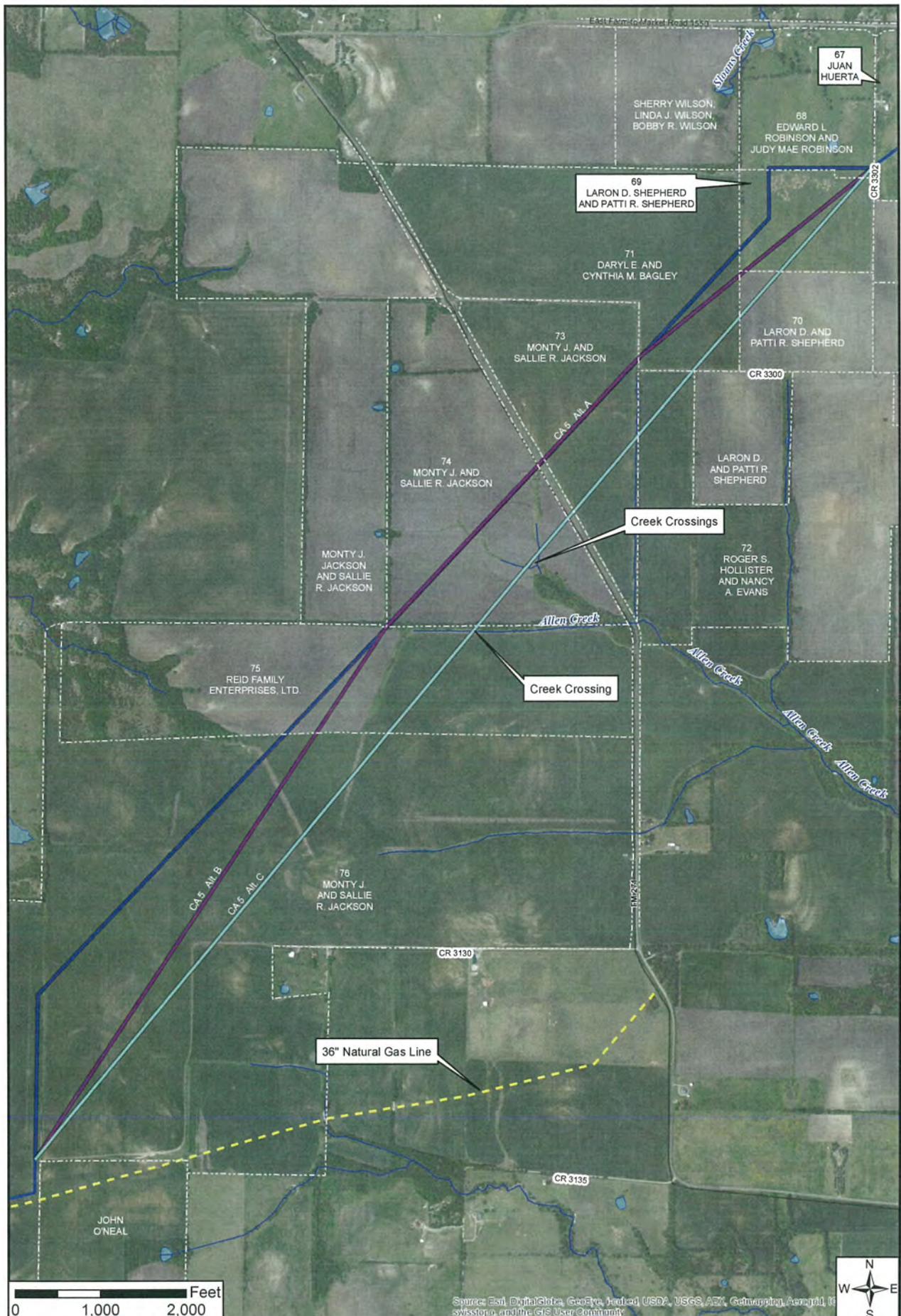
PROJECT NO.	NTD13138
DATE CREATED	Date: 11/22/2013
PROJECT COORDINATOR	ANDREW STEIN
FILE NAME	SectionB_CA4.mxd
PREPARED BY	BP



**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section B Corridor - Conflict Area #4**

**FREESE NICHOLS**  
 10497 TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-8300  
 F: 713-600-6801

Section  
 B  
 Exhibit  
 5



Source: Esri, DigitalGlobe, GeoEye, AeroMap, USDA, USGS, FEMA, Geotitles, Aerial, U.S. Department of Agriculture, and the GIS User Community



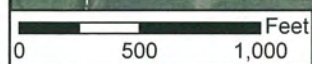
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DATE CREATED	11/02/2012
OWNER & COORDINATOR	STP/BBB
UCRS Date Plane (feet)	Texas North Central
FILE NAME	SectionB_CAD.mxd
DRAWN BY	RP



**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section B Corridor - Conflict Area #5**

**FREESE NICHOLS**  
 30497 TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-6800  
 F: 713-600-6801

Section  
 B  
 Exhibit  
 6



Source: Esri, DigitalGlobe, GeoEye, Earthstar (USA), USGS, AeroVISTA, IGN, GSA, Swisstopo, and the GIS User Community



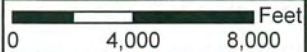
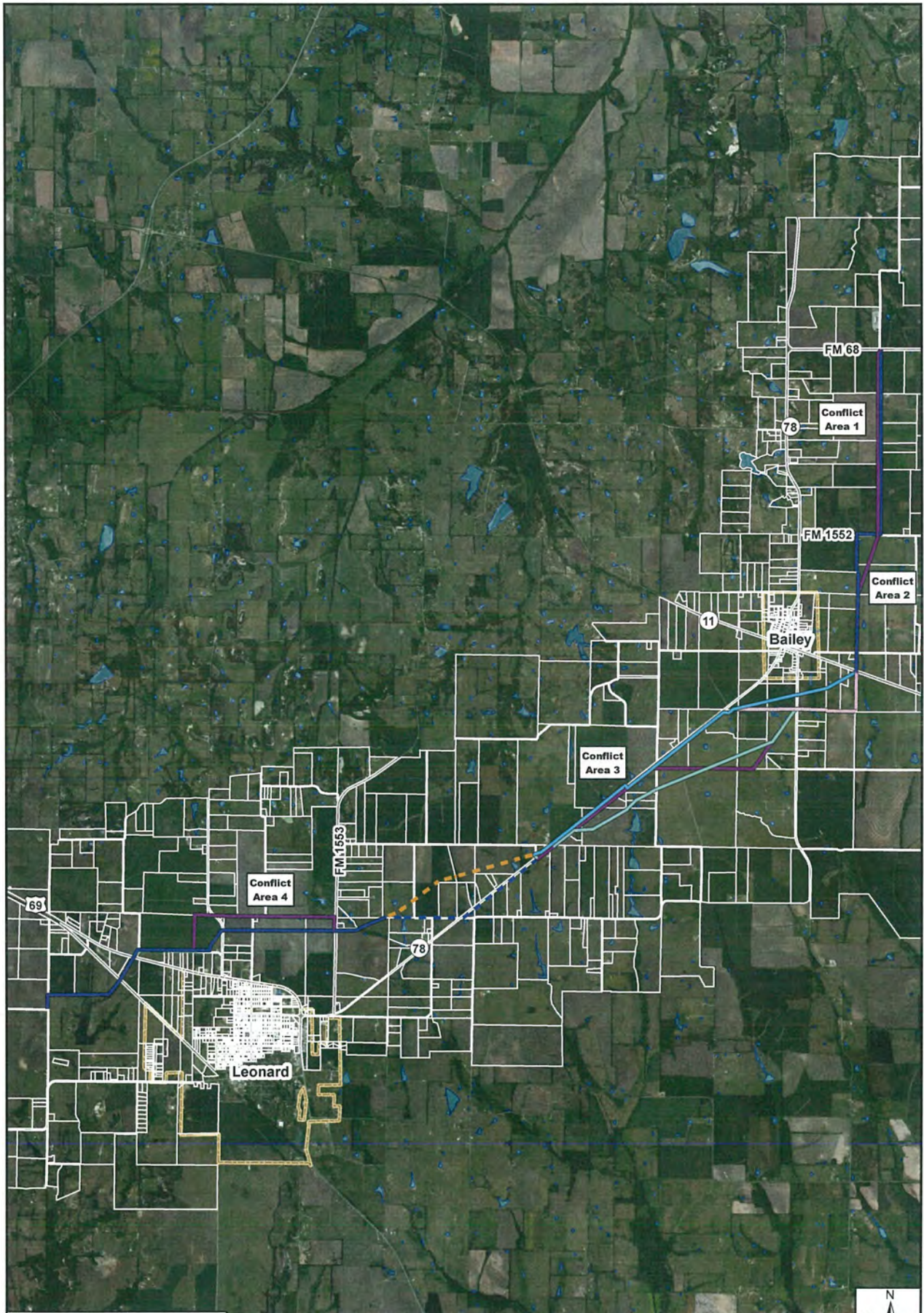
PROJECT NO.	NTD13158
DATE CREATED	Date: 11/02/2013
PROJECT COMPLETION DATE	
ADDED State Plane Area: Texas North Central	
FILE NAME	SectionB_CAD.mxd
PREPARED BY	BP



**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section B Corridor - Conflict Area #6**

**FREESE NICHOLS**  
 10497 TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-6800  
 F: 713-600-6801

Section  
 B  
 Exhibit  
 7



Source: Esri, DigitalGlobe, GeoEye, AeroCast, USDA, USGS, AeroVantage, IGNFO, and the GIS User Community



PROJECT NO.	NTD13138
DATE CREATED	04/10/2013
DRAWN & CHECKED BY	SP
DATA SOURCE	Various
FILE NAME	Section_C_corridor.mxd
PREPARED BY	SP

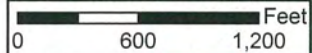
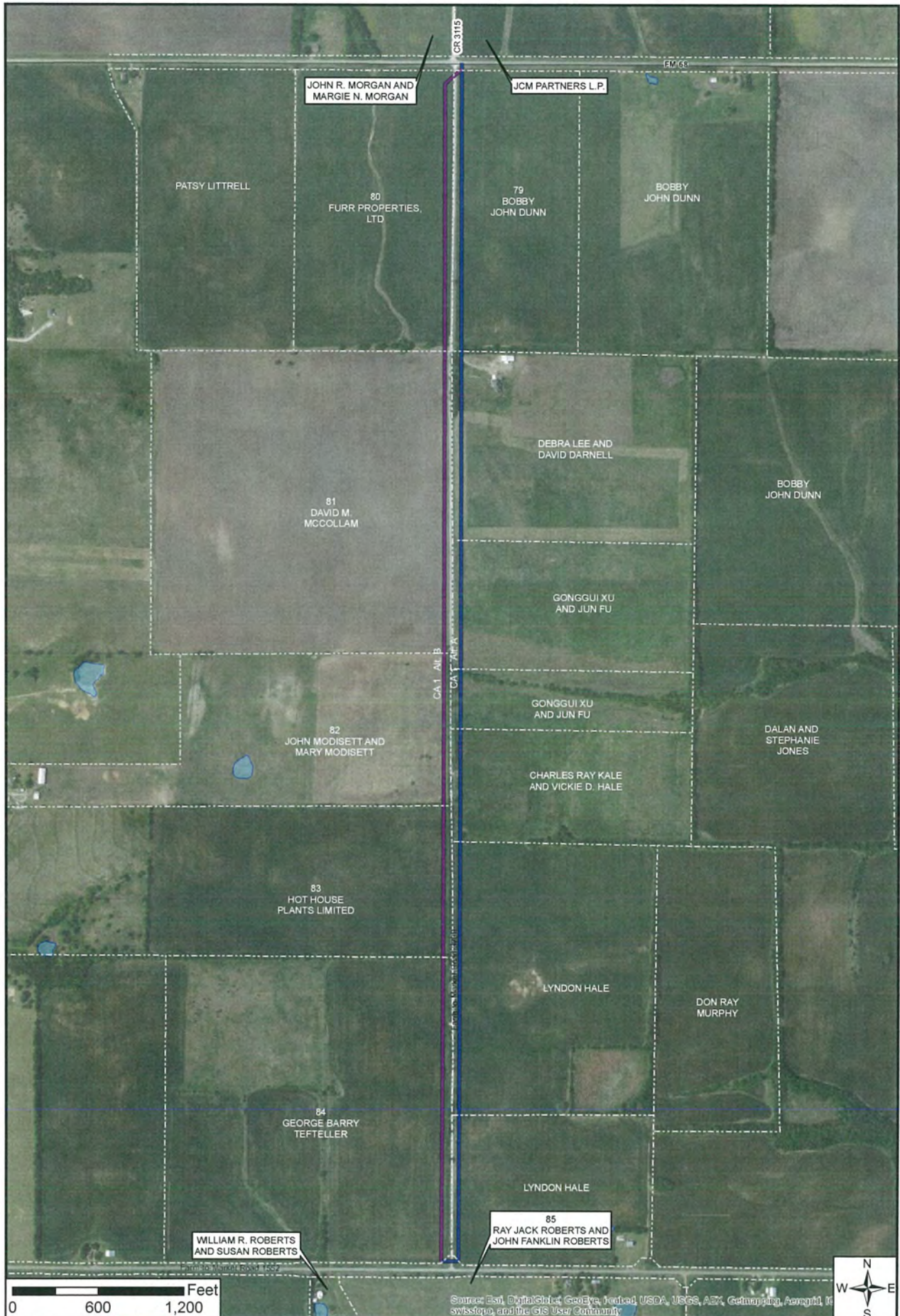


**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section C Corridor**

**FREES NICHOLS**  
 13497 TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-6800  
 F: 713-600-6801

Section  
 C  
 Exhibit  
 1





Source: Esri, DigitalGlobe, GeoEye, Terracon, USDA, USGS, AZE, Getmapping, Aergrid, IGN, Swisstopo, and the GIS User Community

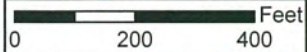
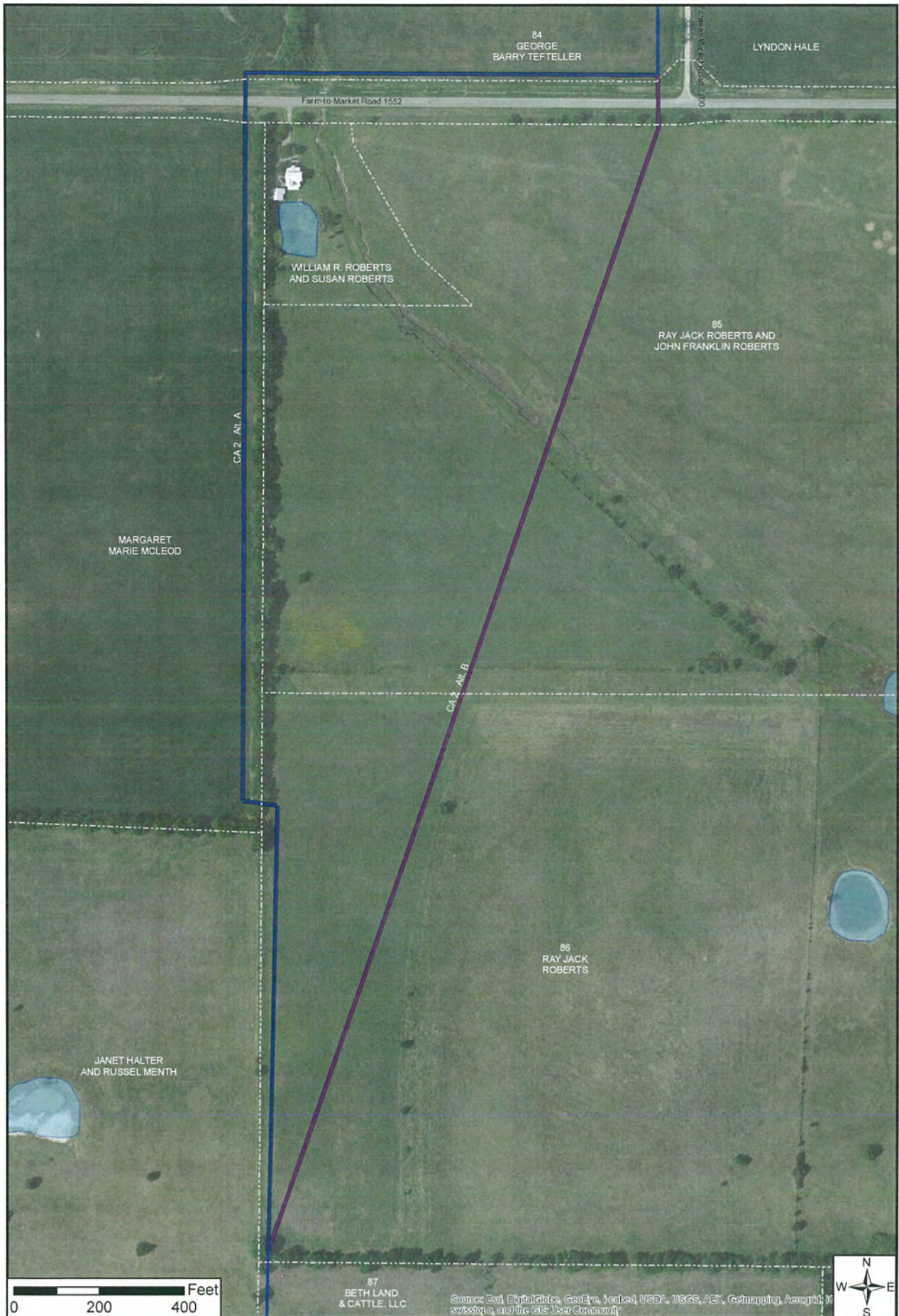
PROJECT NO.	NTD1338
DATE	11/22/2013
PROJECT COORDINATOR	ST/ST/ST
MAPS STATE (FILE PATH)	\\nas01\maps\state\Texas\North Central
FILE NAME	SectionC_CA1.mxd
PREPARED BY	BP



**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section C Corridor - Conflict Area #1**

**FREESE NICHOLS**  
 10497 TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-6800  
 F: 713-600-6801

Section  
 C  
 Exhibit  
 2



PROJECT NO: NTD13136  
 DATE CREATED: Date 11/02/2013  
 SOURCE & COORDINATE SYSTEM: NAD83 State Plane (feet) Texas North Central  
 FILE NAME: Section\_CA2.mxd  
 PREPARED BY: BP

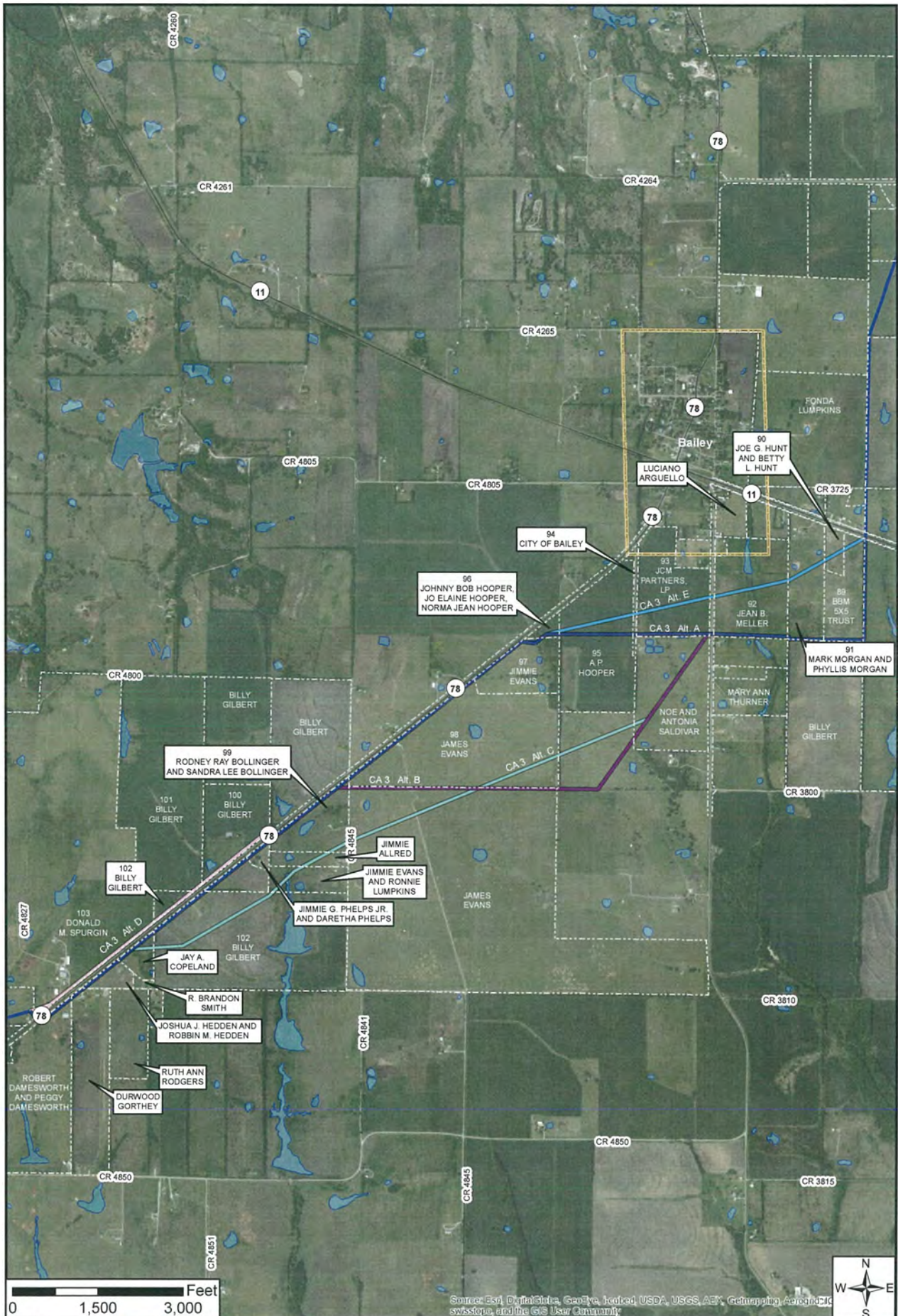


**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section C Corridor - Conflict Area #2**

Source: Esri, DigitalGlobe, GeoEye, AeroGRID, USDA, USGS, AEM, Getmapping, Aergrid, Mswisstopo, and the GIS User Community

**FREESE NICHOLS**  
 10497 TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-6800  
 F: 713-600-6801

Section  
 C  
 Exhibit  
 3



PROJECT NO.	NTD13138
DATE CREATED	Date: 11/02/2013
PROJECT COORDINATOR	4433 State Place (West) Texas North Central
FILENAME	Section_C_CA3.mxd
PREPARED BY	sp



**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section C Corridor - Conflict Area #3**

**FREESE NICHOLS**  
 10497 TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-8800  
 F: 713-600-8801

Section  
 C  
 Exhibit  
 4



PROJECT No: NTD13158  
 DATE CREATED: 11/02/2013  
 PROJECT LOCATION: 0781228  
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 FILE NAME: Section\_C\_CA#4.mxd  
 PREPARED BY: RP

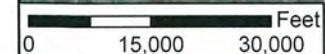


**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Section C Corridor - Conflict Area #4**

**FREESE NICHOLS**  
 TOWN AND COUNTRY WAY  
 SUITE 500  
 HOUSTON, TEXAS 77024  
 P: 713-600-6800  
 F: 713-600-6801

Section  
**C**  
 Exhibit  
**5**





Source: Esri, DigitalGlobe, GeoEye, IGN, USDA, USGS, AEX, Geoportals, AeroGRID, Stasista, and the GIS User Community



PROJECT NO: NTD13136  
 DATE CREATED: 04/15/2013  
 DATUM & COORDINATE SYSTEM: NAD83 State Plane (North Texas North Central)  
 FILE NAME: Overall\_align031313  
 PREPARED BY: RP



**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Overall Recommended Alignment**

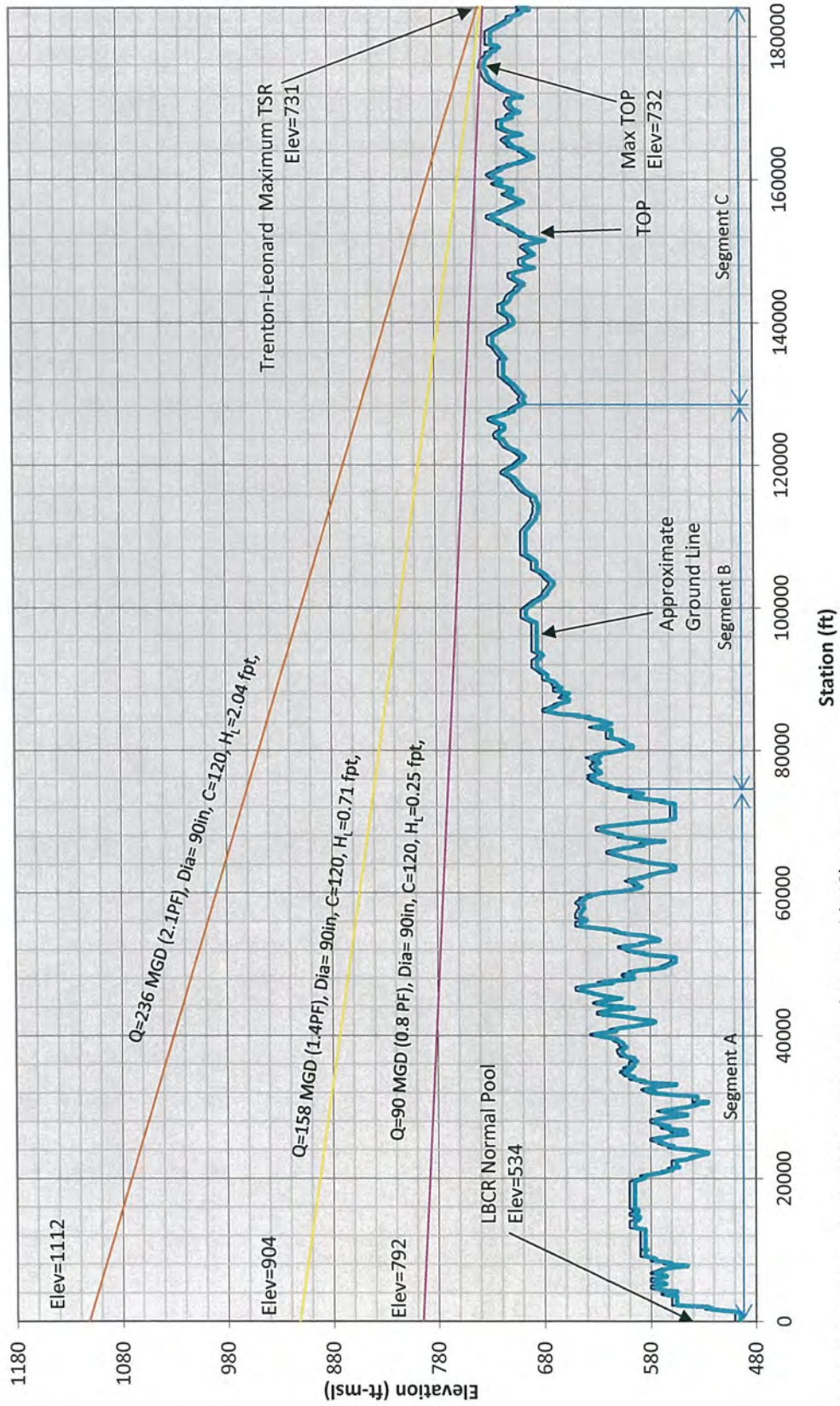
**FREES NICHOLS**  
 10457 TOWN AND COUNTRY WAY  
 SUITE 600  
 HOUSTON, TEXAS 77024  
 P: 713-600-6800  
 F: 713-600-6801

**Overall Pipeline**  
**Exhibit**  
**2**



## **APPENDIX B HYDRAULICS DATA**

**90" Raw Water Pipeline  
Lower Bois d'Arc Reservoir to Leonard WTP Site  
TSR Site 1, Max WSE (El. 731)**

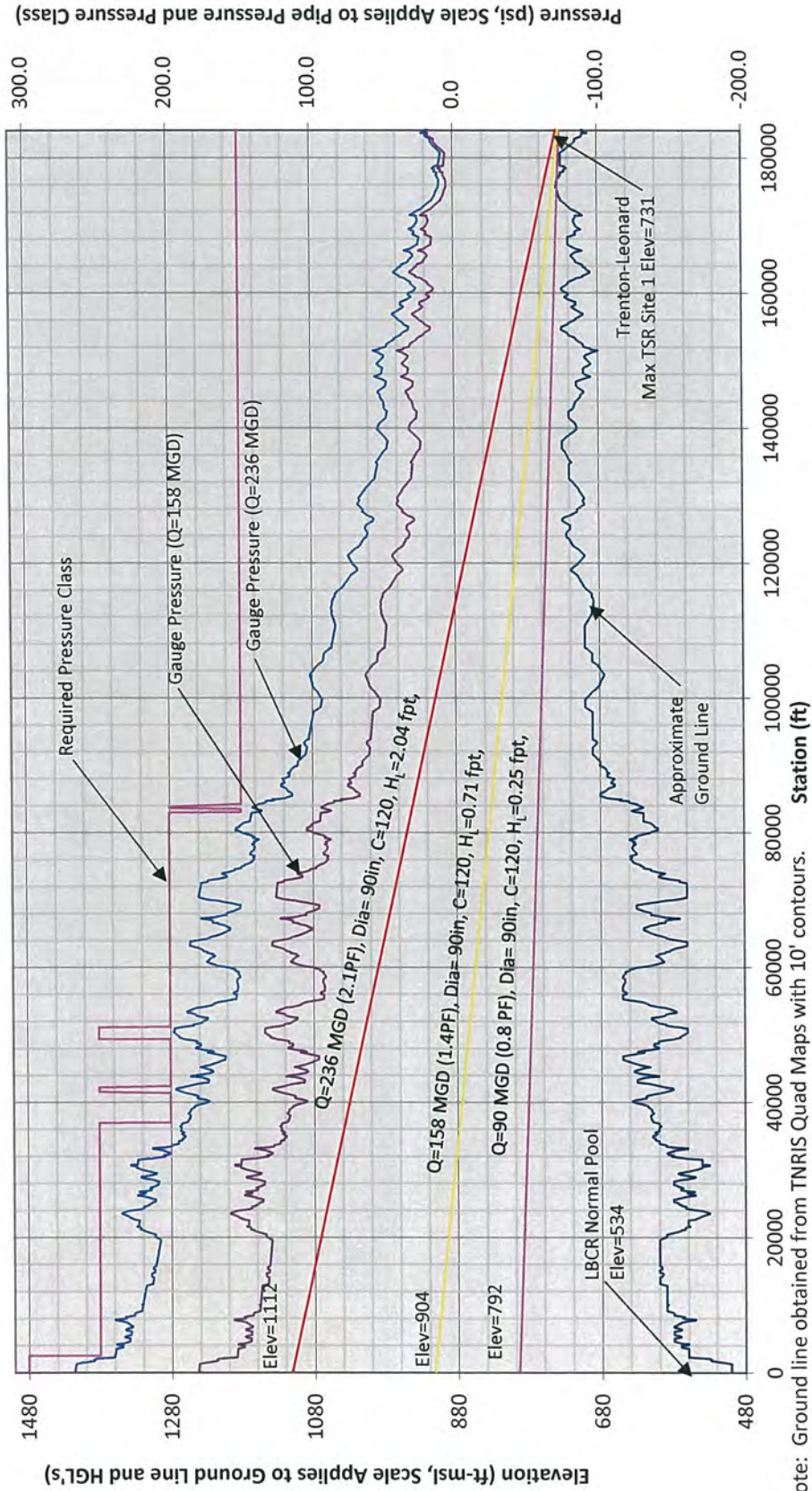


Note: Ground line obtained from TNRS Quad Maps with 10' contours.



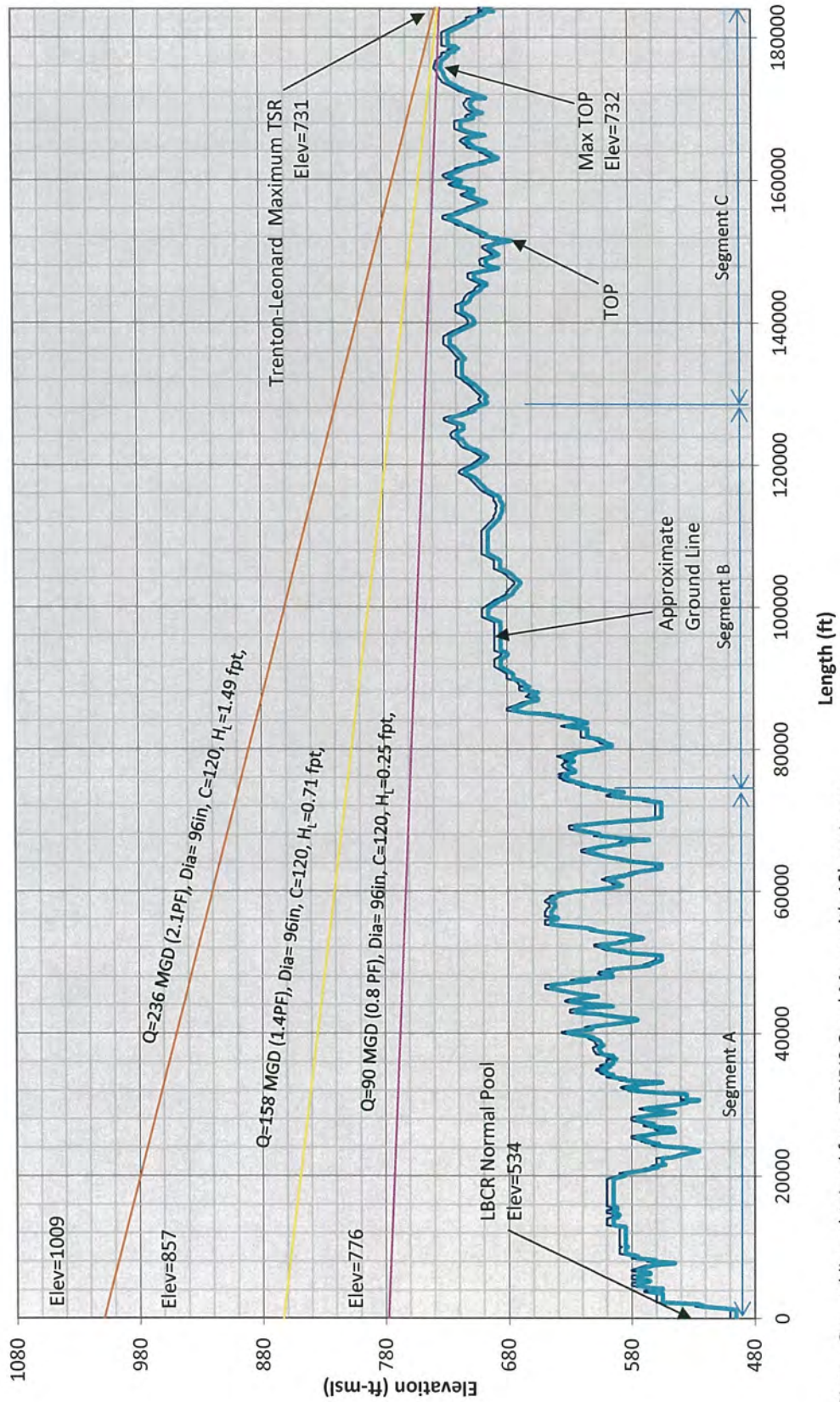
**90" Raw Water Pipeline  
Lower Bois d'Arc Reservoir to Leonard WTP Site  
TSR Site 1, Max WSE (El. 731)**

Pipe Class Lengths:  
(Q=236 MGD)  
300 psi: 2,500ft  
250 psi: 37,100ft  
200 psi: 43,700ft  
150 psi: 103,800 ft



Note: Ground line obtained from TNRIS Quad Maps with 10' contours.  
NTMWD Minimum pipe class is 150 psi

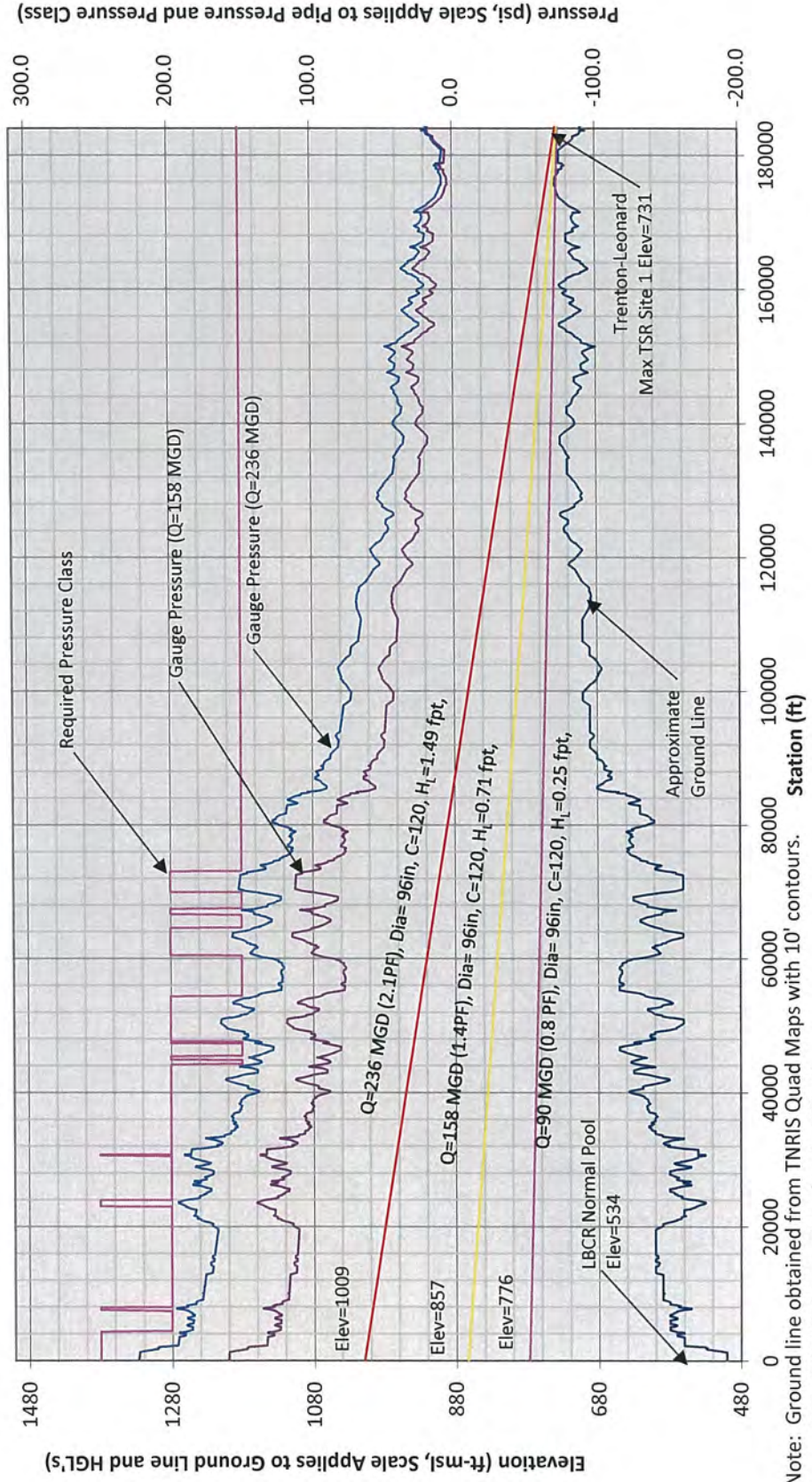
**96" Raw Water Pipeline  
Lower Bois d'Arc Reservoir to Leonard WTP Site  
TSR Site 1, Max WSE (El. 731)**



Note: Ground line obtained from TNRIS Quad Maps with 10' contours.

**96" Raw Water Pipeline  
Lower Bois d'Arc Reservoir to Leonard WTP Site  
TSR Site 1, Max WSE (EI. 731)**

**Pipe Class Lengths:**  
(Q=236 MGD)  
300 psi: 0ft  
250 psi: 6050ft  
200 psi: 53,650ft  
150 psi: 127,400 ft



Note: Ground line obtained from TNRS Quad Maps with 10' contours.  
NTMWD Minimum pipe class is 150 psi

**North Texas Municipal Water District**  
**Lower Bois d'Arc Creek Reservoir Water Supply Project**  
**Pipeline Diameter Optimization**  
**Terminal Storage Reservoir Site 1**

**Assumptions:**

Raw Water Pipeline  
 1.4 PF (158 MGD) for  $\longrightarrow$  4 months  
 0.8 PF (90 MGD) for  $\longrightarrow$  8 months  
 Average Flow (MGD) 110

Parameters	Pipe Diameter					
	78	84	90	96	102	108
<b>Peak Flow Velocity Check</b>						
Peak Flow, MGD (2.145 PF)	236	236	236	236	236	236
Peak Velocity, fps	10.85	9.44	8.23	7.23	6.40	5.71
<b>Design Flows</b>						
1.4 PF Flow, MGD	158	158	158	158	158	158
1.4 PF Velocity, fps	7	6.32	5.51	5	4	4
0.8 PF Flow, MGD	90	90	90	90	90	90
0.8 PF Velocity, fps	4.18	3.60	3.14	2.76	2.44	2.18
<b>Elevation Data</b>						
Max. Site 2 TSR Elev, ft-msl	731	731	731	731	731	731
LBCR Normal Lake Elev, ft-msl	534	534	534	534	534	534
<b>Pipe Data</b>						
Pressure Pipe Length, ft	187,605	187,605	187,605	187,605	187,605	187,605
Pipe Length, ft	187,605	187,605	187,605	187,605	187,605	187,605
H-W C Factor	120	120	120	120	120	120
<b>Pump Head Calculation (1.4 PF)</b>						
Static Head, ft	197	197	197	197	197	197
Friction Head, ft	366	256	183	133	99	75
Total Head, ft	563	453	380	330	296	272
<b>Pump Head Calculation (0.8 PF)</b>						
Static Head, ft	197	197	197	197	197	197
Friction Head, ft	129	90	64	47	35	27
Total Head, ft	326	287	261	244	232	224
<b>Power Required (1.4 PF)</b>						
Wire-to-Water Efficiency, %	75	74	75	75	75	75
Horsepower	20,838	16,961	14,041	12,220	10,960	10,068
kW	15,539	12,648	10,470	9,113	8,173	7,508
Days operating per year (3 mo)	90	89	90	90	90	90
Hours per year	2,160	2,136	2,160	2,160	2,160	2,160
kWh/yr	33,563,767	27,016,439	22,615,539	19,683,369	17,653,018	16,216,251
<b>Power Required (0.8 PF)</b>						
Wire-to-Water Efficiency, %	75	74	75	75	75	75
Horsepower	6,875	6,132	5,509	5,142	4,889	4,710
kW	5,127	4,573	4,108	3,835	3,646	3,512
Days operating per year (9 mo)	275	274	275	275	275	275
Hours per year	6,600	6,576	6,600	6,600	6,600	6,600
kWh/yr	33,838,313	30,070,454	27,110,833	25,309,069	24,061,457	23,178,590
<b>Pipe Cost (2021 Dollars)</b>	\$ 148,295,098	\$ 169,683,814	\$ 192,498,445	\$ 216,738,990	\$ 242,405,449	\$ 282,331,053
<b>Total Present Worth (50 yr LCCA)</b>	\$ 509,616,901	\$ 475,802,222	\$ 463,620,281	\$ 465,470,732	\$ 476,890,428	\$ 509,799,096

### Life Cycle Cost Analysis Variables

#### Assumed Variables

Lake Level	534
TSR Elevation	731
Static Head	197
Pipe Diameter (in)	78
Friction Factor, C	120
Pressure Pipe Length (ft)	187605
Peaking Factor 1	1.4
PF 1 Duration (Mo)	4
Peaking Factor 2	0.8
PF 2 Duration (Mo)	8

#### Power Variables

Electricity Cost (kW-hr)	\$	0.05
Run Time (PF 1, hrs)		2920
Run Time (PF 2, hrs)		5840
Pumping Efficiency		75%

#### Financial Variables

Bond Interest Rate	4.50%
Bond Term (yrs)	25
Discount Rate	5%
Inflation Rate	3%

#### Construction Cost

\$/dia-in/ft	\$	8.00
Construction Cost	\$	117,065,520.00
Inflated Const. Cost (2021 Dollars)	\$	148,295,098.30

Average		
Year	Sequence	Surface Water Delivered (MGD)
2021	8	40
2022	9	40
2023	10	40
2024	11	40
2025	12	40
2026	13	40
2027	14	50
2028	15	60
2029	16	70
2030	17	80
2031	18	88
2032	19	96
2033	20	104
2034	21	110
2035	22	110
2036	23	110
2037	24	110
2038	25	110
2039	26	110
2040	27	110
2041	28	110
2042	29	110
2043	30	110
2044	31	110
2045	32	110
2046	33	110
2047	34	110
2048	35	110
2049	36	110
2050	37	110
2051	38	110
2052	39	110
2053	40	110
2054	41	110
2055	42	110
2056	43	110
2057	44	110
2058	45	110
2059	46	110
2060	47	110
2061	48	110
2062	49	110
2063	50	110
2064	51	110
2065	52	110
2066	53	110
2067	54	110
2068	55	110
2069	56	110
2070	57	110

70 MGD WTP

Expand to 140 MGD WTP

Expand to 210 MGD WTP

Expand to 280 MGD WTP

Peak					
Surface Water Pumped (MGD)	Friction Head (ft)	Total Head (ft)	Power (kW)	Power Used (kW-hr)	Power Cost (\$)
56	54	251	3285	9591069	\$ 479,553.44
56	54	251	3285	9591069	\$ 479,553.44
56	54	251	3285	9591069	\$ 479,553.44
56	54	251	3285	9591069	\$ 479,553.44
56	54	251	3285	9591069	\$ 479,553.44
56	54	251	3285	9591069	\$ 479,553.44
70	81	278	4555	13299645	\$ 664,982.26
84	114	311	6105	17825250	\$ 891,262.50
98	151	348	7981	23304964	\$ 1,165,248.18
112	193	390	10230	29872447	\$ 1,493,622.33
123.2	231	428	12328	35997613	\$ 1,799,880.65
134.4	271	468	14715	42968545	\$ 2,148,427.23
145.6	314	511	17414	50850178	\$ 2,542,508.92
154	348	545	19657	57397657	\$ 2,869,882.85
154	348	545	19657	57397657	\$ 2,869,882.85
154	348	545	19657	57397657	\$ 2,869,882.85
154	348	545	19657	57397657	\$ 2,869,882.85
154	348	545	19657	57397657	\$ 2,869,882.85
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154	348	545	19657	57397657	\$ 2,869,882.85
154	348	545	19657	57397657	\$ 2,869,882.85
154	348	545	19657	57397657	\$ 2,869,882.85
154	348	545	19657	57397657	\$ 2,869,882.85

Off-Peak					
Surface Water Pumped (MGD)	Friction Head (ft)	Total Head (ft)	Power (kW)	Power Used (kW-hr)	Power Cost (\$)
32	19	216	1618	4724491	\$ 236,224.55
32	19	216	1618	4724491	\$ 236,224.55
32	19	216	1618	4724491	\$ 236,224.55
32	19	216	1618	4724491	\$ 236,224.55
32	19	216	1618	4724491	\$ 236,224.55
32	19	216	1618	4724491	\$ 236,224.55
40	29	226	2114	6171613	\$ 308,580.67
48	40	237	2666	7784533	\$ 389,226.67
56	54	251	3285	9591069	\$ 479,553.44
64	69	266	3979	11618343	\$ 580,917.14
70	82	279	4595	13416949	\$ 670,847.43
77	96	293	5270	15387184	\$ 769,359.19
83	112	309	6008	17542226	\$ 877,111.29
88	124	321	6605	19287621	\$ 964,381.04
88	124	321	6605	19287621	\$ 964,381.04
88	124	321	6605	19287621	\$ 964,381.04
88	124	321	6605	19287621	\$ 964,381.04
88	124	321	6605	19287621	\$ 964,381.04
88	124	321	6605	19287621	\$ 964,381.04
88	124	321	6605	19287621	\$ 964,381.04
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88	124	321	6605	19287621	\$ 964,381.04
88	124	321	6605	19287621	\$ 964,381.04
88	124	321	6605	19287621	\$ 964,381.04
88	124	321	6605	19287621	\$ 964,381.04
88	124	321	6605	19287621	\$ 964,381.04

<b>Total Cost</b>				
<b>Total Power</b>	<b>Inflated Power</b>	<b>Debt Service</b>	<b>Total Cost</b>	<b>Present Worth</b>
<b>Cost (\$)</b>	<b>Cost (\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
715,777.99	\$ 906,726.14	\$10,001,000.00	\$ 10,907,726.14	\$ 7,382,778.40
715,777.99	\$ 933,927.93	\$10,001,000.00	\$ 10,934,927.93	\$ 7,401,189.64
\$ 715,777.99	\$ 961,945.76	\$10,001,000.00	\$ 10,962,945.76	\$ 7,420,153.22
\$ 715,777.99	\$ 990,804.14	\$10,001,000.00	\$ 10,991,804.14	\$ 7,439,685.70
\$ 715,777.99	\$ 1,020,528.26	\$10,001,000.00	\$ 11,021,528.26	\$ 7,459,804.16
\$ 715,777.99	\$ 1,051,144.11	\$10,001,000.00	\$ 11,052,144.11	\$ 7,480,526.17
\$ 973,562.93	\$ 1,472,601.29	\$10,001,000.00	\$ 11,473,601.29	\$ 7,765,784.97
\$ 1,280,489.18	\$ 1,994,960.41	\$10,001,000.00	\$ 11,995,960.41	\$ 8,119,338.19
\$ 1,644,801.62	\$ 2,639,423.76	\$10,001,000.00	\$ 12,640,423.76	\$ 8,555,536.35
\$ 2,074,539.47	\$ 3,428,897.65	\$10,001,000.00	\$ 13,429,897.65	\$ 9,089,883.36
\$ 2,470,728.08	\$ 4,206,249.17	\$10,001,000.00	\$ 14,207,249.17	\$ 9,616,025.46
\$ 2,917,786.42	\$ 5,116,356.16	\$10,001,000.00	\$ 15,117,356.16	\$ 10,232,021.70
\$ 3,419,620.21	\$ 6,176,214.47	\$10,001,000.00	\$ 16,177,214.47	\$ 10,949,375.52
\$ 3,834,263.89	\$ 7,132,860.30	\$10,001,000.00	\$ 17,133,860.30	\$ 11,596,871.08
\$ 3,834,263.89	\$ 7,346,846.11	\$10,001,000.00	\$ 17,347,846.11	\$ 11,741,705.10
\$ 3,834,263.89	\$ 7,567,251.50	\$10,001,000.00	\$ 17,568,251.50	\$ 11,890,884.13
\$ 3,834,263.89	\$ 7,794,269.04	\$10,001,000.00	\$ 17,795,269.04	\$ 12,044,538.54
\$ 3,834,263.89	\$ 8,028,097.11	\$10,001,000.00	\$ 18,029,097.11	\$ 12,202,802.59
\$ 3,834,263.89	\$ 8,268,940.03	\$10,001,000.00	\$ 18,269,940.03	\$ 12,365,814.55
\$ 3,834,263.89	\$ 8,517,008.23	\$10,001,000.00	\$ 18,518,008.23	\$ 12,533,716.87
\$ 3,834,263.89	\$ 8,772,518.47	\$10,001,000.00	\$ 18,773,518.47	\$ 12,706,656.27
\$ 3,834,263.89	\$ 9,035,694.03	\$10,001,000.00	\$ 19,036,694.03	\$ 12,884,783.84
\$ 3,834,263.89	\$ 9,306,764.85	\$10,001,000.00	\$ 19,307,764.85	\$ 13,068,255.24
\$ 3,834,263.89	\$ 9,585,967.79	\$10,001,000.00	\$ 19,586,967.79	\$ 13,257,230.79
\$ 3,834,263.89	\$ 9,873,546.83	\$10,001,000.00	\$ 19,874,546.83	\$ 13,451,875.59
\$ 3,834,263.89	\$ 10,169,753.23	\$0.00	\$ 10,169,753.23	\$ 6,883,289.29
\$ 3,834,263.89	\$ 10,474,845.83	\$0.00	\$ 10,474,845.83	\$ 7,089,787.97
\$ 3,834,263.89	\$ 10,789,091.20	\$0.00	\$ 10,789,091.20	\$ 7,302,481.61
\$ 3,834,263.89	\$ 11,112,763.94	\$0.00	\$ 11,112,763.94	\$ 7,521,556.06
\$ 3,834,263.89	\$ 11,446,146.86	\$0.00	\$ 11,446,146.86	\$ 7,747,202.74
\$ 3,834,263.89	\$ 11,789,531.26	\$0.00	\$ 11,789,531.26	\$ 7,979,618.82
\$ 3,834,263.89	\$ 12,143,217.20	\$0.00	\$ 12,143,217.20	\$ 8,219,007.38
\$ 3,834,263.89	\$ 12,507,513.72	\$0.00	\$ 12,507,513.72	\$ 8,465,577.60
\$ 3,834,263.89	\$ 12,882,739.13	\$0.00	\$ 12,882,739.13	\$ 8,719,544.93
\$ 3,834,263.89	\$ 13,269,221.30	\$0.00	\$ 13,269,221.30	\$ 8,981,131.28
\$ 3,834,263.89	\$ 13,667,297.94	\$0.00	\$ 13,667,297.94	\$ 9,250,565.22
\$ 3,834,263.89	\$ 14,077,316.88	\$0.00	\$ 14,077,316.88	\$ 9,528,082.18
\$ 3,834,263.89	\$ 14,499,636.39	\$0.00	\$ 14,499,636.39	\$ 9,813,924.64
\$ 3,834,263.89	\$ 14,934,625.48	\$0.00	\$ 14,934,625.48	\$ 10,108,342.38
\$ 3,834,263.89	\$ 15,382,664.24	\$0.00	\$ 15,382,664.24	\$ 10,411,592.65
\$ 3,834,263.89	\$ 15,844,144.17	\$0.00	\$ 15,844,144.17	\$ 10,723,940.43
\$ 3,834,263.89	\$ 16,319,468.49	\$0.00	\$ 16,319,468.49	\$ 11,045,658.64
\$ 3,834,263.89	\$ 16,809,052.55	\$0.00	\$ 16,809,052.55	\$ 11,377,028.40
\$ 3,834,263.89	\$ 17,313,324.13	\$0.00	\$ 17,313,324.13	\$ 11,718,339.26
\$ 3,834,263.89	\$ 17,832,723.85	\$0.00	\$ 17,832,723.85	\$ 12,069,889.43
\$ 3,834,263.89	\$ 18,367,705.57	\$0.00	\$ 18,367,705.57	\$ 12,431,986.12
\$ 3,834,263.89	\$ 18,918,736.73	\$0.00	\$ 18,918,736.73	\$ 12,804,945.70
\$ 3,834,263.89	\$ 19,486,298.83	\$0.00	\$ 19,486,298.83	\$ 13,189,094.07
\$ 3,834,263.89	\$ 20,070,887.80	\$0.00	\$ 20,070,887.80	\$ 13,584,766.89
\$ 3,834,263.89	\$ 20,673,014.43	\$0.00	\$ 20,673,014.43	\$ 13,992,309.90
<b>Total</b>			<b>\$ 752,936,264.68</b>	<b>\$ 509,616,901.03</b>



**Life Cycle Cost Analysis Variables**

**Assumed Variables**

Lake Level	534
TSR Elevation	731
Static Head	197
Pipe Diameter (in)	84
Friction Factor, C	120
Pressure Pipe Length (ft)	187605
Peaking Factor 1	1.4
PF 1 Duration (Mo)	4
Peaking Factor 2	0.8
PF 2 Duration (Mo)	8

**Power Variables**

Electricity Cost (kW-hr)	\$	0.05
Run Time (PF 1, hrs)		2920
Run Time (PF 2, hrs)		5840
Pumping Efficiency		75%

**Financial Variables**

Bond Interest Rate		4.50%
Bond Term (yrs)		25
Discount Rate		5%
Inflation Rate		3%

**Construction Cost**

\$/dia-in/ft	\$	8.50
Construction Cost	\$	133,949,970.00
Inflated Const. Cost (2021 Dollars)	\$	169,683,814.40

Average		
Year	Sequence	Surface Water Delivered (MGD)
2021	8	40
2022	9	40
2023	10	40
2024	11	40
2025	12	40
2026	13	40
2027	14	50
2028	15	60
2029	16	70
2030	17	80
2031	18	88
2032	19	96
2033	20	104
2034	21	110
2035	22	110
2036	23	110
2037	24	110
2038	25	110
2039	26	110
2040	27	110
2041	28	110
2042	29	110
2043	30	110
2044	31	110
2045	32	110
2046	33	110
2047	34	110
2048	35	110
2049	36	110
2050	37	110
2051	38	110
2052	39	110
2053	40	110
2054	41	110
2055	42	110
2056	43	110
2057	44	110
2058	45	110
2059	46	110
2060	47	110
2061	48	110
2062	49	110
2063	50	110
2064	51	110
2065	52	110
2066	53	110
2067	54	110
2068	55	110
2069	56	110
2070	57	110

70 MGD WTP

Expand to 140 MGD WTP

Expand to 210 MGD WTP

Expand to 280 MGD WTP

Peak					
Surface Water Pumped (MGD)	Friction Head (ft)	Total Head (ft)	Power (kW)	Power Used (kW-hr)	Power Cost (\$)
56	37	234	3072	8969440	\$ 448,472.02
56	37	234	3072	8969440	\$ 448,472.02
56	37	234	3072	8969440	\$ 448,472.02
56	37	234	3072	8969440	\$ 448,472.02
56	37	234	3072	8969440	\$ 448,472.02
56	37	234	3072	8969440	\$ 448,472.02
70	56	253	4153	12125493	\$ 606,274.65
84	79	276	5428	15851051	\$ 792,552.55
98	105	302	6932	20241665	\$ 1,012,083.26
112	135	332	8695	25390503	\$ 1,269,525.17
123.2	161	358	10314	30116825	\$ 1,505,841.26
134.4	189	386	12134	35432683	\$ 1,771,634.16
145.6	219	416	14172	41383341	\$ 2,069,167.06
154	243	440	15853	46289832	\$ 2,314,491.59
154	243	440	15853	46289832	\$ 2,314,491.59
154	243	440	15853	46289832	\$ 2,314,491.59
154	243	440	15853	46289832	\$ 2,314,491.59
154	243	440	15853	46289832	\$ 2,314,491.59
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154	243	440	15853	46289832	\$ 2,314,491.59
154	243	440	15853	46289832	\$ 2,314,491.59
154	243	440	15853	46289832	\$ 2,314,491.59
154	243	440	15853	46289832	\$ 2,314,491.59

Off-Peak					
Surface Water Pumped (MGD)	Friction Head (ft)	Total Head (ft)	Power (kW)	Power Used (kW-hr)	Power Cost (\$)
32	13	210	1575	4598345	\$ 229,917.26
32	13	210	1575	4598345	\$ 229,917.26
32	13	210	1575	4598345	\$ 229,917.26
32	13	210	1575	4598345	\$ 229,917.26
32	13	210	1575	4598345	\$ 229,917.26
32	13	210	1575	4598345	\$ 229,917.26
40	20	217	2032	5933345	\$ 296,667.26
48	28	225	2529	7383914	\$ 369,195.68
56	37	234	3072	8969440	\$ 448,472.02
64	48	245	3667	10708832	\$ 535,441.60
70	57	254	4186	12223573	\$ 611,178.67
77	67	264	4746	13857948	\$ 692,897.40
83	78	275	5350	15621141	\$ 781,057.06
88	86	283	5833	17033534	\$ 851,676.70
88	86	283	5833	17033534	\$ 851,676.70
88	86	283	5833	17033534	\$ 851,676.70
88	86	283	5833	17033534	\$ 851,676.70
88	86	283	5833	17033534	\$ 851,676.70
88	86	283	5833	17033534	\$ 851,676.70
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88	86	283	5833	17033534	\$ 851,676.70
88	86	283	5833	17033534	\$ 851,676.70
88	86	283	5833	17033534	\$ 851,676.70
88	86	283	5833	17033534	\$ 851,676.70
88	86	283	5833	17033534	\$ 851,676.70

<b>Total Cost</b>				
<b>Total Power</b>	<b>Inflated Power</b>	<b>Debt Service</b>	<b>Total Cost</b>	<b>Present Worth</b>
<b>Cost (\$)</b>	<b>Cost (\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
678,389.28	\$ 859,363.25	\$11,443,000.00	\$ 12,302,363.25	\$ 8,326,723.69
678,389.28	\$ 885,144.15	\$11,443,000.00	\$ 12,328,144.15	\$ 8,344,173.22
\$ 678,389.28	\$ 911,698.47	\$11,443,000.00	\$ 12,354,698.47	\$ 8,362,146.23
\$ 678,389.28	\$ 939,049.42	\$11,443,000.00	\$ 12,382,049.42	\$ 8,380,658.43
\$ 678,389.28	\$ 967,220.91	\$11,443,000.00	\$ 12,410,220.91	\$ 8,399,726.00
\$ 678,389.28	\$ 996,237.53	\$11,443,000.00	\$ 12,439,237.53	\$ 8,419,365.60
\$ 902,941.91	\$ 1,365,780.66	\$11,443,000.00	\$ 12,808,780.66	\$ 8,669,486.93
\$ 1,161,748.23	\$ 1,809,965.88	\$11,443,000.00	\$ 13,252,965.88	\$ 8,970,128.97
\$ 1,460,555.28	\$ 2,343,762.47	\$11,443,000.00	\$ 13,786,762.47	\$ 9,331,423.51
\$ 1,804,966.76	\$ 2,983,335.04	\$11,443,000.00	\$ 14,426,335.04	\$ 9,764,311.41
\$ 2,117,019.92	\$ 3,604,084.71	\$11,443,000.00	\$ 15,047,084.71	\$ 10,184,459.22
\$ 2,464,531.56	\$ 4,321,571.01	\$11,443,000.00	\$ 15,764,571.01	\$ 10,670,082.19
\$ 2,850,224.12	\$ 5,147,821.81	\$11,443,000.00	\$ 16,590,821.81	\$ 11,229,321.25
\$ 3,166,168.29	\$ 5,890,005.69	\$11,443,000.00	\$ 17,333,005.69	\$ 11,731,660.51
\$ 3,166,168.29	\$ 6,066,705.86	\$11,443,000.00	\$ 17,509,705.86	\$ 11,851,258.14
\$ 3,166,168.29	\$ 6,248,707.04	\$11,443,000.00	\$ 17,691,707.04	\$ 11,974,443.70
\$ 3,166,168.29	\$ 6,436,168.25	\$11,443,000.00	\$ 17,879,168.25	\$ 12,101,324.83
\$ 3,166,168.29	\$ 6,629,253.29	\$11,443,000.00	\$ 18,072,253.29	\$ 12,232,012.39
\$ 3,166,168.29	\$ 6,828,130.89	\$11,443,000.00	\$ 18,271,130.89	\$ 12,366,620.58
\$ 3,166,168.29	\$ 7,032,974.82	\$11,443,000.00	\$ 18,475,974.82	\$ 12,505,267.01
\$ 3,166,168.29	\$ 7,243,964.06	\$11,443,000.00	\$ 18,686,964.06	\$ 12,648,072.84
\$ 3,166,168.29	\$ 7,461,282.99	\$11,443,000.00	\$ 18,904,282.99	\$ 12,795,162.84
\$ 3,166,168.29	\$ 7,685,121.48	\$11,443,000.00	\$ 19,128,121.48	\$ 12,946,665.54
\$ 3,166,168.29	\$ 7,915,675.12	\$11,443,000.00	\$ 19,358,675.12	\$ 13,102,713.32
\$ 3,166,168.29	\$ 8,153,145.37	\$11,443,000.00	\$ 19,596,145.37	\$ 13,263,442.53
\$ 3,166,168.29	\$ 8,397,739.73	\$0.00	\$ 8,397,739.73	\$ 5,683,920.80
\$ 3,166,168.29	\$ 8,649,671.93	\$0.00	\$ 8,649,671.93	\$ 5,854,438.43
\$ 3,166,168.29	\$ 8,909,162.08	\$0.00	\$ 8,909,162.08	\$ 6,030,071.58
\$ 3,166,168.29	\$ 9,176,436.95	\$0.00	\$ 9,176,436.95	\$ 6,210,973.73
\$ 3,166,168.29	\$ 9,451,730.06	\$0.00	\$ 9,451,730.06	\$ 6,397,302.94
\$ 3,166,168.29	\$ 9,735,281.96	\$0.00	\$ 9,735,281.96	\$ 6,589,222.03
\$ 3,166,168.29	\$ 10,027,340.42	\$0.00	\$ 10,027,340.42	\$ 6,786,898.69
\$ 3,166,168.29	\$ 10,328,160.63	\$0.00	\$ 10,328,160.63	\$ 6,990,505.65
\$ 3,166,168.29	\$ 10,638,005.45	\$0.00	\$ 10,638,005.45	\$ 7,200,220.82
\$ 3,166,168.29	\$ 10,957,145.61	\$0.00	\$ 10,957,145.61	\$ 7,416,227.44
\$ 3,166,168.29	\$ 11,285,859.98	\$0.00	\$ 11,285,859.98	\$ 7,638,714.27
\$ 3,166,168.29	\$ 11,624,435.78	\$0.00	\$ 11,624,435.78	\$ 7,867,875.70
\$ 3,166,168.29	\$ 11,973,168.85	\$0.00	\$ 11,973,168.85	\$ 8,103,911.97
\$ 3,166,168.29	\$ 12,332,363.92	\$0.00	\$ 12,332,363.92	\$ 8,347,029.33
\$ 3,166,168.29	\$ 12,702,334.83	\$0.00	\$ 12,702,334.83	\$ 8,597,440.21
\$ 3,166,168.29	\$ 13,083,404.88	\$0.00	\$ 13,083,404.88	\$ 8,855,363.41
\$ 3,166,168.29	\$ 13,475,907.03	\$0.00	\$ 13,475,907.03	\$ 9,121,024.31
\$ 3,166,168.29	\$ 13,880,184.24	\$0.00	\$ 13,880,184.24	\$ 9,394,655.04
\$ 3,166,168.29	\$ 14,296,589.76	\$0.00	\$ 14,296,589.76	\$ 9,676,494.69
\$ 3,166,168.29	\$ 14,725,487.46	\$0.00	\$ 14,725,487.46	\$ 9,966,789.54
\$ 3,166,168.29	\$ 15,167,252.08	\$0.00	\$ 15,167,252.08	\$ 10,265,793.22
\$ 3,166,168.29	\$ 15,622,269.64	\$0.00	\$ 15,622,269.64	\$ 10,573,767.02
\$ 3,166,168.29	\$ 16,090,937.73	\$0.00	\$ 16,090,937.73	\$ 10,890,980.03
\$ 3,166,168.29	\$ 16,573,665.86	\$0.00	\$ 16,573,665.86	\$ 11,217,709.43
\$ 3,166,168.29	\$ 17,070,875.84	\$0.00	\$ 17,070,875.84	\$ 11,554,240.71
<b>Total</b>			<b>\$ 702,976,582.85</b>	<b>\$ 475,802,221.85</b>

<b>Life Cycle Cost Analysis Variables</b>			
<b>Assumed Variables</b>			
Lake Level		534	
TSR Elevation		731	
Static Head		197	
Pipe Diameter (in)		90	
Friction Factor, C		120	
Pressure Pipe Length (ft)		187605	
Peaking Factor 1		1.4	
PF 1 Duration (Mo)		4	
Peaking Factor 2		0.8	
PF 2 Duration (Mo)		8	
<b>Power Variables</b>			
Electricity Cost (kW-hr)	\$	0.05	
Run Time (PF 1, hrs)		2920	
Run Time (PF 2, hrs)		5840	
Pumping Efficiency		75%	
<b>Financial Variables</b>			
Bond Interest Rate		4.50%	
Bond Term (yrs)		25	
Discount Rate		5%	
Inflation Rate		3%	
<b>Construction Cost</b>			
\$/dia-in/ft	\$	9.00	
Construction Cost	\$	151,960,050.00	
Inflated Const. Cost (2021 Dollars)	\$	192,498,444.91	

			<b>Average</b>		
	<b>Year</b>	<b>Sequence</b>	<b>Surface Water Delivered (MGD)</b>		
70 MGD WTP	2021	8			0
	2022	9			40
	2023	10			40
	2024	11			40
Expand to 140 MGD WTP	2025	12			40
	2026	13			40
	2027	14			50
	2028	15			60
Expand to 210 MGD WTP	2029	16			70
	2030	17			80
	2031	18			88
	2032	19			96
Expand to 280 MGD WTP	2033	20			104
	2034	21			110
	2035	22			110
	2036	23			110
	2037	24			110
	2038	25			110
	2039	26			110
	2040	27			110
	2041	28			110
	2042	29			110
	2043	30			110
	2044	31			110
	2045	32			110
	2046	33			110
	2047	34			110
2048	35			0	
2049	36			0	
2050	37			110	
2051	38			110	
2052	39			110	
2053	40			110	
2054	41			110	
2055	42			110	
2056	43			110	
2057	44			110	
2058	45			110	
2059	46			110	
2060	47			110	
2061	48			110	
2062	49			110	
2063	50			110	
2064	51			110	
2065	52			110	
2066	53			110	
2067	54			110	
2068	55			110	
2069	56			110	
2070	57			110	

<b>Peak</b>					
Surface Water Pumped (MGD)	Friction Head (ft)	Total Head (ft)	Power (kW)	Power Used (kW-hr)	Power Cost (\$)
56	27	224	2932	8561284	\$ 428,064.21
56	27	224	2932	8561284	\$ 428,064.21
56	27	224	2932	8561284	\$ 428,064.21
56	27	224	2932	8561284	\$ 428,064.21
56	27	224	2932	8561284	\$ 428,064.21
56	27	224	2932	8561284	\$ 428,064.21
70	40	237	3889	11354554	\$ 567,727.70
84	57	254	4985	14554807	\$ 727,740.37
98	75	272	6243	18230328	\$ 911,516.39
112	96	293	7688	22447695	\$ 1,122,384.75
123.2	115	312	8992	26255547	\$ 1,312,777.33
134.4	135	332	10440	30484696	\$ 1,524,234.82
145.6	156	353	12044	35167491	\$ 1,758,374.55
154	174	371	13355	38996522	\$ 1,949,826.09
154	174	371	13355	38996522	\$ 1,949,826.09
154	174	371	13355	38996522	\$ 1,949,826.09
154	174	371	13355	38996522	\$ 1,949,826.09
154	174	371	13355	38996522	\$ 1,949,826.09
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154	174	371	13355	38996522	\$ 1,949,826.09
154	174	371	13355	38996522	\$ 1,949,826.09
154	174	371	13355	38996522	\$ 1,949,826.09
154	174	371	13355	38996522	\$ 1,949,826.09



<b>Total Cost</b>				
<b>Total Power</b>	<b>Inflated Power</b>	<b>Debt Service</b>	<b>Total Cost</b>	<b>Present Worth</b>
<b>Cost (\$)</b>	<b>Cost (\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
653,840.16	\$ 828,265.15	\$12,982,000.00	\$ 13,810,265.15	\$ 9,347,331.05
653,840.16	\$ 853,113.10	\$12,982,000.00	\$ 13,835,113.10	\$ 9,364,149.13
\$ 653,840.16	\$ 878,706.49	\$12,982,000.00	\$ 13,860,706.49	\$ 9,381,471.74
\$ 653,840.16	\$ 905,067.69	\$12,982,000.00	\$ 13,887,067.69	\$ 9,399,314.04
\$ 653,840.16	\$ 932,219.72	\$12,982,000.00	\$ 13,914,219.72	\$ 9,417,691.60
\$ 653,840.16	\$ 960,186.31	\$12,982,000.00	\$ 13,942,186.31	\$ 9,436,620.49
\$ 856,572.71	\$ 1,295,643.08	\$12,982,000.00	\$ 14,277,643.08	\$ 9,663,670.84
\$ 1,083,783.86	\$ 1,688,499.94	\$12,982,000.00	\$ 14,670,499.94	\$ 9,929,571.82
\$ 1,339,580.60	\$ 2,149,633.61	\$12,982,000.00	\$ 15,131,633.61	\$ 10,241,685.24
\$ 1,627,967.46	\$ 2,690,782.17	\$12,982,000.00	\$ 15,672,782.17	\$ 10,607,955.88
\$ 1,884,777.96	\$ 3,208,708.31	\$12,982,000.00	\$ 16,190,708.31	\$ 10,958,508.68
\$ 2,166,928.02	\$ 3,799,721.39	\$12,982,000.00	\$ 16,781,721.39	\$ 11,358,529.60
\$ 2,476,363.18	\$ 4,472,587.35	\$12,982,000.00	\$ 17,454,587.35	\$ 11,813,951.77
\$ 2,727,502.02	\$ 5,073,957.21	\$12,982,000.00	\$ 18,055,957.21	\$ 12,220,982.56
\$ 2,727,502.02	\$ 5,226,175.93	\$12,982,000.00	\$ 18,208,175.93	\$ 12,324,010.18
\$ 2,727,502.02	\$ 5,382,961.21	\$12,982,000.00	\$ 18,364,961.21	\$ 12,430,128.63
\$ 2,727,502.02	\$ 5,544,450.04	\$12,982,000.00	\$ 18,526,450.04	\$ 12,539,430.63
\$ 2,727,502.02	\$ 5,710,783.54	\$12,982,000.00	\$ 18,692,783.54	\$ 12,652,011.69
\$ 2,727,502.02	\$ 5,882,107.05	\$12,982,000.00	\$ 18,864,107.05	\$ 12,767,970.18
\$ 2,727,502.02	\$ 6,058,570.26	\$12,982,000.00	\$ 19,040,570.26	\$ 12,887,407.43
\$ 2,727,502.02	\$ 6,240,327.37	\$12,982,000.00	\$ 19,222,327.37	\$ 13,010,427.79
\$ 2,727,502.02	\$ 6,427,537.19	\$12,982,000.00	\$ 19,409,537.19	\$ 13,137,138.77
\$ 2,727,502.02	\$ 6,620,363.31	\$12,982,000.00	\$ 19,602,363.31	\$ 13,267,651.07
\$ 2,727,502.02	\$ 6,818,974.20	\$12,982,000.00	\$ 19,800,974.20	\$ 13,402,078.75
\$ 2,727,502.02	\$ 7,023,543.43	\$12,982,000.00	\$ 20,005,543.43	\$ 13,540,539.25
\$ 2,727,502.02	\$ 7,234,249.73	\$0.00	\$ 7,234,249.73	\$ 4,896,424.97
\$ 2,727,502.02	\$ 7,451,277.23	\$0.00	\$ 7,451,277.23	\$ 5,043,317.72
\$ 2,727,502.02	\$ 7,674,815.54	\$0.00	\$ 7,674,815.54	\$ 5,194,617.26
\$ 2,727,502.02	\$ 7,905,060.01	\$0.00	\$ 7,905,060.01	\$ 5,350,455.77
\$ 2,727,502.02	\$ 8,142,211.81	\$0.00	\$ 8,142,211.81	\$ 5,510,969.45
\$ 2,727,502.02	\$ 8,386,478.16	\$0.00	\$ 8,386,478.16	\$ 5,676,298.53
\$ 2,727,502.02	\$ 8,638,072.51	\$0.00	\$ 8,638,072.51	\$ 5,846,587.49
\$ 2,727,502.02	\$ 8,897,214.68	\$0.00	\$ 8,897,214.68	\$ 6,021,985.11
\$ 2,727,502.02	\$ 9,164,131.12	\$0.00	\$ 9,164,131.12	\$ 6,202,644.66
\$ 2,727,502.02	\$ 9,439,055.06	\$0.00	\$ 9,439,055.06	\$ 6,388,724.00
\$ 2,727,502.02	\$ 9,722,226.71	\$0.00	\$ 9,722,226.71	\$ 6,580,385.72
\$ 2,727,502.02	\$ 10,013,893.51	\$0.00	\$ 10,013,893.51	\$ 6,777,797.29
\$ 2,727,502.02	\$ 10,314,310.32	\$0.00	\$ 10,314,310.32	\$ 6,981,131.21
\$ 2,727,502.02	\$ 10,623,739.63	\$0.00	\$ 10,623,739.63	\$ 7,190,565.15
\$ 2,727,502.02	\$ 10,942,451.81	\$0.00	\$ 10,942,451.81	\$ 7,406,282.10
\$ 2,727,502.02	\$ 11,270,725.37	\$0.00	\$ 11,270,725.37	\$ 7,628,470.57
\$ 2,727,502.02	\$ 11,608,847.13	\$0.00	\$ 11,608,847.13	\$ 7,857,324.68
\$ 2,727,502.02	\$ 11,957,112.54	\$0.00	\$ 11,957,112.54	\$ 8,093,044.43
\$ 2,727,502.02	\$ 12,315,825.92	\$0.00	\$ 12,315,825.92	\$ 8,335,835.76
\$ 2,727,502.02	\$ 12,685,300.70	\$0.00	\$ 12,685,300.70	\$ 8,585,910.83
\$ 2,727,502.02	\$ 13,065,859.72	\$0.00	\$ 13,065,859.72	\$ 8,843,488.16
\$ 2,727,502.02	\$ 13,457,835.51	\$0.00	\$ 13,457,835.51	\$ 9,108,792.80
\$ 2,727,502.02	\$ 13,861,570.57	\$0.00	\$ 13,861,570.57	\$ 9,382,056.58
\$ 2,727,502.02	\$ 14,277,417.69	\$0.00	\$ 14,277,417.69	\$ 9,663,518.28
\$ 2,727,502.02	\$ 14,705,740.22	\$0.00	\$ 14,705,740.22	\$ 9,953,423.83
<b>Total</b>			<b>\$ 684,978,308.26</b>	<b>\$ 463,620,281.17</b>



<b>Life Cycle Cost Analysis Variables</b>			
<b>Assumed Variables</b>			
Lake Level		534	
TSR Elevation		731	
Static Head		197	
Pipe Diameter (in)		96	
Friction Factor, C		120	
Pressure Pipe Length (ft)		187605	
Peaking Factor 1		1.4	
PF 1 Duration (Mo)		4	
Peaking Factor 2		0.8	
PF 2 Duration (Mo)		8	
<b>Power Variables</b>			
Electricity Cost (kW-hr)	\$	0.05	
Run Time (PF 1, hrs)		2920	
Run Time (PF 2, hrs)		5840	
Pumping Efficiency		75%	
<b>Financial Variables</b>			
Bond Interest Rate		4.50%	
Bond Term (yrs)		25	
Discount Rate		5%	
Inflation Rate		3%	
<b>Construction Cost</b>			
\$/dia-in/ft	\$	9.50	
Construction Cost	\$	171,095,760.00	
Inflated Const. Cost (2021 Dollars)	\$	216,738,989.82	

				<b>Average</b>		
				Year	Sequence	Surface Water Delivered (MGD)
70 MGD WTP				2021	8	40
				2022	9	40
				2023	10	40
				2024	11	40
				2025	12	40
Expand to 140 MGD WTP				2026	13	40
				2027	14	50
				2028	15	60
				2029	16	70
				2030	17	80
Expand to 210 MGD WTP				2031	18	88
				2032	19	96
				2033	20	104
				2034	21	110
	Expand to 280 MGD WTP				2035	22
				2036	23	110
				2037	24	110
				2038	25	110
				2039	26	110
			2040	27	110	
			2041	28	110	
			2042	29	110	
			2043	30	110	
			2044	31	110	
			2045	32	110	
			2046	33	110	
			2047	34	110	
			2048	35	110	
			2049	36	110	
			2050	37	110	
			2051	38	110	
			2052	39	110	
			2053	40	110	
			2054	41	110	
			2055	42	110	
			2056	43	110	
			2057	44	110	
			2058	45	110	
			2059	46	110	
			2060	47	110	
			2061	48	110	
			2062	49	110	
			2063	50	110	
			2064	51	110	
			2065	52	110	
			2066	53	110	
			2067	54	110	
			2068	55	110	
			2069	56	110	
			2070	57	110	

Peak					
Surface Water Pumped (MGD)	Friction Head (ft)	Total Head (ft)	Power (kW)	Power Used (kW-hr)	Power Cost (\$)
56	20	217	2838	8285623	\$ 414,281.13
56	20	217	2838	8285623	\$ 414,281.13
56	20	217	2838	8285623	\$ 414,281.13
56	20	217	2838	8285623	\$ 414,281.13
56	20	217	2838	8285623	\$ 414,281.13
56	20	217	2838	8285623	\$ 414,281.13
70	29	226	3710	10833876	\$ 541,693.78
84	41	238	4685	13679348	\$ 683,967.39
98	55	252	5778	16871906	\$ 843,595.32
112	70	267	7007	20460175	\$ 1,023,008.74
123.2	84	281	8099	23647708	\$ 1,182,385.40
134.4	99	296	9296	27142914	\$ 1,357,145.72
145.6	114	311	10606	30969417	\$ 1,548,470.84
154	127	324	11668	34070750	\$ 1,703,537.52
154	127	324	11668	34070750	\$ 1,703,537.52
154	127	324	11668	34070750	\$ 1,703,537.52
154	127	324	11668	34070750	\$ 1,703,537.52
154	127	324	11668	34070750	\$ 1,703,537.52
154	127	324	11668	34070750	\$ 1,703,537.52
154	127	324	11668	34070750	\$ 1,703,537.52
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154	127	324	11668	34070750	\$ 1,703,537.52
154	127	324	11668	34070750	\$ 1,703,537.52
154	127	324	11668	34070750	\$ 1,703,537.52
154	127	324	11668	34070750	\$ 1,703,537.52
154	127	324	11668	34070750	\$ 1,703,537.52
154	127	324	11668	34070750	\$ 1,703,537.52

<b>Off-Peak</b>					
Surface Water Pumped (MGD)	Friction Head (ft)	Total Head (ft)	Power (kW)	Power Used (kW-hr)	Power Cost (\$)
32	7	204	1527	4459580	\$ 222,978.98
32	7	204	1527	4459580	\$ 222,978.98
32	7	204	1527	4459580	\$ 222,978.98
32	7	204	1527	4459580	\$ 222,978.98
32	7	204	1527	4459580	\$ 222,978.98
40	10	207	1942	5671240	\$ 283,562.00
48	15	212	2378	6943215	\$ 347,160.73
56	20	217	2838	8285623	\$ 414,281.13
64	25	222	3325	9708331	\$ 485,416.56
70	30	227	3737	10910810	\$ 545,540.48
77	35	232	4170	12175723	\$ 608,786.17
83	41	238	4626	13507866	\$ 675,393.32
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
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88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14
88	45	242	4984	14553943	\$ 727,697.14

<b>Total Cost</b>				
Total Power	Inflated Power	Debt Service	Total Cost	Present Worth
Cost (\$)	Cost (\$)	(\$)	(\$)	(\$)
637,260.11	\$ 807,262.05	\$14,617,000.00	\$ 15,424,262.05	\$ 10,439,747.68
637,260.11	\$ 831,479.91	\$14,617,000.00	\$ 15,448,479.91	\$ 10,456,139.28
\$ 637,260.11	\$ 856,424.30	\$14,617,000.00	\$ 15,473,424.30	\$ 10,473,022.63
\$ 637,260.11	\$ 882,117.03	\$14,617,000.00	\$ 15,499,117.03	\$ 10,490,412.48
\$ 637,260.11	\$ 908,580.54	\$14,617,000.00	\$ 15,525,580.54	\$ 10,508,324.03
\$ 637,260.11	\$ 935,837.96	\$14,617,000.00	\$ 15,552,837.96	\$ 10,526,772.92
\$ 825,255.78	\$ 1,248,273.42	\$14,617,000.00	\$ 15,865,273.42	\$ 10,738,241.54
\$ 1,031,128.12	\$ 1,606,464.01	\$14,617,000.00	\$ 16,223,464.01	\$ 10,980,679.03
\$ 1,257,876.45	\$ 2,018,522.44	\$14,617,000.00	\$ 16,635,522.44	\$ 11,259,576.40
\$ 1,508,425.30	\$ 2,493,197.18	\$14,617,000.00	\$ 17,110,197.18	\$ 11,580,854.94
\$ 1,727,925.88	\$ 2,941,678.14	\$14,617,000.00	\$ 17,558,678.14	\$ 11,884,404.51
\$ 1,965,931.89	\$ 3,447,273.47	\$14,617,000.00	\$ 18,064,273.47	\$ 12,226,611.33
\$ 2,223,864.16	\$ 4,016,546.05	\$14,617,000.00	\$ 18,633,546.05	\$ 12,611,917.42
\$ 2,431,234.66	\$ 4,522,812.64	\$14,617,000.00	\$ 19,139,812.64	\$ 12,954,578.57
\$ 2,431,234.66	\$ 4,658,497.02	\$14,617,000.00	\$ 19,275,497.02	\$ 13,046,415.10
\$ 2,431,234.66	\$ 4,798,251.93	\$14,617,000.00	\$ 19,415,251.93	\$ 13,141,006.73
\$ 2,431,234.66	\$ 4,942,199.48	\$14,617,000.00	\$ 19,559,199.48	\$ 13,238,436.10
\$ 2,431,234.66	\$ 5,090,465.47	\$14,617,000.00	\$ 19,707,465.47	\$ 13,338,788.36
\$ 2,431,234.66	\$ 5,243,179.43	\$14,617,000.00	\$ 19,860,179.43	\$ 13,442,151.18
\$ 2,431,234.66	\$ 5,400,474.82	\$14,617,000.00	\$ 20,017,474.82	\$ 13,548,614.88
\$ 2,431,234.66	\$ 5,562,489.06	\$14,617,000.00	\$ 20,179,489.06	\$ 13,658,272.50
\$ 2,431,234.66	\$ 5,729,363.73	\$14,617,000.00	\$ 20,346,363.73	\$ 13,771,219.85
\$ 2,431,234.66	\$ 5,901,244.64	\$14,617,000.00	\$ 20,518,244.64	\$ 13,887,555.61
\$ 2,431,234.66	\$ 6,078,281.98	\$14,617,000.00	\$ 20,695,281.98	\$ 14,007,381.45
\$ 2,431,234.66	\$ 6,260,630.44	\$14,617,000.00	\$ 20,877,630.44	\$ 14,130,802.07
\$ 2,431,234.66	\$ 6,448,449.36	\$0.00	\$ 6,448,449.36	\$ 4,364,564.35
\$ 2,431,234.66	\$ 6,641,902.84	\$0.00	\$ 6,641,902.84	\$ 4,495,501.28
\$ 2,431,234.66	\$ 6,841,159.92	\$0.00	\$ 6,841,159.92	\$ 4,630,366.32
\$ 2,431,234.66	\$ 7,046,394.72	\$0.00	\$ 7,046,394.72	\$ 4,769,277.31
\$ 2,431,234.66	\$ 7,257,786.56	\$0.00	\$ 7,257,786.56	\$ 4,912,355.63
\$ 2,431,234.66	\$ 7,475,520.16	\$0.00	\$ 7,475,520.16	\$ 5,059,726.29
\$ 2,431,234.66	\$ 7,699,785.76	\$0.00	\$ 7,699,785.76	\$ 5,211,518.08
\$ 2,431,234.66	\$ 7,930,779.34	\$0.00	\$ 7,930,779.34	\$ 5,367,863.63
\$ 2,431,234.66	\$ 8,168,702.72	\$0.00	\$ 8,168,702.72	\$ 5,528,899.53
\$ 2,431,234.66	\$ 8,413,763.80	\$0.00	\$ 8,413,763.80	\$ 5,694,766.52
\$ 2,431,234.66	\$ 8,666,176.71	\$0.00	\$ 8,666,176.71	\$ 5,865,609.52
\$ 2,431,234.66	\$ 8,926,162.01	\$0.00	\$ 8,926,162.01	\$ 6,041,577.80
\$ 2,431,234.66	\$ 9,193,946.87	\$0.00	\$ 9,193,946.87	\$ 6,222,825.14
\$ 2,431,234.66	\$ 9,469,765.28	\$0.00	\$ 9,469,765.28	\$ 6,409,509.89
\$ 2,431,234.66	\$ 9,753,858.24	\$0.00	\$ 9,753,858.24	\$ 6,601,795.19
\$ 2,431,234.66	\$ 10,046,473.98	\$0.00	\$ 10,046,473.98	\$ 6,799,849.04
\$ 2,431,234.66	\$ 10,347,868.20	\$0.00	\$ 10,347,868.20	\$ 7,003,844.51
\$ 2,431,234.66	\$ 10,658,304.25	\$0.00	\$ 10,658,304.25	\$ 7,213,959.85
\$ 2,431,234.66	\$ 10,978,053.38	\$0.00	\$ 10,978,053.38	\$ 7,430,378.64
\$ 2,431,234.66	\$ 11,307,394.98	\$0.00	\$ 11,307,394.98	\$ 7,653,290.00
\$ 2,431,234.66	\$ 11,646,616.83	\$0.00	\$ 11,646,616.83	\$ 7,882,888.70
\$ 2,431,234.66	\$ 11,996,015.33	\$0.00	\$ 11,996,015.33	\$ 8,119,375.36
\$ 2,431,234.66	\$ 12,355,895.79	\$0.00	\$ 12,355,895.79	\$ 8,362,956.63
\$ 2,431,234.66	\$ 12,726,572.67	\$0.00	\$ 12,726,572.67	\$ 8,613,845.32
\$ 2,431,234.66	\$ 13,108,369.85	\$0.00	\$ 13,108,369.85	\$ 8,872,260.68
<b>Total</b>			<b>\$ 687,712,266.69</b>	<b>\$ 465,470,731.85</b>

### Life Cycle Cost Analysis Variables

#### Assumed Variables

Lake Level	534
TSR Elevation	731
Static Head	197
Pipe Diameter (in)	102
Friction Factor, C	120
Pressure Pipe Length (ft)	187605
Peaking Factor 1	1.4
PF 1 Duration (Mo)	4
Peaking Factor 2	0.8
PF 2 Duration (Mo)	8

#### Power Variables

Electricity Cost (kW-hr)	\$	0.05
Run Time (PF 1, hrs)		2920
Run Time (PF 2, hrs)		5840
Pumping Efficiency		75%

#### Financial Variables

Bond Interest Rate		4.50%
Bond Term (yrs)		25
Discount Rate		5%
Inflation Rate		3%

#### Construction Cost

\$/dia-in/ft	\$	10.00
Construction Cost	\$	191,357,100.00
Inflated Const. Cost (2021 Dollars)	\$	242,405,449.14

Average		
Year	Sequence	Surface Water Delivered (MGD)
2021	8	40
2022	9	40
2023	10	40
2024	11	40
2025	12	40
2026	13	40
2027	14	50
2028	15	60
2029	16	70
2030	17	80
2031	18	88
2032	19	96
2033	20	104
2034	21	110
2035	22	110
2036	23	110
2037	24	110
2038	25	110
2039	26	110
2040	27	110
2041	28	110
2042	29	110
2043	30	110
2044	31	110
2045	32	110
2046	33	110
2047	34	110
2048	35	110
2049	36	110
2050	37	110
2051	38	110
2052	39	110
2053	40	110
2054	41	110
2055	42	110
2056	43	110
2057	44	110
2058	45	110
2059	46	110
2060	47	110
2061	48	110
2062	49	110
2063	50	110
2064	51	110
2065	52	110
2066	53	110
2067	54	110
2068	55	110
2069	56	110
2070	57	110

70 MGD WTP

Expand to 140 MGD WTP

Expand to 210 MGD WTP

Expand to 280 MGD WTP

<b>Peak</b>					
Surface Water Pumped (MGD)	Friction Head (ft)	Total Head (ft)	Power (kW)	Power Used (kW-hr)	Power Cost (\$)
56	15	212	2772	8094798	\$ 404,739.88
56	15	212	2772	8094798	\$ 404,739.88
56	15	212	2772	8094798	\$ 404,739.88
56	15	212	2772	8094798	\$ 404,739.88
56	15	212	2772	8094798	\$ 404,739.88
56	15	212	2772	8094798	\$ 404,739.88
70	22	219	3587	10473439	\$ 523,671.95
84	31	228	4477	13073316	\$ 653,665.80
98	41	238	5456	15931547	\$ 796,577.37
112	52	249	6536	19084326	\$ 954,216.29
123.2	62	259	7480	21842447	\$ 1,092,122.36
134.4	73	270	8503	24829586	\$ 1,241,479.29
145.6	85	282	9611	28063325	\$ 1,403,166.25
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73
154	94	291	10500	30660915	\$ 1,533,045.73

<b>Off-Peak</b>					
Surface Water Pumped (MGD)	Friction Head (ft)	Total Head (ft)	Power (kW)	Power Used (kW-hr)	Power Cost (\$)
32	5	202	1514	4420856	\$ 221,042.80
32	5	202	1514	4420856	\$ 221,042.80
32	5	202	1514	4420856	\$ 221,042.80
32	5	202	1514	4420856	\$ 221,042.80
32	5	202	1514	4420856	\$ 221,042.80
32	5	202	1514	4420856	\$ 221,042.80
40	8	205	1917	5598097	\$ 279,904.87
48	11	208	2336	6820234	\$ 341,011.70
56	15	212	2772	8094798	\$ 404,739.88
64	19	216	3229	9429133	\$ 471,456.66
70	22	219	3611	10544472	\$ 527,223.60
77	26	223	4009	11706285	\$ 585,314.24
83	30	227	4424	12918140	\$ 645,906.98
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
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88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
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88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61
88	34	231	4747	13861992	\$ 693,099.61

<b>Total Cost</b>				
<b>Total Power</b>	<b>Inflated Power</b>	<b>Debt Service</b>	<b>Total Cost</b>	<b>Present Worth</b>
<b>Cost (\$)</b>	<b>Cost (\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
625,782.68	\$ 792,722.77	\$16,348,000.00	\$ 17,140,722.77	\$ 11,601,515.87
625,782.68	\$ 816,504.46	\$16,348,000.00	\$ 17,164,504.46	\$ 11,617,612.25
\$ 625,782.68	\$ 840,999.59	\$16,348,000.00	\$ 17,188,999.59	\$ 11,634,191.52
\$ 625,782.68	\$ 866,229.58	\$16,348,000.00	\$ 17,214,229.58	\$ 11,651,268.17
\$ 625,782.68	\$ 892,216.47	\$16,348,000.00	\$ 17,240,216.47	\$ 11,668,857.11
\$ 625,782.68	\$ 918,982.96	\$16,348,000.00	\$ 17,266,982.96	\$ 11,686,973.73
\$ 803,576.83	\$ 1,215,482.05	\$16,348,000.00	\$ 17,563,482.05	\$ 11,887,655.99
\$ 994,677.50	\$ 1,549,675.13	\$16,348,000.00	\$ 17,897,675.13	\$ 12,113,851.02
\$ 1,201,317.25	\$ 1,927,761.53	\$16,348,000.00	\$ 18,275,761.53	\$ 12,369,754.77
\$ 1,425,672.95	\$ 2,356,420.15	\$16,348,000.00	\$ 18,704,420.15	\$ 12,659,887.80
\$ 1,619,345.96	\$ 2,756,828.11	\$16,348,000.00	\$ 19,104,828.11	\$ 12,930,899.67
\$ 1,826,793.53	\$ 3,203,293.51	\$16,348,000.00	\$ 19,551,293.51	\$ 13,233,085.03
\$ 2,049,073.23	\$ 3,700,854.19	\$16,348,000.00	\$ 20,048,854.19	\$ 13,569,853.68
\$ 2,226,145.35	\$ 4,141,286.10	\$16,348,000.00	\$ 20,489,286.10	\$ 13,867,955.33
\$ 2,226,145.35	\$ 4,265,524.69	\$16,348,000.00	\$ 20,613,524.69	\$ 13,952,044.90
\$ 2,226,145.35	\$ 4,393,490.43	\$16,348,000.00	\$ 20,741,490.43	\$ 14,038,657.15
\$ 2,226,145.35	\$ 4,525,295.14	\$16,348,000.00	\$ 20,873,295.14	\$ 14,127,867.77
\$ 2,226,145.35	\$ 4,661,053.99	\$16,348,000.00	\$ 21,009,053.99	\$ 14,219,754.70
\$ 2,226,145.35	\$ 4,800,885.61	\$16,348,000.00	\$ 21,148,885.61	\$ 14,314,398.25
\$ 2,226,145.35	\$ 4,944,912.18	\$16,348,000.00	\$ 21,292,912.18	\$ 14,411,881.10
\$ 2,226,145.35	\$ 5,093,259.55	\$16,348,000.00	\$ 21,441,259.55	\$ 14,512,288.43
\$ 2,226,145.35	\$ 5,246,057.33	\$16,348,000.00	\$ 21,594,057.33	\$ 14,615,707.99
\$ 2,226,145.35	\$ 5,403,439.05	\$16,348,000.00	\$ 21,751,439.05	\$ 14,722,230.13
\$ 2,226,145.35	\$ 5,565,542.23	\$16,348,000.00	\$ 21,913,542.23	\$ 14,831,947.94
\$ 2,226,145.35	\$ 5,732,508.49	\$16,348,000.00	\$ 22,080,508.49	\$ 14,944,957.28
\$ 2,226,145.35	\$ 5,904,483.75	\$0.00	\$ 5,904,483.75	\$ 3,996,387.01
\$ 2,226,145.35	\$ 6,081,618.26	\$0.00	\$ 6,081,618.26	\$ 4,116,278.62
\$ 2,226,145.35	\$ 6,264,066.81	\$0.00	\$ 6,264,066.81	\$ 4,239,766.98
\$ 2,226,145.35	\$ 6,451,988.81	\$0.00	\$ 6,451,988.81	\$ 4,366,959.99
\$ 2,226,145.35	\$ 6,645,548.48	\$0.00	\$ 6,645,548.48	\$ 4,497,968.79
\$ 2,226,145.35	\$ 6,844,914.93	\$0.00	\$ 6,844,914.93	\$ 4,632,907.86
\$ 2,226,145.35	\$ 7,050,262.38	\$0.00	\$ 7,050,262.38	\$ 4,771,895.09
\$ 2,226,145.35	\$ 7,261,770.25	\$0.00	\$ 7,261,770.25	\$ 4,915,051.94
\$ 2,226,145.35	\$ 7,479,623.36	\$0.00	\$ 7,479,623.36	\$ 5,062,503.50
\$ 2,226,145.35	\$ 7,704,012.06	\$0.00	\$ 7,704,012.06	\$ 5,214,378.61
\$ 2,226,145.35	\$ 7,935,132.42	\$0.00	\$ 7,935,132.42	\$ 5,370,809.97
\$ 2,226,145.35	\$ 8,173,186.39	\$0.00	\$ 8,173,186.39	\$ 5,531,934.26
\$ 2,226,145.35	\$ 8,418,381.99	\$0.00	\$ 8,418,381.99	\$ 5,697,892.29
\$ 2,226,145.35	\$ 8,670,933.44	\$0.00	\$ 8,670,933.44	\$ 5,868,829.06
\$ 2,226,145.35	\$ 8,931,061.45	\$0.00	\$ 8,931,061.45	\$ 6,044,893.93
\$ 2,226,145.35	\$ 9,198,993.29	\$0.00	\$ 9,198,993.29	\$ 6,226,240.75
\$ 2,226,145.35	\$ 9,474,963.09	\$0.00	\$ 9,474,963.09	\$ 6,413,027.97
\$ 2,226,145.35	\$ 9,759,211.98	\$0.00	\$ 9,759,211.98	\$ 6,605,418.81
\$ 2,226,145.35	\$ 10,051,988.34	\$0.00	\$ 10,051,988.34	\$ 6,803,581.38
\$ 2,226,145.35	\$ 10,353,547.99	\$0.00	\$ 10,353,547.99	\$ 7,007,688.82
\$ 2,226,145.35	\$ 10,664,154.43	\$0.00	\$ 10,664,154.43	\$ 7,217,919.48
\$ 2,226,145.35	\$ 10,984,079.07	\$0.00	\$ 10,984,079.07	\$ 7,434,457.07
\$ 2,226,145.35	\$ 11,313,601.44	\$0.00	\$ 11,313,601.44	\$ 7,657,490.78
\$ 2,226,145.35	\$ 11,653,009.48	\$0.00	\$ 11,653,009.48	\$ 7,887,215.50
\$ 2,226,145.35	\$ 12,002,599.76	\$0.00	\$ 12,002,599.76	\$ 8,123,831.97
<b>Total</b>			<b>\$ 704,584,358.96</b>	<b>\$ 476,890,428.02</b>



### Life Cycle Cost Analysis Variables

#### Assumed Variables

Lake Level	534
TSR Elevation	731
Static Head	197
Pipe Diameter (in)	108
Friction Factor, C	120
Pressure Pipe Length (ft)	187605
Peaking Factor 1	1.4
PF 1 Duration (Mo)	4
Peaking Factor 2	0.8
PF 2 Duration (Mo)	8

#### Power Variables

Electricity Cost (kW-hr)	\$	0.05
Run Time (PF 1, hrs)		2920
Run Time (PF 2, hrs)		5840
Pumping Efficiency		75%

#### Financial Variables

Bond Interest Rate		4.50%
Bond Term (yrs)		25
Discount Rate		5%
Inflation Rate		3%

#### Construction Cost

\$/dia-in/ft	\$	11.00
Construction Cost	\$	222,874,740.00
Inflated Const. Cost (2021 Dollars)	\$	282,331,052.53

Average		
Year	Sequence	Surface Water Delivered (MGD)
2021	8	40
2022	9	40
2023	10	40
2024	11	40
2025	12	40
2026	13	40
2027	14	50
2028	15	60
2029	16	70
2030	17	80
2031	18	88
2032	19	96
2033	20	104
2034	21	110
2035	22	110
2036	23	110
2037	24	110
2038	25	110
2039	26	110
2040	27	110
2041	28	110
2042	29	110
2043	30	110
2044	31	110
2045	32	110
2046	33	110
2047	34	110
2048	35	110
2049	36	110
2050	37	110
2051	38	110
2052	39	110
2053	40	110
2054	41	110
2055	42	110
2056	43	110
2057	44	110
2058	45	110
2059	46	110
2060	47	110
2061	48	110
2062	49	110
2063	50	110
2064	51	110
2065	52	110
2066	53	110
2067	54	110
2068	55	110
2069	56	110
2070	57	110

70 MGD WTP

Expand to 140 MGD WTP

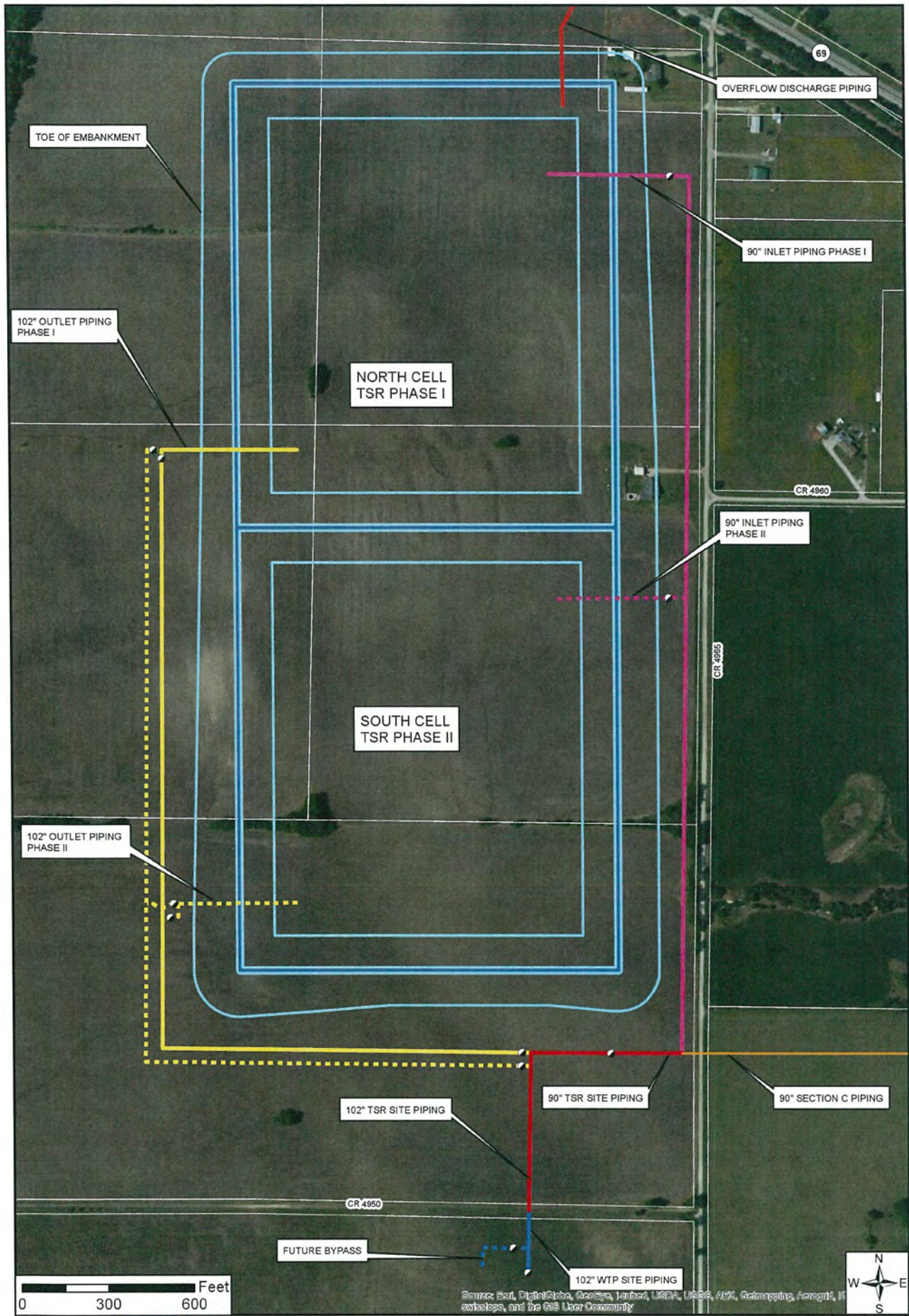
Expand to 210 MGD WTP

Expand to 280 MGD WTP

Peak					
Surface Water Pumped (MGD)	Friction Head (ft)	Total Head (ft)	Power (kW)	Power Used (kW-hr)	Power Cost (\$)
56	11	208	2726	7959797	\$ 397,989.86
56	11	208	2726	7959797	\$ 397,989.86
56	11	208	2726	7959797	\$ 397,989.86
56	11	208	2726	7959797	\$ 397,989.86
56	11	208	2726	7959797	\$ 397,989.86
56	11	208	2726	7959797	\$ 397,989.86
70	17	214	3499	10218446	\$ 510,922.29
84	23	220	4330	12644575	\$ 632,228.75
98	31	228	5228	15266284	\$ 763,314.21
112	40	237	6202	18110972	\$ 905,548.62
123.2	47	244	7043	20565304	\$ 1,028,265.19
134.4	56	253	7943	23193006	\$ 1,159,650.32
145.6	64	261	8907	26007391	\$ 1,300,369.57
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21
154	71	268	9674	28248604	\$ 1,412,430.21

<b>Off-Peak</b>					
Surface Water Pumped (MGD)	Friction Head (ft)	Total Head (ft)	Power (kW)	Power Used (kW-hr)	Power Cost (\$)
32	4	201	1505	4393461	\$ 219,673.03
32	4	201	1505	4393461	\$ 219,673.03
32	4	201	1505	4393461	\$ 219,673.03
32	4	201	1505	4393461	\$ 219,673.03
32	4	201	1505	4393461	\$ 219,673.03
32	4	201	1505	4393461	\$ 219,673.03
40	6	203	1899	5546352	\$ 277,317.61
48	8	205	2306	6733230	\$ 336,661.52
56	11	208	2726	7959797	\$ 397,989.86
64	14	211	3162	9231613	\$ 461,580.63
70	17	214	3522	10285304	\$ 514,265.20
77	20	217	3895	11374177	\$ 568,708.86
83	23	220	4281	12500934	\$ 625,046.68
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37
88	25	222	4580	13372467	\$ 668,623.37

<b>Total Cost</b>				
<b>Total Power</b>	<b>Inflated Power</b>	<b>Debt Service</b>	<b>Total Cost</b>	<b>Present Worth</b>
<b>Cost (\$)</b>	<b>Cost (\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
617,662.89	\$ 782,436.87	\$19,040,000.00	\$ 19,822,436.87	\$ 13,416,605.53
617,662.89	\$ 805,909.98	\$19,040,000.00	\$ 19,845,909.98	\$ 13,432,493.05
\$ 617,662.89	\$ 830,087.28	\$19,040,000.00	\$ 19,870,087.28	\$ 13,448,857.20
\$ 617,662.89	\$ 854,989.90	\$19,040,000.00	\$ 19,894,989.90	\$ 13,465,712.27
\$ 617,662.89	\$ 880,639.59	\$19,040,000.00	\$ 19,920,639.59	\$ 13,483,072.99
\$ 617,662.89	\$ 907,058.78	\$19,040,000.00	\$ 19,947,058.78	\$ 13,500,954.54
\$ 788,239.91	\$ 1,192,283.58	\$19,040,000.00	\$ 20,232,283.58	\$ 13,694,005.91
\$ 968,890.27	\$ 1,509,499.47	\$19,040,000.00	\$ 20,549,499.47	\$ 13,908,710.11
\$ 1,161,304.07	\$ 1,863,552.12	\$19,040,000.00	\$ 20,903,552.12	\$ 14,148,346.88
\$ 1,367,129.25	\$ 2,259,656.35	\$19,040,000.00	\$ 21,299,656.35	\$ 14,416,445.82
\$ 1,542,530.40	\$ 2,626,054.74	\$19,040,000.00	\$ 21,666,054.74	\$ 14,664,438.67
\$ 1,728,359.19	\$ 3,030,688.30	\$19,040,000.00	\$ 22,070,688.30	\$ 14,938,310.59
\$ 1,925,416.25	\$ 3,477,515.92	\$19,040,000.00	\$ 22,517,515.92	\$ 15,240,741.11
\$ 2,081,053.57	\$ 3,871,372.67	\$19,040,000.00	\$ 22,911,372.67	\$ 15,507,318.86
\$ 2,081,053.57	\$ 3,987,513.85	\$19,040,000.00	\$ 23,027,513.85	\$ 15,585,927.78
\$ 2,081,053.57	\$ 4,107,139.26	\$19,040,000.00	\$ 23,147,139.26	\$ 15,666,894.97
\$ 2,081,053.57	\$ 4,230,353.44	\$19,040,000.00	\$ 23,270,353.44	\$ 15,750,291.18
\$ 2,081,053.57	\$ 4,357,264.04	\$19,040,000.00	\$ 23,397,264.04	\$ 15,836,189.27
\$ 2,081,053.57	\$ 4,487,981.96	\$19,040,000.00	\$ 23,527,981.96	\$ 15,924,664.30
\$ 2,081,053.57	\$ 4,622,621.42	\$19,040,000.00	\$ 23,662,621.42	\$ 16,015,793.59
\$ 2,081,053.57	\$ 4,761,300.07	\$19,040,000.00	\$ 23,801,300.07	\$ 16,109,656.75
\$ 2,081,053.57	\$ 4,904,139.07	\$19,040,000.00	\$ 23,944,139.07	\$ 16,206,335.81
\$ 2,081,053.57	\$ 5,051,263.24	\$19,040,000.00	\$ 24,091,263.24	\$ 16,305,915.24
\$ 2,081,053.57	\$ 5,202,801.14	\$19,040,000.00	\$ 24,242,801.14	\$ 16,408,482.06
\$ 2,081,053.57	\$ 5,358,885.17	\$19,040,000.00	\$ 24,398,885.17	\$ 16,514,125.87
\$ 2,081,053.57	\$ 5,519,651.73	\$0.00	\$ 5,519,651.73	\$ 3,735,917.55
\$ 2,081,053.57	\$ 5,685,241.28	\$0.00	\$ 5,685,241.28	\$ 3,847,995.08
\$ 2,081,053.57	\$ 5,855,798.52	\$0.00	\$ 5,855,798.52	\$ 3,963,434.93
\$ 2,081,053.57	\$ 6,031,472.47	\$0.00	\$ 6,031,472.47	\$ 4,082,337.98
\$ 2,081,053.57	\$ 6,212,416.65	\$0.00	\$ 6,212,416.65	\$ 4,204,808.12
\$ 2,081,053.57	\$ 6,398,789.15	\$0.00	\$ 6,398,789.15	\$ 4,330,952.36
\$ 2,081,053.57	\$ 6,590,752.82	\$0.00	\$ 6,590,752.82	\$ 4,460,880.93
\$ 2,081,053.57	\$ 6,788,475.40	\$0.00	\$ 6,788,475.40	\$ 4,594,707.36
\$ 2,081,053.57	\$ 6,992,129.67	\$0.00	\$ 6,992,129.67	\$ 4,732,548.58
\$ 2,081,053.57	\$ 7,201,893.56	\$0.00	\$ 7,201,893.56	\$ 4,874,525.04
\$ 2,081,053.57	\$ 7,417,950.36	\$0.00	\$ 7,417,950.36	\$ 5,020,760.79
\$ 2,081,053.57	\$ 7,640,488.87	\$0.00	\$ 7,640,488.87	\$ 5,171,383.62
\$ 2,081,053.57	\$ 7,869,703.54	\$0.00	\$ 7,869,703.54	\$ 5,326,525.12
\$ 2,081,053.57	\$ 8,105,794.65	\$0.00	\$ 8,105,794.65	\$ 5,486,320.88
\$ 2,081,053.57	\$ 8,348,968.49	\$0.00	\$ 8,348,968.49	\$ 5,650,910.50
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\$ 2,081,053.57	\$ 9,123,143.29	\$0.00	\$ 9,123,143.29	\$ 6,174,902.48
\$ 2,081,053.57	\$ 9,396,837.59	\$0.00	\$ 9,396,837.59	\$ 6,360,149.56
\$ 2,081,053.57	\$ 9,678,742.71	\$0.00	\$ 9,678,742.71	\$ 6,550,954.04
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\$ 2,081,053.57	\$ 10,576,223.49	\$0.00	\$ 10,576,223.49	\$ 7,158,404.36
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\$ 2,081,053.57	\$ 11,220,315.50	\$0.00	\$ 11,220,315.50	\$ 7,594,351.18
<b>Total</b>			<b>\$ 753,205,449.46</b>	<b>\$ 509,799,095.89</b>



PROJECT NO.	N1917-20
DATE CREATED	04/11/2021
PROJECT & CONSULTANT NAMES	6403 State Place, Fort Worth, Texas 76104
D.L. NAME	TSR Piping v2
PREPARED BY	E.R.



**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Lower Bois d'Arc Creek Reservoir Raw Water Pipeline**  
**Terminal Storage Reservoir - Location 1**

**FRESE NICHOLS**  
 16097 TOWN AND COUNTRY WAY  
 SUITE 500  
 HOUSTON, TEXAS 77024  
 P: 713-600-6800  
 F: 713-600-6801

**TSR**  
**Exhibit**  
**1**

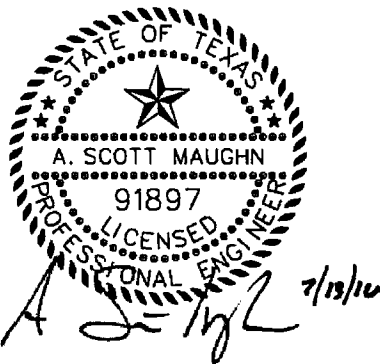
# LEONARD WTP TO MCKINNEY NO. 4 TREATED WATER PIPELINE

## Pipeline Corridor Selection Technical Memorandum

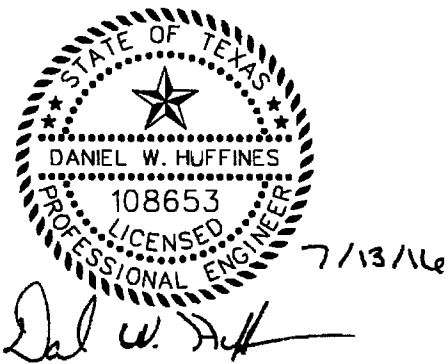
Prepared for:

### North Texas Municipal Water District

7-15-16



FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
ENGINEERING FIRM  
F-2144



FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
ENGINEERING FIRM  
F-2144

Prepared by:

**FREESE AND NICHOLS, INC.**  
2711 N. Haskell Avenue, Suite 3300  
Dallas, Texas 75204  
214-217-2200

**TO:** North Texas Municipal Water District

**CC:** Jeff Payne, PE; Clay Herndon, PE

**FROM:** Scott Maughn, PE; Daniel Huffines, PE

**SUBJECT:** Leonard WTP to McKinney No. 4 Treated Water Pipeline  
 Project No. 425 (NTD14624)  
 Pipeline Corridor Selection Technical Memorandum

**DATE:** July 15, 2016

## EXECUTIVE SUMMARY

The study included six corridor options for the proposed treated water pipeline from the Leonard Water Treatment Plant to the McKinney No. 4 Pump Station. Through desktop analysis and site visits, **Option C** is the preferred option when considering the following criteria:

- Avoiding the need for time consuming and costly environmental permitting
- Minimizing pipe length
- Minimizing impact to landowners along the corridor
- Minimizing conflict with existing utilities and other improvements
- Constructability within the proposed corridor

Hydraulic analysis revealed each option has similar hydraulic characteristics. No single option is exposed to any extreme terrain that would require excess pumping operations compared to its alternatives. See Table 1 below for a preliminary cost estimate of each alternative. FNI recommends Option C. Once the corridor is selected, an alignment selection process will take place within the chosen corridor option to ultimately secure a 100 to 140-foot-wide easement for the treated water pipeline. The alignment study will be presented in a future report.

**Table 1: Opinion of Probable Construction Cost Summary**

SUMMARY						
Option	A	B	B1	C	C1	C2
Length	124,300	126,300	125,700	123,900	126,100	127,300
Landowner Count	260	167	143	150	152	167
Construction Cost	\$111,090,000	\$111,350,000	\$110,390,000	\$109,140,000	\$111,840,000	\$111,900,000
Land Cost	\$6,630,000	\$4,790,000	\$4,300,000	\$4,420,000	\$4,490,000	\$4,800,000
Total Corridor Cost	<b>\$117,720,000</b>	<b>\$116,140,000</b>	<b>\$114,690,000</b>	<b>\$113,560,000</b>	<b>\$116,330,000</b>	<b>\$116,700,000</b>

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## INTRODUCTION

The purpose of this memorandum is to document the corridor selection process for the Leonard Water Treatment Plant (WTP) to McKinney No. 4 Pump Station (PS) Treated Water Pipeline (TWPL). For this project, the corridor is to be defined as a quarter-mile wide path heading southwest from the proposed Leonard WTP site to the proposed PS. This memorandum discusses the overall project constraints used to determine the recommended corridor option. Selection of the preferred option was based on a desktop analysis of various economic and non-economic factors of each option, as well as a windshield survey in the field. The recommended option, documented herein, is used to identify parcels needed for Right-of-Entry (ROE) and is used as a baseline for the first stages of field work and alignment development. The following general parameters were adopted to generate acceptable corridor options:

1. Align the beginning with the proposed Leonard WTP site and the end with the proposed PS site.
2. Minimize pipeline length where it does not impact other parameters.
3. Avoid or minimize the need for environmental permitting and avoid environmentally sensitive areas.
4. Minimize impact to landowners along each corridor option.
5. Minimize conflict with existing utilities and other improvements.
6. Minimize the future Farmersville to Blue Ridge 2026 Capital Improvement Project (CIP) line connection length (see [Future CIP Line Connection](#) section below)

Using a straight-line route shown in Figure 1, as a fundamental starting point, six corridor options were developed as options for routing around environmental hazards and development, considering the general parameters stated above. The six corridors include options A, B, B-Alternate 1 (B1), C, C-Alternate 1 (C1), and C-Alternate 2 (C2). The options all begin at the Leonard WTP and head southwest toward the PS. All pertinent information in the figures of this report may be referenced in the attachments section of the memorandum.



Figure 1: Straight-line Route

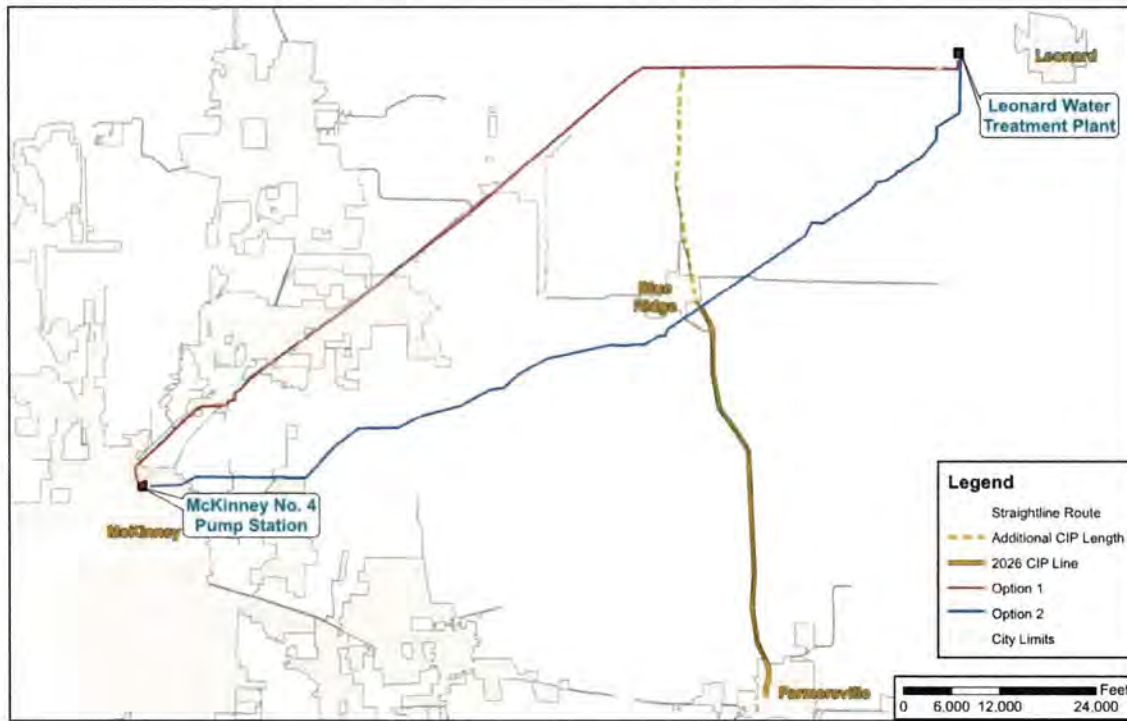


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**Future CIP Line Connection:**

A future NTMWD CIP pipeline is planned to connect Farmersville to the proposed TWPL near Blue Ridge in 2026, after the anticipated construction of this project. The position of the TWPL corridor will have a direct effect on the length and inherent cost of this future CIP pipeline. For example, in Figure 2 Option 1 would require a longer CIP pipeline connection than Option 2. The analysis in this report will reward a corridor option that will reduce the length of the future CIP pipeline and penalize a corridor option that increases the length of the line. See **Attachment 2: Corridor Selection Matrix** for weighted scoring of this criterion. For the remainder of the report, this CIP pipeline will be referred to as the “2026 pipeline”.



**Figure 2: Additional CIP Length**

**CORRIDOR OPTION ALTERNATIVES**

The six options investigated are shown on **Attachment 1: Leonard WTP to McKinney No. 4 PS Treated Water Pipeline Project**. Analysis began with three initial options: Option A, B, and C. Option B and C split into different alternatives in order to route around increased development and environmentally sensitive areas closer to the PS site.

Option A runs parallel to State Highway (SH) 78 from east to west for approximately 7.5 miles before it turns southwest to follow TX-121 for approximately 13 miles. At an overhead electric (OHE) easement, Option A turns south toward the PS Site.



Option B generally follows a fairly direct path southwest from the Leonard WTP for approximately 13 miles to the intersection of Farm-to-Market (FM) 1827 and FM 545. Just east of this intersection, Option B splits into Option B and Option B1. Both options turn south to run parallel to FM 1827 for 1.5 miles and then turn west for approximately 1 mile. Option B continues on its own path west before turning southwest after crossing railroad tracks to get to the PS site. Option B1 heads southwest to converge with Options C, C1, and C2 until they meet and parallel a City of Irving 72" Chapman waterline easement heading west to the PS site.

Option C heads south from the Leonard WTP to parallel an OHE easement southwest towards the PS site south of the other options for approximately 10.5 miles. About a half mile northeast of the intersection between CR 502 and FM 1377 Option C splits into Option C, C1, and C2. Option C cuts west then south to converge with Option B1. Option C1 heads south then west to converge with B1 and C. Option C2 continues southwest until it meets and parallels the same Irving 72" Chapman waterline mentioned above and heads west until it reaches the PS site.

### DETAILED CORRIDOR OPTION ANALYSIS

#### Shared Northern Corridor:

Options A, B, and C share a corridor route for a distance of 0.25 miles as they leave the Leonard WTP. The shared corridor begins by heading south from the Leonard WTP site. The corridor travels through mostly open grass land before the corridors diverge just north of SH 78. The Option C corridor then crosses SH 78 and an overhead electrical utility line while Options A and B turn west to parallel FM 78. Overall, this portion of the corridor has no known environmentally sensitive areas or major road crossings and only one known utility crossing. Further coordination in the alignment phase will better determine the connection point to the WTP.



Figure 3: Shared Northern Corridor

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**Option A Corridor:**

After splitting from the shared corridor, Option A heads due west along SH 78 for approximately 7.5 miles through sparsely wooded open land and cuts through many private driveways. Option A crosses SH 160 to continue west through open land toward Sam Rayburn Highway, TX-121. Option A then turns southwest to follow TX-121 for 13 miles. At the northern portion of Option A along TX-121, the land is sparsely wooded open land that cuts through many private driveways. As Option A parallels TX-121 further south and nears Melissa, parcels become more concentrated due to increased development in the area. Option A continues to follow TX-121 until it meets an OHE easement and turns south toward the PS Site.



**Figure 3: Option A**

Throughout the entire corridor, Option A crosses 16 creeks, a few of which have moderate to thick vegetation. The Pilot Grove Creek and Sister Grove Creek are heavily wooded creek crossings surrounded by potential forested wetlands. There are also 7 small ponds and 1 reservoir within this option that need to be avoided. There are 19 OHE utility crossings within Option A in addition to many paralleling OHE utilities for most of the Corridor. Option A also crosses NTMWD’s existing Texoma Pipeline just south of the intersection of TX-121 and SH 78. Other known crossings are detailed in **Attachment 4: Creek, Transportation and Known Utility Crossings**. Overall, Option A has 73 road crossings and 1 railroad crossing, owned by Dallas Area Rapid Transit; the railroad crossing will be bored, in addition 23 of the 73 crossings will be TXDOT bored crossings due to their road classification. The route encounters 39 structures, including some houses and businesses that could potentially be affected during construction of the pipeline. Alternative routing to alleviate these conflicts within Option A will be investigated further in the alignment phase if this option is selected. There are other conflicts that will impact Option A including a cemetery on the south side of SH 78, a landfill east of TX-121 between

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FM 545, and the future Collin County Outer Loop. Options to route around the landfill were explored and discarded due to additional conflicts with a Meat Producers Factory and several small reservoirs, owned by Chambliss Land LLC, on the east side of the landfill. Routing the option south around these problematic areas would join Option A with Option B and therefore this alternative was not further developed. In addition, Option A adds approximately 5.7 miles to the future 2026 CIP pipeline.

**Attachment 2: Corridor Selection Matrix** details specific selection criteria pertaining to Option A. Note that Option A has the most wooded land that would require clearing, an excessive parcel count, and the greatest amount of anticipated rock trenching. Option A also moves through land that has a higher anticipated commercial value and higher potential for future development due to its proximity to major highways.

**Option B Corridor:**

Option B continues southwest from its break point with A after crossing three private drives. It crosses through sparsely wooded open land encountering several ponds for slightly over 7 miles before crossing SH 78. From there, Option B continues southwest for nearly 6 miles, again through sparsely wooded open land with several ponds, toward Sister Grove Creek. From desktop analysis, Sister Grove Creek appears to be defined as a wetland by U.S. Fish and Wildlife Service. However, the point at which Option B crosses Sister Grove Creek appears to be less environmentally significant than the crossings of the other options considered. Once Option B reaches the intersection of CR 545 and FM 1827, it heads south for about 1.5 miles just below a ridge line behind a residential area. At the intersection of FM 1827 and CR 471 Option B heads west for about a mile along CR 471 cutting through several private



drives. Option B then turns southwest across open land and crosses a tributary of the Soil Conservation

**Figure 4: Option B**

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Service Site 12 Reservoir. This appears to be a significant crossing due to flooding and vegetation indicating potential wetlands in the area. Option B then traverses west for a little over a mile through thinly wooded land. As Option B nears the PS site, development increases and the option is routed around heavy urban areas. Option B continues west for another 2 miles, crossing Clemons Creek as well as a railroad, owned by Dallas Area Rapid Transit. It then heads southwest again along the west side of the railroad through mostly wooded land before converging with the Shared Southern Corridor (discussed later in the memorandum) to head west, paralleling the Irving 72" Chapman waterline to the PS site.

Conflicts for this option include 32 road crossings and one railroad crossing; the railroad crossing will be bored, in addition 21 of these 33 crossings will likely be bored due to their TXDOT road classification. This route will encounter 16 small ponds and reservoirs within the proximity of the corridor option. There are nine OHE utility crossings in addition to crossing the NTMWD's Texoma Pipeline and many other smaller pipelines. Detailed notes on known utility crossings can be found in **Attachment 4: Creek, Transportation and Known Utility Crossings**. Option B adds approximately 2.6 miles to the 2026 CIP pipeline, causing increased future cost. There are a total of 18 stream/creek crossings. A few of these crossings require further environmental analysis to determine the degree of wetland interference. Nine structures will need further evaluation for potential conflicts with the alignment. There is one known private cemetery in the vicinity of the option near the Soil Conservation Service Site 12 Reservoir and CR 409. Option B will avoid this parcel in the alignment phase. **Attachment 2: Corridor Selection Matrix** details specific selection criteria pertaining to Option B. Note that Option B has the most stream/creek crossings.

**Option B1 Corridor:**

Option B1 follows the same route as Option B southwest from the Leonard WTP site. Option B1 breaks from Option B just before the intersection of FM 1827 and CR 471 to head south through sparsely wooded open land approximately 900 feet until it joins Option C. At this intersection, Option B1 converges with and continues to follow Option C to the PS site. Option C is discussed in the next section.



**Figure 5: Option B1**

Conflicts for this option include 32 road crossings and one railroad crossing, owned by Dallas Area Rapid Transit; the railroad crossing will be bored, in addition 21 of these 33 crossings will likely be bored due to their TXDOT road classification. There are eight small ponds within the proximity of the corridor option that will need to be avoided. There are 13 OHE utility crossings in addition to crossing the NTMWD's Texoma Pipeline and many other smaller pipelines. Detailed notes on known utility crossings can be found in **Attachment 4: Creek, Transportation and Known Utility Crossings**. Option B1 adds approximately 2.6 miles to the 2026 CIP pipeline connection causing increased future cost. There are a total of 16 stream/creek crossings; a few of these crossings require further environmental analysis to determine the degree of wetland interference. Option B1 construction area will likely conflict with three structures, but alternative routing to alleviate these conflicts within Option B1 will be investigated further in the alignment phase if this option is selected. Option B1 is in close proximity to a private cemetery in the vicinity of Soil Conservation Service Site 12 Reservoir and CR 409. There is also a pet cemetery located near where B1 crosses CR 341; this parcel will be avoided in the alignment phase. **Attachment 2: Corridor Selection Matrix** details specific selection criteria pertaining to Option B1. Note that Option B1 has the least number of affected parcels and the fewest potential wetland crossings.

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**Option C Corridor:**

Option C begins by heading south from the Leonard WTP for about 1.25 miles through mostly open land, then cuts southwest to FM 981 to follow the road until it reaches an OHE easement approximately one mile down the road. Option C follows the OHE easement southwest for almost 10 miles through sparsely wooded open land. Option C heads west then southwest just north of the Soil Conservation Service Site 28 Reservoir. After a third of a mile, Options C crosses a tributary of the Soil Conservation Service Site 12 Reservoir. This appears to be a significant crossing due to flooding and vegetation indicating potential wetlands in the area. Options C then heads west for about one third of a mile through thinly wooded land. Options C continues along a shared portion with Option B1 until it converges with the Shared Southern Corridor described below.



**Figure 6: Option C**

Conflicts for this option include 30 road crossings and one railroad crossing, owned by Dallas Area Rapid Transit; the railroad crossing will be bored, in addition 22 of these 31 crossings will likely be bored due to their TXDOT road classification. There are five small ponds and one reservoir within the proximity of the corridor option that will need to be avoided. There are 19 OHE utility crossings in addition to many other utility crossings that are detailed in **Attachment 4: Creek, Transportation and Known Utility Crossings**. Option C does not add any additional length to the 2026 CIP pipeline connection, since it is the southernmost option at the potential connection point. Option C has a total of 13 stream/creek crossings. A few of these crossings require further environmental analysis to determine the degree of wetland interference. Specifically, Sister Grove creek appears to be heavily wooded and may be surrounded by wetlands as observed in the desktop analysis. This crossing is inaccessible for further analysis until right of entry is acquired. Five structures will need further evaluation for potential conflicts

with this alignment. Option C is in close proximity to a private cemetery in the vicinity of Soil Conservation Service Site 12 Reservoir and CR 409. There is also a pet cemetery near where B1 crosses CR 341, cemeteries will be avoided in the alignment phase. **Attachment 2: Corridor Selection Matrix** details specific selection criteria pertaining to Option C. Note that Option C is the shortest of all the Options.

**Option C1 Corridor:**

Option C1 follows the same route as Option C from the Leonard WTP site southwest and diverges from Option C 0.5 miles south of Blue Ridge, just East of FM 1377. Shortly after Options C1 and C2 pass the Soil Conservation Site 28 Reservoir they split. Option C1 heads southwest, north of C2 through mostly sparsely wooded open land with occasional ponds. Option C1 continues until it crosses CR 500 at which point it heads due west for three miles to converge with Option C. From there, Option C1 follows Option C and then the Shared Southern Corridor to the PS Site.



**Figure 7: Option C1**

Conflicts for this option include 32 road crossings and one railroad crossing, owned by Dallas Area Rapid Transit; the railroad crossing will be bored, in addition 22 of these 33 crossings will likely be bored due to their TXDOT road classification. There are 14 small ponds and one reservoir within the proximity of the corridor option that will need to be avoided. There are 14 OHE utility crossings in addition to many other utility crossings that are detailed in **Attachment 4: Creek, Transportation and Known Utility Crossings**. Like Option C, Option C1 does not add any additional length to the 2026 CIP pipeline connection. There are a total of 14 stream/creek crossings. A few of these crossings require further environmental analysis to determine the degree of wetland interference. Specifically, Sister Grove Creek appears to be heavily wooded and may be surrounded by wetlands as observed in the desktop analysis.



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This crossing is inaccessible for further analysis until right of entry is obtained. The Option C1 construction area will likely conflict with six structures, but alternative routing to alleviate these conflicts within Option C1 will be investigated further in the alignment phase if this option is selected. Option C1 comes in close proximity to a private cemetery between crossing a tributary of the Soil Conservation Service Site 12 Reservoir and CR 409. There is also a pet cemetery near where B1 crosses CR 341; cemeteries will be avoided in the alignment phase. **Attachment 2: Corridor Selection Matrix** details specific selection criteria pertaining to Option C1. Note that Option C1 has the least amount of wooded land.

**Option C2 Corridor:**

Option C2 follows the same route as Option C from the Leonard WTP site southwest and splits from Option C 0.5 miles south of Blue Ridge just east of FM 1377. Then Option C2 heads southwest through sparsely wooded open land with occasional ponds until it converges with the Irving 72" Chapman waterline. Option C2 parallels the Irving 72" Chapman waterline for about 4.5 miles before converging with the Shared Southern Corridor, which is described later in this memorandum.



**Figure 8: Option C2**

Conflicts for this option include 31 road crossings and one railroad crossing, owned by Dallas Area Rapid Transit; the railroad crossing will be bored, in addition 23 of these 32 crossings will likely be bored due to their TXDOT road classification. There are 12 small ponds and one reservoir within the proximity of the corridor option that will need to be avoided. There are 13 OHE utility crossings in addition to many other utility crossings that are detailed in **Attachment 4: Creek, Transportation and Known Utility Crossings**. Similar to Option C, Option C2 does not add any additional length to the 2026 CIP pipeline connection. There are a total of 13 stream/creek crossings. A few of these crossings require further

environmental analysis to determine the degree of wetland interference. Specifically, Sister Grove Creek appears to be heavily wooded and surrounded by potential wetlands. Option C2 routes between the Irving 72" Chapman waterline and flooded forest land just west of where it crosses Sister Grove Creek. Altering the option north, routes it into Option C1 and routing south is unacceptable due to the additional cost of pipeline length and clearing heavily wooded land. The Option C2 construction area will likely conflict with 4 structures. Avoidance of these structures will be explored further in the alignment phase if this option is selected. **Attachment 2: Corridor Selection Matrix** details specific selection criteria pertaining to Option C2. Note that Option C2 has the least amount of perceived rock trenching.

**Shared Southern Corridor:**

Options B1, C, C1, and C2 join to form the Shared Southern Corridor. These four options converge about 0.75 miles east of FM 2933 and 1.25 miles north of New Hope. Option A does not follow the Shared Southern Corridor at any point. The Shared Southern Corridor follows the Irving 72" Chapman waterline west toward the PS site for about four miles. After crossing the East Fork Trinity River, Option B joins the Shared Southern Corridor from the Northeast. Then the Shared Southern Corridor continues one mile to the PS Site.

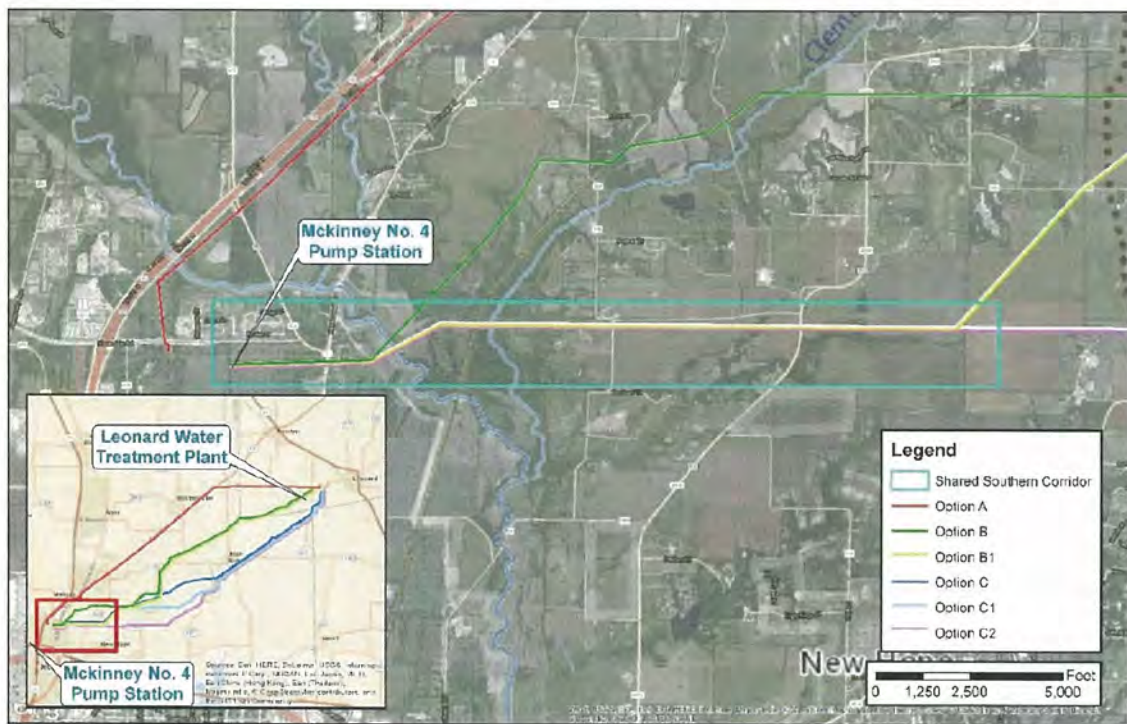


Figure 9 : Shared Southern Corridor

## ENVIRONMENTAL ANALYSIS

As part of the initial pipeline corridor study, FNI environmental scientists conducted a desktop review and limited windshield survey of the alternative pipeline corridors. The purpose of this review was to identify crossings of potential waters of the U.S. that could trigger notification to the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. The types of data utilized for the desktop review included existing aerial photography, the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data, and U.S. Geological Survey (USGS) 7.5-minute topographic maps. During the review, several areas, including potential forested wetlands and areas where the pipeline corridor runs within or parallel to existing stream beds, were identified. Construction of the proposed pipeline through these areas could require the need to prepare and submit a Pre-Construction Notification (PCN) to the USACE. It should be noted that these areas were identified at a desktop level with limited on-site verification. A more definitive assessment of these sites will be conducted during the alignment evaluation phase with on-site investigations by qualified biologists/environmental scientists. The assessment will determine if these sites are wetlands (as defined by the USACE) and if the proposed option would be within, and parallel to, existing streams.

## HYDRAULIC ANALYSIS

A preliminary hydraulic analysis was used to determine if any route encountered unfavorable terrain that would result in increased head at the WTP compared to its alternatives. A higher head generally results in higher operational (pumping) and capital cost (increased pipe pressure classes). The analysis primarily compared total head variability among the proposed corridors using hydraulic grade lines (HGLs).

**Attachment 9: Hydraulic Grade Lines** includes figures and results of the hydraulic analysis of each corridor. The hydraulic grade elevation at the McKinney No. 4 PS of 747 feet was taken from the technical memorandum, *NTMWD SH 5 Preliminary Pump Station Engineering*, dated June 2015. The flowrate assumptions were taken from the memorandum, *Peaking Factor for Lower Bois d’Arc Creek Water Transmission System*, dated November 2007; see Table 2: Firm Capacity below. For this report, only the initial 84-inch diameter pipeline is considered with flows of 90 and 180 MGD for 2021 and 2025, respectively. Note that in the future, a parallel 60-inch diameter pipe is planned to maintain the system pressures similar to the single, 84-inch pipe at the higher projected flows.

**Table 2: Future Capacity**

Year	Pipeline Diameter (in)	HSPS Firm Capacity (MGD)
2021	84	90
2025	84	180
2030	84/60	270
2035	84/60	360

The HGLs were also used to investigate TCEQ (30 TAC) §290.44(d), which recommends that a water transmission line be designed to maintain a minimum internal pressure of 5 psi above any external hydrostatic pressure at all times. A tank was positioned in close proximity to the high point of each route for compliance. Be advised, further analysis is required to determine specific requirements for a pressure maintenance strategy. This will be included in the design of the Leonard WTP High Service Pump Station.

The preliminary HGL analysis shows that all corridors have similar hydraulic characteristics and no single corridor is exposed to any extreme terrain that would require excess operational or capital costs compared to its alternatives. Further analysis will be provided in the alignment phase.

### ADDITIONAL CONSIDERATIONS

**Attachment 2: Corridor Selection Matrix** ultimately gives a score to each option using a list of design criteria to generate a recommended option. Explanation of the weighted scoring procedure may be found at the conclusion of the attachment. The list of design criteria is defined below:

<u>Route Length</u>	– Length of the route [LF]
<u>Parcel Count</u>	– Land parcels that come in contact with the proposed route alignment [EA]
<u>Future CIP Line Connection</u>	– See <b>Future CIP Line Connection</b> in the Introduction of this memorandum [LF]
<u>Perennial Stream Crossing</u>	– Streams that would likely be crossed by bore installation [EA]
<u>Intermittent Stream Crossing</u>	– Streams that would likely be crossed by open cut installation [EA]
<u>Wetlands Crossing</u>	– Length of wetland area crossings taken from the National Wetlands Inventory defined by U.S. Fish and Wildlife Service [LF]
<u>Wooded</u>	– Areas that include tree interference viewed from an aerial [LF]
<u>Rock Trenching</u>	– Areas that encounter a restrictive layer (rock) within 6.5 feet of the ground surface [LF]
<u>Minor Transportation Crossing</u>	– A road that would likely be crossed by open cut installation [EA]
<u>Major Transportation Crossing</u>	– A TXDOT road or Railroad that would be crossed by bored installation [EA]

**Attachment 5: Land Owner List** shows the land owners, whose parcel intersects the option for each of the proposed corridor options.

**Attachment 6: Buoyancy Calculations** show the pipe buoyancy design process performed for the treated water pipeline. From these calculations, it is concluded that a 4-foot depth of cover is sufficient to prevent the pipeline from becoming buoyant when empty after the line is installed.

**Attachment 7: Extraterritorial Jurisdiction Exhibit** shows the extraterritorial jurisdiction (ETJ) boundaries for the authorities in the area. The ETJ shows the opportunity for the cities of Princeton, Blue Ridge, Anna, New Hope, Melissa, and Trenton to connect to the proposed TWPL.

**Attachment 8: Future Collin County Outer Loop Exhibit** shows plans for the Collin County Outer Loop to extend from TX-121 east to eventually cross the proposed TWPL options. Currently, this construction is scheduled to occur after the TWPL has been implemented and therefore does not influence route recommendation.

### OPINION OF PROBABLE CONSTRUCTION COST

Below is a summary table of the Opinion of Probable Construction Cost (OPCC). For a further breakdown of the cost and factors considered, see **Attachment 3: Opinion of Probable Construction Cost**. The summary table shows length, landowner count, and the costs associated with the project: construction (with a 20% contingency), land, and total option cost.

**Table 3: Opinion of Probable Construction Cost Summary**

Option	SUMMARY					
	A	B	B1	C	C1	C2
Length	124,300	126,300	125,700	123,900	126,100	127,300
Landowner Count	260	167	143	150	152	167
Construction Cost	\$111,090,000	\$111,350,000	\$110,390,000	\$109,140,000	\$111,840,000	\$111,900,000
Land Cost	\$6,630,000	\$4,790,000	\$4,300,000	\$4,420,000	\$4,490,000	\$4,800,000
<b>Total Corridor Cost</b>	<b>\$117,720,000</b>	<b>\$116,140,000</b>	<b>\$114,690,000</b>	<b>\$113,560,000</b>	<b>\$116,330,000</b>	<b>\$116,700,000</b>

### RECOMMENDATIONS SUMMARY

FNI recommends Option C. Option C was selected because it minimizes the need for environmental permitting, minimizes the 2026 CIP pipeline connection length, optimizes pipeline length without additional conflicts or constructability issues, minimizes impact to landowners along the corridor option, and minimizes conflicts with existing utilities and other improvements in comparison to the other options. The method used for option recommendation is reflected in a weighted analysis shown in **Attachment 2: Corridor Selection Matrix**.

### ATTACHMENTS

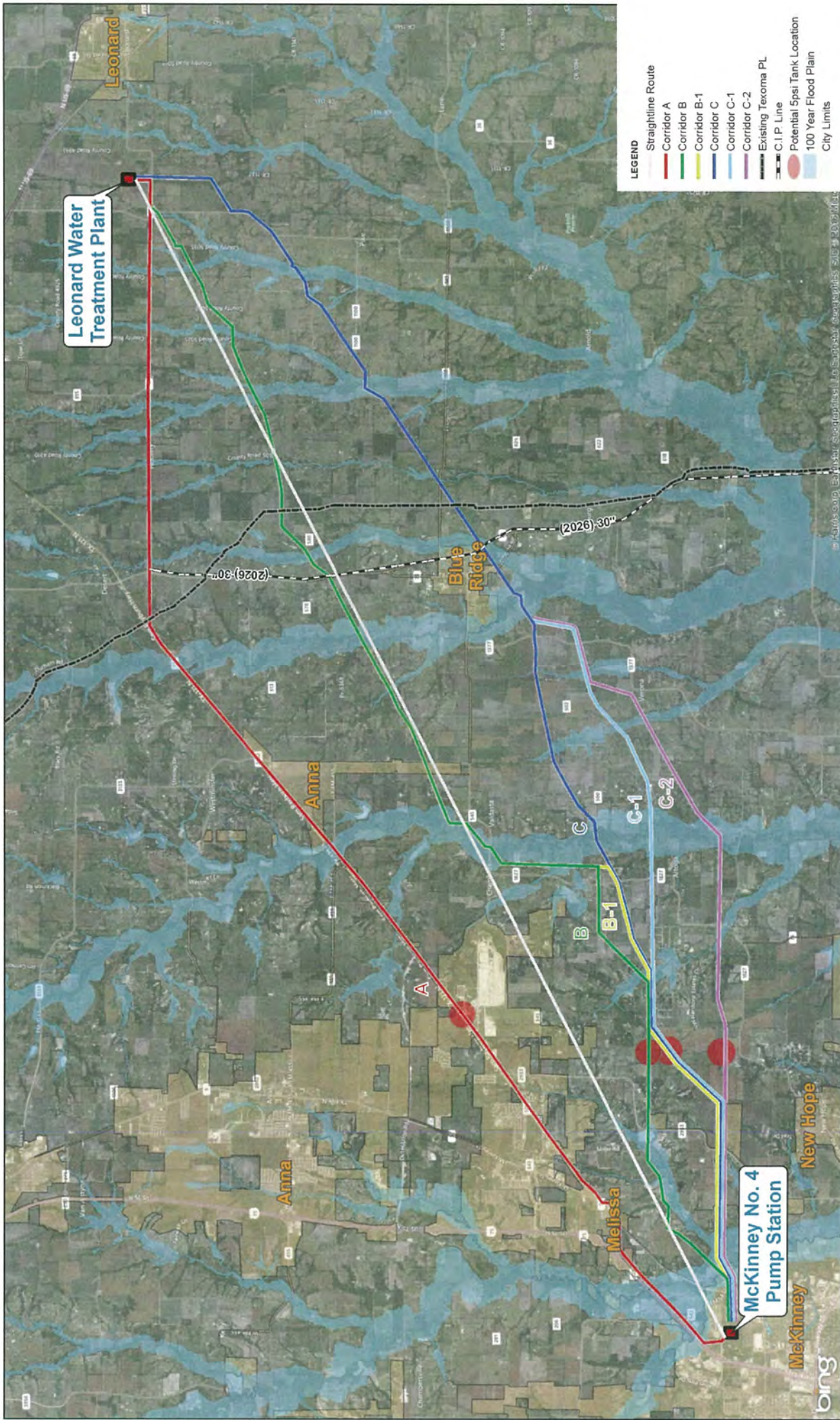
- Attachment 1: Leonard WTP to McKinney No. 4 PS Treated Water Pipeline Proposed Corridor Map
- Attachment 2: Corridor Selection Matrix
- Attachment 3: Opinion of Probable Construction Cost
- Attachment 4: Creek, Transportation, and Known Utility Crossings
- Attachment 5: Land Owner List
- Attachment 6: Buoyancy Calculations
- Attachment 7: Extraterritorial Jurisdiction Exhibit
- Attachment 8: Future Collin County Outer Loop Extension Exhibit
- Attachment 9: Hydraulic Grade Lines



July 15, 2016

## **Attachment 1**

Leonard WTP to McKinney No. 4 Treated Water Pipeline Proposed  
Corridor Map



- LEGEND**
- Straightline Route
  - Corridor A
  - Corridor B
  - Corridor B-1
  - Corridor C
  - Corridor C-1
  - Corridor C-2
  - Existing Texoma PL
  - C.I.P. Line
  - Potential 5psi Tank Location
  - 100 Year Flood Plain
  - City Limits

**Attachment**  
1

**Scale**  
10,000 5,000 0 10,000 20,000 Feet

**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
Leonard WTP to McKinney No. 4 Treated Water Pipeline Proposed Corridor Map

PROJECT:	WED1424
CLIENT:	CONNER CONSULTANTS
COORDINATOR:	ADRIAN PLUMMER
DATE:	7/1/2014
PREPARED BY:	GWALLS
DESIGNED BY:	GWALLS
SCALE:	AS SHOWN
PROJECT LOCATION:	2711 N. HAGLEY AVENUE SUITE 3300 DALLAS, TEXAS 75245 PHONE: (214) 217-2230

July 15, 2016

**Attachment 2**  
Corridor Selection Matrix





Weighted Route Scores

	Weights	Quantities					
<b>Table 1: Raw Quantities (Low is Best)</b>							
Item Description	Item Weight (High = Most Important) (0 = Not Considered)	Routes					
		Proposed A	Proposed B	Proposed B1	Proposed C	Proposed C1	Proposed C2
Route Length, ft	37	124,300	126,300	125,700	123,900	126,100	127,300
Parcel Count, ea	13	260	167	143	150	152	167
Future CIP Line Connection, ft	11	30,000	14,000	14,000	-	-	-
Perennial Stream Crossing, ea	9	8	8	7	6	8	7
Intermittent Stream Crossing, ea	7	9	9	10	8	7	6
Wetland Crossing, ft	8	10,000	13,400	12,500	17,800	19,400	17,700
Wooded, ft	6	18,600	17,100	17,200	16,800	15,800	16,400
Rock Trenching, ft	3	39,200	36,000	34,800	32,200	39,100	31,900
Minor Transportation Crossing, ea	3	51	12	12	9	11	9
Major Transportation Crossing (TXDOT & RR), ea	3	23	21	21	22	22	23
Total	100						
<b>Table 2: Normalized Score (Low is Best)</b>							
Item Description		Proposed A	Proposed B	Proposed B1	Proposed C	Proposed C1	Proposed C2
Route Length, ft		36.56	37.15	36.97	36.44	37.09	37.44
Parcel Count, ea		2.22	1.43	1.22	1.28	1.30	1.43
Future CIP Line Connection, ft		1.00	0.47	0.47	-	-	-
Perennial Stream Crossing, ea		4.00	4.00	3.50	3.00	4.00	3.50
Intermittent Stream Crossing, ea		2.25	2.25	2.50	2.00	1.75	1.50
Wetland Crossing, ft		1.06	1.43	1.33	1.89	2.06	1.88
Wooded, ft		6.64	6.11	6.14	6.00	5.64	5.86
Rock Trenching, ft		5.37	4.93	4.77	4.41	5.36	4.37
Minor Transportation Crossing, ea		1.21	0.29	0.29	0.21	0.26	0.21
Major Transportation Crossing (TXDOT & RR), ea		11.50	10.50	10.50	11.00	11.00	11.50
<b>Table 3: Weighted Score (Low is Best)</b>							
Item Description	Item Weight	Proposed A	Proposed B	Proposed B1	Proposed C	Proposed C1	Proposed C2
Route Length, ft	37	13.53	13.74	13.68	13.48	13.72	13.85
Parcel Count, ea	13	0.29	0.19	0.16	0.17	0.17	0.19
Future CIP Line Connection, ft	11	0.11	0.05	0.05	-	-	-
Perennial Stream Crossing, ea	9	0.36	0.36	0.32	0.27	0.36	0.32
Intermittent Stream Crossing, ea	7	0.16	0.16	0.18	0.14	0.12	0.11
Wetland Crossing, ft	8	0.09	0.11	0.11	0.15	0.17	0.15
Wooded, ft	6	0.40	0.37	0.37	0.36	0.34	0.35
Rock Trenching, ft	3	0.16	0.15	0.14	0.13	0.16	0.13
Minor Transportation Crossing, ea	3	0.04	0.01	0.01	0.01	0.01	0.01
Major Transportation Crossing (TXDOT & RR), ea	3	0.35	0.32	0.32	0.33	0.33	0.35
Total	100	15.47	15.45	15.32	15.04	15.38	15.44

<b>Best Score</b>	<b>15.04</b>
<b>Route</b>	<b>Proposed C</b>

\*\*\* Explanation of Weighted Route Tables

**Table 1: Raw Quantities**, includes the raw quantities for each item description. Each item description is defined in the memorandum. These quantities were found by method of desktop analysis using GIS and Google Earth.

**Table 2: Normalized Score**, shows the normalized ratings of the design criteria in each corridor. Normalizing of ratings means adjusting values measured in different scales to a notationally common scale. The normalized scores are calculated by taking the raw quantities within an item description and dividing it by the maximum difference between all the quantities in the same description.

**Table 3: Weighted Score**, uses the normalized score and applies the predefined item weight for the respective item description. At this point, each corridor is now enabled to be tallied and scored to determine a route recommendation.

July 15, 2016

**Attachment 3**  
Opinion of Probable Construction Cost

**ROUTE CLASSIFICATIONS AND INSTALLATION COSTS**

Description	Installation Classification	Installation Factor	84" Diameter Pipe Material Cost [\$/LF]	Installation Cost [\$/LF]	Flowable Fill [\$/LF]	Pavement Replacement [\$/LF]	Creek Restoration (Gabions, Riprap, etc.) [\$/LF]	Tunnel [\$/LF]	ROW Restoration (Seed/Sod) [\$/LF]	Total Pipeline Unit Cost [\$/LF]
Open	1	1.00	\$ 448	\$ 224	-	-	-	-	\$ 6	\$ 678
Wooded	2	1.06	\$ 448	\$ 237	-	-	-	-	\$ 6	\$ 691
Open Cut Creek Crossing	3	1.06	\$ 448	\$ 237	\$ 125	-	\$ 300	-	\$ 6	\$ 1,116
Open Cut Road Crossing	4	1.10	\$ 448	\$ 246	\$ 125	\$ 250	-	-	-	\$ 1,069
Bore or Tunnel Crossing	5	1.00	\$ 448	\$ 224	-	-	-	\$ 1,250	-	\$ 1,922
Deep Cut (10-15' cover)	6	1.20	\$ 448	\$ 269	\$ 36	-	-	-	\$ 6	\$ 759
Rock Trenching	7	1.20	\$ 448	\$ 269	-	-	-	-	\$ 6	\$ 723

**APPURTENANCES & MISC.**

	\$/EA	Spacing, FT	\$/LF
8" Air Valve & Manhole	\$ 30,000	3500	\$ 8.57
12" Blowoff Valve & Manhole	\$ 25,000	3500	\$ 7.14
Misc. Appurtenances	\$ 10,000	10000	\$ 1.00
<b>Total</b>	<b>\$</b>	<b>\$</b>	<b>16.71</b>

Contingency

20%

**LAND COSTS**

Description	Type	Permanent Easement		Temporary Easement		Total Land Cost \$/LF
		Width, FT =	\$/SF	Width, FT =	\$/SF	
Rural	R	\$11.48	\$0.11	\$5,000.00	\$0.00	\$11.48
					\$0.00	\$0.00
Parcel Acquisition	EA		\$ 20,000			\$11.48

NORTH TEXAS MUNICIPAL WATER DISTRICT  
Leonard to McKinney No. 4 Pipeline  
Option A



Innovative approaches  
Practical results  
Outstanding service

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS		UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST Material & Installation [\$]	CONSTRUCTION COST Appurtenances & Miscellaneous [\$]
	Length [ft]	Land Class	Instit. Class	Land M&I [\$/ft]			
Type 1 - Open	62,600	R	1	11	718,549	42,442,800	1,046,314
Type 2 - Wooded	18,600	R	2	11	213,499	12,860,784	310,886
Type 3 - Open Cut Creek Crossing	-	R	3	11	-	-	-
Type 4 - Open Cut Road Crossing	750	R	4	11	8,609	802,050	12,536
Type 5 - Bore or Tunnel Crossing	3,150	R	5	11	36,157	6,054,300	52,650
Type 6 - Deep Cut (10-15' cover)	-	R	6	11	-	-	-
Type 7 - Rock Trenching	39,200	R	7	11	449,954	28,333,760	655,200
Landowner Count <sup>2</sup>	260	EA		20,000.00	5,200,000		
<b>Total:</b>	<b>124,300</b>				\$6,626,768	\$90,493,694	\$2,077,586

CONSTRUCTION COST **\$92,571,280**

CONTINGENCY 20% **\$18,514,256**

TOTAL CONSTRUCTION COST: **\$111,090,000**

TOTAL LAND COST **\$6,630,000**

TOTAL ROUTE COST **\$117,720,000**

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.

2. For ROE and acquisition related costs

NORTH TEXAS MUNICIPAL WATER DISTRICT  
Leonard to McKinney No. 4 Pipeline  
Option B



Innovative Approaches  
Practical Results  
Outstanding Service

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS		UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST	
	Length [ft]	Land Class	Instit. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]
Type 1 - Open	70,180	R	1	11	805,556	47,582,040	1,173,009
Type 2 - Wooded	17,100	R	2	11	196,281	11,823,624	285,814
Type 3 - Open Cut Creek Crossing	-	R	3	11	-	-	-
Type 4 - Open Cut Road Crossing	650	R	4	11	7,461	695,110	10,864
Type 5 - Bore or Tunnel Crossing	2,370	R	5	11	27,204	4,555,140	39,613
Type 6 - Deep Cut (10-15' cover)	-	R	6	11	-	-	-
Type 7 - Rock Trenching	36,000	R	7	11	413,223	26,020,800	601,714
Landowner Count <sup>2</sup>	167	EA		20,000.00	3,340,000		
<b>Total:</b>	<b>126,300</b>				\$4,789,725	\$90,676,714	\$2,111,014

CONSTRUCTION COST \$92,787,728  
 CONTINGENCY 20% \$18,557,546  
 TOTAL CONSTRUCTION COST: \$111,350,000  
 TOTAL LAND COST \$4,790,000  
 TOTAL ROUTE COST \$116,140,000

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.

2. For ROE and acquisition related costs

NORTH TEXAS MUNICIPAL WATER DISTRICT  
Leonard to McKinney No. 4 Pipeline  
Option B1



Innovative approaches.  
Proven results.  
Outstanding service.

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS		UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST			
	Length [ft]	Land Class	Instll. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]	Appurtenances & Miscellaneous [\$]	
Type 1 - Open	70,980	R	1	11	814,738	678	48,124,440	1,186,380	
Type 2 - Wooded	17,200	R	2	11	197,429	691	11,892,768	287,486	
Type 3 - Open Cut Creek Crossing	-	R	3	11	-	1116	-	-	
Type 4 - Open Cut Road Crossing	600	R	4	11	6,887	1069	641,640	10,029	
Type 5 - Bore or Tunnel Crossing	2,120	R	5	11	24,334	1922	4,074,640	35,434	
Type 6 - Deep Cut (10-15' cover)	-	R	6	11	-	759	-	-	
Type 7 - Rock Trenching	34,800	R	7	11	399,449	723	25,153,440	581,657	
Landowner Count <sup>2</sup>	143	EA		20,000.00	\$/EA	2,860,000			
<b>Total:</b>	<b>125,700</b>						<b>\$4,302,837</b>	<b>\$89,886,928</b>	<b>\$2,100,986</b>

CONSTRUCTION COST **\$91,987,914**  
 CONTINGENCY 20% **\$18,397,583**  
 TOTAL CONSTRUCTION COST: **\$110,390,000**  
 TOTAL LAND COST **\$4,300,000**  
 TOTAL ROUTE COST **\$114,690,000**

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.
2. For ROE and acquisition related costs

NORTH TEXAS MUNICIPAL WATER DISTRICT  
 Leonard to McKinney No. 4 Pipeline  
 Option C



Innovative approaches.  
 Practical results.  
 Outstanding service.

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS		UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST		
	Length [ft]	Land Class	Instl. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]	Appurtenances & Miscellaneous [\$]
Type 1 - Open	72,220	R	1	11	828,972	48,965,160	1,207,106	
Type 2 - Wooded	16,800	R	2	11	192,837	11,616,192	280,800	
Type 3 - Open Cut Creek Crossing	-	R	3	11	-	-	-	
Type 4 - Open Cut Road Crossing	150	R	4	11	1,722	160,410	2,507	
Type 5 - Bore or Tunnel Crossing	2,530	R	5	11	1922	4,862,660	42,287	
Type 6 - Deep Cut (10-15' cover)	-	R	6	11	759	-	-	
Type 7 - Rock Trenching	32,200	R	7	11	369,605	23,274,160	538,200	
Landowner Count <sup>2</sup>	150	EA		20,000.00	\$/EA	3,000,000		
<b>Total:</b>	<b>123,900</b>					\$4,422,176	\$88,878,582	\$2,070,900

CONSTRUCTION COST **\$90,949,482**

CONTINGENCY 20% **\$18,189,896**

TOTAL CONSTRUCTION COST: **\$109,140,000**

TOTAL LAND COST **\$4,420,000**

TOTAL ROUTE COST **\$113,560,000**

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.

2. For ROE and acquisition related costs

NORTH TEXAS MUNICIPAL WATER DISTRICT  
Leonard to McKinney No. 4 Pipeline  
Option C-1



Innovative approaches  
Practical results  
Outstanding service

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS		UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST Material & Installation [\$]	CONSTRUCTION COST Appurtenances & Miscellaneous [\$]	
	Length [ft]	Land Class	Instr. Class	Land [\$/ft]				M&I [\$/ft]
Type 1 - Open	68,140	R	1	11	678	46,198,920	1,138,911	
Type 2 - Wooded	15,800	R	2	11	691	10,924,752	264,086	
Type 3 - Open Cut Creek Crossing	-	R	3	11	1116	-	-	
Type 4 - Open Cut Road Crossing	200	R	4	11	1069	213,880	3,343	
Type 5 - Bore or Tunnel Crossing	2,860	R	5	11	1922	5,496,920	47,803	
Type 6 - Deep Cut (10-15' cover)	-	R	6	11	759	-	-	
Type 7 - Rock Trenching	39,100	R	7	11	723	28,261,480	653,529	
Landowner Count <sup>2</sup>	152	EA		20,000.00	\$/EA	3,040,000		
<b>Total:</b>	<b>126,100</b>					\$4,487,429	\$91,095,952	\$2,107,671

CONSTRUCTION COST \$93,203,623  
 CONTINGENCY 20% \$18,640,725  
 TOTAL CONSTRUCTION COST: \$111,840,000  
 TOTAL LAND COST \$4,490,000  
 TOTAL ROUTE COST \$116,330,000

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.
2. For ROE and acquisition related costs



**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**Leonard to McKinney No. 4 Pipeline**  
**Option C2**



Innovative approaches  
 Practical results  
 Outstanding service

ORIGINAL ALIGNMENT Type & Description	SEGMENT PARAMETERS		UNIT COSTS		EASEMENT LAND COSTS [\$]	CONSTRUCTION COST	
	Length [ft]	Land Class	Instl. Class	Land [\$/ft]		M&I [\$/ft]	Material & Installation [\$]
Type 1 - Open	76,320	R	1	11	876,033	51,744,960	1,275,634
Type 2 - Wooded	16,400	R	2	11	188,246	11,339,616	274,114
Type 3 - Open Cut Creek Crossing	-	R	3	11	-	-	-
Type 4 - Open Cut Road Crossing	200	R	4	11	2,296	213,880	3,343
Type 5 - Bore or Tunnel Crossing	2,480	R	5	11	28,466	4,766,560	41,451
Type 6 - Deep Cut (10-15' cover)	-	R	6	11	-	-	-
Type 7 - Rock Trenching	31,900	R	7	11	366,162	23,057,320	533,186
Landowner Count <sup>2</sup>	167	EA		20,000.00	3,340,000		
<b>Total:</b>	<b>127,300</b>				<b>\$4,801,203</b>	<b>\$91,122,336</b>	<b>\$2,127,729</b>

CONSTRUCTION COST \$93,250,065  
 CONTINGENCY 20% \$18,650,013  
 TOTAL CONSTRUCTION COST: \$111,900,000  
 TOTAL LAND COST \$4,800,000  
 TOTAL ROUTE COST \$116,700,000

1. Appurtenances & Miscellaneous - Includes air valves, blow off valves, butterfly valves, etc.

2. For ROE and acquisition related costs

**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
Leonard to McKinney No. 4 Pipeline  
**Summary Options**



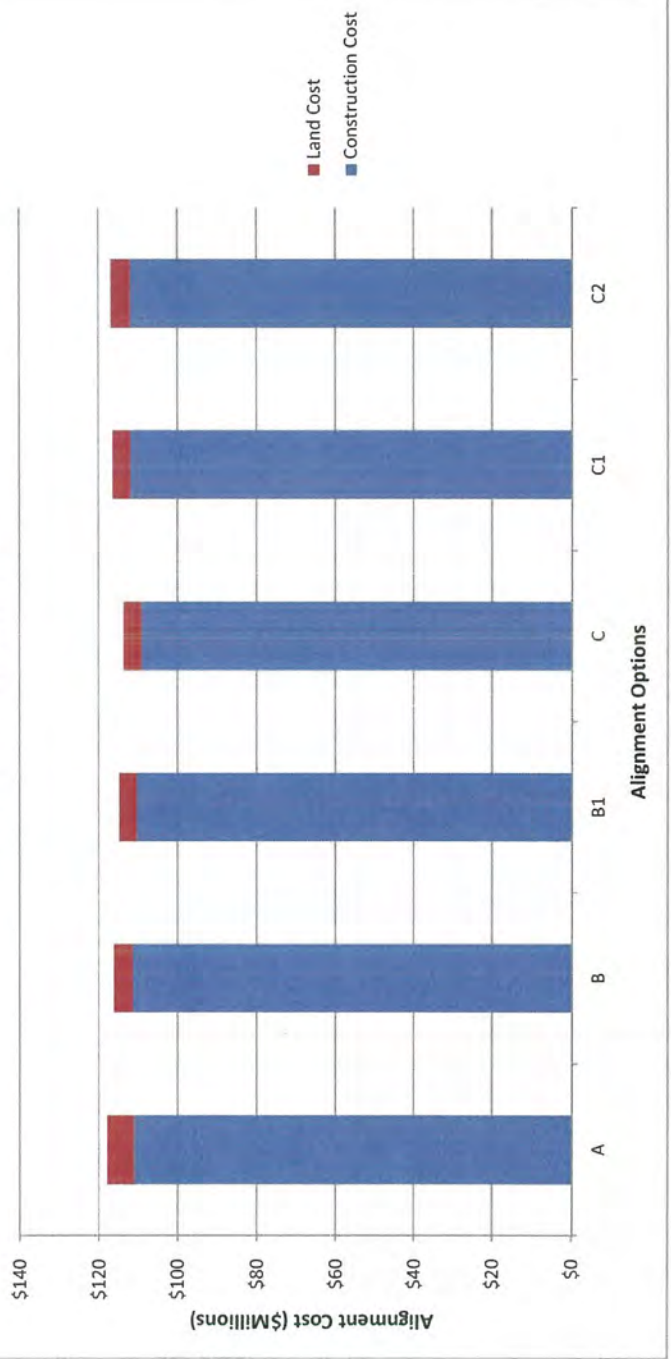
Innovative approaches  
Practical results  
Outstanding service

**OPINION OF PROBABLE CONSTRUCTION COSTS**

<b>ESTIMATOR</b>		<b>CHECKED BY</b>	<b>ACCOUNT NO</b>
CDL		JP	NTD14624

Option	SUMMARY			
	A	B	B1	C
Option Length	124,300	126,300	125,700	123,900
Landowner Count	260	167	143	150
Construction Cost	\$111,090,000	\$111,350,000	\$110,390,000	\$109,140,000
Land Cost	\$6,630,000	\$4,790,000	\$4,300,000	\$4,420,000
<b>Total Corridor Cost</b>	<b>\$117,720,000</b>	<b>\$116,140,000</b>	<b>\$114,690,000</b>	<b>\$113,560,000</b>

**TWPL Cost Estimate**



July 15, 2016

## **Attachment 4**

Creek, Transportation and known Utility Crossings



NORTH TEXAS MUNICIPAL WATER DISTRICT  
Leonard To McKinney No. 4 Pump Station Treated Water Pipeline

CROSSINGS

Corridor Option	Crossing	Open Cut Distance (ft.)	Boring Distance (ft.)	Additional Notes
A	8.63" Gas Line			runs NW/SE, crosses just N of SH 78
A	Overhead Electrical Utility			
A	Creek		100	Part of Soil Conservation Service Site 47 Reservoir, tributary of Bear Creek, heavily wooded
A	FM981		50	
A	CR4945	50		
A	Bear Creek		100	sparsely wooded crossing
A	Overhead Electrical Utility			
A	CR4940	50		
A	Overhead Electrical Utility			
A	Overhead Electrical Utility			
A	Private Road 462	50		
A	Overhead Electrical Utility			
A	Delba Creek		100	sparsely wooded crossing
A	CR 4930	50		
A	Overhead Electrical Utility			
A	Balley Creek		100	Heavily wooded
A	FM815		50	
A	16" Natural gas PL			Runs N-S crosses just west of FM 815
A	10.75" Natural gas PL			Runs N-S crosses just west of FM 815
A	8.63" Gas PL			Runs N-S crosses just west of FM 815
A	Indian Creek		100	Heavily wooded, just south of Soil Cons. SVC Site 39 Reservoir
A	Overhead Electrical Utility			
A	Private Road	50		
A	Overhead Electrical Utility			
A	Dog Creek		75	Heavily wooded, just south of Soil Cons. SVC Site 38 Reservoir
A	CR 4910	50		
A	24" Natural Gas PL			Runs N-S, crosses just East of CR 635
A	16" Natural gas PL			Runs N-S, crosses just East of CR 635
A	Overhead Electrical Utility			
A	CR 635	50		
A	12.75" Gas PL			Runs N-S, crosses just West of CR 635
A	Overhead Electrical Utility			
A	Desert Creek		100	Sparsely wooded near houses, heavily wooded in other parts of corridors. Just east of SH 160 and 78 intersection
A	Cemetery			
A	SH 160		150	
A	30" Crude PL			Runs N-S, crosses West of SH 160 and South of TX-121
A	30" Crude PL			Runs N-S, crosses West of SH 160 and South of TX-121
A	Texoma PL		300	Appears to be 2 crossings on google earth...might want to double check
A	CR 936	50		
A	Pr-5003	50		
A	24" Natural Gas PL			Runs NW/SE Crosses A east of Pilot Grove Creek and West of Texoma PL
A	Private Road	50		
A	Pilot Grove Creek		150	Heavily wooded with surrounding wetlands north of CR 581
A	CR 581	50		
A	CR 527	50		
A	Branch of Pilot Grove Creek	50		Moderately wooded creek crossing
A	FM2862		50	
A	CR 513	50		
A	Creek Crossing	100		Moderately wooded creek crossing
A	CR 507	50		
A	E FM 455		50	
A	Sister Grove Creek		150	Heavily wooded with surrounding wetlands just south of E FM 455
A	CR 475	50		
A	Overhead Electrical Utility			
A	Creek		100	Moderately wooded stream tributary of Sister Grove
A	Overhead Electrical Utility			
A	Brinlee Branch Creek		100	Branch of Sister Grove Creek moderately wooded
A	Overhead Electrical Utility			
A	CR 420	50		
A	Brinlee Branch Creek	50		Moderately wooded Crossing with surrounding ponds
A	CR 416	50		
A	Landfill			Big Landfill here - 1093 acres
A	Sliff Creek	75		Moderately wooded creek crossing, some surrounding development near SH 121
A	Overhead Electrical Utility			
A	Private Road	50		
A	FM 2933		50	
A	Overhead Electrical Utility			
A	Clemons Creek		100	Heavily wooded, many houses in this area and a large pond to the southeast
A	Creek	100		Moderately wooded, in the middle of developed neighborhood, tributary to Clemons
A	Nugent St.	50		
A	Lillian Dr.	50		
A	FM 545		50	
A	Eastwood Rd	50		
A	FM 339		50	
A	Creek	75		Tributary to Clemons, runs along "Creekside RD"

Corridor Option	Crossing	Open Cut Distance (ft.)	Boring Distance (ft.)	Additional Notes
A	Creekside RD	50		
A	Overhead Electrical Utility			
A	Railroad Crossing		150	
A	Overhead Electrical Utility			
A	Bartlett Rd	50		
A	CR 338	50		
A	SH 5		150	
A	CR 275	50		
A	E Fork Trinity River		150	Heavily wooded, crosses wetlands
A	CR 277	50		
A	FM 543		50	
A	10.75" Natural Gas PL			Runs E-W, crosses A just south of FM 543 and US Hwy 75 intersection
A	6.63" Gas PL			Runs E-W, crosses A just south of FM 543 and US Hwy 75 intersection
A	Honey Creek		100	Heavily wooded, crosses wetlands
A	Overhead Electrical Utility			
A	Bloomdale Road	50		
A	Overhead Electrical Utility			
A	<b>A TOTALS</b>	<b>1800</b>	<b>2675</b>	
B	8.63" Crude PL			runs NW/SE, crosses just N of SH 78
B	Overhead Electrical Utility			
B	SH 78		80	
B	Creek		75	Part of Soil Conservation Service Site 47 Reservoir
B	CR 5035	50		
B	CR 5040	50		
B	Bear Creek		80	Lightly wooded creek crossing
B	24" Natural Gas PL			Runs E-W, Crosses A just east of County Road 5030
B	CR 5030	50		
B	Delba Creek	80		Lightly wooded creek crossing
B	CR 5025	50		
B	16" Natural Gas PL			Runs N-S, crosses A just east of Indian Creek, parallels the 10.75" line
B	10.75" Natural Gas PL			Runs N-S, crosses A just east of Indian Creek, parallels the 16" line
B	Bailey Creek	50		Sparsely wooded creek crossing, creek appears dried up in this area
B	Private Road	50		
B	Indian Creek		75	Sparsely wooded crossing
B	8.63" Gas PL			Runs N-S, crosses A just west of Indian Creek, east of CR 5020, parallels OHE
B	Overhead Electrical Utility			
B	CR 5020	50		
B	Overhead Electrical Utility			
B	CR 5010	50		
B	Pot Rack Creek		100	Moderately wooded crossing
B	Pot Rack Creek Tributary	50		appears dried up
B	CR 5005	50		
B	12.75" Gas PL			
B	16" Natural Gas PL			
B	Texoma PL			Runs N-S, share alignment when cross B just north of CR 5005 East of CR 633
B	24" Natural Gas PL			
B	County RD 633	50		
B	30" Crude PL			Runs N-S, B crosses just N of CR 580 and east of Desert Creek
B	30" Crude PL			Runs N-S, B crosses just east of Desert Creek just south of CR 580
B	FM 580	50		
B	Desert Creek		75	Moderately wooded, crosses just south of FM 580 and east of SH 78
B	Overhead Electrical Utility			
B	SH 78		100	
B	Pilot Grove Creek		100	Moderately wooded, surrounded by wetlands on North and South sides of corridor
B	Overhead Electrical Utility			
B	CR 577	50		
B	Red Oak Creek	50		Moderately wooded crossing west of CR 577
B	CR 505	50		
B	Overhead Electrical Utility			
B	FM 2862		50	
B	Scrib Ln	50		
B	CR 503	50		
B	CR 475	50		
B	Overhead Electrical Utility			
B	FM 545		50	
B	Sister Grove Creek		80	Moderately wooded crossing
B	FM 1827		50	<b>B-1 Splits from B at this crossing</b>
B	Overhead Electrical Utility			
B	Private road	50		
B	CR 469	50		
B	Stiff Creek		150	This is the flooded Soil Conservation Site 12 Reservoir crossing
B	CR 409	50		
B	CR 410	50		
B	FM 2933		50	
B	Overhead Electrical Utility			
B	Clemons Creek		200	Moderately wooded crossing with wetlands nearby the south of corridor
B	Private Road	50		
B	Railroad Crossing		200	
B	CR 338	50		
B	10.75" Natural Gas PL			Runs E-W crosses just West of RR, north of the 6.63 gas PL
B	6.63 Gas PL			Runs E-W crosses just West of RR south of 10.75" line
B	E Fork Trinity River		150	Moderately wooded with some surrounding wetlands

Corridor Option	Crossing	Open Cut Distance (ft.)	Boring Distance (ft.)	Additional Notes
B	SH 5		150	
B	<b>B TOTALS</b>	<b>1280</b>	<b>1815</b>	<b>These totals are only option B totals, not B-1</b>
B-1	FM 1827		50	
B-1	Overhead Electrical Utility			
B-1	CR 469	50		
B-1	Private Road	50		
B-1	Stiff Creek		150	This is the flooded Soil Conservation Site 12 Reservoir crossing
B-1	CR 409	50		
B-1	Overhead Electrical Utility			
B-1	CR 341	50		
B-1	Overhead Electrical Utility			
B-1	10.75" Natural Gas PL			Runs E-W, crosses S of CR 341 and East of FM 2933, parallels 6.63" line
B-1	6.63" Gas PL			Runs E-W, crosses S of CR 341 and East of FM 2933, parallels 10.75" line
B-1	FM 2933		50	
B-1	Overhead Electrical Utility			
B-1	CR 338	50		
B-1	Railroad Crossing		100	
B-1	E Fork Trinity River		150	Heavily wooded creek crossing with wetlands
B-1	Overhead Electrical Utility			
B-1	SH 5		150	
B-1	Overhead Electrical Utility			
B-1	<b>B-1 TOTALS</b>	<b>1230</b>	<b>1515</b>	<b>These totals include the crossings from route B down to FM 1827 and all B-1 crossings</b>
C	8.63" Crude PL			runs NW/SE, crosses just N of SH 78
C	Overhead Electrical Utility			
C	SH 78		80	
C	CR 5045	50		
C	Overhead Electrical Utility			
C	24" Natural Gas PL			Runs E-W, Crosses West of CR 1138 and East of FM 981, about 1/2 mile south of CR 5045
C	FM 981		50	
C	Overhead Electrical Utility			
C	Private road	50		
C	Bear Creek		100	Sparsely wooded with surrounding wetlands, crosses just north of CR 673
C	CR 673	50		
C	CR 672	50		
C	Overhead Electrical Utility			
C	CR 670	50		
C	16" Natural Gas PL			runs N-S, Crosses just west of CR 670 east of Indian Creek, parallels 10.75" PL
C	10.75" Natural Gas PL			runs N-S, Crosses just west of CR 670 east of Indian Creek, parallels 16" PL
C	Indian Creek		100	Moderately wooded crossing
C	8.63" Gas PL			runs N-S, crosses just west of Indian Creek, east of CR 671
C	Overhead Electrical Utility			
C	CR 671	50		
C	Overhead Electrical Utility			
C	CR 631	50		
C	Pot Rack Creek		75	Sparsely wooded
C	CR 632	50		
C	12.75" Gas PL			Runs N-S, crosses just North of FM 981, West of CR 632, parallels 16" PL
C	16" Natural Gas PL			Runs N-S, crosses just North of FM 981, West of CR 632, parallels 12.75" PL
C	FM 981		50	
C	Overhead Electrical Utility			
C	CR 626	50		
C	30" Crude PL			Runs N-S, crosses just west of CR 626, runs parallel to other 30" line generally
C	Overhead Electrical Utility			
C	30" Crude PL			Runs N-S, crosses just west of CR 626, runs parallel to other 30" line generally
C	24" Natural Gas PL			Runs N-S, crosses just east of Desert Creek, west of 30" PL
C	Desert Creek		75	Sparsely wooded, some wetlands to the south
C	SH 78		100	
C	S TX-78-BR		100	
C	Pilot Grove Creek		200	Heavily wooded, crosses wetlands
C	Overhead Electrical Utility			
C	Overhead Electrical Utility			
C	FM 1377		50	<b>East of this crossing, the corridor splits into C, C-1, and C-2</b>
C	Lick Branch	100		branch of Pilot Grove Creek, moderately wooded
C	Harrington Branch	100		branch of Pilot Grove Creek, moderately wooded
C	Overhead Electrical Utility			
C	Overhead Electrical Utility			
C	CR 502	50		
C	CR 500	50		
C	Overhead Electrical Utility			
C	Sister Grove Creek		150	Heavily wooded, wetlands to the north and south
C	Overhead Electrical Utility			
C	FM 1827		50	
C	Overhead Electrical Utility			
C	Halter Branch	75		Branch of sister grove creek, moderately wooded, crosses right at FM 1827
C	CR 469	50		
C	Private RD	50		
C	Stiff Creek		150	This is the flooded Soil Conservation Site 12 Reservoir crossing
C	CR 409	50		
C	Overhead Electrical Utility			
C	CR 341	50		
C	10.75" Natural Gas PL			Runs E-W, crosses S of CR 341, East of FM 2933, parallels other 6.63" Gas PL
C	6.63" Gas PL			Runs E-W, crosses S of CR 341, East of FM 2933, parallels other 10.75" natural Gas PL

Corridor Option	Crossing	Open Cut Distance (ft.)	Boring Distance (ft.)	Additional Notes
C	FM 2933		50	
C	Overhead Electrical Utility			
C	CR 338	50		
C	Railroad Crossing		100	
C	E Fork Trinity River		200	Heavily wooded creek crossing with wetlands surrounding
C	Overhead Electrical Utility			
C	SH 5			
C	Overhead Electrical Utility			
C	<b>C TOTALS</b>	<b>1075</b>	<b>1680</b>	<b>These totals are Option C totals and do not include the C-1 and/or C-2 crossings</b>
C-1	Private Road	50		<b>Continued from the corridor split point above in Option C</b>
C-1	FM 1377		50	
C-1	Overhead Electrical Utility			
C-1	Lick Branch Creek		100	Moderately wooded creek crossing
C-1	CR 573	50		
C-1	CR 501	50		
C-1	Private Road	50		
C-1	CR 500	50		
C-1	Overhead Electrical Utility			
C-1	Sister Grove Creek		400	Heavily wooded creek crossing
C-1	Overhead Electrical Utility			
C-1	FM 1827		50	
C-1	Creek		80	branch of sister grove, wooded creek crossing
C-1	CR 469	50		
C-1	Sliff Creek		150	This is the flooded Soil Conservation Site 12 Reservoir crossing
C-1	CR 409	50		
C-1	CR 341	50		
C-1	10.75" Natural Gas PL			Runs E-W, crosses S of CR 341, East of FM 2933, parallels other 6.63" Gas PL
C-1	6.63" Gas PL			Runs E-W, crosses S of CR 341, East of FM 2933, parallels other 10.75" natural Gas PL
C-1	FM 2933		50	
C-1	CR 338	50		
C-1	Railroad Crossing		100	
C-1	E Fork Trinity River		150	Heavily wooded creek crossing with wetlands
C-1	Overhead Electrical Utility			
C-1	SH 5		100	
C-1	<b>C-1 TOTALS</b>	<b>900</b>	<b>2160</b>	<b>These totals include the crossings of Option C down to FM 1377 and all of C-1</b>
C-2	Private Road	50		<b>Continued from the corridor split point above in Option C</b>
C-2	FM 1377		50	
C-2	Lick Branch Creek		100	Moderately wooded creek crossing
C-2	CR 470	50		
C-2	Harrington Branch Creek		100	
C-2	CR 470	50		
C-2	Sister Grove Creek		100	Moderately wooded with wetlands surrounding
C-2	CR 465	50		
C-2	FM 1827		50	
C-2	CR 995	50		
C-2	Sliff Creek		75	
C-2	10.75" Natural Gas PL			Parallels C-2 from Sister Grove Creek to just West of FM 409, then crosses
C-2	6.63" Gas PL			Parallels C-2 from Sister Grove Creek to just West of FM 409, then crosses
C-2	Ticky Creek		75	Lightly wooded creek crossing
C-2	Overhead Electrical Utility			
C-2	CR 409	50		
C-2	FM 2933		50	
C-2	Overhead Electrical Utility			
C-2	CR 338	50		
C-2	Railroad Crossing		100	
C-2	East Fork Trinity River		150	Heavily wooded creek crossing with wetlands
C-2	Overhead Electrical Utility			
C-2	SH 5		150	
C-2	<b>C-2 TOTALS</b>	<b>800</b>	<b>1930</b>	<b>These totals include the crossings of Option C down to FM 1377 and all of C-2</b>



July 15, 2016

## **Attachment 5**

### Land Owner List



This page is a placeholder for information submitted with the application that may contain confidential information. Please contact Cindy DePrato, Executive Assistant at (512) 463-8420 to request reviewing this information.

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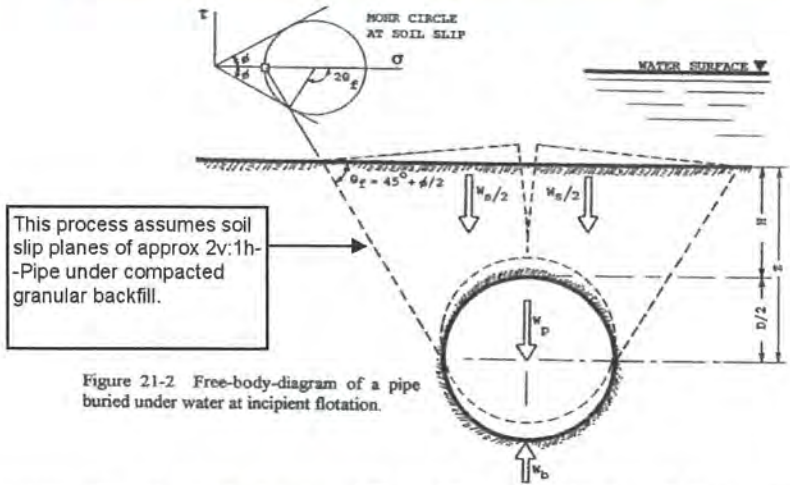
This page is a placeholder for information submitted with the application that may contain confidential information. Please contact Cindy DePrato, Executive Assistant at (512) 463-8420 to request reviewing this information.



July 15, 2016

**Attachment 6**  
Buoyancy Calculations

**PIPE BUOYANCY DESIGN PROCESS—FLOTATION OF PIPES  
SIMPLIFIED, WORST CASE EXAMPLE**



Reference: "Structural Mechanics of Buried Pipes" by Watkins & Anderson

**VARIABLES:**   = user input        = constant or calculated

$W_p =$	<span style="background-color: yellow; border: 1px solid black; padding: 2px;">396.20</span> lb/lf (Weight of empty pipe per unit length)
$W_c =$	<span style="background-color: yellow; border: 1px solid black; padding: 2px;">0.00</span> lb/lf (Weight of pipe contents per unit length, set to zero for worst case)
OD =	<span style="background-color: yellow; border: 1px solid black; padding: 2px;">86.00</span> inches (outside pipe diameter) <span style="background-color: gray; border: 1px solid black; padding: 2px;">7.17</span> feet
ID =	<span style="background-color: yellow; border: 1px solid black; padding: 2px;">84.00</span> inches (inside pipe diameter) <span style="background-color: gray; border: 1px solid black; padding: 2px;">7.00</span> feet
$\gamma_w =$	<span style="background-color: yellow; border: 1px solid black; padding: 2px;">62.40</span> lb/ft <sup>3</sup> (unit weight of water, or other liquid pipe is immersed in)

**CALCULATED VALUES:**

$W = W_c + W_p =$  396.20 lb/lf (Weight of Pipe & Contents)

$\gamma_b =$  62.40 lb/ft<sup>3</sup> (buoyant unit weight of soil)

$D =$  85.00 inches (mean diameter)      7.08 feet

$W_s =$  Buoyant weight of soil wedges above a buried pipe per (lb/lf)  
Assumes soil slip planes of approximately 2v:1h

$W_s = \gamma_b [Z(D + 0.5Z) - \pi D^2 / 8]$       See below for values

$W_b =$  Buoyant (uplift force) on pipe (lb/lf) = weight of liquid displaced

$W_b = \pi(OD)^2 \gamma_w / 4$       2515.87 lb/ft

$fs =$   $fs = \frac{ABS (W_T)}{W_b}$       safety factor (see below for values)

H (ft)	Z (ft)	fs	$W_s$ (lb/ft)	$W$ (lb/ft)	$W_T$ (lb/ft)	$W_b$ (lb/ft)
1	4.54	0.72	-1422.12	-396.20	-1818.32	2515.87
2	5.54	1.02	-2178.72	-396.20	-2574.92	2515.87
3	6.54	1.32	-2997.72	-396.20	-3393.92	2515.87
4	7.54	1.70	-3879.12	-396.20	-4275.32	2515.87
5	8.54	2.07	-4822.92	-396.20	-5219.12	2515.87
6	9.54	2.47	-5829.12	-396.20	-6225.32	2515.87
7	10.54	2.90	-6897.72	-396.20	-7293.92	2515.87
8	11.54	3.35	-8028.72	-396.20	-8424.92	2515.87
9	12.54	3.82	-9222.12	-396.20	-9618.32	2515.87
10	13.54	4.32	-10477.9	-396.20	-10874.12	2515.87
11	14.54	4.85	-11796.1	-396.20	-12192.32	2515.87
12	15.54	5.39	-13176.7	-396.20	-13572.92	2515.87
13	16.54	5.97	-14619.7	-396.20	-15015.92	2515.87
14	17.54	6.57	-16125.1	-396.20	-16521.32	2515.87
15	18.54	7.19	-17692.9	-396.20	-18089.12	2515.87
16	19.54	7.84	-19323.1	-396.20	-19719.32	2515.87
17	20.54	8.51	-21015.7	-396.20	-21411.92	2515.87
18	21.54	9.21	-22770.7	-396.20	-23166.92	2515.87
19	22.54	9.93	-24588.1	-396.20	-24984.32	2515.87
20	23.54	10.68	-26467.9	-396.20	-26864.12	2515.87
H >= 0.5D		fs >= 1.47222				
H < 0.5D		fs < 1.47222				

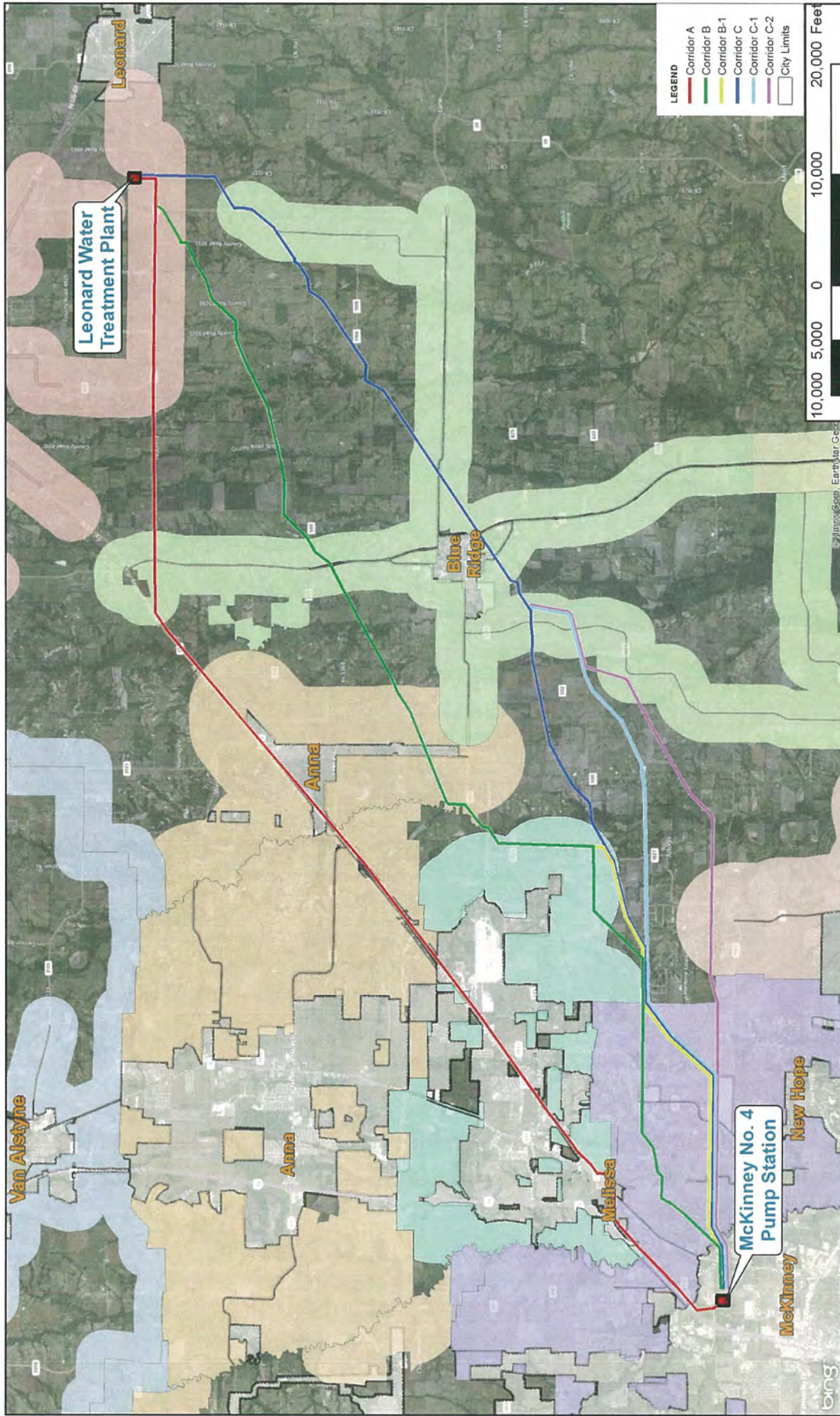
According to Watkins & Anderson, the height of cover should be at least half the pipe diameter. This correlates to a factor of safety of approximately 1.47222. This only applies when you have granular embedment or better compacted to at least 90% density. Also, if the designer has specified all welded joints, this added resistance is sufficient to resist uplift with only half the diameter of cover.

If the designer is unsure of the control of backfill or the embedment material is something other than granular, then a conservative rule of thumb would be to specify soil cover equal to pipe diameter. The designer could also run detailed buoyancy calculations on additional tabs in this spreadsheet.



July 15, 2016

**Attachment 7**  
Extraterritorial Jurisdiction Exhibit



<b>PROJECT:</b> MIDLAND <b>FILE:</b> EIJ 2006 <b>COORDINATE SYSTEM:</b> NAD83/UTM ZONE 16Q UTM <b>DATE:</b> 7/20/10 <b>PREPARED BY:</b> GSA/ALS		<b>FRISBEE NICHOLS</b> 2711 N. Hagel Avenue Suite 3200 Fort Worth, TX 76104 Phone: (214) 317-2290	
<b>NORTH TEXAS MUNICIPAL WATER DISTRICT</b> Leonard WTP to McKinney No. 4 Treated Water Pipeline Extraterritorial Jurisdiction Exhibit		<b>ETJ</b> Anna Blue Ridge Farmerville McKinney Melissa Pincotton Trenchon Van Alstyne	
<b>LEGEND</b> Corridor A Corridor B Corridor B-1 Corridor C Corridor C-1 Corridor C-2 City Limits		<b>Attachment</b> 7	

Scale: 1" = 10,000 Feet

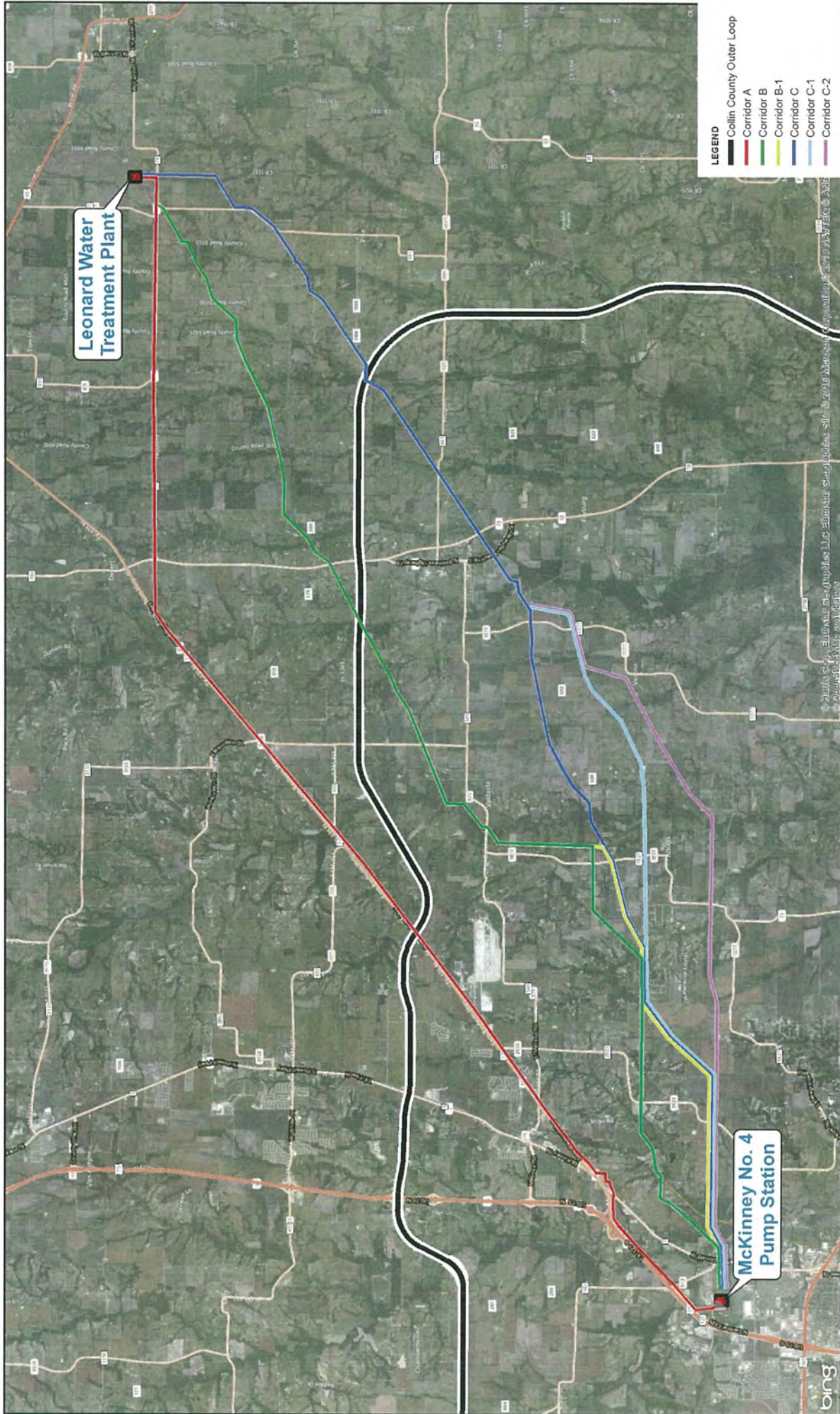


July 15, 2016

## **Attachment 8**

Future Collin County Outer Loop Extension Exhibit





- LEGEND**
- Collin County Outer Loop
  - Corridor A
  - Corridor B
  - Corridor B-1
  - Corridor C
  - Corridor C-1
  - Corridor C-2

**Leonard Water Treatment Plant**

**McKinney No. 4 Pump Station**

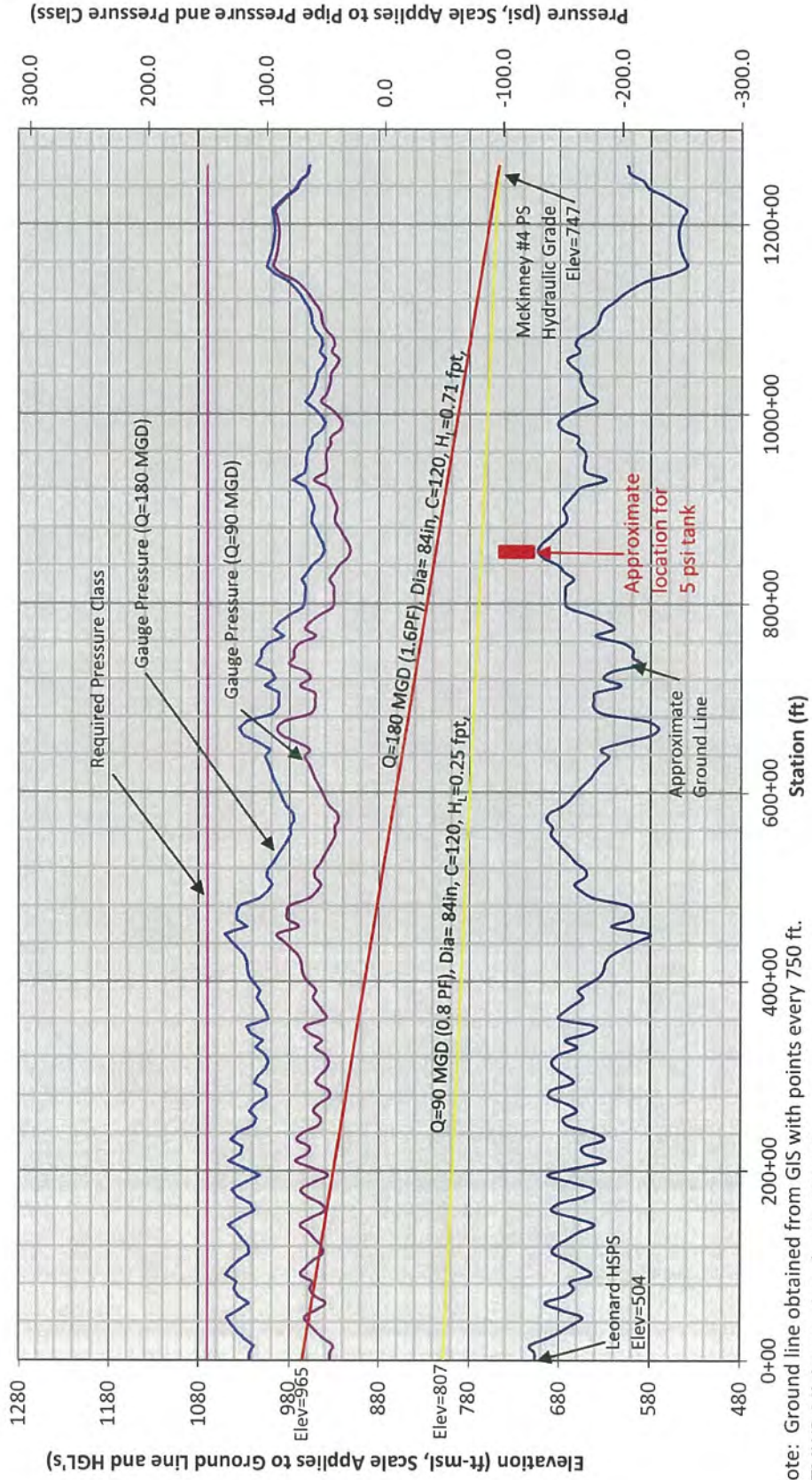
<b>NORTH TEXAS MUNICIPAL WATER DISTRICT</b> Leonard WTP to McKinney No. 4 Treated Water Pipeline Future Collin County Outer Loop Extension Exhibit			<b>Attachment</b> 8
10,000 5,000 0 10,000 20,000 Feet			
<b>PREPARED BY:</b> FRESSE MICHOELS 2711 N. Hagel Avenue Suite 3300 Irving, TX 75038 Phone: (214) 317-2200			
<b>DATE:</b> 08/20/2014			
<b>PROJECT:</b> Collin County Outer Loop, 3 and 4 mile			
<b>COORDINATE SYSTEM:</b> NAD83 UTM Zone 18Q UTM			
<b>FILE:</b> MID14004			



July 15, 2016

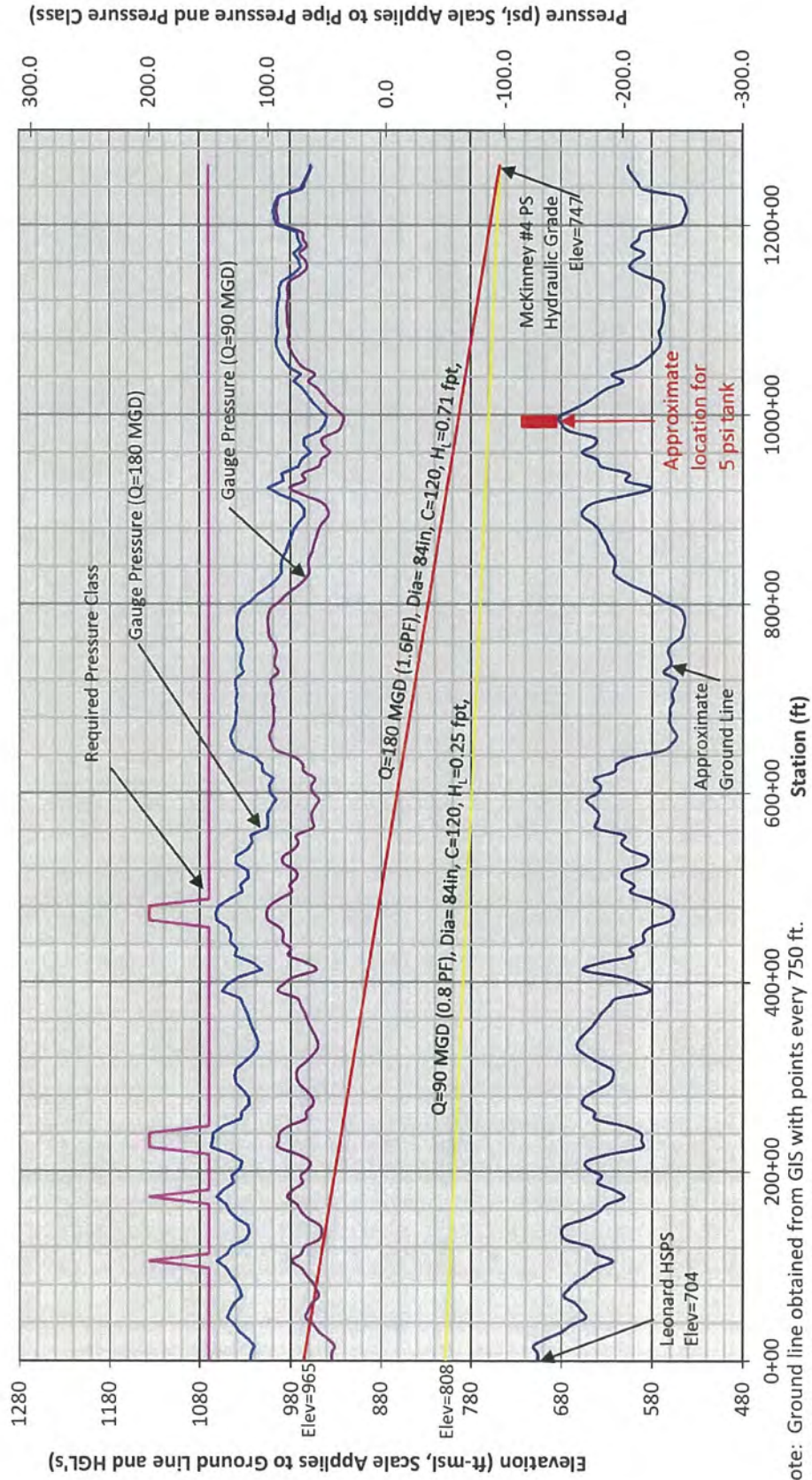
**Attachment 9**  
Hydraulic Grade Lines

**84" Treated Water Pipeline, Corridor A  
Leonard WTP to McKinney No. 4  
Hydraulic Grade (El. 747)**



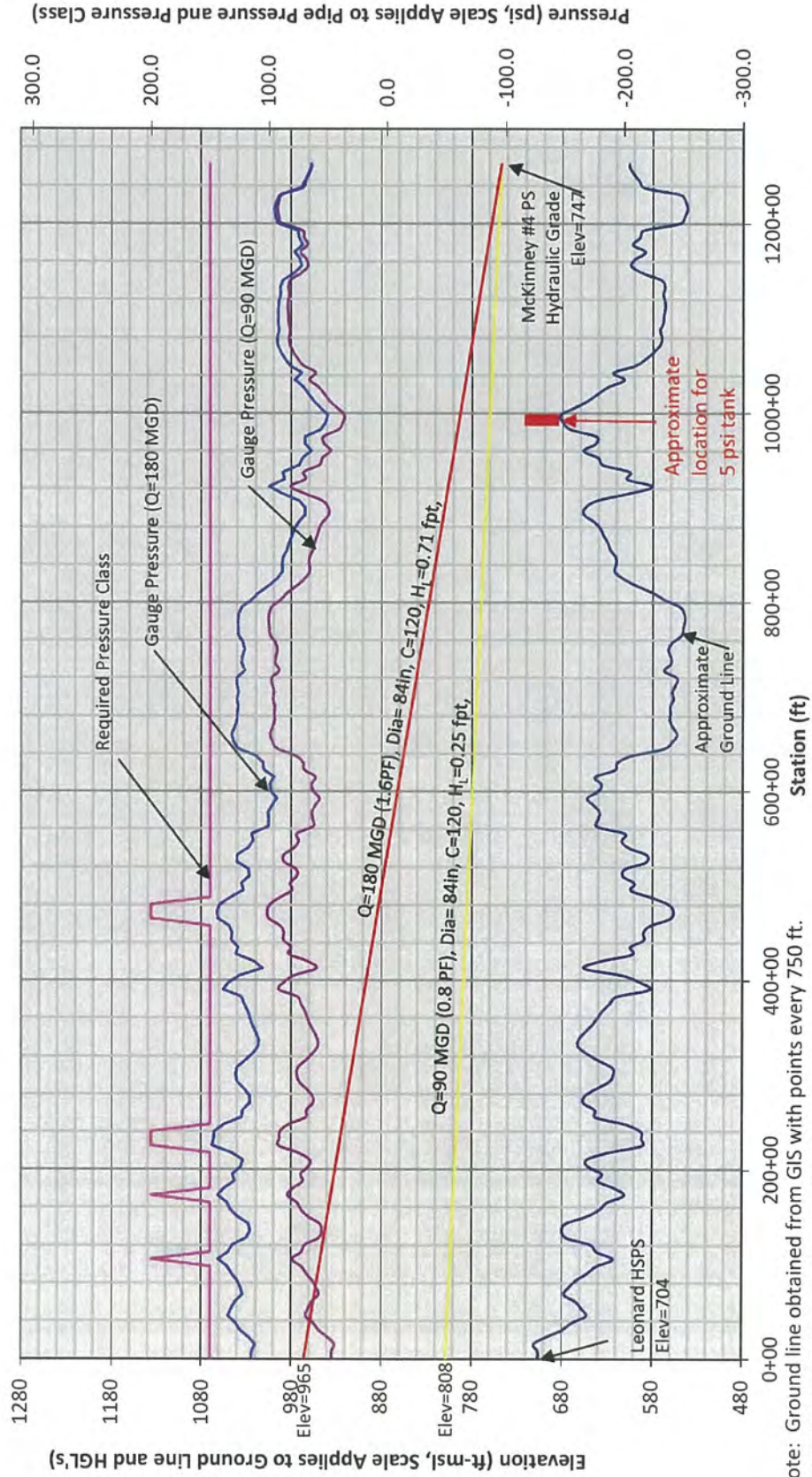
Note: Ground line obtained from GIS with points every 750 ft.  
NTMWD Minimum pipe class is 150 psi

**84" Treated Water Pipeline, Corridor B  
Leonard WTP to McKinney No. 4  
Hydraulic Grade (El. 747)**



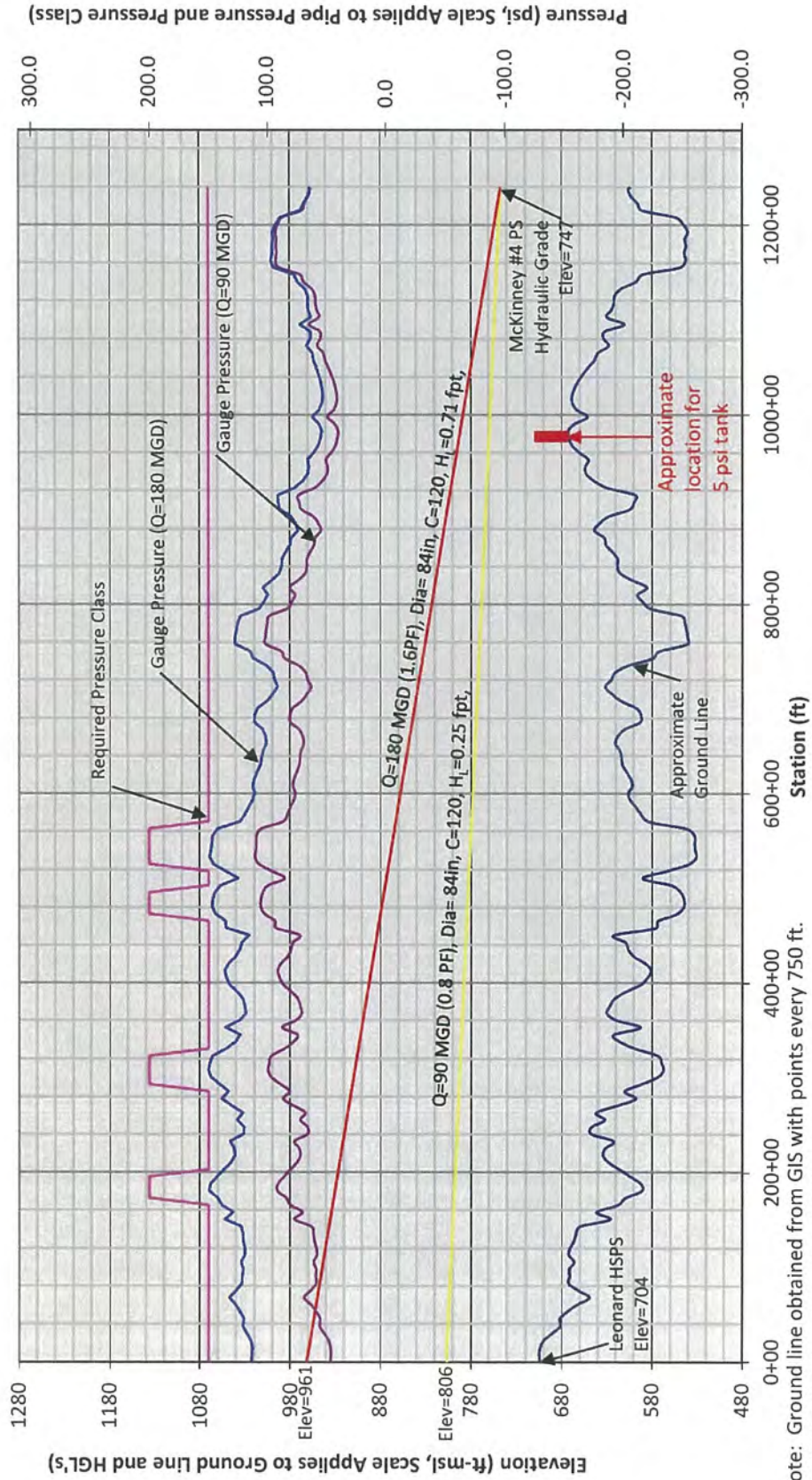
Note: Ground line obtained from GIS with points every 750 ft.  
NTMWD Minimum pipe class is 150 psi

**84" Treated Water Pipeline, Corridor B1  
Leonard WTP to McKinney No. 4  
Hydraulic Grade (El. 747)**



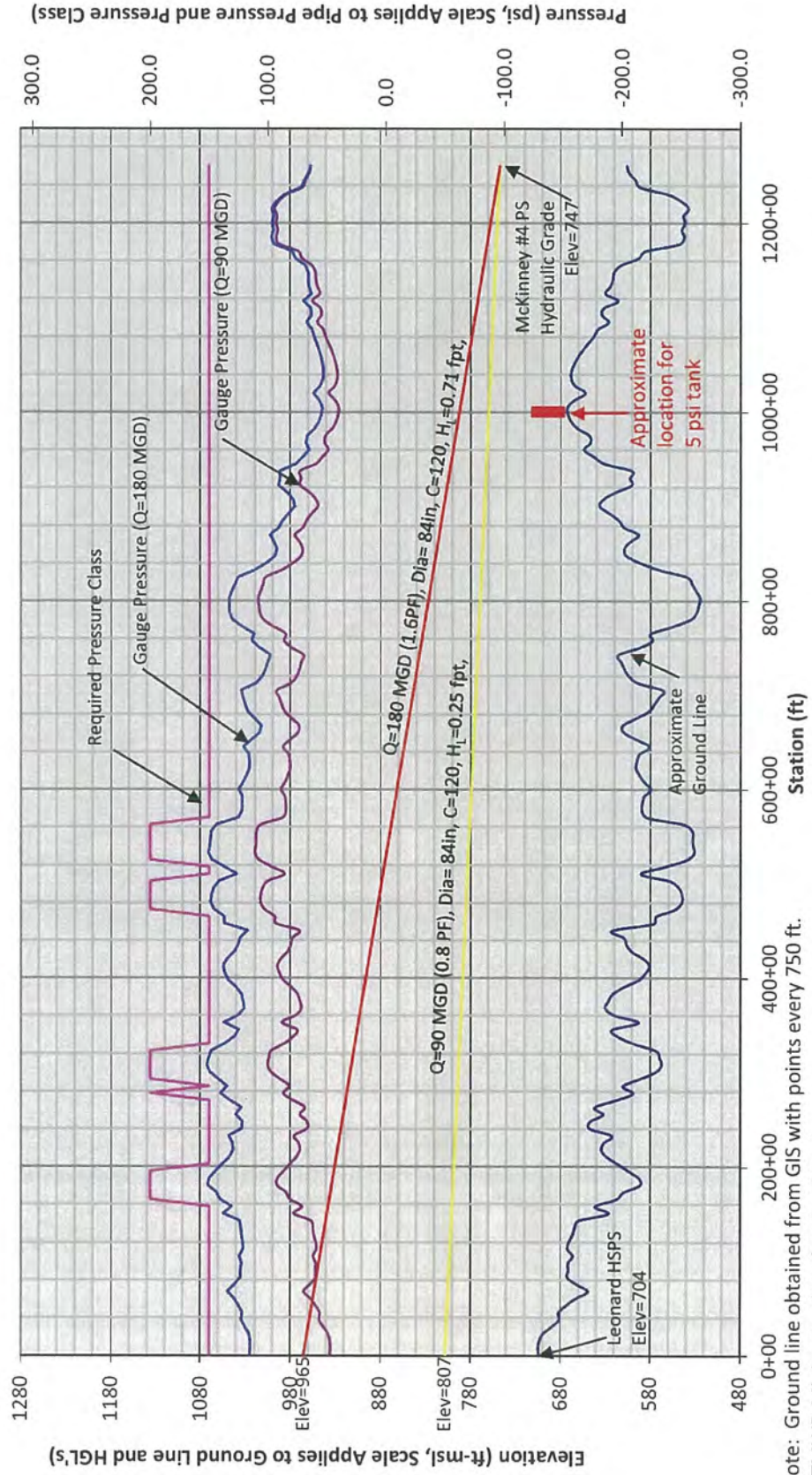
Note: Ground line obtained from GIS with points every 750 ft.  
NTMWD Minimum pipe class is 150 psi

**84" Treated Water Pipeline, Corridor C  
Leonard WTP to McKinney No. 4  
Hydraulic Grade (El. 747)**



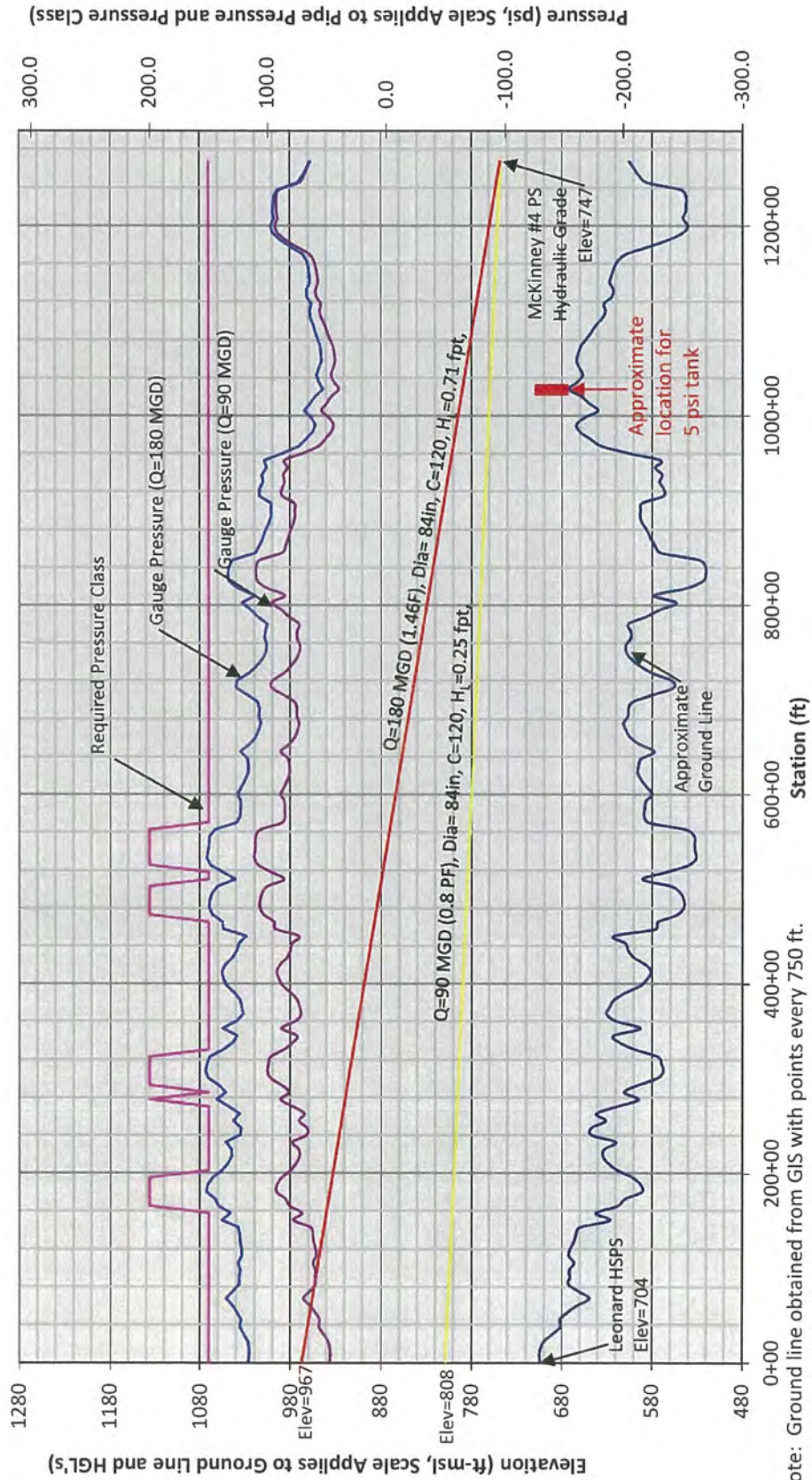
Note: Ground line obtained from GIS with points every 750 ft.  
NTMWD Minimum pipe class is 150 psi

### 84" Treated Water Pipeline, Corridor C1 Leonard WTP to McKinney No. 4 Hydraulic Grade (El. 747)



Note: Ground line obtained from GIS with points every 750 ft.  
NTMWD Minimum pipe class is 150 psi

**84" Treated Water Pipeline, Corridor C2  
Leonard WTP to McKinney No. 4  
Hydraulic Grade (El. 747)**



Note: Ground line obtained from GIS with points every 750 ft.  
NTMWD Minimum pipe class is 150 psi





Lower Bois D'arc Reservoir

Section A

Section B

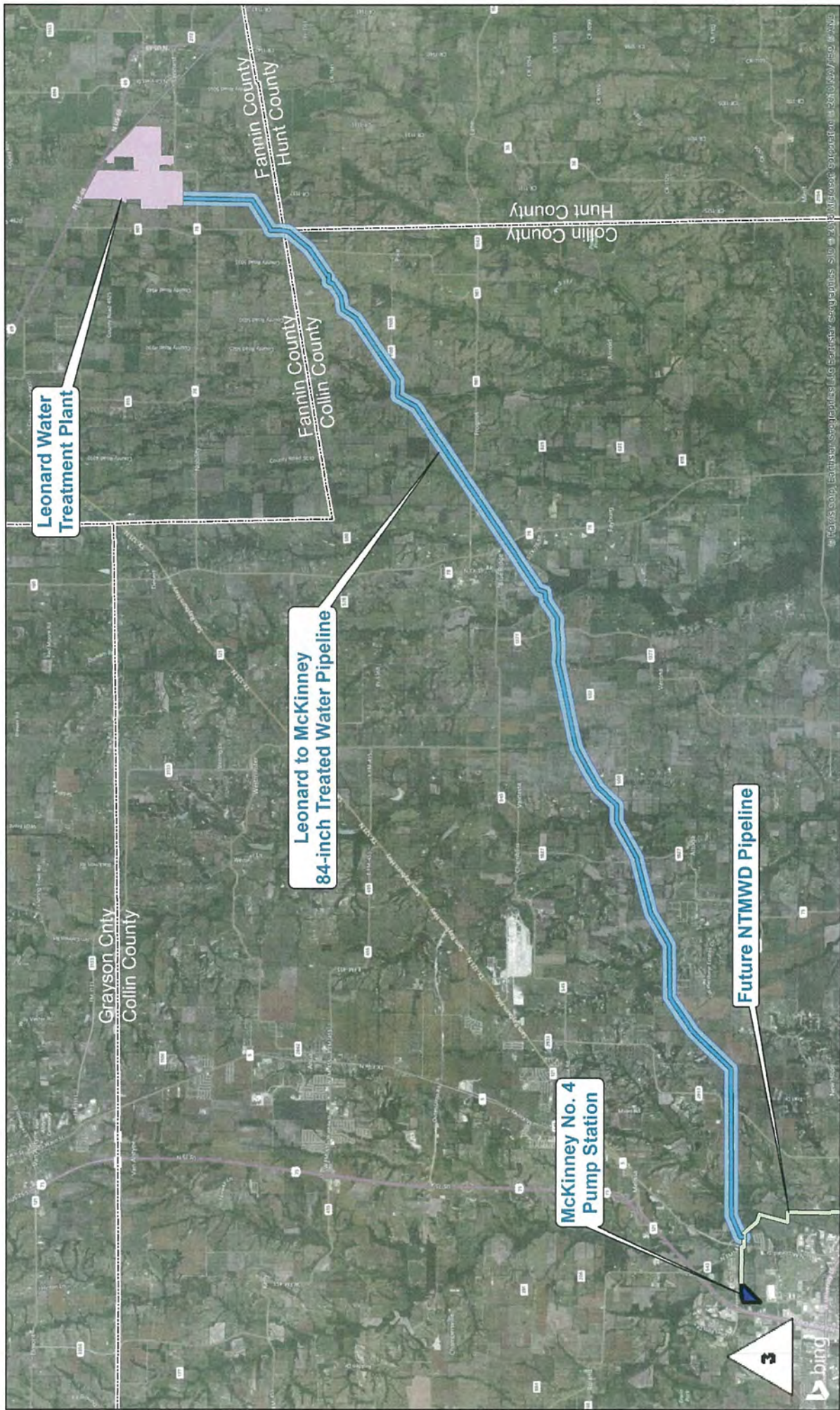
Section C

Leonard Water Treatment Plant

<b>NORTH TEXAS MUNICIPAL WATER DISTRICT</b> Raw Water Pipeline Selected Alignment Map		 Figure <b>2</b>
 13,500 0 13,500 27,000 Feet		
<b>FRESSE NICHOLS</b> 2711 N. Haskell Avenue Suite 3300 Dallas, TX 75204 Phone: (214) 217-2230		
PROJECT: RD14624 TITLE: Proposed Pipeline COORDINANT SYSTEM: NAD83 UTM PLANE 18 RBNM CLEARED (GCS)		
DATE: 10/12/2018 PREPARED BY: GCS, WLS		



Grayson Cnty  
 Collin County  
 bing



**Leonard Water Treatment Plant**

**Leonard to McKinney 84-inch Treated Water Pipeline**

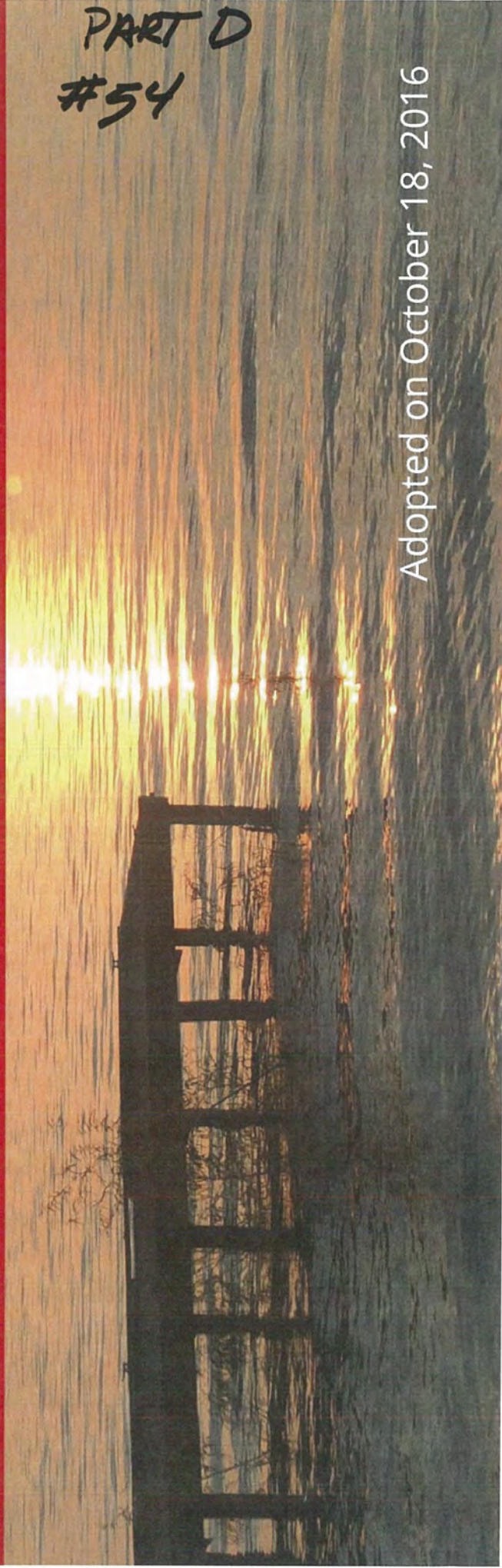
**McKinney No. 4 Pump Station**

**Future NTMWD Pipeline**

	<b>Figure</b> 1
	<b>PROJECT:</b> NTMWD #2 <b>FILE:</b> Leonard_Fig001.dwg <b>COORDINATE SYSTEM:</b> NAD83 STATE PLANE TX 8000 CENTRAL (FEET) <b>DATE:</b> 10/18/2018 <b>PREPARED BY:</b> COLGALS <small>Copyright © 2018 by Bird Construction, Inc. All rights reserved. Microsoft Corporation is the copyright owner of Microsoft Office 2016.</small>
<b>NORTH TEXAS MUNICIPAL WATER DISTRICT</b>	
<b>Leonard WTP to McKinney No. 4 Treated Water Pipeline Selected Corridor Map</b>	

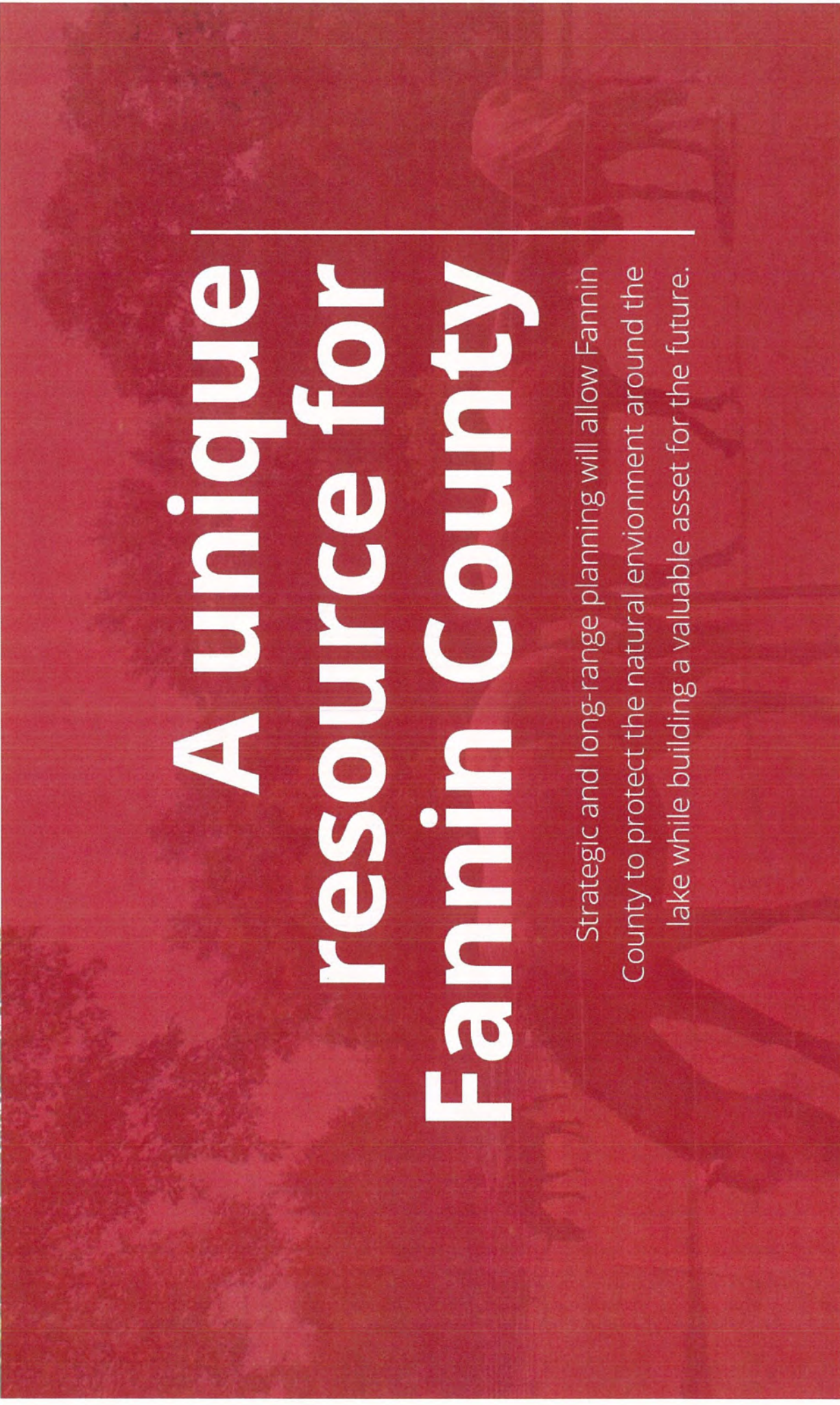
*Fannin County's Comprehensive Plan for*

# **Lower Bois d'Arc Creek Reservoir**



PART D  
#54

Adopted on October 18, 2016



# A unique resource for Fannin County

Strategic and long-range planning will allow Fannin County to protect the natural environment around the lake while building a valuable asset for the future.

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# History

## *of the Lower Bois d'Arc Creek Reservoir*

With north central Texas becoming one of the fastest growing regions in the state, Fannin County officials anticipated that this growth would greatly affect different facets of development in the County, particularly the need for water. The North Texas Municipal Water District (NTMWD) is a regional provider of water, wastewater, and solid waste disposal services. It currently serves a population of approximately 1.6 million residents, which is projected to more than double by 2070. In order to meet the needs of the expected population, as well as to support businesses, jobs, and economic prosperity in the region, a reliable water supply is critical; therefore, the Lower Bois d'Arc Creek Reservoir (LBCR) project commenced.

The NTMWD began studying the lake and considered it a potential reservoir in 1984. Further studies were conducted, but it was not until 2004 that a push for the construction of the LBCR began. In late 2004, Fannin County officials held a series of meetings with NTMWD regarding the construction of the LBCR. From the meetings, an understanding was developed between

the two entities. An economic study was completed in 2004, and updated in 2007 and 2012, that analyzed the potential impacts of a new reservoir on Fannin County. In 2004, the City of Bonham and NTMWD executed a contract that allowed Bonham to become a customer of the NTMWD. In the contract, NTMWD agreed to plan, design, construct, finance, operate, and maintain a new water treatment plant to serve the residents of Bonham.

Fannin County Commissioners Court passed a resolution on March 28, 2005 that endorsed and encouraged the State and Federal permitting actions required for the proposed LBCR and requested that NTMWD undertake all costs associated with the permitting and future construction of the LBCR. The resolution also encouraged the formation of a local entity that would represent not only the interest of the County, but also the communities, cities, towns, and water providers located within the County during the planning, permitting, and construction of the reservoir.

The Fannin County Water Supply Agency (Agency) was





formed as recommended by the County. On March 22, 2007, the Agency passed a resolution that endorsed and encouraged the NTMWD to undertake the permitting and construction costs of the proposed LBCR. The following year, the Agency passed another resolution that authorized the execution of a Memorandum of Agreement (MOA) with NTMWD, which stated that NTMWD would provide a water supply to any member of the Agency through a water supply contract between the Agency and NTMWD. The MOA was finalized and became effective on March 3, 2009.

With the support of the County and the NTMWD, Texas Local Government Code Chapter 231, Subchapter G, was amended effective April 29, 2011 to grant Fannin County the authority to zone “the area within 5,000 feet of where the shoreline of the Lower Bois d’Arc Creek Reservoir would be if the reservoir were filled to its storage capacity.” This zoning authority will help ensure cohesive development around the LBCR.

### **Projected Lake Information**

for more information visit: [www.ntmwd.com/bois\\_dArc](http://www.ntmwd.com/bois_dArc)

- The lake is projected to be under 516’ at least 10% of the time (based on historic hydrologic record of 50 years)
- The lake is projected to be over 534’ at least 10% of the time (based on historic hydrologic record of 50 years)
- The lake will be between 516’ and 534’ at least 80% of the time (based on historic hydrologic record of 50 years)
- Water will run over the spillway at 541’
- The projected average inflow is 200,000 acre-feet (an acre-foot is the volume of one acre of surface area to a depth of one foot)

*Source: LBCR Environmental Impact Statement*

# Chapter 1

## *Baseline Analysis and Existing Conditions*

**Chapter Purpose:** To document existing conditions and establish a framework for the comprehensive plan

### **Introduction to the Plan**

#### **Background**

The Lower Bois d'Arc Creek Reservoir (LBCR) is an approximately 16,500-acre proposed lake on Bois d'Arc Creek in Fannin County. The LBCR is a recommended water supply source for the North Texas Municipal Water District (NTMWD) that is expected to meet the water needs of the growing region, which includes Fannin County. The NTMWD began studying this lake in 1984 and filed for a Texas water rights permit in December 2008. In 2015, the State of Texas issued a water right to NTMWD to construct the lake with a capacity of 367,609 acre-feet and a reliable water supply of 120,000 acre-feet per year. The LBCR will be owned and operated by the NTMWD. Water from the lake will be used to meet the growing demands of the NTMWD customers, provide water to users in Fannin County, and provide recreational opportunities to the region. This project is a critical component to NTMWD's long-range water supply plan. The LBCR is not only expected to provide a much needed water supply, but the construction and use of the lake is also expected to be an economic boost to Fannin County and surrounding areas.

**Fannin County Regional Location**







### **Purpose of the Plan**

The purpose of this Comprehensive Plan is to establish a vision for how the land around the LBCR should develop. The content found within this plan will serve as a guide for County officials, as well as residents, for development-related decisions such as roads, land uses, and parks. The plan will also guide the development of the zoning ordinance, which is how much of the vision of the plan will be implemented. The creation of a comprehensive plan and zoning ordinance presents a unique opportunity for Fannin County and its residents. This is the first time within the State of Texas that a county will develop and adopt a comprehensive plan and zoning ordinance prior to the construction of a reservoir.

### **Statutory Authority**

Authority of certain counties in Texas to create a comprehensive plan is granted by Chapter 231 of the Texas Local Government Code. Chapter 231 of the Texas Local Government Code also outlines the legal requirements for zoning regulations to be enacted around certain lakes and reservoirs in Texas.

### **Planning Area**

The LBCR will be located in the north central portion of Fannin County, approximately 70 miles northeast of Dallas. The planning area for this Comprehensive Plan is the land that lies within a 5,000 foot buffer off the shoreline of the reservoir, which is 534 feet above mean sea level (AMSL). The planning area is shown in Figure 1.

## **Chapter 231**

*Chapter 231 of the Texas Local Government Code enables Fannin County to regulate zoning within the area that is 5,000 feet from the Lower Bois d'Arc Creek Reservoir shoreline.*

## Previous Planning Studies

### Lower Bois d’Arc Creek Reservoir Transportation Plan

Portions of the LBCR Transportation Plan summarize the discussions, agreements, and results of an effort between the NTMWD, Texas Department of Transportation (TxDOT), and Fannin County. The plan was developed in 2011 to identify and address future transportation needs in the area once the LBCR is constructed. This plan proposes that FM 1396 be abandoned and that several county roads be improved, for a total cost of approximately \$37.24 million.

### Texoma Comprehensive Economic Development Strategy

The Texoma Comprehensive Economic Development Strategy (CEDS) is a regional plan created by the Texoma Council of Governments that is updated every five years to provide assistance with the development of Cooke, Fannin, and Grayson Counties. The current plan was developed in 2012 to address planning efforts through 2017. The CEDS has developed four goals that will aid the advancement of the Texoma Region as a robust regional economy:

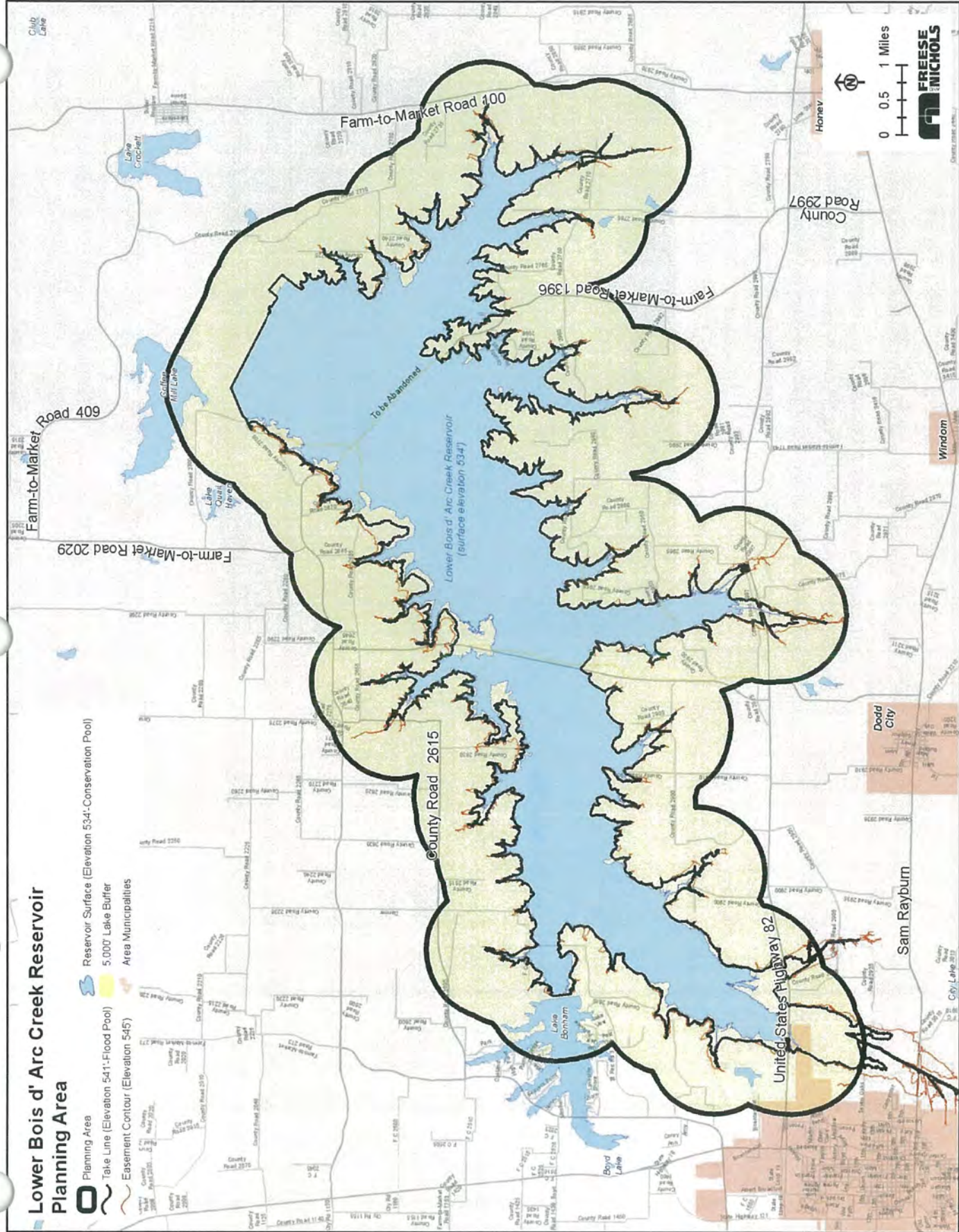
1. To implement unified regional economic development initiatives,
2. To advance the region’s economic progress through the use of current and pertinent data,
3. To increase the economic competitiveness of the region in the global economy, and
4. To advance high-quality infrastructure and community improvements to support development, redevelopment, and revitalization of the built environment and social fabric.

### Economic Development Study

An economic development study called “Update of the Economic, Fiscal, and Developmental Impacts of the Proposed Lower Bois d’Arc Reservoir Project” was completed in March 2012 and updated in January 2015. The purpose of the report was to provide an update of the previous economic assessments done in 2004 and 2007. The report concluded the following about the economic impact of the lake to Fannin County:

- During the construction phase of the dam, local economic activity will increase between \$509 million and \$563 million for Fannin County,
- This activity will contribute between \$211 million and \$324 million in gross county product and support between 4,999 and 5,525 person-years of employment with associated labor income between \$165 million and \$183 million,
- Visitors to the lake will bring \$17 million to \$22 million in new annual spending to the local economy,
- It is estimated over a 30-year period at least 1,100 new full-time residents will be established around the lake,
- An additional 2,100 residences will likely be built as vacation/weekend/second homes,
- The construction of the new homes will bring an average of 133 jobs per year to the local economy, and
- At full development, property taxes on new housing alone will add \$1.9 million to county tax revenue, school district revenue will be \$3.9 million per year, and local sales tax will generate at least \$303,000 per year with an additional \$183,000 in hotel occupancy taxes.

**Figure 1. LBCR Planning Area**



## Demographic Profile of Fannin County

### Historical Population and Growth Trends

People are the most important component of any community. The following discussion is intended to provide insight into the historical and existing characteristics of Fannin County residents. This demographic analysis will aid in planning for future growth of the County.

The population of Fannin County has experienced significant fluctuations since the 1900s, as shown in Table 1. The periods with the greatest rate of population growth occurred from 1990 to 2000, with a population change of approximately 6,438 people or a compound annual growth rate (CAGR) of 2.33 percent. There were several periods in which Fannin County experienced high levels of population decline, with the most significant occurring between 1940 and 1950 with a decrease of 9,811 people. According to the Texoma Council of Governments (TCOG) population estimate, there were 34,182 people living within Fannin County in 2015. Texas, on the other hand, has not experienced a similar pattern of growth. The State has managed to have a continuous trend of population increase, including the periods when Fannin County experienced a decline.

This could mean that although people were leaving Fannin County, they remained within the State of Texas. Table 2 shows a comparison of the population trends of Fannin County and the surrounding counties. Collin County has experienced the largest population

increase in both population numbers and compound annual growth rate (5.4 percent). Fannin County has grown at a similar CAGR as Grayson County, even though Grayson has a significantly larger population. Lamar and Delta counties have experienced lower CAGR, 0.5 percent and 0.2 percent, respectively.

### Surrounding Counties



**Table 1. Historical Population**

Year	Fannin County			Texas		
	Population	Population Change	CAGR	Population	Population Change	CAGR
1900	51,793	---	---	3,048,710	---	---
1910	44,801	(6,992)	-1.44%	3,896,542	847,832	2.48%
1920	48,186	3,385	0.73%	4,663,228	766,686	1.81%
1930	41,163	(7,023)	-1.56%	5,824,715	1,161,487	2.25%
1940	41,064	(99)	-0.02%	6,414,824	590,109	0.97%
1950	31,253	(9,811)	-2.69%	7,711,194	1,296,370	1.86%
1960	23,880	(7,373)	-2.65%	9,579,677	1,868,483	2.19%
1970	22,705	(1,175)	-0.50%	11,196,730	1,617,053	1.57%
1980	24,285	1,580	0.68%	14,229,191	3,032,461	2.43%
1990	24,804	519	0.21%	16,986,510	2,757,319	1.79%
2000	31,242	6,438	2.33%	20,851,820	3,865,310	2.07%
2010	33,915	2,673	0.82%	25,145,561	4,293,741	1.89%
2013*	33,819	(96)	0.09%	25,639,373	493,812	0.65%

Source: 1900-2010 U.S. Census

**Table 2. Growth of Surrounding Counties**

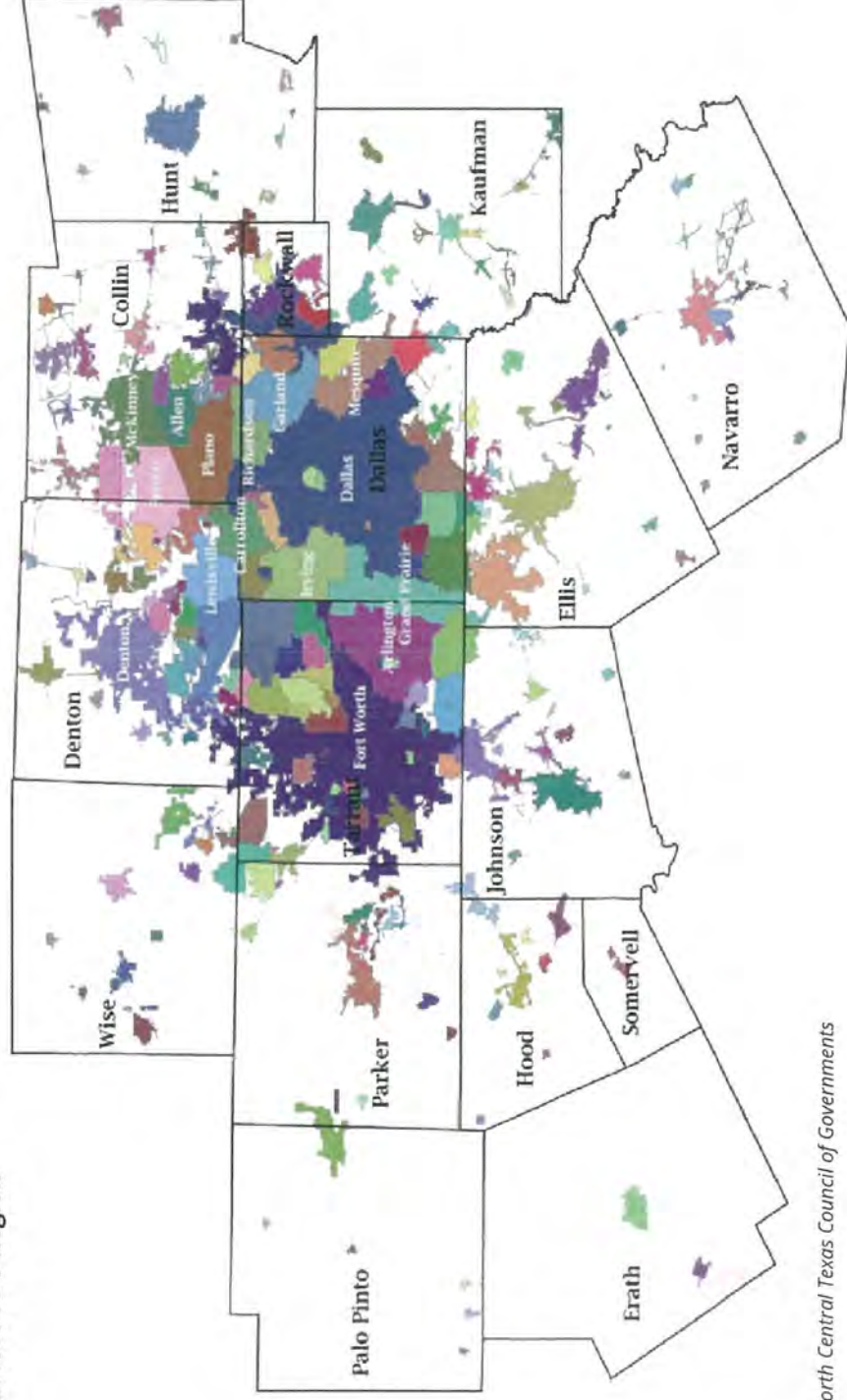
Year	Fannin County	Grayson County	Collin County	Hunt County	Delta County	Lamar County
1980	24,285	89,796	144,490	55,248	4,839	42,156
1990	24,804	95,021	264,036	64,343	4,857	43,949
2000	31,242	110,595	491,675	76,596	5,327	48,499
2010	33,915	120,877	782,341	86,129	5,231	49,793
2013*	33,819	121,292	811,308	86,455	5,237	49,751
CAGR	1.0%	0.9%	5.4%	1.4%	0.2%	0.5%

Source: 1980-2010 U.S. Census, \*2009-2013 ACS 5-Year Estimates

### **DFW Growth Affecting Fannin County**

The anticipated growth in the North Central Texas Council of Governments (NCTCOG) region - particularly in the NTMWD service area and the DFW Metroplex - was a major influencing factor in the proposal to construct the LBCR. The DFW Metroplex is currently the 4th largest Metropolitan Statistical Area in the country, and according to Vision North Texas 2050, DFW is expected to grow by 4.1 million people between 2000 and 2030. By 2050, the Metroplex is anticipated to have approximately 11.7 million people. The growth is not expected to remain within the boundaries of the NCTCOG region, but instead growth will eventually move away from the DFW Metroplex and into other areas, such as Fannin County.

**Figure 2. NCTCOG Region**



Source: North Central Texas Council of Governments

## Gender and Age

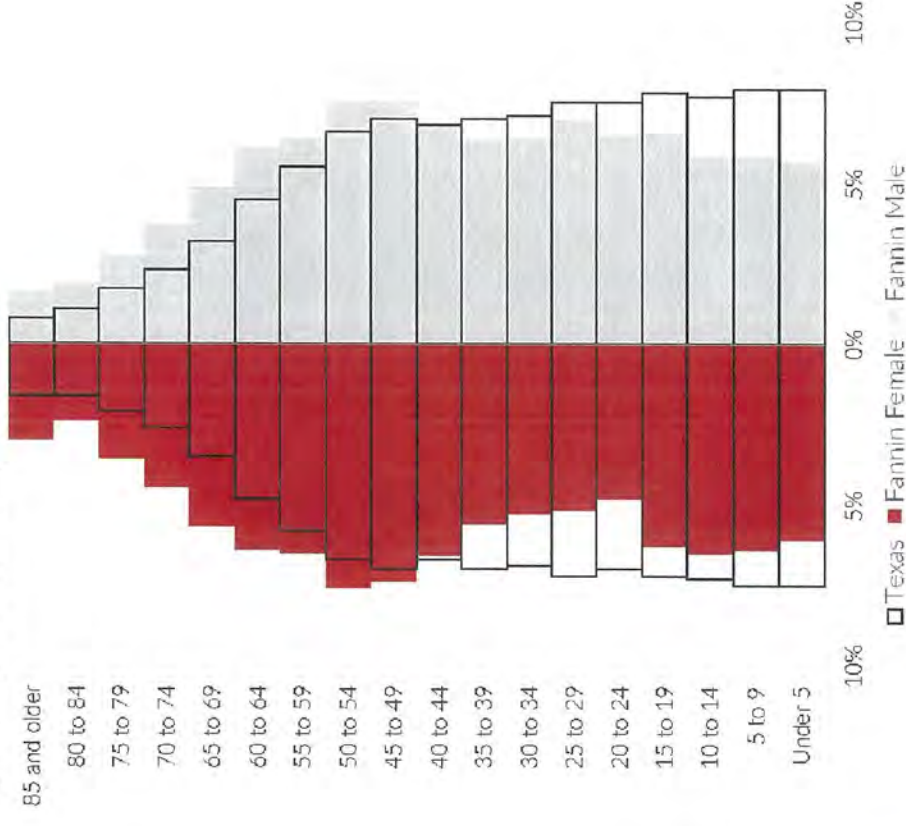
Analyzing the age composition within an area can provide insight to what services and facilities may be needed in the future. Awareness of these age distribution changes will ensure that the area surrounding the LBCR can meet the needs of the local age groups. The change in age composition for Fannin County, by percentage of each age group, is shown in Table 3. The composition has remained relatively stable since 2000. The greatest increase between 2000 and 2010 occurred in the Older Labor Force age group (45 to 64 years), by approximately 4.6 percent. An increase in this category can indicate a skilled labor force, since people within this category have been part of the labor force for quite some time. The Elderly category, which is representative of senior citizens 65 years and older, shows an increase of the “baby boomer” population within the County. The Young (0 to 14 years), High School (15 to 19 years), College/New Family (20 to 24 years), and Prime Labor Force (25 to 44 years) categories experienced decreases in percentages from 2000 to 2010, which can indicate young singles and young families are leaving Fannin County. The age and gender distribution for the year 2010 can be better observed in Figure 3, in comparison to the State of Texas. Compared to Texas, there is a smaller percentage of ages 0-40 and a larger percentage of ages 45 and older in Fannin County.

**Table 3. Age Group Breakdown**

	Young 0-14 yrs	High School 15-19 yrs	College/ New Family 20-24 yrs	Prime Labor Force 25-44 yrs	Older Labor Force 45-64 yrs	Elderly 65+ yrs
2000	19.0%	6.8%	6.3%	28.6%	23.2%	16.1%
2010	18.1%	6.5%	5.7%	24.9%	27.8%	17.0%
% Change	(0.9)%	(0.3)%	(0.6)%	(3.7)%	4.6%	0.9%

Source: 2000 and 2010 U.S. Decennial Census

**Figure 3. Age and Gender Pyramid**



## Race and Ethnicity

Information regarding race and ethnicity is important to local governments to ensure that all of its citizens are being represented in the decision-making process. Fannin County has a large White population, which is significantly higher when compared to the State. The Black or African American population is significantly lower compared to the State - 6.8 percent in Fannin County compared to 11.8 percent in the State. As shown in Table 4, the County has a comparatively small Hispanic or Latino population, as well as a smaller Two or More Races population.

**Table 4. Race and Ethnicity**

Demographic	Fannin County	Texas
Total Population	33,915	25,145,561
One Race	97.9%	97.3%
White	86.0%	70.4%
Black or African American	6.8%	11.8%
American Indian and Alaska Native	1.1%	0.7%
Asian	0.4%	3.8%
Native Hawaiian and Other Pacific Islander	0.0%	0.1%
Some other races	3.6%	10.5%
Two or more races	2.1%	2.7%
Hispanic or Latino (of any race)	9.5%	37.6%
Not Hispanic or Latino	90.5%	62.4%

Source: 2010 U.S. Decennial Census





## Educational Attainment

Observing the educational level of a population can indicate the degree of skills and abilities possessed by the residents of the community. This information is important to analyze since it can be useful in attracting businesses to the area, which in turn will increase economic development opportunities.

Table 5 shows a comparison of the educational attainment levels of the citizens (25 years of age and older) of Fannin County and Texas. Similar to other rural communities, Fannin County has a higher percentage of high school graduates as the highest level of education achieved than the State of Texas, 36.8 percent and 25.3 percent respectively. When looking at higher education, approximately 15 percent of the citizens of Fannin County have received a bachelor's degree or higher.

**Table 5. Educational Attainment**

Educational Attainment	Fannin County	Texas
Population 25 years and over	23,552	16,080,307
Less than 9th grade	6.1%	9.4%
9th to 12th grade, no diploma	11.5%	9.4%
High school graduate (includes equivalency)	36.8%	25.3%
Some college, no degree	24.3%	22.7%
Associate's degree	6.4%	6.5%
Bachelor's degree	9.9%	17.7%
Graduate or professional degree	5.0%	8.9%
Percent high school graduate or higher	82.4%	81.2%
Percent bachelor's degree or higher	15.0%	26.7%

Source: 2009-2013 ACS 5-Year Estimates

**Figure 4. Educational Attainment**



Source: 2009-2013 ACS 5-Year Estimates

## Employment and Occupation Characteristics

Employment opportunities can affect the growth of communities. These opportunities are important because they allow people to settle into a community and establish their home. In Fannin County, it is the proximity to employment opportunities in the DFW region that makes this possible.

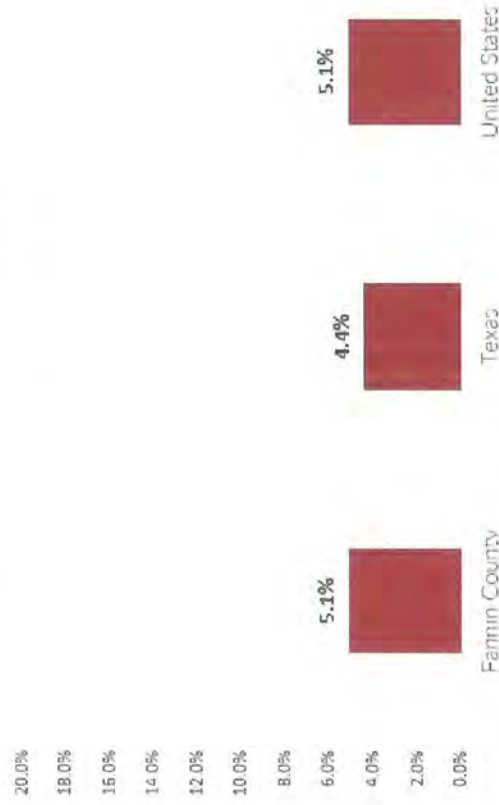
Figure 5 shows the unemployment rates from the United States Bureau of Labor Statistics for the month of September 2015. Fannin County had a 5.1 percent unemployment rate, which is greater than the State's average of 4.4 percent. Table 6 compares the percent of each occupational category for Fannin County and Texas. The most noticeable difference is in the Production, transportation, and material moving occupations category, with 17.7 percent in Fannin County but only 11.8 percent in Texas. The major occupations in the County are Management, professional, and related occupations with 30 percent and Sales and office occupations with 24 percent.

**Table 6. Occupation**

Occupation	Fannin County	Texas
Civilian employed ages 16 years and over	13,627	11,569,041
Management, professional, and related occupations	29.3%	34.6%
Service occupations	16.3%	17.7%
Sales and office occupations	23.9%	24.9%
Natural resources, construction, and maintenance occupations	12.9%	11.0%
Production, transportation, and material moving occupations	17.7%	11.8%

Source: 2009-2013 ACS 5-Year Estimates

**Figure 5. Unemployment Rates (September 2015)**

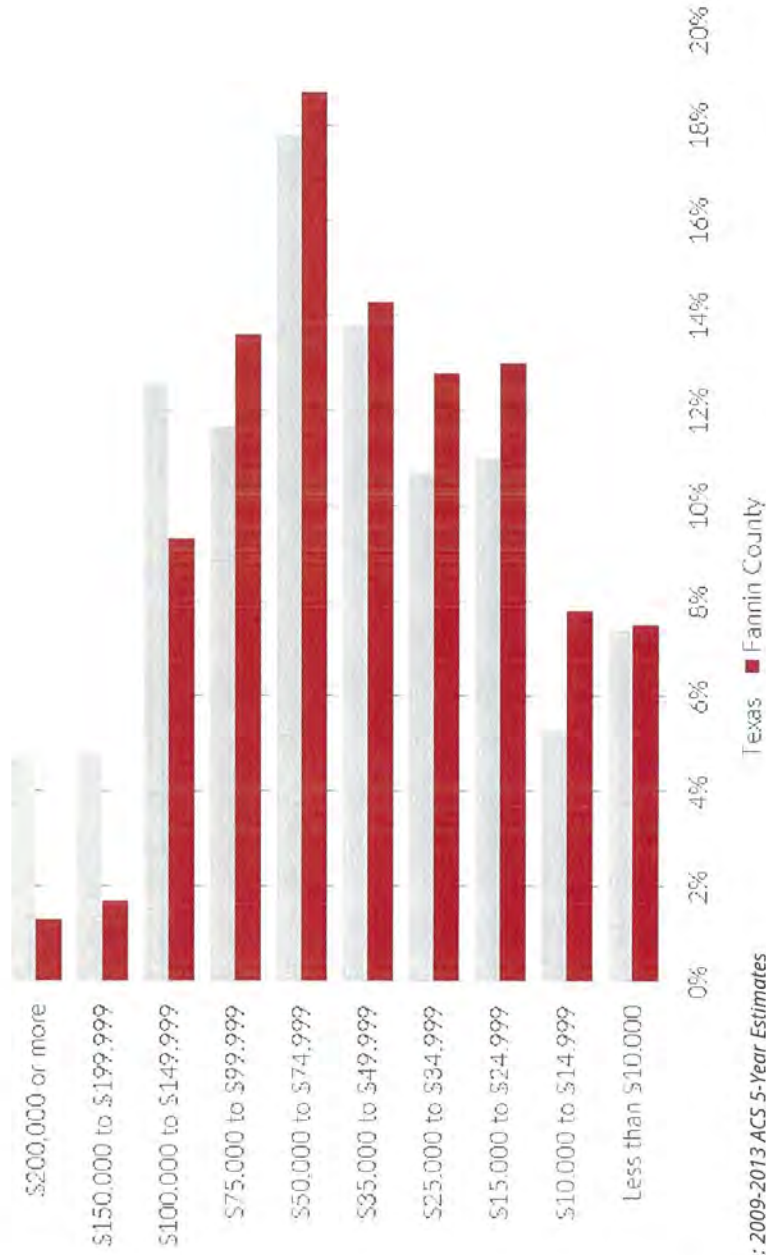


Source: U.S. Bureau of Labor Statistics

## Income Levels

Income can serve as an indicator for the retail market. Higher income levels generally mean more disposable income is available and attracts more retail possibilities, which in turn can translate into a higher tax base. Median household income in Fannin County was \$34,501 in 1999. In 2013, it increased to \$44,355. When compared to the State of Texas, Fannin County has a significantly smaller percentage of households earning \$100,000 or more. The largest income bracket for the County was households earning \$50,000 to \$74,999 per year, followed by households earning \$35,000 to \$49,999 per year. The percentage of families earning less than \$49,999 was greater in Fannin County than the State of Texas - 55.4 percent in Fannin County compared to 48.2 percent for the State.

**Figure 6. Income Levels**



Source: 2009-2013 ACS 5-Year Estimates

## Housing Type

There are a total of 14,159 housing units in Fannin County. 83 percent of Fannin County's housing units are occupied, compared to 88 percent for the State. The percentage of vacant housing units is larger for the County when compared to the State—17 percent in the County compared to 12 percent for the State. Of the occupied units, Fannin County has 75 percent owner-occupied, which is a larger percentage than the State average of 63 percent.

**Table 7. Housing Occupancy**

Housing Occupancy	Fannin County	Texas
Total Housing Units	14,159	10,070,703
Occupied housing units	83%	88%
Vacant housing units	17%	12%
Owner-occupied	75%	63%
Renter-occupied	25%	37%
Homeowner vacancy rate	3.9	2
Rental vacancy rate	7.1	9.2
Average household size of owner-occupied unit	2.63	2.93
Average household size of renter-occupied unit	2.62	2.63

Source: 2009-2013 American Community Survey 5-Year Estimates

## Housing Value

Housing values are important to examine because it generally indicates what the community can expect its future housing stock to contribute to the local economy. Table 8 reflects the total housing value for both 2000 and 2013. In 2000, approximately 86 percent of the housing stock was valued below \$99,999. In 2013, that number decreased by almost 30 percent. Meanwhile, housing units above \$100,000 greatly increased, which is an indication that home values are rising. In 2000, the median home value was \$54,500 and by 2013 had increased to \$92,600.

**Table 8. Housing Value**

Housing Value	2000	2013
Owner-occupied units	4,936	8,813
Less than \$50,000	44.9%	23.1%
\$50,000 to \$99,999	40.8%	31.6%
\$100,000 to \$149,999	10.0%	17.7%
\$150,000 to \$199,999	2.8%	13.5%
\$200,000 to \$299,999	1.4%	8.3%
\$300,000 to \$499,999	0.1%	3.8%
\$500,000 to \$999,999	0.1%	1.5%
\$1,000,000 or more	0.0%	0.5%
Median Housing Value	\$54,500	\$92,600

Source: 2000 U.S. Decennial Census, 2009-2013 ACS 5-Year Estimates

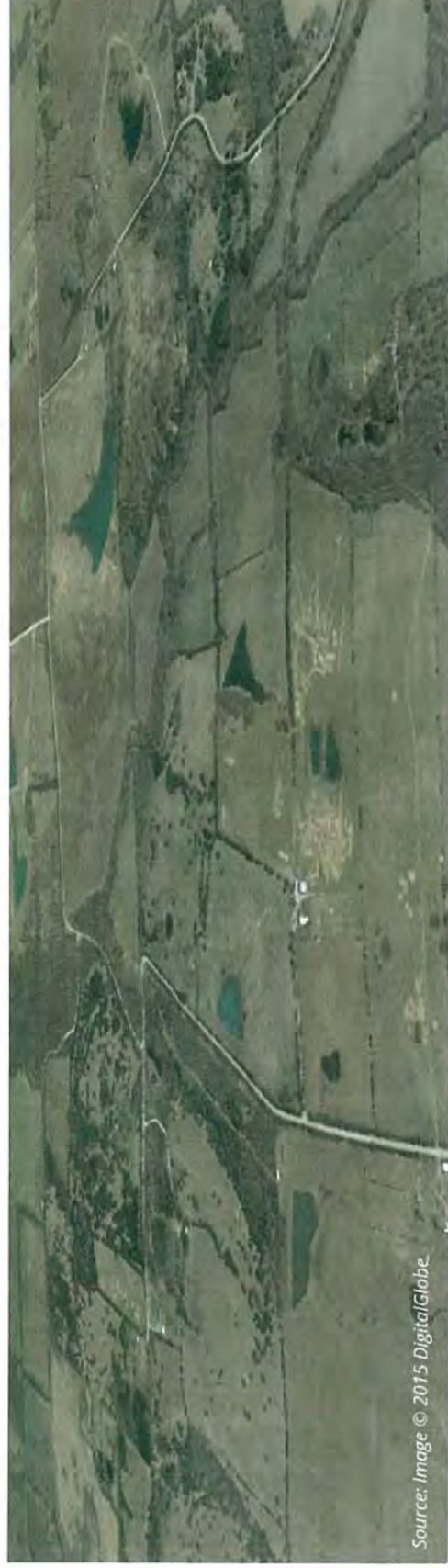
## Existing Land Use

Providing for the orderly and efficient use of land is a major planning consideration in the development of the LBCR. The pattern of land use that exists today has seen little variation over the years since the area has remained predominately agricultural or undeveloped. The relationships of existing and future land uses will shape the character and quality of life of the community for many years to come. In order to accurately assess the area's future land use needs, an analysis of present land use patterns is of primary importance. Growth and development occurring around the LBCR in the future will require the conversion of a large amount of vacant open space and agricultural land into developed uses. The relationships of existing and future land uses will have an impact upon the area economically, and will also shape the character and livability of the community in the years to come. A well-planned and orderly land use arrangement can be served more easily and efficiently than a random and scattered association of unrelated uses.

## Land Use Types

In November 2015, aerial photography supported by field verification was used to identify existing land uses to identify land use trends. The information obtained from the survey was color-coded to create Figure 8 to discuss the current land use patterns. The following section provides an overview of the different types of land uses included within the survey.

**Figure 7. Aerial view of the intersection of US 82 and FM 2900**



## Residential Land Use

The following is an overview of land uses that are primarily residential, including single family, two-family, and manufactured homes.

### Single Family

A single dwelling unit that is detached from any other dwelling unit, is built on-site, and is designed to be occupied by only one family. Single family homes are the more prevalent housing type and developed land use type.

Single Family Home



### Two-Family

A structure with two attached dwelling units that is designed to be occupied by two families (one in each unit). Two-family units are also commonly referred to as duplex units.

Manufactured Home



### Manufactured Home

A manufactured home is a single family dwelling unit that is manufactured in a factory rather than on-site.

## Nonresidential Land Use

Nonresidential land uses include areas in which people typically do not reside.

### Commercial

Commercial establishments primarily provide a service to consumers. Examples include hotels, automobile service stations, automobile sales lots, and self-storage businesses.

Commercial Use



### **Industrial**

Allows for the processing, storage, assembly, and/or repairing of materials. Uses range from light industrial with all activity occurring indoors, to heavy industrial with some activity occurring outside.

### **Parks and Open Space**

Public or private park land, open space, and/or recreation area that is outside. May include recreational facilities, such as tennis courts, public swimming pools, picnic pavilions, and basketball courts.

### **Public/Semi-Public**

Uses that are generally accessible to the public, such as schools, churches, public buildings, golf courses, cemeteries, and some medical facilities. Also includes some support services, such as a school bus storage lot.

### **Rural**

The rural land use designation includes all of the land that is used for agricultural purposes, or vacant land that is currently undeveloped.

### **Caddo National Grasslands**

The Caddo National Grasslands is comprised of 17,785 acres of open prairie and wooded land. The grassland is administered by the U.S. Forest Service and managed by Texas Parks and Wildlife Department. The grassland is available year round to the public, and provides recreational activities such as bicycling, camping, equestrian activities, fishing, hiking, wildlife viewing, and hunting.

### **Public/Semi-Public Use**



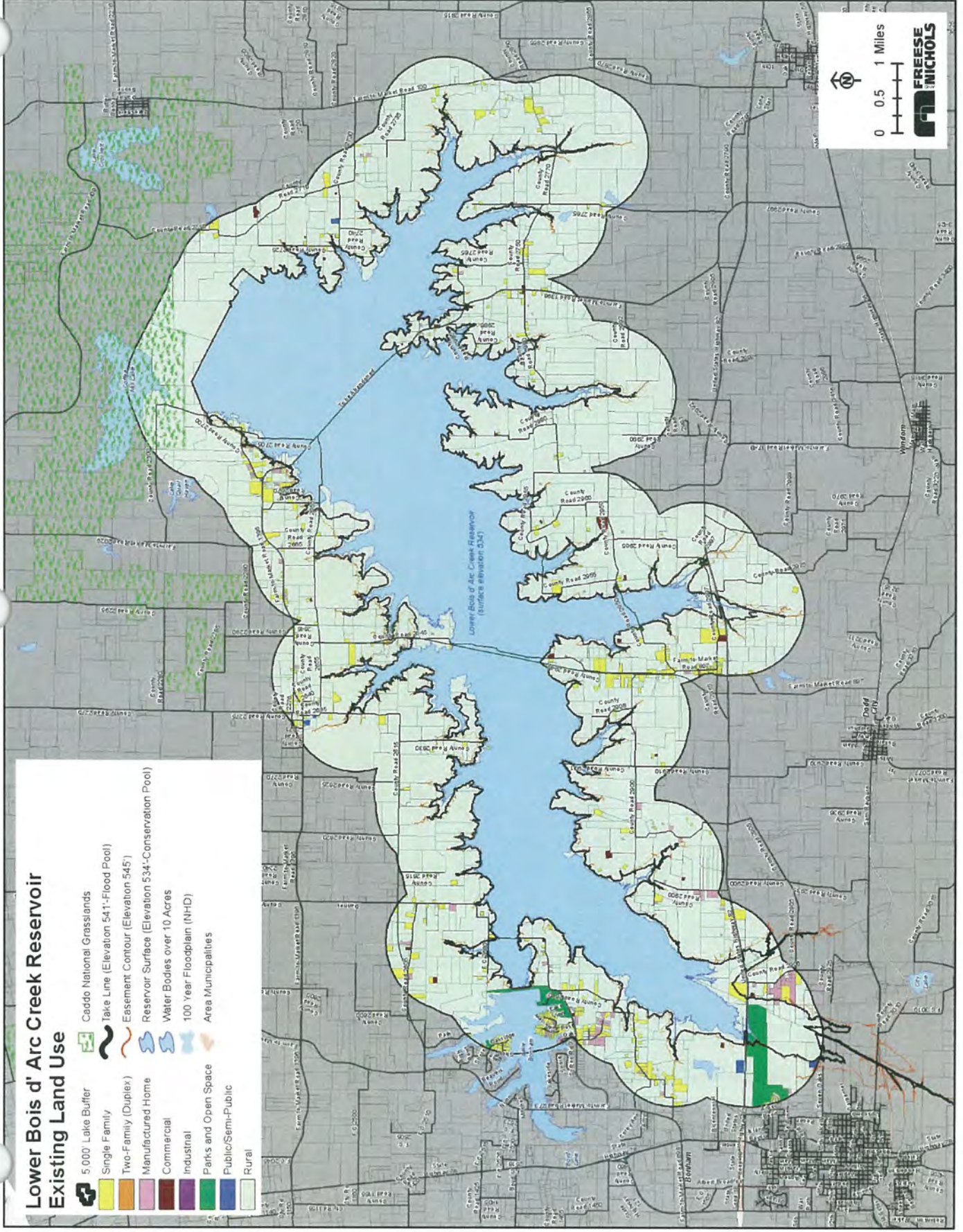
### **Rural Land**



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**Fig 8. Existing Land Use Map**



## Physical Constraints to Development

The area's constructed and natural patterns have influenced the shape and growth of the area surrounding the LBCR. Understanding how such features influence and regulate the current development patterns can provide insight into the most appropriate way to develop the area in the future. These patterns are divided into two primary categories: natural constraints that include the geographical aspects of the planning area and constructed constraints that include the features that have been constructed or added to the area. Figure 11 shows the physical factors that influence development around the LBCR.

## Natural Constraints

### Topography

The topography around LBCR ranges in elevation from 371 feet at the center of the reservoir to approximately 700 feet at the highest point just south of the lake. There are no drastic fluctuations in the topography throughout the planning area, and, therefore, will not pose as a constraint to the development around the reservoir. The area is full of vegetation ranging from open fields to forested areas.

### Riverby Ranch

Riverby Ranch was a 14,959-acre working cattle ranch that had been significantly overgrazed. As shown in Figure 9, it is located a few miles northeast of the location of LBCR. Water naturally stands on the property, but some drainage improvements have already been made. Taking some simple steps to restore the original hydrology of the ranch can significantly improve the quality of the land. In order to offset the habitat displacement resulting from the creation of the reservoir, Riverby Ranch has been purchased by the NTMWD for mitigation purposes.

### Littoral Zone Wetlands

Littoral wetlands are areas within the lake where wetland vegetation is expected to grow. As seen in the Physical Constraints to Development Map in Figure 11, these areas lie within the reservoir footprint along the shoreline and streams. The littoral wetlands and contributing streams are included as part of the mitigation for the lake and will have specific development restrictions. Areas designed as part of the LBCR Mitigation Plan will be protected in perpetuity. The easement will include both the water and adjacent shoreline areas. These restrictions have not been formalized, but likely will include restricted shoreline access, including restrictions on boat docks and piers.

### **100-Year Floodplain**

Land that lies within a floodplain is usually difficult and costly to develop. However, floodplains provide opportunities for recreational uses, such as parks and trails. In the planning areas around the lake, there are floodplains leading into the wetland areas that are primarily undeveloped but have sparse developments at a close proximity. Overall, floodplain areas cannot be difficult to develop and have restricted uses.

### **Conservation Pool (Elevation 534 Feet AMSL)**

When the lake is considered 100% full, the water will be at an elevation of 534 feet AMSL.

### **Take Line (Elevation 541 Feet AMSL)**

The take line marks the boundary between private property and the lake. The take line is at an elevation of 541 feet AMSL and marks the 100-year flood pool for the lake.

### **Easement (Elevation 541 Feet AMSL to 545 Feet AMSL)**

There is an easement on private property between an elevation of 541 feet AMSL and 545 feet AMSL. The NTMWD is the holder of the easement and the easement limits the type of development that can occur within this area.

### **Drainage Basin**

A drainage basin is an area of land in which precipitation flows downhill and into a body of water such as lakes, rivers, and wetlands. It includes both the streams and rivers that convey the water as well as the surface water and water table from which water drains into the channels. There is an imaginary line commonly known as the watershed that separates neighboring drainage basins and establishes into what basin precipitation will flow. As seen in Figure 10, the major drainage basin found in Fannin County is the Bois d'Arc Creek Drainage Basin. The vast majority of the precipitation that occurs within the basin will flow into the LBCR, which is expected to have a drainage area of 327 square miles. The other drainage basin found within the County is North Sulphur River Drainage Basin.

The basin is located in the southeastern portion of the County and extends into Delta and Lamar counties.

**Figure 9. Riverby Ranch Mitigation Area**

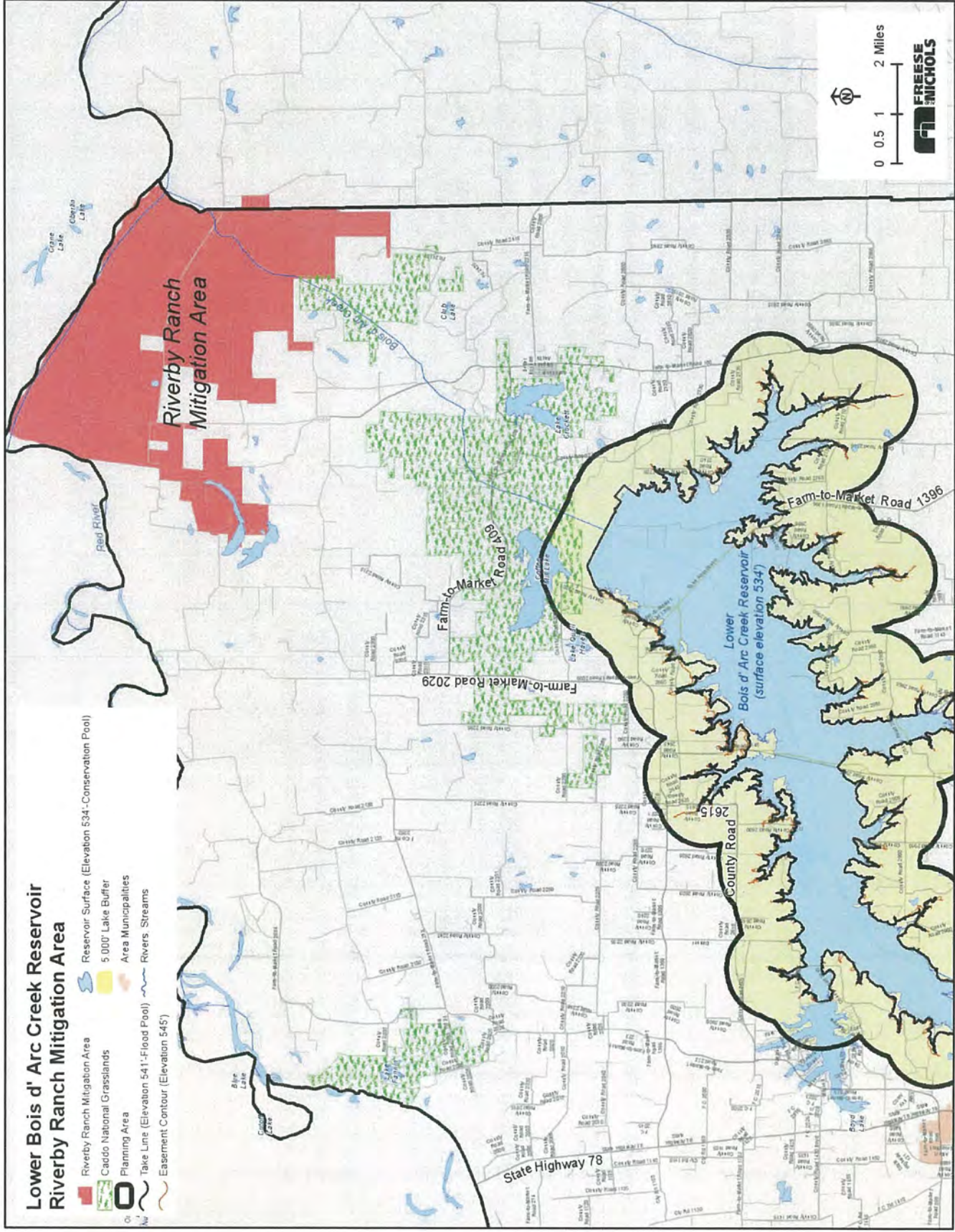
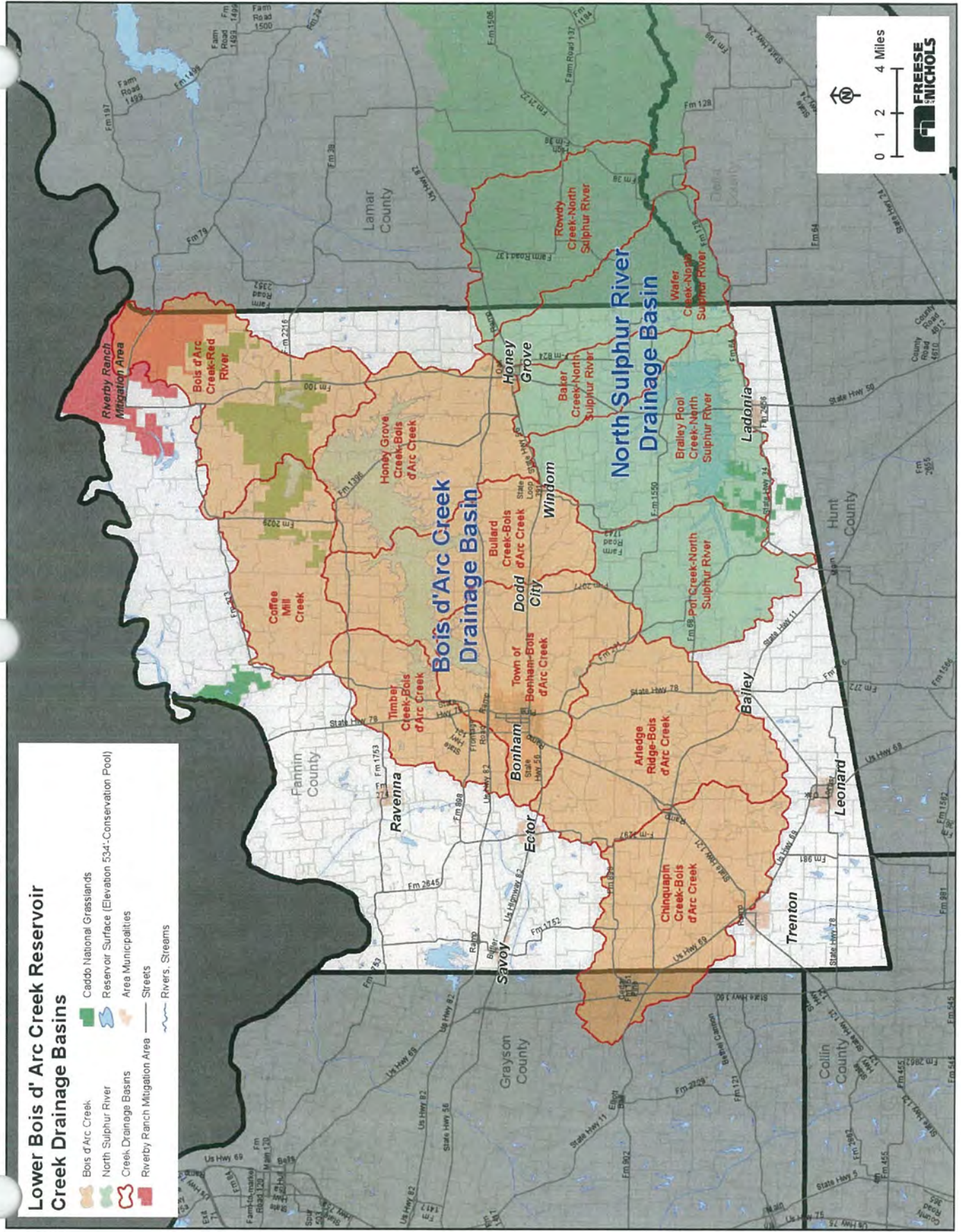


Figure 10. Drainage Basin Map (with creek basins)



## Constructed Constraints

### Utilities

There are multiple water, gas, and electric utility lines running through the LBCR planning area. These lines will not restrict development, but will make the future development of the area feasible by alleviating the need for constructing water, gas, and electric utility lines in the immediate future.

### Cemeteries

There are currently several cemeteries located within the planning area of the reservoir. Since cemeteries cannot be easily relocated, they will be constraints to development immediately surrounding the cemeteries. Note that some cemeteries will be moved with the construction of the lake.

### Neighboring Municipalities

There are four neighboring municipalities at close proximity to the lake: Bonham, Dodd City, Windom, and Honey Grove. Of the four, Bonham will have the largest effect on the development of the area around the LBCR. Coordination of zoning should be considered for Bonham and the County because of the overlapping zoning boundaries.

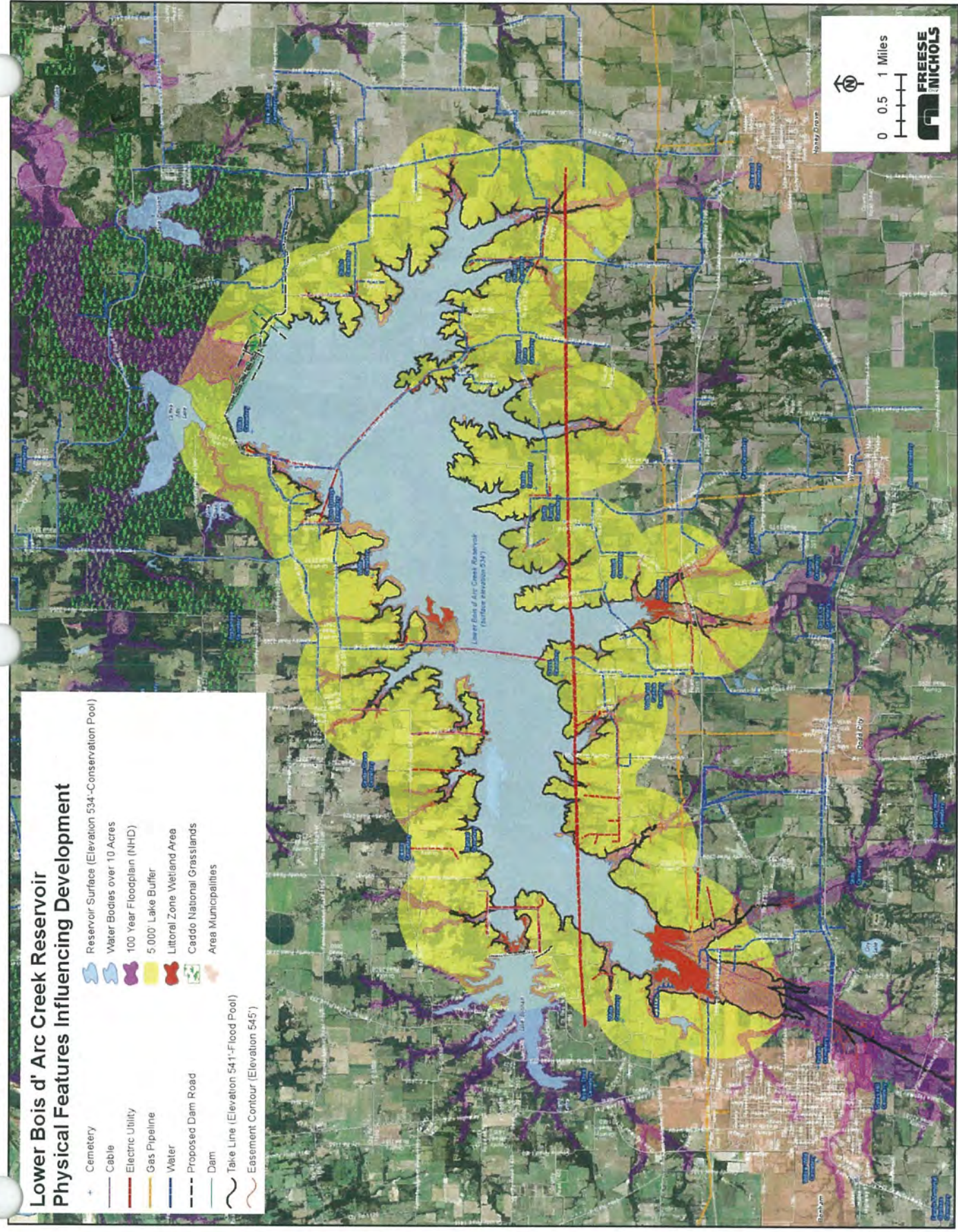
## Caddo National Grasslands Wildlife Management Area

The Caddo National Grasslands WMA is a federally owned grassland managed under a cooperative agreement between the US Forest Service and Texas Parks and Wildlife Department. The WMA is split into two units: the 13,360-acre Bois d'Arc Creek Unit that is located northeast of the lake, and the 2,780-acre Ladonia Unit that is located a few miles west of Ladonia. The grasslands offer a variety of recreational opportunities including camping, hunting, hiking, fishing, and wildlife viewing. Part this area overlaps with the 5,000' zoning area. These grasslands are not anticipated to develop and they will remain as Federal parkland.

## Caddo National Grasslands



**Figure 11. Physical Constraints to Development**



## **Surrounding School Districts**

The LBCR will be located within the boundaries of four school districts: Bonham ISD, Sam Rayburn ISD, Honey Grove ISD, and Dodd City ISD. These school districts will benefit from the construction of the LBCR in the form of property tax revenues. It is expected that over \$5 million per year will be generated by area school districts under current law. This gain in school district revenue will not be accompanied by a proportionate increase in student population, because the majority of valuations will be expected to come from weekend and vacation residences. The following provides a description of each of the four school districts.

### **Bonham ISD**

Bonham ISD will include the western most part of the LBCR. The school district currently has five schools: three elementary schools, one middle school, and one high school. During the 2014-2015 school year, there were a total of 1,903 students enrolled in the school district. The district had 150 teachers during that year, with a total staff of 298. The student to teacher ratio was 13.3:1, meaning that there was an average of 13.3 students for every one teacher.

### **Honey Grove ISD**

The southeastern portion of the LBCR will lie within the boundaries of this school district. Honey Grove ISD was established in 2001 and home to three schools: an elementary, middle, and high school. Aside from the City of Honey Grove, the district also serves the Town of Windom and extends into a small portion of Lamar County. During the 2014-2015 academic year, there were a total of 610 students

enrolled in the district. There were a total of 106 staff members employed during that year, with 44 of them being teachers. The student to teacher ratio is 13.9:1.

### **Sam Rayburn ISD**

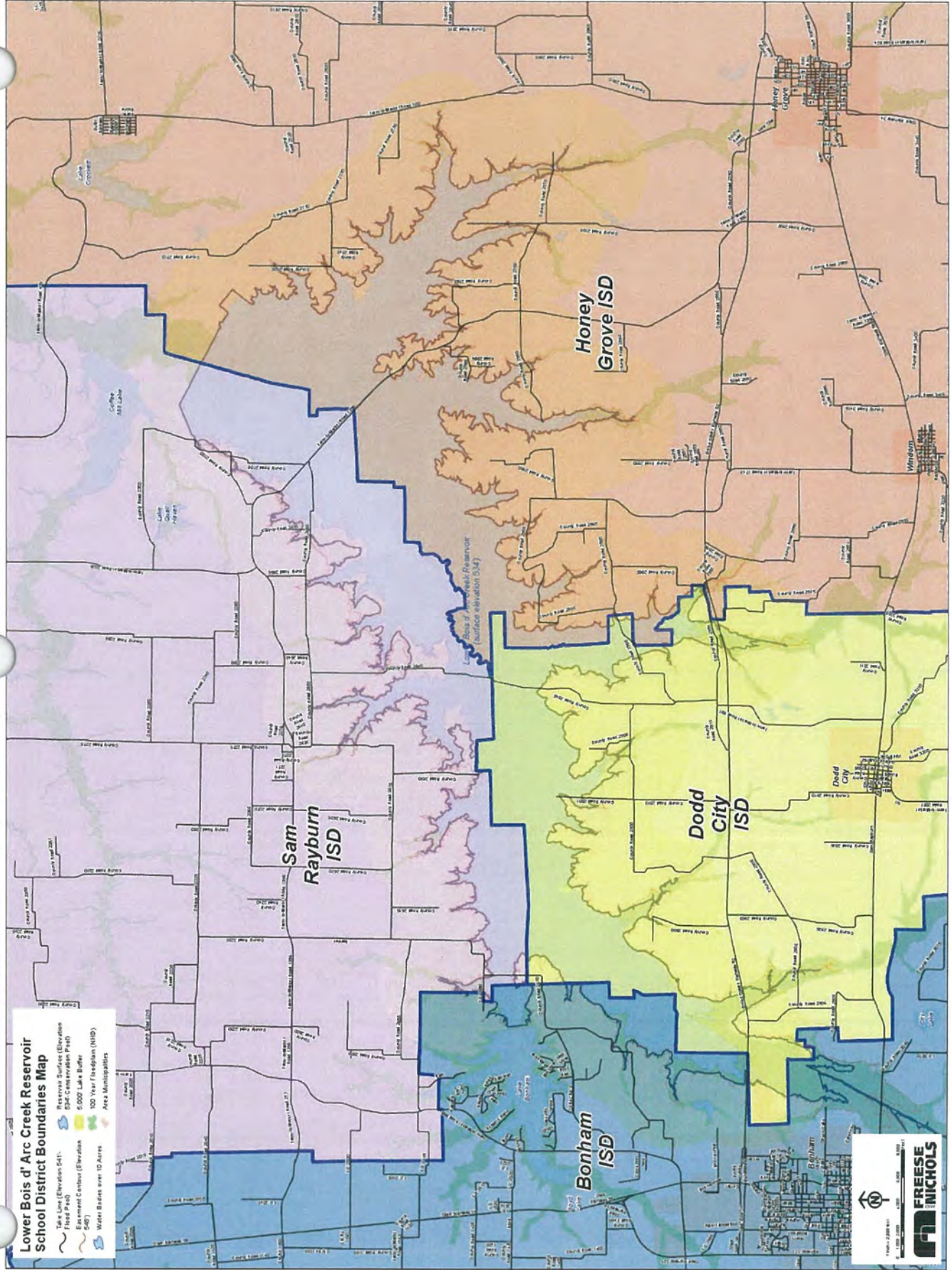
Sam Rayburn ISD was formed in 1964 by the consolidation of the North Fannin and Telephone school districts. Once the reservoir is completed, the district will have the northern half of the reservoir located within its boundaries. The school district primarily serves the community of Ivanhoe, but also has students from Telephone and Elwood. Schools within the district are widely known within the northeast Texas community as leaders in technology, academics, and athletics. There are only two schools found within the school district - one that holds students from pre-kindergarten to 5th grade, and the other holds students from 6th through 12th grade. There were 488 students enrolled in the 2014-2015 academic year, with a student to teacher ratio of 11.6:1.

### **Dodd City ISD**

The southwestern portion of the LBCR will lie within the boundaries of Dodd City's school district. Dodd City ISD is the second smallest school district found within Fannin County, with only one school that serves pre-kindergarten through 12th grade. There were 385 students enrolled in the school district during the 2014-2015 school year. That same year, the district employed 63 staff members. The student to teacher ratio is 6.1:1.



Figure 12. School District Map



## Summary | Baseline Analysis and Existing Conditions

It is important to note the baseline features including demographics, existing land use, physical constraints, past planning efforts, and the planning context in order to ensure effective planning. Not only does an understanding of these factors paint a picture of Fannin County, but it also allows for sound planning decisions to be made in the future. Fannin County is located in the northeastern part of Texas, a region that is primarily rural. With the population growth that will be happening over the next few decades within the DFW Metroplex, it is expected that the growth will spread outside of DFW and into neighboring regions - in particular Fannin County. Growth is also expected in Fannin County as a result of the construction of the LBCR. This growth will cause the County to greatly change both in demographics as well as land use composition. Having an idea of the County's past, present, and potential future will help ensure that coordinated, informed, and realistic scenarios are ultimately developed for the community.



# Chapter 2

## *Vision and Issue Identification*

**Chapter Purpose:** To document public input and establish a vision for the lake to inform the plan recommendations

### **Introduction**

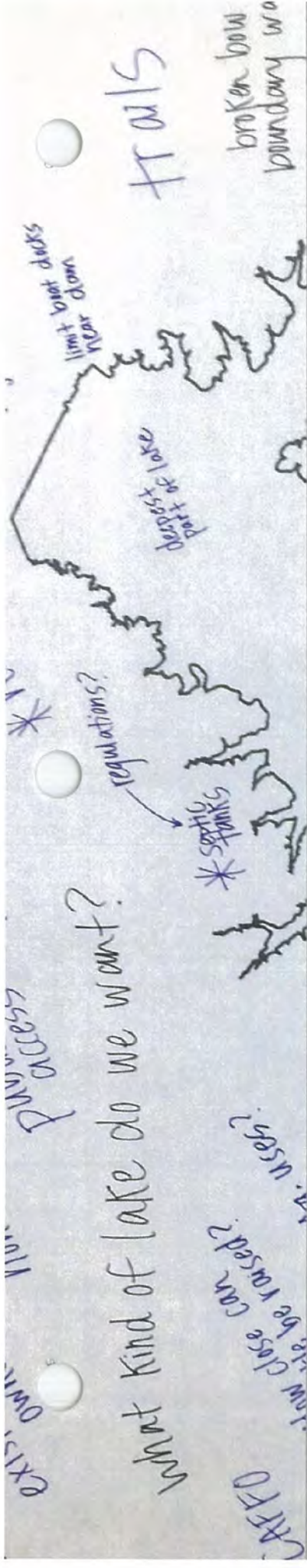
It is important to think about how the area around LBCR will develop in the future. Setting a long-term vision helps to guide the development of a comprehensive plan. At the beginning of the planning process, a vision was set by identifying issues and needs. This vision was developed with the help of the Zoning Commission and public input. This chapter will paint a picture of what the residents of Fannin County desire around the LBCR and will set a basis for the recommendations in this Comprehensive Plan.

Members of the first Zoning Commission in Fannin County and members during the development of this Comprehensive Plan include the following:

- Judge Creta Carter
- Gary Fernandes
- David Johnson
- Dustin Knight
- Bob McCraw

### **Formation and Purpose of the Zoning Commission**

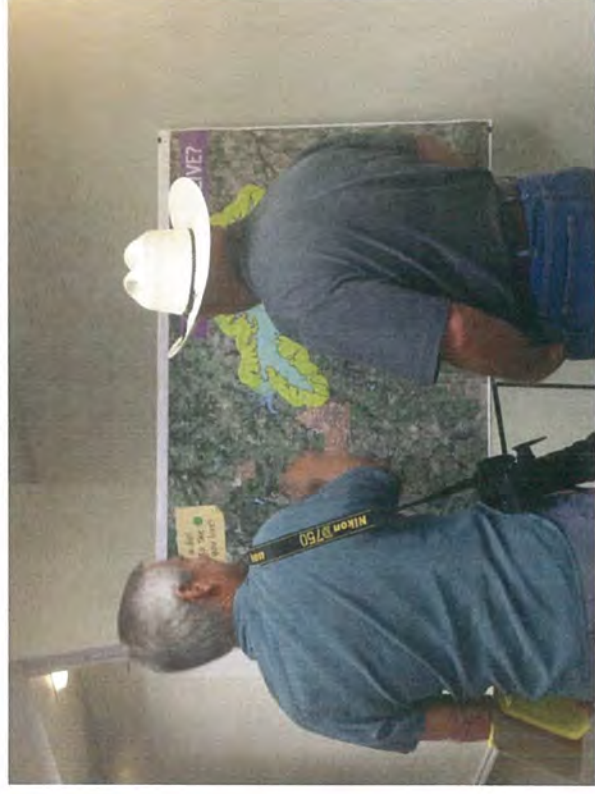
Texas Local Government Code, Subchapter G, Section 231.136 outlines the authority and responsibilities given to the County Zoning Commission. The Commission “shall recommend boundaries for the original zoning districts and appropriate zoning regulations for each district.” The Zoning Commission was formed with the County Judge as the chairperson. Each County Commissioner appointed a Zoning Commission member to make a total five members. The Zoning Commission will hold public hearings to hear rezoning cases for land in the LBCR zoning districts. For the purpose of this Comprehensive Plan, the Zoning Commission was used as a steering committee to help guide the Plan’s formation. According to Texas Local Government Code Section 231.134, zoning ordinances must be developed in accordance with a comprehensive plan. The Zoning Commission’s involvement with the development of the Comprehensive Plan will allow the group to gain a better of understanding of the basis for developing the zoning regulations and map for the area around the LBCR.



## Public Input Process

The following meetings were held to aid the development of this Comprehensive Plan by gathering input on the vision for the LBCR. Identifying issues and needs helped form an overall vision for how the LBCR should develop. The following meetings were held as part of the public input process:

- 08/19/2015 | Zoning Commission Meeting #1
- 09/30/2015 | Stakeholder Interviews
- 10/14/2015 | Additional Stakeholder Interviews
- 10/14/2015 | Zoning Commission Meeting #2
- 10/14/2015 | Public Open House #1
- 12/15/2015 | Zoning Commission Meeting #3 (Lake Tour)
- 02/24/2016 | Zoning Commission Meeting #4
- 06/27/2016 | Zoning Commission Meeting #5
- 08/29/2016 | Public Open House #2



Public Open House #1 on 10/14/2015

## Zoning Commission Meeting #1

**Date:** August 19, 2015

**Location:** Fannin County Courthouse

**Attendance:** Zoning Commission members and 50+ public

**Purpose:** To kick-off the project, explain the planning process, and obtain general input about the overall vision for the lake.

**Summary:** The meeting began with a brief overview of the history of the LBCR and why it is needed for Texas water supply and recreational opportunities. This brought up many questions about the LBCR and a representative from the NTMWD was in attendance to answer questions and correct any misinformation. After this, the LBCR Comprehensive Plan and Zoning project was introduced and a brief overview of planning and its importance was given. The role of the Zoning Commission was explained and the members of the Commission were introduced. The rest of the meeting involved asking questions to the Zoning Commission and the public providing their vision for the LBCR. The issues and comments were recorded on a large board that allowed attendees to view the comments after the meeting. Over 50 members of the public were in attendance to watch the meeting. This led to a large amount of public discussion allowing the consultants to gain valuable information on how the public felt about the LBCR. After the presentation and discussion, the members of the Zoning Commission and the public mingled and discussed the future LBCR. The Zoning Commission members, a NTMWD representative, and the consultants were able to answer additional questions from the public by using the maps and boards set up around the room.



### Key Takeaways:

1. There is significant interest in the lake, but confusion on specific details and hydrology
2. Maintaining a rural environment is desired
3. Public access and recreational amenities are necessary
4. Agriculture is very important to the community
5. Commercial uses should be limited

## Stakeholder Interviews

**Date:** September 30, 2015

**Location:** Fannin County Courthouse

**Purpose:** To gain specific input on how the LBCR would affect various public agencies in Fannin County.

**Summary:** In an effort to obtain valuable public input, various public agencies were interviewed. These stakeholders would be affected by the creation of the lake and their feedback is important to the planning process. Representatives from surrounding cities, police and fire departments, and the County were interviewed individually. Each interview started with a brief overview of the planning process and the importance of planning around a future lake. A general set of questions was developed to aid in guiding the discussion.

1. The creation of the lake will influence how people will use the land surrounding it. What should the lake be? How should land around the shoreline be developed? What is your vision for the lake?
2. How might your organization be influenced by lake development?
3. What uses should be promoted and what should be avoided around the lake? What should the lake offer residents and visitors?
4. What lake developments are good examples or bad examples?
5. Do you have any additional comments or ideas regarding the lake? What do you think needs to be considered during the comprehensive planning process?

Overall, each entity was in support of the lake and viewed it as an asset to the County. Each entity agreed that the lake should be well-maintained and unique. Almost every person interviewed mentioned that they did not want to see the LBCR development become like the development of Lake Tawakoni. While Lake Tawakoni has great features, the lack of regulations has allowed undesirable uses to develop. The municipalities interviewed agreed that the construction of the LBCR will help Fannin County and bring economic development to the surrounding cities. Each representative wanted to see that public access to the LBCR was available. The fire and police department's main concern was ease-of-access to all areas of the lake and response times.

### Who was interviewed?

County Commissioners and Representatives from:

- District Attorney's office
- City of Bonham
- City of Honey Grove
- City of Leonard
- Sheriff's Department
- Bonham Police Department

### Key Takeaways:

1. The LBCR should be a unique resource to the County
2. Economic development opportunities are important
3. Public access is necessary
4. Emergency response personnel should be able to access all parts of the LBCR

## Additional Stakeholder Interviews

**Date:** October 14, 2015

**Location:** Fannin County Courthouse

**Purpose:** To gain specific input on how the LBCR would affect various public agencies in Fannin County.

**Summary:** Since all the stakeholder interviews could not be held in one day, additional interviews were held. A representative from Bonham Fire Department was interviewed first, then representatives from all independent school districts in Fannin County were interviewed as a group. The school district interview started with a

brief overview of the planning process and why it is important to plan around a future lake. The group had many questions about why the LBCR was needed and other engineering/hydrology related questions. A representative from the NTMWD was in attendance to answer these questions. The main concern of the school district representatives was an equal share for all districts near the lake. They would like for there to be equal commercial and residential opportunities in each school district so that the new tax-base is evenly spread since the LBCR would be in Sam Rayburn ISD, Dodd City ISD, Honey Grove ISD, and Bonham ISD. Another concern was the effect of the abandoned roadways on bus routes. Emergency service concerns were also discussed related to ease-of-access and response time. Access to the north and central portions of the lake are especially important. The representative also raised the concern of the potential of injuries to workers during construction of the dam.

### Who was interviewed?

Representatives from:

- Bonham Fire Dept.
- Bonham ISD
- Dodd City ISD
- Honey Grove ISD
- Sam Rayburn ISD
- Fannindel ISD
- Leonard ISD
- Trenton ISD
- Ector ISD
- Savoy ISD

### Key Takeaways:

1. Residential tax-base is important to the four school districts near the LBCR
2. Ease-of-access and response time is critical to emergency response personnel
3. School buses need to be able to access all residential areas around the LBCR
4. CR 100 is a major bus route and it is narrow with no shoulders, and will need to be addressed to handle future traffic concerns
5. Access to the dam construction is important for emergency response personnel
6. The connections of FM 897 to the north is important
7. Long-term camping facilities are not desired



## Zoning Commission Meeting #2

**Date:** October 14, 2015

**Location:** Fannin County Courthouse

**Attendance:** Zoning Commission members

**Purpose:** To discuss the vision again with the group and reach consensus on the identified issues and needs.

**Summary:** Since the first Zoning Commission meeting was generally filled with input from the public, a second Zoning Commission meeting was needed to hear the specific thoughts from the five members – specifically related to vision and land use. The meeting started by reviewing the purpose of the project and the role of the Zoning Commission. During the meeting, an idea was presented about a lake tour to help the Commission members gain a visual understanding of desirable and undesirable uses. After the lake tour discussion, specific visioning questions were asked and discussed:

1. What types of land uses are needed? What types of land uses should be avoided?
2. Based on the land uses discussed, what types of roads are needed? Which roads need upgrades?
3. What residential standards would help to enhance the lake area? (Lot size, building materials, etc.)
4. What nonresidential areas would help to enhance the lake area?
5. What recreational uses are needed?
6. What type of destination should the lake be?
7. How should the lake connect to the region through trails?

## Key Takeaways:

1. Regional trail connections are important to increase the access to the LBCR
2. All existing uses should be allowed to continue
3. The LBCR will enhance the quality of life
4. It is important to provide opportunities for people to do things at the lake
5. The County should make recommendations for desirable boat dock attributes
6. Standards for retaining walls should be set
7. The LBCR will bring economic development to the County

## Public Open House #1

**Date:** October 14, 2015

**Location:** Fannin County Court-at-Law

**Attendance:** 31 people

**Purpose:** To meet with the public before the development of the Plan to gather input regarding the vision for the LBCR and to identify any issues or needs.

### Presentation

The meeting began with a presentation that included the purpose of the meeting, the project scope and schedule, and a general overview of planning and why it's important. Many of the attendees were at the first Zoning Commission meeting so they were familiar with the planning process and why planning around the LBCR is needed.



## Interactive Survey

After the presentation, polling devices were used to conduct a survey. This survey was used in setting the vision for the LBCR. The following are the questions asked and the responses from the attendees. A total of 31 attendees participated in the survey.

### Q1 | How long have you lived in Fannin County?

- Less than 1 year (3%)
- 2-5 years (14%)
- 6-10 years (10%)
- More than 10 years (66%)
- I don't live in Fannin County (7%)

### Q2 | Out of the following, which statement do you identify with the most? "I desire the lake to be..."

- As open and rural as possible (43%)
- A regional destination filled with recreation uses (33%)
- Primarily high-end housing (10%)
- A place with resort or commercial uses (14%)



**Q3 | Out of the following, which should be the most important element when planning for the lake?**

Public access (33%)



Homes with docks (30%)



Commercial (0%)



Agriculture (37%)



**Q6 | Out of the following, which represents the level of standards you want to see for nonresidential uses around the lake?**

(23%)



(14%)



(9%)



(55%)



**Q4 | Out of the following, which residential type is most suitable for the lake area?**

- Homes on large lots – over 5 acres (26%)
- Homes on small lots – less than 5 acres (15%)
- Condos/vacation rentals (4%)
- Mixture of A, B, and C (56%)

**Q5 | How important is the quality (materials/design) of residential development around the lake?**

- Extremely important (69%)
- Somewhat important (14%)
- Not important at all (17%)

**Q7 | Should nonresidential buildings be designed around a central theme?**

- Yes (21%)
- No (79%)

**Q8 | Should marinas be allowed around the lake?**

- Yes (43%)
- No (21%)
- Only in certain locations (36%)

**Q9 | Should there be public access areas?**

- Yes (90%)
- No (10%)

**Q10 | Should there be campgrounds?**

- Yes (83%)
- No (17%)

**Q11 | Should there be RV parks?**

- Yes (83%)
- No (17%)

**Q12 | Should there be private recreation and parks?**

- Yes (66%)
- No (34%)

**Q13 | Trails can be an important element to lake development. Which of the following statements do you agree with?**

- Trails should only be in parks and not connected to surrounding development (31%)
- Trails should be developed around the entire lake, where possible (10%)
- Trails should be connected to other parts of the County to create a larger trail network (10%)
- All of the above (38%)
- None of the above (10%)

**Q14 | With increased traffic, do any roads need to be improved?**

- Yes (93%)
- No (7%)

**Q15 | Out of the following, what type of recreation is most important to you?**

Swimming/beach (4%)



Fishing (52%)



Camping (9%)



Picnic Facilities (4%)



Trails (4%)



Passive recreation (26%)



**Q16 | How should the major roads be designed around the lake?**

- Designed to travel as fast as possible and carry the most traffic (7%)
- Rural, slower speed roads with nice landscaping (59%)
- Road around the lake/shoreline drive (28%)
- I don't have a preference (7%)

## Breakout Groups

After the presentation and survey, a land use exercise was conducted to allow participants an opportunity give input on where certain uses should or should not be allowed around the LBCR. The participants formed three groups. The groups used a large map to identify the areas that were suitable for each land use by placing the corresponding land use sticker on the map. To complete the exercise, each group presented their map. Overall, the each group's ideas were similar, and the input gathered was used in the formation of the Future Land Use Plan map and this Comprehensive Plan.

**Group #1** | This group placed a marina and other commercial uses near the southeast shoreline of the lake where FM 1396 will be abandoned. They designated the northern shoreline of the lake for agricultural uses and the southern portion for large and small lot residential. They evenly distributed parks and boat ramps around the lake.



**Group #1**

**Group #2** | Similar to group #1, group #2 placed agricultural uses in the northern shoreline of the lake and residential uses in the southern shoreline. Additionally, they specified an area for five-acre residential lots. This group also designated land uses along US 82 and said that this corridor is important because it will be the main gateway to the lake and surrounding area. They added residential, hotels, and commercial uses along the corridor. They also distributed parks and boat ramps around the lake, including a park that would connect Lake Bonham to the LBCR.

**Group #3** | This group distributed agricultural uses all around the LBCR shoreline. Similar to group #2, they paid attention to the US 82 corridor and added hotels and other commercial uses. They only designated residential uses on the southern shoreline of the lake, similar to the other two groups. Parks, boat ramps, and camping sites were distributed around the LBCR shoreline.



**Group #2**



**Group #3**

## Open House

The last portion of the public meeting was an open house format. It was a time for attendees to have small group conversations with other attendees, the consultants, and the NTMWD staff. In addition, it allowed attendees to walk around the room to look at maps and participate in input boards set up around the room. The following is a summary of the input boards.

- “Supply water to the County for economic growth. Keep it rural, quiet, and good for fishing, hunting, and boating.”

## Board #3 | What we have heard so far...

The following statements that were gathered from previous public input were on the board and attendees were asked to put a dot next to each statement they agree with.

## Board #1 | What types of parks and recreation are needed?

- “I would like to see safe, beautiful, parks like Fannin Lake”.
- “Mainly that which supports hunting and fishing with a limited number of campgrounds.”
- “Private control ownership for camp and cabin rental.”
- “Existing roadways that now enter lake to become boat ramps.”

## Board #2 | What is your vision for the lake and surrounding area?

- “I would like to see this as a beautiful project. The lake should be pleasing to the eye, not develop like a cookie cutter lake.”
- “I have a vision for my land that does not include a reservoir.”
- “Lots of residential along lake’s shore.”
- “Boat docks allowed.”
- “Businesses to support rural/recreational lifestyle.”
- “Limited hotels and requirements for hotels to keep them mid to upper range.”
- “Restaurants/bar with patios and water view.”

(The numbers in parenthesis indicate the number of dot responses.)

- Keep the area clean and nice (15)
- Keep current agricultural uses (12)
- Be a good fishing lake (11)
- Keep the land rural, not a Dallas lake (10)
- Promote tourism/recreational destination (8)
- Promote recreational opportunities for Fannin County residents (7)
- Have hike and bike trails (6)
- No heavy commercial uses (6)
- Need to have public access (6)
- Not like Lake Texoma or Lake Tawakoni (5)
- Have a resort/convention center (2)



## Written Comments

There was a table set up for attendees to write down any comments. This form of public input was to allow those who may not be comfortable speaking at meetings a chance to give their input. Only one written comment was received.

*"I think this is a great opportunity to create a wonderful project. Appreciate your help."*

Cards were also handed out to residents as they left to direct them to the comment section on the project website.



## Key Takeaways:

1. Maintain current agricultural uses, especially on the north side
2. Residential should be primarily on the south side
3. Boat ramps and public access should be appropriately located around the lake
4. Maintain the rural and natural environment
5. Small-scale commercial uses are appropriate along major thoroughfares
6. US 82 will be a main gateway and is important for economic development
7. Opportunities for various house types should be available
8. Parks, trails, and other recreational opportunities are very important
9. Not everyone is happy about the project, but still wants to make sure the natural/rural feeling of the County is protected
10. Connection between Lake Bonham and the LBCR is important – specifically through a park

## Zoning Commission Meeting #3 (Lake Tour)

**Date:** December 15, 2015

**Location:** Lake Tawakoni, Lake Fork, and Jim Chapman Lake

**Attendance:** Zoning Commission members and two representatives from NTMWD

**Purpose:** To tour nearby lakes to gain a visual understanding of desirable and undesirable development.

**Summary:** The Zoning Commission created the idea of touring nearby lakes to gain a visual understanding of desirable and undesirable development. The lake tour started at Lake Tawakoni in southern Hunt County, then went to Lake Fork in western Wood County, and ended at Jim Chapman Lake in northern Hopkins County. The group viewed different types of boat docks and agreed that boat docks around the LBCR should be open-air and have a pitched roof. The group toured residential areas to see what different types of lot setbacks looked like and saw different types of commercial development. They also saw boat ramps, parks, and camping/RV sites. Overall, the lake tour helped the Zoning Commission to visualize various lake concepts and elements, which will help them in the formation of the zoning regulations. The following is information about the lakes that were toured by the Zoning Commission and pictures from the lake tour.

### Lake Tawakoni

- Surface area: 37,000 acres
- Storage capacity: 872,000 acre feet
- Elevation: 437.5 (Conservation Pool)
- Owner: Sabine River Authority of Texas

### Lake Fork

- Surface area: 27,000 acres
- Storage capacity: 637,000 acre feet
- Elevation: 403.0 (Conservation Pool)
- Owner: Sabine River Authority of Texas

### Jim Chapman Lake (formerly known as Cooper Lake)

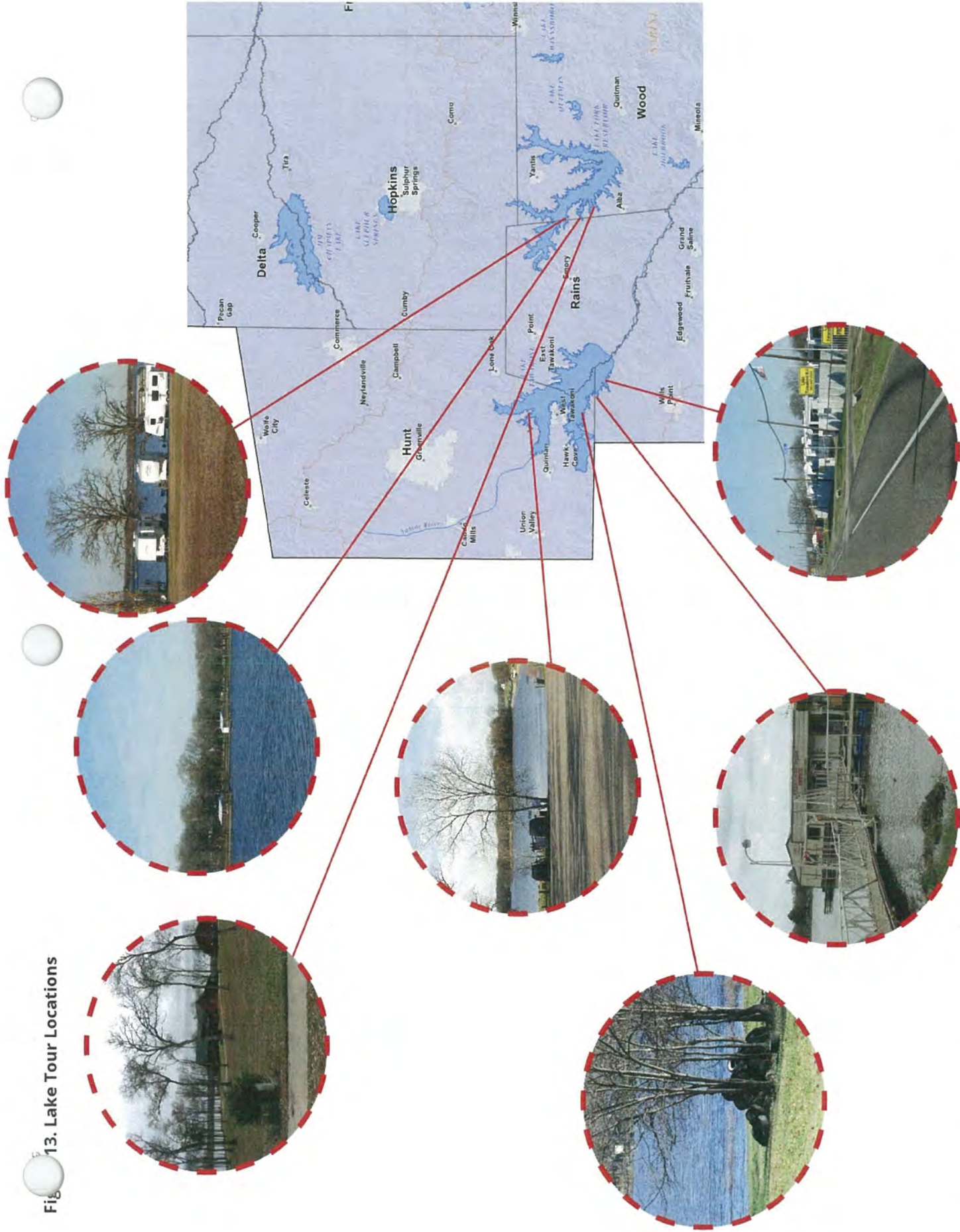
- Surface area: 18,000 acres
- Storage capacity: 299,000 acre feet
- Elevation: 440.0 (Conservation Pool)
- Owner: US Army Corps of Engineers

### Key Takeaways:

1. Quality development is critical to protecting the natural environment of the LBCR
2. Boat docks should have design standards, like pitched roofs
3. It is important to create a plan and zoning regulations before development occurs
4. The visual appearance of buildings, signs, dumpsters, and landscaping is important
5. RV parks should have quality standards such as paved roads and required maintenance, and should also be for short-term use only



Fig 13. Lake Tour Locations



## Zoning Commission Meeting #4

**Date:** February 24, 2016

**Location:** Fannin County Courthouse

**Attendance:** Zoning Commissioner members

**Purpose:** To present the first draft Plan to the public and obtain feedback.

**Summary:** The Zoning Commission members met to review the first draft of the Comprehensive Plan. The members asked questions and agreed on edits to the plan. The edits included more information about lake levels, updates to the Future Land Use Plan designations, building materials, clarification on Concentrated Animal Feeding Operations (CAFOs), minimum house size, planned developments, and general formatting edits. The Zoning Commission agreed to review the plan a second time once all edits had been incorporated.



## Zoning Commission Meeting #5

**Date:** June 27, 2016

**Location:** Fannin County Courthouse

**Attendance:** Zoning Commission members

**Purpose:** To present the second draft Plan to the public and gain consensus.

**Summary:** The Zoning Commission members met to review the second draft of the Comprehensive Plan. The members were satisfied with the plan and gave approval for the plan to be presented to the Commissioner's Court and to be posted online for public review.



## Public Open House #2

**Date:** Monday, August 29, 2016

**Location:** Fannin County Court-at-Law

**Attendance:** Approximately 60 people

**Purpose:** To present the draft Plan to the public and obtain feedback.



### Presentation and Discussion

The consultant gave a presentation summarizing the entire Comprehensive Plan. The main themes and recommendations from each chapter were reviewed. After the presentation, members of the audience were given the chance to ask questions. Many of the questions were related to tax exemptions, water levels, and general lake operations.

### Input Boards and Comment Cards

After the presentation and discussion, the public was given the opportunity to submit their thoughts through input boards or comment cards. Each board was related to a chapter in the Plan. The consultants were at each board to answer questions. The public did not submit any input on the boards, but used the boards to examine the maps and ask additional questions. Three comment cards were also submitted.



## Project Website

A project website was created to increase the public's access to information about the project. The website contains documents, agendas, and presentations from all meetings. It also contains a feature that allows the public to submit input about the project. The comments that were submitted through the website can be found in the appendix of this plan.

### Key Takeaways:

1. Property value is important to residents
2. Not everyone likes the idea of strategic planning
3. Some residents desire boat docks and boat ramps
4. Some residents are thinking about long-term investments in parks and connections



HC2016

### Welcome to the Fannin County - Lower Bois d'Arc Creek Reservoir Comprehensive Plan and Zoning Homepage

The purpose of this project effort is to develop a Comprehensive Plan for the area (see Lake Aerial) surrounding the Lower Bois d'Arc Creek Reservoir in Fannin County. The second purpose is to develop county zoning regulations for the area surrounding the reservoir. The project will follow the process outlined in the Texas Local Government Code, Chapter 331, Subchapter G, (T.L.G.C. 331.031-031.41). The project began in August 2015 and will take approximately one year to complete.


[Click here to Submit a Comment](#)



Area of proposed reservoir

Date	Link
08/19/2015	<a href="#">LC2015 Highlights.pdf</a> Section 231 of the Texas Local Government Code outlining the zoning authority granted to Fannin County for the Lower Bois d'Arc Reservoir.
08/19/2015	<a href="#">FAQs for Fannin County Zoning LC2015_08_19.pdf</a> FAQs related to zoning and references to Texas Local Government Code.
08/19/2015	<a href="#">Action Steps for Fannin County Zoning LC2015_08_19.pdf</a> Action plan for developing the comprehensive plan and the zoning ordinance. The gray lines indicate the action has been completed.
08/19/2015	<a href="#">Lake_Topo_LC2015_08_19.pdf</a> Map of topography/elevation of proposed reservoir.
08/19/2015	<a href="#">Lake_Physical_Features_LC2015_08_19.pdf</a> Map of physical features of proposed reservoir. The yellow area is the 5,000' buffer from the 534' elevation which can be legally zoned by the County.
08/19/2015	<a href="#">Lake_Aerial_LC2015_08_19.pdf</a> Aerial map of proposed reservoir. The yellow area is the 5,000' buffer from the 534' elevation which can be legally zoned by the County.
08/19/2015	<a href="#">LBCC Zoning Commission Kick-off LC2015_08_19.pdf</a> Presentation from the August 19, 2015 Fannin County Zoning Commission Kick-off Meeting.
08/28/2015	<a href="#">LBCC Pool Elevations.pdf</a> LBCC Elevation Frequencies.pdf
10/14/2015	<a href="#">LBCC Public Open House LC2015_10_14 Presentation and Survey Results.pdf</a> Presentation and survey results from the LBCC comprehensive Plan Public Meeting on

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# The Lower Bois d'Arc Creek Reservoir is envisioned as...

**A NATURAL RESOURCE**



**A DESTINATION**



**A PLACE FOR RECREATION**



**AN ASSET FOR THE COUNTY**



## Summary | Vision

Overall, people are in support of the LBCR and want to see it flourish as a unique, natural resource for Fannin County. Even those who do not support the construction of the lake generally still understand the need for strategic planning to protect the land and prevent undesirable development. The following are the major themes that emerged during the public engagement process and were used to craft the vision for the LBCR.

### Major Themes:

1. The LBCR should be a unique resource to the County
2. Economic development opportunities are important
3. Public access and recreational amenities are necessary
4. Agriculture and maintaining a rural environment is very important to the community
5. Commercial uses should be limited
6. Quality development is critical to protecting the natural environment of the LBCR
7. Residential options near the lake are desired
8. Some residents are upset about the lake being built, but still want to make sure the natural/rural feeling of the County is protected
9. Residential tax-base is important to the County, as well as the four school districts near the LBCR
10. Ease-of-access and response time is critical to emergency response personnel





# Chapter 3

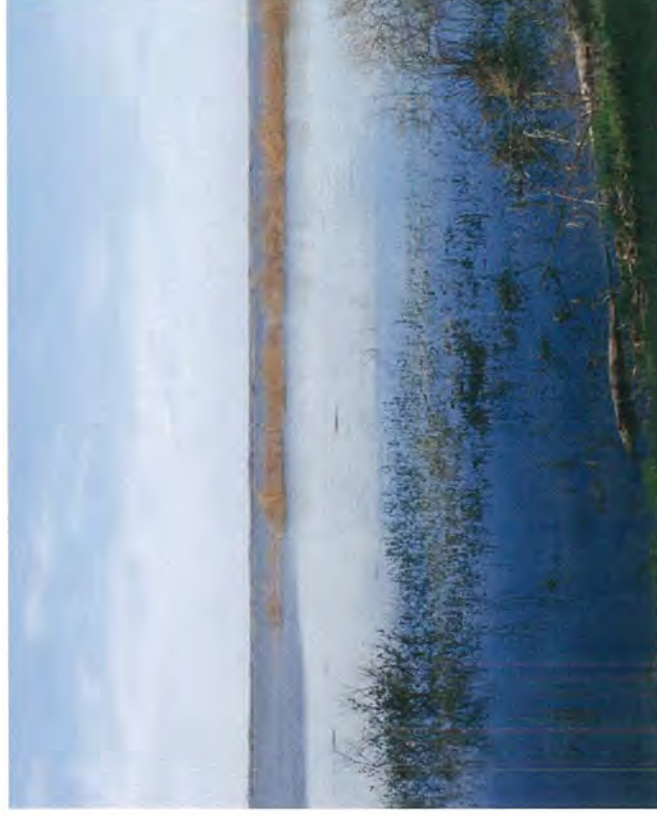
## *Future Land Use Plan*

**Chapter Purpose:** To ensure quality residential and nonresidential uses around the lake

### **Introduction**

An important part of this Comprehensive Plan is establishing the ideal Future Land Use Plan for the area. The Future Land Use Plan and Map portray the overall framework of desired land uses surrounding the Lower Bois d’Arc Creek Reservoir (LBCR). Specifically, the Future Land Use Plan designates various areas within the reservoir’s planning area for particular land uses, based principally on the specific land use policies outlined herein.

The Future Land Use Map, shown in Figure 14, is graphically depicted for use during zoning and development plan review process. It is important to note that the Future Land Use Map is not a zoning map, which legally regulates specific development requirements on individual parcels. Rather, the zoning map, which will be created once the Comprehensive Plan is completed, should be guided by the graphic depiction of the preferred long-range development pattern as shown on the Future Land Use Map.





## Future Land Use Categories

This section of the Future Land Use Plan provides an in depth description of each recommended land use type as shown in

Figure 14. This section also provides recommendations as to the development of each land use type to provide some guidance for the creation of the Zoning Ordinance. The Future Land Use categories are:

- Agriculture/Open Space
- Large Lot Residential
- Small Lot Residential
- Nonresidential

## How Does Future Land Use Relate to Zoning?

The future land use plan informs the zoning ordinance by providing a framework for where land uses are suitable around the lake. It is recommended that all the land around the lake be initially zoned agricultural/open space to accommodate the existing uses. It would be impractical to zone all the land around the lake to match the future land use plan because the dam has yet to be constructed and the market cannot be accurately predicted. There are two ways the County can rezone the land -- reactive and proactive. The reactive way is when new uses are being planned by residents and developers they will submit a rezoning request to the zoning commission. The zoning commission will then review the request and use this comprehensive plan and future land use plan as a guide to determine if the rezoning is appropriate. The proactive way is to slowly rezone pieces of land before development happens. This should not be done all at once, but instead should be done after the dam is constructed and the lake starts to fill in. These gradual rezonings could help to attract certain types of development to particular locations.

## Agriculture/Open Space

### Vision

Land with the designation of agriculture/open space is envisioned to take up the majority of the planning area surrounding the LBCR. This land use type will prevent overdevelopment from occurring as well as protect the water quality found in the region. The land use category is intended to support the continuing operation of an important part of the agricultural related businesses found in Fannin County. The designation includes land that is used for active farming or ranching, hunting, fishing, open space, and agricultural operations. It is important to note that Texas Parks and Wildlife Department regulates all hunting and fishing in Texas. Although the land should primarily be used for agricultural uses or left as open space, it is also appropriate for large lot residential developments to be found within this land use.

### Recommendations

Concentrated animal feeding operations (CAFOs) should not be allowed within this land use category. CAFOs are agricultural facilities in which animals are kept and raised in confined areas and whose waste is discharged into the water supply. Prohibiting CAFOs within the LBCR will ensure that there is a high level of water quality.

### What is a Concentrated Animal Feeding Operation (CAFO)?

In Texas, CAFOs are regulated by the Texas Commission on Environmental Quality. They are defined as “lots or other facilities, other than an aquatic animal production facility, where animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and in which the animal confinement areas do not sustain crops, vegetation, forage growth, or post-harvest residues in the normal growing season over any portion of the lot or facility.” *Source: Texas Commission on Environmental Quality*

Desirable



Undesirable



## Large Lot Residential

### Vision

This land use is indicative of single family homes located on large properties in an effort to maintain the rural character of the area.

### Recommendations

All new developments should have lots greater than one acre in size to provide for a rural lifestyle. Lots should have 100' of frontage to prevent homes from being densely packed along the roadway, resulting in a more densely developed area. Limits on impervious coverage should be set at 40%. Homes should have a front yard and rear yard setback of at least 80' from the property line. This will prevent homes from encroaching on the road and the lake. Homes should have a 25' side yard setback to ensure ample amount of spacing between homes. Having side yard setbacks will prevent homes from being clustered too close to one another. All large lot developments should have paved roads that are at least 28' in width with a 60' right-of-way. The roadways should have two driving lanes each with a width of 12', as well as 2' shoulders on each side. This will ensure that mobility throughout large lot residential areas is easily accessible not only for the residents but also for emergency vehicles. Water will be obtained either from a well or from a provider. Wastewater will be collected by community wastewater collection systems for new subdivisions. On-site sewage facilities are allowed at locations where community wastewater systems are not feasible, provided they protect water quality and meet the requirements of Subchapter D, Chapter 285 of the Title 30 Texas Administrative Code.

### Desirable



### Undesirable



## **Small Lot Residential**

### **Vision**

Small lot residential land use is representative of traditional, single family dwelling units found on half-acre lots. Quality construction should be utilized in all small lot neighborhoods to ensure long-term structural durability as well as to preserve the long term visual integrity of the LBCR area. Quality building materials and landscaping should be encouraged. It is envisioned that HOAs would develop to create and maintain community amenities.

### **Recommendations**

The average lot size in these developments should be 30,000 sq. ft. or about two-thirds of an acre. This will allow for smaller lots that still maintain the look and feel of the rural setting. Lots should be required to have a 100' frontage with a 200' depth to ensure that lots are all of a similar shape and avoid the creation of flag lots. Limits on impervious coverage should be set at 40%. Homes should have both a front yard and rear yard setback of 40' to ensure that homes are not being constructed either too close to the roadway or too close to neighboring homes to the rear. This will make the small lot areas look cohesive. Homes located within these neighborhoods should have a minimum dwelling area of 1,800 square feet. Having a minimum dwelling area for homes ensures that the area surrounding LBCR is developed with large, high quality homes. Similar to large lot developments, small lot residential developments should also have paved roads that are at least 28' in width and a 60' right-of-way.

The roadways should have two 12' undivided driving lanes and 2' shoulders on either side. This will ensure that mobility throughout large lot residential areas is easily accessible not only for the residents but also for emergency vehicles.

### **Desirable**



### **Undesirable**



## Office/Retail/Commercial

### Vision

Nonresidential uses will be primarily located along major thoroughfares and will be limited throughout the planning area. Nonresidential uses should be constructed to a high quality to ensure that they are visually appealing as well as to prolong the longevity of the structure. Generally, nonresidential uses should include restaurants, hotels, small shops, and marinas. Marinas and public access areas will provide visitors of LBCR with great opportunities for boating activities. Marinas are harbors in which privately owned boats are kept, while public access points are locations in which boat ramps will be located to allow LBCR visitors to enter and exit the lake.

### Recommendations

Marinas should be the primary nonresidential use around the lake. There are three potential marina locations identified in Figure 22 in Chapter 5. Public access areas should be provided at multiple prime locations surrounding the LBCR. This will ensure that visitors of the lake are provided with the best possible access to the water. Nonresidential uses should also have a minimum lot size of one acre. The front yard setback requirement should be 80'. Nonresidential uses near the lake should consider the amount of parking needed to accommodate large trucks and boat trailers.

### Desirable



### Undesirable



## NTMWD-Owned Property

### Vision

The vision for this land use type is to support the operation of the lake as a reservoir and recreational area. Land with this designation is currently owned by the NTMWD. Its purpose is to allow for safe and efficient reservoir operations.

### Recommendation

As its primary function, this land use should be used to support the operation of the reservoir, which includes offices, buildings, infrastructure, and any other uses needed for the lake to function as a reservoir. It is anticipated that some of the areas will remain undeveloped in the immediate future, but may develop over time as residential subdivisions are constructed. As a secondary function, some of the properties within this land use category could be used as recreational opportunities. Notably, site evaluation is necessary to determine if land is suitable for recreational needs and to ensure that the primary function – supporting reservoir operations – is not compromised in any fashion. To the extent property currently owned by the NTMWD is determined unnecessary for reservoir operation following the construction of LBCR, such property may be sold and converted to some other use that is consistent with adjacent land uses and the Comprehensive Plan. The Comprehensive Plan would then be revised to reflect this change in use.

### Desirable



### Undesirable





## Recreational Areas

### Vision

Recreational areas are envisioned to provide both passive and active recreational opportunities to the visitors of the LBCR. There are locations shown on the Future Land Use Map (others may be added in the future) that are designated as appropriate for park lands. Areas that are designated as recreational areas will help ensure that land is protected from development, protects water quality, and enhances the area's natural beauty. Further site evaluations are needed to be certain that these areas are suitable for recreational areas.

### Recommendations

Recreational areas are identified in Figure 14 and Figure 24. These areas should be developed to provide a superior recreation system for residents and create a regional destination for tourists. The implementation of these areas will require strategic partnerships with various entities in Fannin County. All recreational areas should be well maintained and designed to protect the natural environment of Fannin County. Generally, recreational areas should be developed adjacent to the lake, in areas that have proposed boat docks, near marinas, and near areas where major thoroughfares are located.

### Desirable



### Undesirable



## Multi-Family

This future land use category is not shown on the future land use map because multi-family developments require a large amount of infrastructure and it is unrealistic to determine a specific location for this type of development at this time. If a developer decides to build apartments around the lake, they could use the PD process to rezone their land to a PD to allow for multi-family development to occur. This PD district will be a practical way for the zoning commission to approve multi-family developments while still have control over the design and other elements. It is recommended that when development proposals for multi-family are approved by the zoning commission, the Future Land Use Map be updated to reflect the location.

## What is a PD?

A planned development (PD) is a unique zoning tool to assist in implementing the vision and policies of the comprehensive plan. It allows the Commissioner's Court to see development proposals and work with the property owner to ensure development is consistent with the vision of the comprehensive plan.

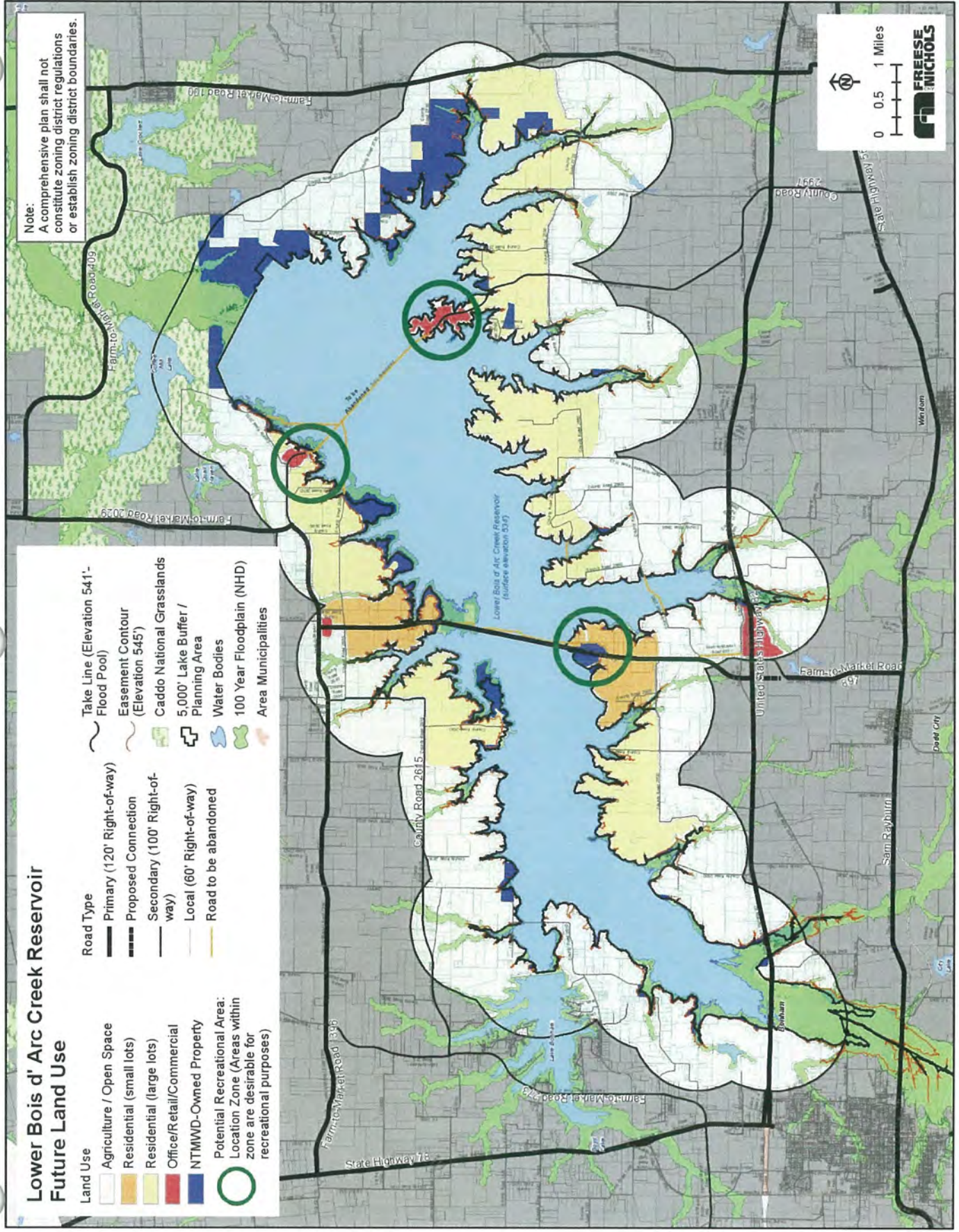
## How will PDs be used in Fannin County?

When a property owner wants to develop their property with a different use than what is on the future land use plan and the zoning map, one option is to apply for a PD. The property owner can work with the County to agree on requirements such as building materials and landscaping. This allows for flexibility in implementing the comprehensive plan and ensures that quality development is occurring around the lake. It is anticipated that multi-family development will occur around the lake under the PD process.

It is anticipated that multi-family development will occur around the lake under the PD process



Figure 14. Future Land Use Map



## Residential Design Recommendations

### Connections to Adjacent Uses

As new residential developments begin to appear around the LBCR, it is important to consider the future connections that will be needed to adjacent neighborhoods and any nonresidential development. Doing so will improve the circulation throughout the neighborhoods as well as provide easy access for school buses and emergency vehicles. To avoid future connection issues, subdivisions should be required to have at least one street stub-out into currently undeveloped tracts of land. This will allow for new subdivisions to create roads that are a continuation of an existing street.



### Plan for Trail Connections

The LBCR area is envisioned to be predominately rural with recreational areas located throughout. There should be trails located in certain areas around the reservoir in order to provide access to open space, parks, and other facilities to help link various areas of the community to one another. The development of the trail system will be the responsibility of the County. It is important that trail connections are implemented as development occurs, in particular residential development. This can be done in the form of establishing sidewalks or paths that run through residential areas to create small trails within the subdivisions that can later be incorporated into the larger trail network. Trail connections can also be created by providing oversized shoulders on roads.



## Building Materials

To promote a rural character around the lake, the required building materials should be less stringent while still promoting quality development. Wood/log, metal, brick, and stone/masonry building materials should be required. Additional details and requirements for each building material should be incorporated into the zoning ordinance.

## Manufactured Homes

There are two types of manufactured homes: manufactured (HUD code) homes and industrialized (modular) homes. The primary difference is that manufactured homes are constructed to the Federal HUD code standards and modular homes are constructed to the same State of Texas codes as site built houses. According to State law, municipalities may not differentiate between modular homes and site built homes. Modular homes become a part of the real property once installed and must be installed on a permanent foundation system. Manufactured homes should be allowed in residential areas around the lake as long as they conform to the building material standards that are outlined in the zoning ordinance. To promote quality development, industrialized homes should be encouraged over manufactured homes.



## Industrialized Housing

*(Per Section 1202.002 of the State of Texas Occupations Code, as may be amended)*

- a. Industrialized housing is a residential structure that is:
  - i. designed for the occupancy of one or more families;
  - ii. constructed in one or more modules or constructed using one or more modular components built at a location other than the permanent site; and
  - iii. designed to be used as a permanent residential structure when the module or the modular component is transported to the permanent site and erected or installed on a permanent foundation system.
- b. Industrialized housing includes the structure's plumbing, heating, air conditioning, and electrical systems.
- c. Industrialized housing does not include:
  - i. a residential structure that exceeds three stories or 49 feet in height;
  - ii. housing constructed of a sectional or panelized system that does not use a modular component; or
  - iii. a ready-built home constructed in a manner in which the entire living area is contained in a single unit or section at a temporary location for the purpose of selling and moving the home to another location.

## Manufactured Housing

*(Per Section 1201.003 of the State of Texas Occupations Code, as may be amended)*

- a. Manufactured Home – HUD Code
  - i. means a structure:
    1. constructed on or after June 15, 1976, according to the rules of the United States Department of Housing and Urban Development;
    2. built on a permanent chassis;
    3. designed for use as a dwelling with or without a permanent foundation when the structure is connected to the required utilities;
    4. transportable in one or more sections; and
    5. in the traveling mode, at least eight body feet in width or at least 40 body feet in length or, when erected on site, at least 320 square feet;
  - ii. includes the plumbing, heating, air conditioning, and electrical systems of the home; and
  - iii. does not include a recreational vehicle as defined by 24 C.F.R. Section 82.8(g).

## Nonresidential Design Recommendations

### Building Facades

Building material regulations in nonresidential areas are important to enhance the aesthetic value of the community and to establish a cohesive look. Businesses should use high quality materials on the front façade of their buildings. The use of metal façades should not be promoted.

### Building Articulation

Building articulation refers to offsets of the outer walls or roof line of a building. A perfectly flat wall with no variations has no articulation, and therefore provides no architectural character to a building. Within the nonresidential areas of LBCR, businesses should incorporate articulation to the front façade of the buildings to enhance the architectural quality of the area.

### Refuse Containers

The placement of trash and recycling receptacles is often an overlooked component of site design. They are often placed, unintentionally, in highly visible locations. Receptacles, however, do not have to be unsightly or reduce the visual quality of nonresidential developments. To ensure refuse containers do not become eyesores, they should be screened from public view or located behind the main structure. This can be done with a variety of materials such as masonry walls or landscaping.

### Outside Storage

Outside storage areas are generally defined as areas where goods and materials are displayed or stored outside a building for periods that are longer than 24 hours on a permanent basis. Examples include pre-fabricated storage sheds, commercial equipment, landscaping material storage, and some agricultural uses. To avoid unappealing views, new businesses should be required to locate outside storage in areas not visible to public view. Screening with masonry walls or fences are useful methods. This should be required of all outside storage except for those serving agricultural uses. Materials being stored should not exceed the height of the screening.



## Business Signage

Signage establishes an identity to buildings, businesses, and developments. As one of the most visible elements in a streetscape or corridor, signs significantly influence the visual environment. As development occurs, special consideration should be given to the types of permitted signage. Monument signs should be predominately used since they are visually appealing and do not create clutter along roadways. Attached signs would also be acceptable since they are of a smaller scale and can be easily attached to small shops or boutiques. Detached signage should have a height restriction that does not allow for billboards to be placed along roadways.

## Wayfinding Signage

Wayfinding signs are aimed at providing guidance to specific locations or features of an area. Wayfinding signs may be used to direct vehicular traffic to parks and boat ramps located around the LBCR. They may also be used to help pedestrians or bicyclists identify public facilities, parks, public access areas, trails, marinas and other areas of interest within the LBCR. Acceptable types of wayfinding signs may be pole mounted, part of a monument sign, attached to traffic signal poles, or attached to light poles.



## Recreational Vehicle (RV) Parks and Camping Areas

The area surrounding the LBCR is envisioned to include recreational opportunities. Therefore, it is recommended that the County develop standards for future recreational vehicle (RV) parks and camping areas. These RV parks and camping areas will be allowed to be located within the nonresidential areas since they fall within the commercial category. The following standards are recommended to be applied to all RV parks and camping areas surrounding LBCR.

### Park Area

The minimum area of RV parks and camping areas should be 3 acres.

### Rental Space Size

A minimum rental space of 1,500 square feet should be required for all individual sites (including concrete pad and open space). There should not be a minimum square footage requirement for tent sites or building sizes. Rental cabins tend to be small since most time is spent outside of the cabin utilizing the recreational areas.

### Rental Pads

A minimum of 80 percent of all spaces should be equipped with a surfaced area that has a minimum area of 10 feet by 40 feet. These areas should have water, sewer, and electricity hookups available. Surfacing should consist of concrete or asphalt, unless otherwise approved by the County. Other alternatives are pervious pavement or reinforced grass, which promote infiltration and have many benefits to water quality.





### **Streets**

Streets within RV parks should be designed to provide the safest and most convenient access to all rental spaces and common use facilities. Streets should be constructed in a manner that allows emergency vehicles easy access into the park and throughout the internal street network. It should be required that all streets be paved with concrete or asphalt of a similar standard, and are a minimum of 24' for two-way traffic and 15' for one way traffic.

Wherever an interior street is meant to curve, it should be required that there be a 45' turning radius to facilitate access for emergency vehicles.

### **Frontage**

To provide ample space between rental spaces, all spaces should be required to have a minimum frontage of 30' along an interior roadway.

### **Disposal Stations**

RV parks should be required to have at least one sanitary disposal station. These stations should only be used to remove and dispose of waste from RV holding tanks.



## Utilities

**Water** — A supply of accessible, adequate, safe, and potable water that is under pressure should be provided within an RV park. All aspects of the water supply from design, construction, and maintenance should be required to comply with the Texas Commission on Environmental Quality (TCEQ) standards as well as Fannin County standards. Rental RV spaces that are equipped with sewer and electrical connections should have two water outlets, while all other spaces only need one.

**Sewer** — Sewer connections should be connected to a public sewage system or an approved on-site sewage system if a public sewage system is not available. Sanitary sewage systems should be installed and maintained in compliance to TCEQ standards.

**Electricity** — Electrical outlets should be made available to all rental pad sites. They should be installed in compliance to the State of Texas Electrical Code. Electrical utility lines should be placed underground so as to not disrupt the look and feel of the RV park.

## Refuse Disposal

Refuse disposal should be made accessible to all occupants of the RV park. One small refuse container should be required within each rental space and several large containers should be located throughout the park. Large refuse containers should be required to be screened from public view. Park owners should be responsible for the appropriate collection and removal of refuse.

## Landscaping

Grass and other natural landscaping should be required throughout all RV parks and should be designed to give parks an aesthetically pleasing appearance within the park and along the frontage from major roadways. Landscaping should also serve as a buffer between the RV park and adjacent properties.

## Structural Additions

Canvas awnings, screened enclosures, platforms, or any other temporary structure that is normally associated with camping should be allowed within a rental space, but must be removed when the space is vacated. No other structural additions should be allowed.

## Stormwater Management Recommendations

### Subdivision Plats

A subdivision plat should not be approved that does not make adequate provisions for stormwater runoff. Additionally, a stormwater drainage plan should be prepared in accordance with standard engineering practice, as part of the subdivision final plat.

### Design Criteria

Drainage structures should be designed to accommodate runoff from a storm event. The County should work to develop the appropriate threshold. The facilities should also be designed so as to minimize any increase in the quantity or velocity of stormwater runoff from the subdivision.

### Low-Lying Lands Along Natural Drainage Course

Low-lying lands along natural drainage courses subject to flooding or overflowing during storm periods should be preserved and retain their natural state as drainage ways, and should not be included as residential lots in the subdivision.

### Primary Roads

Additional right-of-way may be needed at intersections and for specific site features to promote efficient stormwater management practices.



## Summary | Future Land Use Plan

The Future Land Use Plan and Map lay the foundation for how the lake area should be developed. This chapter establishes land uses and the types of development envisioned to occur. Recommendations for the important qualities of development are also listed.

### Major Themes:

1. The lake area should be developed as a desirable home, commercial, and tourist destination
2. The lake area should primarily have a rural feel, with some areas for more intense development
3. The southern half of the lake is anticipated to develop first and should have a mixture of large and small lot residential development
4. Nonresidential uses should occur at locations shown on the Future Land Use Map



# Chapter 4

## *Transportation Plan*

**Chapter Purpose:** To ensure that roadways provide access around all parts of the lake and to all destinations in the County

### **Introduction**

The thoroughfare system forms one of the most visible and permanent elements in a community. It establishes the framework for community growth and development and, along with the Future Land Use Plan, forms a long-range statement of public policy. As the alignment and right-of-way of major transportation facilities are established and adjacent property is developed, it is difficult to facilitate system changes without significant financial impacts. However, by incorporating programmed land uses and planning for future roadway needs, strategies that maximize the land use and transportation relationship can be developed.

More specifically, the transportation system should:

- Provide mobility and accessibility at appropriate levels
- Expand as needed to meet the demands of the area's anticipated development
- Be economically feasible for the citizenry and the County
- Be correlated with regional considerations

### **Existing Transportation Conditions**

#### **Daily Traffic Volumes**

U.S. Highway 82 and State Highway 78 experience the highest traffic volumes in the area surrounding the Lower Bois d'Arc Creek Reservoir (LBCR). The lowest traffic volumes are found on east FM 100 and north FM 273. According to the TxDOT Annual Average Daily Traffic Counts shown in Figure 15, there are approximately 6,900 cars per day at the western end of the planning area and 5,400 cars per day along the eastern end near Honey Grove. This can indicate that US 82 mainly serves as a connection for cities that lie along the roadway.

#### **Current Transportation Systems**

#### **Regional Highways**

There are three major highways that run at a close proximity to the LBCR and play a key role in providing current and future mobility to the reservoir: SH 78, SH 56, and US 82.



### **State Highway 78**

SH 78 is a TxDOT maintained highway located just west of the proposed LBCR. The roadway runs in a predominately southwest-to-northeast direction beginning at the intersection with IH 30 in Dallas and travels approximately 90 miles north-northeast to Oklahoma's border. The highway provides a major link from the DFW Metroplex to the LBCR area.

### **State Highway 56**

SH 56 is a TxDOT maintained highway located just south of the proposed LBCR. The roadway runs east-west parallel with US 82 from Whitesboro to Honey Grove. This highway will not be affected by the lake; however, it connects the Fannin County cities of Savoy, Ector, Bonham, Dodd City, Windom, and Honey Grove. SH 56 is anticipated to see increased traffic due to the proximity to the LBCR.

### **U.S. Highway 82**

US 82 will be a key to the growth and development of LBCR's surrounding area. The County should ensure that it is aware of and greatly involved in any discussions or decisions related to US 82. Figure 15 depicts the traffic volumes for the major roadways surrounding the LBCR. US 82 carries more vehicles per day than any

other roadway in Fannin County. The heaviest traffic volumes on US 82 are near the intersection with CR 2915. Currently, TxDOT has a project under development pertaining to US 82 - an approximately 14.5-mile strip located between SH 78 and FM 100 expected to have two lanes in each direction and shoulders. The estimated cost for the project is around \$38,000,000, and there is no expected start or completion date known at this time.

### **U.S. Highway 82**



## Public Transportation

### Texoma Area Paratransit System (TAPS) Public Transit

The TAPS Public Transit provides curb-to-curb service that runs throughout the Texoma Council of Governments region, which includes the counties of Clay, Cooke, Fannin, Grayson, Montague, and Wise. Trips are prioritized to seniors (60+ years) and individuals with disabilities. Seniors and individuals with disabilities may request a trip for any purpose, including to keep an appointment, get to work, go shopping, get to an educational facility, or any other reason. Riders are asked to schedule a ride with the Get-a-Ride services at least two days before the trip date.

### Air Transportation

#### Jones Field Airport

The Jones Field Airport was constructed in 1941. The airport is located 2 miles north of the central business district of Bonham and five miles southwest from what will be the LBCR. Jones Field Airport covers an area of approximately 300 acres, at an elevation of 618 feet above the mean sea level. Once an Air Force base, the airport currently serves as a general aviation airport owned by the City of Bonham. The airport is predominately used by people who have single engine airplanes. Each fall, the airport hosts one of Bonham's biggest festivals, the Bonham Festival of Flight, which attracts people from all over Fannin County to see the airshow. Access to Jones Field Airport is provided via SH 78, north of its intersection with US 82.

TAPS Service Area Map



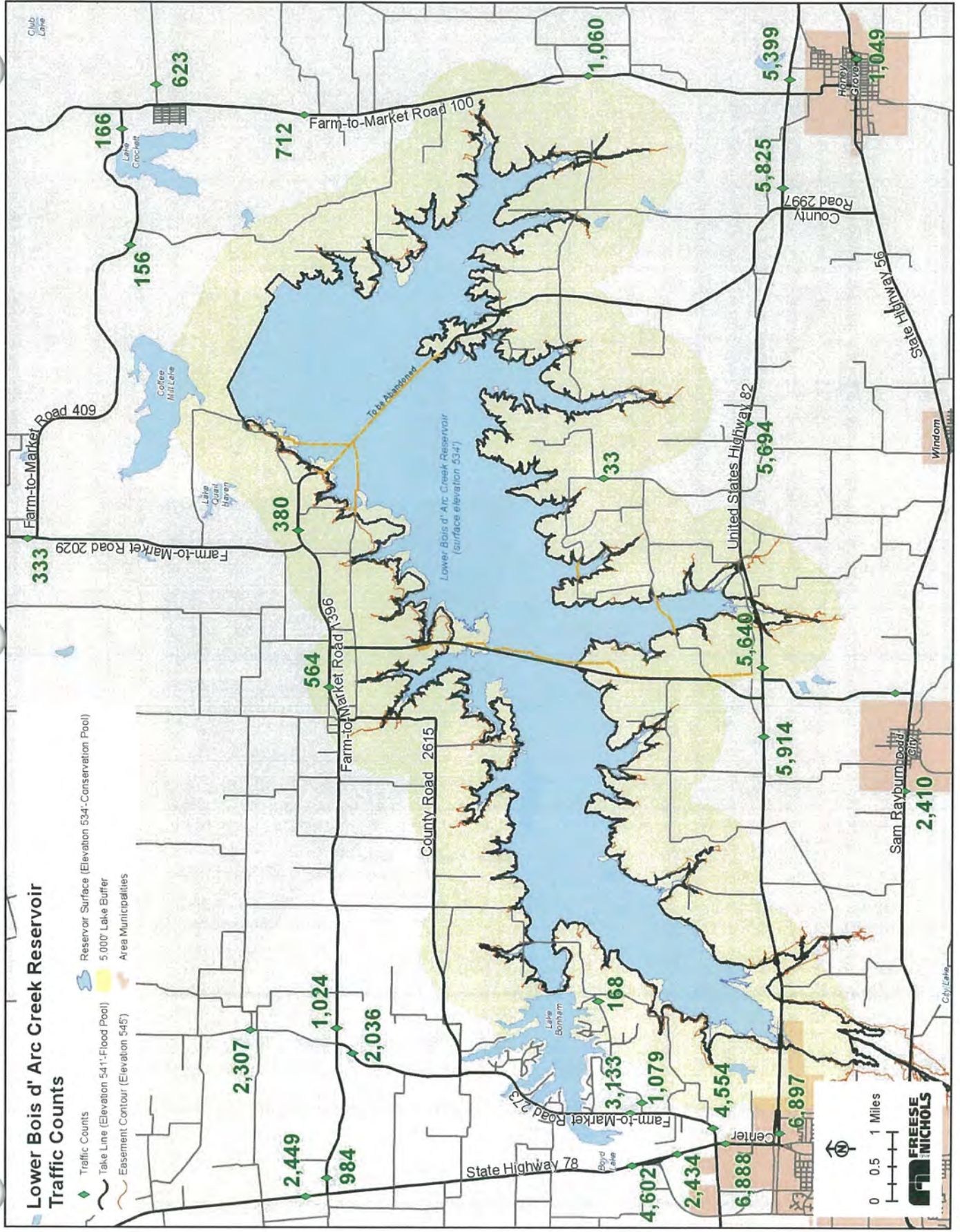
Source: [www.tapsbus.com](http://www.tapsbus.com)

#### Municipal Airport Example





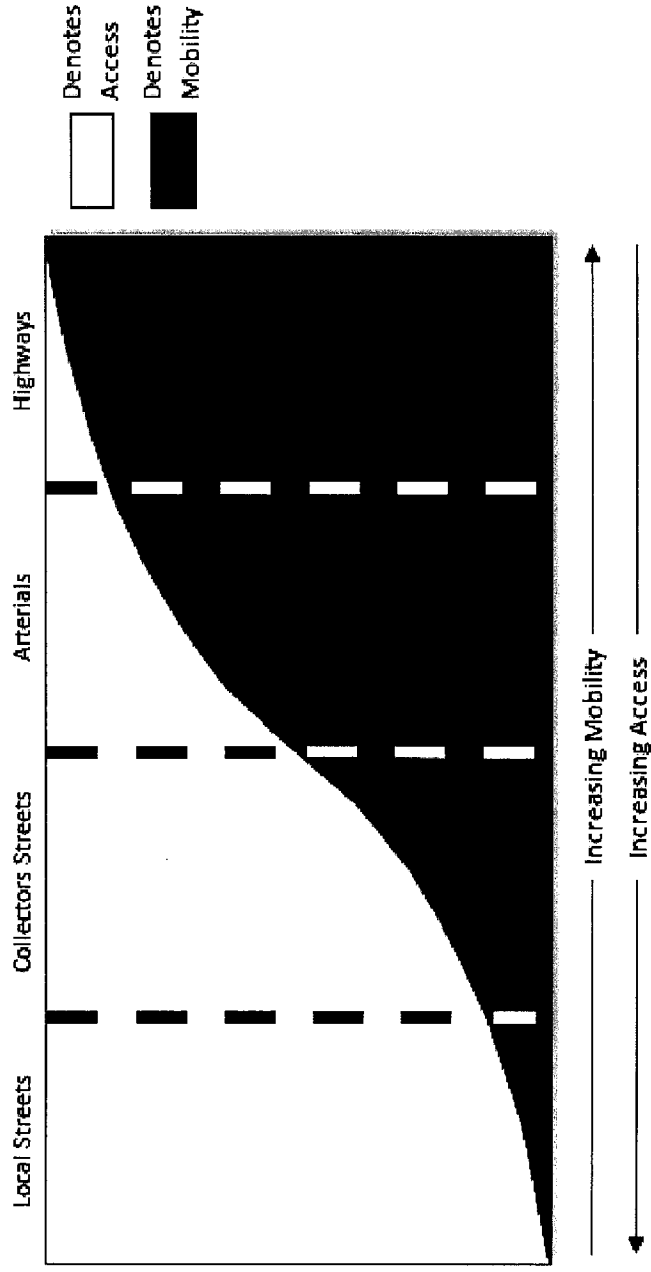
**Figure 15. Traffic Count Map**



## Access Management and Connectivity

Access management refers to the practice of controlling access allowed onto a roadway by considering specific design criteria for the location, spacing, design and operation of driveways, median openings and intersections. Generally, as the capacity of a roadway is increased, it is important to ensure the safe access to adjacent properties. Not only does access management provide for safer driving conditions, but it also enhances the visual appearance of roadways. To avoid having access points at a close proximity to one another, only one driveway should be allowed per lot. If that is not feasible, driveways should be separated by a minimum of 150'. Developments that are placed within 100' of neighboring establishments should provide connections and cross access easements, both as walkways and drives. Additionally, vehicles should not park within the right-of-ways leading to adjacent properties.

**Figure 16. Functional Classification**



## Local Thoroughfare System

The Transportation Plan for LBCR is based upon a classification system that recognizes that every roadway within the planning area can be described according to its anticipated function. Thoroughfare types, as discussed in the following sections, will be classified as primary, secondary, and local. Although this does not follow the typical functional classification system (i.e., arterial, collector, and local roadways), the hierarchy used herein is thought to be the most suitable for the LBCR area. The following section contains roadway cross-sections for the applicable types of thoroughfares shown on the Transportation Plan Map. The cross-sections are intended to help the County provide for adequate mobility along the expected future high-traffic roadways, while also providing for access to local land uses. The Transportation Plan Map shows the future recommended roadways according to the hierarchical system defined herein. Table 9 describes the roadway types in relation to various characteristics.

**Table 9. Summary of Roadway Cross-Sections**

Roadway Type	Right-of-Way Width	Purpose
Primary Roadway	120'	Accommodate high levels of traffic volumes; provide access to and around the lake; mobility is key element; access to properties is limited
Secondary Roadway	100'	Provide greater access to the lake; mobility and access are equally important
Local Roadway	60'	Provide access to properties; slower speed facilities

## Primary Roadways

It is recommended that a Primary Roadway have 120 feet of right-of-way width. It is the largest roadway section within the area that is immediately surrounding LBCR. Additionally, trails can be implemented in the shoulders of the roadways at a future date when trail connectivity exists. Figure 17 provides a cross-section for a Primary Roadway with a trail implemented into the right-of-way.

There are eight Primary Roadways shown on the Transportation Plan Map, which include:

- US 82
- E. Sam Rayburn Drive
- FM 897
- FM 100
- FM 409
- FM 2029
- FM 1396
- SH 78

These roadways are expected to be the main routes that travelers will use to access the different areas of the lake. These roads create a large loop around the lake, with one roadway, FM 897, bisecting the lake from north to south.

## Secondary Roadways

Secondary roadways are intended to distribute traffic from local access streets and funnel it to major thoroughfares. Secondary roadways are intended to provide more mobility than local streets, and local streets are intended to provide more access than secondary roadways. Secondary roadways should provide access to adjacent land uses as well as the key areas found around the LBCR, such as marinas and nonresidential developments. It is recommended that roadways of this classification have a 100' right-of-way that will ultimately accommodate a four-lane undivided roadway. Examples around LBCR include:

- FM 273
- County Road 2615

## Local Roadways

Roadways identified as local are designed to convey light volumes of traffic, generally around 1,000 or fewer vehicles per day. These roadways are primarily intended to provide access to adjacent properties. The mobility aspect of local roadways is secondary to accessibility. Due to the fact that local roadways are generally constructed within residential areas, safety is of high importance. It is recommended that local streets be configured to discourage through-traffic movement. All County Roads and a few FM roadways within the LBCR planning area have been designated as local roadways. Refer to Figure 19 for a graphic depiction of the recommended local roadways.

Figure 17. 120' ROW Cross-Section for Primary Roadways

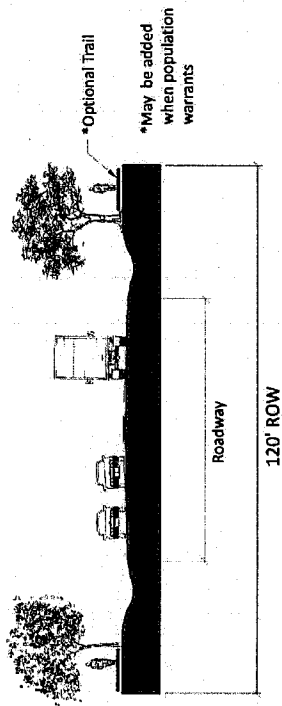


Figure 19. 60' ROW Cross-Section for Local Roadways

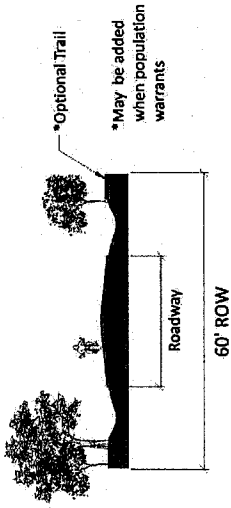
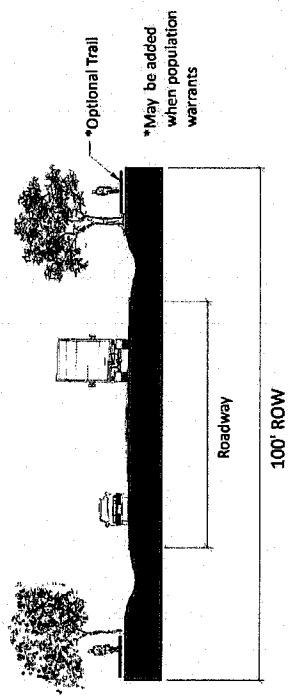
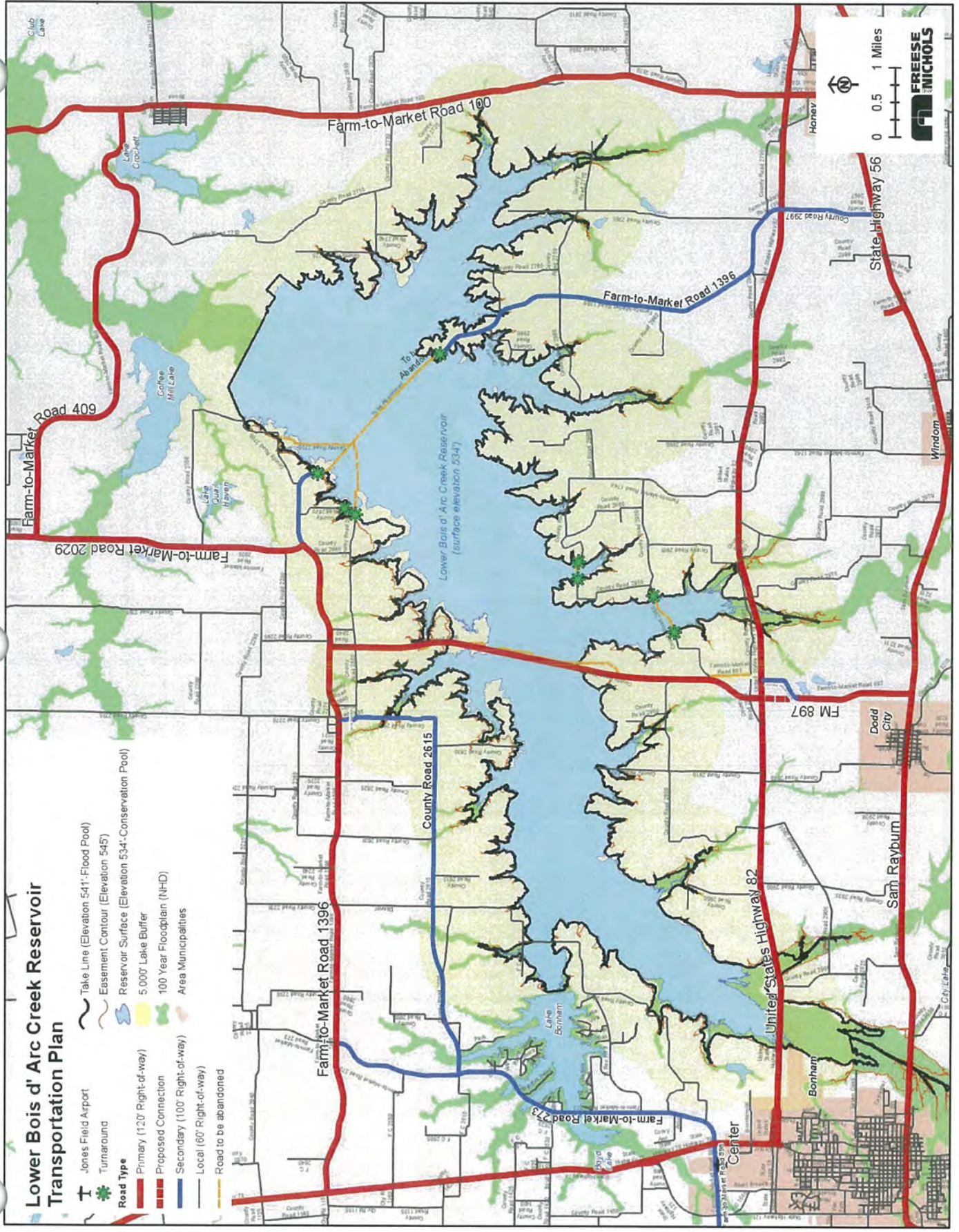


Figure 18. 100' ROW Cross-Section for Secondary Roadways



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Figure 20. Transportation Plan



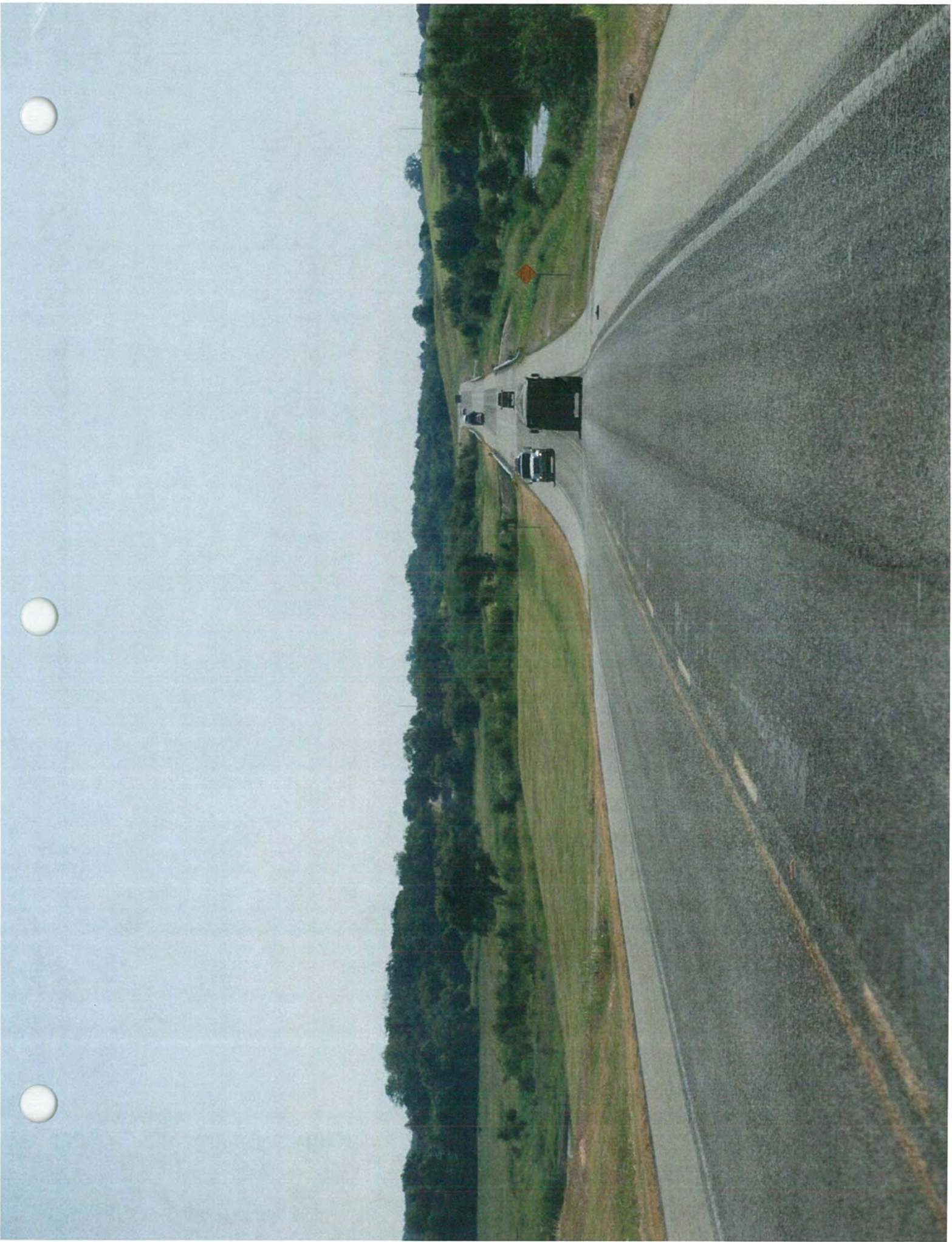
## Summary | Transportation Plan

The thoroughfare system is the backbone of the Plan. These roadways will help transport people to, from, and around the lake. This chapter establishes the hierarchy and locations of the thoroughfares.

### Major Themes:

1. It is important to plan for access around the entire lake
2. It is important to ensure that all emergency service vehicles can quickly access all parts of the lake area
3. Roads and roadway improvements will help to drive growth and development
4. Trails along certain roadways will help to provide a superior recreational system





# Chapter 5

## *Parks, Recreation, Trails, and County Connectivity Plan*

**Chapter Purpose:** To create a unique, well-connected recreation system for County residents and visitors to enjoy

### **Introduction**

A vital component for a community is the space devoted to satisfying active and passive recreational needs. The LBCR will provide a recreational asset to Fannin County. The lake's close proximity to the Dallas-Fort Worth region will attract many weekend visitors. While it is important to provide space for parks and recreation, it is also important to preserve open space to maintain the natural feel of the environment. This chapter will help coordinate parks and recreation efforts by Fannin County and other regional entities.





## Public Access to the Lake

Public access to the LBCR is vital to Fannin County and its residents. It is important that residents and visitors are able to fully access and enjoy the lake, even if they do not own lake front property; however, the public access points should still be appropriately situated to allow the County to better manage public resources and safety. A limited number of public access points are proposed because the County seeks to maintain quality public boat ramps while ensuring fiscal responsibility.

Public access points for launching boats in the water are identified in Figure 22. These public access points are easily accessible via roadways and trails. Most of the lake's visitors will likely come from US 82; therefore, two public access points were identified on the south side of the lake. Public access points were identified on all sides of the lake to give all residents and visitors sufficient access. Three of the public access points are near areas identified for suitable marina locations. These access points are also areas where non-residential uses could potentially develop. The other identified public access points are in areas where parkland was identified.

Varying lake levels were taken into account when identifying public access points because the upper end of the lake (the western portion) will be the first part of the lake to experience limited access in a season of drought, due to higher elevations. Figure 21 depicts the pool elevations of the LBCR.

School districts were also taken into account in the placement of public access points. Development generally occurs around public access points near major thoroughfares; thereby creating residential tax revenue for the school districts. There are three public access points initially planned at various locations around the lake.

Figure 21. LBCR Pool Elevations

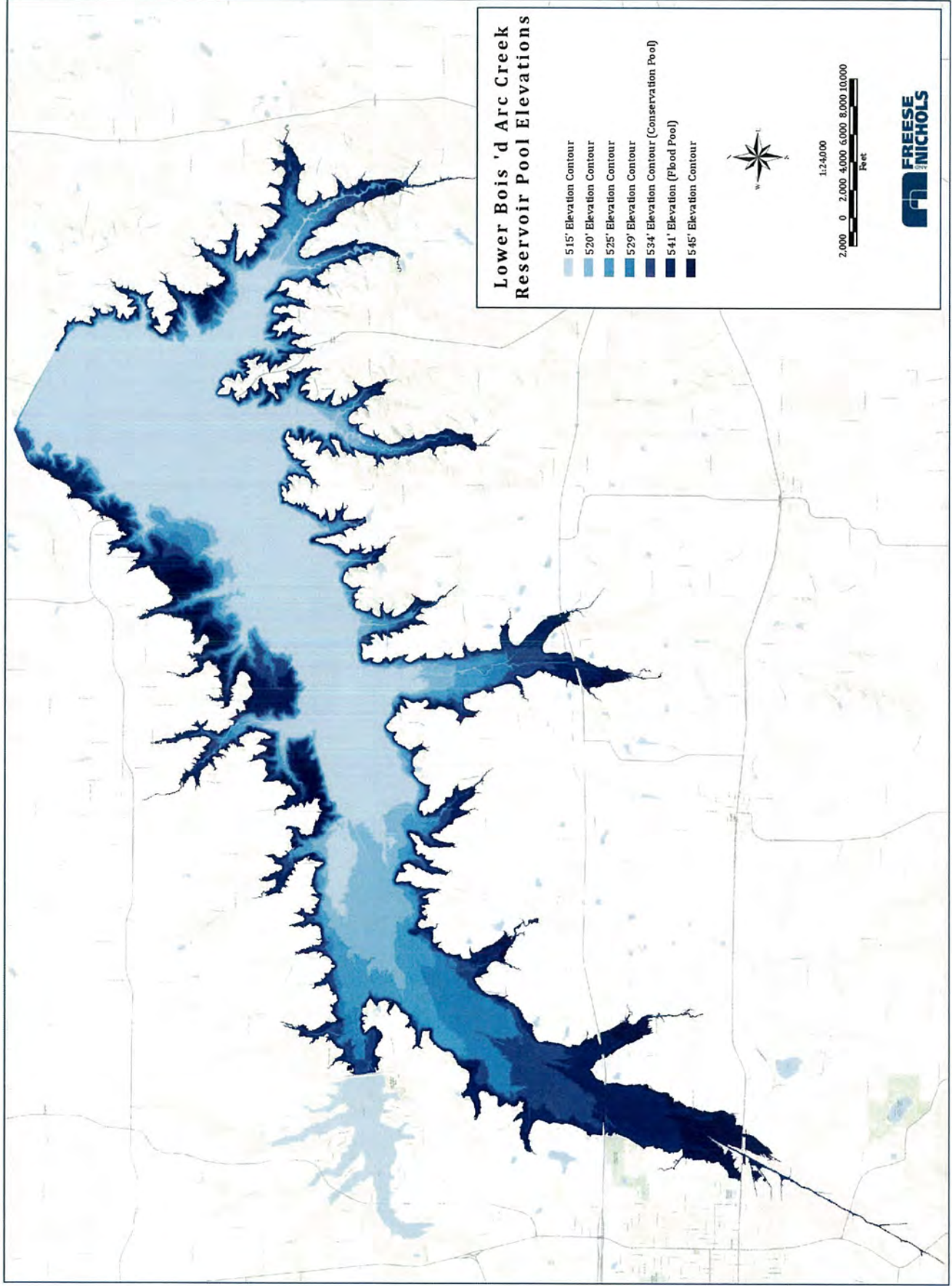
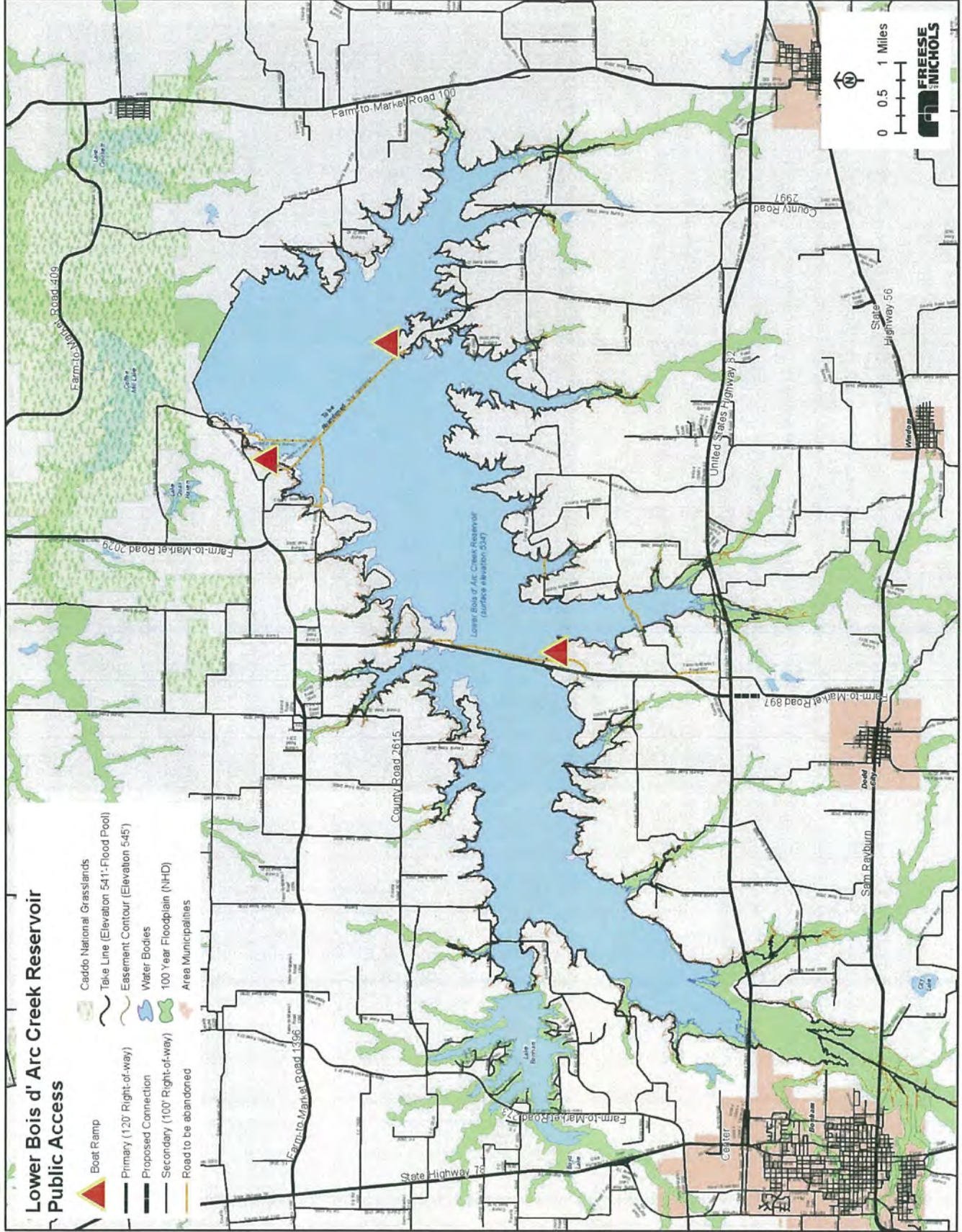


Figure 22. Public Access Points Map



## Parks | Active Recreation

Lakes are generally associated with boating recreation; however, there are more recreational opportunities around the lake that will add value to the LBCR. Large parks with playgrounds and trails should be developed around the lake near the areas designated for public access. Most parks should be connected by the trail system, which may be paved or unpaved. In certain areas, outdoor fitness equipment can be installed to promote healthy activity. This type of recreation is ideal for families and those that want to enjoy the lake without boating. Camping facilities will also add value to the LBCR. These facilities should be located near the water so that visitors can have a view of the lake. To protect the environment and the water quality, concrete pad sites with electricity should be provided. The campgrounds should be for short-term visitors only, to maintain the character of the lake. Additionally, visitors will have the ability to bring their pets to these public parks and trails. A regulation should be enacted that requires pet owners to pick up waste from their pets. All parks and trails should have pet waste stations installed to encourage cleanliness.

**Playground**



**Swimming area**



**Multi-use trail**



**RV camping sites**



### The LBCR parks are envisioned to have:

- Camping
- Playgrounds
- Swimming areas
- Trails (paved and unpaved)
- Fitness trails/exercise areas

*Locations for potential parks have been identified in Figure 24.*

## Parks | Passive Recreation

Many people enjoy lakes for the natural beauty rather than active recreation. The land around the lake is currently sparsely developed and very rural. This will allow for large amounts of land to be preserved for open space. This is not only important to preserve the environment, but also protect water quality. The land around the lake is home to many types of natural species, which can allow bird and animal watching. These environmentally-sensitive areas are generally on the southern portion of the lake and have been planned to be preserved as wetlands and open space by the NTMWD. Areas should also be designated for public picnic areas with seating, tables, and waste receptacles so that visitors can have a place to rest and eat. Another form of passive recreation is pier fishing, which is ideal for families with young children.

Picnic tables



Nature preserve



Fishing pier



Pavilion



### The LBCR parks are envisioned to have:

- Nature preserves
- Bird-watching
- Pier fishing
- Picnic areas
- Pavilions

*Locations for potential parks have been identified in Figure 24.*

## Trail Connections

Trails and sidewalks are important to the LBCR to promote non-vehicular mobility. All of the proposed parks are also connected by the trail system, which will allow visitors to freely move around the lake while enjoying the natural environment.

### Trail Connections around the Lake

The trail connections around the lake should connect as many parks and recreational amenities as possible so that visitors can travel freely between them. The trails should also tie into the regional trail network to increase the accessibility of the lake. Many of the proposed trails shown in Figure 24 are along existing roadways or easements to make implementation of the trails easier and more practical. There are many existing utility easements that are already cleared. Agreements and partnerships with landowners and the owner of the easement would allow for a useful trail connection. All trail connections should also be coordinated with surrounding entities to ensure that critical destination points are not overlooked. For example, the City of Bonham is the closest municipality to the lake and will be a destination where many visitors will stay. Coordination with Bonham's current park and trail system, including connections to adjacent Lake Bonham, are critical. It is not feasible to have a trail all the way around the lake near the water's edge because of private property. All trails should be multi-use to allow walkers, runners, and cyclists. Generally, a multi-use trail is 12' wide. The trail can either be paved or left natural depending on the environment of the area.

Multi-use concrete trail



Natural trail





### Utility Line Trail

An existing utility line and easement runs through the southern portion of the lake and may make a practical trail location. The trail may not cross the lake, but would connect different portions of the lake with smaller trail segments. The trails can be built as development occurs around the lake. The utility easement can be seen on the Future Parks and Trails map in Figure 24.

**Existing Utility Easement**



**Utility Easement with Trail**



## Regional Trail Connections

It is important to connect the County with trail connections and now is the best time to plan for these future trails. The regional trail connections should have a strong tie with historical areas and future developments to offer superior recreational opportunities.

### Northeast Texas Trail

When the Northeast Texas Trail is completed, it will be the longest hike and bike trail in Texas and the fourth largest in the United States. It is currently 130 miles long and runs from Farmersville (Collin County) to New Boston (Bowie County). It links 19 rural towns and seven counties. The trail is on an abandoned rail line that was released by Union Pacific and the Chaparral in the late 1990s and has now been land banked. This corridor does not have any active rail, but the entire corridor is preserved so that it could be used again for rail in the future. This trail is a very popular attraction and could be connected to the LBCR to add value to the lake and the trail. The trail runs south of Ladonia, near the potential site for Lake Ralph Hall. It will be necessary to provide connections from the LBCR to the trail to bring bicyclists and other people looking for trail recreation, allowing the LBCR to become a destination for parks and trails.

### “Old Bob” Rail Line - Connection to LBCR and Lake Ralph Hall

One way to connect the Northeast Texas Trail and Lake Ralph Hall to the LBCR is using the “Old Bob” rail line. The “Old Bob” rail line is an abandoned railroad corridor that runs north-south from Ladonia to Honey Grove. This corridor intersects with the Northeast Texas Trail and could provide a connection from the trail and Lake Ralph Hall to the LBCR. This corridor is not land banked, which means that the old line runs through private property. Right-of-way acquisition would be necessary to piece the corridor back together and make it possible for the public to use. While the possibility of acquiring the old railroad right-of-way is remote, this may be an opportunity in the coming decades to provide recreational opportunities and preserve east Fannin County history.

## Lake Ralph Hall

Lake Ralph Hall is a proposed reservoir for the Upper Trinity Regional Water District (UTRWD). The proposed new water supply will be located on the North Sulphur River in Fannin County, south of the LBCR and north of Ladonia. The addition of two lakes gives Fannin County a chance to plan for a successful future and leverage the lakes to benefit the County. Trail connections between the LBCR and Lake Ralph Hall are critical. As previously mentioned, the “Old Bob” rail line is a potential connection. There are also many existing water lines and utility easements that could be used as right-of-way for trail installation. The trail(s) between the two lakes should be wide enough to accommodate runners, walkers, cyclists, and even horses. Since the trail will be a true multi-purpose trail, it should be made of natural materials. This will be a fiscally-responsible way to implement a trail and also help to preserve the natural beauty of the area between the two lakes. The easiest way to acquire land for the trail connection would be to use the right-of-way along SH 34.

### Funding Mechanisms:

- The County will be responsible for implementing regional trail connections
- Partnerships with nearby cities, entities, and organizations
- State and Federal grants

Figure 23. Regional Trail Connection Map

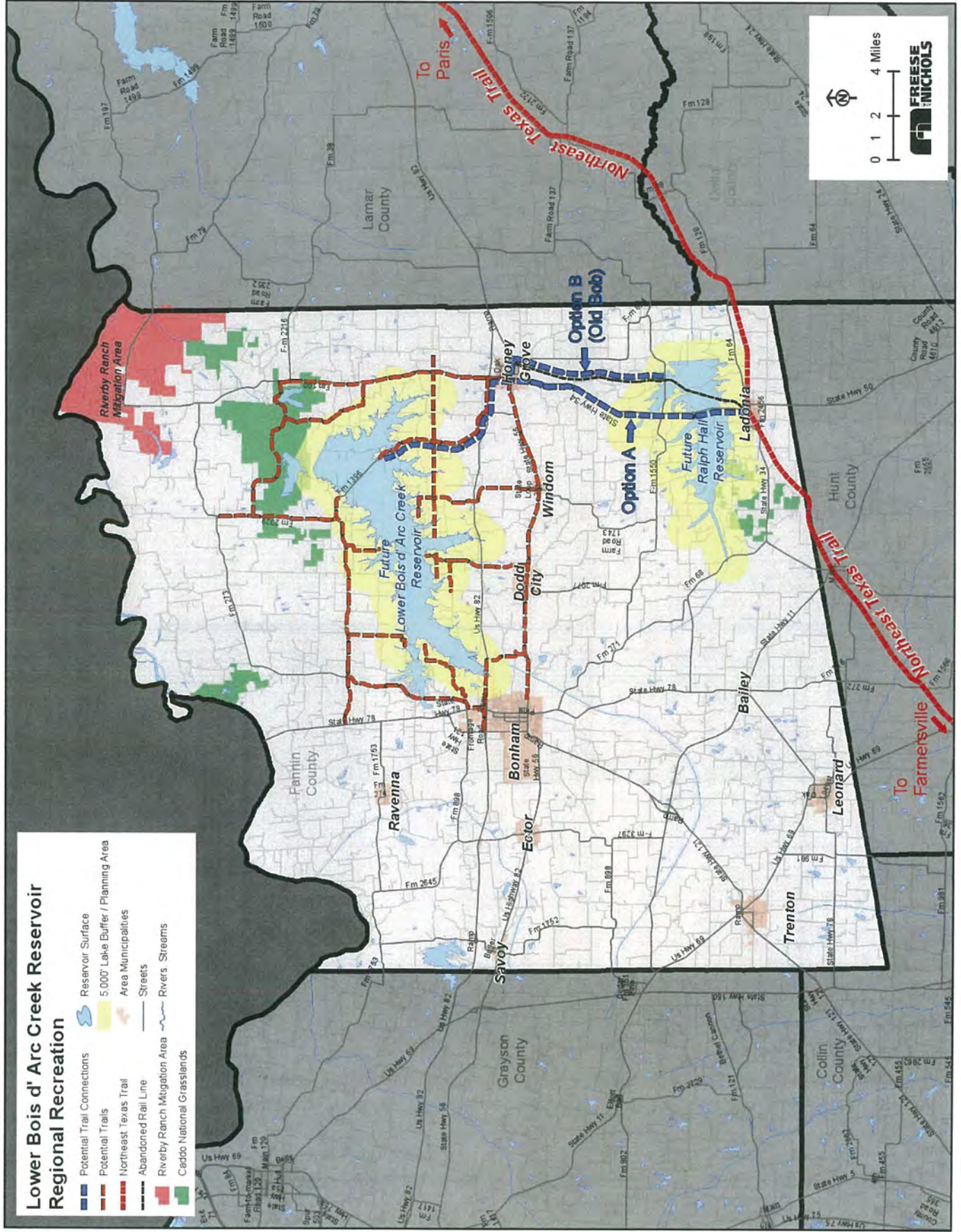
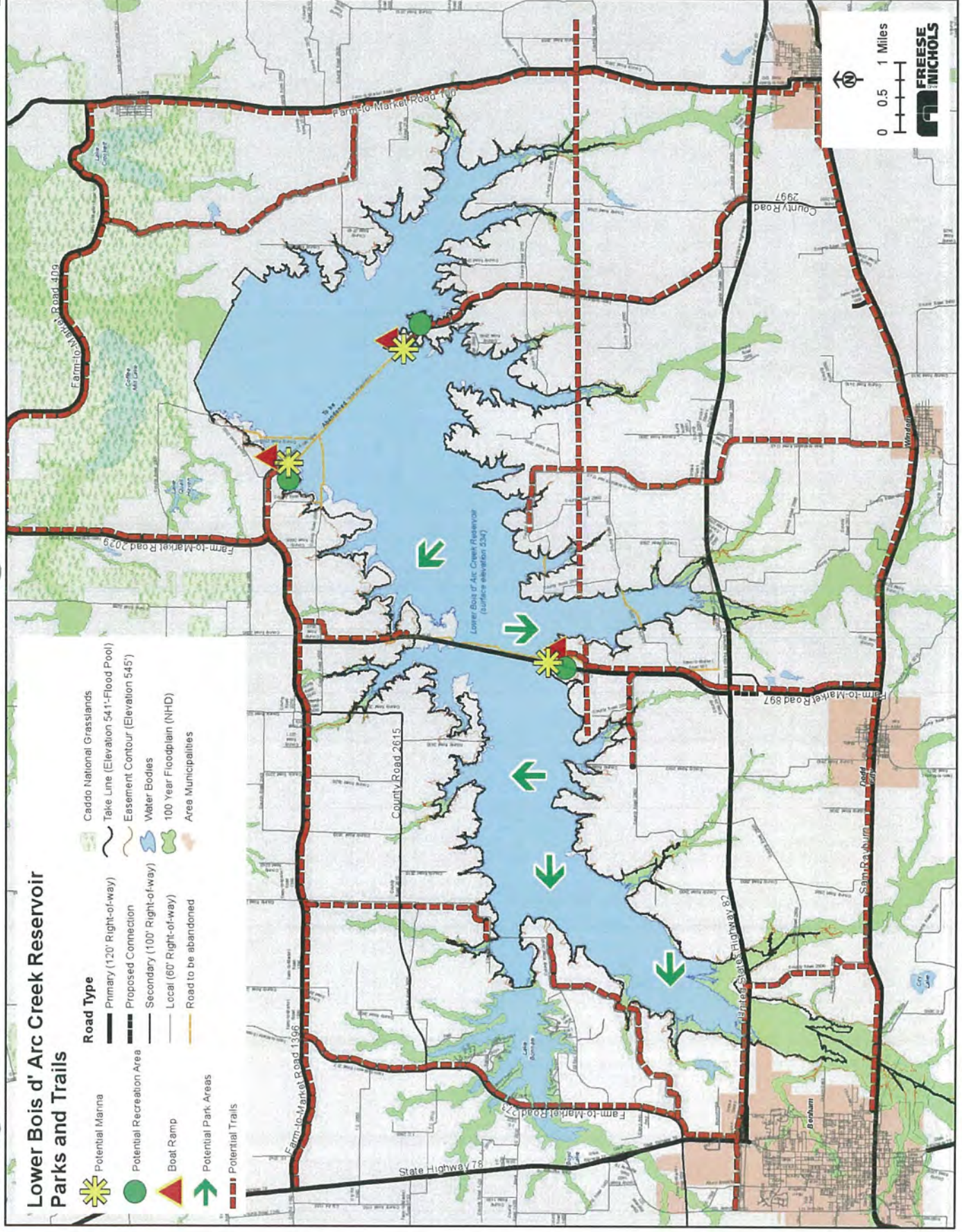


Figure 5 Future Parks and Trails Map



## Summary | Parks, Recreation, Trails, and County Connectivity Plan

One of the main purposes of the lake is to provide recreational opportunities for residents and visitors. This chapter establishes a plan for providing recreational opportunities in and around the lake. Additionally, this chapter plans for recreational connections between the LBCR and Lake Ralph Hall.

### Major Themes:

1. The recreational system will be a major asset for the County
2. Resident and visitors will be able to enjoy a superior recreational system
3. Hiking and biking opportunities will attract visitors
4. The LBCR will be a regional destination for tourists
5. Public access to the lake is important and will be accomplished through public boat ramps and marinas that are aesthetically-pleasing
6. Parks are planned to serve active and passive recreational needs
7. Trail connections are designed to be an asset to homeowners and visitors
8. Trails will take decades to develop, but the locations must be planned now
9. Linking the LBCR and Lake Ralph Hall will be a major accomplishment
10. Connecting to the Northeast Texas Trail will open both lakes to more tourists and recreational opportunities

**DESIGNATED  
CAMPSITE**

**TYPE II  
WILDLIFE MANAGEMENT AREA**

**A HUNTER  
FUNDED  
PROJECT**



# Chapter 6

## *Lake Edge Development Standards*

**Chapter Purpose:** To recommend standards for the development of uses around the lake's edge that can inform NTMWD's plan for boat docks and lake activities, while protecting water quality

### **Introduction**

The guidelines in this chapter are specific to the development around the edge of lake and are important to protect water quality and the natural beauty of the LBCR. These guidelines should be incorporated in the development of the zoning ordinance for the area close to the lake edge. Any guidelines or regulations related to developing on the land adjacent to the lake will be enforced by Fannin County. Any guidelines or regulations related to structures on or over the water will be under the authority of the NTMWD. Initial and annual fees will be required for boat docks and piers. The NTMWD owns the land under the water and the water itself. This chapter explains the County's vision for docks on the lake. The County recognizes that NTMWD is the sole authority responsible for allowing docks on the lake. A cooperative partnership between the County and NTMWD will ensure that desirable development occurs, while protecting the natural environment and water quality as well as minimizing shoreline erosion.







## Residential Guidelines for Boat Docks and Piers

### Registration and Inspection

Boat docks should only be permitted with the approval of the NTMWD. This will benefit the owner if emergency response or law enforcement is called to the location. Registration of boat docks will also help NTMWD locate the dock owner in the event of an emergency or maintenance issue. All boat docks are subject to inspection periodically and dock owners will be required to provide proof of adequate liability insurance as required by NTMWD. The dock owner is responsible for all dock maintenance.

Private docks are owned and maintained by private individuals; therefore, the individual assumes all responsibilities associated with the maintenance of a dock. Dock owners may also be subject to additional hold harmless agreements.



### Fixed Docks

Fixed docks consist of pilings fixed into the lake bed with decking on top. Since these docks do not move, they require less maintenance, support larger loads, will last longer, and are structurally stable. The biggest issue with fixed docks is that they can become submerged at high lake levels and can be unusable during low lake levels.

### PWC Floats or Lifts

Personal watercraft (PWC) floats or PWC lifts should be permitted along with the dock.

Fixed dock



Fixed dock



Fixed dock with PWC lift



## Design Guidelines for Docks and Piers

Prospective dock owners should check the water depth in the dock location to ensure it is adequate for the dock and associated activities. For example, small shallow coves may make it difficult to moor a large boat.

### Stress Loads

The stress exerted on a dock is proportional to its size and height. Larger docks must be engineered so that toppling is avoided and to accommodate increased stress by wind and waves. This stress occurs when a floating dock must absorb both the tallest side of the wave and the lowest side of the wave at the same time. This is more common in areas where the lake is wide and deep. A qualified engineer or dock builder should be consulted to determine the size and height that is best for the particular location. The dock should not be permitted if it cannot be proven to handle appropriate stress loads.

### Recommended Guidelines:

- No dock or structure shall exceed 1,500 square feet
- Covered (roofed) structures must be open and not walled or enclosed. One exterior side may be walled for the placement of an approved storage area.
- A dock and any of its structures may not exceed 30 feet in height, as measured from the highest point of the structure above the normal pool elevation of the lake.
- Dock length shall be the shortest amount feasible to allow access to the lake, as determined by NTMWD, but in no case should exceed 150 feet

Desirable boat docks



### **Dock and Pier Maintenance**

It is essential to perform regular maintenance on boat docks to ensure the dock's usefulness. Poor maintenance can lead to a dock breaking loose and causing a hazard in the open waters. The owners should agree to maintain all docks in an acceptable and safe condition. All docks and piers should be subject to inspection.

**Unsafe dock**



## Residential Wastewater

Per section 3.2.16 of the Fannin County Subdivision Ordinance:

*“to use individual on-site septic systems for sewage treatment a suitability study will be performed on the property and the study will be submitted with the preliminary plat. The purpose of the study is to verify that all of the proposed lots in the subdivision will comply with the Fannin County regulations for on-site sewage facilities. The individual of company performing the study must be qualified to perform site evaluations under the rules for on-site sewage facilities. Minimum lot size is one acre per the Fannin County On-Site Sewage Facility Regulations.”*

If these regulations cannot be met, the homeowner must connect to a centralized sewage system. Ideally, all homes would be on a centralized wastewater system to protect water quality.

## Nonresidential Guidelines for Marinas

### Location

Potential marina locations are identified and shown on the Future Parks and Trails Map in Figure 24.

### Size and Height

A marina should not exceed 30' in height. All marina roofs should be pitched to provide aesthetic appeal.

## Permitting, Registration, and Inspection

Marinas should be permitted by and registered with the NTMWD.

This will benefit the owner if emergency response or law enforcement are called to the location. Initial and annual marina fees may be required. Additionally, all marinas are subject to inspection by the NTMWD or Fannin County; therefore, the marina owner is responsible for making all improvements necessary to comply with the lake edge development guidelines. It should be required that a marina owner maintain comprehensive general or public liability insurance that is suitable for the type of commercial use in operation.

## Undesirable marina



## Restrooms

Restrooms should not be allowed on docks, piers, or over the water in any manner. All restrooms for nonresidential uses must be on land and connected to an approved septic system or centralized wastewater system. No portable restrooms should be allowed near the shoreline. All floating buildings must provide continuous connection to the marina's wastewater system.

## Fuel and Pumpout Stations

Sanitary wastewater pumpouts are required for all marinas to address boats and RVs. Sewage will introduce dangerous pathogens into the water and must be controlled and addressed properly.

Limiting the number of stations helps protect water quality. Boat fueling should be done at a gas dock. Fueling stations should be prohibited from using fuel with ethanol. Additionally, storing fuel in large quantities should be banned near the lake edge. The pumpout stations should be connected to an approved septic system or centralized wastewater system. All fueling stations must have a sign that clearly displays the TCEQ emergency spill hotline. All fueling docks should have wave protection to help stabilize boats. It is recommended to also have a personal watercraft (PWC) dock or platform to help stabilize the PWC.

## Safety Tips for Fueling

- Clear the area of anyone not involved in fueling the boat
- Make sure the boat is secure to the gas dock
- Turn off engine(s) and electronics
- Never fuel around an open-flame or while smoking
- Keep nozzle in contact with the edge of the fill to prevent spills
- Do not top off tank – know how much fuel the tank can hold and stop at 90% because fuel expands as temperatures rise
- Clean up any fuel spill immediately and wipe down any part of the boat that may have come in contact with fuel
- Treat fueling operations with care and remain present the entire time
- Use extra caution when fueling PWCs, since they sit closer to the water
- Report any fuel spills immediately to the TCEQ emergency spill hotline at 1-800-832-8224 (24 hours a day)

## Fish Cleaning Stations

Fish cleaning stations should be provided, which provides for the sanitary disposal of fish waste. Rinse water from stations should not runoff into the lake or use septic systems. Fish waste should not be disposed into the marina and fish cleaning on docks and floats should not be allowed.

- of the vessel.
- To the extent practicable, minimize the use of soap and detergents in the marina environment.
- Ensure vessels, and any portable containers on such vessels, are appropriately drained of water to prevent the introduction or spread of invasive species.

## Pollution Control

Stormwater runoff from marina parking lots and other impervious areas is a significant source of pollution. Activities at marinas (boat scraping, cleaning, fueling, engine repair, fisheries, etc.) can elevate pollutant concentrations in runoff. The following practices will minimize the impacts marina operations have on stormwater.

## Boat Maintenance

To prevent pollution and protect water quality, certain boat maintenance should be performed with the vessel out of the water. If there is a likelihood that pollutants may be lost in the water, the maintenance should be performed in an area that is designed for that purpose. The following maintenance should be performed with the vessel out of the water or in a designated area:

- Repairs requiring the disassembly of the outboard or lower drive units.
- Bilge repairs requiring opening or penetrating the hull.
- Scraping, sandblasting, or painting the hull exterior or drive units.
- Interior or on-deck painting or similar activity involving aerosol application with a risk of over-spray or drip beyond the confines

## Recommended Guidelines:

- All areas of the marina should be cleaned on a regular basis to prevent oil, paint, dust, sanding residues, and other wastes from washing into surface waters, storm drains, ditches, swales, sloughs, and other watercourses.
- All drainage associated with maintenance, sandblasting, and repair activities should be separated from other stormwater discharges, and best management practices specific to those activities should be employed to minimize the chance for release.
- Sweep or vacuum boyard areas and collect the debris. Sandblast grit, dust, and other work area debris should not accumulate.
- Covered work areas can prevent contamination of stormwater run-off, and can reduce the need for structural controls.

## Public Boat Ramps

Public boat ramps should only be located at public access points, as shown in Figure 22 or as amended in the future. Limiting the number of public access points will ensure that the water's edge is protected and that the boat ramps can be easily maintained.

### Recommended Guidelines:

- Each public boat ramp should have a designated parking area that is close to the ramp
- The parking lot should be connected to the ramp by the same pavement
- Boats that are trailered to launch at a boat ramp are typically 26 feet in length and all boat ramp facilities, including the parking lot, should accommodate this size
- The accepted national standard for the slope of a boat launch is 12% to 15%, and the preferred is 14%
- Each launch lane should be at least 20 feet - a 10 foot occupy zone and a five foot buffer zone on each side
- If more than one launch lane is provided, there should be boarding float access between each lane

Examples of public boat ramps





## Nonresidential Setbacks

A parking lot or permanent structure, other than a dock or a combined storage area on the water's edge, should be set back at least 100' from the shoreline.

## Nonresidential Wastewater

All marinas and nonresidential uses must be connected to a centralized wastewater system or an approved system. Septic tanks should be prohibited.

## Open Storage

In areas around the lake's edge, mini warehouses and open storage should not be viewable from any primary or secondary street. Open storage uses along the roadway should screen all storage from public view. Boats should not be stored out in the open. Boat storage areas should be screened at least 6' high with a masonry wall or a row of evergreen trees.

**Undesirable boat storage**



**Enclosed boat storage**



## Water Quality

The LBCR is an important water supply source; therefore, water quality is of the utmost importance. To ensure the best quality drinking water possible, certain restrictions will be put in place by the NTMWD. Boating and fishing will still be allowed. All sightings of littering, pollution, or illegal dumping should be immediately reported to the lake office. In the event of a fuel spill, the Texas Commission on Environmental Quality's (TCEQ) emergency hotline should be contacted immediately.

### Tires near the shoreline



### Dumpster near the water



### Recommended Guidelines:

- Do not leave fuel containers on an open deck
- Store fuel in an approved container in vented storage areas
- Hazardous materials are not allowed to be stored on the marina (batteries, fuel, tires, oil, cleaners, antifreeze)
- Boats should be out of the water to be cleaned below the water line
- It is recommended to use a minimal amount of cleaning products
- All cleaning products should be phosphate-free and biodegradable
- Boats with sewage holding tanks must use an approved sewage pumpout facility at a marina around the lake
- Report any boat that is submerged or partially submerged at a marina, since the boat may contain gasoline, oil, or other hazardous materials
- Antifreeze is very harmful to water quality and the fish habitat and should be appropriately applied and properly disposed of
- Properly dispose of any trash and litter
- Any pollution concerns should be reported immediately

Immediately report any fuel spills to the TCEQ emergency spill hotline at 1-800-832-8224 (24 hours a day)

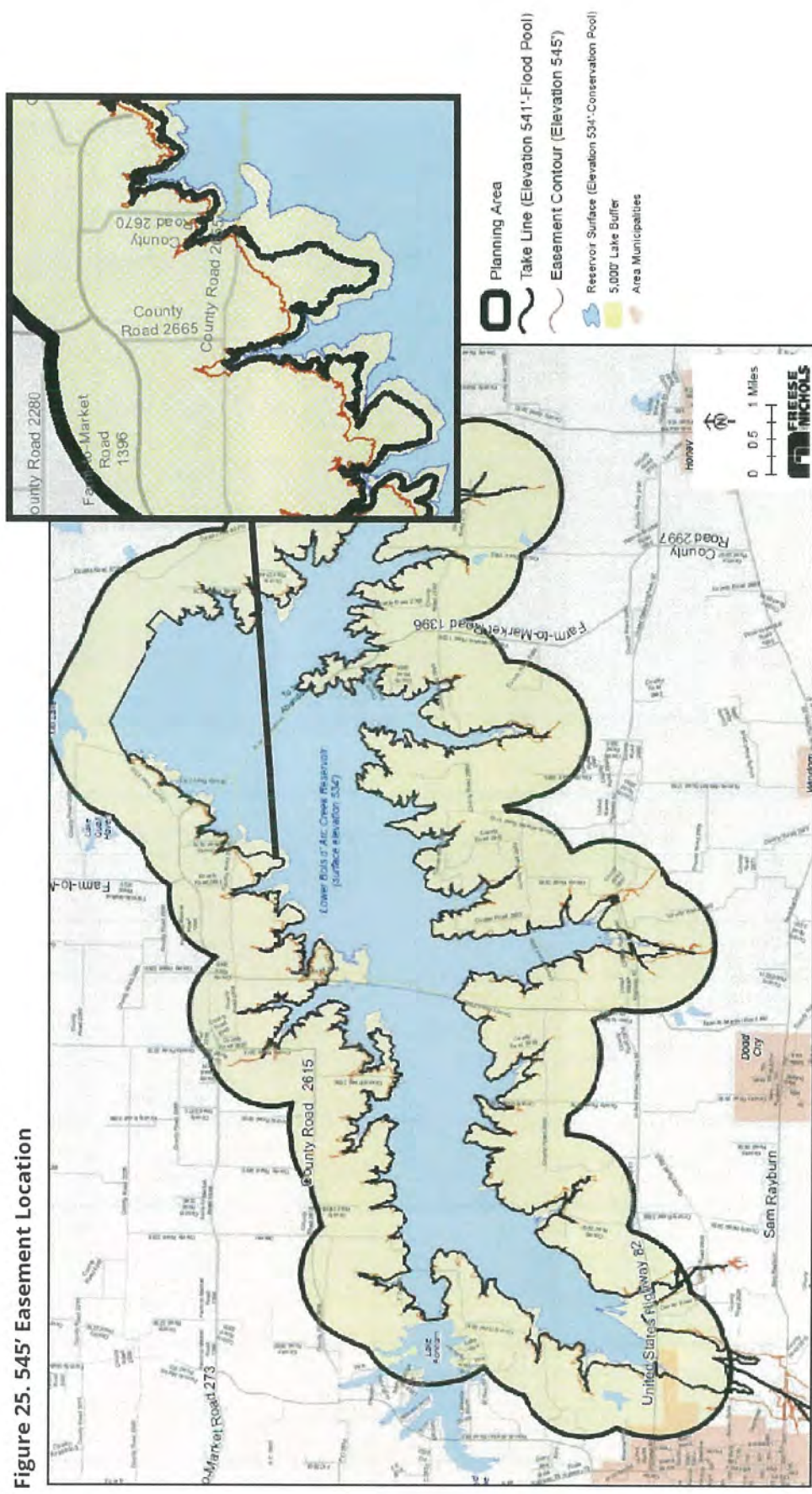
## Water Withdraw

Water may not be drawn from the lake for residential or commercial uses unless approved by NTMWD.

## NTMWD Easement (Flowage and Floodplain Easement)

This easement is to be free and clear of all habitable structures. The easement cannot have any fill or dirt added to it. The easement is located between the 541' elevation (take line) and the 545' elevation. This is shown by the red line (easement contour) in Figure 25.

Figure 25. 545' Easement Location



## Erosion Control/Shoreline Stabilization

Shoreline erosion is a natural part of any lake. Controlling shore erosion is important to reduce sedimentation and the growth of algae and weeds, and to prevent property from eroding which decreases lot size. The following are basic stabilization methods to control and prevent shoreline erosion.

- **Native vegetation** – the deep roots of these plants keep the earth together and removal of the plants can cause the shore to weaken
- **Gentle slopes** – the gradual slope on a natural shoreline will absorb the energy of the waves
- **Healthy trees** – help to stabilize the shoreline
- **Rip-rap** – refers to medium/large granite or limestone stones covering the shore to prevent erosion by decreasing the impact of waves on the shoreline and is the preferred method of erosion control

## Retaining Walls

Retaining walls should be considered on a case-by-case basis and should be designed by an engineer. Retaining walls should be constructed from quality materials and should be designed to be aesthetically pleasing. Restrictions should be set for the amount of impervious surfaces that are immediately adjacent to the shoreline (excluding rip-rap and other bank stabilization structures). This will help to ensure best practices and preservation of riparian vegetation.

Example of natural shoreline



Retaining wall



## Lighting

All boat docks, piers, and marinas should be lighted continuously from sunset to sunrise and should meet all lighting requirements established by NTMWD. All lights should be required to be fixed – not blinking – so boaters do not confuse the light with a buoy light. It is recommended that lighting be directed downward to clearly identify the marina. All lighting should be designed to illuminate the boat dock so that the light does not “blind” boat operators when they pass the structure. No bulbs should be directly visible to boaters or a neighbor’s property. The following outlines what type of lighting should and should not be used.

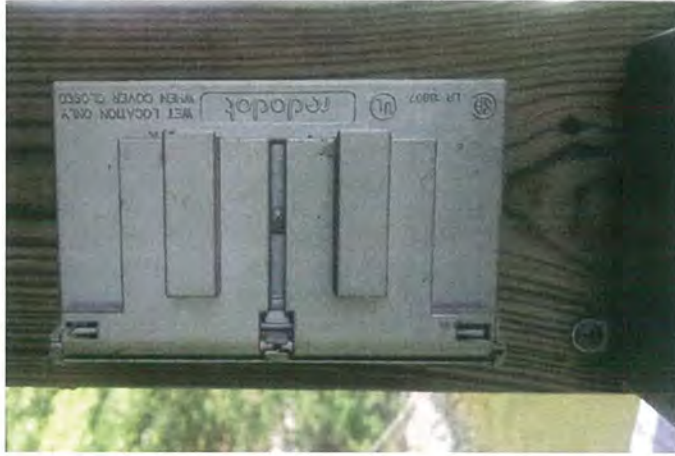
- **White lights** - discouraged because they attract insects and can have an adverse blinding effect on boaters
- **Yellow/amber lights** - encouraged because they are less likely to attract insects and are easy on the eyes
- **Red/green lights** - prohibited because boaters may confuse with the lighting that typically marks navigation
- **Reflectors** - must be white or amber and at least 20 square inches and cannot be used to replace lighting
- **Bulb wattage** - low watts are encouraged (40 watts or less); low wattage fluorescent lights in incandescent bases have a longer lifespan

Lighting examples



## Electrical

Electrical wiring over the open water surface should be prohibited. Additionally, it is the marina owner's responsibility and liability to protect the safety of guests while on the marina. It is recommended that an electrical system on a marina be installed and maintained in compliance with the National Electrical Code (NEC) and the National Electrical Safety Code (NESC). The National Fire Protection Association (NFPA) 303 Marinas and Boat Yards document should also be used as a guideline. All electrical systems should be designed and installed by a licensed electrician.



### Recommended Guidelines:

- All electrical equipment and materials must be approved by the manufacturer for use in wet/damp locations
- All electrical equipment and materials must be firmly attached to the surface on which they are mounted
- Only copper conductors should be used
- All electrical equipment that is in locations where physical damage may occur must have guards or enclosures
- All unused openings in boxes and conduits should be closed
- Suitable covers should be on all boxes and enclosures to prevent accidental contact with energized parts
- Electrical cables installed in the water should only be Type G, Type W, or Marina and Boatyard Cable
- A strain relief device should be installed at all termination points
- Never use extension cords in place of permanent electrical wiring
- Low-voltage (non-battery operated) and solar-powered systems are highly recommended and must be in accordance with the National Electric Code (NEC)
- Floating marinas must provide additional slack on wiring to accommodate varying lake levels
- The service equipment used for the system must be located on the adjacent shore



## Summary | Lake Edge Development Standards

The lake edge and its future development is critical in determining the future of the lake. This chapter defines how the lake edge development will occur.

### Major Themes:

1. Quality guidelines have been developed to show the vision for this type of development
2. Septic tanks are limited to large lot residential developments of one acre or more because of the hazardous effect that a failing septic tank can have on the quality of the water supply
3. Nonresidential guidelines have been established to promote quality marina development
4. Shoreline erosion control is recommended
5. The recommendations of this chapter should be enforced through a zoning ordinance
6. There are constraints around what can be constructed in the NIMWD easement





# Chapter 7

## *Implementation Plan*

**Chapter Purpose:** To use the vision for the lake and plan recommendations to create specific implementation steps for the County to achieve the vision of the Comprehensive Plan

### **Introduction**

Successful plans establish a clear vision for the future and identify the steps necessary to achieve that vision. This section completes the Comprehensive Plan by providing implementation techniques and priorities that address the vision, recommendations, and related policies established herein. This Implementation Plan is structured into a coordinated action program so that County leaders, staff, and other decision-makers can easily identify the steps that are necessary to achieve the vision for the LBCR. It is also important to note that counties or cities cannot afford to complete all of the desired tasks at once; therefore, it is important to identify the top priorities that are most critical for achieving the vision. Many of these recommendations will take several years to complete, but this plan will help the County to identify action items.

### **The Role of the Comprehensive Plan**


#### **A Guide for Daily Decision-Making**

Many diverse individuals and groups will be involved in the development of land surrounding the lake. In the future, each new development that takes place represents an addition to the County and the lake area's physical form. The composite of all

such efforts creates the County as it is seen and experienced by its citizens and visitors. If planning is to be effective, it must guide each and every individual development decision. The County, in its daily decisions pertaining to whether to surface a street or amend a zoning ordinance provision should always refer to the basic concepts outlined within the Comprehensive Plan. A private builder or investor, likewise, should recognize the broad concepts and policies of the Plan so that their efforts become integrated into planning efforts of the LBCR area and the County.

### **Zoning and Subdivision**

The processes for reviewing and processing zoning amendments, development plans, and subdivision plats provide significant opportunities for implementing the Comprehensive Plan. Each zoning and development decision should be evaluated and weighed against applicable recommendations and policies contained within this Comprehensive Plan. The Plan allows the County to review proposals and requests in light of an officially prepared document adopted through a sound, thorough planning process. If decisions are made that are inconsistent with Plan recommendations, then they should include actions to modify or amend the Plan accordingly in order to ensure consistency and fairness in future decision-making. The



zoning ordinance represents a significant measure that the County can take to implement Comprehensive Plan recommendations.

### **A Flexible and Alterable Guide**

The Comprehensive Plan for the LBCR is intended to be a dynamic planning document – one that responds to changing needs and conditions. Major plan amendments should not be made without thorough analysis of immediate needs, as well as consideration for long-term effects of proposed amendments. The County Commissioners, Zoning Commissioners, and other officials should consider each proposed amendment carefully to determine whether it is consistent with the Plan’s goals and policies, and whether it will be beneficial for the long-term health and vitality of the LBCR area.

### **Annual Reviews**

At one-year intervals, a periodic review of the Plan with respect to current conditions and trends should be performed. Such ongoing, scheduled evaluations will provide a basis for adjusting capital expenditures and priorities, and will reveal changes and additions that should be made to the Plan in order to keep it current and applicable long-term. It would be appropriate to devote one annual meeting of the Zoning Commission to reviewing the status and

continued applicability of the Plan in light of current conditions. By such periodic evaluations, the Plan will remain functional, and will continue to give civic leaders effective guidance in decision-making. During reviews, consideration should be given to the following:

- The County’s progress in implementing the Plan;
- Changes in conditions that formed the basis of the Plan;
- Community support for the Plan’s goals and recommendations;
- Changes in County officials’ policies and priorities; and
- Changes in State laws.

### **Complete Review with Public Participation**

The Comprehensive Plan should undergo a complete, more thorough review and update every five to ten years. The review and updating process should begin with the Zoning Commission and should be a complete review. Upon completion of LBCR, and its filling with water, it is likely that the County will need to reevaluate the Comprehensive Plan to ensure it adequately addresses development and growth. Specific input on major changes should be sought from various groups, including property owners, civic leaders and major stakeholders, developers, merchants, and other citizens who express an interest in the long-term growth and development of the LBCR.

# How to Implement Chapter 3: Future Land Use Plan

## 1. Adopt Zoning Regulations

### Action

The County should adopt zoning regulations in accordance with the Future Land Use Plan and Map.

### Rationale

Zoning will ensure that future developments will occur according to the Future Land Use Plan and Map.

## 2. Utilize the Full Boundaries of the Zoning Authority

### Action

The County should adopt zoning regulations within 5,000' of the shoreline (534 feet AMSL) in accordance to Texas Local Government Code Section 231.132.

### Rationale

In order to provide the best environment to manage new development, it is necessary to apply zoning within the entire 5,000' area around the lake. With the exception of the intersection of US 82 and FM 897, the land from 3,500' to 5,000' is shown as agriculture and will serve to keep the area predominately rural and also as a buffer to the other zoning districts, which will be applied closer to the lake shore.

## 3. Coordination for New Lake Parks

### Action

The County should work with other local governments and reach out to landowners regarding the possibility of creating parks at the locations shown on the Future Land Use Map.

### Rationale

Parks are generally acquired in two manners. First, a local government can purchase land from a property owner for a park. In this case, the sooner parkland can be purchased, the more affordable the land is to acquire. The second manner is through a partnership with the landowner, which generally occurs when the landowner develops the land and would like the local governments to eventually take ownership for operation and maintenance for the park.

#### **4. Amend County's Subdivision Ordinance**

##### **Action**

Amend the County's subdivision ordinance to require two points of access into residential subdivisions, as well as trail connections.

##### **Rationale**

As new residential development occurs, the County's subdivision ordinance will be used to regulate the design of neighborhoods and this design should reflect the vision of the Comprehensive Plan.

#### **5. Coordinate with Local Residents, the City of Bonham, and NTMWD to Ensure Water Quality in the Watershed**

##### **Action**

A committee or civic group (e.g., Friends of the Lake) should be created to help monitor and identify areas contributing to sediment and pollution runoff, promote the care and beautification of the lake, and be a forum for public comment and involvement.

##### **Rationale**

A committee or civic group should be developed to ensure the quality of the lake can build support for implementing the vision and serve as a way for the general public to become involved with lake affairs.

#### **6. Protect the Visual Appearance of US 82, where possible**

##### **Action**

Ensure zoning regulations protect the look and feel of the highway by prohibiting open storage or by requiring businesses to provide adequate screening in the 5,000' zoning area. Additionally, landscaping and building design standards will be needed for commercial developments along this important corridor.

##### **Rationale**

US 82 will be the main entry into the lake community. In order to attract desirable development, the highway frontages should be well-designed and built with quality materials. If left unchecked, the highway corridor can quickly develop a cluttered appearance with low-quality development.

# How to Implement Chapter 4: Transportation Plan

## 1. Adopt County-Wide Thoroughfare Plan

### Action

The County should adopt a County-wide Thoroughfare Plan that addresses roadway needs across the County.

### Rationale

A County-wide perspective would help address regional and local issues, such as ensuring that the LBCR area is appropriately connected to the region.

## 2. Coordinate with TxDOT

### Action

The County should coordinate with TxDOT for opportunities of cost-sharing and prioritization of roadway improvements.

### Rationale

With the adoption of this Plan, County leaders now have another tool to use in discussions with TxDOT. This Plan can be used to show where future growth will occur and to request funding participation from TxDOT.

## 3. Amend the County's Subdivision Ordinance

### Action

Amend the County's subdivision ordinance to apply the recommended roadway rights-of-way.

### Rationale

As development occurs and land is subdivided, developers must dedicate right-of-way for roadways in accordance with the subdivision ordinance. Therefore, it is critical to amend the ordinance to ensure the rights-of-way are dedicated.

#### **4. Promote Commercial Development along Primary Roadways**

**Action**  
If the County is involved in partnerships or agreements regarding land development, then land along the Primary corridors should be developed first according to the Future Land Use Plan and Map.

**Rationale**  
It is desirable to allow land along the primary corridors to develop to take advantage of existing roadway infrastructure and to allow for faster responses from emergency services.

#### **5. Plan for Secondary and Roadway Improvements**

**Action**  
While the need for roadway improvements may be years away, the County should assess which roadways, if improved, are needed to promote the desired development.

**Rationale**  
In order to attract the quality development the County desires, the roadway infrastructure system needs to accommodate the projected uses.

#### **6. Require Curbs on Local Roadways**

**Action**  
In order to prevent the deterioration of roadway edges, curbs should be used in all residential subdivisions with new roadway construction. Curbs may be standard or ribbon design.

**Rationale**  
As a road ages, the edges can become cracked and broken. This is common in rural areas where curbs are not typically used, which poses both aesthetic and safety issues. Aesthetically, these roads are unappealing and can detract from the appearance and value of a neighborhood. The main safety concern is that vehicles tend to travel in the center of roads to avoid being next to the edge and can create situation where two vehicles cannot pass each other at the same time.

# How to Implement Chapter 5: Parks, Recreation, Trails, and County Connectivity Plan

## 1. Program and Prioritize Park Sites

### Action

The parks sites should be programmed (e.g., determined by type of facilities) and prioritized in order of first to be developed.

### Rationale

The Plan shows park sites around the lake; however, a more detailed analysis should be performed regarding the type of facilities and activities that should occur at each park site. For example, some park sites may be well suited as a nature preserve with natural habitat for bird watching, while other sites may be more suited for playground facilities and picnic areas. Once the park sites have been programmed, the sites should be prioritized to determine which park site should be constructed first.

## 2. Coordinate Trail Construction

### Action

Trail construction will occur over several decades, but the County should reach out to landowners and easement holders regarding the future development of trails.

### Rationale

Trail construction and the acquisition of land or the right to build a trail can take decades. Trails around the LBCR will most likely only occur when a landowner develops the property. The other means that trails will be constructed are within roadway rights-of-way or within parks.

## 3. Utility Line Trail

### Action

As land is developed along the utility corridor, the County should make efforts to develop a trail within the utility easement. If possible, the County should investigate purchasing the land within the utility easement from the property owners. Generally, most property owners when developing the land would likely be favorable to selling the land with the easement because the land will never be developable due to easement restrictions.

### Rationale

Finding trail corridors that are already cleared and ready for use is a difficult task. Generally, utility easements are used for trail locations because the land is free and clear of any obstacles. Additionally, they are used for trail locations because utility easements typically run through areas that are beneficial to connect by trails (i.e., residential developments to nonresidential development).



#### 4. Plan for Regional Trail Connections

##### Action

Plan to connect LBCR with the future Lake Ralph Hall and the Northeast Texas Trail (NETT).

##### Rationale

In order to make the recreation areas unique and desirable, a regional connection to the future Lake Ralph Hall and NETT is needed. Regional trails offer opportunities to connect Fannin County's two major recreational features (LBCR and Lake Ralph Hall). Honey Grove and Ladonia are connected by SH 34, but were also once connected by the "Old Bob" rail line. This rail line was abandoned over 70 years ago, but evidence of its location remains. The highway, or old rail line, could be a major recreational opportunity to connect the two lakes.

#### 5. Plan for Trails along Certain Roadways

##### Action

Utilize the trails map when new roadways are being constructed to ensure trails are constructed in the right-of-way.

##### Rationale

Trail construction and locations can be difficult issues to address. If the construction of a trail can be timed with construction of a roadway and built within the right-of-way, then there are fewer complications with site selection and funding.

#### 6. Develop a Park Planning Commission

##### Action

Develop a park planning commission to be charged with the oversight of the development of the County's recreational system.

##### Rationale

This will help to ensure that the planning of the recreational system is strategically coordinated.

# How to Implement Chapter 6: Lake Edge Development Standards

## 1. Continue Partnerships with NTMWD to Ensure Quality Boat Docks

### Action

Continually work with NTMWD to ensure that quality boat dock facilities are being constructed and update the Comprehensive Plan if needed to address any unforeseen issues with boat dock construction.

### Rationale

The NTMWD will be the sole entity responsible for permitting boat docks on the lake, but the County may assist NTMWD in implementing and enforcing NTMWD's regulations for such boat docks. The County's responsibility is to set the vision for the quality of the development on the lake. Having NTMWD as a partner to ensure quality development is the best method for promoting the vision for the lake.

## 2. Work with Water and Wastewater Providers to Extend Lines

### Action

To encourage water and wastewater lines to service the LBCR area, the County should coordinate with local providers in an effort to provide services to the area. This will help to avoid the use of wells and septic systems, since septic systems can pose a hazard to water quality.

### Rationale

Water/wastewater providers, such as Municipal Utility Districts (MUDs) or Water Supply Corporations (WSCs), provide services to the LBCR area. With a quality infrastructure system from the providers, land will be better able to handle development than if left to develop on wells and septic systems. Wells can be suitable for rural residential use, but may not be adequate for fire protection in a subdivision. Septic systems can fail if not properly maintained and can pollute the lake, as has been the case in other Texas lakes.

## 3. Incentivize Connecting to Water and Wastewater System

### Action

The County should investigate incentives for developers to connect homes to centralized water and wastewater systems. These incentives could include participation in roadway improvements or other public infrastructure improvements that will help benefit water quality.

### Rationale

Since the County is not a water or wastewater provider, its authority is somewhat limited regarding water and wastewater planning. Incentives can be one element that can help supplement the County's zoning and subdivision authority. According to State law, approved septic tanks cannot be prohibited on properties one acre or larger; however, the use of centralized wastewater systems is highly encouraged.

## 4. Educate Property Owners on Marina Sites and Boat Docks

### Action

Since only three marinas are shown on the Future Land Use Plan, the County should work closely with the property owners in the zoning process and help educate owners regarding the vision for the lake and help with coordination with NTMWD. Additionally, residential property owners should be educated to ensure quality boat dock development and stream bank stabilization.

### Rationale

In lake edge developments that include access to the lake, there will always be at least three groups involved in development - the property owners, NTMWD, and the County. These three groups all have an interest in seeing quality development around the lake. The County should be focused on educating the public and coordinating with owners and NTMWD.

## 5. Prohibit Dumping and Open Storage Adjacent to the Lake

### Action

Establish zoning regulations to prohibit dumping of tires and other debris and open storage adjacent to the lake.

### Rationale

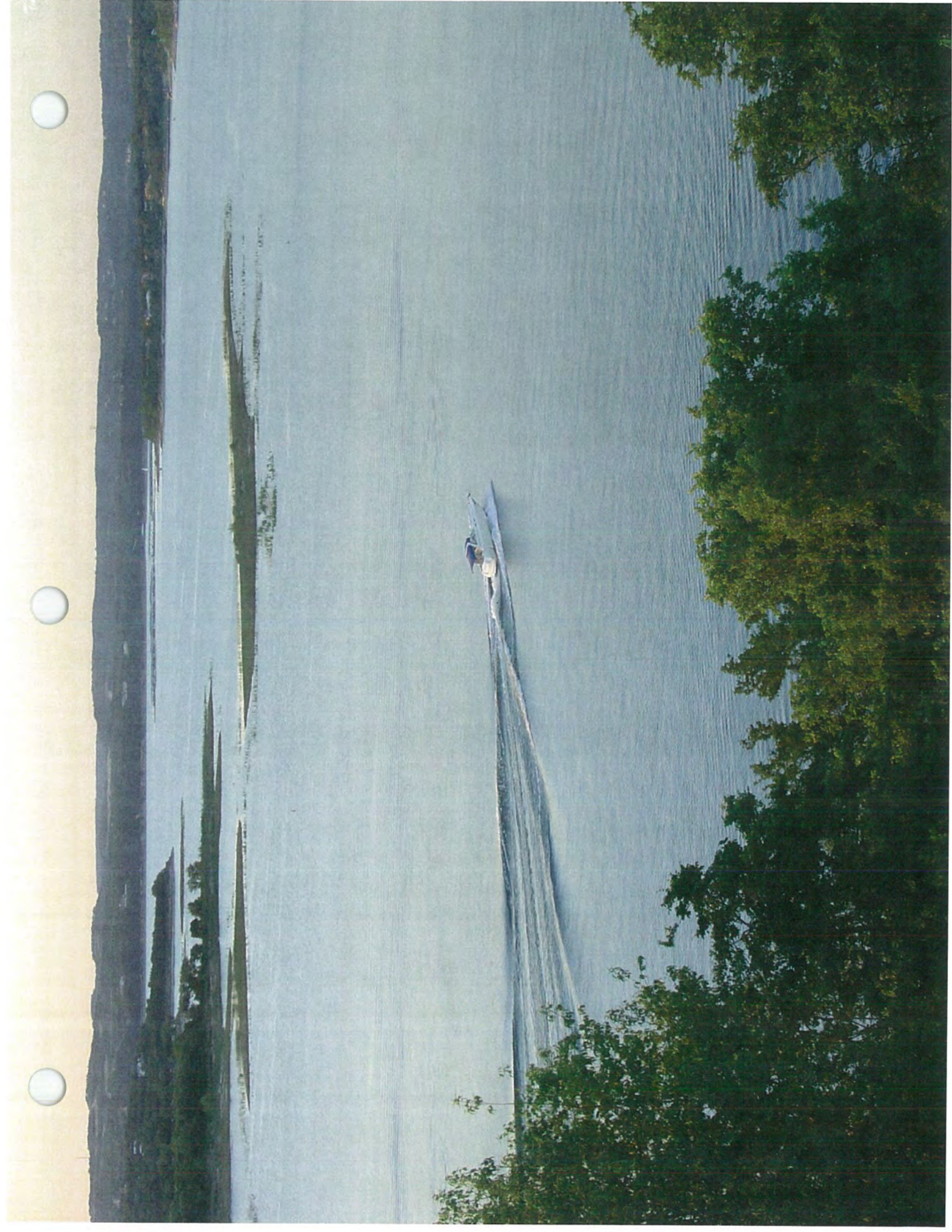
The vision for the lake is one of high quality. The public expressed that some lakes in Texas have not been well kept. These lakes have a very negative image with poor quality development, which is what the public and County seeks to avoid with the LBCR.

## Summary | Implementation Plan

The following are the top ten implementation actions in order of importance. The actions should be pursued with the adoption of this comprehensive plan.

### Top Priorities for Implementation:

1. Adopt Zoning Regulations (FLUP #1)
2. Utilize the Full Boundaries of the Zoning Authority (FLUP #2)
3. Continue Partnerships with NTMWD to Ensure Quality Boat Docks (Lake Edge #1)
4. Program and Prioritize Park Sites (Parks #2)
5. Work with Water and Wastewater Providers to Extend Lines (Lake Edge #2)
6. Plan for Regional Trail Connections (Parks #5)
7. Coordination for New Lake Parks (FLUP #3)
8. Plan for Trail along Certain Roadways (Parks #7)
9. Amend the County's Subdivision Ordinance (Transportation #3)



# Appendix

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## Acknowledgements

Thank you to the following people for contributing to the development of this Comprehensive Plan:

### Fannin County Judge

Creta L. Carter II

### Fannin County Commissioners

Gary Whitlock, Precinct 1

Stanley Barker, Precinct 2

Jerry Magness, Precinct 3

Dean Lackey, Precinct 4

### Fannin County Zoning Commissioners

Gary Fernandes

David Johnson

Dustin Knight

Bob McCraw

### Fannin County Staff

Leah Gibby, Executive Assistant to the County Judge

Rita Watts, Former Executive Assistant to the County Judge

## Consultant Team | Freese and Nichols

Dan Sefko, FAICP, Project Director

Daniel Harrison, AICP, Project Manager

Chelsea Irby, Project Planner

Bryan Gant, GIS Mapping/Analyst

Mireya Varela, Planning Support


## Mapping

All maps found in this Comprehensive Plan can also be found in this appendix.

## Online Comments

All comments submitted through the project website can be found in this appendix.

**Lower Bois d' Arc Creek Reservoir  
Neighboring Counties**

 Texas Counties

Oklahoma

*Future  
Lower Bois d' Arc Creek  
Reservoir*

Grayson  
County

Fannin  
County

Lamar  
County

Delta  
County

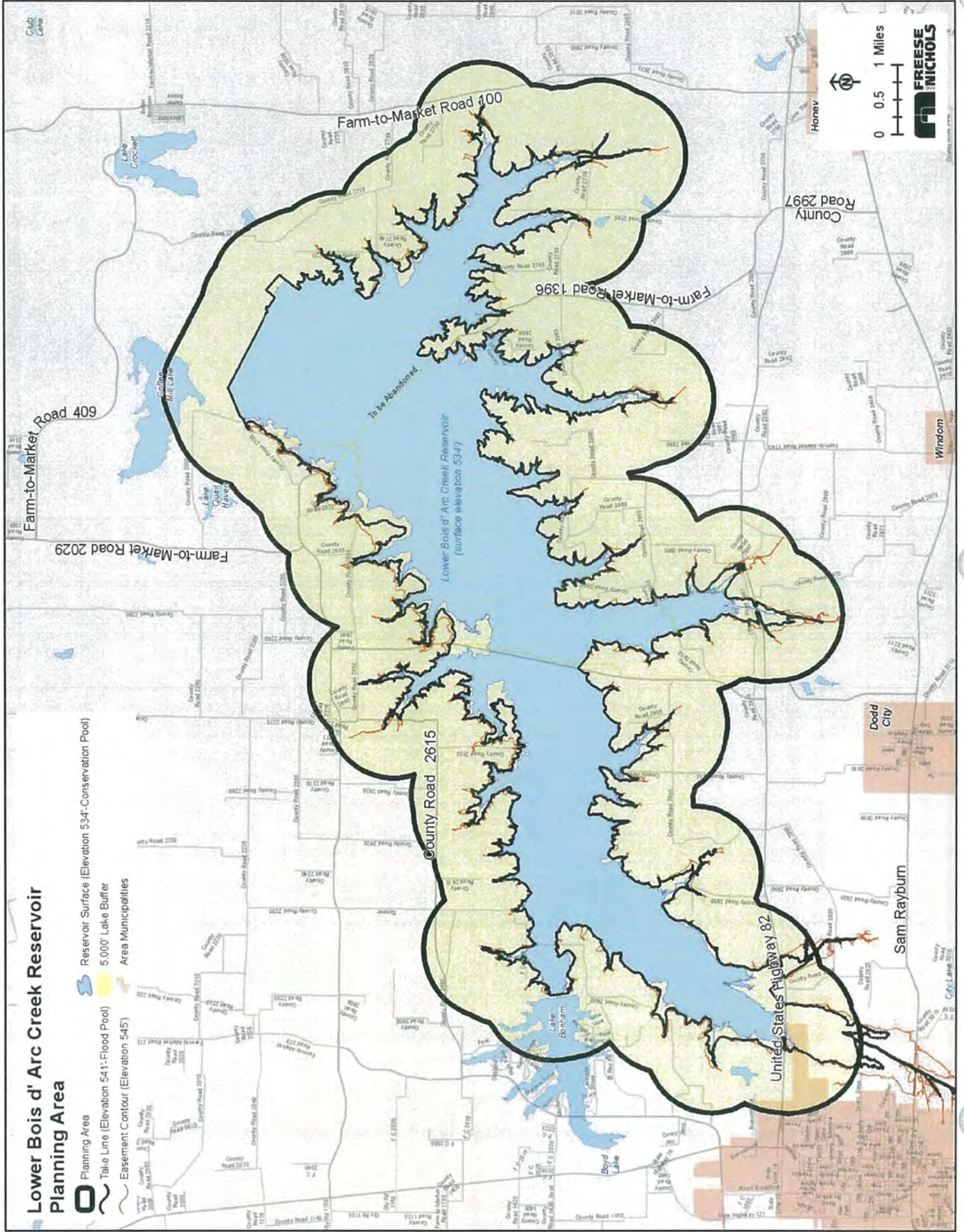
Collin  
County

Hunt  
County

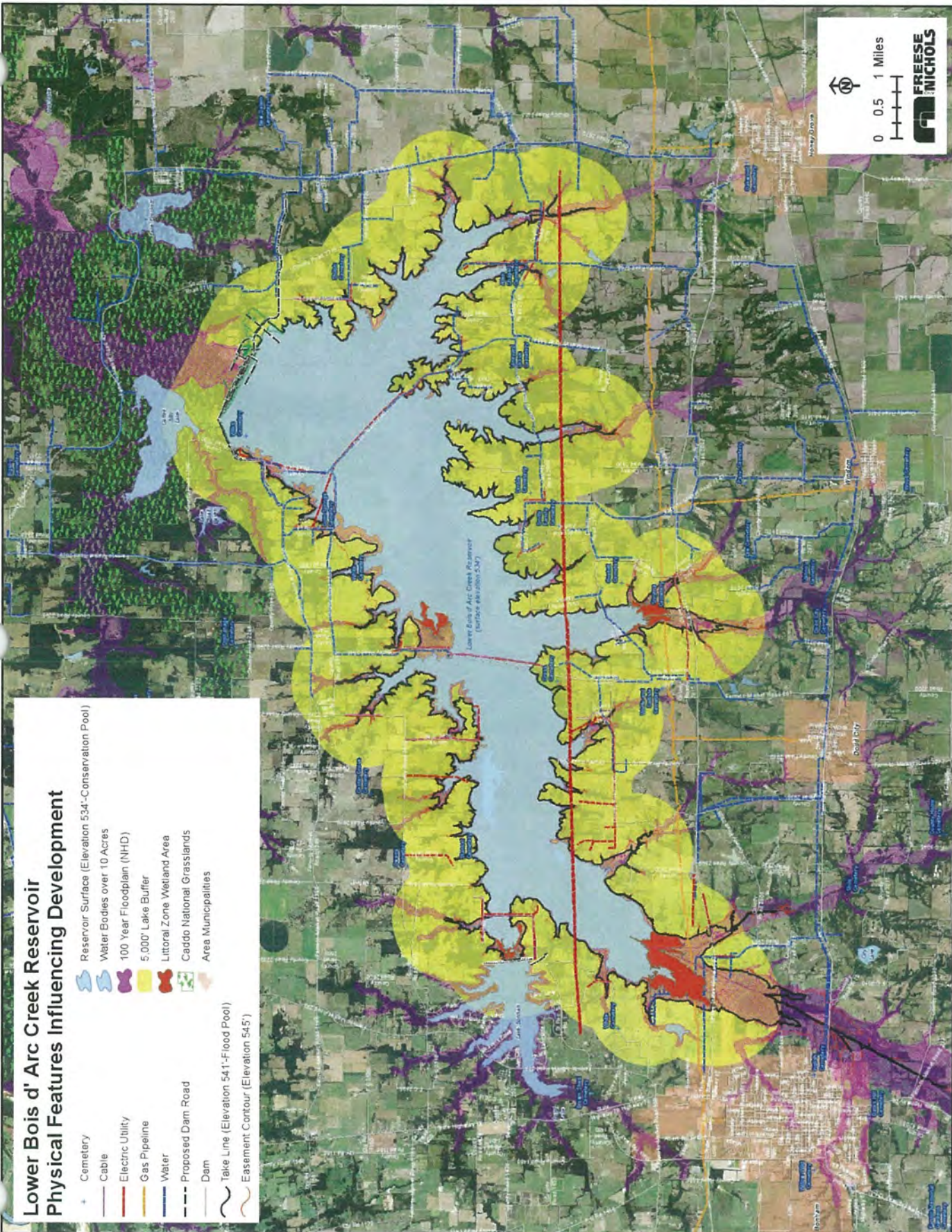
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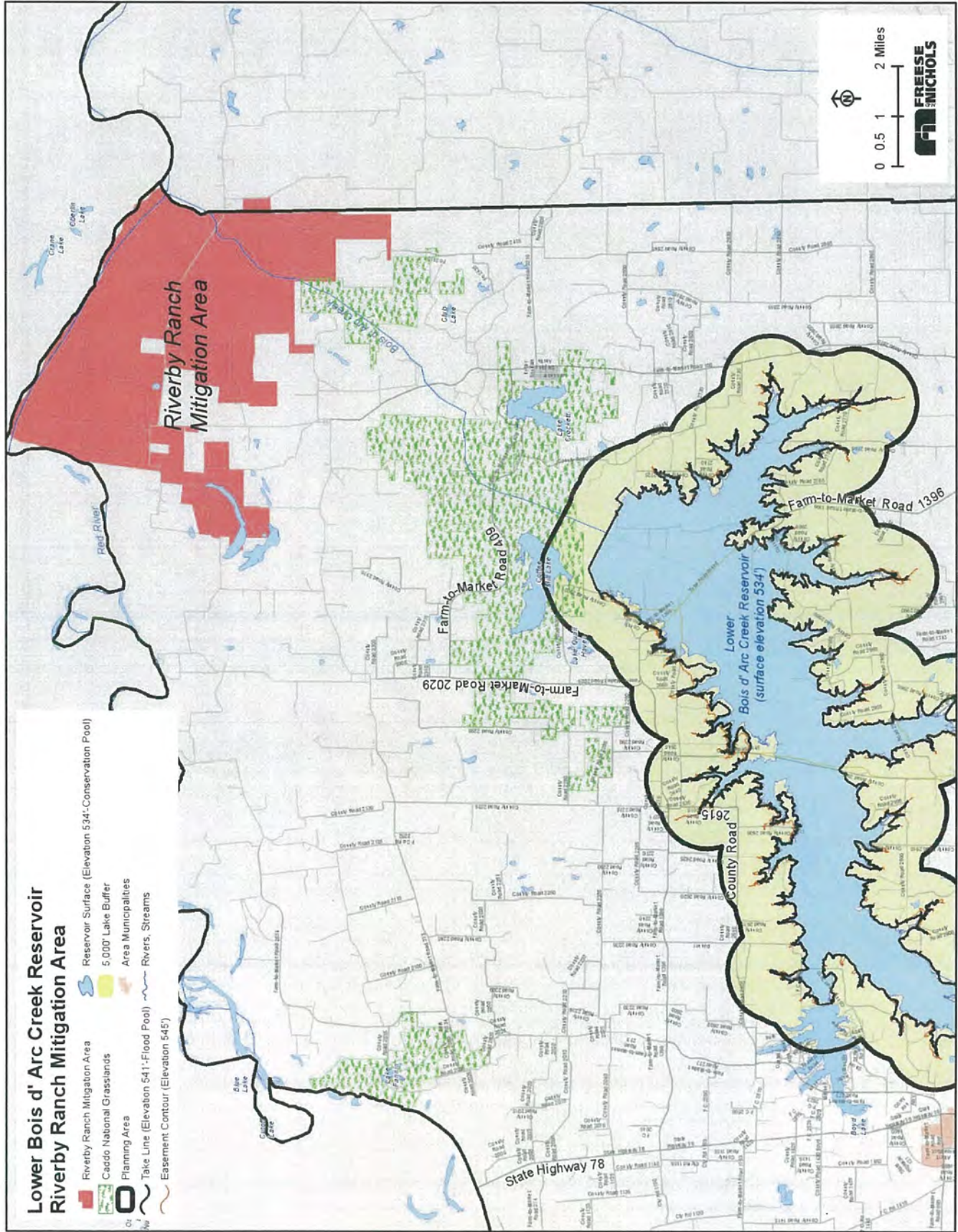

# Lower Bois d' Arc Creek Reservoir Planning Area

-  Planning Area
-  Reservoir Surface (Elevation 534; Conservation Pool)
-  5,000' Lake Buffer
-  Take Line (Elevation 541; Flood Pool)
-  Area Municipalities
-  Easement Contour (Elevation 545)














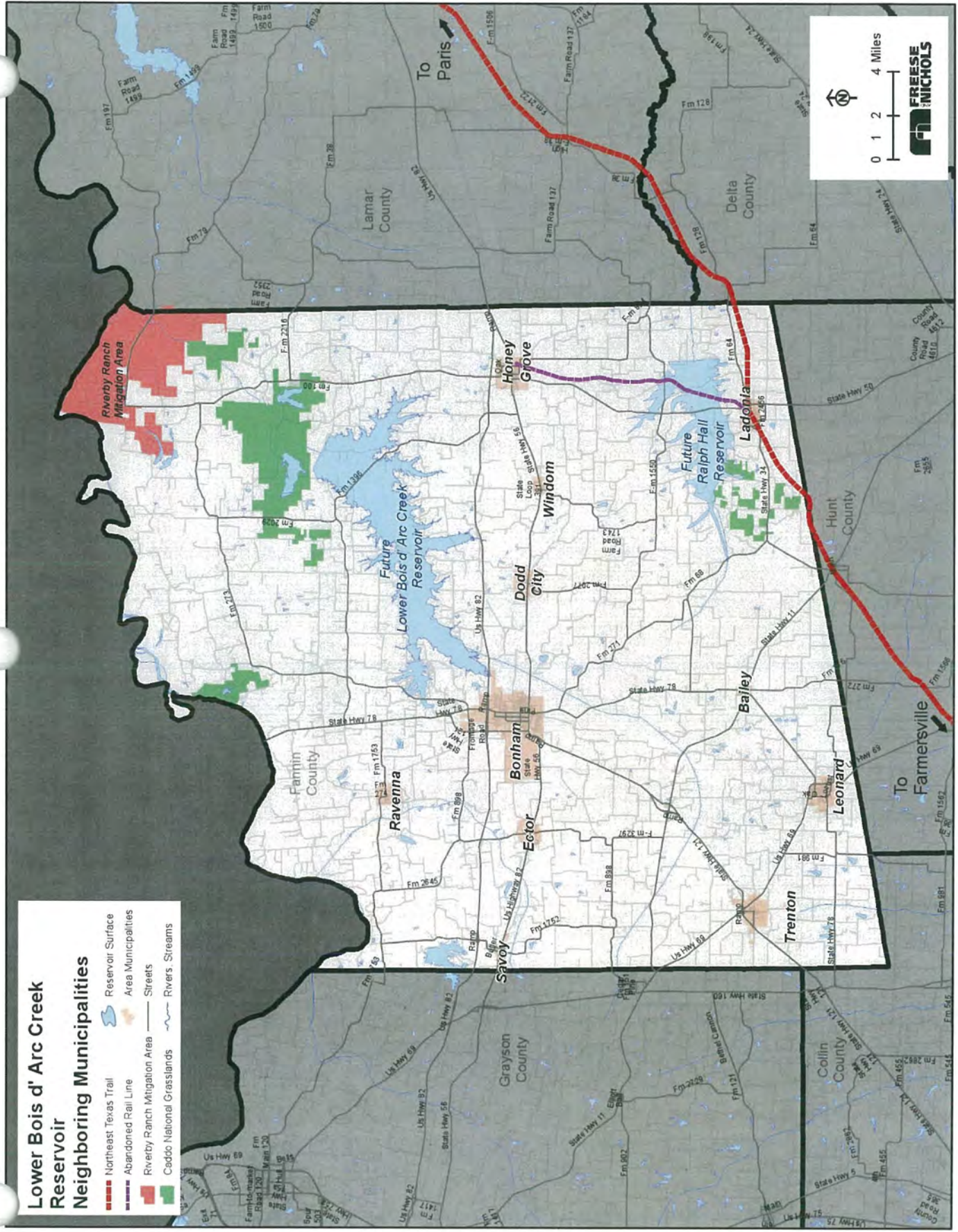


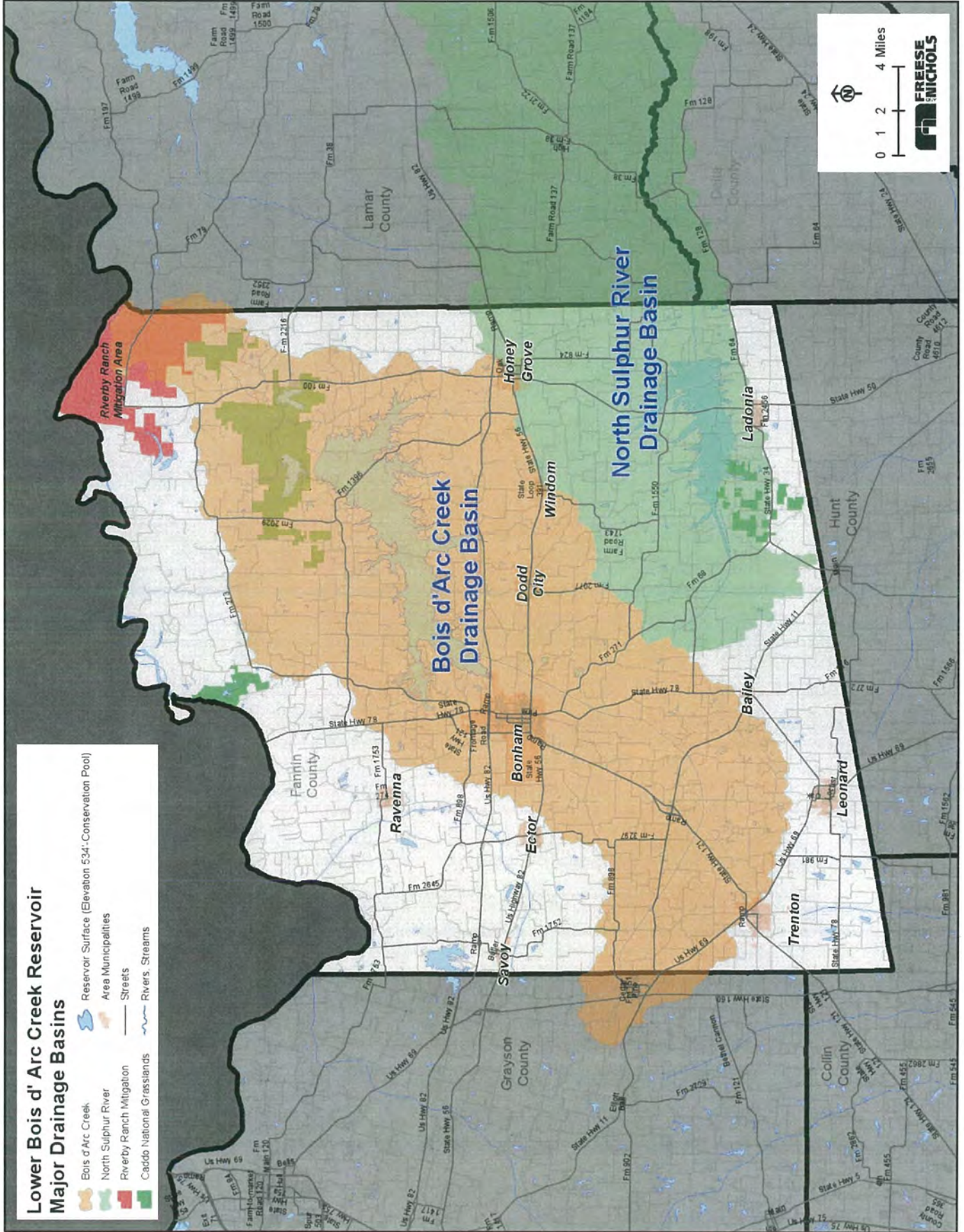


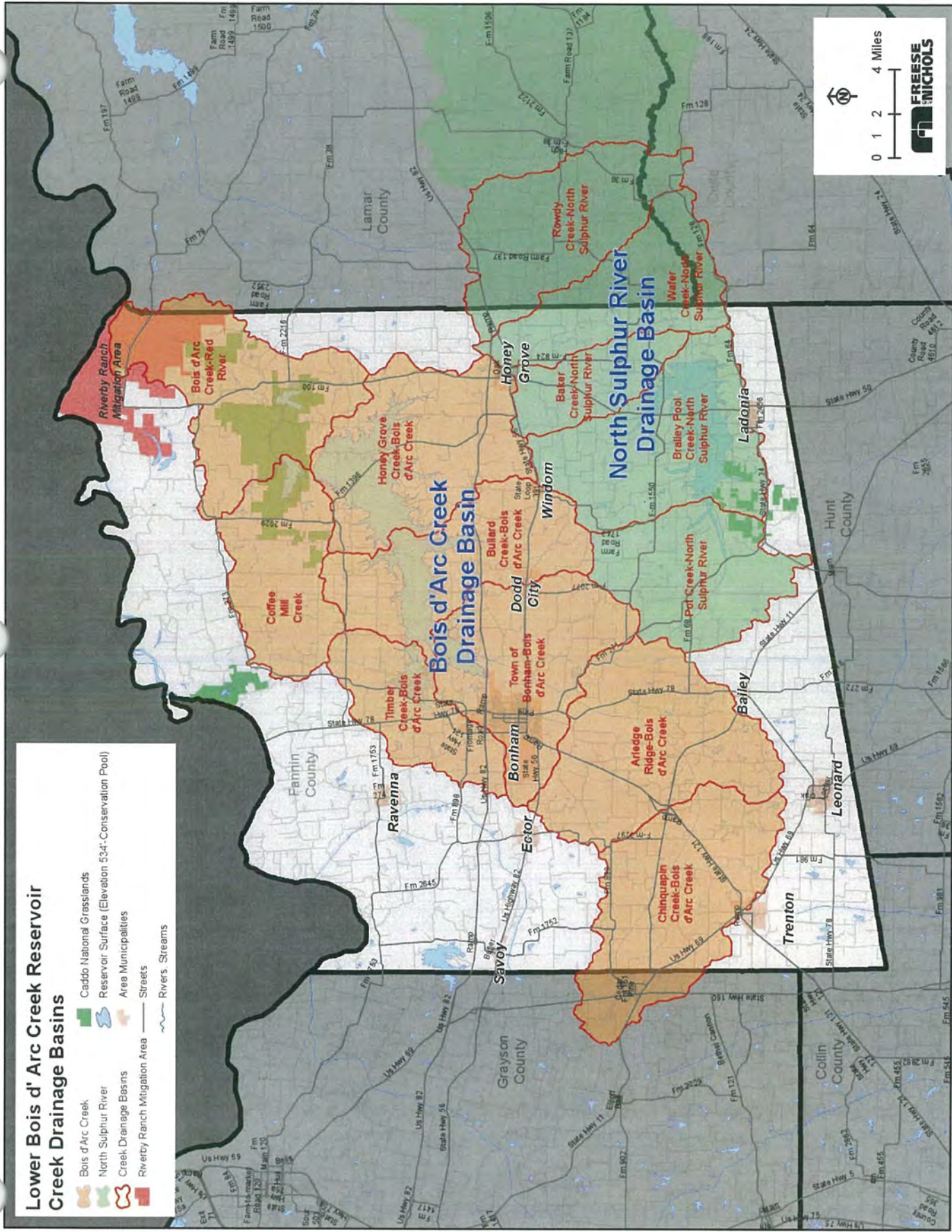
# Lower Bois d' Arc Creek Reservoir

## Neighboring Municipalities

-  Northeast Texas Trail
-  Reservoir Surface
-  Abandoned Rail Line
-  Area Municipalities
-  Riverby Ranch Mitigation Area
-  Caddo National Grasslands
-  Streets
-  Rivers
-  Streams



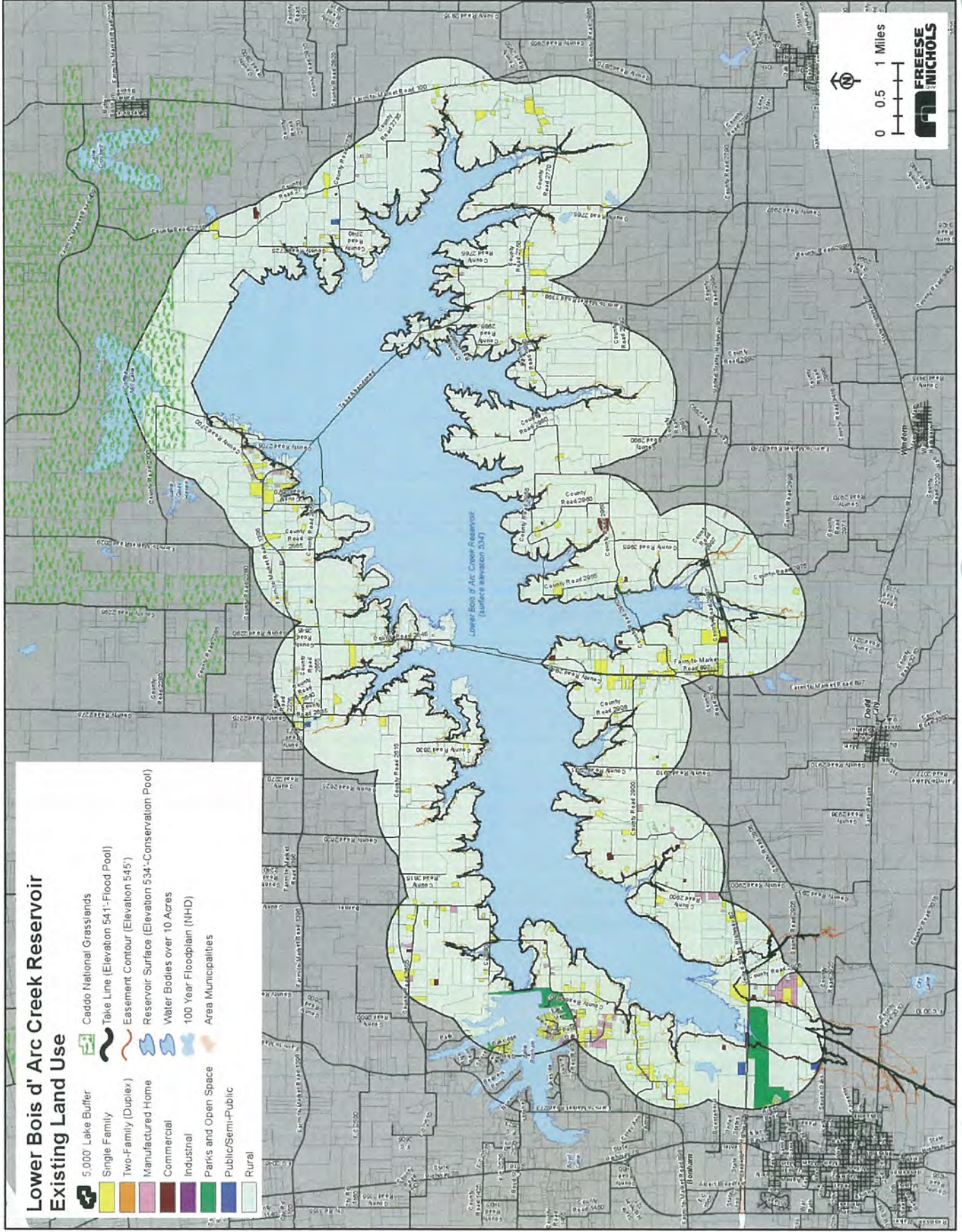




**Lower Bois d'Arc Creek Reservoir  
Creek Drainage Basins**

- Bois d'Arc Creek
- North Sulphur River
- Creek Drainage Basins
- Riverby Ranch Mitigation Area
- Caddo National Grasslands
- Reservoir Surface (Elevation 534'-Conservation Pool)
- Area Municipalities
- Streets
- Rivers/Streams

0 1 2 4 Miles



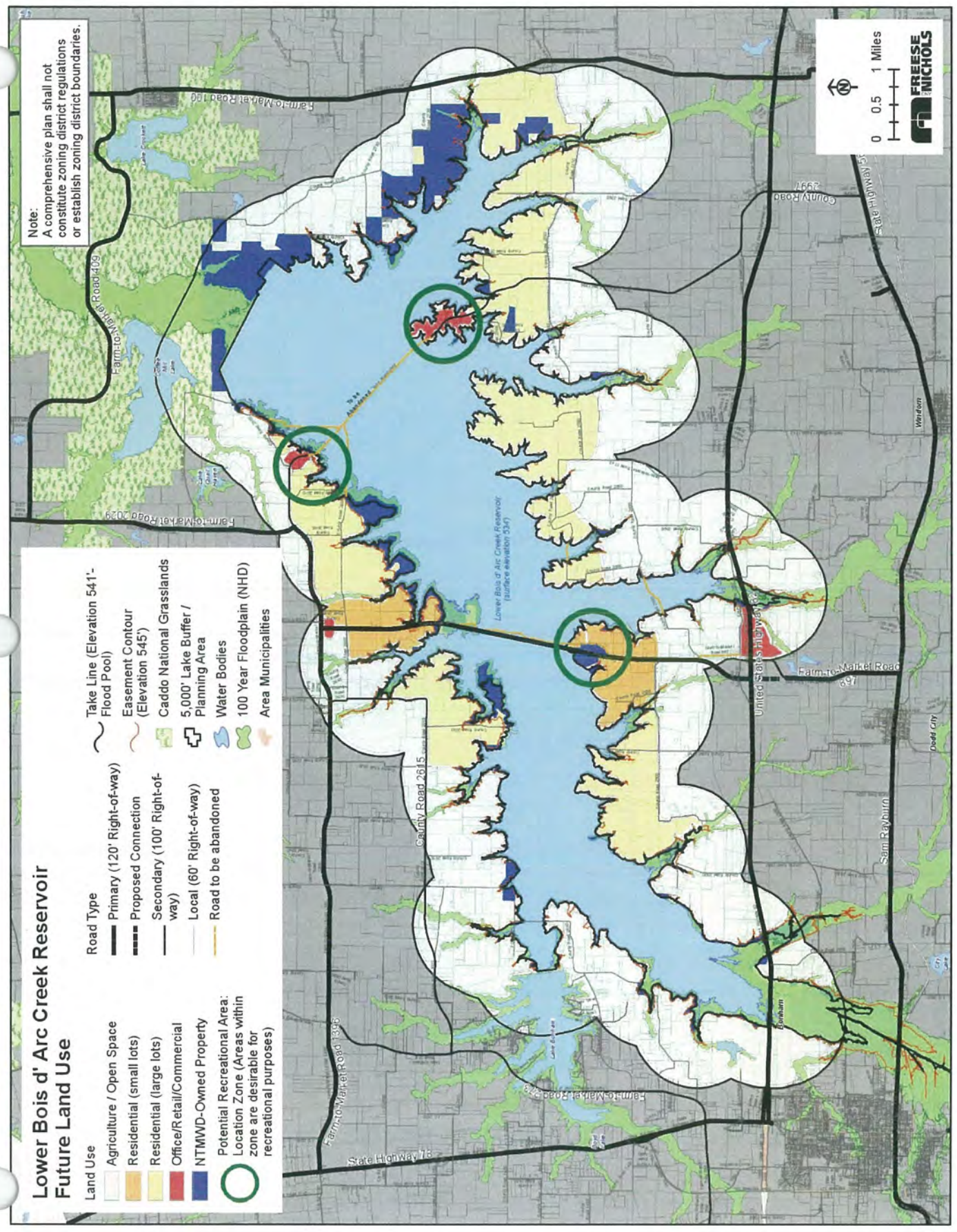
# Lower Bois d'Arc Creek Reservoir Future Land Use

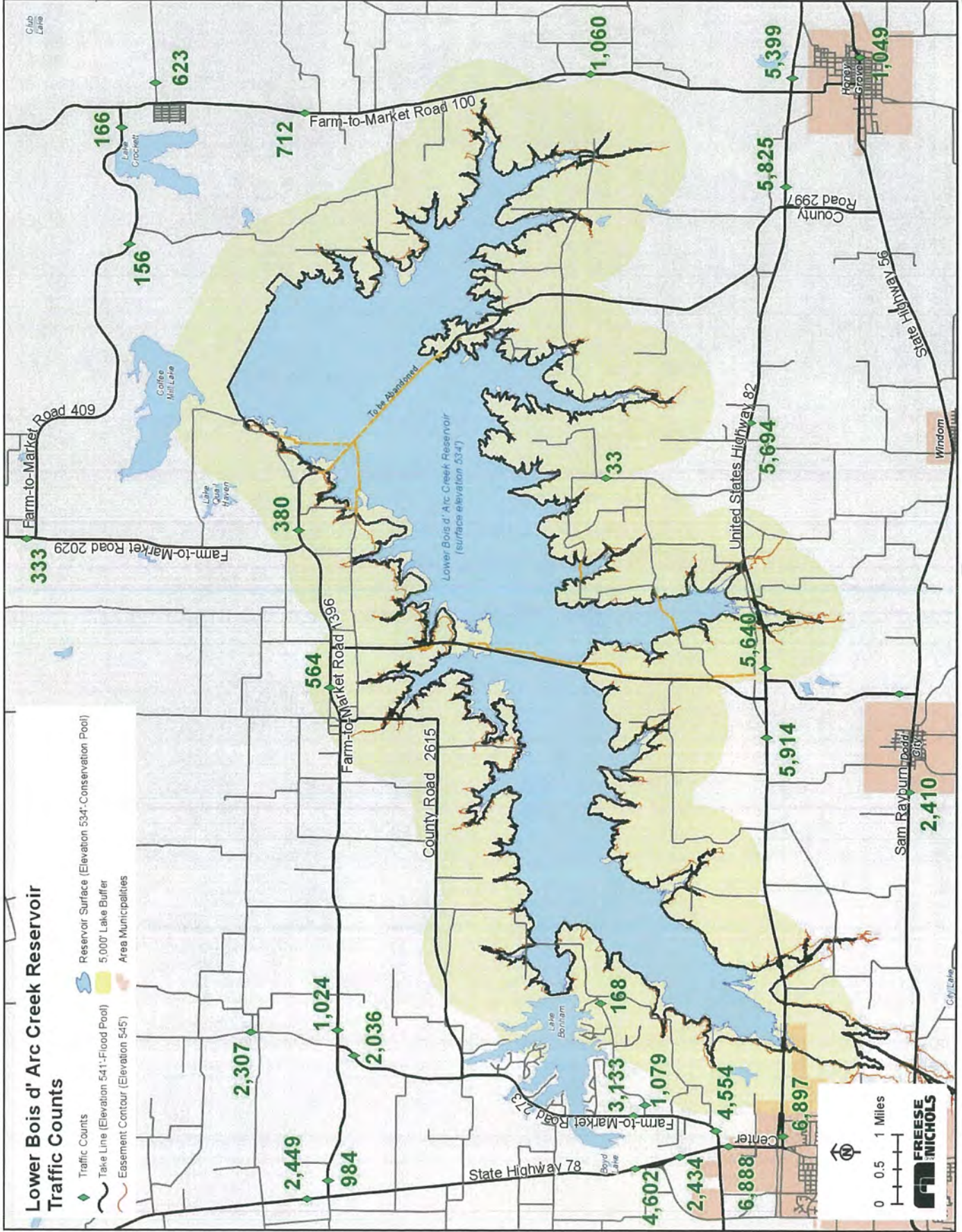
- Land Use**
- Agriculture / Open Space
  - Residential (small lots)
  - Residential (large lots)
  - Office/Retail/Commercial
  - NTMWD-Owned Property
  - Potential Recreational Area: Location Zone (Areas within zone are desirable for recreational purposes)
- Road Type**
- Primary (120' Right-of-way)
  - Proposed Connection
  - Secondary (100' Right-of-way)
  - Local (60' Right-of-way)
  - Road to be abandoned
- Take Line (Elevation 541'- Flood Pool)**
- Easement Contour (Elevation 545')**
- Caddo National Grasslands**
- 5,000' Lake Buffer / Planning Area**
- Water Bodies**
- 100 Year Floodplain (NHD)**
- Area Municipalities**

**Note:**  
A comprehensive plan shall not constitute zoning district regulations or establish zoning district boundaries.

0 0.5 1 Miles

**FRESE NICHOLS**

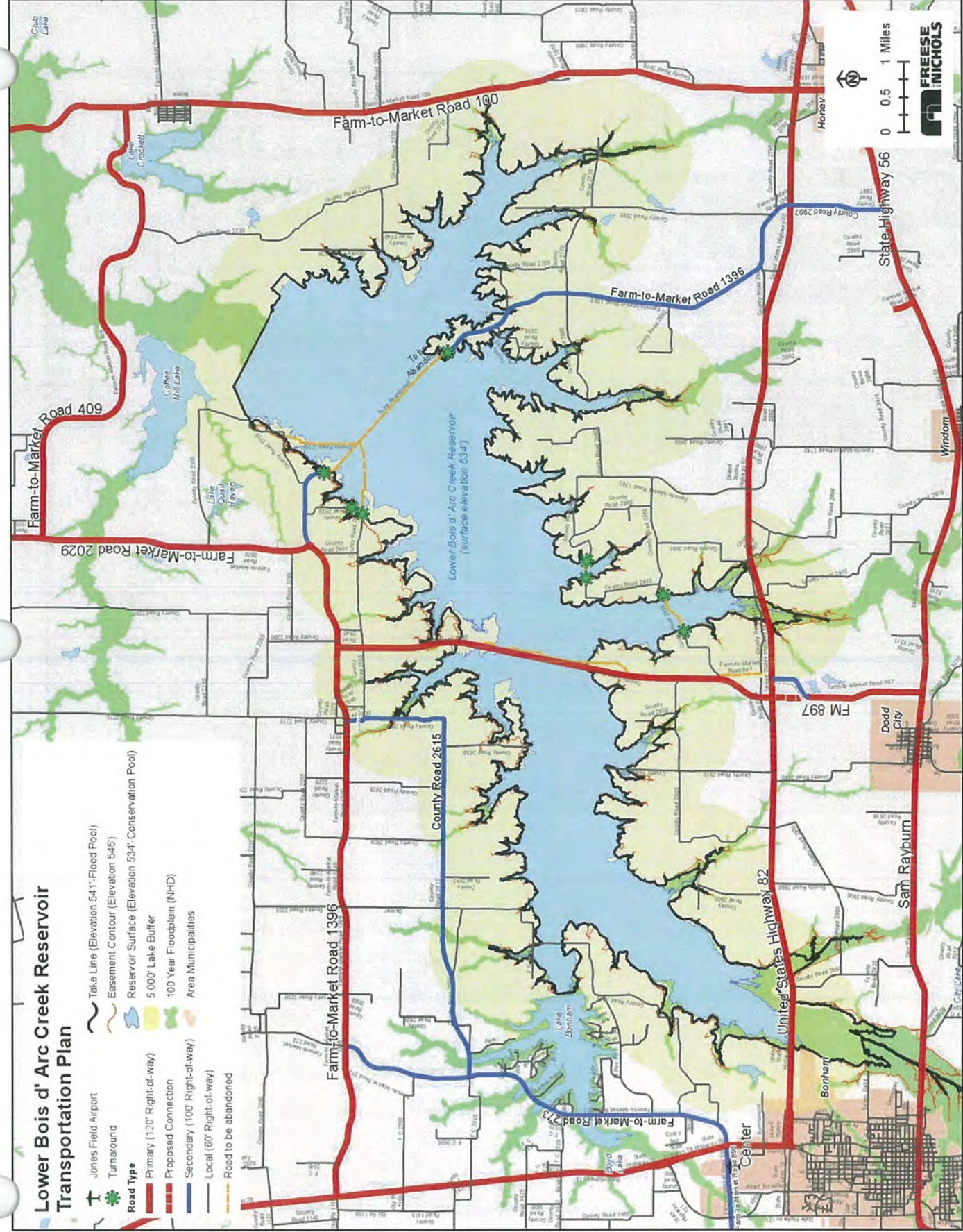


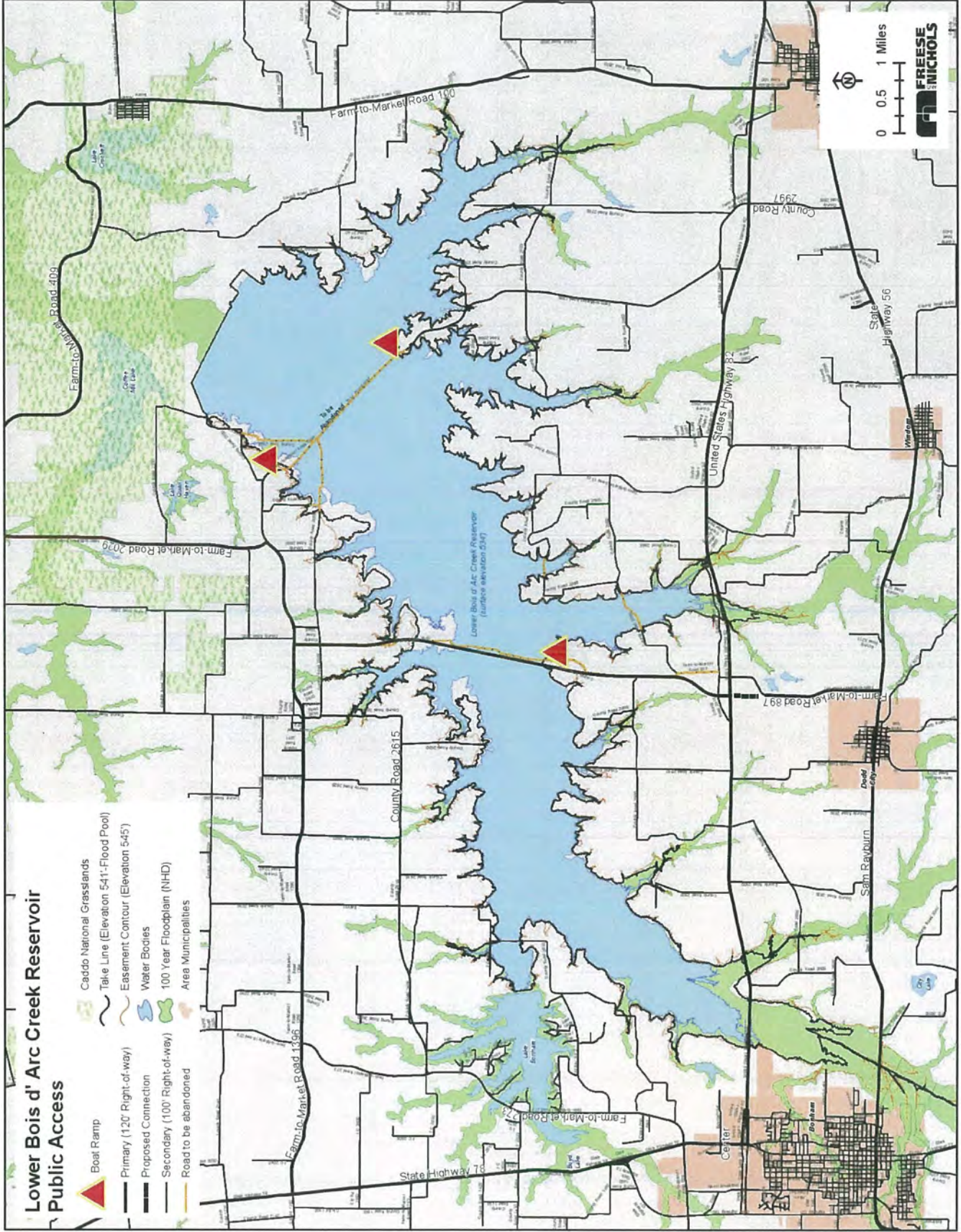


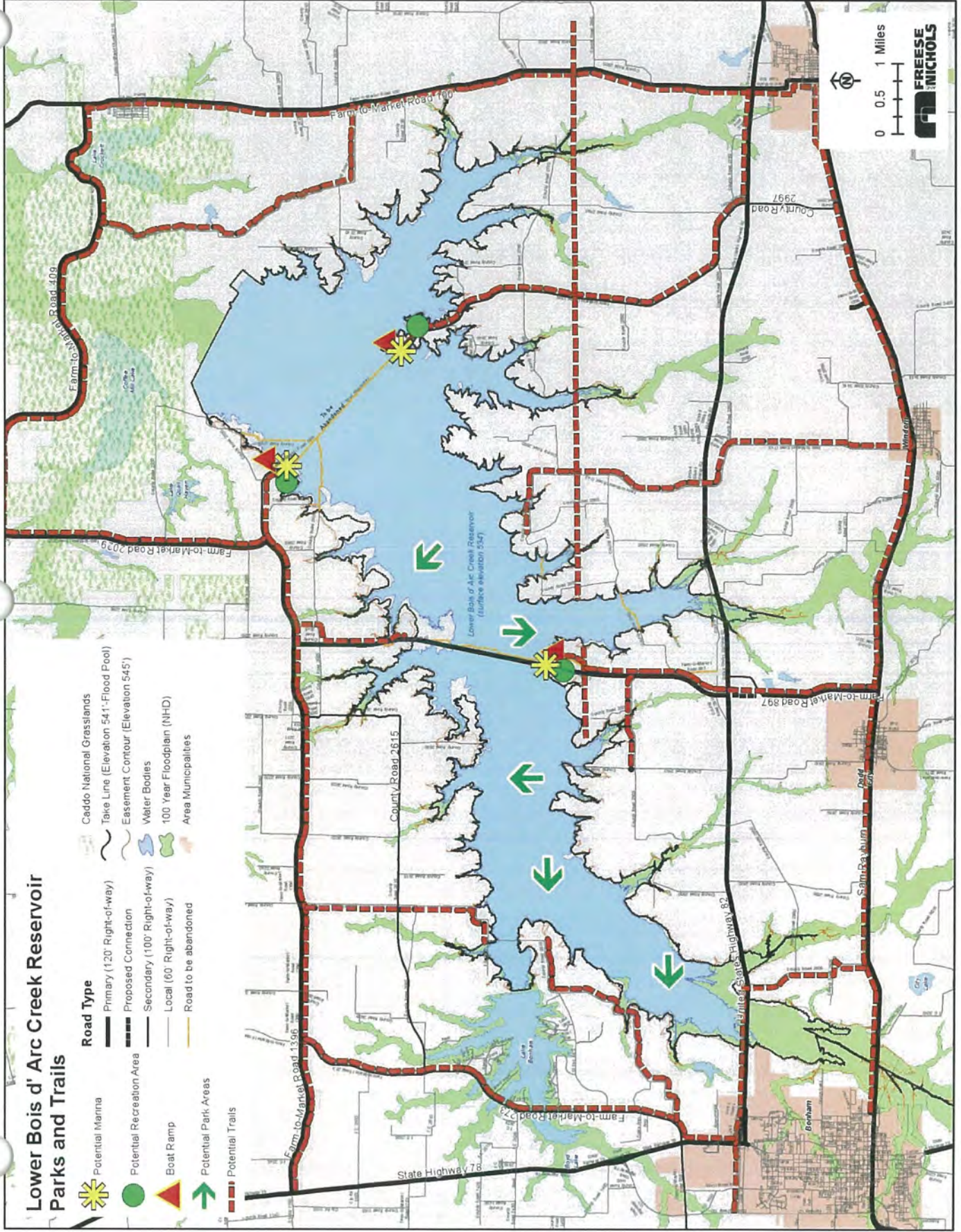


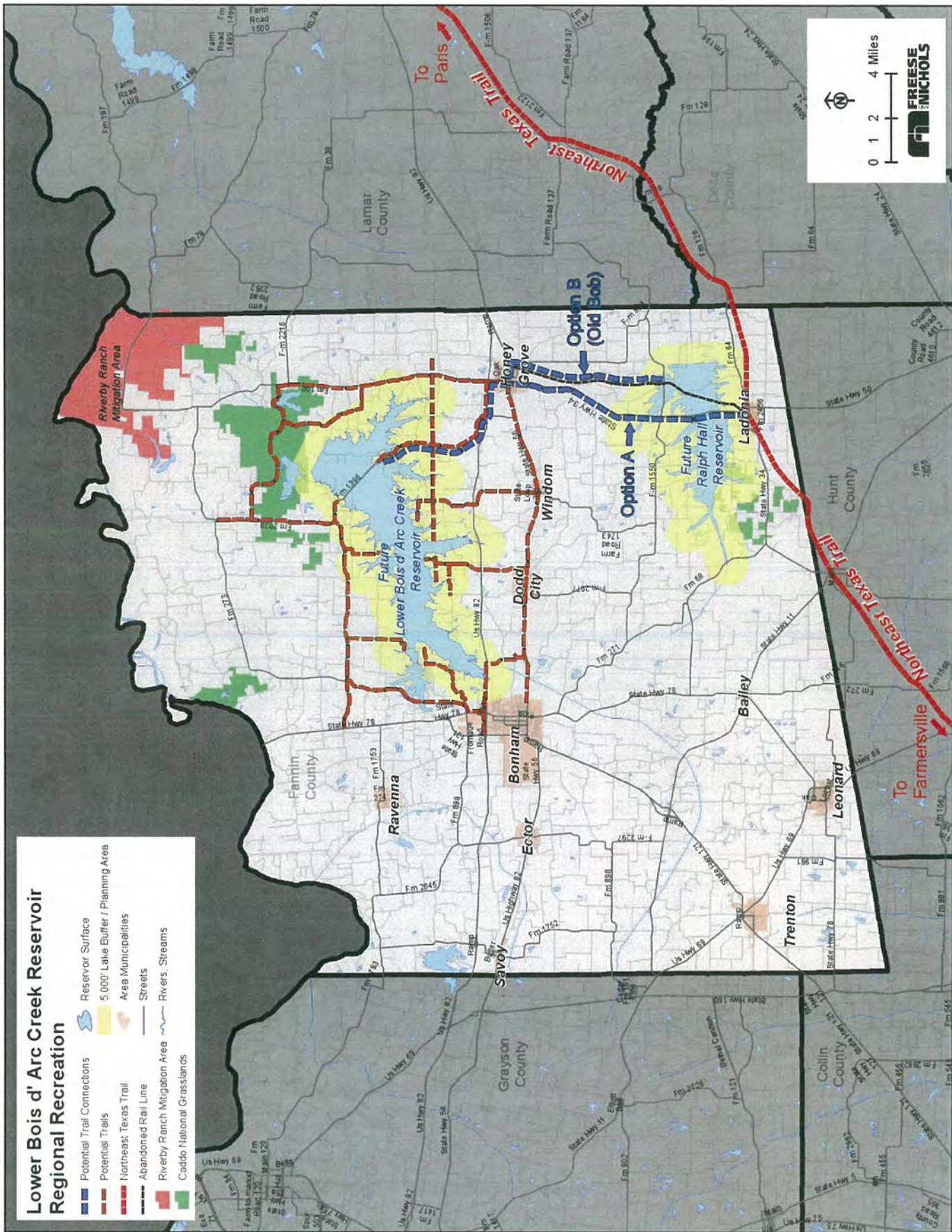
# Lower Bois d'Arc Creek Reservoir Transportation Plan

- Jones Field Airport
  - Turnaround
  - Take Line (Elevation 541; Flood Pool)
  - Easement Contour (Elevation 545)
  - Reservoir Surface (Elevation 534; Conservation Pool)
  - 5,000' Lake Buffer
  - 100 Year Floodplain (NHD)
  - Area Municipalities
- Road Type**
- Primary (120' Right-of-way)
  - Proposed Connection
  - Secondary (100' Right-of-way)
  - Local (60' Right-of-way)
  - Road to be abandoned



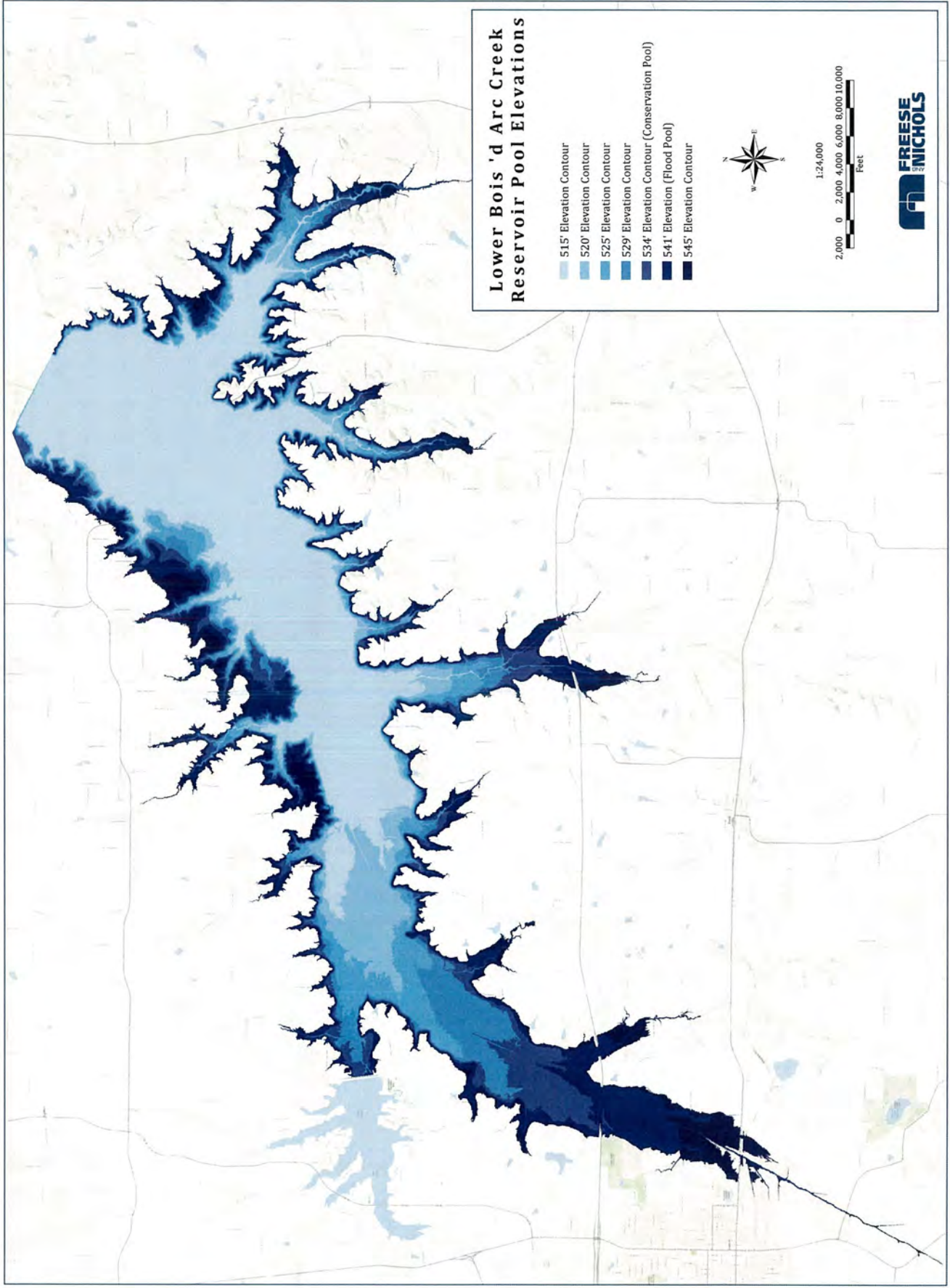






### Lower Bois d'Arc Creek Reservoir Regional Recreation

- Potential Trail Connections
- Reservoir Surface
- 5,000' Lake Buffer / Planning Area
- Potential Trails
- Area Municipalities
- Northeast Texas Trail
- Abandoned Rail Line
- Streets
- Riverby Ranch Mitigation Area
- Rivers, Streams
- Caddo National Grasslands



## Comments Received from Project Website

These comments were not edited for grammar or spelling.

1. *"I live at FM 1396 and CR 2645, and as is the case with many in this area, much of our assets are invested in our homes and property. We are near where the lake will be and don't want our property values diminished by zoning which allows bait shops and liquor stores every few feet. Neither do we want mobile home parks with houses that are deteriorated and surrounded by trash. Many here believe that the only benefit derived from this lake will go to the Metroplex and Fannin Co. citizens will lose the pastoral setting we cherish. Fannin is one of the poorest counties in the state, yet we will probably be left with the bill. In my opinion, neither Bonham officialdom nor North Texas Water are really concerned about those of us whose way of life will be most seriously affected by their actions."*
2. *"In planning how about an area for "Park Homes", TOWs (Tiny Home on Wheels)."*
3. *I own property that is on the lake front and I would like to know if owners around the lake can have their own private boat docks and boat ramps."*
4. *Where can these ideas/comments be viewed?"*
5. *"I do agree that some kind of planning makes sense. However, I did not like the Delphi Methodology employed for "input" purposes. I will continue to attend the meetings."*
6. *"The vision I have, not the one I desire, is the same thing that has happened to Delta County with even worse consequences. A county dependent on an agricultural economy that has been broken by the loss of so much farm land and tax base with no industry or tourism or anything else to take its place. A county that believed the fast talk of urban planners but had no guarantee of development which never occurs. Fannin County is giving up natural resources and getting nothing in return, so one could not hope for much of a bright future. The vision I have is of a financially broke county struggling with a constantly low water supply reservoir that yield nothing but more expenses for the county. No development, no tourism, nothing but added cost and no recourse."*
7. *"Zone a major park facility where entry to the facilities are made off of CR 2610. The traffic flow will hub from Bonham at highways 78/121, to 273 to Park Rd 3 to CR 2610 and build a modern park that will attract tourism and serve the citizens of Fannin County."*
  - a. *Why is this request important? – (1) Position's Bonham/Fannin County seat as a hub for lake activities using the major highway from the Metroplex, point west of Bonham and Bonham residence a western access to the lake. With the creation of Lake Ralph Hall, Bonham is well positioned to be the hub for Fannin County. (2) Leverages and integrates existing city facilities/resources, example Lake Bonham Recreational Area, with the economic growth from the lake. (3) The tourism revenue is important to the City of Bonham, it's businesses and its residence. (4) Park facilities can be an economic engine for years and can be enjoyed by local residents year round. (5) The park location does not require the*

construction of a bridge over the water. (6) The facilities construction will cost the least if planned and executed before the lake fills.

residents of our county out. They will learn this soon after.

b. Key requirements – (1) Must guarantee navigable water for boating from the park to the dam, down to the 500 year drought line. (2) The boat ramp must be deep enough to launch down to the 500 year drought line. (3) The facilities can be situated along the banks of Timber Creek and the boating lanes can be developed along the Timber creek to Bois d'Arc Creek channels from there anywhere on the lake. (4) Must team up with Texas Parks and Wildlife to influence the quality of the fishery. (5) The area behind Lake Bonham dam can be planned with hiking trails, bird watching and access to duck hunting which will bring value to areas not normally used around lakes. (6) Overnight stay facilities able to support charging boat batteries for overnight guest.

c. Examples – (1) Lake Fork is a good example of how the fishing industry has transform the economics around the lake and surrounding communities, but yet the communities were able to maintain their rural character. (2) Lake Ray Roberts is an example of how the Texas Parks and Wildlife regulations has an impact on the fishing economics. By setting the black bass length requirements to 14", the community has seen tourism traffic increase from when the lake had a big fish slot. (3) Humphrey Pavilion on Lake Sam Rayburn. (4) Anderson County, South Carolina's new Green Pond Landing & Event Center is a 221-foot by 50-foot high capacity mega-ramp."

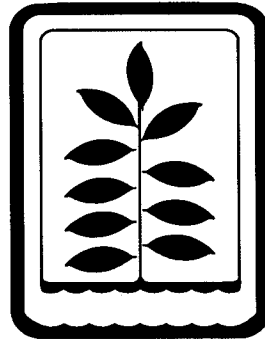
8. It will not prosper Fannin County at all it is taking tax revenue away and taking good farming land away from area farmers. Bonham sold the



Prepared by Freese and Nichols, Inc.  
2711 N. Haskell Ave.  
Suite 3300  
Dallas, TX 75204



# North Texas Municipal Water District



## REQUEST FOR PROPOSALS

### CONSTRUCTION MANAGER AT RISK

**LOWER BOIS D' ARC CREEK RESERVOIR DAM AND INTAKE PROJECT** ←

**Project No. 366 344**



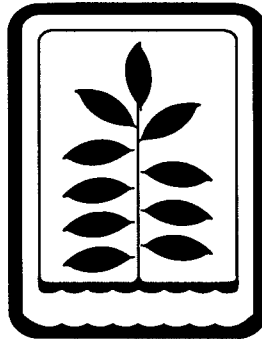
**Freese and Nichols Project No. NTD13565**

#### **DOCUMENTS ISSUED FOR CONSTRUCTION**

These "Issued for Construction" Contract Documents have been prepared by revising the Bidding Documents to record references to addenda, field orders or change orders issued as of April 17, 2015. The Bidding Documents may have been revised to incorporate these revisions directly into the "Issued for Construction" Contract Documents. Contractor is responsible for determining that these documents are consistent with their understanding of the Bidding Documents as modified per the appropriate provisions of the Contract Documents, The Bidding Documents, as modified per the appropriate provisions of the Contract Documents, take precedence over these "Issued for Construction" documents.



# North Texas Municipal Water District



## REQUEST FOR PROPOSALS

### CONSTRUCTION MANAGER AT RISK

#### LOWER BOIS D' ARC CREEK RESERVOIR DAM AND INTAKE PROJECT

Project No. 366 344



Freese and Nichols Project No. NTD13565

THE SEAL THAT ORIGINALLY APPEARED ON THIS DOCUMENT WAS AUTHORIZED BY JEFFREY A. PAYNE, P.E., TEXAS NO. 90732 ON JANUARY 14, 2015. FREESE AND NICHOLS, INC. TEXAS REGISTERED ENGINEERING FIRM F- 2144. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.



**DIVISION 00**

**REQUEST FOR PROPOSALS AND CONTRACTS**

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**END OF SECTION**

**00 01 15 LIST OF DRAWINGS**

**END OF SECTION**

**00 11 19      REQUEST FOR PROPOSALS****ARTICLE 1:    GENERAL NOTICE**

1.01    The North Texas Municipal Water District (“Owner”) extends this Request For Proposals (“RFP”) to solicit a response (“Proposal”) from any interested party (“Proposer”) for Construction Manager at Risk (CMAR) Services (“Services”) for the construction of:

A.    Lower Bois d’ Arc Creek Reservoir Dam and Intake Project (“Project”), North Texas Municipal Water District Project No. 344. The Project consists of:

1.    A zoned earthen embankment approximately 2 miles long and 90 feet tall at its highest point and containing approximately 4.7 million cubic yards, and
2.    Approximately 420,000 square feet of a soil bentonite slurry trench cutoff for the foundation, and
3.    Uncontrolled three cycle labyrinth service spillway that is estimated to contain about 14,000 cubic yards of reinforced concrete and 16,000 cubic yards of roller compacted concrete, and
4.    Approximately 200,000 cubic yards of soil cement erosion protection for the dam and spillway, and
5.    Reinforced concrete water supply intake tower, approximately 100 feet tall, with two 78- inch conduits through the dam that will feed the water supply pump station located on the downstream side of the dam. The pump station is not part of the scope for this Project, and
6.    Lake Bonham Dam improvements including expansion of the pilot channel in the emergency spillway and addition of a toe berm with erosion protection and modifications to the internal toe drain system, and
7.    Leonard Dam modifications including expansion of the emergency spillway and raising the embankment.

The Owner's budget for the Project is \$ 98 Million. The Project is to be complete and in operation on or before December 31, 2018. Additional information related to this work can be found on the website cited in Article 2 of 00 11 19. Documents include: “30% LBCR Intake Submittal (12-3-2014)” and “2015-01-05 - PDR cover – Final”.

B.    The scope of work also includes a terminal storage reservoir (TSR) and impoundment area clearing

1.    An earthen embankment with a soil-cement floor and slope lining with a volume of approximately 210 million gallons with a top of embankment footprint of approximately 1,500’ x 1,300’. The top of the embankment is currently anticipated to be at elevation 738’ AMSL (approximate height 30 feet) and the floor of the reservoir at 710’ AMSL, with a total length of approximately 5,700 LF. Project will include two 102-inch conduits to connect the TSR to the Leonard Water Treatment Plant (WTP), and
2.    Morning-glory type spillway structure with an approximately one-mile-long drop inlet overflow discharge pipe to discharge overflows back to the Red River basin, and

3. Approximate maximum of 3,200 acres of timber clearing in an area outside the footprint of the dam but within the impoundment area.

The Owner’s budget for the terminal storage reservoir and impoundment area clearing is \$40 Million. The impoundment area clearing is to be complete by July 2, 2018 and the terminal storage reservoir is to be complete by December 31, 2019.

1.02 Services required consist of preconstruction, procurement and construction services as described in the RFP. Selection of the CMAR will be made using a one-step procurement and selection process. The evaluation criteria, weighting points and scoring methodology are further described in the Instructions For Proposers. The Owner intends to enter into a CMAR Agreement (“Agreement”) a copy of which is included in this RFP for the work described in 1.01 A and B above. For work described in 1.01 A, preliminary design documents have been completed, including a geotechnical data report, preliminary design report and preliminary design drawings. The 60% design drawings are scheduled to be complete by March 31, 2015.

1.03 For the work described in 1.01 B. above, for the Terminal Storage Reservoir (TSR) it is anticipated that a significant amount of imported fill will be required due to the existing site’s elevations. This will be the first cell of a two-cell system. The second cell is a future project and not included in the scope of this Project. The TSR site is immediately adjacent to the NTMWD’s proposed Leonard WTP site and is located at the southwest corner of US 69 and County Road 4965 just west of Leonard, Texas. The TSR will receive water from the Lower Bois d’ Arc Reservoir. It is anticipated that design initiation will be August 2017. As for the impoundment area clearing the exact acreage to be cleared is not known at this time due primarily to the level of interest from the local community to harvest the timber. The current schedule contemplates design initiation in August 2015. Additional information related to this work can be found on the website. Documents include: “NTD11388- BALANCING RESERVOIR\_HALF (Sheet BR-2 & BR-9)”, “Lower Bois d’ Arc Creek Reservoir Clearing Plan” and “TSR - Location 1”. The Terminal Storage Reservoir will be similar to what is described on sheets BR-2 and BR-9.

1.04 Services required consist of preconstruction, procurement and construction services as described in the Contract Documents. Selection of the CMAR will be made using a one-step process. The selection criteria include the following:

Evaluation Criteria	Weight
Financial Information, Ability to Provide Bonds and Insurance, Compliant Proposal Transmittal Form	Pass/Fail
Proposer Qualifications, Experience and Past Performance	15
Organization, CMAR, CMAR Team, CMAR Team Members and Key Personnel	20
On Time and On Budget Past Performance	5
Project Approach	25
Safety Program and Safety Performance	5



Cost Proposal	30
<b>Total</b>	<b>100</b>

- 1.05 The criteria are further defined in Section 0045 16 "Statement of Qualifications".
- 1.06 The procurement and the provision of services will be in accordance with Texas Government Code Chapter 2269 and this RFP. Performance and Payment Bonds will be required before construction of the Project begins. Proposal security in the form of a Bid Bond is required until Performance and Payment bonds are provided.

**ARTICLE 2: EXAMINATION AND PURCHASE OF DOCUMENTS**

- 2.01 Advertisement and proposal information for the Project can be found at the following website: <http://construction.freese.com>
- 2.02 The RFP may be downloaded or viewed free of charge at this website. It is the downloader's responsibility to determine that a complete set of documents, as defined in the Instructions for Proposers and the Agreement are received. Printed copies of the RFP may be purchased at the website for the cost of printing. The cost for printed RFP is not refundable.
- 2.03 This website will be updated periodically with Addenda, procurement and RFP information, additional reports or other information relevant to the procurement of the Project. Proposers are encouraged to routinely monitor the web site.

**ARTICLE 3: MANDATORY PRE-PROPOSAL CONFERENCE**

- 3.01 A mandatory pre-proposal conference and tour will be held in Fannin County at the Council Chambers in Bonham City Hall, 514 Chestnut Street, Bonham, TX on January 22, 2015 beginning at 9:00 am. After the meeting a site tour will be conducted. Attendance at this conference is required to submit a Proposal.

**ARTICLE 4: DELIVERY OF PROPOSALS**

- 4.01 Deliver Proposals to the address shown below no later than 11:00 am on February 18, 2015 at the NTMWD Office's at 505 Brown Street, Wylie Texas 75098 for the Proposal to be accepted. In accordance with Texas law, the names of Proposers submitting a Proposal and the fees and costs stated in each Proposal will be read aloud at this time and place. There will be no further discussion of the Proposals or the procurement process and no questions or comments will be received at this time and place. Proposals received after this time will be returned unopened. Address Proposals to:

President and Board of Directors  
 North Texas Municipal Water District  
 505 E. Brown Street  
 Wylie, Texas 75098

- 4.02 Proposals will be evaluated, scored and ranked as set forth in this RFP. Proposals will include a Statement of Qualifications and a Cost Proposal and any other information required by the Owner to assist in selecting the Proposer offering the Owner the best value Proposal for the Project based on the published selection criteria and its ranking evaluation. The Owner may invite any or all Proposers to participate in an interview with the Owner to present information on their qualifications, approach and introduce their Key Personnel. The Owner may also invite any or all Proposers to confidential meetings to discuss the Proposer’s Proposal. Proposals may not be withdrawn within 90 days from the date on which Proposals are submitted.

Procurement Schedule

Activity	Date (2015)
Issue RFP	January 14
Proposal Preparation Period	January 14 – February 18
Deadline for submission of questions	February 9
Submission of Proposals	February 18
Review and evaluation of proposals	February 19 –March 2
Interviews	March 4
Final Review and evaluation of proposals	March 5 – March 10
Selection Notification of highest ranked Proposer	March 18
Board Approval	March 26
Agreement execution	March 30
Notice to Proceed	March 31

- 4.03 The Owner assumes no obligations, responsibilities and liabilities, fiscal or otherwise, to reimburse all or part of the costs incurred or alleged to have been incurred by parties considering a response to and/or responding to this RFP. All such costs shall be borne solely by each Proposer.

**ARTICLE 5: AWARD OF AGREEMENT**

- 5.01 It is the intent of the Owner to award the Agreement to the Proposer who provides the best value Proposal for the Project based on the published selection criteria and its ranking evaluation. The Owner will attempt to negotiate an agreement with the selected Proposer. If the Owner is unable to negotiate a satisfactory agreement with the selected Proposer, the Owner will, formally and in writing, end negotiations with that Proposer and proceed to negotiate with the next Proposer in the order of the selection ranking until an agreement is reached or negotiations with all ranked Proposers end.

**ARTICLE 6: POINT OF CONTACT FOR QUESTIONS REGARDING PROCUREMENT PROCESS AND COMMUNICATION PROTOCOL**

6.01 To ensure fairness during the procurement process, until the Agreement is executed, Proposers and their employees, representatives and agents shall not contact an Owner staff, member of selection committee, Owner Board member, or any other official, employee, representative or consultant (identified immediately below of the Owner involved with this procurement process other than the Point of Contact identified below.

A. Owner Representatives and Consultants

1. Freese and Nichols, Inc.
2. Cyganiewicz Geotechnical LLC
3. Darell Zimbelman (individual peer reviewer)
4. Gorrondona and Associates
5. Texplor of Dallas, Inc.
6. True Grit
7. TRI Environmental
8. Gehrig, Inc.
9. Utah Water Research Laboratory

6.02 Direct questions regarding this RFP and Project are to be submitted in writing and using the process on the website. Modifications to the RFP prior to the award of the Agreement can only be made by Addenda.

Point of Contact:

Douglas Herbst  
Freese and Nichols, Inc.

Website:

<https://construction.freese.com>

6.03 All communications are subject to distribution to all Proposers except that Owner will endeavor to prevent disclosure to other Proposers' information unique to a particular Proposer or otherwise identified as proprietary or confidential by a Proposer. The Owner will share with all Proposers all Addenda to this RFP including any revisions based on its review of Proposer comment and questions concerning this RFP. The Owner disclaims the accuracy of information derived from any source other than the Point of Contact identified above, and the use of any such information is at the sole risk of the Proposer. Only answers and responses issued by formal Addenda shall be final and binding upon the Owner. Oral and other interpretations shall be without legal effect and Proposer shall not rely on such oral and other interpretations.

NORTH TEXAS MUNICIPAL WATER DISTRICT

By s/ Darwin Whiteside  
Darwin Whiteside, President

**END OF SECTION**

## **00 21 16 INSTRUCTIONS FOR PROPOSERS**

### **ARTICLE 1: DEFINED TERMS**

- 1.01 Terms used in the RFP will have the meanings indicated in this RFP or in the General Conditions and Supplementary Conditions.

### **ARTICLE 2: PROPOSALS RECEIVED**

- 2.01 Refer to the RFP for information on receipt of Proposals.

### **ARTICLE 3: COPIES OF RFP**

- 3.01 Obtain a complete RFP as indicated in the RFP.
- 3.02 Use complete RFP in preparing Proposals; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of an incomplete RFP.
- 3.03 Owner and Engineer will make copies of RFP available on the above terms only for the purpose of obtaining Proposals for completion of the Services and do not confer a license or grant permission or authorization for any other use.

### **ARTICLE 4: PROPOSALS**

- 4.01 Proposers are required to submit a Proposal for consideration in award of the Agreement for the Services.

### **ARTICLE 5: EXAMINATION OF RFP**

- 5.01 Before submitting a Proposal:
- A. Examine and carefully study the RFP, including any Addenda and the related supplemental data identified in the RFP.
  - B. Become familiar and satisfied with all federal, state, and local Laws and Regulations that may affect cost, progress, or the completion of Work.
  - C. Carefully study and correlate the information known to Proposer with the RFP, Addenda and the related supplemental data identified in the RFP or Contract Documents.
  - D. Promptly give Point of Contact written notice of all conflicts, errors, ambiguities, or discrepancies that Proposer discovers in the RFP, Addenda and the related supplemental data. Determine that the RFP, Addenda and the related supplemental data are generally sufficient to indicate and convey understanding of all terms and conditions for completion of the Services.

### **ARTICLE 6: ADDENDA**

- 6.01 The RFP does not contain the Agreement and General Conditions. These documents will be the subject of Addendum No. 1 and will be issued in the near future and prior to the Pre-Proposal Conference.

## **ARTICLE 7: INTERPRETATIONS AND ALTERNATE PROPOSALS**

- 7.01 Prior to the deadline stated in 00 11 19 Article 4.02, submit all questions about the meaning or intent of the RFP, Addenda and the related supplemental data to the Point of Contact as indicated in the RFP. Interpretations or clarifications considered necessary by the Owner in response to such questions will be issued by Addenda to all parties recorded as having registered as a Proposer at the mandatory pre-proposal meeting. Addenda will be sent electronically and be posted on web site. Questions received less than 9 days prior to the date for opening of Proposals may not be answered. Submit any offer of alternate terms and conditions, or offer of Services not in strict compliance with the RFP to the Point of Contact no later than the deadline stated immediately above. Owner will issue Addenda as appropriate if any of the proposed changes to the RFP are accepted. ~~A Proposal submitted with clarifications or taking exceptions to the Contract Documents, except as modified by Addenda, may be rejected.~~ **A Proposal submitted taking material and significant exceptions to the Contract Documents, except as may be modified by Addenda, may be rejected.** Proposers shall submit with its Proposal a listing of any minor exceptions and clauses which may need further discussion to clarify the language of the Agreement or General Conditions. The specific listing provided by the selected Proposer will be used by the Owner as the basis of negotiations. This listing shall be provided as an attachment to the Proposal Transmittal Form.



## **ARTICLE 8: PROPOSAL SECURITY**

- 8.01 A Proposal must be accompanied by an acceptable Bid Bond in the name of the Owner for each offer. The Bid Bond must be issued by a surety legally authorized to do business in the State of Texas, is listed in the Department of Treasury's Circular 570 and has an A.M. Best Company Rating of A-VIII or better. .

Provide a Bid Bond in the amount of \$6,900,000 (5 percent of the Owner's budget of \$138,000,000.).

- 8.02 The Bid Bond of the selected Proposer will be retained as security until Performance and Payment Bonds for either 100 percent of the Owner's budget or the Guaranteed Maximum Price have been provided. This Bid Bond will be returned when the Performance and Payment Bonds are provided. Owner may annul the Notice of Award and the Proposal security of the Proposer will be forfeited if the apparent successful Proposer fails to execute and deliver the Agreement or Amendments to the Agreement establishing a Guaranteed Maximum Price for construction. The Proposal security of other Proposers whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Agreement or 90 days after the date Proposals are opened.

## **ARTICLE 9: CONTRACT TIMES**

- 9.01 See applicable provisions in the Agreement.

## **ARTICLE 10: LIQUIDATED DAMAGES**

10.01 Provisions for Liquidated Damages are set forth in the Agreement.

**ARTICLE 11: RETAINAGE**

11.01 Provisions concerning Proposer's rights to deposit securities and or retainage are set forth in the Agreement.

**ARTICLE 12: PREPARATION OF PROPOSAL**

12.01 The Proposal Transmittal Form and other Proposal Forms are included with the RFP. A copy of these forms in Word or Excel will be made available to Proposers.

12.02 Complete all blanks on the Proposal Transmittal Form, Proposal Form 1. Execute Proposal Form 1 as indicated below:

- A. For a corporation in the corporate name with the signature of the president, a vice-president or other corporate officer accompanied by evidence of authority of the individual to sign on behalf of the corporation. Show the corporate address and state of incorporation with the signature.
- B. For a partnership in the partnership name with the signature of a partner. The title of the partner must appear with the signature. The document must be accompanied by evidence of authority for that individual to sign on behalf of the partnership. Show the official address of the partnership with the signature.
- C. For a limited liability company in the name of the firm with the signature of an officer of that company. The document must be accompanied by evidence of authority for that individual to sign on behalf of the company. Show the state in which the firm was formed and the official address of the firm with the signature.
- D. For a joint venture with a signature of an authorized person from each joint venturer in the manner indicated on the Proposal Transmittal Form. The document must be accompanied by evidence of authority for each individual to sign on behalf of their respective organizations. Show the official address of the joint venture with the signature.

12.03 Type or print all names in ink below the signature.

12.04 Acknowledge receipt of all Addenda by filling in the number and date of each Addenda received. Provide a signature as indicated to verify that the Addenda were received. A Proposal Transmittal Form that does not acknowledge the receipt of all Addenda may be considered non-responsive.

12.05 Provide the name, address and telephone number of the individual to be contacted for any communications regarding the Proposal in the Proposal Transmittal Form.

12.06 Proposer shall provide evidence of its and if applicable, the Guarantor's, authority to do business in the State of Texas and include such evidence with Proposal Form 1. Alternatively, Proposer will covenant to obtain such authority prior to award of the Agreement, with its execution of Proposal Form 1.

**ARTICLE 13: CONFIDENTIALITY OF PROPOSAL INFORMATION**

13.01 In accordance with Texas Government Code 552.110 trade secrets and confidential information in Proposals are not open for public inspection. Proposals will be opened in a manner that avoids disclosure of the contents to competing Proposers and keeps the Proposals secret during considerations. All Proposals are open for public inspection after the Agreement is awarded, but trade secrets and confidential information in Proposals are not typically open for public inspection. The Owner will protect this information to the extent allowed by law. Clearly indicate which specific documents are considered to be trade secrets or confidential information by stamping or watermarking all such documents with the word "confidential" prominently on each page or sheet or on the cover of bound documents. Place "confidential" stamps or watermarks so that they do not obscure any of the required information on the document, either in the original or in a way that would obscure any of the required information in a photocopy of the document. Photocopies of "confidential" documents will be made only for the convenience of the selection committee and will be destroyed after the Effective Date of Agreement. Original confidential documents will be returned to the Proposer after the Effective Date of Agreement if the Proposer indicates that the information is to be returned with the Proposal, and direction for its return are provided by the Proposer.

#### **ARTICLE 14: SUBMITTAL OF PROPOSALS**

14.01 The Proposal shall consist of two separate parts the Statement of Qualifications and the Cost Proposal. The Proposer shall complete and submit the Statements of Qualifications per Section 00 45 16 and the Cost Proposal as per Section 00 42 23.01.

A. The Statement of Qualifications shall be submitted in the following format and subject to the page limits as indicated:

Cover Letter

Section 1: Proposer Transmittal Form

Section 2: Proposer Qualifications, Experience and Past Performance

Section 3: Organization, CMAR, CMAR Team, CMAR Team Members and Key Personnel

Section 4: On Time and Budget Performance

Section 5: Financial Information

Section 6: Project Approach

Section 7: Safety Program and Safety Performance

Section 8: Resumes

B. Except for charts, schedules, exhibits and other illustrative and graphical information, all information shall be prepared on 8.5" x 11" white paper, except where specifically excepted in this RFP. Charts, schedules, exhibits and other illustrative and graphical information may be on 11" x 17" paper, but must be folded to 8.5" x 11". All printing, except for the front cover of the Statement of Qualifications and any appendices, must be a font of not less than 11-point and be double-sided. **A double-sided page shall be considered two (2) pages for purposes of the page limitations.** Any plan sheets or drawing submitted shall be drawn to an identifiable scale and submitted on 11" x 17" sheets. Audio visual materials including audio tapes, video tapes and CD Rom material will not be accepted.

- C. Proposers are instructed to limit the information included in the Proposal to the information necessary to demonstrate its technical and financial qualifications for the Project and any other information specifically requested in this RFP. Proposals should be prepared in a straightforward and concise manner. The Owner is not interested in receiving marketing brochures, promotional material, generic narratives, elaborate binding, colored displays, etc. in the Proposals. Emphasis should be placed on clarity and completeness of content and responsiveness to the RFP requirements.
- D. Proposal Forms

Proposal Forms		
Proposal Form Number	Title	Proposal Submittal Location (See Article 13 Submittal of Proposal- Section 13.01)
1	Proposal Transmittal Form	Statement of Qualifications Section 1, Proposal Transmittal Form
2	00 42 23.02 Vendor Compliance to State Law	Enclosed with Proposal Form 1, the Proposal Transmittal Letter
3	00 42 23.03 Conflict of Interest Questionnaire	Enclosed with Proposal Form 1, the Proposal Transmittal Letter
4	00 42 23.04 Surety Letter of Intent	Enclosed with Proposal Form 1, the Proposal Transmittal Letter
5	00 42 23.05 Insurance Letter of Intent	Enclosed with Proposal Form 1, the Proposal Transmittal Letter
6	00 42 23.06 Guarantor Acknowledgement (if applicable)	Enclosed with Proposal Form 1, the Proposal Transmittal Letter
7	Statement of Qualifications Information	Statement of Qualifications Section 2 Proposer Qualifications, Experience and Past Performance
8	Similar Project Experience	Statement of Qualifications Section 2 Proposer Qualifications, Experience and Past Performance
9	Current Projects and Projects Completed	Statement of Qualifications Section 2 Proposer Qualifications, Experience and Past Performance
10	Key Personnel and Alternate Key Personnel	Statement of Qualifications Section 3 Organization, CMAR, CMAR Team, CMAR Team Members and Key Personnel
11	Demonstration of On-Time Performance	Statement of Qualifications Section 4 On-Time and Budget Performance
12	Demonstration of Budget Performance	Statement of Qualifications Section 4 On-Time and Budget Performance
13	00 45 16.01 Financial Resources Data	Statement of Qualifications Section 5 Financial Information
14	00 45 16.02 Bank Credit References	Statement of Qualifications Section 5 Financial Information



15	00 45 16.03 Proposer Safety Performance Questionnaire	Statement of Qualifications Section 7 Safety Program and Safety Performance
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- E. Proposer shall provide ten (10) printed copies of the Proposal.
- F. ~~Proposer shall provide one digital copy of the Proposal in portable document format (pdf) on a compact disk or other media that will allow files to be shared by the Owner's selection committee. The Proposal is to be a single file that will print to match the printed copy provided. Confidential information may be provided in a separate file, provided that file is referenced in the Proposal.~~

**Proposer shall provide one digital copy of the Proposal in portable document format (pdf) on a compact disk or other media. The Proposal is to be a single file that will print to match the printed copy provided. Confidential information may be provided in a separate file, provided that file is referenced in the Proposal. The digital copy of the Proposal will be included in the Cost Proposal envelope.**

- G. Proposer shall enclose the Statement of Qualifications and Cost Proposal in separate opaque sealed envelopes plainly marked with the Project name, the name and address of the Proposer along with other required documents. Address an outer envelope to the mailing address shown in the Request for Proposals and enclose the sealed packages containing the Statement of Qualifications and the Cost Proposal. The Proposer assumes full responsibility for ensuring that the Proposal arrives at the prescribed location before the prescribed time.

#### ARTICLE 15: INTERVIEWS AND CONFIDENTIAL PROPOSER MEETINGS

15.01 The Owner, at its sole discretion, may choose to conduct interviews with any or all Proposers to provide Proposers a better opportunity to demonstrate they can provide the best value to the Owner for this Project. The Owner, at its sole discretion, may also hold confidential meeting with any or all Proposers to provide the Owner a better opportunity to understand and discuss the Proposal.

- A. If the Owner chooses to conduct interviews or hold meetings Proposers will be notified of:
1. The time and place for the interview or meeting.
  2. Interview or meeting format and agenda.
  3. Individuals that are expected to participate in the interview or meeting as a minimum.

15.02 Failure to participate in the interview or meeting may result in disqualification from consideration for the Project

#### ARTICLE 16: MODIFICATION OR WITHDRAWAL OF PROPOSAL

16.01 A Proposer may modify or withdraw a Proposal using a document executed in the same manner that a Proposal must be executed. Deliver the document to the place where the Proposals are to be submitted prior to the date and time for the opening of the Proposals.

16.02 A Proposer may withdraw its Proposal within 24 hours after Proposals are opened if the Proposer files a signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Proposal. The Proposal security will be returned if it is clearly demonstrated to the Owner that there was a material and substantial mistake in its Proposal. A Proposer that requests to withdraw its Proposal under these conditions may be disqualified from responding to a reissued Request for Proposals for the Services to be furnished under this RFP.

**ARTICLE 17: OPENING OF PROPOSALS**

17.01 Proposals will be publicly opened at the time and place indicated in this RFP. Owner will publicly acknowledge receipt of Proposals received in time to be considered. The Owner will read aloud names of each Proposer and any fees and costs that are associated with the Proposal as required by Texas law. A summary of the amounts on the Statement of Proposed Fees and Expenses will be made available to Proposers after the Agreement has been awarded.

**ARTICLE 18: EVALUATION OF PROPOSALS**

18.01 Within 45 days after the date of opening the Proposals, the Owner will evaluate and rank each Proposal with respect to the selection criteria described in this RFP. In evaluating Proposals, Owner will consider whether or not the Proposals fully comply with the RFP submittal requirements.

18.02 In considering Proposals, Owner will evaluate, score and rank the Proposals in accordance with the requirements set forth in this RFP to determine which Proposal offers the best value to the Owner.

18.03 The Proposals will be evaluated using the criteria indicated in the table below.

Evaluation Criteria	Description and RFP Location	Weight
Financial Information, Ability to Provide Bonds and Insurance, Compliant Proposal Transmittal Form	Section 00 45 16; Article 2.05 A, B, C, D, E, F, G, Section 00 42 23 Sections 00 42 23.01 through 23.06	Pass/Fail
Proposer Qualifications, Experience and Past performance	Section 00 45 16 Article 2.01 Section 00 45 16 Article 2.02 A,B,C	15
Organization, CMAR, CMAR Team, CMAR Team Members and Key Personnel	Section 00 45 16 Article 2.03 A, B, C D, E, F, G, H Section 00 45 16 Article 2.04 C	20
On Time and On Budget Past Performance	Section 00 45 16 Article 2.04 A, B	5
Project Approach	Section 00 45 16 Article 2.06 A	25

Safety Program and Safety Performance	Section 00 45 16 Article 2.07 A	5
Cost Proposal	Section 00 42 23.01	30
Total		100

- 18.04 The Owner will evaluate and score the Statements of Qualifications of each Proposer based on the criteria included in the RFP. Upon the completion of the evaluation and scoring of the SOQs, the Cost Proposals will be evaluated and scored. The score of the SOQ will be added to the score of the Price Proposal for each Proposal and the Proposals will be ranked from highest to lowest score.
- 18.05 The Owner, in its sole discretion, will decide to invite any or all Proposers to participate in interviews. The Owner will consider the information provided in these interviews and reassess, if appropriate and necessary the rankings of those Proposers. Using information from the Statements of Qualifications, the Cost Proposals and the interview the Owner will make the final determination as to which Proposal is the highest ranked Proposal that offers the best value to the Owner.
- 18.06 Material misstatements and/or inaccuracies in the information submitted in the Proposals that was relied upon for evaluation, scoring and ranking may be grounds for rejection of the Proposal for this Project. Any material misstatements and/or inaccuracies, if discovered after award of the Agreement may be grounds for immediate termination of the Agreement, at the Owner's sole discretion. Additionally, the Proposer will be liable to the Owner for any additional costs or damages to the Owner resulting from such misstatements and/or inaccuracies, including costs and attorney's fees for collecting such costs and damages.
- 18.07 Submission of a Proposal indicates Proposer's acceptance of the evaluation and scoring criteria and methodology contained in the RFP as well as Proposer's recognition and acknowledgement that subjective judgments must be made by the selection committee during the evaluation.

**ARTICLE 19: AWARD OF CONTRACT**

- 19.01 The Proposer selected for award of the Agreement will be the Proposer whose Proposal provides the best value to the Owner. The Owner is not bound to accept the lowest priced Cost Proposal.
- 19.02 Proposers shall only be allowed to submit one Proposal in which it has an interest in. Reasonable grounds for believing that any Proposer has an interest in more than one Proposal for the Project shall be cause for disqualification of that Proposer and the rejection of all Proposals in which that Proposer has an interest.

**ARTICLE 20: CONTRACT SECURITY AND INSURANCE**

20.01 The General Conditions sets forth Owner’s requirements as to performance, payment and other bonds and insurance. When the successful Proposer delivers the executed Agreement to Owner, it must be accompanied by the required bonds and required certificates of insurance.

**ARTICLE 21: SIGNING OF AGREEMENT**

21.01 The Notice of Award to the successful Proposer will be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents that are identified in the Agreement. The successful Proposer shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner within 15 days. Owner will deliver two fully signed counterparts to successful Proposer within 10 days after receiving the signed documents from the successful Proposer.

**ARTICLE 22: AGREEMENT NOT TO BE ASSIGNED**

22.01 The Agreement may not be assigned in whole or in part by the successful Proposer without the prior written consent of the Owner.

**ARTICLE 23: SALES AND USE TAXES**

23.01 City or state sales taxes should generally not be included in the Cost Proposal as the Owner qualifies as an exempt agency. Certain items such as rented equipment may be taxable even though the Owner is a tax exempt agency. The Proposer assumes responsibility for including any applicable sales taxes in the Cost Proposal and assumes responsibility for complying with all applicable statutes and rulings of the State of Texas Comptroller.

23.02 It is the Owner’s intent to have the Agreement qualify as a “separated contract.” In order for this Agreement to qualify:

- A. If awarded this Agreement, obtain a sales tax permit from the State of Texas Comptroller.
- B. If awarded this Agreement, the dollar value of materials exempt from the sales tax must be identified.

**ARTICLE 24: WAGE RATES**

24.01 A schedule listing the minimum wage rates for various classifications of laborers which have been established by the Owner for this Project are included in Section 00 43 43 “Wage Rates.” Proposers must pay not less than the minimum wage shown on this list and comply with all statutes and ruling of the State Comptroller.

**ARTICLE 25: REQUIREMENTS FOR PROFESSIONAL SERVICES**

25.01 Proposer shall secure any required services for the Project that are defined as professional services under the Professional Services Procurement Act, Chapter 2254 of the Texas Government Code ( for example, registered professional land surveyors, professional architects and professional engineers using the qualifications based selection process prescribed by that Chapter.

## **ARTICLE 26: INSPECTION AND CONSTRUCTION MATERIALS TESTING**

26.01 As required by Texas law, the Owner will provide or contract for independently of the CMAR, inspection services, testing of construction material engineering and verification testing services necessary for acceptance of the Project. The CMAR will be required to provide management for coordination of these services.

## **ARTICLE 27: SELF PERFORMANCE**

- 27.01 In accordance with Texas law, the CMAR may perform minor work that may be included in its General Conditions for the Project. For the other Work, the CMAR may seek to self-perform Work if the CMAR submits a bid or proposal in the same manner as all other trade subcontractors or suppliers and if the Owner determines that the CMAR bid or proposal provides the best value for the Project.
- 27.02 At this time, the Owner contemplates that self-perform will be allowed for the Project and there will be no limitation as to the amount of self-perform Work the CMAR could undertake for the Project.
- 27.03 If a selected trade Subcontractor defaults in the performance of its work or fails to execute subcontract after being selected the CMAR may, without advertising, fulfill the subcontract requirements itself or select a replacement trade Subcontractor.
- 27.04 Proposer shall indicate on Proposal Form 7 its intention to pursue self-perform work for the Project.

## **ARTICLE 28: VALIDITY OF PROPOSALS**

- 28.01 The offer represented by each Proposal will remain in full force and effect for ninety (90) days after the Proposal submission date. If the award of the contract has not been made by the Owner within ninety days (90) after the Proposal submission date, each Proposer that has not previously agreed to an extension of such deadline shall have the right to withdraw its Proposal. The Owner may, at its sole discretion, release any Proposal prior to that date.
- 28.02 Owner may, at its sole discretion release any Proposal and return the Proposal Security prior to the end of the time period stated immediately above.

## **ARTICLE 29: RESPONSIVENESS**

- 29.01 To be deemed responsive, Proposals must be prepared thoroughly; be responsive to the requirements and criteria contained in the RFP; demonstrate an ability to meet the requirements of the RFP and conform to the material terms and/or conditions of the RFP, all as determined solely by the Owner. The Owner will reject a Proposal if it is materially incomplete, takes excessive exceptions to material terms and/or conditions of the RFP or defines plans for executing the Services and Work that do not appear to demonstrate an ability to meet the RFP requirements, all as determined solely by the Owner. The Owner will apply reasonable judgment, balance and discretion in deciding whether a Proposal is responsive.
- 29.02 Should the Owner's review of a Proposal result in the judgment by the Owner that the Proposal is not responsive, such Proposal will be returned to the Proposer submitting the Proposal along

with the Proposal Security. A Proposer that submits a Proposal that is not responsive will not be considered for award of the Agreement.

### **ARTICLE 30: OWNER NOT RESPONSIBLE FOR ASSUMPTIONS BY PROPOSERS**

30.01 Each Proposal shall represent the assumptions that the Proposer has incorporated into its Proposal, proposed Project Approach and Cost Proposal. Neither the participation of the Owner at any meetings with the Proposer, nor the subsequent award by the Owner of the Agreement, shall in any way be interpreted as an agreement or approval by the Owner that the assumptions are reasonable or correct or that the Owner accepts any liability for the Proposer's Proposal. The Owner specifically disclaims responsibility or liability for any Proposer's assumptions in developing its Proposal.

### **ARTICLE 31: RIGHTS AND RESERVATIONS OF THE OWNER**

31.01 In connection with this procurement process, including Proposals and award of the Agreement, Owner reserves to itself all rights (which rights shall be exercisable by Owner at its sole discretion) available to it under applicable law, including without limitation, the following with or without cause and with or without notice:

- A. The right to cancel, withdraw, postpone or extend RFP in whole or in part at any time prior to the execution by Owner of the Agreement without incurring any obligations or liabilities.
- B. The right to issue a new RFP or to revise and modify, at any time prior to the Proposal submittal date, information included in the RFP including but not limited to the dates set or projected and factors to be considered in evaluating Proposals and the responsibilities of the Proposers.
- C. The right to modify the procurement schedule.
- D. The right to waive deficiencies, informalities and irregularities in a Proposal and accept and review a non-conforming Proposal.
- E. The right to suspend and terminate the procurement process or to terminate evaluations of Proposals received at any time.
- F. The right to correspondence with the Proposers to seek an improved understanding of Proposals at any time.
- G. The right to request an interview with any or all Proposers during the Proposal evaluation period.
- H. The right to hold meetings and conduct discussions with any or all of the Proposers to seek an improved understanding of the Proposals
- I. The right to seek or obtain data and information from any source that has the potential to improve the understanding and evaluation of the Proposals.
- J. The right to appoint and change appointees of any selection committee.
- K. The right to use assistance of outside technical and legal experts and consultants in the evaluation process.

- L. The right to respond to all, some or none of the inquiries, questions and/or requests for clarification received relative to this RFP.
- M. The right to seek clarifications from any Proposer to fully understand information provided in the Proposal.
- N. The right to request additional information from a Proposer during the evaluation of Proposals.
- O. The right to reject a Proposal containing exceptions, additions, qualifications or conditions not called for in the RFP.
- P. The right to conduct an independent investigation of any information, including prior experience identified in a Proposal by contacting project references, accessing public information, contacting independent parties or any other means.

#### **ARTICLE 32: PARTNERING SESSION**

32.01 The Owner may request that the selected Proposer include within its scope for Preconstruction Services a one day Partnering Session conducted by a third party facilitator. This session will create and foster a collaborative project environment committed to a team approach for a successful project. The Selected Proposer should be prepared to submit two Partnering Session proposals to the owner which includes the session detailed agenda, resume of facilitator, references and a fee and expense statement. If the Owner decides to proceed with this session the scope of Preconstruction Services will be revised to include the scope and cost of such session to be conducted as soon as reasonably practical after Agreement execution.

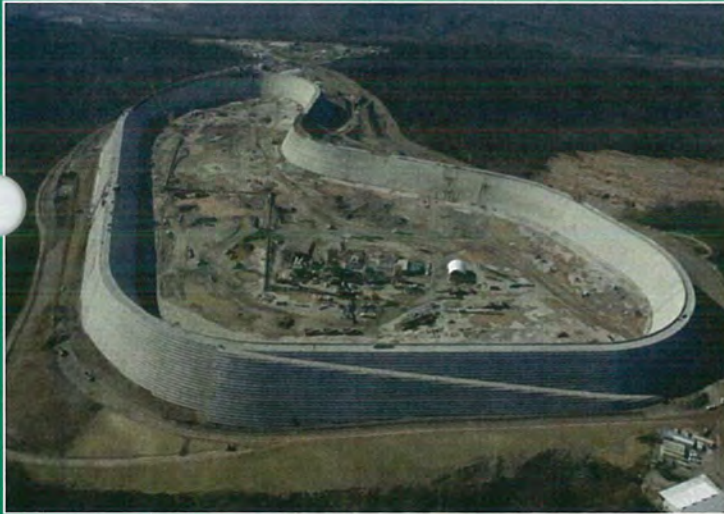
#### **ARTICLE 33: REQUIREMENTS TO KEEP TEAM INTACT.**

33.01 The CMAR Team proposed by Proposer, including but not limited to the CMAR Team members, Key Personnel and Alternate Key Personnel identified in the Proposal, shall remain on Proposer's CMAR Team for the duration of the procurement process and , if the Proposer is awarded the Agreement, the duration of the Project. If circumstances require a proposed change, it must be submitted in writing to the Point of Contact. The Owner, in its sole discretion, will determine whether to authorize the change. Unauthorized changes to the Proposer's CMAR Team at any time during the procurement process may result in the elimination of the Proposer from further consideration.

**END OF SECTION**

**Proposal for:**

# **CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project, Project No. 344**



Submitted To:

North Texas Municipal Water District  
505 Brown Street, Wylie, TX 75098

Submitted By:

Archer Western Construction, LLC with Monks  
Construction and ASI Constructors, Inc.  
1411 Greenway Drive  
Irving, TX 75063







CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
Project No. 344

February 18, 2015

North Texas Municipal Water District  
505 Brown Street  
Wylie, TX 75098

Re: Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
Construction Manager At-Risk RFQ – Project No. 344

Dear Selection Committee:

Archer Western (AW) is pleased to submit our proposal for the above referenced project and excited to have the opportunity to continue our working relationship with the North Texas Municipal Water District (NTMWD). We understand and appreciate the importance of this project to your overall program for providing reliable water sources to the rapidly growing NTMWD service areas. We are submitting our proposal in accordance with your RFP and acknowledging addenda 1, 2, 3, 4, and 5.

In preparation for this proposal and with the interest of the project in mind, AW is teamed with R.E. Monks Construction (Monks) and ASI Constructors, Inc. (ASI) to further strengthen our team of experts in offering comprehensive dam and reservoir construction CMAR services. This solidifies our cohesive CMAR Team of accomplished and experienced civil construction companies with the capacity and resources to respond to the complexity and schedule of this important project.

**Collectively, our team member firms have participated in the management and construction of FOUR out of the last ten projects that have received the annual United States Society on Dams "Excellence in the Constructed Project" Award.**

The AW Team fully understands and will successfully accomplish the specific tasks and deliverables that have been defined for, or that are inherent to, this project. Each of our corporate offices is dedicating extensive resources to support the competent key personnel assigned to this project. Our key project personnel are well versed and committed to:

- extensive collaboration and coordination with all stakeholders in the CMAR process,
- performing pre-construction services resulting in a constructible and compliant design that supports a schedule driven, cost efficient project with the utmost in quality,
- complete the Clearing by July 2, 2018,
- complete the Dam and Intake by December 31, 2018, and
- complete the Terminal Storage Reservoir by December 31, 2019.

In addition to the proven expertise we bring as managers and builders of large complex projects, our CMAR Team also possesses:

- industry leading expertise in earthen dam construction, soils management, including but not limited to classification/identification and processing of highly plastic clays, as well as slurry wall construction and control of water,
- industry leading expertise in Roller Compacted Concrete (RCC) dam construction and soil cement production and placement,
- knowledge and expertise to provide innovative solutions to any dam or reservoir challenge,
- knowledge in providing preconstruction services under CMAR contracts,
- knowledge of the local market, and
- significant knowledge of and familiarity with NTMWD and Freese & Nichols (FNI).





## CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project Project No. 344

**AW** is a leader in the construction industry, locally and nationally. Our firm has constructed **38 projects for NTMWD with a value over \$177 million**. We are a member of The Walsh Group of Companies, a general contracting, construction management, and design-build firm currently ranked among the nation's Top 10 Contractors of dams and reservoirs by the Engineering News Record. The Walsh Group is a privately held, family-owned business founded in 1898, with 2014 revenue exceeding \$4 billion. Our history provides us with a wealth of applicable experience and proven management systems that we will contribute to this project. AW has successfully completed several billion dollars of dams, reservoirs, water and wastewater treatment plant projects, pump stations, and other water related projects throughout the country. Collectively, these projects range from the traditional Design-Bid-Build to CMAR and Design-Build. Our corporate and local experience in Construction Management at Risk projects will help NTMWD continue to model their way for future CMAR projects. With our extensive background and ability to successfully self-perform over 70% of the work on the majority of our projects, we will provide NTMWD valuable guidance and construction expertise to ensure the Lower Bois d'Arc Creek Reservoir Dam and Intake Project is a resounding success.

**R.E. Monks** is an industry leading heavy civil earthwork contractor with an established reputation for assisting owners and designers to advance the project delivery process as well as being renowned throughout the industry as the "go to" contractor for Reservoir and Flood Control Infrastructures. Garnishing a history of constructing projects for SCS and USACE, Monks has successfully completed over 50 dam and reservoir projects, from new to rehabilitation, and has successfully participated in both CMAR and Design/Build project delivery. As an industry leader in state of the art equipment and GPS technology, Monks' advantages are well beyond just competitive cost. With their extensive expertise in earthwork, incomparable understanding of North Texas' soils classification/identification and processing, dam and reservoir construction, and their ability to self-perform these scopes of work, Monks will provide instrumental insight and lessons learned to the project.

**ASI** is a construction leader in the water resources industry, having successfully completed more than one hundred dam and dam rehabilitation projects including thirty new RCC dams. During the mid-80's, after successfully completing the second RCC dam built in the United States, ASI quickly established itself as a predominant leader in RCC dam construction. They have been consistently ranked within ENR's top 5 in dams since 2001, exclusively in dam construction and rehabilitation. With their immeasurable expertise in RCC dam construction and their expertise in soil cement, spillway construction, labyrinth weirs, and their ability to self-perform all of these scopes of work, ASI will provide invaluable knowledge and lessons learned to the project.

**The members of our team have worked together successfully under various contracting relationships on multiple past projects. NTMWD will not experience the delays associated with a new team's learning curve. We will be focused on your needs from day one.**

This Team was assembled with the best interest of NTMWD and the project in mind. Each one of our Team member companies has provided our clients with exemplary services throughout the years and will continue to do so for this project. Not only will our Team provide NTMWD with extensive management and construction expertise but we will also provide widespread planning efforts during the preconstruction and construction phases to ensure project success. Our ability to schedule and manage multiple construction phases while maintaining budgetary requirements with an open book philosophy will provide NTMWD and FNI with valuable information during each step of the way to insure the entire team has the most up to date data to make sound decisions and keep the project moving in the right direction.





**CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
Project No. 344**

Collectively our Team passionately promotes a partnering approach to our work. We will quickly mesh with NTMWD and FNI to develop a cohesive unit, working side by side from our first day on the job, confirming to NTMWD that they made the right decision to select our Team as a critical partner who understands the many facets and intricacies of this project. Our Team's first-class ability to schedule, build and manage, and coordinate complex construction projects ethically, safely, and with the highest quality as its core values is what sets us apart from our competition. We will waste no time adding value to the project. Our team will collaborate effectively from day one, providing value engineering studies, schedule impact analysis, risk assessments and detailed open book estimates that will be presented to NTMWD in a clear and detailed format for early decision making and incorporation into the final design documents, avoiding misled decisions that may not benefit the project from a cost or schedule aspect.

AW has consistently been your "Best Value" contractor. Our Team is dedicated to the success of this project and we will succeed because of the extensive knowledge and resources available from our Team. Not only do all members of our Team excel at self-performance of the scopes of work associated with this project, we also excel in providing reliable CMAR services. Our Team's experience leads to additional reliability in project costs, schedule, quality, and safety.

Three key factors to consider in your selection are:

- 1) Does the proposed team have proven experience with NTMWD and FNI?
- 2) Does the proposed team have a local presence to respond to the needs of NTMWD and have they performed this in the past?
- 3) Does the proposed team have a proven track record of completing projects for NTMWD and FNI on time, within budget, safely, and of the utmost quality?

Our Team answers a resounding **YES** to all three questions and will answer yes for this project.

Our Team's proven history as extremely qualified construction managers and builders has the Owner's interest at heart. We have built careers delivering successful projects while minimizing costs and mitigating risks, maximizing success and building relationships. We do this every day with our own resources; as evidenced by the many successful projects each of us has completed for our clients. Our Team is excited to submit our proposal to you and is confident that we will apply lessons-learned from other projects that will provide NTMWD with the **Best Value** project through the CMAR process. We look forward to working with you and eagerly await the NTP for the Lower Bois d'Arc Creek Reservoir Dam and Intake Project.

Should you have any questions or require additional information, please do not hesitate to call Curtis Weston at (214) 454-6448 or [cweston@walshgroup.com](mailto:cweston@walshgroup.com)

Sincerely,

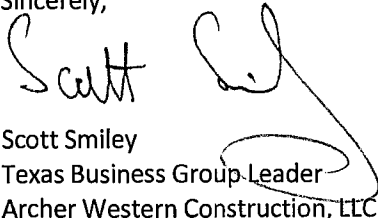
  
Scott Smiley  
Texas Business Group Leader  
Archer Western Construction, LLC





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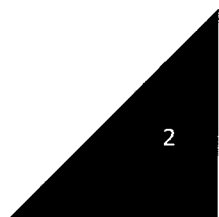
**CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
Project No. 344**

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**00 42 23 REV. 1 PROPOSAL TRANSMITTAL FORM (PROPOSAL FORM 1)**

**ARTICLE 1: PROPOSAL RECIPIENT AND PRINCIPAL CONTACT PERSON**

1.01 This Proposal is submitted to

President and Board of Directors  
North Texas Municipal Water District  
505 Brown Street, Wylie Texas 75098

1.02 The principal contact person who will serve as the interface between the Owner and the Proposer for all communications during the procurement period is:

Name:

Title:

Address: 1411 75038

Phone: 972-457-8500

Fax: 972-457-8501

Email:

**ARTICLE 2: PROPOSER’S ACKNOWLEDGMENTS**

2.01 The undersigned Proposer proposes and agrees, if this Proposal is accepted, to enter into an Agreement with Owner in the form included in the RFP to perform all Services and Work as specified or indicated in and within the amounts indicated in the Cost Proposal. Proposer agrees to complete the Services and Work within the Contract Price and within the Contract Time established in the Amendment(s) setting forth the Guaranteed Maximum Price for the Early Work Packages or entire Work and comply with the other terms and conditions of the Contract Documents

2.02 Proposer accepts all of the requirements, terms, and conditions of the RFP, including without limitation those dealing with the Bid Bond, required performance and payment bonds and insurance. The Proposal will remain subject to acceptance for 90 days after the opening of Proposals.

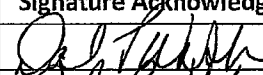
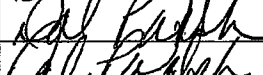
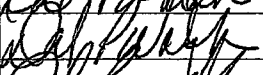
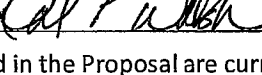
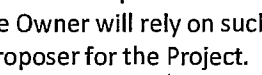
2.03 Proposer accepts the provisions of the Agreement as to Liquidated Damages in the event of its failure to complete Work in accordance with the schedule set forth in the Agreement.

**ARTICLE 3: PROPOSER’S REPRESENTATIONS**

3.01 In submitting this Proposal, Proposer certifies, represents and warrants, that:

- A. The submittal of the Proposal has been duly authorized by, and in all respects binding upon, the Proposer.
- B. The undersigned declares that it is the Proposer or by holding the position below indicated is authorized to execute this Proposal Transmittal Form on behalf of the Proposer and that all representations made on this form are true and accurate

- C. Proposer has examined, carefully studied and understands and agrees to be bound by the requirements of the RFP, and Contract Documents, the other related data identified in the RFP, and the following Addenda, receipt of all of which is hereby acknowledged:

Addendum No.	Addendum Date	Signature Acknowledging Receipt
1	January 27, 2015	
2	January 29, 2015	
3	January 30, 2015	
4	February 3, 2015	
5	February 12, 2015	

- D. All information and statements contained in the Proposal are current, correct and complete and are made with full knowledge that the Owner will rely on such information and statements in determining the selected Proposer for the Project.
- E. The submission of this Proposal will constitute an incontrovertible representation by Proposer that Proposer has complied with every requirement of the RFP that without exception the Proposal is premised upon completion of the Services required by the RFP, Addenda and the related supplemental data included with the RFP.
- F. Proposer acknowledges that it is aware and understands the requirements of Chapter 176 of the Texas Local Government Code and Proposer is solely responsible for complying with such requirements.
- G. Proposer acknowledges that the Proposer or Guarantor, if a Guarantor is proposed, complies with the net worth requirement of the RFP and it has the ability to maintain such net worth during the implementation of the Project.
- H. If a Guarantor is proposed, Proposer acknowledges that the Guarantor Acknowledgement, Proposal Form 4 is executed by the individual authorized to execute the form on behalf of the Guarantor.
- I. The Surety identified on Proposal Form 4 is authorized by law to do business in the State of Texas pursuant to a current certificate of authority to transact surety business and the Surety is listed in the Department of Treasury's Circular 570 and has an A.M. Best Company Rating of A-VIII or better..
- J. The insurance company identified on Proposal Form 5 is duly licensed or authorized in the jurisdiction in which the Project is located to issue policies for the limits and coverages so required and has an A.M. Best Company Rating of A-VIII or better.
- K. Proposer has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.
- L. Proposer is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and the furnishing of Goods and Special Services.
- M. Proposer has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) and (2) reports and drawings of Hazardous Environmental Conditions that have been included with the RFP.

- N. Proposer has carefully studied all additional or supplementary examinations, investigations, explorations, tests, studies and data included with the RFP concerning conditions including surface, subsurface and Underground Facilities at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Proposer, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents to be employed by Proposer, and safety precautions and programs incident thereto and accepts the consequences for not doing so.
- O. Proposer is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- P. Proposer has correlated the information known to Proposer, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- Q. Proposer has given Point of Contact written notice of all conflicts, errors, ambiguities, or discrepancies that Proposer has discovered in the RFP and Contract Documents, and the written resolution thereof by Owner is acceptable to Proposer.
- R. The RFP and Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Services and Work for which this Proposal is submitted.
- S. Proposer will submit written evidence of its, and if applicable, Guarantor's authority to do business in Texas not later than the date of its execution of the Agreement.
- T. Proposer further represents that this Proposal is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Proposer has not directly or indirectly induced or solicited any other Proposer to submit a false or sham Proposal; Proposer has not solicited or induced any individual or entity to refrain from making a Proposal; and Proposer has not sought by collusion to obtain for itself any advantage over any other Proposer or over Owner.

#### **ARTICLE 4: COST PROPOSAL FOR SERVICES**

- 4.01 Proposer will provide CMAR Services in accordance with the RFP, Agreement, and Contract Documents for the prices shown in the Cost Proposal and will complete the construction of the Project within the Guaranteed Maximum Price established in a future Amendment(s).



**ARTICLE 5: TIME OF COMPLETION**

5.01 Proposer agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

**ARTICLE 6: ATTACHMENTS TO THIS PROPOSAL TRANSMITTAL FORM**

- 6.01 The following documents are attached to and made a condition of this Proposal:
- A. Required Bid Bond to be attached to this Proposal Transmittal Form
  - B. Proposal Form
    - 1. Proposal Form 2, Section 00 42 23 .02 -Vendor Compliance to State Law
    - 2. Proposal Form 3, Section 00 42 23 .03 - Conflict of Interest Questionnaire
    - 3. Proposal Form 4, Section 00 42 23.04 Surety Letter of Intent
    - 4. Proposal Form 5, Section 00 42 23 .05 - Insurance Company Letter of Intent
    - 5. Proposal Form 6, Section 00 42 23 .06 –Guarantor Acknowledgement (if applicable)
  - C. Evidence of Proposer’s and if applicable, Guarantor’s authority to do business in the State of Texas
  - D. A listing of any minor exceptions or clauses requiring discussion for further clarification to the Agreement (00 52 23) or General Conditions (00 72 00) as requested in 00 21 16 Section 7.01 of the RFP.

**ARTICLE 7: DEFINED TERMS**

7.01 The terms used in this Proposal have the meanings indicated in the RFP, General Conditions and the Supplementary Conditions. The significance of terms with initial capital letters is described in the RFP and General Conditions.

**ARTICLE 8: VENUE**

8.01 Proposer agrees that venue shall lie exclusively in Fannin County, Texas for any legal action.

**ARTICLE 9: PROPOSAL SUBMITTAL**

9.01 This Proposal is submitted by:

**If Proposer is an Individual:**

Name: \_\_\_\_\_  
*(typed or printed)*

By: \_\_\_\_\_  
*(Individual's Signature)*

Doing business as: \_\_\_\_\_

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Proposal submitted on the following date: \_\_\_\_\_

**A Partnership**

Partnership Name: \_\_\_\_\_  
*(typed or printed)*

Name of General Partner: \_\_\_\_\_  
*(typed or printed)*

By: \_\_\_\_\_  
*(Signature of general partner -- attach evidence of authority to sign)*

Doing business as: \_\_\_\_\_

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Proposal submitted on the following date: \_\_\_\_\_


**A Corporation**

Corporation Name: Archer Western Construction, LLC  
(typed or printed)

State of Incorporation: IL

Type: LLC  
(General Business, Professional, Service, Limited Liability)

Date of Qualification to do business in Texas  
is: 5-20-2010

By:   
(Signature – attach evidence of authority to sign)

Name: Daniel P. Walsh  
(typed or printed)

Title: President

Attest:   
Matthew Walsh (Signature of Corporate Secretary)

Business address: 1411 Greenway Drive  
Irving, TX 75038

Phone: 972-457-8500 E-mail: tvick@walshgroup.com

Proposal submitted on the following date: February 18, 2015

**Joint Venture**

Joint Venturer Name: \_\_\_\_\_  
*(typed or printed)*

By: \_\_\_\_\_  
*(Signature of joint venture partner -- attach evidence of authority to sign)*

Name: \_\_\_\_\_  
*(typed or printed)*

Title: \_\_\_\_\_

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Proposal submitted on the following date: \_\_\_\_\_

Joint Venturer Name: \_\_\_\_\_  
*(typed or printed)*

By: \_\_\_\_\_  
*(Signature of joint venture partner -- attach evidence of authority to sign)*

Name: \_\_\_\_\_  
*(typed or printed)*

Title: \_\_\_\_\_

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Proposal submitted on the following date: \_\_\_\_\_

**Contact for receipt of official communications:**

Name: \_\_\_\_\_  
*(typed or printed)*

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.

**Affidavits**

One of the following four affidavits shall be executed and provided with this form.

AFFIDAVIT FOR CORPORATION

State Texas ) §  
County of Dallas ) §

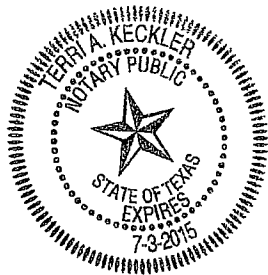
Daniel P. Walsh, being duly sworn deposes and says that they are President of the  
(Name) Archer Western Construction, LLC (Title)  
Corporation submitting the foregoing form and related information; have read such documents; and  
that such documents are true and correct and contain no material misrepresentations; and that they are  
authorized to make this affidavit on behalf of the Corporation.

[Handwritten Signature]  
(Signature) Daniel P. Walsh

Signed and sworn to me before this 16<sup>th</sup> day of February, 20 15.

[Handwritten Signature]  
(Notary Public)

My commission expires: July 3, 2015



AFFIDAVIT FOR PARTNERSHIP

State \_\_\_\_\_) §

County of \_\_\_\_\_) §

\_\_\_\_\_, being duly sworn deposes and says  
(Name)

that they are \_\_\_\_\_ of the  
(Title)

\_\_\_\_\_ company submitting the foregoing form and related information; have read such documents; and that such documents are true and correct and contain no material misrepresentations; and that they are authorized to make this affidavit on behalf of the Partnership.

\_\_\_\_\_  
(Signature)

Signed and sworn to me before this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
(Notary Public)

My commission expires:

AFFIDAVIT FOR INDIVIDUAL

State \_\_\_\_\_ ) §

County of \_\_\_\_\_ ) §

\_\_\_\_\_, being duly sworn deposes and says  
(Name)

that they are \_\_\_\_\_ of the  
(Title)

\_\_\_\_\_ company submitting the foregoing form and related information; have read such documents; and that such documents are true and correct and contain no material misrepresentations.

.

\_\_\_\_\_  
(Signature)

Signed and sworn to me before this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
(Notary Public)

My commission expires:



JOINT VENTURE STATEMENT

We the undersigned do hereby give notice to our agreement to propose as a joint venture on the Project and by submitting the foregoing form and related information; have read such documents; and that such documents are true and correct and contain no material misrepresentations.

\_\_\_\_\_  
*(Name of Joint Venture)*

\_\_\_\_\_  
*(Name of Firm)*

\_\_\_\_\_  
*(Signature)*

Signed and sworn to me before this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
*(Notary Public)*

My commission expires:  
\_\_\_\_\_

\_\_\_\_\_  
*(Name of Firm)*

\_\_\_\_\_  
*(Signature)*

Signed and sworn to me before this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
*(Notary Public)*

My commission expires:  
\_\_\_\_\_

**END OF SECTION**

# THE AMERICAN INSTITUTE OF ARCHITECTS

## AIA Document A310 Bid Bond

KNOW ALL MEN BY THESE PRESENTS, THAT WE Archer Western Construction, LLC

as Principal, hereinafter called the Principal, and Travelers Casualty and Surety Company

a corporation duly organized under the laws of the State of Connecticut

as Surety, hereinafter called the Surety, are held and firmly bound unto North Texas Municipal Water District

as Obligee, hereinafter called the Obligee, in the sum of Six Million Nine Hundred Thousand and 00/100

Dollars (\$ 6,900,000.00 ),  
for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for LOWER BOIS D' ARC CREEK RESERVOIR DAM  
AND INTAKE PROJECT  
Project No. 366

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and materials furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this 18 day of February, 2015

Archer Western Construction, LLC

(Principal) (Seal)

By: [Signature]  
Daniel P. Walsh, President (Title)

Travelers Casualty and Surety Company

(Surety) (Seal)

By: [Signature]  
Attorney-in-Fact Jodi Wallace (Title)

Surety Phone No.

This page is a placeholder for information submitted with the application that may contain confidential information. Please contact Cindy DePrato, Executive Assistant at (512) 463-8420 to request reviewing this information.

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

**RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

**FURTHER RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

**FURTHER RESOLVED**, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

**FURTHER RESOLVED**, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 18 day of February, 20 15

  
Kevin E. Hughes, Assistant Secretary



To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at [www.travelersbond.com](http://www.travelersbond.com). Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.

**00 42 23.01 REV.1 COST PROPOSAL**

**ARTICLE 1: FEES FOR SERVICES FOR LOWER BOIS D'ARC CREEK RESERVOIR DAM AND INTAKE PROJECT, NORTH TEXAS MWD PROJECT NO. 344.**

- 1.01 To: President and Board of Directors  
North Texas Municipal Water District  
505 Brown Street  
Wylie, TX 75098
- 1.02 The undersigned Proposer proposes to furnish all services, plant, materials and equipment required to perform the Construction Management at Risk Services (the "Services") described in Section 01 01 01 of the RFP for the prices indicated below.
- 1.03 The undersigned declares that it is the Proposer or by holding the position below indicated is authorized to execute this Price Proposal on behalf of the Proposer and that all representations made on this Cost Proposal are true and correct
- 1.04 The undersigned acknowledges that the Cost Proposal is based on the Agreement included in this RFP and as amended by any addenda during the procurement period.

**ARTICLE 2: FEES FOR WORK DESCRIBED IN SECTION 00 11 19 1.01 A.**

- 2.01 Proposer will provide Construction Manager at Risk (CMAR) Services in accordance with the RFP, Agreement and Contract Documents for the prices shown below and will complete the construction of the Project within the Guaranteed Maximum Price established in a future Amendment.
  - A. Pre-construction Services Fee: The Lump Sum amount of \$ 990,467.00 .  
To include all costs and expenses in accordance with the Contract Documents for Pre-Construction Services as described in Section 01 01 01 "Construction Manager at Risk Services."
  - B. Procurement Service Fee: The Lump Sum amount of \$ 368,239.00 .  
To include all costs and expenses in accordance with the Contract Documents for Procurement Services as described in Section 01 01 01 "Construction Manager at Risk Services."
  - C. Construction Service Fee: 5.00 percent of Cost of Work.  
To include CMAR's general or indirect overhead and profit associated with the Cost of the Work.
- 2.02 Costs for Bonds and Insurance:
  - A. Performance and Payment Bonds: 0.90 percent of Cost of Work.  
Cost for providing 100 percent Performance and Payment Bonds as required by the Contract Documents.
  - B. General Insurance: 0.85 percent of Cost of Work.

Cost for providing insurance as required by the Contract Documents other than Builder's Risk Insurance.



~~C. Builder's Risk Insurance: Lump Sum amount of \$\_\_\_\_\_.~~

~~Cost for providing Builder's Risk Insurance as required by the Contract Documents.~~

2.03 General Conditions (as defined in the RFP and Agreement and to include all costs and expenses in accordance with the Contract Documents for Construction Services as described in Section 01 01 01 "Construction Manager at Risk Services.")

A. General Conditions: 2.42 percent of Cost of Work.

B. Monthly General Conditions Cost: \$ 55,000.00 per month.

Extended General Conditions not to exceed monthly amount.

2.04 Contingency Funds:

A. Contingency Funds: 3 percent of Cost of Work.

Amount of Contingency Funds included in the Guaranteed Maximum Price.

### ARTICLE 3: FEES FOR WORK DESCRIBED IN SECTION 00 11 19 1.01 B.

3.01 Proposer will provide Construction Manager at Risk (CMAR) Services in accordance with the RFP, Agreement and Contract Documents for the prices shown below and will complete the construction of the Project within the Guaranteed Maximum Price established in a future Amendment.

A. Pre-construction Services Fee: The Lump Sum amount of \$406,239.00.

To include all costs and expenses in accordance with the Contract Documents for Pre-Construction Services as described in Section 01 01 01 "Construction Manager at Risk Services and specifically 01 01 01 Construction Manager At Risk Services paragraph 1.04."

B. Procurement Service Fee: The Lump Sum amount of \$148,968.00.

To include all costs and expenses in accordance with the Contract Documents for Procurement Services as described in Section 01 01 01 "Construction Manager at Risk Services."

C. Construction Service Fee: 5.00 percent of Cost of Work.

To include CMAR's general or indirect overhead and profit associated with the Cost of the Work.

3.02 Costs for Bonds and Insurance:

A. Performance and Payment Bonds: 0.90 percent of Cost of Work.

Cost for providing 100 percent Performance and Payment Bonds as required by the Contract Documents.

B. General Insurance: 0.85 percent of Cost of Work.

Cost for providing insurance as required by the Contract Documents other than Builder's Risk Insurance.

~~C. Builder's Risk Insurance: Lump Sum amount of \$ \_\_\_\_\_.~~

~~Cost for providing Builder's Risk Insurance as required by the Contract Documents.~~



3.03 General Conditions (as defined in the RFP and Agreement and to include all costs and expenses in accordance with the Contract Documents for Construction Services as described in Section 01 01 01 "Construction Manager at Risk Services.")

A. General Conditions: 1.98 percent of Cost of Work.

B. Monthly General Conditions Cost: \$ 40,000.00 per month.

Extended General Conditions not to exceed monthly amount.

3.04 Contingency Funds:

A. Contingency Funds: 2.00 percent of Cost of Work.

Amount of Contingency Funds included in the Guaranteed Maximum Price.



Archer Western Construction, LLC

Daniel P. Walsh  
Name

President  
Title

  
Signature

2-18-15  
Date

**END OF SECTION**

**00 42 23.02 VENDOR COMPLIANCE TO STATE LAW (PROPOSAL FORM 2)**

Chapter 2252 of the Texas Government Code applies to the award of government contract to non-resident bidders. This law provides that:

“a government entity may not award a governmental contract to a nonresident bidder unless the nonresident underbids the lower bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident’s principal place of business is located.”

“Nonresident Bidder” refers to a person who is not a resident of Texas

“Resident Bidder” refers to a person whose principal place of business is in this state, including a contractor whose ultimate parent company or majority owner has its principal place of business in this state.

Check the statement that is correct for Bidder.

Non-resident bidders in \_\_\_\_\_ (give state), our principal place of business, are required to be \_\_\_\_\_ percent lower than resident bidders by State law. A copy of the statute is attached.

Non-resident bidders in Illinois (give state), our principal place of business, are not required to under bid resident bidders.

Our principal place of business or corporate offices are in the State of Texas.

Bidder:

Company Name: Archer Western Construction, LLC

By:   
(Signature -- attach evidence of authority to sign)

Name: Daniel P. Walsh, President

~~XXXX~~   
Matthew Walsh (Signature of Corporate Secretary)

Business address: 1411 Greenway Drive Irving, TX 75038

Phone: 972-457-8500 E-mail: cweston@walshgroup.com

**END OF SECTION**

**CONFLICT OF INTEREST QUESTIONNAIRE**

**FORM CIQ**

For vendor or other person doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 1491, 80th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code by a person who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the person meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. See Section 176.006, Local Government Code.

A person commits an offense if the person knowingly violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor.

**OFFICE USE ONLY**

Date Received

**1** Name of person who has a business relationship with local governmental entity.

Archer Western Construction, LLC

**2**  Check this box if you are filing an update to a previously filed questionnaire.

(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date the originally filed questionnaire becomes incomplete or inaccurate.)

**3** Name of local government officer with whom filer has employment or business relationship.

None

Name of Officer

This section (item 3 including subparts A, B, C & D) must be completed for each officer with whom the filer has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the filer of the questionnaire?

Yes  No

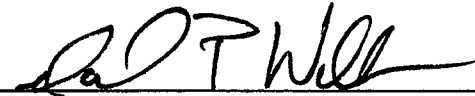
B. Is the filer of the questionnaire receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?

Yes  No

C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership of 10 percent or more?

Yes  No

D. Describe each employment or business relationship with the local government officer named in this section.

**4**  
  
 Signature of person doing business with the governmental entity  
 Daniel P. Walsh

  
 Date



Date: February 18, 2015

President and Board of Directors  
North Texas Municipal Water District  
505 Brown Street  
Wylie, Texas 75098

Re: Request For Proposals (RFP) for the Construction Management at Risk Lower Bois d' Arc Creek Reservoir Dam Project

Dear Mr. President and Board of Directors:

Archer Western Construction, LLC (the "Proposer") has submitted its Proposal in response to the Request For Proposals, as amended by Addenda for the Construction Management at Risk Lower Bois d' Arc Creek Reservoir Dam Project (the "Project") issued by the North Texas Municipal Water District (the "Owner") on February 18, 2015. The RFP states the requirement that the selected Proposer will enter into the CMAR Agreement (the "Agreement") to provide the Construction Management at Risk Services (the "Services") as described in the RFP and Agreement enclosed in the RFP.

The Surety has reviewed both the Proposer's Proposal and the RFP, including the Agreement, which together will form the basis of the Proposer's submittal. The Surety hereby certifies that, if the Proposer is selected as the Construction Manager at Risk for the Project and subject to the review and approval of the final terms and conditions of the Agreement, it intends to issue on behalf of the Proposer, as security for the performance of the Proposer's obligations under the Agreement, a Bid Bond, a Performance and Payment Bond of the form included in the RFP in the amounts specified in the RFP for the benefit of the Owner, as beneficiary, in the event the Proposer is selected for the execution of the Agreement.

This Letter of Intent shall expire 60 days from the date of this Letter of Intent and it may be extended or renewed by mutual consent of the Proposer and its Surety(s).

Name of Surety(s): Travelers Casualty and Surety Company

Name of Designated Signatory: Jodi Wallace

Title: Attorney-in-Fact

Signature: \_\_\_\_\_

A handwritten signature in black ink that reads "Jodi Wallace". The signature is written over a horizontal line that serves as a signature line.

This page is a placeholder for information submitted with the application that may contain confidential information. Please contact Cindy DePrato, Executive Assistant at (512) 463-8420 to request reviewing this information.

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

**RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

**FURTHER RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

**FURTHER RESOLVED**, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

**FURTHER RESOLVED**, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 18 day of February, 2015.

  
Kevin E. Hughes, Assistant Secretary



To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at [www.travelersbond.com](http://www.travelersbond.com). Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.



*Aon Risk Services Central, Inc.  
Illinois Division*

February 6, 2015

President and Board of Directors  
North Texas Municipal Water District  
505 Brown Street  
Wylie, Texas 75098

**Re: Request for Proposals (RFP) for the Construction Management at Risk Lower Bois d'Arc Creek Reservoir Dam Project  
Contractor: Archer Western Construction, LLC**

Dear Mr. President and Board of Directors:

Archer Western Construction, LLC has submitted its Proposal in response to the Request For Proposals, as amended by Addenda for the Construction Management at Risk Lower Bois d'Arc Creek Reservoir Dam Project (the "Project") issued by the North Texas Municipal Water District (the "Owner") on February 6, 2015. The RFP states the requirement that the selected Proposer will enter into the CMAR agreement (the "Agreement") to provide the Construction Management at Risk Services (the "Services") as described in the RFP and Agreement enclosed in the RFP.

The Insurance Broker has reviewed both the Proposer's Proposal and the RFP, including the Agreement, which together will form the basis of the Proposer's submittal. The Insurance Broker hereby certifies that, if the Proposer is selected as the Construction Manager at Risk for the Project and for the execution of the Agreement and subject to the review and approval of the final terms and conditions of the Agreement, the Insurance Broker hereby certifies that it intends to broker all required insurance identified in the Agreement.

If you have any questions, please contact me.

Sincerely,

Richard Subak, CPCU, ARM  
Senior Vice President – Strategic Account Manager  
Construction Practice Group  
312-381-4380  
rick.subak@aon.com



## Office of the Secretary of State

### CERTIFICATE OF FILING OF

Archer Western Construction, LLC  
File Number: 801272994

The undersigned, as Secretary of State of Texas, hereby certifies that an Application for Registration for the above named Foreign Limited Liability Company (LLC) to transact business in this State has been received in this office and has been found to conform to the applicable provisions of law.

ACCORDINGLY, the undersigned, as Secretary of State, and by virtue of the authority vested in the secretary by law, hereby issues this certificate evidencing the authority of the entity to transact business in this State from and after the effective date shown below for the purpose or purposes set forth in the application under the name of

Archer Western Construction, LLC

The issuance of this certificate does not authorize the use of a name in this state in violation of the rights of another under the federal Trademark Act of 1946, the Texas trademark law, the Assumed Business or Professional Name Act, or the common law.

Dated: 05/20/2010

Effective: 05/20/2010



A handwritten signature in black ink, appearing to read "Hope Andrade".

Hope Andrade  
Secretary of State



**00 42 23.06    GUARANTOR ACKNOWLEDGEMENT (PROPOSAL FORM 6)**

(To be typed on Guarantor's Letterhead)

Date

President and Board of Directors  
North Texas Municipal Water District  
505 Brown Street  
Wylie, TX 75098

Dear Mr. President and Board Members:

\_\_\_\_\_ (the "Proposer") has submitted herewith a Proposal in response to the RFP dated \_\_\_\_\_ for the Lower Bois d' Arc Creek Reservoir Dam Project (the "Project"), as amended, pursuant to which it is seeking to be qualified by the North Texas Municipal Water District (the "Owner") to provide for the Project the Construction Management at Risk (CMAR) Services (the "Services") described in the above referenced RFP.

In the event the Proposer is selected to provide the Services and the Proposer and Owner negotiate a CMAR Agreement that can be executed, the Guarantor hereby certifies that it will irrevocably, absolutely and unconditionally guarantee pursuant to a Guaranty Agreement (provided by the Owner and acceptable to the Guarantor) the performance of all of the Proposer's obligations under the CMAR Agreement, a copy of which was included in the above referenced RFP.

\_\_\_\_\_  
Name of Guarantor

\_\_\_\_\_  
Name and Title of Authorized Signatory

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Note: If more than one Guarantor is proposed, each firm shall be jointly and severally obligated and shall independently provide an executed copy of this Guarantor Acknowledgement. If a Guarantor is a joint venture, each firm shall be jointly and severally obligated and shall independently provide an executed copy of this Guarantor Acknowledgement.

**00 43 43 WAGE RATES**

**1.0 GENERAL**

**1.01 PAYMENT OF PREVAILING WAGE RATES**

- A. CMAR and any Subcontractor employed on this Project shall pay not less than the rates established by the Owner as required by Texas Government Code Chapter ~~22358~~ **2258**.



**1.02 RECORDS**

- A. In accordance with Texas Government Code Chapter 2258.024, the CMAR and its Subcontractors, if any, shall keep a record showing:
  - 1. The name and occupation of each worker employed by the CMAR or Subcontractor in the construction of the Work; and
  - 2. The actual per diem wages paid to each worker.
- B. The record shall be open at all reasonable hours to inspection by the officers and agents of the Owner.

**1.03 LIABILITY; PENALTY; CRIMINAL OFFENSE**

- A. Texas Government Code Chapter 2258.003 – Liability: An officer, agent or employee of the Owner is not liable in a civil action for any act or omission implementing or enforcing Chapter 2258 unless the action was made in bad faith.
- B. Texas Government Code Chapter 2258.053(b) – Penalty: Any CMAR or Subcontractor who violates the requirements of Chapter 2258, shall pay to the Owner, on whose behalf the Agreement is made, \$60 for each worker employed or each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the Agreement.
- C. Texas Government Code Chapter 2258- Criminal Offense:
  - 1. An officer, agent, or representative of the Owner commits an offense if the person willfully violates or does not comply with a provision of Chapter 2258.
  - 2. Any CMAR or Subcontractor, or an agent or representative of the CMAR or Subcontractor, commits an offense if the person violates Texas Government Code 2258.024.
  - 3. An offense is punishable by:
    - a. A fine not to exceed \$500;
    - b. Confinement in jail for a term not to exceed six months; or
    - c. Both a fine and confinement.

1.04 PREVAILING WAGE RATES

- A. The minimum rates for various labor classifications as established by the Owner are as shown in Appendix A.

**APPENDIX A – PREVAILING WAGE RATES**

Item	Worker	Minimum Prevailing Wage
1	Asbestos worker/ heat & frost insulator (includes application of all insulating materials, protective coverings, coatings and finishings to all types of mechanical systems)	\$12.13
2	Electrician – Cable splicer	\$22.67
3	Electrician	\$20.26
4	Line construction – Cable splicer	\$20.26
5	Line construction - Groundman	\$16.06
6	Line construction - Operators	\$18.80
7	Hydraulic crane – 35 ton and under	\$18.25
8	Hydraulic crane – over 35 tons, derricks, overhead gentry, stiffleg, tower, etc., and cranes with piledriving or caisson attachments	\$21.67
9	Iron workers - reinforcing and structural	\$14.76
10	Plumbers and Pipefitters	\$16.72
11	Sheet metal worker	\$17.38
12	Carpenter	\$10.54
13	Concrete Finisher	\$9.61
14	Form Builder	\$8.04
15	Form Setter	\$9.58
	Laborers	
16	Common	\$7.25
17	Utility	\$7.25
18	Pipelayer	\$7.97
	Power Equipment Operators	
19	Backhoe	\$10.98
20	Bulldozer	\$9.95
21	Front End Loader	\$10.78
22	Mechanic	\$9.88
23	Motor Grader	\$11.64
24	Oiler	\$9.19
25	Scraper	\$8.00
26	Truck Driver	\$7.47

The minimum prevailing wage rates indicated for Items 1 through 11 above are based upon survey data conducted and compiled by the North Texas Municipal Water District in August 2010. The minimum prevailing wage rates indicated for Items 12 through 26 above are based upon General Decision: TX20100036 05/04/2010 TX36 for Heavy Construction, Including Treatment Plants in Collin County

**END OF SECTION**

## **00 45 16 STATEMENT OF QUALIFICATIONS**

### **ARTICLE 1: REQUIREMENTS FOR THE STATEMENT OF QUALIFICATIONS**

- 1.01 The Statement of Qualifications must include, as a minimum, the information described in this Section. Failure to submit the required information in the Statement of Qualifications may result in the Owner considering the Proposal as non-responsive and may result in rejection of the Proposal by the Owner. Proposers may be required to provide supplemental information to clarify, enhance or supplement the information provided in the Statement of Qualifications.
- 1.02 Proposers must provide the information requested in the Statement of Qualifications. Information is requested, subject to the page limits indicated, and on the Proposal Forms attached to this section. The page limits do not include the forms themselves. A copy of these forms will be provided in Microsoft Word to assist with the preparation of the Statement of Qualifications. Information in these forms must be provided completely and in detail. Failure to include the information completely and clearly may result in lower scores in the evaluations. Information that cannot be incorporated in the form may be included in an appendix to the form. This appendix must be clearly referenced by appendix number in the form, and the appended material must include the appendix number on every sheet of the appendix. The appendix must include only the information that responds to the question or item number to which the appended information applies. The appendices to the forms shall be included immediately after the form itself.

### **ARTICLE 2: STATEMENT OF QUALIFICATIONS SUBMISSION REQUIREMENTS AND PAGE LIMITS**

- 2.01 Cover Letter –Subject to a maximum three (3) page limit, Proposers are free to submit a cover letter of their choice.
- 2.02 Proposer Qualifications, Experience and Past Performance
- A. Subject to a two (2) page limit, Proposer shall provide information as to the history of the Proposer, ownership, organization and other background information including years providing construction services and CMAR services, growth over time in terms of number of projects, size of projects, types of projects, firm revenue, number of employees , etc. Proposer shall complete and submit Proposal Form 7.
- B. Subject to a four (4) page limit, describe in summary format philosophy and experience working in a collaborative manner with an owner and its engineer during preconstruction (includes procurement services) and construction phases.
- Describe Proposer’s experience in constructing similar facilities on Proposal Form 8. Experience should include the satisfactory completion of eight (8) similar projects. The most recent projects are preferred. For the eight projects- CMAR for similar projects, construction of similar projects and CMAR for other projects are the priority preferred by the Owner. The similar projects should include construction of dams, intakes and reservoirs including any site clearing associated with these type of similar projects. Separate site clearing type projects should not be included on this Proposal Form. Use one form per project. The Proposer must demonstrate experience in the construction of projects of similar construction cost or techniques or describe how it intends to provide the needed experience and expertise. If Proposer does not have specific experience with projects of this

type and magnitude, the Proposer may describe its proposed approach and how its experience with other projects enhances their capability to successfully complete this Project.



Subject to a one (1) page limit per project for the **five eight** projects discussed immediately above, Proposer may submit additional information including but not limited to: photographs, project descriptive narratives, letters of recommendation, project awards, and references to demonstrate experience in constructing a project which meets the owner's expectations for a quality project constructed on time and within budget.



- C. Describe Proposer's overall experience in construction and CMAR for current projects and projects completed within the last ~~five (5)~~ **ten (10)** years on Proposal Form 9. *Proposers do not have to include the Projects listed on Proposal Form 8.* Current projects greater than 50% construction complete should be included on this form.

Subject to a ten (10) page limit: For those projects constructed using the CMAR approach provide specific information as to the results on three (3) of the completed projects as to Proposer's efforts on these projects for working in a collaborative relationship with the owner and engineer during the design and construction phases of the project. Describe how the Guaranteed Maximum Price was developed and managed for one (1) of the projects on the list. Discuss the cost and schedule control methodologies utilized and the project results on another specific project from the list. For another project on the list, discuss how the contingency funds were managed and the project results. Provide specific examples from projects on this list where cost and time savings were realized from the CMAR's direct involvement in the preconstruction services phase. Describe, for another project on the list, how the owner's quality expectations were met by the CMAR and the actions undertaken by the CMAR to be able to do so.

## 2.03 Organization, CMAR, CMAR Team, CMAR Team Members and Key Personnel

- A. Subject to a two (2) page limit, provide the name of the Proposer and names of any CMAR Team Members. For purposes of this submittal requirement, CMAR Team will be defined as the team formed by the Proposer for purposes of responding to this RFP. CMAR Team Member will be defined as a corporate entity or firm or individual included in the CMAR Team or identified in the Proposal that will provide any of the Services for this Project. Provide brief summary information for the CMAR Team Members such as background information including years providing construction services and CMAR services, growth over time in terms of number of projects, size of projects, types of projects, firm revenue, number of employees, etc.
- B. Subject to a three (3) page limit, describe the functional role and Services that will be provided by CMAR Team Members. Describe the history of the relationships among CMAR Team Members and the Proposer working on projects. Provide a brief description of the managerial structure proposed for this Project.
- C. Provide an organizational chart(s) for this Project showing the functional structure of Proposer's Project team with lines identifying the participants (both firms and individuals) who are responsible for major elements of the provision of the Services. Charts shall indicate the anticipated percent of each individual's time that will be committed to the Project. Critical support elements of project management and administration, preconstruction and procurement services and management, construction management,

QC, safety, subcontractor management, etc. shall be identified. Charts will be not subject to the page limit.

- D. Proposer shall designate Key Personnel and Alternate Key Personnel proposed for the Project. Key Personnel include the Project Manager, Preconstruction Services Manager, Project Superintendent, Safety Manager and Quality Control Manager. The Project Superintendent must be dedicated to this Project full time for the duration **during the construction services phase** of the Project.
- E. The Proposer will designate such individuals and alternates and provide the information requested on Proposal Form 10 for each Key Personnel and Alternate Key Personnel position. Alternate Key Personnel will be committed to the Project if the Proposer is not able to commit the Key Personnel individuals for the Project at the time the Agreement is signed. Qualifications and experience of these Alternate Key Personnel individuals will be considered in evaluating the qualifications of the Proposer.
- F. The Proposer must provide the services of the proposed Key Personnel or Alternate Key Personnel for the life of the Project as a condition of qualification. Failure to provide the proposed Key Personnel or Alternate Key Personnel may result in the disqualification of the Proposer and may void the award of the Agreement.
- G. Include in tabular format the identification and a brief narrative that describes the roles and working relationship of the proposed Key Personnel and Alternate Key Personnel that worked on the projects on Proposal Forms 8 and 9. Table not included in page limit.
- H. Provide a resume for each Key Personnel and Alternate Key Personnel. Resumes shall not be more than two (2) pages per individual. Resume shall include the general experience, education and formal training, specific technical and managerial experience on similar projects, work history including roles and responsibilities of experience on similar projects for proposed Key Personnel and Alternate Key Personnel. List the projects on which Key Personnel and Alternate Key Personnel have had significant involvement in the last 5 years as well as indicate their involvement in the projects listed on Proposal Form 8.



#### 2.04 Ability to Meet Proposed Time and Budget for Project

- A. Provide information by completing Proposal Forms 11 and 12 to demonstrate the ability of the Proposer to complete projects on time and on budget. Proposers are to provide a tabulation of all projects completed by the Proposer within the last 5 years, (excluding those projects on Proposal Form 8) and show the original contract date for substantial and final completion, the amended date for substantial and final completion and the actual date for substantial and final completion. The tabulations will also show the Bid/GMP and the final Cost/GMP without the impact of any change orders and the final GMP with change orders along with a description of those change orders in summary as to scope of change order and amount (increase or deduct.)
- B. Comments may be added to the tabulation to indicate the reasons for amending the contract completion dates and GMPs.
- C. Provide a tabulation for the number of projects and dollar volume currently under contract and the projected completion date of each active project and how the resources dedicated to these assignments will not impact Proposer's ability to effectively execute the construction of this Project. Also indicate on this tabulation the Key Personnel and

Alternate Key Personnel that are involved on these active projects and when they will be available to provide services on this Project. Table not subject to page limit.

## 2.05 Financial Information

- A. Each Proposer shall submit the financial information requested below. If the Proposer is a consortium, a joint venture, LLC or a partnership, the Proposal shall identify the parties and relationships. Each participating party or firm of such consortium, joint venture, LLC, or partnership shall provide full disclosure information regarding their financial strength as required by this section. If the Proposer is not a public company, it shall provide independently audited financial statements and may request that the information be treated confidentially by the Owner. If any such party has been in existence less than 3 years, the information shall be provided for the period of existence.
- B. Please furnish for the appropriate entities, the following financial information listed below. If any of this information is not provided, the reason for its omission shall be described.
1. Evidence of the ability of the Proposer to meet the bonding requirements described in the RFP. **Letter(s) of Intent in the form required by the RFP (Proposal Form 4) from the Surety or Sureties must be included with the Proposal Transmittal Form.**
  2. Evidence of the ability of the Proposer to meet the insurance requirements described in the RFP. **Letter(s) of Intent in the form required by the RFP (Proposal Form 5) from the insurance company must be included with the Proposal Transmittal Form.**
  3. Most recent annual audited financial report for the Proposer prepared in accordance with Generally Accepted Accounting Principles ("GAAP") and all relevant notes.
  4. The most recent Form 10-Q filed with the Securities and Exchange Commission ("SEC") by the Proposer or if not regulated by the SEC, the most recent quarterly audited financial report for each party and relevant notes.
  5. Completion and submission in the Proposal of Proposal Form 13 - Financial Resources Data.
  6. Completion of Proposal Form 14- two (2) "Bank Credit Reference Forms" by banks providing services to the Proposer.
- C. Proposers are advised that the Owner is seeking a CMAR with financial strength sufficient to perform the Services. The Owner will look to the financial strength of the Proposer and any proposed Guarantor in the event the Proposer does not possess the required financial qualifications. Accordingly, to strengthen the Proposer's financial qualifications, Proposers may submit the financial qualifications of a Guarantor that will absolutely and unconditionally guarantee the performance and payment obligations of the CMAR under the Agreement. A Proposer that is an LLC, a special purpose entity or a subsidiary formed for the purpose of responding to this RFP shall be required to have a Guarantor.
- D. Proposers are made aware that Proposers demonstrating an ability to provide the performance and payment bonds and the ability to maintain a minimum net worth of \$20 million, as measured by either the Proposer or a proposed Guarantor, shall be deemed to have the financial strength and capacity to undertake this Project. If the Proposer meets the minimum net worth requirement, there is **no** Guarantor requirement

- E. Proposers requiring a Guarantor shall provide the financial information for the Guarantor that is required in Items B 3 through 5 above. **Proposers requiring a Guarantor shall clearly identify the Guarantor and shall include with the Proposal Transmittal Form a Guarantor Acknowledgement (Proposal Form 6) signed by a representative of the Guarantor who is authorized to sign such latter and to commit the Guarantor to the obligations contained in the Guarantor Acknowledgement.**
- F. If the Guarantor is a partnership, the Guarantor Acknowledgment shall be signed by one or more of the general partners. If the Guarantor is a corporation, the Guarantor Acknowledgment shall be signed by an authorized officer along with his or her title beneath the full corporate name. If the Guarantor is a joint venture, an authorized representative of each firm in the joint venture shall sign a separate Guarantor Acknowledgment. Anyone signing as an agent must include in the Proposal the legal evidence of his or her authority to execute such Guarantor Acknowledgement. The Guarantor will be required to sign a Guaranty Agreement which will be included in the Agreement. The form of Guaranty Agreement will be developed when the need for such is evident during the procurement process.
- G. Direct Financial Questions
1. The purpose of this section is to elicit information pertaining to unfavorable circumstances or events that have the potential to adversely impact the Proposer's and, if applicable, the Guarantor's ability to honor its contractual commitments in the provision of the Services. To the extent that any of these questions are answered in a manner that indicates that any of these unfavorable circumstances or events have occurred, it is the responsibility of the Proposer to describe the unfavorable circumstance or event and provide sufficient information to demonstrate that the unfavorable circumstance or event will not adversely impact the Proposer's and if applicable the Guarantor's ability to honor its contractual commitments in the provision of the Services.
    - a. Material Adverse Changes in Financial Position. Within the last three years, describe any material, historical, existing or anticipated changes in financial position of the Proposer, and if applicable Guarantor, including any material changes in the mode of conducting business, mergers, acquisitions, takeovers, joint ventures or divestitures.
    - b. Bankruptcy. Has the Proposer, or if applicable Guarantor, ever declared bankruptcy or filed for protection from creditors under state or federal proceedings? If so, when and describe the impact it would have on the ability to undertake this Project
    - c. Liabilities and/or Potential Liabilities. List and briefly describe any pending or past legal proceedings within last three years and judgments or any contingent liabilities in which the Proposer, and if applicable Guarantor, or any parents, affiliates and subsidiaries of the Proposer or Guarantor was or is a party that could adversely affect the Proposer's, and if applicable Guarantor's, financial position or ability to undertake this Project.
    - d. Completion of Contracts. Within the last five years has the Proposer, and if applicable Guarantor, failed to complete any contract or has any contract been terminated due to alleged poor performance, default or litigation?



- e. Violation of Laws. Has the Proposer, and if applicable Guarantor, been convicted of any criminal conduct or been found in violation of any federal, state, or local statute, regulation or court order concerning antitrust, public contracting, employment discrimination or prevailing wages? If so, describe the circumstances.
- f. Debarred from Bidding. Has the Proposer, and if applicable Guarantor, been debarred or are under consideration for debarment on public contracts by the federal government or by any governmental entity in Texas or any other state? If so, describe the circumstances. Is the decision under review or was it upheld by formal legal and/or grievance process?
- g. Contractor Refusal. Has Proposer, and if applicable Guarantor, ever refused to construct or to provide materials defined in the contract documents for any project?
- h. Proposer Release. Has Proposer and if applicable Guarantor, been released from a bid or proposal in the past three years?
- i. Litigation. Has Proposer and if applicable Guarantor, been involved in litigation involving owners for construction projects that have been filed within last five years or that are currently outstanding?
- j. Claims. Provide a summary of significant claims incidences (claim is 3% or more of the contract amount) over the past five years that Proposer and if applicable Guarantor, has had involving owners for construction projects.

## 2.06 Project Approach

- A. Subject to a 25 page limit and based on the information included in the RFP, provide a description of your Project management and execution approach that demonstrates your ability to deliver a high quality Project on time and at or under the GMP and otherwise deliver the best value for the Owner. It is recommended to include in these descriptions specific efforts, actions, and examples from previous projects to support your approach as being a best value approach. The approach should include discussion at a minimum of the following:

Preconstruction Services – Subject to an eight (8) page limit, provide a summary of your Project approach to constructability input to the design, estimating and scheduling services during the design, GMP development, change management, early out packages to enhance time savings, quality control, risk management including identification, assessment, analysis and mitigation, sequencing of construction for the care of water and the soil bentonite slurry trench. Please provide specific examples from prior projects where your recommendations to the Owner during the preconstruction services phase resulted in schedule acceleration or cost savings. Provide an example of a risk management plan and a copy of the risk register from a previous dam construction project, (not subject to the page limit).

- 1. Procurement Plan –Subject to a four (4) page limit, provide a summary of your approach to working with the Owner to develop work packages that will be attractive to potential bidders/proposers, provide maximum competition from highly qualified trade subcontractors and implementing time and cost efficient procurement services to engage best value construction services within the Project budget/GMP. The Owner wishes to provide the local North Texas Dallas area contracting community (suppliers,

vendors, subcontractors, specialty subcontractors, etc.) the opportunity for inclusion in this Project. The procurement plan must address Proposer's approach to identify such parties, solicit interest, provide Project information and otherwise seek and secure that involvement in the Project.

2. General Coordination – Subject to a three (3) page limit, provide a summary of your approach to coordinating involvement with the Owner and its Engineer in the preconstruction, procurement and construction phases of the Project.
3. Construction Services – Subject to a ~~twelve (12)~~ **ten (10)** page limit, provide a summary of your approach for this Project for administration; management of subcontractors and suppliers; schedule control; cost control; document control; quality management; site safety; change management; commissioning, start-up and transition to Owner operations. Specifically please include the following:
  - a. Provide a summary of your construction plan on how this Project will constructed to meet the schedule requirement of complete the construction earlier.
  - b. Provide information on your approach to quality control for this Project during the construction phases, including but not limited to the inspection and testing of construction materials, quality control process including who will handle quality control reviews and when are they conducted and control of nonconformance.
  - c. Provide information as to the risk management for this Project during construction.
  - d. Please address your intended approach during construction with regard to the sequencing of construction for the care of water and the soil bentonite slurry trench. Also, provide project performance and lessons learned from prior projects where the care of water and/or a soil bentonite slurry trench were within the scope of work.
  - e. Provide any past experience and lessons learned from managing and performing construction of large embankments with high plasticity clays.



#### 2.07 Safety Program and Safety Performance

- A. Subject to a three (3) page limit, submit a summary description of the health and safety program that you would propose for the Project.
  - a. Complete the Proposer Safety Performance Questionnaire, Proposal Form 15. Please note, Proposers with an EMR higher than 1.0 may be disqualified as a Proposer for the Project.



**CMAR Lower Bois d’Arc Creek Reservoir Dam and Intake Project  
Project No. 344**

*History of Proposer* - **Archer Western (AW)** is a member of The Walsh Group of Companies, a general contracting, construction management, and design-build firm currently ranked among the nation’s Top 10 Contractors of Water Treatment, Water Supply, and Dam and Reservoir Builder by the Engineering News Record. The Walsh Group is a privately held, family-owned business founded in 1898. We maintain our headquarters in Chicago, IL and have regional offices located strategically across the country. In order to facilitate its growth, AW was created for non-union contracts as Walsh began to win more contracts outside of the Illinois area. Our history provides us with a wealth of applicable experience and proven management systems that we will contribute to this project.

AW has successfully completed several billion dollars of water, wastewater, dam and reservoir projects, pump stations, and other water related projects throughout the country. Collectively, these projects range from the traditional design-bid-build to CMAR and Design-Build. With our extensive background and ability to successfully self-perform over 70% of the work on the majority of our projects, we will provide North Texas Municipal Water District (NTMWD) valuable guidance and construction expertise throughout the course of the Lower Bois d’Arc Creek Reservoir Dam and Intake project. Our corporate and local experience in Construction Management at Risk projects will help NTMWD model the way for their future CMAR projects.

Today, The Walsh Group has 16 regional offices throughout the US, and AW operates out of 7 of those. In all its years of construction operations, no member of the Walsh Group of Companies has ever failed to complete a contract. The Walsh Group of Companies has virtually unlimited bonding capacity through Travelers Casualty and Surety Company, owns the second-largest privately-owned equipment fleet in the US valued at over \$500M, and produces annual revenues in excess of \$4B. Business Group Leader, Scott Smiley and Program Manager Jeff Polak were among the first members of Archer Western Texas Region, establishing a Texas base in 1994 and specializing in water / wastewater treatment plants. Our Texas Plant Group has seen the following growth over the past 21 years:

	1994 - 1995	1996 - 2000	2001 - 2005	2006 - 2010	2011 - 2015
Number of projects	4	22	63	98	106
Size of projects	<\$10M	\$1M - \$19M	\$1M - \$45M	\$1M - \$48M	\$1M - \$78M
Types of Projects	WTP/WWTP expansions	Plant Expansions, Pump Stations, Pipelines,	Plant Expansions, new plants, Pump Stations, Pipelines, Dams	Plant Expansions, New Plants, Piping, Pump Stations, Dams, Reservoirs, Energy Centers, CMAR projects,	Plant Expansions, new plants, Pump Stations, Pipelines, Dams, Reservoirs, Spillways, CMAR and Design-Build projects
Revenue	\$20M	\$98M	\$667M	\$903M	\$719M
Number of employees	20	180	500	750	800





Archer Western has been performing CMAR projects for over fifteen years in other areas of the country and now due to recent legislation, finally in Texas. As a corporation, Archer Western/Walsh Construction has successfully delivered over 1,500 alternate delivery method projects. AW has an incredible amount of experience in all aspects of your project and has received much praise on the CMAR projects we have completed. To the right is a letter from the Owner praising AW as a Construction Manager. Please refer to later sections of this proposal for more project specific information. Through our CMAR experiences, we have learned there are many advantages to this procurement method for all parties involved. The greatest benefit all parties receive is the teamwork atmosphere that is created by everyone actively working together for the common goal of designing and building a successful project.

**DALLAS COUNTY PARK CITIES  
MUNICIPAL UTILITY DISTRICT**

1811 REGAL ROW  
PHO -214/852-8639 FAX -214/852-8643  
DALLAS, TEXAS 75235-2398

<p><b>DIRECTORS</b></p> <p>Mark W. Connell, President Michael R. Lacy, Vice-President Leslie J. Conant, Secretary William B. Madden, Director John F. Beall, Director</p>	<p><b>ADMINISTRATION</b></p> <p>Larry McDaniel, Gen. Mgr. Jerry Brannon, Asst. To GM Deborah White, Acct. Sec.</p>
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May 17, 2013

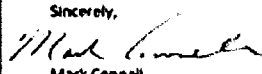
Re: Archer Western Contractors as Construction Manager at Risk


To Whom It May Concern:

The District is currently in the midst of finalizing a \$33.7 million dollar plant improvement and a new membrane filter facility construction project. This is the first major capital project the District has undertaken since its initial water treatment plant construction in 1950. We evaluated various construction methods and decided to use the Construction Manager at Risk (CMAR) method. This was a very new concept for the Texas water industry as the State legislature had just allowed its use a few years ago. The team approach with the Owner, Designer, and Contractor working together through both the design and construction phases appealed to our small utility. Prior to groundbreaking we were given a guaranteed maximum price and shared any cost savings with the contractor. The District had selected CDM Smith as the design firm and selected Archer Western Contractors (AWC), LLC, as our CMAR through the request for qualifications process.

As our project winds down, we have nothing but praise for the work of AWC as our CMAR. From the beginning, they were an active participant in the design portion of our project, providing valuable constructability insight. As a result, we realized substantial savings through their value engineering. While they are self performing some of the work, they had to compete for those portions along with other contractors and their pricing was very competitive. We have been very impressed with their construction crews and quality of their work. They have also kept the project on schedule and under budget. They have managed the project and other contractors with minimal problems. Whenever a problem arose, they responded with a correction immediately. In our opinion, they have been an excellent team member, working well with CDM Smith and the District staffs throughout this project. They have kept everyone involved up to date through bi-weekly progress meetings as well as their attendance at our monthly Board of Directors meetings. We would recommend their work as CMAR with no hesitation. They are very knowledgeable, cooperative, providing quality work and a safe work environment.

Sincerely,

  
 Mark Connell  
 Board President

  
 Larry McDaniel, P.E.  
 General Manager

Please feel free to visit our website at [www.walshgroup.com](http://www.walshgroup.com) to experience the true history of the corporation and its growth.



**SOQ INFORMATION (PROPOSAL FORM 7)**

**General Information**

Proposer doing business as	Archer Western Construction, LLC		
Business address of principle office	1411 Greenway Drive		
	Irving, TX 75038		
Main number	972-457-8500		
Fax number	972-457-8501		
Website address	<a href="http://www.walshgroup.com">www.walshgroup.com</a>		
Form of business (check one)	<input checked="" type="checkbox"/> A corporation	<input type="checkbox"/> A partnership	<input type="checkbox"/> An individual
<b>If a Corporation</b>			
Date of incorporation	9/3/2009		
State of incorporation	Illinois		
Chief Executive 's name	N/A		
President's name	Daniel P. Walsh		
Vice President's name(s)			
	Randy J. Lee		
	David B. Casey		
	Roy D. Epps		
Secretary's name	Matthew M. Walsh IV		
Treasurer's name	Timothy S. Gerken		
<b>If a Partnership</b>			
Date of organization	N/A		
State whether partnership is general or limited			
<b>If an Individual</b>			
Name	N/A		
Business address			
<b>Identify all individuals not previously named which exert a significant amount of business control over the organization</b>			
Don Gillis – President, National Heavy Civil Division			
Scott Smiley – Texas Region Business Group Leader			
<b>Indicators of Organization Size</b>			
Average number of current full time employees	700 in Texas Region	Average estimate of revenue for the current year	\$300 Million in Texas Region

Proposer doing business as	Archer Western Construction, LLC	
<b>Organization History</b>		
List of names that the Proposer currently and has operated under over the history of the company, including the names of related companies presently doing business:		
Names of organization	From date	To date
Archer Western Construction, LLC	9-3-09	Present
Archer Western Contractors, LLC	3-18-83	Present – but phasing out for 4 <sup>th</sup> generation
List of companies, firms or organizations that own any part of the organization.		
Name of companies, firms or organization.	Percent ownership	
The Walsh Construction Group, LLC	99.4%	

**Proposer Resources and Self-Perform Intentions**

<b>Equipment</b>				
Provide a list of major equipment proposed for use on this Project. Attach additional information if necessary				
Equipment item	Primary use on project	Own	Will buy	Lease
200 Ton Crane	General Use	X		
Rubber Tire Loader	General Use	X		
345 Excavator	General Use	X		
8 each 631 Caterpillar Scrapers	Earthwork/Dam Construction	X		
4 each 637 Caterpillar Scrapers	Earthwork/Dam Construction	X		
2 each D10 Caterpillar Dozers with Ripper w/GPS	Earthwork/Dam Construction	X		
1 each D9 Caterpillar Dozer with Ripper w/GPS	Earthwork/Dam Construction	X		
1 each D8 Caterpillar Dozer with Ripper w/GPS	Earthwork/Dam Construction	X		
1 each 825 Caterpillar Compactor	Earthwork/Dam Construction	X		
2 each Caterpillar Challengers with Disks	Earthwork/Dam Construction	X		
2 each 631 Caterpillar Water Tankers (8,000 gal)	Earthwork/Dam Construction	X		
2 each 14M Caterpillar Motor Graders w/GPS	Earthwork/Dam Construction	X		
1 each 950 Caterpillar Wheel Loader	Earthwork/Dam Construction	X		
1 each 336 Caterpillar Excavator	Earthwork/Dam Construction	X		
1 each 300 CY/HR Capacity RCC/Soil-Cement Batch Plant (includes aggregate feed bins, feed conveyors, MCC/control house, plant, 8 CY twin-shaft mixer, concrete hopper, concrete conveyors, 24 CY overhead load-out bin, dust collector, 2x200 Ton auxiliary silos, 2x 20,000 gal Frac tanks)	RCC, Soil Cement, Intake/Outlet Works Construction	X		
1 each 150 CY/HR Conventional Concrete Batch Plant (includes aggregate feed bins, aggregate conveyors, MCC/Control House, plant, dust collector, 2 x 75-ton silos, 2x 150-ton auxiliary storage pigs)	RCC, Soil Cement, Intake/Outlet Works Construction	X		
1 each 850KW (Prime) Generator Set	RCC, Soil Cement, Intake/Outlet Works Construction	X		
1 each 350KW (Prime) generator Set	RCC, Soil Cement, Intake/Outlet Works Construction	X		
4 – 5 each CAT 740 40-ton articulated haul trucks	RCC, Soil Cement, Intake/Outlet Works Construction	X		
4 -5 each Advanced 10 CY Front-discharge concrete mixer trucks	RCC, Soil Cement, Intake/Outlet Works Construction	X		
1 each Putzmeister TB-600 Telebelt truck	RCC, Soil Cement, Intake/Outlet Works Construction	X		
1 each Putzmeister 42M concrete pump truck	RCC, Soil Cement, Intake/Outlet Works Construction	X		
1 each Kobelco CK-1600 crawler crane	RCC, Soil Cement, Intake/Outlet Works Construction	X		
1 each Kobelco CK-1100 crawler crane	RCC, Soil Cement, Intake/Outlet Works Construction	X		

1 each CAT 966 Loader	RCC, Soil Cement, Intake/Outlet Works Construction	X		
1 each CAT 950 Loader	RCC, Soil Cement, Intake/Outlet Works Construction	X		
<b>Division of work between Proposer and subcontractors</b>				
<p>What self-perform work does the Proposer contemplate undertaking? Provide a description of the types/scopes of work and an estimate of the overall percentage of the total Work such self-perform may include. Please note: This is for informational purposes only and will not be considered in the evaluation of Proposals.</p>				
<p>Concrete          Slurry Trench          Labyrinth Spillway          Intake Tower/Structure          Foundation preparation          Grout Curtain Bench Construction          Dam Embankment          Spillway Excavation          Blanket Drain Installation          Chimney Drain Installation          Foundation Drain          Drainage Infrastructure          Terminal Storage Earthwork and Grading for Liner/Soil Cement •          RCC Production and Placement          Soil Cement Production and Placement</p>		<p>Our Team has the capability of pursuing upwards of 75%-80% of this project and intend to submit through bid packages per Texas law.</p>		
<p>What work does Proposer propose to subcontract on this Project?</p>				
<p>Timber Clearing          Erosion Protection          Electrical          Reservoir Liner          Lake Access Points          Bonham Repairs          Site Access Road Enhancements          Site Restoration          Fuel Supply</p>				



**Proposer's Subcontractors and Vendors (THE REST OF THIS FORM DOES NOT HAVE TO BE COMPLETED FOR PROPOSAL SUBMISSION)**

Proposer doing business as:				
<b>Project Subcontractors</b>				
Provide a list of subcontractors that will provide more than 10 percent of the work (based on contract amounts)				
Name	Work to be provided	Est. percent of contract	HUB/MWBE firm	
Provide information on the proposed key personnel, project experience and a description of past relationship and work experience for each subcontractor listed above using the Project Information forms.				
<b>Suppliers</b>				
Provide a list of major equipment or materials proposed for use on this Project. Attach additional information if necessary.				
Supplier name	Equipment / material provided	Furnish only	Furnish and install	HUB/MWBE firm



*Philosophy and Experience Working in a collaborative manner during preconstruction, procurement, construction phases*

AW's business model has been to pursue work experience spanning nearly every conceivable sector of construction work, and this unique diversity ensures our strength. AW is able to provide the unique combination of an experienced, successful team, coupled with the financial and resourceful strength of a large, well-established corporation, while providing market knowledge and personal attention of a smaller, local firm.

What sets AW apart from other large contractors is how we operate. We are the least top-heavy prime contractor you will ever work with. We are more flexible and responsive, and far more nimble than any other large contractor in the industry. We have virtually no bureaucracy and we do not abide bottlenecks. We are a trusted team member in the resolution of many of our client's challenges, and have been one of yours for over 20 years. From ownership down, this kind of trust between team members at Walsh/AW has been earned over years of working together. Our corporate ethic has been built over 100+ years by an American family that believes if you put your clients' needs first, success will follow. Every key player in our company is indoctrinated in this ethic and trusted to carry it out. Today, it is the foundation of our reputation.

AW, as a member of The Walsh Group, has delivered over \$1.54 Billion in successful alternative delivery method projects. We were fortunate to have been intimately involved in the evolution of CMAR project delivery methods from the start. Early on, we recognized the advantages of moving away from the traditional, hard-bid method and we sought opportunities to work with owners and designers to deliver projects that would stand as proof of the benefits of alternative contracting approaches. Today, the CMAR approach is our preferred way to build, especially on high profile, highly specialized projects. Although only established as an available procurement option for water/wastewater for the past 15 years, AW has successfully completed 44 CMAR projects throughout the nation, valued at over \$430 million.

**Preconstruction:** The people on our Project Team have been in water infrastructure construction for the bulk of their careers; for some in fact, this is the only industry they have ever known. To build a craft over the span of a career takes commitment; to the craft, the clients, the industry. The traditional hard-bid approach limited our ability to apply our experience in a broad sense. It allowed us to contribute our expertise only after construction had begun. We pride ourselves on making good decisions in the field (in fact, it's one of our biggest points of pride), but, good problem solving in the field has one effect; it keeps a project on track. Taking the expert builder's knowledge and experience to the design phase of a project however, can affect the project on a much larger scale, at a point in the project where it will make real economic impact. This is how we prefer to work. Some of the benefits we regularly bring to the preconstruction stages of our projects are:

- Assessing and recommending site logistics requirements/sequencing, packages
- Recommending phasing, sequencing, construction feasibility, developing construction packages, and scheduling
- Providing cost-estimating expertise
- Identify critical elements that may require risk mitigation
- Quality Management
- Additional elements required by CMAR contract or for complete and operable system for Owner





**An example of our Preconstruction input benefits on a recent local CMAR is as follows:**

Dallas County Park Cities MUD Advanced Membrane and Plant Improvements (see Form 9) - AW provided the GMP estimates at each phase of design. These estimates proved to be accurate as the project bid out at just under the 1.5 percent below the GMP while keeping the owner's 5% contingency untouched. AW made many recommendations during the course of the design which were incorporated into the design and provided savings to the owner. An example was the suggestion to use fabricated steel pipe in lieu of ductile iron pipe for the larger diameter above ground piping. This resulted in an approximate savings of \$200,000.

AW also provided cost comparisons during the design which enabled DCPCMUD to make educated decisions on various options. As an example, AW provided a cost analysis on reroofing the existing buildings with a built up roofing system verses modifying the existing buildings to allow the use of a standing seam roofing system. While it was expected that the standing seam roofing system would be as much as \$800,000 more expensive than the built up system, the cost comparison came in at only a \$200,000 increase. DCPCMUD found this additional cost to be an acceptable trade off to eliminate the leaking flat buildup roofs and obtain the added benefit of the sloping standing seam roof which also updated the over sixty year old buildings.



Additionally, our Team members R.E. Monks and ASI constructors have provided valuable preconstruction input on previous projects. One example from ASI is as follows: The Cabresto Dam (see Form 9), located near Questa, New Mexico in a high altitude and very sensitive sub-alpine environment, has experienced significant seepage issues in recent years and has an undersized spillway. Due to these deficiencies, the New Mexico Office of the State Engineer placed the dam under a significant restriction. The decision was made to remove the existing dam and construct a new dam 160 feet downstream. The new dam, completed Fall 2012, is a zoned embankment dam with a roller-compacted concrete spillway constructed directly over the embankment. ASI was awarded this project in the Spring of 2011. ASI worked directly with the design engineer, RJH Consultants, and the New Mexico Office of the State Engineer (NM OSE) to redesign several elements, provide constructability review and cost estimates of these redesigned elements, to reduce the overall cost of the project. **The combined redesign efforts of ASI, RJH, and the NM OSE working together reduced the overall project costs by over \$1 million from the original bid of \$6.3 million.**

**Procurement Procedures:** Near the completion of the design, our Project Team will prepare bid packages for the portions of the work that are to be subcontracted and for buyout items. We will solicit bids from reputable subcontractors with skills applicable to this project. We will develop clear and concise bid packages covering all scopes of work without overlaps or gaps. This ensures proper trade coverage without incurring additional costs.

Analyzing all aspects of the project from the earliest date possible and following through that analysis until all items are in place is the single most important element in providing NTMWD with the Best Value by reducing or actually eliminating the future need for change orders. The list of proposed qualified subcontractors will be





## CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project Project No. 344

jointly reviewed by NTMWD, Freese and Nichols, AW, RE Monks, and ASI, to gain concurrence on the bidders list. A bid opening will be performed at the agreed upon location and all team members will discuss the best overall value to the project.

One of our procurement strategies is to process all contracts quickly. This ensures buy-in from the subcontractors and suppliers with long lead items to have materials submitted, approved and fabricated in an acceptable time frame. It also protects against material price escalations. Having the vendor's commitment for lead times gives the management team a working timeline and the ability to plug realistic expectations for submittal and equipment delivery into the P6 schedule. As the schedule is web-based, all members of the Program team will also have access to the live document for progress tracking.

Through the CMAR delivery method and the continued preconstruction services, your Project Team could maximize any potential advantage, such as releasing long lead time equipment, locking in current pricing to avoid future price escalations, stagger labor and trade work, shortening overall construction time, while also minimizing any potential conflict by constantly coordinating the completed designs with the unfinished pieces.

**Construction:** On a design-bid-build project, Archer Western, R.E. Monks, and ASI, each self-perform the majority of their respective typical scopes of work. As a CMAR project, this offers an additional advantage in that our project managers, superintendents and assistant project managers are uniquely qualified to value engineer the project and to manage the project. They have intimate knowledge of every aspect of project construction and can offer the best valued suggestions for cost or schedule savings. They have first-hand knowledge of what is required to get the job done. They know how to maximize the production and quality of each selected subcontractor and how to assist them in the common goal towards a successful completion, supplementing with their own crews, if assistance is needed.

**Another example from our Dallas County Park Cities Advanced Membrane CMAR** reveals the efforts that our Team makes on each and every project we undertake.

During removal of existing paving, we realized that the underground clearwell was leaking water. While discussing the leak with the client, previous repairs to the clearwell slab in the area of the leak were indicated. With an upcoming plant shutdown approaching for a pipe tie-in, which was going to require the clearwell to be completely drained, our team coordinated a plan with the client and the engineer to inspect the clearwell slab immediately upon it being drained. The inspection revealed the failure of an existing crack repair and it was determined that an emergency repair of the crack and numerous other repairs would need to be made while the clearwell was drained. In addition, structural support piers were to be drilled and placed under the existing foundation. Knowing the urgency of performing the clearwell repairs expeditiously and understanding the general parameters of the repair procedures through communication with the engineer, our team proactively brought an experienced crack repair subcontractor on site to evaluate the work that was going to be required, get their recommendation of products to perform the repairs, and obtain their commitment to mobilizing the site immediately upon approval of the repairs. Once the design team finalized the details, our construction management team put together a cost proposal, obtained approval from the client, and





**CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
Project No. 344**

was beginning the repairs in less than a week. Through detailed coordination with the client, the engineer and various subcontractors and suppliers, the emergency repairs were able to be accomplished to the satisfaction of the client, without an additional unexpected shut down and draining of the clearwell and without adding to the already established GMP.

The benefits of the recent revolution in municipal procurement are many. The transparency, trust and teamwork alternative delivery methods engender, benefit everyone: agency owners, designers, builders, and most important of all, the public. We can list hundreds of examples where early partnering on a project saved money, shortened schedules, prevented issues, solved problems, and made the project more successful. In short, we see the revolution in public procurement as just that, a revolution, and we have made it our business to stay ahead of that revolution because it is simply a better way to do business.



**Similar Project Experience (Complete this form for eight (8) similar projects) (Proposal Form 8)**

Project owner	US Army Corps of Engineers	Project name	LPV-111 ECI (Early Contractor Involvement) type project (The USACE's version of CMAR)
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General description of project  
 Archer Western was the managing partner for the Joint Venture selected by the New Orleans District of the U.S. Army Corps of Engineers to reconstruct a 5.3 mile stretch of the New Orleans East Back Levee adjacent to the Gulf Intercoastal Waterway. **% of work self-performed: 59%**

**Project Budget and Schedule Performance**

Budget history		Schedule performance		
	Amount	% of Bid/GMP	Date	Days
Bid or GMP	\$294,894,757		6-29-2009	
Change orders- Owner enhancements (additional scope requested by owner)	\$51,640,104	18%	Contract substantial completion date at notice to proceed	6-1-2011
Change orders- Unforeseen conditions			Contract final completion date at notice to proceed	8-10-2011
Change orders- Design issues			Change Order authorized substantial completion date	6-1-2011
Change Orders due to Force Majeure			Change Order authorized final completion date	8-31-2011
Total change orders			Actual / estimated substantial completion date	6-1-2011
Final cost or GMP	\$349,651,280		Actual / estimated final completion date	8-31-2011

**Key Project Personnel**

Name	Project Manager	Superintendent	Safety Manager	Quality Control Manager
James Gardner	Larry Lee	Otto Brannan	Curtis Grassing	
Percentage of time devoted to the Project.	30%	100%	5%	100%
Proposed for this Project.	Yes	Yes	Yes	Yes
Did Individual start and complete the project?	Yes	Yes	Yes	Yes
If not, who started or completed the Project in their place.				

**Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)**

Name	Title/ position	Organization	Telephone	E-mail
Carrie Wakumoto	Senior Contracting Officer	US Army Corps of Engineers	(504) 862-1975	Carrie.wakumoto@usace.army.mil
Bruce LeLong	Project Engineer	URS Corporation	504-837-6326	Bruce_Lelong@URSCorp.com
James Gardner	Pre-Con & Const. Mgr	Archer Western	972-457-8500	jgardner@walshgroup.com
Jodi Wallace	Surety Agent	Traveler's Casualty & Surety	630-961-7037	jmwallace@aew-insurance.com

**Disputes resolved or pending resolution by arbitration, litigation or dispute review boards**

Number of disputes resolved(provide a brief description of the dispute(s))	Total amount involved in resolved issues:	N/A	Number of disputes pending(provide a brief description))	N/A	Total amount involved in pending Issues:	N/A
N/A		N/A		N/A		N/A

# LPV-111- CSX Railroad to Michoud Canal – ECI (USACE CMAR)

**Location**

New Orleans, LA

**Contract Value**

\$348,400,000

**Owner**

US Army Corps of Engineers

Contact: Carrie Wakumoto

504-862-1975

**Completion Date**

June 2011

*“OUTSTANDING”  
CCASS RATING*



Archer Western is the managing partner for the Joint Venture selected by the New Orleans District of the U.S. Army Corps of Engineers to reconstruct a 5.3 mile stretch of the New Orleans East Back Levee adjacent to the Gulf Intercoastal Waterway. The construction is primarily clay embankment with earth stabilization along with concrete T-walls, pump station reconstruction and utility relocations. The earth stabilization is Deep Soil Mixing (DSM), 1.8 million cubic yards, one of the largest DSM projects in the country. The purpose of the project is to provide a 100-year level of risk reduction to that section of levee, which suffered extensive damage from Hurricane Katrina. These improvements will provide advance protection from storm surge for some of the region’s most vulnerable areas by 2011

*During Preconstruction, Archer Western worked alongside the design team to provide reviews of the documents, focus on constructability issues, and reduce potential conflicts. Archer Western’s team created a website to effectively and efficiently solicit and award subcontractor and vendor bid packages. The website allows the local community to sign up and view bid packages and receive automated email notifications of bid status, pre-bid meeting updates, and package amendments. Archer Western saved the Owner almost \$61 million in cost savings.*



**Similar Project Experience (Complete this form for eight (8) similar projects) (Proposal Form 8)**

<b>Project owner</b>	<b>North Texas Municipal Water District</b>	<b>Project name</b>	<b>Lake Texoma Outfall to Wylie WTP Raw Water Pipeline Plant Bid Package #3 Balancing Reservoir</b>
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General description of project:



Please refer to the attached project highlight sheet for a full description of the project.

ASI-R.E. Monks Joint Venture participated in the NTMWD's \$309-million Lake Texoma Outfall to Wylie WTP Raw Water Pipeline Plant Bid Package #3 Balancing Reservoir CMAR Contract as an execution subcontractor to the CMAR to construct a two-cell 80MG balancing reservoir. This overall project was primarily a water transmission pipeline project, and, as such, the CMAR relied on ASI-R.E. Monks Joint Venture to finalize several significant technical issues with the project designer, Freese and Nichols. During the subcontractor selection and award phase, and prior to construction of the reservoir, ASI-R.E. Monks Joint Venture and Freese & Nichols successfully collaborated on the definition of dam embankment zone requirements to eliminate a significant material imbalance on this phase of the project, and this collaboration provided NTMWD and its CMAR with a significant reduction in cost for this portion of the project. This collaboration and cooperation with Freese & Nichols had been established on numerous prior dam construction projects in Texas and the long-established familiarity with Freese & Nichols's design and specification requirements promoted open and collaborative discussions on potential problems throughout the construction of the balancing reservoir, thereby eliminating any re-work, disputes and delays. The ASI-RE Monk Joint Venture completed this phase of the project for NTMWD and its CMAR safely, on-time, within original budget and without any disputes or disruption. **Please refer to Section 2.03. ASI is proposing the utilization of the same key personnel for the current proposal.**

**Project Budget and Schedule Performance**

	Budget history		Schedule performance	
	Amount	% of Bid/GMP Amount	Date	Days
Bid or GMP	\$21,374,332.30 (ASI Portion)	-----	11/01/12	
Change orders- Owner enhancements (additional scope requested by owner)	-----	-----	Notice to Proceed	
Change orders- Unforeseen conditions	-----	-----	Contract substantial completion date at notice to proceed	
Change orders- Design issues	(\$275,337)	-1.29%	Contract final completion date at notice to proceed	12/01/13
Change Orders due to Force Majeure	-----	-----	Change Order authorized substantial completion date	11/01/13
Total change orders	(\$275,337) (JV Portion)	-----	Change Order authorized final completion date	12/31/13
Final cost or GMP	\$21,098,995	98.71%	Actual / estimated substantial completion date	11/01/13
			Actual / estimated final completion date	12/31/13





Key Project Personnel						
Name	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager		
Kevin Delo	Jim Fuller	Brian Looby / Rick Montano	N/A			
100%	100%	100%	N/A			
Yes	TBD	TBD	N/A			
Yes	Yes	Yes	N/A			
N/A	N/A	N/A	N/A			
N/A	N/A	N/A	N/A			
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)						
Owner	Name	Title/ position	Organization	Telephone	E-mail	
Tom Hornseth	Comal County	County Engineer	(830) 608-2090		rabthh@co.comal.tx.us	
Victor Vasquez	Freese & Nichols	Project Engineer	(512) 617-3142		VMV@freese.com	
N/A	N/A	N/A	N/A		N/A	
David N. Broyles	Arthur J. Gallagher RMS, Inc.	President	(806) 785-1988		Nick_Broyles@ajg.com	
Disputes resolved or pending resolution by arbitration, litigation or dispute review boards						
Number of disputes resolved (provide a brief description of the dispute(s))	Total amount involved in resolved issues:	Number of disputes pending (provide a brief description of the dispute(s))	Total amount involved in resolved issues:			
0	\$0	0	\$0			

# LAKE TEXOMA BALANCING RESERVOIR

Howe, TX USA



## Fast Facts

### ASI Role:

General Contractor

### Type of Dam:

Earthen

### Spillway Height:

30 ft.

### Crest Length:

6,166 ft.

### Soil Cement:

79,000 CY

### Conventional Concrete:

6,330 CY

### Contract Value:

\$21,589,000

## NOTABLE FEATURES

- ◇ Dual-cell 240 Million Gallon Balancing Reservoir.

## Reference /

### Owner:

North Texas Municipal Water District (Owner)  
Garney Co. (CMAR)  
1333 NW Vivion Road  
Kansas City, MO 64118  
Wayne Barker, Project Manager  
T (816) 741-4600  
F (816) 741-4488  
wbarker@garney.com  
Mike Moore  
mmoore@garney.com

### Engineer:

Freese & Nichols  
1701 N. Market Street  
Ste. 500  
Dallas, TX 75202  
T (214) 217-2200  
F (214) 217-2201

## PROJECT HIGHLIGHTS

The Lake Texoma Outfall to Wylie WTP Raw Water Pipeline Plant Bid Package #3 Balancing Reservoir project consists of connecting to the existing 72-inch outfall pipeline near existing Lake Texoma Outfall at FM902 and Bennett Road west of Tom Bean, in Texas. The project entails construction of a dual-cell 240 Million Gallon Balancing Reservoir near existing Lake Texoma Outfall on FM902 east of Bennett Road, installation of approximately 1400 LF of 96-inch and 300 LF of 78-inch installation also include the 78" magmeter. Each cell is lined with geocomposite and HDPE liner, topped with 12" of soil cement. Work also included 224,000 SY of geocomposite and liner, and installation of in-line isolation valves and air-release valves.



## ASI Completion

### Date:

November 2013

## ASI Job Number:

Job # 12-18



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1850 E. Platteville Blvd.; Pueblo West, CO 81007  
T. (719) 647-2821 F. (719) 647-2890  
www.asiconstructors.com



**Similar Project Experience (Complete this form for eight (8) similar projects) (Proposal Form 8)**

Project owner	US Army Corps of Engineers	Project name	LPV-109.02a Levee Enlargement for South Point to CSX
General description of project			
Major items of work included installation of 9,000,000 linear foot of vertical drains in area of existing sand blanket; placement of 290,000 cy of gravel drainage material; placement of approximately 3,000,000 cy embankment material; construction of T-wall and gates at Hwy 11 and Hwy 90; deep soil mixing; installation of new discharge pipes, pumps, gear boxes, engines, and FSI at 2 USFWS pump stations; constructing sluice gate concrete structures and installation of new pipes.			

**Project Budget and Schedule Performance**

Budget history		Schedule performance	
	Amount	% of Bid/GMP Amount	
Bid or GMP	114,962,000		3/30/2010
Change orders- Owner enhancements (additional scope requested by owner)	31,092,124		6/13/2011
Change orders- Unforeseen conditions			N/A
Change orders- Design issues			9/8/2011
Change Orders due to Force Majeure			N/A
Total change orders			8/31/2011
Final cost or GMP	\$141,330,585		N/A

**Key Project Personnel**

Name	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
	Martin Pospisil	Curtis Grussing	Otto Brannon	Rogers Vincent
Percentage of time devoted to the Project.	100%	100%	60%	100%
Proposed for this Project.	Yes	Yes	Yes	Yes
Did Individual start and complete the project?	Yes	Yes	Yes	Yes
If not, who started or completed the Project in their place.				
Reason for change.				

**Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)**

Name	Title/ position	Organization	Telephone	E-mail
Owner	Chester Ashley	USACE	504-862-1287	
Designer	Dwayne Smith	URS	251-652-1157	
Construction Manager	N/A			
Surety	Jodi Wallace	Travelers	631-279-6113	jmw Wallace@aew-insurance.com

**Disputes resolved or pending resolution by arbitration, litigation or dispute review boards**

Number of disputes resolved (provide a brief description of the dispute(s))	Total amount involved in resolved issues:	N/A	Number of disputes resolved (provide a brief description of the dispute(s))	N/A	Total amount involved in pending Issues:	N/A

Statement of Qualifications  
 NTD 13562 Arc Bois d' Arc Creek Reservoir Dam and Intake

00 45 16 - 16  
 11/30/2011

# LPV-109.02a, Levee Enlargement for South Point to CSX

## Location

New Orleans, LA

## Owner

US Army Corps of Engineers

Contact: Chester Ashley

504-862-1287

## Contract Value

\$141,330,585

## Completion Date

August 2011

HPO, LPV-109.02a, Levee Enlargement for South Point to CSX Railroad and US 11 and US 90 Highway Crossings, Orleans Parish, LA

Major items of work includes installation of 9,000,000 linear foot of vertical drains in area of existing sand blanket; placement of 290,000 cy of gravel drainage material; placement of approximately 3,000,000, cy of embankment material; construction of T-wall and gates at Hwy 11 and Hwy 90; deep soil mixing; installing new discharge pipes, pumps gear boxes, engines and FSI at 2 USFWS pump stations; constructing sluice gates concrete structures and installation of new pipes.

**Evaluator Remarks:** Effectiveness of Management: The contractor was exceptionally responsive and professional in dealing with the Corps of Engineers and stake holders. Resources were immediately dedicated to critical work areas. Subcontractors were expertly managed. The proposed subcontracting plan was exceeded.

**Timely Performance:** Very proactive in maintaining and adhering to the progress schedule. When there was a need to change work activities, the work schedule was appropriately adjusted to meet the contract completion date. Of particular note is the contractors "work arounds" in Area 4 to accommodate adjacent work by another contractor. It is an understatement to say that exceptional effort was made to meet the HYL A date of 1 June 2011. "MISSION ACCOMPLISHED!"

*"OUTSTANDING"  
CCASS RATING*

NO LOST TIME ACCIDENTS





**Similar Project Experience (Complete this form for eight (8) similar projects) (Proposal Form 8)**

Project owner	Ameren UE	Project name	Taum Sauk Plant Upper Reservoir Dam
<p>General description of project</p> <p>Please refer to the attached project highlight sheet for a full description of the project.</p>			
<p>The Taum Sauk Plant Upper Reservoir Dam project was an Early Contractor Involvement procurement where the contractor was selected at an approximate 70% design-completion stage. The Contractor worked with the Engineer to refine the design from 70% and 90% to provide the Owner with the benefit of contractor-input with respect to constructability of various design features, cost and schedule realism inputs, and inputs on means, methods and equipment necessary to complete the environmental permitting process. This contract was an Alliance-type contract (versus CMAR) but this delivery method is essentially similar to CMAR in many respects. The Contract defined a Target Price that was agreed at the 90% design-completion stage, in a manner similar to the GMP Amendment defined in this project. Performance versus this Target Price as well as other defined project metrics (Safety, Schedule Adherence, Environmental Stewardship, Owner satisfaction) impacted the contractor's overall fees. The Alliance contract provided for the early start on long-lead procurements, etc. in a manner similar to the Early-works package GMP Amendment proposed in this contract.</p> <p><b>The Taum Sauk project was completed successfully and won the United States Society on Dam's Excellence in the Constructed Project for 2010 and a nominated finalist for the Outstanding Civil Engineering Achievement (OCEA) Award.</b></p> <p><b>ASI self-performed 100% of the work.</b></p>			
<p><b>Project Budget and Schedule Performance</b></p>			
<p>Budget history</p>			
Bid or GMP	Amount	% of Bid/GMP Amount	Schedule performance
Change orders- Owner enhancements (additional scope requested by owner)	\$318,000,000	100%	Notice to Proceed
Change orders- Unforeseen conditions	\$45,000,000	14.15%	Contract substantial completion date at notice to proceed
Change orders- Design issues	\$42,000,000	13.21%	Contract final completion date at notice to proceed
Change Orders due to Force Majeure	-----	-----	Change Order authorized substantial completion date
Total change orders	-----	-----	Change Order authorized final completion date
Final cost or GMP	\$87,000,000	27.36%	Actual / estimated substantial completion date
	\$405,000,000	127.36%	Actual / estimated final completion date
			4/01/07
			10/30/2009
			N/A
			4/01/10
			N/A
			4/01/10
			6/30/10



**Key Project Personnel**

Name	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
	John Bowen	Kevin Delo	Brian Looby / Craig Pascal / Chris Hicks / Jeff Romines / Shawn Copeland / Jim Andrews	N/A (by Owner)
Percentage of time devoted to the Project.	100%	100%	100%	N/A
Proposed for this Project.	Yes	Yes	TBD	N/A
Did Individual start and complete the project?	Yes	Yes	Yes	N/A
If not, who started or completed the Project in their place.	N/A	N/A	N/A	N/A
Reason for change.	N/A	N/A	N/A	N/A

**Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)**

Owner	Name	Title/ position	Organization	Telephone	E-mail
	Craig Giesmann	Project Manager	Ameren EU	(314) 554-2535	<a href="mailto:CGiesmann@ameren.com">CGiesmann@ameren.com</a>
Designer	Paul Rizzo	Project Engineer	Paul C. Rizzo Associates	(412) 856-9700	<a href="mailto:Paul.rizzo@rizzoassoc.com">Paul.rizzo@rizzoassoc.com</a>
Construction Manager	N/A	N/A	N/A	N/A	N/A
Surety	David N. Broyles	President	Arthur J. Gallagher RMS, Inc.	(806) 785-1988	<a href="mailto:Nick_Broyles@aig.com">Nick_Broyles@aig.com</a>

**Disputes resolved or pending resolution by arbitration, litigation or dispute review boards**

Number of disputes resolved (provide a brief description of the dispute(s))	Total amount involved in resolved issues:	Number of disputes pending (provide a brief description of the dispute(s))	Total amount involved in resolved Issues:
0	\$0	0	\$0

# TAUM SAUK PLANT UPPER RESERVOIR DAM

Annapolis, Missouri USA



## Fast Facts

### ASI Role:

General Contractor

### Type of Dam:

RCC Gravity Dam with  
Conventional Concrete Facing

### Dam Height:

120+ feet

### Crest Length:

6,750 feet

### RCC Volume:

2,851,000 CY

### Conventional Concrete:

300,000 CY

### Contract Value:

\$405,000,000

## NOTABLE FEATURES

- ◇ 3 RCC batch plants and one conventional batch plant on site.
- ◇ 6 million tons of aggregate processing onsite for RCC.
- ◇ 3.5 million CY rockfill embankment.
- ◇ 0.6 to 1 formed upstream face.
- ◇ Formed stepped downstream face, 6 ft step height.
- ◇ Construction of water supply system with 10,000 lf of 10" HDPE water line.
- ◇ Awarded the 2010 USSD Award of Excellence in the Constructed Project.

## PROJECT HIGHLIGHTS

The Taum Sauk Upper Reservoir Rebuild Project consisted of returning an existing AmerenUE Pumped Storage Generation Facility to working condition after the Upper Reservoir suffered a breach in the existing concrete faced rockfill dam. The facility falls under the jurisdiction of the Federal Energy Regulatory Commission (FERC) and the project is being constructed to satisfy requirements imposed by FERC for a return to service.



These requirements have been fulfilled by replacing the concrete face rockfill dam with a new symmetrical RCC dam. The RCC aggregates for the project were produced by crushing of the remaining rockfill dam materials after removal of the concrete facing element.



The major work activities associated with this process consisted of excavation, rock excavation, crushing, foundation cleaning, foundation grouting, dental/leveling concrete placement, RCC placement, 800 LF emergency spillway with ogee crest, upstream and downstream formwork, and conventional concrete facing placement. Three RCC batch plants and one conventional concrete batch plant were erected onsite to produce these materials required for dam construction. Work also included utilization of owner supplied fly ash in RCC, mined from slurry ponds at separate coal generation facility and transported to the project site. The design included fabrication of fly ash proportioning and feed system for 3 RCC batch plants. The dam axis has a length of 6,750 LF and the dam was constructed in a series of 9 monoliths each containing +/- 300,000 CY of RCC.



## Reference /

### Owner:

Ameren UE  
St. Louis, MO  
Craig Giesmann  
(314) 554-2535

### Engineer:

Paul C. Rizzo &  
Associates  
500 Penn Center Blvd.  
Suite 100, Building 5  
Pittsburgh, PA 15235  
Paul Rizzo  
(412) 856-9700

### ASI Completion

#### Date:

April 2010

### ASI Job

#### Number:

Job # 07-05



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**Similar Project Experience (Complete this form for eight (8) similar projects) (Proposal Form 8)**

<b>Project owner</b>	<b>Stafford County Department of Utilities</b>	<b>Project name</b>	<b>Rocky Pen Run Dam and Reservoir Hydraulic Structures</b>
<p>General description of project</p> <p>Please refer to the attached project highlight sheet for a full description of the project.</p> <p>The project was a silent joint venture between ASI Constructors, Inc. (51%) and Haymes Brothers, Inc. (49%). Due to owner procurement restrictions precluding the joint venture as a prequalified entity (both ASI and HBI had prequalified individually, but separately), the contract was executed in the name of HBI. ASI self-performed all foundation, spillway, and intake/outlet structure construction and was responsible for management of the joint venture and scheduling and coordination of the overall project."</p>			
			

**Project Budget and Schedule Performance**

Budget history		Schedule performance	
	Amount	% of Bid/GMP Amount	
Bid or GMP	\$33,357,755	100%	Notice to Proceed
Change orders- Owner enhancements (additional scope requested by owner)	-----	-----	Contract substantial completion date at notice to proceed
Change orders- Unforeseen conditions	\$2,142,245	6.42%	Contract final completion date at notice to proceed
Change orders- Design issues	-----	-----	Change Order authorized substantial completion date
Change Orders due to Force Majeure	-----	-----	Change Order authorized final completion date
Total change orders	\$2,142,245	6.42%	Actual / estimated substantial completion date
Final cost or GMP	\$35,500,000	106.42%	Actual / estimated final completion date
			2/01/12
			11/11/2013
			3/11/2014
			11/30/2013
			4/30/2014
			11/30/2013
			4/30/2014





**Key Project Personnel**

Name	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
	Robert Hartman	Danny Farrar / Bill Fuller	Brian Looby / David Armstrong/ Pat Hade	Jacob Edwards
Percentage of time devoted to the Project.	100%	100%	100%	100%
Proposed for this Project.	No	TBD	TBD	TBD
Did Individual start and complete the project?	Yes	Yes	Yes	Yes
If not, who started or completed the Project in their place.	N/A	N/A	N/A	N/A
Reason for change.	N/A	N/A	N/A	N/A

**Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)**

Name	Title/ position	Organization	Telephone	E-mail
Bryon Counsell	Construction Project Administrator	Stafford County Department of Utilities	(540) 658-8643	<a href="mailto:BCounsell@staffordcountywa.gov">BCounsell@staffordcountywa.gov</a>
Kevin L. Dill, PE	Project Engineer	URS	(301) 820-3155	<a href="mailto:kevin.dill@urs.com">kevin.dill@urs.com</a>
N/A	N/A	N/A	N/A	N/A
David N. Broyles	President	Arthur J. Gallagher RMS, Inc.	(806) 785-1988	<a href="mailto:Nick_Broyles@aig.com">Nick_Broyles@aig.com</a>

**Disputes resolved or pending resolution by arbitration, litigation or dispute review boards**

Number of disputes resolved (provide a brief description of the dispute(s))	Total amount involved in resolved issues:	Number of disputes pending (provide a brief description of the dispute(s))	Total amount involved in resolved issues:
0	\$0	0	\$0

# ROCKY PEN RUN DAM AND RESERVOIR HYDRAULIC STRUCTURES

Stafford, Virginia USA



## PROJECT HIGHLIGHTS



The Rocky Pen Run Dam and Reservoir project was an off-stream reservoir project near Fredericksburg, Virginia. The project consisted of a pump station located on the Rappahannock River, that transfers water from the river to the reservoir and a new 130-foot-high and 1,000-foot-long earthen embankment dam, and a new 10 MGD water treatment plant.

ASI Constructors, Inc. constructed the dam portion of this project. The embankment dam project included roughly 1 million CY of zoned earthfill, a 160-foot-long labyrinth

weir converging spillway, intake tower, outlet works and associated gates and valves. The reservoir will store roughly 160,000 acre feet (approximately 5.4 billion gallons) of water for the residents of Stafford County. The new reservoir created a more reliable source of water as it will permit diversions from the Rappahannock River during periods of high flow for later use.



### Fast Facts

**ASI Role:**

General Contractor

**Type of Dam:**

Earthen Embankment/  
Conventional

**Dam Height:**

130 feet

**Crest Length:**

1,000 feet

**Conventional Concrete:**

11,317 CY

**Contract Value:**

\$35,500,000

### NOTABLE FEATURES

- ◇ Largest public works project in Stafford County, Virginia.
- ◇ Reliable source of water for the region.
- ◇ 1 million CY of zoned earthfill.
- ◇ 160-foot-long labyrinth weir converging spillway.

### Reference /

**Owner:**

Stafford County  
Department of Utilities  
Bryon Counsell,  
Construction Project  
Administrator  
1300 Courthouse Road  
Stafford, VA 22554

**Engineer:**

URS Corporation  
12420 Milestone Cntr Dr  
Germantown, MD 20876  
Kevin L. Dill, PE  
T. (301) 820-3155  
C. (301) 717-0501  
[kevin.dill@urs.com](mailto:kevin.dill@urs.com)

Larry Chronister  
Parsons Onsite  
Representative  
T: (540) 658-4253  
C: (717) 226-1851  
[larry.l.chronister@parsons.com](mailto:larry.l.chronister@parsons.com)

**ASI Completion****Date:**

November 2013

**ASI Job****Number:**

Job # 12-01



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**ASI Constructors, Inc.**

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[www.asiconstructors.com](http://www.asiconstructors.com)



**Similar Project Experience (Complete this form for eight (8) similar projects) (Proposal Form 8)**

<b>Project owner</b>	<b>Comal County</b>	<b>Project name</b>	<b>Dry Comal Creek Flood Retarding Structure</b>
----------------------	---------------------	---------------------	--

General description of project

Please refer to the attached project highlight sheet for a full description of the project.

ASI Constructors, Inc. had a crew of 50 employees who worked around the clock, six days a week, to obtain the substantial completion date of July 31, 2012 for a deadline mandated for the county to get a \$12.2 million federal grant.

Please refer to Section 2.03. ASI is proposing the utilization of the same key personnel for the current proposal.



**Project Budget and Schedule Performance**

Budget history		Schedule performance	
	Amount	% of Bid/GMP Amount	Days
Bid or GMP	\$12,694,310	100%	12/15/11
Change orders- Owner enhancements (additional scope requested by owner)	\$130,337	1.03%	7/10/12
Change orders- Unforeseen conditions	-----	-----	9/30/12
Change orders- Design issues	-----	-----	N/A
Change Orders due to Force Majeure	-----	-----	N/A
Total change orders	-----	-----	7/10/12
Final cost or GMP	\$12,824,647	101.03%	9/30/12



Key Project Personnel									
Name	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	Percentage of time devoted to the Project.	Proposed for this Project.	Did Individual start and complete the project?	If not, who started or completed the Project in their place.	Reason for change.
	ASI: Kevin Delo REM: Bill Obenchain	ASI: Jim Fuller / Jim Brower	ASI: Brian Looby / Rick Montano REM: Dennis Good	ASI: Brandon Burnett REM: Bill Obenchain	100%	Yes as to Kevin Delo	Yes	N/A	N/A
	100%	100%	100% as to ASI 25% as to REM	100% as to ASI 25% as to REM	TBD	Yes	Yes	N/A	N/A
	Yes as to Kevin Delo	TBD	TBD	TBD	Yes	Yes	N/A	N/A	N/A
	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)									
	Name	Title/ position	Organization	Telephone	E-mail				
Owner	N/A	N/A	NTMWD	N/A	N/A				
Designer	Marc Miller	Project Engineer	Freese & Nichols	(817) 735-7525	N/A				
Construction Manager	Wayne Barker	Construction Manager	Garney Companies	(816) 741-4600	wbarker@garney.com				
Surety (ASI)	David N. Broyles	President	Arthur J. Gallagher RMS, Inc.	(806) 785-1988	Nick_Broyles@ajg.com				
Surety (REM)	Kevin McMahon	Executive Vice President	Willis of Denver	(303) 765-1507	Kevin.mcmahon@willis.com				
Disputes resolved or pending resolution by arbitration, litigation or dispute review boards									
Number of disputes resolved (provide a brief description of the dispute(s))	Total amount involved in resolved issues:	Number of disputes pending (provide a brief description of the dispute(s))	Total amount involved in resolved Issues:						
0	\$0	0	\$0						

# DRY COMAL CREEK FLOOD RETARDING STRUCTURE

New Braunfels, Texas USA



## Fast Facts

### ASI Role:

General Contractor

### Type of Dam:

Roller-Compacter Concrete

### Dam Height:

85 feet

### Crest Length:

1,500 feet

### RCC Volume:

80,663 CY

### Conventional Concrete:

7,300 CY

### Contract Value:

\$ 12,824,647

## NOTABLE FEATURES

- ◇ Milled 22,000 CY of rock for excavation.
- ◇ Installed 25 ft. deep, over 1,000 ft. long cutoff wall.
- ◇ Grout enriched facing upstream and downstream.
- ◇ Built on a dry creek bed.

## PROJECT HIGHLIGHTS

The Dry Comal Creek Dam is a 1,500 foot long and 100 foot high flood control dam located on near New Braunfels, Texas on the Dry Comal Creek watershed. The dam is on a tributary of Dry Comal Creek and helps to prevent flooding in the Guadalupe River basin. It is the fifth flood-control dam built on these tributaries of the creek since the 1970s. It is also the first finished of five new dams proposed to prevent flooding in the region after a massive flood in 1998.

This watershed conveys water only during large storm events, which have historically caused significant damage to homes and businesses in New Braunfels. Dry Comal Creek Dam provides flood protection to the city of New Braunfels up to the 100 year storm event.

ASI Constructors, Inc. had a crew of 50 employees who worked around the clock, six days a week, to obtain the substantial completion date of July 31, 2012 for a deadline mandated for the county to get a \$12.2 million federal grant.

This project consisted of constructing a roller-compacted concrete flood control structure. Major work activities for this project consisted of excavating 21,000 CY rock, a 990 foot long and 20 foot deep cutoff wall, and batching and placing 82,000 CY of roller compacted concrete, 4,600 CY of structural concrete, and 9,000 CY of grout enriched roller compacted concrete. Work also included foundation prepping and grouting.



### ASI Constructors, Inc.

1850 E. Platteville Blvd.; Pueblo West, CO 81007  
T. (719) 647-2821 F. (719) 647-2890  
www.asiconstructors.com

## Reference /

### Owner:

Comal County  
Purchasing Office  
1297 Church Hill Dr  
New Braunfels, TX 78130

### Engineer:

Freese & Nichols  
10814 Jollyville Road  
Building 4, Ste. 100  
Austin, TX 78759  
Mr. Victor Vasquez  
VMV@freese.com

## ASI Completion

### Date:

September 2012

## ASI Job

### Number:

Job # 11-17



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**Similar Project Experience (Complete this form for eight (8) similar projects) (Proposal Form 8)**

<b>Project owner</b>	<b>City of Westminster</b>	<b>Project name</b>	<b>Standley Lake Dam</b>
<p>General description of project</p> <p>Please refer to the attached project highlight sheet for a full description of the project.</p> <p><b>Please note the General Contractor for this project was ASI-R.E. Monks Joint Venture.</b></p> <p><b>This project was completed on budget and 4 months ahead of schedule.</b></p> <p><b>Winner of the 2005 AGC Aon Award.</b></p>			
			
		 <p>Associated General Contractor's Build America Award 2005</p>	

**Project Budget and Schedule Performance**

Budget history			Schedule performance	
	Amount	% of Bid/GMP Amount	Date	Days
Bid or GMP	\$30,649,208	-----	07/01/02	
Change orders- Owner enhancements (additional scope requested by owner)	\$1,861,492	6%	Contract substantial completion date at notice to proceed	01/01/05
Change orders- Unforeseen conditions	-----	-----	Contract final completion date at notice to proceed	02/01/05
Change orders- Design issues	-----	-----	Change Order authorized substantial completion date	-----
Change Orders due to Force Majeure	-----	-----	Change Order authorized final completion date	-----
Total change orders	\$1,861,492	6%	Actual / estimated substantial completion date	9/01/04
Final cost or GMP	\$32,510,700	106%	Actual / estimated final completion date	10/01/04

**Key Project Personnel**



Project Manager		Project Superintendent		Safety Manager		Quality Control Manager	
Name	ASi: Rick Kerr REM: Bill Rice	ASi: Lee Schermerhorn REM: Bill Obenchain	ASi: Craig Pascal REM: Dennis Good	ASi: Jeff Lawson REM: Bill Obenchain	ASi: Rick Kerr REM: Bill Rice	ASi: Lee Schermerhorn REM: Bill Obenchain	ASi: Jeff Lawson REM: Bill Obenchain
Percentage of time devoted to the Project.	100% for ASI 25% for REM	100%	100% for ASI 25% for REM	100%	100% for ASI 25% for REM	100%	100%
Proposed for this Project.	No	No	No	No	No	No	No
Did Individual start and complete the project?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If not, who started or completed the Project in their place.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reason for change.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>							
Name	Title/ position	Organization	Telephone	E-mail			
Dan Strietelmeier	Project Manager	City of Westminster	(303) 658-2179	<a href="mailto:dstreite@cityofwestminster.us">dstreite@cityofwestminster.us</a>			
James Schneider	Vice President / Project Manager	CH2MHill	(303) 771-0900				
N/A	N/A	N/A	N/A	N/A			
David N. Broyles	President	Arthur J. Gallagher RMS, Inc.	(806) 785-1988	<a href="mailto:Nick_Broyles@aig.com">Nick_Broyles@aig.com</a>			
Kevin McMahon	Executive Vice President	Willis of Denver	(303) 765-1507	<a href="mailto:Kevin.mcmahon@willis.com">Kevin.mcmahon@willis.com</a>			
<b>Disputes resolved or pending resolution by arbitration, litigation or dispute review boards</b>							
Number of disputes resolved (provide a brief description of the dispute(s))	Total amount involved in resolved issues:	Number of disputes pending (provide a brief description of the dispute(s))	Total amount involved in resolved Issues:				
0	\$0	0	\$0				

# STANDLEY LAKE DAM REHABILITATION

Westminster, Colorado USA



## PROJECT HIGHLIGHTS

The Standley Lake Dam is located in Westminster, Colorado and provides water storage for the cities of Westminster, Thornton, and Northglenn. The renovation work began in August of 2002 in order to correct embankment slope stability problems and enlarge the spillway to meet Colorado safety standards.

The rehabilitation of the Standley Lake Dam included the construction of new, tunneled outlet works with a multi-level intake, the placement of additional berms on the downstream face to enhance dam stability and emergency spillway construction. The project included excavation of 1.4 million CY spillway channel and construction of embankment stability berm. New outlet works involved twin 72 inch diameter micro-tunnel wet taps of the existing reservoir with drives of approx. 650 ft. and 1,220 ft. at depths of 80 ft. to 110 ft. below water surface. It also included retrieval pit excavation and construction of two underwater intake structures. Work included construction of a 35 ft. diameter reinforced concrete lined valve shaft 100 ft. deep, excavation of 1,000 ft. of 11.5 ft. horseshoe conventional tunnel with 102 inch diameter steel conduit liner along with 2,750 ft. of buried 102 inch steel conduit liner, and 720 ft. of buried 84 inch steel conduit. Work included stream release facilities with two 36 inch fixed cone valves, a new valve house, new 7,500 CY concrete labyrinth weir spillway and 26,000 CY RCC in eight drop structures. Work also included abandonment of existing outlet works through the dam.



### Fast Facts

**ASI Role:**

General Contractor

ASI/R.E. Monks JV

**Type of Dam:**

Earthfill

**Dam Height:**

90 feet

**Crest Length:**

8,500 feet

**RCC Volume:**

28,000 CY

**Conventional Concrete:**

7,000 CY

**Dam Embankment:**

1,030,000 CY

**Contract Value:**

\$32,500,000

### NOTABLE FEATURES

- ◇ Winner of the 2005 AGC Aon Award.
- ◇ Twin 72" micro-tunnel intakes and "wet" lake taps.
- ◇ Underwater intake structure installation.
- ◇ Eight RCC grade control drop structures.
- ◇ Labyrinth spillway weir.
- ◇ 965' conventional outlet tunnel.
- ◇ The project was completed under budget and 4 months ahead of schedule.

### Reference /

**Owner:**

City of Westminster  
Dan Strietelmeier  
(303) 658-2179

**Engineer:**

CH2MHill  
9191 South Jamaica St.  
Englewood, CO 80112  
James Schneider  
Vice President/Project  
Manager  
(303) 771-0900

**ASI Completion****Date:**

October 2004

**ASI Job****Number:**

Job #11-0205



*Built to Last.*

**ASI Constructors, Inc.**

1850 E. Platteville Blvd.; Pueblo West, CO 81007

T. (719) 647-2821 F. (719) 647-2890

www.asiconstructors.com





**Similar Project Experience (Complete this form for eight (8) similar projects) (Proposal Form 8)**

Project owner	City of Waco, TX	Project name	Lake Brazos Dam Replacement
General description of project			

The project involved the construction of a labyrinth weir to replace the existing 102" gated spillway. The project included demolition, earthwork, reinforced concrete, sheetpiling, tie-back anchors, handrail, security fencing and gates, and other miscellaneous improvements. % of Work Self-Performed: 89%

**Project Budget and Schedule Performance**

Budget history		Schedule performance		
	Amount	% of Bid/GMP Amount	Date	Days
Bid or GMP	\$15,936,324		1-2-2006	
Change orders- Owner enhancements (additional scope requested by owner)	\$506,115	0.03%	8-25-2007	
Change orders- Unforeseen conditions			9-24-2007	
Change orders- Design issues			12-9-2007	
Change Orders due to Force Majeure			1-8-2008	
Total change orders			12-9-2007	
Final cost or GMP	\$16,442,439		1-8-2008	

**Key Project Personnel**

Name	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
	Curtis Weston	Jason Davis	Jack Brazil	Regis Jones
Percentage of time devoted to the Project.	30%	100%	5%	100%
Proposed for this Project.	Yes	Yes	Yes	Yes
Did Individual start and complete the project?	Yes	Yes	Yes	Yes
If not, who started or completed the Project in their place.				
Reason for change.				

**Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)**

Name	Title/ position	Organization	Telephone	E-mail
Owner	David Kerr	City of Waco	254-709-0053	davidk@ci.waco.tx.us
Designer	Victor Vasquez	Freese & Nichols	817-735-7300	
Construction Manager	N/A			
Surety	Jodi Wallace	Traveler's Casualty & Surety	630-961-7037	jmwallace@aew-insurance.com

**Disputes resolved or pending resolution by arbitration, litigation or dispute review boards**

Number of disputes resolved (provide a brief description of the dispute(s))	Total amount involved in resolved issues:	Number of disputes pending - describe	Total amount involved in pending issues:
N/A	N/A	N/A	N/A

# LAKE BRAZOS DAM REPLACEMENT - WACO, TX

## Location

Waco, Texas

## Owner

Ricky Kerr  
City of Waco  
200 Colcord Ave.  
Waco, Texas 76707  
254-750-8040

## Contract Value

\$16,400,000

## Completion Date

July 2007



The previous dam, a steel arched hydraulic actuated structure was completed as a gated spillway in 1970, and its gates posed maintenance and operational problems. Since the original construction, the dam had not provided a reliable lake level, and the City of Waco had struggled to maintain and repair the gates. To address the maintenance and reliability issues a labyrinth weir was designed to replace the existing gated spillway.

The new dam is 600 feet in length with 25 cycles totaling 3200 feet of Weir wall overall. Without expanding the dam's footprint or rerouting the flowing river during construction, half of the project was completed over the foundation of the existing dam, and the remaining half was constructed behind a 15' cofferdam wall.

Archer Western self-performed 89% of the work and was responsible for all facets including subcontractor management, self-performed work, scheduling, QA/QC and safety management. Archer Western self-performed excavation, piping, structural concrete, and process equipment installation.

Severe rains and flooding occurred as construction neared completion, and the Labyrinth Weir performed as designed.

## Unique Project Requirements

- Fast-track schedule
- Design assist and construction of cofferdams/TRS
- Installed temporary sheet pile for complex excavation and embankments
- Dam modification/gates installation.
- Complex mechanical equipment
- Performed pile-driving of 50,000 SF of sheet pile
- Marine environment/navigable waterway
- Large concrete structure pours that required 14,000 CY of concrete
- Placed 10,500 tons of rip rap and stone
- Environmentally-sensitive area required coordination with the City of Waco

*The United States Society on Dams' Award for*

**Best Constructed Dam in 2008**

*American Public Works Association*

*Texas Chapter*



**Current Projects and Projects Completed Within the Last Five (5) Ten (10) Years (Proposal Form 9)** 1

<b>Project owner</b>		<b>Project name</b>	
General description of project:			
Project cost		Date project completed	
Key project personnel		Project manager	Project superintendent
Name		Safety manager	Quality control manager
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
Owner	Name	Title/ position	Organization
Designer	Name	Title/ position	Organization
Construction manager	Name	Title/ position	Organization
Telephone	Name	Title/ position	Organization
E-mail	Name	Title/ position	Organization
<b>Project owner</b>			
General description of project:			
Project cost		Date project completed	
Key project personnel		Project manager	Project superintendent
Name		Safety manager	Quality control manager
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
Owner	Name	Title/ position	Organization
Designer	Name	Title/ position	Organization
Construction manager	Name	Title/ position	Organization
Telephone	Name	Title/ position	Organization
E-mail	Name	Title/ position	Organization
<b>Project owner</b>			
General description of project:			
Project cost		Date project completed	
Key project personnel		Project manager	Project superintendent
Name		Safety manager	Quality control manager
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
Owner	Name	Title/ position	Organization
Designer	Name	Title/ position	Organization
Construction manager	Name	Title/ position	Organization
Telephone	Name	Title/ position	Organization
E-mail	Name	Title/ position	Organization



**Current Projects and Projects Completed Within the Last Ten (10) Years (Proposal Form 9)**

Project owner	City of Lubbock, TX	Project name	Lubbock Terminal Storage Reservoir
<p>The project consisted of furnishing and installing a new 225 MG terminal reservoir, 4 ea. 1 MG evaporation ponds, 2 ea. 1 MG retention ponds, "thru levee" drainage structures, channels, water control gates, and miscellaneous piping and appurtenances. General scope included trench safety systems, 15,200 lf of silt fence for erosion control, 660 sf of concrete riprap at the 24" culvert, 695,558 cy structural excavation, 712,673 cy of structural backfill, pond liners consisting of 184,953 sy of 20 oz. geotextile fabric and 146,594 sy of 60 mil HDPE liner, 26,930 cy of soil cement at the evaporation ponds, 5311 tn stone bedding for piping, 9,531 tn of 6" caliche base for roads around site and on reservoirs with 7,586 sy of asphalt paving, an inlet structure of 405 cy, an outlet structure of 167 cy, access roads, landings and concrete apron at reservoir of 3,815 cy, 1,976 lf of 16" DIP reclaimed water, 1,972 lf of 36" DIP emergency overflow, 3,476 lf of 48" DIP raw water piping and bypass line, 2 ea. 24" slide gates, 5 ea. 48" slide gates, and 1 ea. 72" slide gate.</p> <p>The project was awarded using the Owner's Competitive Sealed Proposal procurement method, with 40% of the selection criteria based on contractor qualifications and 60% based on price.</p> <p><b>RE Monks was earthwork subcontractor</b>  <b>% of Work AW Self-Performed: 60%</b></p> <p><b>Problems encountered and corrective action taken to successfully complete the project:</b> The evaporation ponds originally required soil cement stabilization with on-site material utilization. After extensive research and testing it was determined that the on-site soil did not meet project requirements and would have required a major change order to resolve the situation. Archer Western worked closely with the engineer and owner to provide a no cost solution to the problem by installing 6" of Fibermesh concrete in lieu of the soil cement stabilization.</p>			
Project cost	\$9,699,857	Date project completed	9/8/2011
Key project personnel	Project manager Wayne Pursley	Project superintendent Shawn Durham	Safety manager Greg Henderson
Name			Quality control manager Tom Grammer
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
	Name	Title/ position	Organization
Owner	Wood Franklin	Chief Engineer	City of Lubbock
Designer	Bryan Stephens	Project Manager	Parkhill, Smith, & Cooper
Construction manager	Steve Keeling	Project Manager	Black & Veatch
			Telephone
			806-775-2164
			806-473-2200
			913-207-2466
			E-mail
			wfranklin@mail.ci.lubbock.tx.us
			bstephens@team-psc.com
			keelingsw@bv.com





**CMAR - Advanced Membrane and WTP Improvements**

**Dallas County Park Cities Municipal Utility District**

**Project owner**

**Project name**

The primary components of this project were the construction of a new 24 MGD low-pressure membrane filtration facility, membrane feed pump station, upgrades to the existing filtration system, replacement of the raw water screen, flocculation equipment, rapid mixers, and painting of existing clarifiers. **Serving as the CMAR, AW was responsible for:** GMP and cost model development, estimating, constructability reviews, scheduling, subcontractor management and selection, value engineering, QA/QC, safety, bonds, permits, insurance and general construction. AW assisted with the bidding phase and selection of a membrane supplier, and negotiated a contract with GE/Zenon for the preconstruction services to assist with the design of the membrane facility. AW negotiated an amendment to GE/Zenon's contract for the supply of the membrane equipment, performance and start up services, and assisted the engineer with the completion of the design for the Membrane Facility. Our project team developed the construction bid packages, incorporated schedule constraints for tie-ins to the existing facilities during start up and testing of the new membrane facility, and developed the GMP.



Project cost	\$32,532,384	Date project completed	3/4/2013
Key project personnel	Project manager Wayne Pursley	Project superintendent	Safety manager Greg Henderson
Name	Wayne Pursley	Travis Vick	Tom Grammer

**Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)**

	Name	Title/ position	Organization	Telephone	E-mail
Owner	Larry McDaniel	Utility Director	DCPCMUD	214-652-8639	mcdaniel@parkcitieswater.com
Designer	Susan Crawford	Project Manager	CDM Smith	214-346-2800	crawfordsl@cdm.com
Construction manager	Wayne Pursley	Construction Manager	Archer Western	972-457-8500	wpursley@walshgroup.com



Project owner	DeKalb County Public Works	Project name	Scott Candler WTP
<p>This project involved the new construction of a 378,000 sf, 150 MG inline water treatment facility. The new plant is housed under one roof with facilities for pre-zone, rapid mix, flocculation, sedimentation, intermediate ozonation, filtration, chemical feed, and solids handling facilities utilizing centrifuges. The scope of work included all process, electrical, supervisory control, data acquisition, HVAC, plumbing, instrumentation, control equipment, components, and systems required for a complete and operational plant. AW served as the general contractor/construction manager, and supervised all aspects of construction work. The 32-acre site required 400,000 CY of excavation, and site finishes included yard piping, grading, and finish landscaping, with 21,506 yards of paved access roadways and 1,643 linear feet of curb and gutter. The project included state of the art systems for supervisory control, data acquisitions, process control, and other systems, as well as the most current motor, pump, and generator systems available.</p> <p>The facility also included a 54,000 sf administration building including a full state-of-the-art laboratory. The facility structure contains architectural elements including approximately 71,000 sf of architectural precast, translucent panels, store front glass and glazing, and aluminum composite panels. AW has also supervised all elements of the construction of mechanical and electrical systems, including a 13,400 square foot electrical/generator building to house 4 new 2000 KW diesel generators and switchgear. A 48,000 gallon diesel fuel storage system consisting of 4 separate tanks was also installed.</p>			
Project cost	\$155,013,636	Date project completed	3/15/2006
Key project personnel	Project manager James Goyer	Project superintendent Lynn Walker	Quality control manager Paul Gilsdorf
Name	Title/ position	Organization	E-mail
Owner	Project Manager	DeKalb County Public Works	rchen@dekalbcountyga.gov
Designer	Project Manager	CDM	kcomstock@brwncaid.com
Construction manager	N/A		
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>			



**USACE and City of Phoenix, AZ**      **Tres Rios Restoration project and Pump Station**

**Project owner**

**Project name**

Tres Rios was a collaborative effort between the US Army Corps of Engineers, funding 65% of the project, and the City of Phoenix, funding 35% of the project. The Ecosystem Restoration and Flood control project is geared to improve a seven-mile long, 1,500-acre section near Salt and Gila rivers in southwestern Phoenix, according to the city. The project scope included a flood protection levee, effluent pump station, emergent wetlands, as well as riparian corridors and open water marsh areas. The full-scale project also involved 480 acres of emergent wetlands that will help clean the highly-treated effluent from the 91st Avenue Wastewater Treatment Plant, provide wildlife habitat and create an area with trails, picnic areas and an environmental education center for visitors to experience the spirit of the historic river. The 300MGD effluent pump station, constructed within the 91st Avenue Wastewater Treatment Plant, will help the community to reuse treated wastewater. "Creating wetlands in the desert is a challenge mainly because of one reason – water," the city says. "This vital resource is in high demand to promote growth, sustain industry and provide life to our yards, parks and agricultural areas."



In addition, we have constructed concrete spillways and flow control structures with associated weir gates, sluice gates, and stop logs. The project also included the installation of 18,000 LF of underground water lines and 600 LF of 84 inch fiberglass effluent lines. In addition to our self-performed activities, the Project Team managed and coordinated the installation of over 300,000 aquatic and terrestrial plants to create the wetlands habitat. **The project was a traditional hard bid contract, but the US Army Corps of Engineers requested additional embankments to the project that were to be completed as design-build. Once given the notice to proceed on the embankments, AW and Jacobs worked together on completing the design. The team performed constructability reviews, cost modeling, alternative pricing strategies, and conducted weekly design meetings.** The additional work included the creation of 27,000 linear feet of small irrigation ditches which required sustainable materials to line the ditches. These materials required consideration of environmental factors, durability, and native materials, while providing a cost effective solution to the project. AW also ensured that the subcontractors remained involved in all aspects of the project. For example, the landscape subcontractor frequently met with the US Army Corps of Engineers to discuss what plants were available that could be incorporated into the project. **PROJECT WON USACE AWARD OF EXCELLENCE 2012;**

**CCASS overall rating of OUTSTANDING**

Project cost	\$59,997,323	Date project completed	December 2011
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Kory Burden	Randy Good	Gary Campbell
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
	Name	Title/ position	Organization
Owner	Joel Rodriguez	Project Engineer	USACE
Designer	Dusan Stanistic	Project Manager	Jacobs Engineering
Construction manager	N/A		
		Telephone	E-mail
		602-650-3954	Joel.rodriguez@usace.army.mil
		602-650-4058	Dusan.stanistic@jacobs.com
			Quality control manager
			Scott Scheider



**Design-Build - Pima County Water Reclamation Facility**

**Pima County**

**Project name**

For this project, AW partnered with CH2MHILL in a **design-build capacity** to build a new 32 MGD wastewater reclamation facility immediately adjacent to an existing, operational facility that was decommissioned upon completion of the new plant. The new plant is part of a countywide Regional Optimization Master Plan to upgrade sewage treatment operations. It is the largest infrastructure project Pima County has ever undertaken. Pima County's new 32 MGD wastewater reclamation facility will produce class B quality effluent. Construction included headworks, dissolved air flotation system, bioreactor, final clarifiers, chlorine contact basin, disk filter system, new administration and maintenance buildings, and associated yard piping, utilities, and miscellaneous sitework consisting of grading and revegetation, and a perimeter masonry wall.



**Archer Western joined the proposal effort at 0% design in January of 2010, collaborating on a design to quickly ramp up construction, keep underground crews efficient, and utilize cranes and concrete forms to maximize the pace of the project. The schedule, cost model, equipment and supervision roles were developed and refined during the proposal stage.**

Project cost	\$52,200,000	Date project completed	June 2013
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Doug Post	Bill Price	Dale Walker
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
Owner	Ken Shaler	Title/ position	Organization
Designer	Joe Glicker	Project Engineer	Pima County
Construction manager	N/A	Project Manager	CH2MHill
			Telephone
			503-822-7289
			503-736-4378
			E-mail
			Matt Seale





**American Municipal Power Inc. Cannelton Hydroelectric Project – Hawesville, KY**

**Project name**

The Project is a run-of-the-river hydroelectric generating facility that features three bulb-type turbine/generators, each with a controllable pitch propeller (Kaplan) runner. The units are designed for an approximate maximum discharge of 51,000 cubic feet per second at a rated head of 20 feet and installed capacity of 84 megawatts. The powerhouse measures about 258 feet long by 207 feet wide by 107 feet high. The project is located at existing U.S. Army Corps of Engineers Cannelton Locks and Dam Facility on the Ohio River. As the general contractor we installed a sheet pile cut-off wall; improvements to the existing ground below the closure structures; construction of a cast-in-place concrete powerhouse with approach and tailrace channels; construction of closer structures on the north and south side of the powerhouse; operation and removal of the cofferdam and dewatering system; installation, testing, and start-up of Owner-furnished equipment including three bulb turbine generator units, gate equipment, powerhouse crane, main power transformers, trashrake, and log grabber; construction of site facilities, substation, transmission line interconnection, and recreation facilities.



Project cost	\$191,976,000	Date project completed	May 2014
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Joshua Bohanon	Scott Guentzel	Charles Lockhart
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
Owner	Name Phil Meier	Title/ position Assistant VP	Organization American Municipal Power Inc.
Designer		Architect/Engineer	
Construction manager	N/A		
			Telephone 614-540-1111
			E-mail pmeier@amppartners.org
			Quality control manager Martin Maxey



Project owner	City of Phoenix	Project name	North Gateway Pump Station
<p>The City of Phoenix North Gateway Pump Station project consisted of the construction of 8.5 miles of dual 24" force main pipeline. Within the 8.5 miles are two 78" diameter bores, one of 700 LF and the other of 460 LF, under the Central Arizona Project canal. The project also required the construction of influent sewer lines, odor control facilities, a new pump station and associated utilities, junction structures, a chemical handling facility, and diversion structures.</p>			
Project cost	32,300,00	Date project completed	March 2006
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Doug Post	Randy Good	Gary Campbell
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>			
Owner	Name John Masche	Title/ position Project Manager	Telephone 602-692-8386
Designer	Damon Williams (at Jacobs now)	Project Manager	602-217-1020
Construction manager	Archer Western		Damon.williams@jacobs.com
			Quality control manager Rob Infantino
			E-mail john.masche@phoenix.gov



**Project owner** City of Baltimore **Project name** Back River ENR Phase III – Baltimore, MD

General description of project: Construction includes upgrades to the Nitrification Process and the construction of a new Denitrification Process and associated work. This work includes: New Flow Distribution Structure for the primary effluent; New Denitrification Pumping Station and Denitrification Diversion Chamber; New Denitrification Filter Facility; New Denitrification Chemical Facility; New Methanol Facility; New Backwash Treatment Facility; Modifications to existing Activated Sludge Plants No. 2 & 3 ( 6 basins each-one at a time); Lime Silo Demolition @ Sludge Plant No. 3; Blower Building No. 3 Control Modifications; Nitrification Chemical Building Ferric Chloride system modifications; Electrical Power Distribution related to all of the above described work; Plant Process Control System upgrades and new installation; New Communication System plant wide; Site work including Mass Excavation, Dewatering, 108" and 144" PCCP, Yard Piping, Electrical & Communication Duct banks, Demolition, Junction Box Construction, Electrical Power Substations, Construction of 2 new Electrical Buildings. In the Denitrification Facility, Backwash Facility, Pump Station and Flow Distribution Structure the following work will be done; Electrical/Instrumentation; Mechanical, Plumbing, HVAC, Concrete, Architectural, Structural, Masonry Bridge Cranes, Equipment Installation, Start-up and Performance Testing.

Project cost	\$263,558,205	Date project completed	September 2016
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Joseph Chaklos	Stephen Naschert	Jeffrey Getty
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
Owner	Rick Aiken	Title/ position	Organization
Designer	N/A	Project Manager	City of Baltimore
Construction manager	Gary Keller	Construction Mgr	Whitman, Requardt, and Associates Louis Berger Inc
		Telephone	Rick.aiken@baltimorecity.gov
		E-mail	gkeller@louisberger.com
		Quality control manager	Jeffrey Tedder



**Colorado Springs Utilities**      **Project name**      **Southern Delivery System – Raw Water Pump Stations – Colorado Springs, CO**

General description of project: The Southern Delivery System (SDS) Raw Water Pump Stations project includes the construction of three raw water Pump Stations: 1) Juniper Pump Station; 2) Williams Creek Pump Station; 3) Bradley Pump Station. These Pump Stations are located from Pueblo to Colorado Springs, Colorado. The program also consists of three pump stations with a capacity of 50 MGD each that are taking water from Pueblo Reservoir in Pueblo Colorado at elevation 4750.00 and pumping it over 50 miles to a new water treatment plant in Colorado Springs at elevation 6364.00, currently under construction. This is pumping water over 1600 feet in elevation. AW has the general construction contract for these pump stations, and R.E. Monks is our subcontractor for the site grading, and structural excavation and backfill for these pump stations.



Project cost	\$78,314,181.74	Date project completed	November 2015
Key project personnel	Project manager William Nelson	Project superintendent Bob Pretz, Lon Baker, Bo Addleman	Safety manager Greg Henderson
Name			Quality control manager Tom Grammer
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
	Name	Title/ position	Organization
Owner	Joseph Rasmussen	Project Manager	Colorado Springs Utilities
Designer	Tom Charles	Project Manager	CDM Smith
Construction manager	Matthew Schultz	Construction Manager	MWH
		Telephone	E-mail
		719.668.4173	jrasmusen@csu.org
		303.383.2300	CharlesTJ@cdmsmith.com
		719-668-3750	maschultz@csu.org





Project owner		Dallas Water Utilities		Project name		Southside WWTP Solids Dewatering	
<p>This project included a dewatering structure that houses 12 belt filter presses with an observation deck and multiple conveyors and new operations building. It houses the polymer system, sludge pumps, electrical room, SCADA room, control room, lab, and mechanical room. Features include a cake hopper and conveyor structure with two silos that can hold approx. 400,000 lbs of cake each. The project included stormwater and wastewater pump stations with vertical turbine pumps and submersible suction pumps. The existing blend tank equipment was demoed and replaced with new recirculation/chopper pumps and positive displacement blowers, with jet aeration system and aluminum domes.</p> <p>All structures and equipment were in place within the project timeline. The engineer provided the integration services for the owner, however, the owner did not have a contract with the engineer to perform this work until 2 years into the project. By this time the equipment vendors had already installed their programming and test ran their equipment. Unfortunately, the vendors programming did not fall in line with the specifications. The belt filter presses and cake hopper system programming had to be completely redone and checked out before commencing with the un-witnessed and witnessed field testing and the 60 day operational availability demonstration. Scope additions also contributed to the extension of the completion dates.</p>							
Project cost	\$39,780,794	Date project completed		December 2013			
Key project personnel		Project manager		Project superintendent		Safety manager	
Name		Curtis Weston		Mark Miller		Mario Gomez	
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>							
Owner	Leslie Castillo	Title/ position	Project Manager	Organization	Dallas Water Utilities	Telephone	214-948-4560
Designer	Chamindra Dassanyake	Title/ position	Project Manager	Organization	Malcolm Pirnie	Telephone	817-870-2630
Construction manager	N/A	Title/ position		Organization		E-mail	cdassanyake@hazenandsawyer.com (current)
Quality control manager		Jason Buoy					





**FE Weymouth WTP (ORP) Oxidation Facilities – La Verne, CA**

**Project name**

**Metropolitan Water District**

**Project owner**

General description of project: The project consists of performing all necessary work to retrofit the F.E. Weymouth Water Treatment Plant to treat water with an oxygen/ozone system. The work includes constructing an ozone generation building, ozone contactors, contactor inlet and outlet conduits, liquid oxygen (LOX) storage and feed system, chemical feed facilities, electrical facilities, large diameter yard conduits and piping, grading, paving, demolition, adding and modifying plant utilities and controls, connections to existing facilities, landscaping, commissioning, training, installation of Metropolitan Furnished ozonation equipment such as LOX Tanks and Vaporizers, ozone generators and related systems, and all other accessories.

Project cost	\$95,497,513	Date project completed	May 2016
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Blayne Goodman	Ronne Padilla, Jr.	Gary Campbell
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
	Name	Title/ position	Organization
Owner	Lou Francuz	Sr Engineer	Metropolitan Water District of Southern CA
Designer	Brandon Yallaly	Sr Engineer/Projects	Carollo Engineers
Construction manager	N/A		
		Telephone	E-mail
		(909) 392-5405	lfrancuz@mwdh2o.com
		(208) 376-2288	byallaly@carollo.com



Project owner	PPL Generation, LLC	Project name	Holtwood Power Plant Expansion Project – Holtwood, PA	
<p>The project includes development of a 130 MW hydro-electric power- generation plant expansion and shad restoration project at PPL Holtwood LLC's existing hydro-electric plant. This project scope included a new powerstation that will contain two company furnished and contractor installed 65 MW vertical Kaplan hydroelectric turbine generator systems. This includes providing most of the ancillary balance of plant equipment. Walsh provided a new draft tube extension for the existing Unit 1. This will extend Unit No. 1's draft tube from its current discharge point in the existing tailrace to a discharge point in the Piney Channel by tunneling under the existing diversion wall. Walsh demolished the existing forebay skimmer wall and provided a new replacement skimmer wall. Walsh self-performed all excavation including excavation and proper disposal of both submerged and dry soil as well as excavation rock to widen and deepen the existing forebay and excavation and proper disposal of both submerged and dry (cofferdammed) rock (primarily) to deepen and widen portions of the main tailrace and Piney channel. Sitework included providing new roads, parking areas, a railroad overpass bridge, Incidental Waste Water Basin (IWB), relocated utilities, tailrace fishing access, and retaining walls. Walsh installed New Inflatable Flashboards on the existing dam crest to replace the existing rubber dams. Walsh also modified the existing fish elevator by providing additional attraction flow to Entrances A, B and C via a new attraction water pipe, extending the Entrance A and B crowder travel, adding eel passage equipment, and encasing the Entrance C gate guides in concrete and reinstalling the Entrance C gate, guide and operator. All work was performed with consideration of wetlands, fish migration, and eagle and osprey netting restrictions.</p>				
Project cost	\$237,170,000	Date project completed	December 2012	
Key project personnel	Project manager Bernard Conway	Project superintendent John Aitchison	Safety manager Ed Buffington	Quality control manager Larry Glover
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>				
Owner	Name Ralph Conforti	Title/ position (610) 295-3550	Organization PPL Generation, LLC	Telephone 610-774-5987
Designer	E-mail rkconforti@pplweb.com			
Construction manager	N/A	Kleinschmidt	717-687-7211	



**PPL Montana, LLC**      **PPL Montana Rainbow – Great Falls, Montana**

Redevelopment of the Rainbow Dam project site into a single generating unit that will have a nominal rated capacity of 60 MW output. The upgrade included the realignment of the county road; construction of a new intake, powerhouse, and penstock; installation of an approximately 60 MW turbine and generator, transformers, breakers, and switchgear; construction of a new tailrace; construction of a new road to access the new powerhouse; development of sedimentation ponds for dewatering of the excavations during construction; and disposal of spoils from project excavation on PPL Montana land. Walsh Construction self-performed the cofferdam installation, excavation and all concrete structures. The concrete work includes a new retaining wall at the powerhouse; new intake structures; the new 0.45 mile long power canal; a new power canal spillway; new penstock intake; new tailrace channel, access bridge over the canal; new drainage crossing and new powerhouse structure. Walsh coordinated activities with specialty contractors for installing the penstock pipe and the turbine and generator equipment. The penstock is a 25 foot diameter steel pipe that will convey water from the penstock forebay to the powerhouse. All work was coordinated with consideration for wetlands, fish and other aquatic habitat.



Project cost	\$92,783,269		Date project completed	April 2012	
Key project personnel	Project manager	Project superintendent	Safety manager	Quality control manager	
Name	Duane Petersen	Paul Kaminski	Gary Campbell	Robert Flood	

**Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)**

	Name	Title/ position	Organization	Telephone	E-mail
Owner	Michael Magnan	Senior Project Manager	PPL Montana, LLC	(610) 774-5334	mgmagnan@pplweb.com
Designer	All calls go through Michael Magnan		URS Washington Division	(610) 774-5334	mgmagnan@pplweb.com
Construction manager	Michael Magnan	Senior Project Manager	PPL Montana, LLC	(610) 774-5334	mgmagnan@pplweb.com





Project owner		Pennsylvania Turnpike Commission		Project name		Lehigh/Pohopoco Bridge – Palmerton, PA	
<p>General description of project: The Lehigh River and Pohopoco Creek Bridge Replacements Project is a component of the Pennsylvania Turnpike's self-funded, 10-year capital improvement plan. This undertaking required 1.77 miles of total reconstruction on the Northeast Extension (I-476) of the Turnpike. Towering as high as 125 feet above the Lehigh River and Pohopoco Creek, two combined northbound and southbound bridges were replaced by four independent prestressed concrete bridges. Minimizing impact on the Turnpike's paying travelers, the 1530 and 1020 foot-long bridges were built adjacent to the old ones. Completely realigning the freeway established design-build challenges. On the south end of the bridges the highway would run into the side of a mountain, calling for 500,000 cubic yards of excavation. On the north end of the bridges Interstate 476 would have been pushed into thin air, which was solved by constructing a 16,500 square foot T-wall.</p>							
Project cost		\$101,500,000		Date project completed		October 2012	
Key project personnel		Project manager		Project superintendent		Safety manager	
Name		Daniel Lucas		Michael LaSalle		Steven Thomas	
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>							
Owner		Name		Title/ position		Organization	
Designer		Phil Hawley		Construction Engineer Manager		Pennsylvania Turnpike Commission	
Construction manager		Scott M. Shimko		Transportation Project Manager		Borton Lawson	
		N/A					
						Telephone	
						(610) 279-1645	
						E-mail	
						phawley@paturnpike.com	
						sshimko@borton-lawson.com	
						Quality control manager	
						William Marcarello	





Project owner		Denton County Transit Authority		Project name		DCTA Passenger Rail Service – Lewisville, TX	
<p><b>CM/GC -</b> DCTA (Denton County Transit Authority) passenger rail system serves Denton and Carrollton in North Central Texas. This segment of rail service consists of 21.6 miles and was the first phase of a project that interlines with DART to provide a single seat service from Denton to downtown Dallas. The general scope of work for the DCTA Rail Project included over 20 miles of FRA class IV single track installation; minor track alignment modifications; rail maintenance facility and yard construction; five (5) passenger rail platforms; three (3) park-and-ride facilities; landscaping and irrigation; approximately 43 Highway grade crossings; approximately 10 miles of hike-and-bike trail relocation including a pedestrian bridge; a major railroad bridge structure; approximately ten (10) new bridge class culverts carrying railroad loads, retaining walls, and sound walls; drainage and utilities; signals; communications; fare collection; and operations and maintenance.</p>							
Project cost		\$67,550,000		Date project completed		December 2010	
Key project personnel		Project manager		Project superintendent		Safety manager	
Name		Clayton Sorrells		Martin Swartfager		Brent Green	
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>							
Owner		Name		Title/ position		Organization	
Designer		Name		Title/ position		Organization	
Construction manager		Name		Title/ position		Organization	
		Jim Cline		President		Denton County Transportation Authority	
		Robert Kennah		Engineer		URS	
		N/A					
						Telephone	
						972-221-4600	
						214-741-7777	
						E-mail	
						jcline@dccta.net	
						Quality control manager	
						Kevin Blaylock	





Project owner	North Texas Municipal Water District	Project name	Wilson Creek WWTP Expansion
<p>Construction included an addition of a Biological Nutrient Removal treatment train with diffusers, mixers and nitrogen recycle pumps; blowers and RAS/WAS/Scum pumps for the BNR train; Secondary Clarifier for the BNR train, disk filters, UV Disinfection system for the BNR; belt filter press and associated conveyor; non-potable water pump; blower building for BNR train; administration building and new access road; effluent flow monitoring; new electrical grounding system for both existing and new facilities.</p>			
Project cost	\$31,787,592	Date project completed	December 2012
Key project personnel	Project manager Curtis Weston	Project superintendent Frank Etier	Safety manager Mario Gomez
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>			
Owner	Brian Campbell	Title/ position Project Manager	Organization NTMWD
Designer	Jenna Covington	Project Engineer	CH2MHill
Construction manager	N/A		
			Quality control manager Tom Grammer
			E-mail bcampbell@ntmwd.com
			Telephone 972-442-5405
			972.663.2266 Jennafer.Covington@CH2M.com






Project owner	Cobb County Marietta Water Authority	Project name	Wyckoff WTP Upgrades – Acworth, GA
<p>General description of project. This project includes improvements to the water treatment plant including: new raw water metering, rapid mix facility, and raw water splitter box structure. Demo and reconstruction of Flocc. Sedimentation Basins 1-4, construction Flocc. Sedimentation Basins 7&amp;8. Rehab of existing Filters 9-16. Construction of new Filters 17-20. Construction of the new Granulated Activated Carbon Filtering Facility. Construction of new post flash chemical mixing facility. New Chemical Building feeding flash chemicals to plant. New Settled Solids Equalization Basin, Back Wash Equalization Basin. Rehab to the existing Back Wash Recycle Basin. Lastly construction of three new Finished Water Flow Meter Vaults, and rerouting of natural stream culverts, piping, electrical and I&amp;C.</p>			
Project cost	\$77,099,444	Date project completed	August 2013
Key project personnel	Project manager Matthew McCormack	Project superintendent William Kirkpatrick	Safety manager Juan Rodriguez Orozc
Name			Quality control manager Kurt Glover
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
	Name	Title/ position	Organization
Owner	Patrick Pherson	Project Administrator	Cobb County Marietta Water Authority
Designer	Ed Minchew	Project Engineer	CH2M Hill
Construction manager	N/A		
			Telephone (770) 514-5350 770-643-9617
			E-mail ppherson@ccmwa.org Ed.Minchew@CH2M.com





Project owner		Algonquin Water Services		Project name		CMAR - Gold Canyon WRF Phase 3 Expansion	
Archer Western performed this expansion of an existing water reclamation facility from 0.8 MGD to 1.9 MGD through a series of multiple bypass operations, utility relocations, and ingenuity. Facing potential regulatory penalties, this fast-track project included multiple phase construction and multiple GMPs; the first \$8.5M portion was designed and completed in just six months, meeting the required regulatory deadlines to the day. To complete the project, AW constructed the new Administration Building. Plant upgrades included new headworks facility, bioreactors, blower building, secondary clarifiers, disk filtration, solids handling, odor control systems, and an administration building.							
Project cost	\$9,900,000	Project manager	Rob Infantino	Date project completed	December 2005	Safety manager	Gary Campbell
Key project personnel		Project superintendent	Randy Good	Quality control manager			Rich Meyers
Name							
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>							
	Name	Title/ position	Organization	Telephone	E-mail		
Owner	Arne Kleppe	Project Manager	Algonquin Water Services	623-262-4120			
Designer	Tom Nichols	Project Manager	Damon S. Williams	623-935-9367			
Construction manager	N/A						



Project owner	Cape Fear Public Utility Authority	Project name	Sweeney WTP – Wilmington, NC
<p>General description of project: This project consisted of expanding the existing Sweeney Water Treatment Plant to 35 MGD including phased demolition of existing facilities, construction of new facilities, and modifications to the existing plant. Work was completed in three phases. Phase One consisted of the demolition of one of the original structures of the plant, built in the 1800s, where a new wash water equalization basin was constructed. Phase Two was the construction of the first half of the new "South Plant" - one super pulsator clarifier system and one new bank of filters, built at the location of the old wash water holding tank. A new high service pump station on the east side of the plant was also constructed and put into service. Phase Three included the demolition of the filtration/pumping/administration building, providing area for the construction of a second super pulsator clarifier system, a second bank of filters, a new UV treatment facility, and a new administration building.</p>			
Project cost	\$59,657,320	Date project completed	August 2012
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Daniel Nawrocki	Scott Guentzel	Jeffrey Getty
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>			
Owner	Name Christene Mitchell	Title/ position Engineering Manager	Organization Cape Fear Public Utility Authority
Designer	Jeff Coggins	Engineer	Black & Veatch
Construction manager	N/A		
			Telephone (910) 332-6354
			E-mail christene.mitchell@cfpua.org
			Quality control manager Johnathan Glynn
			cogginsJD@bv.com



**Athens-Clarke County**      **Athens North Oconee WRF – Athens, GA**

**Project name**

General description of project: The county's construction program for the renovation and expansion of the North Oconee Water Reclamation Facility Project consisted of the construction of new facilities and selective demolition, including decommissioning and removing plant process and associated equipment. All construction work was organized in sequential phases that were closely coordinated with the plant's operation staff and performed while the facility remained fully operational. The contract included management of subcontractors and suppliers, construction of structural concrete, including concrete equipment pads, integrated systems controls, and installation, commissioning, and testing of the SCADA system. The project allowed the plant to increase the discharge flow capacity from 38 ML/Day to 53 ML/Day.




Project cost	\$92,446,686	Date project completed	May 2011
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Kelly Hadley	Andrew Curl	Juan Rodriguez Orozc
			Quality control manager
			Jeffrey Rhodes

**Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)**

	Name	Title/ position	Organization	Telephone	E-mail
Owner	Jeff Knight	Environmental Engineer	Athens-Clarke County	(706) 613-3470	jeff.knight@athensclarkecounty.com
Designer	John Horton	Engineer	CH2M Hill	706-604-9095	john.horton@ch2m.com
Construction manager	Pat Thomas	Sr. Constr. Mgr	Jacobs Engineering	(678) 333-0245	pat.thomas@jacobs.com



Project owner	US Army Corps of Engineers	Project name	DC Aqueduct Dalecarlia WTP – Chevy Chase, MD
General description of project: The project consisted of a new Residuals Processing Facility to collect and dewater the solids generated by the existing Dalecarlia Water Treatment Plant in preparation for off-site disposal. Delivered via new underground piping, the facility is fed by three new pump stations constructed at the Georgetown Reservoirs, the Dalecarlia Forebay Reservoir, and the existing Dalecarlia Treatment. Modifications to the existing Dalecarlia Water Treatment Plant included the installation of new hose less vac collection equipment in four existing sedimentation basins, construction of a new electrical substation, and the renovation of an existing pump/electrical station.	<p></p> 		
Project cost	\$109,800,798	Date project completed	October 2012
Key project personnel	Project manager Bernard Conway	Project superintendent James Pellegrino Jr.	Safety manager Bradley Ahonen
Name	Roger Davis	Title/ position Resident Engineer	Quality control manager Michael Dobson
Owner	Glenn Palen	Architect & Engineer of Record	Telephone 202-966-2316
Designer	N/A	Organization US Army Corps of Engineers	E-mail Roger.K.Davis@usace.army.mil
Construction manager		CH2M Hill	glenn.palen@ch2m.com
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			





**South Cobb Tunnel Pump Station – Austell, GA**

**Project owner** **Cobb County Water System** **Project name** **South Cobb Tunnel Pump Station – Austell, GA**

General description of project: The project consists of a 130-MGD lift station to convey wastewater flows from the tunnel to the plant, with 6 32.5 MGD vertical non-clog centrifugal pumps in a conventional wet well / dry pit configuration. The lift station will have a concentric cylinder configuration with the inner cylinder functioning as the wet well and the dry well occupying the annular space between the outer cylinder and the wet well exterior wall. Both the wet well and the dry well will be divided into two bays. The wet well will be provided with an odor control system, while the dry wells will be provided with elevators, auxiliary pumps, HVAC and dehumidification systems.



<b>Project cost</b>	\$66,642,057	<b>Date project completed</b>	October 2011
<b>Key project personnel</b>	<b>Project manager</b>	<b>Project superintendent</b>	<b>Safety manager</b>
<b>Name</b>	Matt McCormack	Jesse Chamberlain	Brad Ahonen
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
	<b>Name</b>	<b>Title/ position</b>	<b>Organization</b>
<b>Owner</b>	Juby Jones	Engineering Mgr	Cobb County Water System
<b>Designer</b>	Jeff Acton	Engineer	Jacobs
<b>Construction manager</b>	David L. Rendini	Construction Manager	Parsons
		<b>Telephone</b>	<b>E-mail</b>
		770-419-6339	JBJones@cobbcounty.org
		404-427-6272	Jeffrey.Acton@jacobs.com
		770-238-6431	david.rendini@parsons.com



Project owner	Dallas Area Rapid Transit		Project name	AW-H DART CMGC-3 Line Section NW-2, NW-3, NW-4 – Dallas, TX	
<p>General description of project: This is the second of two large-scale Light Rail Transit System Extension projects being constructed for Dallas Area Rapid Transit (DART). On the second project Archer Western has been teamed with Herzog Contracting Corp as a Joint Venture on Line Sections NW-2, NW-3 and NW-4. Construction of these line sections include 13.5 miles of track, 5 at-grade and 3 elevated passenger stations, and 3 elevated bridge structures which are comprised of approximately 46,000 linear feet of bridge deck. The majority of the line was double LRT tracks with 15'-6" centers and built alongside active freight railroad. Over 2 million MH with no lost time accidents. <b>AW provided CM services during 12 months of preconstruction. The team provided \$32 Million in approved value engineering cost savings to DART. The project was completed on time and under budget, with 0.8 percent change orders and no claims.</b></p>					
Project cost	\$468,945,784	Date project completed	December 2010		
Key project personnel	Project manager	Project superintendent	Safety manager	Quality control manager	
Name	Ben Withered	Brett Myers	Jack Brazil	Greg Henderson	
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>					
Owner	Name	Title/ position	Organization	Telephone	E-mail
Designer	Diane Golhofer	Project Manager	DART	214-328-9677	diane@dgconsultants.com
Construction manager	Scott Ashley	Project Engineer	ACT 21 – JV	214-749-2735	sashley@dart.org
	Gary Geppert	Construction Manager	Archer Western	972-457-8500	ggeppert@walshgroup.com



Project owner	Fulton County	Project name	Johns Creek Wastewater Treatment Facility & Environmental Campus – Alpharetta, GA
<p><b>A design-build</b> project for the construction of a new state-of-the-art 15 MGD wastewater advanced treatment facility. The campus like design of this treatment facility along with the educational center and historic park features provides an aesthetic addition to the neighborhood. This facility uses an activated sludge treatment process using a Membrane Bio-reactor as the major treatment system process. This allows Fulton County to meet the highest water quality standards well into the future. The project consisted of approximately 120,000 cy of mass earthwork required to construct the below grade treatment process. For odor control reasons, the entire process train is covered. The above grade structures consist of an Administration Building, Educational Building, Laboratories, Maintenance Facility and Generator Building.</p> <p>Process system design includes the following processes: raw sewage collection; modify existing influent pump station; new influent pump station; coarse screening; equalization; grit removal; primary clarification; fine screening; grit and grease removal; activated sludge process; membrane system; UV disinfection; effluent flow pumping, transmission, outfall; reuse system; digestion and solids handling; aerobic digestion; chemical storage and metering; odor control; noise guarantee; system controls and SCADA system.</p> <p><b>Services Provided: Serving as the lead of the Design-Build team, AW was responsible for management and delivery of the entire project. Our scope included estimating, scheduling, subcontractor management, value engineering, QA/QC, safety, traffic control, bonds, permits, insurance, and general construction.</b></p>			
Project cost	\$137,656,741	Date project completed	November 2008
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Frank Curl	Andy Curl	Brad Ahonen
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>			
	Name	Title/ position	Organization
Owner	Paul Williams	Contact Administrator	Fulton County
Designer	Kelly Comstock	Project Manager	Brown & Caldwell
Construction manager	N/A		
		Telephone	E-mail
		404-730-7400	Paul.williams@fultoncountyga.gov
		770-673-3669	kcomstock@brwnclld.com
			Quality control manager
			Matt McCormack



Project owner		San Diego County Water Authority		Project name		Olivenhain-Hodges ESP Pumped Storage Projects/Pump – Escondido, CA	
<p>The Lake Hodges Pump Station is part of the San Diego County Water Authority's Emergency Storage Project (ESP). The Olivenhain-Hodges Pumped Storage Project is an integral component of the Lake Hodges projects, providing electrical generating capacity while enhancing Emergency Storage Project requirements to ensure regional water reliability. The ESP is a system of reservoirs, interconnected pipelines, and pumping stations that makes water available to the San Diego region in the event of an interruption in imported water deliveries. As water is conveyed to the Lake from the reservoir, it passes through turbines to generate electricity. Power generation is intended for peak demand and purchased by local utility SDG&amp;E. During times of emergency or drought, the turbines are reversed and water is pumped from the lake back into the reservoir.</p>							
Project cost		\$76,562,936		Date project completed		November 2008	
Key project personnel		Project manager		Project superintendent		Safety manager	
Name		William Seale		Christian Twombly		Stephen Samuelson	
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>							
		Name		Title/ position		Organization	
Owner		Gary Bousquet		Principal Engineer		San Diego County Water Authority	
Designer		James Witnik		VP		MWH	
Construction manager		Bill Zondarak		CM		Jacobs Engineering Group	
						Telephone	
						(858) 522-6823	
						(858) 751-1232	
						(619) 255-3770	
						E-mail	
						gbousquet@sdcwa.org	
						james.a.witnik@mwhglobal.com	
						bill.zondarak@jacobs.com	





<b>Project owner</b>	<b>City of Scottsdale</b>	<b>Project name</b>	<b>CMAR - CAP Water Treatment Plant Expansion – Scottsdale, AZ</b>
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This project was a three-part package designed to increase the plant capacity from 50 to 80 MGD. It included a 6 MG pre-stressed reservoir, associated process piping and a splitter box structure around two existing 54-inch finished water pipes connecting two existing reservoirs to the new reservoir through two 84-inch diameter pipelines. It also included a pretreatment contact basin, two cast in place concrete metering vaults, a junction vault, and approximately 1,400 LF of buried steel pipe ranging in size from 36" to 66" in diameter. The installation of utility, process, and mechanical piping, process equipment, cast-in-place concrete, as well as excavation was self-performed on this project.

**Preconstruction included: GMP & cost model development, estimating, scheduling, subcontractor management and selection, value analysis, and permit procurement. Archer Western also encouraged phasing to help balance various aspects of the project, most notably assisting in phased design deliverables, meeting key operation constraints, and cash flow requirements. The project team also participated in assisting with design pilot programs, process equipment demonstrations, and equipment selection.**



<b>Project cost</b>	\$78,337,745	<b>Date project completed</b>	June 2008
<b>Key project personnel</b>	<b>Project manager</b>	<b>Project superintendent</b>	<b>Safety manager</b>
<b>Name</b>	Brad Sanders	Rich Meyers	Gary Campbell
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
<b>Owner</b>	<b>Name</b>	<b>Title/ position</b>	<b>Organization</b>
	Art Nunez	Water Recl Svcs Dir	City of Scottsdale
<b>Designer</b>	Peter Tymkiw	Project Manager	Malcolm Pirnie
<b>Construction manager</b>	Rob Infantino	CMAR Services Director	Archer Western
			<b>Telephone</b>
			480-312-8724
			602-797-4612
			602-246-1485
			<b>E-mail</b>
			anunez@scottsdaleaz.gov
			peter.tymkiw@arcadis-us.com
			rinfantino@walsgroup.com
			<b>Quality control manager</b>
			Rob Infantino (as CMAR services director)



**CMAR - Surprise WRF 8 MGD Expansion – Surprise, AZ**

**Project name**

**City of Surprise**

**Project owner**

This CMAR project called for an 8 million gallon per day expansion, thereby increasing the capacity of the facility from 8 to 16 million gallons per day. This facility treats typical domestic wastewater from residential and commercial areas in the City of Surprise.

This project included improvements to the influent pumps, headworks, aeration basins, disinfection facilities, and ancillary facilities. The installation of utility, process, and mechanical piping, process equipment, cast in place concrete, as well as excavation was self-performed on this project. Installation of an underground pipeline in a public street required coordination of traffic control and access to local business adjacent to the construction activity. **Constant communication and a respectful attitude with the business owners enabled this activity to be completed without a single complaint. In addition, we worked closely with the Design Engineer and Owner to develop a phased delivery of seven GMPs and five construction packages in order to meet the aggressive regulatory requirement schedule milestones.**

% of work self-performed: 75%



Project cost	\$78,155,090	Date project completed	September 2008
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Duane Petersen	Clay Gundersen	Gary Campbell
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
	Name	Title/ position	Organization
Owner	Kinga Stanek	Sr Project Manager at time of project	City of Surprise
Designer	Raj Thakur	Owner	RT Engineers
Construction manager	N/A		
		Telephone	E-mail
		708-588-4113	kinga.stanek@mwrdd.org
		602-309-7078	not available
			Rob Infantino as CMAR director



**Design Build - Nashville Central Biosolids & Wastewater Treatment Facility – Nashville, TN**

Nashville Central Wastewater Treatment Plant was a 125 MGD, \$120 million design-build, three year project that replaced the conventional incineration method of solids handling where all the waste is hauled to a nearby landfill. This biosolids process will convert the waste producing a high-grade reusable fertilizer pellet. The new solids handling facility is designed for a future maximum month loading condition of 137 dry tons per day.


- This project is a large \$120 million alternate delivery method project.
- Archer Western was required to work closely with the Client to utilize part of the existing process water for testing while maintaining full functioning abilities of the existing solids handling facilities until such time as the new Biosolids Facility was fully commissioned. Many hours of coordination meetings were logged with action plans distributed for effective communications.

**% of work self-performed: 90%**



Project cost	\$120,186,146	Date project completed	October 2008
Key project personnel	Project manager Kelly Hadley	Project superintendent Doug Hilgers	Safety manager Bo Means
Name	Project manager Title/ position	Project superintendent Organization	Safety manager Organization
Owner	Ron Taylor Project Manager	Metropolitan Govt. of Nashville	Quality control manager Mitch Palmer
Designer	Shannon Lambert Project Manager at time of project	Black & Veatch	Telephone 605-862-4585
Construction manager	N/A		E-mail Ron.taylor@nashville.gov shannon.lambert@bwsc.net



Project owner	Cobb County Water System	Project name	RL Sutton Biosolids Handling, Phase II – Smyrna, GA
<p>General description of project: The Phase II improvements and expansion of the R.L. Sutton WRF Facility Improvements Project will consist of the construction of new facilities and refurbishing of existing facilities to enhance the operational efficiency and mechanical reliability of the biosolids handling and treatment facilities.</p> 			
Project cost	\$55,669,949	Date project completed	July 2008
Key project personnel	Project manager Adam Williams	Project superintendent Andy Curl	Safety manager Brad Ahonen
Name			Quality control manager Pavel Mayfield
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
Owner	Name Richard Wittman	Title/ position Project Manager	Organization Cobb County Water System
Designer	Jeff Mills	Project Manager	Camp Dresser & McKee
Construction manager			
			Telephone 770-419-6326
			E-mail richard.wittman@cobbcounty.org
			millsja@cdmsmith.com





**Chaparral Water Treatment Plant – Scottsdale, AZ**

**Project name**

**City of Scottsdale**

General description of project: This project for the City of Scottsdale consists of a new 30-million-gallon per day water treatment plant. Construction includes a raw water pumping station; raw water and secondary strainers; a membrane filtration system; granular activated carbon contractors; 5.5-million-gallon finished water storage reservoir, and other structures. The project contains over 130,000 cubic yards of excavation and over 22,000 cubic yards of concrete.



Project cost	\$65,580,226	Date project completed	February 2006
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Doug Post	Dale Casino	Gary Campbell
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
	Name	Title/ position	Organization
Owner	Art Nunez	Water Recl Svcs Dir	City of Scottsdale
Designer	Dallas Sweet	Designer of Record	Black and Veatch
Construction manager	N/A		
			Brad Sanders
			Quality control manager
			Telephone
			E-mail
			480-312-8724
			(602) 324-6970
			anunez@scottsdaleaz.gov
			sweetd@bv.com



Current Projects and Projects Completed Within the Last Five (5) Years (Proposal Form 9)

Project owner	Town of Castle Rock	Project name	North Meadows Extension <u>CMGC</u> - Kraemer North America (Monks Construction- Silent Partner)	
<p>General description of project: <u>CMGC</u></p> <ul style="list-style-type: none"> <li>• Construction of new roadway (major arterial) connecting The Meadows subdivision to I-25 with a divided intersection at Hwy 85</li> <li>• Bridges over the BNSF and Union Pacific RR, Hwy 85 and Plum Creek</li> <li>• Major drainage components include: <ul style="list-style-type: none"> <li>• 166 lf of concrete box culvert installation below Hwy 85 &amp; Union Pacific RR</li> <li>• Storm drain and detention ponds</li> <li>• Relocation of a major sewer line requiring bypass pumping</li> </ul> </li> <li>• On I-25, top down construction was utilized to install both NB and SB Bridges below I-25</li> <li>• 850,000 cy earthwork</li> </ul>				
Project cost	\$65,000,000.00		Date project completed	May, 2016
Key project personnel	Project manager	Project superintendent	Safety manager	Quality control manager
Name	Mike McNish (Kraemer)	Kevin Sutiliff (Monks)	Leroy Garcia (Monks)	Chad Dubbs (Kraemer)
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>				
Owner	Name	Title/ position	Organization	Telephone
	Frank Main	Town Representative	Town of Castle Rock	303-660-1015
Designer	George Tsiouvaras	Engineer	TSH	303-771-6200
Construction manager	Tim Maloney	Program Manager	Kraemer North America	303-688-750
				E-mail
				N/A
				N/A
				tmaloney@edkraemer.com





**Current Projects and Projects Completed Within the Last Five (5) Years (Proposal Form 9)**

Project owner	UTW Academy Development	Project name	South Academy Highlands
<p><b>General description of project:</b></p> <ul style="list-style-type: none"> <li>• 2,500,000 cy excavation to zone fills within a 112 AC site</li> <li>• 1,000,000 cy of rock excavation</li> <li>• Sand filter installation below 42,000 sf of building area</li> <li>• Overexcavation of future commercial building sites</li> </ul>			
Project cost	\$9,669,776	Date project completed	May, 2015
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Sam Sprinkle (Monks)	Joe Cline (Monks)	Leroy Garcia (Monks)
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>			
	Name	Title/ position	Organization
Owner	Alan Bornstein	Representative	UTW Academy Development
Designer	Kyle Campbell	Division Manager	Classic Consulting
Construction manager	Matt Barrows	Project Manager	Brinkmann Constructors
		Telephone	E-mail
		314-259-5803	N/A
		719-785-0790	kcampbell@classicconsulting.net
		720-841-8211	mbarrows@askbrinkmann.com
			Joe Cline (Monks)





Current Projects and Projects Completed Within the Last Five (5) Years (Proposal Form 9)

Project owner	United States Army Corps of Engineers		Project name	CAB GSAB Hangar	
General description of project:	<ul style="list-style-type: none"> <li>• Infrastructure improvements for a 120,000 SF Helicopter Hangar Facility</li> <li>• 250,000 SY of Airfield Pavement</li> <li>• 2.5 miles of reconstruction of improved roadway within Fort Carson</li> <li>• 650,000 TN Import of general fill</li> <li>• 110,000 TN of structural fill</li> <li>• 105,000 CY of onsite cut to fill</li> </ul>				
Project cost	\$5,782,260	Project manager	Jason Greer (Monks)	Date project completed	August, 2015
Key project personnel	Project manager	Project superintendent	Kevin Jones (Monks)	Safety manager	Leroy Garcia (Monks)
Name	Justin Scherzberg	Construction Rep	USACE	Quality control manager	Nick Zunk (Monks)
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>					
Owner	Justin Scherzberg	Title/ position	Organization	Telephone	E-mail
Designer	USACE Omaha District	Construction Rep	USACE	719-358-3789	Justin.c.scherzberg@usace.army.mil
Construction manager	Kyle Robbins	Project Manager	Swinerton	303-423-0632	KRobbins@swinerton.com





**Current Projects and Projects Completed Within the Last Five (5) Years (Proposal Form 9)**

Project owner	Colorado Springs Utilities	Project name	SDS Water Treatment Plant
<p><b>General description of project:</b></p> <ul style="list-style-type: none"> <li>• Site preparation for a new 50 MGD Water Treatment Plant, 10 MG Raw Water Storage Tank, 7 MG Underground Finished Water Reservoir</li> <li>• 60 foot over excavation and replacement for the plant and tank</li> <li>• Structural excavation and backfill for the process building under-slab piping and footers</li> <li>• Site grading prep for concrete backwash lagoons and sediment drying beds</li> <li>• Over excavation and backfill of the raw water pump station</li> <li>• Excavation and backfill for the underground finished water reservoir</li> <li>• 1,360,000 CY of earth movement</li> </ul>			
Project cost	\$6,731,970.00	Date project completed	Dec 2016
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Jason Greer (Monks)	Kevin Jones (Monks)	Leroy Garcia (Monks)
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>			
	Name	Title/ position	Organization
Owner	John Kolkman	CSU Representative	Colorado Springs Utilities/MWH Global
Designer	Bart Giles	Design Manager	Carollo
Construction manager	Paul Laufer	Project Manager	McCarthy
		Telephone	E-mail
		303-533-1900	N/A
		303-980-8277	BGiles@carollo.com
		719-668-6515	PLaufer@McCarthy.com





**Current Projects and Projects Completed Within the Last Five (5) Years (Proposal Form 9)**

Project owner	Denver Water	Project name	Hazelatine Reservoir Slope Improvements			
<p><b>General description of project:</b></p> <ul style="list-style-type: none"> <li>• Stabilizing interior slopes within Hazelatine Reservoir</li> <li>• 6,000 lf of slope re-construction adjacent to the Platte River</li> <li>• 522,000 cy of zone fill</li> <li>• 187,00 cy of slope protection fill</li> <li>• 330,000 cy of buttress fill</li> <li>• 488,000 cy of foundation excavation and prep</li> <li>• 72 ac of seeding/slope stabilization</li> </ul>						
Project cost	\$2,700,000.00	Date project completed	March, 2013			
Key project personnel	Project manager	Project superintendent	Safety manager	Quality control manager		
Name	George Wehner (Monks)	Bill Obenchain (Monks)	Dennis Good (Monks)	Ryan McConnell (Monks)		
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>						
	Name	Title/ position	Organization	Telephone	E-mail	
Owner	Robert Mahoney	Director of Engineering	Denver Water	(303) 628-6000	Robert.Mahoney@denverwater.org	
Designer	Jeff Buston		Tetra Tech	(303) 772-5282	Jeff.butson@tetrattech.com	
Construction manager	Patty Ortiz	Manager	Diverse Project Consultants Inc	(303) 906-0213	portiz@diverse-llc.com	





**Current Projects and Projects Completed Within the Last Five (5) Years (Proposal Form 9)**

Project owner	City of Colorado Springs	Project name	Sand Creek Basin #6
<p><b>General description of project:</b></p> <ul style="list-style-type: none"> <li>• Reconstruction of existing detention pond and dam damaged previously by flooding</li> <li>• Excavation and export of excess material for detention pond enlargement</li> <li>• Complete removal and reconstruction of existing dam</li> <li>• Installation of soil riprap slope protection</li> <li>• Installation of soil riprap sediment basins</li> <li>• Outlet structure/pipe with sand filter</li> <li>• Wetland establishment and protection</li> </ul>			
Project cost	\$1,243,782	Date project completed	May, 2015
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Jason Greer (Monks)	Ray Childs (Monks)	Leroy Garcia (Monks)
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>			
Owner	Name Aaron Egbert	Title/ position City Engineer	Organization City of Colorado Springs
Designer	Rich Wray	Engineer	Kiowa Engineering
Construction manager	Derek Phipps	Construction Manager	AECOM
		Telephone	E-mail
		719-385-5465	AEgbert@springsgov.com
		719-630-7342	rwray@kiowaengineering.com
		719-268-7404	Derek.Phipps@AECOM.com





Current Projects and Projects Completed Within the Last Five (5) Years (Proposal Form 9)

Project owner	United States Army Corps of Engineers		Project name	4 <sup>th</sup> ID Vehicle Bridge	
<p><b>General description of project:</b></p> <ul style="list-style-type: none"> <li>• Construction of one divided intersection and one new standard intersection within Fort Carson</li> <li>• Demolition of a 3-way Civilian Vehicle and Tank Armorment Crossing</li> <li>• .75 miles of road construction with .5 miles of temporary detour</li> <li>• 70,000 TN import of structural fill for bridge abutments</li> <li>• .25 miles of tank roads.</li> </ul>					
Project cost	\$3,279,849		Date project completed	June, 2016	
Key project personnel	Project manager	Project superintendent	Safety manager	Quality control manager	
Name	Jason Greer (Monks)	Ray Childs (Monks)	Leroy Garcia (Monks)	Tae Hillyer (Monks)	
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>					
Owner	Name	Title/ position	Organization	Telephone	E-mail
Designer	Shauna Smith	Construction Rep	USACE	719-358-3789	Shauna.a.smith@usace.army.mil
Construction manager	USACE Omaha District	N/A	USACE	N/A	N/A
	Tommy Bartlett	Project Manager	Medvolt	719-499-5525	Tommy.bartlett@tepa.com





**Current Projects and Projects Completed Within the Last Five (5) Years (Proposal Form 9)**

Project owner	City Of Norfolk	Project name	Western Branch Reservoir Dam Safety Modifications
<p>General description of project: The Work of this Project includes remedial measures to upgrade the Western Branch Reservoir Dam to modern safety standards. The existing, earth embankment dam is about 1,900 feet long by 45 feet high with appurtenances that include a semi-circular reinforced concrete spillway crest, spillway chute slab and training walls, intake tower, embankment parapet walls, and upstream slope paving. The Work includes the construction of a new 500-foot wide roller compacted concrete ("RCC") secondary spillway, embankment reinforcement, a combined steel sheet and soil mix cutoff wall, renovation of the spillway and chute, replacing the concrete parapet wall, a new roadway on the crest, other access improvements, as well as repairs to various dam appurtenances. <b>The included photo is Pre-Construction.</b></p>			
			
Project cost	\$21,943,636.25	Date project completed	EST: March 2017
Key project personnel	Project manager Kevin Mitchell	Project superintendent Tristan Proffet	Safety manager Brian Looby
Name	Name Curt Hauger	Title/ position Project Manager	Quality control manager Jacob Edwards
<p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p>			
Owner	Name Chris Guvernator IV, PE	Organization City of Norfolk Department of Utilities	Telephone (757) 664-6701
Designer	Name N/A	Organization O'Brien & Gere	Telephone (757) 431-2966
Construction manager	Name N/A	Organization N/A	Telephone N/A
			E-mail Curt.hauger@norfolk.gov
			E-mail Chris.Guvernator@obg.com
			E-mail N/A



**Project owner** United States Army Corps of Engineers **Project name** Illinois River Basin Lockport Pool Major Rehabilitation; Stage 1C; Forebay Wall

General description of project: The work for the Lockport Pool Major Rehabilitation, Stage 1C, Forebay Wall Project, Phase I located in Lockport, Will County, Illinois includes the following: Mobilization and demobilization; clearing and grubbing of trees and vegetation; installation of new temporary conduit; removal of existing communication cable and conduit; removal of existing chain-link fencing and gates; removal of existing flagpole, turbine and stone wall appurtenances; removal of existing guardrail; construction of temporary construction access road with processed rock fill and rock surfacing; installation of jersey barriers; removal, salvaging, processing and stockpiling of existing stone retaining wall; excavation, processing and stockpiling of existing rock fill embankment; construction of secant pile shoring wall; located in Lockport, Will County, Illinois includes the following: Mobilization and demobilization; clearing and grubbing of trees and vegetation; installation of new temporary conduit; removal of existing communication cable and conduit; removal of existing chain-link fencing and gates; removal of existing flagpole, turbine and stone wall appurtenances; removal of existing guardrail; construction of temporary construction access road with processed rock fill and rock surfacing; installation of jersey barriers; removal, salvaging, processing and stockpiling of existing stone retaining wall; excavation, processing and stockpiling of existing rock fill embankment; construction of secant pile shoring wall; excavation, processing and stockpiling of existing bedrock; placement of dental concrete; placement of roller-compacted concrete (RCC) for construction of an RCC wall; installation of a seepage control drainage system with perforated and solid PVC pipe and manholes; placement of Portland cement concrete (PCC); placement of impervious fill material; placement of processed rock fill; construction of two secant pile cutoff walls; installation of observation wells; construction of maintenance garage with concrete foundation and slab; construction of a new lower access road with processed rock fill, granular subbase, and RCC pavement; placement of granular subbase and ACC pavement; reinstallation of existing chain-link fencing; installation of new chain-link fencing; installation of new guardrail; removal of existing and installation of new electrical and associated items; removal of existing onsite structures including maintenance garage, concrete cinder tower, and light tower; and reinstallation of existing flagpole, turbine, and stone wall appurtenances; and disposal of excess material. **The included photo is Pre-Construction.**



Project cost	\$31,913,113.00	Date project completed	EST: October 2016
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Jeff Webb	Nelson Brilinski	Brian Looby/Chris Hicks
	Title/ position	Organization	Telephone
Owner	Jeff Scukanec	Area Engineer	USACE
Designer	Jeff Scukanec	Area Engineer	USACE
Construction manager	N/A	N/A	N/A
			E-mail
			Sean Thomason / Jordan Dutoi

**Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)**

Quality control manager	EST: October 2016
Quality control manager	EST: October 2016
Quality control manager	EST: October 2016





**Project owner** | U.S. Army Corps of Engineers | **Project name** | Safety Upgrades and Repairs at Marine Corps Base Quantico

General description of project: D/B repairs to 3 high-hazard dams at Quantico Marine Corps Base, Quantico, VA as follows:



**Lunga Dam:** design and construction of a roller-compacted concrete auxiliary spillway within the existing earthen embankment, design and construction of seepage collection system, design and installation of a method for low level reservoir release at the end of the existing embankment conduit, design and installation of a secondary closure on the main intake tower sluice gate, replacement of existing intake tower components, sealing of cracks in Ogee spillway and clearing of accumulated sediment in front of main sluice gate.

**Breckinridge Dam:** design and construction of additions to the embedded corewall/dam section of the concrete gravity dam for diverting flow from earthen abutments, design and installation of a secondary closure on the main intake tower sluice gate, design and construction of seepage collection system, design and construction of erosion protection along downstream toe, replacement of existing intake components, clearing of accumulated sediment in front of main sluice gate and clearing of accumulated debris within outlet tunnel and replacement of trash screen.

**Gray's Reservoir Dam:** restoration of reservoir to design capacity by removal of deposited materials, disposal of deposited material off Government property, placement of erosion protection along downstream toe, removal and disposal of abandoned trash screen machinery, installation of grated cover, safety railing, intake sluice gate system, intake trash screen system, design and installation of a walkway from left abutment to intake structure, design and installation of manually operated all-weather solar powered lighting along walkway and at intake structure, repair of leaking concrete raw water pipe connected to intake structure, replacement of quote mark air and vacuum release quote mark valve and quote mark suction blow-off assembly quote mark on concrete raw water pipe. Other components of the work include all aspects of health and safety planning and execution, site preparation, surface and groundwater management (to include permanent seepage and erosion control measures), excavation and onsite stockpiling of debris, utility removal/relocation, noise control during construction, site grading, and site restoration (to include fencing, paving, restoration of above and below-ground utilities). **The included photo is Pre-Construction.**

Project cost	\$8,222,350	Date project completed	Est: May 2016
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Peter Yard	Tristan Proffet	Brian Looby
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
	Name	Title/ position	Organization
Owner	Paula M. Beck	Contracting Officer	USACE
Designer	Paula M. Beck	Contracting Officer	USACE
Construction manager	N/A	N/A	N/A
		Telephone	E-mail
		(757) 201-6244	<a href="mailto:Paula.m.beck@usace.army.mil">Paula.m.beck@usace.army.mil</a>
		(757) 201-6244	<a href="mailto:Paula.m.beck@usace.army.mil">Paula.m.beck@usace.army.mil</a>
		N/A	N/A



**Project owner** City of Cullman, AL **Project name** Duck River Reservoir Phase II Dam and Raw Water Intake Project

General description of project: The Project generally consists of construction of the Dam and Raw Water Intake for the Duck River Reservoir. Implementation and maintenance of the Construction Best Management Practices Plan for Erosion and Sediment Control. Access Road Construction and existing road stabilization. Surveying. Limited clearing and Grubbing. Overburden soil removal within the dam footprint. Rock excavation within the dam footprint, spillway and intake area. Installation of cofferdams and inlet structure for river diversion through an existing 10-foot diameter reinforced concrete pipe. Temporary bypass pumping after diversion pipe is plugged. -Dewatering to accomplish construction in the dry. -Final foundation preparation to include dental and trim excavation, preliminary and final foundation cleaning, placement of bedding mortar and dental concrete etc. Foundation grouting to construct a grout curtain and improve foundation. Construction of raw water intake tower and associate gates, electrical service, lighting, gates, trash rack and t-screens with air burst cleaning system. Construction of an outlet works to include valves and vault. Further development of the on-site rock and earthen embankment material sites or approval of off-site material. Construction of a RCC dam, endwalls and spillway, including an on-site batching and transporting and placement of RCC. Construction of a drainage gallery and access shaft in the RCC spillway/Dam. Construction of foundation drains. Construction of stilling basin. Installation of two 48 inch steel pipes for raw water conveyance to the pump station and for minimum and emergency releases. Note that the pump station will be constructed in the future and is not part of this Project. Tie-in and modifications to the existing 10-foot diameter diversion pipe and installation of associated valves. Demolition of a portion of the 10-foot diameter pipe in the stilling basin area. Construction of earth core, rock fill embankment sections of the dam. Construction of rock bolts in the stilling basin to stabilize rock cuts. Installation of a precast concrete building for electrical and controls associated with the dam and raw water intake tower. Building will also house the compressor for the screens associated with the intake tower. Installation of instrumentation including geotechnical instrumentation. Termination of river diversion and start of filling of the reservoir. Installation of a security/monitor system. Final site cleanup and stabilization. Demobilization.



Project cost \$51,795,292.00 Date project completed EST: March 2016

Key project personnel	Project manager	Project superintendent	Safety manager	Quality control manager
Name	Bruce Weinberger	Kenny Bryant	Keith Ozbolt	Juan Payne

**Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)**

Name	Title/ position	Organization	Telephone	E-mail
Wayne Fuller	Chairman	City of Cullman	(256) 736-5616	N/A
Tom Harwell	Project Engineer	CH2MHill	(205) 209-3008	Tom.Harwell@CH2M.com
Construction manager	N/A	N/A	N/A	N/A



**Project owner** Brookfield Renewable Energy Group      **Project name** Upper Dam Safety Modifications

General description of project: The Upper Dam is located at the headwaters of the Androscoggin River watershed in Western Maine near the New Hampshire border. Upper Dam is part of an extensive water storage system to regulate flows of the Androscoggin River for downstream hydroelectric power generation, flood control, and other industrial uses. The Upper Dam was constructed in the mid- 1850s to raise the pool elevation of the natural glacial lake and increase the storage of Lake Mooselookmeguntic for the purpose of controlling flows for log driving. The Upper Dam is comprised of a stone-filled, steel-reinforced, concrete crib and timber-gated spillway and earthen embankments to the north and south of the spillway. The spillway is approximately 200 feet long and 25 feet tall. The spillway contains a total of 17 gates which are used to regulate flows. Sheet piles are located beneath the spillway to reduce seepage. The project is a turnkey remediation and replacement of Upper Dam. The work at Upper Dam involves the complete renewal of the spillway structure, the remediation of embankments and the design and the allowance for future installation of a minimum flow turbine generator. The improvements are part of FERC Part 12 modifications and are being driven primarily by the need to safely pass flows under Probable Maximum Flood conditions.




Project cost	\$16,100,000		Date project completed	EST: December 2015	
Key project personnel	Project manager	Project superintendent	Safety manager	Quality control manager	
Name	Blake Bennetts	Tristan Proffett	Brian Looby	Tristan Proffett	
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>					
	Name	Title/ position	Organization	Telephone	E-mail
Owner	Peter Brockett	Project Engineer	Brookfield Renewable Energy Group	(603) 752-2353	<a href="mailto:Peter.brockett@brookfieldrenewable.com">Peter.brockett@brookfieldrenewable.com</a>
Designer	Joe Monroe	Design Engineer	Schnabel Engineering	(770) 781-8008	N/A
Construction manager	N/A	N/A	N/A	N/A	N/A



Project owner	Xcel Energy	Project name	Clear Lake Dam Replacement
<p>General description of project:            The Clear Lake Dam is located in Georgetown, CO and is part of the Georgetown Hydroelectric Project, owned and operated by Public Service Company of Colorado, d/b/a Xcel Energy. Clear Lake provides storage for winter-period operation of the hydroelectric plant and is also an important recreational facility in the region. Following state safety inspections, FERC expressed concerns about the dam's inadequate spillway capacity. The existing small, ungated spillway had the capability of passing the estimated 50-year flood prior to the dam being overtopped. Overtopping of Clear Lake Dam during a large flood could result in dam failure. The project consists of the removal of the existing embankment dam and the construction of a new RCC dam in the same location.</p>			
Project cost	\$6,180,000.00	Date project completed	EST: November 2015
Key project personnel	Project manager Peter Yard	Project superintendent	Safety manager Brian Looby
Name	Project manager Peter Yard	Project superintendent Mike Atwood	Quality control manager Mike Atwood
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
Owner	Name Aldea Wolther	Title/ position Sourcing Project Specialist	Organization Xcel Energy
Designer	Name Steve Jamieson, P.E.	Title/ position Project Engineer	Organization W.W. Wheeler & Associates
Construction manager	Name N/A	Title/ position N/A	Organization N/A
Telephone	Telephone (303) 571-7703	Telephone (720) 260-0548	E-mail Aldea.Wolther@xcelenergy.com
E-mail	E-mail Steve.jamieson@wwwwheeler.com	E-mail N/A	E-mail N/A



Project owner	Dalworth Soil & Water Conservation District	Project name	Mountain Creek FRS #10
<p>General description of project: The project includes draining the existing Padera Lake; removing and replacing the principal spillway pipe and outlet structures; excavating, lime treating and replacing certain areas of the existing dam embankment; raising and widening the existing dam cross section; and constructing a new RCC emergency spillway. Principal items of work include approximately 100,000 CY of excavation/ backfill and 12,000 CY of RCC.</p>			
Project cost	\$5,640,000.00	Date project completed	EST: September 2015
Key project personnel	Project manager Kevin Delo	Project superintendent George Brower	Safety manager Rick Montano
Name	Name	Title/ position	Telephone
Owner	Virgil Helm	Contracting Officer	(214) 924-7386
Designer	Tom Beach	Project Engineer	(254) 760-5943
Construction manager	N/A	N/A	N/A
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
		Organization	E-mail
		Dalworth Soil & Water Conservation District	vhelm43@yahoo.com
		NRCS	tom.Beach@usda.gov
		N/A	N/A

Project owner	Tarrant Regional Water District	Project name	Joint Booster Station #3 JB3R of the Integrated Pipeline																																								
<p>General description of project: This project consists of the construction of two approximately 40 million gallon earthen reservoirs lined with geonet composite with filter fabric on both sides, 60 mil HDPE liner, and 9" of soil cement; installation of approximately 500 LF (in 2 sections) of 108" concrete encased steel pipe; installation of approximately 500 LF of 114" concrete encased steel pipe; and construction of the underdrain systems for the reservoirs. R.E. Monks is performing all of the earthwork for this project.</p>			<p><b>This project is being constructed by ASI-R.E. Monks Joint Venture.</b></p> <table border="1"> <thead> <tr> <th>Project cost</th> <td>\$11,387,000.00</td> <th>Date project completed</th> <td>EST: July 2015</td> </tr> <tr> <th>Key project personnel</th> <td>Project manager Kevin Delo</td> <th>Project superintendent</th> <td>ASI: Doug Laub REM: Bill Obenchain</td> </tr> <tr> <th>Name</th> <td></td> <th>Safety manager</th> <td>Rick Montano</td> </tr> <tr> <td></td> <td></td> <th>Quality control manager</th> <td>Jonathan Trivisonno</td> </tr> </thead> </table> <p><b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b></p> <table border="1"> <thead> <tr> <th>Owner</th> <th>Name</th> <th>Title/ position</th> <th>Organization</th> <th>Telephone</th> <th>E-mail</th> </tr> </thead> <tbody> <tr> <td>Designer</td> <td>Matt Gaughan, P.E.</td> <td>Project Manager</td> <td>Tarrant Regional Water District</td> <td>(817) 720-4474</td> <td>Matt.gaughan@trwd.com</td> </tr> <tr> <td>Construction manager</td> <td>Coy Veatch</td> <td>Project Engineer</td> <td>Freese &amp; Nichols</td> <td>(817) 735-7300</td> <td>Coy.Veatch@freese.com</td> </tr> <tr> <td></td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Project cost	\$11,387,000.00	Date project completed	EST: July 2015	Key project personnel	Project manager Kevin Delo	Project superintendent	ASI: Doug Laub REM: Bill Obenchain	Name		Safety manager	Rick Montano			Quality control manager	Jonathan Trivisonno	Owner	Name	Title/ position	Organization	Telephone	E-mail	Designer	Matt Gaughan, P.E.	Project Manager	Tarrant Regional Water District	(817) 720-4474	Matt.gaughan@trwd.com	Construction manager	Coy Veatch	Project Engineer	Freese & Nichols	(817) 735-7300	Coy.Veatch@freese.com		N/A	N/A	N/A	N/A	N/A
Project cost	\$11,387,000.00	Date project completed	EST: July 2015																																								
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Construction manager	Coy Veatch	Project Engineer	Freese & Nichols	(817) 735-7300	Coy.Veatch@freese.com																																						
	N/A	N/A	N/A	N/A	N/A																																						





**Project owner** United States Army Corps of Engineers **Project name** Fort Peck Plunge Pool

General description of project: Fort Peck Dam on the Missouri River was subjected to severe flooding in 2011. This required operating its spillway for approximately 4 months with peak discharges more than double the previous maximum discharge since the project was constructed in 1938. The hole scoured at the downstream end of the spillway exposed much of the cutoff structure supporting the spillway chute. There is now less than 30 feet of embedment remaining of the original 70 feet. There is a valid concern that the spillway cutoff structure is undermined. The purpose of this project is to improve the stability of the existing cutoff structure by filling a significant portion of the scour hole with Roller Compacted Concrete (RCC) and installing tieback anchors through the existing left cutoff wall. In addition, training walls will be used to facilitate placement of backfill to support the existing cutoff structure wing walls and to help divert erosive flow away from the critical locations near the intersection of the existing cutoff center wall and wing walls. Other work to be performed includes expanding a 175 foot apron length to 250-foot and 350-foot; Widening the base of the training walls to facilitate future expansion; deepening the cutoff wall; constructing a reinforced concrete cap on the apron to increase longevity of the repair; and repairing concrete surface damage (spalling and cracks) on the existing spillway chute.



Project cost	\$33,897,764.00	Date project completed	EST: February 2015
Key project personnel	Project manager Kelly West	Project superintendent	Safety manager Rick Montano
Name		James Brower	Ed Odoya
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
	Name	Title/ position	Telephone
Owner	Lee McCormick	Project Manager	(402) 995-2084
Designer	Lee McCormick	Project Manager	(402) 995-2084
Construction manager	N/A	N/A	N/A
			E-mail
			<a href="mailto:lee.m.mccormick@usace.army.mil">lee.m.mccormick@usace.army.mil</a>
			<a href="mailto:lee.m.mccormick@usace.army.mil">lee.m.mccormick@usace.army.mil</a>
			N/A



**Project name** Beaver Park Dam Rehabilitation, Phase II

**Project owner** Colorado Parks & Wildlife

General description of project: The work at the Beaver Park Dam Rehabilitation Phase II project consisted of multiple activities. The most important activity was the implementation and monitoring of safety measures that protect the public and workers from rock falls. Stream diversion and care were important as well; while the reservoir was drained, a minimum discharge flow rate of 7 cfs was maintained throughout the project duration. Demolition work consisted of removing the existing intake structure, gate house and downstream outlet pipe. The activities that made accessing the downstream portion of work possible included building a 5,800 SF soil nail wall and excavating 78,000 CY of material that was used to construct an upstream cofferdam. The existing outlet pipe has a new steel liner inserted and the lower portion of the downstream pipe was completely replaced and encased. This new downstream pipe and encasement terminates at two fixed cone valves inside a new outlet structure. A new intake structure was constructed with a sluice gate, vent pipe and hydraulic actuation system. A filter drain system consisting of sand and gravel was installed while backfilling the left abutment to final grade. The dam crest was widened and erosion control placed on the face. Finally, a control building was placed which included a generator, solar power system, hydraulic gate actuation control system, electric valve automation control system and all electrical, instrumentation and communication systems. The monitoring system included piezometers, inclinometers and SCADA.



Project cost \$8,939,497.50 Date project completed EST March 2015

Key project personnel	Project manager	Project superintendent	Safety manager	Quality control manager
Name	Tom Eagens	Telly Labus	Brian Looby	Erik States/Tyler Richards

**Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)**

Name	Title/ position	Organization	Telephone	E-mail
Owner	John P. Clark, P.E.	Colorado Parks & Wildlife	(303) 291-7395	john.clark@state.co.us
Designer		AECOM	(303) 228-3000	
Construction manager	N/A	N/A	N/A	N/A



**Project name** Arkansas River Levee Improvements – Phase 1


**Project owner** Pueblo Conservancy District

General description of project: The project involves the remediation/reconstruction of approximately 3300 linear feet of the existing Arkansas River Levee from the 11th Street Bridge to the southeast. The current levee consists of an existing earthen embankment approximately 40' tall which is faced with reinforced concrete approximately 10" thick. The Phase One project includes lowering of the existing embankment by approximately 12' and removing and replacing all reinforced concrete facing and foundations, complete with all incidentals of construction. 2.5 miles of Levee work, including repairing and/or replacing the plinth (the footing at the toe of the levee); replacing all or a portion of the concrete panels; repairing and/or replacing the small parapet wall at the crest; fixing portions of the embankment underlying the panels; maintaining (not damaging) the existing step pools.





Project cost	\$3,603,740	Date project completed	EST March 2015
Key project personnel	Project manager	Safety manager	Quality control manager
	Mike Atwood	Brian Looby	Casey Mimms
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
Owner	Name	Title/ position	Telephone
Designer	Kim Kock	Project Engineer	(719) 544-6823
Construction manager	N/A	N/A	N/A
		Organization	E-mail
		Pueblo Conservancy District	kkock@northstar-co.com
		Northstar Engineering and Surveying	
		N/A	N/A



Project owner	United States Army Corps of Engineers	Project name	Canton Lake Dam Weir and Hydraulic Structures
<p>General description of project: At Canton Lake, the Government is constructing an auxiliary spillway adjacent to the right abutment of the existing spillway. This auxiliary spillway will be controlled by a weir and nine fuse gates. The auxiliary spillway will be located in the auxiliary channel which is 480 feet wide and has been partially excavated up to the auxiliary spillway location to final channel grade. Vertical diaphragm walls approximately 50 feet tall line the auxiliary channel. Construction activities include placement of a concrete weir (sill) approximately 35 feet deep by 70 feet long and spanning the 480 foot wide channel (approximately 40,000 cubic yards of concrete placement); concrete water intake monolith approximately 40 feet tall with a 47 by 15 feet base; concrete intake conduit approximately 11 feet square and 250 feet long; and concrete fuse gates, nine each, approximately 30 feet tall and 50 feet wide. Construction activities will also include, structural and mass concrete placement requiring on-site batch plant, formwork, shoring of existing diaphragm walls, excavation, and dewatering. After completion the final phase will include further excavation to connect the new spillway to the reservoir.</p>		<p>U.S.A.C.E. Contract #W52BY-11-C-0026 Canton Resident Office Canton OK 73724-9817</p> <p><b>Canton Auxiliary Spillway Hydraulic Structures</b> ASI Constructors, Inc. Dam and Water Resource Constructors. 1800 E. Platteville Blvd., Pueblo West, CO 81007</p> <p>Image # 3665 Date: 7/25/2014 Asi-Aerial LLC, Oklahoma City 405/942-3456</p>	<p>EST Mid-February 2015</p>
Project cost	\$38,397,000.00	Date project completed	EST Mid-February 2015
Key project personnel	Project manager Kevin Delo	Project superintendent Dale Hamel / Robert Vance / David Johns	Safety manager Brian Looby / Chris Hicks / Pat Hade
Name	Steven Rous	Title/ position Project Engineer	Quality control manager Charlie Holman
Owner	Steven Rous	Organization USACE	Telephone (918) 704-5385
Designer	Steven Rous	Organization USACE	E-mail N/A
Construction manager	N/A	Organization N/A	E-mail N/A
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			





Project owner	Eastern New Mexico Rural Water System	Project name	Ute Reservoir Intake Screen and Pump Forebay Shaft
<p>General description of project: ASI Constructors, Inc. (ASI) is the prime contractor constructing a new water intake facility located on the Ute Reservoir located near Logan, New Mexico. The purpose of the project is to provide potable water to eight city and county member agencies for municipal, commercial and industrial use. The project will replace current groundwater supplies from the Ogallala formation of the High Plains Aquifer with a sustainable surface water source (Ute Reservoir). Ute Dam was constructed in 1959 creating Ute Reservoir to store water for these purposes. The project will put this underutilized infrastructure investment to beneficial use. The members of the Eastern NM Water Utility Authority include the communities of Clovis, Grady, Elida, Melrose, Portales and Texico; and Curry and Roosevelt Counties. This joint ASI/ECL project involves an extensive pre-excavation curtain grouting program for water control, excavation by drill/blast methods of a 50 foot diameter 95 foot deep shaft adjacent to the reservoir, installation of rockbolts / shotcrete for temporary ground support, microtunnel "wet" lake tap with underwater machine retrieval, concrete lining of the intake shaft, underwater drill/blast rock excavation, underwater construction of intake piping/valves/screens and support structure, site work and construction of the intake control building. ASI/ECL crews are self-performing all scope items outside of the blasting and the microtunneling.</p>			
Project cost	\$13,980,563.00	Date project completed	EST March 2015
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Shane McFadden	Doug Laub	Brian Looby / Rick Montano
<b>Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)</b>			
	Name	Title/ position	Telephone
Owner	Paul Van Gulick	Program Manager	(505) 275-0022
Designer	Andrew Finney	Geotechnical Global Technology Lead; Tunneling Regional Technology Lead	916-285-0361
Construction manager	N/A	N/A	N/A
			E-mail
			Chris Robbins / Kyle Kubes



Project owner	Fairfax County	Project name	Huntsman Lake Dam Pohick Creek #8 Dam Rehabilitation
<p>General description of project: The major items of work consist of removing and replacing the existing principal spillway riser structure, armoring the auxiliary spillway with articulated concrete block, replacement of asphalt trail, and access road. Work also included armoring the control section, outlet section, and training dikes with ACB's, topsoil, and vegetation. Extending the existing training dikes to the valley floor to protect the dam embankment and to contain the auxiliary spillway flows. Changing the alignment of the auxiliary spillway to move it away from residences and to protect the sanitary sewer. Regrading the top of dam for approximately 40 feet adjacent to the auxiliary spillway to raise it 0.6 feet to the design elevation. Replacing the principal spillway riser with a baffle top riser. Constructing a concrete cutoff wall at toe of auxiliary spillway.</p>			
Project cost	\$2,470,189	Date project completed	September 2014
Key project personnel	Project manager Peter Yard	Project superintendent Tristan Proffet	Safety manager Brian Looby Quality control manager Jacob Edwards
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Owner	Name William Nolan	Title/ position Project Engineer	Organization Fairfax County Telephone 703-324-5111 E-mail <a href="mailto:William.Nolan@fairfaxcounty.gov">William.Nolan@fairfaxcounty.gov</a>
Designer	Name Brad Melton	Title/ position Project Engineer	Organization Fairfax County Telephone 703-324-5111 E-mail <a href="mailto:Brad.Melton@fairfaxcounty.gov">Brad.Melton@fairfaxcounty.gov</a>
Construction manager	Name N/A	Title/ position N/A	Organization N/A Telephone N/A E-mail N/A



<b>Project owner</b>	Fairfax County	<b>Project name</b>	Huntsman Lake Dredging	
<p>General description of project: Mechanical Dry Dredging of 34,500 CY of sediment from Huntsman Lake. Major work items consist of site preparation, mechanical dry dredging, shore line stabilization, re-forestation, and site restoration.</p>				
				
				
<b>Project cost</b>	\$5,210,850	<b>Date project completed</b>	September 2014	
<b>Key project personnel</b>	<b>Project manager</b>	<b>Project superintendent</b>	<b>Safety manager</b>	<b>Quality control manager</b>
<b>Name</b>	Peter Yard	Tristan Proffet	Brian Looby	Jacob Edwards
<b>Reference contact information (listing names indicates approval to contacting the names individuals as a reference)</b>				
	<b>Name</b>	<b>Title/ position</b>	<b>Organization</b>	<b>Telephone</b>
<b>Owner</b>	Mannan Qureshi	Project Engineer	Fairfax County	703-324-5111
<b>Designer</b>	Mannan Qureshi	Project Engineer	Fairfax County	703-324-5111
<b>Construction manager</b>	N/A	N/A	N/A	N/A
				<b>E-mail</b>
				Manna.Qureshi@fairfaxcounty.gov
				Manna.Qureshi@fairfaxcounty.gov
				N/A



**Project owner** Colorado Springs Utilities

**Project name** Northfield Dam Modifications

General description of project: The dam is a 30-foot high embankment dam approximately 350 feet in length, with a storage volume of 245 ac.ft. The dam, constructed in 1890, is located in the foothills between Colorado Springs and Woodland Park, Colorado. Northfield Dam is currently classified as a small, significant hazard dam. Major work items associated with the modifications to Northfield Dam include: Demolishing multiple structures including a large decommissioned water treatment Plant; Removing various unused underground piping; Abandoning/Grouting sections of pipe that will remain within the existing embankment; Demolishing the existing; Constructing a new concrete spillway control structure; Excavating unsuitable material from the existing dam embankment; Installing a new toe drain and toe drain outfall structure; Installing new piping and valve work that will connect to and extend the existing pipe system; and Placing fill to raise the downstream crest of Northfield Dam about 8 feet.



Project cost	3,404,247.00		Date project completed	December 2014	
Key project personnel	Project manager	Project superintendent	Safety manager	Quality control manager	
Name	Peter Yard	Tom Eagens/Jim Fuller/Mike Atwood	Brian Looby	Blake Bennetts/ Casey Mimms	
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/ position	Organization	Telephone	E-mail
Owner	Kelly Valdez	Principal Contracting Agent	Colorado Springs Utilities	719-668-8664	<a href="mailto:kvaldez@csu.org">kvaldez@csu.org</a>
Designer	URS Corporation	Water Resource Engineer	URS Corporation	303-740-3852	<a href="mailto:greg_glunz@urscorp.com">greg_glunz@urscorp.com</a>
Construction manager	N/A	N/A	N/A	N/A	





<b>Project owner</b>	<b>New Mexico Department of Game &amp; Fish</b>	<b>Project name</b>	<b>Modifications to Lake Roberts Dam</b>		
<p>General description of project: The Modifications to Lake Roberts Project work consists of demolition of existing concrete spillway, reconstruction of the primary spillway, construction of an additional secondary spillway, construction of an eight-foot dam raise, new dam instrumentation, and misc. site improvements. Work included an 80 ft. stilling basin with pier baffles, underdrain system, 8 ft. embankment raise, new upstream/downstream rip-rap armor, new instrumentation, and other miscellaneous site improvements.</p>					
<b>Project cost</b>	\$6,924,815.00		<b>Date project completed</b>	November 2014	
<b>Key project personnel</b>	<b>Project manager</b>	<b>Project superintendent</b>	<b>Safety manager</b>	<b>Quality control manager</b>	
<b>Name</b>	Kevin Mitchell	Greg Swindle	Brian Looby / Rick Montano	John Murray	
<b>Reference contact information (listing names indicates approval to contacting the names individuals as a reference)</b>					
	<b>Name</b>	<b>Title/ position</b>	<b>Organization</b>	<b>Telephone</b>	<b>E-mail</b>
<b>Owner</b>	Mike Gustin	Project Manager	New Mexico Department of Game and Fish	505-476-8112	<a href="mailto:Michael.Gustin@state.nm.us">Michael.Gustin@state.nm.us</a>
<b>Designer</b>	Greg Glunz	Water Resource Engineer	URS Corporation	303-740-3852	<a href="mailto:greg_glunz@urscorp.com">greg_glunz@urscorp.com</a>
<b>Construction manager</b>	N/A	N/A	N/A	N/A	N/A





Project owner	Arkansas State Game & Fish Commission	Project name	Spring River Dam #3
<p>General description of project: Spring River Dam 3 was constructed in the early 1900's for hydro power and generated power until 1972. Storm damage has damaged water control gates and the integrity of dam. Recent studies have concluded that the dam needs work to remain in service. The work includes removal and replacement of all gates; mechanical work in the mechanical room for gates; cleaning cavity and filling with concrete to change from Ambursen type to mass concrete dam; and cut off the top of the spillway and put Obermeyer gates on top.</p>			
Project cost	\$3,150,000.00	Date project completed	September 2014
Key project personnel	Project manager	Project superintendent	Quality control manager
Name	Kevin Mitchell	George Brower	Brian Looby Megan Stolarski
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Owner	Dale Gunter, P.E.	Chief – Construction	Organization AR State Game & Fish Commission
Designer	Stewart Noland, P.E.	Project Engineer	Telephone 501-978-7309 E-mail <a href="mailto:ldgunter@agfc.state.ar.us">ldgunter@agfc.state.ar.us</a>
Construction manager	N/A	N/A	501-664-1552 E-mail <a href="mailto:snoland@crisengineers.com">snoland@crisengineers.com</a> N/A





Project owner	Los Alamos County	Project name	Los Alamos Canyon Dam Modifications
<p>General description of project: The Los Alamos Dam was constructed by the U.S. Corps of Engineers (USACE) for the USWD and was completed on April 21, 1943. This reservoir was for water storage for supply and recreational use, but did not meet Office of the State Engineer rules with respect to adequate spillway capacity and embankment safety. This was partly due to a forest fire that occurred in Los Alamos watershed in June 2011. This fire produced a large amount of sediment build up in the reservoir and this had to be bypassed by a temporary emergency diversion channel on the left abutment and a cofferdam was also constructed on the crest of the dam to safely divert storm water flows and minimize potential overtopping of the existing dam. The Los Alamos Canyon Dam modifications by ASI consisted of demolition, removal, and disposal of the existing gunnite coating and articulated concrete mattresses on the reservoir faces, existing outlet gate tower, existing soil nail wall and other appurtenant features of the dam. Upstream and downstream faces of the dam structure were enhanced with additional fill and filter material and reconstructed to new slopes. A new roller-compacted concrete (RCC) spillway with formed concrete trainer walls was constructed. Additionally, a new service spillway and stilling basin was constructed of formed concrete. A new submerged outlet gate was also constructed. New outlet piping was installed from the existing dam pipe to the existing canyon pipeline connection point. Monitoring and instrumentation points, together with other appurtenant features, were also installed. The project also consisted of rebuilding roads and constructing the remaining reinforced concrete cutoff walls and crest wall.</p>			
Project cost	\$5,246,282.00	Date project completed	January 2013
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Lloyd Ludlow	Robert Vance/Mike Atwood	Brian Looby / Rick Montano N/A
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Owner	Tim Glasco	Title/ position	Telephone
Designer	Ed Toms	Project Manager	E-mail
Construction manager	N/A	Vice President, Engineering	ta.glasco@lacnm.us ed.toms@urs.com
	N/A	N/A	N/A





Project owner	City of Manassas, VA	Project name	T. Nelson Elliott Dam Safety Modifications	
<p>General description of project: The T. Nelson Elliott Dam is located in Prince William County, Virginia and is a composite dam that consists of both concrete and earthen sections. The dam is 1,306 feet long and 74 feet high from the dam crest to the stream. The dam was designed in 1968 by Hayes, Seay, Mattern &amp; Mattern and is categorized as a Class I (high hazard) dam by the Virginia Department of Conservation and Recreation (DCR), which is the regulatory agency that has jurisdiction over the dam. This purpose of the T. Nelson Elliott Dam Improvements Project was to improve Elliott Dam to satisfy the DCR requirement that a Category I (high hazard) dam be designed to safely pass the Probable Maximum Flood (PMF) event. The dam was originally designed to safely pass 50% of the PMF. The right embankment was stripped and a RCC overlay of 8,500 CY was placed and covered back up. There were 28 post-tensioned anchors installed through the crest of the dam. Work also included new parapet walls on the left abutment and right embankment, a new Obermeyer gate along the spillway, a retention wall around a Northern Virginia Electric (NOVEC) transmission tower and a new throttling knife gate.</p>				
Project cost	\$7,148,214.00	Date project completed	June 2012	
Key project personnel	Project manager	Project superintendent	Safety manager	Quality control manager
Name	Peter Yard	Tristan Proffet	Brian Looby	Mark Moore
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)				
Owner	James M. Falls	Title/ position	Organization	Telephone
Designer	Dr. Scott Jones	Purchasing Manager	City of Manassas, VA	E-mail
Construction manager	N/A	Project Engineer	URS Corp.	ifalls@ci.manassas.va.us
Construction manager	N/A	N/A	N/A	N/A



**Project owner**

New Mexico Office of the State Engineer- Dam Safety Bureau

Cabresto Lake Dam



General description of project: The Cabresto Dam, located near Questa, New Mexico in a high altitude and very sensitive sub-alpine environment, has experienced significant seepage issues in recent years and has an undersized spillway. Due to these deficiencies, the New Mexico Office of the State Engineer placed the dam under a significant restriction. The decision was made to remove the existing dam and construct a new dam 160 feet downstream. The new dam is a zoned embankment dam with a roller-compacted concrete spillway constructed directly over the embankment. ASI was awarded this project in the Spring of 2011. ASI worked directly with the design engineer, RJH Consultants, and the New Mexico Office of the State Engineer (NM OSE) to redesign several elements, provide constructability review and cost estimates of these redesigned elements, to reduce the overall cost of the project. **The combined redesign efforts of ASI, RJH, and the NM OSE working together reduced the overall project costs by over \$1 million from the original bid of \$6.3 million.** The site was located in a pristine sub-alpine forest environment and initial construction activities were undertaken in a time of extreme fire danger. ASI worked directly with representative of the NM OSE and the US Forest Service representatives at the Carson National Forest to develop construction means and methods that dramatically reduced the risk of fire creation. When the fire danger became too extreme to continue working, ASI voluntarily demobilized from the site and remobilized to complete our initial phase of construction when the fire danger had reduced to acceptable levels. Our efforts at minimizing the fire danger in our work area earned ASI praise from the local office of the US Forest Service at the Carson National Forest.

Project cost	\$5,086,000.00	Date project completed	November 2012
Key project personnel	Project manager Jeff Lawson/Del Shannon	Project superintendent Jim Brower	Safety manager Brian Looby / Rick Montano
Name			Quality control manager David Sawyer
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Owner	Name Charles N. Thompson, P.E.	Title/ position Director	Telephone 505-383-4134
Designer	Robert J. Huzjak, P.E.	President	303-225-4611 rhuziak@rjh-consultants.com
Construction manager	N/A	N/A	N/A



Project owner	Pennsylvania American Water	Project name	Nesbitt Dam
<p>General description of project: Nesbitt Dam is located in Spring Brook Township, Pennsylvania. The purpose of the project was to rehabilitate the Pennsylvania American Water Company's Nesbitt Dam as mandated by the Pennsylvania Department of Environmental Protection, Bureau of Waterways Engineering, Division of Dam Safety to comply with current dam safety requirements. The primary objectives of the project included increasing total spillway capacity to convey the Probable Maximum Flood (PMF), improving stability, and correcting observed seepage problems. The Nesbitt Dam project entailed the installation of relief and temporary dewatering wells, foundation grouting, installation of various water diversions both temporary and permanent, temporary shoring wall, and a permanent H-Pile supported shoring wall. It also included installation of drains embedded in zoned material that discharge through a chambered weir vault. Approximately 37,860 CY of roller-compacted concrete was utilized in the spillway with conventional facing, armored slopes, and two training walls. Approximately 86,000 CY of excavation work, with 19,700 CY of approved backfill was also completed. Over 6,000 CY of total conventional concrete including a new ogee and stepped armoring was added and 2,419 feet of high capacity post tensioned rock anchors. Work also included installing and maintaining erosion and sediment controls, and the rehabilitation of the gallery mechanical and bridge.</p>			
Project cost	\$22,274,100.00	Date project completed	October 2012
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Kenny Bryant	Jim Fuller/James Brower/Doug Laub	Brian Looby / David Armstrong / Pat Hade
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
	Name	Title/ position	Organization
Owner	Anthony M. Nokovich, P.E.	Senior Engineer	Pennsylvania American Water
Designer	Same as above		
Construction manager	N/A	N/A	N/A
		Telephone	E-mail
		717-691-2138	anthony.nokovich@amwater.com
			Brandon Burnett





**Project owner** Colorado Springs Utilities **Project name** Southern Delivery System, Pueblo Dam Connection

General description of project: The Pueblo Dam and Reservoir is located on the Arkansas River in Pueblo County about six miles upstream and west of the city of Pueblo. This regional water project will deliver water to Colorado Springs, Pueblo West, Fountain, and Security. It will provide these communities with a long-term, stable water supply for the next several decades. Phase 1 of the SDS work included the connection to the North Outlet Works of the Pueblo Dam. The project included work inside the dam, pipeline, structural concrete, fixed cone valve facility, mussel control system, electrical, instrumentation and controls. The work also included installation of the upstream bulkhead, forming, and pouring the concrete thrust block and lining the channel with rip rap. We also completed construction of a cofferdam to divert the Arkansas River around our work area. Other work included excavation of earthen materials out of the existing river channel, 55 feet down to the rock bottom of the channel. ASI also built a mass concrete foundation in the river channel to support a structural concrete valve containing and fixed cone valve and a rotary cone valve control facility. This facility will regulate and control releases from the dam into the river and SDS pipeline. The existing dam outlet was lined with SS liner sections, which ASI connected to an existing gate flange in the tunnel. The annules between the liner and tunnel were backfilled with concrete. **In 2013, the American Public Works Association (APWA) Colorado Chapter awarded the Southern Delivery System (SDS) Pueblo Dam Connection 1A Project the Project of the Year Award and the Structures Large Award.**



Project cost	\$6,256,627.00	Date project completed	July 2012
Key project personnel	Project manager Pete Dobbs	Project superintendent Greg Swindle/Ted Perry	Safety manager Brian Looby
Name			Marty Kearney
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Owner	Jed Chambers	Title/ position Contract Manager	Organization Colorado Springs Utilities
Designer	Stephanie Harrison	Project Engineer	CH2MHill
Construction manager	N/A	N/A	N/A
			Telephone 719-668-7359
			E-mail N/A
			Quality control manager Marty Kearney




Project owner	Energy Source	Project name	Hudson Ranch I Geothermal Project
<p>General description of project: The Hudson Ranch I project is a 49.9 megawatt (MW) Geothermal power generating facility under development within the Salton Sea known resource area in the Imperial County city of Calipatria, California. ASI was the structural concrete contractor for this project. ASI provided construction services involving the erection of the major foundations on this project including a turbine-generator structure, cooling tower, wellhead separators, crystallizers, water tanks, primary and secondary clarifier tanks, pipeline supports, and various ancillary structures.</p>			
Project cost	\$10,732,788.00	Date project completed	July 2011
Key project personnel	Project manager Robert Hartman	Project superintendent Danny Farrar	Safety manager Brian Looby / Chris Hicks
Name			Jacob Edwards
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
	Name	Title/ position	Organization
Owner	John Featherstone	Owner's Representative	Energy Source
Designer	Marlon Will	Senior Consultant/Structural P.E.	AMEC E&C Services, Inc.
Construction manager	N/A	N/A	N/A
			Telephone
			760-312-8002
			770-688-2669
			E-mail
			<a href="mailto:jfeatherstone@energysource.com">jfeatherstone@energysource.com</a>
			<a href="mailto:marlon.will@amec.com">marlon.will@amec.com</a>








Project owner	New Escalante Irrigation Company	Project name	Wide Hollow Water Supply Storage Facility
<p>General description of project: The Wide Hollow Water Supply Storage Facility work included removing the existing embankment and foundation materials, then reconstructing the foundation and embankment to a higher elevation that restored the structure's original storage capacity. Significant features of the construction included site preparation and restoration, removal of the existing embankment and foundation, construction of a new embankment, installation of outlet works, and construction of spillways. Work also included construction of features at the Escalante Petrified Forest State Park to address impacts from the raised water level and mitigation efforts to compensate for loss of wetland and riparian habitats.</p>			
Project cost	\$8,400,000.00	Date project completed	March 2011
Key project personnel	Project manager	Project superintendent	Safety manager
Name	Jeff Lawson	Kevin Switzer/Bill Fuller	Brian Looby
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Owner	Name	Title/ position	Telephone
Designer	Bart Carter	Manager	435-616-1459
Construction manager	Eric R. Dixon, P.E.	Project Engineer	801-756-0309
	N/A	N/A	N/A
			E-mail
			Les Weaver
			Quality control manager
			edixon@fransoncivil.com
			N/A



Project owner	Yadkin County, NC	Project name	Deep Creek Watershed Dam 5D		
<p>General description of project: The Deep Creek Watershed Dam 5D project entailed the construction of a composite earth embankment with a roller-compacted concrete (RCC) gravity dam section, consisting of 50,000 CY of RCC and over 8,000 CY of structural concrete. The finished dam is approximately 72 feet high and has a total length of approximately 1,490 feet. Additional features of this project included a reinforced concrete principal spillway riser with a 60-inch diameter ductile iron pipe outlet conduit. The 300 foot long auxiliary overflow spillway (over the RCC section of dam) is enclosed with 16 foot high structural concrete training walls. Also, the reinforced concrete stilling basin included 63 roller bucket energy dissipaters. The work also included foundation prepping and grouting. In 2013 the Deep Creek Watershed Dam 5D project in Yadkin County, North Carolina was selected as recipient of the U.S. Society on Dam 2013 Award of Excellence in the Constructed Project. The Deep Creek project included the first use in the United States of grout-enriched roller-compacted concrete (GERCC) as the sole upstream barrier. The use of GERCC resulted in considerable project cost savings and its successful use at Deep Creek Dam has gained considerable attention from the United States dam and water resource engineering community. ASI served as an RCC subcontractor on this project.</p>		Project cost	\$8,188,082.00	Date project completed	February 2010
Key project personnel	Project manager	Project superintendent	Quality control manager		
Name	Bill Fuller	Jim Fuller/Danny Farrar	Pete Dobbs / Pat Hade N/A		
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/ position	Telephone E-mail		
Owner	Stan Kiser	County Manager	336-679-4200 <a href="mailto:skiser@yadkincountync.gov">skiser@yadkincountync.gov</a>		
Designer	Robert Cannon	PG/Principal	336-274-9456 <a href="mailto:rcannon@schnabel-eng.com">rcannon@schnabel-eng.com</a>		
Construction manager	Andy Haymes/Chuck Haymes	Principals	434-432-8282 <a href="mailto:Ahaymes@HaymesBrothers.com">Ahaymes@HaymesBrothers.com</a>		



**Project owner** Duke Energy Corporation

**Project name** Catawba Dam ESSI Project

General description of project: The Catawba Dam Embankment Seismic Stability Improvements (ESSI) is a component of the Bridgewater Hydroelectric Development which was constructed close to 100 years ago. The facility falls under the Federal Energy Regulatory Commission (FERC) and the project was constructed to satisfy requirements imposed by FERC in order to return to service. These requirements were fulfilled by resurfacing and extending the existing spillway, adding a buttress and wing wall, and upgrading the minimum flow release system. There were two batch plants on site to produce the required concrete for these improvements. The major work activities associated with this process consisted of foundation cleaning, foundation prepping and grouting, dental / leveling concrete placement, RCC placement, spillway demo/resurfacing, and conventional concrete placement.



Project cost \$14,092,710.00 Date project completed April 2010

Key project personnel	Project manager	Project superintendent	Safety manager	Quality control manager
Name	Bill Fuller	Jim Fuller/Kevin Switzer	Pete Dobbs / Pat Hade	Dave Hayward

Reference contact information (listing names indicates approval to contacting the names individuals as a reference)

Name	Title/ position	Organization	Telephone	E-mail
Grady L. Allen	Project Director	Duke Energy Corporation	828-584-4402	grady.allen@duke-energy.com
Brian Chrisman	Project Engineer	HDR Engineering	704-377-4182	N/A
Construction manager	N/A	N/A	N/A	N/A



CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
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For 3 of the completed CMAR projects- Provide specific information as to the results of Proposer's efforts on projects working in a collaborative manner with the owner and engineer during design & construction phases-

**Lake Texoma Outfall to Wylie WTP Raw Water Pipeline Plant Bid Package #3 Balancing Reservoir**



ASI-R.E. Monks Joint Venture participated in the NTMWD's \$309-million Lake Texoma Outfall to Wylie WTP Raw Water Pipeline Plant Bid Package #3 Balancing Reservoir CMAR Contract as an execution subcontractor to the CMAR to construct a two-cell 80MG balancing reservoir. This overall project was primarily a water transmission pipeline project, and as such, the CMAR relied on ASI-R.E. Monks Joint Venture to finalize several significant technical issues with the project designer, Freese and Nichols. During the subcontractor selection and award phase, and prior to construction of the reservoir, ASI-R.E. Monks Joint Venture and Freese & Nichols successfully collaborated on the

definition of dam embankment zone requirements to eliminate a significant material imbalance on this phase of the project, and this collaboration provided NTMWD and its CMAR with a significant reduction in cost for this portion of the project. This collaboration and cooperation with Freese & Nichols had been established on numerous prior dam construction projects in Texas and the long-established familiarity with Freese & Nichol's design and specification requirements promoted open and collaborative discussions on potential problems throughout the construction of the balancing reservoir, thereby eliminating any re-work, disputes and delays. The ASI-RE Monk Joint Venture completed this phase of the project for NTMWD and its CMAR safely, on-time, within original budget and without any disputes or disruption.

**Lake Brazos Dam**



Even though this project was not a CMAR or alternate delivery project, it had several benefits from AW's involvement and expertise, specifically related to special planning and collaboration with the owner and design engineer to achieve the successful completion of the project. One particular case was in the planning and construction of the labyrinth weir walls, the primary design feature of this award winning project. The crest of the weir walls were required to be built with extremely tight tolerances to accommodate the discharge capacity





## CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project Project No. 344

of the structure. Several detailed planning sessions were held between AW, the owner and the design engineer to strategize on how to attain and maintain these strict tolerances. AW evaluated the discussions formulated during these meetings and selected the proper forming system to facilitate the tight tolerances required. Test sections were set up and test placements were performed to prove out the placement and finishing procedures proposed to achieve the tight tolerances. The metal forming system selected allowed for special form pieces to be fabricated to accommodate the crest design and dimensioning as well as to be removable from the vertical sections of the wall forms. The process included, setting the vertical wall forms to the specified line and grade and installing the crest forms on top of the vertical wall forms. The design of the crest forms provided a 5" horizontal continuous slot for the concrete to be placed into the wall. Once the wall had been placed, the crest forms were removed after the concrete had time to take set, approximately 2-4 hours. The concrete was still green and could be rubbed and floated to ensure the proper profile was achieved at the apex of the crest. *Photos of this operation can be found on page 25 of Section 6 in this proposal.* The labyrinth weir walls were constructed successfully within the tight tolerances.



### North Gateway Pump Station Project



This project was originally intended to be a water treatment plant. Because this project utilized the CMAR method and AW was involved early in the project, we had the opportunity to openly collaborate with the design engineer. During our initial review and evaluation of the project and through many discussions with the owner and the design engineer, questions were raised regarding the necessity of a new water treatment plant in the area. The project team re-assessed the City's needs and redefined the project intent based on the existence of a nearby water reclamation facility. Collaborative efforts went into evaluating the existing facility to determine if it could be modified and upgraded. As a result of this evaluation, it was

determined that the under-utilized water reclamation facility ten miles away could take the place of the thought to be needed new water treatment plant. This allowed the original concept to be replaced by an influent pump station and additional pipelines, saving the City of Phoenix 50% of the cost to construct a new water treatment plant.





For another 1 of the projects- Describe how GMP was developed and managed-

#### Dallas County Park Cities Membrane Improvements



AW provided detailed cost models at each design phase milestone (30/60/90) and established the Final GMP upon the collaborative review of the 90% cost model. These proved accurate, as the project bid out at just less than 1.5% below the GMP, while keeping the Owner's 5% contingency untouched. AW started their preconstruction involvement tasked with helping determine which membrane system supplier provided the best value for the owner and the project. Our specific task was to run cost estimates on conceptual structures that each of the membrane systems would require for their inclusion in the project. Once the membrane system supplier was

selected, CDM Smith designed the project to 30%, 60% and 90%. At each milestone phase, AW performed a detailed cost model according to the documents provided as well as completing the overall cost model to reflect total anticipated project costs, basing the components not designed from knowledgeable construction assumptions and considerations. AW provided this list of assumptions and considerations with each cost model, to help support the cost models, during the collaborative constructability and cost model review meetings with DCPC and CDM Smith. Once the design reached 90%, AW provided the final cost model for evaluation. This final cost model was reviewed in detail with DCPC and CDM Smith, along with a final constructability review of the contract documents. Immediately following the review meeting, AW reconvened to incorporate all discussions and decisions to finalize the GMP for the project. Upon final receipt of the 100% design documents, AW internally performed a detailed estimate of the 100% designed project, confirming the established GMP, and incorporated the finalized scopes into the appropriate bid packages that were currently being finalized.

For another 1 of the projects- Discuss the cost and schedule control methodologies utilized and the project results-

#### The Gold Canyon WRF Phase 3 Expansion



This project was implemented under the CM@R model to allow the Owner and Contractor to meet a very aggressive schedule. The team identified long lead items, developed a design packaging plan and permitting strategy. AWC was constructing critical elements of the project while the designer was completing design of the support system. An overall design, permitting, construction and commissioning of the project was completed within 14 months. It was critical during this fast track project to take a proactive role in cost and schedule efficiencies during preconstruction and construction services, these services overlapping most of the time.

AW collaborated with the owner and design engineer to establish a detailed design and construction schedule to benefit the project. AW provided timely cost estimates for each phase of the design as it was completed with real time construction costs in efforts to keep the early work progressing. Diligence in the dedicated estimating did not cease until the final design was complete. Daily and weekly progress of preconstruction activities as well as construction activities were monitored closely and constantly communicated with the owner and design team in efforts to address any indications of delays or modifications that would need immediate attention. AW and the design engineer worked closely together to expedite submittal reviews and exchange of information to keep the pace of the project accelerated.





For another 1 of the projects- Discuss how contingency funds were managed and the project results-

### Johns Creek Environmental Campus



This project represents an example of value engineering efforts facilitating in the management of contingencies. This award winning project consists of a 15 MGD Membrane Bioreactor, implementing the latest in technology innovation and capacity, all nestled within the affluent Ellard community of North Atlanta. Among the challenges not typically present in this type of project were the significant exterior aesthetics requiring local review board approval, unprecedented phased permitting, extensive community outreach objectives, \$1 million odor control Letter of Credit, and penalties associated with noise and operational

cost. Our value engineering skills were tested early and often during the project's procurement phase with our initial response to the RFP substantially exceeding the allocated budget. Our procurement team, led by Robert Szoch and Shane Lippert, worked through several iterations of cost saving measures that ultimately reduced the capital expenditure by 10% from our initial offering, resulting in the project's award. Our team worked closely with Fulton County to value engineer many facets of the project, all while continuing to meet their expectations of quality, operability, and longevity. A sampling of several major VE efforts is detailed below:

- 1) Odor Control- Given the substantial Letter of Credit associated with odor control performance, this item presented a difficult value engineering effort, with much due consideration to risk and prudence. The entire process train, from the raw sewage pump station to the UV Disinfection channels, is either enclosed within buildings or covered with aluminum plank. Our team evaluated options to reduce the overall air volume through the odor control units by performing a detailed cost benefit analysis of the basin cover supplier. Our efforts ultimately revealed a cost reduction upwards of 20% to the multimillion dollar odor control package.
- 2) Site Balance – The initial site layout posed several challenges including significant groundwater sources and large volumes of material haul off. Our approach resulted in adjusting the overall building elevations while maintaining the delicate plant hydraulics. With our in-house civil estimating team, we were able to eliminate all excess material haul off and substantially reduce the amount of dewatering required.
- 3) Precast Structural Members – The original structural approach required cast-in-place columns and decks with integral beams for the project's building components. Through the VE process, the construction team converted many of those components to structural precast. Not only did this present a reduction in construction cost, but also provided significant schedule acceleration.





## CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project Project No. 344

Provide specific examples from projects on this list where cost and time savings were realized from the CMAR's direct involvement in the preconstruction phase-

### Pima County Water Reclamation Facility



Archer Western joined the proposal effort at 0% design in January of 2010 as a team partner to CH2MHILL, collaborating on a design to quickly ramp up construction, keep underground crews efficient, and utilize cranes and concrete forms to maximize the pace of the project. The schedule, cost model, equipment and supervision roles were developed and refined during the proposal stage. Upon project award in January 2011, we worked with the preconstruction team to phase the start of construction with the deep excavation package, and excavating began by May 2011. In addition our Project team collaborated with the owner and opted

to use a dissolved air flotation (DAF) system at the beginning of the process train rather than at the end, where DAF systems are usually located in wastewater treatment systems, which was the first such DAF application in the United States. By placing the DAF at the start of the process, the county eliminated the need for four extra primary clarification tanks. As a result of our involvement with the phasing of the early out construction packages and the "outside the box" approach to the location of the DAF system during the preconstruction phase, the project experienced cost and schedule advantages that allowed the owner additional flexibility with respect to the project budget.

### Surprise SPA 1 – 8.0 MGD Expansion



Serving as the CMAR, Archer Western was responsible for design package and cost model development, estimating, scheduling, subcontractor management, value engineering, QA/QC, safety, traffic control, bonds, permits, insurance and general construction. Through continual value analysis and teamwork, Archer Western was a key participant in achieving savings of approximately \$4 million. \$1 million of this savings was realized by our suggestion to install FRP baffle walls in lieu of the original concept of concrete baffle walls. We also promoted and implemented the idea of combining RAS/WAS Pump Stations and Effluent Pump Stations, from separate stand-alone structures into common structures. This resulted in a significant savings in cost due to the reduction of excavation, concrete, required

pumping equipment and mechanical piping. Both of these value engineering opportunities not only provided cost savings to the project but also reduced schedule durations. The efforts of working with the owner and design engineer did not stop at preconstruction, during the course of construction a major issue quickly confronted the City. Recognizing a quick solution and quicker action was needed to resolve the issue; Archer Western worked in a Design-Build capacity with a separate design engineer to deliver the installation of a new 30" offsite effluent discharge pipeline in just four months. In doing so, Archer Western was able to minimize the operational impacts and re-establish water delivery to adjacent farmers.







For another 1 of the projects- Describe how the Owner's quality expectations were met by the CMAR and the actions undertaken by the CMAR to be able to do so-

## Early Contractor Involvement Yields Positive Impact on Quality

### Taum Sauk Plant Upper Reservoir Dam



#### Project Information

The Taum Sauk Plant Upper Reservoir Dam project was an Early Contractor Involvement procurement where the contractor was selected at an approximate 70% design-completion stage. The Contractor worked with the Engineer to refine the design from 70% and 90% to provide the Owner with the benefit of contractor-input with respect to constructability of various design features, cost and schedule realism inputs, and inputs on means, methods and equipment necessary to complete the environmental permitting process. This contract was an Alliance-type contract (versus CMAR) but this delivery method is essentially similar to CMAR in many respects. The Contract defined a Target Price that was agreed at the 90% design-completion stage, in a manner similar to the GMP Amendment defined in this project. Performance versus this Target Price as well as other defined project metrics (Safety, Quality, Schedule Adherence, Environmental Stewardship, Owner satisfaction) impacted the contractor's overall fees. The Alliance contract provided for the early start on long-lead procurements, etc. in a manner similar to the Early-works package GMP Amendment proposed in this contract.

#### Quality Impact

The Taum Sauk Plant Upper Reservoir Dam project was the result of a catastrophic failure of a 1960's-era rockfill embankment dam. In the aftermath of this is high-profile dam failure, the project Owner was under extreme scrutiny by FERC and the Missouri Public Service Commission. A forensic report on the failure indicated that lapses in quality of initial construction and in operations were contributors to the dam failure. To state that Quality was an important stakeholder objective on this project would be a gross understatement.

To address this very important Owner objective during the preconstruction phase, the Contractor and Owner collaborated and established contract performance metrics for both 'Quality' and for 'Owner Satisfaction' that had significant bearing (both positive and negative) on the Contractor's fees.

In addition, the Contractor participated with the Engineer and the Owner's internal nuclear division quality management staff in the joint development of a Quality Control Inspection Program (QCIP). This robust program was a FERC requirement. Under this QCIP, the Contractor maintained a significant on-site Contractor Quality Control (CQC) staff that had primary responsibility for inspection of the work; the Owner maintained an independent 3<sup>rd</sup>-party testing firm and established a large on-site testing laboratory; the "of record" Quality Assurance and Quality Control testing was performed by this independent firm, as coordinated by the Engineer.

This program established an effective 'double-blind' operating scenario to ensure strict adherence to the rigid quality standards established in the contract. Part of the QCIP was routine audits of the QA/QC conducted by the Owner through a 3<sup>rd</sup>-party independent auditing firm, as well as quarterly reviews of the established contract performance metrics that calculated increases and/or decreases in Contractors fees for the work.

This collaboration on Quality provided very effective results. The thorough QA/QC recordkeeping passed all of the independent audits, the on-site concrete production process had a 99.95% acceptance rate, resulting in a very minimal amount of re-work, the Contract metrics for Quality and Owner Satisfaction were all positive, and Owner's status with FERC was greatly improved upon completion of this project.





**CMAR Lower Bois d’Arc Creek Reservoir Dam and Intake Project  
Project No. 344**

*Proposer and CMAR Team Members - Archer Western (AW)* is the Proposer, and the single-source liaison to NTMWD. We have joined forces with R.E. Monks and ASI to provide NTMWD the best possible value for this CMAR Team.

Please see Section Two for summary information on AW, and its growth. Our CMAR and Alternate Project Delivery is extensive locally and throughout the nation. Several projects in the metroplex, have been successfully completed using the CMAR, CM/GC, ECI, and Design-Build methods. Additionally, our local managers, who have performed projects for NTMWD for decades, have consistently worked collaboratively with the design engineers to resolve a variety of challenges. To this expertise, we add our Team members R.E. Monks Construction and ASI Constructors, Inc.



**R.E. MONKS CONSTRUCTION** was established in 1965 as a Heavy Civil contractor. From modest beginnings, they have grown into a major Infrastructure Services contractor serving the industry’s leading construction clients. They are known for providing experienced personnel, late model equipment and excellent maintenance support, required to successfully complete your project. They maintain a balanced project portfolio of public works projects and privately negotiated work; and their substantial wheelhouse of resources will impress any potential client interested in the safe, cost effective execution of their work.

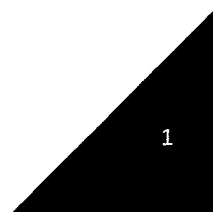
**R.E. MONKS CONSTRUCTION** has an established record in working with well-recognized designers and engineers to advance the project delivery process. The alternative bid approach is an increasingly effective tool in controlling project cost, quality and schedule. Their substantial financial strength and leading edge construction technology allows them to compete in this fast growing area of the construction market.

As a result of the company’s collective excellence in the construction field, **R.E. Monks Construction** was presented with the **2005 National ACG/AON Build America Award**, which recognizes the highest achievement in construction excellence as it relates to the companies project management, innovation in construction technologies, safety record, client service reputation, community relations efforts and the company’s sensitivity to the environment. “*Partnering*” is a label used for a variety of innovative approaches to managing relationships between organizations in construction. These arrangements have one thing in common – a desire to move beyond the limitations of traditional project relationships and work in a team oriented environment. **R.E. Monks Construction** has been a pioneer in the partnering process since 1991 and has received national recognition for their partnering efforts such as the AGC’s – **Marvin A. Black award in 2000**. (A.D.O.T. – Clifton, AZ).



ASI Constructors, Inc. is a self-performing heavy-civil engineering contractor specializing in the construction and rehabilitation of dams (RCC, earthfill, and concrete), spillways, and other major water resource projects. ASI also offers many additional specialized services through our Marine Group including inspection, on-water/underwater construction, and maintenance.

ASI provides clients innovative and cost-effective solutions to their complex projects. Sophisticated engineering and construction technologies, an honest commitment to fair business dealings along with a partnering approach to work, and a genuine culture of safety and quality management are their foundations. ASI maintains an operations-driven focus where performance defines success.





## CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project Project No. 344

**HISTORY** - ASI General Contractors, Inc was founded in 1978 in Buena Vista, Colorado. The company was owned and managed by two partners and operated as a regional heavy-civil contractor, with a work portfolio that varied from small dams, tunnels, and industrial construction with annual revenues typically at \$10 million.

In 1984 the company constructed Middle Fork Dam in Parachute, CO. This was the second Roller Compacted Concrete (RCC) dam built in the United States. Throughout the mid 1980's the company established itself as a leader in RCC dam construction. In 1987 the company was reorganized as ASI RCC, Inc. with ownership maintained by one of the original principals and several minority partners. The company continued to operate as a heavy-civil contractor in the Rocky Mountain region and also maintained a leading position in the continually growing RCC dam construction market. In 1997 the majority ownership of ASI RCC, Inc. was purchased by Patel Engineering, Ltd. and at that time, two long-time shareholders assumed management responsibility for all company operations. Between 1997 and 2000 annual revenues were increased from \$20 million to \$50 million as the company expanded operations to both the Southeast and Pacific Northwest.

ASI Constructors, Inc. was incorporated in December 2005 in Colorado. In this corporate transition, key management individuals purchased the majority of assets from the previous shareholders and re-established ASI Constructors as a domestic corporation. The company remains privately owned by managing principals and key employees with proven track records for successful project delivery through a professional and hands-on approach to business and field operations.

ASI's revenues exceed \$100MM annually, and they maintain a staff of 250-300 specialized personnel.

### PROJECTS

ASI is a construction leader in the water resources industry, having successfully completed more than **one hundred twenty-five** dam and dam rehabilitation projects and thirty new Roller Compacted Concrete (RCC) dams.

#### Design/Build and Early Contractor Involvement

ASI is a pioneer in the design/build and early contractor involvement approach to new dam construction and dam modifications and are recognized leaders in this emerging area of dam work. ASI completed the first true dam design/build dam project at the Pine Brook Dam in Boulder, Colorado and have continued this with numerous other design/build projects throughout the US and overseas. Comfortable with the design/build contract arrangement, they have design engineers on staff who regularly work directly with engineering team members to provide the best overall and cost effective design.

In the past several years they have completed, or are currently working on, the following design/build projects:

- Taum Sauk Pumped Storage Hydroelectric Facility – Ameren UE
- Upper & Middle Dams, ME – NextEra Maine Hydro, LLC
- Bear Creek Dam Rehabilitation (Tennessee Valley Authority)
- Wyaralong Dam, Queensland, Australia
- Cotter Dam, Canberra, Australia
- Pine Brook Dam, Boulder, Colorado
- Genesee Dam, Idledale, Colorado
- Cabresto Dam, Questa, New Mexico

#### Consulting Services

Because of the expertise gained over more than 30 years working on water projects ASI is often asked to provide consulting services at nearly every phase of a project. They consult with both owners and engineers on appropriate construction technologies, constructability reviews, value engineering studies, cost estimates, material suitability, and a wide range of other issues that are vital to any water resources project, large or small.





### *Functional Roles and Services:*

As Proposer, AW will be the lead team member for this CMAR project. Our proposed primary personnel are the same management that have completed multiple successful projects for you for almost 15 years. You have experienced their capabilities, their managerial style, their partnering efforts, and their goals for a mutually successful project, with your ultimate goals at heart. We have proposed to add Jim Gardner to this management team, because of his expertise on large heavy civil projects for AW in preconstruction. Jim will bolster Curtis and Frank's efforts in preconstruction, aiding in AW's ability to support NTMWD through the CMAR process and on to another successful project completion.

R.E. Monks is a heavy civil/earthwork contractor with expertise in massive earthwork projects; and in processing, evaluation, and identification of soils. They have a long history of successfully building dams and reservoirs, they understand wick drains, and slurry trenches, and they have developed and implemented several "Care of Water" plans. Dan and George will be part of the preconstruction team, evaluating constructability, logistics, design, safety, and helping to develop the overall schedule. They have already proven to be a valuable asset on the Lake Texoma Outfall to Wylie Balancing Reservoir project and they will do no less for this project. During construction, they will supervise whichever subcontractor is deemed to provide NTMWD with the Best Value to complete the project, whether that be their own crews, or others.

ASI Constructors, Inc is our Team's expert in roller compacted concrete, soil cement construction, dam construction, labyrinth weirs, and spillways. They have committed members of their design team and estimating team to provide value engineering services throughout preconstruction; and members of their upper management to add constructability analysis and be available through procurement and for on-site assistance through construction. NTMWD will recognize many of the submitted ASI personnel from the Lake Texoma Outfall to Wylie Balancing Reservoir project including John Bowen, Peter Yard, and Kevin Delo.

*History of Relationships* - Paths have crossed many times between AW, R.E. Monks, and ASI; some while chasing the same projects, some while working similar programs side by side, and some even as partners on the same successful project. Over the course of many years, these Team members have developed a strong respect for the talents and philosophies of each other.

**The Southern Delivery System Program** for Colorado Springs Utilities (CSU) is an example of where these three Team members are working alongside each other, all owning different portions of this very important System for CSU.

General description of project: The Pueblo Dam and Reservoir is located on the Arkansas River in Pueblo County about six miles upstream and west of the city of Pueblo. This regional water project will deliver water to Colorado Springs, Pueblo West, Fountain, and Security. It will provide these communities with a long-term, stable water supply for the next several decades. Phase 1 of the SDS work included the connection to the North Outlet Works of the Pueblo Dam. The project included work inside the dam, pipeline, structural concrete, fixed cone valve facility, mussel control system, electrical, instrumentation and controls. The work also included installation of the upstream bulkhead, forming, and pouring the concrete thrust block and lining the channel with rip rap. We also completed construction of a cofferdam to divert the Arkansas River around our work area. Other work included excavation of earthen materials out of the existing river channel, 55 feet down to the rock bottom of the channel. ASI also built a mass concrete foundation in the river channel to support a structural concrete valve containing and fixed cone valve and a rotary cone





## CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project Project No. 344

valve control facility. This facility will regulate and control releases from the dam into the river and SDS pipeline. The existing dam outlet was lined with SS liner sections, which ASI connected to an existing gate flange in the tunnel. The annules between the liner and tunnel were backfilled with concrete. In 2013, the American Public Works Association (APWA) Colorado Chapter awarded the Southern Delivery System (SDS) Pueblo Dam Connection 1A Project the Project of the Year Award and the Structures Large Award.



The program also consists of three pump stations with a capacity of 50 MGD each that are taking water from Pueblo Reservoir in Pueblo Colorado at elevation 4750.00 and pumping it over 50 miles to a new water treatment plant in Colorado Springs at elevation 6364.00, currently under construction. This is pumping water over 1600 feet in elevation. AW has the general construction contract for these pump stations, and R.E. Monks is our subcontractor for the site grading, and structural excavation and backfill for these pump stations.

The Juniper Pump Station is constructed in rock and requires rock excavation within the Bureau of Reclamation and State Park boundaries. Williams Creek Pump Station is located on the prairie east of Fountain, Colorado; at the end of a six mile access road that dead ends at the pump station. Due to the expansive soils along the Front Range, the pump station is built on drilled piers and void forms for the friction and not bearing capacity. There is also a 1.6 mg reservoir being constructed on the site to accept the water being pumped from Juniper. Bradley Pump Station is located east of Colorado Springs, is similar to Williams Creek, and is also constructed on drilled piers and void forms. It, too, has a 1.6 mg forebay on that site. It will accept the pumped water from Williams Creek, then pump the water to the new water treatment plant.

### Lubbock Terminal Storage Reservoir:

The project consisted of furnishing and installing a new 225 MG terminal reservoir, 4 ea. 1 MG evaporation ponds, 2ea. 1 MG retention ponds, "thru levee" drainage structures, channels, water control gates, and miscellaneous piping and appurtenances. General scope included trench safety systems, 15,200 lf of silt fence for erosion control, 660 sf of concrete riprap at the 24" culvert, 695,558 cy structural excavation, 712,673 cy of structural backfill, pond liners consisting of 184,953 sy of 20 oz. geotextile fabric and 146,594 sy of 60 mil HDPE liner, 26,930 cy of soil cement at the evaporation ponds, 5311 tn stone bedding for piping, 9,531 tn of 6" caliche base for roads around site and on reservoirs with 7,586 sy of asphalt paving, an inlet structure of 405 cy, an outlet structure of 167 cy, access roads, landings and concrete apron at reservoir of 3,815 cy, 1,976 lf of 16" DIP reclaimed water, 1,972 lf of 36" DIP emergency overflow, 3,476 lf of 48" DIP raw water piping and bypass line, 2 ea. 24" slide gates, 5 ea. 48" slide gates, and 1 ea. 72" slide gate.





## CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project Project No. 344

The project was awarded using the Owner's Competitive Sealed Proposal procurement method, with 40% of the selection criteria based on contractor qualifications and 60% based on price. R.E. Monks performed the heavy civil work for the Water Treatment Plant that AW built at the same time, which consisted of over 900,000 cubic yards of grading. They also constructed the Terminal Storage Facility and two evaporation ponds.

### Dry Creek Dam

ASI was a subcontractor to R.E. Monks on this project. The Dry Creek Dam is located in Larimer County, CO. The project consisted of constructing a new pumped storage reservoir, which included 11,000 cy RCC spillway, 1200 cy conventional and a facing concrete, outlet works including intake and valve vault with one 30" cone valve and one 10" cone valves. RCC and CLSM were produced with an on-site batch plant. The project also included a Labyrinth Weir Spillway.

#### Type of Dam:

New Embankment Dam  
w/RCC Emergency  
Spillway

#### Dam Height:

60 feet

#### Crest Length:

7,000 feet

#### RCC Volume:

11,000 cy

#### Conventional Concrete:

1,500 cy



*Additionally, please notice the extensive history of ASI and Monks working together through Forms 8 and 9.*

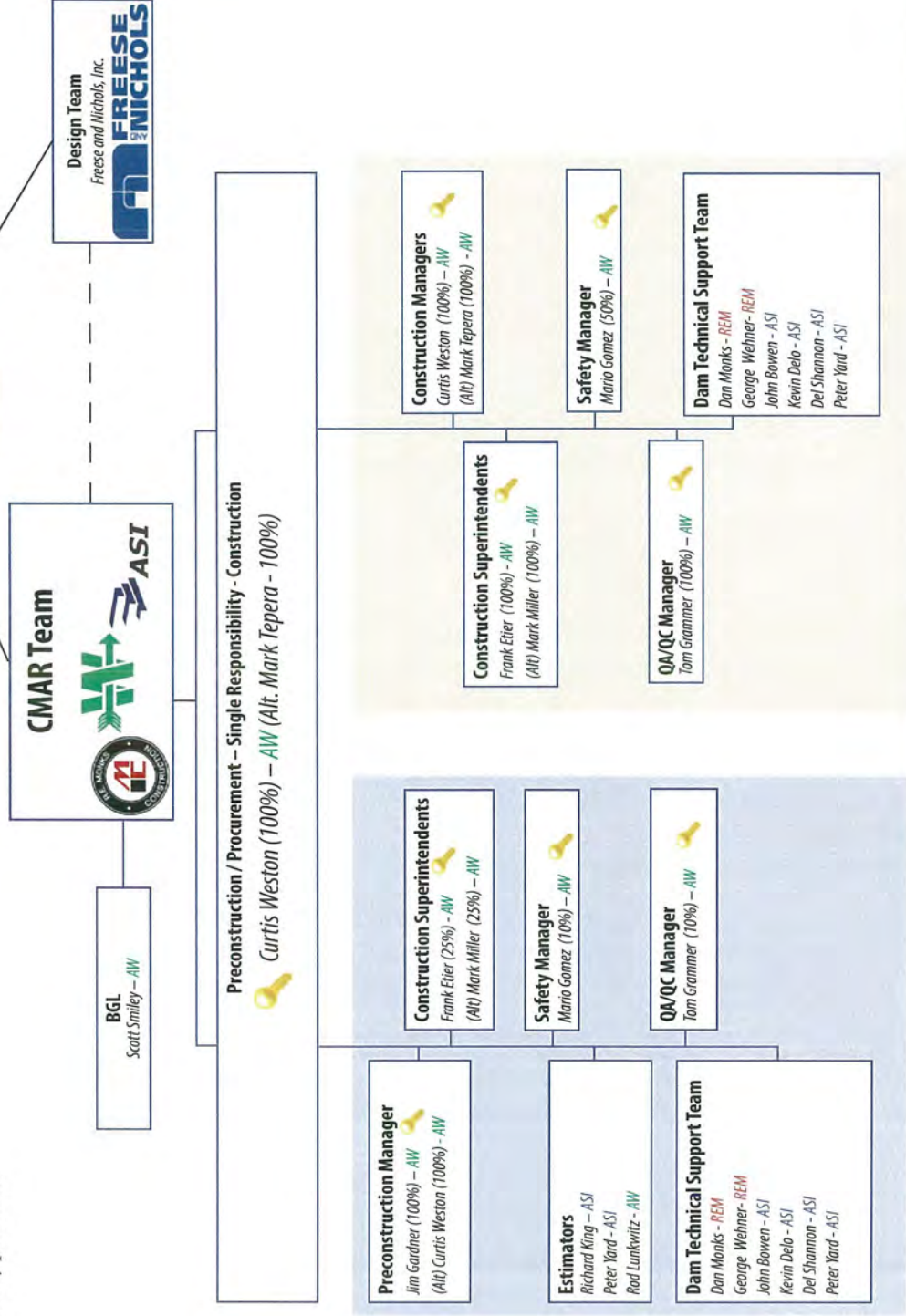
**Brief Description of Managerial Structure Proposed** - As previously stated, AW is taking the lead on this CMAR project. Our longstanding relationship with NTMWD and our extensive alternate delivery experiences locally and nationally create the foundation of this successful Project Team. But, the expertise brought by our team members, R.E. Monks Construction and ASI Constructors, Inc. truly build this Team to be highly beneficial for you, as the project owner, as well as to your design team. Any one branch of this team could individually complete this project successfully; but together, we create the **BEST VALUE** team for NTMWD.





# Organization Chart

Denotes requested key personnel



**Proposed Key Personnel and Alternate Key Personnel (Proposal Form 10)**

Proposer doing business as:	Archer Western Construction, LLC	
<b>Proposed Project Organization</b>		
<b>Experience of Key Personnel</b>		
Provide information on the Key Personnel proposed for this Project that will undertake the following roles for this Project. Provide the information for each of these roles on the pages for each of these Key Personnel and Alternate Key Personnel.		
Role	Primary Key Personnel	Alternate Key Personnel
Preconstruction Manager	Jim Gardner	Curtis Weston
Project Manager	Curtis Weston	Mark Tepera
Project Superintendent	Frank Etier	Mark Miller
Project Safety Manager	Mario Gomez	Mario Gomez
Quality Control Manager	Tom Grammer	Tom Grammer



**Proposed Project Managers**

Proposer doing business as		Archer Western Construction, LLC	
<b>Key Personnel</b>			
Name of individual		Curtis Weston	
Years of experience as project manager		18+	
Years of experience with Proposer		13	
Number of similar projects as project manager		40+	
Number of similar projects in other positions		20+	
Current project assignments			
Name of assignment		Percent of time used for this Project	Estimated project completion date
Lubbock SEWRP Solids Handling		20%	January 2017
NTMWD Lift Station Improvements		15%	June 2016
CMAR – NTMWD Lower Bois d’ Arc Creek Reservoir Dam and Intake		100% as needed through precon and 100% during construction	
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)			
Name	Brian Campbell, P.E.	Name	Leslie Castillo
Title/ position	Project Manager	Title/ position	Project Manager
Organization	NTMWD	Organization	DWU
Telephone	972.442.5405	Telephone	214.948.4560
E-mail	bcampbell@ntmwd.com	E-mail	Leslie.castillo@dallascityhall.com
Project	Wilson Creek RE WTP (various)	Project	Dallas SS WWTP Solids Dewatering
Candidate role on project	Project Manager	Candidates role on project	Project Manager
<b>Alternate Key Personnel</b>			
Name of individual		Mark Tepera	
Years of experience as project manager		16	
Years of experience with Proposer		20	
Number of similar projects as project manager		25+	
Number of similar projects in other positions		10	
Current project assignments			
Name of assignment		Percent of time used for this Project	Estimated project completion date
Dallas Central Primary Clarifiers & Solids Hndlg		30%	September 2016
Sam C. McKenzie WWTP		10%	July 2016
CMAR – NTMWD Lower Bois d’ Arc Creek Reservoir Dam and Intake		100% as needed through precon and 100% during construction	
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)			
Name	Regina Stencel	Name	Robby Isbell
Title/ position	Project Manager	Title/ position	Project Manager
Organization	DWU	Organization	City of Mansfield
Telephone	214.671.9184	Telephone	817.477.2248
E-mail	Regina.stencel@dallascityhall.com	E-mail	Robby.isbell@mansfield-tx.gov
Project	Dallas Central WWTP (Various)	Project	Mansfield WTP Phase IV Expansion
Candidate role on project	Project Manager	Candidate role on project	Project Manager

**Proposed Preconstruction Manager**

Proposer doing business as		Archer Western Construction, LLC	
<b>Key Personnel</b>			
Name of individual		Jim Gardner	
Years of experience as preconstruction manager		11	
Years of experience with Proposer		9	
Number of similar projects as preconstruction manager		4	
Number of similar projects in other positions		20+	
Current project assignments			
Name of assignment		Percent of time used for this Project	Estimated project completion date
Design-Build Integrator Crenshaw/LAX Corridor project		20%	3/2015
CMAR – NTMWD Lower Bois d’Arc Creek Reservoir Dam and Intake		100% through preconstruction and as needed during construction	
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Name	Carrie Wakumoto, P.E.	Name	Diane Gollhofer, P.E.
Title/ position	Project Engineer	Title/ position	Project Manager
Organization	USACE	Organization	Dallas Area Rapid Transit Authority
Telephone	504.862.1975	Telephone	214.328.9677
E-mail		E-mail	diane@dgrconsultants.com
Project	LPV-111 – ECI, CSX Railroad to Michoud Canal	Project	CM/GC LRT Sections SE-1, SE-2, NW-1B
Candidate role on project	Preconstruction Mgr/ Project Mgr	Candidate role on project	Preconstruction Mgr/ Project Mgr
<b>Alternate Key Personnel</b>			
Name of individual		Curtis Weston	
Years of experience as preconstruction manager		3	
Years of experience with Proposer		13	
Number of similar projects as preconstruction manager		2	
Number of similar projects in other positions		50+	
Current project assignments			
Name of assignment		Percent of time used for this Project	Estimated project completion date
Lubbock SEWRP Solids Handling		20%	January 2017
NTMWD Lift Station Improvements		15%	June 2016
CMAR – NTMWD Lower Bois d’Arc Creek Reservoir Dam and Intake		100% as needed through precon and 100% during construction	
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)			
Name	Brian Hamrick, P.E.	Name	Brian Campbell, P.E.
Title/ Position	Senior Project Manager	Title/ Position	Project Manager
Organization	Liberty Water	Organization	NTMWD
Telephone	623.278.3756	Telephone	972.442.5405
E-mail	Brian.hamrick@libertyutilities.com	E-mail	bcampbell@ntmwd.com
Project	WWTP Expansion CMAR	Project	Wilson Creek RE WTP (various)
Candidate role on project	Preconstruction and Construction Mgr	Candidate role on project	Project Manager

## Proposed Project Superintendent

Proposer doing business as		Archer Western Construction, LLC	
<b>Key Personnel</b>			
Name of individual		Frank Etier	
Years of experience as project superintendent		11	
Years of experience with Proposer		14	
Number of similar projects as superintendent		12	
Number of similar projects in other positions		7	
Current project assignments			
Name of assignment		Percent of time used for this Project	Estimated project completion date
NTMWD Prairie Creek Odor Abatement		25%	September 2015
NTMWD Wilson Creek Odor Control		10%	May 2015
NTMWD Wylie III Filter Imp		20%	August 2015
CMAR –Lower Bois d’Arc Reservoir Dam and Intake		100% as needed through precon and 100% through construction	
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Name	Greg Bradley	Name	Corey Anderson
Title/ position	Construction Inspector Supervisor	Title/ position	Project Manager
Organization	NTMWD	Organization	NTMWD
Telephone	972.442.5405	Telephone	972.442.5405
E-mail	gbradley@ntmwd.com	E-mail	canderson@ntmwd.com
Project	Various	Project	Various
Candidate role on project	Superintendent	Candidate role on project	Superintendent
<b>Alternate Key Personnel</b>			
Name of individual		Mark Miller	
Years of experience as project superintendent		25	
Years of experience with Proposer		21	
Number of similar projects as superintendent		12	
Number of similar projects in other positions		6	
Current project assignments			
Name of assignment		Percent of time used for this Project	Estimated project completion date
Lubbock SEWRP Solids Handling Improvements		60%	January 2017
CMAR – NTMWD Lower Bois d’Arc Creek Reservoir Dam and Intake		100% (after Sept)	
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)			
Name	Robert Allen	Name	Leslie Castillo
Title/ position	Construction Manager	Title/ position	Project Manager
Organization	Freese and Nichols, Inc.	Organization	DWU
Telephone	817.735.7300	Telephone	214.948.4560
E-mail	<a href="mailto:rca@freese.com">rca@freese.com</a>	E-mail	Leslie.castillo@dallascityhall.com
Project	Benbrook/Rolling Hills Pump Stations	Project	Dallas SS WWTP Solids Dewatering
Candidate role on project	Superintendent	Candidate role on project	Superintendent

**Proposed Project Safety Officer**

Proposer doing business as		Archer Western Construction, LLC	
<b>Key Personnel</b>			
Name of individual		Mario Gomez	
Years of experience as project safety manager		7	
Years of experience with Proposer		7	
Number of similar projects as safety manager		30+	
Number of similar projects in other positions		Has always worked in the capacity of a safety officer	
Current project assignments			
Name of assignment		Percent of time used for this Project	Estimated project completion date
Regional Safety Manager		100%	N/A
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Name	Jack Brazil	Name	Danny Garcia
Title/ position	Corporate Safety Manager	Title/position	Senior Construction Consultant
Organization	Archer Western Construction	Organization	Global Loss Prevention
Telephone	817-640-3898	Telephone	254-722-9580
E-mail	jbrazil@walshgroup.com	E-mail	danny.garcia@chartisinsurance.com
Project	Various	Project	DART
Candidate role on project	Safety Manager	Candidate role on project	Safety Manager
<b>Alternate Key</b>			
Name of individual		Mario Gomez	
Years of experience as project safety manager		7	
Years of experience with Proposer		7	
Number of similar projects as safety manager		30+	
Number of similar projects in other positions		Has always worked in the capacity of a safety officer	
Current project assignments			
Name of assignment		Percent of time used for this Project	Estimated project completion date
Regional Safety Manager		100%	N/A
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)			
Name	Jack Brazil	Name	Danny Garcia
Title/ position	Corporate Safety Manager	Title/ position	Senior Construction Consultant
Organization	Archer Western Construction	Organization	Global Loss Prevention
Telephone	817-640-3898	Telephone	254-722-9580
E-mail	jbrazil@walshgroup.com	E-mail	danny.garcia@chartisinsurance.com
Project	Various	Project	DART
Candidate role on project	Safety Manager	Candidate role on project	Safety Manager

**Proposed Project Quality Control Manager**

Proposer doing business as		Archer Western Construction, LLC	
<b>Key Personnel</b>			
Name of individual		Tom Grammer	
Years of experience as quality control manager		10	
Years of experience with Proposer		16	
Number of similar projects as quality manager		10	
Number of similar projects in other positions		20+	
Current project assignments			
Name of assignment		Percent of time used for this Project	Estimated project completion date
Various Ongoing Projects		100%	
Reference contact information (listing names indicates approval to contacting the names individuals as a reference)			
Name	Joseph Rasmussen	Name	Larry McDaniel
Title/ position	CSU Engineer	Title/ position	General Manager
Organization	Colorado Springs Utilities	Organization	Dallas County Park Cities MUD
Telephone	719-668-4173	Telephone	214-652-8639
E-mail	jras mussen@csu.org	E-mail	mcdaniel@parkcitieswater.com
Project	SDS Raw Water Pump Stations	Project	CMAR – Advanced Membrane Facility and Plant Improvements
Candidate role on project	Regional QC Manager	Candidate role on project	Regional QC Manager
<b>Alternate Key Personnel</b>			
Name of individual		Tom Grammer	
Years of experience as quality control manager		10	
Years of experience with Proposer		16	
Number of similar projects as quality manager		10	
Number of similar projects in other positions		20+	
Current project assignments			
Name of assignment		Percent of time used for this Project	Estimated project completion date
Various Ongoing Projects		100%	
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)			
Name	Joseph Rasmussen	Name	Larry McDaniel
Title/ Position	CSU Engineer	Title/ Position	General Manager
Organization	Colorado Springs Utilities	Organization	Dallas County Park Cities MUD
Telephone	719-668-4173	Telephone	214-652-8639
E-mail	jras mussen@csu.org	E-mail	mcdaniel@parkcitieswater.com
Project	SDS Raw Water Pump Stations	Project	CMAR – Advanced Membrane Facility and Plant Improvements
Candidate role on project	Regional QC Manager	Candidate role on project	Regional QC Manager





**Demonstration of On-Time Performance (Proposal Form 11)**

Proposer: Archer Western Construction, LLC		Provide information on all projects completed by Proposer within the last 5 years.									
Owner Name	Project Name and Description	Original Contract Date for Substantial Completion	Original Contract Date for Final Completion	Amended Contract Date for Substantial Completion	Amended Contract Date for Final Completion	Actual Contract Date for Substantial Completion	Actual Contract Date for Final Completion				
San Antonio Water System	Dos Rios WWTP Diffuser Replacement **EARLY	2/17/2015	2/17/2015	2/17/2015	2/17/2015	11/17/2014	11/17/2014				
City of Cedar Park	Cedar Park WTP Rehabilitation	5/1/2014	6/1/2014	6/13/2014	7/15/2014	6/13/2014	7/15/2014				
NTMWD	Upper Rowlett Creek Lift Station Metering Improvements ** EARLY SC	7/19/2014	9/17/2014	7/19/2014	9/17/2014	6/19/2014	9/16/2014				
Oklahoma City Water Utilities Trust	Witcher Pump Station, replacement of Lagoon Pumps and Installation of emergency generators ** EARLY SC	11/9/2014	12/9/2014	11/9/2014	12/9/2014	10/31/2014	12/9/2014				
NTMWD	Lake Texoma Outfall @ Wylie WTP - Sub to DN Tanks (NTMWD CMAR)	3/29/2013	11/29/2013	7/12/2013	8/1/2014	7/12/2013	8/1/2014				
City of Round Rock	Brushy Creek West WWTP Rehab * ** EARLY SC	10/29/2013	11/28/2013	11/28/2013	11/28/2013	11/7/2013	12/9/2013				
Oklahoma City Water Utilities Trust	Chisholm Creek WWTP Pollution Control Facilities ** EARLY SC & FC	1/2/2014	1/2/2014	3/26/2014	3/26/2014	1/24/2014	1/24/2014				
Oklahoma City Water Utilities Trust	New Booster Pump Station #25 and Storage Tank Complex	3/3/2014	4/1/2014	3/28/2014	4/26/2014	3/28/2014	4/24/2014				
City of Bryan	Tabor - 16th Street & N. Texas Ave GW Storage Tanks	2/4/2014	3/6/2014	2/4/2014	3/6/2014	2/4/2014	3/6/2014				
City of Springtown	Springtown Interim WWTP Improvements ** EARLY SC & FC	8/9/2013	9/8/2013	8/9/2013	9/8/2013	4/24/2013	5/15/2013				
NTMWD	Rowlett Creek WWTP Improvements	6/23/2013	8/22/2013	10/11/2013	12/10/2013	10/11/2013	12/10/2013				
DWU	Central WWTP Electrical Improvements	5/2/2014	6/1/2014	5/2/2014	6/1/2014	5/2/2014	6/1/2014				
Pima County, AZ	Pima County Water Reclamation Facility (Design-Build)	02/28/2014	02/28/2014	02/28/2014	02/28/2014	02/28/2014	02/28/2014				
BRA	Morris Sheppard Dam Controlled Outlet Conduit - Contract D	2/1/2013	3/1/2013	1/3/2014	2/2/2014	1/3/2014	2/2/2014				
NTMWD	Water Treatment Plant IV Filter Improvements ** EARLY FC	9/30/2013	10/30/2013	9/30/2013	4/28/2014	9/30/2013	12/29/2013				



City of Fort Worth	South Holly HSPS Motor & Switchgear Replacement	4/19/2013	6/5/2013	4/19/2013	6/5/2013	4/19/2013	6/5/2013
Liberty Water	<b>CMAR – WWTP Expansion</b>	2/28/2013	6/25/2013	2/28/2013	6/25/2013	2/28/2013	6/25/2013
Beaver Water District	Chlorine Dioxide Facility	11/1/2012	12/31/2012	11/1/2012	12/31/2012	11/1/2012	12/31/2012
City of Scottsdale, AZ	<b>CMAR - Scottsdale Hydrogen Sulfide Mitigation Project</b>	09/30/2014	09/30/2014	09/30/2014	09/30/2014	09/30/2014	09/30/2014
City of Marble Falls	Marble Falls WWTP	11/17/2012	12/17/2012	11/17/2012	12/17/2012	11/17/2012	12/17/2012
City of Plano	Custer Road Pump Station	10/15/2011	7/1/2012	10/15/2011	7/1/2012	10/15/2011	7/1/2012
City of Boerne	Boerne WWTP <b>** EARLY SC</b>	3/5/2013	4/4/2013	5/20/2013	6/19/2013	2/25/2013	6/19/2013
Chisholm Trail SUD	North Lake Georgetown Pump Station <b>** EARLY SC &amp; FC</b>	10/12/2011	12/12/2011	12/11/2011	2/10/2012	9/6/2011	11/1/2011
NTMWD	Expand Frisco - McKinney Pump Station to 130 MGD	5/4/2012	7/28/2013	5/4/2012	7/28/2013	5/4/2012	7/28/2013
TRA	Chlorine and Ammonia Bulk Storage Area	7/8/2011	7/22/2011	7/8/2011	9/14/2011	7/5/2011	9/14/2011
Oklahoma City Water Utilities Trust	OKC - South Canadian WTP	4/27/2012	7/11/2012	7/31/2012	8/5/2012	7/31/2012	8/5/2012
		The City's existing pump station failed and flooded, compromising our excavation. We then had to properly fill the excavation and re-excavate. Time extensions were granted					
City of Amarillo	Potter County Pump Station <b>** EARLY SC &amp; FC</b>	9/7/2011	11/6/2011	10/11/2011	12/10/2011	9/5/2011	11/21/2012
DWU	Central WWTP Complex-B Final Clarifiers	12/20/2011	1/3/2012	1/20/2012	2/3/2012	1/20/2012	2/3/2012
City of Weatherford	Weatherford Pipeline Repair <b>****Emergency Repair; designed &amp; completed in less than 3 weeks</b>	N/A	N/A	N/A	N/A	N/A	9/7/2010
City of Waco	Bullhide Creek WWTP <b>** EARLY SC &amp; FC</b>	12/24/2011	1/24/2012	3/6/2012	4/6/2012	2/4/2012	3/3/2012
City of Ft. Worth	Village Creek WWTP Secondary Area & Filter Rehab	12/1/2011	1/4/2012	3/1/2012	5/1/2012	3/1/2012	5/1/2012
		Delays on this project were due to sequencing work around a separate contract at Village Creek at the Owner's request. We were able to work with the Owner to minimize all impact.					
DWU	Eastside WTP Transfer Pump Stations 1 & 2	10/31/2013	12/31/2013	10/31/2013	12/31/2013	10/31/2013	12/31/2013
NTMWD	Wilson Creek WWTP Expansion	5/23/2012	7/22/2012	11/5/2012	1/4/2013	11/5/2012	1/4/2013
Brazos River Authority	Williamson County RWS - Pump Expansion	4/30/2011	5/30/2011	10/25/2011	12/16/2011	10/25/2011	12/16/2011





City of Scottsdale, AZ	<b>CMAR - Scottsdale Gravity Thickener #3 Facility</b>	05/31/2013	05/31/2013	10/31/2013	10/31/2013	10/31/2013	10/31/2013	10/31/2013
City of Lubbock	Lake Alan Henry Pump Stations	3/8/2012	6/8/2012	3/8/2012	6/8/2012	3/8/2012	6/8/2012	6/8/2012
City of Wichita Falls	Lake Diversion Emergency Spillway Slope Remediation <b>** EARLY SC &amp; FC</b>	6/22/2010	6/22/2010	6/22/2010	6/22/2010	6/9/2010	6/9/2010	6/9/2010
Bexar County	Olmos Dam Rehabilitation <b>** EARLY FC</b>	6/5/2011	7/5/2011	6/5/2011	7/5/2011	6/5/2011	6/5/2011	6/24/2011
Texas Parks & Wildlife	Ozonation Facility - Possum Kingdom Fish Hatchery	12/14/2010	1/13/2011	12/14/2010	1/13/2011	12/14/2010	1/13/2011	1/13/2011
Ameresco	Dallas Biogas Recovery Facility <b>** EARLY SC &amp; FC</b>	10/28/2010	11/11/2010	11/27/2010	12/11/2010	10/28/2010	11/11/2010	11/11/2010
City of Lubbock	Lake Alan Henry WTP	5/1/2012	7/6/2012	6/1/2012	2/16/2013	9/28/2012	2/16/2013	2/16/2013
		Owner had requested additional work, extending the contract completion. AW overcame additional issues as well, project was successfully completed for the Owner and no LDs were assessed.						
Hydronics	Digester Renovations - Hydronics	5/5/2011	5/5/2011	5/5/2011	5/5/2011	5/5/2011	5/5/2011	5/5/2011
City of Lufkin	Digester Renovations - City of Lufkin	5/5/2011	5/5/2011	5/5/2011	5/5/2011	5/5/2011	5/5/2011	5/5/2011
SAWS	SAWS Mission Pump Station	11/8/2011	1/7/2012	5/4/2012	4/11/2013	5/4/2012	4/11/2013	4/11/2013
Central TX Water Supply	Raw Water Intake Improvements Contract #2	3/3/2011	4/4/2011	12/5/2011	1/10/2012	12/5/2011	1/10/2012	1/10/2012
		Owner delayed granting substantial completion because the plant that the water was being sent to (under Owner's separate contract) wasn't complete and ready to accept the water from our contract.						
City of Lawton	Lawton WWTP Imp. Work Package No. 1	11/29/2010	12/29/2010	11/28/2011	12/28/2011	8/29/2011	12/20/2011	12/20/2011
		Owner was trying to use up allowance money before closing the contract. Although time extensions had been granted as shown, substantial was attained almost 3 months early of the granted extension date.						
City of Waco	Liquid Oxygen Tanks & Vaporizers	3/2/2010	3/12/2010	3/23/2010	5/5/2010	3/23/2010	5/5/2010	5/5/2010
City of Wichita Falls	Cypress WTP 2010 - 10 mgd Conventional treatment plant	1/7/2012	1/7/2012	7/19/2012	9/10/2012	7/19/2012	9/10/2012	9/10/2012
		Owner requested additional work to an existing pump station 5 miles from the plant site, which extended the contract. Per Russell Schreiber, Public Works Director: "Essentially, we added 3 new projects to AW while they were in the middle of completing the original contract."						
DPCMUD	<b>CMAR - Dallas Park Cities Membrane Facility</b>	3/4/2013	6/7/2013	3/4/2013	6/7/2013	3/4/2013	6/7/2013	6/7/2013
DWU	Dallas SSWWTP Solids Dewatering Facility	1/21/2012	3/11/2012	1/21/2012	3/11/2012	1/21/2012	3/11/2012	3/11/2012



City of Scottsdale, AZ	CMAR - Scottsdale CAP WTP Onsite Sodium Hypochlorite Generation Facility	08/31/2012	08/31/2012	08/31/2012	08/31/2012	08/31/2012	08/31/2012
Denton County Transportation Authority	A-Train DCTA CM/GC	12/10	12/10	12/10	12/10	12/10	
Dallas Water Utilities	Bachman WTP - Maintenance Bldg & Control Room	4/29/2011	6/30/2011	4/29/2011	6/30/2011	4/29/2011	6/30/2011
City of Mona, UT	CMAR - Mona WWTP	2/28/2012	4/30/2012	2/28/2012	5/30/2012	2/28/2012	5/30/2012
NTMWD	Chapman Lake Pump Station	4/1/2011	6/1/2011	12/10/2012	12/10/2012	12/10/2012	12/10/2012
		Additional requested switchgear delayed job completion over a year, with time extensions granted.					
NTMWD	Wilson Creek WWTP Odor Control Upgrades	12/30/2009	1/29/2010	12/30/2009	1/29/2010	12/30/2009	1/29/2010
City of Scottsdale, AZ	CMAR - Scottsdale Advanced Water Treatment Facility Expansion	9/30/2011	9/30/2011	11/30/2013	11/30/2013	11/30/2013	11/30/2013
This contract was increased in size by 89%. An additional \$24 million was awarded as a CMAR type contract in which we worked with the engineer and owner on the design and provided cost models to develop a design that was within the owner's budget. We went on to construct the additional work. <i>The original hard bid portion of the project was completed on time and the work associated with the change order was also completed in the designated time frame.</i>							
City of San Marcos	San Marcos Surface WWTP Wet Weather Improvements	3/26/2010	6/1/2010	6/27/2010	8/1/2010	6/27/2010	7/31/2010
Single-sourced RAS pump late delivery affected the completion of the project, as well as granted time extensions for change orders.							
City of Cactus	Cactus WWTP	11/20/2009	12/30/2009	12/9/2009	6/30/2010	12/9/2009	6/30/2010
NTMWD	High Service PS 2-1 Expansion to 150 MGD	9/6/2009	10/18/2009	9/6/2009	10/18/2009	9/6/2009	10/18/2009
NTMWD	Lake Texoma Pump Station Improvements	7/1/2010	8/1/2010	9/1/2014	9/1/2014	9/1/2014	9/1/2014
Project was actually on hold because, due to erosion and siting, the pumps were in OK water and Texas was not allowed to pump it.							
City of Scottsdale, AZ	Scottsdale CAP WTP Improvements CMAR	9/2010	10/2010	9/2010		9/2010	6/2013



DWU	Southside Energy Recovery Facilities Utilities	3/18/2010	3/18/2010	4/17/2010	4/17/2010	11/18/2010	11/18/2010
		Project was given a 30 day extension for the 1 change order to modify the substation. Yet, bigger delay was 2-fold. This project was actually put in place to feed the Biogas Recovery Facility Project (210026). This project did not bid until February 2010. AW was awarded this project as well, but NTP was not until 3/31/10. Until the Biogas recovery project was completed, there was no way to test the heat exchangers for performance, so DWU would not grant "completion". Once they were able to test the heat exchangers, they discovered an issue regarding wrong heat transfer properties. So, actual completion was delayed further. No official changes were made to the modified contract completion date of 4/17/10. Actual completion was granted 11/18/10.					
City of Mansfield	Mansfield WTP Phase IV Expansion	4/18/2011	6/17/2011	4/18/2011	6/17/2011	4/18/2011	6/17/2011
TRA	TRA Mosier Valley 87 MGD Reliability Project	12/31/2010	2/14/2011	9/8/2011	10/23/2011	9/8/2011	12/30/2011
City of Waco	Waco DAF	10/1/2010	11/10/2010	5/2/2012	5/2/2012	12/30/2010	5/2/2012
		Time extensions granted for additional items requested by Owner and Owner requested re-design of piping to save trees. Also, Owner requested additional starter & switchgear					
City of Wichita Falls	Jasper WTP Pre-Sed Basin & Plan Mods * ** EARLY FC	7/8/2009	8/16/2009	7/8/2009	8/16/2009	7/8/2009	7/8/2009
DWU	Elm Fork WTP Ozone Completion Improvements	9/30/2009	11/30/2009	2/22/2011	8/31/2011	2/22/2011	8/31/2011
		Sole sourced supplier delayed completion.					
DWU	Sunset Pump Station	7/23/2010	9/1/2010	10/21/2010	11/30/2010	10/21/2010	11/30/2010
		Additional time was added for owner changes in dual feed power supply to the project.					
TRA	Ten Mile Creek WWTP	3/26/2010	5/25/2010	10/19/2010	12/18/2010	9/23/2010	12/18/2010
		Owner initiated changes and issues with electrical equipment extended the project.					
City of Arlington	John F. Kubala WTP Expansion	2/17/2010	4/18/2010	N/A	2/7/2012	N/A	2/7/2012
		Owner requested to add an emergency generator late in the project which added almost 2 years to the completion date. All delays are documented and approved.					
TRA	Red Oak WWTP ** EARLY SC	9/1/2010	11/1/2010	9/1/2010	11/1/2010	8/1/2010	11/1/2010
Guadalupe-Blanco RA	GBRA - TP-4 Hydroelectric Station * ** EARLY SC & FC	7/10/2008	8/25/2008	7/10/2008	8/25/2008	6/11/2008	6/11/2008
NTMWD	South Mesquite Creek WWTP	3/10/2009	4/9/2009	3/10/2009	4/9/2009	3/10/2009	4/9/2009
TxDOT	Lubbock Storm Water Pump Stations (3)	6/9/2009	2/3/2010	6/9/2009	3/3/2010	6/9/2009	3/3/2010



City of Waxahachie	Waxahachie Water Treatment Plant (Sokoll) New Plant	7/20/2009	10/28/2009	9/5/2009	12/14/2009	12/10/2009	2/1/2010
		Additional time was added for numerous (79) change orders and design modifications during construction. Also, the City desired some additional programming to the membrane system, and although they were selling water for 3 months prior, they would not grant substantial completion, until the programming issue was resolved and never have executed the time extensions, although no claims were filed.					
TRA	Lake Livingston Outlet Works Improvements	12/9/2009	2/7/2010	12/9/2009	2/7/2010	12/9/2009	2/7/2010
DWU	Central WWTP - Effluent Filters	3/25/2010	5/9/2010	3/25/2010	9/30/2010	3/25/2010	9/30/2010

**Demonstration of On-Time Performance (Proposal Form 11)**



Proposer: R.E. Monks Construction Company LLC		Provide information on all projects completed by Proposer within the last 5 years.					
Owner Name	Project Name and Description	Original Contract Date for Substantial Completion	Original Contract Date for Final Completion	Amended Contract Date for Substantial Completion	Amended Contract Date for Final Completion	Actual Contract Date for Substantial Completion	Actual Contract Date for Final Completion
North Texas Municipal Water District	Lake Texoma Outfall to Wylie Balancing Reservoir	Nov 1, 2013	Dec 1, 2013	Nov 1, 2013	Dec 31, 2013	Nov 1, 2013	Dec 31, 2013
Broadmoor Resort	Emerald Valley Dams	July, 2014	July, 2014	Aug, 2014	Aug, 2014	July, 2014	Aug, 2014
Douglas County, CO	Hess Road	Dec, 2011	Jan, 2012	June, 2012	July, 2012	April, 2012	June, 2012
El Paso County, CO	Marksheffel Road Improvements	May, 2012	May, 2012	May, 2012	May, 2012	Jan, 2012	May, 2012
Prairie Center Metro District	Prairie Center Regional	Dec, 2013	Dec, 2013	Dec, 2013	Dec, 2013	Dec, 2013	Dec, 2013
City of Midland, TX	Midland Landfill	Nov, 2013	Nov, 2013	Nov, 2013	Nov, 2013	Oct, 2013	Nov, 2013
El Paso County, CO	Hodgen Road Phase 1	May, 2012	June, 2012	June, 2012	July, 2012	June, 2012	July, 2012
El Paso County, CO	Hodgen Road Phase 2	July, 2014	Aug, 2014	Sept, 2014	Oct, 2014	Sept, 2014	Oct, 2014
El Paso County, CO	Taxiway E, G, & H	Nov, 2013	Nov, 2013	Nov, 2013	Nov, 2013	Nov, 2013	Nov, 2013
CB&I/Shaw Environmental	Ft Carson Landfill	May, 2014	May, 2014	May, 2014	May, 2014	Dec, 2013	Dec, 2013





**Demonstration of On-Time Performance (Proposal Form 11)**

Name of Offeror: <b>ASI Constructors, Inc.</b>						
Provide information on all projects completed by the Offeror within the last 5 years.						
Owner Name	Project Description	Original Contract Date for Substantial Completion	Original Contract Date for Final Completion	Amended Contract Date for Substantial Completion	Amended Contract Date for Final Completion	Actual Contract Date for Substantial Completion
Colorado Springs Utilities	Northfield Dam Modifications	December 8, 2015	January 7, 2015	May 31, 2015	June 30, 2015	November 25, 2014
Notes:						
Fairfax County	Huntsman Lake Dam Pohick Creek No. 8	September 23, 2014	November 7, 2014	N/A	N/A	September 23, 2014
Notes: N/A						
Fairfax County	Huntsman Lake Dam Dredging	August 13, 2014	September 27, 2014	N/A	N/A	August 13, 2014
AR Fish and Game Commission	Spring River Dam	August 1, 2014	September 2, 2014	N/A	N/A	August 1, 2014
Notes: N/A						
North Texas Municipal District – Garney (CMAR)	Lake Texoma Outfall to Wylie WTP Raw Water Pipeline Plant Bid Package #3 Balancing Reservoir – Howe, TX	November 1, 2013	December 1, 2013	N/A	December 31, 2013	November 1, 2013
Notes: N/A						
Los Alamos County	Los Alamos Canyon Dam Modifications – Los Alamos, NM	September 30, 2012	October 30, 2012	December 15, 2012	January 30, 2013	December 10, 2012
Notes: Owner added significant additional scope (reservoir dredging) to dam rehabilitation contract due to wildfire impact to watershed						
Stafford County Department of Utilities	Rocky Pen Run Dam & Reservoir Hydraulic Structures – Stafford, VA	November 11, 2013	March 11, 2014	November 30, 2013	April 30, 2014	November 8, 2013
Notes: N/A						
Comal County Purchasing Office	Dry Comal Creek Flood Retarding Structure – New Braunfels, TX	July 10, 2012	September 30, 2012	N/A	N/A	July 10, 2012
Notes: N/A						



Name of Offeror: <b>ASI Constructors, Inc.</b>						
Provide information on all projects completed by the Offeror within the last 5 years.						
Owner Name	Project Description	Original Contract Date for Substantial Completion	Original Contract Date for Final Completion	Amended Contract Date for Substantial Completion	Amended Contract Date for Final Completion	Actual Contract Date for Final Completion
City of Manassas, VA	T. Nelson Elliott Dam Safety Modifications – Manassas, VA	March 30, 2012	June 15, 2012	N/A	March 20, 2012	June 2, 2012
Notes: N/A						
State of New Mexico – New Mexico Office of the State Engineer – Dam Safety Bureau	Cabresto Lake Dam – Questa, NM	November 1, 2012	December 20, 2012	N/A	May 10, 2013	November 1, 2012
Notes: Owner extended final completion date to allow for reclamation work in preferable weather						
Pennsylvania American Water	Nesbitt Dam – Scranton, PA	September 15, 2012	November 1, 2012	N/A	September 13, 2012	October 25, 2012
Notes: N/A						
Colorado Springs Utilities	Southern Delivery System, Pueblo Dam Connection – Pueblo, CO	April 15, 2012	May 30, 2012	June 15, 2012	July 15, 2012	July 12, 2012
Notes: Owner directed additional work scope and modifications to initial design						
New Escalante Irrigation Company	Wide Hollow Water Supply Storage Facility – Escalante, UT	December 30, 2010	February 12, 2011	N/A	March 15, 2012	March 1, 2011
Notes: Owner directed additional permanent erosion control measures to scope of work.						
Yadkin County, NC	Deep Creek Watershed Dam 5D – Yadkin County, NC		June 15, 2010	N/A	N/A	February 10, 2010
Notes: N/A						
Duke Energy Corporation	Catawba Dam ESSI Project	March 30, 2009	May 1, 2010	N/A	March 20, 2009	April 3, 2010
Notes: N/A						
AmerenUE	Taum Sauk Plant – Upper Reservoir Reconstruction Project	October 30, 2009	n/a	April 1, 2010	April 1, 2010	June 30, 2010
Notes: Contract was an emergency rehabilitation – initial work scope and contract value based on preliminary geotechnical investigation.						



**Demonstration of Budget Performance (Proposal Form 12)**

Proposer:		Provide information on all projects completed by Proposer within the last 5 years.											
Owner Name	Project Name, Brief Description of Project Scope, Brief description of On-Budget Performance and Brief Descriptions of Change Orders and Impact on On-Budget Performance	Construction Projects				CMAR Projects				Change Order Amount	Final GMP		
		Bid Price	Change Order Amount	Final Price	GMP	Bid Price	Change Order Amount	Final Price	GMP				
San Antonio Water System	Dos Rios WWTP Diffuser Replacement Phase 1	\$1,417,030	\$0	\$1,417,030									
City of Cedar Park	Cedar Park WTP Rehabilitation	\$1,563,000	\$26,832	\$1,589,832									
NTMWD	Upper Rowlett Creek Lift Station Metering Improvements	\$2,070,000	\$0	\$2,070,000									
Oklahoma City Water Utilities Trust	Witcher Pump Station, replacement of Lagoon Pumps and Installation of emergency generators	\$7,511,000	\$33,608	\$7,544,608									
NTMWD	Lake Texoma Outfall @ Wylie WTP - Sub to DN Tanks	\$3,121,870	(\$18,768)	\$3,103,102									
City of Round Rock	Brushy Creek West WWTP Rehab	\$4,172,400	\$2,719	\$4,175,119									
Oklahoma City Water Utilities Trust	Chisholm Creek WWTP Pollution Control Facilities	\$3,831,000	(\$44,668)	\$3,786,332									
Oklahoma City Water Utilities Trust	New Booster Pump Station #25 and Storage Tank Complex	\$13,892,000	\$124,239	\$14,016,239									
City of Bryan	Tabor - 16th Street & N. Texas Ave GW Storage Tanks	\$3,601,520	\$117,562	\$3,719,082									
City of Springtown	Springtown Interim WWTP Improvements	\$691,500	\$2,768	\$694,268									
NTMWD	Rowlett Creek WWTP Improvements	\$3,980,590	\$110,799	\$4,091,389									
DWU	Central WWTP Electrical Improvements	\$10,698,250	\$0	\$10,698,250									
Pima County, AZ	<b>Pima County Water Reclamation Facility (Design-Build)</b>										\$50,500,000	\$3,661,352	\$54,080,208
Brazos River Authority	Morris Sheppard Dam Controlled Outlet Conduit - Contract D	\$5,675,318	\$2,890	\$5,678,208									
NTMWD	Water Treatment Plant IV Filter Improvements	\$5,364,550	\$374,086	\$5,738,636									
City of Fort Worth	South Holly HSPS Motor & Switchgear Replacement	\$3,783,000	\$36,962	\$3,819,962									
Liberty Water	<b>CMAR WWTP Expansion</b>										\$2,000,000	(\$150,188)	\$1,849,812





Beaver Water District	Chlorine Dioxide Facility	\$4,498,000	\$92,730	\$4,590,730		
City of Scottsdale, AZ	<b>CMAR - Scottsdale Hydrogen Sulfide Mitigation Project</b>			\$4,500,000		\$3,781,239
City of Marble Falls	Marble Falls WWTP	\$4,253,000	\$23,927	\$4,276,927		
City of Plano	Custer Road Pump Station	\$5,435,000	(\$182,196)	\$5,252,804		
City of Boerne	Boerne WWTP	\$33,024,025	(\$3,967,493)	\$29,056,532		
	This project is significant in this category because of AW's partnering, constructability and value engineering efforts. Although AW's number was the low bid, the City of Boerne was contemplating throwing the bids out because they were over the given budget. AW worked with the City of Boerne to refine the scope, review constructability issues and offer value engineering savings and ultimately were able to get the project within a budget that the City could accept.					
Chisholm Trail SUD	North Lake Georgetown Pump Station	\$1,783,000	\$355,161	\$2,138,161		
NTMWD	Expand Frisco - McKinney Pump Station to 130 MGD	\$6,441,225	\$78,843	\$6,520,068		
TRA	Chlorine and Ammonia Bulk Storage Area	\$414,400	\$10,749	\$403,651		
Oklahoma City Water Utilities Trust	OKC - South Canadian WTP	\$11,763,000	\$561,800	\$12,324,800		
City of Amarillo	Potter County Pump Station	\$7,833,000	\$38,036	\$7,871,036		
DWU	Central WWTP Complex-B Final Clarifiers	\$7,826,000	\$240,721	\$8,066,721		
City of Weatherford	Weatherford Pipeline Repair <b>***Emergency Repair; designed &amp; completed in less than 3 weeks</b>	\$212,989	\$0	\$212,989		
City of Waco	Bullhide Creek WWTP	\$9,618,570	\$405,084	\$10,023,654		
City of Ft. Worth	Village Creek WWTP Secondary Area & Filter Rehab	\$8,214,000	\$88,988	\$8,302,988		
DWU	Eastside WTP Transfer Pump Stations 1 & 2	\$25,499,000	\$703,087	\$26,202,087		
NTMWD	Wilson Creek WWTP Expansion	\$30,659,000	\$1,128,952	\$31,787,952		
Brazos River Authority	Williamson County RWS - Pump Expansion	\$5,140,100	(\$10,690)	\$5,129,410		
City of Scottsdale, AZ	<b>CMAR - Scottsdale Gravity Thickener #3 Facility</b>			\$2,250,258	\$616,413	\$2,866,671
City of Lubbock	Lake Alan Henry Pump Stations	\$20,629,620	\$53,660	\$20,683,280		



City of Wichita Falls	Lake Diversion Emergency Spillway Slope Remediation	\$931,218	\$507,404	\$423,814	
	AW was called in to help the City of Wichita Falls on this emergency slope remediation because of the relationship that has been developed with the Jasper Plant and the Cypress WTP and the crews and philosophies they have discovered of AW throughout those projects. AW was able to save the City more than half of the original budget for the emergency repair.				
Bexar County	Olmos Dam Rehabilitation	\$4,092,150	\$15,716	\$4,107,866	
Texas Parks & Wildlife	Ozonation Facility - Possum Kingdom Fish Hatchery	\$1,483,000	(\$116,403)	\$1,366,597	
Ameresco	Dallas Biogas Recovery Facility	\$2,719,870	\$198,866	\$2,918,736	
City of Lubbock	Lake Alan Henry WTP	\$40,873,000	\$243,813	\$41,116,813	
Hydronics	Digester Renovations - Hydronics	\$270,000	(\$135,000)	\$135,000	
City of Lufkin	Digester Renovations - City of Lufkin	\$277,000	(\$138,500)	\$138,500	
	Each of the above 2 projects were to renovate 2 digesters. Due to budget limitations, only 1 digester was renovated for each project, halving the contract amounts.				
SAWS	SAWS Mission Pump Station	\$11,842,000	\$22,229	\$11,864,229	
	Requirements from San Antonio Historical Society review after the contract had been let, addition of fire rated windows and change in electrical gear configuration.				
Central TX Water Supply	Raw Water Intake Improvements Contract #2	\$2,442,000	\$6,172	\$2,448,172	
City of Lawton	Lawton WWTP Imp. Work Package No. 1	\$5,366,000	(\$306,000)	\$5,060,000	
City of Waco	Liquid Oxygen Tanks & Vaporizers	\$360,000	\$0	\$360,000	
City of Wichita Falls	Cypress WTP 2010 - 10 mgd Conventional treatment plant	\$42,686,000	\$2,819,675	\$45,505,675	
	Per Russell Schreiber, Public Works Director: "Essentially, we added 3 new projects to AW while they were in the middle of completing the original contract. Overall, the percentage of change orders (6.6%) may appear high to the uninformed; yet, changes to the original scope of work were only slightly over 0.5%. For this magnitude of a project, 0.5% is outstanding and shows the cohesiveness of the entire project team."				
DPCMUD	Dallas Park Cities Membrane Facility CMAR	\$300,000	\$32,232,384	\$33,701,352	(\$1,168,968)
	This contract was written for preconstruction services only. A change order (after established GMP) was written for the Construction Management and construction of the entire project.				
DWU	Dallas SSWWTP Solids Dewatering Facility	\$39,056,200	\$723,594	\$39,779,794	
City of Scottsdale, AZ	CMAR - Scottsdale CAP WTP Onsite Sodium Hypochlorite Generation Facility			\$5,500,000	\$5,500,000



Denton County Transportation Authority	<b>A-Train DCTA CM/GC</b>							\$193,000,000	\$0	\$193,000,000	\$193,000,000
Dallas Water Utilities	Bachman WTP - Maintenance Bldg & Control Room	\$14,370,000	(\$186,000)		\$14,184,000						
City of Mona, UT	<b>CMAR - Mona WWTP</b>							\$9,842,928	(\$117,023)	\$9,725,905	
NTMWD	Chapman Lake Pump Station	\$2,214,631	(\$36,055)		\$2,178,576						
NTMWD	Wilson Creek WWTP Odor Control Upgrades	\$1,127,000	(\$390,100)		\$736,900						
City of Scottsdale, AZ	<b>CMAR - Scottsdale Advanced Water Treatment Facility Expansion</b>							\$27,405,000	\$24,000,000	\$50,895,114	
<p><i>This contract was increased in size by 89%. An additional \$24 million was awarded as a CMAR type contract in which we worked with the engineer and owner on the design and provided cost models to develop a design that was within the owner's budget. We went on to construct the additional work. The original hard bid portion of the project was completed on time and the work associated with the change order was also completed in the designated time frame.</i></p>											
City of San Marcos	San Marcos Surface WWTP Wet Weather Improvements	\$5,786,000	\$167,000		\$5,953,000						
<p>Unit price sludge removal overruns, plant sequencing limitations and allowable time off line, splitter box redesign &amp; emergency repair of existing LPV and replace instead of reusing those fittings were all parts of the unforeseen change order items on this project.</p>											
City of Cactus	Cactus WWTP	\$11,157,000	\$519,473		\$11,676,473						
NTMWD	High Service PS 2-1 Expansion to 150 MGD	\$1,233,985	\$2,000		\$1,235,985						
NTMWD	Lake Texoma Pump Station Improvements	\$6,479,702	\$37,046		\$6,516,748						
City of Scottsdale, AZ	<b>Scottsdale CAP WTP Improvements CMAR</b>							\$77,628,852	(\$828,852)	\$76,800,000	
DWU	Southside Energy Recovery Facilities Utilities	\$6,354,000	\$197,734		\$6,551,734						
City of Mansfield	Mansfield WTP Phase IV Expansion	\$24,564,000	\$172,475		\$24,736,475						
TRA	TRA Mosier Valley 87 MGD Reliability Project	\$25,096,000	\$1,164,421		\$26,260,421						
City of Waco	Waco DAF	\$39,612,000	\$6,563,305		\$46,175,305						
City of Wichita Falls	Jasper WTP Pre-Sed Basin & Plan Mods	\$2,933,000	\$0		\$2,933,000						
DWU	Elm Fork WTP Ozone Completion Improvements	\$5,307,000	\$555,944		\$5,862,944						
<p>Owner requested scope additions</p>											
DWU	Sunset Pump Station	\$22,739,000	\$232,000		\$22,971,000						
<p>Owner changes for dual feed power supply</p>											



TRA	Ten Mile Creek WWTP	\$22,163,000	\$485,073	\$22,648,073	
City of Arlington	John F. Kubala WTP Expansion	\$28,831,000	\$2,610,632	\$31,441,632	
	Repair filters, new emergency generator, miscellaneous items, added filter improvements to Pierce-Burch on this contract, as well.				
TRA	Red Oak WWTP	\$18,385,000	\$541,150	\$18,926,150	
	Approximately 60% of these changes were for additional scope items, although this project did have its share of unforeseen conditions and design issues. Each of these; however, were less than 1% of the contract value.				
Guadalupe-Blanco RA	GBRA - TP-4 Hydroelectric Station	\$777,500	(\$33,338)	\$744,162	
NTMWD	South Mesquite Creek WWTP	\$3,784,000	\$115,800	\$3,899,800	
TxDOT	Lubbock Storm Water Pump Stations (3)	\$6,153,094	\$761,627	\$6,914,721	
City of Waxahachie	Waxahachie Water Treatment Plant (Sokoll) New Plant	\$42,270,000	\$198,113	\$42,468,113	
	Change orders at this plant were fairly extensive in quantity ranging from drawing discrepancies to adding items that the operators wanted, adding spares, deleting unneeded cable trays, etc. AW worked with the City and the Engineer to trade out as many items as possible to try and balance the adds and deducts to maintain the budget.				
TRA	Lake Livingston Outlet Works Improvements	\$898,000	\$0	\$898,000	
DWU	Central WWTP - Effluent Filters	\$19,733,000	\$656,175	\$20,389,175	
	City added scope, primarily related to the non-potable water tower.				



**Demonstration of Budget Performance (Proposal Form 12)**

Proposer: R.E. Monks Construction Company LLC		Provide information on all projects completed by Proposer within the last 5 years.									
Owner Name	Project Name, Brief Description of Project Scope, Brief description of On-Budget Performance and Brief Descriptions of Change Orders and Impact on On-Budget Performance	Construction Projects					CMAR Projects				
		Bid Price	Change Order Amount	Final Price	GMP	Change Order Amount	Final GMP				
North Texas Municipal Water District	Lake Texoma Outfall to Wylie Balancing Reservoir	\$21,374,332	(\$275,337) Value Engineering	\$21,098,995							
Broadmoor Resort	Emerald Valley Dams (Emergency Repair)	Cost Plus	N/A	\$ 2,929,400							
Douglas County, CO	Hess Road	\$ 11,018,843.47	\$ 346,044.37	\$ 11,364,887.84							
El Paso County, CO	Marksheffel Road Improvements	\$ 8,141,369	\$ 94,355	\$ 8,235,724							
Prairie Center Metro District	Prairie Center Regional	\$ 2,718,723	\$ 782,309	\$3,501,032							
City of Midland, TX	Midland Landfill	\$ 5,772,510	(\$ 68,378) Value Engineering	\$ 5,704,132							
El Paso County, CO	Hodgen Phases 1&2	\$ 10,297,303	(\$ 189,031) Value Engineering	\$ 10,108,272							
El Paso County, CO	Taxiway E, G, & H	\$ 3,294,586	\$ 219,260	\$ 3,075,326							
El Paso County, CO	Ft Carson Landfill	\$ 4,759,000	\$ 87,667	\$ 4,846,667							



**Demonstration of Budget Performance (Proposal Form 12)**

Name of Offeror:		ASI Constructors, Inc.						
Provide information on all projects completed by the Offeror within the last 5 years.								
Owner Name	Project Description	Original/Final Contract Price	Value of Change Orders				Total Change Orders	Percent of Changes to Original Contract Price
			Owner Enhancements	Unforeseen Conditions	Design Issues			
Colorado Springs Utilities	Northfield Dam Modifications	\$3,404,247/ \$4,674,416	\$1,270,169					37.31%
Notes: N/A								
Fairfax County	Huntsman Lake Dam Pohick Creek No. 8	\$2,438,607/ \$2,470,179	\$31,572					1.29%
Notes: N/A								
Fairfax County	Huntsman Lake Dam Dredging	\$3,187,500/ \$3,590,060	\$402,560					12.63%
AR Fish and Game Commission	Spring River Dam	\$3,150,000/ \$3,325,000	\$175,000					5.56%
Notes: N/A								
North Texas Municipal District – Garney (CMAR)	Lake Texoma Outfall to Wylie WTP Raw Water Pipeline Plant Bid Package #3 Balancing Reservoir – Howe, TX	\$21,374,332 / \$21,098,995				(\$275,337)		-1.29%
Notes: Cost savings due to Contractor proposed engineering change								
Los Alamos County	Los Alamos Canyon Dam Modifications – Los Alamos, NM	\$2,648,824/ \$5,246,282	\$2,597,458				\$2,597,458	98.06%
Notes: Owner added significant additional scope (reservoir dredging) to dam rehabilitation contract due to wildfire impact to watershed								
Stafford County Department of Utilities	Rocky Pen Run Dam & Reservoir Hydraulic Structures – Stafford, VA	\$33,357,755/ \$35,500,000	\$2,142,245				\$2,142,245	6.42%
Notes: Significant increases in unit price scope items due to changed geotechnical condition (foundation)								
Comal County Purchasing Office	Dry Comal Creek Flood Retarding Structure – New Braunfels, TX	\$12,694,310/ \$12,824,647					\$130,337	1.03%
Notes: Minor increases in unit price scope items								



Name of Offeror:		ASI Constructors, Inc.					
Provide information on all projects completed by the Offeror within the last 5 years.							Percent of Changes to Original Contract Price
Owner Name	Project Description	Original/Final Contract Price	Value of Change Orders			Total Change Orders	
			Owner Enhancements	Unforeseen Conditions	Design Issues		
City of Manassas, VA	T. Nelson Elliott Dam Safety Modifications – Manassas, VA	\$7,120,000/ \$7,148,214	\$28,214			\$28,214	0.40%
Notes: N/A							
State of New Mexico – New Mexico Office of the State Engineer – Dam Safety Bureau	Cabresto Lake Dam – Questa, NM	\$6,300,000/ \$5,086,000			(\$1,214,000)	(\$1,214,000)	-19.27%
Notes: Significant cost savings due to value-engineering re-design allowed project to proceed within Owner's budget.							
Pennsylvania American Water	Nesbitt Dam – Scranton, PA	\$19,092,055/ \$22,274,100	\$682,045	\$2,500,000		\$3,182,045	16.67%
Notes: Owner directed significant additional scope to rehabilitate change in condition in existing dam discovered during construction							
Colorado Springs Utilities	Southern Delivery System, Pueblo Dam Connection – Pueblo, CO	\$5,625,000/ \$6,256,627	\$200,000		\$431,627	\$631,627	11.23%
Notes: Contract increases due to Owner directed additional work scope and modifications to initial design							
New Escalante Irrigation Company	Wide Hollow Water Supply Storage Facility – Escalante, UT	\$8,525,703/ \$8,178,956			(\$346,747)	(\$346,747)	-4.07%
Notes: Design changes reduced numerous unit price costs resulting in significant overall savings that offset an unforeseen foundation condition							
Yadkin County, NC	Deep Creek Watershed Dam 5D – Yadkin County, NC	\$7,688,393/ \$8,188,082		\$499,689		\$499,689	6.50%
Notes: Significant increases in unit price scope items due to changed geotechnical condition (foundation)							
Duke Energy Corporation	Catawba Dam ESSI Project	\$13,600,000/ \$14,092,710			\$492,710	\$492,710	3.62%
Notes: Engineer directed design modifications due to regulatory requirements							



Name of Offeror:		ASI Constructors, Inc.					
Provide information on all projects completed by the Offeror within the last 5 years.							
Owner Name	Project Description	Original/Final Contract Price	Value of Change Orders			Total Change Orders	Percent of Changes to Original Contract Price
			Owner Enhancements	Unforeseen Conditions	Design Issues		
AmerenUE	Taum Sauk Plant – Upper Reservoir Reconstruction Project	\$318,000,000/ \$405,000,000	\$45,000,000	\$42,000,000		\$87,000,000	27.36%
Notes: Owner directed performance under project labor agreement resulted in a significant increase in cost; Additionally, original significant increases work scope items due to changed geotechnical condition (foundation). Contract was an emergency rehabilitation – initial work scope and contract value based on preliminary geotechnical investigation.							







**CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
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Archer Western Construction, Texas Region, treatment plant division, led by Business Group Leader, Scott Smiley, and Program Manager, Jeff Polak, currently has approximately 20 projects under construction; an estimated "in progress" value of \$288,000,000. This is not an uncommon workload for AW. This current workload will in no way adversely affect our ability to effectively and successfully execute this project. Our current staff is ready and able to immediately start your project.

This group has handled approximately \$300,000,000 in revenue each year over the past four years. We have 10 project managers, 22 superintendents, many assistant project managers and engineers, and a field labor force of over 700. This is how we are able to self-perform between 60%-75% of water infrastructure projects, better controlling costs and schedules. However, we are also nimble enough to manage local subcontractors and suppliers if doing so provides the Owner and community an advantage.

Also, as a member of the Walsh Construction Group, we have access to an equipment fleet of over \$500 million. This fleet is managed by a dedicated staff operating out of the corporate headquarters that work with project management teams to schedule the specific equipment needed for any project from the time of award through completion. They are able to react and respond to more or different equipment being needed at any given time, drawing from a nation-wide pool of resources, or enabling the project team to rent locally, should that be to the project's advantage.

All personnel listed below, Monks and ASI support personnel, and any additional AW support staff, are available to provide needed services for this CMAR contract immediately. None of their present duties will preclude this.

Active Project	Contract Amount	Personnel	Completion Date	Personnel Availability
<b>NTMWD - Upper Rowlett and Upper Cottonwood Creek Lift Station Improvements</b>	\$8,904,500	Curtis Weston (Primary PM and Alt. Preconstruction Mgr)	06/16	Available Immediately for all preconstruction and procurement activities and will be available full time at start of construction
<b>Lubbock SEWRP Solids Handling Improvements</b>	\$33,556,000	Curtis Weston (Primary PM and Alt. Preconstruction Mgr)	01/17	Available Immediately for all preconstruction and procurement activities and will be available full time at start of construction





**CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
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<b>Prairie Creek WWTP Odor Abatement Improvements</b>	\$3,251,659	Frank Etier (Primary Superintendent)	09/15	Frank is PM on this project, and is immediately available for all preconstruction and procurement activities and will be available full time at start of construction
<b>NTMWD - Wilson Creek WWTP Odor Control Improvements</b>	\$656,700	Frank Etier (Primary Superintendent)	05/15	Frank is PM on this project, and is immediately available for all preconstruction and procurement activities and will be available full time at start of construction
<b>NTMWD - Wylie WTP III Filter and Improvements</b>	\$6,452,461	Frank Etier (Primary Superintendent)	08/15	Frank is PM on this project, and is immediately available for all preconstruction and procurement activities and will be available full time at start of construction
<b>Crenshaw/LAX Light Rail Transit Corridor Project</b>	\$1,300,000,000	Jim Gardner (Primary preconstruction manager)	N/A	As DB Integrator and Sr. Project Manager, Jim's responsibilities for this project are essentially complete and he is immediately available for this project.
<b>I-35 Managed Lanes</b>	\$1,200,000,000	Jim Gardner (Primary preconstruction manager)	N/A	Jim is contributing his expertise to this project while awaiting his next assignment
<b>Dallas Central Primary Clarifiers 1-6</b>	\$18,316,000	Mark Tepera (Alt. PM)	09/16	Available Immediately for all preconstruction and procurement activities and will be available full time by April 2016





**CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
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<b>Sam C McKenzie WWTP</b>	\$29,732,507	Mark Tepera (Alt. PM)	07/16	Available Immediately for all preconstruction and procurement activities and will be available full time by April 2016
<b>DWU Central and SS WWTP Solids Handling Imp.</b>	\$6,359,750	Mark Tepera (Alt. PM)	04/16	Available Immediately for all preconstruction and procurement activities and will be available full time by April 2016
<b>Lubbock SEWRP Solids Handling Improvements</b>	\$33,556,000	Mark Miller (Alt. Superintendent)	01/17	Mark will be available for preconstruction meetings, as well and available to be on site full time 06/16



**END OF SECTION**

00 45 16.01 FINANCIAL RESOURCES DATA PROPOSAL FORM 13

Proposer Name: \_\_\_\_\_

Financial Metric (Indicate appropriate years)	2011 or 2012	2012 or 2013	2013 or 2015
A. Operating Revenues			
B. Operating Expense (not including Depreciation and Amortization)			
C. Depreciation and Amortization			
D. Operating Income (A-B-C)			
E. Net Income			
F. Total Assets			
G. Current Assets			
H. Total Liabilities			
I. Current Liabilities			
J. Net Worth (Equity) (F-H)			
Market Price per share (as of xx/xx/xxxx)			
No. of outstanding shares (as of xx/xx/xxxx)			

END OF SECTION

Bank Credit Reference

Please provide the following information for the Proposer and Project Guarantor (if applicable). Please sign and date this form.

Bank Reference for Archer Western Construction, LLC ( "Company")

Name of banking institution or organization: The Private Bank

Address: 120 South LaSalle Street Chicago, IL 60603

Contact Individual: Jan Bukowiecki

Phone: 312-564-1324 Email: jbukowiecki@ThePrivateBank.com

Please indicate Yes or No in the appropriate box by answering the following questions and also respond to the last two questions:

Question	Yes	No
Has your organization or institution extended credit to the Company in the past three years?		X
Has the Company ever defaulted on a loan with your institution or organization?		X
Has the Company's credit history included any instances of delinquent payments?		X
To your knowledge, has the Company ever filed for bankruptcy or been involved in any bankruptcy proceedings?		X
To your knowledge, have any of the corporate officers of the Company ever been in default on a loan?		X
To your knowledge, has any creditor ever filed any criminal charges against the Company?		X
Please discuss any other questions or issues that may have come out in any financial due diligence evaluation or credit check performed by your institution or organization		
Response:		
Overall, how would you rank the financial stability or credit worthiness of the Company (e.g. excellent, good, satisfactory or poor?)		
Response: Excellent		

Jan Bukowiecki  
Signature

JAN BUKOWIECKI - OFFICER  
Printed Name and Title

2/11/15  
Date

END OF SECTION



*FINANCIAL INFORMATION*

*Form 4 and Form 5 can be found in section 1*

*Most recent Audited Financials can be found in Confidential Envelope*

*Most recent Quarterly Financials can be found in Confidential Envelope*

*Form 13 – Financial Resources Data – can be found in Confidential Envelope*

*DIRECT FINANCIAL QUESTIONS:*

*a. Material Adverse Changes in Financial Position.*

Within the last three years, there have been no material, historical, existing or anticipated changes in financial position of Archer Western, , including any material changes in the mode of conducting business, mergers, acquisitions, takeovers, joint ventures or divestitures.

*b. Bankruptcy.*

Archer Western has never declared bankruptcy or filed for protection from creditors under state or federal proceedings.

*c. Liabilities and/or Potential Liabilities.*

There are no pending or past legal proceedings within last three years and judgments or any contingent liabilities in which Archer Western or any parents, affiliates and subsidiaries of Archer Western was or is a party that could adversely affect Archer Western's financial position or ability to undertake this Project.

*d. Completion of Contracts.*

Within the last five years, Archer western has never failed to complete any contract nor has ever had any contract terminated due to alleged poor performance, default or litigation.

*e. Violation of Laws.*

Archer Western has not ever been convicted of any criminal conduct or been found in violation of any federal, state, or local statute, regulation or court order concerning antitrust, public contracting, employment discrimination or prevailing wages.

*f. Debarred from Bidding.*

Archer Western has never been debarred or under consideration for debarment on public contracts by the federal government or by any governmental entity in Texas or any other state.





*g. Contractor Refusal.*

Archer Western has never refused to construct or to provide materials defined in the contract documents for any project.

*h. Proposer Release.*

Archer Western has not been released from a bid or proposal in the past three years.

*i. Litigation.*

Archer Western is a party to construction-related litigation in the regular course of business. In the majority of these actions, Archer Western has been a named defendant in an insurance related claim, primarily workers compensation and related third-party actions. Notices and claims for mechanics' lien and payment bond claims have also been asserted on several projects in the ordinary course of business and usually are due to the timing of payment.

***Archer Western regularly indemnifies and holds project owners and its surety harmless from such claims and strives to prevent the filing of such claims.***

Responding further, Archer Western notes that the Texas Business Group, plant division, managed by the same personnel that will manage this project, has not been involved in litigation involving owners for construction projects that have been filed within the last five years nor that are currently outstanding. Archer Western is a national contractor. Additional corporate information can be provided upon request.

*j. Claims.*

Archer Western, Texas Business Group, plant division has had no significant claims incidences (claim is 3% or more of the contract amount) over the past five years involving owners for construction projects.







## Section 6 – Project Approach

Please note for flow of the proposal, we have moved the General Coordination approach topic in front of the Preconstruction Services approach topic.

### General Coordination (004516-2.06) – Up to 3 pages

The success of this project is directly affected by the commitment of full cooperation and collaboration between NTMWD, FNI, and AW's Team to be constant and seamless at every moment of the project. Our CMAR Team will take a proactive role in creating a unified team atmosphere for all project stakeholders to ensure this commitment. A key factor in accomplishing this team atmosphere is for the entire project team to establish open lines of communication and to effectively implement that communication throughout all phases of the project. This allows all parties to share lessons learned and cost and schedule information in an open-book format, ensuring that all expectations and objectives are fully met throughout the duration of the project.

Immediately following Notification of Award, the AW Team will conduct a kickoff workshop to:

- Introduce project team members and identify decision makers
- Establish a "partnering" environment based on transparency and openness and determine if a partnering session shall be conducted
- Establish and understand goals and objectives of all stakeholders
- Identify local community and environmental concerns or impacts
- Establish protocol for meetings, communications, and documentation via web proposed based project management system
- Establish Quality and Safety cultures, expectations and goals
- Review design documents and drawings (anticipated to be between 30%- 60%), discuss current constructability suggestions to facilitate the project schedule and value engineering opportunities while maintaining the integrity of NTMWD's vision, as well as the intent of the design
- Review project schedule logistics, sequencing, and milestones as it relates to submittal reviews, bid package solicitations, design completion and construction activities
- Discuss early out packages to assist with identification of design team's needs and establish dates to get packages advertised
- Identify known or anticipated risk factors to be evaluated
- Discuss development of GMP and contingencies
- Discuss site survey and controls
- Evaluate site access and infrastructure requirements
- Discuss significant project concerns such as care of water, plastic clays, soil cement aggregates supply and quality, sand supply and quality for blanket and chimney drains (typically C-33), and adequate construction water.

Associated General Contractors'



Build America Award 2005

For the duration of the project we must all commit to working together and being accountable to each other as one entity. Professionalism, open communication, immediate trust, and commitment to each other will set the stage for project success. **With this in mind, our Team that will be responsible for constructing this project on time and within the established GMP, will be the same team involved in the preconstruction activities through the final design development and procurement.**

Multiple tasks and processes will be used by AW's Team to manage risk and successfully deliver the entire project within NTMWD's budget. Safety,





## CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project Project No. 344

schedule, quality, and cost transparency will be the guiding principles used for all activities. Below are some key processes or deliverables that our Team will provide immediately upon selection and/or throughout the preconstruction, procurement, and construction phases:

- Maintain excellent project communications and work diligently to keep all stakeholders involved in the project informed of the progress through developing working relationships and holding regularly documented meetings. All meetings will be accessible via conference call as necessary.
- Respect the design process, keeping redesign costs to a minimum and working closely with FNI to provide cost effective solutions as our goal.
- Actively participate in constructability reviews during design to gain maximum value for the money.
- Provide and update cost estimates as the design completion progresses to ensure overall budgets are achieved.
- Develop bid packages to achieve best value while encouraging local involvement.
- Utilize the project schedule as the road map and vision to a successful project and effectively manage the schedule to maintain accuracy in forecasted completion dates and costs.
- Safely maintain and coordinate construction operations through logistics planning, material handling and hazard analysis.

In efforts to facilitate full cooperation and collaboration amongst the project stakeholders, AW's Team is prepared to organize a partnering session through an independent facilitator. This falls in line with our philosophy of creating an environment where each stakeholder feels comfortable to share opinions on key project objectives or expectations openly, leading to a successful project. It is envisioned that a set of project goals is created during this partnering session and accepted by all project stakeholders.

AW's Team believes in the concept of partnering based on the premise that important, complementary opportunities may exist between all project participants. From preconstruction through the construction of the project, if the right people are brought together in an open environment, with an effective organizational process, mutually beneficial relationships can be established that will result in successful project delivery. To effectively create this relationship, we strive to achieve the following:

- **Commitment** – Commitment must begin with the top levels of management, but be equally held by all members of the Project Team. Team members must be committed to the concept of partnering. We may establish a specific partnership charter that includes a mission statement, common goals and objectives to successfully execute the plan. The jointly developed partnership charter is not a contract, but a *symbol of commitment*.
- **Communication** – Open, honest communication among all team members is crucial. All team members require feedback on how their performance compares to the Team's expectations. A key to good communication is to understand and appreciate individual differences.
- **Trust** – Teamwork is not possible where there is cynicism about another's motives. Through the development of trust in personal relationships and communication about each team member's risks and goals, evolves a better understanding that will lead to project success. With this understanding comes a true, trustworthy partnership.
- **Conflict Resolution** – Obstacles are inevitable. To be successful in resolving issues, team members must feel free to admit to problems that interfere with project goals and objectives in order to discover solutions. There must, and will be, an agreed upon process in place for resolving issues in a timely

Marvin A. Black  
Excellence in Partnering Award





**CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
Project No. 344**

manner. The alternative to problem solving binds the Team's energy in faultfinding through scapegoats, thus reducing the Team's effectiveness in achieving goals and objectives.

- **Continuous Evaluation** – In order to ensure implementation, the Project Team must agree to plan for periodic joint evaluation based on the mutually established goals. This is to ensure the plan is proceeding as intended and that all team members are carrying their share of the load.

AW's Team strongly trusts that this support strategy greatly enhances the opportunity of our projects to be successful in every respect. To that end, our relationship with NTMWD does not cease at the completion of a project. In addition to standing behind our work and honoring warranties, our Team will continue to support NTMWD beyond each project as we have in the past.





## Section 6 – Project Approach

### Preconstruction Services (004516-2.06) – Up to 8 pages

#### Project Management

AW's Team understands the amount of commitment, coordination and collaboration it takes to maintain successful preconstruction services. We understand that, as necessary, meetings are the most effective way to accomplish this. We are fully prepared to attend all necessary meetings and anticipate, at a minimum, the following meetings:

- Kickoff Workshop
- Partnering Sessions
- Constructability Review Meetings – 30/60/90
- Cost Estimate and GMP Review Meetings – 30/60/90
- Early Out Bid Package and Bid Package Development Review Meetings
- CPM Schedule and Construction Sequencing Collaboration Meetings
- Project Awareness/Workshop Events
- Bid Package Pre-Bid Conferences

Other topics that may warrant smaller meeting forums or can be combined with the aforementioned meetings would include; Quality Management Plan Review, Project Specific Health and Safety Plan Review, Bid Package Proposal Review and Evaluation, and Project Logistics Planning.

#### Time Management

AW's Team has started evaluating the sequencing of the project and building a clear vision for the completion of the construction. Upon meeting with NTMWD and FNI to completely understand their expectations and vision for the project and to share our vision, we will finalize an integrated vision for the most efficient completion of the project. This integrated vision will naturally identify the order of importance for the completion of design. We will begin to proactively work with FNI to identify areas of the project that pose significant opportunities for value engineering. We will incorporate the design completion activities into our project CPM schedule so we can assist FNI in achieving success in delivering the design to support the needs of the project. As scopes of work become more defined through the completion of design, our Team will modify the CPM schedule to reflect more detailed activities increasing the accuracy of the schedule.

Effectively managing the CPM schedule during the preconstruction services will provide the Project Team with an accurate method of monitoring the effects of modifications that may be necessary throughout the completion of design. Our Team will quickly evaluate and quantify the magnitude of different viable options for the Project Team to accurately and confidently determine which direction to proceed.

In our initial evaluation of the project, particular consideration will be given to the sequencing of the work and the routing of Bois d'Arc Creek and Honey Grove Creek. An inadequate diversion plan will negatively affect the quality and productivity of the slurry trench and clay embankment operations. Our Team strategized one possible option would be to use the proposed intake channel, 78" intake pipes, and the service spillway exit channel as an effective phased care of water plan for construction. We view this as extremely critical to the success of this project, and we would promote a dedicated workshop to collaboratively assess the options with NTMWD and FNI. ***A more detailed explanation of this Care of Water option can be found on page 8 of this section.***





## Cost Management

### Dam

AW's Team approach to cost management begins with understanding the importance of developing detailed cost estimates and maintaining a realistic schedule for the project throughout the preconstruction phase, facilitating the confident development of the Final GMP. Each one of our Team member firms has dedicated experienced estimators, as well as senior managers, to ensure the integrity of the cost estimates and schedules provided for this project. AW's Team will provide cost estimates that reflect current, real-time project costs as well as anticipated escalations that only our expertise can anticipate. Every cost estimate will be assembled in a similar format, detailed for transparent evaluation, allowing NTMWD and FNI and our Team to effectively evaluate cost management procedures in an open and honest roundtable discussion.

AW's Team is fully prepared and committed to providing the GMP with the 90% design documents. With our diverse construction knowledge and unparalleled dam and reservoir expertise, we will successfully conceptualize what has yet to be designed. With important communications and exchange of information during the kickoff workshop, our Team will confidently price the conceptual items to meet design intent and owner vision. Our Team's GMP will include a complete list of the conceptual assumptions of likely scenarios, with valuation, thus minimizing large lump sum contingencies. It will still be necessary to carry a contingency; however, this valuation will be as identified on the bid form in the cost proposal portion of this proposal and validated upon an intimate review and understanding of, but not limited to, the following:

- 90% design documents
- Risk assessment
- Project schedule
- Conceptual assumptions
- Prior experiences

By openly communicating design strategies and GMP conceptual assumptions, FNI and AW's Team will productively work together, with the completion of design, to confidently complete the project within the established budget, without sacrificing quality or functionality of NTMWD's investment. This philosophy of openly communicating design strategies, conceptual assumptions, and transparent cost estimates will effectively eliminate the possibility for any significant changes to the GMP, assuring NTMWD that this project can be constructed within its budget at the infancy of preconstruction services.

As the design progresses to 90%, AW's Team will continue to thoroughly review the documents for constructability recommendations and alternative solutions for portions of the work. We will monitor the evolution of the design and specifications by tracking the changes from phase to phase as related to constructability review items, value engineering opportunities, and corrections needed to ensure that the contract documents evolve into a clean, concise set of documents capturing the ultimate vision for the project.

AW's Team will structure the initial cost estimates around the anticipated bid package scopes of work in an effort to facilitate quick comparisons throughout the development of the GMP. As the scopes of work are finalized and agreed upon, our ability to sort and customize the cost estimates to reflect the revised scopes is quick and seamless. With this flexibility in our cost estimates, we will provide a breakdown of the 90% GMP that will be used to compare with the true costs realized as bid packages are awarded. Not only will this provide a historical map of the progression and development of the GMP, but it also provides apples to apples comparison of the GMP to the actual project costs. We will maintain a "GMP to Actual Cost" comparative breakdown report and present this to NTMWD and FNI weekly as a score card for the project team to openly communicate project costs. A snap shot example of this can be found at the end of the Procurement Services section.





AW's Team is confident in its ability to provide and maintain an accurate GMP for the project from the 90% design documents that is not inflated with unnecessary contingencies or multipliers.

### Terminal Storage Reservoir

In addition to the prior items detailed for the Dam Cost Management, our Team will leverage its extensive experience managing and constructing storage reservoirs and knowledge of costs to provide NTMWD and FNI accurate and reliable feedback on the anticipated costs of the TSR prior to design attaining 30%. Many of our Team members have been involved in the very recent construction of several reservoirs that significantly resemble the vision of the TSR for this project and are best suited to provide cost and construction guidance. We are confident that our expertise is second to none and we are committed to proactively assist in the evaluation and evolution of the design and specifications in efforts to deliver a high quality, cost efficient TSR.

### Quality Management/Design Review

AW's Team is committed to actively constructing quality projects. Our management approach is comprehensive and multi-dimensional. We respect and effectively manage quality control during all phases of construction. During the preconstruction services our major quality control efforts are focused on providing accurate cost estimates and realistic schedules for assisting with discussions and decisions related to the best interest of the project. Special attention is also spent in the development of bid packages and defining scopes of work that consistently account for total scope coverage without scope gaps or overlap.

One of the most important quality control aspects of the preconstruction services is contract document reviews and providing constructability input to the current design documents. It is our responsibility as the CMAR Team to provide accurate information and evaluations while assisting in ensuring the contract documents are clean and concise. Providing this service with the highest of quality enables NTMWD and FNI to make sound evaluations and decisions as well as eliminate the possibility for change orders after the bid packages are awarded.

AW's Team will document and track changes to the contract drawings and specifications to immediately be incorporated into bid package scope considerations and will advise when revised contract documents are necessary and critical to a specific solicitation. AW will also be the liaison responsible for clearly communicating and ensuring the design intent is captured in the bid package scopes as well as in the construction of the project.



*Lesson Learned: During the design review meetings one of our major lessons learned was to request the Design Team to track changes in the design documents to improve overall project team collaboration and transparency with the Owner. Tracking these changes between the major design milestones allows the entire team to review significant changes in an efficient manner to mitigate risk and provide more efficient design review meetings.*

### Risk Management

One of the greatest advantages to be realized by NTMWD and FNI, through the Construction Manager at Risk project delivery method, is that it allows AW's Team to identify and either eliminate or mitigate potential project risks early, during the preconstruction phase. Our coordination efforts facilitate a collaborative thought process





CMAR Lower Bois d’Arc Creek Reservoir Dam and Intake Project  
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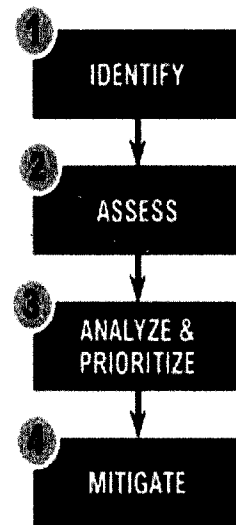
during early design phases, effectively reducing the number of high risk operations and ultimately saving the project time and money. The following items are examples of risk factors that will need to be evaluated and prioritized by the Project Team:

- Availability of sand (typically C-33) and aggregate materials
- Availability and reliability of concrete supply
- Flooding of work areas
- Sensitivity of on-site clays to moisture variations and clay (zone fill) locations and suitability
- Care of Water sequencing during construction (see page 8 of this section for detailed option)
- Slurry Trench sequencing
- Interfacing pump station and pipeline considerations with dam and spillway design

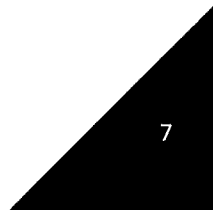
AW’s Risk Management Plan is a continuously evolving document, developed during the preconstruction phase and maintained throughout construction to project close out. It is simple, straight forward, and to the point. The final evaluation and assignment of magnitude is done as a collaborative activity with NTMWD and FNI. We have adopted a four step process to address project risk:

- Identify the source of the risk. AW’s Team’s history as experts in dam and reservoir construction allows us to accurately foresee constructability issues during adolescent design phases. Our ability to visualize what is not yet depicted in the contract documents helps us identify a source of risk before it comes to fruition.
- Assess the severity of the risk. After identifying a potential risk, the Project Team assesses said risk in terms of potential severity of impact and probability of occurrence. We score severity and probability on a scale from one to five, five being the most severe or most probable.
- Prioritize the risk. Once all potential risks have been identified and assessed, a simple formula is applied to prioritize the risks:  
*\* Probability of occurrence (1 to 5) multiplied by Severity of impact (1 to 5) is equal to the magnitude of risk (1 to 25)*
- Mitigate the risk. Upon prioritization, AW’s experienced Team begins the risk mitigation process in collaboration with NTMWD and FNI. We start with activities that have the greatest magnitude of risk, and continue down the list until all potential risks are addressed.

**RISK MANAGEMENT PROCESS**



AW’s Team will continually track and develop our risk matrix model to keep NTMWD and FNI apprised of the major factors that could impact the overall success of this project. Within this risk matrix will be potential cost and schedule impacts related to the individual issues which provides the Project Team with a clear understanding of major challenges and how working together in a team atmosphere, with dedicated professionals, establishes major cost savings that are realized while schedule impacts are reduced.





### Care of Water:

The mission of this project is to provide an additional, reliable drinking water source for NTMWD member Cities and Customers. The conservation and value of water continues to increase as population and demands for it also increase. All of us are stakeholders in the conservation and care of water.

With careers built on delivering infrastructure dedicated to the conservation and care of water, the team of AW, Monks and ASI know the importance of clean water. Working in an environment centered on 404 permits and the Clean Water Act of 1972 further defined by the Waters of the US, our Team excels in the knowhow and efficient handling of waterways, streams and groundwater.

This project, like most, will require ground water mitigation, stream channel realignment, flood mitigation, and erosion control. The design and implementation of handling water must encompass seasonal high runoff; possible 100 years flood events, as well as channelization of realigned streams and channels.

Groundwater may be encountered in the construction of the slurry wall and intake structure. Proper care and handling is required when dealing with groundwater. Our Team will have in place the required water testing and construction of settlements ponds for proper retention. The design of these features will be dependent upon the amount of groundwater encountered.

Stream channel realignment will be necessary for the construction of the slurry wall as well as dam embankment. This alignment may happen more than once depending on schedule and further collaboration with NTMWD and FNI. There may be a requirement to bypass the flow through the intake pipe once constructed. Maintaining proper flows will guarantee the downstream users access to the water. Proper planning and design will be necessary to move the water. This scope of work could be issued as a bid package to qualified contractors vs incidental to other bid packages.

Our Team has evaluated what we consider to be a viable solution for the Care of Water for this project. We have made the following assumptions which can be tweaked once we are selected and can gather additional information and further collaborate with NTMWD and FNI.

- The project will retain a sufficient amount of water for construction needs.
- The existing streams may be joined and channeled in one or the other.
- There is minor ground water encountered to handle.
- The existing streams can be diverted into the intake structure to carry through the dam.

The following is a phasing plan for this Care of Water option:

#### Existing Creek Alignment



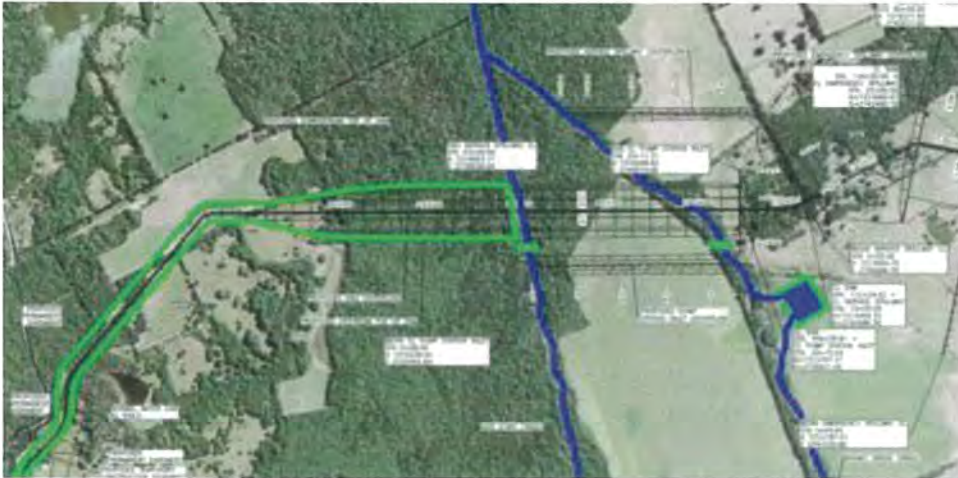




**Phase 1**

**Care of Water Components**

- Construct a water storage pond on the edge of Honey Grove Creek. Once constructed, the stream will be diverted into the construction pond. The construction pond will have an overflow that will put the water back into the Honey Grove Creek.
- In conjunction to the construction of the pond, two temporary crossings will be installed over both Honey Grove and Bois d'Arc Creeks. This will be accomplished using a large diameter pipe capable of handling weights of heavy equipment.



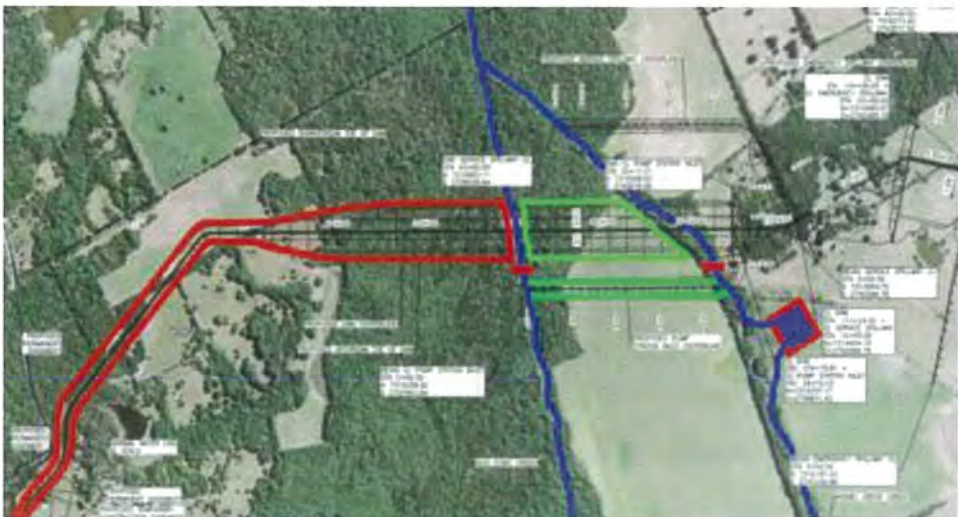
**Major Work Components**

- Clearing
- Establish adequate haul roads
- Construct slurry trench pad
- Construct slurry trench

**Phase 2**

**Care of Water Components**

- Excavate the proposed pump inlet channel. Upon verification, this material could be utilized in the embankment of the dam adjacent to the channel excavation or to construct the slurry trench pad. Leave a plug on each end of the channel until a time it is required for use.



**Major Work Components**

- Clearing
- Construct slurry trench pad
- Construct slurry trench





### Phase 3

#### Care of Water Components

- Remove the plugs from Honey Grove Creek and Bois d'Arc creek into inlet channel
- Plug the lower side of Bois d'Arc between the temp crossing and the inlet channel.



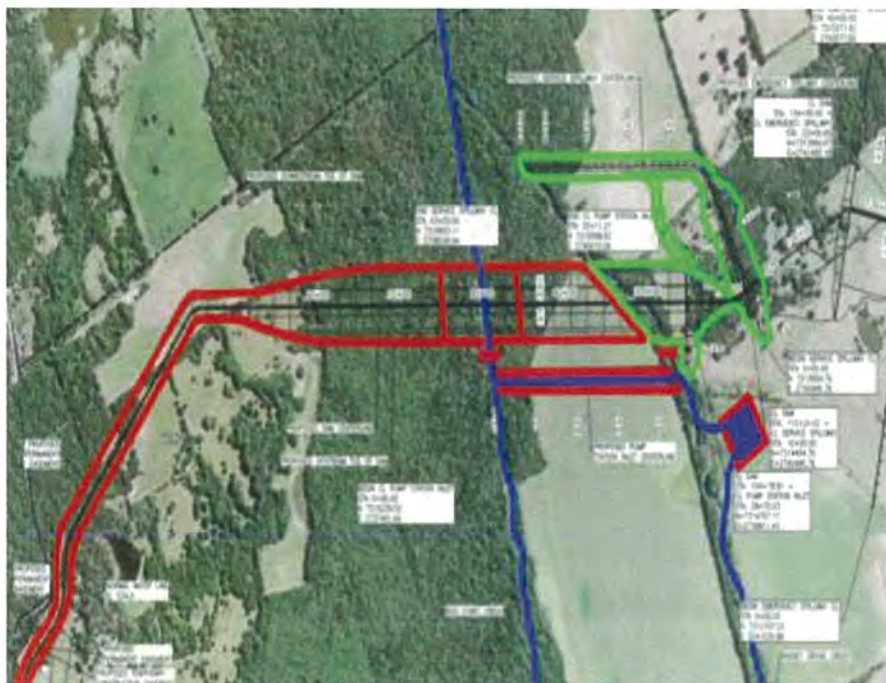
#### Major Work Components

- Construct slurry trench pad through Bois d'Arc Creek
- Construct slurry trench through Bois d'Arc Creek

### Phase 4

#### Care of Water Components

- Remove the plug from Bois d'Arc Creek into inlet channel
- Install plug from Honey Grove Creek between the temp crossing and the inlet channel.



#### Major Work Components

- Construct Slurry Trench pad through Honey Grove Creek
- Install Slurry Trench through Honey Grove Creek to Sta103+75
- Excavate dam foundation to bedrock
- Excavate and grade service spillway channel
- Construct a temporary channel from the edge of the dam at the dual conduit location to the service spillway channel
- Install the intake structure through the dam
- Construct bottom lift of intake tower



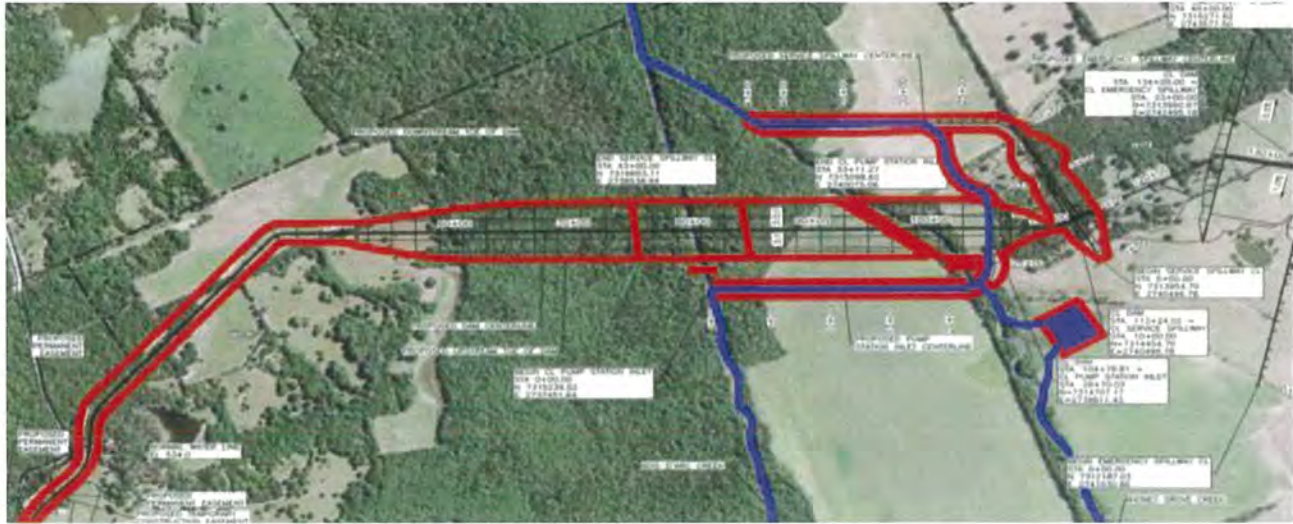


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Phase 5

Care of Water Components

- Prepare the intake structure to accept the flow of both Bois d'Arc and Honey Grove Creeks
- Shape the remainder of the intake channel to the intake tower
- Insert plug into the Bois d'Arc Creek between the temp crossing and the intake channel
- Divert the water through the dam and into the temporary channel to the service spillway channel
- Remove both temp crossings



It is currently anticipated for the temporary channel to the service spillway to remain in place until the construction of the dam is completed satisfactorily enough to start filling the reservoir.





## Section 6 – Project Approach

### Procurement Services (004516-2.06) – Up to 4 pages

#### Strategy

Another important aspect of the preconstruction services is the establishment of an effective project procurement strategy. ***The driving factor in AW's Team strategy is selecting subcontractors and vendors who can deliver the best value for each particular scope of the work while meeting the project goals.*** Our procurement strategy and development of bid packages also takes into consideration:

- Nature of the work requirements
- Maximizing/Enhancing schedule delivery
- Scope packaging or scope separation to encourage proper and competitive subcontractor and vendor participation
- Detailed coordination of interfacing bid package scopes
- Reduction of overall project costs
- Capabilities of local market subcontractors and vendors
- Scope alignment of the detailed cost estimates
- Identification of long lead items and early procurement goals
- Early procurement of volatile commodities

Our procurement strategy also includes subcontractor qualifications as part of the selection process. It is our goal to identify financially stable firms that provide the highest quality management, safety, products and installation available to achieve the best value for NTMWD and the project.

#### Bid Packages

AW's Team will work with NTMWD and FNI to ensure that all bid packages are mutually agreed upon before any formal solicitations are conducted. Collaborative efforts will be focused on developing packages that promote as much local and competitive involvement as possible without sacrificing the projects quality, safety, schedule, or budget.

Each bid package will include the following:

- Instruction to Bidders – Includes, but is not limited to, detailed instructions regarding the proposal requirements, explanation of selection criteria and evaluation process, bonding requirements, proposal preparation and submission, and notification of pre-bid conference
- Proposal Form – Includes, but is not limited to, detailed summary of work, detailed scopes of work to be included in pricing, detailed list of scopes not to include in pricing, bid form, and qualifications sheets.
- Project CPM Schedule.
- Pertinent Contract Drawings, Specifications and other documents deemed necessary for accurately bidding the package.

#### Project Solicitation

AW's Team will proactively solicit interest in the project; our efforts will be realized by the following commitments early in the preconstruction services phase:

- **Project Awareness-** Our Team will generate a current listing of local and regional contractors to contact and identify interest for the targeted trades and scopes of work for the project and interest in attending a project specific workshop event. Initial contact will be made via email correspondence, phone calls, or GradeBeam notifications. Follow up contacts will be made via phone call to firms that did not respond to the initial contact.





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- **Workshop Events-** Our Team will then conduct a series of workshops for the firms that are interested in pursuing the scopes of work regardless of tier level. The number of workshops will be based on the amount of interest generated through the **Project Awareness** efforts. The workshop discussions will include, but not be limited to, general project information, contracts/bonding/insurance, specific scope of work capabilities, and education of the CMAR and bid package processes. AW's Team will coordinate the logistics of the workshops with NTMWD and FNI, and strongly encourage the involvement of all parties in these workshops.

### Bid Package Solicitation

As bid packages are finalized, our Team will issue a 'Notice to Bidders' for each bid package solicitation. This "Notice to Bidders" will be distributed as follows:

- Mailed or emailed to each firm that has expressed interest in the project and/or attended the aforementioned workshop events
- Advertised in two newspaper circulations such as, The Fannin County Leader and The Herald Democrat
- Advertised at two plan rooms such as ISQFT and Dodge

Each bid package solicitation will be in two distributions, the initial notification will be targeted for one month prior to the bid date and the final notification will be no less than two weeks prior to the bid due date. The final notification will also be given prior to the pre-bid conference date identified in the bidding documents; this is in efforts to ensure all firms are "reminded" of the conference.

### Bidding Process

The pre-bid conference will be scheduled to occur at least one week in advance of the bid date but following the final notification as previously mentioned. The pre-bid conferences are anticipated to be held at our Team's on site office complex. AW's Team will conduct the conferences with NTMWD and FNI project representatives in attendance. The pre-bid conference agenda will include, but not be limited to:

- Attendee sign in
- Introduction of the Project Team
- Project overview and detailed review of the specific bid package associated with the conference
- Discuss intricacies of the bid package requirements and expectations from bidders
- Review current Addenda and document any questions or discussions that may need to be addressed in final Addendum following the conference
- Acknowledge bid date and time and cover submission process including where to turn in bids
- Site/work area tours as necessary

Following each pre-bid conference, AW's Team will collaborate with NTMWD and FNI to evaluate each conference to determine the anticipated participation in bidding the package and to identify and address any questions or discussions that need to be addressed in a follow-up Addendum.

During the preconstruction efforts to generate interest in the project, as well as during the procurement process, AW's Team will maintain a current list of all firms that have been actively interested in pursuing the work associated with the project. This listing will continuously be updated, tracked and referenced as communications take place during the procurement process. As Addenda are issued, our Team will ensure that everyone on the list is provided with the current Addendum as well as ensuring that each notification system is updated with the current Addendum.





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*It shall be noted, if any member of AW's Team has interest in pursuing a bid package, we will formally submit our bid proposal package in the same form and fashion expected of the other bidders on the same date and by the same time required of the others.*

AW's Team will receive bids on the date as established in the bidding documents with NTMWD and FNI present. Evaluation of the bid price as well and qualifications will be the basis of recommendation, final selection and award of the work. This is ultimately a collaborative effort amongst the Project Team, unless one of AW's Team members submits a bid. In this event, all bids will be received by either NTMWD or FNI and the evaluation process for recommendation, selection and award will be their sole responsibility and made in the absence of AW's Team members.

**GMP to Actual Cost Comparison**

During the preconstruction phase and into the procurement phase, AW's Team will be providing cost estimates as necessary for individual activity evaluation and for overall project cost evaluation at the current design levels. All of this is in efforts to help zero in on a final GMP and to ensure the project stays within NTMWD's budget. As the bid package scopes are further identified, our cost estimates will begin to be based around the bid package scope structure. AW's Team will generate a line item project cost sheet that reflects each bid package and its respective current GMP value. This is our "GMP to Actual Cost" comparison sheet and it will be updated with the realized value as each bid package is awarded, enabling the Project Team to keep track of where the overall costs of the project fall related to the GMP and NTMWD's budget. A snap shot of this cost comparison sheet from one of our previous CMAR projects can be referenced below. When the final bid package was awarded, the comparison of the GMP to Actual Cost was just under \$600,000, less than 1.5% of the cost of the project, proving the accuracy of our conceptual estimating.

Bid Package	Pre-Bid Date & Time	Bid Date & Time	GMP	BID	Diff
#1 Equipment Purchase	August 26, 2010 @ 9:00AM	September 16, 2010 @ 2:00PM	\$ 2,270,000.00	\$ 1,405,587.00	\$ 864,413.00
#2 Electrical	September 8, 2010 @ 9:00AM	September 15, 2010 @ 2:00PM	\$ 4,050,000.00	\$ 3,764,000.00	\$ 286,000.00
#3 Instrumentation	September 8, 2010 @ 9:00AM	September 15, 2010 @ 2:00PM	\$ 1,200,000.00	\$ 1,189,000.00	\$ 11,000.00
#4 Excavation and Foundation	September 7, 2010 @ 9:00AM	September 23, 2010 @ 2:00PM	\$ 2,400,000.00	\$ 2,196,250.00	\$ 203,750.00
#5 Yard Piping	September 7, 2010 @ 9:00AM	September 23, 2010 @ 2:00PM	\$ 1,400,000.00	\$ 1,299,500.00	\$ 100,500.00
#6 Plumbing	September 7, 2010 @ 1:30PM	September 15, 2010 @ 2:00PM	\$ 265,000.00	\$ 315,516.00	\$ (50,516.00)
#7 HVAC	September 7, 2010 @ 1:30PM	September 15, 2010 @ 2:00PM	\$ 620,000.00	\$ 421,395.00	\$ 198,605.00
#8 Process Piping & Equipment	September 8, 2010 @ 1:30PM	September 23, 2010 @ 2:00PM	\$ 2,900,000.00	\$ 3,125,000.00	\$ (225,000.00)
#9 Masonry	September 7, 2010 @ 9:00AM	September 15, 2010 @ 2:00PM	\$ 800,000.00	\$ 794,188.00	\$ 5,812.00
#10 Structural Framing & Metal Deck	October 06, 2010 @ 9:00AM	October 14, 2010 @ 2:00PM	\$ 350,000.00	\$ 560,000.00	\$ (210,000.00)

Each bid will be evaluated and analyzed thoroughly prior to finalizing recommendations for selection to ensure that all scopes are covered, specific exceptions have not been taken that could create scope gaps or future changes orders, and the bids appear reasonable for consideration.





## Section 6 – Project Approach

### Construction Services (004516-2.06) – Up to 10 pages

Effective contract management is very important to the success of our approach to this project. AW's Team will be the forefront to ensuring the construction of the project conforms to the construction design documents and NTMWD's expectations. Our ultimate objective is to deliver the project with the best interests of all the stakeholders in mind. We will conduct preconstruction meetings with each of the contractors to ensure they fully understand the expectations of the project and NTMWD, understand the requirements of their respective scopes of work, are prepared to staff the job adequately to support the schedule, and know and follow our quality and safety culture protocols. AW's Team will actively conduct routine coordination meetings and encourage open communication between our Team and the contractors building the project. This allows everyone to effectively communicate scheduled work activities, coordination with all scopes of work, issues or areas of concern and resolutions, potential project risk and mitigation of this risk. Our Team will be responsible for implementing our proven management systems to effectively manage and monitor the progress of the project as it relates to costs, schedule, safety and quality. We will also be proactive in the timely communication with NTMWD, FNI, or our subcontracts and suppliers if issues arise that could potentially negatively affect any aspect of the project.

#### Sub and Supplier Management

AW's Team prides itself in the relationships we have established with our subcontractors and vendors. Upon award of the bid packages we will conduct preconstruction meetings to define communication processes for the project, define the safety and quality expectations for the project, and communicate the vision for the project in terms of the CPM schedule. Preparatory meetings will be held before major work activities commence. At these meetings, we will establish a baseline for the quality of workmanship, identify safety concerns associated with the task, and discuss scheduling to avoid resource and work area conflicts. Our Team will utilize input from the subcontractors and vendors to validate the CPM schedule for the project. During the project, subcontractors will actively participate in weekly schedule coordination meetings and the major subcontractors will be required to participate in owner progress meetings. AW's Team will keep in constant communication with their subcontractors and vendors in efforts to make sure they are kept current on schedule requirements, delivery needs, RFIs and modifications, or other items that could affect the outcome of the project.

#### Site Safety

At every stage of every project, AW's Team will maintain safety as our number one priority. We are committed to providing a safe and healthy work environment for our employees, subcontractor and vendor employees, NTMWD and FNI employees, and the community. ***Safety shall not be sacrificed for production but rather considered as an integral part of quality control, cost reduction, and job efficiency.*** Our Team understands that safety is the responsibility of everyone and that it is essential to our success. Safety, quality, and productivity are directly linked. While the ultimate success of the project's health and safety program depends on the full cooperation of each individual employee, it is our responsibility to see that health and safety work practices and procedures are not only adequate, but also enforced. Every supervisor is aware of the safety performance demonstrated by the employees under our supervision.

Our Team includes Archer Western's Regional Safety Manager, Mario Gomez. He will select a site-specific Safety Committee that will review design drawings to identify potentially hazardous work activities. Together, we will:

- **Develop a Project Specific Health and Safety Plan** for the project
- **Complete Job Hazard Analyses** for major work activities
- **Create an Emergency Action Plan** specific to the project that will incorporate NTMWD and FNI staff





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Throughout the entire project, our site-specific Safety Committee continues enhancement of the plans they develop during the beginning phases of the project and is ultimately responsible for the safety culture developed throughout the life of the project. The committee immediately shows our value by incorporating safety as criteria by which the entire project is evaluated. Upon executing subcontract and purchase order contracts, the committee distributes safety documents and begins contractor orientation training, further advising the contractors as to the safety requirements of the project. During monthly Safety Committee Meetings, we discuss concerns, review trends, and evaluate upcoming work activities for potential hazards and ways to mitigate these hazards.

For a project of this nature and magnitude, special safety consideration efforts will be focused on, but not limited to, the following:

- Deep Excavations and Trenching
- Heavy Equipment Traffic Plans
- Designated Hauls Routes
- Water Hazards
- Insects, Animals, and Snakes
- Elevated Work Surfaces

### Time Management

Through detailed planning and daily observation of the work, AW's Team will monitor the progress in a proactive manner. We are prepared to make quick decisions to modify methods or redirect the work to avoid timely or costly delays. The project CPM schedule is dissected into shorter interval schedules such as 90-day look ahead and 4-week detailed construction schedules.

The 90-day look ahead schedule is evaluated by our Team in preplanning efforts so we can make necessary adjustments to crew sizes, equipment support, number of shifts, or material availability timely enough to prevent the overall schedule from falling behind. We will also analyze areas that we can pull the schedule ahead and evaluate the logistics of doing so. This also gives us the opportunity to confirm all required submittals have been accounted for, special notifications are not overlooked, and coordination with the other scopes of work take place. We will communicate with any subcontractors or suppliers that need to be mobilized to the site during that 90-day look ahead and begin our interaction and coordination efforts with them so they are prepared to hit the site productively.

Our 4-week schedules are a detailed breakdown of the CPM schedule work activities that are reviewed with our Team, subcontractors, and suppliers weekly. These schedules are updated and maintained weekly. Deviation from these detailed schedules can represent an issue in the progress of the project or it could simply mean that minor modifications were made, during our daily management of the work, to facilitate the work flow. A current 4-week schedule will be provided and reviewed with NTMWD and FNI as often as requested but at least at each progress meeting. This will facilitate scheduling of testing agencies, inspections of the work, and coordination with all scopes of the work.

With our daily observations, 4-week detailed scheduling, 90-day look ahead evaluations and routine updating of the CPM schedule, we will proactively manage the progress of the project and quickly identify if the schedule is in jeopardy of not being met. In the event we feel there is an issue, AW's Team will identify the root concern(s) and proactively make changes to the approach in those areas. It may be as simple as working a few extra hours a week or adding an additional piece of equipment or it may be more extensive and require a reevaluation of the sequencing and logic of the current procedures. In any case, we will openly communicate with NTMWD and FNI any necessary major changes in a timely fashion.







### Cost Management

As the project transitions into the construction services phase, the cost management makes a transition of its own. With the GMP set, the bid packages awarded, and the current anticipated risk items accounted for or mitigated; the expected overall costs of the project are well identified, barring any unforeseen or calculated risk not accounted for. The cost management becomes maintenance of projected cash flows and monthly payment applications.

- Project Cash Flow Summary- AW's Team will provide an anticipated cash flow summary that shows NTMWD the projected monthly billings to be expected during the course of the project. As the project progresses, we will provide updates to this cash flow summary if significant deviations from the current summary are realized. Any significant deviations from the originally anticipated cash flow summary would be a result of a major sequencing change in the CPM schedule or a major change in scope of work from the original bid packages. In either event, through open lines of communication with NTMWD and FNI, our Team will communicate deviations upon their earliest discovery so all parties can collaboratively evaluate the overall impacts to the project.
- Monthly Payment Applications- AW's Team will prepare a detailed schedule of values for the project that will be the basis for monthly payment applications. As with the CPM schedule, our Team will work with our subcontractors and suppliers to break down their scopes of work into more manageable items to facilitate the preparation and review of monthly payment applications. Upon completing the detailed schedule of values, it will be reviewed with NTMWD and FNI for acceptance prior to the first request for payment. As monthly progress payment applications are prepared, our Team will make an initial review of the subcontractor and supplier requests to ensure the percentage complete requested for each pay item is accurate and true to the actual status of the work. Once we confirm the requests are acceptable, we will incorporate these percentages into our overall monthly payment application and review with NTMWD and FNI for acceptance. Upon verification and agreement, the monthly payment applications can be submitted.

### Quality Management

Archer Western's Quality Management System describes the corporate policy of "**setting the highest standard of Quality.**" During the preconstruction services, with valuable input and feedback from NTMWD and FNI, AW's Team will develop a Project-Specific Quality Management Plan (QMP). This QMP will establish quality goals for the project, identify key personnel for quality issues, define quality education, and set standard operating procedures.

As Quality Control Manager, Tom Grammer will oversee the development of the project specific QMP that will detail methods of inspection and testing as required by the contract including notification and coordination procedures. It will set forth equipment and material receiving processes to ensure that all equipment and material delivered to the jobsite meets specification and submittal requirements. Furthermore, it will provide detailed procedures for accurately maintaining work-in-place quantity tracking and identify major work activities that will require detailed work plans.

AW's Team has successfully completed many projects with vast similarities to the Lower Bois d'Arc Creek Reservoir Dam and Intake Project. By bringing quality to the forefront during the initial planning stages of a project, our Team will effectively implement our Project-Specific QMP and complete this project beyond the expectations of NTMWD and FNI.

AW's Team will ensure that Work Plans are developed for every definable feature of work identified in the Project-Specific QMP. The Work Plan details task requirements according to features of work. The focus is on





## CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project Project No. 344

scope, sequence, tolerances and standards of construction, resources, subcontractor coordination, contract documents, layout, safety, and environmental requirements. The three primary phases discussed in each Work Plan are as follows.

1. **Preparatory Phase** – The development of a Work Plan begins with the review of the contract documents and submittals, coordination between trades, defining inspection and testing requirements, and assurance that prerequisite work has been completed and complies with the contract documents. Preparatory Meetings are coordinated to familiarize all involved parties with the level of quality that is expected in the forthcoming task. Our Team will keep accurate records and provide proper documentation, allowing the next phase to begin when our inspection indicates that all requirements are fulfilled.
2. **Production Phase** – Compliance verification, Initial Inspections, and testing are the quality control tools used to maintain preferred workmanship standards during production. Hold Points, built in to each Work Plan, provide opportunities to double check work, execute required testing, and perform inspections to confirm adherence to or exceed the project's quality standards.
3. **Follow Up Phase** – Our Team will continue to make daily inspections as construction progresses, ensure that required testing is performed, record the results, and make any necessary corrections are completed properly. The Work Plans will be Audited and Revised to accommodate any modifications during the work and redistributed to field crews and subcontractors for immediate implementation.

During this process, NTMWD and FNI will be intimately engaged through direct involvement, timely communications and coordination of the work activities.

Tom Grammer will ultimately be responsible for the oversight of our QMP and its implementation; however, every member of our Team is expected and qualified to enforce every aspect of this plan. As a Team, we will constantly monitor the work throughout each day. If deficiencies are experienced, they will be documented and communicated to the Project Team. Acceptable remedial actions will be implemented quickly in efforts to keep the work progressing forward and the occurrence will be addressed with the respective crew and/or contractor to ensure the deficiency does not reoccur.

Special Quality Control considerations will be focused on the following components of the project:

- Slurry Trench
- Blanket Drains
- Chimney Drain and Collector Drains
- RCC and Soil Cement
- High Plastic Clay Embankments
- Labyrinth Weir
- Testing Frequencies and Coordination
- Care of Water

### Risk Management

As mentioned earlier, our Team's risk management plan is a continuously evolving document, developed during the preconstruction services phase and maintained throughout the construction services phase to project close out. Identification of "at risk" items and activities related to costs, schedule, safety and quality have been made and evaluated during the preconstruction services, known and anticipated at that time. Final assessment of magnitude for these items has been collaboratively determined by AW's Team, NTMWD, and FNI. Some, if not most, of these items will be completely eliminated or substantially mitigated throughout the preconstruction services efforts; however, there may be items that need continuous monitoring of the implementation of the mitigation process throughout the duration of construction. AW's Team will continue to monitor the project





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during construction for additional “at risk” exposure and actively communicate these discoveries to NTMWD and FNI in a timely fashion to allow for proper assessment so that the most effective mitigation can be implemented.

Our Team will continue to document and track the risk items, rankings, and mitigation procedures on the project risk register throughout the project.

### Change Management

Changes are not anticipated but are typically unavoidable and normally arise from unforeseen conditions, owner requested changes, drawing modifications, or code issues. AW's Team will be dedicated from preconstruction through the completion of construction to minimize change potentials through extensive constructability reviews, detailed development of bid packages and effective management of the construction contractors during construction. In the event changes are encountered, our Team will follow the ground rules established in the contract documents for pricing and processing modifications. When a change or modification is realized, the first order of business will be to openly discuss the source and scope of the change with NTMWD and FNI to decide how the change will be compensated; will it be funded by the cost of the work or by the contingency established for NTMWD. Our Team will diligently review the proposed change request for accuracy and warranted pricing in a timely matter and present the costs to NTMWD and FNI for final evaluation and approval. AW's Team will be responsible for ensuring the scope of each modification is clearly understood internally and by the affected bid package contractors or vendors. If unclear, we will work with NTMWD and FNI to clear up any uncertainties so the modifications can be priced more accurately. As contract modifications are approved, the costs will be reflected on a revised schedule of values/payment application and the associated activities will be added to the CPM schedule.

### Start-up/Commissioning/Turn Over

Start-up, commissioning, and acceptance testing represent an important and highly anticipated milestone on every project. Our Team's Project-Specific Quality Management Plan will contain all requirements necessary for start-up and commissioning; including installation certification, calibration, acceptance testing of equipment as well as procedures and guidelines for filling the reservoir. AW's Team will collaboratively work with NTMWD and FNI to successfully accomplish the commissioning efforts and detail every aspect of final acceptance and turnover of the dam and reservoir facilities. Our Team will prepare final reports to document all start-up, testing, and commissioning activities for the project.

### Warranty Correction Period

AW's Team is fully committed to the successful completion of this project and we pride ourselves on the availability and timeliness of correcting items that may come up following the construction during the warranty period. Only when we have carried out our responsibility through the warranty period can we consider the project successful. Our Team has no concern with being immediately available to respond to any needs during the warranty period as AW has had an established regional office located in the DFW metroplex since 1994. This enables us to be on site within 2 hours regardless of the time of the call.

### Lessons learned

The AW Team brings together the combined previous experience on more than 150 previous dam projects, and the biggest lesson learned through this experience is that every dam project has its unique challenges. Dam construction is very seldom 'easy' or 'straightforward', and to deliver a successful project requires not only a committed team, but a team backed with the knowledge gained through prior experiences with these unique challenges. The AW Team's depth of experience will eliminate the 'learning-curve' that is experienced on many dam and reservoir construction projects.





In the review of the early-stage FNI design for the dam and reservoir, the following were noted as examples of previous successful risk mitigation measures and remedies to 'lessons learned':

#### Care of Water

- As discussed in the previous section of this narrative ('Care of Water'), the coordination of a well-conceived, phased river diversion scheme with slurry wall, foundation preparation, and dam embankment construction activities is critical to the success of the project. With this in mind, the following topics are worthy of an early-stage workshop between CMAR and the FNI design team:
  - Evaluate cost and schedule consideration for diversion schemes that provide a range of flood protection (i.e 2-yr flood, 5-yr flood, 10-yr flood). Consider cost and time consequences of potential flood-related delays in making the selection on the 'best value' diversion scheme.
  - Often, the cost and time involved in constructing conservative diversion schemes can be significant, and even with conservative designs; some risk of flooding will remain.
  - Evaluate time involved for schedule critical foundation work (slurry wall, foundation preparation) and make certain there is adequate time available and in reasonably-favorable weather conditions/seasons so that these work items can be efficiently constructed.
  - Prioritize maintaining the schedule for this work that has seasonal risk implications.
  - Consider adjustments to specifications/designs that mitigate duration of implementation on these schedule-critical work items if this lessens overall project exposure to flooding/delays. Often times more money spent on acceleration of critical foundation work will more than offset the cost and time associated with flood damage and flood-related delays.

#### Slurry Trench

- Selection of slurry-wall construction means and methods adequate to establish the minimum design requirement for penetration into the underlying shale. Consider a pre-production full-scale trial to demonstrate this capacity in the actual conditions that will exist at the site.
- Provide in the design for a working bench/platform of adequate dimension and bearing capacity to allow for efficient operation of the slurry trench excavation equipment. This will often require an adjustment to the minimum dimensions required in the design to accommodate the equipment required to efficiently construct the slurry wall.
- Make certain adequate infrastructure (water supply, bentonite storage facilities, etc.) are established to support sustained slurry production and delivery, and that this infrastructure is coordinated with the Care of Water requirements (i.e. environmental controls).

#### Large Embankments with High Plastic Clays

- Coordinate the geotech information, site test pits, lab information, visual and test results to coordinate the embankment requirements (LL, PI, #200) and quality requirements.
- Consider full-scale trial embankment/test section to evaluate sensitivity of plastic clays to moisture variation and the type of zone fill (clay) required. This allows the production assumptions to be 'vetted' and mitigates a significant risk to the project cost and schedule.
- If borrow areas are subject to flooding/inundation due to river diversion phasing, consider pre-excavation and stockpiling at least part of this material. The cost associated with this type of risk mitigation measure often proves to be considerably less than the cost of delays if flooding occurs.
- If schedule considerations dictate working in adverse cool/rainy seasons, pre-develop mitigation measures with FNI (i.e. stockpile protection measures, limited addition of lime-amendments, etc.) that provide for a means of continuing efficient embankment placement. If mitigation methodology isn't pre-developed in conjunction with the Engineer, there will typically be inadequate time to implement these as the impacts occur.





CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
Project No. 344

- Develop means to prevent contamination of filter/drain aggregates and prevent unnecessary saturation of in-place core material during rain events. Establish defined limits on quantity of material that is exposed at any one time to mitigate risk associated with contamination loss.

**The Wrap-Up**

AW's Team knows and understands dam and reservoir construction to the "nth" degree. Not only do we know how to construct every element of this project but we know how to properly and effectively manage this project for ultimate cost, schedule, safety, and quality efficiency to make this project a resounding success for all stakeholders. Our Team's successful history of managing and constructing dam and reservoir projects makes us an invaluable resource for the preconstruction activities that will set the stage for the construction of this important project. **The following information is a snapshot of the key components to Dam & Reservoir, Balancing Reservoir, and Labyrinth Weir construction.** The photos are from the following projects: Dry Creek Reservoir, Fortune (Welton) Reservoir, Standley Lake Dam and Reservoir, Lake Texoma Balancing Reservoir, and the Lake Brazos Dam. At least one of our Team members was involved in the management and construction of each of these projects.

**Key Work Components of Dams and Reservoirs:**



Core Trench Excavation/Foundation Prep



Core Trench Prep



Core Trench Prep & Core Trench Slush Grout



Inlet/Outlet Pipe





Downstream Sand Blanket (C-33)



Zone II Clay Embankment over Blanket Drain



Zone I (clay core) at Embankment Interior

Zone II (clay) at Embankment Exterior



Vertical Chimney Drain Placement



Global Positioning System Surveying



Care of Water and Spillway Bedding





CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
Project No. 344



Completed Dam & Reservoir



Completed RCC Emergency Spillway

**Key Components of Balancing Reservoirs:**



Earthwork Operations



Excavation of Inlet/Outlet Piping



Flow Meter Vault



Piping Encasement





CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
Project No. 344



On-Site Soil Cement Plant



Reservoir Geocomposite, Liner, & Underdrain



Soil Cement Placement



Soil Cement Anchor Trench & Liner/Curing



Earth Fill, Subgrade, Drain, Liner, Soil Cement Topsoil



Completed Reservoir







Key Components to Labyrinth Weirs:



Labyrinth Wall Crest Test Forms



Labyrinth Wall Crest (test pour & finishing)



Labyrinth Weir Construction



Labyrinth Crest Finishing



Crest Profile Check Finishing



Apex Formwork & Reinforcement Installation



Apex Concrete Placement



Completed Labyrinth Dam





### *Health and Safety Program*

In all phases of endeavors, our Project Team is guided by an established Health & Safety Program. This program is based on a sincere desire to eliminate personal injuries, occupational injuries and illnesses, and damage to equipment and property, as well as to protect the public whenever and wherever the public is exposed to, in contact with, or is affected by, the company's work. Safety is not just an activity with this CMAR Team, it is part of our culture and therefore, applies to any project we undertake, big or small, fast-tracked or extended schedules.

The team believes that every employee has the RIGHT and the RESPONSIBILITY to work in a safe environment, and that it is essential for our success. Safety, quality, and productivity are directly linked. While the ultimate success of the project's health and safety program depends on the full cooperation of each individual employee, it is our responsibility to see that health and safety work practices and procedures are not only adequate, but also enforced. Every supervisor is aware of the safety performance demonstrated by the employees under our supervision.

Our Project Team includes AW's Regional Safety Manager, Mario Gomez. He will select a site-specific Safety Committee comprised of various members of the Project Team that will review design drawings to identify potentially hazardous work activities. Together, we will:

**Develop a Project Specific Health and Safety Plan**

**Complete a Job Hazard Analysis** for major and critical work activities

**Create an Emergency Action Plan** specific to the project that will incorporate all stakeholders' personnel

Throughout the entire project, our site-specific Safety Committee will continue to enhance plans that are developed during preconstruction and the beginning phases of the project, and is ultimately responsible for the safety culture developed throughout the life of the project. The safety committee immediately shows value by incorporating safety as criteria by which the entire project is evaluated. Upon executing subcontract and purchase order contracts, the committee will distribute safety documents and begin contractor orientation training, as well as, further advise the contractors to the safety requirements of the project. During monthly Safety Committee Meetings, we will discuss concerns, review trends, and evaluate upcoming work activities for potential hazards and define/evaluate means to mitigate these hazards. Our view on SAFETY is based on two driving forces:

- the sincere desire to eliminate occupational injuries and illnesses; and
- the belief that this is a reasonable, attainable goal.

**"No one gets hurt"** is our safety slogan and in formal and informal ways, we indoctrinate every employee into this philosophy. Because we place such importance on no one getting hurt, many of our employees go on to become leaders in safety, teaching and mentoring others, and helping to evolve our systems that promote safety.





It is our goal to totally eliminate accidents and illnesses from our operations for these reasons.

- No endeavor is worthy if it should bring about human suffering through injury, illness, or loss of life.
- A good safety record reflects the quality of management, supervision and work force. It also serves to promote business and thereby continue the growth and success of the Company.
- Accidents increase costs and decrease profits and productivity.

**Key components to our Safety Program that would be applicable to this project:**

*THA's – Task Hazard Analysis*

At the beginning of each shift, every foreman/superintendent is responsible for developing a THA for the work his or her crew is to perform that day.

*ISA's - Job Safety Analysis*

Recognizes and addresses all of the possible hazards that might be encountered and their prevention on new work activity

*Safety Training*

All employees receive a safety orientation upon hire. All hourly employees receive awareness training in the following categories: Fall Protection, Confined Space Entry, Hazard Communication, Excavation & Trenching.

Foreman level and above receive training in these additional categories: Scaffolding, Fall Protection, Confined Space Entry, and Excavation/Trenching. This training is renewed every four years. Additionally, our employees receive OSHA 10 Hour Construction Safety (renewed every four years), First Aid/CPR (renewed every two years), as well as, Blood borne Pathogens.

Management and supervisory positions additionally receive OSHA 30 Hour Training (renewed every four years).

*Jobsite Safety Inspections*

In addition to the daily safety inspection done by every foreman, a member of the project staff does a weekly site inspection, plus additional periodic inspections.

*Behavior Based Safety Observation Program*

We use a behavior-based program to help further reduce the injuries caused by unsafe acts / conditions. Our program is called R.E.A.P. (Review Employee Actions & Performance). Everyone from foreman and above are held accountable for completing a required number of REAP cards per week. A key goal of the REAP program is to improve communications among ALL levels of craft and staff.

*Injury Investigation*

All injuries are investigated to determine the root cause and develop a prevention that will keep anyone else from being injured in the same manner. Not only do we communicate the results of these investigations back to our people, but our Safety Managers periodically meet with other construction firm Safety personnel to share lessons learned and results from our investigations. Another way we communicate our lessons learned is by taking an active role in the development and participation of National Safety Week.





CMAR Lower Bois d'Arc Creek Reservoir Dam and Intake Project  
Project No. 344

*Incident Alerts*

Safety Alerts are issued whenever an unusual incident occurs at other company locations. Safety is too important not to share knowledge between companies.

*Quarterly Audits*

Every project goes through a quarterly safety audit by the Regional Safety Manager to audit compliance with all required company programs.

*Safety Incentive Program*

If a project experiences an injury free quarter project personnel are eligible for a safety incentive award. The value of the award increases during the year as the project progresses without an OSHA recordable injury. Safety luncheons for all project personnel are given to celebrate the injury free quarter.

*Summary*

Our goal is to ensure that everyone recognize hazards and unsafe conditions. Along with the training and knowledge, employees are strongly encouraged to take an active role in the safety program, i.e. participating in safety committees, making management aware of hazards and watching out for their fellow employees so everyone goes home each day injury free. All employees have stop work authority; it is their right and responsibility to have a safe work environment.



**00 45 16.03 PROPOSER SAFETY PERFORMANCE QUESTIONNAIRE (PROPOSAL FORM 15)**

Proposer Safety Performance Questionnaire				
Proposer Name	Archer Western Construction, LLC			
Health and Safety				
Please use your OSHA No. 200/300 logs to record the number of injuries and illnesses for the last three (3) years.				
Year (state the applicable years)	2014	2013	2012	
Number of Fatalities	0	0	0	
Lost Work Day Cases Incident Rate -1	0	0	0.9	
OSHA Recordable Incident Rate -2	1.7	1.4	1.3	
Number of Hours Worked	713,033	564,389	467,699	
Total Number of Employees on Your Payroll	342	271	224	
Is a copy of your OSHA No. 200/300 logs for the last three (3) years attached?			Yes	X No
Owner requires CMAR provides the above accident statistics, even though certain companies may not be statutorily required to keep OSHA 200/300 logs.				
-1 The following formula is used for calculating the Lost Work Day Incident Rate:		=	(Number of Lost work Day Cases x 200,000) divided by Number of Hours Worked	
-2 The following formula is used for calculating the OSHA Recordable Incident Rate:		=	(Number of Recordable Cases X 200,000) divided by Number of Hours Worked	
List your Worker's Compensation (WC) Experience Modification Rate (EMR) for the three (3) most recent years:				
Year (state the applicable years)	Interstate		Intrastate	
2014	0.63		0.29	
2013	0.76		0.29	
2012	0.70		0.29	
Is a letter from your WC insurance carrier certifying the above EMRs attached?			Yes	X No
If your WC carrier has not issued an EMR because you have not accrued enough WC costs, is a copy of your WC Loss Run (available from your WC carrier) attached?			Yes	No N/A
If the current EMR is greater than 1.0, is a comprehensive written explanation of the safety methods and procedures that are being implemented to reduce this rate attached?			Yes	No N/A
Has Proposer received an OSHA (or State OSHA) citation within the last five (5) years?			Yes	X No
If answered yes to immediately above question, is there a copy of the citation(s)			Yes	X No
Was the citation(s) contested/vacated?			Yes	X No
If answered yes to immediately above question, please describe		Informal conference with OSHA – case still pending		
What specific corrective actions were taken to prevent further injuries/ penalties?		Avoid all pinch point areas and proper training in pinch point awareness was given to all employees.		
Does Proposer have a written occupational safety and health program?			Yes	X No
If you answered yes to the immediately above question, is there a copy attached?			Yes	No X
Does Proposer conduct field safety inspections to determine compliance with applicable regulations and procedures?			Yes	X No
If you answered yes to the immediately above question, is a sample copy of inspection form attached?			Yes	X No
Who conducts these inspections (provide position/title)?		We run a weekly rotating schedule for inspections. Thus, all management positions are responsible for the safety of the project and it provides checks and balances that allow for cross referencing and follow-up, as well		

	as higher accountability. Additionally, our Regional Safety Manager, along with our safety committee, make monthly site visits and inspections						
How often are safety inspections conducted?	Weekly						
Does Proposer have the following on your staff or on retainer?	Yes	No	How Many	Staff	Retainer	If yes, list certification number(s)	
Occupational Physician		X					
Certified Industrial Hygienist		X					
Certified Safety Professional	X		2	X		C3637, C3324	
Certified Health Physicist		X					
Does Proposer have an orientation program for new hires?		Yes	X	No			
If you answered yes to the immediately above question, is an outline of the orientation and the topics covered provided?		Yes		No	X		
Has Proposer implemented any of the following training programs? If yes, please provide the last date this training was provided or place a "N/A" if the training is not applicable							
Yes	No	Date	Training Program	Yes	No	Date	Training program
X			Asbestos	X			Hazardous Waste (40 Hour)
X			Blasting/Explosives	X			Hearing Conservation
X			Blood Borne Pathogens	X			Heavy Equipment Operation
X			Confined Space Entry		X	N/A	Laboratory Safety
X			Construction (OSHA Certified 10 hours)	X			Ladder/Scaffolding
X			Construction (OSHA Certified 30 hours)	X			Lead
X			Cranes Operations	X			Lockout/Tag Out
X			Electrical Safety	X			Personal Protective Equipment
X			Excavation Competent Person	X			Power-actuated Tools
X			Fall Protection	X			Process Safety Management
X			Fire Extinguishers				Radiation Protection
X			First Aid/CPR	X			Respiratory Protection
X			Forklift Operations	X			Welding/Cutting
Who conducts training (Name and Title)	Dates of our trainings vary throughout the company & most are available at will on line. See training matrix. Our Certified Safety Professionals provide training outside of on line training.						
Does Proposer have a program in place to discipline workers that perform unsafe work practices?	Yes	X	No				
If you answered yes to the immediately above question, is a copy of the program attached?	Yes		No	X			
Does Proposer have written Accident Investigation Procedures?	Yes	X	No				
If you answered yes to the immediately above question, is a copy attached?	Yes		No	X			
Does Proposer currently maintain a program in compliance with applicable State "Right to Know" laws and the OSHA Hazard Communication Standard?	Yes	X	No				
If you answered yes to the immediately above question, is a copy attached?	Yes		No	X			
Does Proposer hold "tailgate/toolbox safety meetings?	Yes	X	No				
If you answered yes to the immediately above question, is a sample copy attached?	Yes	X	No				
If you answered yes, how often are such meetings held?	Weekly						
Does Proposer have a written Alcohol and Substance Abuse Program?	Yes	X	No				
If you answered yes to the immediately above question, does it include?							
10-panel substance testing?	Yes	X	No				


Pre-employment/pre-job assignment testing within 30 days of employment or pre-job assignment?	Yes	X	No	
Post-accident drug and alcohol testing?	Yes	X	No	
Random testing (10 percent per month)?	Yes	X	No	
Reasonable suspicion drug and alcohol testing?	Yes	X	No	
Is a copy of Alcohol and Substance Abuse Program attached?	Yes		No	X

The undersigned warrants and represents that he/she is authorized to sign this document and that the data and information provided on this document is accurate in all respects.

Archer Western Construction, LLC  
Name of Proposer

Daniel P. Walsh  
Name

President  
Title

  
Signature

2-18-15  
Date

Archer Western's Health and Safety Manual, that contains all items referenced above, is over 1000 pages in its entirety, but can be provided, upon request.

**END OF SECTION**



*Aon Risk Services Central, Inc.  
Illinois Division*

July 28, 2014

To Whom It May Concern

**RE: Archer Western  
Workers Compensation – Texas EMR Rating**

Please be advised the following reflect the State of Texas - Workers Compensation Experience Modification Rating Factors for Archer Western.

Effective 6/1/14	.29
Effective 6/1/13	.29
Effective 6/1/12	.29
Effective 6/1/11	.29
Effective 6/1/10	.41
Effective 6/1/09	.41
Effective 6/1/08	.47
Effective 6/1/07	.48
Effective 6/1/06	.51
Effective 6/1/05	.58
Effective 4/1/04	.61
Effective 4/1/03	.45

Should you have any questions, please do not hesitate to contact me.

Sincerely,

Rick Subak, CPCU, ARM  
Aon Risk Services  
Construction Services Group  
Vice President – Account Executive  
(312) 381-4380 Direct  
Rick.subak@aon.com





*Aon Risk Services Central, Inc.  
Illinois Division*

February 9, 2015

To Whom It May Concern

**RE: Archer Western Construction  
Workers Compensation – EMR NCCI Rating**

Please be advised that the following reflects the revised Workers Compensation Experience Modification Rating Factor for Archer Western Construction.

Effective 6/1/14                      .63

Should you have any questions, please do not hesitate to contact our office.

Sincerely,

Rick Subak, CPCU, ARM  
Aon Risk Services  
Construction Services Group  
Vice President - Relationship Manager  
(312) 381-4380 Direct  
(312) 381-0275 Fax



*Aon Risk Services Central, Inc.  
Illinois Division*

May 20, 2013

To Whom It May Concern

**RE: Archer Western  
Workers Compensation – EMR NCCI Rating**

Please be advised that the following reflects the Workers Compensation Experience Modification Rating Factors for Archer Western.

Effective 6/1/2013	.76
Effective 6/1/2012	.70
Effective 6/1/2011	.73
Effective 6/1/2010	.81

Should you have any questions, please do not hesitate to contact our office.

Sincerely,

Rick Subak, CPCU, ARM  
Aon Risk Services  
Construction Services Group  
Vice President – Account Executive  
(312) 381-4380 Direct

Establishment	Date Range	Office	State
Archer Western Construction	01/02/2009 to 12/31/2014	all	all

Please note that inspections which are known to be incomplete will have the identifying Activity Nr shown in *italic*.  
Information for these open cases is especially dynamic, e.g., violations may be added or deleted.

Sort By: | [Date](#) | [Name](#) | [Office](#) | [State](#) |

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Get Detail			Select All	Reset	Results 1 - 7 of 7						
				By Date							
		Activity	Opened	RID	St	Type	Sc	SIC	NAICS	Vio	Establishment Name
<input type="checkbox"/>	1	982850.015	06/27/2014	0625400	TX	Planned	Complete		237110		Archer Western Construction, Llc
<input type="checkbox"/>	2	<i>965681.015</i>	04/01/2014	0625400	TX	Referral	Complete		237110	1	Archer Western Construction, Llc
<input type="checkbox"/>	3	956714.015	01/28/2014	0830600	CO	Complaint	Partial		236210		Archer Western Construction, Ltd
<input type="checkbox"/>	4	317114221	05/13/2013	0355112	VA	Planned	Partial	1542	236220		Archer Western Construction
<input type="checkbox"/>	5	316850049	10/24/2012	0355124	VA	Complaint	Partial	1542	236220		Archer Western Construction
<input type="checkbox"/>	6	530541.015	07/18/2012	0627510	TX	Unprog Rel	Partial		236210		Archer Western Construction, Ltd
<input type="checkbox"/>	7	316483593	03/28/2012	0454712	TN	Planned	Complete	1542	236220	1	Archer Western Construction Llc

**Inspection: 965681.015 - Archer Western Construction, Llc**

Inspection Information - Office: Austin		
Nr: 965681.015	Report ID:0625400	Open Date: 04/01/2014
Archer Western Construction, Llc 4506 North Fm 620 Austin, TX 78726 SIC: NAICS: 237110/Water and Sewer Line and Related Structures Construction Mailing: 1411 Greenway Drive, Irving, TX 75038		
Inspection Type: Referral Scope: Complete Ownership: Private Safety/Health: Safety Emphasis: N:Trench,L:Crane	Union Status: NonUnion  Advanced Notice: N Close Conference: 04/01/2014 Close Case:	
Related Activity: Type ID Safety Health Referral 900256 Yes		

**Case Status: OPEN**

Violation Summary						
	Serious	Willful	Repeat	Other	Unclass	Total
Initial Violations	1					1
Current Violations				1		1
Initial Penalty	5000					5000
Current Penalty				3500		3500
FTA Amount						

Violation Items										
#	ID	Type	Standard	Issuance	Abate	Curr\$	Init\$	Fta\$	Contest	LastEvent
1.	<u>01001</u>	Other	19260703 A01	08/07/2014		\$3500	\$5000	\$0		I - Informal Settlement

**Standard Cited:**19260703 A01 *Requirements for cast-in-place Concrete.*

Violation Items			
Nr: 965681.015	Citation: 01001	Issuance: 08/07/2014	ReportingID: 0625400
Viol Type: Other	NrInstances: 1	Contest Date:	
Abatement Date: 3	Nr Exposed: 2	Final Order: 09/02/2014	
Initial Penalty: 5000	REC:	Emphasis:	
Current Penalty: 3500	Gravity:	Haz Category:	

Penalty and Failure to Abate Event History						
Type	Event	Date	Penalty	Abatement	Type	FTA Insp
Penalty	Z: Issued	08/07/2014	5000		Serious	
Penalty	I: Informal Settlement	09/02/2014	3500		Other	


Archer Western Construction											
Inspection #	Location	Type	Standard	Issuance	Abate	Curr\$	Init\$	Flt\$	Contest	Last Event	Summary / Resolution
965681.015	Job #213104 - Austin TX	Other than 29 CFR 1926.703 (a)(1)		8/7/2014	pending	\$3,500	\$5,000			contesting	During stripping operations, employee was tied off to the form loosening bolts to be removed. After bolts were removed crane lifted in position to remove slack from cable. This cause the form to move pinning the employee's leg.

**Weekly Safety Inspection Report**

JOB NO. 23051 JOB NAME: JUNIPER PUMP STATION DATE: 2-6-15

PROJECT MANAGER: BILL NELSON SUPERINTENDENT: BOB ADDELMAN

PERSON (S) MAKING INSPECTION SHAWN ROLL - GREGG HENDERSON

**Subcontractors Onsite (List Name and Trade)**

Name	Trade	Name	Trade
<u>MCCABE</u>	<u>ELECTRICAL</u>		
<u>GICP</u>	<u>FRAMER</u>		
<u>PAWE</u>	<u>STRUCTURAL STEEL</u>		
<u>APPLEWOOD</u>	<u>PAINTER</u>		

COLUMN A = Adequate at time of inspection B = Needs consideration C = Needs immediate attention  
N/A = Not applicable

	A	B	C	N/A	Corrective Action Taken
<b>1. Project Information</b>					
OSHA 300 forms available, complete, and posted in February?	X				
OSHA poster(s) posted?	X				
Emergency phone numbers/maps posted for nearest medical center?	X				
Safety "Toolbox" Meetings up to date?	X				
Subcontractor Safety Programs received and reviewed?	X				
Material Safety Data Sheets (MSDS) in binder and up to date?	X				
Adequate First Aid kit(s) & supplies on site?	X				
Emergency Action Plan in place (i.e., evacuation plan, stretcher etc.)?	X				
Work areas properly signed and barricaded?	X				
<b>2. Housekeeping</b>					
Material Storage and staging neat and not a hazard?	X				
General neatness of work area?		X			LAST HOUR CLEAN-UP
Projecting nails removed or bent over?		X			RUNNAGE NAILS BENT OVER
Waste containers provided and used?		X			LAST HOUR CLEAN-UP
Passageways, walkways, stairs, and floor clear?	X				
Electrical cords and welding leads off of the ground?	X				
<b>3. Fire Prevention</b>					
Flammable liquid containers properly labeled?	X				
Flammable/Combustible material spills cleaned up immediately?	X				
Flammable storage tanks grounded/bonded?	X				
Adequate clearance to combustible material?	X				
Approved safety cans used?	X				
Adequate fire extinguishers, checked and accessible?	X				
Phone Number of fire department posted?	X				
"No Smoking" posted and enforced near flammables?	X				
<b>4. Electrical</b>					
Laser warning signs posted?	X				
Extension cords with bare wires or missing ground prongs taken out of service?		X			NEW END PLACED ON CORDS
Lockout/Tagout procedure used when needed?	X				
Ground fault circuit interrupters being used?	X				
<b>5. Hand, Power &amp; Powder Actuated Tools</b>					
Hand tools inspected regularly?	X				
Guards in place on grinders and tools?		X			GUARD PLACED ON GRINDER
Right tool being used for job at hand?	X				
Operators of powder actuated tools are licensed?	X				
<b>6. Fall Protection</b>					
Ground hole(s) & exposed edges are protected?	X				

Guardrails and cables are in-place and secured properly?	X			
Employees have safety harness and used correctly?	X			
Employees exposed to 6 feet fall hazards are tied off?	X			
Employees below protected from falling objects?	X			
<b>7. Ladders</b>				
Ladders extend at least 36" above the landing?	X			
Ladders are secured to prevent slipping, sliding or falling?		X		SUCCESSOR VANT LADDER CLIMB
Ladders with split or missing rungs taken out of service?	X			
Job built ladders built adequately and checked for defects?	X			
Stepladders used in fully open position?	X			
No employees stepping on the top two rungs of stepladder?	X			
<b>8. Scaffolding</b>				
All scaffolding inspected daily?	X			
Erected on sound rigid footing and base plates used?	X			
Tied to structure as required?	X			
Guardrails, intermediate rails, toe-boards and screens in place?	X			
Platform fully decked and planking is sound and sturdy?	X			
Proper access ladder provided?	X			
Employees below protected from falling objects?	X			
Mud sills being used under base plates on soft soil?	X			
<b>9. Floor &amp; Wall Openings</b>				
All floor or deck holes are covered or barricaded and marked?	X			
Perimeter protection is in place and maintained?	X			
Hole or Deck covers are secured?	X			
Materials stored away from edge?	X			
<b>10. Trenches, Excavation &amp; Shoring</b>				
Competent person inspected trench daily and on hand?	X			
Excavations are shored, benched or sloped back?	X			
Materials/spoil pile(s) are stored at least two feet from trench?	X			
Ladders provided every 25 feet in trench?	X			
Excavations over 20 feet in depth have engineer approval?	X			
Equipment is a safe distance from edge of trench or excavation?	X			
Walkways over trenches adequate and secure?	X			
Trench barricaded or identified?	X			
Shoring and sheeting as needed for soil classification and depth?	X			
Fall protection into the excavation has been addressed?	X			
<b>11. Material Handling</b>				
Materials are properly stored or stacked?	X			
Employees are using proper lifting methods?	X			
Tag lines are used to guide loads?	X			
Proper number of workers for each operation?	X			
<b>12. Welding &amp; Burning</b>				
Gas cylinders stored upright?	X			
Proper 20 foot separating distance between fuels and oxygen?	X			
Shielding utilized to protect other's from flash burns when necessary?	X			
Welders wearing protective leather gear to prevent burns?	X			
Burning/welding goggles or shields are used?	X			
Fire extinguishers are nearby?	X			
Hoses are in good condition?	X			
Welding gas cylinders capped when not in use?	X			
Carts provided for moving cylinders?	X			
<b>13. Cranes</b>				
Outriggers are extended and swing radius barricade in place?	X			
Crane setup level and solid pads under outriggers?	X			
Operator is familiar with load charts?	X			
Hand signal charts are on crane?	X			
Crane operator's daily inspection logs are up-to-date?	X			
Safety latch provided and working properly on the hook?	X			

Safety Inspection Report Continued JOB NAME

JUNIPER PUMP STATION

DATE 2-6-15

All equipment properly maintained?	X			
Employees kept from under suspended loads?	X			
Chains and slings inspected and tagged as required?	X			
<b>14. Concrete Construction</b>				
All trucks equipped with back up alarms?	X			
Respiratory Protection Program in-place and followed?	X			
Employees are protected from cement dust?	X			
Employees wearing eye protection?	X			
Exposed skin is covered?	X			
All reinforcing steel protected by approved caps or troughs?	X			
<b>15. Personal Protective Equipment</b>				
Dust control measures in place on the project?	X			
Adequate footwear being worn?	X			
Hard hats are being worn?	X			
Safety glasses are being worn?	X			
Respirators are used when required?	X			
Hearing protection being worn when required?	X			
Safety harness, lifelines, & lanyards being used when required?	X			
Traffic vests being worn when required?	X			
<b>16. Traffic Control</b>				
Are pedestrians and public vehicles protected from construction hazards?			X	
Are exposed workers trained on how to work next to motor vehicles?			X	
Is the appropriate High-Visibility safety apparel being worn?			X	
Are Temporary Traffic Barriers in place when possible to protect the workers?			X	
Are qualified flaggers being used to reduce or stop vehicular traffic?			X	
Has pre-planning taken place to minimize the exposure to risk?			X	
Are employees protected from motor vehicles?			X	
<b>17. Unsafe Acts or Practices Observed (List)</b>				

Additional Comments

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# Safety Matrix Responsibilities

"Safety is actively caring for the well-being of my fellow worker."



	Foreman	Superintendent	Project Engineer	Asst. Project Mgr.	Project Mgr.	Sr. Project Mgr.	Program Mgr.	Estimators	BGL
Safety Matrix Activities	Project Safety Plan								
	JHA								
	THA	1/wk	1/qtr	1/qtr	1/wk	1/wk	1/qtr	1/qtr	
	REAP	1/wk	1/wk	1/wk	1/wk	1/wk	1/qtr	1/qtr	
Training	Tool Box Talks	1/mo	1/qtr	1/qtr	1/qtr	1/qtr	1/qtr	1/qtr	
	Safety Committee Participation								
	OSHA 30 Hour	4 Yr	4 Yr	4 Yr	4 Yr	4 Yr	4 Yr	4 Yr	4 Yr
	CPR/BBP/FA	Every Other Year	Every Other Year	Every Other Year	Every Other Year	Every Other Year	Every Other Year	Every Other Year	Every Other Year
Crane Awareness	4 Yr	4 Yr	4 Yr	4 Yr	4 Yr	4 Yr	4 Yr	4 Yr	

The mission of **The Walsh Group** is to be the builder of choice for our customers; the employer of choice for our people; to set the highest standards for **ethics, quality and safety**; and to achieve a fair balance of responsibility, profitability and citizenship.

 = required  
 = optional

\*included in 30 hour

# WALSH SAFETY HUDDLE #41 – Slips, Trips, and Falls

## ❖ INTRODUCTION

- Falls are the leading accident in our industry, most occur at the same level you are walking or working on
- There are 3 physics principles involved in falls:
  - Friction-resistance between two objects that creates traction (i.e. boot and ground)
  - Momentum-effect on an object in motion caused by speed and weight.
  - Gravity-it pulls you toward the ground.

## ❖ SLIPS

- Caused by loss of balance resulting from too little friction between your feet and the ground.
  - Means of avoidance:
    - Practice Safe Walking-Take shorter steps, turn feet slightly outward for traction
    - Clean up spills-Immediate removal of slippery surfaces (e.g.slurry) can prevent injury
    - Don't allow lubricants or residues to accumulate on walking surfaces (steps of machines?)
    - Be extra cautious on smooth surfaces (ice, decking, smooth floor concrete)

## ❖ TRIPS

- Caused when your foot hits an object and you are moving with enough momentum to be thrown off balance.
  - Means of avoidance:
    - Make sure you can see where you are going, see over carried loads
    - Keep areas well lit. OSHA mandates 5 foot candles of light in all work areas.
    - Use good housekeeping practices, less junk = less probability to trip.
    - Stage materials in locations out of access paths
    - Keep extension cords bundled/covered over by plywood to allow a continuous surface.
    - Eliminate loose footing-debris, backfill material on stairs, ramps, walkways, and ladders.

## ❖ FALLS

- Caused whenever a person is too far away from his center of balance.
  - Means of avoidance:
    - Make sure hallways, stairs, and work areas are lit
    - Report or repair any loose stairs, steps, rungs, or handrails
    - Never store materials in access paths (catwalks, scaffolding)
    - Wear shoes or boots appropriate for your job with non-skid soles, replace them when they are worn.

## ❖ CONCLUSION

- Eliminating the hazards associated with slips, trips, and falls at work requires buy-in from all parties involved. There are numerous laws written by OSHA and other agencies to limit exposures, but it is a dedicated workforce and management team that is needed to keep up the job well enough to ensure that workers are not exposed to these hazards.



Make time to clean



**WASH**  
Safety Huddle 41  
Walsh Construction



They make dumpsters for this ya know!

**SAFETY FIRST**

**CLEAN UP**

**SPIILLS**



Goight?

What about the access route?

If you stumble on an...  
...accident hazard...



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# Slips, Trips, & Falls

## Scott Smiley

Business Group Leader

**Years of Experience:**

35 Years in the Construction Industry  
20 Years with Archer Western

**Education:**

Bachelor of Science  
Construction Engineering  
Iowa State University, 1980



**Expertise:**

As the Business Group Leader of Archer Western Construction’s (AW) Texas, OK, AR and Colorado region, Scott is in charge of the development of business opportunities through existing and new client contact. He is ultimately responsible for the successful completion of every project undertaken by the Texas Regional Office. His 30+ years building water infrastructure will ensure every project is a success in all respects.

Scott’s leadership style bestows authority and responsibility on his management teams. He empowers and inspires them, and holds them strictly accountable for results. His teams respect him as evidenced by his staff turn-over which is far below industry standards. In this manner, you can count on a team that has worked together to deliver many successful projects

**Project Experience:**

**Draper, OK WTP, Auxiliary Pump Station - \$35.9M**

**Norman, OK WRF Phase 2 Improvements - \$48.8M**

**SAWS Naco Pump Station - \$19.2M** project for San Antonio Water System

**Lubbock SE WRP Solids Handling Improvements - \$33.6M** project for the City of Lubbock

**Lake Livingston Hydro-Electric Plant - \$77M** Design-Build Project for East Texas Electric Coop

**San Jacinto Ground Water Reduction Plan - \$6M** for SJRA

**Platte Canyon Dam Spillway Modification - \$3.2M** Denver Water

**Hickory Water Supply - \$12.8M**

**Rowlett Creek Improvements - \$3.9M**

**Schertz Parkway Pump Station - \$8.7M**

**Morris Sheppard Dam - \$5.7M**

**NTMWD WTP Filter Imp. - \$5M**

**Midland Raw Water Project - \$7M**

**Marble Falls WWTP - \$4.2M**

**Elizabeth St. Pump Station - \$8.9M**

**Forney Dam - \$4.5M**

**Boerne WWTP - \$27M**

**Liberty Water CMAR WWTP Expansion - Contract Value: \$2M**

**SAWS Mission Pump Station - \$12M**

**Custer Road Pump Station - \$5M**

**Expand Frisco-McKinney Pump Station to 130 MGD - \$6M**

**Central WWTP Complex-B Final Clarifiers - \$8M**

**Bullhide Creek WWTP - \$10M**

**Village Creek WWTP Secondary Area & Filter Rehab - \$8M**

**Eastside WTP Transfer Pump Stations 1 & 2 - \$25M**

**Wilson Creek WWTP Expansion - \$32M**

**Williamson County RWS - Pump Expansion - Contract Value: \$5M**

**Dallas SSWWTP Solids Dewatering Facility - \$39M**

**TRA Central WWTP Phase IV-B Pump Station Imp. - \$12M**

**Bachman WTP - Maintenance Bldg. & Control Room - \$14M**

**Wilson Creek WWTP Odor Control Upgrades - \$767K**

**San Marcos Surface WWTP Wet Weather Imp - \$6M**

**Lake Texoma Pump Station Imp. - \$6.5M**

**Southside Energy Recovery Facilities Utilities - \$6.6M**

**Mansfield WTP Phase IV Expansion - \$25M**

**TRA Mosier Valley 87 MGD Reliability Project - \$26M**

**Waco DAF - \$46M**





**Elm Fork WTP Ozone Completion Imp. - \$5.9M**  
**Sunset Pump Station - \$23M**  
**TRA Administration Building - \$5M**  
**Red Oak WWTP - \$19M**  
**Waxahachie WTP - \$42M**  
**Central WWTP – Effluent Filters - \$20M**  
**Frisco-McKinney Pump Station Expansion - \$6.7M**  
**GBRA – San Marcos RW Capacity Expansion - \$11M**  
**Sabine River Pump Station - \$8M**  
**L.D. Lockett Ground Storage - \$7M**  
**Conveyance Pump Station - \$15M**  
**Central WWTP White Rock Primary Clarifier Imp. - \$18M**  
**University Pump Station – Ground Storage Tank - \$6M**  
**Southside WWTP Solids Screening & Thickening - \$5.9M**  
**BRA East Williamson County WTP - \$17M**  
**TRA Phase IV-A Pump Station Improvements - \$27M**  
**Lawton Southeast WTP - \$32M**  
**Richland Chambers Wetlands - \$14M**  
**Lubbock Southwest Pump Station - \$7.8M**

**Lake Brazos Dam Replacement - \$16M**  
**Lake Livingston Dam Repair - \$7M**  
**North Gate Pump Station - \$9.5M**  
**University Pump Station - \$6M**  
**Eagle Mountain WTP Raw Water Pump Station - \$7M**  
**Elm Fork WTP – Clarifier & Meter Imp. New Pump - \$5M**  
**Noland WWTP Imp. - \$15M**  
**TRA Biosolids Stabilization Phase I - \$7M**  
**Mount Carmel WTP - \$15M**  
**TRA West Fork Interceptor WF-1 - \$11M**  
**Southside WWTP Diffused Aeration/Process Imp. \$24M**  
**Bartlesville WTP - \$38M**  
**Rolling Hills WTP – Phase 4 - \$5M**  
**Bachman WTP - \$23M**  
**Mansfield WTP – Phase III - \$5M**  
**Ullrich WTP Contract 3 - \$60.6M**  
**Village Creek WWTP – Uprating Mods- \$6M**  
**Richland Chambers Pump Station - \$18M**  
**Central WWTP – Mech. Imp - \$11M**  
**Rolling Hills WTP - \$15M**

**Bachman WTP - \$12.9M**  
**Village Creek WWTP \$33.8M**  
**Walnut Creek WWTP 75 MGD Upgrade Phase I - \$19M**  
**Eastside WTP Ozone Facilities - \$46M**  
**Wilson Creek WWTP - \$38.6M**  
**Pecan Creek Water Reclamation Plant - \$17M**  
**Southside WWTP Anaerobic Digester No.'s 1-8 \$7.8M**  
**Lake Ray Roberts WTP, \$37M**  
**Bastrop Energy Center - \$6.4M**  
**Flower Mound WWTP - \$16M**  
**Eastside WTP Process Imp. II Contract 3 - \$35M**  
**TRA Low Service Booster Pump Station –\$7.4M**  
**John F. Kubala WTP \$14.8M**  
**Upper Trinity Regional WTP –\$10.5M**  
**Central WWTP Bar Screen & Mechanical Improvements –\$5M**  
**TRA Mosier Valley Plant Expansion to 72 MGD – \$12.8M**  
**Central WWTP Grit Removal & Air Line Mods –\$14.7M**  
**Arlington Ozone Facilities –\$19M**  
**Southside WWTP Pump Station C Screening Mods - \$7M**  
**Mohawk WTP –\$16M**



**Previous Experience:**

**MARTIN K. EBY CONSTRUCTION COMPANY, INC.**  
 1985-1994  
 Superintendent

**MARTIN K. EBY CONSTRUCTION COMPANY, INC.**  
 1980 – 1982  
 Field/Office Engineer

**OLSON CONSTRUCTION COMPANY**  
 1982-1985  
 Superintendent

**Owner Contacts:**

**Thomas Sanders** – Trinity River Authority / 817-467-4343 / 5300 S. Collins Arlington, TX 76018 / sanderst@trinityra.org

**Dan Nolen** – Dallas Water Utilities / 214-948-4552 / 2121 Main St. Dallas, TX 75201 / daniel.nolen@dallascityhall.com

**Bob Wallace** - The Wallace Group / 254-772-9272 /8225 Central Park Dr., Ste 100 Waco, TX 76712 / Bobw@wallace-group.com



## Curtis Weston

Construction Manager

### *Years of Experience:*

30 Years in the Construction Industry  
14 Years with Archer Western

### **Education:**

Bachelor of Science  
Construction Engineering  
Iowa State University, 1985

*Primary Language - English*

### *Expertise:*

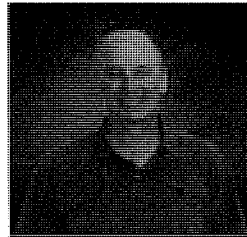
Curtis will be the primary contact for NTMWD. He has significant experience managing and building treatment plants in Texas; he has built 15 successful wastewater treatment plant projects, and over 43 water treatment plants and pump stations. Curtis' projects have been new greenfield plants, expansions, and renovations, and he has valuable CMAR experience.

During the preconstruction phase, Curtis will provide his leadership to the project team's constructability reviews, value-engineering analysis, project scheduling, and GMP estimates. He will also develop bid package strategies to provide the best value to NTMWD. Curtis will be fully committed to the entire project, from preconstruction, through construction. During the construction phase, Curtis will manage the team and provide oversight and direction to ensure all milestones are achieved on time and to the highest quality.

### **Key Projects:**

**WWTP Expansion CMAR - \$1.8M project for Liberty Water** Contact: Brian Hamrick 623-278-3756

CMAR services and construction of an expansion of the Woodmark Wastewater Treatment Plant with associated pumps, basins, piping, electrical controls, and site development. The scope of work was completed in multiple GMPs. GMP No. 1 - Flow Verification; GMP No. 2 - 30% Level Construction Cost Estimate and Design Phase Services; GMP No. 3 - 90% Level Construction Cost Estimate and Design Phase Services; GMP No. 4 - Construction services and Price to Construct WWTP Expansion. Construction work included a headworks channel with Mechanical Bar Screen, washer compactor, a small self-contained cloth filter, a belt press, and some pipe. Last was an aeration basin expansion and a blower.



### **Key Projects (cont.):**

**Lake Brazos Dam Replacement - \$16M project for the City of Waco** \* Contact: David Kerr 254-750-5600

A labyrinth weir was designed and replaced the gated spillway. Construction was performed without expanding the dam's footprint or rerouting the flowing river. This was a complicated project that AW had never performed before. However, being that the team was highly experienced in water infrastructure, despite the severe rains and challenging construction demands, Curtis and his team produced an award winning project restoring the allure of the Brazos River for downtown Waco.

**Wilson Creek WWTP Expansion - \$31.7M project for North Texas Municipal Water District** \* Completed February 2013 Contact: Robert Williams \* 972-442-5405

One of many successful projects that Curtis has completed for NTMWD - Construction included an addition of a Biological Nutrient Removal treatment train with diffusers, mixers and nitrogen recycle pumps; blowers and RAS/WAS/Scum pumps for the BNR train; Secondary Clarifier for the BNR train, disk filters, UV Disinfection system for the BNR; belt filter press and associated conveyor; non-potable water pump; blower building for BNR train; administration building and new access road; effluent flow monitoring; new electrical grounding system for both existing and new facilities.

### *Project Experience:*

**Project Manager \* 2002-Present**

Upper Rowlett and Upper Cottonwood Creek Lift Station Improvements - \$8.9M project for NTMWD \* Scheduled for Completion June 2016



**Project Experience cont:**

Lubbock SE WRP Solids Handling Improvements - \$33.5M project for the City of Lubbock \* Scheduled for completion January 2017 \* Contact: Teofilo Flores 806.775.2164

Upper Rowlett Creek Lift Station Metering Improvements - \$2M project for NTMWD \* Completed July 2014 \* Contact: Brian Campbell 972.442.5405

Lake Texoma Outfall@ Wylie WTP - for DN Tanks - \$3M project for NTMWD \* Completed March 2014 \* Contact: Corey Anderson 972-442-5405

Lake Texoma Outfall - for Garney - \$3.9M project for NTMWD \* Scheduled for Completion February 2015 \* Contact: Corey Anderson 972-442-5405

Elm Fork WTP Chlorine Rehabilitation - \$17M project for Dallas Water Utilities \* Scheduled for Completion January 2015 \* Contact: Lisa Jowell \* 214.948.4225

Rowlett Creek WWTP Improvements - \$3.9M project for NTMWD \* Completed October 2013 \* Contact: Scott Holden 972.442.5405

WTP IV Filter Improvements - \$5.3M Project for North Texas Municipal Water District\* Completed September 2013 Contact: Steve Long \* 972-442-5405

CMAR - WWTP Expansion - \$1.8M project for Liberty Water \* Completed 6/13 Contact: Brian Hamrick 623.278.3756

Custer Road Pump Station - \$5.4M Project for the City of Plano \* Completed October 2011 Contact: Jim Razinha \* 972-941-7105

Expand Frisco-McKinney Pump Station - \$6.5M Project for NTMWD \* Completed 7/13 Contact: Jim Kelley \* 972-442-5405

Wilson Creek WWTP - \$31.7M project for North Texas Municipal Water District \* Completed December 2012 Contact: Brian Campbell \* 972-442-5405

Dallas Biogas Recovery Facility - \$2.7M Project for Ameresco \* Completed October 2010 Contact: Jacinta Duoma \* 314-216-0267

Dallas Southside WWTP Solids Dewatering - \$39M Project for the City of Dallas\* Completed January 2012 Contact: Leslie Castillo \* 214-948-4560

Chapman Lake Pump Station - \$2.2M Project for NTMWD \* Completed 3/13 Contact: Robert Williams \* 972-442-5405

McKinney Lift Station - \$1.7M Project for North Texas Municipal Water District \* Completed February 2010 Contact: Dennis McSherry \* 972-442-5405

Lake Texoma Pump Station Improvements - \$6.5M project for the North Texas Municipal Water District \* Scheduled for Completion September 2014 Contact: Jim Kelley \* 972-442-5405

High Service PS 2-1 Expansion to 150 MGD - \$1.2M Project for the North Texas Municipal Water District \* Completed September 2009

TRA Mosier Valley 87 MGD Reliability Project - \$26M Project for the Trinity River Authority \* Completed September 2011

Waco Dissolved Air Flotation Facilities - \$46M Project for the City of Waco \* Completed May 2011

Sunset Pump Station -23M Project for the City of Dallas \* Completed October 2010

South Mesquite Creek WWTP -3.9M Project for the North Texas Municipal Water District \* Completed March 2009

Waxahachie Water Treatment Plant -42.7M Project for the City of Waxahachie \* Completed December 2009

Preston Road Lift Station Improvements - \$2M project for NTMWD \* Completed June 2008

Frisco/McKinney Pump Station Expansion - \$6.7M project for NTMWD \* Completed June 2008

Buffalo Creek Lift Station Expansion - \$1.2M project for NTMWD \* Completed August 2008

Wylie Raw Water Pump Station - \$919K project for NTMWD \* Completed April 2008

Southside WWTP Solids Screening and Thickening - \$25.9M project for Dallas Water Utilities \* Completed February 2008

Plano Spring Creek Lift Station - \$4.4M project for NTMWD \* Completed December 2006

Lake Brazos Dam Replacement - \$16M project for the City of Waco \* Completed December 2007

Lake Livingston Dam Repair - \$7M project for Trinity River Authority \* Completed June 2006

Southside WWTP Diffused Aeration/Process Improvement - \$24M project for Dallas Water Utilities \* Completed November 2006

Wilson Creek Wastewater Treatment Plant - \$38.6M project for the NTMWD \* Completed July 2004



**Jim Gardner**

PreConstruction Manager

*Years of Experience:*

35 Years in the Construction Industry  
10 Years with Archer Western

*Education:*

Bachelor of Science  
Civil Engineering  
University of Texas, 1976

*Primary Language - English**Expertise:*

Jim has 35 years of experience managing large, heavy civil construction projects involving excavation, grading, utilities, stabilization, drainage, and structures. As a project/preconstruction manager on multiple, diverse projects, he has been responsible for the supervision and administration of all preconstruction and construction, including self-performing crews and subcontractors.

His organizational, planning, and teamwork skills have brought success to two of AW's most challenging projects — a \$350 million LPV-111 project for the US Army Corps of Engineers (USACE) and a \$423 million DART project. Both were completed on time, with outstanding ratings from the clients.

Jim has proven skills in production, quality review and analysis, cost review and forecasting projections, schedule development, estimating, and budget development and control. He is an excellent communicator across the board, with owners, engineers, subcontractors, stakeholders, and third-party entities. He will bring these strengths to this project.

*Key Projects:*

**Los Angeles County Metro Transit Authority, Crenshaw/LAX Light Rail Transit Corridor Project 2013/2014** - Design-Build for 8.5-miles of new LRT line with eight passenger stations, TBM and Cut & Cover tunneling, bridges, structures, drainage, grading, lighting, TPSS, communication and signaling systems, etc. \$1.3B total value of D-B contract. Jim was the Sr. Project Manager and Design-Build Integrator for this project.

**FDOT/Central Florida Rail Corridor, SunRail Commuter Rail IOS, 2012/2013** Design-Build contract for 32-miles of commuter rail service through seven communities, railway maintenance of 62-miles of existing corridor, and passenger stations. \$200+M total value of contracts. Scope includes new track construction, track upgrading and re-alignment, highway and pedestrian grade crossings, bridge replacement, wayside and crossing signals, station platforms and finishes, Vehicle Storage and Maintenance Facility and Operations Control Center, communications and systems integration, etc. Jim was the Sr. Project Manager and Design-Build Integrator

*Key Projects (cont.):*

**ECI - LPV-111, CSX Railroad to Michoud Canal, New Orleans, LA, \$350M Senior Project and Preconstruction Manager, 2009-2011.** Jim oversaw 300+ employees and was ultimately responsible for the successful execution of this \$350M project, which included Pre-Construction Services during the Design Phase and then reconstruction of a 5.2-mile stretch of the New Orleans East Back Levee adjacent to the Gulf Intracoastal Waterway (GIWW). This project is the largest, deep-soil-mixing project completed in North America. Jim oversaw construction of 2,000 linear feet (LF) of flood wall, DSM of 1.8 million CY of material; placement of 1.6 million CY of imported fill, pile driving, installation of H-pile foundations, and construction of mass concrete structures—to meet the 100-year protection level. This project was completed on schedule, in 20 months, and received an Outstanding CCASS rating from the USACE.

**DART LRT Line Sections SE-1, SE-2, NW-1B, Dallas, TX, \$423M Senior Project and Preconstruction Manager, 2006-2009 CM/GC** Jim was ultimately responsible for the successful delivery to Dallas Area Rapid Transit (DART) of this \$423M project—a 12.3-mile light rail system construction manager/general contractor (CM/GC) project. The project also included 1.5 million CY of earthworks. Jim was responsible for pre-construction services, all aspects of construction operations, and direct supervision of 80 members of project management staff. This project won the Matthew Myles Walsh National Safety Award for superior safety performance.





*Project Experience cont:*

**DART CM/GC LRT Line Sections SE -1, SE-2, NW-1B Dallas, TX - \$420M project for Dallas Area Rapid Transit Authority**

**Senior Project and Preconstruction Manager** Contact: Diane Gollhofer, P.E. \* 214.749.2928 This 12.3 mile project crossed over waterways and wound through the center of downtown historical areas, which required close communication with area residents, business and special attention to traffic control planning. Among many structural challenges, it included a complex two mile long bridge incorporating two aerial stations and over 1.5 million CY of earthwork. It also passes through the heart of Fair Park, the home of the State Fair of Texas and multiple football events at the Cotton Bowl Stadium. Due to large crowds the project required significant coordination with event staff and city officials.

**State Highway 121 Reconstruction Project, Collin County, TX, \$135M Senior Project Manager, 2004-2006**

Jim was the Senior Project Manager on this project, responsible for the overall supervision of construction of 6-miles of new and rehabilitated roadway work including rock and dirt excavation, grading, utilities, drainage, paving, and rip rap for the \$135M new six lane Sam Rayburn Tollway between the Dallas North Tollway and FM 544. The team was also awarded the adjacent 3-mile section of roadway. The Owner required close coordination and advanced notifications with Stonebriar Center, one of the largest retail malls and marketing centers in Texas and several other commercial businesses. The state highway project also required coordination between TxDOT and NTTA as well as with other jurisdictional agencies as it connected to the complex interchange at the Dallas North Tollway Bridge.

**Dallas-Fort Worth International Airport, Dallas/Fort Worth, TX, \$45M Senior Project Manager, 2001-2003**

Jim was responsible for overseeing the excavation, grading, stabilization, drainage, asphalt, concrete pavement, electrical, and NAVAIDS construction on multiple, concurrent projects at DFW, including \$12.5M Terminal B Expansion/ Improvements and \$32.5M Runway 18L Extension. In order to avoid impacting ongoing airport functions and active taxi-ways, Jim coordinated closely with airport personnel multiple times daily to ensure that the airport and taxi-way environments remained free of debris, dust, and vibration. He also coordinated and managed the work to be performed on the airport operations area including demolition, modifications to existing and installation of new underground utilities, phased construction of concrete and asphalt pavement, water main installation and relocation, construction of underground duct banks, pavement markings, runway and apron lighting and signage, and coordination of multiple on-site subcontractors.

**USACE LPV-111, CSX Railroad to Michoud Canal (Improvements to the New Orleans East Back Levee), New Orleans, LA - \$295M**

**DART Green Line Expansion, LRT Line Sections SE-1, SE-2,**

**NW-1B, Dallas, TX - \$423M**

**TxDOT State Highway 121 Reconstruction Project Collin County, TX - \$99M**

**Dallas-Fort Worth International Airport, DFW, TX - \$50M**

**Palm Beach International Airport Apron B Expansion, Palm Beach, FL - \$15M**

**North Texas Tollway Authority (NTTA) Tollway Tunnel, Addison, TX - \$15M**

**TxDOT US67, Garland TX - \$10**

**TxDOT US 75 North Central Expressway, Dallas, TX - \$17.5M**

**Interstate I-20 Tarrant County, Fort Worth, TX - \$46**

**SH183/Beltline Rd, Irving, TX - \$17M**

**Woodall Rogers Freeway, Dallas, TX - \$25M**

**Wastewater Treatment Plant Expansion, Dallas, TX - \$37M**

**I-635/I-35 Interchange & I-635 Earthwork Projects, Dallas, TX - \$30M**

**Previous Experience:**

**MARIO SINACOLA & SONS EXCAVATING, INC**  
2003-2006  
Project Manager

**ANGELO LAFRATE CONSTRUCTION, LLC**  
1999-2003  
Project Manager

**HB ZACHARY**  
1976-1999  
Project Manager  
Project Engineer



## Frank C. Etier Jr.

Project Superintendent

### *Years of Experience:*

13 Years in the Construction Industry  
13 Years with Archer Western

### *Education:*

Bachelor of Science  
Construction Management  
Louisiana State University, 2000

### *Additional Training:*

American Red Cross – CPR  
Competent Person  
OSHA 30 Hour

### *Expertise:*

As a Project Superintendent, Frank is responsible for the completion of all phases of the project. Duties include the review of plans, scheduling of work, tracking of job costs, managing daily field operation and coordinating with the owner's engineers. Frank is responsible for on-site management of safety, subcontractor coordination, and the supervision of all construction work, ensuring it is completed to the owner's satisfaction.

Frank has recently been promoted to Project Manager, successfully completing many treatment plant projects and pump stations, but transitions back to Superintendent when needed for a particular project. In this manner, he sees the project from both perspectives, and the entire jobsite benefits. He oversees maintenance of quality control systems, schedule requirements, cost accountability, and the follow-through of all AW safety protocol.

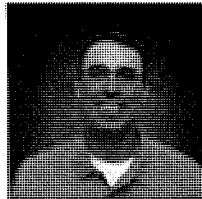
### *Key Projects:*

#### ***Wilson Creek WWTP Expansion - \$31.6M project for the North Texas Municipal Water District \* Completed February 2013***

Contact: Robert Williams \* 972-442-5405

The project included the addition of a Biological Nutrient Removal Treatment Train with diffusers, mixers and nitrogen recycle pumps; blowers and RAS/WAS/Scum pumps for the BNR train; secondary clarifier for the BNR train, disk filters and UV disinfection system for the BNR train; belt filter press and associated conveyor; non-potable water pump; blower building for BNR train; administration building and new access road; effluent flow monitoring; new electrical grounding system for both existing and new facilities.

Multiple NTMWD Projects



### *Project Experience:*

#### ***Project Manager \* 2012 - Present***

Panda Sherman Power - \$694K  
Negotiated service contract for Panda Sherman Power, LLC \* Completed October 2014 Contact: Rick Baron \* 972-361-2000

Prairie Creek WWTP Odor Abatement Improvements - \$3.2M Project for the City of Lewisville \* Scheduled for Completion August 2015 Contact: Todd White \* 972-219-3764

South Delivery Point Improvements - \$1.5M project for the North Texas Municipal Water District \* Completed September 2014 Contact: Scott Holden \* 972-442-5405

Forney Lift Station Improvements - \$1.2M project for the North Texas Municipal Water District \* Completed August 2014 Contact: David Clisch \* 972-442-5405

Panda Sherman Power Plant - \$1M project for the Panda Sherman Power, LLC \* Completed October 2013 Contact: Michael Johnson \* 903-421-0741

CMAR - Lake Texoma Outfall @ Wylie WTP Sub to DN Tanks - \$3.1M project for the North Texas Municipal Water District \* Completed March 2014 Contact: Corey Anderson \* 972-442-5405

CMAR - Lake Texoma Outfall @ Wylie WTP Sub to Garney - \$3.9M project for the North Texas Municipal Water District \* Completed February 2015 Contact: Corey Anderson \* 972-442-5405

Wylie WTP III Filter and Improvements - \$6.4M project for the North Texas Municipal Water District \* Scheduled for Completion August 2015 Contact: John Montgomery \* 972-442-5405

#### ***Project Superintendent \* 2003 - Present***

Rowlett Creek WWTP Improvements - \$3.9M project for NTMWD \* Completed June 2013 Contact: Scott Holden \* 972.442.5405



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***Project Experience Continued:***

**Expand Frisco-McKinney Pump Station** - \$6.5M project for the North Texas Municipal Water District  
**Wilson Creek WWTP Expansion** - \$31.6M project for the North Texas Municipal Water District  
**Chapman Lake Pump Station** - \$2M project for the North Texas Municipal Water District  
**Wilson Creek WWTP Odor Control Upgrades**- \$737K project for the North Texas Municipal Water District  
**McKinney Lift Station**- \$1.7M project for the North Texas Municipal Water District  
**High Service Pump Station 2-1 Expansion to 150 MGD** - \$1.2M project for the North Texas Municipal Water District  
**Lake Texoma Pump Station Improvements** - \$6.5M project for the North Texas Municipal Water District  
**Plano Spring Creek Lift Station Expansion** - \$1M project for the North Texas Municipal Water District  
**Sunset Pump Station** - \$23M project for Dallas Water Utilities  
**Lake Livingston Outlet Works Improvements** - \$898K project for the Trinity River Authority  
**Frisco #1 Pump Station** - \$4.8M project for the City of Frisco  
**Preston Road Lift Station Improvements** - \$2M project for the North Texas Municipal Water  
**Frisco/McKinney Pump Station Expansion** - \$6.7M project for the North Texas Municipal Water District  
**Emergency Direct Connection – BNSF Pump Station** - \$355K project for the City of Frisco  
**Mansfield WTP Pump Additions** - \$788K project for the City of Mansfield  
**Wylie Raw Water Pump Station #3** - \$919K project for the North Texas Municipal Water District  
**Frisco Re-Use Pump Station** - \$431K project for the City of Frisco  
**Custer Road Pump Station Expansion** - \$2.7M project for the City of Allen  
**University Pump Station Ground Storage Tank #2** - \$5.9M project for the City of McKinney  
**Plano Spring Creek Lift Station** - \$4.4M project for the North Texas Municipal Water District  
**University Pump Station Expansion** - \$5.9M project for the City of McKinney  
**Mansfield WTP – Phase III** - \$5.5M project for the City of Mansfield

***Project Engineer \* 2001 – 2003***

**Flower Mound WWTP** - \$16M project for the Town of Flower Mound  
**John F. Kubala WTP Expansion** - \$14.8M project for the City of Arlington



# Mark Tepera

Project Manager

**Years of Experience:**

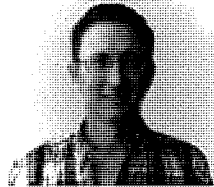
23 Years in the Construction Industry  
20 Years with Archer Western

**Education:**

Bachelor of Science  
Building Construction  
Texas A&M University, 1991

**Additional Training:**

American Red Cross – CPR/BBP  
Competent Person  
OSHA 30 Hour



**Expertise:**

As a Senior Project Manager, Mark is responsible for the overall successful completion of the project. He oversees maintenance of quality control systems, schedule requirements, cost accountability, and the establishment of management systems. It is his duty to ensure close coordination among all project team members, ensuring the Owner a successful project delivery.

Mark is a highly experienced water infrastructure builder with over 20 years of experience. Working in the field for 20+ years gives Mark the advantage of providing the team with practical solutions to detailed and complex issues, thus eliminating potential delays, disruptions, and conflicts during construction. His strong communication skills allow him to work easily with others in obtaining creative solutions for successful operations of his responsibilities.

**Key Projects:**

**Central WWTP Primary Clarifier Improvements** Contact: Dallas Water Utilities \* Dan Nolen \*214-316-3640

White Rock clarifier Improvements consisted of 10 existing clarifiers for conversion to primary service throughout the White Rock Plant area. There were several changes requested throughout this project. Per Dan Nolen, of DWU, AW is historically easy to work with on any design changes that come up during construction. AW is consistently dependable in emergency situations to work cohesively with the owner on design changes and can adjust as needed during plant shut downs. The work that Mark Tepera did on this project was no exception to that norm.

**Georgia Pacific Warehouse Design-Build**

Mark Tepera worked as Superintendent on this early Design-Build Project for Georgia-Pacific in 1997 in Ft. Worth, TX. Our design partner was Golder Livingstone, out of Kansas City, MO. Mark was involved with all design meetings and carried the Owner's and Engineer's intent into the field with him.

**Project Experience:**

**Project Manager \* 1999-Present**

**Sam C. McKenzie WWTP - \$29.7M**  
Project for New Braunfels Utilities \*  
Scheduled for completion July 2016  
Contact: Rosemary Icosipentarios  
830.629.8400

**Town of Pecos, Texas WWTP - \$5.8M**  
Project for Town of Pecos City \*  
Completed April 2014 Contact: \* Mark Sanchez 915-533-6811

**Upper White Rock Creek Lift Station Improvements - \$2M** Project for North Texas Municipal Water District \*  
Completed February 2014 Contact: \* Robert Williams \* 972-442-5405

**Central WWTP White Rock Electrical Improvements - \$12.3M** Project for Dallas Water Utilities \* Completed January 2014 Contact: \* Regina Stencil \* 214-671-9184

**Western Dams Rehabilitation - \$3.6M** Project for Dallas Water Utilities \* Completed December 2013 Contact: \* Kimberlie Brashear \* 214-948-4249

**Central WWTP Electrical Improvements - \$10.6M** Project for Dallas Water Utilities \* Completed May 2014 Contact: \* Richard Wagner \* 214-948-4584

**Midland Raw Water Project - \$7M** Project for City of Midland \* Completed October 2013 Contact: \* Stuart Purvis \* 432-685-7432

**East Fork Raw Water Supply – Diversion Pump Station Imp. - \$960K** Project for North Texas Municipal Water District \* Completed October 2012 Contact: Kara Byrnes \* 972-442-5405

**Forney Dam - \$4M** Project for the Dallas Water Utilities \* Completed September 2012 Contact: Lisa Jowell \* 214-948-4225



**Project Experience Continued:**

**Central WWTP Maintenance & Rehab Improvements** - \$2M Project for the Dallas Water Utilities \* Completed March 2012 Contact: Richard Wagner \* 214-948-4584

**Village Creek WWTP Reclaimed Water Improvements** - \$1.9M Project for the City of Fort Worth \* Completed November 2011 Contact: Madelene Rafalko \* 817-392-4926

**Central WWTP Complex-B Final Clarifiers** - \$8M Project for the Dallas Water Utilities \* Completed October 2012 Contact: Jennifer Cottingham \* 214-948-4572

**Weatherford Pipeline Repair** - \$213K Project for the City of Weatherford \* Completed September 2010 Contact: James Hotopp \* 817-598-4016

**Village Creek WWTP Aeration Diffuser Upgrades as Subcontractor to Johnson Controls** - \$4.2M Project for the City of Fort Worth \* Completed April 2012 Contact: Madelene Rafalko \* 817-392-4926

**Village Creek WWTP Secondary Area & Filter Rehab** - \$8.3M Project for the City of Fort Worth \* Completed March 2012 Contact: Madelene Rafalko \* 817-392-4926

**Eastside WTP Transfer Pump Stations 1 & 2** - \$25.5M Project for the Dallas Water Utilities \* Completed October 2013 Contact: Jennifer Cottingham \* 214-948-4572

**Mansfield WTP Phase IV Expansion** - \$24.7M Project for the City of Mansfield \* Completed April 2011 Contact: Robby Isbell \* 817-447-2248

**Elm Fork WTP Ozone Completion Improvements** - \$5.9M Project for the City of Dallas \* Completed February 2011 Contact: Fariborz Fakheri \* 214-948-4560

**Booster Chlorination Facilities** - \$3.6M Project for the City of Dallas \* Completed April 2010 Contact: Fariborz Fakheri \* 214-948-4560

**Red Oak WWTP** - \$19M Project for Trinity River Authority \* Completed August 2010 Contact: Thomas Sanders \* 817-467-4343

**Central WWTP Effluent Filters** - \$20.4M Project for the City of Dallas \* Completed March 2010 Contact: Dan Nolen \* 214-316-3640

**L.D. Lockett Ground Storage Reservoir - \$6.9M Award Winning project for the City of Colleyville** \* Completed March 2009 Contact: Chad Bartee \* 817-506-1095

**Conveyance Pump Station** - \$14.8M Project for North Texas Municipal Water District \* Completed March 2008 Contact: Kara Byrnes \* 972-442-5405

**Central WWTP Primary Clarifier Improvements** - \$18M Project for the Dallas Water Utilities\* Completed July 2009 Contact: Dan Nolen \* 214-316-3640

**North Gate Pump Station**- \$9.6M Project for the City of Irving \* Completed August 2007 Contact: Steven Pettit \* 972-721-2281

**Project Superintendent \* 1995-1999**

Central WWTP Grit Removal & Plant Exp.

Joint Pump Station Facilities

Flower Mound WWTP

**Previous Experience:**

MARTIN K. EBY CONSTRUCTION CO, INC.

1992 – 1995

Field Engineer for Water/Wastewater Plants



## Mark Miller

Project Superintendent

### Years of Experience:

30 Years in the Construction Industry  
21 Years with Archer Western

### Additional Training:

American Red Cross – CPR/BBP  
Competent Person  
OSHA 30 Hour

### Expertise:

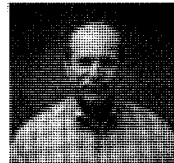
As a Senior Project Superintendent, Mark Miller is responsible for the completion of all phases of the project. Duties include the review of plans, scheduling of work, tracking of job costs, managing daily field operation and coordinating with the owner's engineers. Mark is responsible for on-site management of safety, subcontractor coordination, and the supervision of all construction work, ensuring it is completed to the owner's satisfaction.

Mark has recently completed several successful wastewater treatment projects; and has worked in the industry for 30 years building strong relationships with owners, design engineers, vendors and subcontractors. Mark is responsible for project safety, managing all subcontractor operations, coordinating with City staff, and managing the day-to-day construction efforts. Mark will also maintain project schedules and see that every milestone is achieved.

### Key Projects:

**Wilson Creek WWTP Expansion** - \$38.5M project for the North Texas Municipal Water District \* Completed August 2004 Contact: Jim Kelley \* 972-442-5405 - This project consisted of the construction of a 16 MGD expansion to the existing plant. It included the construction of two primary clarifiers, one primary sludge pumping station, two BNR basins, one blower building, two secondary clarifiers, one secondary sludge pumping station, four filters, three ultraviolet disinfection basins, chemical feed facility additions, odor control facilities, 60-inch plant outfall line and lake head wall, construction of solids handling facilities, miscellaneous modifications to existing facilities, associated site work, plant & yard piping, electrical & instrumentation.

**Southside Solids Dewatering Facility**- \$39M Project for Dallas Water Utilities \* Completed January 2012 Contact: Leslie Castillo \* 214-948-4560 - Project included a dewatering structure that houses 12 belt filter presses with an observation deck, multiple conveyors and new operations building. It houses the polymer system, sludge pumps, electrical room, SCADA room, control room, lab, and mechanical room. The project included stormwater and washwater pump stations with vertical turbine pumps and submersible suction pumps.



### Projects:

**Senior Project Superintendent \* 2007 - Present**

**Elm Fork WTP Chlorine Rehabilitation** - \$17M project for Dallas Water Utilities \* Completed January 2015 \* Contact: Lisa Jowell \* 214.948.4225

**Southside Solids Dewatering Facility**- \$39M Project for Dallas Water Utilities \* Subs. Completed January 2012 Contact: Leslie Castillo \* 214-948-4560

**Waxahachie WTP** - \$42.5M Project for Dallas Water Utilities \* Completed December 2009 Contact: David Bailey \* 972-937-7330

**Benbrook/Rolling Hills** - \$33.7M Project for Tarrant Regional Water District \* Completed June 2008 Contact: Robert Allen \* 817-735-7300

**Sabine River Pump Station** - \$7.6M Project for TXU Mining Co., LP \* Completed April 2007 Contact: David Watkins \* 903-836-6239

### Project Superintendent \* 2000-2007

**Southside WWTP Diffused Aeration /Process Improvements** – \$24M Project for Dallas Water Utilities \* Completed November 2006 Contact: Richard Wagner \* 214-948-4560

**North Texas Raw Water Pump Station** - \$893K Project for North Texas Municipal Water District \* Completed August 2001 Contact: Randel Dobbs \* 972-442-5405

**John F. Kubala WTP** - \$14.8M Project for the Trinity River Authority \* Completed March 2002 Contact: Rick McCleery \* 817-457-7550

### Superintendent \* 1996 - 2000

**Mosier Valley WTP Improvements** - 12.8M Project for the Trinity River Authority Contact: Thomas Sanders \* 817-467-4343



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***Project Experience Continued:***

**Pierce Burch Raw Water Pumping** - \$872K Project for the City of Arlington Contact: Rick McCleery \* 817-457-7550

**Carrollton Northern Pump Station** - \$4.6M Project for the City of Carrollton Contact: Timothy Tumulty \* 972-466-3000

***Carpenter Superintendent \* 1994-1996***

**Eastside WTP Phase I Process Improvements** - \$7M Project for Dallas Water Utilities

**Flower Mound WWTP** - \$7.4M Project for the City of Flower Mound

***Previous Experience:***

MARTIN K. EBY CONSTRUCTION CO, INC.

1985-1994

Carpenter Superintendent

Carpenter Foreman



### Years of Experience

16 Years in the Construction Industry  
7 Years with Archer Western

### Additional Training

Authorized OSHA Construction Trainer  
MEDIC First Aid Authorized Instructor  
C3 Competent Person  
Crane Safety Awareness



Primary Language English

### Technical and Managerial Expertise

Mr. Gomez has over a decade of experience working in an industrial environment and he has over five years of dedicated training and experience as a safety manager on heavy construction projects. He has proven to be a resourceful safety and health professional with hands-on knowledge and is helping create safe and highly productive worksites while successfully controlling and reducing risk. He conducts safety training, orientation sessions and teaches OSHA courses to ensure that AW policies and procedures are followed. He performs weekly safety audits and prepares the results for submission to our client. He has earned several awards throughout his career for superior safety, quality, production, and client service, including the Matthew Myles Walsh II Safety Award for his Dallas Area Rapid Transit project. In addition to Mr. Gomez's safety training, he is experienced and effective working with people of diverse cultures and backgrounds and has used his fluent Spanish/English translation skills to train Spanish-speaking personnel in the field. He is experienced in interacting with all levels of management and personnel and adapts well to changing priorities in fast-paced environments and is a tremendous asset to the AW Team.

### Key Projects

Lake Alan Henry Pump Stations- Contract D- \$20.6M Project for City of Lubbock, TX \* Completed March 2012 Contact: Wood Franklin \* 806-775-2343

Mario was the Safety Manager for this project, which consisted of two separate booster stations and a 6 MG prestressed concrete tank. Pumps at Post included 1 ea. 2000 hp and 2 ea. 2500 hp vertical turbine pumps, and at Lake Alan Henry included 1 ea. 1500 hp and 2 ea. 1000 hp vertical turbines. The project also included motors, variable frequency drives, pump control ball valves and hydraulic accumulator system, pump room traveling crane, interior piping and valves, motor cooling water systems, plumbing systems, 5 kV switchgear and motor control centers, other general electric work, instrumentation and control, HVAC systems, and installation of yard piping and associated appurtenances, including air valves, blow-off valves and butterfly valves. Piping included 2006 lf of 42" and 662 lf of 48" steel pipe.

New Booster Pump Station \$25 and Storage Tank Complex - \$14M project for the Oklahoma City Water Utilities Trust \* Completed March 2014 Contact Dustin Seagraves 405-297-2048

Mario was the Safety Manager for the complete installation of a new Booster Pump Station and storage tank. The work to include the following major items: 1) Booster Pump Station including three, 14,600 gpm, 1250 hp horizontal split case pumps; 2) One 5-Million Gallon Ground Storage Tank; 3) Medium Voltage Power & Controls; 4) Sitework; 5) Yard Piping including connections to existing mains on Portland Avenue. 6) One 30in Altitude Control/Pressure Sustaining Valve.



### Projects

Draper WTP, Auxiliary Pump Station - \$35.9M Project for Oklahoma City Water Utilities Trust \* Scheduled for Completion June 2016 Contact: Larry Hare 405-297-2068

Norman WRF Phase 2 Improvements - \$48.8 Project for Norman Utilities Authority \* Scheduled for Completion September 2016 Contact: Mark Daniels 405-366-5443

Green Mountain Pump Station Renovations - \$6.2M Project for Denver Water \* Scheduled for Completion March 2015 Contact: Jared Heath \* 303-628-6033

Witcher Pump Station - \$7.5M Project for OCWUT \* Completed November 2014 Contact: Joshua Randell \* 405-297-3491

Upper Rowlett and Upper Cottonwood Creek Lift Station Improvements - \$8.9M project for NTMWD \* Scheduled for Completion June 2016

Lubbock SE WRP Solids Handling Improvements - \$33.5M project for the City of Lubbock \* Scheduled for completion January 2017 \* Contact: Teofilo Flores 806.775.2164

Kirkwood & Cade Branch Lift Stations - \$7M Project for Trinity River Authority \* Scheduled for Completion August 2015 Contact: Richard Postma 817.366.6420

Modifications to North Lake Dam and Spillway - \$3M Project for the City of Coppell, TX \* Completed October 2014

South Delivery Points - \$1.5M project for NTMWD \* Completed July 2014 \* Contact: Scott Holden 972.442.5405

Upper Rowlett Creek Lift Station Metering Improvements - \$2M project for NTMWD \* Completed July 2014 \* Contact: Brian Campbell 972.442.5405

Lake Texoma Outfall@ Wylie WTP - for DN Tanks - \$3M project for NTMWD \* Completed 11/13 \* Contact: Jason Phillippi 972.823.3303

Lake Texoma Outfall - for Garney - \$3.9M project for NTMWD \* Completed March 2014 \* Contact: Wayne Barker 303.725.9167

Elm Fork WTP Chlorine Rehabilitation - \$17M project for Dallas Water Utilities \* Scheduled for Completion January 2015 Contact: Lisa Jowell \* 214.948.4225



## Project Experience Continued:

Rowlett Creek WWTP Improvements - \$3.9M project for NTMWD \* Completed October 2013  
Contact: Scott Holden 972.442.5405

Arsenic Water Treatment Plant - \$1.6M project for the City of Crane, TX \* Completed September 2014 Contact: Dru Gravens 432.558.3563

Lake Arlington Raw Water Pump Station - \$2.2M project for the City of Arlington \* Completed May 2014 Contact: Mohammad Bayan 817.459.6644

Town of Pecos, Texas WWTP - \$5.8M Project for Town of Pecos City \* Scheduled for Completion June 2015 Contact: Mark Sanchez 915-533-6811

Village Creek WRF Gravity Belt Thickener Addition Project - \$1M Project for City of Forth Worth \* Scheduled for Completion Oct 2014  
Contact: Seiavash Mir 817-392-8404

Upper White Rock Creek Lift Station Improvements - \$2M Project for North Texas Municipal Water District \* Completed March 2014 Contact: Robert Williams 972-442-5405

Central WWTP White Rock Electrical Improvements - \$12.3M Project for Dallas Water Utilities \* Scheduled for Completion October 2014  
Contact: Regina Stencil 214-671-9184

Western Dams Rehabilitation - \$3.6M Project for Dallas Water Utilities \* Completed May 2014 Contact: Kimberlie Brashear 214-948-4249

Central WWTP Electrical Improvements - \$10.6M Project for Dallas Water Utilities \* Completed July 2014 Contact: Richard Wagner 214-948-4584

Midland Raw Water Project - \$7M Project for City of Midland \* Completed October 2013 Contact: Stuart Purvis 432-685-7432

South Holly HSPS Motor and Switchgear Replacement - \$3.8M project for the City of Ft. Worth \* Completed 03/13 Contact: Chris Harder 817.392.6820

NTMWD Water Treatment Plant IV Filter Improvements, Wylie, TX - Contract Value \$5M

WWTP Expansion CMAR - Liberty Water, Flint, TX - Contract Value: \$1.8M

Riverbend Water Reclamation Facility Improvements, Aubrey, TX - Contract Value \$3M

Beaver Water District Chlorine Dioxide Facility, Lowell, TX - Contract Value \$4.6M

Dallas Central WWTP White Rock Electrical Improvements, Dallas, TX-Contract Value: \$12M

Elm Fork WTP Chlorine Rehabilitation, Dallas, TX-Contract Value: \$17M

Bachman WTP Chlorine Scrubber, Dallas, TX-Contract Value: 9.4M

Platte Canyon Dam Spillway Modifications, Denver, CO-Contract Value: \$3.5M

Hickory Water Supply, San Angelo, TX-Contract Value: \$13M

Rowlett Creek WWTP Improvements, Rowlett, TX-Contract Value: \$4M

Schertz Parkway Pump Station, Schertz, TX-Contract Value: \$8.7M

Dallas Central WWTP Electrical Improvements, Dallas, TX-Contract Value: \$10M

Morris Sheppard Dam Controlled Outlet Conduit - Contract D, Graford, TX-Contract Value: \$5.7M

East Fork Raw Water Supply - Diversion Pump Station, Seagoville, TX-Contract Value: \$960K

Marble Falls WWTP Improvements, Marble Falls, TX-Contract Value: \$4.2M

Forney Dam, Forney, TX-Contract Value: \$5M

TRA Central WWTP - Contract #5 Levee Improvements, Dallas, TX-Contract Value: \$600K

Central Maintenance and Rehab Improvements, Dallas, TX-Contract Value: \$2M

Boerne WWTP, Boerne, TX-Contract Value: \$27M

North Lake Georgetown Pump Station, Georgetown, TX-Contract Value: \$2M

Expand Frisco-McKinney Pump Station to 130 MGD, Frisco, TX-Contract Value: \$6.5M

Village Creek Reclaimed Water Improvements, Fort Worth, TX-Contract Value: \$2M

Central WWTP Complex B Final Clarifier Improvements, Dallas, TX-Contract Value: \$8M

Bullhide Creek WWTP, Waco, TX-Contract Value: \$10M

Village Creek WWTP Secondary Area & Filter Rehab, Ft. Worth, TX-Contract Value: \$8M

Eastside WTP Pump Stations 1 & 2, Dallas, TX-Contract Value: \$25.5M

Wilson Creek WWTP Expansion & Advanced Treatment, Allen, TX-Contract Value: \$31M

Olmos Dam Rehabilitation, San Antonio, TX-Contract Value: \$4.1M

Mansfield Water Treatment Plant Phase IV Expansion, Mansfield, TX-Contract Value: \$25M

Bachman WTP Maintenance Building & Control Room, Dallas, TX-Contract Value: \$14M

Southside WWTP Dewatering Facility, Dallas, TX-Contract Value: \$39M

Dallas Park Cities, Dallas, TX-Contract Value: \$34M

Dallas Biogas Recovery Facility, Dallas, TX-Contract Value: \$3M

Village Creek Aeration Basin Imp., Fort Worth, TX-Contract Value: \$4M

## Previous Experience

Blaylock Industries  
1996-1998

## Tom Grammer

Quality Control Manager

26 Years in the Construction Industry  
17 Years with Archer Western

### Education:

University of Texas – Arlington  
Mechanical Engineering

### Additional Training:

American Red Cross- CPR/First Aid/BBP  
Competent Person  
OSHA 30 Hour  
Troxler Electronic Labs  
Radiological Safety

TEEX Course "Work Zone Traffic Control"  
Various Safety & Management Rigger Certification  
Crane Safety Awareness  
USACE- Construction Quality Management

### Expertise:

As Quality Control Manager of the Texas Region Treatment Plant Office, Mr. Grammer is responsible for managing and administering Archer Western's Three Phase Control Quality Control Program. He works closely with the project staff during preconstruction to develop and implement a site specific quality control plan. Tom makes periodic visits to the project sites to ensure Archer Western's quality control program is being followed by both subcontractors and Archer Western's self-perform crews. This involves attending preparatory meetings with major subcontractors, field inspections, and assisting the project staff or subcontractors with quality issues, if they arise.

#### **CMAR Dallas Park Cities Facility - \$33.7M Project for Dallas Park Cities Municipal Utility District \* Completed March 2013**

Contact: Larry McDaniel \* 214-652-8639

Preconstruction period lasted approximately a year, where AWC participated in all meetings adding constructability and value engineering advantages as the design progressed in increments of 30%, 60%, 90% and 100%. We participated in obtaining permits and in the Owner's board meetings. We provided potholing and subsurface investigations throughout the early stages of design. We created bid packages and bid on each one that we wanted to self-perform. All bids were opened with the CMAR, Engineer, and Owner and a roundtable discussion produced the list of successful subcontractors.

Tom assisted the project team with all phases of the implementation of Archer Western's three phase quality control plan. This included preparatory meetings, periodic site visits, and quality control oversight on all aspects of the construction phase.

#### **Lake Alan Henry WTP- \$41.1M Project for City of Lubbock, TX \* Completed Sept. 2012 – Greenfield Plant**

Contact: Wood Franklin \* 806-775-2164

This project consists of the following: Flow Control Structure; Raw Water Screening Structure; Two 7.5 MGD Pretreatment trains, expandable to 10 MGD in the future; including a flow distribution structure. Installation of a MF/UF membrane filtration system with initial capacity of 15 MGD including backwash and clean-in-place equipment. Reclaimed water basin with decanting equipment, return pump station, and residuals collection sump; residuals thickening basin and thickened residual pumps; residual drying beds; Clearwell, High Service Pump Station; plant water pumps; chemical storage and feed facilities, administration bldg., electrical & instrumentation, emergency generator, site & yard piping, etc.

### Sampling of Projects:

#### **QC/Senior Project Engineer**

**CMAR Dallas Park Cities Facility - \$33.7M Project for Dallas Park Cities Municipal Utility District \* Completed March 2013**

Contact: Larry McDaniel \* 214-652-8639

**Lubbock Digesters #8 & #9 - \$13.9M Project for City of Lubbock, TX \* Contact: Wood Franklin \* 806-775-2164**

**Lake Alan Henry WTP - \$41.1M Project for City of Lubbock, TX \***

Contact: Wood Franklin \* 806-775-2164

**Southside Solids Dewatering Facility- \$39M Project for Dallas Water Utilities \* Completed March 2012**

Contact: Leslie Holguin \* 214-948-4560

**Sunset Pump Station- \$23M Project for Dallas Water Utilities \* Completed October 2010**

Contact: Kimberlie Brashear \* 214-948-4560

**Central WWTP White Rock Plant Primary Clarifier Improvements - \$18M Project for Dallas Water Utilities \* Completed July 2009**

Contact: Dan Nolen \* 214-948-3640

**University Pump Station Ground Storage Tank #2 - \$5.9M Project for the City of McKinney \* Completed September 2007**

Contact: David Whiteside \* 972-547-7500

**Southside WWTP Diffused Aeration/Process Improvements – \$24M Project for Dallas Water Utilities \* Completed November 2006**

Contact: Richard Wagner \* 214-948-4560

**Mansfield Water Treatment Plant Phase III Expansion - \$5.5M Project for the City of Mansfield \* Completed March 2005**

Contact: Bud Ervin \* 817-276-4200

**Wilson Creek Wastewater Treatment Plant Expansion - \$39M Project for the North Texas Municipal Water District \* Completed July 2004**

Contact: Jim Kelley \* 972-442-5405

**Southside Wastewater Treatment Plant - \$7.8M Project for Dallas Water Utilities \* Completed August 2003**

Contact: Jerry Taylor \* 214-948-4564

**John F. Kubala Water Treatment Plant - \$14.8M Project for the City of Arlington \* Completed March 2002**

Contact: Rick McCleery \* 817-457-7550

**Mosier Valley WTP Improvements - \$12.8M Project for the Trinity River Authority \* Completed February 2001**

Contact: Thomas Sanders \* 817-467-4343

**Waxahachie WTP New Plant & Membrane Facility – Contract Value: \$42M**

**Arlington Ozone Facilities – \$19.2M Project for the City of Arlington**

#### PREVIOUS EXPERIENCE

Martin K. Eby Construction, Inc.  
January 1989- January 1998

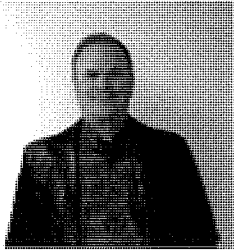




R.E. Monks Construction Company LLC  
Est. 1965



**DANIEL R. MONKS**  
*President and Chief Executive Officer*



*“Culture – Constructing opportunity  
for those that desire it”*

### Professional Profile:

In Construction since 1974

With R.E. Monks Construction since 1974

He has served as President and CEO since 2006. He previously served as the Company's Vice President from 1981 through 2005, R.E. Monks Concrete President from 1981 through 1997 (acquired by LaFarge) and Fountain Hills Concrete President from 1984 through 1999 (acquired by Fort McDowell Sand and Gravel)

He received his degree in Civil Engineering from the University of Southern Colorado.

### Regional Project Highlights:

- Lake Texoma Balancing Reservoir – Howe, Texas
- JB3 Balancing Reservoir – Waxahachie, Texas
- Lubbock Water Treatment Plant Site Infrastructure – Lubbock, Texas
- Midland Landfill – Midland, Texas
- Lubbock Landfill – Lubbock, Texas
- Austin Bergstrom Runway/Apron – Austin, Texas
- Keystone Dam – El Paso, Texas

### Southwest/Mountain Project Highlights:

- North Meadows Extension CMGC – Castle Rock, Colorado
- Standley Lake Dam and Reservoir (Joint Venture) – Westminster, Colorado
- Dry Creek Reservoir – Berthoud, Colorado
- Fortune (Welton) Reservoir – Arvada, Colorado
- Emerald Valley Dams Emergency Repair – Colorado Springs, Colorado
- Hoover Dam Bypass/Arizona Approach – Mohave County, Arizona
- Rocky Mountain Arsenal Environmental Cover – Commerce City, Colorado
- Phelps Dodge Miami Mine Reclamation – Miami, Arizona
- West Covina Development Grading – West Covina, California

### Partnering History

Dan has successfully partnered with several agencies, owners and contractors for the past 35 years with zero claims.

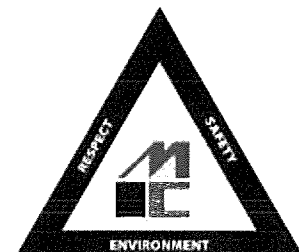
His first formal partnering session was in 1991 on the Davis Dam-Kingman Highway with the Arizona Department of Transportation. The formal partnering councils and their past industry positions are as follows:

- Colonel Charles C.E. Cowan-
  - Commander of the Portland District – U.S. Army Corps of Engineers
  - Director - Arizona Department of Transportation
- Larry Bonine-
  - Director - Arizona Department of Transportation
- Tom Warne –
  - Deputy Director/COO - Arizona Department of Transportation
  - Executive Director - Utah Department of Transportation
- Dave Zanetell-
  - Project Director – FHWA – Hoover Dam Bypass
  - COO - Kraemer, North America
- Troy Hood-
  - Contracting Officer – Soil Conservation Service – Albuquerque District

Informal Partnering sessions and interviews include:

- North Texas Municipal Water District
- Freese and Nichols
- Tarrant County Regional Water District

*Mission: To safely enable a respectful environment for quality infrastructure and team success*

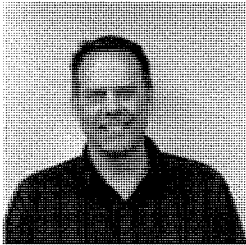




**R.E. Monks Construction Company LLC**  
Est. 1965



**GEORGE S. WEHNER**  
Vice President



**Professional Profile:**

In Construction since 1989

With R.E. Monks Construction since 2000

George has served in various capacities, including Vice President since 2010, Chief Estimator from 2007 through 2010, and Project Manager from 2000 through 2006.

George brings a valuable collection of business intellect and leadership skills to the Company and he has been involved with the successful execution of our CMAR/CMGC and design build projects.

He received his degree in Environmental Science from the University of Colorado at Colorado Springs.

**Regional Project Highlights:**

- Lake Texoma Balancing Reservoir – Howe, Texas
- JB3 Balancing Reservoir – Waxahachie, Texas
- Lubbock Water Treatment Plant Site Infrastructure – Lubbock, Texas
- North Texas Regional Landfill – Lubbock, Texas
- Midland Landfill – Midland, Texas

**Southwest/Mountain Project Highlights:**

- North Meadows Extension CMGC
- Standley Lake Dam and Reservoir – Westminster, Colorado
- Rocky Mountain Arsenal - Environmental Cover – Commerce City, Colorado
- Dry Creek Reservoir – Berthoud, Colorado
- Woodmen/Powers Extension – Colorado Springs, Colorado

**Professional Affiliations**

- Associated General Contractors of America
- Colorado Contractors Association
- El Paso County Contractors Association

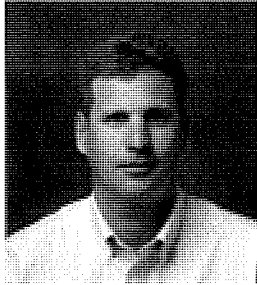
*Listing of Award Winning Projects that George has been directly involved in:*

- Standley Lake Dam and Reservoir – AON Build America
- Woodmen/Powers Extension – CDOT/CCA Outstanding Project Management
- Woodmen/Powers Extension – Gold Hard Hat Award
- Prairie Gateway Infrastructure – Bronze Hard Hat Award
- Hess Road – ACPA Colorado/Wyoming Excellence in Concrete Pavement

***Mission: To safely enable a respectful environment for quality infrastructure and team success***



**John F. Bowen**  
**President**



**Expertise:**

Mr. Bowen has over twenty-two years of dam and water facility construction management, project management, and cost estimating experience. He is responsible for acquisition and project management oversight for all ASI's projects from procurement to closeout. Mr. Bowen has amassed a wealth of experience and earned a strong reputation throughout the dam and water resource construction industry for his in depth experience in the construction of RCC dams. ASI project sizes range from \$500,000 to over \$400,000,000, exclusively in dam and water facility heavy civil construction.

Mr. Bowen's duties include overall responsibility for the operating Company and its subsidiaries, management of all project acquisitions and oversight of all company operations, including responsibility for tracking and managing all project budgets, schedules, contract issues, and maintaining positive client relations.

As President of ASI Constructors, Inc., John has led the construction of some of the largest RCC projects in the United States and abroad to include the \$400 million Taum Sauk Upper Reservoir Rebuild Project which included 3.3 million CY of RCC to complete the construction of an RCC gravity dam with conventional concrete facing. This project was awarded the 2010 USSD Award of Excellence in the Constructed Project. The Wyaralong Dam Project in Beaudesert, Australia, a project that ASI was invited to participate in as a key member of a selected team of highly skilled international alliance members, involved the construction of an RCC dam 1,600 feet in length and 157 feet high. This project was awarded the 2011 Alliance Contracting Excellence Awards (Category A- Major Project Alliances) in Sydney, Australia. Additionally, Mr. Bowen directed the construction of the \$32 million Hickory Log Dam in Canton, GA—the tallest non-federal dam in state of Georgia. This project consisted of the construction of a 188-foot high by 1050-foot long RCC gravity dam and ancillary facilities in only 6 months.

**Years of Experience:** 25 Years

**Education:** B.S., Civil Engineering, University of Virginia, 1997; Engineer in Training, Virginia

**Technical Papers and Presentations:**

- Presentation: November 1998, PCA RCC Dam & Dam Rehabilitation Short Course & Tour, Buckhorn, NC
- Presentation: September 2004, International RCC Dams Seminar & Study Tour, Atlanta, GA
- Presentation: September 2009, RCC 2009 St. Louis, MO

**Employment History:**

December 2005 to Present  
ASI Constructors, Inc.  
Pueblo West, Colorado  
President

June 1993 to November 2005  
ASI RCC, Inc.,  
Buena Vista, Colorado  
Vice President

July 1990 to May 1993  
Lodigiani USA, Ltd.  
Fairfax, Virginia

1988 to 1989  
John F. Bowen & Associates  
McLean, Virginia

**President for the following ASI Projects:**

Western Branch Reservoir Dam Safety Modifications (VA) - \$21.9 million  
Lockport Pool Major Rehabilitation, Stage 1C, Forebay Wall (IL) - \$31.9 million  
Quantico Marine Corps Base Dam Safety Upgrades (VA) - \$8.2 million  
Duck River Reservoir Phase II Dam and Raw Water Intake Project (AL) - \$51.8 million  
Clear Lake Dam Replacement (CO) - \$6.1 million  
Mountain Creek FRS #10 (TX) - \$5.6 million  
Joint Booster Pump Station #3 of the IPL (TX) - \$11.4 million  
Beaver Park Dam Rehabilitation Phase II (CO) - \$8.9 million  
Upper Dam (ME) - \$16.1 million  
Fort Peck Plunge Pool (MT) - \$33.9 million  
Spring River Dam (AR) - \$3.15 million  
Ute Reservoir Intake Screens, Tunnel and Pump Forebay Shaft (NM) - \$13.98 million  
Rocky Pen Run Dam & Reservoir Hydraulic Structures (VA) - \$11.35 million  
Lake Texoma Outfall to Wylie WTP Raw Water Pipeline Plant Bid Package #3 Balancing Reservoir (TX) - \$21.59 million  
Stagecoach Spillway Replacement, Tacoma Hydroelectric Project (CO) - \$3.9 million  
Los Alamos Canyon Dam Modifications (NM) - \$2.65 million  
Terrace Reservoir Spillway (CO) - \$4.2 million  
Modifications to Lake Roberts Dam (NM) - \$5.3 million  
Lower Occoquan Dam Rehabilitation (VA) - \$3.6 million  
SDS Pueblo Dam Connection General Construction (CO) - \$5.6 million  
Pathfinder Dam Spillway Modifications (WY) - \$2.67 million  
New Creek Site 14 Dam (WV) - \$3.98 million  
Cabresto Dam Rehabilitation (NM) - \$5.5 million  
Dutch Fork Lake Dam Renovations (PA) - \$3.5 million  
T. Nelson Elliot Dam Safety Modifications (VA) - \$6.4 million  
Canton Lake Dam Weir and Hydraulic Structures (OK) - \$35.1 million  
Dry Comal Creek Flood Retarding Structure (TX) - \$12.7 million  
Nesbitt Dam Project – \$19 million - Dam Rehabilitation  
Burlington Dams Rehabilitation - \$4 million - Dam Rehabilitation  
Hudson Ranch 1 Geothermal Project – \$10 million - Geothermal Plant  
Harry S. Truman Project - \$2.6 million  
Lake Rush Dam Modifications - \$3.2 million - Dam Rehabilitation  
Pathfinder Dam - \$2.7 million - Dam Rehabilitation  
Wyralong Dam Project Australia - \$348 million AUD (project) - New Dam  
Wide Hollow Water Supply Storage Facility - \$8.4 million  
Cotter Dam Enlargement Project Australia - \$362 million AUD – New Dam  
Deep Creek Dam – \$7.7 million - New Dam  
Bear Creek Dam Rehabilitation Project – \$10 million - Construction of an RCC Berm (Dam)  
Dog River Dam Modifications – \$11.4 million - Spillways and Outlet Modifications  
Catawba Dam ESSI Project – \$13.6 million - Dam Modification and Rehabilitation  
USAF Academy Repair Non-Potable Reservoir No.2 - \$3.1 million - Dam Rehabilitation  
Repair/Alter Storm Water System Phase II - Big Lake Dam - \$1.1 million - Dam Rehabilitation  
Taum Sauk Plant - Upper Reservoir Reconstruction Project – \$405 million – New Dam  
Modifications to Dams Y-15 and Y-16 Yellow River Watershed (NC) - \$6.1 million – Spillways/Outlet Modification  
Hickory Log Dam - Phase II (NC) - \$6.36 million – New Dam

**Vice President for the following ASI Projects:**

Pine Brook Dam and Reservoir (CO) - \$4.0 million - New Dam and Reservoir  
Little Puerco Wash Flood Protection (NM) - \$3.37 million - New Dam  
San Juan Chama DWP Diversion Dam (NM) - \$15.3 million - New Dam  
Franklin Dam Replacement (KY) - \$4.98 million - New Replacement Dam  
Marrowbone Creek Dam No. 1 (VA) - \$2.48 million - Dam Rehabilitation  
Yellow River Dam Y-17 Rehabilitation (GA) - \$1.45 million - Dam Rehabilitation  
Piute Dam Rehabilitation (UT) - \$4.2 million - Dam Rehabilitation  
Upper Stillwater Dam (UT) - \$5.59 million - Dam Rehabilitation  
Standley Lake Dam Rehabilitation (CO) - \$32.5 million - Dam Rehabilitation  
Loch Raven Dam Rehabilitation (MD) - \$28.9 million - Dam Rehabilitation

**Kevin Delo**  
**Construction Project Manager**



**Expertise:**

Kevin has over twenty-five years of dam and water facility and heavy civil construction management and supervision. During those years he has acquired the following skills that contribute to his knowledge and expertise in the industry: earthmoving, structural concrete, dewatering, RCC delivery and placement, sheet pile installation, marine construction, tunneling, pile driving, slurry walls, and shotcrete. Kevin is also experienced with job scheduling and cost management.

**Relevant Projects:**

**Canton Lake Dam Weir and Hydraulic Structures (OK)**

Client: USACE District, Tulsa

Contract Value: \$38,397,000

Duration: 12/11 – Est. 10/14

Construction Manager: This project consists of constructing a roller-compacted concrete flood control structure. At Canton Lake, the Government is constructing an auxiliary spillway adjacent to the right abutment of the existing spillway. This auxiliary spillway will be controlled by a weir and nine fuse gates. This auxiliary spillway will be located in the auxiliary channel which is 480' wide and has been partially excavated up to the auxiliary spillway location to final channel grade. Vertical diaphragm walls approximately 50' tall line the auxiliary channel. Construction activities include placement of a concrete weir (sill) approximately 35' deep by 70' long and spanning the 480' wide channel (approximately 40,000 CY of concrete placement); concrete water intake monolith approximately 40' tall with a 47' x 15' base; concrete intake conduit approximately 11' square and 250' long; and concrete fuse gates, nine each, approximately 30' tall and 50' wide. Construction activities will also include, structural and mass concrete placement requiring on-site batch plant, formwork, shoring of existing diaphragm walls, excavation, and de-watering. The shoring of the existing diaphragm walls, excavation and subsequent weir construction presents a unique constructability challenge.

**Years of Experience:** 27 years

**Employment History:**

October 2006 to Present

ASI Constructors, Inc.  
Pueblo West, CO  
Construction Project Manager  
Project Superintendent  
Structures Superintendent

January 1996 to October 2006

ASI RCC, Inc.  
Buena Vista, CO

1988 to 1995

Western Summit Constructors, Inc.  
Denver, CO

The contractor is required to shore the soil beneath the walls during excavation. In addition, the contractor will be responsible for maintaining the structural stability of the walls during the excavation process for both the weir and the conduit. The interactions between the diaphragm wall and soil during phases of excavation are complex and significant analysis will be required. Potential solutions may include but are not limited to: additional anchoring of the existing diaphragm walls, new secant pile or diaphragm wall below (or overlapping) the existing diaphragm walls, piles driven at the edge of the conduit excavation. After completion the final phase will include further excavation to connect the new spillway to the reservoir.

**Lake Texoma Balancing Reservoir (TX)**

Client: North Texas Municipal Water District

Contract Value: \$21,589,331

Duration: 01/2013 – 12/2013

Construction Manager: This project consists of connecting to the existing 72-inch outfall pipeline; construction of a dual-cell 240 Million Gallon Balancing Reservoir; installation of approximately 1,500 LF of Raw Water Transmission Pipeline including approximately 800 LF of 96-inch and 700 LF of 84-inch C200 Steel pipe; and installation of in-line isolation valves and air-release valves.

**Dry Comal Creek Flood Retarding Structure (TX)**

Client: USACE District, Tulsa

Contract Value: \$12,694,000

Duration: 11/2011 – 9/2012

Construction Manager: This project consisted of constructing a roller-compacted concrete flood control structure on a tributary of the Dry Comal Creek, in Comal County, Texas.

**Taum Sauk Upper Reservoir Rebuild Project (MO)**

Client: AmerenUE, MO;

Contract Value: \$405,000,000

Duration: 01/2007 – 04/2010

Construction Manager: This project consisted of excavation, material crushing/processing, and RCC production and placement to replace the existing rock fill dam after a catastrophic failure. The project featured a RCC quantity of 3,000,000 CY. The Taum Sauk Plant - Upper Reservoir Rebuild Project consisted of returning an existing AmerenUE Pumped Storage Generation Facility to working condition after the Upper Reservoir suffered a breach in the existing concrete faced rockfill dam. The facility falls under the jurisdiction of the Federal Energy Regulatory Commission (FERC) and the project was constructed to satisfy requirements imposed by FERC for a return to service. These requirements were being fulfilled by replacing the concrete face rockfill dam with a new symmetrical RCC dam. The RCC aggregates for the project were produced by crushing of the remaining rockfill dam materials after removal of the concrete facing element. The major work activities associated with this process consisted of excavation, rock excavation, crushing, foundation cleaning, dental/leveling concrete placement, RCC placement, upstream and downstream formwork, and conventional concrete facing placement. Three RCC batch plants and one conventional concrete batch plant were erected onsite to produce these materials required for dam construction. The dam axis has a length of 6,750 lf and the dam is being constructed in a series of 9 monoliths each containing +/- 300,000 CY of RCC.

**Hickory Log Dam (GA)**

Client: Cobb County-Marietta Water Authority/City of Canton, GA

Contract Value: \$32,000,000

Duration: 10/2006 - 06/2007

Project Superintendent: The project consisted of the construction of a 188-foot high by 1050-foot long RCC gravity dam and ancillary facilities. Major items of work include placement of approximately 230,000 CY of RCC and approximately 15,000 CY of foundation and reinforced conventional concrete, and 120,000 square feet of upstream face precast facing panels with PVC geomembrane. Notable features of the project included; Double shift RCC Production, 400 CY/hour onsite RCC Plant, 100% conveyor delivery, Tallest non-federal dam in state of Georgia and All completed in 6 months.

**Loch Raven Dam Rehabilitation (MD)**

Client: City of Baltimore, MD

Contract Value: \$28,861,000

Duration: 07/2002 – 09/2005

Project Superintendent for Joint Venture with Cianbro for construction of 75,000 CY RCC and conventional concrete buttress at existing mass concrete dam. Work included phased cofferdam diversion of Gunpowder River through the work site; demolition and reconstruction of the spillway outlet transition, and approx. 180 LF of 10' diameter PCCP outlet conduit; installation of 58 high capacity post-tensioned rock anchors at 7,170' drill length, with 6,850' strand length; and construction of a miter gate closure system. Total materials included 57,000 CY excavation; 60,000 CY RCC; and 15,000 CY conventional concrete.

**Hunting Run Dam (VA)**

Client: County of Spotsylvania, Fredericksburg, VA

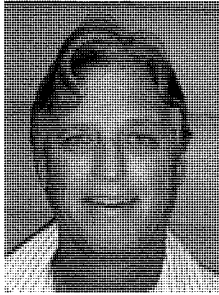
Contract Value: \$21,499,000

Duration: 05/2000 – 09/2002

Structures Superintendent for new 135,000 CY RCC dam. Project included excavation of 430,000 CY of earth and rock; construction and maintenance of stream and river diversion facilities; cleanup and preparation of rock foundations; drilling and grouting for approximately 110,000 SF of grout curtain; fabrication and installation of 120,000 SF of precast panels; placement of approximately 380,000 CY of earth and rock fill; and construction of spillways and outlet works.



**Peter Yard**  
**Project Sponsor**



**Expertise:**

Peter has over thirty years of experience in the heavy construction industry including nuclear and fossil-fueled power plants, marine, bridge construction, airports, underground utilities and dam construction. Peter's expertise in use of HCSS estimating software, Primavera scheduling software, Expedition project management, Excel spreadsheet, and Microsoft Word makes him a valuable asset.

**Relevant Projects:**

**ASI Constructors, Inc., Pueblo West, CO**

Duration: 2010 to Present

Project Sponsor

Responsible for estimating and construction management of RCC and conventional concrete dams, power plant facilities and other heavy civil projects.

**Joint Booster Pump Station #3 JB3R of the Integrated Pipeline (TX)**

Ennis, TX

Client: Tarrant Regional Water District

Contract Value: \$11,387,600

Project Sponsor

This project consists of the construction of two approximately 40 million gallon earthen reservoirs lined with geonet composite with filter fabric on both sides, 60 mil HDPE liner, and 9" of soil cement; installation of approximately 500 LF (in 2 sections) of 108" concrete encased steel pipe; installation of approximately 500 LF of 114" concrete encased steel pipe; and construction of the underdrain systems for the reservoirs.

**Years of Experience:** 41 Years

**Education:** B.S., Civil Engineering, 1974; Worcester Polytechnic Institute, Worcester, Massachusetts

**Professional License:**

Florida Certified General Contractor- CGC1510673  
Designated Construction Professional, Virginia

**Employment History:**

2010 to Present

ASI Constructors, Inc.  
Pueblo West, CO  
Project Sponsor, Senior Project Manager

1998 to 2010

Thalle Construction Co., Inc.  
Hillsborough, NC  
Senior Project Manager/Senior  
Estimator/Chief

1997 to 1998

Cianbro Corporation  
Bloomfield, CT  
Project Manager/Estimator/  
Site Superintendent

1987 to 1997

Gates Construction Co.  
Little Ferry, NJ  
Project Manager/Estimator

1974 to 1987

Ebasco Services Incorporated  
Assistant Engineer / Quality Control Inspector  
/ Residential Engineer

**Fort Peck Plunge Pool (MT)**

Contract Value: \$33,897,764

Client: U.S. Army Corps of Engineers

The Fort Peck Dam on the Missouri River was subjected to severe flooding in 2011. This required operating its spillway for approximately 4 months with peak discharges more than double the previous maximum discharge since the project was constructed in 1938. The hole scoured at the downstream end of the spillway exposed much of the cutoff structure supporting the spillway chute. There is now less than 30 feet of embedment remaining of the original 70 feet. There is a valid concern that the spillway cutoff structure is undermined. The purpose of this project is to improve the stability of the existing cutoff structure by filling a significant portion of the scour hole with Roller Compacted Concrete (RCC) and installing tieback anchors through the existing left cutoff wall. In addition, training walls will be used to facilitate placement of backfill to support the existing cutoff structure wing walls and to help divert erosive flow away from the critical locations near the intersection of the existing cutoff center wall and wing walls. Other work to be performed includes expanding a 175 foot apron length to 250-foot and 350-foot; widening the base of the training walls to facilitate future expansion; deepening the cutoff wall; constructing a reinforced concrete cap on the apron to increase longevity of the repair; and repairing concrete surface damage (spalling and cracks) on the existing spillway chute.

**New Creek Site 14 (WV)**

Contract Value: \$3,965,000

Client: City of Manassas, VA

The earthfill embankment dam was constructed in 1963. This rehabilitation made necessary improvements to the reinforced concrete intake riser, auxiliary spillway (ASW), and downstream slope of the embankment. The work consisted of replacing the reinforced concrete intake riser structure, modifying the open channel auxiliary spillway to include a roller compacted concrete (RCC) structural stepped chute spillway, realigning the auxiliary spillway outlet channel, flattening the downstream slope of the embankment and installing a filter and drainage system, and extending the principal spillway (PSW) outlet works downstream. Site restoration and wetland mitigation plants are included in the work.

**Lake Texoma Outfall to Wylie WTP Raw Water Pipeline (TX)**

Contract Value: \$21,589,331

Client: North Texas Municipal Water District

This project consisted of connecting to the existing 72-inch outfall pipeline near existing Lake Texoma Outfall at FM902 and Bennett Rd. west of Tom Bean, TX. The project work involved construction of a dual-cell 240 million gallon Balancing Reservoir near existing Lake Texoma Outfall on FM902 east of Bennett Road. Work also included installation of approximately 1,500 LF of Raw Water Transmission Pipeline including approximately 800 LF of 96-inch and 700 LF of 84-inch C200 Steel pipe and installation of in-line isolation valves and air-release valves.

**Dry Comal Creek Flood Retarding Structure (TX)**

Contract Value: \$12,694,000

Client: Comal County

This project consisted of constructing a roller-compacted concrete flood control structure on a tributary of the Dry Comal Creek, in Comal County, Texas.

**T. Nelson Elliott Dam Safety Modifications (VA)**

Contract Value: \$6,445,000

Client: National Resources Conservation Service

The T. Nelson Elliott Dam is located in Prince William County, Virginia and is a composite dam that consists of both concrete and earthen sections. The dam is 1,306 feet long and 74 feet high from the dam crest to the stream. The dam was designed in 1968 by Hayes, Seay, Mattern & Mattern and is categorized as a Class I (high hazard) dam by the Virginia Department of Conservation and Recreation (DCR), which is the regulatory agency that has jurisdiction over the dam. This purpose of the T. Nelson Elliott Dam Improvements Project was to improve Elliott Dam to satisfy the DCR requirement that a Category I (high hazard) dam be designed to safely pass the Probable Maximum Flood (PMF) event. The dam was originally designed to safely pass 50% of the PMF.

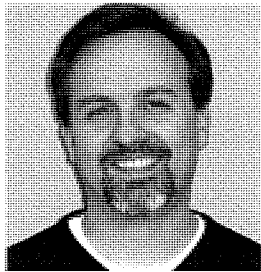
**Hickory Log Dam (GA)**

Contract Value: \$32,000,000

Client: Cobb County-Marietta Water Authority and City of Canton, Georgia

Project Engineer: The project consists of the construction of a 188-foot high by 1050-foot long RCC gravity dam and ancillary facilities. Major items of work include placement of approximately 230,000 cubic yards of RCC and approximately 15,000 cubic yards of foundation and reinforced conventional concrete, and 120,000 square feet of upstream face precast facing panels with PVC geo-membrane. Notable features of the project included; Double shift RCC Production, 400 cubic yards/hour onsite RCC Plant, 100% conveyor delivery, Tallest non-federal dam in state of Georgia and all completed in 6 months.

**Del Shannon**  
**Design Manager**



**Expertise:**

Del A. Shannon has 20 years of experience working in the civil, geotechnical, and environmental engineering field, with most of the experience working on dam safety and dam design. He has been involved as the Engineer of Record, Project Manager and Project Engineer on a wide variety of embankment and concrete dams.

Del regularly contributes his expertise to local and national committees; most recently serving on the geotechnical engineering committee responsible for rewriting and updating the Colorado Dam Safety Rules and Regulations. He also serves on the Geotechnical Engineering and Design/Build Subcommittees for the US Society on Dams and the Association of State Dam Safety Officials and regularly contributes technical papers to both of these organizations. In 2008 he traveled to China to participate in dam safety inspections of dams damaged during the Wenchuan Earthquake. He has been invited to give a presentation to the British Dam Society 2010 annual conference on the United States dam safety rules and regulations.

**Professional Registration:** PE – 2002, Colorado NCEES, #26644

**Publications:**

- "Dam Damage: Evaluating and Learning From the Wenchuan Earthquake's Impact to China's Dams," Proceeding, 2009 Technical Committee on Lifelines for Earthquake Engineering (TCLEE)
- "Reconstructing River Reservoir No. 3 – From Emergency Action to Breach to Safe Operation in 21 Months," Proceedings, 2007 Association of State Dam Safety Officials Annual Conference.
- "Successful Application of the Design/Build Approach at Pine Brook Dam," Proceedings, 2006 United States Society on Dams Annual Conference.
- "Big Easy Levee Design: Proposed Improvements to the Existing 17th Street, and London Avenue Canal Levees," Proceedings, 2008 Association of State Dam Safety Officials Annual Conference.

**Years of Experience:** 25 years

**Professional Licenses and Education:** M.S., Civil Engineering, University of Colorado, 1993; B.A., Communications, Pacific Lutheran University, 1989

**Professional Associations:**

- US Society on Dams (USSD), Geotechnical Subcommittee, Design-Build Subcommittee
- Association of State Dam Safety Officials (ASDS), Geotechnical Committee Member Responsible for Updating Colorado State Dam Safety Regulations, 2005-2006
- American Society of Civil Engineers (ASCE)

**Employment History:**

December 2009 to Present  
ASI Constructors, Inc.  
Pueblo West, Colorado  
Design Manager

2007 to 2009  
Black & Veatch, Inc.  
Denver, Colorado  
Regional Practice Manager: Dams, Levees and Reservoirs

2004 to 2006  
AECOM  
Denver, Colorado  
Senior Project Manager

2002 to 2003  
Tetra Tech  
Ft. Collins, Colorado  
Senior Project Manager

2001 to 2002  
Shannon & Wilson, Inc.  
Denver, Colorado  
Principal Geotechnical Engineer

1994 to 2001  
URS  
Denver, Colorado  
Project Engineer to Senior Project Manager

**Cabresto Dam Rehabilitation Project, Questa, NM**

Project Manager for the pre-construction of the Cabresto Dam Rehabilitation Project. Cabresto Dam has experienced significant seepage issues in recent years and has an undersized spillway (the probably maximum flood will significantly overtop the dam), and as a result of these deficiencies the New Mexico Office of the State Engineer placed the dam under a significant restriction. The decision was made to breach the existing dam and construct a new dam 160 feet downstream. The new dam will be a zoned embankment dam with a roller compacted concrete spillway constructed directly over the embankment. ASI was awarded this project in the Spring of 2011 and since then we have been working directly with the designer – RJH Consultants – and the NM Office of the State Engineer to redesign several elements, provide constructability review and cost estimates of these redesigned elements, with the intent of reducing the overall cost of the project. To date the combined redesign efforts of ASI, RJH and the NM OSE working together have reduced the overall project costs by over \$1 million from the original bid of \$6.3 million.

**Pine Brook Dam and Reservoir Design, Boulder, Colorado**

2007 Award of Excellence from United States Society on Dams (USSD)

Engineer of Record - Responsible for design of the Pine Brook Dam and Reservoir located in the Pine Brook Hills subdivision, near Boulder, Colorado. The Pine Brook Dam and Reservoir is one of the first dam projects in Colorado to utilize the design-build approach. Assisted in providing final design services for this roller compacted concrete dam. The dam is approximately 90-feet high, with a capacity of 100 acre-feet, and will be used as a raw water supply reservoir for the 400 home subdivision, with its own water supply treatment and distribution system. The design was initiated in January 2005 and construction of the dam was completed 18 months later in June 2006. The design and construction innovations realized for this project saved over \$3 million when compared to projects of similar size and scope.

**C.W. "Bill" Young Dam, Tampa, Florida**

Advisory Engineer – Part of a team of experts evaluating the cause and potential remediation alternatives of significant cracking and movement of the soil cement upstream facing system. Since it was completed and filled in 2005 the upstream facing system has experienced ongoing and progressive cracking that continues to this day. The cause of this cracking is unknown and is currently being investigated. Currently the dam is under a significant reservoir restriction until the cause of the cracking is identified and repair alternatives are identified and implemented.

**Elwood Dam Modifications, Platte River Recovery Implementation Plan, Kearney, Nebraska**

Lead Dam Engineer – Responsible for coordinating and performing the engineering analyses surrounding the planned modification of Elwood Dam. Elwood Dam is an off stream reservoir with a storage capacity of approximately 40,000 AF. The current plan is to deliver short term high capacity flows to help regenerate habitat along the Platte River for threatened and endangered species. These flows would be on the order of approximately 5,000 cfs and a portion of this water – between 1,000 and 2,000 cfs – would be released from Elwood Reservoir. The current capacity for releases from Elwood is 350 cfs and significant modifications are required to achieve the new target release rate. A new outlet works and modifications to the upstream slope to ensure embankment stability during rapid drawdown are required.

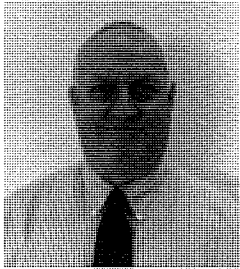
**River Reservoir No. 3 Dam Rehabilitation, Greer, Arizona**

Project Manager - Responsible for the design and construction of the rehabilitation of River Reservoir No. 3 Dam which experienced a dangerous piping condition that required an emergency drawdown of the reservoir elevation. The designed improvements to the dam included removing an approximate 200 foot long section of the embankment, repairing the drain that collapsed and caused the near piping failure, and replacing the embankment with the same material that was removed.

**Potential Failure Mode Analysis (PFMA), Palmetto Bend Dam, Edna, Texas**

Lead Engineer/Dam Safety Engineer - The Palmetto Bend Dam, originally designed and constructed by the US Bureau of Reclamation in 1976 and 1977 and now owned and operated by the Lavaca Navidad River Authority (LNRA), is an earthfill dam constructed across the Navidad River Valley, approximately 7 miles southeast of Edna, Texas. The dam is comprised of a main embankment approximately 1.3 miles long and associate dikes totaling 6.6 miles in length. The reservoir created by the Palmetto Dam has total capacity of 170,310 acre-feet of water. Shortly after construction sand boils and seepage were noted downstream of the main dam embankment. These seeps and boils have experienced intermittent flow over the years, but some have persisted since construction. The PFMA identified that these seeps and boils were not a critical dam safety feature of this dam and only minimal remediation measures were required to address these concerns.

**Richard W. King**  
**Estimating Manager**



**Expertise:**

As Estimating Manager, Richard has over 32 years of knowledge and experience related to the construction industry and specifically relating to heavy civil projects such as bridges, power plants, dams, treatment plants, pump stations, mass excavations, sheeting, shoring, piling and marine construction. Richard has significant experience with HCSS estimating software including in-house training of the department, as well as a working knowledge of Agtek, Suretrak, Primavera, Excel, Word, and PowerPoint.

Richard's notable projects include \$52 MM Duck River Reservoir Phase II Dam and Raw Water Intake Project in Cullman, Alabama; \$37 MM design-build Canton Auxiliary Spillway Hydraulic Structures Project, for the USACE in Canton, Oklahoma; \$34 MM Fort Peck Plunge Pool Rehabilitation Project in Fort Peck, Montana; \$101 MM design-build Lake Livingston Hydroelectric Project in Livingston, Texas; \$73 MM Joint Venture for the Herbert Hoover Dike Rehabilitation Project Culverts 1 & 1A Replacement in Glades County, Florida; \$30 MM Raw Water Transmission Pipeline for the Southern Delivery System in Colorado Springs, Colorado; \$13 MM Fish Barrier RCC Dam on landlocked property of the US Forest Service in New Mexico; \$13 MM Flooding Retarding Structure on the Dry Comal Creek in New Braunfels, Texas; \$14 MM Ute Reservoir Intake Screens, Tunnel, and Pump Forebay Shaft at the Ute Reservoir in Logan, New Mexico; and \$84 MM dam raise, intake, and hydroelectric power plant on the Blue Lake Expansion Project in Sitka, Alaska.

**Experience Record:**

**Estimating Manager**

ASI Constructors, Inc. 2011 – Present

Responsible for managing the Estimating Department of this multi-disciplined heavy civil including 4 office locations and 8 staff. Scope of projects include roller compacted concrete dams, structural concrete dams, large diameter pipe installations, tunneling, temporary water diversion, mass excavations, underwater work, sheeting, piling and cofferdams. Project values up to \$100 million and include participation as joint venture partner, prime contractor and sub-contractor.

**Years of Experience:** 30 years

**Education:** Civil Engineering, Geneva College (1982); AGG-ASPE – Advanced Estimating Academy; Dow Leadership Center - Leadership: Professional Growth through Self Analysis; Fred Pryor Seminars - How to Supervise People

**Employment History:**

2011 to Present

ASI Constructors, Inc.  
Pueblo West, CO  
Estimating Manager

1999 to 2011

COP Construction LLC  
Billings, MT  
Estimating Manager

1985 to 1999

78 Construction Corp.  
Alpha, NJ  
Owner/Estimator/Project Manager

1983 to 1985

Skyway Construction, Inc.  
Annandale, NJ  
Estimator

1982 to 1983

Elson Killam Associates  
Millburn, NJ  
Field Engineer

Notable projects include \$73 million Joint Venture for the replacement of reservoir intakes and outlets in Glades County, FL; \$30 million raw water steel pipeline for the Southern Delivery System in Colorado Springs, CO; \$13 million Fish Barrier RCC dam on landlocked property of the US Forest Service; \$13 million Flooding Retarding Structure on the Dry Comal Creek in New Braunfels, TX; \$14 million deep water intake, tunnel, and shaft at the Ute Reservoir in Logan, NM.

**Relevant Projects:**

**Western Branch Reservoir Dam (VA)**

Client: City of Norfolk Department of Utilities Contract

Contract Value: \$21,943,636  
Under Construction

The Work of this Project includes remedial measures to upgrade the Western Branch Reservoir Dam to modern safety standards. The existing, earth embankment dam is about 1,900 feet long by 45 feet high with appurtenances that include a semi-circular reinforced concrete spillway crest, spillway chute slab and training walls, intake tower, embankment parapet walls, and upstream slope paving. The Work includes the construction of a new 500-foot wide RCC secondary spillway, embankment reinforcement, a combined steel sheet and soil mix cutoff wall, renovation of the spillway and chute, replacing the concrete parapet wall, and a new roadway on the crest. Work also includes other access improvements, as well as repairs to various dam appurtenances.

**Duck River Reservoir Phase II Dam and Raw Water Intake Project (AL)**

Client: City of Cullman Utilities Board

Contract Value: \$51,795,292  
Under Construction

Phase II of the project consists of: Implementation and maintenance of the Construction BMP Plan for Erosion and Sediment Control; Access Road construction and existing road stabilization; surveying; clearing and grubbing; overburden soil removal; rock excavation, spillway and intake area; installation of cofferdams and inlet structure for river diversion through an existing 10-foot diameter reinforced concrete pipe; temporary bypass pumping after diversion pipe is plugged; dewatering to accomplish construction in the dry; final foundation preparation to include dental and trim excavation, preliminary and final foundation cleaning, placement of bedding mortar and dental concrete etc.; foundation grouting to construct a grout curtain and improve foundation; construction of raw water intake tower and associate gates, electrical service, lighting, gates, trash rack and t-screens with air burst cleaning system; construction of an outlet works to include valves and vault; further development of the on-site rock and earthen embankment material sites or approval of off-site material; construction of a 158,000 CY RCC dam, endwalls and spillway, including an on-site batching and transporting and placement of RCC; construction of a drainage gallery and access shaft in the RCC spillway/dam; construction of foundation drains; construction of stilling basin; installation of two 48" steel pipes for raw water conveyance to the pump station (to be constructed later) and for minimum and emergency releases; tie-in and modifications to the existing 10-foot diameter diversion pipe and installation of associated valves; demolition of a portion of the 10-foot diameter pipe in the stilling basin area; construction of earth core, rock fill embankment sections of the dam; construction of rock bolts in the stilling basin to stabilize rock cuts; installation of a precast concrete building for electrical and controls associated with the dam and raw water intake tower. Building will also house the compressor for the screens associated with the intake tower; installation of instrumentation including geotechnical instrumentation; termination of river diversion and start of filling of the reservoir; installation of a security/monitor system; and final site cleanup and stabilization.

**Fort Peck Plunge Pool Rehabilitation Project (MT)**

Client: United States Army Corps of Engineers – Omaha District

Contract Value: \$33,897,764  
Under Construction

Fort Peck Dam on the Missouri River was subjected to severe flooding in 2011. This required operating its spillway for approximately 4 months with peak discharges more than double the previous maximum discharge since the project was constructed in 1938. The hole scoured at the downstream end of the spillway exposed much of the cutoff structure supporting the spillway chute. There is now less than 30 feet of embedment remaining of the original 70 feet. There is a valid concern that if the spillway cutoff structure is undermined. The purpose of this project is to improve the stability of the existing cutoff structure by filling a significant portion of the scour hole with Roller Compacted Concrete (RCC) and installing tieback anchors through the existing left cutoff wall. In addition, training walls will be used to facilitate placement of backfill to support the existing cutoff structure wing walls and to help divert erosive flow away from the critical locations near the intersection of the existing cutoff center wall and wing walls.

**Blue Lake Expansion (AK)**

Client: City and Borough of Sitka, AK

Contract Value: \$84,000,000

This project included multiple features required to improve the Owner's power generation capacity and reliability. These features included the raising of a thin arch concrete dam by 83 feet, drilling and blasting a new intake structure, tunnel, and shaft; drilling and blasting a drainage tunnel, installing new 90" steel penstock sections and installing tunnel liners in existing penstock sections; drilling and blasting an adit tunnel and surge shaft; excavation into rock and construction of a new powerhouse with new turbines and penstock. This work needed to be completed while the existing facility was in use. All new facility tie-in work had to be completed by working around the clock during a 60 day generation outage. This project will last 3 years and portions will be built during the winter months in Sitka, AK.



March 4, 2015

Mr. Corey Anderson  
North Texas Municipal Water District  
Phone: 972-442-5405

RE: Project 344 LBCR Dam CMAR Interview – Follow up request

Dear Corey:

Archer Western is providing the following information in response to your request for estimated man hours that were included within the submitted cost proposal for the Preconstruction, Procurement, and Construction phases of the project:

For the Preconstruction and Procurement phase of the project, R.E. Monks and ASI have a combined estimated total of 3,600 man hours. Our Team Commitment is what is required for Preconstruction and Procurement services is included in the lump sum amount for this phase of the project.

For the Construction Services phase of the project, the following is what is included at the proposed fees:

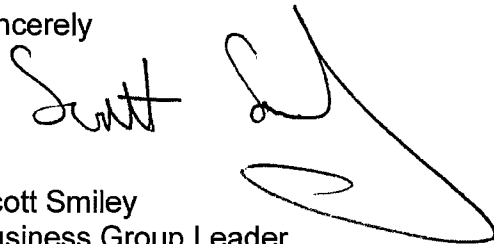
R.E. Monks: 2 days per month for Dan Monks, 2 days per month for PM/Superintendent, 1152 man hours total.

ASI Constructors: 2 days per month for John Bowen, 2 days per month for PM/Superintendent, 1152 man hours total.

If additional time or commitment is desired during the construction services phase of the project, we can meet or set up a conference call to discuss further.

Archer Western is committed to any additional questions you have regarding our proposal, feel free to contact us at any time, we look forward to another successful project with North Texas Municipal Water District and Freese and Nichols.

Sincerely



Scott Smiley  
Business Group Leader

Cc: Jeff Polak  
Curtis Weston  
Frank Etier  
file



Archer Western Construction, LLC

March 5, 2015

Mr. Corey Anderson  
North Texas Municipal Water District  
Phone: 972-442-5405

RE: Project 344 LBCR Dam CMAR Interview – Follow up request Revised

Dear Corey:

Archer Western is providing the following information in response to your request for estimated man hours that were included within the submitted cost proposal for the Preconstruction, Procurement, and Construction phases of the project:

For the Preconstruction and Procurement phase of the project, R.E. Monks and ASI have a combined estimated total of 3,600 man hours. Below is a detailed summary of the people and hours of commitment for the Preconstruction and Procurement phase of the project:

The Dam preconstruction & procurement phase is expected to take +/- 8 months

ASI & REM Executives (Dan Monks and John Bowen)  
General Involvement - 8 Months x 2 days/each x 2 = 256 MH  
30/60/90 design reviews - 3 each x 4 days/each x 2 = 192 MH

ASI & REM Technical Managers (non-executive) (various combinations of Kevin Delo, Peter Yard, Del Shannon, Rich King, George Wehner, Bill Obenchain, Donald Layne )  
General Involvement 8-months x 2 days/each X 4 = 512 MH  
30/60/90 design reviews 3 each x 4-days/each x 6 = 576 MH  
Procurements, bid packages 8 each x 2-days/each X 3 = 384 MH

Subtotal Dam --- 1,920 MH

The TSR preconstruction & procurement phase is expected to take +/- 6 months

ASI & REM Executives (Dan Monks and John Bowen)  
General Involvement - 6 Months x 2 days/each x 2 = 192 MH  
30/60/90 design reviews - 3 each x 4 days/each x 2 = 192 MH

ASI & REM Technical Managers (non-executive) (various combinations of Kevin Delo, Peter Yard, Del Shannon, Rich King, George Wehner, Bill Obenchain, Donald Layne )

1411 Greenway Drive  
Irving, Texas 75038  
972-457-8500  
An Equal Opportunity Employer





General Involvement 6-months x 2 days/each X 4 = 384 MH  
30/60/90 design reviews 3 each x 4-days/each x 6 = 576 MH  
Procurements, bid packages 8 each x 2-days/each X 3 = 384 MH

Subtotal TSR --- 1,728 MH

Total All --- 3,648 Man Hours

For the Construction Services phase of the project, the following is what is included at the proposed fees:

R.E. Monks: 2 days per month for Dan Monks, 2 days per month for PM/Superintendent, 1152 man hours total.

ASI Constructors: 2 days per month for John Bowen, 2 days per month for PM/Superintendent, 1152 man hours total.

Archer Western will coordinate and manage this time effectively to insure this time is utilized during critical activities or times during construction when their experience and expertise is required to insure the successful completion of this critical project for the North Texas Municipal Water District.

Our team is looking forward to another successful project with North Texas Municipal Water District and Freese and Nichols, do not hesitate to contact us if you have any questions regarding this letter.

Sincerely

Scott Smiley  
Business Group Leader

Cc: Jeff Polak  
Curtis Weston  
Frank Etier  
file



**NORTH TEXAS MUNICIPAL  
WATER DISTRICT**

*Regional Service Through Unity*

March 9, 2015

Mr. Daniel Walsh  
Archer Western Construction, LLC  
1411 Greenway Drive  
Irving, Texas 75088

Re: Project No. 344  
Lower Bois d'Arc Creek Reservoir Dam and Intake  
Construction Manager at Risk Selection  
*Notice of Intent for Award of Contract*

Dear Mr. Walsh:

This letter is to inform you that the North Texas Municipal Water District (NTMWD) completed the evaluations for the Construction Manager at Risk (CMAR) contract and will make a recommendation to the Board of Directors at the March 26, 2015, Board Meeting to authorize the award of contract to Archer Western Construction, LLC, for the Lower Bois d'Arc Creek Reservoir Dam and Intake, Project No. 344.

As soon as the NTMWD Board of Directors approves the recommendation, an award of contract letter will be sent to you. Pending Board approval on March 26<sup>th</sup>, we respectfully request that the Archer Western CMAR team join our design team for a meeting with Texas Commission on Environmental Quality at the Freese & Nichols office in Dallas, on Tuesday, April 14. Mr. Corey Anderson will provide you with the necessary details after the award of contract is approved.

Should you have questions or require additional information, do not hesitate to contact Mr. Corey Anderson at (972) 442-5405, or this office directly.

Sincerely,

  
THOMAS W. KULA  
Executive Director

JMS/CA/sp

xc: Jeff Payne, P.E., Freese & Nichols, Inc.



## 00 52 23 CONSTRUCTION MANAGEMENT AT RISK SERVICES AGREEMENT

THIS CONSTRUCTION MANAGEMENT AT RISK SERVICES AGREEMENT, hereinafter referred to as the "Agreement", is made and dated as of \_\_\_\_\_, 2015, between the North Texas Municipal Water District, a district created pursuant to Section 59, Article XVI of the Texas Constitution, acting by and through its duly authorized representative, having its principal offices at 505 E. Brown Street, Wylie, Texas 75098, hereinafter referred to as "Owner" or "NTMWD" and Archer Western Construction, a Limited Liability Corporation organized and operating under the laws of the State of Illinois, having an office at 1411 Greenway Drive, Irving, Texas 75038, hereinafter referred to as "CMAR", (each also hereinafter referred to as "Party" individually or "Parties" collectively), for construction management at risk services in connection with the Lower Bois d' Arc Creek Reservoir Dam Project.

CMAR

### Recitals

The NTMWD has determined to implement a program for the design and construction of the Lower Bois d' Arc Creek Reservoir. The NTMWD has determined that one phase of this program is the construction of a dam across the Lower Bois d' Arc Creek. The dam will consist of an earthen embankment approximately 2 miles long and 90 feet tall at its highest point with a soil bentonite cutoff trench in the foundation and the upstream face of the dam protected by soil cement. There will be an uncontrolled three cycle labyrinth spillway with a 1,500 foot wide emergency spillway and a reinforced water supply intake tower that will feed the water supply pump station located on the downstream side of the dam.

The dam phase of the program will be completed using the construction management at risk (CMAR) project delivery method in accordance with Chapter 2269 of the Texas Government Code.

The NTMWD has determined to contract with a construction management at risk firm to perform the preconstruction, procurement and construction services. The services will include working and coordinating with the design engineer selected pursuant to a separate procurement.

The NTMWD issued a Request for Proposals (the "RFP") Construction Manager at Risk Services for the construction of Lower Bois d' Arc Creek Reservoir Dam and Intake Project, on January 14, 2015.

Proposals submitted in response to the RFP were received on February 18, 2015 from seven firms, including the Archer Western Construction, LLC.

The Proposals were reviewed by the NTMWD and assigned a score based on the evaluation criteria and scoring method set forth in the RFP.

Based on the evaluations and scoring of the Proposals, the NTMWD determined that the Archer Western Construction, LLC provided the best value Proposal for the performance of the services among the firms responding to the RFP.

[CLARIFICATION: The following sentence is not applicable.]

~~In \_\_\_\_\_ of 2015, the NTMWD initiated negotiations with the Archer Western Construction, LLC for performance of the services, which have concluded with this Agreement.~~

On \_\_\_\_\_, 2015, by Resolution No. \_\_\_\_\_, the governing body of the NTMWD authorized the execution and delivery of this Agreement on behalf of the NTMWD.

In consideration of the mutual covenants herein contained, the parties hereto, intending to be legally bound, agree as follows:

## **ARTICLE 1: REPRESENTATIONS AND WARRANTIES**

### **1.01 Representations and Warranties of the CMAR.**

#### **A. The CMAR hereby represents and warrants that:**

1. **Existence and Powers.** The CMAR is a Limited Liability Corporation duly organized, validly existing and in good standing under the laws of the State of Illinois, with the full legal right, power and authority to enter into and perform its obligations under this Agreement.
2. **Due Authorization and Binding Obligation.** This Agreement has been duly authorized, executed and delivered by all necessary corporate action of the CMAR and constitutes the legal, valid and binding obligation of the CMAR, enforceable against the CMAR in accordance with its terms.
3. **Information Supplied by the CMAR.** The information supplied and representations and warranties made by the CMAR in all submittals made in response to the RFP with respect to the CMAR (and to the best of its knowledge after due inquiry, all information supplied in such submittals with respect to any CMAR Team Member) are true, correct and complete in all material respects.
4. **No Conflict of Interest.** The CMAR understands that as a political subdivision of Texas, the laws governing Owner's Board, employees, and agents ("Prohibited Persons") may prohibit any Prohibited Person from having a financial interest, directly or indirectly, in any contract with the Owner. The CMAR represents and certifies that its owners, officers, employees and agents are not Prohibited Persons and that it has tendered to the Owner all necessary disclosures and other documents in compliance with the Owner's policies and governing laws, including, without limitation, a discretionary contracts disclosure statement and a Conflict of Interest Questionnaire.
5. **No Commitments Limiting Ability to Perform CMAR Services.** The CMAR has no commitments, obligations, or impediments of any kind that would have a material and adverse impact on the ability of the CMAR to perform the Services in accordance with the Agreement. The CMAR covenants that it will not enter into any such commitment throughout the period of the performance of the Services.
6. **No approvals required.** No approval, authorization, order of consent of, or declaration, registration of filing with any governmental body is required for the valid execution and delivery of the Agreement by the CMAR except as such have been duly obtained or made.

7. Licensing and Registration Requirements. The CMAR possesses all licenses required under Laws and Regulations to perform all services required of the CMAR under this Agreement and is not in violation of any of the terms or conditions of such licenses. The CMAR is registered with all appropriate governmental bodies to the extent necessary to perform all the Services. The CMAR has the authority to do business in the State of Texas.
8. No Litigation. Except as disclosed in writing to Owner, there is no legal proceeding, at law or in equity, before or by any court, arbitral tribunal or other governmental body pending or, to the best of the CMAR's knowledge after due inquiry, overtly threatened or publicly announced against the CMAR, in which an unfavorable decision, ruling or finding could reasonably be expected to have a material and adverse effect on the execution and delivery of this Agreement by the CMAR or the validity, legality or enforceability of this Agreement against the CMAR, or any other agreement or instrument entered into by the CMAR in connection with the transactions contemplated hereby, or on the ability of the CMAR to perform its obligations hereunder or under any such other agreements or instruments. For the purposes of this section only, "material" is defined to be an effect in excess of \$1M.
9. Claims and Demands. Except as disclosed in writing to Owner, there are no material and adverse claims or demands based in environmental, contract or tort law pending or threatened against the CMAR or any of its affiliates that would have a material and adverse effect upon the ability of the CMAR to perform the Services. For the purposes of this section only, "material" is defined to be an effect in excess of \$1M.
10. Laws and Regulations Compliance. Neither the CMAR nor any of its affiliates has any knowledge of any material violation of any law, order, rule or regulation with respect to any facilities or structures constructed by the CMAR or any of its affiliates. For the purposes of this section only, "material" is defined to be an effect in excess of \$1M.
11. The CMAR represents that it is familiar with the ethics requirements of the Owner and agrees to comply with such requirements.

## **ARTICLE 2: SERVICES AND THE PROJECT**

- 2.01 CMAR shall complete the Construction Management at Risk Services (the "Services") as specified or indicated in the Contract Documents Section 01 01 01.
- 2.02 CMAR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Lower Bois d' Arc Creek Reservoir Dam and Intake Project ("Project"), North Texas Municipal Water District Project No. 344. The Project consists of:

1. A zoned earthen embankment approximately 2 miles long and 90 feet tall at its highest point and containing approximately 4.7 million cubic yards; and
2. Approximately 420,000 square feet of a soil bentonite slurry trench cutoff for the foundation; and

3. Uncontrolled three cycle labyrinth service spillway that is estimated to contain about 14,000 cubic yards of reinforced concrete and 16,000 cubic yards of roller compacted concrete; and
4. Approximately 200,000 cubic yards of soil cement erosion protection for the dam and spillway; and
5. Reinforced concrete water supply intake tower, approximately 100 feet tall, with two 78 inch conduits through the dam that will feed the water supply pump station located on the downstream side of the dam (The pump station is not part of the scope for this Project.); and
6. Lake Bonham Dam improvements including expansion of the pilot channel in the emergency spillway and addition of a toe berm with erosion protection and modifications to the internal toe drain system; and
7. Leonard Dam modification including expansion of the emergency spillway and raising the embankment.

The Owner's Budget for the work immediately above is \$98 Million. This portion of the Project is to be complete and in operation on or before December 31, 2018.

2.03 The Project will also include:

1. An earthen embankment with a soil-cement floor and slope lining with a volume of approximately 210 million gallons with a top of embankment footprint of approximately 1,500' x 1,300'. The top of the embankment is currently anticipated to be at elevation 738' AMSL (approximate height 30 feet) and the floor of the reservoir at 710' AMSL, with a total length of about 5700 LF. The Project will include two 102-inch pipes to connect TSR to the Leonard water treatment plant.
2. Morning-glory type spillway structure with an approximately one-mile-long drop inlet overflow discharge pipe to discharge overflows back to the Red River basin.
3. Approximate maximum of 3,200 acres of timber clearing in an area outside the footprint of the dam but within the impoundment area.

The Owner's budget for the terminal storage reservoir and impoundment area clearing is \$30 Million and \$10 Million, respectively. The Impoundment Area Clearing is to be complete by July 2, 2018 and the Terminal Storage Reservoir is to be complete by December 31, 2019.

2.04 The Project for which the Services under the Contract Documents may be the whole or only a part is generally described as follows:

North Texas Municipal Water District

Lower Bois d' Arc Creek Reservoir Dam and Intake Project, North Texas MWD Project No. 344

NTD13565

### **ARTICLE 3: ENGINEER**

3.01 The Project has been designed by:

Freese and Nichols, Inc. (the "Engineer")

1701 N. Market St., Suite 500, LB 51

Dallas, Texas 75202-2001

Engineer, who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Services and the Work in accordance with the Contract Documents.

#### **ARTICLE 4: CONTRACT TIMES**

- 4.01 Time of the Essence: All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.
- 4.02 Dates for Substantial Completion and Final Payment:
- A. The Work will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates set forth in Paragraphs 2.02 and 2.03 above. These dates are approximate as of the time of this initial Agreement and will be fixed when the Guaranteed Maximum Price for the entire Work is established.
- 4.03 Liquidated Damages
- A. CMAR and Owner recognize that time is of the essence in this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraphs 2.02 and 2.03 above, plus any extensions of the Contract Time allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and CMAR agree that as liquidated damages for delay (but not as a penalty), CMAR shall pay Owner the amount of Liquidated Damages stipulated in the Amendment establishing the Guaranteed Maximum Price for each day that expires after the time specified in Paragraphs 2.02 and 2.03 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CMAR shall neglect, refuse, or fail to complete the remaining Work and achieve Final Completion within the Contract Time, CMAR shall pay Owner the amount of Liquidated Damages stipulated in the Amendment establishing the Guaranteed Maximum Price. The Owner will be the sole judge as to whether the Work has been completed within the allotted time. Assessment of Liquidated Damages by the Owner shall not constitute a waiver of the Owner's right to sue and collect additional damages which Owner may sustain by the failure of the CMAR to perform in accordance with the terms of its Contract.

#### **ARTICLE 5: CONTRACT PRICE**

- 5.01 Owner shall pay CMAR for completion of the Services and the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Article 6, 7 and 8 subject to additions and deletions as provided in the Contract Documents and subject to the limitations set forth in the Statement of Proposed Fees and

Expenses and with Article 9. The Contract Price cannot exceed the Guaranteed Maximum Price (the "GMP") as set forth in Article 10.

#### **ARTICLE 6: CMAR'S FEE**

- 6.01 CMAR's fees shall be as set forth in the Statement of Proposed Fees and Expenses.
- 6.02 The Owner's Budget as presented in the Request for Proposals will be applied to the fees and costs stated in the Statement of Proposed Fees and Expenses to assist the Owner in the evaluation of Proposals.

#### **ARTICLE 7: COST OF THE WORK**

- 7.01 Cost of the Work is the sum of amounts Bid for Work provided by accepted Subcontractor and Suppliers and the Cost of Work self-performed by the CMAR. Cost of Work outside of amounts Bid by Subcontractor and Suppliers and the Cost of Work self-performed by the CMAR shall be determined as provided in Paragraph 11.01 of the General Conditions.

#### **ARTICLE 8: CONTINGENCY FUNDS**

- 8.01 The contingency funds are for the exclusive use of the CMAR while executing the Work to address unexpected circumstances and/or to defray unanticipated charges and additional expenses incurred by the CMAR due to inaccuracies in estimating and for the CMAR's costs and expenses incurred to correct subcontractor scope deficiencies and Subcontractor field errors and omissions that are not otherwise reimbursable and do not constitute a change in the Work. The contingency funds shall not be allocated to any particular line item in the Cost of Work and is established to cover the costs for increases in the Cost of Work incurred by the CMAR for unforeseen causes or details not capable of reasonable anticipation at the time of the execution of the Agreement and it is not intended for changes in the scope of the Work or for reimbursement of expenses and costs not otherwise recoverable as a Cost of Work under Paragraph 11.01 of the General Conditions.
- 8.02 The amount of the contingency funds shall be three percent (3 %) of the estimated Cost of the Work for Work described in Article 2.02 of the Agreement and two percent (2%) the estimated Cost of the Work for the Work described in Article 2.03 of the Agreement.
- 8.03 Subject to prior written approval by the Owner, the contingency funds may be used for costs incurred in accordance with this Article by the CMAR. The CMAR shall prepare and submit to Owner a detailed listing and written justification as to the need to use any part of the contingency funds prior to using any part of the contingency funds. Charges against the contingency funds will be tabulated and reported by the CMAR as part of the CMAR's monthly Progress Meeting. CMAR will also provide a tracking system for the measurement and transfer of contingency accounts.
- 8.04 It is understood that the amount of any such contingency funds is the maximum amount available to the CMAR to cover cost incurred in accordance with this Article and that cost overruns in excess of the contingency funds will be borne by the CMAR.
- 8.05 The full amount of any remaining contingency funds shall be considered to be within the GMP for purposes of the calculation of any Shared Savings at the final completion of the Work.



## ARTICLE 9: GUARANTEED MAXIMUM PRICE

9.01 The GMP will be the sum of the CMAR's fees and expenses established under Article 6, the Cost of the Work established under Article 7, and expenditures for contingency funds as determined in Article 8. This total, established as the Guaranteed Maximum Price in an Amendment to the Agreement, is subject to authorized increases or decreases for changes in the Services and the Work. The CMAR guarantees that the Contract Price will not exceed the GMP unless the Owner authorizes an increase in accordance with the Agreement.

- A. The CMAR is responsible for cost overruns, unless the GMP has been increased by Change Order for a change in Project scope by the Owner.
- B. CMAR will be paid for actual cost incurred by the CMAR for Cost of the Work in accordance with Article 11 of the General Conditions, up to the Guaranteed Maximum Price.

Within 30 days after the CMAR is furnished the 90% Construction Documents, the CMAR shall submit its GMP Proposal for the entire Work, in such form and with such backup documentation as required herein for the GMP Proposal. Except as may otherwise be agreed by the Owner and the CMAR in advance, the GMP Proposal shall include a contingency funds of three percent (3%) of the estimated Cost of the Work for Work described in Article 2.02 of the Agreement and two percent (2%) of the estimated Cost of the Work for the Work described in Article 2.03 of the Agreement.

9.02 Any GMP Proposal shall include the following, unless the Parties mutually agree otherwise:

- A. The proposed GMP will be developed as specified in Article 9 of this Agreement and as set out herein. The GMP Proposal shall be submitted in a binder with a title page that indicates whether the GMP Proposal is an Early Work Package or GMP Proposal for the entire Work. If an Early Work Package it shall be numbered and titled and dated. Binder pages shall be numbered. Binder shall include all specified items and components of a GMP as required by the Agreement. Sections must be divided by tabs for ease of reference. The GMP Proposal will be organized as follows:
  - 1. Transmittal Letter
  - 2. Table of Contents
  - 3. Tab 1 – Executive Summary- brief general summary, including the Scope of Work for the GMP Proposal.
  - 4. Tab 2 – A list of Drawings and Specifications and other Contract Documents, with the most recent revisions dates, upon which the GMP Proposal is based.
  - 5. Tab 3 – Description of Variations, Substitutions proposed to the Drawings and Specifications.
    - a. Specification listing- provide a detail listing of Specifications by division and section, which describes exclusions, substitutions, modifications, etc. If no changes are proposed for a particular section, insert “as per specifications”.

- 1). Qualifications and Assumptions- a narrative summary of all qualifications and assumptions included in the Specifications listing.
  - 2). Exclusions- a summary of all exclusions included in the Specifications listing, plus any exclusions not related to the Specifications.
  - b. A list of the assumptions and clarifications made by the CMAR in the preparation of the GMP Proposal, which list is intended to supplement the information regarding the scope and requirements of the Work contained in the Contract Documents.
  - c. Value Analysis recommendations – if applicable.
  - d. Allowance Schedule – a list of allowances including definitions for all allowances or any open pricing terms and a statement of their basis – if applicable.
  - e. A schedule of unit prices – if applicable
  - f. All other information used as the basis for the GMP Proposal.
6. Tab 4 – The proposed GMP for the designated portion of the Work -Cost of the Work Breakdown:
- a. Estimated Cost of the Work shall be broken down into Master Format 2004 divisions and such additional sections and Early Work Packages as may have been directed by Owner prior to the submission of the GMP Proposal.
  - b. Cost breakdown will be a lump sum for each Division and, if applicable, a section with information on proposed subcontractors and pricing supporting such costs.
  - c. Itemized listing of all proposed General Conditions Costs, including all definitions of cost categories.
  - d. The GMP Proposal shall provide for contingency funds in accordance with the Agreement.
  - e. Allowances and unit prices shall be included.
  - f. It must include a description of how the estimated Cost of the Work was derived and prepared in accordance with the requirements of the Agreement.
7. Tab 5 Progress Schedule
- a. The Progress Schedule for a GMP Proposal must include detailed activities for all events and Milestones included in the construction phase.
  - b. Additionally, the Progress Schedule update must include detailed, logic driven activities for all construction phase activities.
  - c. All paths in the Progress Schedule must lead to Milestone activities to ultimately achieve Substantial Completion on or before the Milestone for Substantial Completion.
  - d. The Progress Schedule must be provided in hard copy form in the binder and also in an electronic format attached to the binder.
  - e. A Schedule of Values based upon the Contract Time requirements.

9.03 Early Work Packages may be awarded by the CMAR during the Preconstruction Services of the Project to facilitate the early preparation of the Site, purchase long lead time materials and

equipment and otherwise accelerate certain portions of the Work in advance of the agreement between the Owner and CMAR regarding the GMP Proposal for the entire Work. These Early Work Packages will be ready for commencement of their construction before it is appropriate to arrive at an overall GMP for the entire Work. Early Work Package shall be defined as a portion of Work that the Parties agree should be executed during the Preconstruction Services of the Project.

- 9.04 Either Owner or the CMAR may propose Early Work Packages to proceed prior to that time the GMP Proposal for the entire Work is approved by the Owner. Based upon the written agreement of the Parties, the CMAR may either perform, if selected by the Owner as the successful Bidder, or subcontract such Early Work Packages before the GMP Proposal for the entire Work has been submitted and approved. The approved GMP amount for the Scope of Work in any early Work Package shall be included in the subsequent GMP Proposal for the entire Work as an individual line item with reference made to the appropriate GMP Amendment. The CMAR's fee for billing purposes for such Early Work Package Scope of Work shall not exceed the pro rata portion of the fee that the Cost of Work of the Early Work Package as performed bears to the Owner's Budget. The CMAR will be obligated to provide payment and performance bonds in accordance with Article 5 of the General Conditions for the GMP amount any early Work Package.
- 9.05 The Owner may choose to accelerate the completion of certain portions of the design work so that some specific Early Work Packages may be awarded by the CMAR prior to the completion of the remaining Construction Documents or acceptance by the Owner of the GMP Proposal for the entire Work. The CMAR shall verify that the Engineer has provided the documents necessary to Bid and award any Early Work Package. Any Early Work Package shall contain language which makes those subcontracts 100% assignable to Owner at Owner's option, in the event this Agreement is terminated, and that the Subcontractors shall be obligated to accept that assignment if it should occur.
- 9.06 After submission of any Early Work Package GMP Proposal and the GMP Proposal for the entire Work, the CMAR and Owner shall promptly meet to discuss and review the proposals.
- A. If Owner has any comments regarding the respective proposal or finds any inconsistencies or inaccuracies in the information presented, it shall promptly give written notice to the CMAR of such comments or findings.
  - B. To the extent that the estimated Cost of the Work of the GMP Proposal exceeds the Owner's Budget, the CMAR shall exercise best efforts (as measured by its applicable standard of care under this Agreement) to propose Value Analysis solutions and other cost reduction measures to bring such construction costs within the Owner's Budget.
    - 1. The Owner and CMAR may cooperate in the revision of the Scope of Work to reduce the cost and re-Bid those portions of the Scope of Work that was revised.
    - 2. The Owner may authorize the CMAR to re-bid some or all portions of the Scope of Work within a reasonable time in an attempt to reduce costs.
  - C. If appropriate, the CMAR shall, upon receipt of Owner's notice to the CMAR, make appropriate adjustments to the GMP Proposal.
  - D. If Owner accepts a GMP Proposal, as may be amended by Owner and the CMAR, the GMP Proposal and its basis shall be set forth in a GMP Amendment to this Agreement.

- E. Notice to Proceed on a GMP Amendment may be issued immediately upon full approval and execution and receipt of all required bonds and insurance.
- F. The CMAR agrees that to the best of its knowledge that the Contract Documents at the time of the execution of the respective GMP Amendment are sufficient to enable it to determine the GMP for all the Work covered by such GMP Amendment and that such Work can be completed in accordance with the Contract Documents for the GMP. By agreeing to a GMP, the CMAR agrees with the Owner that the Work required by the Contract Documents for the Work covered by the respective GMP Amendment, including without limitation, construction means, methods, procedures and techniques necessary to perform the Work, will be consistent with (i) good and sound practices within the construction industry; (ii) generally prevailing and accepted industry standards applicable to the Work and (iii) requirements of any warranties applicable to the Work.

9.07 If Owner rejects the GMP Proposal for the entire Work (which it may do in its sole discretion) or fails to notify the CMAR in writing within thirty (30) calendar days of receipt of the GMP Proposal that it accepts the GMP Proposal, the GMP Proposal shall be deemed withdrawn and of no effect. In such event, Owner and the CMAR shall meet and confer as to how the Project will proceed with Owner having the following options, the selection of which option Owner may make in its sole discretion:

- A. Owner may suggest modifications to the GMP Proposal and consider the CMAR's additional Value Analysis proposals and other suggestions for cost reduction, whereupon, if such modifications are accepted in writing by the Owner and CMAR, the GMP Proposal shall be deemed accepted and the parties shall proceed in accordance with Section 9.07 D,E and F above or;
- B. Owner may authorize and direct, in writing, the CMAR to proceed with the specified Work on the basis of reimbursement as provided in Article 6 (CMAR's Fee) and Article 7 ( Cost of the Work) hereof without a GMP, in which case all references in Agreement to the GMP will not be applicable or;
- C. Owner may terminate this Agreement in accordance with Article 19.

9.08 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the CMAR. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the CMAR shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them being necessary to produce the indicated results. To the extent the Drawings and Specifications are anticipated to require further development by the Engineer, the CMAR has provided in the GMP for such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include such things as changes in scope, systems, kinds and quality of materials, finishes or equipment, all of which, if required shall be incorporated by Change Order.

#### **ARTICLE 10: CHANGES IN THE GUARANTEED MAXIMUM PRICE**

10.01 The amount of any increases or decreases in the GMP CMAR which results from a Change Order shall be set forth in the applicable Change Order subject to the following:

- A. Any increase or decrease in the CMAR's fee for Construction Services resulting from net additions or decreases in the Cost of the Work shall be determined in accordance with Paragraph 12.01.C of the General Conditions.
- B. Wherever there is a Guaranteed Maximum Price:
  - 1. In the case of net additions in the Work, the amounts of any increase in Guaranteed Maximum Price shall be determined in accordance with Paragraphs 11.01 through 11.02, inclusive, of the General Conditions.
  - 2. In the case of net deletions in the Work, the amount of any such decrease shall be determined in accordance with Paragraph 11.02.C of the General Conditions, and any Guaranteed Maximum Price shall be reduced by mutual agreement.

#### **ARTICLE 11: SHARED SAVINGS**

- 11.01 Shared Savings shall only be applicable to the Work described in Article 2, Section 2.02 of this Agreement and shall not include the Work described in Article 2, Section 2.03. All savings and remaining contingency funds for the Work described in Article 2, Section 2.03 shall be retained by the Owner. Savings shall be defined as the amount of funds (if any) that remain unspent within the GMP at the time of final completion of the Work and shall consist of the difference between the actual Cost of Work and the Cost of Work contained in the Amendment for the GMP for the Work.
- 11.02 "Shared Saving" shall be defined as the amount of funds (if any) that remain unspent within the GMP at the time of final completion of the Work and shall consist of the difference between the actual Cost of Work and the Cost of Work contained in the Amendment for the GMP for the Work plus any remaining contingency funds.
- 11.03 Shared Savings shall be paid to the CMAR only to the extent that Shared Savings exist and can be allocated based on the requirements of this Article.
- 11.04 Shared Savings shall be paid to the CMAR within 30 days of Final Payment.
- 11.05 At the time of final completion, any Shared Savings under the final adjusted amount of the GMP and remaining contingency funds shall be distributed to the Parties with fifty percent (50%) to the CMAR and fifty percent (50%) to the Owner, subject to maximum amounts payable to the CMAR as indicted below:
  - A. Three quarters of one percent (0.75%) of the actual Cost of Work if Substantial Completion date is met or achieved at an earlier date, plus
  - B. For every Calendar Day that the date of Substantial Completion is earlier than the agreed-upon Substantial Completion deadline, an additional amount of \$4,000 per Calendar Day will be paid to the CMAR; however
  - C. The total maximum amount of Shared Savings (the sum of subsections "A" and "B") paid to CMAR will be limited to one and one half percent (1.5%) of the GMP, regardless of the number of Calendar Days for an earlier Substantial Completion date.
  - D. All Shared Savings beyond the total maximum amount payable to the CMAR will be retained by the Owner.
  - E. By way of example and for illustrative purposes:

- F. If actual Cost of Work is \$80,000,000; 0.75% would equal \$600,000.
- G. The maximum amount payable would be 1.5 % or \$1,200,000.
- H. The maximum number of earlier days for Shared Savings payment would equal 150 Calendar Days (approximately 5 months).

**ARTICLE 12: PAYMENT PROCEDURES**

**12.01 Submittal and Processing of Payments for Services associated with the Pre-Construction Services and Procurement Services:**

- A. On the first working day following the 25<sup>th</sup> of each month, Contractor shall submit to Owner for review an Application for Payment completed and signed by Contractor covering the Services completed as of the date of the Application and accompanied by such documentation as may be required.
- B. Engineer will within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present Application to Owner or return the Application to CMAR indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
- C. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's knowledge and review of the Services completed, that such Services were generally in accordance with the requirements of the Agreement and the Contract Documents.



~~Sixty~~ **Thirty** days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will become due, and when due will be paid by Owner to CMAR.

**12.02 Submittal and Processing of Payments:** CMAR shall submit Applications for Payment of the Work in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

**12.03 Progress Payments and Retainage for the Work:**

- A. Owner shall make progress payments on the basis of CMAR's Applications for Payment on or about the 25<sup>th</sup> day of each month during performance of the Work. All such payments will be measured by the Schedule of Values established as provided in Paragraph 2.07.A of the General Conditions.
- B. Prior to Substantial Completion, progress payments will be made in an amount equal to 90 percent of the total amount earned for completed Work and properly stored materials on hand, with the balance being retainage. When 50 percent of the Contract Price has been earned, the retainage may be held at its current value until Substantial Completion if the Owner determines that satisfactory progress has been made. This retainage amount may be adjusted for changes in the Guaranteed Maximum Price that occur after 50 percent of the Guaranteed Maximum Price has been paid to the Contractor.
- C. Payment will be less the aggregate of payments previously made and less such amounts as Owner may be entitled to withhold pursuant to the Contract Documents, including but not

limited to Liquidated Damages, in accordance with Paragraph 14.02 of the General Conditions. In addition to the amount retained above, the Owner may retain additional amounts as set forth elsewhere in the Contract Documents.

- 12.04 Final Payment: Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price, as modified in accordance with the Contract Documents, and as recommended by Engineer as provided in said Paragraph 14.07.

#### **ARTICLE 13: SELF-PERFORM**

- 13.01 The CMAR may seek to perform portions of the Work itself, other than the minor work that may be included in the CMAR's General Conditions costs, if the CMAR submits its Bid for those portions of the Work in the same manner as all other Subcontractors. If the CMAR intends to submit a Bid for such Work, it shall notify Owner prior to soliciting Bids and all such Bids will be submitted directly to the Owner or the Engineer. If the Owner determines that the CMAR's Bid provides the best value for Owner, the CMAR will be awarded that portion of the Work. Owner's determination in such matters is final.

#### **ARTICLE 14: INTEREST**

- 14.01 The Owner is not obligated to pay interest on monies not paid except as provided in Section 2252.032 of the Texas Government Code.

#### **ARTICLE 15: CMAR'S REPRESENTATIONS FOR THE WORK**

- 15.01 CMAR makes the following representations:
- A. CMAR has examined and carefully studied the Contract Documents and the other related data identified in the Request For Proposals.
  - B. CMAR has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
  - C. CMAR is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
  - D. CMAR has carefully studied: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site including Underground Facilities which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.
  - E. CMAR has obtained and carefully studied all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions including surface, subsurface, and Underground Facilities at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by CMAR, including any specific means, methods, techniques, sequences, and procedures of construction

expressly required by the Contract Documents, and safety precautions and programs incident thereto or assumes responsibility for doing so.

- F. CMAR does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. CMAR is aware of the general nature of Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. CMAR has correlated the information known to CMAR, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- I. CMAR has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that CMAR has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to CMAR.
- J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

#### **ARTICLE 16: ACCOUNTING RECORDS**

16.01 Accounting Record Availability: CMAR shall keep such full and detailed accounts of materials incorporated and labor and equipment utilized for the Work consistent with the requirements of Paragraph 11.01.D of the General Conditions and as may be necessary for proper financial management under this Agreement. Subject to prior written notice, Owner shall be afforded reasonable access during normal business hours to all CMAR's records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and CMAR's fee. CMAR shall preserve all such documents for a period of 3 years after the final payment by Owner.

#### **ARTICLE 17: CONTRACT DOCUMENTS**

17.01 Contents:

- A. The Contract Documents consist of the following:
  - 1. Specifications, forms and documents listed in Section 00 01 10 "Table of Contents" except as specifically excluded in Paragraph C.
  - 2. Addenda (Numbers 00 91 00-1 to 00 91 00-5, inclusive).
  - 3. Exhibits to this Agreement (enumerated as follows):
    - a. Treatment Plan for Inadvertent Discovery of Native American Human Remains or Unmarked Burials During Archaeological Investigations of the Area of Potential Effect (APE) for the Proposed Lower Bois d'Arc Reservoir an Agreement Between North Texas Municipal Water District The U.S. Army Corps of Engineers, Tulsa District The Texas Historical Commission



- b. Treatment Plan An Agreement Between North Texas Municipal Water District the U.S. Army Corps of Engineers, Tulsa District The Texas Historical Commission and the Caddo Nation of Oklahoma
- 4. Documentation submitted by Contractor prior to Notice of Award
  - a. Proposal
  - b. Confidential documents excluded from Contract Documents
    - 1). 00 45 16.01 - Financial Resources Data Form and attachments (original documents retained by NTMWD)
    - 2). Appendix 7A - OSHA Log of Work-Related Injuries and Illnesses
  - c. Supplemental information provided after interview
    - 1). Archer Western Construction Letter dated March 4, 2015
    - 2). Archer Western Construction Letter dated March 5, 2015
- B. The following are also Contract Documents which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
  - 1. Notice to Proceed.
  - 2. Amendment(s).
  - 3. Change Order(s).
  - 4. Field Order(s).
  - 5. Work Change Directive(s).
  - 6. Engineers Written Interpretation(s).
- C. The documents listed in Paragraph 17.01.A are attached to this Agreement (except as expressly noted otherwise above).
- D. There are no Contract Documents other than those listed above in this Article 17.
- E. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

**ARTICLE 18: NON APPROPRIATION OF FUNDS**

18.01 Notwithstanding any other provision of this Agreement, this Agreement may be terminated if for any reason there are not sufficient appropriated and available monies for the purpose of maintaining the District's payment obligations under this Agreement. In the event of such termination, the termination will be in accordance with Paragraph 15.03 of the General Conditions.

**ARTICLE 19: TERMINATION**

19.01 In addition to the termination terms and conditions in Article 15 of the General Conditions, CMAR'S failure to provide the Key Personnel or Alternate Key Personnel will justify termination for cause by the Owner.

19.02 In addition to the termination terms and conditions in Article 15 of the General Conditions, upon three days written notice, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate this Agreement at the conclusion of the Pre-Construction Services or failure of the Owner and CMAR to come to an agreement on the Guaranteed Maximum Price Proposal for the entire Work. The CMAR shall be paid for Services actually rendered through the date of termination.

#### **ARTICLE 20: MISCELLANEOUS**

20.01 Terms: Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

20.02 Assignment of Contract: No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

20.03 Successors and Assigns: Owner and CMAR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

20.04 Severability: Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and CMAR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

20.05 Venue: CMAR agrees that venue shall lie exclusively in district courts of Collin County, Texas for any legal action.

#### **ARTICLE 21: INADVERTENT DISCOVERY OF NATIVE AMERICAN HUMAN REMAINS OR UNMARKED BURIALS**

21.01 CMAR understands and acknowledges that Owner is bound by treatment plans for the inadvertent discovery of Native American human remains or unmarked burials (the "Treatment Plans"), which are attached as exhibits and incorporated by reference into this Agreement. Said Treatment Plans were made between Owner, the U.S. Army Corps of Engineers, Tulsa District, the Texas Historical Commission and the Caddo Nation of Oklahoma. CMAR understands and agrees to be bound by said Treatment Plans to the fullest extent allowed by law; CMAR and Owner reasonably anticipate that the progress of the Work will be encumbered at times by the need by CMAR and Owner to abide by the terms of the Treatment Plans, but that there shall be no change in the contract price, only the contract time (if necessary).

21.02 Pursuant to the Treatment Plans, all Work will be performed in a manner consistent with Title 13, Part II, Chapter 22, Cemeteries, and any other requirements under Chapter 711 of the Texas

Health and Safety Code, and the Antiquities Code of Texas (Title 9, Chapter 191 of the Texas Natural Resources Code).

- 21.03 The term “human remains”, as defined under Chapter 711 of the Texas Health and Safety Code (711.001[15]), refers to the body of a decedent, and is inclusive of, born or ashes, and associated funerary objects; Chapter 711 of the Texas Health and Safety Code also defines “cemetery” as a place that is used or intended to be used for interment, and includes a graveyard, burial park, mausoleum, or any other area containing one or more graves (711.001[2]); the term “interment” means the permanent disposition of remains by entombment, burial, or placement in a niche (711.001[16]).
- 21.04 In the event that human remains are encountered during the performance of any Work, the CMAR shall immediately cease performance of Work and immediately notify Owner.
- A. CMAR shall notify Owner within one (1) hour of initially encountering human remains.
  - B. Notification by CMAR to Owner must be made by both telephone and email to the Designated Representative identified below.
- 21.05 In the event that unassociated artifacts are encountered during the performance of any Work, the CMAR shall immediately cease performance of Work and immediately notify Owner.
- A. CMAR shall notify Owner within one (1) hour of initially encountering unassociated artifacts.
  - B. Notification by CMAR to Owner must be made by both telephone and email to the designated representative.
- 21.06 NO DAMAGES FOR DELAY: CMAR understands that the discovery of potential human remains, unmarked burials, and/or historical artifacts will result in delays to the Work. CMAR hereby agrees that its sole remedy for any damages caused as a result of said delays is an extension of the contract time. CMAR hereby waives any remedy or claim it may have at law or in equity for an increase in the contract price as a result of any delays, disruptions of work, inefficiencies, schedule acceleration or compression, or similar damages related to the discovery of potential human remains, unmarked burials, and/or historical artifacts

IN WITNESS WHEREOF, Owner and CMAR have signed this Agreement in duplicate. One counterpart each has been delivered to Owner and CMAR. All portions of the Contract Documents have been signed or identified by Owner and CMAR or on their behalf.

This Agreement will be effective on \_\_\_\_\_.

Owner: North Texas Municipal Water District  
*(typed or printed)*

CMAR: Archer Western Construction, LLC  
*(typed or printed)*

By: \_\_\_\_\_  
*(Individual's signature)*

By: \_\_\_\_\_  
*(Individual's signature)*

Name: \_\_\_\_\_  
*(typed or printed)*

Name: Daniel P. Walsh  
*(typed or printed)*

Title: \_\_\_\_\_  
*(typed or printed)*

Title: President  
*(typed or printed)*

Attest: \_\_\_\_\_  
*(Individual's signature)*

Attest: \_\_\_\_\_  
*(Individual's signature)*

Address for giving notice:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Designated representative:

Designated representative:

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Phone: \_\_\_\_\_

Facsimile: \_\_\_\_\_

Facsimile:  
e: \_\_\_\_\_

E-mail: \_\_\_\_\_

E-mail: \_\_\_\_\_

*(If CMAR is a corporation or a partnership, attach evidence of authority to sign.)*

**END OF SECTION**

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT



Prepared by

**ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE**

and

Issued and Published Jointly by



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*A Practice Division of the*  
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
  2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Services and the Work.
  3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
  4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
  5. *Bid*—~~The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.~~ The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices and schedule for the Work to be performed to the CMAR including proposals submitted by the CMAR for self-performed Work.
  6. *Bidder*—~~The individual or entity who submits a Bid directly to Owner.~~ The Subcontractor, Supplier, individual or entity that submits a Bid or the CMAR that submits a Bid for self-performed Work.
  7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
  8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
  9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
  10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
  11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Services and the Work. The Contract supersedes prior negotiations,

representations, or agreements, whether written or oral. Contract shall have the same meaning as Agreement.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Services and the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer’s written recommendation of final payment.
15. *Contractor*—~~The individual or entity with whom Owner has entered into the Agreement.~~ In these Contract Documents, Contractor has the same meaning as the Construction Manager at Risk and CMAR.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

The Engineer’s Consultants are:

Cyganiewicz Geotechnical LLC  
Darell Zimbelman (individual peer reviewer)  
Gorrondona and Associates  
Texplor of Dallas, Inc.  
TrueGrit  
TRI Environmental  
Gehrig, Inc.  
Utah Water Research Laboratory

21. *General Requirements*—Sections of Division 1 of the Specifications.

22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products,

telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.
52. *Construction Manager at Risk or CMAR* —The individual or entity with whom Owner has entered into the Agreement. The terms CMAR, Construction Manager at Risk and Contractor shall have the same meaning in these Contract Documents.
53. *Owner's Budget*—The amount budgeted by the Owner for the Services and the Work.
54. *Guaranteed Maximum Price* —The sum of the Construction Manager at Risk's fees and expenses established under Article 6 of the Agreement, the Cost of the Work established under Article 7 of the Agreement and expenditures for contingency funds as determined in Article 8 of the Agreement. Guaranteed Maximum Price shall have the same meaning as GMP.
55. *Proposal Security*—The financial security in the form of a bid bond provided by Proposer to the Owner at the time the Proposal is submitted until Performance, Payment and other bonds required by the Contract Documents in the amount of 100% of the Owner's Budget or Guaranteed Maximum Price are provided.
56. *Modification*—(a) Amendment; (b) Change Order; (c) Field Order; or (d) Work Change Directive.
57. *Amendment*—a written amendment to the Agreement that is duly authorized, approved or ratified by the Owner and duly authorized by the CMAR that provides for a material change, alteration or revision to the terms and conditions of the Agreement.
58. *Guaranteed Maximum Price Proposal* (“GMP Proposal”)—means the proposal submitted by the CMAR which sets forth its GMP and all assumptions and clarifications concerning the Contract Documents and Project and the Scope of Work upon which the GMP is based. This term can be used for either the GMP Proposal for the entire Work or an Early Work Package GMP Proposal.

59. Guaranteed Maximum Price Amendment (“GMP Amendment”)—means the document that is issued by the Owner to the CMAR to incorporate the Work and GMP within an Early Work Package GMP Proposal or the GMP Proposal for the entire Work into this Agreement. The Amendment shall modify this Agreement and shall contain additional terms and conditions which are specific to the Scope of Work within the Early Work Packages GMP Proposal or GMP Proposal for the entire Work.
60. Scope of Work—means the entire Work which is included within the GMP Proposal for the entire Work. This term can also be used to describe the subset of Work which is included within a particular Early Work Package.
61. Value Analysis—means the systematic application of recognized techniques by a multidiscipline team to identify the function of a product or service, establish a worth for that function, generate alternatives through the use of creative thinking and provide needed modifications to accomplish the original purpose of the Project, reliably, without sacrificing safety, necessary quality and environmental and performance attributes of the Project.
62. CMAR Team—means the team formed by the Proposer for purposes of responding to the RFP.
63. CMAR Team Member—means a corporate entity or firm or individual included in the CMAR Team or identified in the Proposal that will provide any of the Services for this Project.

## 1.02 Terminology

- A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:*
  1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.
  2. “At no additional cost to Owner”, “With no extra compensation to CMAR”, “At CMAR's own expense”, or similar words mean that the CMAR will perform the Work without any increase in the Contract Price. It is understood that the Cost of the Work is included in the Contract Price and will be performed at no additional cost to the Owner unless specifically stated otherwise.

## C. Day:



1. ~~The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.~~ A "Calendar Day" shall be a day of 24 hours measured from midnight to the next midnight, and is any day of the year, with no days being excluded.
2. A "Working Day" shall be a day which permits construction of the principal units of the Work for a period of not less than 7 hours between 7:00 a.m. and 6:00 p.m. Working Days do not include days on which weather or other conditions not under the control of the CMAR prevent CMAR from working the 7 hours defining a Working Day. Working Days do not include Saturdays, Sundays or any of the following holidays: New Year, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the day after Thanksgiving and Christmas Eve and Christmas Day.

D. *Defective:*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:
  - a. does not conform to the Contract Documents; or
  - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
  - c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.
5. Specifications are written in modified brief style. Requirements apply to all Work of the same kind, class, and type even though the word "all" is not stated.

6. Simple imperative sentence structure is used which places a verb as the first word in the sentence. It is understood that the words "furnish", "install", "provide", or similar words include the meaning of the phrase "The CMAR shall..." before these words.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## ARTICLE 2 – PRELIMINARY MATTERS

### 2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

### 2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ~~ten~~ five printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

### 2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

### 2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

### 2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and
  3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.
- B. Before undertaking each part of the Work, CMAR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CMAR shall promptly report in writing to the Engineer any conflict, error, ambiguity or discrepancy which the CMAR may discover and shall obtain a written interpretation from the Engineer before proceeding with any Work affected thereby. In the event of a conflict in the Drawings, Specifications, or other portions of the Contract Documents which were not reported prior to the Award of the Contract, the CMAR shall be deemed to have included the most expensive item in their Bid.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
  1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
  2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

### ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

#### 3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all. Drawings and Specifications do not indicate or describe all of the Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the CMAR and coordinated with the Engineer. Provide any Work, materials or equipment required for a complete and functional system even if they are not detailed or specified.
  1. The Contract requirements described in the General Conditions, Supplementary Conditions and General Requirements apply to each and all Specification Sections unless specifically noted otherwise.
  2. Organization of Contract Documents is not intended to control or to lessen the responsibility of the CMAR when dividing Work among Subcontractors, or to establish the extent of Work to be performed by any trade, Subcontractor or Supplier. Specifications or details do not need to be indicated or specified in each Specification or Drawing. Items shown in the Contract Documents are applicable regardless of location in the Contract Documents.
  3. Standard paragraph titles and other identifications of subject matter in the Specifications are intended to aid in locating and recognizing various requirements of the Specifications. Titles do not define, limit, or otherwise restrict Specification text.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.
- D. Comply with the most stringent requirements where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, unless Contract Documents indicate otherwise.

Quantity or quality level shown or indicated shall be minimum to be provided or performed in every instance.

Actual installation may comply exactly with minimum quality indicated, or it may exceed that minimum within reasonable limits.

In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for context of requirements.

Refer instances of uncertainty to the Engineer for a decision before proceeding.

- E. Provide materials and equipment comparable in quality to similar materials and equipment incorporated in the Project or as required to meet the minimum requirements of the application if the materials and equipment are shown in the Drawings but are not included in the Specifications.
- F. The Contract Documents comprise the entire Agreement between Owner and CMAR. The Contract Documents may be modified only by Amendment or Field Order or Change Order.

### 3.02 *Reference Standards*

#### A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

- B. Comply with applicable construction industry standards as if bound or copied directly into the Contract Documents regardless of lack of reference in the Contract Documents. Apply provisions of the Contract Documents where Contract Documents include more stringent requirements than the referenced standards.

Standards referenced directly in the Contract Documents take precedence over standards that are not referenced but recognized in the construction industry as applicable.

Comply with standards not referenced but recognized in the construction industry as applicable for performance of the Work except as otherwise limited by the Contract Documents. The Engineer determines whether code or standard is applicable, or which of several are applicable.

Make copies of reference standards available as requested by Engineer or Owner.

### 3.03 *Reporting and Resolving Discrepancies*

#### A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written

interpretation or clarification from Engineer before proceeding with any Work affected thereby.

- a. CMAR represents that he has familiarized himself with the nature and extent of the Contract Documents, Work, location, all local conditions, and Laws and Regulations that in any manner may affect performance of the Work, and represents that he has correlated his study and observations with the requirements of the Contract Documents. CMAR also represents that he has studied all conditions referred to in the Contract Documents and will make such additional surveys and investigations as he deems necessary for the performance of the Work at the Contract price in accordance with the requirements of the Contract Documents and that he has correlated the results of all such data with the requirements of the Contract Documents.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. ~~Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.~~ In the event of a conflict in the Drawings, Specifications, or other portions of the Contract Documents which were not reported prior to the Bid, the CMAR shall be deemed to have included the most expensive item, system, procedure, etc. in his Bid.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
  - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
  - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
1. A Field Order;
  2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or
  3. Engineer's written interpretation or clarification.

### 3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
  2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. ~~Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.~~ Nothing herein shall preclude CMAR from retaining copies of the Contract Documents for record purposes, unless specifically prohibited in writing by the Owner for security reasons. If the Owner so directs, CMAR shall surrender all copies of the construction Contract Documents and other related documents, in paper or digital format and remove these documents from computer equipment or storage devices as a condition of final payment.

### 3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from

the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

#### **ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS**

##### *4.01 Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. ~~Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.~~ CMAR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment. A copy of the written agreements for the use of such land shall be provided to the Owner for record purposes.

##### *4.02 Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
  - 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
  - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
  - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or



2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions, or information.

#### 4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
2. is of such a nature as to require a change in the Contract Documents; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly but no later than within 3 days after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer’s Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner’s obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer’s findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
  - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
  - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
  - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
  - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
  - c. Contractor failed to give the timely written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

#### 4.04 *Underground Facilities*

- A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
  1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
  2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
    - a. reviewing and checking all such information and data;
    - b. locating all Underground Facilities shown or indicated in the Contract Documents;
    - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
    - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.
- B. *Not Shown or Indicated:*
  1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly but no later than within 3 days after becoming aware

thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

#### 4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

#### 4.06 *Hazardous Environmental Condition at Site*

~~A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.~~

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

~~B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:~~

- ~~1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of~~

~~construction to be employed by Contractor and safety precautions and programs incident thereto; or~~

~~2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or~~

~~3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.~~

- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. ~~To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution~~

~~costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, OWNER SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS CMAR, AND SUBCONTRACTORS AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO A HAZARDOUS ENVIRONMENTAL CONDITION, PROVIDED THAT SUCH HAZARDOUS ENVIRONMENTAL CONDITION: (I) WAS NOT SHOWN OR INDICATED IN THE DRAWINGS OR SPECIFICATIONS OR IDENTIFIED IN THE CONTRACT DOCUMENTS TO BE INCLUDED WITHIN THE SCOPE OF THE WORK, AND (II) WAS NOT CREATED BY CMAR OR BY ANYONE FOR WHOM CMAR IS RESPONSIBLE. NOTHING IN THIS PARAGRAPH 4.06.G SHALL OBLIGATE OWNER TO INDEMNIFY ANY INDIVIDUAL OR ENTITY FROM AND AGAINST THE CONSEQUENCES OF THAT INDIVIDUAL'S OR ENTITY'S OWN NEGLIGENCE.**~~

- H. ~~To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CMAR SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO A HAZARDOUS ENVIRONMENTAL CONDITION CREATED BY CMAR OR BY ANYONE FOR WHOM CMAR IS RESPONSIBLE. NOTHING IN THIS PARAGRAPH 4.06.H SHALL OBLIGATE CMAR TO INDEMNIFY ANY INDIVIDUAL OR ENTITY FROM AND AGAINST THE CONSEQUENCES OF THAT INDIVIDUAL'S OR ENTITY'S OWN NEGLIGENCE.**~~
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

## ARTICLE 5 – BONDS AND INSURANCE

### 5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02. Failure of the CMAR to provide a satisfactory replacement bond may be considered an event of default under Article 15, Paragraph 15.02.
- D. CMAR or surety on behalf of CMAR shall promptly notify the Owner of all claims filed against the Payment Bond. When a claimant has satisfied the conditions prescribed by Texas Government Code 2253, the CMAR or surety on behalf of CMAR shall, with reasonable promptness, notify the claimant and Owner of the amounts that are undisputed and the basis for challenging any amounts that are disputed, including, but not limited to, the lack of substantiating documentation to support the claim as to entitlement or amount, and the CMAR or surety on behalf of CMAR shall, with reasonable promptness, pay or make arrangements for payment of any undisputed amount; provided, however, that the failure of the CMAR or surety on behalf of CMAR to timely discharge its obligations under this paragraph or to dispute or identify any specific defense to all or any part of a claim shall not be deemed to be an admission of liability by the CMAR or surety as to such claim or otherwise constitute a waiver of the CMAR's or surety's defenses to, or right to dispute, such claim.
- E. Owner shall not be liable for payment of any costs or expenses of any claimant under Payment Bonds, and shall have no obligations to make payments to, give notices on behalf of, or otherwise have obligations to claimants under Payment Bonds.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.
- B. Sureties providing performance, payment and other bonds shall have an A.M. Best Company Rating of A-VIII or better. Insurance companies providing insurance required by Contract Documents shall have an A.M. Best Company Rating of A-VIII or better.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain in accordance with Paragraph 5.04.
- ~~B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.~~
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
  - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
  - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
  4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
    - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
    - b. by any other person for any other reason;
  5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
  6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
  2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
  3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
  4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
  5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
  6. include completed operations coverage:
    - a. Such insurance shall remain in effect for two years after final payment.
    - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence



satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

- C. Worker's Compensation and Employer's Liability Insurance required by Paragraph 5.04.A.1 and 5.04.A.2 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

<u>Workers' Compensation, etc.,</u>	
1) State:	Statutory
2) Applicable Federal (e.g., Longshore)	Statutory
<u>Employers' Liability</u>	
1) Bodily Injury by Accident	\$1,000,000 \$500,000
2) Bodily Injury by Disease - Each Employee	\$1,000,000 \$500,000
3) Bodily Injury by Disease - Policy Limit	\$1,000,000 \$500,000
4) Maritime Coverage Endorsement	
<u>Insurance shall include a waiver of subrogation in favor of the Additional Insured identified in Paragraph 5.04.B.1.</u>	



- D. CMAR's Liability Insurance required by Paragraph 5.04.A.3, through 5.04.A.5 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

<u>Insurance for Claims of Damages</u>	
1) General Aggregate (Except Products - Completed Operations)	\$50,000,000 / Occurrence \$100,000,000 / Aggregate
2) Products - Completed Operations Aggregate	\$50,000,000 / Occurrence \$100,000,000 / Aggregate
3) Personal and Advertising Injury (One Person/Organization)	\$1,000,000
4) Each Occurrence (Bodily Injury and Property Damage)	\$50,000,000
6) Personal Injury Liability coverage will include claims arising out of Employment Practices Liability, limited to coverage provided under standard contract.	1,000,000
7) Property Damage Liability insurance will provide explosion, collapse and underground coverage where applicable	\$100,000,000
8) Watercraft Liability Policy. Coverage shall apply to all self-propelled vessels	\$1,000,000



9) <u>Excess Liability, Umbrella Form to include coverage of Watercraft Liability. General Aggregate - Each Occurrence</u>	<u>\$100,000,000</u>
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<u>Insurance for Claims of Damages</u>	
1) <u>General Aggregate (Except Products - Completed Operations)</u>	<u>\$1,000,000 / Occurrence</u> <u>\$2,000,000 / Aggregate</u>
2) <u>Products - Completed Operations Aggregate</u>	<u>\$1,000,000 / Occurrence</u> <u>\$2,000,000 / Aggregate</u>
3) <u>Personal and Advertising Injury (One Person/Organization)</u>	<u>\$1,000,000</u>
4) <u>Each Occurrence (Bodily Injury and Property Damage)</u>	<u>\$1,000,000</u>
5) <u>Limit per Person – Medical Expenses</u>	<u>\$5,000</u>
6) <u>Personal Injury Liability coverage will include claims arising out of Employment Practices Liability, limited to coverage provided under standard contract.</u>	<u>1,000,000</u>
7) <u>Property Damage Liability insurance will provide explosion, collapse and underground coverage where applicable</u>	<u>\$1,000,000</u>
8) <u>Watercraft Liability Policy. Coverage shall apply to all self-propelled vessels</u>	<u>\$1,000,000</u>
9) <u>Excess Liability, Umbrella Form to include coverage of Watercraft Liability. General Aggregate - Each Occurrence</u>	<u>\$1,000,000</u>

CMAR's Liability Insurance shall also include completed operations and product liability coverage, and eliminate the exclusion with respect to property under the care, custody and control of CMAR. In lieu of elimination of the exclusion, CMAR may provide and maintain Installation Floater insurance for property under the care, custody, or control of CMAR. The Installation Floater insurance shall be a broad form or "All Peril" policy providing coverage for all materials, supplies, machinery, fixture, and equipment which will be incorporated into the Work. Coverage under the CMARs Installation Floater will include:

- faulty or defective workmanship, materials, maintenance or construction,
- cost to remove defective or damaged Work from the Site or to protect it from loss or damage,
- cost to cleanup and remove pollutants,
- coverage for testing and startup,
- any loss to property while in transit,
- any loss at the Site,

- any loss while in storage, both on-Site and off-Site, and
- any loss to temporary Work if the value is included in the Contract Price.

Coverage cannot be contingent on an external cause or risk or limited to property for which the CMAR is legally liable. CMAR's Installation Floater will provide limits of insurance adequate to cover the value of the installation. The CMAR will be solely responsible for any deductible carried under this coverage and claims on materials, supplies, machinery, fixture, and equipment which will be incorporated into the Work while in transit or in storage. This policy will include a waiver of subrogation for those listed as additional insured in these Supplemental Conditions.

E. CMAR's Automobile Liability Insurance required by Paragraph 5.04.A.6 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

<u>Bodily Injury:</u>	
<u>1) Each Person</u>	<u>\$1,000,000</u>
<u>2) Each Accident</u>	<u>\$1,000,000</u>
<u>Property Damage:</u>	
<u>1) Each Accident</u>	<u>\$1,000,000</u>
<u>Or</u>	
<u>2) Combined Single Limit (Bodily Injury and Property Damage)</u>	<u>\$1,000,000</u>

F. Additional insured on all insurance policies in accordance with Paragraph 5.04.B.1 include:

North Texas Municipal Water District  
Freese and Nichols, Inc.  
Cyganiewicz Geotechnical LLC  
Darell Zimbelman (individual peer reviewer)  
Gorronдона and Associates  
Texplor of Dallas, Inc.  
True Grit  
TRI Environmental  
Gehrig, Inc.  
Utah Water Research Laboratory

G. CMAR's Contractual Liability Insurance required by Paragraph 5.04.B.3 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

<u>CMAR's Contractual Liability Insurance</u>	
<u>1) General Aggregate</u>	<u>\$100,000,000</u>
<u>2) Each Occurrence (Bodily Injury and Property Damage)</u>	<u>\$50,000,000</u>





<u>CMAR's Contractual Liability Insurance</u>	
<u>1) General Aggregate</u>	<u>\$1,000,000</u>
<u>2) Each Occurrence (Bodily Injury and Property Damage)</u>	<u>\$1,000,000</u>

5.05 *Owner's Liability Insurance*

A. ~~In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents. In addition to the insurance required to be provided by CMAR under Paragraph 5.04, CMAR shall purchase and maintain for Owner, at no additional cost, Owner's Protective Liability insurance naming Owner as the named insured with insurance that will protect said parties against claims which may arise from operations under the Contract Documents. This coverage shall be from the same company that provides CMAR's liability insurance coverage, and in the same minimum amounts. The Engineer and Engineer's consultants are additional insured as their interest may appear including their officers, directors, agents and employees.~~

5.06 *Property Insurance*

A. ~~Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall: CMAR shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to deductible amounts as may be provided by the Supplementary Conditions or required by Laws and regulations). The policies of insurance required to be purchased and maintained by CMAR in accordance with this Paragraph 5.06 shall comply with requirements of Paragraph 5.08. This insurance shall:~~

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location and in transit for incorporation in the Work from such storage locations that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
  5. allow for partial utilization of the Work by Owner;
  6. include testing and startup; and
  7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. ~~Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee. CMAR shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of those listed as an insured or listed as an additional insured in Paragraph 5.04.B.1.~~
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- ~~D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.~~
- ~~E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.~~

#### 5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such

policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

~~B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:~~

~~1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and~~

~~2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.~~

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

#### ~~5.08 Receipt and Application of Insurance Proceeds~~

~~A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.~~

~~B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such~~

~~agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.~~

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

5.11 *Owner's Insurance for Project*

- A. Owner shall not be responsible for purchasing and maintaining any insurance to protect the interest of the CMAR, Subcontractors, Engineers, or others in the Work. The stated limits of insurance required are minimum only. CMAR shall determine the limits that are adequate. These limits may be basic policy limits or any combination of basic limits and umbrella limits. In any event, CMAR is fully responsible for all losses arising out of, resulting from or connected with operations under this Contract whether or not said losses are covered by insurance. The acceptance of certificates or other evidence of insurance by the Owner, Engineer, and/or others listed as additional insured in Paragraph 5.04.B.1 that in any respect do not comply with the Contract requirements does not release the CMAR from compliance herewith.

## ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means,

methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents and properly executed by the CMAR.

- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

#### 6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, no Work shall be performed at the Site between 6:00 p.m. and 7:00 a.m. CMAR will not permit the performance of Work on a Saturday, Sunday, or any District holiday without Owner's written consent. Work performed on the Site between 6:00 p.m. and 7:00 a.m. and Work performed Saturday, Sunday or any District holiday will be allowed only with the Owner's written consent, which shall not be unreasonably withheld. Should CMAR desire to Work on these days, he shall contact the Owner, in writing, for approval at least 48 hours in advance. Emergency Work may be done without prior permission. Tie-ins and connections to existing facilities will be made at time authorized by the Owner.



#### 6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.



#### 6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
  2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

#### 6.05 *Substitutes and "Or-Equals"*

- A. ~~Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below. Where equipment and products are specified by name, no substitutes or "or-equal" will be considered or approved unless the term "or-equal" is included in the individual Specification. If substitutes or "or equals" are specifically permitted for consideration by the individual Specifications, they must be submitted and will be reviewed and evaluated in accordance with the provisions established in Paragraph 6.05 and in the General Requirements of the Specifications.~~
1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
    - a. in the exercise of reasonable judgment Engineer determines that:
      - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
      - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
      - 3) it has a proven record of performance and availability of responsive service.
    - b. Contractor certifies that, if approved and incorporated into the Work:

- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
- 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
  - 1) shall certify that the proposed substitute item will:
    - a) perform adequately the functions and achieve the results called for by the general design,
    - b) be similar in substance to that specified, and
    - c) be suited to the same use as that specified;
  - 2) will state:
    - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
    - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
    - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
  - 3) will identify:
    - a) all variations of the proposed substitute item from that specified, and

b) available engineering, sales, maintenance, repair, and replacement services; and

4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. ~~No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal."~~ "No "or-equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order or Field Order. Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute or "or-equal" proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute or "or-equal" so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute or "or-equal". Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute or "or-equal".

F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

#### 6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the ~~Supplementary Conditions~~ Contract Documents require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for

acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the ~~Supplementary Conditions~~ Contract Documents, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
  2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers

on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

- H. Owner or Engineer may furnish to any such Subcontractor, Supplier, or other person or organization, to the extent practicable, information about amounts paid to CMAR in accordance with CMAR's Application for Payment on account of the particular Subcontractor's, Supplier's, other person's or other organization's Work.

#### 6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. ~~To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.~~ **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, OWNER SHALL INDEMNIFY AND HOLD HARMLESS CMAR, AND ITS OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS, AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY INFRINGEMENT OF PATENT RIGHTS OR COPYRIGHTS INCIDENT TO THE USE IN THE PERFORMANCE OF THE WORK OR RESULTING FROM THE INCORPORATION IN THE WORK OF ANY INVENTION, DESIGN, PROCESS, PRODUCT, OR DEVICE SPECIFIED IN THE CONTRACT DOCUMENTS, BUT NOT IDENTIFIED AS BEING SUBJECT TO PAYMENT OF ANY LICENSE FEE OR ROYALTY TO OTHERS REQUIRED BY PATENT RIGHTS OR COPYRIGHTS.**
- C. ~~To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.~~ **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CMAR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND**

ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY INFRINGEMENT OF PATENT RIGHTS OR COPYRIGHTS INCIDENT TO THE USE IN THE PERFORMANCE OF THE WORK OR RESULTING FROM THE INCORPORATION IN THE WORK OF ANY INVENTION, DESIGN, PROCESS, PRODUCT, OR DEVICE NOT SPECIFIED IN THE CONTRACT DOCUMENTS.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. ~~If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.~~ If CMAR performs any Work that it is contrary to Laws or Regulations, CMAR shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.
- D. All Bidders are required to complete and submit with their Bid the Vendor Compliance to State Law form, which follows the Proposal.
- E. Workers Compensation Statement for Building or Construction Projects for Government entities in Texas. Definitions included in 6.09.E pertain only to 6.09.E and are included verbatim as a statutory requirement of the State of Texas.

1. Definitions:

Certificate of coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project for the duration of the project.

Duration of the Project - includes the time from the beginning of the Work on the project until the CMAR's/person's Work on the project has been completed and accepted by the governmental entity.

Persons providing services on the Project ("Subcontractor" in 406.096) - includes all persons or entities performing all or part of the services the CMAR has undertaken to perform on the project, regardless of whether that person contracted directly with the CMAR and regardless of whether that person has employees. This includes, without limitation, independent CMARs, Subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

2. The CMAR shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the CMAR providing services on the Project, for the duration of the Project.
3. The CMAR must provide a certificate of coverage to the governmental entity prior to being awarded the Contract.
4. If the coverage period shown on the CMAR's current certificate of coverage ends during the duration of the Project, the CMAR must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.
5. The CMAR shall obtain from each person providing services on a project, and provide to the governmental entity:
  - a. a certificate of coverage, prior to that person beginning Work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and
  - b. no later than 7 days after receipt by the CMAR, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.
6. The CMAR shall retain all required certificates of coverage for the duration of the Project and for 1 year thereafter.

7. The CMAR shall notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the CMAR knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.
8. The CMAR shall post on each project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.
9. The CMAR shall contractually require each person with whom it contracts to provide services on a project, to:
  - a. provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the project, for the duration of the project;
  - b. provide to the CMAR, prior to that person beginning Work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;
  - c. provide the CMAR, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
  - d. obtain from each other person with whom it contracts, and provide to the CMAR:
    - 1) a certificate of coverage, prior to the other person beginning Work on the project; and
    - 2) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
  - e. retain all required certificates of coverage on file for the duration of the project and for 1 year thereafter;
  - f. notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and
  - g. contractually require each person with whom it contracts, to perform as required by Paragraphs (1) - (7), with the certificates of coverage to be provided to the person for whom they are providing services.
10. By signing this Contract or providing or causing to be provided a certificate of coverage, the CMAR is representing to the governmental entity that all employees of the CMAR who will provide services on the Project will be covered by workers' compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate



insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the CMAR to administrative penalties, criminal penalties, civil penalties, or other civil actions.

11. The CMAR's failure to comply with any of these provisions is a breach of Contract by the CMAR which entitles the governmental entity to declare the Contract void if the CMAR does not remedy the breach within 10 days after receipt of notice of breach from the governmental entity.

#### 6.10 Taxes

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work. The Owner qualifies as an exempt agency as defined by the statutes of the State of Texas. The CMAR shall comply with all statutes and rulings of the State Comptroller.

#### 6.11 Use of Site and Other Areas

##### A. Limitation on Use of Site and Other Areas:

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. ~~To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.~~ **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CMAR SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY CLAIM OR ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY SUCH OWNER OR OCCUPANT AGAINST OWNER,**

**ENGINEER, OR ANY OTHER PARTY INDEMNIFIED HEREUNDER TO THE EXTENT CAUSED BY OR  
BASED UPON CMAR'S PERFORMANCE OF THE WORK.**

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
  - 1. all persons on the Site or who may be affected by the Work;
  - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify

owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion). The CMAR's duties and responsibilities for the safety or protection of persons or the Work or property at the Site or adjacent thereto shall be reinstated when any additional efforts are required during the 1 year correction period to correct defects in the Work.

#### 6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

#### 6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

#### 6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. ~~If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work~~

Change Directive or Change Order will be issued. If Engineer determines that the incident giving rise to the emergency action was not the responsibility of the CMAR and that a change in the Contract Documents is required because of the action taken by CMAR in response to such an emergency, a Change Order, Field Order or Work Change Directive will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

- a. Submit number of Samples specified in the Specifications.
- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

- a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
- b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
- c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
- d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
3. ~~With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.~~ With each submittal, CMAR shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents on a Shop Drawing Deviation Request form provided by the Engineer and request that a Field Order or Change Order be issued for each of the specific variations submitted for approval. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. ~~Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.~~ Engineer's review and approval shall not relieve CMAR from responsibility for any variation from the requirements of the Contract Documents unless CMAR has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation issuing a Field Order or Change Order. If the proposed Modification is approved by the Engineer, the submittal will be considered to be in strict compliance with the Contract Documents and it will be reviewed in accordance with the Contract Documents. If the proposed Modification is not approved, the submittal will be returned to the CMAR with appropriate comments. Engineer's review and approval shall not relieve CMAR from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. ~~Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.~~ CMAR shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Re-submittals shall reference and respond directly to Engineer's previous comments. Any variations from strict compliance with the Contract Documents will be identified in the same manner as required in Paragraph 6.17.C.3 and will require the same approvals.
- F. CMAR shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than two submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples, or other items requiring approval and CMAR shall reimburse Owner for Engineer's charges for such time.
- G. In the event that CMAR requests a change of a previously approved item, CMAR shall reimburse Owner for Engineer's charges for its review time unless the need for such change is beyond the control of CMAR.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing. CMAR assumes and bears responsibility for all costs and time delays associated with any variation from the requirements of the Contract Documents.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
  1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
  2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
  1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;
3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
4. use or occupancy of the Work or any part thereof by Owner;
5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
6. any inspection, test, or approval by others; or
7. any correction of defective Work by Owner.



D. ~~The duration of the warranty shall be for one year from the date of final completion of the entire Work. Except, as otherwise agreed in writing by the parties, partial occupancy or use of some or all of the Work any part thereof shall not commence the warranty obligations.~~



The duration of the warranty shall be for one year from the date of final completion of the entire Work or any part of the Work as may be agreed to in writing by the parties based on the overall schedule for the Project. Except, as otherwise agreed in writing by the Owner, partial occupancy or use of some or all of the Work or any part thereof shall not commence the warranty obligations.

## 6.20 Indemnification

A. ~~To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable. TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CMAR SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO THE PERFORMANCE OF THE WORK, PROVIDED THAT ANY SUCH CLAIM, COST, LOSS, OR DAMAGE IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE, OR DEATH, OR TO INJURY TO OR DESTRUCTION OF TANGIBLE PROPERTY (OTHER THAN THE WORK ITSELF), INCLUDING THE LOSS OF USE RESULTING THEREFROM BUT ONLY TO THE EXTENT CAUSED BY ANY INTENTIONAL, KNOWING, AND/OR NEGLIGENT ACT OR OMISSION OF CMAR, ANY SUBCONTRACTOR, ANY SUPPLIER, OR ANY INDIVIDUAL OR ENTITY DIRECTLY OR INDIRECTLY~~

**EMPLOYED BY ANY OF THEM TO PERFORM ANY OF THE WORK OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE.**

- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- ~~C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:~~
- ~~1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or~~
  - ~~2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.~~

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's



review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

## **ARTICLE 7 – OTHER WORK AT THE SITE**

### *7.01 Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
  - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
  - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

### *7.02 Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
  - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
  - 2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- ~~B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.~~
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

7.04 *Claims between Contractors*

- A. Should CMAR cause damage to the Work or property of any other contractor at the Site, or should any claim arising out of CMAR's performance of the Work at the Site be made by any other contractor against CMAR, Owner, Engineer, or the construction coordinator, then CMAR (without involving Owner, Engineer, or construction coordinator) shall either (1) remedy the damage, (2) agree to compensate the other contractor for remedy of the damage, or (3) remedy the damage and attempt to settle with such other contractor by agreement, or otherwise resolve the dispute by arbitration or at law.
- B. **CMAR SHALL, TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, DEFEND, INDEMNIFY AND HOLD HARMLESS OWNER, ENGINEER, THE CONSTRUCTION COORDINATOR AND THE OFFICERS, DIRECTORS, PARTNERS, EMPLOYEES, AGENTS AND OTHER CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES AND DAMAGES (INCLUDING, BUT NOT LIMITED TO, FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND COURT AND ARBITRATION COSTS) ARISING DIRECTLY, INDIRECTLY OR CONSEQUENTIALLY OUT OF ANY ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY OTHER CONTRACTOR AGAINST OWNER, ENGINEER, CONSULTANTS, OR THE CONSTRUCTION COORDINATOR TO THE EXTENT SAID CLAIM IS BASED ON OR ARISES OUT OF CMAR'S PERFORMANCE OF THE WORK. SHOULD ANOTHER CONTRACTOR CAUSE DAMAGE TO THE WORK OR PROPERTY OF CMAR OR SHOULD THE PERFORMANCE OF WORK BY ANY OTHER CONTRACTOR AT THE SITE GIVE RISE TO ANY OTHER CLAIM, CMAR SHALL NOT INSTITUTE ANY ACTION, LEGAL OR EQUITABLE, AGAINST OWNER, ENGINEER, OR THE CONSTRUCTION COORDINATOR OR PERMIT ANY ACTION AGAINST ANY OF THEM TO BE MAINTAINED AND CONTINUED IN ITS NAME OR FOR ITS BENEFIT IN ANY COURT OR BEFORE ANY ARBITER WHICH SEEKS TO IMPOSE LIABILITY ON OR TO RECOVER DAMAGES FROM OWNER, ENGINEER, OR THE CONSTRUCTION COORDINATOR ON ACCOUNT OF ANY SUCH DAMAGE OR CLAIM.**
- C. If CMAR is delayed at any time in performing or furnishing the Work by any act or neglect of Owner or another contractor who is not directly or indirectly under the control of CMAR, and Owner and CMAR are unable to agree as to the extent of any adjustment in Contract Times

attributable thereto, CMAR may make a Claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be CMAR's exclusive remedy with respect to Owner, Engineer, and construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor – there shall be no adjustment of the Contract Price allowed. This paragraph does not prevent recovery from Owner, Engineer, or construction coordinator for activities that are their respective responsibilities.

## **ARTICLE 8 – OWNER'S RESPONSIBILITIES**

### **8.01 *Communications to Contractor***

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

### **8.02 *Replacement of Engineer***

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

### **8.03 *Furnish Data***

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

### **8.04 *Pay When Due***

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

### **8.05 *Lands and Easements; Reports and Tests***

- A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

### **8.06 *Insurance***

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

### **8.07 *Change Orders***

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

### **8.08 *Inspections, Tests, and Approvals***

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

**ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION**

9.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct,

control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

### 9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.
- B. The Resident Project Representative (the "RPR") will be Engineer's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealings in matters pertaining to the Work in general shall be with Engineer and CMAR. RPR's dealings with Subcontractors shall be through or with the full knowledge and approval of CMAR. The RPR shall:
1. Schedules: Review the Progress Schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by CMAR and consult with Engineer concerning acceptability.
  2. Conferences and Meetings: Attend meetings with CMAR, such as preconstruction conferences, progress meetings, job conferences and other Project-related meetings, and prepare and circulate copies of minutes thereof.
  3. Liaison:
    - a. Serve as Engineer's liaison with CMAR, working principally through CMAR's authorized representative, assist in providing information regarding the intent of the Contract Documents.
    - b. Assist Engineer in serving as Owner's liaison with CMAR when CMAR's operations affect Owner's on-Site operations.
    - c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
  4. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to CMAR clarifications and interpretations as issued by Engineer.
  5. Shop Drawings and Samples:
    - a. Record date of receipt of Samples and approved Shop Drawings.

- b. Receive Samples which are furnished at the Site by CMAR, and notify Engineer of availability of Samples for examination.
6. Changes Consider and evaluate CMAR's suggestions for changes in Drawings or Specifications and report such suggestions, together with RPR's recommendations, to Engineer. Transmit to CMAR in writing decisions as issued by Engineer.
7. Review of Work and Rejection of Defective Work:
  - a. Conduct on-Site observations of CMAR's Work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
  - b. Report to Engineer whenever RPR believes that any part of CMAR's Work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of Work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
8. Inspections, Tests, and System Startups:
  - a. Verify that tests, equipment, and systems startups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that CMAR maintains adequate records thereof.
  - b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems startups.
9. Records:
  - a. Record names, addresses, fax numbers, e-mail addresses, website locations, and telephone numbers of all, Subcontractors, and major Suppliers of materials and equipment.
  - b. Maintain records for use in preparing Project documentation.
10. Reports:
  - a. Furnish to Engineer periodic reports as required of progress of the Work and of CMAR's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.
  - b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from CMAR.
  - c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition.

11. Payment Requests: Review Applications for Payment with CMAR for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.
12. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, Operation and Maintenance Manuals and other data required by the Specifications to be assembled and furnished by CMAR are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.
13. Completion:
  - a. Participate in a Substantial Completion inspection, assist in the determination of Substantial Completion and the preparation of lists of items to be completed or corrected.
  - b. Participate in a final inspection in the company of Engineer, Owner, and CMAR and prepare a final list of items to be completed and deficiencies to be remedied.
  - c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.

C. The RPR shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
3. Undertake any of the responsibilities of CMAR, Subcontractors, Suppliers, or CMAR's superintendent.
4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of CMAR's Work unless such advice or directions are specifically required by the Contract Documents.
5. Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or CMAR.
6. Participate in specialized field or laboratory tests or inspections conducted off-Site by others except as specifically authorized by Engineer.
7. Accept Shop Drawing or Sample submittals from anyone other than CMAR.
8. Authorize Owner to occupy the Project in whole or in part.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05. The CMAR shall notify the Engineer in writing prior to beginning any Work addressed in a Field Order if the CMAR does not agree that the Work involved represents no additional cost and/or time change in the Contract Documents.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between



Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

**ARTICLE 10 – CHANGES IN THE WORK; CLAIMS**

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
  2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
  3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

- B. CMAR assumes and bears responsibility for all costs and time delays associated with any variation from the requirements of the Contract Documents unless the variation is specifically approved by Change Order.

#### 10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

#### 10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than ~~30~~ 07 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within ~~60~~ 30 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The parties agree and acknowledge that the ability to accurately determine causation, liability, and proper adjustments to the Contract Time and/or Contract Price under these conditions are extremely time sensitive. It is anticipated that a failure by CMAR to provide the aforementioned notice(s) and / or supporting documents within the prescribed deadlines would greatly frustrate if not make impossible the task of accurately analyzing the Claim. As such, CMAR hereby agrees and any failure by CMAR to provide the aforementioned notice(s) and / or supporting documents within the prescribed deadlines shall constitute an unequivocal waiver of said Claim, if any. The opposing party shall submit any response to Engineer and the claimant within ~~30~~ 07 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
  2. approve the Claim; or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
  - E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
  - F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

## ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

### 11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, ~~shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items~~ those paid for the Work included in the Contract Price, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B. CMAR shall provide certified payroll records listing personnel classifications and salaries for all individuals involved in additional Work. Salaries for those not included in the certified payroll will be considered as being compensated under Paragraph 11.01.B, and shall include only the following items:
  1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, ~~without limitation, superintendents, foremen~~ one foreman (unless agreed upon prior to beginning Work), and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, ~~shall be included in the above~~ not exceed 1.5 times regular pay and shall be included in the above to the extent authorized by Owner.
  2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with

Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
  - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
  - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
  - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
  - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
  - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
  - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the ~~negligence~~ acts or omissions of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made

with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, superintendents, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form and at intervals acceptable to Engineer an itemized cost breakdown together with supporting data.

## 11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:*
1. Contractor agrees that:
    - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
    - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance:*
1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

## 11.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- ~~D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:~~
- ~~1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and~~
  - ~~2. there is no corresponding adjustment with respect to any other item of Work; and~~

3. ~~Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.~~

D. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

1. If the total cost of a particular item of Unit Price Work amounts to 20 percent or more of the total Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by the CMAR differs by more than 20 percent from the estimated quantity of such item indicated in the Agreement; and
2. if there is no corresponding adjustment with respect to any other item of Work; and
3. if CMAR believes that CMAR has incurred additional expense as a result thereof; or if Owner believes that the quantity variation entitles Owner to an adjustment in the Unit Price, either the Owner or CMAR may make a claim for an adjustment in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the effect of any such variation in the quantity of the Unit Price Work performed.

## **ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES**

### *12.01 Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
  1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
  3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:
  1. a mutually acceptable fixed fee; or
  2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:



- a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
- b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
- c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
- d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

#### 12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

#### 12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God. No time extensions will be allowed for weather conditions for Projects using Calendar Days for the Contract Time. The CMAR agrees to make no Claims for an adjustment in the Contract Price for damage due to delay in the performance of the Contract occasioned by any act or omission to act of the Owner, Engineer, or any of the Engineer's or Owner's agents and/or contractors, and agrees that any such claim shall be fully compensated by an extension of the Contract Time, as set forth in a Change Order, to complete performance of the Work as provided herein.
- B. ~~If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or~~

~~interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.~~

- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C. The CMAR agrees to make no Claims for an adjustment in the Contract Price for damage due to delay in the performance of the Work occasioned by fire, flood, epidemic, abnormal weather conditions, acts of God, or other causes not the fault of and beyond control of Owner and Contractor, and agrees that any such claim shall be fully compensated by an extension of the Contract Time, as set forth in a Change Order, to complete performance of the Work as provided herein.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

#### 12.04 No Damage for Delays

- A. The CMAR agrees to make no Claim for an adjustment in the Contract Price for damage due to delay in the performance of the Contract occasioned by any act or omission to act of the Owner, Engineer, or any of the Engineer's or Owner's agents and/or contractors, and agrees that any such claim shall be fully compensated by an extension of the Contract Time, as set forth in a Change Order, to complete performance of the Work as provided herein..

### **ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

#### 13.01 *Notice of Defects*

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

#### 13.02 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the

Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

### 13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

~~B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:~~

- ~~1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;~~
- ~~2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and~~
- ~~3. as otherwise specifically provided in the Contract Documents.~~

B. CMAR shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents. The CMAR is solely responsible for maintaining that the quality of Work is in accordance with the Contract Documents. The CMAR shall be responsible for the notification and scheduling required assuring that a certified technician from the testing laboratory is present during all sampling and testing procedures required in the Contract Documents. The CMAR shall not proceed with Work requiring such testing without the presence of the laboratory's certified technician. The Owner, at his option, may perform additional tests as quality monitoring. Quality monitoring activities of the Owner and Engineer, or failure on the part of the Owner or Engineer to perform tests on Work, in no way relieves the CMAR of the obligation to perform Work and furnish materials conforming to the Contract Documents.

#### 1. CMAR's Responsibilities

a. Control the quality of Work produced and verify that the Work performed meets the standards of quality established in the Contract Documents.

1. Inspect and verify conformance of all materials furnished and Work performed, whether by the CMAR, its Subcontractors or its Suppliers.
2. Provide and pay for the services of a testing laboratory approved by Owner to insure that products proposed for use fully comply with the Contract Documents.
3. Perform tests as indicated in this and other sections of the Specifications. Schedule the time and sequence of testing with the Owner and Engineer. Testing is to be observed by the Owner, Engineer, or designated representative.
4. Promptly replace any defective materials and/or Work incorporating defective materials or workmanship.

5. Provide Certified Test Reports as required by the “Submittal Procedures” Section. Reports are to indicate that materials and construction are in compliance with the Contract Documents.
6. Assist the Engineer, Owner, and Owner’s testing organization to perform quality monitoring activities.

2. Quality Monitoring Activities by the Owner

- a. Quality Monitoring activities of the Owner and Engineer through their own forces or through contracts with materials testing laboratories and survey crews are for the Owner’s use in monitoring the results of the CMAR’s Work and quality control activities, if deemed necessary by the Owner and Engineer. The Quality Monitoring activities of the Owner do not relieve the CMAR of its responsibility to provide testing in accordance with the requirements of the Contract Documents or to provide materials and Work complying with the Contract Documents.

3. Submittals

- a. Submittals shall be accordance with the “Submittal Procedures” Section, and shall include:
  1. The name of the proposed primary and secondary testing laboratories along with documentation of qualifications, a list of tests that can be performed, and a list of the certified laboratory technicians and the licensed engineers who will be performing the sampling and testing for the Work along with their certifications and licenses.
  2. Test reports per Paragraph 7 “Test Reports” of this Supplementary Condition.

4. Standards

- a. Provide a testing laboratory that complies with the ASTM (American Society of Testing Materials) and/or ACIL (American Council of Independent Laboratories) “Recommended Requirements for Independent Laboratory Qualifications”, or other specified testing organizations.
- b. Perform tests listed in the Specifications.

5. Delivery and Storage

- a. Handle and protect test specimens of products and construction materials at the construction Site in accordance with ASTM or other applicable testing procedures.

6. Verification Testing

- a. Provide verification testing when tests performed by the Owner indicate that materials or the results of construction activities are not in conformance with Contract Documents.
- b. Verification testing is to be provided at the CMAR’s expense to verify products or Work are in compliance after corrections have been made.
- c. Tests must comply with recognized methods or with methods recommended by the Owner’s testing laboratory and approved by the Engineer.

7. Test Reports

A. Test reports are to be prepared for all tests.

1. Tests performed by testing laboratories may be submitted on their standard test report forms. These reports must include the following:
  - a. Name of the Owner, Project title and number, equipment installer and general CMAR.
  - b. Name of the laboratory, address, and telephone number.
  - c. Name and signature of the certified laboratory personnel performing the sampling and testing.
  - d. Date and time of sampling, inspection, and testing.
  - e. Date the report was issued.
  - f. Description of the test performed.
  - g. Weather conditions and temperature at time of test or sampling.
  - h. Location at the Site or structure where the test was taken.
  - i. Standard or test procedure used in making the test.
  - j. A description of the results of the test.
  - k. Statement of compliance or non-compliance with Contract Documents.
  - l. Interpretations of test results, if appropriate.

B. Distribute copies of the test reports to:

<u>Recipient</u>	<u>No. of Copies</u>
<u>Owner</u>	<u>2 copies</u>
<u>Resident Project Representative</u>	<u>1 copy</u>
<u>Engineer</u>	<u>1 copy</u>
<u>CMAR</u>	<u>1 copy</u>

8. Non-Conforming Work

- A. CMAR shall promptly correct any Work that is not in compliance with the Contract Documents and shall immediately notify the Owner when the corrective Work will be performed.
  - B. Payment for non-conforming Work shall be withheld until such Work is corrected or replaced with Work complying with the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

#### 13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

#### 13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

### 13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

### 13.07 *Correction Period*

- A. When early acceptance of a Substantially Completed portion of the Work is accomplished in the manner indicated, the correction period for that portion of the Work shall commence at the time of Substantial Completion of that Work. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. repair such defective land or areas; or
  - 2. correct such defective Work; or
  - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
  - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and



Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

## ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

### 14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

### 14.02 *Progress Payments*

#### A. *Applications for Payments:*

1. ~~At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.~~ On the first Working Day following the 25th of each month, CMAR shall submit to Owner for review an Application for Payment filled out and signed by CMAR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

#### B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
  - a. the Work has progressed to the point indicated;
  - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
  - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
  - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
  - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
  - a. to supervise, direct, or control the Work, or
  - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
  - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

- e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
    - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
    - b. the Contract Price has been reduced by Change Orders;
    - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
    - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

1. ~~Ten~~ Sixty days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.



D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
  - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
  - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
  - c. there are other items entitling Owner to a set-off against the amount recommended;
  - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A;
  - e. Owner has been notified of failure to make payments to Subcontractors or Suppliers or for labor;
  - f. failure to submit up-to-date record documents as required by GC-6.12,;
  - g. failure to submit monthly Progress Schedule updates or revised schedules as requested by the Owner or Engineer; or

- h. failure to provide Project photographs required by Specifications.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action to Owner's satisfaction.
  3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 ~~and subject to interest as provided in the Agreement.~~
  4. Owner may permanently withhold payment from Contract Price for
    - a. liquidated damages incurred by CMAR, or
    - b. compensation for Engineer for overtime charges of Resident Project Representative, third review of submittals, review of substitutions, re-inspection fees, inspections or designs related to correction of defective Work, or other Services identified as requiring payment by the CMAR. Compensation will be based on the following rates:

Position	Hourly Rate
Principal in Charge	\$275
Project Manager	\$205
Project Engineer	\$165
Construction Manager	\$165
Resident Engineer	\$145
Resident Project Representative	\$125
Senior Resident Representative	\$160
Design Engineer	\$145
Engineering Technician	\$115
Clerk	\$60
Expenses will be billed at the actual cost multiplied by 1.15.	

- c. Costs for tests performed by the Owner to verify that Work previously tested and found to be defective has been corrected. Verification testing is to be provided at the CMAR's expense to verify products or Work are in compliance after corrections have been made.

#### 14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

#### 14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

#### 14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part

of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

#### 14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 14.07 *Final Payment*

##### A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
  - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
  - b. consent of the surety, if any, to final payment;

- c. a list of all Claims against Owner that Contractor believes are unsettled; and
  - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

*B. Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

*C. Payment Becomes Due:*

1. ~~Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor. The first Working Day following the 20th day of the second month following the submittal of the final Application for Payment and accompanying documentation, the amount recommended by the Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to CMAR.~~

*14.08 Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of

the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

#### 14.09 *Waiver of Claims*

~~A. The making and acceptance of final payment will constitute:~~

- ~~1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and~~
- ~~2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.~~

The making and acceptance of final payment will constitute a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

### **ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION**

#### 15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

#### 15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
3. Contractor's repeated disregard of the authority of Engineer; or
4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
5. If CMAR fails to provide the replacement bond required by General Conditions, Section 5.01.C or insurance coverage as required by General Conditions Article 5.



6. If any petition of bankruptcy is filed by or against CMAR, or if CMAR is adjudged as bankrupt or insolvent or makes a general assignment for the benefit of creditors, or if a receiver is appointed for the benefit of CMAR's creditors, or if a receiver is appointed on account of CMAR's insolvency, upon the occurrence of any such event, Owner shall be entitled to request of CMAR or its successor in interest adequate assurance of future performance in accordance with the terms and conditions hereof. Failure to comply with such request within 7 days of delivery of the request shall entitle Owner to terminate this Agreement and to the accompanying rights set forth in Paragraphs 15.02 and 15.03 hereof. In all events pending receipt of adequate assurance of performance and actual performance in accordance therewith, Owner shall be entitled to proceed with the Work with its own forces or with other contractors on a time and material or other appropriate basis. The Cost of Work by Owner or other contractors will be back charged against the Contract Sum hereof.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
  2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
  3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

~~F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.~~

### 15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
  2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
  3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
  4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

### 15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

## ARTICLE 16 – DISPUTE RESOLUTION

### 16.01 *Methods and Procedures*

- ~~A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.~~
- ~~B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.~~
- ~~C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:~~
- ~~1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or~~
  - ~~2. agrees with the other party to submit the Claim to another dispute resolution process; or~~
  - ~~3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.~~
- A. Owner and CMAR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Law.

## ARTICLE 17 – MISCELLANEOUS

### 17.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
  2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

### 17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

- B. All references and conditions for a "Calendar Day Contract" in the General Conditions shall apply for a "Fixed Date Contract." A "Fixed Date Contract" is one in which the calendar dates for reaching Substantial Completion and/or final completion are specified in lieu of identifying the actual Calendar Days involved.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the ~~state in which the Project is located~~ State of Texas.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

17.07 *Assignment*

This Contract may not be assigned in whole or in part by the CMAR without the prior written consent of the Owner.

## **ADDENDA**

**ADDENDUM NO. 1**  
**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**CONSTRUCTION MANAGER AT RISK LOWER BOIS D'ARC CREEK**  
**RESERVOIR DAM AND INTAKE PROJECT**

**PROJECT NO. 344**

**NTD13565**

**JANUARY 27, 2015**

**PROPOSAL DATE: FEBRUARY 18, 2015**

*The following additions, deletions, modifications, or clarifications shall be made to the appropriate sections of the plans and specifications and shall become a part of the Contract Documents. Proposers shall acknowledge receipt of this Addendum in the space provided on the Proposal Form.*

**BIDDING REQUIREMENTS:**

1. Cover Page(s): Delete, "366" and replace with "344".
2. Delete in its entirety 00 11 19 REQUEST FOR PROPOSALS and replace with 00 11 19 REQUEST FOR PROPOSALS PROJ 344 Addendum1. Please note- the completion dates for the work described in 1.01 B have been revised and in paragraph 1.03, the impoundment clearing information, "Reservoir Clearing D additional contours" has been replaced. The new information can be found on the website. Other revisions consisted of minor revisions only.
3. 01 01 01 CONSTRUCTION MANAGER AT RISK SERVICES
  - a. 1.01 A: Add the following at the end of the sentence " ,including but not limited to the balance of this document"
  - b. 1.01: Add the following: "M. It is anticipated that all the preconstruction and procurement services for the work described in 00 11 19 1.01 A will be provided in the time period of 2015".
  - c. 1.05 A: Delete in its entirety and replace with the following: "The pre-construction services for the work described in 00 11 19 1.01 B will commence at an earlier design complete date and will include the additional Services described immediately below in paragraphs B and C. It is anticipated that all the preconstruction and procurement services for the work described in 00 11 19 1.01 B for the clearing will be in 2015 and for the TSR it will be the 3Q and 4Q 2017 and 1Q 2018."

- d. 3.06 B: Delete the following phrase in the first sentence, "option described in the Agreement Section 9.02A 3.06.A is selected" and replace it with, " GMP exceeds the Owner's Budget"
  - e. 3.06 C: Delete the following phrase in the first sentence, "if the option described in the Agreement Section 9.02B is selected" and replace it with, "and". Delete the following in the second sentence, "Determine" and replace with "determine".
  - f. 3.06 D: Delete the following in the first sentence, "Assist" and replace with "assist". Delete the following phrase from the first sentence, "if the option described in the Agreement Section 9.02C is selected". Include the following phrase at the beginning of the first sentence, "If the GMP exceeds the Owner's Budget,".
- 4. Incorporation of 00 52 23 CONSTRUCTION MANAGEMENT AT RISK SERVICES AGREEMENT in its entirety.
  - 5. Incorporation of 00 72 00 STANDARD GENERAL CONDITIONS in its entirety.
  - 6. 00 45 16 STATEMENT OF QUALIFICATIONS
    - a. Paragraph 2.02 C: Delete "five (5)" and replace with "ten (10)".
    - b. Proposal Form 9: Delete "Five (5)" and replace with "Ten (10)".



FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
ENGINEERING FIRM  
F-2144

**END OF ADDENDUM NO. 1**

## 00 11 19 REQUEST FOR PROPOSALS

### ARTICLE 1: GENERAL NOTICE

1.01 The North Texas Municipal Water District ("Owner") extends this Request For Proposals ("RFP") to solicit a response ("Proposal") from any interested party ("Proposer") for Construction Manager at Risk (CMAR) Services ("Services") for the construction of:

A. Lower Bois d' Arc Creek Reservoir Dam and Intake Project ("Project"), North Texas Municipal Water District Project No. 344. The Project consists of:

1. A zoned earthen embankment approximately 2 miles long and 90 feet tall at its highest point and containing approximately 4.7 million cubic yards, and
2. Approximately 420,000 square feet of a soil bentonite slurry trench cutoff for the foundation, and
3. Uncontrolled three cycle labyrinth service spillway that is estimated to contain about 14,000 cubic yards of reinforced concrete and 16,000 cubic yards of roller compacted concrete, and
4. Approximately 200,000 cubic yards of soil cement erosion protection for the dam and spillway, and
5. Reinforced concrete water supply intake tower, approximately 100 feet tall, with two 78- inch conduits through the dam that will feed the water supply pump station located on the downstream side of the dam. The pump station is not part of the scope for this Project, and
6. Lake Bonham Dam improvements including expansion of the pilot channel in the emergency spillway and addition of a toe berm with erosion protection and modifications to the internal toe drain system, and
7. Leonard Dam modifications including expansion of the emergency spillway and raising the embankment.

The Owner's budget for the Project is \$ 98 Million. The Project is to be complete and in operation on or before December 31, 2018. Additional information related to this work can be found on the website cited in Article 2 of 00 11 19. Documents include: "30% LBCR Intake Submittal (12-3-2014)" and "2015-01-05 - PDR cover – Final".

B. The scope of work also includes a terminal storage reservoir (TSR) and impoundment area clearing

1. An earthen embankment with a soil-cement floor and slope lining with a volume of approximately 210 million gallons with a top of embankment footprint of approximately 1,500' x 1,300'. The top of the embankment is currently anticipated to be at elevation 738' AMSL (approximate height 30 feet) and the floor of the reservoir at 710' AMSL, with a total length of approximately 5,700 LF. Project will include two 102-inch conduits to connect the TSR to the Leonard Water Treatment Plant (WTP), and
2. Morning-glory type spillway structure with an approximately one-mile-long drop inlet overflow discharge pipe to discharge overflows back to the Red River basin, and



3. Approximate maximum of 3,200 acres of timber clearing in an area outside the footprint of the dam but within the impoundment area.

The Owner’s budget for the terminal storage reservoir and impoundment area clearing is \$40<sup>[SL1]</sup> Million. The impoundment area clearing is to be complete by July 2, 2018 and the terminal storage reservoir is to be complete by December 31, 2019.

- 1.02 Services required consist of preconstruction, procurement and construction services as described in the RFP. Selection of the CMAR will be made using a one-step procurement and selection process. The evaluation criteria, weighting points and scoring methodology are further described in the Instructions For Proposers. The Owner intends to enter into a CMAR Agreement (“Agreement”) a copy of which is included in this RFP for the work described in 1.01 A and B above. For work described in 1.01 A, preliminary design documents have been completed, including a geotechnical data report, preliminary design report and preliminary design drawings. The 60% design drawings are scheduled to be complete by March 31, 2015.
- 1.03 For the work described in 1.01 B. above, for the Terminal Storage Reservoir (TSR) it is anticipated that a significant amount of imported fill will be required due to the existing site’s elevations. This will be the first cell of a two-cell system. The second cell is a future project and not included in the scope of this Project. The TSR site is immediately adjacent to the NTMWD’s proposed Leonard WTP site and is located at the southwest corner of US 69 and County Road 4965 just west of Leonard, Texas. The TSR will receive water from the Lower Bois d’ Arc Reservoir. It is anticipated that design initiation will be August 2017. As for the impoundment area clearing the exact acreage to be cleared is not known at this time due primarily to the level of interest from the local community to harvest the timber. The current schedule contemplates design initiation in August 2015. Additional information related to this work can be found on the website. Documents include: “NTD11388- BALANCING RESERVOIR\_HALF (Sheet BR-2 & BR-9)”, “Lower Bois d’ Arc Creek Reservoir Clearing Plan” and “TSR - Location 1”. The Terminal Storage Reservoir will be similar to what is described on sheets BR-2 and BR-9.
- 1.04 Services required consist of preconstruction, procurement and construction services as described in the Contract Documents. Selection of the CMAR will be made using a one-step process. The selection criteria include the following:

Evaluation Criteria	Weight
Financial Information, Ability to Provide Bonds and Insurance, Compliant Proposal Transmittal Form	Pass/Fail
Proposer Qualifications, Experience and Past Performance	15
Organization, CMAR, CMAR Team, CMAR Team Members and Key Personnel	20
On Time and On Budget Past Performance	5
Project Approach	25
Safety Program and Safety Performance	5

Cost Proposal	30
Total	100

- 1.05 The criteria are further defined in Section 0045 16 "Statement of Qualifications".
- 1.06 The procurement and the provision of services will be in accordance with Texas Government Code Chapter 2269 and this RFP. Performance and Payment Bonds will be required before construction of the Project begins. Proposal security in the form of a Bid Bond is required until Performance and Payment bonds are provided.

**ARTICLE 2: EXAMINATION AND PURCHASE OF DOCUMENTS**

- 2.01 Advertisement and proposal information for the Project can be found at the following website: <http://construction.freese.com>
- 2.02 The RFP may be downloaded or viewed free of charge at this website. It is the downloader's responsibility to determine that a complete set of documents, as defined in the Instructions for Proposers and the Agreement are received. Printed copies of the RFP may be purchased at the website for the cost of printing. The cost for printed RFP is not refundable.
- 2.03 This website will be updated periodically with Addenda, procurement and RFP information, additional reports or other information relevant to the procurement of the Project. Proposers are encouraged to routinely monitor the web site.

**ARTICLE 3: MANDATORY PRE-PROPOSAL CONFERENCE**

- 3.01 A mandatory pre-proposal conference and tour will be held in Fannin County at the Council Chambers in Bonham City Hall, 514 Chestnut Street, Bonham, TX on January 22, 2015 beginning at 9:00 am. After the meeting a site tour will be conducted. Attendance at this conference is required to submit a Proposal.

**ARTICLE 4: DELIVERY OF PROPOSALS**

- 4.01 Deliver Proposals to the address shown below no later than 11:00 am on February 18, 2015 at the NTMWD Office's at 505 Brown Street, Wylie Texas 75098 for the Proposal to be accepted. In accordance with Texas law, the names of Proposers submitting a Proposal and the fees and costs stated in each Proposal will be read aloud at this time and place. There will be no further discussion of the Proposals or the procurement process and no questions or comments will be received at this time and place. Proposals received after this time will be returned unopened. Address Proposals to:

President and Board of Directors  
 North Texas Municipal Water District  
 505 E. Brown Street  
 Wylie, Texas 75098

- 4.02 Proposals will be evaluated, scored and ranked as set forth in this RFP. Proposals will include a Statement of Qualifications and a Cost Proposal and any other information required by the Owner to assist in selecting the Proposer offering the Owner the best value Proposal for the Project based on the published selection criteria and its ranking evaluation. The Owner may invite any or all Proposers to participate in an interview with the Owner to present information on their qualifications, approach and introduce their Key Personnel. The Owner may also invite any or all Proposers to confidential meetings to discuss the Proposer's Proposal. Proposals may not be withdrawn within 90 days from the date on which Proposals are submitted.

**Procurement Schedule**

<b>Activity</b>	<b>Date (2015)</b>
Issue RFP	January 14
Proposal Preparation Period	January 14 – February 18
Deadline for submission of questions	February 9
Submission of Proposals	February 18
Review and evaluation of proposals	February 19 – March 2
Interviews	March 4
Final Review and evaluation of proposals	March 5 – March 10
Selection Notification of highest ranked Proposer	March 18
Board Approval	March 26
Agreement execution	March 30
Notice to Proceed	March 31

- 4.03 The Owner assumes no obligations, responsibilities and liabilities, fiscal or otherwise, to reimburse all or part of the costs incurred or alleged to have been incurred by parties considering a response to and/or responding to this RFP. All such costs shall be borne solely by each Proposer.

**ARTICLE 5: AWARD OF AGREEMENT**

- 5.01 It is the intent of the Owner to award the Agreement to the Proposer who provides the best value Proposal for the Project based on the published selection criteria and its ranking evaluation. The Owner will attempt to negotiate an agreement with the selected Proposer. If the Owner is unable to negotiate a satisfactory agreement with the selected Proposer, the Owner will, formally and in writing, end negotiations with that Proposer and proceed to negotiate with the next Proposer in the order of the selection ranking until an agreement is reached or negotiations with all ranked Proposers end.

**ARTICLE 6: POINT OF CONTACT FOR QUESTIONS REGARDING PROCUREMENT PROCESS AND COMMUNICATION PROTOCOL**

6.01 To ensure fairness during the procurement process, until the Agreement is executed, Proposers and their employees, representatives and agents shall not contact an Owner staff, member of selection committee, Owner Board member, or any other official, employee, representative or consultant (identified immediately below of the Owner involved with this procurement process other than the Point of Contact identified below.

A. Owner Representatives and Consultants

1. Freese and Nichols, Inc.
2. Cyganiewicz Geotechnical LLC
3. Darell Zimbelman (individual peer reviewer)
4. Gorrondona and Associates
5. Texplor of Dallas, Inc.
6. True Grit
7. TRI Environmental
8. Gehrig, Inc.
9. Utah Water Research Laboratory

6.02 Direct questions regarding this RFP and Project are to be submitted in writing and using the process on the website. Modifications to the RFP prior to the award of the Agreement can only be made by Addenda.

Point of Contact:

Douglas Herbst  
Freese and Nichols, Inc.

Website:

<https://construction.freese.com>

6.03 All communications are subject to distribution to all Proposers except that Owner will endeavor to prevent disclosure to other Proposers' information unique to a particular Proposer or otherwise identified as proprietary or confidential by a Proposer. The Owner will share with all Proposers all Addenda to this RFP including any revisions based on its review of Proposer comment and questions concerning this RFP. The Owner disclaims the accuracy of information derived from any source other than the Point of Contact identified above, and the use of any such information is at the sole risk of the Proposer. Only answers and responses issued by formal Addenda shall be final and binding upon the Owner. Oral and other interpretations shall be without legal effect and Proposer shall not rely on such oral and other interpretations.

NORTH TEXAS MUNICIPAL WATER DISTRICT

By s/ Darwin Whiteside  
Darwin Whiteside, President

**END OF SECTION**

**DRAFT**  
**Lower Bois d'Arc Creek Reservoir Clearing Plan**

This Reservoir Clearing Plan reflects conditions depicted in the aerial photography flown in 2007. Land uses and vegetation cover types can change based on private landowner timber harvest, agricultural and recreational practices. This Reservoir Clearing Plan is subject to approval by the Section 404 permit, water right permit and Section 401 water quality certification.

**1. OBJECTIVES**

The objectives of the Reservoir Clearing Plan are to:

- Enhance reservoir fish habitat by minimizing the clearing of standing trees and shrubs in selected areas within the reservoir.
- Improve human access to shore locations by creating shore access locations for boat ramps, bank fishing, etc. through selective clearing of trees and shrubs.
- Reduce hazards to boating safety and fishing resulting from large floating debris by minimizing the source of such debris.
- Create aesthetic views of the reservoir along selected segments of the shoreline.

**2. RESERVOIR CLEARING**

The clearing of trees and shrubs from the reservoir area will be performed prior to reservoir filling. Recommended clearing methods and associated activities include areas for hand clearing, areas where hand or machine clearing are suitable, and the creation of access and safe landing sites along the reservoir shoreline.

Consideration will be given to both wood salvage and environmentally sensitive areas that may require specific treatment during clearing operations. Flagging or marking of clearing boundaries and on-site supervision will be required for the successful implementation of all aspects of the reservoir clearing plan.

**2.1 Areas to be Cleared**

Areas to be cleared are shown on Figure 1.

### **2.1.1 Access Sites**

User access to the reservoir area from land and access to land from the reservoir for reasons of recreational enjoyment (including camping, fishing, swimming, or hunting) or emergency purposes will be provided at designated locations (Figure 1). A number of landing sites will be identified along the future reservoir shoreline and these sites will be cleared. Clearing at these sites may require the removal of stumps and other vegetation to ensure safe access/egress to the shoreline. Hand clearing will be considered at landing sites above the high water mark to minimize environmental effects and maximize recreational, aesthetic and cultural opportunities.

### **2.1.2 Consideration of Environmentally Sensitive Sites**

If any environmentally sensitive site is identified, consideration of such sites, based on the nature of the site, will be incorporated into the final Reservoir Clearing Plan.

### **2.1.3 What is to be Cleared**

All standing woody material, which includes dead and living trees and shrubs 5 feet tall or taller and fallen trees 5 feet or more in length with a diameter of 6 inches or greater at its largest point will be cleared and removed.

### **2.1.4 Timing of Clearing Activities**

Reservoir clearing will be undertaken in the two years preceding reservoir impoundment except for areas that will be cleared during construction of the dam and associated facilities.

## **2.2 Methods of Clearing**

### **2.2.1 Mechanical Clearing**

The preferred method of clearing is mechanical clearing by shear-blading during the dry season. Using this method, the cleared material will be deposited in windrows or piles and left to dry. Cleared material will be burned as fire danger conditions allow.

Machine clearing has the advantage of shearing stumps off at ground level, along with all other vegetation that is there. It also accumulates most of the loose and dead woody debris that is on the forest floor. Machine clearing will minimize the amount of woody and organic debris that would remain on site and enter the water following reservoir filling.

All areas designated for mechanical clearing on Figure 1 will be cleared using this method, with the following exceptions:

- Cultural sites, known or discovered to exist, within the areas identified for mechanical clearing will receive different treatment, as appropriate, determined on a case by case basis.
- Selected locations as may be designated by the District for tree salvage (for use as firewood, saw-logs, cabins, etc.) and will be hand cleared using chain saws or other appropriate timber harvesting machinery.

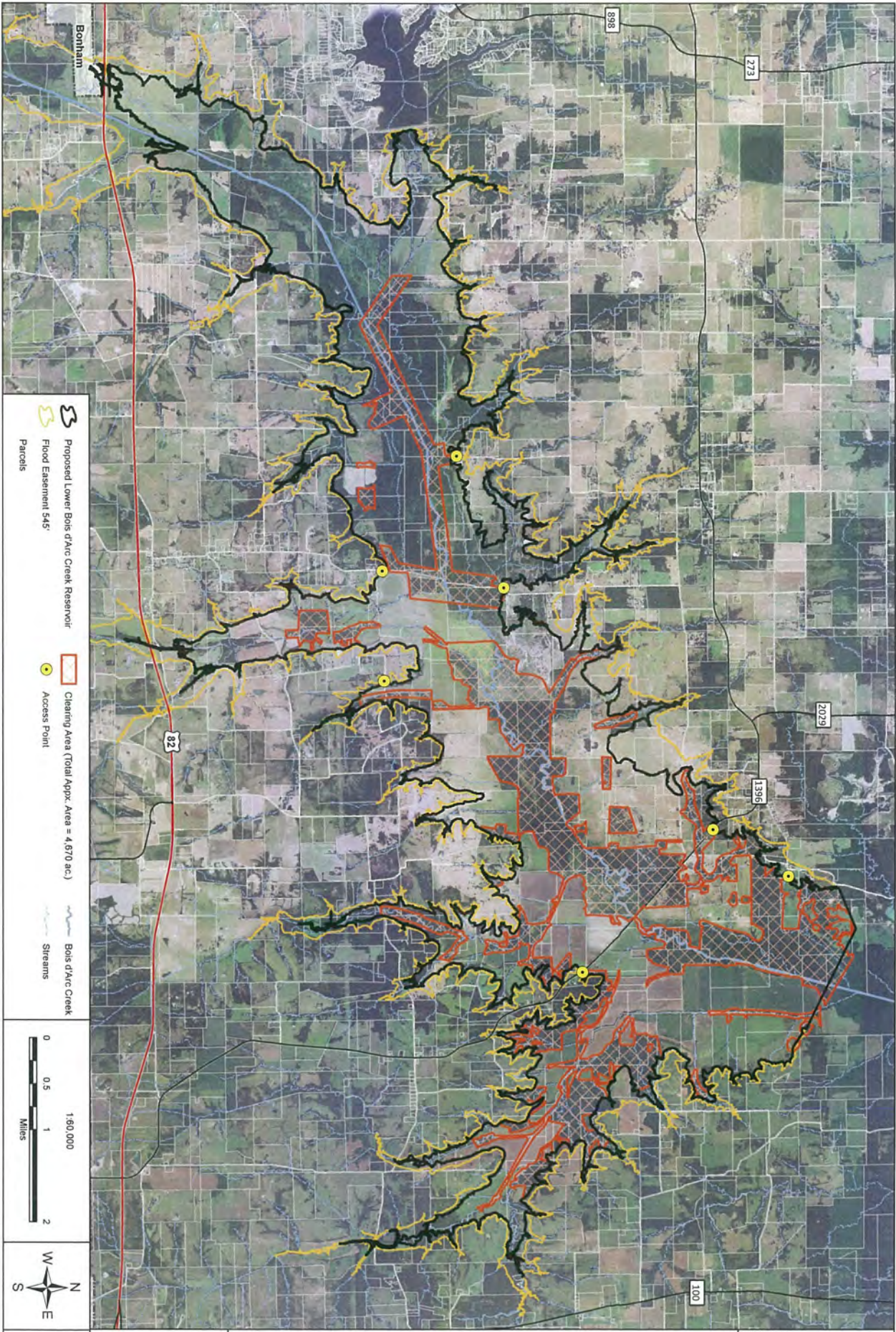
#### **2.2.2 Hand Clearing**

Hand clearing may need to be used where it is not possible to operate mechanical clearing equipment because of site location or conditions.

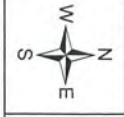
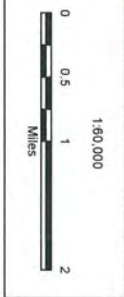
### **3. POST-IMPOUNDMENT**

Large woody debris will be removed as necessary for the safe operation of boat ramps, swimming areas, water intake structures, and spillways.

Project: Lower Bois d'Arc Creek Reservoir Clearing Plan  
 Date: 1/20/15  
 Scale: 1" = 1,600,000'  
 Author: Freese and Nichols, Inc.  
 Project Manager: [Name]  
 Designer: [Name]  
 Checker: [Name]  
 Date: 1/20/15



Proposed Lower Bois d'Arc Creek Reservoir Flood Easement, 545' Parcels  
 Clearing Area (Total Appx. Area = 4,870 ac.)  
 Access Point  
 Bois d'Arc Creek  
 Streams



**FIGURE 1**  
  
**FREES AND NICHOLS, INC.**  
 4500 International Plaza Suite 200  
 Fort Worth, Texas 76109-4895  
 (817) 736-7300

NTMWD  
 Lower Bois d'Arc Creek  
**Reservoir Clearing Plan**

FN PROJECT NO	NTD00128
DATE CREATED	1/20/15
DATUM & COORDINATE SYSTEM	NAD83 State Plane (North Texas North Central)
FILE NAME	Reservoir_Clearing_010714.mxd
PREPARED BY	BS



**00 52 23 CONSTRUCTION MANAGEMENT AT RISK SERVICES AGREEMENT**

THIS CONSTRUCTION MANAGEMENT AT RISK SERVICES AGREEMENT, hereinafter referred to as the "Agreement", is made and dated as of \_\_\_\_\_, 2015, between the North Texas Municipal Water District, a district created pursuant to Section 59, Article XVI of the Texas Constitution, acting by and through its duly authorized representative, having its principal offices at 505 E. Brown Street, Wylie, Texas 75098, hereinafter referred to as "Owner" or "NTMWD" and \_\_\_\_\_, a \_\_\_\_\_ organized and operating under the laws of the State of \_\_\_\_\_, having an office at \_\_\_\_\_, hereinafter referred to as "CMAR", (each also hereinafter referred to as "Party" individually or "Parties" collectively), for construction management at risk services in connection with the Lower Bois d' Arc Creek Reservoir Dam Project.

CMAR

**Recitals**

The NTMWD has determined to implement a program for the design and construction of the Lower Bois d' Arc Creek Reservoir. The NTMWD has determined that one phase of this program is the construction of a dam across the Lower Bois d' Arc Creek. The dam will consist of an earthen embankment approximately 2 miles long and 90 feet tall at its highest point with a soil bentonite cutoff trench in the foundation and the upstream face of the dam protected by soil cement. There will be an uncontrolled three cycle labyrinth spillway with a 1,500 foot wide emergency spillway and a reinforced water supply intake tower that will feed the water supply pump station located on the downstream side of the dam.

The dam phase of the program will be completed using the construction management at risk (CMAR) project delivery method in accordance with Chapter 2269 of the Texas Government Code.

The NTMWD has determined to contract with a construction management at risk firm to perform the preconstruction, procurement and construction services. The services will include working and coordinating with the design engineer selected pursuant to a separate procurement.

The NTMWD issued a Request for Proposals (the "RFP") \_\_\_\_\_, on \_\_\_\_\_, 2015.

Proposals submitted in response to the RFP were received on \_\_\_\_\_, 2015 from \_\_\_\_\_ firms, including the \_\_\_\_\_.

The Proposals were reviewed by the NTMWD and assigned a score based on the evaluation criteria and scoring method set forth in the RFP.

Based on the evaluations and scoring of the Proposals, the NTMWD determined that the \_\_\_\_\_ provided the best value Proposal for the performance of the services among the firms responding to the RFP.

In \_\_\_\_\_ of 2015, the NTMWD initiated negotiations with the \_\_\_\_\_ for performance of the services, which have concluded with this Agreement.

On \_\_\_\_\_, 2015, by Resolution No. \_\_\_\_\_, the governing body of the NTMWD authorized the execution and delivery of this Agreement on behalf of the NTMWD.

In consideration of the mutual covenants herein contained, the parties hereto, intending to be legally bound, agree as follows:

## **ARTICLE 1: REPRESENTATIONS AND WARRANTIES**

### **1.01 Representations and Warranties of the CMAR.**

#### **A. The CMAR hereby represents and warrants that:**

1. **Existence and Powers.** The CMAR is a \_\_\_\_\_ duly organized, validly existing and in good standing under the laws of the State of \_\_\_\_\_, with the full legal right, power and authority to enter into and perform its obligations under this Agreement.
2. **Due Authorization and Binding Obligation.** This Agreement has been duly authorized, executed and delivered by all necessary corporate action of the CMAR and constitutes the legal, valid and binding obligation of the CMAR, enforceable against the CMAR in accordance with its terms.
3. **Information Supplied by the CMAR.** The information supplied and representations and warranties made by the CMAR in all submittals made in response to the RFP with respect to the CMAR (and to the best of its knowledge after due inquiry, all information supplied in such submittals with respect to any CMAR Team Member) are true, correct and complete in all material respects.
4. **No Conflict of Interest.** The CMAR understands that as a political subdivision of Texas, the laws governing Owner's Board, employees, and agents ("Prohibited Persons") may prohibit any Prohibited Person from having a financial interest, directly or indirectly, in any contract with the Owner. The CMAR represents and certifies that its owners, officers, employees and agents are not Prohibited Persons and that it has tendered to the Owner all necessary disclosures and other documents in compliance with the Owner's policies and governing laws, including, without limitation, a discretionary contracts disclosure statement and a Conflict of Interest Questionnaire.
5. **No Commitments Limiting Ability to Perform CMAR Services.** The CMAR has no commitments, obligations, or impediments of any kind that would have a material and adverse impact on the ability of the CMAR to perform the Services in accordance with the Agreement. The CMAR covenants that it will not enter into any such commitment throughout the period of the performance of the Services.
6. **No approvals required.** No approval, authorization, order of consent of, or declaration, registration of filing with any governmental body is required for the valid execution and delivery of the Agreement by the CMAR except as such have been duly obtained or made.
7. **Licensing and Registration Requirements.** The CMAR possesses all licenses required under Laws and Regulations to perform all services required of the CMAR under this

Agreement and is not in violation of any of the terms or conditions of such licenses. The CMAR is registered with all appropriate governmental bodies to the extent necessary to perform all the Services. The CMAR has the authority to do business in the State of Texas.

8. No Litigation. Except as disclosed in writing to Owner, there is no legal proceeding, at law or in equity, before or by any court, arbitral tribunal or other governmental body pending or, to the best of the CMAR's knowledge after due inquiry, overtly threatened or publicly announced against the CMAR, in which an unfavorable decision, ruling or finding could reasonably be expected to have a material and adverse effect on the execution and delivery of this Agreement by the CMAR or the validity, legality or enforceability of this Agreement against the CMAR, or any other agreement or instrument entered into by the CMAR in connection with the transactions contemplated hereby, or on the ability of the CMAR to perform its obligations hereunder or under any such other agreements or instruments. For the purposes of this section only, "material" is defined to be an effect in excess of \$1M.
9. Claims and Demands. Except as disclosed in writing to Owner, there are no material and adverse claims or demands based in environmental, contract or tort law pending or threatened against the CMAR or any of its affiliates that would have a material and adverse effect upon the ability of the CMAR to perform the Services. For the purposes of this section only, "material" is defined to be an effect in excess of \$1M.
10. Laws and Regulations Compliance. Neither the CMAR nor any of its affiliates has any knowledge of any material violation of any law, order, rule or regulation with respect to any facilities or structures constructed by the CMAR or any of its affiliates. For the purposes of this section only, "material" is defined to be an effect in excess of \$1M.
11. The CMAR represents that it is familiar with the ethics requirements of the Owner and agrees to comply with such requirements.

## **ARTICLE 2: SERVICES AND THE PROJECT**

- 2.01 CMAR shall complete the Construction Management at Risk Services (the "Services") as specified or indicated in the Contract Documents Section 01 01 01.
- 2.02 CMAR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Lower Bois d' Arc Creek Reservoir Dam and Intake Project ("Project"), North Texas Municipal Water District Project No. 344. The Project consists of:

1. A zoned earthen embankment approximately 2 miles long and 90 feet tall at its highest point and containing approximately 4.7 million cubic yards; and
2. Approximately 420,000 square feet of a soil bentonite slurry trench cutoff for the foundation; and
3. Uncontrolled three cycle labyrinth service spillway that is estimated to contain about 14,000 cubic yards of reinforced concrete and 16,000 cubic yards of roller compacted concrete; and

4. Approximately 200,000 cubic yards of soil cement erosion protection for the dam and spillway; and
5. Reinforced concrete water supply intake tower, approximately 100 feet tall, with two 78 inch conduits through the dam that will feed the water supply pump station located on the downstream side of the dam (The pump station is not part of the scope for this Project.); and
6. Lake Bonham Dam improvements including expansion of the pilot channel in the emergency spillway and addition of a toe berm with erosion protection and modifications to the internal toe drain system; and
7. Leonard Dam modification including expansion of the emergency spillway and raising the embankment.

The Owner's Budget for the work immediately above is \$98 Million. This portion of the Project is to be complete and in operation on or before December 31, 2018.

2.03 The Project will also include:

1. An earthen embankment with a soil-cement floor and slope lining with a volume of approximately 210 million gallons with a top of embankment footprint of approximately 1,500' x 1,300'. The top of the embankment is currently anticipated to be at elevation 738' AMSL (approximate height 30 feet) and the floor of the reservoir at 710' AMSL, with a total length of about 5700 LF. The Project will include two 102-inch pipes to connect TSR to the Leonard water treatment plant.
2. Morning-glory type spillway structure with an approximately one-mile-long drop inlet overflow discharge pipe to discharge overflows back to the Red River basin.
3. Approximate maximum of 3,200 acres of timber clearing in an area outside the footprint of the dam but within the impoundment area.

The Owner's budget for the terminal storage reservoir and impoundment area clearing is \$30 Million and \$10 Million, respectively. The Impoundment Area Clearing is to be complete by July 2, 2018 and the Terminal Storage Reservoir is to be complete by December 31, 2019.

2.04 The Project for which the Services under the Contract Documents may be the whole or only a part is generally described as follows:

North Texas Municipal Water District  
Lower Bois d' Arc Creek Reservoir Dam and Intake Project, North Texas MWD Project No. 344.

NTD13565

### **ARTICLE 3: ENGINEER**

3.01 The Project has been designed by:

Freese and Nichols, Inc. (the "Engineer")

1701 N. Market St., Suite 500, LB 51

Dallas, Texas 75202-2001

Engineer, who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Services and the Work in accordance with the Contract Documents.

#### **ARTICLE 4: CONTRACT TIMES**

- 4.01 Time of the Essence: All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.
- 4.02 Dates for Substantial Completion and Final Payment:
- A. The Work will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates set forth in Paragraphs 2.02 and 2.03 above. These dates are approximate as of the time of this initial Agreement and will be fixed when the Guaranteed Maximum Price for the entire Work is established.
- 4.03 Liquidated Damages
- A. CMAR and Owner recognize that time is of the essence in this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraphs 2.02 and 2.03 above, plus any extensions of the Contract Time allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and CMAR agree that as liquidated damages for delay (but not as a penalty), CMAR shall pay Owner the amount of Liquidated Damages stipulated in the Amendment establishing the Guaranteed Maximum Price for each day that expires after the time specified in Paragraphs 2.02 and 2.03 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CMAR shall neglect, refuse, or fail to complete the remaining Work and achieve Final Completion within the Contract Time, CMAR shall pay Owner the amount of Liquidated Damages stipulated in the Amendment establishing the Guaranteed Maximum Price. The Owner will be the sole judge as to whether the Work has been completed within the allotted time. Assessment of Liquidated Damages by the Owner shall not constitute a waiver of the Owner's right to sue and collect additional damages which Owner may sustain by the failure of the CMAR to perform in accordance with the terms of its Contract.

#### **ARTICLE 5: CONTRACT PRICE**

- 5.01 Owner shall pay CMAR for completion of the Services and the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Article 6, 7 and 8 subject to additions and deletions as provided in the Contract Documents and subject to the limitations set forth in the Statement of Proposed Fees and

Expenses and with Article 9. The Contract Price cannot exceed the Guaranteed Maximum Price (the "GMP") as set forth in Article 10.

#### **ARTICLE 6: CMAR'S FEE**

- 6.01 CMAR's fees shall be as set forth in the Statement of Proposed Fees and Expenses.
- 6.02 The Owner's Budget as presented in the Request for Proposals will be applied to the fees and costs stated in the Statement of Proposed Fees and Expenses to assist the Owner in the evaluation of Proposals.

#### **ARTICLE 7: COST OF THE WORK**

- 7.01 Cost of the Work is the sum of amounts Bid for Work provided by accepted Subcontractor and Suppliers and the Cost of Work self-performed by the CMAR. Cost of Work outside of amounts Bid by Subcontractor and Suppliers and the Cost of Work self-performed by the CMAR shall be determined as provided in Paragraph 11.01 of the General Conditions.

#### **ARTICLE 8: CONTINGENCY FUNDS**

- 8.01 The contingency funds are for the exclusive use of the CMAR while executing the Work to address unexpected circumstances and/or to defray unanticipated charges and additional expenses incurred by the CMAR due to inaccuracies in estimating and for the CMAR's costs and expenses incurred to correct subcontractor scope deficiencies and Subcontractor field errors and omissions that are not otherwise reimbursable and do not constitute a change in the Work. The contingency funds shall not be allocated to any particular line item in the Cost of Work and is established to cover the costs for increases in the Cost of Work incurred by the CMAR for unforeseen causes or details not capable of reasonable anticipation at the time of the execution of the Agreement and it is not intended for changes in the scope of the Work or for reimbursement of expenses and costs not otherwise recoverable as a Cost of Work under Paragraph 11.01 of the General Conditions.
- 8.02 The amount of the contingency funds shall be \_\_\_\_percent (\_\_\_ %) of the Cost of Work.
- 8.03 Subject to prior written approval by the Owner, the contingency funds may be used for costs incurred in accordance with this Article by the CMAR. The CMAR shall prepare and submit to Owner a detailed listing and written justification as to the need to use any part of the contingency funds prior to using any part of the contingency funds. Charges against the contingency funds will be tabulated and reported by the CMAR as part of the CMAR's monthly Progress Meeting. CMAR will also provide a tracking system for the measurement and transfer of contingency accounts.
- 8.04 It is understood that the amount of any such contingency funds is the maximum amount available to the CMAR to cover cost incurred in accordance with this Article and that cost overruns in excess of the contingency funds will be borne by the CMAR.
- 8.05 The full amount of any remaining contingency funds shall be considered to be within the GMP for purposes of the calculation of any Shared Savings at the final completion of the Work.

#### **ARTICLE 9: GUARANTEED MAXIMUM PRICE**

- 9.01 The GMP will be the sum of the CMAR's fees and expenses established under Article 6, the Cost of the Work established under Article 7, and expenditures for contingency funds as determined in Article 8. This total, established as the Guaranteed Maximum Price in an Amendment to the Agreement, is subject to authorized increases or decreases for changes in the Services and the Work. The CMAR guarantees that the Contract Price will not exceed the GMP unless the Owner authorizes an increase in accordance with the Agreement.
- A. The CMAR is responsible for cost overruns, unless the GMP has been increased by Change Order for a change in Project scope by the Owner.
  - B. CMAR will be paid for actual cost incurred by the CMAR for Cost of the Work in accordance with Article 11 of the General Conditions, up to the Guaranteed Maximum Price.
- 9.02 Within 30 days after the CMAR is furnished the 90% Construction Documents, the CMAR shall submit its GMP Proposal for the entire Work, in such form and with such backup documentation as required herein for the GMP Proposal. Except as may otherwise be agreed by the Owner and the CMAR in advance, the GMP Proposal shall include a contingency funds of \_\_\_\_\_ percent (\_\_\_%) the estimated Cost of the Work.
- 9.03 Any GMP Proposal shall include the following, unless the Parties mutually agree otherwise:
- A. The proposed GMP will be developed as specified in Article 9 of this Agreement and as set out herein. The GMP Proposal shall be submitted in a binder with a title page that indicates whether the GMP Proposal is an Early Work Package or GMP Proposal for the entire Work. If an Early Work Package it shall be numbered and titled and dated. Binder pages shall be numbered. Binder shall include all specified items and components of a GMP as required by the Agreement. Sections must be divided by tabs for ease of reference. The GMP Proposal will be organized as follows:
    - 1. Transmittal Letter
    - 2. Table of Contents
    - 3. Tab 1 – Executive Summary- brief general summary, including the Scope of Work for the GMP Proposal.
    - 4. Tab 2 – A list of Drawings and Specifications and other Contract Documents, with the most recent revisions dates, upon which the GMP Proposal is based.
    - 5. Tab 3 – Description of Variations, Substitutions proposed to the Drawings and Specifications.
      - a. Specification listing- provide a detail listing of Specifications by division and section, which describes exclusions, substitutions, modifications, etc. If no changes are proposed for a particular section, insert "as per specifications".
        - 1). Qualifications and Assumptions- a narrative summary of all qualifications and assumptions included in the Specifications listing.
        - 2). Exclusions- a summary of all exclusions included in the Specifications listing, plus any exclusions not related to the Specifications.

- b. A list of the assumptions and clarifications made by the CMAR in the preparation of the GMP Proposal, which list is intended to supplement the information regarding the scope and requirements of the Work contained in the Contract Documents.
  - c. Value Analysis recommendations – if applicable.
  - d. Allowance Schedule – a list of allowances including definitions for all allowances or any open pricing terms and a statement of their basis – if applicable.
  - e. A schedule of unit prices – if applicable
  - f. All other information used as the basis for the GMP Proposal.
6. Tab 4 – The proposed GMP for the designated portion of the Work -Cost of the Work Breakdown:
- a. Estimated Cost of the Work shall be broken down into Master Format 2004 divisions and such additional sections and Early Work Packages as may have been directed by Owner prior to the submission of the GMP Proposal.
  - b. Cost breakdown will be a lump sum for each Division and, if applicable, a section with information on proposed subcontractors and pricing supporting such costs.
  - c. Itemized listing of all proposed General Conditions Costs, including all definitions of cost categories.
  - d. The GMP Proposal shall provide for contingency funds in accordance with the Agreement.
  - e. Allowances and unit prices shall be included.
  - f. It must include a description of how the estimated Cost of the Work was derived and prepared in accordance with the requirements of the Agreement.
7. Tab 5 Progress Schedule
- a. The Progress Schedule for a GMP Proposal must include detailed activities for all events and Milestones included in the construction phase.
  - b. Additionally, the Progress Schedule update must include detailed, logic driven activities for all construction phase activities.
  - c. All paths in the Progress Schedule must lead to Milestone activities to ultimately achieve Substantial Completion on or before the Milestone for Substantial Completion.
  - d. The Progress Schedule must be provided in hard copy form in the binder and also in an electronic format attached to the binder.
  - e. A Schedule of Values based upon the Contract Time requirements.
- 9.04 Early Work Packages may be awarded by the CMAR during the Preconstruction Services of the Project to facilitate the early preparation of the Site, purchase long lead time materials and equipment and otherwise accelerate certain portions of the Work in advance of the agreement between the Owner and CMAR regarding the GMP Proposal for the entire Work. These Early Work Packages will be ready for commencement of their construction before it is appropriate to arrive at an overall GMP for the entire Work. Early Work Package shall be defined as a portion of



Work that the Parties agree should be executed during the Preconstruction Services of the Project.

- 9.05 Either Owner or the CMAR may propose Early Work Packages to proceed prior to that time the GMP Proposal for the entire Work is approved by the Owner. Based upon the written agreement of the Parties, the CMAR may either perform, if selected by the Owner as the successful Bidder, or subcontract such Early Work Packages before the GMP Proposal for the entire Work has been submitted and approved. The approved GMP amount for the Scope of Work in any early Work Package shall be included in the subsequent GMP Proposal for the entire Work as an individual line item with reference made to the appropriate GMP Amendment. The CMAR's fee for billing purposes for such Early Work Package Scope of Work shall not exceed the pro rata portion of the fee that the Cost of Work of the Early Work Package as performed bears to the Owner's Budget. The CMAR will be obligated to provide payment and performance bonds in accordance with Article 5 of the General Conditions for the GMP amount any early Work Package.
- 9.06 The Owner may choose to accelerate the completion of certain portions of the design work so that some specific Early Work Packages may be awarded by the CMAR prior to the completion of the remaining Construction Documents or acceptance by the Owner of the GMP Proposal for the entire Work. The CMAR shall verify that the Engineer has provided the documents necessary to Bid and award any Early Work Package. Any Early Work Package shall contain language which makes those subcontracts 100% assignable to Owner at Owner's option, in the event this Agreement is terminated, and that the Subcontractors shall be obligated to accept that assignment if it should occur.
- 9.07 After submission of any Early Work Package GMP Proposal and the GMP Proposal for the entire Work, the CMAR and Owner shall promptly meet to discuss and review the proposals.
- A. If Owner has any comments regarding the respective proposal or finds any inconsistencies or inaccuracies in the information presented, it shall promptly give written notice to the CMAR of such comments or findings.
  - B. To the extent that the estimated Cost of the Work of the GMP Proposal exceeds the Owner's Budget, the CMAR shall exercise best efforts (as measured by its applicable standard of care under this Agreement) to propose Value Analysis solutions and other cost reduction measures to bring such construction costs within the Owner's Budget.
    - 1. The Owner and CMAR may cooperate in the revision of the Scope of Work to reduce the cost and re-Bid those portions of the Scope of Work that was revised.
    - 2. The Owner may authorize the CMAR to re-bid some or all portions of the Scope of Work within a reasonable time in an attempt to reduce costs.
  - C. If appropriate, the CMAR shall, upon receipt of Owner's notice to the CMAR, make appropriate adjustments to the GMP Proposal.
  - D. If Owner accepts a GMP Proposal, as may be amended by Owner and the CMAR, the GMP Proposal and its basis shall be set forth in a GMP Amendment to this Agreement.
  - E. Notice to Proceed on a GMP Amendment may be issued immediately upon full approval and execution and receipt of all required bonds and insurance.

- F. The CMAR agrees that to the best of its knowledge that the Contract Documents at the time of the execution of the respective GMP Amendment are sufficient to enable it to determine the GMP for all the Work covered by such GMP Amendment and that such Work can be completed in accordance with the Contract Documents for the GMP. By agreeing to a GMP, the CMAR agrees with the Owner that the Work required by the Contract Documents for the Work covered by the respective GMP Amendment, including without limitation, construction means, methods, procedures and techniques necessary to perform the Work, will be consistent with (i) good and sound practices within the construction industry; (ii) generally prevailing and accepted industry standards applicable to the Work and (iii) requirements of any warranties applicable to the Work.
- 9.08 If Owner rejects the GMP Proposal for the entire Work (which it may do in its sole discretion) or fails to notify the CMAR in writing within thirty (30) calendar days of receipt of the GMP Proposal that it accepts the GMP Proposal, the GMP Proposal shall be deemed withdrawn and of no effect. In such event, Owner and the CMAR shall meet and confer as to how the Project will proceed with Owner having the following options, the selection of which option Owner may make in its sole discretion:
- A. Owner may suggest modifications to the GMP Proposal and consider the CMAR's additional Value Analysis proposals and other suggestions for cost reduction, whereupon, if such modifications are accepted in writing by the Owner and CMAR, the GMP Proposal shall be deemed accepted and the parties shall proceed in accordance with Section 9.07 D,E and F above or;
  - B. Owner may authorize and direct, in writing, the CMAR to proceed with the specified Work on the basis of reimbursement as provided in Article 6 (CMAR's Fee) and Article 7 ( Cost of the Work) hereof without a GMP, in which case all references in Agreement to the GMP will not be applicable or;
  - C. Owner may terminate this Agreement in accordance with Article 19.
- 9.09 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the CMAR. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the CMAR shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them being necessary to produce the indicated results. To the extent the Drawings and Specifications are anticipated to require further development by the Engineer, the CMAR has provided in the GMP for such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include such things as changes in scope, systems, kinds and quality of materials, finishes or equipment, all of which, if required shall be incorporated by Change Order.

#### **ARTICLE 10: CHANGES IN THE GUARANTEED MAXIMUM PRICE**

- 10.01 The amount of any increases or decreases in the GMP CMAR which results from a Change Order shall be set forth in the applicable Change Order subject to the following:
- A. Any increase or decrease in the CMAR's fee for Construction Services resulting from net additions or decreases in the Cost of the Work shall be determined in accordance with Paragraph 12.01.C of the General Conditions.

B. Wherever there is a Guaranteed Maximum Price:

1. In the case of net additions in the Work, the amounts of any increase in Guaranteed Maximum Price shall be determined in accordance with Paragraphs 11.01 through 11.02, inclusive, of the General Conditions.
2. In the case of net deletions in the Work, the amount of any such decrease shall be determined in accordance with Paragraph 11.02.C of the General Conditions, and any Guaranteed Maximum Price shall be reduced by mutual agreement.

**ARTICLE 11: SHARED SAVINGS**

- 11.01 Shared Savings shall only be applicable to the Work described in Article 2, Section 2.02 of this Agreement and shall not include the Work described in Article 2, Section 2.03. All savings and remaining contingency funds for the Work described in Article 2, Section 2.03 shall be retained by the Owner. Savings shall be defined as the amount of funds (if any) that remain unspent within the GMP at the time of final completion of the Work and shall consist of the difference between the actual Cost of Work and the Cost of Work contained in the Amendment for the GMP for the Work.
- 11.02 "Shared Saving" shall be defined as the amount of funds (if any) that remain unspent within the GMP at the time of final completion of the Work and shall consist of the difference between the actual Cost of Work and the Cost of Work contained in the Amendment for the GMP for the Work plus any remaining contingency funds.
- 11.03 Shared Savings shall be paid to the CMAR only to the extent that Shared Savings exist and can be allocated based on the requirements of this Article.
- 11.04 Shared Savings shall be paid to the CMAR within 30 days of Final Payment.
- 11.05 At the time of final completion, any Shared Savings under the final adjusted amount of the GMP and remaining contingency funds shall be distributed to the Parties with fifty percent (50%) to the CMAR and fifty percent (50%) to the Owner, subject to maximum amounts payable to the CMAR as indicted below:
- A. Three quarters of one percent (0.75%) of the actual Cost of Work if Substantial Completion date is met or achieved at an earlier date, plus
  - B. For every Calendar Day that the date of Substantial Completion is earlier than the agreed-upon Substantial Completion deadline, an additional amount of \$4,000 per Calendar Day will be paid to the CMAR; however
  - C. The total maximum amount of Shared Savings (the sum of subsections "A" and "B") paid to CMAR will be limited to one and one half percent (1.5%) of the GMP, regardless of the number of Calendar Days for an earlier Substantial Completion date.
  - D. All Shared Savings beyond the total maximum amount payable to the CMAR will be retained by the Owner.
  - E. By way of example and for illustrative purposes:
    1. If actual Cost of Work is \$80,000,000; 0.75% would equal \$600,000.

2. The maximum amount payable would be 1.5 % or \$1,200,000.
3. The maximum number of earlier days for Shared Savings payment would equal 150 Calendar Days (approximately 5 months).

#### **ARTICLE 12: PAYMENT PROCEDURES**

##### **12.01 Submittal and Processing of Payments for Services associated with the Pre-Construction Services and Procurement Services:**

- A. On the first working day following the 25<sup>th</sup> of each month, Contractor shall submit to Owner for review an Application for Payment completed and signed by Contractor covering the Services completed as of the date of the Application and accompanied by such documentation as may be required.
- B. Engineer will within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present Application to Owner or return the Application to CMAR indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
- C. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's knowledge and review of the Services completed, that such Services were generally in accordance with the requirements of the Agreement and the Contract Documents.

Sixty days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will become due, and when due will be paid by Owner to CMAR.

##### **12.02 Submittal and Processing of Payments: CMAR shall submit Applications for Payment of the Work in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.**

##### **12.03 Progress Payments and Retainage for the Work:**

- A. Owner shall make progress payments on the basis of CMAR's Applications for Payment on or about the 25th day of each month during performance of the Work. All such payments will be measured by the Schedule of Values established as provided in Paragraph 2.07.A of the General Conditions.
- B. Prior to Substantial Completion, progress payments will be made in an amount equal to 90 percent of the total amount earned for completed Work and properly stored materials on hand, with the balance being retainage. When 50 percent of the Contract Price has been earned, the retainage may be held at its current value until Substantial Completion if the Owner determines that satisfactory progress has been made. This retainage amount may be adjusted for changes in the Guaranteed Maximum Price that occur after 50 percent of the Guaranteed Maximum Price has been paid to the Contractor.
- C. Payment will be less the aggregate of payments previously made and less such amounts as Owner may be entitled to withhold pursuant to the Contract Documents, including but not limited to Liquidated Damages, in accordance with Paragraph 14.02 of the General

Conditions. In addition to the amount retained above, the Owner may retain additional amounts as set forth elsewhere in the Contract Documents.

- 12.04 Final Payment: Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price, as modified in accordance with the Contract Documents, and as recommended by Engineer as provided in said Paragraph 14.07.

#### **ARTICLE 13: SELF-PERFORM**

- 13.01 The CMAR may seek to perform portions of the Work itself, other than the minor work that may be included in the CMAR's General Conditions costs, if the CMAR submits its Bid for those portions of the Work in the same manner as all other Subcontractors. If the CMAR intends to submit a Bid for such Work, it shall notify Owner prior to soliciting Bids and all such Bids will be submitted directly to the Owner or the Engineer. If the Owner determines that the CMAR's Bid provides the best value for Owner, the CMAR will be awarded that portion of the Work. Owner's determination in such matters is final.

#### **ARTICLE 14: INTEREST**

- 14.01 The Owner is not obligated to pay interest on monies not paid except as provided in Section 2252.032 of the Texas Government Code.

#### **ARTICLE 15: CMAR'S REPRESENTATIONS FOR THE WORK**

- 15.01 CMAR makes the following representations:
- A. CMAR has examined and carefully studied the Contract Documents and the other related data identified in the Request For Proposals.
  - B. CMAR has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
  - C. CMAR is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
  - D. CMAR has carefully studied: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site including Underground Facilities which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.
  - E. CMAR has obtained and carefully studied all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions including surface, subsurface, and Underground Facilities at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by CMAR, including any specific means, methods, techniques, sequences, and procedures of construction

expressly required by the Contract Documents, and safety precautions and programs incident thereto or assumes responsibility for doing so.

- F. CMAR does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. CMAR is aware of the general nature of Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. CMAR has correlated the information known to CMAR, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- I. CMAR has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that CMAR has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to CMAR.
- J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

#### **ARTICLE 16: ACCOUNTING RECORDS**

16.01 Accounting Record Availability: CMAR shall keep such full and detailed accounts of materials incorporated and labor and equipment utilized for the Work consistent with the requirements of Paragraph 11.01.D of the General Conditions and as may be necessary for proper financial management under this Agreement. Subject to prior written notice, Owner shall be afforded reasonable access during normal business hours to all CMAR's records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and CMAR's fee. CMAR shall preserve all such documents for a period of 3 years after the final payment by Owner.

#### **ARTICLE 17: CONTRACT DOCUMENTS**

17.01 Contents:

- A. The Contract Documents consist of the following:
  - 1. Specifications, forms and documents listed in Section 00 01 10 "Table of Contents" except as specifically excluded in Paragraph C.
  - 2. Addenda (Numbers 00 91 00-1 to 00 91 00-insert Addenda number, inclusive).
  - 3. Exhibits to this Agreement (enumerated as follows):
    - a. Treatment Plan for Inadvertent Discovery of Native American Human Remains or Unmarked Burials During Archaeological Investigations of the Area of Potential Effect (APE) for the Proposed Lower Bois d'Arc Reservoir an Agreement Between North Texas Municipal Water District The U.S. Army Corps of Engineers, Tulsa District The Texas Historical Commission

- b. Treatment Plan An Agreement Between North Texas Municipal Water District the U.S. Army Corps of Engineers, Tulsa District The Texas Historical Commission and the Caddo Nation of Oklahoma
  4. Documentation submitted by Contractor prior to Notice of Award (pages insert page numbers, inclusive).
- B. The following are also Contract Documents which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
1. Notice to Proceed.
  2. Amendment(s).
  3. Change Order(s).
  4. Field Order(s).
  5. Work Change Directive(s).
  6. Engineers Written Interpretation(s).
- C. The documents listed in Paragraph 17.01.A are attached to this Agreement (except as expressly noted otherwise above).
- D. There are no Contract Documents other than those listed above in this Article 17.
- E. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

#### **ARTICLE 18: NON APPROPRIATION OF FUNDS**

18.01 Notwithstanding any other provision of this Agreement, this Agreement may be terminated if for any reason there are not sufficient appropriated and available monies for the purpose of maintaining the District's payment obligations under this Agreement. In the event of such termination, the termination will be in accordance with Paragraph 15.03 of the General Conditions.

#### **ARTICLE 19: TERMINATION**

19.01 In addition to the termination terms and conditions in Article 15 of the General Conditions, CMAR'S failure to provide the Key Personnel or Alternate Key Personnel will justify termination for cause by the Owner.

19.02 In addition to the termination terms and conditions in Article 15 of the General Conditions, upon three days written notice, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate this Agreement at the conclusion of the Pre-Construction Services or failure of the Owner and CMAR to come to an agreement on the Guaranteed Maximum Price Proposal for the entire Work. The CMAR shall be paid for Services actually rendered through the date of termination.

#### **ARTICLE 20: MISCELLANEOUS**

20.01 Terms: Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

- 20.02 Assignment of Contract: No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.
- 20.03 Successors and Assigns: Owner and CMAR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.
- 20.04 Severability: Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and CMAR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.
- 20.05 Venue: CMAR agrees that venue shall lie exclusively in district courts of Collin County, Texas for any legal action.

#### **ARTICLE 21: INADVERTENT DISCOVERY OF NATIVE AMERICAN HUMAN REMAINS OR UNMARKED BURIALS**

- 21.01 CMAR understands and acknowledges that Owner is bound by treatment plans for the inadvertent discovery of Native American human remains or unmarked burials (the "Treatment Plans"), which are attached as exhibits and incorporated by reference into this Agreement. Said Treatment Plans were made between Owner, the U.S. Army Corps of Engineers, Tulsa District, the Texas Historical Commission and the Caddo Nation of Oklahoma. CMAR understands and agrees to be bound by said Treatment Plans to the fullest extent allowed by law; CMAR and Owner reasonably anticipate that the progress of the Work will be encumbered at times by the need by CMAR and Owner to abide by the terms of the Treatment Plans, but that there shall be no change in the contract price, only the contract time (if necessary).
- 21.02 Pursuant to the Treatment Plans, all Work will be performed in a manner consistent with Title 13, Part II, Chapter 22, Cemeteries, and any other requirements under Chapter 711 of the Texas Health and Safety Code, and the Antiquities Code of Texas (Title 9, Chapter 191 of the Texas Natural Resources Code).
- 21.03 The term "human remains", as defined under Chapter 711 of the Texas Health and Safety Code (711.001[15]), refers to the body of a decedent, and is inclusive of, born or ashes, and associated funerary objects; Chapter 711 of the Texas Health and Safety Code also defines "cemetery" as a place that is used or intended to be used for interment, and includes a graveyard, burial park, mausoleum, or any other area containing one or more graves (711.001[2]); the term "interment" means the permanent disposition of remains by entombment, burial, or placement in a niche (711.001[16]).
- 21.04 In the event that human remains are encountered during the performance of any Work, the CMAR shall immediately cease performance of Work and immediately notify Owner.



- A. CMAR shall notify Owner within one (1) hour of initially encountering human remains.
- B. Notification by CMAR to Owner must be made by both telephone and email to the Designated Representative identified below.

21.05 In the event that unassociated artifacts are encountered during the performance of any Work, the CMAR shall immediately cease performance of Work and immediately notify Owner.

- A. CMAR shall notify Owner within one (1) hour of initially encountering unassociated artifacts.
- B. Notification by CMAR to Owner must be made by both telephone and email to \_\_\_\_\_.

21.06 NO DAMAGES FOR DELAY: CMAR understands that the discovery of potential human remains, unmarked burials, and/or historical artifacts will result in delays to the Work. CMAR hereby agrees that its sole remedy for any damages caused as a result of said delays is an extension of the contract time. CMAR hereby waives any remedy or claim it may have at law or in equity for an increase in the contract price as a result of any delays, disruptions of work, inefficiencies, schedule acceleration or compression, or similar damages related to the discovery of potential human remains, unmarked burials, and/or historical artifacts

IN WITNESS WHEREOF, Owner and CMAR have signed this Agreement in duplicate. One counterpart each has been delivered to Owner and CMAR. All portions of the Contract Documents have been signed or identified by Owner and CMAR or on their behalf.

This Agreement will be effective on **Date to be inserted at the Time of Contract Execution.**

Owner:	_____	CMAR:	_____
	<i>(typed or printed)</i>		<i>(typed or printed)</i>
By:	_____	By:	_____
	<i>(Individual's signature)</i>		<i>(Individual's signature)</i>
Name:	_____	Name:	_____
	<i>(typed or printed)</i>		<i>(typed or printed)</i>
Title:	_____	Title:	_____
	<i>(typed or printed)</i>		<i>(typed or printed)</i>
Attest:	_____	Attest:	_____
	<i>(Individual's signature)</i>		<i>(Individual's signature)</i>

Address for giving notice:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Designated representative:	Designated representative:
Name: _____	Name: _____
Title: _____	Title: _____
Address: _____	Address: _____

_____	_____
_____	_____
Phone: _____	Phone: _____
Facsimile: _____	Facsimile: _____
E-mail: _____	E-mail: _____

*(If CMAR is a corporation or a partnership, attach evidence of authority to sign.)*

**END OF SECTION**

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

**ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE**

and

Issued and Published Jointly by



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Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
  2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Services and the Work.
  3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
  4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
  5. *Bid*—~~The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.~~ The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices and schedule for the Work to be performed to the CMAR including proposals submitted by the CMAR for self-performed Work.
  6. *Bidder*—~~The individual or entity who submits a Bid directly to Owner.~~ The Subcontractor, Supplier, individual or entity that submits a Bid or the CMAR that submits a Bid for self-performed Work.
  7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
  8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
  9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
  10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Services and the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral. Contract shall have the same meaning as Agreement.
12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Services and the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer’s written recommendation of final payment.
15. *Contractor*—~~The individual or entity with whom Owner has entered into the Agreement.~~ In these Contract Documents, Contractor has the same meaning as the Construction Manager at Risk and CMAR.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

The Engineer’s Consultants are:

Cyganiewicz Geotechnical LLC  
Darell Zimbelman (individual peer reviewer)  
Gorrondona and Associates  
Texplor of Dallas, Inc.  
TrueGrit  
TRI Environmental  
Gehrig, Inc.  
Utah Water Research Laboratory

21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.

47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.
52. *Construction Manager at Risk or CMAR* —The individual or entity with whom Owner has entered into the Agreement. The terms CMAR, Construction Manager at Risk and Contractor shall have the same meaning in these Contract Documents.
53. *Owner's Budget*—The amount budgeted by the Owner for the Services and the Work.
54. *Guaranteed Maximum Price* —The sum of the Construction Manager at Risk's fees and expenses established under Article 6 of the Agreement, the Cost of the Work established under Article 7 of the Agreement and expenditures for contingency funds as determined in Article 8 of the Agreement. Guaranteed Maximum Price shall have the same meaning as GMP.
55. *Proposal Security*—The financial security in the form of a bid bond provided by Proposer to the Owner at the time the Proposal is submitted until Performance, Payment and other bonds required by the Contract Documents in the amount of 100% of the Owner's Budget or Guaranteed Maximum Price are provided.
56. *Modification*—(a) Amendment; (b) Change Order; (c) Field Order; or (d) Work Change Directive.

57. Amendment—a written amendment to the Agreement that is duly authorized, approved or ratified by the Owner and duly authorized by the CMAR that provides for a material change, alteration or revision to the terms and conditions of the Agreement.
58. Guaranteed Maximum Price Proposal (“GMP Proposal”)—means the proposal submitted by the CMAR which sets forth its GMP and all assumptions and clarifications concerning the Contract Documents and Project and the Scope of Work upon which the GMP is based. This term can be used for either the GMP Proposal for the entire Work or an Early Work Package GMP Proposal.
59. Guaranteed Maximum Price Amendment (“GMP Amendment”)—means the document that is issued by the Owner to the CMAR to incorporate the Work and GMP within an Early Work Package GMP Proposal or the GMP Proposal for the entire Work into this Agreement. The Amendment shall modify this Agreement and shall contain additional terms and conditions which are specific to the Scope of Work within the Early Work Packages GMP Proposal or GMP Proposal for the entire Work.
60. Scope of Work—means the entire Work which is included within the GMP Proposal for the entire Work. This term can also be used to describe the subset of Work which is included within a particular Early Work Package.
61. Value Analysis—means the systematic application of recognized techniques by a multidiscipline team to identify the function of a product or service, establish a worth for that function, generate alternatives through the use of creative thinking and provide needed modifications to accomplish the original purpose of the Project, reliably, without sacrificing safety, necessary quality and environmental and performance attributes of the Project.
62. CMAR Team—means the team formed by the Proposer for purposes of responding to the RFP.
63. CMAR Team Member—means a corporate entity or firm or individual included in the CMAR Team or identified in the Proposal that will provide any of the Services for this Project.

## 1.02 Terminology

- A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:*
1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless

there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

2. "At no additional cost to Owner", "With no extra compensation to CMAR", "At CMAR's own expense", or similar words mean that the CMAR will perform the Work without any increase in the Contract Price. It is understood that the Cost of the Work is included in the Contract Price and will be performed at no additional cost to the Owner unless specifically stated otherwise.

C. *Day:*

1. ~~The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.~~ A "Calendar Day" shall be a day of 24 hours measured from midnight to the next midnight, and is any day of the year, with no days being excluded.
2. A "Working Day" shall be a day which permits construction of the principal units of the Work for a period of not less than 7 hours between 7:00 a.m. and 6:00 p.m. Working Days do not include days on which weather or other conditions not under the control of the CMAR prevent CMAR from working the 7 hours defining a Working Day. Working Days do not include Saturdays, Sundays or any of the following holidays: New Year, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the day after Thanksgiving and Christmas Eve and Christmas Day.

D. *Defective:*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:
  - a. does not conform to the Contract Documents; or
  - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
  - c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
  3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
  4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
  5. Specifications are written in modified brief style. Requirements apply to all Work of the same kind, class, and type even though the word "all" is not stated.
  6. Simple imperative sentence structure is used which places a verb as the first word in the sentence. It is understood that the words "furnish", "install", "provide", or similar words include the meaning of the phrase "The CMAR shall..." before these words.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## ARTICLE 2 – PRELIMINARY MATTERS

### 2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

### 2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to ~~ten~~ five printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

### 2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after



the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
2. a preliminary Schedule of Submittals; and
3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

- B. Before undertaking each part of the Work, CMAR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CMAR shall promptly report in writing to the Engineer any conflict, error, ambiguity or discrepancy which the CMAR may discover and shall obtain a written interpretation from the Engineer before proceeding with any Work affected thereby. In the event of a conflict in the Drawings, Specifications, or other portions of the Contract Documents which were not reported prior to the Award of the Contract, the CMAR shall be deemed to have included the most expensive item in their Bid.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

## 2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
  2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
  3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

## **ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE**

### 3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all. Drawings and Specifications do not indicate or describe all of the Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the CMAR and coordinated with the Engineer. Provide any Work, materials or equipment required for a complete and functional system even if they are not detailed or specified.
1. The Contract requirements described in the General Conditions, Supplementary Conditions and General Requirements apply to each and all Specification Sections unless specifically noted otherwise.
  2. Organization of Contract Documents is not intended to control or to lessen the responsibility of the CMAR when dividing Work among Subcontractors, or to establish the extent of Work to be performed by any trade, Subcontractor or Supplier. Specifications or details do not need to be indicated or specified in each Specification or Drawing. Items shown in the Contract Documents are applicable regardless of location in the Contract Documents.
  3. Standard paragraph titles and other identifications of subject matter in the Specifications are intended to aid in locating and recognizing various requirements of the Specifications. Titles do not define, limit, or otherwise restrict Specification text.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor,

documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.

- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.
- D. Comply with the most stringent requirements where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, unless Contract Documents indicate otherwise.

Quantity or quality level shown or indicated shall be minimum to be provided or performed in every instance.

Actual installation may comply exactly with minimum quality indicated, or it may exceed that minimum within reasonable limits.

In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for context of requirements.

Refer instances of uncertainty to the Engineer for a decision before proceeding.

- E. Provide materials and equipment comparable in quality to similar materials and equipment incorporated in the Project or as required to meet the minimum requirements of the application if the materials and equipment are shown in the Drawings but are not included in the Specifications.
- F. The Contract Documents comprise the entire Agreement between Owner and CMAR. The Contract Documents may be modified only by Amendment or Field Order or Change Order.

### 3.02 *Reference Standards*

- A. Standards, Specifications, Codes, Laws, and Regulations
1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
  2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of

the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

- B. Comply with applicable construction industry standards as if bound or copied directly into the Contract Documents regardless of lack of reference in the Contract Documents. Apply provisions of the Contract Documents where Contract Documents include more stringent requirements than the referenced standards.

Standards referenced directly in the Contract Documents take precedence over standards that are not referenced but recognized in the construction industry as applicable.

Comply with standards not referenced but recognized in the construction industry as applicable for performance of the Work except as otherwise limited by the Contract Documents. The Engineer determines whether code or standard is applicable, or which of several are applicable.

Make copies of reference standards available as requested by Engineer or Owner.

### 3.03 *Reporting and Resolving Discrepancies*

#### A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
  - a. CMAR represents that he has familiarized himself with the nature and extent of the Contract Documents, Work, location, all local conditions, and Laws and Regulations that in any manner may affect performance of the Work, and represents that he has correlated his study and observations with the requirements of the Contract Documents. CMAR also represents that he has studied all conditions referred to in the Contract Documents and will make such additional surveys and investigations as he deems necessary for the performance of the Work at the Contract price in accordance with the requirements of the Contract Documents and that he has correlated the results of all such data with the requirements of the Contract Documents.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. ~~Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof. In the event of a conflict in the Drawings, Specifications, or other portions of the Contract Documents which were not reported prior to the Bid, the CMAR shall be deemed to have included the most expensive item, system, procedure, etc. in his Bid.~~

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
  - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
  - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
  1. A Field Order;
  2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or
  3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
  1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
  2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. ~~Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.~~ Nothing herein shall preclude CMAR from retaining copies of the Contract Documents for record purposes, unless specifically prohibited in writing by the Owner for security reasons. If the Owner so directs, CMAR shall surrender all copies of the construction Contract Documents and other related documents, in paper or digital format and remove these documents from computer equipment or storage devices as a condition of final payment.

### 3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

## **ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS**

### 4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

- C. ~~Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment. CMAR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment. A copy of the written agreements for the use of such land shall be provided to the Owner for record purposes.~~

#### 4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the “technical data” contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such “technical data” is identified in the Supplementary Conditions. Except for such reliance on such “technical data,” Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions, or information.

#### 4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
2. is of such a nature as to require a change in the Contract Documents; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly but no later than within 3 days after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
  - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
  - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
  - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
  - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
  - c. Contractor failed to give the timely written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.



#### 4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
  - a. reviewing and checking all such information and data;
  - b. locating all Underground Facilities shown or indicated in the Contract Documents;
  - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
  - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly but no later than within 3 days after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

#### 4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

#### 4.06 *Hazardous Environmental Condition at Site*

~~A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.~~

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

~~B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:~~

- ~~1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or~~
- ~~2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or~~
- ~~3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.~~

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph

6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. ~~To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence. TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, OWNER SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS CMAR, AND SUBCONTRACTORS AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO A HAZARDOUS ENVIRONMENTAL CONDITION, PROVIDED THAT SUCH HAZARDOUS ENVIRONMENTAL CONDITION: (I) WAS NOT SHOWN OR INDICATED IN THE DRAWINGS OR SPECIFICATIONS OR IDENTIFIED IN THE CONTRACT DOCUMENTS TO BE INCLUDED WITHIN THE~~

**SCOPE OF THE WORK, AND (II) WAS NOT CREATED BY CMAR OR BY ANYONE FOR WHOM CMAR IS RESPONSIBLE. NOTHING IN THIS PARAGRAPH 4.06.G SHALL OBLIGATE OWNER TO INDEMNIFY ANY INDIVIDUAL OR ENTITY FROM AND AGAINST THE CONSEQUENCES OF THAT INDIVIDUAL'S OR ENTITY'S OWN NEGLIGENCE.**

- H. ~~To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CMAR SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO A HAZARDOUS ENVIRONMENTAL CONDITION CREATED BY CMAR OR BY ANYONE FOR WHOM CMAR IS RESPONSIBLE. NOTHING IN THIS PARAGRAPH 4.06.H SHALL OBLIGATE CMAR TO INDEMNIFY ANY INDIVIDUAL OR ENTITY FROM AND AGAINST THE CONSEQUENCES OF THAT INDIVIDUAL'S OR ENTITY'S OWN NEGLIGENCE.**~~
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

## **ARTICLE 5 – BONDS AND INSURANCE**

### **5.01 *Performance, Payment, and Other Bonds***

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's

authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02. Failure of the CMAR to provide a satisfactory replacement bond may be considered an event of default under Article 15, Paragraph 15.02.
- D. CMAR or surety on behalf of CMAR shall promptly notify the Owner of all claims filed against the Payment Bond. When a claimant has satisfied the conditions prescribed by Texas Government Code 2253, the CMAR or surety on behalf of CMAR shall, with reasonable promptness, notify the claimant and Owner of the amounts that are undisputed and the basis for challenging any amounts that are disputed, including, but not limited to, the lack of substantiating documentation to support the claim as to entitlement or amount, and the CMAR or surety on behalf of CMAR shall, with reasonable promptness, pay or make arrangements for payment of any undisputed amount; provided, however, that the failure of the CMAR or surety on behalf of CMAR to timely discharge its obligations under this paragraph or to dispute or identify any specific defense to all or any part of a claim shall not be deemed to be an admission of liability by the CMAR or surety as to such claim or otherwise constitute a waiver of the CMAR's or surety's defenses to, or right to dispute, such claim.
- E. Owner shall not be liable for payment of any costs or expenses of any claimant under Payment Bonds, and shall have no obligations to make payments to, give notices on behalf of, or otherwise have obligations to claimants under Payment Bonds.

#### 5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.
- B. Sureties providing performance, payment and other bonds shall have an A.M. Best Company Rating of A-VIII or better. Insurance companies providing insurance required by Contract Documents shall have an A.M. Best Company Rating of A-VIII or better.

#### 5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain in accordance with Paragraph 5.04.

- ~~B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.~~
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

#### 5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
  2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
  3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
  4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
    - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
    - b. by any other person for any other reason;
  5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
  6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

- B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
  - a. Such insurance shall remain in effect for two years after final payment.
  - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

C. Worker's Compensation and Employer's Liability Insurance required by Paragraph 5.04.A.1 and 5.04.A.2 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

<u>Workers' Compensation, etc.,</u>	
1) <u>State:</u>	<u>Statutory</u>
2) <u>Applicable Federal (e.g., Longshore)</u>	<u>Statutory</u>
<u>Employers' Liability</u>	
1) <u>Bodily Injury by Accident</u>	<u>\$1,000,000</u>
2) <u>Bodily Injury by Disease - Each Employee</u>	<u>\$1,000,000</u>

3) Bodily Injury by Disease - Policy Limit	\$1,000,000
4) Maritime Coverage Endorsement	
<u>Insurance shall include a waiver of subrogation in favor of the Additional Insured identified in Paragraph 5.04.B.1.</u>	

D. CMAR's Liability Insurance required by Paragraph 5.04.A.3, through 5.04.A.5 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

<u>Insurance for Claims of Damages</u>	
1) <u>General Aggregate (Except Products - Completed Operations)</u>	<u>\$50,000,000 / Occurrence</u> <u>\$100,000,000 / Aggregate</u>
2) <u>Products - Completed Operations Aggregate</u>	<u>\$50,000,000 / Occurrence</u> <u>\$100,000,000 / Aggregate</u>
3) <u>Personal and Advertising Injury (One Person/Organization)</u>	<u>\$1,000,000</u>
4) <u>Each Occurrence (Bodily Injury and Property Damage)</u>	<u>\$50,000,000</u>
6) <u>Personal Injury Liability coverage will include claims arising out of Employment Practices Liability, limited to coverage provided under standard contract.</u>	<u>1,000,000</u>
7) <u>Property Damage Liability insurance will provide explosion, collapse and underground coverage where applicable</u>	<u>\$100,000,000</u>
8) <u>Watercraft Liability Policy. Coverage shall apply to all self-propelled vessels</u>	<u>\$1,000,000</u>
9) <u>Excess Liability, Umbrella Form to include coverage of Watercraft Liability. General Aggregate - Each Occurrence</u>	<u>\$100,000,000</u>

CMAR's Liability Insurance shall also include completed operations and product liability coverage, and eliminate the exclusion with respect to property under the care, custody and control of CMAR. In lieu of elimination of the exclusion, CMAR may provide and maintain Installation Floater insurance for property under the care, custody, or control of CMAR. The Installation Floater insurance shall be a broad form or "All Peril" policy providing coverage for all materials, supplies, machinery, fixture, and equipment which will be incorporated into the Work. Coverage under the CMARs Installation Floater will include:



- faulty or defective workmanship, materials, maintenance or construction,
- cost to remove defective or damaged Work from the Site or to protect it from loss or damage,
- cost to cleanup and remove pollutants,
- coverage for testing and startup,
- any loss to property while in transit,
- any loss at the Site,
- any loss while in storage, both on-Site and off-Site, and
- any loss to temporary Work if the value is included in the Contract Price.

Coverage cannot be contingent on an external cause or risk or limited to property for which the CMAR is legally liable. CMAR's Installation Floater will provide limits of insurance adequate to cover the value of the installation. The CMAR will be solely responsible for any deductible carried under this coverage and claims on materials, supplies, machinery, fixture, and equipment which will be incorporated into the Work while in transit or in storage. This policy will include a waiver of subrogation for those listed as additional insured in these Supplemental Conditions.

E. CMAR's Automobile Liability Insurance required by Paragraph 5.04.A.6 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

<u>Bodily Injury:</u>	
<u>1) Each Person</u>	<u>\$1,000,000</u>
<u>2) Each Accident</u>	<u>\$1,000,000</u>
<u>Property Damage:</u>	
<u>1) Each Accident</u>	<u>\$1,000,000</u>
<u>Or</u>	
<u>2) Combined Single Limit (Bodily Injury and Property Damage)</u>	<u>\$1,000,000</u>

F. Additional insured on all insurance policies in accordance with Paragraph 5.04.B.1 include:

North Texas Municipal Water District  
Freese and Nichols, Inc.  
Cyganiewicz Geotechnical LLC  
Darell Zimbelman (individual peer reviewer)  
Gorronдона and Associates  
Texplor of Dallas, Inc.  
True Grit  
TRI Environmental  
Gehrig, Inc.  
Utah Water Research Laboratory

G. CMAR's Contractual Liability Insurance required by Paragraph 5.04.B.3 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

<u>CMAR's Contractual Liability Insurance</u>	
<u>1) General Aggregate</u>	<u>\$100,000,000</u>
<u>2) Each Occurrence (Bodily Injury and Property Damage)</u>	<u>\$50,000,000</u>

5.05 *Owner's Liability Insurance*

A. ~~In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.~~ In addition to the insurance required to be provided by CMAR under Paragraph 5.04, CMAR shall purchase and maintain for Owner, at no additional cost, Owner's Protective Liability insurance naming Owner as the named insured with insurance that will protect said parties against claims which may arise from operations under the Contract Documents. This coverage shall be from the same company that provides CMAR's liability insurance coverage, and in the same minimum amounts. The Engineer and Engineer's consultants are additional insured as their interest may appear including their officers, directors, agents and employees.

5.06 *Property Insurance*

A. ~~Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:~~ CMAR shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to deductible amounts as may be provided by the Supplementary Conditions or required by Laws and regulations). The policies of insurance required to be purchased and maintained by

CMAR in accordance with this Paragraph 5.06 shall comply with requirements of Paragraph 5.08. This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
  2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
  3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
  4. cover materials and equipment stored at the Site or at another location and in transit for incorporation in the Work from such storage locations that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
  5. allow for partial utilization of the Work by Owner;
  6. include testing and startup; and
  7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. ~~Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee. CMAR shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of those listed as an insured or listed as an additional insured in Paragraph 5.04.B.1.~~
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to

each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

- ~~D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.~~
- ~~E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.~~

#### 5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- ~~B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:~~
- ~~1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and~~
  - ~~2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained~~

~~on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.~~

- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

#### ~~5.08 Receipt and Application of Insurance Proceeds~~

- ~~A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.~~
- ~~B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.~~

#### 5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

#### 5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall

commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

5.11 Owner's Insurance for Project

- A. Owner shall not be responsible for purchasing and maintaining any insurance to protect the interest of the CMAR, Subcontractors, Engineers, or others in the Work. The stated limits of insurance required are minimum only. CMAR shall determine the limits that are adequate. These limits may be basic policy limits or any combination of basic limits and umbrella limits. In any event, CMAR is fully responsible for all losses arising out of, resulting from or connected with operations under this Contract whether or not said losses are covered by insurance. The acceptance of certificates or other evidence of insurance by the Owner, Engineer, and/or others listed as additional insured in Paragraph 5.04.B.1 that in any respect do not comply with the Contract requirements does not release the CMAR from compliance herewith.

**ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES**

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents and properly executed by the CMAR.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. ~~Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.~~ Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, no Work shall be performed at the Site between 6:00 p.m. and 7:00 a.m. CMAR will not permit the

performance of Work on a Saturday, Sunday, or any District holiday without Owner's written consent. Should CMAR desire to Work on these days, he shall contact the Owner, in writing, for approval at least 48 hours in advance. Emergency Work may be done without prior permission. Tie-ins and connections to existing facilities will be made at time authorized by the Owner.

### 6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

### 6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
  - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
  - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

### 6.05 *Substitutes and "Or-Equals"*

- A. ~~Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below. Where equipment and products are specified by name, no substitutes or "or-equal" will be considered or approved unless the term "or-equal" is included in the individual Specification. If substitutes or "or equals" are specifically permitted for~~

consideration by the individual Specifications, they must be submitted and will be reviewed and evaluated in accordance with the provisions established in Paragraph 6.05 and in the General Requirements of the Specifications.

1. *“Or-Equal” Items:* If in Engineer’s sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an “or-equal” item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
  - a. in the exercise of reasonable judgment Engineer determines that:
    - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
    - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
    - 3) it has a proven record of performance and availability of responsive service.
  - b. Contractor certifies that, if approved and incorporated into the Work:
    - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
    - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
2. *Substitute Items:*
  - a. If in Engineer’s sole discretion an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
  - b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
  - c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
  - d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:



- 1) shall certify that the proposed substitute item will:
  - a) perform adequately the functions and achieve the results called for by the general design,
  - b) be similar in substance to that specified, and
  - c) be suited to the same use as that specified;
- 2) will state:
  - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
  - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
  - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
- 3) will identify:
  - a) all variations of the proposed substitute item from that specified, and
  - b) available engineering, sales, maintenance, repair, and replacement services; and
- 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. ~~No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal."~~ "No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by

either a Change Order or Field Order. Engineer will advise Contractor in writing of any negative determination.

- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute or "or-equal" proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute or "or-equal" so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute or "or-equal". Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute or "or-equal".
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

#### 6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the ~~Supplementary Conditions~~ Contract Documents require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the ~~Supplementary Conditions~~ Contract Documents, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
  2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.
- H. Owner or Engineer may furnish to any such Subcontractor, Supplier, or other person or organization, to the extent practicable, information about amounts paid to CMAR in accordance with CMAR's Application for Payment on account of the particular Subcontractor's, Supplier's, other person's or other organization's Work.

#### 6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

- B. ~~To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights. TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, OWNER SHALL INDEMNIFY AND HOLD HARMLESS CMAR, AND ITS OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS, AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY INFRINGEMENT OF PATENT RIGHTS OR COPYRIGHTS INCIDENT TO THE USE IN THE PERFORMANCE OF THE WORK OR RESULTING FROM THE INCORPORATION IN THE WORK OF ANY INVENTION, DESIGN, PROCESS, PRODUCT, OR DEVICE SPECIFIED IN THE CONTRACT DOCUMENTS, BUT NOT IDENTIFIED AS BEING SUBJECT TO PAYMENT OF ANY LICENSE FEE OR ROYALTY TO OTHERS REQUIRED BY PATENT RIGHTS OR COPYRIGHTS.~~
- C. ~~To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents. TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CMAR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY INFRINGEMENT OF PATENT RIGHTS OR COPYRIGHTS INCIDENT TO THE USE IN THE PERFORMANCE OF THE WORK OR RESULTING FROM THE INCORPORATION IN THE WORK OF ANY INVENTION, DESIGN, PROCESS, PRODUCT, OR DEVICE NOT SPECIFIED IN THE CONTRACT DOCUMENTS.~~

## 6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or,

if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

#### 6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. ~~If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03. If CMAR performs any Work that it is contrary to Laws or Regulations, CMAR shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work.~~
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.
- D. All Bidders are required to complete and submit with their Bid the Vendor Compliance to State Law form, which follows the Proposal.
- E. Workers Compensation Statement for Building or Construction Projects for Government entities in Texas. Definitions included in 6.09.E pertain only to 6.09.E and are included verbatim as a statutory requirement of the State of Texas.

##### 1. Definitions:

Certificate of coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project for the duration of the project.

Duration of the Project - includes the time from the beginning of the Work on the project until the CMAR's/person's Work on the project has been completed and accepted by the governmental entity.

Persons providing services on the Project ("Subcontractor" in 406.096) - includes all persons or entities performing all or part of the services the CMAR has undertaken to

perform on the project, regardless of whether that person contracted directly with the CMAR and regardless of whether that person has employees. This includes, without limitation, independent CMARs, Subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

2. The CMAR shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the CMAR providing services on the Project, for the duration of the Project.
3. The CMAR must provide a certificate of coverage to the governmental entity prior to being awarded the Contract.
4. If the coverage period shown on the CMAR's current certificate of coverage ends during the duration of the Project, the CMAR must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.
5. The CMAR shall obtain from each person providing services on a project, and provide to the governmental entity:
  - a. a certificate of coverage, prior to that person beginning Work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and
  - b. no later than 7 days after receipt by the CMAR, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.
6. The CMAR shall retain all required certificates of coverage for the duration of the Project and for 1 year thereafter.
7. The CMAR shall notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the CMAR knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.
8. The CMAR shall post on each project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.
9. The CMAR shall contractually require each person with whom it contracts to provide services on a project, to:

- a. provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the project, for the duration of the project;
  - b. provide to the CMAR, prior to that person beginning Work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;
  - c. provide the CMAR, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
  - d. obtain from each other person with whom it contracts, and provide to the CMAR:
    - 1) a certificate of coverage, prior to the other person beginning Work on the project; and
    - 2) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
  - e. retain all required certificates of coverage on file for the duration of the project and for 1 year thereafter;
  - f. notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and
  - g. contractually require each person with whom it contracts, to perform as required by Paragraphs (1) - (7), with the certificates of coverage to be provided to the person for whom they are providing services.
10. By signing this Contract or providing or causing to be provided a certificate of coverage, the CMAR is representing to the governmental entity that all employees of the CMAR who will provide services on the Project will be covered by workers' compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the CMAR to administrative penalties, criminal penalties, civil penalties, or other civil actions.
11. The CMAR's failure to comply with any of these provisions is a breach of Contract by the CMAR which entitles the governmental entity to declare the Contract void if the CMAR does not remedy the breach within 10 days after receipt of notice of breach from the governmental entity.

6.10 Taxes

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work. The Owner qualifies as an exempt agency as defined by the statutes of the State of Texas. The CMAR shall comply with all statutes and rulings of the State Comptroller.

6.11 Use of Site and Other Areas

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. ~~To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.~~ **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CMAR SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY CLAIM OR ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY SUCH OWNER OR OCCUPANT AGAINST OWNER, ENGINEER, OR ANY OTHER PARTY INDEMNIFIED HEREUNDER TO THE EXTENT CAUSED BY OR BASED UPON CMAR'S PERFORMANCE OF THE WORK.**

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.



- C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

#### 6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

#### 6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
  - 1. all persons on the Site or who may be affected by the Work;
  - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion). The CMAR's duties and responsibilities for the safety or protection of persons or the Work or property at the Site or adjacent thereto shall be reinstated when any additional efforts are required during the 1 year correction period to correct defects in the Work.

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. ~~If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.~~ If Engineer determines that the incident giving rise to the emergency action was not the responsibility of the CMAR and that a change in the Contract Documents is required because of the action taken by CMAR in response to such an emergency, a Change Order, Field Order or Work Change Directive will be issued.

## 6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

### 1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

### 2. *Samples:*

- a. Submit number of Samples specified in the Specifications.
- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

### C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

- a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
- b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
- c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
- d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
3. ~~With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.~~ With each submittal, CMAR shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents on a Shop Drawing Deviation Request form provided by the Engineer and request that a Field Order or Change Order be issued for each of the specific variations submitted for approval. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

*D. Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. ~~Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.~~ Engineer's review and approval shall not relieve CMAR from responsibility for any variation from the requirements of the Contract Documents unless CMAR has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation issuing a Field Order or Change Order. If the proposed Modification is approved by the Engineer, the submittal will be considered to be in strict compliance with the Contract Documents and it will be reviewed in accordance with the Contract Documents. If the proposed Modification is not approved, the submittal will be returned to the CMAR with appropriate comments.

Engineer's review and approval shall not relieve CMAR from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals. CMAR shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Re-submittals shall reference and respond directly to Engineer's previous comments. Any variations from strict compliance with the Contract Documents will be identified in the same manner as required in Paragraph 6.17.C.3 and will require the same approvals.
- F. CMAR shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than two submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples, or other items requiring approval and CMAR shall reimburse Owner for Engineer's charges for such time.
- G. In the event that CMAR requests a change of a previously approved item, CMAR shall reimburse Owner for Engineer's charges for its review time unless the need for such change is beyond the control of CMAR.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing. CMAR assumes and bears responsibility for all costs and time delays associated with any variation from the requirements of the Contract Documents.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
  1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
  2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;
2. recommendation by Engineer or payment by Owner of any progress or final payment;
3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
4. use or occupancy of the Work or any part thereof by Owner;
5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
6. any inspection, test, or approval by others; or
7. any correction of defective Work by Owner.

#### 6.20 *Indemnification*

A. ~~To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.~~ **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CMAR SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO THE PERFORMANCE OF THE WORK, PROVIDED THAT ANY SUCH CLAIM, COST, LOSS, OR DAMAGE IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE, OR DEATH, OR TO INJURY TO OR DESTRUCTION OF TANGIBLE PROPERTY (OTHER THAN THE WORK ITSELF), INCLUDING THE LOSS OF USE RESULTING THEREFROM BUT ONLY TO THE EXTENT CAUSED BY ANY INTENTIONAL, KNOWING, AND/OR NEGLIGENT ACT OR OMISSION OF CMAR, ANY SUBCONTRACTOR, ANY SUPPLIER, OR ANY INDIVIDUAL OR ENTITY DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM TO PERFORM ANY OF THE WORK OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE.**

- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- ~~C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:~~
- ~~1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or~~
  - ~~2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.~~

#### 6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

## **ARTICLE 7 – OTHER WORK AT THE SITE**

### *7.01 Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
1. written notice thereof will be given to Contractor prior to starting any such other work; and
  2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

### *7.02 Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
  2. the specific matters to be covered by such authority and responsibility will be itemized; and
  3. the extent of such authority and responsibilities will be provided.



- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

### 7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- ~~B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.~~
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

### 7.04 *Claims between Contractors*

- A. Should CMAR cause damage to the Work or property of any other contractor at the Site, or should any claim arising out of CMAR's performance of the Work at the Site be made by any other contractor against CMAR, Owner, Engineer, or the construction coordinator, then CMAR (without involving Owner, Engineer, or construction coordinator) shall either (1) remedy the damage, (2) agree to compensate the other contractor for remedy of the damage, or (3) remedy the damage and attempt to settle with such other contractor by agreement, or otherwise resolve the dispute by arbitration or at law.
- B. **CMAR SHALL, TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, DEFEND, INDEMNIFY AND HOLD HARMLESS OWNER, ENGINEER, THE CONSTRUCTION COORDINATOR AND THE OFFICERS, DIRECTORS, PARTNERS, EMPLOYEES, AGENTS AND OTHER CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES AND DAMAGES (INCLUDING, BUT NOT LIMITED TO, FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND COURT AND ARBITRATION COSTS) ARISING DIRECTLY, INDIRECTLY OR CONSEQUENTIALLY OUT OF ANY ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY OTHER CONTRACTOR AGAINST OWNER, ENGINEER, CONSULTANTS, OR THE CONSTRUCTION COORDINATOR TO THE EXTENT SAID CLAIM IS BASED ON OR ARISES OUT OF CMAR'S PERFORMANCE OF THE WORK. SHOULD ANOTHER CONTRACTOR CAUSE DAMAGE TO THE WORK OR PROPERTY OF CMAR OR SHOULD THE PERFORMANCE OF WORK BY ANY OTHER CONTRACTOR AT THE SITE GIVE RISE TO ANY OTHER CLAIM, CMAR SHALL NOT INSTITUTE ANY ACTION, LEGAL OR EQUITABLE, AGAINST OWNER, ENGINEER, OR THE CONSTRUCTION COORDINATOR OR PERMIT ANY ACTION AGAINST ANY OF THEM TO BE MAINTAINED AND CONTINUED IN ITS NAME OR FOR ITS BENEFIT IN ANY COURT OR BEFORE ANY ARBITER WHICH SEEKS TO IMPOSE LIABILITY ON OR TO RECOVER DAMAGES FROM OWNER, ENGINEER, OR THE CONSTRUCTION COORDINATOR ON ACCOUNT OF ANY SUCH DAMAGE OR CLAIM.**
- C. If CMAR is delayed at any time in performing or furnishing the Work by any act or neglect of Owner or another contractor who is not directly or indirectly under the control of CMAR, and Owner and CMAR are unable to agree as to the extent of any adjustment in Contract Times

attributable thereto, CMAR may make a Claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be CMAR's exclusive remedy with respect to Owner, Engineer, and construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor – there shall be no adjustment of the Contract Price allowed. This paragraph does not prevent recovery from Owner, Engineer, or construction coordinator for activities that are their respective responsibilities.

## **ARTICLE 8 – OWNER'S RESPONSIBILITIES**

### **8.01 *Communications to Contractor***

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

### **8.02 *Replacement of Engineer***

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

### **8.03 *Furnish Data***

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

### **8.04 *Pay When Due***

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

### **8.05 *Lands and Easements; Reports and Tests***

A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

### **8.06 *Insurance***

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

### **8.07 *Change Orders***

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

**ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION**

9.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and

observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

### 9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.
- B. The Resident Project Representative (the "RPR") will be Engineer's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealings in matters pertaining to the Work in general shall be with Engineer and CMAR. RPR's dealings with Subcontractors shall be through or with the full knowledge and approval of CMAR. The RPR shall:
  - 1. Schedules: Review the Progress Schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by CMAR and consult with Engineer concerning acceptability.
  - 2. Conferences and Meetings: Attend meetings with CMAR, such as preconstruction conferences, progress meetings, job conferences and other Project-related meetings, and prepare and circulate copies of minutes thereof.
  - 3. Liaison:
    - a. Serve as Engineer's liaison with CMAR, working principally through CMAR's authorized representative, assist in providing information regarding the intent of the Contract Documents.
    - b. Assist Engineer in serving as Owner's liaison with CMAR when CMAR's operations affect Owner's on-Site operations.
    - c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

4. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to CMAR clarifications and interpretations as issued by Engineer.
5. Shop Drawings and Samples:
  - a. Record date of receipt of Samples and approved Shop Drawings.
  - b. Receive Samples which are furnished at the Site by CMAR, and notify Engineer of availability of Samples for examination.
6. Changes Consider and evaluate CMAR's suggestions for changes in Drawings or Specifications and report such suggestions, together with RPR's recommendations, to Engineer. Transmit to CMAR in writing decisions as issued by Engineer.
7. Review of Work and Rejection of Defective Work:
  - a. Conduct on-Site observations of CMAR's Work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
  - b. Report to Engineer whenever RPR believes that any part of CMAR's Work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of Work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
8. Inspections, Tests, and System Startups:
  - a. Verify that tests, equipment, and systems startups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that CMAR maintains adequate records thereof.
  - b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems startups.
9. Records:
  - a. Record names, addresses, fax numbers, e-mail addresses, website locations, and telephone numbers of all, Subcontractors, and major Suppliers of materials and equipment.
  - b. Maintain records for use in preparing Project documentation.
10. Reports:

- a. Furnish to Engineer periodic reports as required of progress of the Work and of CMAR's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.
  - b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from CMAR.
  - c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition.
11. Payment Requests: Review Applications for Payment with CMAR for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.
12. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, Operation and Maintenance Manuals and other data required by the Specifications to be assembled and furnished by CMAR are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.
13. Completion:
- a. Participate in a Substantial Completion inspection, assist in the determination of Substantial Completion and the preparation of lists of items to be completed or corrected.
  - b. Participate in a final inspection in the company of Engineer, Owner, and CMAR and prepare a final list of items to be completed and deficiencies to be remedied.
  - c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.
- C. The RPR shall not:
1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
  2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
  3. Undertake any of the responsibilities of CMAR, Subcontractors, Suppliers, or CMAR's superintendent.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of CMAR's Work unless such advice or directions are specifically required by the Contract Documents.
5. Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or CMAR.
6. Participate in specialized field or laboratory tests or inspections conducted off-Site by others except as specifically authorized by Engineer.
7. Accept Shop Drawing or Sample submittals from anyone other than CMAR.
8. Authorize Owner to occupy the Project in whole or in part.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05. The CMAR shall notify the Engineer in writing prior to beginning any Work addressed in a Field Order if the CMAR does not agree that the Work involved represents no additional cost and/or time change in the Contract Documents.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.



- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

**ARTICLE 10 – CHANGES IN THE WORK; CLAIMS**

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
  2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
  3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.
- B. CMAR assumes and bears responsibility for all costs and time delays associated with any variation from the requirements of the Contract Documents unless the variation is specifically approved by Change Order.

#### 10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

#### 10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than ~~30~~ 07 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within ~~60~~ 30 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The parties agree and acknowledge that the ability to accurately determine causation, liability, and proper adjustments to the Contract Time and/or Contract Price under these

conditions are extremely time sensitive. It is anticipated that a failure by CMAR to provide the aforementioned notice(s) and / or supporting documents within the prescribed deadlines would greatly frustrate if not make impossible the task of accurately analyzing the Claim. As such, CMAR hereby agrees and any failure by CMAR to provide the aforementioned notice(s) and / or supporting documents within the prescribed deadlines shall constitute an unequivocal waiver of said Claim, if any. The opposing party shall submit any response to Engineer and the claimant within ~~30~~ 07 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
  2. approve the Claim; or
  3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

## **ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

### *11.01 Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than ~~those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items~~ those paid for the Work included in the Contract Price, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B. CMAR shall provide certified payroll records listing personnel classifications and salaries for all individuals involved in additional Work. Salaries for those not

included in the certified payroll will be considered as being compensated under Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, ~~without limitation, superintendents, foremen~~ one foreman (unless agreed upon prior to beginning Work), and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall ~~be included in the above~~ not exceed 1.5 times regular pay and shall be included in the above to the extent authorized by Owner.
2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
  - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
  - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

- c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence acts or omissions of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, superintendents, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
  4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
  5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form and at intervals acceptable to Engineer an itemized cost breakdown together with supporting data.

#### 11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:*
1. Contractor agrees that:
    - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
    - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance:*
1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- ~~D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
  - 1. ~~the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and~~
  - 2. ~~there is no corresponding adjustment with respect to any other item of Work; and~~
  - 3. ~~Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.~~~~

D. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

- 1. If the total cost of a particular item of Unit Price Work amounts to 20 percent or more of the total Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by the CMAR differs by more than 20 percent from the estimated quantity of such item indicated in the Agreement; and
- 2. if there is no corresponding adjustment with respect to any other item of Work; and
- 3. if CMAR believes that CMAR has incurred additional expense as a result thereof; or if Owner believes that the quantity variation entitles Owner to an adjustment in the Unit Price, either the Owner or CMAR may make a claim for an adjustment in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the effect of any such variation in the quantity of the Unit Price Work performed.

## ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

### 12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
  3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
  2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
    - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
    - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
    - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
    - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
    - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a



deduction in Contractor's fee by an amount equal to five percent of such net decrease;  
and

- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

#### 12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

#### 12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God. No time extensions will be allowed for weather conditions for Projects using Calendar Days for the Contract Time. The CMAR agrees to make no Claims for an adjustment in the Contract Price for damage due to delay in the performance of the Contract occasioned by any act or omission to act of the Owner, Engineer, or any of the Engineer's or Owner's agents and/or contractors, and agrees that any such claim shall be fully compensated by an extension of the Contract Time, as set forth in a Change Order, to complete performance of the Work as provided herein.
- ~~B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.~~
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C. The CMAR agrees to make no Claims for an adjustment in the Contract

Price for damage due to delay in the performance of the Work occasioned by fire, flood, epidemic, abnormal weather conditions, acts of God, or other causes not the fault of and beyond control of Owner and Contractor, and agrees that any such claim shall be fully compensated by an extension of the Contract Time, as set forth in a Change Order, to complete performance of the Work as provided herein.

- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

#### 12.04 *No Damage for Delays*

- A. The CMAR agrees to make no Claim for an adjustment in the Contract Price for damage due to delay in the performance of the Contract occasioned by any act or omission to act of the Owner, Engineer, or any of the Engineer's or Owner's agents and/or contractors, and agrees that any such claim shall be fully compensated by an extension of the Contract Time, as set forth in a Change Order, to complete performance of the Work as provided herein..

### **ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

#### 13.01 *Notice of Defects*

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

#### 13.02 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

#### 13.03 *Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

~~B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:~~

- ~~1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;~~
- ~~2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and~~
- ~~3. as otherwise specifically provided in the Contract Documents.~~

B. CMAR shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents. The CMAR is solely responsible for maintaining that the quality of Work is in accordance with the Contract Documents. The CMAR shall be responsible for the notification and scheduling required assuring that a certified technician from the testing laboratory is present during all sampling and testing procedures required in the Contract Documents. The CMAR shall not proceed with Work requiring such testing without the presence of the laboratory's certified technician. The Owner, at his option, may perform additional tests as quality monitoring. Quality monitoring activities of the Owner and Engineer, or failure on the part of the Owner or Engineer to perform tests on Work, in no way relieves the CMAR of the obligation to perform Work and furnish materials conforming to the Contract Documents.

1. CMAR's Responsibilities

- a. Control the quality of Work produced and verify that the Work performed meets the standards of quality established in the Contract Documents.
  1. Inspect and verify conformance of all materials furnished and Work performed, whether by the CMAR, its Subcontractors or its Suppliers.
  2. Provide and pay for the services of a testing laboratory approved by Owner to insure that products proposed for use fully comply with the Contract Documents.
  3. Perform tests as indicated in this and other sections of the Specifications. Schedule the time and sequence of testing with the Owner and Engineer. Testing is to be observed by the Owner, Engineer, or designated representative.
  4. Promptly replace any defective materials and/or Work incorporating defective materials or workmanship.
  5. Provide Certified Test Reports as required by the "Submittal Procedures" Section. Reports are to indicate that materials and construction are in compliance with the Contract Documents.
  6. Assist the Engineer, Owner, and Owner's testing organization to perform quality monitoring activities.

2. Quality Monitoring Activities by the Owner

- a. Quality Monitoring activities of the Owner and Engineer through their own forces or through contracts with materials testing laboratories and survey crews are for the Owner's use in monitoring the results of the CMAR's Work and quality control activities, if deemed necessary by the Owner and Engineer. The Quality Monitoring activities of the Owner do not relieve the CMAR of its responsibility to provide testing in accordance with the requirements of the Contract Documents or to provide materials and Work complying with the Contract Documents.

3. Submittals

- a. Submittals shall be accordance with the "Submittal Procedures" Section, and shall include:
1. The name of the proposed primary and secondary testing laboratories along with documentation of qualifications, a list of tests that can be performed, and a list of the certified laboratory technicians and the licensed engineers who will be performing the sampling and testing for the Work along with their certifications and licenses.
  2. Test reports per Paragraph 7 "Test Reports" of this Supplementary Condition.

4. Standards

- a. Provide a testing laboratory that complies with the ASTM (American Society of Testing Materials) and/or ACIL (American Council of Independent Laboratories) "Recommended Requirements for Independent Laboratory Qualifications", or other specified testing organizations.
- b. Perform tests listed in the Specifications.

5. Delivery and Storage

- a. Handle and protect test specimens of products and construction materials at the construction Site in accordance with ASTM or other applicable testing procedures.

6. Verification Testing

- a. Provide verification testing when tests performed by the Owner indicate that materials or the results of construction activities are not in conformance with Contract Documents.
- b. Verification testing is to be provided at the CMAR's expense to verify products or Work are in compliance after corrections have been made.

c. Tests must comply with recognized methods or with methods recommended by the Owner's testing laboratory and approved by the Engineer.

7. Test Reports

A. Test reports are to be prepared for all tests.

1. Tests performed by testing laboratories may be submitted on their standard test report forms. These reports must include the following:

a. Name of the Owner, Project title and number, equipment installer and general CMAR.

b. Name of the laboratory, address, and telephone number.

c. Name and signature of the certified laboratory personnel performing the sampling and testing.

d. Date and time of sampling, inspection, and testing.

e. Date the report was issued.

f. Description of the test performed.

g. Weather conditions and temperature at time of test or sampling.

h. Location at the Site or structure where the test was taken.

i. Standard or test procedure used in making the test.

j. A description of the results of the test.

k. Statement of compliance or non-compliance with Contract Documents.

l. Interpretations of test results, if appropriate.

B. Distribute copies of the test reports to:

<u>Recipient</u>	<u>No. of Copies</u>
<u>Owner</u>	<u>2 copies</u>
<u>Resident Project Representative</u>	<u>1 copy</u>
<u>Engineer</u>	<u>1 copy</u>
<u>CMAR</u>	<u>1 copy</u>

8. Non-Conforming Work

- A. CMAR shall promptly correct any Work that is not in compliance with the Contract Documents and shall immediately notify the Owner when the corrective Work will be performed.
- B. Payment for non-conforming Work shall be withheld until such Work is corrected or replaced with Work complying with the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

#### 13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

### 13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

### 13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

### 13.07 *Correction Period*

- A. When early acceptance of a Substantially Completed portion of the Work is accomplished in the manner indicated, the correction period for that portion of the Work shall commence at the time of Substantial Completion of that Work. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
1. repair such defective land or areas; or
  2. correct such defective Work; or
  3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

#### 13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

#### 13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract



Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.

- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

## ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

### 14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

### 14.02 *Progress Payments*

#### A. *Applications for Payments:*

1. ~~At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.~~ On the first Working Day following the 25th of each month, CMAR shall submit to Owner for review an Application for Payment filled out and signed by CMAR covering the Work completed as of the date of the Application and

accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

*B. Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
  - a. the Work has progressed to the point indicated;
  - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
  - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
  - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or

- involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
- b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
    - a. to supervise, direct, or control the Work, or
    - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
    - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
    - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
    - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
  5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
    - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
    - b. the Contract Price has been reduced by Change Orders;
    - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
    - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

*C. Payment Becomes Due:*

1. ~~Ten~~ Sixty days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
  - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
  - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
  - c. there are other items entitling Owner to a set-off against the amount recommended;
  - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A;
  - e. Owner has been notified of failure to make payments to Subcontractors or Suppliers or for labor;
  - f. failure to submit up-to-date record documents as required by GC-6.12,;
  - g. failure to submit monthly Progress Schedule updates or revised schedules as requested by the Owner or Engineer; or
  - h. failure to provide Project photographs required by Specifications.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action to Owner's satisfaction.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 ~~and subject to interest as provided in the Agreement.~~
4. Owner may permanently withhold payment from Contract Price for
  - a. liquidated damages incurred by CMAR, or
  - b. compensation for Engineer for overtime charges of Resident Project Representative, third review of submittals, review of substitutions, re-inspection fees, inspections or designs related to correction of defective Work, or other Services identified as requiring payment by the CMAR. Compensation will be based on the following rates:

Position	Hourly Rate
Principal in Charge	\$275

Project Manager	\$205
Project Engineer	\$165
Construction Manager	\$165
Resident Engineer	\$145
Resident Project Representative	\$125
Senior Resident Representative	\$160
Design Engineer	\$145
Engineering Technician	\$115
Clerk	\$60
Expenses will be billed at the actual cost multiplied by 1.15.	

- c. Costs for tests performed by the Owner to verify that Work previously tested and found to be defective has been corrected. Verification testing is to be provided at the CMAR's expense to verify products or Work are in compliance after corrections have been made.

#### 14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

#### 14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's

objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

#### 14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
  - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
  - 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
  - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
  - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

#### 14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 14.07 *Final Payment*

##### A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
  - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
  - b. consent of the surety, if any, to final payment;
  - c. a list of all Claims against Owner that Contractor believes are unsettled; and
  - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

##### B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for

Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

1. ~~Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor. The first Working Day following the 20th day of the second month following the submittal of the final Application for Payment and accompanying documentation, the amount recommended by the Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to CMAR.~~

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

~~A. The making and acceptance of final payment will constitute:~~

- ~~1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and~~
- ~~2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.~~



The making and acceptance of final payment will constitute a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

## **ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION**

### *15.01 Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

### *15.02 Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
  2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
  3. Contractor's repeated disregard of the authority of Engineer; or
  4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
  5. If CMAR fails to provide the replacement bond required by General Conditions, Section 5.01.C or insurance coverage as required by General Conditions Article 5.
  6. If any petition of bankruptcy is filed by or against CMAR, or if CMAR is adjudged as bankrupt or insolvent or makes a general assignment for the benefit of creditors, or if a receiver is appointed for the benefit of CMAR's creditors, or if a receiver is appointed on account of CMAR's insolvency, upon the occurrence of any such event, Owner shall be entitled to request of CMAR or its successor in interest adequate assurance of future performance in accordance with the terms and conditions hereof. Failure to comply with such request within 7 days of delivery of the request shall entitle Owner to terminate this Agreement and to the accompanying rights set forth in Paragraphs 15.02 and 15.03 hereof. In all events pending receipt of adequate assurance of performance and actual performance in accordance therewith, Owner shall be entitled to proceed with the Work with its own forces or with other contractors on a time and material or other appropriate basis. The Cost of Work by Owner or other contractors will be back charged against the Contract Sum hereof.

- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
  2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
  3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- ~~F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.~~

### 15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
  2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
  3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
  4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

#### 15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

## **ARTICLE 16 – DISPUTE RESOLUTION**

### 16.01 *Methods and Procedures*

- ~~A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.~~

~~B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.~~

~~C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:~~

- ~~1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or~~
- ~~2. agrees with the other party to submit the Claim to another dispute resolution process; or~~
- ~~3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.~~

A. Owner and CMAR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Law.

## ARTICLE 17 – MISCELLANEOUS

### 17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

### 17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

B. All references and conditions for a "Calendar Day Contract" in the General Conditions shall apply for a "Fixed Date Contract." A "Fixed Date Contract" is one in which the calendar dates for reaching Substantial Completion and/or final completion are specified in lieu of identifying the actual Calendar Days involved.

### 17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise

imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the ~~state in which the Project is located~~ State of Texas.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

17.07 *Assignment*

- A. This Contract may not be assigned in whole or in part by the CMAR without the prior written consent of the Owner.

**ADDENDUM NO. 2**  
**NORTH TEXAS MUNICIPAL WATER DISTRICT**  
**CONSTRUCTION MANAGER AT RISK LOWER BOIS D'ARC CREEK**  
**RESERVOIR DAM AND INTAKE PROJECT**

**PROJECT NO. 344**

**NTD13565**

**JANUARY 29, 2015**

**PROPOSAL DATE: FEBRUARY 18, 2015**

***The following additions, deletions, modifications, or clarifications shall be made to the appropriate sections of the plans and specifications and shall become a part of the Contract Documents. Proposers shall acknowledge receipt of this Addendum in the space provided on the Proposal Form.***

**BIDDING REQUIREMENTS:**

1. 00 42 23.01 COST PROPOSAL

- a. Delete Paragraphs 2.02 C. and 3.02 C. in their entirety

2. 00 72 00 GENERAL CONDITIONS

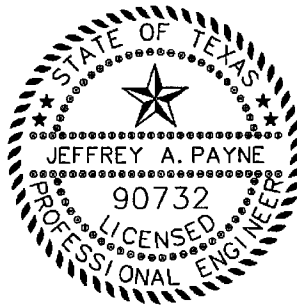
- a. Add the following to the end of the Section 6.19:

“ D. The duration of the warranty shall be for one year from the date of final completion of the entire Work. Except, as otherwise agreed in writing by the parties, partial occupancy or use of some or all of the Work any part thereof shall not commence the warranty obligations.”

3. 00 45 16 STATEMENT OF QUALIFICATIONS

- a. Paragraph 2.06 A. 3. – Delete “twelve (12)” and replace deletion with “ten (10)”.

**END OF ADDENDUM NO. 2**



*[Handwritten Signature]*  
1/29/15

FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
ENGINEERING FIRM  
F-2144

ADDENDUM NO. 3

NORTH TEXAS MUNICIPAL WATER DISTRICT

CONSTRUCTION MANAGER AT RISK LOWER BOIS D'ARC CREEK  
RESERVOIR DAM AND INTAKE PROJECT

PROJECT NO. 344

NTD13565

JANUARY 30, 2015

**PROPOSAL DATE: FEBRUARY 18, 2015**

*The following additions, deletions, modifications, or clarifications shall be made to the appropriate sections of the plans and specifications and shall become a part of the Contract Documents. Proposers shall acknowledge receipt of this Addendum in the space provided on the Proposal Form.*

**BIDDING REQUIREMENTS:**

1. 00 43 43 Section 1.01 A.: Delete "22358" and replace with "2258".
2. 00 45 16 Section 2.02 B.: In third paragraph delete "five" and replace with "eight".
3. 00 45 16 Section 2.03 D.: In the last sentence after the word "duration" add the following "during the construction services phase."
4. 01 70 00: There are two page number ones. Please delete the one that has in the footer to the page, "NTD11388 Texoma to Wylie WTP Raw Water Pipeline".

END OF ADDENDUM NO. 1



*[Handwritten Signature]*  
1/30/15

FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
ENGINEERING FIRM  
F-2144



**ADDENDUM NO. 4**

**NORTH TEXAS MUNICIPAL WATER DISTRICT**

**CONSTRUCTION MANAGER AT RISK LOWER BOIS D'ARC CREEK  
RESERVOIR DAM AND INTAKE PROJECT**

**PROJECT NO. 344**

**NTD13565**

**February 3, 2015**

**PROPOSAL DATE: FEBRUARY 18, 2015**

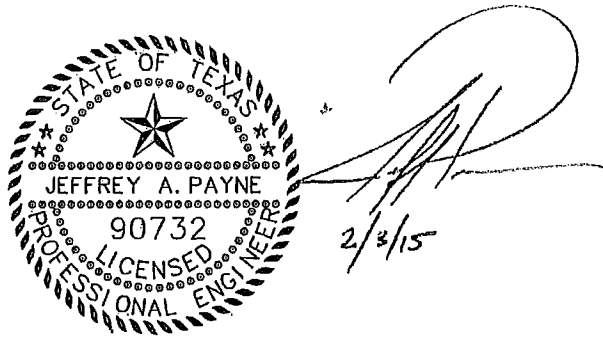
***The following additions, deletions, modifications, or clarifications shall be made to the appropriate sections of the plans and specifications and shall become a part of the Contract Documents. Proposers shall acknowledge receipt of this Addendum in the space provided on the Proposal Form.***

**BIDDING REQUIREMENTS:**

1. 00 42 23: Delete 00 42 23 in its entirety and replace with 0042 23 Rev 1 in its entirety. Revisions have been made to paragraphs 3.01 E, M, N, and O.
2. 00 42 23.01 Delete this in its entirety and replace with 00 42 23.01 Rev 1 in its entirety. The project number has been revised.
3. 00 21 16 14.01F: Delete this in its entirety and replace with, "Proposer shall provide one digital copy of the Proposal in portable document format (pdf) on a compact disk or other media. The Proposal is to be a single file that will print to match the printed copy provided. Confidential information may be provided in a separate file, provided that file is referenced in the Proposal. The digital copy of the Proposal will be included in the Cost Proposal envelope."
4. 00 52 23: Section 12.01 C: Delete "Sixty" and replace with "Thirty".
5. 00 72 00: Section 14.02 C: Delete "Sixty" and replace with "Thirty".

6. 00 21 16 Section 7.01: Delete the last sentence in its entirety and replace with the following, "A Proposal submitted taking material and significant exceptions to the Contract Documents, except as may be modified by Addenda, may be rejected. Proposers shall submit with its Proposal a listing of any minor exceptions and clauses which may need further discussion to clarify the language of the Agreement or General Conditions. The specific listing provided by the selected Proposer will be used by the Owner as the basis of negotiations. This listing shall be provided as an attachment to the Proposal Transmittal Form."

**END OF ADDENDUM NO. 4**



FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
ENGINEERING FIRM  
F-2144

**00 42 23.01 REV.1 COST PROPOSAL**

**ARTICLE 1: FEES FOR SERVICES FOR LOWER BOIS D'ARC CREEK RESERVOIR DAM AND INTAKE PROJECT, NORTH TEXAS MWD PROJECT NO. 344.**

- 1.01 To: President and Board of Directors  
North Texas Municipal Water District  
505 Brown Street  
Wylie, TX 75098
- 1.02 The undersigned Proposer proposes to furnish all services, plant, materials and equipment required to perform the Construction Management at Risk Services (the "Services") described in Section 01 01 01 of the RFP for the prices indicated below.
- 1.03 The undersigned declares that it is the Proposer or by holding the position below indicated is authorized to execute this Price Proposal on behalf of the Proposer and that all representations made on this Cost Proposal are true and correct
- 1.04 The undersigned acknowledges that the Cost Proposal is based on the Agreement included in this RFP and as amended by any addenda during the procurement period.

**ARTICLE 2: FEES FOR WORK DESCRIBED IN SECTION 00 11 19 1.01 A.**

- 2.01 Proposer will provide Construction Manager at Risk (CMAR) Services in accordance with the RFP, Agreement and Contract Documents for the prices shown below and will complete the construction of the Project within the Guaranteed Maximum Price established in a future Amendment.
  - A. Pre-construction Services Fee: The Lump Sum amount of \$\_\_\_\_\_.  
To include all costs and expenses in accordance with the Contract Documents for Pre-Construction Services as described in Section 01 01 01 "Construction Manager at Risk Services."
  - B. Procurement Service Fee: The Lump Sum amount of \$\_\_\_\_\_.  
To include all costs and expenses in accordance with the Contract Documents for Procurement Services as described in Section 01 01 01 "Construction Manager at Risk Services."
  - C. Construction Service Fee: \_\_\_\_\_ percent of Cost of Work.  
To include CMAR's general or indirect overhead and profit associated with the Cost of the Work.
- 2.02 Costs for Bonds and Insurance:
  - A. Performance and Payment Bonds: \_\_\_\_\_ percent of Cost of Work.  
Cost for providing 100 percent Performance and Payment Bonds as required by the Contract Documents.
  - B. General Insurance: \_\_\_\_\_ percent of Cost of Work.

Cost for providing insurance as required by the Contract Documents other than Builder's Risk Insurance.

- 2.03 General Conditions (as defined in the RFP and Agreement and to include all costs and expenses in accordance with the Contract Documents for Construction Services as described in Section 01 01 01 "Construction Manager at Risk Services.")
- A. General Conditions: \_\_\_\_\_ percent of Cost of Work.
  - B. Monthly General Conditions Cost: \$ \_\_\_\_\_ per month.

Extended General Conditions not to exceed monthly amount.

- 2.04 Contingency Funds:
- A. Contingency Funds: \_\_\_\_\_ percent of Cost of Work.  
Amount of Contingency Funds included in the Guaranteed Maximum Price.

**ARTICLE 3: FEES FOR WORK DESCRIBED IN SECTION 00 11 19 1.01 B.**

- 3.01 Proposer will provide Construction Manager at Risk (CMAR) Services in accordance with the RFP, Agreement and Contract Documents for the prices shown below and will complete the construction of the Project within the Guaranteed Maximum Price established in a future Amendment.

- A. Pre-construction Services Fee: The Lump Sum amount of \$\_\_\_\_\_.

To include all costs and expenses in accordance with the Contract Documents for Pre-Construction Services as described in Section 01 01 01 "Construction Manager at Risk Services and specifically 01 01 01 Construction Manager At Risk Services paragraph 1.04."

- B. Procurement Service Fee: The Lump Sum amount of \$\_\_\_\_\_.

To include all costs and expenses in accordance with the Contract Documents for Procurement Services as described in Section 01 01 01 "Construction Manager at Risk Services."

- C. Construction Service Fee: \_\_\_\_\_ percent of Cost of Work.

To include CMAR's general or indirect overhead and profit associated with the Cost of the Work.

- 3.02 Costs for Bonds and Insurance:

- A. Performance and Payment Bonds: \_\_\_\_\_ percent of Cost of Work.

Cost for providing 100 percent Performance and Payment Bonds as required by the Contract Documents.

- B. General Insurance: \_\_\_\_\_ percent of Cost of Work.

Cost for providing insurance as required by the Contract Documents other than Builder's Risk Insurance.

3.03 General Conditions (as defined in the RFP and Agreement and to include all costs and expenses in accordance with the Contract Documents for Construction Services as described in Section 01 01 01 "Construction Manager at Risk Services.")

A. General Conditions: \_\_\_\_\_ percent of Cost of Work.

B. Monthly General Conditions Cost: \$ \_\_\_\_\_ per month.

Extended General Conditions not to exceed monthly amount.

3.04 Contingency Funds:

A. Contingency Funds: \_\_\_\_\_ percent of Cost of Work.

Amount of Contingency Funds included in the Guaranteed Maximum Price.

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Name

---

Title

---

Signature

---

Date

**END OF SECTION**

**00 42 23 REV. 1      PROPOSAL TRANSMITTAL FORM (PROPOSAL FORM 1)**

**ARTICLE 1: PROPOSAL RECIPIENT AND PRINCIPAL CONTACT PERSON**

1.01 This Proposal is submitted to

President and Board of Directors  
North Texas Municipal Water District  
505 Brown Street, Wylie Texas 75098

1.02 The principal contact person who will serve as the interface between the Owner and the Proposer for all communications during the procurement period is:

Name:

Title:

Address:

Phone:

Fax:

Email:

**ARTICLE 2: PROPOSER'S ACKNOWLEDGMENTS**

2.01 The undersigned Proposer proposes and agrees, if this Proposal is accepted, to enter into an Agreement with Owner in the form included in the RFP to perform all Services and Work as specified or indicated in and within the amounts indicated in the Cost Proposal. Proposer agrees to complete the Services and Work within the Contract Price and within the Contract Time established in the Amendment(s) setting forth the Guaranteed Maximum Price for the Early Work Packages or entire Work and comply with the other terms and conditions of the Contract Documents

2.02 Proposer accepts all of the requirements, terms, and conditions of the RFP, including without limitation those dealing with the Bid Bond, required performance and payment bonds and insurance. The Proposal will remain subject to acceptance for 90 days after the opening of Proposals.

2.03 Proposer accepts the provisions of the Agreement as to Liquidated Damages in the event of its failure to complete Work in accordance with the schedule set forth in the Agreement.

**ARTICLE 3: PROPOSER'S REPRESENTATIONS**

3.01 In submitting this Proposal, Proposer certifies, represents and warrants, that:

- A. The submittal of the Proposal has been duly authorized by, and in all respects binding upon, the Proposer.
- B. The undersigned declares that it is the Proposer or by holding the position below indicated is authorized to execute this Proposal Transmittal Form on behalf of the Proposer and that all representations made on this form are true and accurate

- C. Proposer has examined, carefully studied and understands and agrees to be bound by the requirements of the RFP, and Contract Documents, the other related data identified in the RFP, and the following Addenda, receipt of all of which is hereby acknowledged:

Addendum No.	Addendum Date	Signature Acknowledging Receipt

- D. All information and statements contained in the Proposal are current, correct and complete and are made with full knowledge that the Owner will rely on such information and statements in determining the selected Proposer for the Project.
- E. The submission of this Proposal will constitute an incontrovertible representation by Proposer that Proposer has complied with every requirement of the RFP that without exception the Proposal is premised upon completion of the Services required by the RFP, Addenda and the related supplemental data included with the RFP.
- F. Proposer acknowledges that it is aware and understands the requirements of Chapter 176 of the Texas Local Government Code and Proposer is solely responsible for complying with such requirements.
- G. Proposer acknowledges that the Proposer or Guarantor, if a Guarantor is proposed, complies with the net worth requirement of the RFP and it has the ability to maintain such net worth during the implementation of the Project.
- H. If a Guarantor is proposed, Proposer acknowledges that the Guarantor Acknowledgement, Proposal Form 4 is executed by the individual authorized to execute the form on behalf of the Guarantor.
- I. The Surety identified on Proposal Form 4 is authorized by law to do business in the State of Texas pursuant to a current certificate of authority to transact surety business and the Surety is listed in the Department of Treasury's Circular 570 and has an A.M. Best Company Rating of A-VIII or better..
- J. The insurance company identified on Proposal Form 5 is duly licensed or authorized in the jurisdiction in which the Project is located to issue policies for the limits and coverages so required and has an A.M. Best Company Rating of A-VIII or better.
- K. Proposer has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.
- L. Proposer is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and the furnishing of Goods and Special Services.
- M. Proposer has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) and (2) reports and drawings of Hazardous Environmental Conditions that have been included with the RFP.



- N. Proposer has carefully studied all additional or supplementary examinations, investigations, explorations, tests, studies and data included with the RFP concerning conditions including surface, subsurface and Underground Facilities at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Proposer, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents to be employed by Proposer, and safety precautions and programs incident thereto and accepts the consequences for not doing so.
- O. Proposer is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- P. Proposer has correlated the information known to Proposer, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- Q. Proposer has given Point of Contact written notice of all conflicts, errors, ambiguities, or discrepancies that Proposer has discovered in the RFP and Contract Documents, and the written resolution thereof by Owner is acceptable to Proposer.
- R. The RFP and Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Services and Work for which this Proposal is submitted.
- S. Proposer will submit written evidence of its, and if applicable, Guarantor's authority to do business in Texas not later than the date of its execution of the Agreement.
- T. Proposer further represents that this Proposal is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Proposer has not directly or indirectly induced or solicited any other Proposer to submit a false or sham Proposal; Proposer has not solicited or induced any individual or entity to refrain from making a Proposal; and Proposer has not sought by collusion to obtain for itself any advantage over any other Proposer or over Owner.

#### **ARTICLE 4: COST PROPOSAL FOR SERVICES**

- 4.01 Proposer will provide CMAR Services in accordance with the RFP, Agreement, and Contract Documents for the prices shown in the Cost Proposal and will complete the construction of the Project within the Guaranteed Maximum Price established in a future Amendment(s).

**ARTICLE 5: TIME OF COMPLETION**

5.01 Proposer agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

**ARTICLE 6: ATTACHMENTS TO THIS PROPOSAL TRANSMITTAL FORM**

6.01 The following documents are attached to and made a condition of this Proposal:

- A. Required Bid Bond to be attached to this Proposal Transmittal Form
- B. Proposal Form
  - 1. Proposal Form 2, Section 00 42 23 .02 -Vendor Compliance to State Law
  - 2. Proposal Form 3, Section 00 42 23 .03 - Conflict of Interest Questionnaire
  - 3. Proposal Form 4, Section 00 42 23.04 Surety Letter of Intent
  - 4. Proposal Form 5, Section 00 42 23 .05 - Insurance Company Letter of Intent
  - 5. Proposal Form 6, Section 00 42 23 .06 –Guarantor Acknowledgement (if applicable)
- C. Evidence of Proposer’s and if applicable, Guarantor’s authority to do business in the State of Texas
- D. A listing of any minor exceptions or clauses requiring discussion for further clarification to the Agreement (00 52 23) or General Conditions (00 72 00) as requested in 00 21 16 Section 7.01 of the RFP.

**ARTICLE 7: DEFINED TERMS**

7.01 The terms used in this Proposal have the meanings indicated in the RFP, General Conditions and the Supplementary Conditions. The significance of terms with initial capital letters is described in the RFP and General Conditions.

**ARTICLE 8: VENUE**

8.01 Proposer agrees that venue shall lie exclusively in Fannin County, Texas for any legal action.

**ARTICLE 9: PROPOSAL SUBMITTAL**

9.01 This Proposal is submitted by:

**If Proposer is an Individual:**

Name: \_\_\_\_\_  
*(typed or printed)*

By: \_\_\_\_\_  
*(Individual's Signature)*

Doing business as: \_\_\_\_\_

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Proposal submitted on the following date: \_\_\_\_\_

**A Partnership**

Partnership Name: \_\_\_\_\_  
*(typed or printed)*

Name of General Partner: \_\_\_\_\_  
*(typed or printed)*

By: \_\_\_\_\_  
*(Signature of general partner -- attach evidence of authority to sign)*

Doing business as: \_\_\_\_\_

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Proposal submitted on the following date: \_\_\_\_\_

**A Corporation**

Corporation Name: \_\_\_\_\_  
*(typed or printed)*

State of Incorporation: \_\_\_\_\_

Type: \_\_\_\_\_  
*(General Business, Professional, Service, Limited Liability)*

Date of Qualification to do business in Texas  
is: \_\_\_\_\_

By: \_\_\_\_\_  
*(Signature -- attach evidence of authority to sign)*

Name: \_\_\_\_\_  
*(typed or printed)*

Title: \_\_\_\_\_

Attest: \_\_\_\_\_  
*(Signature of Corporate Secretary)*

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Proposal submitted on the following date: \_\_\_\_\_

**Joint Venture**

Joint Venturer Name: \_\_\_\_\_  
(typed or printed)

By: \_\_\_\_\_  
(Signature of joint venture partner -- attach evidence of authority to sign)

Name: \_\_\_\_\_  
(typed or printed)

Title: \_\_\_\_\_

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Proposal submitted on the following date: \_\_\_\_\_

Joint Venturer Name: \_\_\_\_\_  
(typed or printed)

By: \_\_\_\_\_  
(Signature of joint venture partner -- attach evidence of authority to sign)

Name: \_\_\_\_\_  
(typed or printed)

Title: \_\_\_\_\_

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Proposal submitted on the following date: \_\_\_\_\_

**Contact for receipt of official communications:**

Name: \_\_\_\_\_  
(typed or printed)

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.

**Affidavits**

One of the following four affidavits shall be executed and provided with this form.

AFFIDAVIT FOR CORPORATION

State \_\_\_\_\_ ) §

County of \_\_\_\_\_ ) §

\_\_\_\_\_, being duly sworn deposes and says that they are \_\_\_\_\_ of the  
(Name) (Title)

Corporation submitting the foregoing form and related information; have read such documents; and that such documents are true and correct and contain no material misrepresentations; and that they are authorized to make this affidavit on behalf of the Corporation.

\_\_\_\_\_  
(Signature)

Signed and sworn to me before this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
(Notary Public)

My commission expires:

AFFIDAVIT FOR PARTNERSHIP

State \_\_\_\_\_ ) §

County of \_\_\_\_\_ ) §

\_\_\_\_\_, being duly sworn deposes and says  
(Name)

that they are \_\_\_\_\_ of the  
(Title)

\_\_\_\_\_ company submitting the foregoing form and related information; have read such documents; and that such documents are true and correct and contain no material misrepresentations; and that they are authorized to make this affidavit on behalf of the Partnership.

\_\_\_\_\_  
(Signature)

Signed and sworn to me before this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
(Notary Public)

My commission expires:



AFFIDAVIT FOR INDIVIDUAL

State \_\_\_\_\_ ) §

County of \_\_\_\_\_ ) §

\_\_\_\_\_, being duly sworn deposes and says  
(Name)

that they are \_\_\_\_\_ of the  
(Title)

\_\_\_\_\_ company submitting the foregoing form and related information; have read such documents; and that such documents are true and correct and contain no material misrepresentations.

.

\_\_\_\_\_  
(Signature)

Signed and sworn to me before this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
(Notary Public)

My commission expires: