

**AGREEMENT BETWEEN NORTH TEXAS MUNICIPAL WATER DISTRICT
AND
FANNIN COUNTY, TEXAS CONCERNING WATER SUPPLY AND DEVELOPMENT OF
THE LOWER BOIS D'ARC CREEK RESERVOIR PROJECT**

THE STATE OF TEXAS

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COUNTY OF FANNIN

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This **AGREEMENT BETWEEN NORTH TEXAS MUNICIPAL WATER DISTRICT AND FANNIN COUNTY, TEXAS CONCERNING WATER SUPPLY AND DEVELOPMENT OF THE LOWER BOIS D'ARC CREEK RESERVOIR PROJECT** (the "Agreement") is made and entered into as of the 22nd day of June 2017 ("Agreement Date"), by and between **NORTH TEXAS MUNICIPAL WATER DISTRICT**, (the "District"), a conservation and reclamation district created pursuant to Article XVI, Section 59 of the Constitution of the State of Texas, and governed by the provisions of Article 8280-141, Vernon's Revised Civil Statutes, as amended, and **FANNIN COUNTY, TEXAS**, a political subdivision of the State (herein referred to as "Fannin County" or the "County"). The District and the County are individually referred to herein as a "Party" and are collectively referred to herein as the "Parties."

WITNESSETH

WHEREAS, the District and the County are authorized to enter into this Agreement pursuant to Chapter 791 of the Texas Government Code, (the "Interlocal Cooperation Act") and other applicable laws; and

WHEREAS, the District was created, among other things, to serve the water needs of its Member Cities, as defined in TEX. REV. CIV. STAT. ART. 8280-141; and

WHEREAS, the District supplies water to cities, towns and utilities who provide water service to retail customers in Denton, Collin, Hopkins, Hunt, Raines, Rockwall, Dallas, Kaufman, Fannin, and Grayson Counties; and

WHEREAS, both the District and the County are located in the Region C Regional Water Planning Group area pursuant to designations made by the Texas Water Development Board to implement the provisions of Senate Bill 1, an act of the Legislature that requires all regions of the state and all water supply agencies within such regions to develop viable water supply plans over a fifty (50) year planning cycle; and

WHEREAS, Fannin County and the District desire to cooperate in the development of a surface water supply reservoir in Fannin County on Bois d'Arc Creek in the Red River Basin; and

WHEREAS, the Region C Water Plan and the State Water Plan each include a reservoir on Bois d'Arc Creek in Fannin County as a recommended water management strategy for the District, and this proposed reservoir is referred to as the Lower Bois d'Arc Creek Reservoir (the "Reservoir"); and

WHEREAS, the location of the proposed dam to create the impoundment for the Reservoir is on Bois d'Arc Creek, approximately 2.7 miles downstream of the FM 1396 bridge over Bois d'Arc Creek; and

WHEREAS, when the Reservoir is referred to herein, it is mutually agreed that said term shall refer to the body of water to be impounded, including any associated lands reasonably required for safe and reliable operation of such a water supply source, and any lands the District may designate to be part of the project for development, mitigation and operation of the Reservoir; and

WHEREAS, the District has evaluated the feasibility of the proposed Reservoir and has been issued a water rights permit by the Texas Commission on Environmental Quality ("TCEQ") to appropriate, store and divert state water, and has also filed a Clean Water Act Section 404 permit application with U.S. Army Corps of Engineers ("USACE") to construct the proposed Reservoir; and

WHEREAS, to enable the Reservoir's primary use as a dependable water supply, the level of water in the Reservoir will fluctuate due to variable rainfall and runoff into the Reservoir, and due to withdrawal of water from the Reservoir for its intended beneficial use as a water supply, and therefore the Reservoir cannot be maintained at a constant level; and

WHEREAS, the District's goal is to develop a lake that will produce a water supply of approximately 108 million gallons per day ("MGD") on a firm yield basis for the District and its members and customers, including customers located in Fannin County; and

WHEREAS, the District intends to develop the Reservoir giving due regard to environmental considerations and to the protection of water quality in the Reservoir, and enabling economic development in the vicinity of the Reservoir, all in a mutually beneficial manner and in the spirit of partnership with Fannin County; and

WHEREAS, Fannin County and the District agree that the Reservoir will provide major benefits for the citizens of Fannin County, for the local economy, and for the environment; and

WHEREAS, the Parties desire to cooperate in development of the Reservoir to assure realization of the potential for a vital new water supply, for the environmental benefits, and to enable economic development of high quality in the vicinity of the Reservoir; and

WHEREAS, Fannin County has adopted resolutions supporting the proposed Reservoir, and construction of same and the desire to regulate the orderly development of lands within the vicinity of the Reservoir; and

WHEREAS, the District has expressed its intention to provide a water supply to customers within Fannin County, which service would enable a long-term dependable local water supply for the County; and

WHEREAS, Fannin County desires to take a leadership role in attracting and facilitating economic development in the vicinity of the Reservoir; and accordingly, has taken legislative steps to provide for the County to have a role in zoning for unincorporated areas in the vicinity of the Reservoir; and

WHEREAS, the County and the District desire to support an orderly process for acquisition of the real property needed for the Reservoir, and both Parties desire that all property owners be fully and fairly compensated for any property to be acquired for development of the Reservoir; and

WHEREAS, except for the activities set forth in this Agreement or as may be provided by law or other agreement, Fannin County will have no financial responsibility for development of the Reservoir; rather, the District will be responsible for development of the Reservoir pursuant to the applicable state and federal permits; and, the Reservoir will be owned and operated by the District; and

WHEREAS, the District will be responsible for acquiring or providing the funds needed for development of the Reservoir.

NOW, THEREFORE, for good and valuable consideration, the adequacy and sufficiency of which is evidenced by the Parties' respective execution of this Agreement, the District and Fannin County agree, as follows:

AGREEMENT

Section 1. Purpose. The purpose of this Agreement is to establish the respective responsibilities of the Parties in general terms concerning development of the Reservoir, and in light of the matters stated in the recitals, which such recitals are incorporated herein for all purposes. After a thorough review of the District's proposal to develop the Reservoir, the need for water, and the local benefits to be realized to Fannin County and its citizens as a result of the construction of the Reservoir, the District and Fannin County do hereby express their mutual desire to work in a spirit of partnership and cooperation to develop Lower Bois d'Arc Creek Reservoir as a strategic water resource for Fannin County and as an important asset to Fannin County and its citizens. The Parties agree that the Reservoir will provide major benefits for the citizens of Fannin County and the members and customers of the District, for the local economy, and for the environment in the area of Bois d'Arc Creek. The Parties also recognize that the overriding purpose of the Reservoir is to provide a reliable water supply, protected from pollution, and to provide for future water supply needs of the District and Fannin County. Fannin County agrees to provide its full support for the proposed Reservoir and the associated improvements. Accordingly, on its own motion, and as may be requested from time to time by the District, the County agrees to provide supportive statements or testimony concerning the Reservoir for appropriate forums, including public meetings and hearings, Fannin County Commissioners' Court, TCEQ, USACE, and before any other local, state or federal agencies.

Section 2. Reservoir Land Acquisition and Maintenance of Tax Revenues. Fannin County and the District hereby express their desire to cooperate in the District's acquisition of land for the development of the Reservoir and to avoid any significant loss of revenues, including ad valorem tax receipts, to local taxing entities, including the County, that may be associated with the District's acquisition of real property necessary for development of the Reservoir.

a. Land Acquisition. Both Parties agree that it is important to assure that all property owners whose lands are acquired for development of the Reservoir are fully and fairly compensated for their properties. The District had endeavored and will continue to endeavor to acquire properties needed for development of the Reservoir through arms-length negotiation, arriving at a fair price that is mutually agreeable to the landowners and the District. Further, in many cases, as part of an agreed sale of such property, the District has allowed landowners to continue to enjoy use of their property under reasonable terms, pending development of the Reservoir. The District agrees to continue such practices, where appropriate and feasible.

b. Taxes/Tax Exemptions. Both Parties are governmental agencies who are exempt from the payment of state and local taxes. Further, it is recognized that Fannin County and other local taxing entities depend upon the collection of taxes to support their budgets and to maintain services to the citizens of Fannin County. The District is a governmental enterprise that depends upon the sale of services and their associated fees and charges to support its budgets and to provide services to its members and customers, including customers in Fannin County. Both Parties recognize that when the District acquires real property for development of the Reservoir, such property will become tax exempt and such action may have a transitory effect on tax receipts to the County and to other local taxing entities. Further, it is acknowledged that most of the land to be acquired for the Reservoir carries an agricultural exemption for tax appraisal purposes; therefore, any such loss of tax receipts will be considerably less than if the property were not so exempted.

c. Continued Payment of Taxes. The District agrees that, when possible and agreed upon, land acquired for development of the Reservoir has been leased back to property owners, as provided in the terms and conditions of such leases. The District has required that such leases require lessees to continue to pay any and all real property taxes assessed upon the property during the term(s) of the lease by any local taxing entity, including the County. To the extent authorized by law, the District agrees to make every effort to ensure that the tax receipts of Fannin County and other local taxing entities are not impacted by the District's acquisition of real property for the Reservoir and agrees to make every effort to offset any such impacts until such time that land values within the County increase to the extent necessary to offset such impacts to tax receipts. Based on development patterns and the trend of land values around other water supply lakes in Texas which support economic development, the Parties agree that any reduction in tax receipts to Fannin County and other local taxing entities resulting from the District's acquisition of real property for the development of the Reservoir is expected to be transitory or temporary in nature.

Section 3. Controlling and Managing Reservoir Development. The Parties agree that the Lower Bois d'Arc Creek Reservoir is expected to enhance economic development in Fannin County, given the quality of the Reservoir and its proximity to the Dallas-Fort Worth metropolitan area. To that end, the County desires to take a leadership role in economic development activities, including the implementation of zoning for unincorporated areas in the vicinity of the Reservoir. The Parties agree that the pace and the quality of development in the vicinity of the Reservoir will be subject to many factors, including the general economy of the nation and region, governmental policies, zoning, availability of public services, and other factors beyond the control of the Parties. If Fannin County wishes to take specific steps to promote economic development, the District agrees to play an appropriate supportive role, in light of the purpose of the Reservoir, which is to maintain a reliable public water supply, with protection of water quality in the area of the Reservoir and its tributary streams. Further, the Parties agree that the promotion of economic development must take into account the public duty to provide an assurance of safety for people and property on, at, and around the Reservoir.

a. County Zoning. Fannin County agrees to assist in the development of the Reservoir through the promulgation and implementation of zoning regulations around the Reservoir in accordance with Subchapter G, Chapter 231 of the Texas Local Government Code ("LGC"). Specifically, the County agrees to take a lead role in zoning regulations for the area located within 5000 feet of where the shoreline of the Lower Bois d'Arc Creek Reservoir would be if the reservoir were filled to its storage capacity (referred to hereafter as the "Reservoir Zoning Area"), in accordance with Section 231.132(a)(5) of the LGC. Attached as Exhibit 1 is a map identifying the area that may be subject to County zoning regulations. The District agrees to assist Fannin County in its promulgation and implementation of zoning regulations for the Reservoir Zoning Area by retaining a land use planning and zoning consultant (the "Zoning Consultant") to develop for the County the zoning regulations. The District and the County shall collaborate on the selection of the Zoning Consultant, but the District shall have the sole discretion in the final selection of the Zoning Consultant. The District and the County have collaborated on a scope of work to be completed by the Zoning Consultant and the proposed budget for the completion of such work. The District shall have the sole responsibility to pay the consulting fees of the Zoning Consultant for work associated with the development of zoning regulations for the Reservoir Zoning Area. A copy of the scope of work to be completed by the Zoning Consultant is attached as Exhibit 2. The Zoning Consultant has completed Phase 1 of the scope of work regarding the development of the Comprehensive Plan as described in Exhibit 2.

b. Wastewater Systems. To protect the Reservoir and to encourage quality real estate development around the Reservoir, it is the intent of the Parties to support County zoning regulations and District rules and regulations that will protect water quality in the Reservoir and its tributaries. Accordingly, the Parties mutually agree to promote and implement regulations, rules, and policies that encourage future subdivision projects near the Reservoir to be served by community wastewater collection systems rather than by onsite wastewater treatment facilities operated by individual owners. The Parties recognize, however, that a community wastewater collection system may not be feasible in all circumstances. Therefore, the County may allow for exceptions for individually owned facilities by homeowners who do not have community wastewater collection systems available, but only

to the extent that such proposed onsite facilities will comply with applicable construction and operational standards as provided in Subchapter D, Chapter 285 of Title 30, Texas Administrative Code so as to prevent pollution of water and the environment.

c. Inspection of Onsite Wastewater Systems. The District and County agree to work together to ensure that any onsite wastewater treatment facilities in the Reservoir Zoning Area comply with all state and federal laws and regulations and do not impact the water quality of the Reservoir. To achieve this, the District agrees to pay all reasonable costs, as mutually agreed upon by the Parties, that the County may incur to ensure compliance with Subchapter D, Chapter 285 of Title 30, Texas Administrative Code, associated with inspecting onsite wastewater treatment facilities located within the Reservoir Zoning Area, commencing upon the initiation of deliberate impoundment of water in the Reservoir and extending for a period of three (3) years thereafter. The District's agreement to pay such inspection costs is conditioned upon the County's agreement to diligently conduct inspections for such period and the County's agreement to continue regular inspections of all onsite wastewater treatment facilities located within the Reservoir Zoning Area, for as long as the Reservoir continues to be operated and used for water supply purposes.

d. Water Quality Protection. To further protect water quality, particularly for preventing runoff of pollutants into the Reservoir, the County agrees to cooperate with the District in the implementation of zoning regulations, rules and policies to protect water quality in and around the Reservoir and its tributaries, including but not limited to, regulations to control erosion along the shoreline of the Reservoir.

e. Police Powers. Fannin County will exercise its police powers as needed and appropriate to protect public health, safety and welfare in connection with development and operation of the Reservoir, including regular police patrols of the area located within the Reservoir Zoning Area. The Parties agree to work together to determine the extent to which Fannin County needs to exercise its police powers to ensure protection of public health, safety and welfare in connection with development and operation of the Reservoir. The District agrees to enter into an agreement with the applicable County law enforcement agency regarding the payment of the County's costs associated with acquiring and maintaining equipment and facilities necessary for police patrols of the Reservoir, including but not limited to, boats and vehicles for such police patrols. The proposed agreement will provide for the District's payment of all reasonable and necessary expenses associated with the County law enforcement agency's exercise of its police powers as specified herein, and as mutually agreed upon by the District and such agency. To the extent authorized by law and in the District's sole discretion, the proposed agreement may provide for annual lump sum payments to the County law enforcement agency to address its costs and expenses of police patrols and associated equipment and facilities, as described in this Section 3.e., prior to beginning construction of the Reservoir.

f. Transportation Infrastructure. The District will coordinate with both Fannin County and the Texas Department of Transportation ("TxDOT") concerning reasonable and necessary adjustments in the existing road system in the area of the Reservoir so as

to accommodate the development of the Reservoir. The Parties mutually agree to work together to assure that all such adjustments to transportation infrastructure are compatible with the Reservoir, and with the remaining road system in the County. The District agrees that any County roads or bridges to be constructed or modified as part of the Reservoir's development will be built to standards that are equal to or better than the existing standards of such County roads or bridges as of the Agreement Date. Attached as Exhibit 3 is a map of the transportation plan for the Reservoir.

i. *Replacement of FM 1396.* The primary road that will be impacted by Reservoir construction is FM 1396. As provided in the District's May 2011 Transportation Plan (the "Transportation Plan"), the current recommendation regarding offsetting the impact to FM 1396 is to replace it with a new FM 897 from US 82 to FM 1396, including a new bridge over the Reservoir. The proposed extension of FM 897 and the new bridge would be constructed in accordance with TxDOT standards.

Because the Reservoir will impact FM 1396 by eliminating a segment of the road, portions of the road will be removed from the TxDOT highway system. Fannin County agrees to accept the right-of-way ("ROW") of FM 1396 and assume responsibility for maintenance of FM 1396 (1) between FM 2029 and the north shoreline of the Reservoir; and (2) between CR 2745 and the south shoreline of the Reservoir. Fannin County also agrees to accept the ROW and assume responsibility for maintenance of the existing segment of FM 897 from US 82 to CR 2945.

TxDOT will enter into two (2) separate advanced funding agreements, one with Fannin County and one with the District, to address funding of the replacement and maintenance of FM 1396.

ii. *Impacts to County Roads.* Twenty-seven (27) County road crossings were identified as being impacted by the Reservoir in the Transportation Plan. The current recommendation regarding these road crossings as agreed to by the County and the District is to convert one (1) county road crossing into a private driveway, close five (5) county road crossings, leave thirteen (13) county road crossings in place, and to reconstruct eight (8) road crossings using the TxDOT Bridge Project Development Manual for low-volume off-system bridges and the TxDOT Roadway Design Manual for 2-lane rural roads. Included as Exhibit 4 is a map that identifies the location of county road crossings that are being closed and reconstructed.

Seven (7) of the crossings to be reconstructed were identified in the Transportation Plan. One (1) additional crossing that is not included in the Transportation Plan, Site 8A on CR 2750, is now included for investigation and possible improvements and reconstruction. Included in Exhibit 5 is a depiction of this additional crossing. All crossings to be reconstructed will be designed in accordance with the Design Criteria included as Exhibit 6.

iii. *Payment for Impacts to County Roads.* The District recognizes that the use of large vehicles and construction equipment during construction of the Reservoir may impact and/or damage County roads. To address this, the District agrees to conduct an assessment of all County roads to be utilized during construction of the Reservoir, both before and after construction of the Reservoir. Based on these assessments, the District agrees to pay all reasonable costs, as mutually agreed upon by the Parties, associated with making any necessary repairs to such County roads that have been identified in the assessments as being impacted and/or damaged due to Reservoir construction activities.

iv. *Payment for Impacts from Increased Traffic.* The District recognizes that following the deliberate impoundment of water in the Reservoir traffic may increase within the County due to increased development and recreational use of the Reservoir. Such increases in traffic may negatively impact County roads. As a result, the District has conducted an assessment, which the County has reviewed and agrees with, of potentially impacted County roads. Based on this assessment, and as due consideration for these and other potential impacts to the County, the District agrees to provide payments to Fannin County in accordance with the following payment schedule, with the first payment in Year 1 being made to Fannin County within thirty (30) days of commencement of construction of the Reservoir, and the second payment in Year 2 being made to the County the following calendar year on November 1, and then annually on November 1 for 8 years:

Year 1	\$971,263.00
Year 2	\$100,000.00
Year 3	\$100,000.00
Year 4	\$100,000.00
Year 5	\$100,000.00
Year 6	\$100,000.00
Year 7	\$100,000.00
Year 8	\$100,000.00
Year 9	\$100,000.00
Year 10	\$100,000.00
TOTAL	\$1,871,263.00

Following the payment in Year 10, the District shall have no further responsibility or obligation for payment of any costs associated with the maintenance, repair, and/or construction of County roads or any impact to the County resulting from increased traffic from the Reservoir. The payments received by Fannin County from the District shall be administered by the governing body for Fannin County to address any impacts, repairs, developments, or other items determined to be necessary by the governing body of Fannin County.

v. Road Maintenance Facility. Under terms and conditions mutually agreeable to the Parties, the District agrees to pay for, develop, and construct a County-owned and operated road maintenance facility to be used for housing any County equipment and vehicles necessary for making County road repairs. The road maintenance facility will generally be located on approximately 5 to 10 acres of land on the north side of the Reservoir surrounded by a 6-foot chain link fence (or other similar fencing material) with access to the facility paved with a rock-base material (or other similar paving material). The County and District will work together to determine the location, placement, development, and construction of this facility.

g. Recreational Areas and Facilities. Under terms and conditions mutually agreeable to the Parties, the District agrees to pay for, develop, construct, own, operate and maintain at least three (3) recreational areas and associated facilities in the area of the Reservoir with such areas having, collectively, the following types of facilities: boat docks, picnic areas, and/or restrooms. The County and District will work together to determine the location and placement of these recreational areas and facilities.

h. Potential Public Access to Red River. The District agrees to work with the County to potentially allow public access to the Red River at some point or location on the Riverby Ranch mitigation site. The County understands and recognizes that the state and federal mitigation requirements for the Reservoir at the Riverby Ranch mitigation site may not allow for any such public access.

i. Multi-Purpose Facility. In addition to the recreational areas and facilities described in Section 3.g. above, the District also agrees to pay for, develop, construct, operate and maintain a multi-purpose facility that shall be owned by the District, under terms and conditions mutually agreeable to the Parties. The District will reserve space within the multi-purpose facility for the County's use consistent with the uses described herein. The multi-purpose facility shall be used for recreational and educational purposes and will include a nature center to provide public education and outreach on various environmental topics, such as water conservation and wildlife management and conservation. The multi-purpose facility shall also include a command center for emergency services, such as search and rescue services. As part of this command center, living quarters shall be provided so that individuals involved in or affected by an emergency have a place to stay overnight, if necessary. The County and District will work together to determine the location and placement of the multi-purpose facility.

j. Existing Wastewater Treatment Plants. The Parties understand that the construction of the Reservoir may result in more stringent effluent limits for existing public wastewater treatment plants ("WWTPs") discharging directly or indirectly to Bois d'Arc Creek due to the higher water quality standards that will be established for the Reservoir by TCEQ. The District agrees to work with the owners of existing public WWTPs, permitted and operating as of the commencement of construction of the Reservoir, to ensure these WWTPs achieve compliance with the more stringent effluent limits. The District shall have no obligation to provide any assistance regarding any WWTP improvements not required directly as a result of the construction of the Reservoir. The District shall not be required to provide for

improvement to or maintenance of existing WWTPs for any purpose if such improvements or maintenance is identified after five (5) years from the initiation of deliberate impoundment of water in the Reservoir.

Section 4. Potable Water Supplies. The Parties acknowledge that the primary reason for developing Lower Bois d'Arc Creek Reservoir is to provide a dependable public water supply for the District, the District's members and customers, and Fannin County, including any customers in Fannin County. To assist with meeting local needs for water supply in Fannin County, the District agrees to enter into wholesale potable water supply contracts with local entities that supply water for domestic and municipal purposes in Fannin County, under terms and conditions mutually agreeable to such parties.

Section 5. Official Name of Reservoir. The District agrees, upon the initiation of deliberate impoundment of water in the Reservoir, to consider using any such name(s) proposed by the County for the official name of the Reservoir.

Section 6. Indemnification. To the extent authorized by law, the District and Fannin County agree to save and hold each other harmless from all claims, demands, and causes of action that may be asserted by anyone on account of the planning, design, construction, maintenance, and operation of the Reservoir, and the transportation and delivery of water. Both the County and the District agree to be responsible for their own respective negligent acts.

Section 7. Term and Expiration. The term of this Agreement shall be for an initial period of ten (10) years from the Agreement Date (the date first above written) and may be renewed by mutual written agreement as to terms and conditions for an additional period of five (5) years. The Agreement may be terminated by the District without recourse by the County or other parties if, in the sole opinion of the District, any final state and federal permits necessary to enable construction and operation of the Reservoir are not timely received by the District for any reason, including, but not limited to, delays in permitting or litigation associated with the Reservoir.

Section 8. Other Contracts. The Parties agree that the District reserves to itself the sole discretion to enter into contracts with others for participation in the Reservoir or for water supply therefrom. Whether or not others participate in the Reservoir, the District will be solely responsible for developing (planning, regulatory permits, design, construction, operation, etc.) the Reservoir.

Section 9. Coordination of Parties. After this Agreement is fully executed, the Parties agree to continue to regularly communicate and coordinate regarding the Reservoir and the implementation of the provisions of this Agreement. The Parties agree to execute, acknowledge, and deliver or cause to be executed, acknowledged, and delivered, such instruments and take such other action as may be necessary, advisable, or convenient to carry out their obligations under this Agreement and under any document, certificate, or other instrument delivered pursuant hereto or required by law. The Parties further acknowledge that it is difficult to anticipate all of the activities, situations, and other factors which may be relevant to them in satisfying their respective obligations under this Agreement. Therefore, the Parties acknowledge that it will be necessary for them to cooperate with each other relative to any unforeseen situation and work together in good faith to address such situation.

Section 10. Addresses and Notice. Unless otherwise provided herein, any notice, communication, request, reply or advice (herein severally and collectively, for convenience, called "Notice") herein provided or permitted to be given, made or accepted by any party to any other party must be in writing and may be given or be served by depositing the same in the United States mail postpaid and registered or certified and addressed to the party to be notified, with return receipt requested, or by delivering the same to an officer of such party, or by electronic mail, addressed to the party to be notified at the email address provided below. Notice deposited in the mail in the manner described above shall be conclusively deemed to be effective, unless otherwise stated herein, from and after the expiration of three (3) days after it is so deposited. Notice given in any other manner shall be effective only if and when received by the party to be notified. For the purposes of notice, the contact information of the Parties shall, until changed as hereinafter provided, be as follows:

If to Fannin County, to: County Judge
Fannin County Courthouse
Bonham, Texas 75418
Email: clcarter@fanninco.net

If to the District, to: Executive Director
North Texas Municipal Water District
P.O. Box 2408
505 E. Brown St.
Wylie, Texas 75098
Email: tkula@ntmwd.com

The Parties hereto shall have the right from time to time and at any time to change their respective contact information and each shall have the right to specify as its contact information any other contact information by at least fifteen (15) days' written notice to the other party hereto.

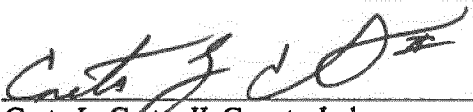
Section 11. State or Federal Laws, Rules, Orders or Regulations. This Agreement is subject to all applicable state and federal laws and any applicable permits, ordinances, rules, orders and regulations of any local, state or federal governmental authority having or asserting jurisdiction; but, nothing contained herein shall be construed as a waiver of any right to question or contest any such law, ordinance, order, rule or regulation in any forum having jurisdiction.

Section 12. Venue. It is specifically agreed among the Parties to this Agreement that Fannin County, Texas, is the place of performance of this Agreement; and in the event that any legal proceeding is brought to enforce this Agreement or any provision hereof, the same shall be brought in Fannin County, Texas.

Section 13. Adoption of Preamble. All of the matters stated in the preamble of this Agreement are true and correct and are hereby incorporated into the body of this Agreement as though fully set forth in their entirety herein.

IN WITNESS WHEREOF, the Parties hereto acting under authority of their respective governing bodies have caused this Agreement to be duly executed in several counterparts, each of which shall constitute an original, all as of the day and year first above written, which is the Agreement Date.

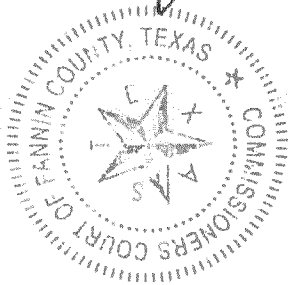
FANNIN COUNTY

By: 
Creta L. Carter II, County Judge

6-20-17
Date

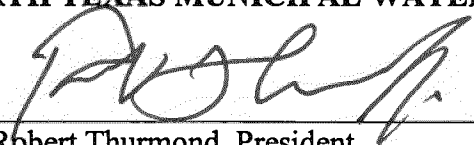
ATTEST:


Tammy Biggar, County Clerk



[signatures on following page]

NORTH TEXAS MUNICIPAL WATER DISTRICT

By: 
Robert Thurmond, President

6/22/2017
Date







ATTEST:

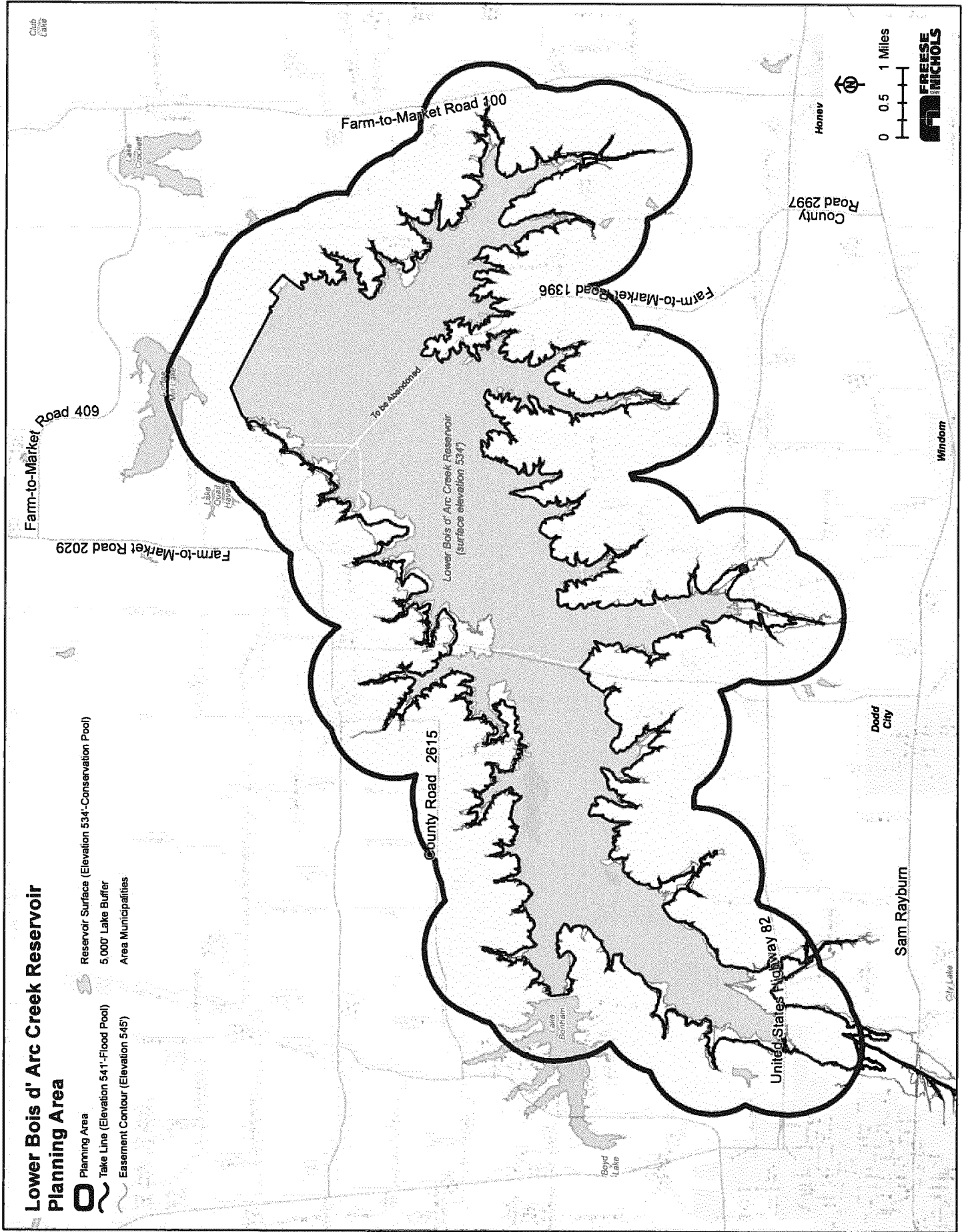
Don Gordon, Secretary



EXHIBIT 1:
Map of Reservoir Zoning Area

Lower Bois d' Arc Creek Reservoir Planning Area

-  Planning Area
-  Reservoir Surface (Elevation 534'-Conservation Pool)
-  Take Line (Elevation 541'-Flood Pool)
-  5,000' Lake Buffer
-  Area Municipalities
-  Easement Contour (Elevation 545')



0 0.5 1 Miles



EXHIBIT 2:
Scope of Work for Zoning Consultant

ATTACHMENT A - SCOPE OF SERVICES
LAKE PLANNING AND ZONING
Lower Bois d'Arc Creek Reservoir

ARTICLE I

PROJECT UNDERSTANDING:

The purpose of this project effort is twofold. The first purpose is to develop a Comprehensive Plan for the area 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 231 – Subchapter G (TLGC 231.131-231.141). The study area is defined as the area within one mile of the property boundary of the proposed Lower Bois d'Arc Creek Reservoir.

It is understood that the North Texas Municipal Water District (NTMWD) is the "Client" and that Fannin County (the County) will have the final decision authority regarding adoption of the comprehensive plan and zoning regulations.

PHASE 1 - BASIC SERVICES FOR THE RESERVOIR COMPREHENSIVE PLAN:

FNI shall render the following professional services in connection with the development of the project:

- A. Freese and Nichols, Inc. (FNI) will assist the County with the formulation of the committee that will guide the plan process.
- B. Baseline Chapter (Chapter 1) of the Comprehensive Plan:
 - 1. **Chapter Purpose:** This chapter will establish the baseline planning elements important to consider during the planning process.
 - 2. **Previous Planning Studies:** FNI will review previous planning studies, such as transportation plans or economic development studies.
 - 3. **Population Growth:** FNI will conduct an analysis of the County's population growth. FNI will also include regional population growth estimates and projections for the region.
 - 4. **Existing Land Use:** FNI will inventory the land uses surrounding the reservoir. The existing land use inventory will include:
 - i. Analysis of types of land use (color-coded by category and quantified by acres);
 - ii. Discussion of existing development patterns; and
 - iii. Discussion of existing land use relationships, both positive and negative.
 - 5. **Physical Factors Influencing Development:** FNI will document the physical environment that influences the future land use pattern and rate of growth. The following are the specific elements to be documented in order to describe the existing physical environment.
 - i. Analysis of the municipal boundaries;
 - ii. Analysis of the major topographic features in eastern Fannin County, including any areas of unusual topography or extensive tree cover; and
 - iii. Generalized documentation and analysis of existing floodplain areas and the proposed lake take line boundary.
- C. Vision Chapter (Chapter 2) of the Comprehensive Plan:
 - 1. **Chapter Purpose:** The vision for the reservoir is more than simply an idea of what the citizens of Fannin County want the reservoir to become; a vision is reflective of the many tangible and intangible characteristics and values that Fannin County citizens desire to preserve and to provide for current residents and future generations of residents and the needs of the owners (i.e., North Texas Municipal Water District).

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LAKE PLANNING AND ZONING
Lower Bois d'Arc Creek Reservoir

2. Issue Identification (Public Input): At the beginning of the project, County residents, stakeholders, Zoning Commissioners, and County Commissioners will be solicited to identify issues they believe are important for the Comprehensive Plan to address. The issue identification process is envisioned to be a brain-storming session during which individuals provide issues for discussion.
 3. Visioning Exercise (Public Input): The vision exercise will ask County residents, stakeholders, Zoning Commissioners, and County Commissioners what they believe the reservoir should offer to the community of Fannin County in regards to development and recreation.
 4. Vision Statement: Based on the results of the public input exercises held during the public input meetings, a vision statement for the reservoir will be prepared.
- D. Future Land Use Plan (Chapter 3) of the Comprehensive Plan:
1. Chapter Purpose: This chapter will serve to establish the future land uses and roadways surrounding the reservoir. The Future Land Use Plan is a policy document that is intended to guide County officials and staff as they make decisions on reservoir area development and zoning. Development of a land use plan that is understandable to citizens, County staff, Zoning Commissioners and County Commissioners will ensure that a cohesive and unified vision for the reservoir is presented to developers and property owners as future development occurs around the reservoir that will protect and enhance the long term use of the reservoir.
 2. Future Land Use Types Defined: A key component of the Future Land Use Plan is the definition and discussion of future land use types. Discussions of the types of land uses will center on the types of land uses, such as residential, nonresidential, and recreation, and where they are best suited around the reservoir. The type and density of development will be discussed.
 3. Future Land Use Plan Map: The Future Land Use Plan will culminate with the depiction of color-coded land uses within the reservoir planning area. The plan will consider the following:
 - i. Location of future residential, nonresidential, recreational and open space and public land uses;
 - ii. Location of environmentally sensitive areas or barriers that should be considered or protected when making future development decisions; and
 - iii. Location of future land uses along major transportation corridors.
 4. Land Use Projections: Land use projections will be calculated. Land use projections will depict the acreage by land use type as reflected within the Future Land Use Plan Map.
- E. Transportation Plan (Chapter 4) of the Comprehensive Plan:
1. Chapter Purpose: Land use and transportation decisions are interrelated. Therefore an important part of the Comprehensive Plan will be to examine the relationship between the existing thoroughfare systems and both existing and future land uses. The purpose of this section is to provide a transportation framework that will serve as a guide for mobility decisions to, from, and around the reservoir.
 2. Existing Conditions: FNI will conduct a general overview of the existing transportation system to serve as a basis for plan development.

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Lower Bois d'Arc Creek Reservoir

3. **Transportation Plan:** Based on plan input, the Future Land Use Plan Map and identified future needs, FNI will create the Transportation Plan by addressing functional roadway classifications, roadway sizing options, and roadway design standards.
- F. **Lake Development Guidelines (Chapter 5) of the Comprehensive Plan:**
1. **Chapter Purpose:** These guidelines are designed to promote health and the general welfare around the reservoir, protect property values, and water quality.
 2. **Residential Guidelines:** In order to promote the residential development established by the plan, guidelines will be written that create building and lot designs that match the vision for that type of development.
 3. **Nonresidential Guidelines:** In order to promote the nonresidential development established by the plan, guidelines will be written that create building and lot designs that reflect the vision for that type of development.
- G. **Lake Parks, Recreation, Trails and County Connections Plan (Chapter 6) of the Comprehensive Plan:**
1. **Chapter Purpose:** This chapter will focus on establishing the parks, recreational opportunities, trails, and the connections from these amenities to other areas within the study area.
 2. **Park, Recreation, and Trail Recommendations:** If supported by the community input, the reservoir can be a destination for recreation and offer County residents and other visitors opportunities to meet park, recreation, and trail needs. The reservoir could contain a variety of parks, recreational features, and trails, such as marinas, natural areas, hiking trails, and biking trails. Recommendations to support these elements will be developed.
 3. **Access to the Lake Areas:** The reservoir can be a major asset to Fannin County by providing recreational opportunities, serving as a tourist destination, and being a unique part of the County's landscape. This portion of the plan will evaluate and recommend how the reservoir can be accessed for recreational opportunities. The purpose of this section will be to enhance the ability of people to use the reservoir and take advantage of the reservoir's many recreational opportunities.
- H. **Implementation Plan (Chapter 7) of the Comprehensive Plan:**
1. **Chapter Purpose:** The Implementation Plan will be 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 Fannin County that is described within the Comprehensive Plan.
 2. **Implementation Actions:** The Implementation Plan will outline actions primarily by:
 - i. Reviewing the various policies and related recommendations from each Plan element;
 - ii. Dividing the policies and related recommendations into applicable implementation actions, such as regulatory actions (e.g., zoning regulations), programs, and intergovernmental partnerships; and
 - iii. Prioritizing the implementation actions into appropriate timeframes.

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LAKE PLANNING AND ZONING
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PHASE 1 - MEETINGS FOR THE COMPREHENSIVE PLAN:

FNI will conduct eleven (11) meetings with the County and four (4) coordination meetings with the NTMWD to develop the Reservoir Comprehensive Plan. The following meetings are included within this scope.

- A. Meeting #1: Steering Committee Meeting (Kick-Off Meeting)
 - 1. FNI will provide an overview of the project scope and give an orientation session for members to explain the purpose of the project.
 - 2. FNI will conduct visioning exercises to solicit input from committee members.
 - 3. A separate coordination meeting will be held with NTMWD to review material and gather input. The meeting date and time will be mutually agreed upon by NTMWD and FNI.

- B. Meetings #2, #3, and #4: Focus Group Meetings
 - 1. FNI will conduct three (3) focus group meetings with individuals selected by either County Commissioners or County staff.
 - 2. All focus groups will be held on the same day.
 - 3. At these meetings, FNI will gather input for the plan with an issues identification exercise and a vision exercise.
 - 4. A separate coordination meeting will be held with NTMWD to review material and gather input. The meeting date and time will be mutually agreed upon by NTMWD and FNI.

- C. Meeting #5: Public Input Meeting
 - 1. FNI will conduct a public meeting at a location determined by the County Commissioners.
 - 2. FNI will provide an overview of the project scope and give a planning orientation session for the public.
 - 3. FNI will conduct visioning exercises to solicit input from the public.

- D. Meeting #6: Steering Committee Meeting (First Draft Discussion)
 - 1. Using the input from the above meetings, FNI will create the first draft of the entire plan.
 - 2. At this meeting, FNI and the steering committee will meet to review the first draft.
 - 3. Revisions to the draft will be identified at this meeting.
 - 4. A separate coordination meeting will be held with NTMWD to review material and gather input. The meeting date and time will be mutually agreed upon by NTMWD and FNI.

- E. Meeting #7: County Commissioners Update Meeting
 - 1. FNI will attend the County Commissioners meeting and provide an update of the project.
 - 2. FNI will provide an overview of the first draft and initial plan revisions.

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Lower Bois d'Arc Creek Reservoir

- F. Meeting #8: Steering Committee Meeting (Second Draft Discussion)
 - 1. Using the input from the above meetings, FNI will create the second draft of the entire plan.
 - 2. At this meeting, FNI and the steering committee will meet to review the second draft.
 - 3. FNI and the steering committee will gain consensus on the second draft.

- G. Meeting #9: County Commissioners Update Meeting
 - 1. FNI will attend the County Commissioners meeting and provide an update of the project.
 - 2. FNI will provide an overview of the second draft and initial plan revisions.
 - 3. A separate coordination meeting will be held with NTMWD to review material and gather input. The meeting date and time will be mutually agreed upon by NTMWD and FNI.

- H. Meeting #10: Public Review Meeting (Open House)
 - 1. FNI will conduct a public meeting at a location determined by the County Commissioners.
 - 2. FNI will present an overview of the draft plan to the public.
 - 3. FNI will solicit input and comments from the public.

- I. Meeting #11: County Commissioners Meeting
 - 1. FNI will attend the County Commissioners meeting and present the final plan.
 - 2. At this meeting, the County Commissioners may adopt the Comprehensive Plan.

PHASE 1 - DELIVERABLES FOR THE COMPREHENSIVE PLAN:

One (1) CD or USB flash drive with the Comprehensive Plan and fifteen (15) printed copies.

PHASE 2 – BASIC SERVICES FOR THE DEVELOPMENT OF THE ZONING REGULATIONS AND ZONING MAP:

The purpose of this section is to create the zoning regulations and zoning map for an area surrounding the reservoir, which shall include the area within 5,000 feet of where the shoreline of the reservoir would be if the reservoir were filled to its storage capacity. The project will follow the process outlined in the Texas Local Government Code, Chapter 231 – Subchapter G (TLGC 231.131-231.141).

Depending on the direction established in the comprehensive plan and subject to the Commissioners' Court discretion. Zoning regulations may be developed to address the following (ref. TLGC 231.133):

- (1) the height, number of stories, and size of buildings and other structures;
- (2) the percentage of a lot that may be occupied;
- (3) the size of yards, courts, and other open spaces;
- (4) population density;
- (5) the location and use of buildings, other structures, and land for business, industrial, residential, or other purposes; and
- (6) the placement of water and sewage facilities, parks, and other public requirements.

Additionally, the Commissioners' Court may establish zoning districts and within each zoning district the Commissioners' Court may regulate the erection, construction, reconstruction, alteration, repair, or use of buildings, other structures, or land (ref. TLGC 231.135).

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LAKE PLANNING AND ZONING
Lower Bois d'Arc Creek Reservoir

- A. Outline of the Zoning Regulations Text
 - 1. Section 1: General Provisions
 - 2. Section 2: Zoning Districts and Uses
 - 3. Section 3: Development or Supplemental Regulations
 - 4. Section 4: Procedures and Administration
 - 5. Section 5: Definitions

- B. Outline of the Zoning Map
 - 1. The zoning map will include an area within 5,000 feet of where the shoreline of the reservoir would be if the reservoir were filled to its storage capacity.
 - 2. The zoning map will be reflective of the Comprehensive Plan.
 - 3. It is anticipated that the zoning map will have districts for residential, nonresidential, and recreational uses. However, these districts will be determined during the development of the Comprehensive Plan, zoning regulations, and zoning map.
 - 4. The County will be responsible for all public notification for the zoning map.

PHASE 2 - MEETINGS FOR THE DEVELOPMENT OF THE ZONING REGULATIONS AND ZONING MAP:

FNI will conduct up to six (6) meetings with the County and up to six (6) coordination meetings with the NTMWD to develop the zoning regulations and zoning map. The following six meetings are included within this scope.

- A. Prior to meeting with the Zoning Commission
 - a. FNI will draft the preliminary zoning text and zoning map.
 - b. A draft will be emailed to Zoning Commission before the first meeting.
 - c. A coordinating meeting with NTMWD will be held before the first meeting.

- B. Meeting #1: Zoning Commission Meeting
 - a. Meet to review and discuss preliminary draft of the zoning text and zoning map.
 - b. At this meeting, the Commission will agree on any revisions to the draft.
 - c. A separate coordination meeting will be held with NTMWD to review material and gather input. The meeting date and time will be mutually agreed upon by NTMWD and FNI.

- C. Meeting #2: County Commissioners Update Meeting
 - a. FNI will attend the County Commissioners meeting and provide an update of the project.
 - b. FNI will provide an overview of the first draft of the zoning text and zoning map and initial plan revisions.
 - c. A separate coordination meeting will be held with NTMWD to review material and gather input. The meeting date and time will be mutually agreed upon by NTMWD and FNI.

- D. Meeting #3: Zoning Commission Meeting
 - a. Meet to review and discuss the revised preliminary draft of the zoning text and zoning map.
 - b. At this meeting, the Commission shall reach a consensus on the draft.

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- c. A separate coordination meeting will be held with NTMWD to review material and gather input. The meeting date and time will be mutually agreed upon by NTMWD and FNI.
- E. Meeting #4: County Commissioners Update Meeting
 - a. FNI will attend the County Commissioners meeting and provide an update of the project.
 - b. FNI will provide an overview of the consensus draft of the zoning text and zoning map.
 - c. A separate coordination meeting will be held with NTMWD to review material and gather input. The meeting date and time will be mutually agreed upon by NTMWD and FNI.
- F. Meeting #5: Zoning Commission Public Hearing
 - a. As required by TLGC 231.136, the Zoning Commission will hold a public hearing on the preliminary report (i.e., the preliminary draft of the Zoning Text and Map).
 - b. After a hearing on the preliminary report, the Zoning Commission may submit a final report to the Commissioners' Court.
 - c. A separate coordination meeting will be held with NTMWD to review material and gather input. The meeting date and time will be mutually agreed upon by NTMWD and FNI.
- G. Meeting #6: Commissioners' Court Public Hearing for Adoption
 - a. As required by TLGC 231.136, a final report must be received from the Zoning Commission before the court can take action or hold a public hearing.
 - b. A zoning regulation or zoning district boundary proposed by the Zoning Commission is not effective until it is adopted by the Commissioners' Court after a public hearing.
 - c. The Commissioners' Court by a majority vote may amend or reject a regulation or boundary proposed by the Zoning Commission.
 - d. The zoning, if adopted, would then take effect.

PHASE 2 - DELIVERABLES FOR THE DEVELOPMENT OF THE ZONING REGULATIONS AND ZONING MAP:

- A. One (1) CD or USB flash drive with the Zoning Regulations and map will be submitted.
- B. Two hard copies of the zoning map (either 48" X 36" or 48" X 24") will be submitted.
- C. Fifteen (15) printed copies will be submitted.

ATTACHMENT A - SCOPE OF SERVICES
LAKE PLANNING AND ZONING
Lower Bois d'Arc Creek Reservoir

ARTICLE II

ADDITIONAL SERVICES:

Additional Services to be performed by FNI, if authorized by the Client, which are not included in the above described basic services, are described as follows:

- A. Preparing documents or revisions not listed above.
- B. Preparing any engineering standards, plans, or drawings.
- C. Preparing data and reports for assistance to the Client/County in preparation for hearings before regulatory agencies, courts, arbitration panels or any mediator, giving testimony, personally or by deposition, and preparations therefore before any regulatory agency, court, arbitration panel or mediator.
- D. Assisting the Client/County in the defense or prosecution of litigation in connection with or in addition to those services contemplated by this AGREEMENT. Such services, if any, shall be furnished by FNI on a fee basis negotiated by the respective parties outside of and in addition to this AGREEMENT.
- E. Meetings in excess of the number of trips included in Article I for periodic site visits, coordination meetings, or contract completion activities.
- F. Providing basic or additional services on an accelerated time schedule. The scope of this service include cost for overtime wages of employees and consultants, inefficiencies in work sequence and plotting or reproduction costs directly attributable to an accelerated time schedule directed by the Client.
- G. Preparing statements for invoicing or other documentation for billing other than for the standard invoice for services attached to this professional services agreement.

ATTACHMENT A - SCOPE OF SERVICES
LAKE PLANNING AND ZONING
Lower Bois d'Arc Creek Reservoir

ARTICLE III

TIME OF COMPLETION:

FNI is authorized to commence work on the Project upon execution of this AGREEMENT, which is anticipated to be July 2015, and agrees to complete the services within 12 months of the execution date of this AGREEMENT.

If FNI's services are delayed through no fault of FNI, FNI shall be entitled to adjust contract schedule consistent with the number of days of delay. These delays may include but are not limited to delays in Client/County or regulatory reviews, delays in the flow of information to be provided to FNI, governmental approvals, etc. These delays may result in an adjustment to compensation as outlined on the face of this AGREEMENT and in Attachment CO.

EXHIBIT 3:
Map of Transportation Plan

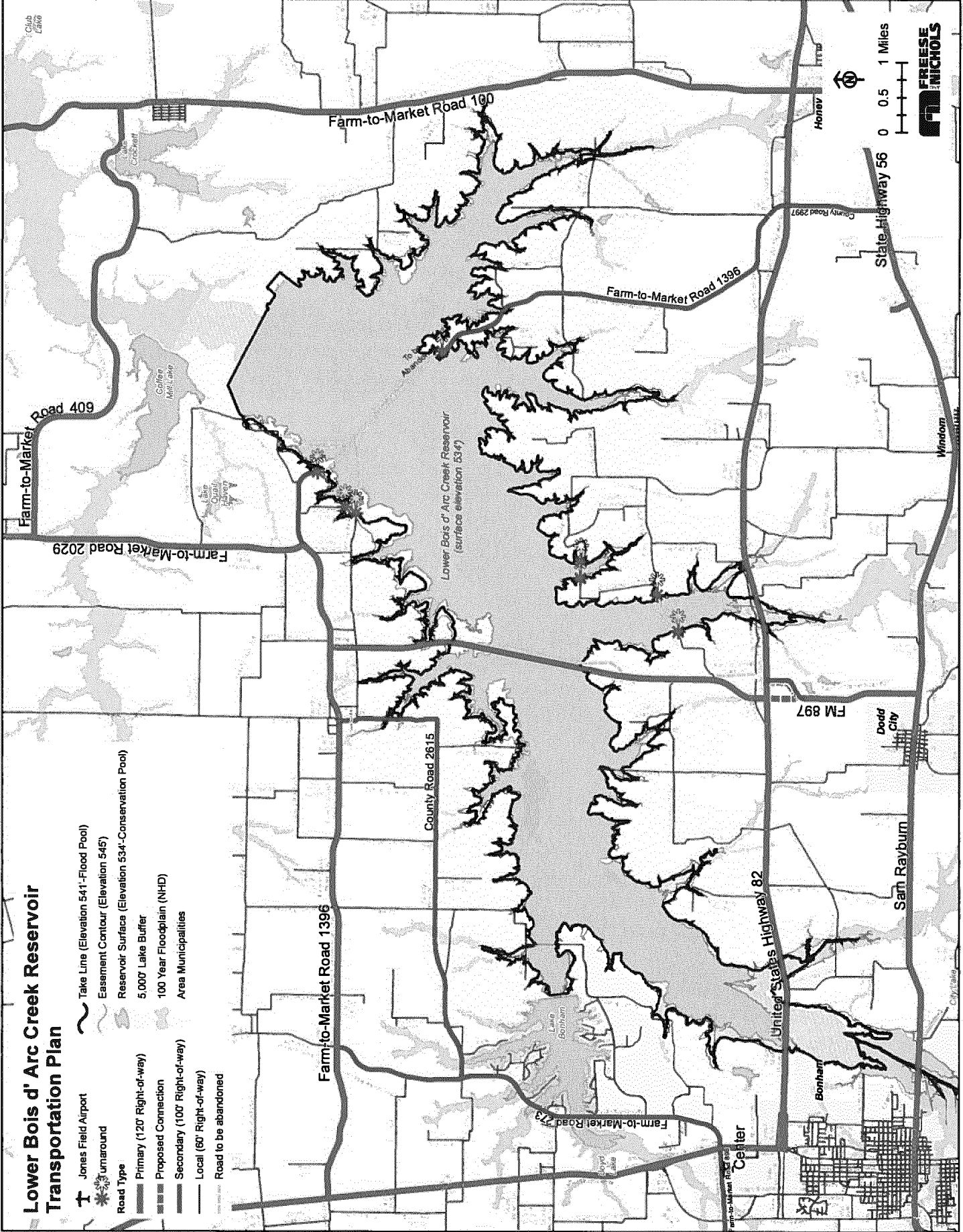


EXHIBIT 4:
Map of County Road Crossings

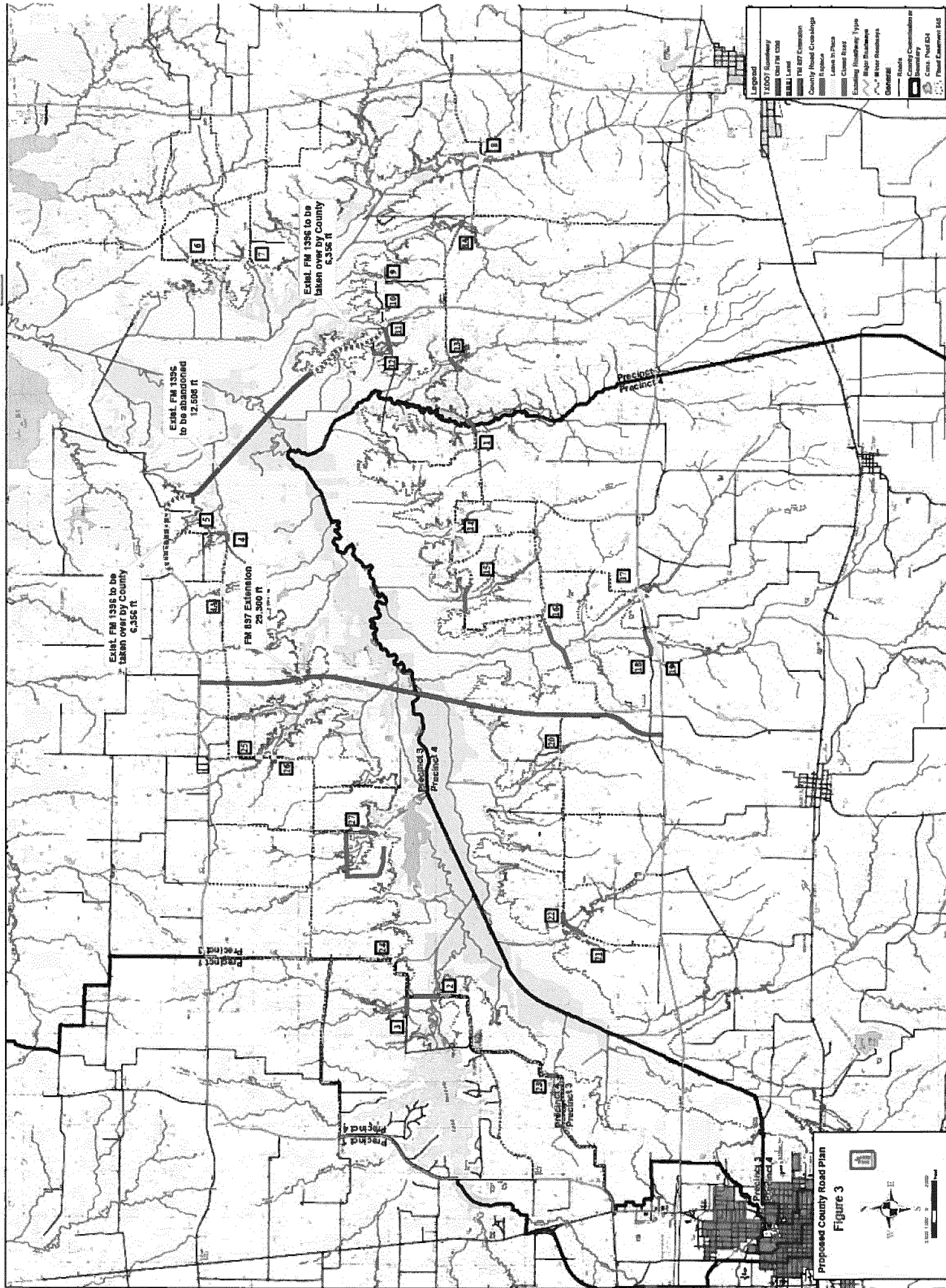
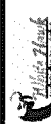


EXHIBIT 5:
Depiction of Site 8A Crossing on CR 2750

MAJOR CONTOUR (12')
MINOR CONTOUR (1')
100 YEAR CONTOUR (54')
PROPERTY LINE
SUNNICK ROADWAY CENTERLINE
APPROXIMATE BRIDGE LIMITS
PROJECT STUDY LIMITS

PRELIMINARY

FOR INTERIM REVIEW ONLY NOT FOR
CONSTRUCTION, BIDDING, OR PERMIT PURPOSES.
RESPONSIBLE ENGINEER:
WHITE HAWK ENGINEERING & DESIGN, LLC
TYPE F-18998
KIMBERLY D. BROOKS, P.E.
TEXAS LICENSE NO. 92570
4/21/2017



2233 BUCKLEY AVE. S.W., SUITE 120
ALBUQUERQUE, NM 87102
TEL: 505-263-8444
FAX: 505-263-8444

North Texas Municipal Water District

FANNIN COUNTY ROADS

SCALE:		SHEET			OF	
NEARBY R.D. NO.	STATE	FEDERAL AID PROJECT	HIGHWAY NO.	SHEET NO.		
	TEXAS					
STATE DISTRICT	COUNTY	SECTION NO.	JOB NO.			

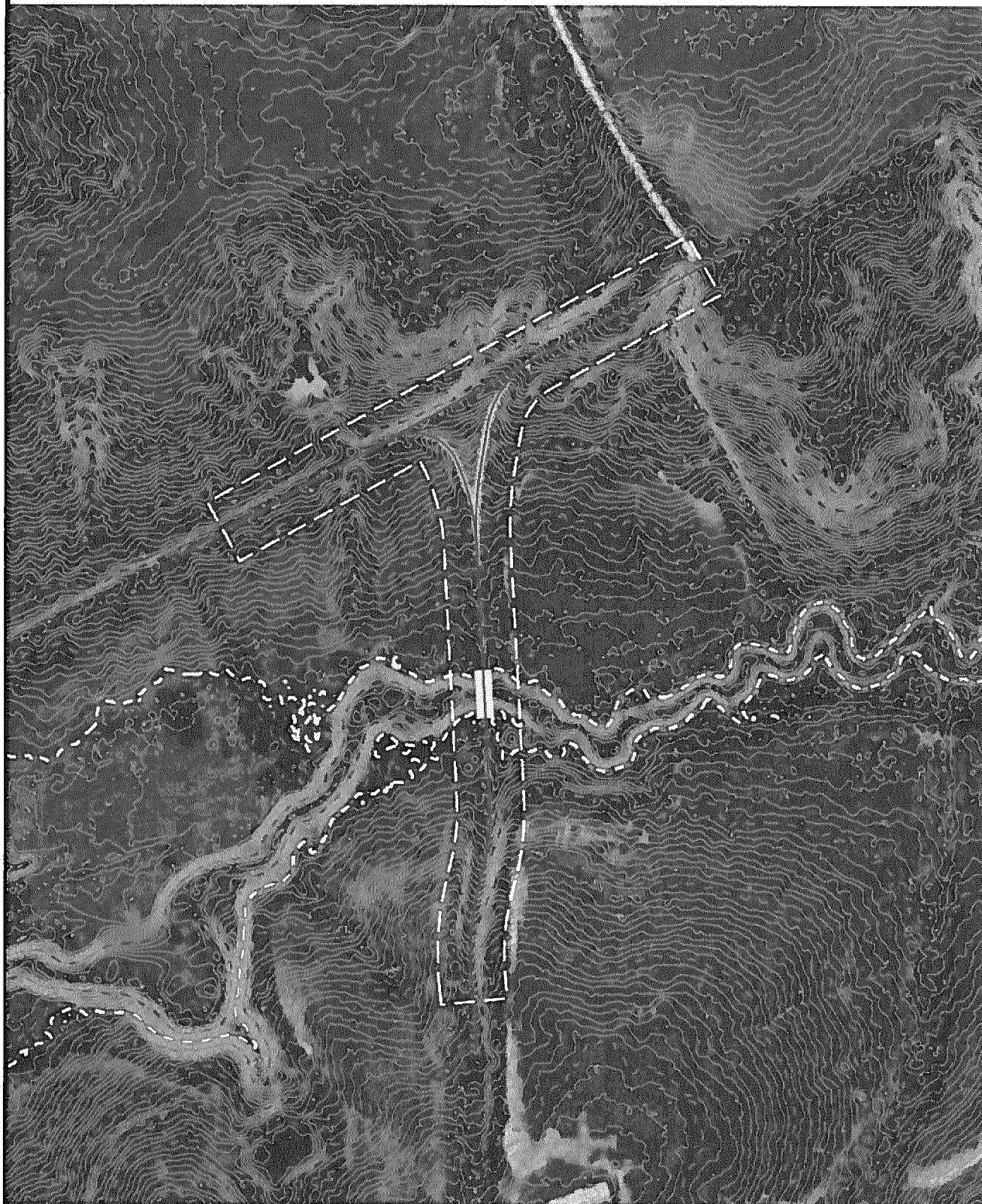


EXHIBIT 6:
County Road Crossing Design Criteria

**FANNIN COUNTY ROADS
DESIGN CRITERIA
NTMWD CONTRACT 2016-0122**

ROADWAY		DESIGN CRITERIA LOCATION			
ITEM	MINIMUM	DÉSIRABLE	REFERENCES	PAGE NUMBER	
Roadway Classification	Off-system, local roads				
Design Speed	30 mph				
Terrain	Rolling				
HORIZONTAL ALIGNMENT					
Control Location	Roadway Centerline				
Stopping Sight Distance	250'			RDM	Page 2-7, Table 2-1
Minimum Centerline Radius	510'			RDM	Page 2-14, Table 2-5
Superelevation Rate	not desirable, refer to Table 2-5 for low-speed facilities if required			RDM	Page 2-14, Table 2-5
Superelevation Runoff	0.62% relative grade, if required			RDM	Page 2-17, Table 2-8
VERTICAL ALIGNMENT					
PGL / Axis of Rotation	Roadway Centerline				
Longitudinal Gradient	0.50% min	7.00% max; 5.00% desirable max	RDM	Page 2-25, Table 2-11	
K value for Crest Curves, min.	29			RDM	Page 2-28, Figure 2-5
K value for Sag Curves , min.	49			RDM	Page 2-29, Figure 2-6
Grade change without a vertical curve	1.00% max			RDM	Page 2-30
Freeboard					
Bridge	1' below low chord				
Pavement	1' below bottom of pavement				
CROSS SECTION ELEMENTS					
Width of Travel Lanes	2-10' lanes with 2' shoulders				
Number of Lanes	2				
Shoulder Widths:					
Inside	N/A				
Outside	2' plus 3'-6" of crown widening for MBGF (Roadway), 1' for rail (Bridge)				
Cross slope (Pavement and Shoulder)	2.0%				
Clear Zone Width	10' minimum			RDM	Page 2-44, Table 2-12
Side Slopes:					
Within Clear Zone	4:1 max			RDM	Page 2-44, Table 2-12
Outside Clear Zones	3.5:1 max				
Proposed Right-of-Way Width	TBD				
Pavement Design	To Be Determined (Assume 8" Flex Base)				
INTERSECTIONS AND DRIVEWAYS					
Design Vehicle	MH/B				
Corner Radii:					
Major Cross Streets	50'			AASHTO	
Minor Cross Streets	50'			AASHTO	
Driveways	10' for Private Residential			RDM	Page C-6, Table C-1
Driveway Widths	14' for Private Residential			RDM	Page C-6, Table C-1
HYDRAULIC DESIGN FREQUENCY					
Inlets, Drainage Pipe, Ditches	5-year; 25-year at sag locations			HDM	Page 4-14, Table 4-2
Cross Culvert Design	10-year			HDM	Page 4-14, Table 4-2
Bridge Class Culvert (Main Channel)	Backwater WSE < 100-year WSE				
Bridge (Main Channel) Design	Backwater WSE < 100-year WSE				
HYDROLOGIC METHOD					
Drainage Area < 200 ac	Rational Method			HDM	Page 4-17
Drainage Area > 200 ac	Varies, refer to TxDOT Flow Chart			HDM	Page 4-18, Figure 4-2
CULVERTS					
Headwater Control Location	1' below bottom of pavement				
Outfall Velocity	3 ft/s	12 ft/s with channel protection 6 ft/s for natural channel	HDM	Page 8-20	
SURFACE DRAINAGE					
Pipe Size	18" min				
Pipe Velocity	3 ft/s	12 ft/s	HDM	Page 10-8	
Pipe Material	RCP for road crossings, CMP for driveways				
SLOPE PROTECTION					
Stone Riprap	For Slope equal to or flatter than 3.5:1 and equal to steeper than 8:1				
Stone Riprap	To be placed from 2' above normal pool elevation to 5' beyond slope tie-down				
Concrete Riprap	For Slope steeper than 3.5:1				
STRUCTURES					
Bridge Design	TxDOT Bridge Design Manual LRFD-2015 & AASHTO LRFD 7th Edition				
Culvert Design	TxDOT Standard Design & AASHTO LRFD 7th Edition				
Miscellaneous	TxDOT Standard Design, AASHTO LRFD 7th Edition & ACI 318				

rev 4/21/17