

Dragonflies and Damselflies (Odonates)

Libellulidae (Dragonfly) occur in a variety of permanent and temporary lentic habitats where they crawl on vegetation and debris. Usually found along littoral areas of lakes, permanent ponds, vernal ponds and marshes, cattail marshes, sphagnum swamps, and bogs. They are highly beneficial predators feeding primarily on insects, especially mosquitoes.

Coenagrionidae (Damselfly) is a lentic species found mostly in permanent ponds, marshes, swamps, and littoral zones of lakes. They occasionally occur among vegetation in parts of streams with little or no current. They are highly beneficial predators feeding primarily on insects, especially mosquitoes.

Aquatic and Semi-Aquatic Bugs (Hemipterans) (Adults)

Corixidae or water boatmen are found in most permanent aquatic habitats and frequently invade temporary ones as well. They feed primarily on detritus, algae, protozoans, and other extremely small animals including insects.

Water Beetles (Coleopterans) (Both larvae and adults)

Gyrinidae or whirligig beetles are widespread and abundant. Most species are lentic with larvae found mostly among submerged vegetation. Larvae are predators feeding on invertebrates while the adults are scavengers feeding on dead animals or preying on small invertebrates.

Halplidae or crawling water beetles are often abundant in shallow lentic or lotic vegetation choked habitats. They are known to overwinter in terrestrial sites adjacent to the water. They are usually found on submerged vegetation or algae. Both the adult and larvae are predators of invertebrates.

Hydrophilidae or water scavenger beetles are a large and abundant family that mostly inhabits shallow, vegetated pool and pond habitats. Adults feed on both living and decaying vegetation whereas the larvae are voracious predators.

Collembola (Spring Tails) are grouped in the class Insecta; however, there is discussion as to the continued inclusion of Collembola in the class Insecta. For this discussion, they are included with the class Insecta. Spring tails are semi-aquatic species located on the surface of marshes, ponds, in quiet areas of lakes, and other damp areas feeding primarily on algae, detritus, and other organic material.

CRUSTACEANS

Amphipods or scuds (Peracarida) have a widespread distribution and are extremely abundant. Amphipods tend to be located in shallow, clear waters, including springs, spring brooks, streams, pools, ponds, and lakes typically attached to rooted vegetation or algae. They are omnivorous scavengers feeding on plant and animal material.

Cladocerans (Water Fleas) are widespread and abundant occurring in all but the harshest freshwater habitats. While they are more abundant in lakes, ponds, and sluggish streams, they also occur in quiet water and in marginal vegetation in rushing streams. Some species can tolerate low levels of dissolved oxygen. They primarily feed on organic detritus, bacteria, algae, and protozoans.

Copepods are found in a wide variety of aquatic environments ranging from lakes, slow moving streams and rivers, swamps, wetlands, marshes, temporary ponds, and small puddles. Copepods are present but less abundant in flowing water of streams and rivers. They are more tolerant of low dissolved oxygen than water fleas. They are an important link in the aquatic food chain.

Astacidae (specifically Cambaridae) or crayfish are typically found in the following habitats: shallow lentic and lotic waters, lakes, ponds, marshes, ditches, low-gradient large rivers, springs, and terrestrial burrows leading to groundwater. They feed on both plant and animal materials and are efficient scavengers.

Ostracods (Seed Shrimp) are found in nearly every conceivable aquatic habitat ranging from temporary and permanent ponds, lakes, intermittent and permanent streams, ditches and irrigation canals. Most are scavengers feeding on bacteria, molds, algae, and detritus.

ARACHNIDS

Hydracarina (Water Mites) are widespread and abundant readily found in all types of aquatic environments. They are typically found in lakes, temporary pools, springs, riffle habitats, and interstitial spaces. They are food for many aquatic invertebrates.

GASTROPODS

Planorbidae (Snails) are widespread and fairly diverse. Planorbids possess hemoglobin as a respiratory pigment and therefore can live in low oxygenated conditions. One of the most intriguing aspects of the biology of freshwater snails is their adaptation to the relative ephemerality of their habitats. They feed on microscopic algae, filamentous algae, aquatic plants, and dead organic matter.

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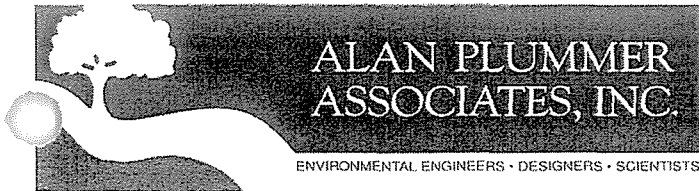
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ATTACHMENT B

**Letter Dated August 28, 2006 from Alan Plummer Associates, Inc.
to Edward Motley, Chiang, Patel and Yerby, Inc.**



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346-0402

August 28, 2006

Mr. Edward Motley, P.E.
Chiang, Patel, and Yerby, Inc.
1820 Regal Row, Suite 200
Dallas, Texas 75235

RE: Biological Conditions within the North Sulphur River – Proposed Lake Ralph Hall

Dear Mr. Motley:

An on-site investigation for assessment of the terrestrial and aquatic communities outside of the conservation pool and within the project area was conducted on August 24 and 25, 2006. This assessment was performed to quantify existing conditions pre-construction of Lake Ralph Hall and to predict the post-construction improvements or detriments to these communities. In conjunction with this assessment, the North Sulphur River was observed to determine the extent of water within the channel.

The North Sulphur River was visually assessed at three locations: FM 904 Bridge, FM 2920 Bridge, and the FM 64 Bridge. At each location, no water was observed within the channel. Photographs from the visual assessment are included in Attachment A. In a letter dated June 15, 2006, conditions within the North Sulphur River as of May 10, 2006 were described which included descriptions of aquatic organisms observed. The letter summarized that the aquatic organisms observed are “common and abundant throughout the area and would be expected to colonize ephemeral and intermittent pools within the North Sulphur River. The fact that flow in the river occurs only in response to rain events, leaving the bed of the river essentially dry the vast majority of the time would strongly suggest that a sustainable community of aquatic organisms cannot and does not exist within the river channel. The organisms observed are opportunists, temporarily sustained by the ephemeral pools and the limited temporal habitat these pools provide.”

The observation of no pools or any water within the channel during the August 24 and 25, 2006 investigation substantiates this conclusion. Should you have any

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Mr. Edward Motley, P.E.
August 28, 2006
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questions or comments, please feel free to phone either Loretta Mokry or myself at
(817) 806-1700.

Sincerely,

ALAN PLUMMER ASSOCIATES, INC.



Jason Voight

Attachment

ATTACHMENT A



P1. 904 bridge looking west.



P2. 904 bridge looking east



P3. 2920 bridge looking east



P4. 2920 bridge looking west



P5. 64 bridge looking east



P6. 64 bridge looking west

ATTACHMENT C

**Calculations of Instream Flow Requirements for Lake Ralph Hall
As Prepared by R. J. Brandes Company, August 20, 2003**

**APPLICATION OF LYONS METHOD FOR INSTREAM FLOW REQUIREMENTS
LAKE RALPH HALL - NORTH SULPHUR RIVER**

RJBCO / 08-20-03

Drainage Area at Ralph Hall Dam Site:		100.9 square miles					
Drainage Area at Gage No. 07343000		276.0 square miles					
Ratio of Dam-to-Gage Drainage Areas:		0.366					
TCEQ Minimum Flow for Water Quality:		0.1 cfs (7Q2 Flow)					
TCEQ Minimum Flow for Water Quality:		6 ac-ft/month					
MONTH	MEDIAN *	MEDIAN	LYONS	LYONS		PRELIMINARY	
	FLOW	FLOW	% OF	MINIMUM		MINIMUM	
	AT	AT	MEDIAN	ENVIRON. FLOWS		ENVIRON. FLOWS	
	GAGE	DAM SITE	FLOW	AT DAM SITE		AT DAM SITE	
	cfs	cfs		cfs	ac-ft	cfs	ac-ft
JAN	26.0	9.5	40%	3.8	211	3.8	211
FEB	40.0	14.6	40%	5.8	325	5.8	325
MAR	36.0	13.2	60%	7.9	486	7.9	486
APR	28.0	10.2	60%	6.1	365	6.1	365
MAY	24.0	8.8	60%	5.3	324	5.3	324
JUN	11.0	4.0	60%	2.4	144	2.4	144
JUL	1.6	0.6	60%	0.4	22	0.4	22
AUG	0.2	0.1	60%	<0.1	3	0.1	6
SEP	0.5	0.2	60%	0.1	7	0.1	7
OCT	1.6	0.6	40%	0.2	14	0.2	14
NOV	9.3	3.4	40%	1.4	81	1.4	81
DEC	20.0	7.3	40%	2.9	180	2.9	180
* Based on 1949-2002 mean daily flow records.						Total =	2,164

Appendix G
Hazardous Materials Radius Report

Radius Report

[NEW: GeoLens by Geosearch](#)

Target Property:

***Proposed Lake Ralph Hall Project Area & Pipeline Alignment
Fannin County, Texas***

Prepared For:

Michael Baker International-Round Rock

Order #: 113649

Job #: 253814

Date: 08/28/2018

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Disclaimer

This report was designed by GeoSearch to meet or exceed the records search requirements of the All Appropriate Inquiries Rule (40 CFR § 312.26) and the current version of the ASTM International E1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process or, if applicable, the custom requirements requested by the entity that ordered this report. The records and databases of records used to compile this report were collected from various federal, state and local governmental entities. It is the goal of GeoSearch to meet or exceed the 40 CFR § 312.26 and E1527 requirements for updating records by using the best available technology. GeoSearch contacts the appropriate governmental entities on a recurring basis. Depending on the frequency with which a record source or database of records is updated by the governmental entity, the data used to prepare this report may be updated monthly, quarterly, semi-annually, or annually.

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Target Property Summary

Target Property Information

*Proposed Lake Ralph Hall Project Area & Pipeline Alignment
Texas*

Coordinates

*Area centroid (-95.968948, 33.4594742)
535 feet above sea level*

USGS Quadrangle

*Farmersville, TX
Greenville Nw, TX
Honey Grove, TX
Celeste, TX
Wolfe City, TX
Commerce North, TX
Gober, TX
Ladonia, TX*

Geographic Coverage Information

County/Parish: Fannin (TX) , Collin (TX) , Hunt (TX)

ZipCode(s):

*Celeste TX: 75423
Dodd City TX: 75438
Farmersville TX: 75442
Honey Grove TX: 75446
Ladonia TX: 75449
Leonard TX: 75452
Wolfe City TX: 75496*

Database Summary

FEDERAL LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
EMERGENCY RESPONSE NOTIFICATION SYSTEM	ERNSTX	0	0	TP/AP
FEDERAL ENGINEERING INSTITUTIONAL CONTROL SITES	EC	0	0	TP/AP
LAND USE CONTROL INFORMATION SYSTEM	LUCIS	0	0	TP/AP
RCRA SITES WITH CONTROLS	RCRASC	0	0	TP/AP
RESOURCE CONSERVATION & RECOVERY ACT - GENERATOR	RCRAGR06	0	0	0.1250
RESOURCE CONSERVATION & RECOVERY ACT - NON-GENERATOR	RCRANGR06	0	0	0.1250
FEMA OWNED STORAGE TANKS	FEMAUST	0	0	0.2500
BROWNFIELDS MANAGEMENT SYSTEM	BF	0	0	0.5000
DELISTED NATIONAL PRIORITIES LIST	DNPL	0	0	0.5000
NO LONGER REGULATED RCRA NON-CORRACTS TSD FACILITIES	NLRRCRAT	0	0	0.5000
RESOURCE CONSERVATION & RECOVERY ACT - NON-CORRACTS TREATMENT, STORAGE & DISPOSAL FACILITIES	RCRAT	0	0	0.5000
SUPERFUND ENTERPRISE MANAGEMENT SYSTEM	SEMS	0	0	0.5000
SUPERFUND ENTERPRISE MANAGEMENT SYSTEM ARCHIVED SITE INVENTORY	SEMSARCH	0	0	0.5000
NATIONAL PRIORITIES LIST	NPL	0	0	1.0000
NO LONGER REGULATED RCRA CORRECTIVE ACTION FACILITIES	NLRRCRAC	0	0	1.0000
PROPOSED NATIONAL PRIORITIES LIST	PNPL	0	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - CORRECTIVE ACTION FACILITIES	RCRAC	0	0	1.0000
RESOURCE CONSERVATION & RECOVERY ACT - SUBJECT TO CORRECTIVE ACTION FACILITIES	RCRASUBC	0	0	1.0000
SUB-TOTAL		0	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
AEROMETRIC INFORMATION RETRIEVAL SYSTEM / AIR FACILITY SUBSYSTEM	AIRSAFS	0	0	TP/AP
BIENNIAL REPORTING SYSTEM	BRS	0	0	TP/AP
CERCLIS LIENS	SFLIENS	0	0	TP/AP
CLANDESTINE DRUG LABORATORY LOCATIONS	CDL	0	0	TP/AP
EPA DOCKET DATA	DOCKETS	0	0	TP/AP
ENFORCEMENT AND COMPLIANCE HISTORY INFORMATION	ECHOR06	1	0	TP/AP

Database Summary

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
FACILITY REGISTRY SYSTEM	FRSTX	3	0	TP/AP
HAZARDOUS MATERIALS INCIDENT REPORTING SYSTEM	HMIRSR06	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM (FORMERLY DOCKETS)	ICIS	0	0	TP/AP
INTEGRATED COMPLIANCE INFORMATION SYSTEM NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	ICISNPDES	1	0	TP/AP
MATERIAL LICENSING TRACKING SYSTEM	MLTS	0	0	TP/AP
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM	NPDESR06	0	0	TP/AP
PCB ACTIVITY DATABASE SYSTEM	PADS	0	0	TP/AP
PERMIT COMPLIANCE SYSTEM	PCSR06	0	0	TP/AP
SEMS LIEN ON PROPERTY	SEMCLIENS	0	0	TP/AP
SECTION SEVEN TRACKING SYSTEM	SSTS	0	0	TP/AP
TOXIC SUBSTANCE CONTROL ACT INVENTORY	TSCA	0	0	TP/AP
TOXICS RELEASE INVENTORY	TRI	0	0	TP/AP
ALTERNATIVE FUELING STATIONS	ALTFUELS	0	0	0.2500
HISTORICAL GAS STATIONS	HISTPST	0	0	0.2500
INTEGRATED COMPLIANCE INFORMATION SYSTEM DRYCLEANERS	ICISCLEANERS	0	0	0.2500
MINE SAFETY AND HEALTH ADMINISTRATION MASTER INDEX FILE	MSHA	0	0	0.2500
MINERAL RESOURCE DATA SYSTEM	MRDS	0	0	0.2500
OPEN DUMP INVENTORY	ODI	0	0	0.5000
SURFACE MINING CONTROL AND RECLAMATION ACT SITES	SMCRA	0	0	0.5000
URANIUM MILL TAILINGS RADIATION CONTROL ACT SITES	USUMTRCA	0	0	0.5000
DEPARTMENT OF DEFENSE SITES	DOD	0	0	1.0000
FORMER MILITARY NIKE MISSILE SITES	NMS	0	0	1.0000
FORMERLY USED DEFENSE SITES	FUDS	0	0	1.0000
FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM	FUSRAP	0	0	1.0000
RECORD OF DECISION SYSTEM	RODS	0	0	1.0000
SUB-TOTAL		5	0	

Database Summary

STATE (TX) LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
STATE INSTITUTIONAL/ENGINEERING CONTROL SITES	SIEC01	0	0	TP/AP
DRY CLEANER REGISTRATION DATABASE	DCR	0	0	0.2500
PETROLEUM STORAGE TANKS	PST	0	0	0.2500
BROWNFIELDS SITE ASSESSMENTS	BSA	0	0	0.5000
CLOSED & ABANDONED LANDFILL INVENTORY	CALF	1	0	0.5000
LEAKING PETROLEUM STORAGE TANKS	LPST	0	0	0.5000
MUNICIPAL SOLID WASTE LANDFILL SITES	MSWLF	1	0	0.5000
RADIOACTIVE WASTE SITES	RWS	0	0	0.5000
RAILROAD COMMISSION VCP AND BROWNFIELD SITES	RRCVCP	0	0	0.5000
VOLUNTARY CLEANUP PROGRAM SITES	VCP	0	0	0.5000
INDUSTRIAL AND HAZARDOUS WASTE CORRECTIVE ACTION SITES	IHWCA	0	0	1.0000
STATE SUPERFUND SITES	SF	0	0	1.0000
SUB-TOTAL		2	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
GROUNDWATER CONTAMINATION CASES	GWCC	0	0	TP/AP
HISTORIC GROUNDWATER CONTAMINATION CASES	HISTGWCC	0	0	TP/AP
LAND APPLICATION PERMITS	LANDAPP	0	0	TP/AP
MUNICIPAL SETTING DESIGNATIONS	MSD	0	0	TP/AP
NOTICE OF VIOLATIONS	NOV	0	0	TP/AP
SPILLS LISTING	SPILLS	0	0	TP/AP
TCEQ LIENS	LIENS	0	0	TP/AP
TIER II CHEMICAL REPORTING PROGRAM FACILITIES	TIERII	0	0	TP/AP
INDUSTRIAL AND HAZARDOUS WASTE SITES	IHW	0	0	0.2500
PERMITTED INDUSTRIAL HAZARDOUS WASTE SITES	PIHW	0	0	0.2500
AFFECTED PROPERTY ASSESSMENT REPORTS	APAR	0	0	0.5000
DRY CLEANER REMEDIATION PROGRAM SITES	DCRPS	0	0	0.5000
INNOCENT OWNER / OPERATOR DATABASE	IOP	0	0	0.5000
RECYCLING FACILITIES	WMRF	0	0	0.5000
SALT CAVERNS FOR PETROLEUM STORAGE	STCV	0	0	0.5000

Database Summary

SUB-TOTAL		0	0	
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Database Summary

TRIBAL LISTING

Standard Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	USTR06	0	0	0.2500
LEAKING UNDERGROUND STORAGE TANKS ON TRIBAL LANDS	LUSTR06	0	0	0.5000
OPEN DUMP INVENTORY ON TRIBAL LANDS	ODINDIAN	0	0	0.5000
SUB-TOTAL		0	0	

Additional Environmental Records

Database	Acronym	Locatable	Unlocatable	Search Radius (miles)
INDIAN RESERVATIONS	INDIANRES	0	0	1.0000
SUB-TOTAL		0	0	
TOTAL		7	0	

Database Radius Summary

FEDERAL LISTING

Standard environmental records are displayed in **bold**.

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
AIRSAFS	0.0200	0	NS	NS	NS	NS	NS	0
BRS	0.0200	0	NS	NS	NS	NS	NS	0
CDL	0.0200	0	NS	NS	NS	NS	NS	0
DOCKETS	0.0200	0	NS	NS	NS	NS	NS	0
EC	0.0200	0	NS	NS	NS	NS	NS	0
ECHOR06	0.0200	1	NS	NS	NS	NS	NS	1
ERNSTX	0.0200	0	NS	NS	NS	NS	NS	0
FRSTX	0.0200	3	NS	NS	NS	NS	NS	3
HMIRSR06	0.0200	0	NS	NS	NS	NS	NS	0
ICIS	0.0200	0	NS	NS	NS	NS	NS	0
ICISNPDES	0.0200	1	NS	NS	NS	NS	NS	1
LUCIS	0.0200	0	NS	NS	NS	NS	NS	0
MLTS	0.0200	0	NS	NS	NS	NS	NS	0
NPDESR06	0.0200	0	NS	NS	NS	NS	NS	0
PADS	0.0200	0	NS	NS	NS	NS	NS	0
PCSR06	0.0200	0	NS	NS	NS	NS	NS	0
RCRASC	0.0200	0	NS	NS	NS	NS	NS	0
SEMSLIENS	0.0200	0	NS	NS	NS	NS	NS	0
SFLIENS	0.0200	0	NS	NS	NS	NS	NS	0
SSTS	0.0200	0	NS	NS	NS	NS	NS	0
TRI	0.0200	0	NS	NS	NS	NS	NS	0
TSCA	0.0200	0	NS	NS	NS	NS	NS	0
RCRAGR06	0.1250	0	0	NS	NS	NS	NS	0
RCRANGR06	0.1250	0	0	NS	NS	NS	NS	0
ALTFUELS	0.2500	0	0	0	NS	NS	NS	0
FEMAUST	0.2500	0	0	0	NS	NS	NS	0
HISTPST	0.2500	0	0	0	NS	NS	NS	0
ICISCLEANERS	0.2500	0	0	0	NS	NS	NS	0
MRDS	0.2500	0	0	0	NS	NS	NS	0
MSHA	0.2500	0	0	0	NS	NS	NS	0
BF	0.5000	0	0	0	0	NS	NS	0
DNPL	0.5000	0	0	0	0	NS	NS	0
NLRRCRAT	0.5000	0	0	0	0	NS	NS	0
ODI	0.5000	0	0	0	0	NS	NS	0
RCRAT	0.5000	0	0	0	0	NS	NS	0

Database Radius Summary

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
SEMS	0.5000	0	0	0	0	NS	NS	0
SEMSARCH	0.5000	0	0	0	0	NS	NS	0
SMCRA	0.5000	0	0	0	0	NS	NS	0
USUMTRCA	0.5000	0	0	0	0	NS	NS	0
DOD	1.0000	0	0	0	0	0	NS	0
FUDS	1.0000	0	0	0	0	0	NS	0
FUSRAP	1.0000	0	0	0	0	0	NS	0
NLRRCRAC	1.0000	0	0	0	0	0	NS	0
NMS	1.0000	0	0	0	0	0	NS	0
NPL	1.0000	0	0	0	0	0	NS	0
PNPL	1.0000	0	0	0	0	0	NS	0
RCRAC	1.0000	0	0	0	0	0	NS	0
RCRASUBC	1.0000	0	0	0	0	0	NS	0
RODS	1.0000	0	0	0	0	0	NS	0
SUB-TOTAL		5	0	0	0	0	0	5

Database Radius Summary

STATE (TX) LISTING

Standard environmental records are displayed in **bold**.

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
GWCC	0.0200	0	NS	NS	NS	NS	NS	0
HISTGWCC	0.0200	0	NS	NS	NS	NS	NS	0
LANDAPP	0.0200	0	NS	NS	NS	NS	NS	0
LIENS	0.0200	0	NS	NS	NS	NS	NS	0
MSD	0.0200	0	NS	NS	NS	NS	NS	0
NOV	0.0200	0	NS	NS	NS	NS	NS	0
SIEC01	0.0200	0	NS	NS	NS	NS	NS	0
SPILLS	0.0200	0	NS	NS	NS	NS	NS	0
TIERII	0.0200	0	NS	NS	NS	NS	NS	0
DCR	0.2500	0	0	0	NS	NS	NS	0
IHW	0.2500	0	0	0	NS	NS	NS	0
PIHW	0.2500	0	0	0	NS	NS	NS	0
PST	0.2500	0	0	0	NS	NS	NS	0
APAR	0.5000	0	0	0	0	NS	NS	0
BSA	0.5000	0	0	0	0	NS	NS	0
CALF	0.5000	0	1	0	0	NS	NS	1
DCRPS	0.5000	0	0	0	0	NS	NS	0
IOP	0.5000	0	0	0	0	NS	NS	0
LPST	0.5000	0	0	0	0	NS	NS	0
MSWLF	0.5000	0	0	1	0	NS	NS	1
RRCVCP	0.5000	0	0	0	0	NS	NS	0
RWS	0.5000	0	0	0	0	NS	NS	0
STCV	0.5000	0	0	0	0	NS	NS	0
VCP	0.5000	0	0	0	0	NS	NS	0
WMRF	0.5000	0	0	0	0	NS	NS	0
IHWCA	1.0000	0	0	0	0	0	NS	0
SF	1.0000	0	0	0	0	0	NS	0
SUB-TOTAL		0	1	1	0	0	0	2

Database Radius Summary

TRIBAL LISTING

Standard environmental records are displayed in **bold**.

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
USTR06	0.2500	0	0	0	NS	NS	NS	0
LUSTR06	0.5000	0	0	0	0	NS	NS	0
ODINDIAN	0.5000	0	0	0	0	NS	NS	0
INDIANRES	1.0000	0	0	0	0	0	NS	0

SUB-TOTAL		0	0	0	0	0	0	0
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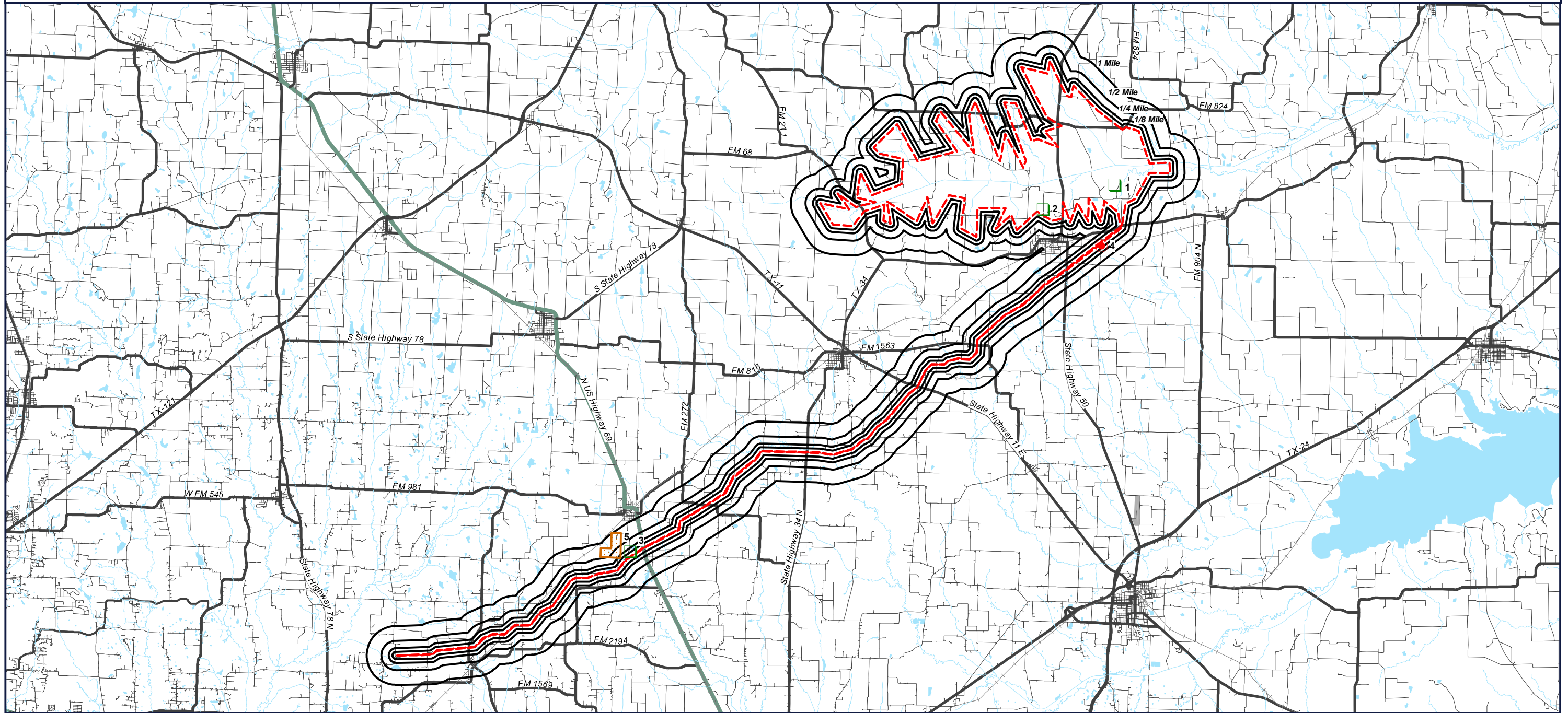
TOTAL		5	1	1	0	0	0	7
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NOTES:

NS = NOT SEARCHED

TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

RADIUS MAP



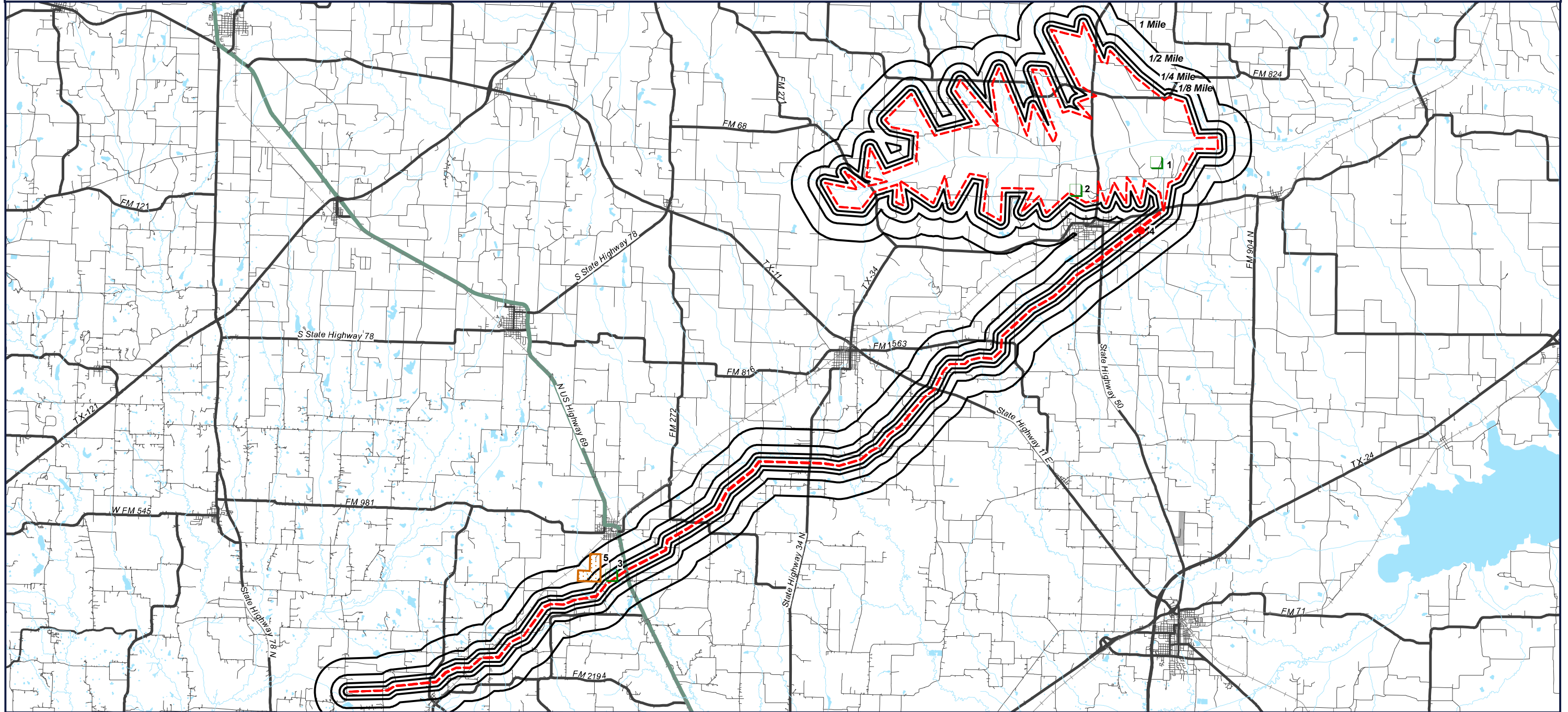
- Target Property (TP)
- FRSTX
- CALF
- MSWLF

**Proposed Lake Ralph Hall
Project Area & Pipeline
Alignment
Fannin County, Texas**



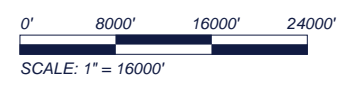
0' 9000' 18000' 27000'
SCALE: 1" = 18000'

RADIUS MAP

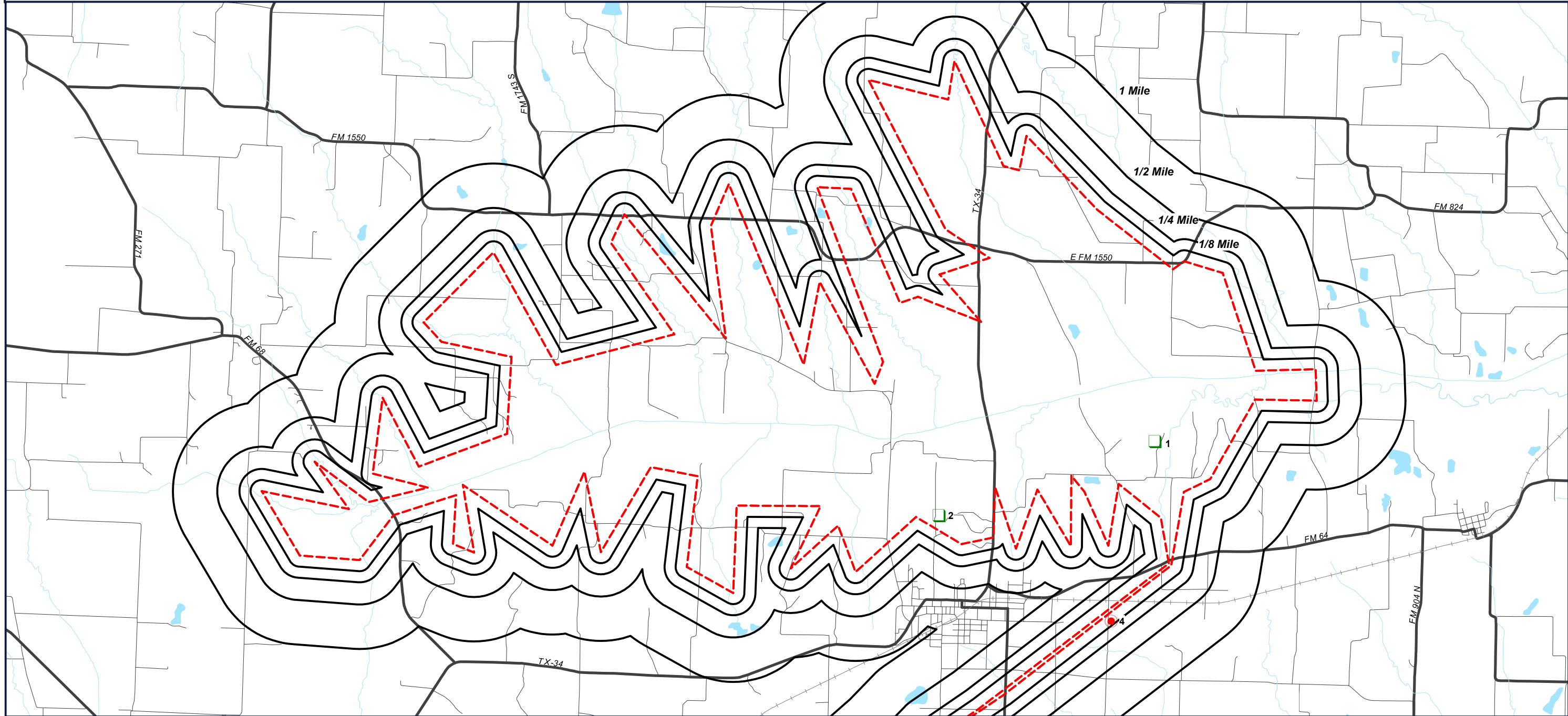


- Target Property (TP)
- FRSTX
- CALF
- MSWLF

**Proposed Lake Ralph Hall
Project Area & Pipeline
Alignment
Fannin County, Texas**



RADIUS MAP



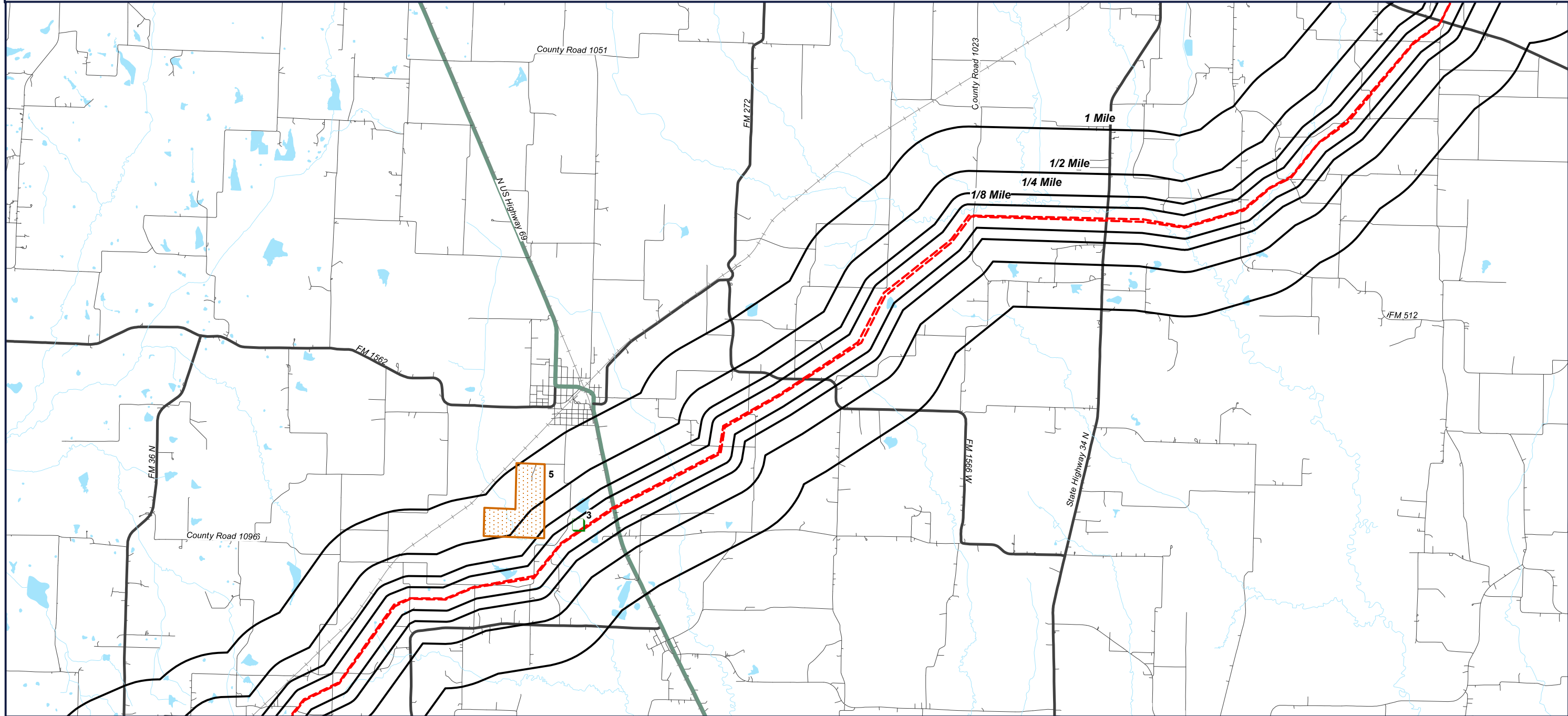
-  Target Property (TP)
-  FRSTX
-  CALF
-  MSWLF

**Proposed Lake Ralph Hall
Project Area & Pipeline
Alignment
Fannin County, Texas**



0' 3000' 6000' 9000'
SCALE: 1" = 6000'

RADIUS MAP



- Target Property (TP)
- FRSTX
- CALF
- MSWLF

**Proposed Lake Ralph Hall
Project Area & Pipeline
Alignment
Fannin County, Texas**

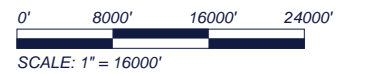


ORTHOPHOTO MAP

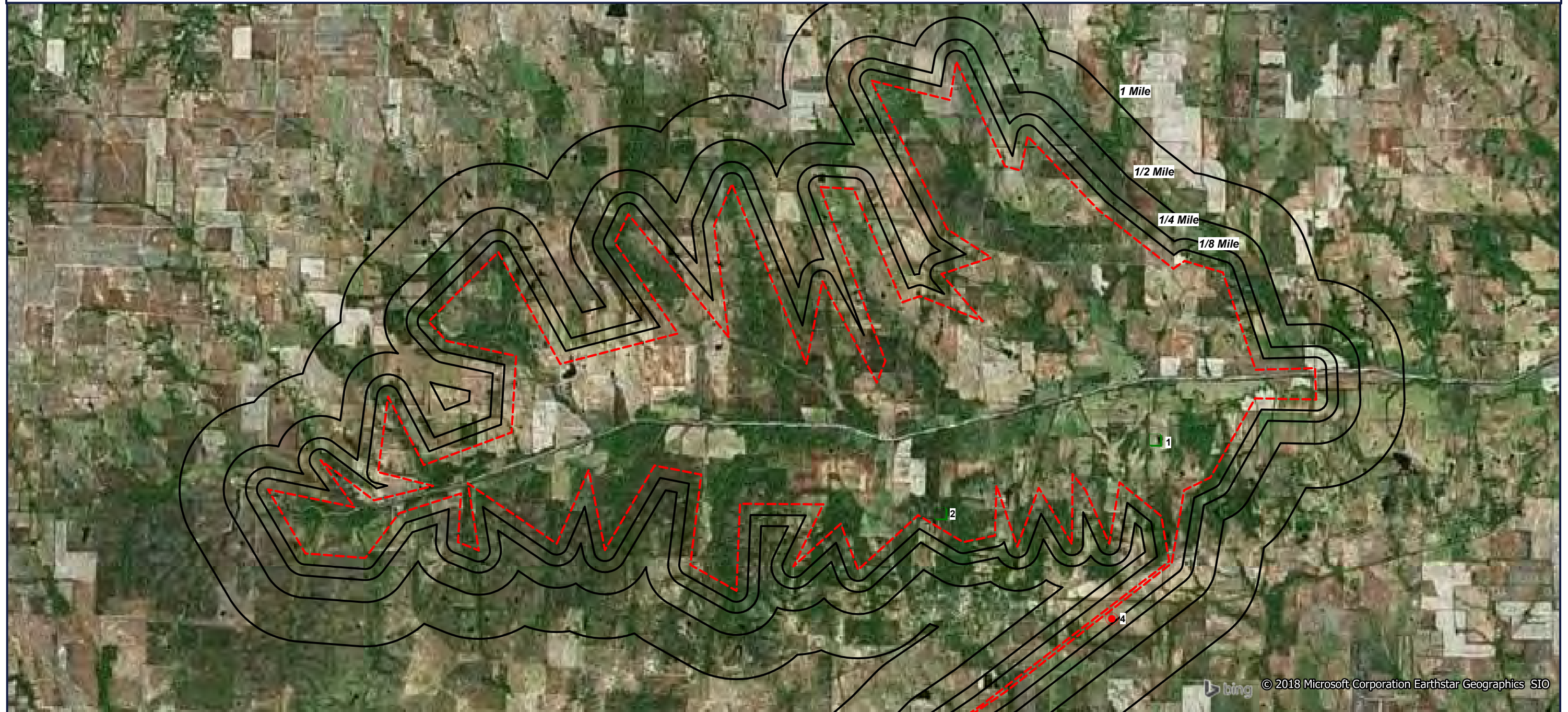


-  Target Property (TP)
-  FRSTX
-  CALF
-  MSWLF

*Quadrangle(s): Farmersville,
Greenville Nw, Honey Grove,
Celeste, Wolfe City, Commerce
North, Gober, Ladonia
Proposed Lake Ralph Hall
Project Area & Pipeline
Alignment
Fannin County, Texas*



ORTHOPHOTO MAP



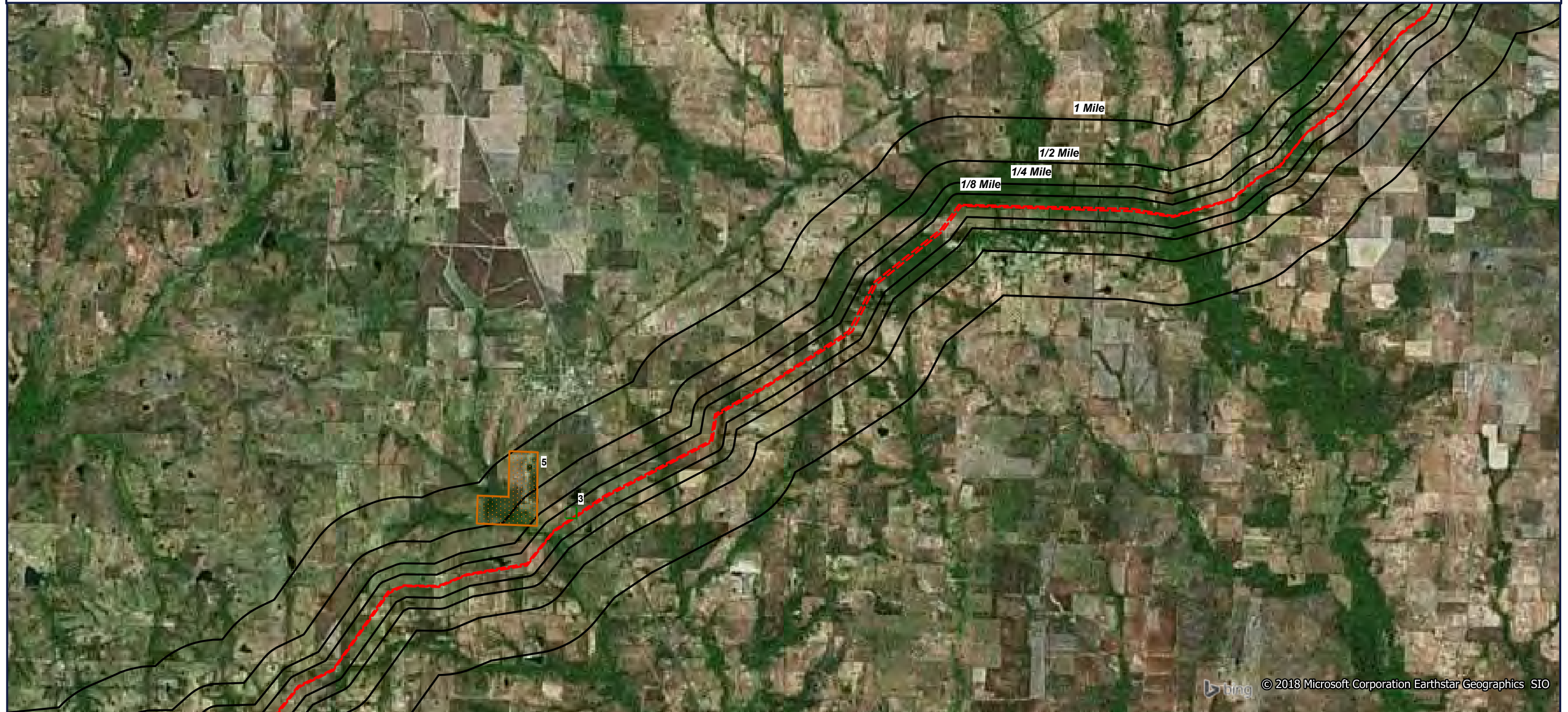
-  Target Property (TP)
-  FRSTX
-  CALF
-  MSWLF

**Quadrangle(s): Farmersville,
Greenville Nw, Honey Grove,
Celeste, Wolfe City, Commerce
North, Gober, Ladonia
Proposed Lake Ralph Hall
Alignment
Fannin County, Texas**



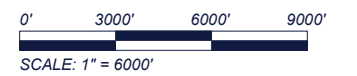
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SCALE: 1" = 6000'

ORTHOPHOTO MAP

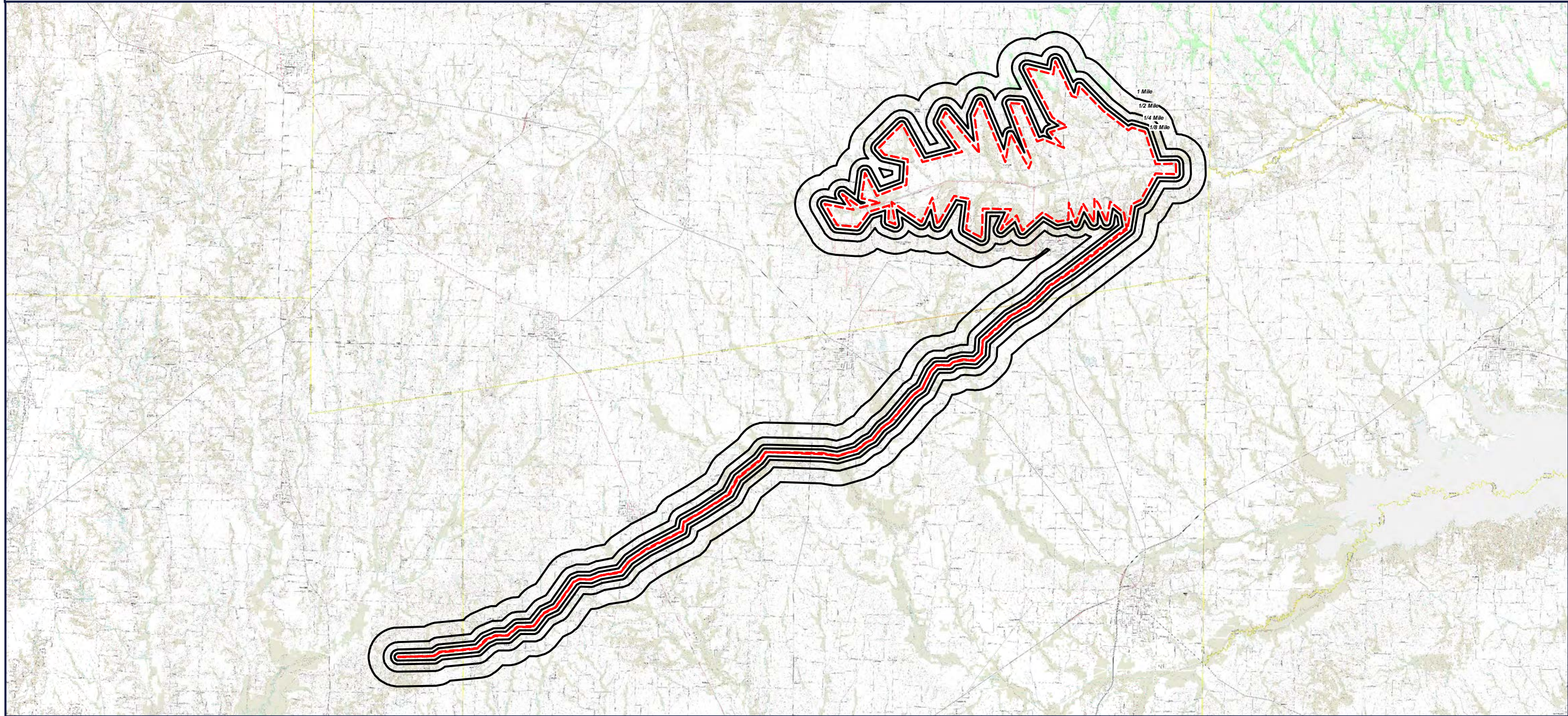


-  Target Property (TP)
-  FRSTX
-  CALF
-  MSWLF

**Quadrangle(s): Farmersville,
Greenville Nw, Honey Grove,
Celeste, Wolfe City, Commerce
North, Gober, Ladonia
Proposed Lake Ralph Hall
Project Area & Pipeline
Alignment
Fannin County, Texas**



TOPOGRAPHIC MAP



Target Property (TP)

Quadrangle(s): Farmersville,
Greenville Nw, Honey Grove,
Celeste, Wolfe City, Commerce
North, Gober, Ladonia
Source: USGS, 03/08/2013
**Proposed Lake Ralph Hall
Project Area & Pipeline
Alignment
Fannin County, Texas**



0' 9000' 18000' 27000'
SCALE: 1" = 18000'

Located Sites Summary

NOTE: Standard environmental records are displayed in **bold**.

Map ID#	Database Name	Site ID#	Relative Elevation	Distance From Site	Site Name	Address	PAGE #
1	FRSTX	110034713594	Higher (538 ft.)	TP	MANN DAIRY	2551 COUNTY ROAD 3640, LADONIA, TX 75449	21
2	FRSTX	110033919446	Higher (561 ft.)	TP	GREG MORRIS PROPERTY	681 COUNTRY LN, LADONIA, TX 75449	22
3	ECHOR06	110070051243	Higher (632 ft.)	0.018 mi. NW (95 ft.)	LINE O21 STA. 406+84 TO 439+54 REPLACEMENT	CR 1089 WEST OF HWY 69, CELESTE, TX 75423	23
3	FRSTX	110070051243	Higher (632 ft.)	0.018 mi. NW (95 ft.)	LINE O21 STA. 406+84 TO 439+54 REPLACEMENT	CR 1089 WEST OF HWY 69, CELESTE, TX 75423	24
3	ICISNPDES	TXR10F4A3INPDES	Higher (632 ft.)	0.018 mi. NW (95 ft.)	LINE O21 STA. 406+84 TO 439+54 REPLACEMENT	CR 1089 WEST OF HWY 69, CELESTE, TX 75423	25
4	CALF	1012	Higher (610 ft.)	0.086 mi. SE (454 ft.)	LEDONIA	1.75 MI E ON FM 64, TX	27
5	MSWLF	1320	Higher (621 ft.)	0.181 mi. NW (956 ft.)	CITY OF CELESTE LANDFILL	1 MILE S OF CELESTE CITY LIMITS, CELESTE, TX	28

Elevation Summary

Elevations are collected from the USGS 3D Elevation Program 1/3 arc-second (approximately 10 meters) layer hosted at the NGTOC. .

Target Property Elevation: 535 ft.

NOTE: Standard environmental records are displayed in **bold**.

EQUAL/HIGHER ELEVATION

Map ID#	Database Name	Elevation	Site Name	Address	Page #
1	FRSTX	538 ft.	MANN DAIRY	2551 COUNTY ROAD 3640, LADONIA, TX 75449	21
2	FRSTX	561 ft.	GREG MORRIS PROPERTY	681 COUNTRY LN, LADONIA, TX 75449	22
3	ECHOR06	632 ft.	LINE O21 STA. 406+84 TO 439+54 REPLACEMENT	CR 1089 WEST OF HWY 69, CELESTE, TX 75423	23
3	FRSTX	632 ft.	LINE O21 STA. 406+84 TO 439+54 REPLACEMENT	CR 1089 WEST OF HWY 69, CELESTE, TX 75423	24
3	ICISNPDES	632 ft.	LINE O21 STA. 406+84 TO 439+54 REPLACEMENT	CR 1089 WEST OF HWY 69, CELESTE, TX 75423	25
4	CALF	610 ft.	LEDONIA	1.75 MI E ON FM 64, TX	27
5	MSWLF	621 ft.	CITY OF CELESTE LANDFILL	1 MILE S OF CELESTE CITY LIMITS, CELESTE, TX	28

LOWER ELEVATION

No Records Found

Facility Registry System (FRSTX)

[MAP ID# 1](#)

Distance from Property: 0 mi. (0 ft.) X

Elevation: 538 ft. (Higher than TP)

FACILITY INFORMATION

REGISTRY ID: 110034713594

NAME: MANN DAIRY

LOCATION ADDRESS: 2551 COUNTY ROAD 3640

LADONIA, TX 754494410

COUNTY: FANNIN

EPA REGION: 6

FEDERAL FACILITY: NOT REPORTED

TRIBAL LAND: NOT REPORTED

ALTERNATIVE NAME/S:

MANN DAIRY

PROGRAM/S LISTED FOR THIS FACILITY

TX-TCEQ ACR - TEXAS COMMISSION ON ENVIRONMENTAL QUALITY - AGENCY CENTRAL REGISTRY

STANDARD INDUSTRIAL CLASSIFICATION/S (SIC)

0241 - DAIRY FARMS

NORTH AMERICAN INDUSTRY CLASSIFICATION/S (NAICS)

NO NAICS DATA REPORTED

[Back to Report Summary](#)

Facility Registry System (FRSTX)

MAP ID# 2

Distance from Property: 0 mi. (0 ft.) X

Elevation: 561 ft. (Higher than TP)

FACILITY INFORMATION

REGISTRY ID: 110033919446

NAME: GREG MORRIS PROPERTY

LOCATION ADDRESS: 681 COUNTRY LN
LADONIA, TX 754493825

COUNTY: FANNIN

EPA REGION: 6

FEDERAL FACILITY: NOT REPORTED

TRIBAL LAND: NOT REPORTED

ALTERNATIVE NAME/S:

GREG MORRIS PROPERTY

PROGRAM/S LISTED FOR THIS FACILITY

TX-TCEQ ACR - TEXAS COMMISSION ON ENVIRONMENTAL QUALITY - AGENCY CENTRAL REGISTRY

STANDARD INDUSTRIAL CLASSIFICATION/S (SIC)

NO SIC DATA REPORTED

NORTH AMERICAN INDUSTRY CLASSIFICATION/S (NAICS)

NO NAICS DATA REPORTED

[Back to Report Summary](#)

Enforcement and Compliance History Information (ECHOR06)

MAP ID# 3

Distance from Property: 0.018 mi. (95 ft.) NW
Elevation: 632 ft. (Higher than TP)

FACILITY INFORMATION

UNIQUE ID: 110070051243

REGISTRY ID: 110070051243

NAME: LINE 021 STA. 406+84 TO 439+54 REPLACEMENT

ADDRESS: CR 1089 WEST OF HWY 69
CELESTE, TX 75423

COUNTY: NOT REPORTED

FACILITY LINK: [Facility Detail Report](#)

[Back to Report Summary](#)

Facility Registry System (FRSTX)

MAP ID# 3

Distance from Property: 0.018 mi. (95 ft.) NW
Elevation: 632 ft. (Higher than TP)

FACILITY INFORMATION

REGISTRY ID: 110070051243

NAME: **LINE 021 STA. 406+84 TO 439+54 REPLACEMENT**

LOCATION ADDRESS: **CR 1089 WEST OF HWY 69
CELESTE, TX 75423**

COUNTY: **NOT REPORTED**

EPA REGION: **6**

FEDERAL FACILITY: **NOT REPORTED**

TRIBAL LAND: **NOT REPORTED**

ALTERNATIVE NAME/S:

NO ALTERNATIVE NAME(S) LISTED FOR THIS FACILITY

PROGRAM/S LISTED FOR THIS FACILITY

NPDES - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

STANDARD INDUSTRIAL CLASSIFICATION/S (SIC)

NO SIC DATA REPORTED

NORTH AMERICAN INDUSTRY CLASSIFICATION/S (NAICS)

NO NAICS DATA REPORTED

[Back to Report Summary](#)

Integrated Compliance Information System National Pollutant Discharge Elimination System (ICISNPDES)

MAP ID# 3

Distance from Property: 0.018 mi. (95 ft.) NW
Elevation: 632 ft. (Higher than TP)

FACILITY INFORMATION

GEOSEARCH ID: TXR10F4A3INPDES
NPDES ID: TXR10F4A3 FACILITY #: 110070051243
NAME: LINE 021 STA. 406+84 TO 439+54 REPLACEMENT
PHYSICAL ADDRESS: CR 1089 WEST OF HWY 69
CELESTE TX 75423
COUNTY: NOT REPORTED
FACILITY TYPE: NOT REPORTED
IMPAIRED WATERS: NOT REPORTED

STANDARD INDUSTRIAL CLASSIFICATION

- NOT REPORTED -

PERMITS

FACILITY TYPE INDICATOR: NON-POTABLE WATER
PERMIT TYPE: GENERAL PERMIT COVERED FACILITY
MAJOR MINOR FACILITY: MINOR DISCHARGER
PERMIT STATUS: EFFECTIVE
WATER BODY: NOT REPORTED
PERMIT NAME: ATMOS ENERGY CORPORATION
AGENCY TYPE: U.S. EPA
ORIGINAL ISSUE DATE: 4/18/2017
ISSUE DATE: 4/18/2017
ISSUING AGENCY: U.S. EPA
EFFECTIVE DATE: 4/18/2017
EXPIRATION DATE: 2/15/2022
RETIREMENT DATE: NOT REPORTED
TERMINATION DATE: NOT REPORTED
PERMIT COMPLIANCE STATUS: YES
PERMIT SUBJECT TO DMR RUN: NOT REPORTED
REPORTABLE NONCOMPLIANCE TRACKING IS ON: YES

INSPECTIONS

- NO INSPECTIONS REPORTED -

HISTORIC COMPLIANCE

- NO HISTORIC COMPLIANCE REPORTED -

SINGLE EVENT VIOLATIONS

- NO SINGLE EVENT VIOLATIONS REPORTED -

FORMAL ENFORCEMENT ACTIONS

- NO FORMAL ENFORCEMENT ACTIONS REPORTED -

EFFLUENT VIOLATIONS

- NOT REPORTED -

EFFLUENT VIOLATIONS contd..

- NOT REPORTED -

EFFLUENT VIOLATIONS contd..

**Integrated Compliance Information System National Pollutant Discharge
Elimination System (ICISNPDES)**

- NOT REPORTED -

[Back to Report Summary](#)

Closed & Abandoned Landfill Inventory (CALF)

MAP ID# 4

Distance from Property: 0.086 mi. (454 ft.) SE
Elevation: 610 ft. (Higher than TP)

SITE INFORMATION

SITE NUMBER: 1012

SITE NAME: LEDONIA

LOCATION:

1.75 MI E ON FM 64

COUNTY: FANNIN

COMMENTS:

IDENTIFIED IN 1968 US DEPT. OF HEW SURVEY;

INSPECTION:

10/23/73-ALL TYPES OF WASTE ACCEPTED; AREA FILL OPERATION; CLOSURE CONFIRMED IN TDH MEMO DATED 10/76

OWNER NAME: CITY OF LEDONIA

DATE OPEN: 0

DATE CLOSE: 1976

SIZE (ACRES): 14.00

SIZE (CUBIC YARDS): 0.00

PARTIES: LEDONIA

LANDFILL CONTENTS

HOUSEHOLD: YES

INDUSTRIAL: YES

AGRICULTURE: YES

OTHER: NR

UNAUTHORIZED: NR

HAZARD PROBABLY: YES

DEPTH CD: NR

MAXIMUM DEPTH: 0.00

OTHER DESCRIPTION: NOT REPORTED

REVIEWER: ACCORDING TO J.H. OCKELS THIS SITE CANNOT
BE VERIFIED

CONSTRUCTION DEMOLITION: YES

TIRES: YES

BRUSH: YES

LEGAL: YES

HAZARD UNLIKELY: NR

HAZARD CERTAINLY: NR

MINIMUM THICKNESS: NR

USE: UK

[Back to Report Summary](#)

Municipal Solid Waste Landfill Sites (MSWLF)

MAP ID# 5

Distance from Property: 0.181 mi. (956 ft.) NW
Elevation: 621 ft. (Higher than TP)

FACILITY INFORMATION

PERMIT#: 1320

NAME: CITY OF CELESTE LANDFILL

ADDRESS: 1 MILE S OF CELESTE CITY LIMITS
CELESTE, TX

COUNTY: HUNT

FACILITY DETAILS

FACILITY TYPE #: LANDFILL FACILITY (HISTORICAL TYPES THAT WERE REQUIRED TO UPGRADE TO TYPE 1 STANDARDS,
OR TO CLOSE AND INSTALL FINAL COVER)

PHYSICAL FACILITY STATUS: CLOSED

LEGAL STATUS: REVOKED

REFERENCE NUMBER(RN): RN102000981

REGION: REGION 04 - DFW METROPLEX

[Back to Report Summary](#)

Unlocated Sites Summary

This list contains sites that could not be mapped due to limited or incomplete address information.

No Records Found

Environmental Records Definitions - FEDERAL

AIRSAFS Aerometric Information Retrieval System / Air Facility Subsystem

VERSION DATE: 10/20/14

The United States Environmental Protection Agency (EPA) modified the Aerometric Information Retrieval System (AIRS) to a database that exclusively tracks the compliance of stationary sources of air pollution with EPA regulations: the Air Facility Subsystem (AFS). Since this change in 2001, the management of the AIRS/AFS database was assigned to EPA's Office of Enforcement and Compliance Assurance.

BRS Biennial Reporting System

VERSION DATE: 12/31/11

The United States Environmental Protection Agency (EPA), in cooperation with the States, biennially collects information regarding the generation, management, and final disposition of hazardous wastes regulated under the Resource Conservation and Recovery Act of 1976 (RCRA), as amended. The Biennial Report captures detailed data on the generation of hazardous waste from large quantity generators and data on waste management practices from treatment, storage and disposal facilities. Currently, the EPA states that data collected between 1991 and 1997 was originally a part of the defunct Biennial Reporting System and is now incorporated into the RCRAInfo data system.

CDL Clandestine Drug Laboratory Locations

VERSION DATE: 07/01/16

The U.S. Department of Justice ("the Department") provides this information as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments. The Department does not establish, implement, enforce, or certify compliance with clean-up or remediation standards for contaminated sites; the public should contact a state or local health department or environmental protection agency for that information.

DOCKETS EPA Docket Data

VERSION DATE: 12/22/05

The United States Environmental Protection Agency Docket data lists Civil Case Defendants, filing dates as far back as 1971, laws broken including section, violations that occurred, pollutants involved, penalties assessed and superfund awards by facility and location. Please refer to ICIS database as source of current data.

EC Federal Engineering Institutional Control Sites

VERSION DATE: 08/03/15

This database includes site locations where Engineering and/or Institutional Controls have been identified as part

Environmental Records Definitions - FEDERAL

of a selected remedy for the site as defined by United States Environmental Protection Agency official remedy decision documents. A site listing does not indicate that the institutional and engineering controls are currently in place nor will be in place once the remedy is complete; it only indicates that the decision to include either of them in the remedy is documented as of the completed date of the document. Institutional controls are actions, such as legal controls, that help minimize the potential for human exposure to contamination by ensuring appropriate land or resource use. Engineering controls include caps, barriers, or other device engineering to prevent access, exposure, or continued migration of contamination.

ECHOR06 Enforcement and Compliance History Information

VERSION DATE: 08/26/17

The EPA's Enforcement and Compliance History Online (ECHO) database, provides compliance and enforcement information for facilities nationwide. This database includes facilities regulated as Clean Air Act stationary sources, Clean Water Act direct dischargers, Resource Conservation and Recovery Act hazardous waste handlers, Safe Drinking Water Act public water systems along with other data, such as Toxics Release Inventory releases.

ERNSTX Emergency Response Notification System

VERSION DATE: 04/29/18

This National Response Center database contains data on reported releases of oil, chemical, radiological, biological, and/or etiological discharges into the environment anywhere in the United States and its territories. The data comes from spill reports made to the U.S. Environmental Protection Agency, U.S. Coast Guard, the National Response Center and/or the U.S. Department of Transportation.

FRSTX Facility Registry System

VERSION DATE: 04/17/18

The United States Environmental Protection Agency's Office of Environmental Information (OEI) developed the Facility Registry System (FRS) as the centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. The Facility Registry System replaced the Facility Index System or FINDS database.

HMIRSR06 Hazardous Materials Incident Reporting System

VERSION DATE: 03/27/18

The HMIRS database contains unintentional hazardous materials release information reported to the U.S. Department of Transportation located in EPA Region 6. This region includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

ICIS Integrated Compliance Information System (formerly DOCKETS)

VERSION DATE: 09/23/17

Environmental Records Definitions - FEDERAL

ICIS is a case activity tracking and management system for civil, judicial, and administrative federal Environmental Protection Agency enforcement cases. ICIS contains information on federal administrative and federal judicial cases under the following environmental statutes: the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Emergency Planning and Community Right-to-Know Act - Section 313, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Safe Drinking Water Act, and the Marine Protection, Research, and Sanctuaries Act.

ICISNPDES Integrated Compliance Information System National Pollutant Discharge Elimination System

VERSION DATE: 07/09/17

Authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

LUCIS Land Use Control Information System

VERSION DATE: 09/01/06

The LUCIS database is maintained by the U.S. Department of the Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

MLTS Material Licensing Tracking System

VERSION DATE: 06/29/17

MLTS is a list of approximately 8,100 sites which have or use radioactive materials subject to the United States Nuclear Regulatory Commission (NRC) licensing requirements.

NPDESR06 National Pollutant Discharge Elimination System

VERSION DATE: 04/01/07

Authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The NPDES database was collected from December 2002 until April 2007. Refer to the PCS and/or ICIS-NPDES database as source of current data. This database includes permitted facilities located in EPA Region 6. This region includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

PADS PCB Activity Database System

VERSION DATE: 07/18/17

PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Environmental Records Definitions - FEDERAL

PCSR06 Permit Compliance System

VERSION DATE: 08/01/12

The Permit Compliance System is used in tracking enforcement status and permit compliance of facilities controlled by the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act and is maintained by the United States Environmental Protection Agency's Office of Compliance. PCS is designed to support the NPDES program at the state, regional, and national levels. This database includes permitted facilities located in EPA Region 6. This region includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. PCS has been modernized, and no longer exists. National Pollutant Discharge Elimination System (ICIS-NPDES) data can now be found in Integrated Compliance Information System (ICIS).

RCRASC RCRA Sites with Controls

VERSION DATE: 03/21/18

The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities with institutional controls in place.

SEMSLIENS SEMS Lien on Property

VERSION DATE: 06/08/18

The U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation (OSRTI), has implemented The Superfund Enterprise Management System (SEMS), formerly known as CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) to track and report on clean-up and enforcement activities taking place at Superfund sites. SEMS represents a joint development and ongoing collaboration between Superfund's Remedial, Removal, Federal Facilities, Enforcement and Emergency Response programs. This is a listing of SEMS sites with a lien on the property.

SFLIENS CERCLIS Liens

VERSION DATE: 06/08/12

A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which United States Environmental Protection Agency has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties. This database contains those CERCLIS sites where the Lien on Property action is complete.

Environmental Records Definitions - FEDERAL

SSTS Section Seven Tracking System

VERSION DATE: 02/01/17

The United States Environmental Protection Agency tracks information on pesticide establishments through the Section Seven Tracking System (SSTS). SSTS records the registration of new establishments and records pesticide production at each establishment. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires that production of pesticides or devices be conducted in a registered pesticide-producing or device-producing establishment. ("Production" includes formulation, packaging, repackaging, and relabeling.)

TRI Toxics Release Inventory

VERSION DATE: 12/31/16

The Toxics Release Inventory, provided by the United States Environmental Protection Agency, includes data on toxic chemical releases and waste management activities from certain industries as well as federal and tribal facilities. This inventory contains information about the types and amounts of toxic chemicals that are released each year to the air, water, and land as well as information on the quantities of toxic chemicals sent to other facilities for further waste management.

TSCA Toxic Substance Control Act Inventory

VERSION DATE: 12/31/12

The Toxic Substances Control Act (TSCA) was enacted in 1976 to ensure that chemicals manufactured, imported, processed, or distributed in commerce, or used or disposed of in the United States do not pose any unreasonable risks to human health or the environment. TSCA section 8(b) provides the United States Environmental Protection Agency authority to "compile, keep current, and publish a list of each chemical substance that is manufactured or processed in the United States." This TSCA Chemical Substance Inventory contains non-confidential information on the production amount of toxic chemicals from each manufacturer and importer site.

RCRAGR06 Resource Conservation & Recovery Act - Generator

VERSION DATE: 03/01/18

The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities currently generating hazardous waste. EPA region 6 includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

Environmental Records Definitions - FEDERAL

RCRANGR06

Resource Conservation & Recovery Act - Non-Generator

VERSION DATE: 03/01/18

The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities classified as non-generators. Non-Generators do not presently generate hazardous waste. EPA Region 6 includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

ALTFUELS

Alternative Fueling Stations

VERSION DATE: 01/22/18

Nationwide list of alternative fueling stations made available by the US Department of Energy's Office of Energy Efficiency & Renewable Energy. Includes Biodiesel stations, Ethanol (E85) stations, Liquefied Petroleum Gas (Propane) stations, Ethanol (E85) stations, Natural Gas stations, Hydrogen stations, and Electric Vehicle Supply Equipment (EVSE).

FEMAUST

FEMA Owned Storage Tanks

VERSION DATE: 12/01/16

This is a listing of FEMA owned underground and aboveground storage tank sites. For security reasons, address information is not released to the public according to the U.S. Department of Homeland Security.

HISTPST

Historical Gas Stations

VERSION DATE: NR

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

ICISCLEANERS

Integrated Compliance Information System Drycleaners

VERSION DATE: 09/23/17

This is a listing of drycleaner facilities from the Integrated Compliance Information System (ICIS). The Environmental Protection Agency (EPA) tracks facilities that possess NAIC and SIC codes that classify businesses as drycleaner establishments.

MRDS

Mineral Resource Data System

VERSION DATE: 03/15/16

Environmental Records Definitions - FEDERAL

MRDS (Mineral Resource Data System) is a collection of reports describing metallic and nonmetallic mineral resources throughout the world. Included are deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references. This database contains the records previously provided in the Mineral Resource Data System (MRDS) of USGS and the Mineral Availability System/Mineral Industry Locator System (MAS/MILS) originated in the U.S. Bureau of Mines, which is now part of USGS.

MSHA Mine Safety and Health Administration Master Index File

VERSION DATE: 09/01/17

The Mine dataset lists all Coal and Metal/Non-Metal mines under MSHA's jurisdiction since 1/1/1970. It includes such information as the current status of each mine (Active, Abandoned, NonProducing, etc.), the current owner and operating company, commodity codes and physical attributes of the mine. Mine ID is the unique key for this data. This information is provided by the United States Department of Labor - Mine Safety and Health Administration (MSHA).

BF Brownfields Management System

VERSION DATE: 06/27/18

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. The United States Environmental Protection Agency maintains this database to track activities in the various brown field grant programs including grantee assessment, site cleanup and site redevelopment. This database included tribal brownfield sites.

DNPL Delisted National Priorities List

VERSION DATE: 06/08/18

This database includes sites from the United States Environmental Protection Agency's Final National Priorities List (NPL) where remedies have proven to be satisfactory or sites where the original analyses were inaccurate, and the site is no longer appropriate for inclusion on the NPL, and final publication in the Federal Register has occurred.

NLRRCRAT No Longer Regulated RCRA Non-CORRACTS TSD Facilities

VERSION DATE: 03/01/18

This database includes RCRA Non-Corrective Action TSD facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly treated, stored or disposed of hazardous waste.

ODI Open Dump Inventory

VERSION DATE: 06/01/85

Environmental Records Definitions - FEDERAL

The open dump inventory was published by the United States Environmental Protection Agency. An "open dump" is defined as a facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944) and which is not a facility for disposal of hazardous waste. This inventory has not been updated since June 1985.

RCRAT Resource Conservation & Recovery Act - Non-CORRACTS Treatment, Storage & Disposal Facilities

VERSION DATE: 03/01/18

The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities recognized as hazardous waste treatment, storage, and disposal sites (TSD).

SEMS Superfund Enterprise Management System

VERSION DATE: 06/08/18

The U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation (OSRTI), has implemented The Superfund Enterprise Management System (SEMS), formerly known as CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) to track and report on clean-up and enforcement activities taking place at Superfund sites. SEMS represents a joint development and ongoing collaboration between Superfund's Remedial, Removal, Federal Facilities, Enforcement and Emergency Response programs.

SEMSARCH Superfund Enterprise Management System Archived Site Inventory

VERSION DATE: 06/08/18

The Superfund Enterprise Management System Archive listing (SEMS-ARCHIVE) has replaced the CERCLIS NFRAP reporting system in 2015. This listing reflect sites that have been assessed and no further remediation is planned and is of no further interest under the Superfund program.

SMCRA Surface Mining Control and Reclamation Act Sites

VERSION DATE: 08/25/17

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Environmental Records Definitions - FEDERAL

USUMTRCA Uranium Mill Tailings Radiation Control Act Sites

VERSION DATE: 03/04/17

The Legacy Management Office of the Department of Energy (DOE) manages radioactive and chemical waste, environmental contamination, and hazardous material at over 100 sites across the U.S. The L.M. Office manages this database of sites registered under the Uranium Mill Tailings Control Act (UMTRCA).

DOD Department of Defense Sites

VERSION DATE: 12/01/14

This information originates from the National Atlas of the United States Federal Lands data, which includes lands owned or administered by the Federal government. Army DOD, Army Corps of Engineers DOD, Air Force DOD, Navy DOD and Marine DOD areas of 640 acres or more are included.

FUDS Formerly Used Defense Sites

VERSION DATE: 06/01/15

The Formerly Used Defense Sites (FUDS) inventory includes properties previously owned by or leased to the United States and under Secretary of Defense Jurisdiction, as well as Munitions Response Areas (MRAs). The remediation of these properties is the responsibility of the Department of Defense. This data is provided by the U.S. Army Corps of Engineers (USACE), the boundaries/polygon data are based on preliminary findings and not all properties currently have polygon data available. **DISCLAIMER:** This data represents the results of data collection/processing for a specific USACE activity and is in no way to be considered comprehensive or to be used in any legal or official capacity as presented on this site. While the USACE has made a reasonable effort to insure the accuracy of the maps and associated data, it should be explicitly noted that USACE makes no warranty, representation or guaranty, either expressed or implied, as to the content, sequence, accuracy, timeliness or completeness of any of the data provided herein. For additional information on Formerly Used Defense Sites please contact the USACE Public Affairs Office at (202) 528-4285.

FUSRAP Formerly Utilized Sites Remedial Action Program

VERSION DATE: 03/04/17

The U.S. DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from the Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations. The DOE Office of Legacy Management (LM) established long-term surveillance and maintenance (LTS&M) requirements for remediated FUSRAP sites. DOE evaluates the final site conditions of a remediated site on the basis of risk for different future uses. DOE then confirms that LTS&M requirements will maintain protectiveness.

NLRRCRAC No Longer Regulated RCRA Corrective Action Facilities

VERSION DATE: 03/01/18

Environmental Records Definitions - FEDERAL

This database includes RCRA Corrective Action facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements.

NMS Former Military Nike Missile Sites

VERSION DATE: 12/01/84

This information was taken from report DRXTH-AS-IA-83A016 (Historical Overview of the Nike Missile System, 12/1984) which was performed by Environmental Science and Engineering, Inc. for the U.S. Army Toxic and Hazardous Materials Agency Assessment Division. The Nike system was deployed between 1954 and the mid-1970's. Among the substances used or stored on Nike sites were liquid missile fuel (JP-4); starter fluids (UDKH, aniline, and furfuryl alcohol); oxidizer (IRFNA); hydrocarbons (motor oil, hydraulic fluid, diesel fuel, gasoline, heating oil); solvents (carbon tetrachloride, trichloroethylene, trichloroethane, stoddard solvent); and battery electrolyte. The quantities of material a disposed of and procedures for disposal are not documented in published reports. Virtually all information concerning the potential for contamination at Nike sites is confined to personnel who were assigned to Nike sites.

During deactivation most hardware was shipped to depot-level supply points. There were reportedly instances where excess materials were disposed of on or near the site itself at closure. There was reportedly no routine site decontamination.

NPL National Priorities List

VERSION DATE: 06/08/18

This database includes United States Environmental Protection Agency (EPA) National Priorities List sites that fall under the EPA's Superfund program, established to fund the cleanup of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action.

PNPL Proposed National Priorities List

VERSION DATE: 06/08/18

This database contains sites proposed to be included on the National Priorities List (NPL) in the Federal Register. The United States Environmental Protection Agency investigates these sites to determine if they may present long-term threats to public health or the environment.

RCRAC Resource Conservation & Recovery Act - Corrective Action Facilities

VERSION DATE: 03/01/18

The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities with corrective action activity.

Environmental Records Definitions - FEDERAL

RCRASUBC

Resource Conservation & Recovery Act - Subject to Corrective Action Facilities

VERSION DATE: 03/01/18

The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. This listing refers to facilities subject to corrective actions.

RODS

Record of Decision System

VERSION DATE: 06/08/18

These decision documents maintained by the United States Environmental Protection Agency describe the chosen remedy for NPL (Superfund) site remediation. They also include site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, and scope and role of response action.

Environmental Records Definitions - STATE (TX)

GWCC Groundwater Contamination Cases

VERSION DATE: 08/26/16

This report contains a listing of groundwater contamination cases which were documented for the 2013 calendar year. Texas Water Code, Section 26.406 requires the annual report to describe the current status of groundwater monitoring activities conducted or required by each agency at regulated facilities or associated with regulated activities. The agencies reporting these contamination cases include the Texas Commission on Environmental Quality, Railroad Commission of Texas, Texas Alliance of Groundwater Districts, and Department of State Health Services.

HISTGWCC Historic Groundwater Contamination Cases

VERSION DATE: 12/31/12

This historic report contains all agency groundwater contamination cases documented from 1994 to 2012. The agencies that reported these contamination cases included the Texas Commission on Environmental Quality, Railroad Commission of Texas, Texas Alliance of Groundwater Districts, and Department of State Health Services.

LANDAPP Land Application Permits

VERSION DATE: 03/01/13

Texas Land Application Permits are a requirement from the Texas Commission on Environmental Quality for any domestic facility that disposes of treated effluent by land application such as surface irrigation, evaporation, drainfields or subsurface land application.

LIENS TCEQ Liens

VERSION DATE: 06/06/18

Liens filed upon State and/or Federal Superfund Sites by the Texas Commission on Environmental Quality.

MSD Municipal Setting Designations

VERSION DATE: 06/01/18

The Texas Commission on Environmental Quality defines an MSD as an official state designation given to property within a municipality or its extraterritorial jurisdiction that certifies that designated groundwater at the property is not used as potable water, and is prohibited from future use as potable water because that groundwater is contaminated in excess of the applicable potable-water protective concentration level. The prohibition must be in the form of a city ordinance, or a restrictive covenant that is enforceable by the city and filed in the property records. The MSD property can be a single property, multi-property, or a portion of property.

Environmental Records Definitions - STATE (TX)

NOV Notice of Violations

VERSION DATE: 02/24/16

This database containing Notice of Violations (NOV) is maintained by the Texas Commission on Environmental Quality. An NOV is a written notification that documents and communicates violations observed during an inspection to the business or individual inspected.

SIEC01 State Institutional/Engineering Control Sites

VERSION DATE: 06/06/18

The Texas Risk Reduction Program (TRRP) requires the placement of institutional controls (e.g., deed notices or restrictive covenants) on affected property in different circumstances as part of completing a response action. In its simplest form, an institutional control (IC) is a legal document that is recorded in the county deed records. In certain circumstances, local zoning or ordinances can serve as an IC. This listing may also include locations where Engineering Controls are in effect, such as a cap, barrier, or other engineering device to prevent access, exposure, or continued migration of contamination. The sites included on this list are regulated by various programs of the Texas Commission on Environmental Quality (TCEQ).

SPILLS Spills Listing

VERSION DATE: 07/20/18

This Texas Commission on Environmental Quality database includes releases of hazardous or potentially hazardous materials into the environment.

TIERII Tier II Chemical Reporting Program Facilities

VERSION DATE: 12/31/12

The Texas Tier II Chemical Reporting Program in the Department of State Health Services (DSHS) is the state repository for EPCRA-required Emergency Planning Letters (EPLs), which are one-time notifications to the state from facilities that have certain extremely hazardous chemicals in specified amounts. The Program is also the state repository for EPCRA/state-required hazardous chemical inventory reports called Texas Tier Two Reports. This data contains those facility reports for the 2005 through the 2012 calendar years. Please contact the Texas Commission on Environmental Quality Tier II Chemical Reporting Division as the current source for this data, due to confidentiality and safety reasons details such as the location and capacity of on-site hazardous chemicals is only available to local emergency planning agencies, fire departments, and/or owners.

DCR Dry Cleaner Registration Database

VERSION DATE: 05/01/18

The database includes dry cleaning drop stations and facilities registered with the Texas Commission on Environmental Quality.

Environmental Records Definitions - STATE (TX)

IHW Industrial and Hazardous Waste Sites

VERSION DATE: 07/06/18

Owner and facility information is included in this database of permitted and non-permitted industrial and hazardous waste sites. Industrial waste is waste that results from or is incidental to operations of industry, manufacturing, mining, or agriculture. Hazardous waste is defined as any solid waste listed as hazardous or possesses one or more hazardous characteristics as defined in federal waste regulations. The IHW database is maintained by the Texas Commission on Environmental Quality.

PIHW Permitted Industrial Hazardous Waste Sites

VERSION DATE: 07/06/18

Owner and facility information is included in this database of all permitted industrial and hazardous waste sites. Industrial waste is waste that results from or is incidental to operations of industry, manufacturing, mining, or agriculture. Hazardous waste is defined as any solid waste listed as hazardous or possesses one or more hazardous characteristics as defined in federal waste regulations. Permitted IHW facilities are regulated under 30 Texas Administrative Code Chapter 335 in addition to federal regulations. The IHW database is maintained by the Texas Commission on Environmental Quality.

PST Petroleum Storage Tanks

VERSION DATE: 06/20/18

The Petroleum Storage Tank database is administered by the Texas Commission on Environmental Quality (TCEQ). Both Underground storage tanks (USTs) and Aboveground storage tanks (ASTs) are included in this report. Petroleum Storage Tank registration has been a requirement with the TCEQ since 1986.

APAR Affected Property Assessment Reports

VERSION DATE: 12/18/17

As regulated by the Texas Commission on Environmental Quality, an Affected Property Assessment Report is required when a person is addressing a release of chemical of concern (COC) under 30 TAC Chapter 350, the Texas Risk Reduction Program (TRRP). The purpose of the APAR is to document all relevant affected property information to identify all release sources and COCs, determine the extent of all COCs, identify all transport/exposure pathways, and to determine if any response actions are necessary. The Texas Administrative Code Title 30 §350.4(a)(1) defines affected property as the entire area (i.e. on-site and off-site; including all environmental media) which contains releases of chemicals of concern at concentrations equal to or greater than the assessment level applicable for residential land use and groundwater classification.

BSA Brownfields Site Assessments

VERSION DATE: 06/06/18

The Brownfields Site Assessments database is maintained by the Texas Commission on Environmental Quality

Environmental Records Definitions - STATE (TX)

(TCEQ). The TCEQ, in close partnership with the U.S. Environmental Protection Agency (EPA) and other federal, state, and local redevelopment agencies, and stakeholders, is facilitating cleanup, transferability, and revitalization of brownfields through the development of regulatory, tax, and technical assistance tools.

CALF Closed & Abandoned Landfill Inventory

VERSION DATE: 11/01/05

The Texas Commission on Environmental Quality, under a contract with Texas State University, and in cooperation with the 24 regional Council of Governments (COGs) in the State, has located over 4,000 closed and abandoned municipal solid waste landfills throughout Texas. This listing contains "unauthorized sites". Unauthorized sites have no permit and are considered abandoned. The information available for each site varies in detail and this historical information is not updated. Please refer to the specific regional COG for the most current information.

DCRPS Dry Cleaner Remediation Program Sites

VERSION DATE: 03/01/18

This list of DCRP sites is provided by the Texas Commission on Environmental Quality (TCEQ). According to the TCEQ, the Dry Cleaner Remediation Program (DCRP) establishes a prioritization list of dry cleaner sites and administers the Dry Cleaning Remediation fund to assist with remediation of contamination caused by dry cleaning solvents.

IOP Innocent Owner / Operator Database

VERSION DATE: 06/06/18

Texas Innocent Owner / Operator (IOP), created by House Bill 2776 of the 75th Legislature, provides a certificate to an innocent owner or operator if their property is contaminated as a result of a release or migration of contaminants from a source or sources not located on the property, and they did not cause or contribute to the source or sources of contamination. The IOP database is maintained by the Texas Commission on Environmental Quality.

LPST Leaking Petroleum Storage Tanks

VERSION DATE: 06/08/18

The Leaking Petroleum Storage Tank listing is derived from the Petroleum Storage Tank (PST) database and is maintained by the Texas Commission on Environmental Quality. This listing includes aboveground and underground storage tank facilities with reported leaks.

MSWLF Municipal Solid Waste Landfill Sites

VERSION DATE: 06/08/18

The municipal solid waste landfill database is provided by the Texas Commission on Environmental Quality. This

Environmental Records Definitions - STATE (TX)

database includes active landfills and inactive landfills, where solid waste is treated or stored.

RRCVCP Railroad Commission VCP and Brownfield Sites

VERSION DATE: 04/11/18

According to the Railroad Commission of Texas, their Voluntary Cleanup Program (RRC-VCP) provides an incentive to remediate Oil & Gas related pollution by participants as long as they did not cause or contribute to the contamination. Applicants to the program receive a release of liability to the state in exchange for a successful cleanup.

RWS Radioactive Waste Sites

VERSION DATE: 07/11/06

This Texas Commission on Environmental Quality database contains all sites in the State of Texas that have been designated as Radioactive Waste sites.

STCV Salt Caverns for Petroleum Storage

VERSION DATE: 09/01/06

The salt caverns for petroleum storage database is provided by the Railroad Commission of Texas.

VCP Voluntary Cleanup Program Sites

VERSION DATE: 06/06/18

The Texas Voluntary Cleanup Program (VCP) provides administrative, technical, and legal incentives to encourage the cleanup of contaminated sites in Texas. Since all non-responsible parties, including future lenders and landowners, receive protection from liability to the state of Texas for cleanup of sites under the VCP, most of the constraints for completing real estate transactions at those sites are eliminated. As a result, many unused or underused properties may be restored to economically productive or community beneficial uses. The VCP database is maintained by the Texas Commission on Environmental Quality.

WMRF Recycling Facilities

VERSION DATE: 11/01/12

This listing of recycling facilities is provided by the Texas Commission on Environmental Quality's Recycle Texas Online service. The company information provided in this database is self-reported. Since recyclers post their own information, a facility or company appearing on the list does not imply that it is in compliance with TCEQ regulations or other applicable laws. This database is no longer maintained and includes the last compilation of the program participants before the Recycle Texas Online program was closed.

Environmental Records Definitions - STATE (TX)

IHWCA Industrial and Hazardous Waste Corrective Action Sites

VERSION DATE: 05/11/18

This database is provided by the Texas Commission on Environmental Quality (TCEQ). According to the TCEQ, the mission of the industrial and hazardous waste corrective action program is to oversee the cleanup of sites contaminated from industrial and municipal hazardous and industrial nonhazardous wastes. The goals of this program are to: Ensure that sites are assessed and remediated to levels that protect human health and the environment; Verify that waste management units or facilities are taken out of service and closed properly; and to Facilitate revitalization of contaminated properties.

SF State Superfund Sites

VERSION DATE: 09/23/16

The state Superfund program mission is to remediate abandoned or inactive sites within the state that pose an unacceptable risk to public health and safety or the environment, but which do not qualify for action under the federal Superfund program (NPL - National Priority Listing). As required by the Texas Solid Waste Disposal Act, Texas Health and Safety Code, Chapter 361, the Texas Commission on Environmental Quality identifies and evaluates these facilities for inclusion on the state Superfund registry. This registry includes any recent developments and the anticipated action for these sites.

Environmental Records Definitions - TRIBAL

USTR06 Underground Storage Tanks On Tribal Lands

VERSION DATE: 04/01/18

This database, provided by the United States Environmental Protection Agency (EPA), contains underground storage tanks on Tribal lands located in EPA Region 6. This region includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

LUSTR06 Leaking Underground Storage Tanks On Tribal Lands

VERSION DATE: 04/01/18

This database, provided by the United States Environmental Protection Agency (EPA), contains leaking underground storage tanks on Tribal lands located in EPA Region 6. This region includes the following states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

ODINDIAN Open Dump Inventory on Tribal Lands

VERSION DATE: 11/08/06

This Indian Health Service database contains information about facilities and sites on tribal lands where solid waste is disposed of, which are not sanitary landfills or hazardous waste disposal facilities, and which meet the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944).

INDIANRES Indian Reservations

VERSION DATE: 01/01/00

The Department of Interior and Bureau of Indian Affairs maintains this database that includes American Indian Reservations, off-reservation trust lands, public domain allotments, Alaska Native Regional Corporations and Recognized State Reservations.

Appendix H
Tribal Consultation Letters



DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

May 2, 2017

Regulatory Division

Subject: Project Number: SWF 2003-00336, Lake Ralph Hall

Mr. Phil Cross
Tribal Historic Preservation Officer
Caddo Nation of Oklahoma
P.O. Box 487
117 Memorial Lane
Binger, Oklahoma 73009

Dear Mr. Cross:

This letter addresses cultural resources requirements under Section 404 of the Clean Water Act associated with a proposal by the Upper Trinity Regional Water District (UTRWD), to construct and operate the proposed Lake Ralph Hall in Fannin County, Texas. The U.S. Army Corps of Engineers, Fort Worth District (USACE) is currently reviewing a permit application for the development of the water supply project. This project has been assigned Project Number SWF-2003-00336. Please include this number in all future correspondence concerning this project.

The proposed Lake Ralph Hall (Project) will include the dam site, the approximate 7,605 acre flood pool (elevation 560.0 amsl), mitigation area, and associated pipelines. In 2005 an archeological survey investigated approximately 15 percent of the flood pool for cultural resources and recorded a total of 17 prehistoric and historic sites. In 2009 a reconnaissance survey for historic-age resources identified 114 resources within the flood pool. Currently the USACE is working with the State Historic Preservation Office (SHPO) and permit Applicant to develop a research design for future cultural resource investigations across the Project.

This letter is to invite you to consult on this project under 36 CFR 800(c)(2)(ii). The USACE and the SHPO plan on developing a Programmatic Agreement (PA), under 36 CFR 800.4(c)(2), to guide future work (testing and mitigation) on the identified sites. The enclosed compact disc (CD) contains copies of the draft research design and draft PA. While the proposed reservoir lies in an area with no known tribal lands or trust lands, the Caddo Nation was historically associated with the area. The USACE requests you review the enclosed documents and notify us of any cultural or religious significance you might attach to this site or this area. We request your participation and consultation in development of the PA.

Thank you for your time, and this opportunity to provide you these review documents. We look forward to working with you on this project. Please direct any questions to Mr. Jimmy Barrera at 817-886-1838.

Sincerely,

Stephen L Brooks
Chief, Regulatory Division

Enclosure



DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

May 2, 2017

Regulatory Division

Subject: Project Number: SWF 2003-00336, Lake Ralph Hall

Dr. Ian Thompson
Tribal Historic Preservation Officer
Choctaw Nation of Oklahoma
P.O. Box 1210
Durant, Oklahoma 74702-1210

Dear Dr. Thompson:

This letter addresses cultural resources requirements under Section 404 of the Clean Water Act associated with a proposal by the Upper Trinity Regional Water District (UTRWD), to construct and operate the proposed Lake Ralph Hall in Fannin County, Texas. The U.S. Army Corps of Engineers, Fort Worth District (USACE) is currently reviewing a permit application for the development of the water supply project. This project has been assigned Project Number SWF-2003-00336. Please include this number in all future correspondence concerning this project.

The proposed Lake Ralph Hall (Project) will include the dam site, the approximate 7,605 acre flood pool (elevation 560.0 amsl), mitigation area, and associated pipelines. In 2005 an archeological survey investigated approximately 15 percent of the flood pool for cultural resources and recorded a total of 17 prehistoric and historic sites. In 2009 a reconnaissance survey for historic-age resources identified 114 resources within the flood pool. Currently the USACE is working with the State Historic Preservation Office (SHPO) and permit Applicant to develop a research design for future cultural resource investigations across the Project.

This letter is to invite you to consult on this project under 36 CFR 800(c)(2)(ii). The USACE and the SHPO plan on developing a Programmatic Agreement (PA), under 36 CFR 800.4(c)(2), to guide future work (testing and mitigation) on the identified sites. The enclosed compact disc (CD) contains copies of the draft research design and draft PA. While the proposed reservoir lies in an area with no known tribal lands or trust lands, the Choctaw Nation was historically associated with the area. The USACE requests you review the enclosed documents and notify us of any cultural or religious significance you might attach to this site or this area. We request your participation and consultation in development of the PA.

Thank you for your time, and this opportunity to provide you these review documents. We look forward to working with you on this project. Please direct any questions to Mr. Jimmy Barrera at 817-886-1838.

Sincerely,

Stephen L Brooks
Chief, Regulatory Division

Enclosure



DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

May 2, 2017

Regulatory Division

Subject: Project Number: SWF 2003-00336, Lake Ralph Hall

Ms. Martina Callahan
Director, Comanche Nation Historic Preservation Office
Comanche Nation of Oklahoma
#6 SW 'D' Avenue, Suite C
Lawton, Oklahoma 73507

Dear Ms. Callahan:

This letter addresses cultural resources requirements under Section 404 of the Clean Water Act associated with a proposal by the Upper Trinity Regional Water District (UTRWD), to construct and operate the proposed Lake Ralph Hall in Fannin County, Texas. The U.S. Army Corps of Engineers, Fort Worth District (USACE) is currently reviewing a permit application for the development of the water supply project. This project has been assigned Project Number SWF-2003-00336. Please include this number in all future correspondence concerning this project.

The proposed Lake Ralph Hall (Project) will include the dam site, the approximate 7,605 acre flood pool (elevation 560.0 amsl), mitigation area, and associated pipelines. In 2005 an archeological survey investigated approximately 15 percent of the flood pool for cultural resources and recorded a total of 17 prehistoric and historic sites. In 2009 a reconnaissance survey for historic-age resources identified 114 resources within the flood pool. Currently the USACE is working with the State Historic Preservation Office (SHPO) and permit Applicant to develop a research design for future cultural resource investigations across the Project.

This letter is to invite you to consult on this project under 36 CFR 800(c)(2)(ii). The USACE and the SHPO plan on developing a Programmatic Agreement (PA), under 36 CFR 800.4(c)(2), to guide future work (testing and mitigation) on the identified sites. The enclosed compact disc (CD) contains copies of the draft research design and draft PA. While the proposed reservoir lies in an area with no known tribal lands or trust lands, the Comanche Nation was historically associated with the area. The USACE requests you review the enclosed documents and notify us of any cultural or religious significance you might attach to this site or this area. We request your participation and consultation in development of the PA.

Thank you for your time, and this opportunity to provide you these review documents. We look forward to working with you on this project. Please direct any questions to Mr. Jimmy Barrera at 817-886-1838.

Sincerely,

Stephen L Brooks
Chief, Regulatory Division

Enclosure



DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

May 2, 2017

Regulatory Division

Subject: Project Number: SWF 2003-00336, Lake Ralph Hall

Mr. Russell L. Martin
President
Tonkawa Tribe of Oklahoma
1 Rush Buffalo Road
Tonkawa, Oklahoma 74653

Dear Mr. Martin:

This letter addresses cultural resources requirements under Section 404 of the Clean Water Act associated with a proposal by the Upper Trinity Regional Water District (UTRWD), to construct and operate the proposed Lake Ralph Hall in Fannin County, Texas. The U.S. Army Corps of Engineers, Fort Worth District (USACE) is currently reviewing a permit application for the development of the water supply project. This project has been assigned Project Number SWF-2003-00336. Please include this number in all future correspondence concerning this project.

The proposed Lake Ralph Hall (Project) will include the dam site, the approximate 7,605 acre flood pool (elevation 560.0 amsl), mitigation area, and associated pipelines. In 2005 an archeological survey investigated approximately 15 percent of the flood pool for cultural resources and recorded a total of 17 prehistoric and historic sites. In 2009 a reconnaissance survey for historic-age resources identified 114 resources within the flood pool. Currently the USACE is working with the State Historic Preservation Office (SHPO) and permit Applicant to develop a research design for future cultural resource investigations across the Project.

This letter is to invite you to consult on this project under 36 CFR 800(c)(2)(ii). The USACE and the SHPO plan on developing a Programmatic Agreement (PA), under 36 CFR 800.4(c)(2), to guide future work (testing and mitigation) on the identified sites. The enclosed compact disc (CD) contains copies of the draft research design and draft PA. While the proposed reservoir lies in an area with no known tribal lands or trust lands, the Tonkawa Tribe was historically associated with the area. The USACE requests you review the enclosed documents and notify us of any cultural or religious significance you might attach to this site or this area. We request your participation and consultation in development of the PA.

Thank you for your time, and this opportunity to provide you these review documents. We look forward to working with you on this project. Please direct any questions to Mr. Jimmy Barrera at 817-886-1838.

Sincerely,

Stephen L Brooks
Chief, Regulatory Division

Enclosure



DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

May 2, 2017

Regulatory Division

Subject: Project Number: SWF 2003-00336, Lake Ralph Hall

Ms. Terri Parton
President
Wichita and Affiliated Tribes
P.O. Box 729
Anadarko, Oklahoma 73005

Dear Ms. Parton:

This letter addresses cultural resources requirements under Section 404 of the Clean Water Act associated with a proposal by the Upper Trinity Regional Water District (UTRWD), to construct and operate the proposed Lake Ralph Hall in Fannin County, Texas. The U.S. Army Corps of Engineers, Fort Worth District (USACE) is currently reviewing a permit application for the development of the water supply project. This project has been assigned Project Number SWF-2003-00336. Please include this number in all future correspondence concerning this project.

The proposed Lake Ralph Hall (Project) will include the dam site, the approximate 7,605 acre flood pool (elevation 560.0 amsl), mitigation area, and associated pipelines. In 2005 an archeological survey investigated approximately 15 percent of the flood pool for cultural resources and recorded a total of 17 prehistoric and historic sites. In 2009 a reconnaissance survey for historic-age resources identified 114 resources within the flood pool. Currently the USACE is working with the State Historic Preservation Office (SHPO) and permit Applicant to develop a research design for future cultural resource investigations across the Project.

This letter is to invite you to consult on this project under 36 CFR 800(c)(2)(ii). The USACE and the SHPO plan on developing a Programmatic Agreement (PA), under 36 CFR 800.4(c)(2), to guide future work (testing and mitigation) on the identified sites. The enclosed compact disc (CD) contains copies of the draft research design and draft PA. While the proposed reservoir lies in an area with no known tribal lands or trust lands, the Wichita and Affiliated Tribes was historically associated with the area. The USACE requests you review the enclosed documents and notify us of any cultural or religious significance you might attach to this site or this area. We request your participation and consultation in development of the PA.

Thank you for your time, and this opportunity to provide you these review documents. We look forward to working with you on this project. Please direct any questions to Mr. Jimmy Barrera at 817-886-1838.

Sincerely,

Stephen L Brooks
Chief, Regulatory Division

Enclosure

Appendix I
Final Lake Ralph Hall Water Resources Technical Report

Final Lake Ralph Hall Water Resources Technical Report

Prepared for:
U.S. Army Corps of Engineers

Submitted by:
Michael Baker International

March 2017

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Appendix: Exhibits

- Exhibit 1 Lake Ralph Hall Study Area
- Exhibit 2 North Sulphur River Watershed
- Exhibit 3 Lake Ralph Hall and Sulphur River Drainage Areas
- Exhibit 4 Lake Ralph Hall and Major Aquifers
- Exhibit 5 Lake Ralph Hall and Minor Aquifers
- Exhibit 6 Percent Change to Pools >75% Full

1.0 Introduction

This report provides an assessment of the current condition of the North Sulphur River and the potential impacts of the proposed Lake Ralph Hall (LRH) Dam construction to receiving waters. This assessment is based on literature review, monitoring data, field assessment data, Water Availability Model (WAM)/ Water Rights Analysis Package (WRAP) and RiverWare model results, and qualitative estimates of pollutant loading and water quality. This assessment utilized data from previous reports in support of the LRH Environmental Impact Statement (EIS) including:

- *Biological Assessment of the North Sulphur River* (Alan Plummer Associates, Inc. [APAI], 2006a)
- *Mitigation Plan for Impacts to Aquatic Resources and Terrestrial Habitats* (APAI, 2012)
- *Environmental Information Document* (APAI, 2006b)
- *Hydrologic and Hydraulic Studies of Lake Ralph Hall* (Brandes, 2004)
- *Lake Ralph Hall RiverWare Modeling Memorandum* (Brandes, 2015)
- *Evaluation of Hydrologic Modeling in Support of the Lake Ralph Hall Environmental Impact Statement* (DiNatale, 2016a)
- *Response to Comments from Texas Parks and Wildlife Department Memorandum* (DiNatale, 2016b)
- *Preliminary Jurisdictional Determination of Waters of the U.S. – Proposed Lake Ralph Hall* (APAI, 2006c)
- *Supplement Number 1 to the Preliminary Jurisdictional Determination of Waters of the U.S. – Proposed Lake Ralph Hall* (APAI, 2008)
- *Lake Ralph Hall Preliminary Habitat Assessment* (APAI, 2005)
- *Habitat Assessment for Proposed Lake Ralph Hall* (APAI, 2011)
- *Geomorphic and Sedimentation Evaluation of North Sulphur River and Tributaries for the Lake Ralph Hall Project* (Mussetter Engineering, Inc [MEI], 2006)
- *Archaeology and Quaternary Geology at Lake Ralph Hall* (AR Consultants, Inc., 2005)

1.1 Project Description

The proposed LRH would be located in Fannin County, Texas, and would be constructed on the existing channel of the North Sulphur River (**Exhibit 1**). The proposed LRH project would include the construction of an earth-filled dam embankment across the valley of the North Sulphur River with a concrete uncontrolled principal spillway located within the existing channel of the river and a concrete ogee-type emergency spillway located within the embankment on the northern floodplain of the river. The top of the dam embankment would occur at an elevation of 562.0 feet above mean sea level and would adjoin the existing ground surface on both ends of the structure. Current studies indicate the proposed LRH reservoir would have a conservation pool storage capacity of approximately 160,000 acre-feet (AF) at an elevation of 551.0 feet above MSL. The surface area of the

reservoir would be approximately 7,605 acres. The maximum depth of the reservoir at the dam would be approximately 90 feet. The firm annual yield of the proposed project would be approximately 34,050 AF/year.

2.0 Affected Environment

2.1 Study Area

The study area includes the Sulphur River Basin extending 127 miles long with a width that varies from 17 to 43 miles (Sulphur River Basin Authority [SRBA], 2014) (**Exhibit 1**). The Sulphur River Basin is located south of the Red River Basin beginning in Fannin County and flowing east to the Texas-Arkansas Border. The basin passes through three ecoregions with the western portion consisting mostly of row crop agriculture and cattle farming. The Sulphur River Basin is divided into seven watersheds including the Lower Sulphur River Watershed, Wright Patman Lake Watershed, Sulphur River Watershed, White Oak Creek Watershed, Days Creek Watershed, North Sulphur River Watershed and South Sulphur River Watershed. The proposed LRH would be located within the North Sulphur River Watershed and includes a portion of the North Sulphur River (**Exhibit 2**).

2.2 North Sulphur River

The North Sulphur River extends from the confluence with the Sulphur River in Lamar County to a point 4.2 miles upstream of Farm to Market Road (FM) 68 in Fannin County (Texas Commission on Environmental Quality [TCEQ] Atlas, 2004) (**Exhibit 2**).

2.2.1 Morphology

MEI completed the *Geomorphic and Sedimentation Evaluation of the North Sulphur River and Tributaries for the Lake Ralph Hall Project* in October 2006. The report provides a description of current conditions of the North Sulphur River and anticipated changes due to the proposed LRH project.

The North Sulphur River and its tributaries, upstream and downstream of the proposed LRH, are downcut, deeply incised, and eroding (MEI, 2006). During the 1920's, the river was channelized to control flooding (AR Consultants, 2005). The channelized portion of the river extends for approximately 40 miles east from the proposed LRH. Current conditions of the river are a result of channelization and straightening of the sinuous and meandering river. Prior to channelization, the river was meandering with an approximate slope of 4.3 feet per mile (MEI, 2006). Prior to channelization, the North Sulphur River at the proposed LRH dam site was approximately 48 feet wide and 6 feet deep but is currently 300 feet wide and 40 feet deep and is composed of erodible shale. Historically, the river had a hydraulic capacity between 700 cubic feet per second (cfs) and 1,000 cfs. Currently, the river at the dam site location contains flows in excess of the 100-year flood peak at approximately 38,000 cfs. Between the late 1920s and the present, approximately 28

million tons of sediment have been eroded from the mainstem of the river and its tributaries upstream of the proposed dam site (MEI, 2006).

2.2.2 Hydrology

The proposed LRH is located solely within the North Sulphur River Watershed on the North Sulphur River (**Exhibit 2**). The North Sulphur River Watershed includes extensive row crop agriculture and high soil productivity (SRBA, 2014). Major tributaries to the North Sulphur River that could be inundated and/or affected by the proposed reservoir include Allen Creek, Bear Creek, Pot Creek, Brushy Creek, Pickle Creek, Davis Creek, Legget Branch, Bralley Pool Creek, Merrill Creek, Hedrick Branch, Long Creek, Baker Creek, and McClure Creek. Hydrology of the North Sulphur River is variable and normally exhibits little to no flow.

Historical data from USGS gage stations in the North Sulphur River Watershed were collected and analyzed to describe with and without project conditions utilizing various models (Brandes, 2004; Brandes, 2015; DiNatale, 2016a; DiNatale, 2016b). Flows in the North Sulphur River primarily consist of runoff, although spring discharges occur for sustained periods following rainfall events (Brandes, 2004). The USGS maintains a streamflow gage on the North Sulphur River and is referred to as the “North Sulphur River near Cooper, TX” gage. Mean daily streamflow records from this gage are available from 1949 to present. The gage is located approximately 20 river miles downstream from the proposed LRH dam site (**Exhibit 1**). Records from this gage indicate a mean daily flow of 261 cfs and a median daily flow of 11 cfs indicating low flow during much of the time with periodic flood events (Brandes, 2004). Data from this gage also indicate zero flow for 10 percent of the time and flow above 306 cfs approximately 10 percent of the time (Brandes, 2004). Historical monthly flows show variable flows with periods of no flow and other periods indicating significant flood flows (Brandes, 2004). During rain events flows increase rapidly in the North Sulphur River Watershed but recede within a day or two to nearly no flow. Small ponds and puddles typically form within the river channel.

2.2.3 Water Quality

Water quality regulatory programs in Texas are administered by TCEQ with the substantial involvement of local river authorities as well as other state and local groups, and are conducted under the Texas Clean Rivers Program and other relevant legislation. The Texas Administrative Code (TAC), Title 30, Chapter 307 promulgates surface water quality criteria, regulations, and standards. In addition, TCEQ regulations require certification that a permit allowing the discharge of dredged or fill material would comply with state water quality standards, under Section 401 of the Clean Water Act (CWA).

The Texas Surface Water Quality Standards establish explicit goals for the quality of streams, rivers, lakes, and bays throughout Texas. Water quality standards are developed to maintain the quality of surface waters in Texas to support public health and enjoyment while protecting aquatic life. Water quality standards identify appropriate uses for surface waters including aquatic life, recreation, and public

water supply (drinking water). Criteria for evaluating support of these uses include dissolved oxygen, temperature, pH, dissolved minerals, toxic substances, and bacteria. TCEQ adopted revisions to the standards which became effective in 2014. However, the Environmental Protection Agency (EPA) has not approved all the 2014 standards revisions. In particular, a revision to the North Sulphur River segment stating the benthic macroinvertebrate community should be assessed as a limited aquatic life was disapproved by the EPA and is currently under review. The 2014 standards are described in **Table 1**.

Table 1. Site-Specific Uses and Criteria for the North Sulphur River (TCEQ, 2014).

Uses	Recreation	Public Contact Recreation
	Aquatic Life	Intermediate ¹
	Domestic Water Supply	-
	Other	-
Criteria	Cl ⁻¹ (mg/L)	190
	SO ₄ ⁻² (mg/L)	475
	TDS (mg/L)	1,320
	Dissolved Oxygen (mg/L)	5.0
	pH Range (SU)	6.0 – 8.5
	Indicator Bacteria ¹ (#/100ml)	126
	Temperature (°F)	93

mg/L – milligrams per liter; SU – standard units; °F – degrees Fahrenheit

¹According to TCEQ, “The intermediate aquatic life use applies only to the fish community. The benthic community is to be assessed using a limited aquatic life use.” This language is under EPA review and has not been approved by EPA.

The Texas Integrated Report of Surface Water Quality describes the status of natural waters based on historical data and assigns water bodies various categories depending on the extent to which they attain standards. In accordance with the federal CWA 305(b) and 303(d), the TCEQ produces an updated report every two years.

According to the *2014 Texas Integrated Report of Surface Water Quality*, the North Sulphur River consists of two assessment segments. Segment 0305_01 includes the portion of the river from the confluence with the South Sulphur River upstream approximately 25 miles to Morrison Creek. Segment 0305_02 includes the portion of the river from the confluence with Morrison Creek upstream approximately 23 miles to the headwaters. Stations associated with Segment 0305_01 include 10230 and 10231. Stations associated with Segment 0305_02 include 17613, 18844, and 18846. Assessment results from TCEQ (2014) are included in **Table 2** and **Table 3**.

Table 2. 2014 Texas Integrated Water Quality Assessment Results, Segment 0305_01, December 2005 to November 2012.

Parameter	# Samples	Mean of Samples	# of Sample Exceeding Criteria	Mean of Samples Exceeding Criteria	Criteria	Sample Sizes	Level of Support
Aquatic Life Use							
DO-Grab Screening Level (mg/L)	25	-	0	-	5.00	AD	NC
DO-Grab Min (mg/L)	25	-	0	-	3.00	AD	FS
Recreation Use							
Bacteria*	14	52.72	0	-	126.00	LD	NC
General Use							
Water Temp (°C)	25	-	0	-	33.90	AD	FS
High pH (SU)	25	-	1	9.2	8.50	AD	FS
Low pH (SU)	25	-	0	-	6.00	AD	FS
TDS (mg/L)	39	676.32	0	-	1,320.00	AD	FS
Chloride (mg/L)	36	43.77	0	-	190.00	AD	FS
Sulfate (mg/L)	36	306.67	0	-	475.00	AD	FS
Nitrate (mg/L)	25	-	1	3.72	1.95	AD	NC
Ammonia (mg/L)	25	-	0	-	0.33	AD	NC
Total Phosphorus (mg/L)	22	-	0	-	0.69	AD	NC
Chlorophyll- <i>a</i> (µg/L)	23	-	7	25.57	14.10	AD	CS

* **E. Coli (Colonies/100mL)**

AD - Adequate Data; **LD** - Limited Data; **NC** - No Concern; **FS** - Fully Supporting; **CS** - Screening Level Concern; **°C** - Degrees Celsius; **µg** - Micrograms

Table 3. 2014 Texas Integrated Water Quality Assessment Results, Segment 0305_02, December 2005 to November 2012.

Parameter	# Samples	Mean of Samples	# of Sample Exceeding Criteria	Mean of Samples Exceeding Criteria	Criteria	Sample Sizes	Level of Support
Aquatic Life Use							
DO-Grab Screening Level (mg/L)	12	-	0	4.9	4.00	AD	NC
DO-Grab Min (mg/L)	12	-	0	-	3.00	AD	FS
DO-24hr Avg (mg/L)	6	-	0	-	5.00	LD	NC
DO-24hr Min (mg/L)	6	-	0	-	3.00	LD	NC
Habitat	3	19.00	-	-	14.00	AD	NC
Macrobenthic Community	6	22.00	-	-	22.00	AD	FS
Fish Community	6	39.00	-	-	33.00	AD	FS
Recreation Use							
Bacteria	12	9.08	0	-	126.00	LD	NC
General Use							
Water Temp (°C)	12	-	0	-	33.90	AD	FS
High pH (SU)	12	-	0	-	8.50	AD	FS
Low pH (SU)	12	-	0	-	6.00	AD	FS
Sulfate (mg/L)	36	306.67	0	-	475.00	AD	FS
TDS (mg/L)	39	676.32	0	-	1,320.00	AD	FS
Chloride (mg/L)	36	43.77	0	-	190.00	AD	FS
Chlorophyll- <i>a</i> (µg/L)	12	-	0	-	14.10	AD	NC
Total Phosphorus (mg/L)	12	-	0	-	0.69	AD	NC
Nitrate (mg/L)	12	-	3	3.06	1.95	AD	NC
Ammonia (mg/L)	12	-	0	-	0.33	AD	NC

* **E. Coli**

AD – Adequate Data; LD – Limited Data; NC – No Concern; FS – Fully Supporting; CS – Screening Level Concern

TCEQ (2014) indicates the majority of parameters assessed fully support the use or are no concern. Chlorophyll-*a* in Segment 0305_01 is the only parameter indicating a concern for water quality based on screening levels from a nonpoint source. Seven out of twenty-three samples exceeded the criteria with a mean exceedance of 25.57 µg/L. Currently, there is no concern for non-attainment of the standard based on numeric criteria.

The Section 303(d) list identifies water bodies in Texas too polluted or otherwise degraded to meet water quality standards. The North Sulphur River is not included in the TCEQ (2014) 303(d) List and is not considered impaired.

Flows in the North Sulphur River are primarily fed by overland runoff, although sustained flow can result from springs (Brandes, 2004). The drainage area of the proposed LRH project footprint includes the Pot Creek and Bralley Pool Creek subwatersheds (**Exhibit 3**) and is approximately 104 square miles. **Table 4** includes

the breakdown of land cover in the drainage area of the proposed LRH Dam. Land cover in the drainage area below the proposed LRH project (**Exhibit 3**) was calculated to the furthest point downstream included in the WAM model (Brandes, 2015). **Table 5** includes the breakdown of land cover in the drainage area of the Sulphur River downstream of the proposed LRH dam site. The primary land cover classifications from both drainage areas are undeveloped and agriculture. The primary pollutants of concern associated with overland flow from agriculture uses are nutrients, organic material, bacteria, sediment, pesticides, and herbicides. There is a very small percentage of developed land in both drainage areas, so impacts from pollutants associated with developed industrial or commercial land, such as metals, organochlorines, or mercury, are not likely to be a concern.

Table 4. Land Cover Values for the LRH Drainage Area.

Class/Value	Classification Description	Area (Square Miles)	Percent of Total Area (%)
Water	Open Water	0.587	0.566
Developed	Developed, Open Space	4.473	4.315
	Developed, Low Intensity	0.139	0.134
	Developed, Medium Intensity	0.025	0.024
	Developed, High Intensity	0.004	0.004
Forest	Deciduous Forest	14.637	14.119
	Evergreen Forest	1.113	1.074
	Mixed Forest	0.027	0.026
Shrubland	Shrub/Scrub	0.167	0.161
Herbaceous	Grassland/Herbaceous	50.51	48.721
Planted/Cultivated	Pasture/Hay	7.697	7.424
	Cultivated Crops	24.262	23.403
Wetlands	Emergent Herbaceous Wetlands	0.031	0.030
Total		103.672	100

Source: National Land Cover Database (NLCD)

Table 5. Land Cover Values for the Sulphur River Downstream of the LRH Drainage Area.

Class/Value	Classification Description	Area (Square Miles)	Percent of Total Area (%)
Water	Open Water	38	2.19
Developed	Developed, Open Space	59	3.38
	Developed, Low Intensity	29	1.65
	Developed, Medium Intensity	4	0.21
	Developed, High Intensity	2	0.10
Barren	Barren Land	3	0.17
Forest	Deciduous Forest	283	16.22
	Evergreen Forest	17	0.97
	Mixed Forest	1	0.06
Shrubland	Shrub/Scrub	57	3.26
Herbaceous	Grassland/Herbaceous	350	20.07
Planted/Cultivated	Pasture/Hay	570	32.67
	Cultivated Crops	203	11.61
Wetlands	Woody Wetlands	117	6.73
	Emergent Herbaceous Wetlands	12	0.70
Total		1,745	

Source: National Land Cover Database (NLCD)

EPA (1983) provides median concentrations for various pollutants of concern for various land use categories including residential, mixed, commercial, and nonurban. Current pollutant loading and water quality conditions were assessed for the LRH drainage area above the proposed dam and the North Sulphur River drainage area below the proposed dam to the furthest point downstream included in the WAM model (downstream site). In order to calculate runoff from 1-year and 2-year storm events, the *Soil Conservation Service Curve Number Method* was utilized including the following equation:

$$Q = (P - I_a)^2 / (P - I_a) + S$$

Where:

Q = runoff (inches)

P = rainfall (inches)

S = retention of moisture (inches)

I_a = the initial abstraction (inches)

In order to calculate average annual runoff the *Simple Method to Calculate Urban Stormwater Loads* (Stormwater Manager's Resource Center, n.d.) was used including:

$$R = P \times P_j \times R_v$$

Where:

R = annual runoff

P = annual rainfall (inches)

P_j = fraction of annual rainfall events that produce runoff

R_v = runoff coefficient

Pollutant loading at the proposed dam location and downstream site of the proposed LRH were calculated utilizing the equation:

$$\sum_{LU} (A_{LU} \times C_{LU} \times Q_{LU}) = L_C$$

Where:

A_{LU} = land use area

C = constituent concentration for the specific land use

Q_{LU} = runoff depth from the land use area

L_C = total load for the constituent of concern

Σ_{LU} = sum of loads for all land uses

Estimated current pollutant concentrations at the downstream site were assessed to evaluate concentrations in the river based on the estimated upstream and downstream loads. To assess mixing of the constituents downstream, the following equation was used assuming conservation of mass:

$$(L_{C-U} + L_{C-D}) / (\sum (Q_u + Q_D)) = C_{EOI}$$

Where:

L_{C-U} = load for each constituent upstream of the dam

L_{C-D} = load for each constituent downstream of the dam

Q_u = runoff volume that will be obtained from the WAM model for the location upstream of the proposed dam

Q_D = runoff volume obtained from the WAM model for the location at the downstream extent of impact

C_{EOI} = the constituent concentration at the downstream extent of impact (assessed as described below)

The changes in concentration and resulting water quality conditions were evaluated downstream based on concentrations assuming complete mixing downstream of the dam. Pollutant loads and water quality were assessed during the 50-percentile monthly flow condition from the WAM model (Brandes, 2015). The 50-percentile monthly flow was used because it does not represent an overly arid condition or large rainfall event.

Estimated pollutant loads and concentrations at the proposed LRH dam site and downstream site are included in **Table 6** and **Table 7**.

Table 6. Pollutant Loads and Concentrations at Proposed LRH Dam Site.

Pollutant	Load (Pounds)			Concentration (mg/L)
	1-Year Storm	2-Year Storm	Annual Rainfall	
TSS	1,713,567	2,135,686	6,813,382	133.50
Lead	734	915	2,920	0.06
Zinc	4,774	5,949	18,980	0.37
Kjeldahl Nitrogen	23,623	29,442	93,927	1.84
Nitrite / Nitrate	13,292	16,567	52,852	1.04
Total Phosphorus	2,962	3,692	11,777	0.23
Soluble Phosphorus	636	793	2,531	0.05

Table 7. Pollutant Loads and Concentrations at Downstream Site.

Pollutant	Load (Pounds)			Concentration (mg/L)
	1-Year Storm	2-Year Storm	Annual Rainfall	
TSS	24,311,018	30,676,321	111,089,157	100.49
Lead	10,419	13,147	47,610	0.04
Zinc	67,724	85,455	309,463	0.28
Kjeldahl Nitrogen	335,145	422,895	1,531,443	1.39
Nitrite / Nitrate	188,584	237,961	861,734	0.78
Total Phosphorus	42,023	53,026	192,026	0.17
Soluble Phosphorus	9,030	11,394	41,262	0.04

2.2.4 Aquatic Organisms

Aquatic organisms have been documented in pools in the North Sulphur River within the proposed LRH footprint and downstream of the proposed LRH dam.

The North Sulphur River Segment 0305_02 was first listed on the 303(d) list in 2006 for impaired habitat, macrobenthic community, and fish community. The impairment for habitat was lowered to a concern for screening level in 2008 and listed as no concern in 2012. The concern for macrobenthic community and fish community was removed from the 303(d) list in 2012 due to a revision in the standard.

The SRBA conducted biological monitoring in the North Sulphur River at three sampling stations (SRBA, 2008) in May 2007 and August 2007. Stations sampled included 17613, 18844, and 18846.

Station 17613 was rated as intermediate for fish community for both events. The macrobenthic community was rated as limited for the May event with ten species and intermediate for the August event due to an increase in the number of species collected. The Habitat Quality Index was rated as high due to the number of riffles, stability of substrate, and amount of available in stream cover.

Station 18844 was rated as limited for macrobenthic community for both events. The fish community for the May event was rated as high with 11 species and intermediate

during the August event with 6 species. The Habitat Quality Index was rated as high due to the number of riffles, stability of substrate, and amount of available in stream cover.

Station 18846 was rated as limited for macrobenthic community and intermediate for fish community during both events. The number of species collected increased during the August event but was not sufficient to change the rating. The Habitat Quality Index for this site was intermediate due to the instability of banks and channelization.

Table 8 and **Table 9** summarize the total number of specimens collected at each sampling location.

Table 8. Fish Species Identified at Each Sample Location (May and August 2007).

Scientific Name	Common Name	Station 17613		Station 18844		Station 18846	
		May 2007	August 2007	May 2007	August 2007	May 2007	August 2007
<i>Ameiurus melas</i>	Black bullhead						1
<i>Ameiurus natalis</i>	Yellow bullhead			1		1	
<i>Campostoma anomalum</i>	Central stoneroller	5					1
<i>Cyprinella lutrensis</i>	Red shiner	38	59	139	4	114	17
<i>Fundulus notatus</i>	Blackstripe topminnow			11			
<i>Gambusia affinis</i>	Western mosquitofish	1	4	4	1		1
<i>Ictalurus punctatus</i>	Channel catfish			1			
<i>Ictiobus bubalus</i>	Smallmouth buffalo		1				
<i>Lepomis cyanellus</i>	Green sunfish	8	25	74	50	18	60
<i>Lepomis humilis</i>	Orangespotted sunfish	1		8	1		
<i>Lepomis macrochirus</i>	Bluegill			5	8	1	5
<i>Lepomis megalotis</i>	Longear sunfish			6	2		1
<i>Micropterus salmoides</i>	Largemouth bass	2	2	2		6	5
<i>Notemigonus crysoleucas</i>	Golden shiner		16				
<i>Notropis stramineus</i>	Sand Shiner	124					
<i>Pimephales vigilax</i>	Bullhead minnow		5	126		43	

Table 9. Aquatic Organisms Identified at Each Sample Location (May and August 2007).

Family	Scientific Name	Station 17613		Station 18844		Station 18846	
		May 2007	August 2007	May 2007	August 2007	May 2007	August 2007
<i>Dytiscidae</i>	<i>Acilius</i>	1				11	1
<i>Aeshnidae</i>	<i>Aeshna</i>						1
<i>Coenagrionidae</i>	<i>Argia</i>		2		1		
<i>Baetidae</i>	<i>Baetis</i>	2	4		11		
<i>Belostomatidae</i>	<i>Belostoma</i>		6		1		1
<i>Hydrophilidae</i>	<i>Berosus</i>	1	2		1		
<i>Ceratopogonidae</i>	<i>Bezzia</i>		1				
<i>Caenidae</i>	<i>Caenis</i>	11	102		89	2	73
<i>Corydalidae</i>	<i>Chauliodes</i>						
<i>Chironomidae</i>	<i>Chironomidae</i>	111	17	102	51	132	42
<i>Gammaridae</i>	<i>Gammarus</i>	14	15		11		
<i>Gerridae</i>	<i>Gerris</i>		1		1		1
<i>Planorbidae</i>	<i>Gyraulus</i>						3
<i>Gyrinidae</i>	<i>Gyrinus</i>				1	1	
<i>Calopterygidae</i>	<i>Hetaerina</i>		1				
<i>Ephemeridae</i>	<i>Hexagenia</i>					2	
<i>Dytiscidae</i>	<i>Hydaticus</i>			3			
<i>Dolichopodidae</i>	<i>Hydrophorus</i>	7		10	1		
<i>Coenagrionidae</i>	<i>Ischnura</i>	6	9		15	1	2
<i>Hydrophilidae</i>	<i>Laccobius</i>					2	
<i>Veliidae</i>	<i>Microvelia</i>		9				
<i>Pleidae</i>	<i>Neoplea</i>	1					
<i>Physidae</i>	<i>Physa</i>	2	3	8	4	1	
<i>Gerridae</i>	<i>Rheumatobates</i>		1				
<i>Simuliidae</i>	<i>Simulium</i>			69		34	
<i>Heptageniidae</i>	<i>Stenacron</i>		2				
<i>Elmidae</i>	<i>Stenelmis</i>		1				
<i>Hydrophilidae</i>	<i>Tropisternus</i>						1
<i>Valvatidae</i>	<i>Valvatidae</i>		2		1		6

In addition to the TCEQ biological data, biological sampling was conducted by the applicant via APAI in May 2006 and August 2006.

May 2006 Biological Sampling Event

Biological sampling was conducted by APAI on the North Sulphur River in May 2006 (Brandes, 2006). Two weeks prior to the May 2006 sampling event, approximately 1.5 inches of precipitation fell in the vicinity of the proposed LRH Dam site. Three stations were sampled and included sites upstream of the SH 34 Bridge, downstream of FM 904 Bridge, and downstream of the SH 38 Bridge (**Exhibit 2**). Six pools at each sampling location were identified for collection utilizing a D-frame aquatic dip net for invertebrates, fish, and amphibians; a Surber Stream Sampler for benthic invertebrates; and a kick net for collecting large and small organisms in open water. The substrate at all three locations consisted of clayey shale with gravel intermixed.

No flow or rooted vegetation was observed at any of the three locations. However, detritus and filamentous algae was observed at all three locations. Pools at the SH 34 location averaged approximately 20 meters by 15 meters with a depth ranging from five to ten centimeters. Pools at the FM 904 location averaged approximately 15 meters by 10 meters with depths ranging from five to 22 centimeters. Pools at the SH 38 location averaged approximately 40 meters by 25 meters with depths ranging from five to 15 centimeters. Data collected were compiled into TCEQ's habitat assessment worksheet with each location scoring a limited (poor) habitat quality index.

A variety of freshwater invertebrates were collected from the three sampling locations. **Table 10** summarizes the total number of specimens collected at each sampling location. Invertebrates identified during the sampling event are common and abundant throughout the area and normally colonize ephemeral to intermittent pools within the North Sulphur River. These organisms are opportunist and are temporarily sustained by these pools. No fish species were collected at any of the three sample locations.

Table 10. Aquatic Organisms Identified at Each Sample Location (May 2006).

Scientific Name	Common Name	Hwy 38 Bridge		Hwy 904 Bridge		Hwy 34 Bridge	
		Surber	D-Frame Dip Net	Surber	D-Frame Dip Net	Surber	D-Frame Dip Net
<i>Amphipoda</i>	Scuds	0	1	2	0	0	6
<i>Baetidae</i>	Mayflies	0	6	0	4	1	23
<i>Caenidae</i>	Mayflies	38	361	155	811	41	425
<i>Cambaridae</i>	Crayfish	0	0	0	0	0	1
<i>Ceratopogonidae</i>	Flies and Midges	0	21	2	13	0	22
<i>Chironomidae</i>	Flies and Midges	84	591	92	288	75	934
<i>Cladocera</i>	Water Fleas	0	0	0	0	284	56
<i>Coenagrionidae</i>	Damselflies	0	0	0	2	0	0
<i>Collembula</i>	Spring Tails	0	0	0	0	0	1
<i>Copepoda</i>	Tiny Crustaceans	0	3	0	0	0	7
<i>Corixidae</i>	Aquatic and Semi-Aquatic Bugs	71	136	3	3	4	53
<i>Culicidae</i>	Mosquitoes	2	50	17	19	1	38
<i>Dolichopodidae</i>	Flies and Midges	0	0	0	0	2	3
<i>Gyrinidae</i>	Water Beetles	0	8	0	0	2	5
<i>Haliplidae</i>	Water Beetles	0	0	0	0	0	4
<i>Heptageniidae</i>	Mayflies	0	0	1	1	0	0
<i>Hydracarina</i>	Water Mites	0	2	6	0	0	1
<i>Hydrophilidae</i>	Water Beetles	0	14	5	15	5	25
<i>Libellulidae</i>	Dragonflies	3	12	8	24	3	55
<i>Ostracoda</i>	Seed Shrimp	0	38	0	0	0	48
<i>Planorbidae</i>	Freshwater Snail	0	0	0	0	0	1

The majority of aquatic organisms collected during the sampling event were identified as Chironomidae (41 percent), Caenidae (36 percent) Cladocera (7 percent), and Corixidae (5 percent).

Chironomidae

Chironomidae is the largest family of aquatic insects and inhabits temporary and permanent aquatic habitats. There are 61 common genera found in Texas that are difficult to identify to genus and species. Chironomidae feeding groups include collector-gatherers, filter-collectors, and predators. Species within this family occupy

burrows and are tolerant to poor water quality and low dissolved oxygen levels (TCEQ, 2009). Chironomidae was the most abundant family collected and was collected at all sampling locations.

Caenidae

Caenidae species are widespread and common in a variety of lentic and lotic habitats in streams, swamps, spring seeps, marshes, lakes, and ponds. These organisms usually occur in sediment and are often partially covered with silt. Adults live only a few hours and mate shortly after emerging. Caenidae species are collector-gathers and filter-collectors and are considered sprawlers. Caenidae species are tolerant to low dissolved oxygen levels and generally sensitive to moderately tolerant to pollution (TCEQ, 2009). Caenidae species were the second most abundant collected and were collected at all sampling locations.

Cladocera

Cladocera species are widespread and common in freshwater and can be found in most streams with the exception of fast-flowing streams and extremely polluted waters. The majority of species feed on organic detritus, bacteria, and protozoans. Only a few species can handle low oxygen levels (TCEQ, 2009).

Corixidae

Corixidae are abundant to common insects in ponds with some species occurring in streams or brackish pools. Corixidae species are swimmers that spend the majority of time clinging to submerged vegetation and feeding on algae and other small organisms (TCEQ, 2009).

August 2006 Site Investigation

A second on-site investigation was conducted in August of 2006 to quantify existing conditions and observe flows within the North Sulphur River channel. The sample locations included the FM 904 Bridge, FM 2990 Bridge, and the FM 68 Bridge (**Exhibit 2**). No water was observed in the North Sulphur River at any of the sample locations due to the lack of rainfall.

2.3 Groundwater

The Trinity and Woodbine aquifers are the two predominant groundwater sources located within the project vicinity (**Exhibit 4 and Exhibit 5**). The Trinity aquifer, as recognized by the TCEQ and the Texas Water Development Board, is listed as a major aquifer for Texas. This aquifer consists of limestone, sand, clay, gravel, and conglomerates. The Trinity aquifer is one of the most extensive and highly used groundwater resources in Texas. It is primarily used by municipalities; however, it is also used for irrigation, livestock, and other domestic purposes.

The Woodbine aquifer is listed as a minor aquifer in Texas. This aquifer overlies the Trinity aquifer and consists of sandstone interbedded with shale and clay. The Woodbine aquifer provides water for municipal, industrial, domestic, livestock, and

small irrigation supplies. Both of these aquifers provide water supply for the rural areas of Fannin County.

The Trinity and Woodbine formations are more than 2,000 feet below ground surface in this area and are separated from the surface by significant thickness of aquicludes or aquitards. These aquifers recharge very slowly and only approximately 3 percent of water that falls as rain over the outcrop area ends up recharging the aquifer. The amount of recharge to the Trinity and Woodbine aquifers is estimated to be less than one inch per year (Nordstrom, 1982) No other groundwater formations are known to occur within the project vicinity.

3.0 Environmental Consequences

3.1 North Sulphur River

3.1.1 Hydrologic Models

The UTRWD has utilized hydrologic models to assess stream impacts to the North Sulphur River and Sulphur River. This modeling was conducted to analyze potential impacts to aquatic resources from the proposed LRH project. DiNatale Water (2016a) evaluated the adequacy of the hydrologic modeling for the purposes of the EIS, verified the modeling performed by UTRWD, and performed additional modeling.

The UTRWD utilized the State of Texas Water Availability Model that uses the Water Rights Analysis Package modeling platform (WAM/WRAP) and the RiverWare model developed by the U.S. Army Corps of Engineers (USACE) for the Red River Basin. The USACE also provided a HEC-RAS model developed for the Sulphur River Basin. DiNatale Water (2016a) evaluated the adequacy of these models to assess impacts to aquatic resources. The RiverWare model results provide the lower end of expected flow while the WAM results provide the upper end of expected flow below LRH (DiNatale, 2016a). In addition, DiNatale Water created a Daily Excel Model to simulate the filling and evaporation from pools on a daily basis (DiNatale, 2016b).

WAM/WRAP Model

TCEQ has developed several hydrologic water availability models for different river basins throughout Texas. WRAP is the modeling package while the input files specific to each river basin is referred to as the WAM. These input files describe hydrology, water rights, demands, and other features unique to each basin. The Sulphur River WAM model simulates the North Sulphur River, South Sulphur River, Sulphur River, White Oak Creek, and the watershed above Wright Patman Lake using a monthly time step.

RiverWare Model

The USACE developed a river network model for the Red River basin using the RiverWare modeling platform. RiverWare was developed at the Center for Advanced Decision Support for Water and Environmental Systems at the University of Colorado.

These models simulate complex river and reservoir networks. The user-developed policy rules featured in this model allow nearly unlimited flexibility to develop and simulate different operating policies and protocols. The Red River Basin RiverWare model includes the Sulphur River and North Sulphur River which are tributaries to the Red River. The model is a daily model that was developed to evaluate different USACE operations including flood control of the Red River Basin. This model includes LRH but does not include simulated diversions to the UTRWD and does not pass water to downstream senior water rights. The UTRWD modified the model to include the UTRWD diversion at LRH to produce a with-project RiverWare model. In addition, UTRWD disabled LRH to simulate without-project conditions.

HEC-RAS Model

The USACE developed the Sulphur River Basin HEC-RAS model that includes unsteady flow simulations of calculated probable maximum floods. The model includes multiple geometries with various proposed reservoirs in the basin, not including the proposed LRH. The HEC-RAS model was used to evaluate the potential impacts to floodplain resources.

Daily Excel Model

DiNatale Water developed an Excel spreadsheet model to address comments received from the Texas Parks and Wildlife Department (TPWD). TPWD requested a daily time step model be developed to more accurately predict impacts to pools within the North Sulphur River (DiNatale, 2016b). In order to evaluate the potential benefits of a daily model, the RiverWare model was used to develop a daily model of the volume of water within the pools in the river channel. The model simulated filling of pools from streamflow and outflow from evaporation on a daily basis. The Excel spreadsheet model was used to compute statistics on the percent of time the pools were full, >75 percent full, >50 percent full, >25 percent full, and not empty. In order to determine impacts to aquatic organisms, the statistics for pools >75 percent full were used. According to DiNatale (2016a), there were only negligible differences between with and without LRH model runs for both the RiverWare and WAM models below the Cooper Gage. Downstream of the Cooper Gage, no impacts to pools are anticipated due to the increased drainage area below the Cooper Gage.

3.1.2 Morphology

MEI conducted a geomorphic and sedimentation study of the proposed LRH project (MEI, 2006). The primary objectives of the study were:

- Quantification of the sedimentation delivery to the reservoir site for the 50-year project life under pre- and post-project conditions,
- Evaluation of the downstream effects of the dam on channel conditions and flow capacity, and
- Assessment of the potential for reducing or managing the upstream sediment supply to the reservoir.
- Assessment of future conditions in the North Sulphur River and tributaries upstream of the dam site in the absence of the project.

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Potential sources of sediment include channel erosion of the North Sulphur and its tributaries as well as watershed erosion. Analysis of the USGS North Sulphur River near Cooper gage and HEC-1/HEC-RAS models were used to estimate flows. Field observations indicated the morphological adjustment of the North Sulphur and its tributaries can be described by a geomorphic model of incised channel evolution (MEI, 2006). A channel evolution model was developed for the North Sulphur River and its tributaries. Estimates of the sheet-and-rill erosion in the watershed were developed with the Modified Universal Soil Equation (MUSLE) with parameters based on subbasin topography and soil types.

The MEI (2006) study concluded channelization-induced degradation and widening of the North Sulphur River and its principal tributaries upstream of the dam site has resulted in the erosion of approximately 28 million tons of sediment since the late 1920s.

MEI (2006) also estimated total annual sediment yield to the proposed LRH dam site under pre and post-project conditions. A range of estimates were provided based on conservative assumptions and worst-case assumptions. The worst-case assumptions assumed 100 percent of the watershed under cultivation with no soil conservation measures. Estimates of total annual sediment yield to the dam site location pre-project conditions ranges from 86 AF to 217 AF. Post-project conditions reduce the contributing watershed area and the length of the channel supplying sediment to the proposed LRH dam site. Estimates of total annual sediment yield to the dam site location post-project conditions ranges from 51 AF to 74 AF. According to MEI (2006), an estimated delivery to the 106,000 AF reservoir over a 50-year period assuming 100 percent trap efficiency would range from 2,570 AF to 3,700 AF. These estimates represent a loss of storage capacity over a 50-year period ranging from 1.6 percent loss to 2.3 percent loss.

Erosion of the North Sulphur River and its tributaries will continue without the proposed LRH. In areas where shale is exposed, channel depths will increase approximately 8 feet and channel bottom widths will increase approximately 16 feet over a 50-year period. Increasing channel depths are likely to cause further failure of the alluvial portions of the banks increasing channel top widths (MEI, 2006).

No adverse downstream impacts on channel morphology or capacity are expected as a result of sediment trapping in the reservoir, or operation of the reservoir (MEI, 2006). The North Sulphur River downstream of the proposed dam site is composed of shale bedrock. Shale bedrock erosion rates are controlled by the number of wetting and drying cycles and not hydraulic processes. Therefore, the proposed LRH dam is unlikely to have any effect on erosion rates downstream of the dam site. In addition, only 25 percent of the annual total sediment yield to the dam site is composed of bed material. The bulk of sediment delivered to the North Sulphur River and its tributaries downstream of the proposed dam site is composed of shale clasts that break down into wash-load size materials as they are exposed to transport and

weathering processes (slaking). Furthermore, the North Sulphur River is a supply-limited system that has the capacity to transport considerably more bed material than is currently being supplied to the channel. Consequently, it is unlikely that significant amounts of sediment will accumulate in the bed of the river downstream of the dam (MEI, 2006).

3.1.3 Hydrology

As described in DiNatale (2016b), using the daily method evaluated at more than 75 percent full is a reasonable, but still conservative estimate of the hydrologic impacts to pools between LRH and the North Sulphur River at the Cooper Gage. **Table 11** summarizes the amount of time pools are >75 percent full with and without the proposed LRH.

Table 11. Percent of Time Pools are > 75 Percent Full (1994 to 2014 Study Period).

Reach	Without LRH	With LRH	Difference
Downstream of Lake Ralph Hall Dam Site	81.9%	33.6%	-48.3%
Downstream of mouth of Baker Creek	80.2%	77.8%	-2.4%
Downstream of mouth of Bledsoe Creek	76.6%	70.5%	-6.0%
Downstream of mouth of Wafer Creek	77.2%	77.2%	0.0%
Downstream of mouth of Ghost Creek	80.3%	80.3%	0.0%
Downstream of mouth of Morrison Creek	73.5%	72.6%	-0.9%
Downstream of mouth of Rowdy Creek	71.9%	68.2%	-3.7%
Downstream of mouth of Cane Creek	74.2%	74.2%	0.0%
Downstream of mouth of Maxwell Creek*	68.3%	65.9%	-2.4%

Source: DiNatale, 2016b

*Reach Ends at Cooper Gage

The results of the model indicate the greatest amount of change to pools >75 percent full occur just below the proposed LRH Dam to Baker Creek (48.3 percent). Changes to pools below Baker Creek to the Cooper Gage range from 0.0 percent to 6.0 percent (**Exhibit 6**). These differences are based on the length of reach and size of pools within each reach.

3.1.4 Water Quality

LRH is estimated to have a maximum storage capacity of 160,000 AF. At capacity, the surface area of the reservoir would be about 11.9 square miles with a maximum depth of about 90 feet. The firm yield of the project is estimated at approximately 34,050 AF/year with expected annual withdrawals of up to 45,000 AF (Brandes, 2004).

The retention of water upstream of a dam can cause numerous water quality issues for the water stored at the reservoir and also for waters downstream. The period of retention of water is a function of the capacity of the reservoir, the flow of water into and out of the reservoir, and the mixing of the reservoir. The period of retention, design, and operation of the reservoir impacts water temperature, dissolved oxygen levels, and sediment and nutrient transport.

In order to predict potential water quality issues in LRH, water quality data from a similar reservoir within the Sulphur River Basin was reviewed. Jim Chapman Lake is

located in Delta and Hopkins counties approximately 13 miles southeast of the proposed LRH. Similar to LRH, Jim Chapman Lake is located in an area consisting mostly of rural land cover. Jim Chapman Lake is located in the Sulphur River Basin with a storage capacity of approximately 298,930 AF. Due to the proximity of the proposed LRH, Jim Chapman Lake could share similar water quality characteristics to LRH once constructed. **Table 12** includes the 2014 water quality standards for Jim Chapman Lake.

Table 12. Site-Specific Uses and Criteria for Jim Chapman Lake (TCEQ, 2014).

Uses	Recreation	Public Contact Recreation
	Aquatic Life	High
	Domestic Water Supply	Public Water Supply
	Other	-
Criteria	Cl ⁻¹ (mg/L)	50
	SO ₄ ⁻² (mg/L)	50
	TDS (mg/L)	225
	Dissolved Oxygen (mg/L)	5.0
	pH Range (SU)	6.5 - 9.0
	Indicator Bacteria ¹ (#/100ml)	126
	Temperature (°F)	93

Assessment results from TCEQ (2014) for Jim Chapman Lake at Segment 0307 are included in **Table 13**.

Table 13. 2014 Texas Integrated Water Quality Assessment Results, Jim Chapman Lake, Segment 0307, Lower 5,000 Acres Near Dam.

Parameter	# Samples	Mean of Samples	# of Sample Exceeding Criteria	Mean of Samples Exceeding Criteria	Criteria	Sample Sizes	Level of Support
Aquatic Life Use							
DO-Grab Screening Level (mg/L)	9	-	0	-	5.00	LD	NC
DO-Grab Min (mg/L)	9	-	0	-	3.00	LD	NC
Recreation Use							
Bacteria*	6	2.42	0	-	126.00	LD	NC
General Use							
Water Temp (°C)	9	-	0	-	33.90	LD	NC
High pH (SU)	9	-	1	8.6	8.50	LD	NS
Low pH (SU)	9	-	0	-	6.00	LD	NC
Total Phosphorus (mg/L)	8	-	0	-	0.20	LD	NC
Chlorophyll- <i>a</i> (µg/L)	9	-	2	32.9	26.70	LD	NC
Ammonia (mg/L)	9	-	1	0.17	0.11	LD	NC
Nitrate (mg/L)	8	-	2	0.69	0.37	LD	NC
Public Water Supply Use							
Nitrate	46	0.21	0	-	10.00	AD	FS
Fluoride	48	0.15	0	-	4.00	AD	FS

* E. Coli

AD – Adequate Data; LD – Limited Data; NC – No Concern; FS – Fully Supporting; CS – Screening Level Concern; NS - Nonsupport

TCEQ (2014) indicates most parameters assessed fully support the use or are no concern. TCEQ (2014) issued a nonsupport for high pH based on a reading above the standard and other information used for the report. Lake Jim Chapman was first placed on the Section 303(d) list for pH in 2000 and is included in the 2014 list. The segment is categorized as a “5C” meaning additional data or information will be collected and/or evaluated before a management strategy is selected. TCEQ lists a potential source for this impairment as a nonpoint source.

LRH may experience similar water quality characteristics as Lake Jim Chapman. Other than elevated pH, no other water quality issues are associated with Lake Jim Chapman. No other activities within the basin were identified as potential sources of pollutants to the proposed LRH.

Post-project estimated pollutant loads were calculated at the proposed LRH dam site location and downstream site using similar methods described in **Section 2.2.3**. In addition, estimated 50-percentile flows from the WAM model were used to calculate estimated pollutant concentrations at both locations (**Table 12** and **Table 13**). Calculations indicate lower pollutant concentrations at the proposed LRH dam site due to a decrease of overland runoff area as a result of the construction of LRH. The

downstream site calculations indicate a slight increase in pollutant concentrations due to decreased flow as a result of LRH. The WAM model calculated average monthly flows at the downstream site with and without LRH. Flows at the downstream site without LRH are estimated to be 33,876 AF/month while flows with LRH decrease to 32,715 AF/month.

Table 14. Loading and Concentrations at Dam Site Post-Project.

Pollutant	Load (Pounds)			Concentration (mg/L)	
	1-Year Storm	2-Year Storm	Annual Rainfall	With LRH	Without LRH
TSS	1,533,567	1,909,624	6,041,414	118.37	133.50
Lead	657	818	2,589	0.05	0.06
Zinc	4,272	5,320	16,830	0.33	0.37
Kjeldahl Nitrogen	21,141	26,326	83,285	1.63	1.84
Nitrite / Nitrate	11,896	14,813	46,864	0.92	1.04
Total Phosphorus	2,651	3,301	10,443	0.20	0.23
Soluble Phosphorus	570	709	2,244	0.04	0.05

Table 15. Loading and Concentration at River Site Post-Project.

Pollutant	Load (Pounds)			Concentration (mg/L)	
	1-Year Storm	2-Year Storm	Annual Rainfall	With LRH	Without LRH
TSS	24,131,018	30,450,258	110,317,189	103.34	100.49
Lead	10,342	13,050	47,279	0.04	0.04
Zinc	67,222	84,826	307,312	0.29	0.28
Kjeldahl Nitrogen	332,663	419,779	1,520,801	1.42	1.39
Nitrite / Nitrate	187,188	236,207	855,746	0.80	0.78
Total Phosphorus	41,712	52,635	190,691	0.18	0.17
Soluble Phosphorus	8,963	11,310	40,975	0.04	0.04

3.1.5 Aquatic Organisms

As described in Section 2.2.4, aquatic organisms occupy pools within the North Sulphur River channel downstream from the proposed LRH Dam location. The aquatic biological community within these pools is dependent on water quality conditions and available habitat within each pool. Changes in water levels within stream pools can lead to changes in water quality including changes in pH, dissolved oxygen, conductivity, siltation level, and concentrations of ions, toxins, or pollutants (Williams, 1987; Stanely et al., 1994; Lake, 2000). These changes affect the composition and interactions of the macroinvertebrate communities within stream pools. Taxa can vary seasonally within pools as flow velocities and water levels change in intermittent streams. In addition, water quality in adjacent pools within the same reach can vary substantially in nutrient concentrations and dissolved oxygen levels as water levels decrease. As water quality within a stream pool changes, the macroinvertebrate community changes and adapts to conditions within the pool. In addition, other factors such as species competition, and predators such as fish, amphibians, and birds can affect the abundance, density, and taxonomic

composition of the macroinvertebrate community (Xerces Society for Invertebrate Conservation, n.d.).

In order to provide a conservative estimate of impacts to aquatic organisms within North Sulphur River pools, model calculations for pools >75 full were used. This method assumes aquatic organisms are impacted in pools experiencing decreasing levels from 100 percent full to 75 percent full.

Biological sampling conducted by APAI indicated the presence of opportunistic invertebrates sustained by pools within the river channel. These pools ranged in depth from 5 centimeters to 22 centimeters. The majority of organisms sampled are tolerant to poor water quality and low dissolved oxygen levels. Based on the biological sampling effort conducted, it is assumed similar aquatic organisms occupy pools downstream of the proposed LRH Dam location. Therefore, similar aquatic organisms would be impacted in downstream pools experiencing decreasing flows and water levels.

According to the DiNatale (2016b) Daily Excel Model, the majority of impacts to pools >75 percent full in the North Sulphur River would occur between the LRH Dam site and Baker Creek (**Table 11**). Pools in reaches below Baker Creek would experience lower levels of change ranging from 0.0 percent to 6.0 percent (**Exhibit 6**). It is anticipated impacts to aquatic organisms in pools with decreasing levels would occur between the proposed LRH dam and the Cooper Gage. Both the RiverWare Model and WAM Model indicated almost no change to reaches below the Cooper Gage.

3.2 Groundwater

Groundwater aquifers at the LRH site area are much deeper than the North Sulphur River channel. In addition, the river channel is primarily comprised of shale bedrock that impedes vertical flow to lower aquifers. Therefore, the potential for the project to impact groundwater in the LRH site area is minimal. Downstream locations near Lake Wright Patman may have increased groundwater interaction. However, due to the minimal differences in flow to LRH, changes to the surface-groundwater interaction would be small or negligible.

4.0 Conclusion

MEI completed a geomorphic and sedimentation study of the proposed LRH. The study concluded channelization-induced degradation and widening of the North Sulphur River and its principal tributaries upstream of the dam site has resulted in the erosion of approximately 28 million tons of sediment since the late 1920s. The study also concluded erosion would continue without the proposed LRH with channel depths increasing 8 feet and channel bottom widths increasing 16 feet over a 50-year period. Without the proposed LRH, sediment yield at the proposed dam site location would range from 86 AF to 217 AF. With the proposed LRH, sediment yield at the proposed dam site would range from 51 AF to 74 AF resulting in a 1.6 percent to 2.3 percent loss of storage capacity over a 50-year period. No adverse downstream

impacts on channel morphology or capacity are expected as a result of the sediment trapping in the reservoir, or operation of the reservoir (MEI, 2006).

According to TCEQ (2014), water quality within the North Sulphur River meets water quality standards and is not included on the 2014 Section 303(d) List. Period of retention, design, and operation of the reservoir impacts water temperature, dissolved oxygen levels, and sediment and nutrient transport. Pollutant loading and concentration calculations indicate a slight increase of 2.83 percent in pollutant concentrations at the downstream site. The increase in pollutant concentrations are a result of lower flows at the downstream site due to the construction of LRH.

A daily Excel model was used to estimate potential impacts to pools >75 percent full downstream of the proposed LRH Dam. The results of the model indicate varying changes to pools >75 percent full in the North Sulphur River between the proposed LRH dam and the Cooper Gage. The reach extending from the proposed LRH Dam to Baker Creek would experience the largest amount of change to pools >75 percent full (**Exhibit 6**). As a result, the largest impacts to aquatic organisms would occur in the reach just below the LRH Dam. A portion of this reach would be completed filled to construct the proposed dam and is the area subject to the greatest hydrologic modification. The USACE considers such effects a complete loss. Lower impacts would occur further downstream at varying levels to the Cooper Gage. Based on the May 2006 sampling event, the majority of aquatic organisms would include Chironomidae, Caenidae, Cladocera, and Corixidae.

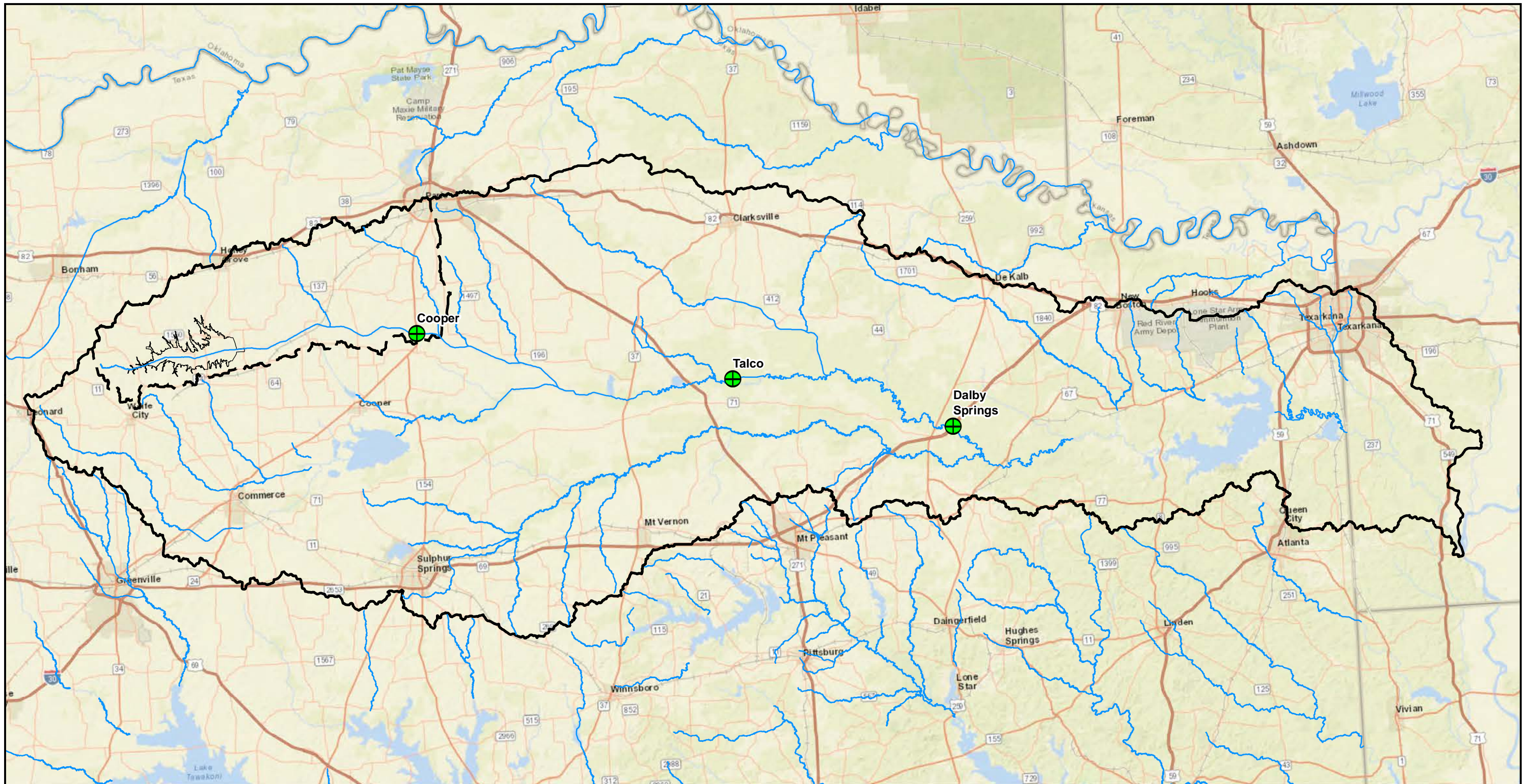
Groundwater aquifers at the proposed LRH study area are not anticipated to be impacted due to the depth of the groundwater aquifers. In addition, the river channel is comprised of shale bedrock impeding vertical flow to lower aquifers.

5.0 References





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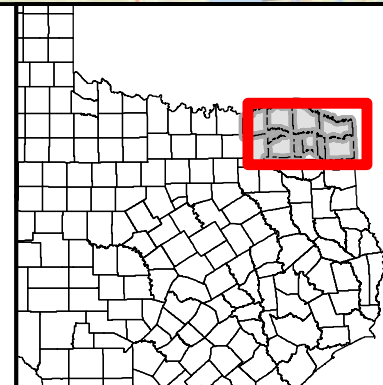
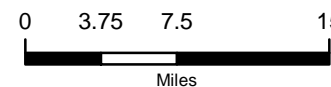
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Legend

-  LRH Proposed Site Area
-  USGS Stream Gages
-  North Sulphur River Watershed
-  Sulphur River Basin

Sources: Study Team 2016; USGS 2016

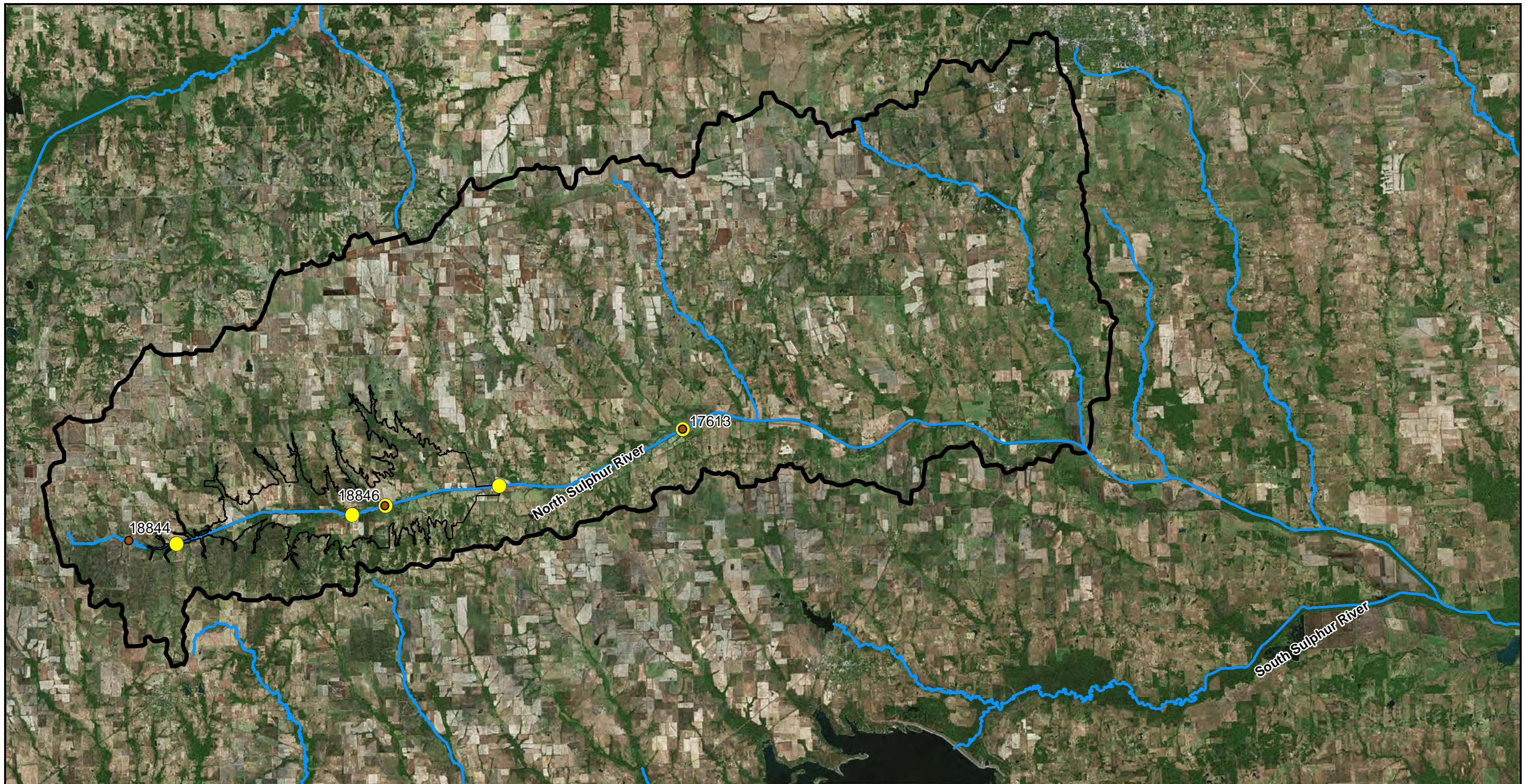


LAKE RALPH HALL STUDY AREA

Exhibit 1

Lake Ralph Hall

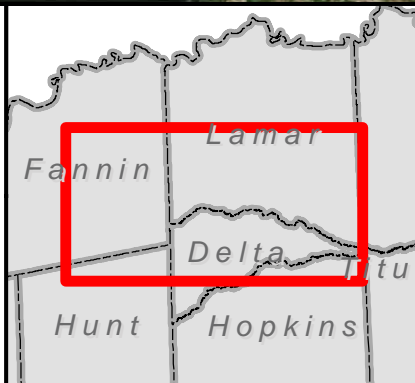
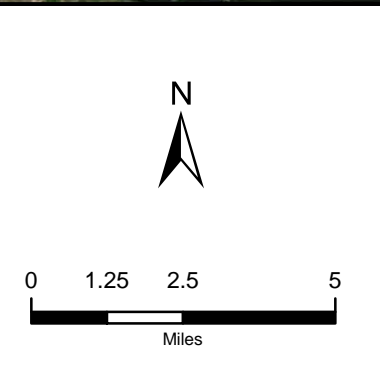
Fannin County



Legend

- LRH Proposed Site Area
- North Sulphur River Watershed
- APAI Biological Sampling Sites
- TCEQ Stations

Sources: Study Team 2016; USGS 2016



NORTH SULPHUR RIVER WATERSHED

Exhibit 2

Lake Ralph Hall

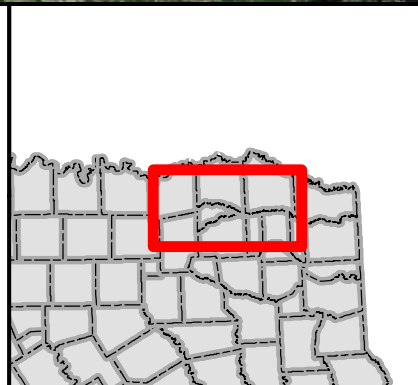
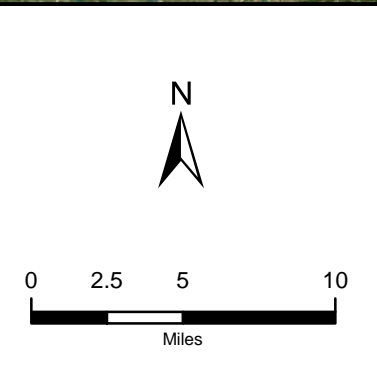
Fannin County



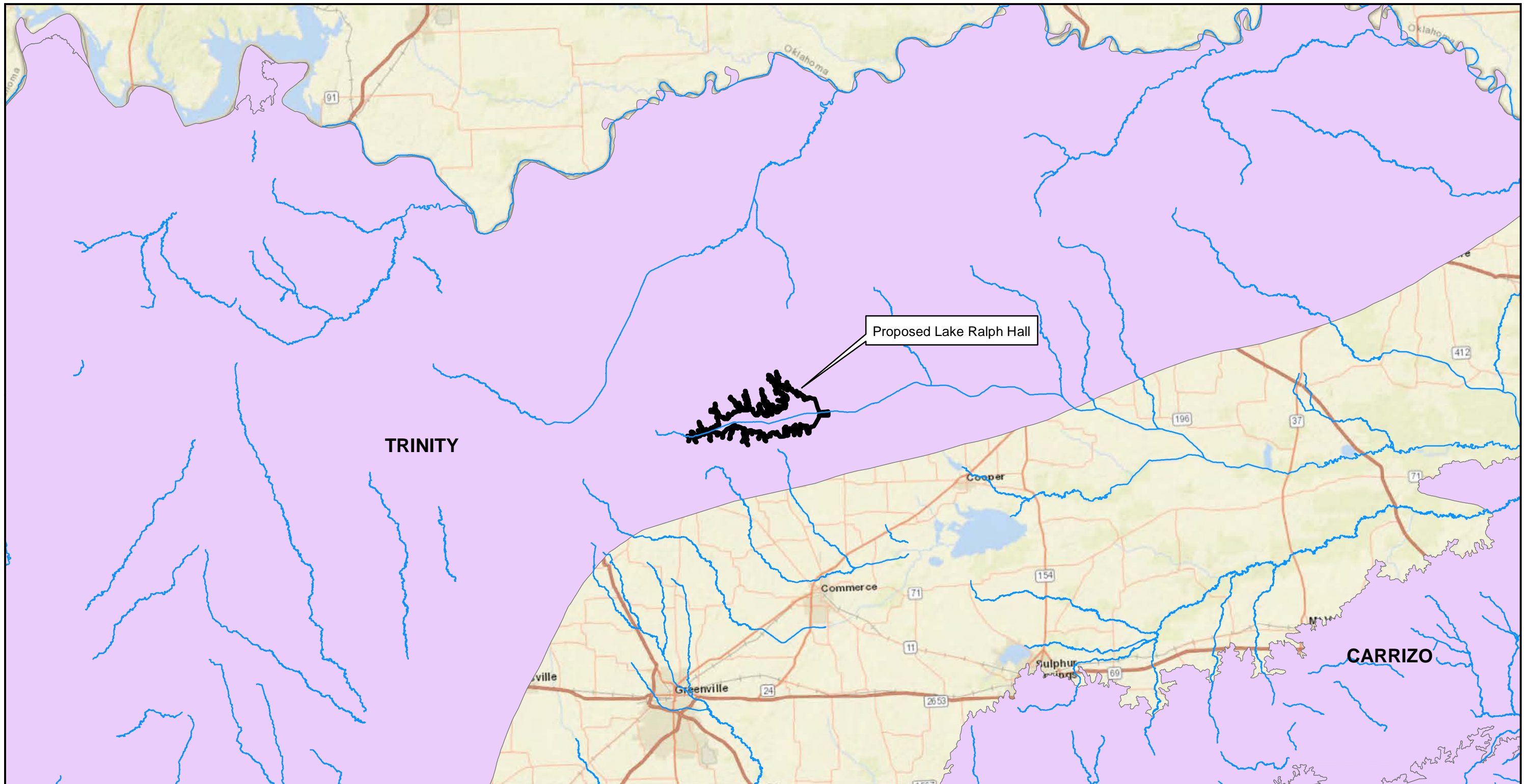
Legend

- LRH Proposed Site Area
- LRH Drainage Area
- Sulphur River Drainage Area

Sources: Study Team 2016; USGS 2016



**LAKE RALPH HALL AND SULPHUR RIVER
DRAINAGE AREAS**
Exhibit 3
Lake Ralph Hall





Proposed Lake Ralph Hall

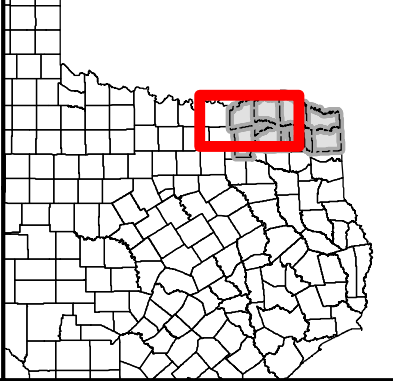
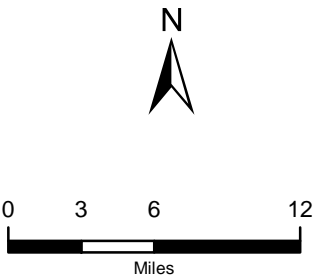
TRINITY

CARRIZO

Legend

-  LRH Proposed Site Area
-  Major Aquifers

Sources: Study Team 2016; USGS 2016



LAKE RALPH HALL AND MAJOR AQUIFERS

Exhibit 4

Lake Ralph Hall

Fannin County