APPENDICES

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Appendix A

2040 RTP and 2015–2018 TIP

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CORRIDOR-BASED MAJOR INVESTMENTS

MPOID	CSJ	County	Facility	From	To	Description	Length (mi)	Main Lanes	Fronatage Lanes	Fiscal Year	Analysis Year	Total Project Cost (M, YOE)
BW 8												
14226	3256-01-089	Harris	BW 8	SH 288	IH 45 S	WIDEN FROM 4 TO 8 MAIN LANES IN SECTIONS	11.50	(4,8)	(3,3)	2015	2018	$ 200.00
14229	3256-04-070	Harris	BW 8	SH 225	IH 45	WIDEN FROM 4 TO 8-MAIN LANES IN SECTIONS	9.00	(4,8)	(3,3)	2017	2025	$ 200.00
16296		Harris	BW 8	IH 10	SH 225	WIDEN FROM 4 TO 8-LANES INCLUDING BRIDGE ACROSS HOUSTON SHIP CHANNEL	5.00	(4,8)	(4,4)	2016	2018	$ 175.00
16297		Harris	BW 8	US 59	US 90	WIDEN FROM 6 TO 8-LANES	12.00	(6,8)	(4,4)	2030	2035	$ 30.00
15573	*3256-02-089*	*Harris*	*BW 8*	*IH 45 N*	*US 59 N*	*ADD AUXILIARY LANES AND WIDEN BRIDGES*	*7.10*	*(6,6)*	*(4,4)*	*2015*	*NRS (2018)*	*$ 21.54*
DOWNTOWN LOOP												
15436	*0500-03-571*	*Harris*	*IH 45 S*	*ALLEN PARKWAY*	*JEFFERSON AVE*	*RECONFIGURE EXISTING ALLEN PARKWAY SOUTHBOUND ENTRANCE RAMP*	*1.88*	*(6,6)*	*(4,4)*	*2015*	*EREA (2018)*	*$ 8.91*
15574	*0500-03-572*	*Harris*	*IH 45 S*	*US 59*	*SP 5*	*INTERCHANGE RECONFIGURATION INCLUDING CONSTRUCTION OF ENTRANCE AND EXIT RAMPS, REPLACEMENT OF EXISTING US 59 NB AND SB DIRECT CONNECTORS*	*1.85*	*n/a*	*n/a*	*2015*	*EREA (2018)*	*$ 35.40*
GPW												
257	3510-02-001	Brazoria	SH 99	SH 288	GALVESTON C/L	SEG B: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE ROADS	20.09	(0,4)	(0,4)	2020	2025	$ 690.80
258	3510-02-002	Brazoria	SH 99	SH 288	FORT BEND C/L	CONSTRUCT 4-LANE TOLLWAY WITH LIMITED 2 2-LANE FRONTAGE ROADS AND INTERCHANGES	8.80	(0,4)	(0,4)	2024	2035	$ 245.40
14246	3510-02-004	Brazoria	SH 99	AT SH 288		CONSTRUCT 4 DIRECT CONNECTORS (TOLL)	0.50	n/a	n/a	2024	2035	$ 74.90
14248	3187-02-010	Chambers	SH 99	AT IH 10 E		CONSTRUCT 4 DIRECT CONNECTORS (TOLL)	0.50	n/a	n/a	2020	2025	$ 80.80
16235	3187-02-011	Chambers	SH 99	HARRIS C/L	FM 1405	SEG I-2: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES	2.06	(0,4)	n/a	2015	2018	$ 36.40
259	3510-10-001	Chambers	SH 99	LIBERTY C/L	IH 10 E	SEG I-1: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE ROADS	5.50	(0,4)	(0,4)	2016	2018	$ 189.30
15493	3510-10-901	Chambers	SH 99	0.66 MI N OF FISHER RD	0.62 MI W OF FISHER RD	SEG I-2: CONSTRUCT 4 LANE TOLLWAY OVERPASS (TOLL)	1.28	(0,4)	(4,4)	2015	2018	$ 23.50

Projects shaded in GRAY are exempt from or are not considered regionally significant under H-GAC regional emissions analysis.

CORRIDOR-BASED MAJOR INVESTMENTS

MPOID	CSJ	County	Facility	From	To	Description	Length (mi)	Main Lanes	Fronatage Lanes	Fiscal Year	Analysis Year	Total Project Cost (M, YOE)
GPW (CONT'D)												
15594		Chambers	SH 99	IH 10 E	FM 1405	SEG I-2: CONSTRUCT OVERPASSES AND ASSOCIATED APPROACHES (TOLL)	6.84	(0,4)	(4,4)	2030	2035	$ 78.00
266	3510-03-001	Fort Bend	SH 99	FM 762	BRAZORIA C/L	CONSTRUCT 4-LANE TOLLWAY WITH LIMITED 2 2-LANE FRONTAGE ROADS AND INTERCHANGES	10.37	(0,4)	(0,4)	2024	2035	$ 279.80
10128	3510-03-002	Fort Bend	SH 99	US 59	FM 762	CONSTRUCT 4-LANE TOLLWAY WITH LIMITED 2 2-LANE FRONTAGE ROADS AND INTERCHANGES	7.39	(0,4)	(0,4)	2024	2035	$ 217.60
283	3510-01-001	Galveston	SH 99	IH 45 S	BRAZORIA C/L	SEG B: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE RDS	8.38	(0,4)	(0,4)	2020	2025	$ 231.50
14249	3510-01-900	Galveston	SH 99	AT IH 45 S		CONSTRUCT 4 DIRECT CONNECTORS (TOLL)	0.75	n/a	n/a	2020	2025	$ 80.80
14264	3187-01-009	Harris	SH 99	BS 146 W	SH 146	SEG I-2: CONSTRUCT 4-LANE TOLL WAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE ROADS	3.02	(4,4)	(0,4)	2016	2018	$ 108.00
16236	3187-01-011	Harris	SH 99	BS 146 E	CHAMBERS C/L	SEG I-2: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES	0.83	(0,4)	n/a	2015	2018	$ 30.70
315	3510-08-001	Harris	SH 99	MONTGOMERY C/L	LIBERTY C/L	SEG H: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE ROADS	1.90	(0,4)	(0,4)	2016	2018	$ 40.70
353	3510-09-001	Liberty	SH 99	US 90	CHAMBERS C/L	SEG I-1: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE ROADS	10.18	(0,4)	(0,4)	2016	2018	$ 323.50
10122	3510-09-002	Liberty	SH 99	HARRIS C/L	US 90	SEG H: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE ROADS	13.80	(0,4)	(0,4)	2016	2018	$ 284.71
367	3510-07-003	Montgomery	SH 99	US 59 N	HARRIS C/L	SEG H: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE ROADS	6.85	(0,4)	(0,4)	2016	2018	$ 114.60
15589		*Brazoria*	*SH 99*	*AT SH 288*		*CONSTRUCT 4 DIRECT CONNECTORS (TOLL)*	*0.75*	*n/a*	*n/a*	*2030*	*EREA (2035)*	*$ 104.00*
15593		*Chambers*	*SH 99*	*AT IH 10 E*		*CONSTRUCT 4 DIRECT CONNECTORS (TOLL)*	*0.75*	*n/a*	*n/a*	*2030*	*EREA (2035)*	*$ 104.00*
14247	*3510-03-004*	*Fort Bend*	*SH 99*	*AT US 59 S*		*CONSTRUCT 4 DIRECT CONNECTORS (TOLL)*	*0.75*	*n/a*	*n/a*	*2030*	*EREA (2035)*	*$ 104.00*

Projects shaded in GRAY are exempt from or are not considered regionally significant under H-GAC regional emissions analysis.

CORRIDOR-BASED MAJOR INVESTMENTS

MPOID	CSJ	County	Facility	From	To	Description	Length (mi)	Main Lanes	Fronatage Lanes	Fiscal Year	Analysis Year	Total Project Cost (M, YOE)
GPW (CONT'D)												
14239	*3510-04-039*	*Fort Bend*	*SH 99*	*AT FM 1093/WESTPARK TOLLWAY*		*CONSTRUCT 2 DIRECT CONNECTORS (TOLL) (WB-NB, NB-EB)*	*0.75*	*n/a*	*n/a*	*2018*	*EREA (2025)*	*$ 38.40*
11378	*3510-04-906*	*Fort Bend*	*SH 99*	*AT FM 1093 (WESTPARK TOLLWAY) INTERCHANGE*		*CONSTRUCT 4 DIRECT CONNECTORS (TOLL) (SB-WB,WB-SB,NB-WB,EB-SB)*	*0.75*	*n/a*	*n/a*	*2019*	*EREA (2025)*	*$ 78.80*
14242	*3510-06-007*	*Harris*	*SH 99*	*AT SH 249*		*CONSTRUCT 4 DIRECT CONNECTORS (TOLL)*	*0.50*	*n/a*	*n/a*	*2025*	*EREA (2035)*	*$ 72.00*
14243	*3510-06-008*	*Harris*	*SH 99*	*AT IH 45 N*		*CONSTRUCT 2 DIRECT CONNECTORS (TOLL)*	*0.75*	*n/a*	*n/a*	*2025*	*EREA (2035)*	*$ 45.20*
15590		*Harris*	*SH 99*	*AT SH 249*		*CONSTRUCT 4 DIRECT CONNECTORS (TOLL)*	*0.75*	*n/a*	*n/a*	*2030*	*EREA (2035)*	*$ 76.00*
15591		*Harris*	*SH 99*	*AT IH 45 N*		*CONSTRUCT 4 DIRECT CONNECTORS (TOLL)*	*0.75*	*n/a*	*n/a*	*2030*	*EREA (2035)*	*$ 76.00*
14244	*3510-07-005*	*Montgomery*	*SH 99*	*AT US 59 N*		*CONSTRUCT 2 DIRECT CONNECTORS (TOLL)*	*0.75*	*n/a*	*n/a*	*2025*	*EREA (2035)*	*$ 45.20*
15592		*Montgomery*	*SH 99*	*AT US 59 N*		*CONSTRUCT 4 DIRECT CONNECTORS (TOLL)*	*0.75*	*n/a*	*n/a*	*2030*	*EREA (2035)*	*$ 76.00*
IH 10E												
201	0739-01-039	Chambers	IH 10 E	SH 73, EAST	JEFFERSON C/L	WIDEN EXISTING FOUR LANE TO SIX LANE	2.87	(4,6)	(4,4)	2016	2018	$ 33.41
IH 10W												
14738	1258-02-034	Fort Bend	FM 1093	JAMES LN	FM 1093/FM 359	WIDEN TO 4 LANES ARTERIAL, NON-TOLL	0.47	(2,4)	n/a	2016	2018	$ 3.73
14739	1258-03-042	Fort Bend	FM 1093	W. OF KATY GASTON RD	SH 99	CONSTRUCT 4 TOLL LANES WITH TWO 2-LANE FRONTAGE ROADS	1.38	(2,4)	(0,4)	2015	2018	$ 39.54
487	1258-03-043	Fort Bend	FM 1093	FM 1463/FM 359	W OF KATY GASTON RD	CONSTRUCT TWO 2-LN FRONTAGE RDS WITH PARTIAL 4 TOLL LANES FROM W OF SPRING GREEN TO W OF KATY-GASTON	2.75	(2,4)	(0,4)	2015	2018	$ 43.73
16193	1258-03-044	Fort Bend	FM 1093	FM 1463/FM 359	2400' E OF FM 1463/FM 359	CONSTRUCT TWO 2-LANE FRONTAGE ROADS (TRANSITION)	0.45	(2,0)	(0,4)	2015	2018	$ 4.84
16192	1258-03-045	Fort Bend	FM 1093	FM 1463/FM 359	W OF FM 723	CONSTRUCT 4 TOLL LANES	1.34	(0,4)	(4,4)	2020	2025	$ 15.21

Projects shaded in GRAY are exempt from or are not considered regionally significant under H-GAC regional emissions analysis.

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HOUSTON-GALVESTON MPO
APPENDIX D
2035 RTP UPDATE - PROJECTS UNDERGOING ENVIRONMENTAL ASSESSMENT

MPOID [CSJ] SPONSOR	FACILITY FROM TO	DESCRIPTION	FISCAL YEAR LENGTH TOTAL PROJECT COST
Brazoria County Projects			
13767 **[0598-02-093]** BRAZORIA COUNTY	**SH 288** CR 58 SH 99	CONSTRUCT 4 TOLL LANES WITH GRADE SEPARATIONS	2032 8.23 $261,000,000
253 **[0188-03-019]** TXDOT HOUSTON DISTRICT	**SH 36** FORT BEND C/L TO N OF WEST COLUMBIA S OF NEW SH 35 TO EXISTING SH 35	WIDEN TO 4-LANE DIVIDED RURAL	2028 9.045 $103,923,748
255 **[0188-05-027]** TXDOT HOUSTON DISTRICT	**SH 36** S OF CR 310 IN CITY OF BRAZORIA S OF JONES CREEK BRIDGE	WIDEN TO 4-LANE DIVIDED WITH GRADE SEPARATION AT FM 2004	2028 9.644 $66,244,748
15589 TXDOT HOUSTON DISTRICT	**SH 99** AT SH 288	CONSTRUCT 4 DIRECT CONNECTORS (TOLL)	2030 0.75 $104,000,000
257 **[3510-02-001]** BRAZORIA COUNTY	**SH 99** SH 288 GALVESTON C/L	SEG B: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE ROADS	2020 20.09 $690,800,000
11599 CITY OF ANGLETON	**SHANKS RD** CEMENTARY RD SH 288B/AIRPORT RD	RECONSTRUCT TO 3-LANE URBAN SECTION	2020 1.8 $6,839,048
11641 CITY OF PEARLAND	**VETERANS DR** BAILEY RD HASTINGS CANNON RD	WIDEN FROM 2 TO 4 LANES DIVIDED CURB AND GUTTER	2020 4 $45,725,105

Sorted by: Street, CSJ Number, then MPOID

HOUSTON-GALVESTON MPO
APPENDIX D
2035 RTP UPDATE - PROJECTS UNDERGOING ENVIRONMENTAL ASSESSMENT

MPOID [CSJ] SPONSOR	FACILITY FROM TO	DESCRIPTION	FISCAL YEAR LENGTH TOTAL PROJECT COST
Galveston County Projects			
5056 **[0976-07-006]** CITY OF LEAGUE CITY	**SH 96** 0.26 MI E OF IH 45 FM 1266	CONSTRUCT HIKE/BIKE TRAIL ALONG SH 96	2021 4.75 $1,074,721
283 **[3510-01-001]** GALVESTON COUNTY	**SH 99** IH 45 S BRAZORIA C/L	SEG B: CONSTRUCT 4-LANE TOLLWAY WITH INTERCHANGES AND TWO NON-CONTINUOUS 2-LANE FRONTAGE RDS	2020 8.38 $231,500,000
14249 **[3510-01-900]** GALVESTON COUNTY	**SH 99** AT IH 45 S	CONSTRUCT 4 DIRECT CONNECTORS (TOLL)	2020 0.75 $80,800,000
9409 GULF COAST CENTER	**TEXAS CITY/LA MARQUE UZA** VA V	OPERATING ASSISTANCE FOR NEW FIXED ROUTE BUS SERVICE IN TEXAS CITY	2023 0 $488,988
9410 GULF COAST CENTER	**TEXAS CITY/LA MARQUE UZA** VA VA	OPERATING ASSISTANCE FOR NEW FIXED RT BUS SVC IN TEXAS CITY	2023 0 $537,282
9412 GULF COAST CENTER	**TEXAS CITY/LA MARQUE UZA** VA VA	LEASING VEHICLES TO PROVIDE NEW FIXED ROUTE SERVICE IN TEXAS CITY	2023 0.001 $261,007
16224 CITY OF GALVESTON	**UTMB MAIN CAMPUS** VA VA	STREETSCAPE ENHANCEMENTS AND PEDESTRIAN FACILITIES TO FACILITATE ACCESS TO TRANSIT ON THE UTMB MEDICAL CAMPUS IN GALVESTON, TEXAS. INCLUDES EXTENSION OF CAMPUS PEDESTRIAN MALL AND UPGRADE OF ADJACENT HIGH-UTILIZATION ISLAND TRANSIT STOP.	2019 0.001 $2,400,000
16223 GULF COAST CENTER	**UTMB VICTORY LAKES CAMPUS** VA VA	PEDESTRIAN AND TRANSIT INFRASTRUCTURE IMPROVEMENTS (SIDEWALKS, WHEELCHAIR RAMPS, CROSSWALKS, LIGHTING, BUS STOPS, ETC.) ALONG VARIOUS CORRIDORS ON THE UNIVERSITY OF TEXAS MEDICAL BRANCH (UTMB) VICTORY LAKES MEDICAL CAMPUS IN LEAGUE CITY, TX.	2019 0.001 $3,400,000

Appendix B

Soils and Prime Farmland Found Within the Proposed SH 99 Segment B Study Area and NRCS-CPA-106 Form

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APPENDIX B

Soils within the Preferred Alternative ROW			
Soil Type	**Description**	**Hydric Category**	**Prime Farmland**
Aris fine sandy loam (Ar - 1) Galveston and Brazoria Counties	This is a nearly level, somewhat poorly drained, non-saline, loamy soil that has clayey subsoil and is located on uplands. The slopes average about 0.3 percent. The soil is very slowly permeable, the surface runoff is slow, the soil is rarely flooded, and a high water table is within two feet of the surface during most of the winter months.	Predominantly Non-hydric	Yes, if Drained
Bacliff clay (Ba-6) Galveston and Brazoria County	This is a nearly level, poorly drained, non-saline, clayey soil that has clayey subsoil and is located on uplands. The slopes average 0.1 percent. This soil is very slowly permeable, surface runoff is very slow, soil is rarely flooded, and a high water table is within one foot of the surface during most of the winter.	Predominantly hydric	Yes, if Drained
Bernard clay loam (Be – 7) Galveston and Brazoria Counties	This soil is a nearly level, non-saline soil with slopes averaging about 0.2 percent. This soil is somewhat poorly drained, surface runoff and permeability are very slow and the water table is above a depth of three feet during winter.	Predominantly Non-hydric	Yes
Bernard-Edna complex(Bn – 8)Galveston and Brazoria Counties	This complex consists of nearly level, non-saline soils. The surface is mainly plane and has many distinct knolls or pimple mounds. Slopes average about 0.2 percent. The soils in this complex are somewhat poorly drained to poorly drained, surface runoff and permeability are very slow. The Bernard soil has a water table above a depth of about 3 feet in winter and the Edna has a perched water table above a depth of 1.5 feet. Under unusual weather conditions some areas are flooded.	Predominantly Non-hydric	Yes
Edna-Aris complex (Es – 15) Galveston and Brazoria Counties	This complex consists of nearly level, somewhat poorly drained and poorly drained, non-saline, loamy soils that have clayey subsoil and are located on uplands. This map unit is generally associated with old stream meander systems. Although the overall surface is plane, it has many distinctive knolls and pimple mounds. The slopes average about 0.3 percent. Edna soil makes up 45 to 70 percent of the map unit. Aris soil makes up 15 to 40 percent. The soils in this complex are very slowly permeable and surface runoff is very slow. These soils are rarely flooded. In unleveled areas, a perched water table is within one-foot of the surface during most of the winter in the intermound areas and is within 1.5 feet of the surface in the mounds areas. In leveled areas, a perched water table is within one foot of the surface during most of the winter. For most urban uses, the main limitations are wetness, high shrink-swell potential, and the uneven topography of the soils.	Predominantly Non-hydric	Not Prime Farmland

Soils within the Preferred Alternative ROW			
Soil Type	**Description**	**Hydric Category**	**Prime Farmland**
Edna fine sandy loam 0 to 1% slopes (13) Brazoria County	This is a nearly level, poorly drained, non-saline, loamy soil that has clayey subsoil and is located on uplands. The slopes average about 0.2 percent. This soil is very slowly permeable and surface runoff is very slow. This soil is rarely flooded. The high water table is within 1.5 feet of the surface during most of the winter. For most urban uses, the main limitations are wetness and high shrink-swell potential of the soil.	Predominantly Non-hydric	No
Lake Charles clay, 0 to 1% slopes (LaA – 24) Galveston and Brazoria Counties	This is a nearly level, somewhat poorly drained, non-saline clayey soil that has clayey subsoil and is located on broad uplands. The slopes average about 0.1 percent. This soil is slowly permeable and the surface runoff is very slow. This soil is rarely flooded. During most of the winter, a high water table is within a depth of 1.5 feet. For most urban uses, the main limitations are wetness, clayey texture, and high shrink-swell potential of the soil.	Galveston; Non-hydric, Brazoria; Predominantly Non-hydric	Yes
Leton-Aris complex (Ls – 28) Galveston and Brazoria Counties	This complex consists of nearly level, poorly drained and somewhat poorly drained, non-saline, loamy soils that have loamy and clayey subsoil. These soils are located on uplands. This complex consists of circular to oblong depressional areas and of circular mounds or knolls. The overall slopes average about 0.3 percent. Leton soil makes up 30 to 50 percent of the map unit. Aris soil makes up 30 to 40 percent. Leton soil is slowly permeable above the high water table. The surface runoff is very slow to ponded. Aris soil is very slowly permeable and the surface runoff is very slow. These soils are rarely flooded. For most urban uses, the main limitations are wetness, shrink-swell potential, and the uneven topography of the soils.	Partially Hydric	Yes, if Drained
Leton loam (Le – 27) Galveston and Brazoria Counties	This is a nearly level, poorly drained, non-saline, loamy soil that has loamy subsoil. It is in old stream meanders and depressional areas on uplands. The slopes average about 0.3 percent. This soil is slowly permeable above the high water table. The surface runoff is very slow, or the soil is ponded. This soil is occasionally flooded. For most urban uses, the main limitation is wetness. Flooding is a hazard.	Predominantly Hydric	Yes, if Drained
Morey silt loam, 0 to 1% slopes Me) Galveston County	This is a nearly level, poorly drained, non-saline, loamy soil that has loamy subsoil and is located on uplands. This map unit typically contains a few circular pimple mounds and the slopes average about 0.3 percent. This soil is slowly permeable above the high water table. The surface runoff is very slow. This soil is rarely flooded. The high water table is within two feet of the surface during most of the winter. For most urban uses, the main limitations are wetness and clayey texture of the soil.	Predominantly Non-hydric	Yes, if Drained

Soils within the Preferred Alternative ROW			
Soil Type	**Description**	**Hydric Category**	**Prime Farmland**
Verland silty clay loam (Ve) Galveston County	This is a nearly level, somewhat poorly drained, non-saline, loamy soil that has clayey subsoil and is located on uplands. The slopes average about 0.3 percent. This soil is very slowly permeable and the surface runoff is very slow. This soil is rarely flooded. It has a high water table within 1.5 feet of the surface during most of the winter. For most urban uses, the main limitations are wetness and high shrink-swell potential of the soil.	Predominantly Non-hydric	No

Source: U.S. Department of Agriculture: Natural Resources Conservations Service Web Soil Survey for Brazoria and Galveston Counties, February 13, 2014

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USDA
United States Department of Agriculture

Natural Resources
Conservation Service

State Office

101 S. Main Street
Temple, TX 76501
Voice 254.742.9800
Fax 254.742.9819

June 1, 2015

Texas Department of Transportation
Post Office Box 1386
Houston, Texas 77251

Attention: Pat Henry

Subject: LNU-Farmland Protection
Proposed SH 99 Segment B
Brazoria and Galveston Counties, Texas

We have reviewed the information provided in your correspondence dated April 28, 2015 concerning the new highway location project in Brazoria and Galveston Counties, Texas. This review is part of the National Environmental Policy Act (NEPA) evaluation for Federal Highway Administration (FHWA). We have evaluated the proposed site as required by the Farmland Protection Policy Act (FPPA).

The proposed project does contain soils classified as Important Farmland Soils. We have completed Parts II, IV, and V of the Farmland Conversion Impact Rating for Corridor Type Projects (CPA-106). The combined rating of the site is 174. The FPPA law states that sites with a rating greater than 160 will need further consideration. We recommend your company find another area that either will not convert prime farmland or converts less prime farmland.

To meet reporting requirements of section 1546 of the Act, 7 U.S.C 4207, and for data collection purposes, after your agency has made a final decision on a project in which one or more of the alternative sites contain farmland subject to the FPPA, NRCS is requesting a return copy of the Form CPA-106, which indicates the final decision. We urge you to use accepted erosion control methods during all phases of construction.

If you have any questions, please contact me at (254) 742-9826, Fax (254) 742-9859 or by email at micki.yoder@tx.usda.gov.

Sincerely,

Micki Yoder

Micki Yoder
NRCS Soil Conservationist

Attachment

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*	3. Date of Land Evaluation Request 4/28/15	4. Sheet 1 of 1
1. Name of Project **SH 99 Segment B**	5. Federal Agency Involved **FHWA**	
2. Type of Project **New Location Highway**	6. County and State **Brazoria and Galveston Counties, Texas**	
PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS 5/4/15	2. Person Completing Form Micki Yoder
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES ☑ NO ☐		4. Acres Irrigated 20,439 / Average Farm Size 204
5. Major Crop(s)	6. Farmable Land in Government Jurisdiction Acres: 739,131 % 78	7. Amount of Farmland As Defined in FPPA Acres: 695,366 % 73
8. Name Of Land Evaluation System Used **LESA**	9. Name of Local Site Assessment System **n/a**	10. Date Land Evaluation Returned by NRCS 6/1/15

PART III *(To be completed by Federal Agency)*	Maximum Points	Alternative Corridor For Segment ____ Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly		1,072			
B. Total Acres To Be Converted Indirectly, Or To Receive Services					
C. Total Acres In Corridor		1,072			
PART IV *(To be completed by NRCS) Land Evaluation Information*					
A. Total Acres Prime And Unique Farmland		622			
B. Total Acres Statewide And Local Important Farmland		182.2			
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted		.001			
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value		42			
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*		82			
PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))*	Maximum Points				
1. Area in Nonurban Use	15	10			
2. Perimeter in Nonurban Use	10	6			
3. Percent Of Corridor Being Farmed	20	3			
4. Protection Provided By State And Local Government	20	20			
5. Size of Present Farm Unit Compared To Average	10	0			
6. Creation Of Nonfarmable Farmland	25	25			
7. Availablility Of Farm Support Services	5	3			
8. On-Farm Investments	20	20			
9. Effects Of Conversion On Farm Support Services	25	0			
10. Compatibility With Existing Agricultural Use	10	5			
TOTAL CORRIDOR ASSESSMENT POINTS	160	92	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland (From Part V)	100	82	0	0	0
Total Corridor Assessment (From Part VI above or a local site assessment)	160	92	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	174	0	0	0

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES ☐ NO ☐

5. Reason For Selection:

Signature of Person Completing this Part: | DATE

NOTE: Complete a form for each segment with more than one Alternate Corridor

Appendix C

Census Data

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Appendix C: Study Area Population, Race, Ethnicity and Income Characteristics

Geographic Area			Total 2010 Population	Not Hispanic or Latino						Hispanic or Latino of Any Race	Percent Minority	Median Household Income*
				White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races			
County												
Brazoria County			313,166	53.2	11.8	0.0	5.4	0.0	0.2	1.4	27.7	46.8	$68,008
Galveston County			291,209	59.3	13.4	0.0	2.9	0.0	0.1	1.4	22.4	40.7	$61,555
Census Tract	**Census Block Group**	**Census Block**											
Brazoria County													
6611.00		--	3,175	53.4	3.2	0.5	0.4	0.0	0.3	0.7	41.4	5.1	$46,622
	1	--	1,694	47.5	4.0	0.3	0.4	0.1	0.4	0.5	46.9	52.5	$46,406
		1002	54	18.5	7.4	0.0	0.0	0.0	0.0	0.0	74.1	**81.5**	--
		1003	76	46.1	0.0	0.0	0.0	0.0	1.3	0.0	51.3	**53.9**	--
		1004	68	32.3	0.0	0.0	0.0	0.0	2.9	0.0	64.7	**2.9**	--
		1006	267	56.2	5.2	1.1	0.4	0.4	0.0	0.0	36.3	7.1	--
		1008	700	38.7	5.6	0.1	0.7	0.0	0.3	0.0	54.0	**6.7**	--
		1009	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1010	102	41.2	0.0	1.0	0.0	0.0	2.9	0.0	54.9	**3.9**	--
		1013	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1014	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1024	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
	2	--	1,481	60.2	2.4	0.7	0.5	0.0	0.3	0.8	35.2	39.8	$46,681
		2006	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2012	277	50.5	2.5	0.4	0.4	0.0	0.0	0.0	44.0	3.3	--
		2020	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2021	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2022	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2023	5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2024	39	71.8	0.0	0.0	0.0	0.0	0.0	0.0	28.2	28.2	--
		2025	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2026	60	48.3	0.0	0.0	0.0	0.0	0.0	0.0	51.7	51.7	--
		2027	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2028	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--

		2029	1	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	**100.0**	--
		2049	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2051	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2052	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2058	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
6612.00		--	4,178	58.1	3.5	0.4	2.6	0.0	0.2	0.9	34.2	41.9	$ 37,303
	1	--	1,013	66.8	1.6	0.4	1.3	0.0	0.1	0.5	29.8	33.1	$52,878
		1000	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1001	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1023	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1025	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1026	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1027	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1028	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1029	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1030	26	76.9	0.0	0.0	0.0	3.8	3.8	0.0	15.4	23.1	--
	2	--	902	64.3	2.7	0.0	1.8	0.0	0.3	1.1	29.8	35.7	$29,415
		2020	177	62.7	2.8	0.0	0.0	0.0	2.8	0.0	31.7	5.6	--
		2021	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2022	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2024	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2025	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
	3	--	2,263	51.7	4.8	0.5	3.6	0.1	0.3	1.1	38.0	48.3	$26,912
		3009	758	49.5	6.3	0.1	5.4	0.3	0.8	0.0	36.3	50.5	--
		3010	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		3011	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		3012	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		3013	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		3014	716	39.0	7.4	0.6	0.1	0.0	0.0	0.0	51.7	**61.0**	--
		3016	43	69.8	4.7	2.3	0.0	0.0	0.0	0.0	23.3	30.2	--
		3017	5	80.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	--
		3018	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		3019	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		3020	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		3021	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
6614.00		--	6,760	65.7	1.8	0.4	0.3	0.0	0.1	0.9	30.8	34.3	$56,118
	4	--	1,095	66.2	1.2	0.1	0.3	0.0	0.3	0.5	31.5	33.7	$41,050
		4005	197	54.3	0.0	0.0	0.0	0.0	2.0	0.0	43.7	45.7	--
		4013	36	25.0	8.3	0.0	0.0	0.0	2.8	0.0	63.9	**75.0**	--
6615.02		--	4,623	68.6	3.5	0.6	0.8	0.0	0.2	1.2	25.0	31.4	$72,519

	1	--	2,979	69.8	4.2	0.2	1.0	0.0	0.1	1.2	23.5	30.2	$64,115
		1000	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1001	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1002	212	45.3	24.1	0.5	1.4	0.0	0.5	0.0	27.8	54.7	--
		1003	2	50.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	**50.0**	--
		1021	15	86.7	13.3	0.0	0.0	0.0	0.0	0.0	0.0	13.3	--
		1023	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1027	636	64.9	5.3	0.0	0.3	0.0	0.0	0.0	27.0	35.1	--
		1037	20	55.0	15.0	0.0	0.0	0.0	0.0	0.0	30.0	45.0	--
6616.01		--	6,184	65.6	3.4	0.4	0.6	0.0	0.1	1.4	34.4	5.9	$55,647
	2	--	1,559	66.8	2.9	0.5	0.1	0.0	0.4	1.4	27.9	33.2	$57,137
		2000	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2001	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2002	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2003	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2004	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2011	43	2.3	4.7	0.0	0.0	0.0	4.7	0.0	76.7	**97.7**	--
		2012	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2016	11	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2017	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		2018	36	80.6	0.0	0.0	0.0	0.0	0.0	0.0	19.4	19.4	--
		2054	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
	3	--	756	81.3	1.3	0.1	0.8	0.0	0.0	1.9	14.5	18.7	$59,375
		3002	169	72.8	2.4	0.0	0.6	0.0	0.0	0.0	23.1	27.2	--
	4	--	2,967	66.5	4.7	0.3	0.9	0.0	0.1	1.5	26.1	33.5	$68,056
		4000	455	52.8	9.2	0.2	1.3	0.0	0.4	0.0	32.1	47.3	--
		4018	343	54.8	6.4	0.3	0.9	0.0	0.0	0.0	35.3	45.2	--
6616.02		--	3,026	51.7	1.5	0.0	0.9	0.0	0.3	1.1	44.5	48.3	$54,535
	1	--	834	73.1	2.3	0.0	1.6	0.0	0.2	1.0	21.8	26.9	$77,917
		1013	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1014	270	57.4	2.6	0.0	4.4	0.0	0.4	0.0	33.7	42.6	--
		1026	29	79.3	0.0	0.0	0.0	0.0	3.4	0.0	17.2	20.7	--
	2	--	2,192	43.5	1.1	0.0	0.7	0.0	0.4	1.1	53.1	56.5	$53,227
		2000	141	56.0	4.3	0.0	0.0	0.0	0.0	0.0	39.0	44.0	--
		2004	13	69.2	7.7	0.0	0.0	0.0	7.7	0.0	15.4	30.8	--
		2008	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2017	852	17.1	0.9	0.0	0.4	0.0	0.6	0.0	80.0	**82.9**	--
		2022	37	86.5	0.0	0.0	0.0	0.0	0.0	0.0	13.5	0.0	--
		2023	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2024	3	66.7	0.0	0.0	0.0	0.0	0.0	0.0	33.3	33.3	--

		2025	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	--
6617.00		--	2,767	72.9	2.3	0.4	0.1	0.0	0.3	0.9	23.1	27.1	$54,938
	3	--	632	76.6	0.0	0.5	0.0	0.0	0.0	0.5	22.5	23.4	$37,778
		3000	51	78.4	0.0	2.0	0.0	0.0	0.0	0.0	13.7	21.6	--
		3003	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		3004	3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		3009	98	50.0	0.0	1.0	0.0	0.0	0.0	0.0	49.0	**50.0**	--
		3013	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	
6618.00		--	5,385	53.8	6.3	0.3	10.2	0.0	0.1	1.6	27.7	46.2	$69,366
	2	--	2,940	45.7	4.5	0.3	17.6	0.0	0.1	1.8	29.9	54.3	$66,804
		2008	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	**100.0**	--
		2010	17	82.4	0.0	0.0	0.0	0.0	0.0	0.0	17.6	0.0	--
		2011	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2012	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2013	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2014	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2015	41	65.9	0.0	0.0	26.8	0.0	0.0	0.0	7.3	34.1	--
		2016	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2017	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2054	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2059	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	**100.0**	--
		2060	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2061	125	56.8	10.4	0.0	0.8	0.0	0.0	0.0	32.0	43.2	--
		2105	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2106	90	60.0	1.1	0.0	5.6	0.0	1.1	0.0	31.1	40.0	--
		2108	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2111	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2113	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2114	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2116	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2121	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2122	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2124	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2126	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2127	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2128	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2130	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2131	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2144	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2145	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--

		2171	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2172	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2178	171	60.2	0.0	1.2	0.0	0.0	0.0	0.0	38.0	39.8	--
		2179	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2181	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2184	366	53.3	1.6	1.1	0.8	0.0	0.0	0.0	42.6	46.7	--
		2185	56	78.6	0.0	0.0	5.4	0.0	0.0	0.0	16.1	5.4	--
		2186	106	84.9	0.0	0.0	0.0	0.0	0.0	0.0	15.1	0.0	--
		2187	187	73.3	3.2	0.0	0.0	0.0	2.1	0.0	21.4	5.3	--
		2188	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2189	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2190	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2191	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2193	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2194	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2199	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2200	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2201	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2212	11	9.1	90.9	0.0	0.0	0.0	0.0	0.0	0.0	**90.9**	--
6619.00			12,253	35.7	28.4	0.2	1.0	0.0	0.1	0.9	33.5	64.3	$62,928
	1	--	2,889	34.1	15.5	0.5	3.3	0.1	0.3	1.7	44.5	65.9	$61,599
		1117	0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	--
		1118	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1120	90	35.6	22.2	0.0	0.0	0.0	2.2	0.0	40.0	**64.4**	--
		1121	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1122	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1123	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Galveston County													
7206.00		--	11,205	56.5	12.9	0.4	5.5	0.2	0.2	1.9	22.3	43.5	$83,377
	1	--	1,709	65.2	8.8	0.6	4.8	0.0	0.1	1.3	19.2	34.8	$74,142
		1004	331	68.0	5.1	0.6	4.5	0.0	0.0	0.0	20.8	32.0	--
		1009	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1011	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1014	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1017	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1028	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1032	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1033	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1034	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1035	45	80.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	--

		1036	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1037	2	50.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	**50.0**	--
		1054	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		1055	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
	2	--	9,496	55.0	13.7	0.4	5.7	0.2	0.2	2.1	22.9	45.0	$85,760
		2006	41	53.7	0.0	0.0	4.9	0.0	0.0	0.0	39.0	46.3	--
		2009	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2010	292	61.3	11.6	0.0	2.4	0.0	0.0	0.0	22.9	38.7	--
		2014	46	41.3	26.1	0.0	10.9	0.0	4.3	0.0	17.4	**58.7**	--
		2017	85	68.2	7.1	0.0	2.4	0.0	0.0	0.0	22.4	31.8	--
		2020	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2021	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2022	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2023	86	59.3	5.8	1.2	14.0	0.0	0.0	0.0	18.6	40.7	--
		2024	68	55.9	14.7	0.0	22.1	0.0	0.0	0.0	7.4	44.1	--
		2025	322	43.8	12.1	0.0	11.5	0.0	0.0	0.0	32.0	**56.2**	--
		2125	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
7207.00		--	9,369	61.8	8.4	0.5	8.1	0.1	0.1	1.6	19.4	38.2	$69,928
	3	--	3,474	58.9	8.1	0.1	8.3	0.2	0.2	1.8	22.4	41.1	$66,875
		3141	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		3142	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
7208.00		--	3,648	45.6	27.2	0.2	1.7	0.0	0.2	1.5	23.7	54.4	$46,779
	2	--	1,113	47.6	23.2	0.0	4.6	0.0	0.0	1.4	23.3	52.5	$97,258
		2053	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
		2054	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Subtotal for 12 Tracts		--	72,573	55.7	10.9	0.4	3.3	0	0.2	1.3	28.3	44.3	$54,544
Subtotal for 19 Block Groups		--	41,988	56.8	7.6	0.3	4.3	0.1	0.2	1.5	29.3	43.2	81,335
Subtotal for 178 Blocks		--	9,636	50.5	5.6	0.7	2.1	0.1	1.9	0.0	39.9	49.5	--

Source: 2010 Census Summary File 1 Table P9, 2008-2012 ACS Table B19013.
Bold cells indicate a high percentage minority population for Census Blocks. ACS data are estimates; they are not counts.
* Income data is provided in 2012 inflation adjusted dollars.

Appendix D

Biological Evaluation Form

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Biological Evaluation Form

CSJ: 3510-01-001, 3510-02-001
Grand Parkway Segment B
SH 288 to Interstate Highway (IH) 45 South

Timothy Love/Roy Knowles, AECOM

TxDOT Environmental Affairs Division
Release Date: 5/2014
320.01.FRM
Version 1

CSJ: 3510-01-001, 3510-02-001 ☐ *Project has no Federal nexus.*

Date of Evaluation: January 2015

Proposed Letting Date:

County: Brazoria

Additional Counties: Galveston

Roadway Name: Grand Parkway Segment B

Project Limits: SH 288 to Interstate Highway (IH) 45 South

Project Description: The proposed SH 99 Segment B would be a new transportation facility built primarily on a new location to accommodate a 70-mile-per-hour (mph) design speed. The proposed SH 99 Segment B's 400-foot right-of-way (ROW) would accommodate one of the following typical roadway sections:

- A four-lane section without frontage roads,
- A four-lane section with frontage roads, or
- A four-lane section with exit and entrance ramps.

Endangered Species Act (ESA)

1. No — Is the action area of the proposed project within the range and in suitable habitat of federally protected species?

Date USFWS County List Accessed: March 6, 2014

Comments:

Resources consulted or activities conducted to make effect determination (if applicable):

☒ TPWD County List ☒ USFWS Critical Habitat Maps ☐ Species Expert Consulted

☒ Aerial Photography ☐ Coastal Areas Maps ☒ Site Visit

☒ Topographic Map ☐ Species Study Conducted ☐ Karst Zone Maps

☒ Ecological Mapping System of Texas (EMST) ☒ Natural Diversity Database (NDD)

Other:

Essential Fish Habitat (EFH)

1. Yes — Are tidally influenced waters in the action area of the proposed project?

Date NOAA EFH Mapper Accessed: January 23, 2015

1.1 Yes — Does the action area of the proposed project contain essential fish habitat?

1.2 No — Is there potential for adverse effects to essential fish habitat?

*Explain:

Upstream portion of a small tributary to Dickinson Bayou

Comments:

Coastal Barrier Resources Act (CBRA)

1. No — Is the action area of the proposed project located within a designated CBRA map unit?

Date USFWS CBRS Mapper Accessed: January 23, 2015

Comments:

Marine Mammal Protection Act (MMPA)

1. No — Is the action area of the proposed project within range of marine mammals and their habitat?

Comments:

Migratory Bird Treaty Act (MBTA)

1. Yes — Is there potential for nesting birds to be present in the project action area during construction?

1.1 No — Were active nests identified during the site survey?

2. Yes — Will BMPs will be incorporated to protect migratory bird nests?

Comments:

Right-of-entry was not available for the majority of the ROW.

Bald and Golden Eagle Protection Act (BGEPA)

1. Yes — Does the proposed project have the potential to impact Bald or Golden Eagles?

   1.1 Yes — Is there potential for Bald or Golden Eagles to nest in the action area of the proposed project during construction activities?

   1.2 No — Is there an active or inactive eagle nest within 660 feet of the action area of the proposed project area?

*Explain:

Right-of-entry was not available for the majority of the ROW. Review of ROW for eagle nests would be conducted after right-of-entry is available.

Comments:

Fish and Wildlife Coordination Act (FWCA)

1. Yes — Does the project have impacts on one or more Waters of the U.S. or wetlands?

   1.1 Yes — Is the project covered by a Nationwide Permit?

   1.2 Yes — Is the project covered by an Individual Permit from the USACE?

Comments:

Jurisdictional waters of the U.S. would be impacted by construction of the roadway.

Executive Order 13112 on Invasive Species

1. Yes — Would the proposed project be in compliance with EO 13112?

Comments

ROW landscaping would be in compliance with Executive Order 13112.

Executive Memorandum on Beneficial Landscaping

1. Yes — Would landscaping be included in the proposed projects?

Describe landscaping activities:

Landscaping would be in compliance with Executive Memorandum of August 10, 1995 and the guidelines for environmentally and economically beneficial landscape practices.

2. Yes — Would the proposed project be in compliance with the Executive Memorandum on Beneficial Landscaping?

Comments

See above

Farmland Protection Policy Act (FPPA)

1. Yes — Would the project require new ROW or permanent easements (*Do not include temporary easements*)?

2. No — Is the proposed project exempt from the provisions of FPPA in accordance with §523.11 of the act?

3. Yes — Has the new ROW been scored using either FPPA Form AD-1006 or SCS-CPA 106?

4. Yes — Was the resulting score above 60 on part V of either form? (If the project scores above 60 on part V of either form, then coordination with NRCS is required.)

Comments:

Project score is 92. Form NRCS-CPA-106 would be coordinated with the NRCS.

General Comments

TPWD Analysis Section

Coordination Conditions

1. No — Is the project limited to a maintenance activity exempt from coordination? https://ftp.dot.state.tx.us/pub/txdot-info/env/env_assessment.pdf

2. No — Has the project previously completed coordination with TPWD?

Tier I Site Assessment

MOU-Triggers

1. Yes — Is the project within range of a state threatened or endangered species or SGCN and suitable habitat is present?

*Explanation:

Limited right-of-entry prevented determining whether suitable habitat for Texas windmill-grass is present. Until right-of-entry is available for the entire proposed ROW, suitable habitat for this species may be present.

Date TPWD County List Accessed: March 6, 2014

Date that the NDD was accessed: January 15, 2015

What agency performed the NDD search? TPWD

NDD Search Results for EOIDs and Tracked Managed Areas

EOID Number	Common Name	Scientific Name	Listing Status	Buffer Zone
8010	Texas windmill-grass	*Chloris texensis*	SGCN	1.5 Mile
11524	Southern Crawfish Frog	*Lithobates areolatus areolatus*	S3	10 Mile

1.1 Yes — Does the BMP PA eliminate the requirement to coordinate for species?

*Explanation:

The vegetation BMP states that the amount of vegetation clearing should be minimized and wherever practicable, impacted vegetation should be replaced with in-kind on-site replacement/restoration of native vegetation.

2. No — NDD and TCAP review indicates adverse impacts to remnant vegetation?

Comments:

3. Yes — Does the project require a NWP with PCN or IP by USACE?

*Explanation:

Numerous waters/wetlands anticipated to be impacted requiring an individual permit.

4. Yes — Does the project include more than 200 linear feet of stream channel for each single and complete crossing of one or more of the following that is not already channelized or otherwise maintained:

   No — Channel realignment; or

   Yes — Stream bed or stream bank excavation, scraping, clearing, or other permanent disturbance.

*Explanation:

Crossings of waters would be bridged or culverted, which would likely require some disturbance to construct/install bridge support structures or culverts.

5. No — Does the project contain known isolated wetlands outside the TxDOT ROW that will be directly impacted by the project?

Comments:

6. Yes — Would the project impact at least 0.10 acre of riparian vegetation?

*Explanation:

The banks of Chocolate Bayou and an unnamed tributary are riparian areas greater than 0.1 acre.

7. Yes — Does project disturb a habitat type in an area equal to or greater than the area of disturbance indicated in the Threshold Table Programmatic Agreement?

*Explanation:

Agriculture, Mixed Woodlands and Forest, and Disturbed Prairie vegetation types are above the threshold.

*Attach associated file of EMST output (Mapper Report or other Excel File which includes MOU Type, Ecosystem Name, Common/Vegetation Type Name) in ECOS

Excel File Name:

EMST_data_Grand_Parkway_SegmentB.xlsx

7.1 Yes — Is there a discrepancy between actual habitat(s) and EMST mapped habitat(s)?

*Explanation:

Mapping discrepancies were noted from review of aerial photographs and site visits. The attached Map shows existing and reclassified EMST habitats.

Attach file showing discrepancy between actual and EMST mapped habitat(s).

File Name:

EMST_data_Grand_Parkway_SegmentB_corrected.xlsx

Is TPWD Coordination Required?

Yes

☐ Early Coordination

☒ Administrated Coordination

BMPs Implemented or EPICs included (as necessary):

TxDOT Contact Information

Name:

Phone Number:

E-mail:

Findings

Endangered Species Act (ESA)

No suitable habitat was observed for any federally listed species; therefore, there will be no effect on federally listed species. However, measures to avoid harm to any threatened and endangered species will be taken should they be observed during construction of the proposed project. Coordination with the USFWS will not be required. The USFWS County list was accessed on March 6, 2014.

Essential Fish Habitat (EFH)

Essential fish habitat is defined by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Based on the nature of the proposed work, this project is unlikely to adversely affect essential fish habitat.

Upstream portion of a small tributary to Dickinson Bayou

Coordination with the National Marine Fisheries Service (NMFS) is not required.

Coastal Barrier Resources Act (CBRA)

The Coastal Barrier Resources Act (CBRA) established the Coastal Barrier Resources System (CBRS) to protect a defined set of geographic units along the coast of the U.S.

This project is not located within a designated CBRA map unit. Coordination with the USFWS is not required.

Marine Mammal Protection Act (MMPA)

Marine mammals are protected under the Marine Mammal Protection Act (MMPA). The Texas coast provides suitable habitat and is within range of several marine mammals including the West Indian Manatee (Trichechus manatus), and bottlenose dolphin (Tursiops truncatus).

The project area does not contain suitable habitat for marine mammals. Coordination with NMFS is not required.

Migratory Bird Treaty Act (MBTA)

The Migratory Bird Treaty Act (MBTA) states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit issued in accordance within the Act's policies and regulations.

TxDOT will take all appropriate actions to prevent the take of migratory birds, their active nests, eggs, or young by the use of proper phasing of the project or other appropriate actions. A MBTA appropriate EPIC will be included in the PS&E.

Bald and Golden Eagle Protection Act (BGEPA)

The project is within range and suitable habitat for Bald or Golden Eagles but will not result in an incidental taking, the project will adhere to the National bald Eagle Management guidelines of 2007. The proposed project activities will not occur within a minimum of 660 feet from an active or inactive eagle nest. No additional documentation will be required.

null

Executive Order 13112 on Invasive Species

Re-vegetation of disturbed areas would be in compliance with the Executive Order on Invasive Species (EO 13112). Regionally native and non-invasive plants will be used to the extent practicable in landscaping and re-vegetation.

Executive Memorandum on Beneficial Landscaping

Landscaping would be a part of the proposed project activities. Re-vegetation of disturbed areas would be in compliance with the Executive Memorandum on Beneficial Landscaping (26Apr94). Regionally native and non-invasive plants will be used to the extent practicable in landscaping and re-vegetation.

Landscaping would be in compliance with Executive Memorandum of August 10, 1995 and the guidelines for environmentally and economically beneficial landscape practices.

Farmland Protection Policy Act (FPPA)

The purpose of the Farmland Protection Policy Act (FPPA) is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. The proposed project would convert farmland subject to the FPPA to non-agricultural, transportation use, and the combined scores of the relative value of the farmland and the site assessment, as documented with the appropriate NRCS form and supporting documentation, are such that the NRCS opinion for reducing the impact must be solicited and alternative actions must be considered.

Fish and Wildlife Coordination Act (FWCA)

The Fish and Wildlife Coordination Act (FWCA) of 1958 requires that federal agencies obtain comments from USFWS and TPWD. This coordination is required whenever a project involves impounding, diverting, or deepening a stream channel or other body of water.

The proposed project is authorized under Section 404 of the Clean Water Act Nationwide Permit and Individual Permit; coordination under FWCA is addressed during the permitting process with the USACE.

TxDOT Reviewer Date

Suggested Attachments

Aerial Map (with delineated project boundaries)

USFWS T&E List

TPWD T&E List

Species Impact Table

NDD EOID List and Tracked Managed Areas (Required for TPWD Coordination)

NOAA EFH Mapper Printout

USFWS CBRA Mapper Printout

EMST Project MOU Summary Table (Required for TPWD Coordination)

TPWD SGCN List

FPPA Documentation

Landscaping Plans

Photos (Required for TPWD Coordination)

Previous TPWD Coordination Documentation (if applicable)

The following table shows the revision history for this guidance document.

Revision History	
Effective Date Month, Year	Reason for and Description of Change

Appendix E

NMFS Coordination

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McMurray, Angela

From: Callie Barnes <Callie.Barnes@txdot.gov>
Sent: Thursday, October 01, 2015 11:16 AM
To: heather.young@noaa.gov
Cc: Meghan Pawlowski; Julia Ragsdale
Subject: Grand Parkway Segment B Draft FEIS - NMFS Review

Good Morning Ms. Young,

TxDOT is proposing State Highway (Grand Parkway) Segment B, an approximate 28.6 mile alignment, on new location, from SH 288 to I-45 south of Brazoria and Galveston Counties. The proposed SH 99 Segment B would be constructed as a four-lane, controlled-access tollway facility, consisting of two lanes in each direction within a 400-foot-wide right-of-way and auxiliary lanes between on-ramps and off-ramps where appropriate.

TxDOT is requesting your input and any comments pertaining to fisheries habitat within the study area and possible impacts to fisheries resources, including Essential Fish Habitat. Please feel free to contact me with any questions you may have or for further information regarding the proposed project.

The *Draft* Final Environmental Impact Statement has been sent to you via TxDOT Dropbox.

Thank you,

Callie Barnes
Environmental Specialist
TxDOT – Houston District
713-802-5965
Callie.barnes@txdot.gov

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Appendix F

Hazardous Materials

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Hazardous Materials Initial Site Assessment (ISA) Report

February 2016

PPA-ENV

Hazardous Materials Initial Site Assessment (ISA) Report

Completion of the ISA complies with the Federal Highway Administration's (FHWA's) policy dealing with hazardous materials discussed in FHWA's *Supplemental Hazardous Waste Guidance* (January 16, 1997) located at http://www.environment.fhwa.dot.gov/guidebook/vol1/doc7b.pdf.

This FHWA policy emphasizes three objectives: 1) the need to identify and assess potentially contaminated sites early in project development, 2) to coordinate early with federal/ state/ local agencies to assess the contamination and the cleanup needed; and 3) to determine and implement measures early to avoid or minimize involvement with substantially contaminated properties.

In addition, completion of the ISA will reduce construction delays that result from unexpected hazardous material discoveries and reduce the department's liability associated with the purchase of contaminated right of way.

Maintain a copy of the completed ISA report with all applicable attachments in the project administrative record.

For additional information, refer to TxDOT's online manual: *Hazardous Materials in Project Development:* http://onlinemanuals.txdot.gov/txdotmanuals/haz/index.htm

Abbreviations and Acronyms

ACM	Asbestos Containing Material
ASTs	Aboveground Storage Tanks
ASTM	American Society for Testing and Materials
CERCLIS	Comprehensive Environmental Response Compensation and Liability Information System
COG	Council of Government
ECOS	Environmental Compliance Oversight System
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
IIR	Issues Identification and Resolution Form in ECOS
ISA	Initial Site Assessment
LPST	Leaking Petroleum Storage Tank
MSWLF	Municipal Solid Waste Landfill
NPL	National Priorities List
PST	Petroleum Storage Tank
RCRA	Resource Conservation and Recovery Act
ROW	Right of Way
RPST	Registered Petroleum Storage Tank
TCEQ	Texas Commission on Environmental Quality
TRC	Texas Railroad Commission
TSD	Treatment Storage and Disposal Facility
USGS	United States Geological Survey
UST	Underground Storage Tank
VCP	Voluntary Cleanup Program

TxDOT Hazardous Materials Initial Site Assessment (ISA) Report

Project Information			
CSJ No: 3510-01-001, 3510-01-003, 3510-02-001, 3510-02-003, 3510-02-004, & 3510-02-905	City: various	Zip Code: various	County: Brazoria & Galveston
HWY: Grand Parkway Seg B	Limits: From SH 288 to IH 45 South, Houston District		

Note

An ISA is not necessary if all of the following conditions are met:

- Work will not include demolition or renovation of structures
- Work will occur entirely within existing right-of-way
- Work will not exceed 2 feet in depth from the surface; and
- Work is contained within the flow lines of the ditches or curb-and-gutter section.

Section 1: Identify Previously Completed Environmental Site Assessments, Known Hazmat Conditions, Preliminary Project Design and Right-of-Way Requirements

Yes/No	Obtain information/comments from design, right of way, and/or environmental staff. Attach maps and/or details as appropriate.
☐ Yes ☒ No	Has a Phase I Environmental Site Assessment (ESA) been prepared for this project? If one or more Phase I ESAs have been prepared for this project, please use applicable information from the Phase I ESA(s) to help complete the ISA.
☐ Yes ☐ No ☒ Unknown	Are there any previous environmental assessments, testing or studies performed within the proposed project area related to contamination issues? If yes, explain here if there are any concerns to the proposed project:
☐ Yes ☒ No	Are preliminary plans detailed enough to show excavation, ROW features, pipelines, utilities and storm sewer details? If no, explain here what information is limited or unavailable: Design is not far enough along at this time.

Section 2: Demolition and Renovation Information

☒Yes ☐No	Are there proposed structure demolition operations or structure modifications for this project (include all ROW structures and bridges)? A total of 64 displacements would occur as a result of the proposed project.

If yes, describe structure locations, anticipated demolitions and/or renovations here:

If yes, record asbestos and/or lead in paint concerns on an IIR form in ECOS. Detailed instructions for completing an ECOS IRR Form are located in the Non-Project Documentation section of ECOS under the heading Hazmat. Contact the ECOS help desk for assistance preparing the IRR Form if necessary.

Note: ACM inspections are required for all bridge and structure renovation and demolition projects. Refer to the guidance found at TxDOT's *Environmental Compliance Toolkit* web page for additional information.

Note: Bridge and structure demolitions and renovations that will disturb ACM require notification to the Texas Department of State Health Services ten (10) working days (hand delivered or post marked) prior to the demolition start date. Refer to guidance found at TxDOT's *Environmental Compliance Toolkit* web page for additional information regarding DSHS notification requirements.

Section 3: Identify Project Activities	
3.1 Yes/No	**Using the preliminary design and ROW information for this project, determine if the project includes any of the activities listed below.**
☒ Yes ☐ No	**Project Excavations:** Are there proposed excavations exceeding three feet below the surface, to include: tunneling, underpass construction, vertical alignment changes, trenching, drilled shafts or storm sewers?
☐ Yes ☒ No	**Dewatering:** Are there proposed de-watering operations. If yes, what is the estimated depth to groundwater?
☒ Yes ☐ No	**Utility Adjustments:** Are there proposed pipeline and underground utility installation or adjustments? The Preferred Alternative would cross 42 petroleum pipelines. The pipelines range in size from 2.38 inches to 36 inches in diameter. During ROW acquisition, additional investigation would be required to determine if removal or adjustments to the pipelines would be necessary.
☒ Yes ☐ No	**Encroachments:** Are there known or potential encroachments into the project area? Encroachments include soil and groundwater contamination, dump sites, tanks, and other issues in the ROW. Based on Railroad Commission of Texas GIS data, 20 of the approximately 117 oil and gas well sites in the proposed SH 99 Segment B study area would be within or adjacent to the Preferred Alternative ROW. See the attached excerpt from the FEIS for more details.
☒ Yes ☐ No	**ROW and Easements:** Are there any acquisitions of new ROW, easements, temporary construction easements planned for the project?

3.2 Complete the appropriate box below:

☒ If Section 3.1 contains any "Yes" answers, please proceed to Section 4.

☐ If Section 3.1 contains all "No" answers, proceed to Section 6, Site Survey. Please perform a site survey documenting the results in Section 6 and then mark the appropriate box below. If a Phase I ESA has been prepared for this project, you may use the applicable site survey information from the Phase I ESA.

- ☐ The site survey did not identify evidence of any environmental concerns listed in Section 6. The ISA is complete. Complete section 10 and maintain a copy of the ISA and all applicable attachments in the administrative record.

- ☐ The site survey identified evidence of environmental concerns listed in Section 6. Continue with Section 4.

Section 4: Current and Past Land Use Information			
Reviewed?	**Review and assess current and past land use (up to 50 years) in the project area. Document and attach sources that were reviewed.** If one or more Phase I ESAs were prepared for this project, please use applicable information from the Phase I ESAs to help complete this section of the ISA.		
☒Yes ☐ No ☐ Not Available ☐ Not Applicable	**4.1 Review Current and if possible Past USGS 7.5 Minute Topographic Maps of the project area:** Look for oil & gas pipelines, tanks, landfills or other industrial features. Describe any concerns:		
	List Topo Maps Reviewed:	Dates:	Comments:
	Algoa, Dickinson, Juliff, Liverpool, Manvel, Rosharon	1974	
☒Yes ☐ No ☐ Not Available ☐ Not Applicable	**4.2 Review Current Aerial Photographs and if possible Past Aerial Photographs of the project area:** Look for oil & gas pipelines, tanks, landfills or other industrial features. Describe any concerns: Area has a history of agricultural, industrial, commercial development. Very recent redevelopment in the area is residential, industrial, and commercial. Likely some level of testing/clean up/new fill material occurred with redevelopment of the area.		
	List All Aerial Photos Reviewed:	Photo Dates:	Comments:
	Google Earth Aerial Maps, USGS	1974, 2006, 2008, 2012, 2013, 2014	Very recent redevelopment in the area is residential, industrial, and commercial.
☐Yes ☐ No ☒ Not Available ☐ Not Applicable	**4.3 Review Current and Past Right-of-Way Maps/Files:** Look for oil & gas pipelines, tanks, landfills, or other industrial features. Describe any concerns:		
	List Maps/ Files & Dates Reviewed:	Comments:	
☐Yes ☐ No ☒ Not Available ☐ Not Applicable	**4.4 Review Sanborn Fire Insurance Maps/Files:** Look for tanks, oil & gas pipelines, landfills, or other industrial features. Describe any concerns:		
	List Maps/ Files & Dates Reviewed:	Comments:	
☐Yes ☐ No ☒ Not Available ☐ Not Applicable	**4.5 Review TxDOT As-Built Plans:** Any concerns identified during previous work within the project limits? If yes, explain: If known, what is the previous Project CSJ:		
☐Yes ☐ No ☒ Not Available ☐ Not Applicable	**4.6 Review TxDOT Geotechnical Soil Boring Logs:** Any concerns noted on the boring logs such as unusual odors, visible contamination, trash, waste or debris? If yes explain:		
☐Yes ☐ No ☒ Not Available ☐ Not Applicable	**4.7 Review TxDOT Temporary Use ROW Agreements (permits issued by the district to entities to occupy a portion of the ROW):** Any concerns such as monitor wells or treatment systems within the ROW? If yes, explain:		
☐Yes ☐ No ☒ Not Available ☐ Not Applicable	**4.8 Review Notifications of Contamination to TxDOT** (These are typically letters from TCEQ or third parties explaining the presence of contamination on TxDOT ROW): Any concerns regarding contamination of ROW from off-site sources? If yes, explain:		

Section 4: Current and Past Land Use Information	
Reviewed?	**Review and assess current and past land use (up to 50 years) in the project area. Document and attach sources that were reviewed.** If one or more Phase I ESAs were prepared for this project, please use applicable information from the Phase I ESAs to help complete this section of the ISA.

Section 5: Complete a Regulatory Records Review (Database Search)

Note: The purpose of the database search is to obtain and review standard sources of environmental information from government agency records that will help identify potential hazardous material issues within the project limits and surrounding properties. A list of standard databases of environmental information from government agency records is included in Section5.1.

To enhance and supplement the standard sources of environmental information, other information such as local records and/or additional state records should be reviewed when, in the judgment of the environmental professional, such additional records are (1) reasonably ascertainable, and (2) are sufficiently useful, accurate, and complete in light of the objective of the regulatory records review.

Standard database source information or other record information from government agencies may be obtained directly from appropriate government agencies or from commercial services.

If one or more Phase I ESAs were prepared for this project, please use applicable information from the Phase I ESAs to help complete this section of the ISA.

Mark the appropriate box below:

☒ A Database search was conducted through a contracted service. Indicate in Section 5.1, and if applicable, Section 5.2, the regulatory records searched and make any comments if potential environmental concerns are identified. A complete copy of the database search findings (contractor's report deliverable) should be maintained in the project administrative record with the ISA.

☐ A Database search was conducted in-house. Include in Section 5.1 the regulatory records searched and make any comments if potential environmental concerns are identified. For in-house database searches, not all databases need to be reviewed for each project, but at a minimum the databases listed in Section 5.1 marked in bold with a star must be reviewed. Include database records that list potential issues in the project administrative record with the ISA. It is not necessary to include records of negative findings in the project administrative record.

Most state and federal databases are located at the following websites:
Federal EPA databases link: http://www.epa.gov/enviro/.
Texas TCEQ databases link: http://www12.tceq.texas.gov/crpub/index.cfm?fuseaction=regent.RNSearch

Section 5.1 Standard Database Sources of Environmental Information from Government Agency Records			
Regulatory Record	Reviewed	Recommended Minimum Search Distance from Project Limits (miles)	Comment Field: Provide any comments related to potential issues discovered within the database.
NPL list*	☒ Yes	1.0	No sites identified within the search radius.
Federal Delisted *NPL* list*	☒ Yes	0.5	No sites identified within the search radius.
Federal CERCLIS list*	☒ Yes	0.5	1 record: Mustang AG Services (Map ID #22; South of SH 35; & East of Walmart, Alvin, TX 7511): Adjacent proposed ROW. The records for the site indicated that no further activity is planned for the site, although limited information was available. Therefore, the site was determined to have a moderate risk for the Preferred Alternative to encounter a REC onsite, with possible migration to adjacent parcels. The site is also listed as the only No Further Remedial Action Planned (NFRAP) site that would be adjacent to or within the proposed ROW of the Preferred Alternative, with no further activity planned. For more details see attached excerpt from the FEIS. Site may pose an environmental concern to the project.
Federal CERCLIS No Further Remedial Action Planned (NFRAP) site list*	☒ Yes	0.5	See above.
Federal RCRA Corrective Action (CORRACTS) list	☒ Yes ☐ No	1.0	1 Record: Ascend Chocolate Bayou Plant (Map ID 53; *Mortesen; FM 2917 Alvin TX; Alvin, TX 77512*). Site is not within or adjacent to the proposed ROW. For more details see attached excerpt from the FEIS. Site would not pose an environmental concern to the project.
Federal RCRA non-CORRACTS Treatment Storage Disposal (TSD) facilities list	☒ Yes ☐ No	0.5	No sites identified within the search radius.
Federal Institutional Controls/ Engineering Controls Registry http://www.epa.gov/ictssw07/public/export/regionalReport/REGION6.HTM	☒ Yes ☐ No	0.5	No sites identified within the search radius

Federal RCRA generators	☒ Yes ☐ No	*property* and *adjoining properties*	2 records: Only one site is listed as active, NTB No. 762 (Map ID #13). The site has a status listing as a conditionally exempt small quality generator, with no corrective actions. When located adjacent to the Preferred Alternative, the RCRAGR06 sites would pose a low risk because no other records were documented onsite. For more details see attached excerpt from the FEIS. Site may pose an environmental concern to the project.
Federal ERNS	☒ Yes ☐ No	*property* only	No sites identified within the search radius.
TCEQ Industrial Hazardous Waste (IHW) Corrective Action sites*	☒ Yes ☐ No	1.0	3 Records: Sites are not located within or directly adjacent to the proposed ROW. For more details see attached excerpt from the FEIS. Sites would not pose an environmental concern to the project.
TCEQ Superfund sites*	☒ Yes	1.0	No sites identified within the search radius.
Closed and abandoned municipal solid waste landfill sites* http://www.tceq.texas.gov/permitting/waste_permits/msw_permits/msw-data	☒ Yes	0.5	No sites identified within the search radius.
TCEQ leaking petroleum storage tank remediation lists (LPST)*	☒ Yes	0.5	14 records: 7 records would be within or adjacent to the proposed ROW. Map IDs # 1, 5, 10, 16, & 24 (3 records at this site). For more details see attached excerpt from the FEIS. Sites may pose an environmental concern to the project.
TCEQ registered petroleum storage tank lists (PST)*	☒ Yes	*property* and *adjoining properties*	31 Records: 17 sites would be within or adjacent to the Preferred Alternative ROW. For more details see attached excerpt from the FEIS. Sites may pose an environmental concern to the project.
TCEQ voluntary cleanup program (VCP) sites*	☒ Yes	0.5	No sites identified within the search radius.
TCEQ Innocent Owner/ Operator (IOP) sites	☒ Yes ☐ No	0.5	No sites identified within the search radius.
TCEQ Dry Cleaners Remediation Database*	☒ Yes ☐ No	0.5	No sites identified within the search radius.
TCEQ Brownfields Database	☒ Yes ☐ No	0.5	No sites identified within the search radius.

Texas Railroad Commission VCP sites* http://www.rrc.state.tx.us/environmental/environsupport/voluntarycleanup.php	☒ Yes	0.5	No sites identified within the search radius.
Section 5.2 List below other records reviewed such as local records and/or additional state records			
Record source	Environmental Concerns (If Yes describe)		
IHW	☒ Yes Six sites are listed on the Industrial and Hazardous Waste (IHW) database. Only one of the six records was listed as active. During the March 2014 site visit, several old aboveground storage tanks were observed on the J.C. Vacuum Service property (Map ID #19). The facility appears to be the storage yard and truck yard for a septic tank vacuum service. When located adjacent to the Preferred Alternative ROW, the sites would pose a low risk, if no other records were documented. However, the IHW sites would pose a moderate risk of encountering a REC when located within the proposed ROW for the Preferred AlternativeThe J.C. Vacuum Service property (Map ID #19) poses a low risk since it is adjacent to the proposed ROW, not within the proposed ROW. For more details see attached excerpt from the FEIS. Site may pose an environmental concern to the project. ☐ No		
GWCC	☒ Yes: Two Groundwater Contamination Case (GWCC) sites would be within or adjacent to the proposed ROW of the Preferred Alternative. The first site, Ky Nun Tong (Map ID #1), is also known as the Alvin Food Mart and is currently still under investigation to determine the extent, composition, and/or other properties and circumstances of the contamination. At the present time, no cleanup has been completed. ROW would be required from the site, meaning the site has a high-risk determination. The second site, Lee Oil Co., Inc. (Map ID #5), is designated as "action complete," and the remediation has been completed. The site would be considered a moderate risk. For more details see attached excerpt from the FEIS. Site may pose an environmental concern to the project. ☐ No		
FRSTX, TIERII, ICISNPDES, DCR, & NOV	☒ Yes: There are a total of 10 Facility Registry System (FRSTX), two Tier II Chemical Reporting Program Facilities (TIERII), one Integrated Compliance Information System National Pollutant Discharge Elimination System (ICISNPDES), one Dry Cleaner Registration (DCR), and four Notice of Violations (NOV) sites that would be within or adjacent to the Preferred Alternative ROW. Each of the sites would pose a low risk, if no other records were documented. However, the sites would pose a moderate risk of encountering RECs when located within the proposed ROW of the Preferred Alternative. For more details see attached excerpt from the FEIS. Site may pose an environmental concern to the project. ☐ No		

Section 6: Complete a Project Site Survey	
Note: Document site survey and findings. Describe location, size of concern. Attach site maps and photographs as appropriate. If a Phase I ESA has been prepared for this project, you may use the applicable site survey information from the Phase I ESA.	
Site Survey Date(s): 3/2014	
6.1 Current Land Use Type: ☒ Undeveloped to light commercial (agricultural, residential, offices, retail, light commercial). ☒ Developed/commercial (automotive repair, gas stations, manufacturing, dry cleaners, military base, waste collection and handling facilities, other industrial sites). Describe: Land within the proposed ROW of the Preferred Alternative would be converted from primarily vacant/developable land to a transportation use. Traveling from west to east along the Preferred Alternative, the density and development pattern would increase, and there would be a greater diversity of land use. Areas near Alvin and League City would have commercial activities adjacent to the Preferred Alternative, along with some industrial and government/medical/education facilities. Other than vacant/developable and undevelopable land use, residential land use would be the next most prevalent land use category found within the Preferred Alternative ROW. Many of the small cities and unincorporated communities in the proposed SH 99 Segment B study area serve as suburban communities for the major employers in the overall Houston-Galveston-Brazoria CMSA (e.g., Houston Medical Center, the National Aeronautics and Space Administration [NASA], and Clear Lake/Webster Medical Center) (Buehler 2014; Allender 2014).	
Evidence? (Yes/No)	**6.2 Specific Concerns Identified (as necessary provide a description for each "Yes" checked).**
☒Yes ☐No	underground storage tanks. Several gas stations in the area. For more details see attached excerpt from the FEIS.
☐Yes ☒No	• vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground.
☒Yes ☐No	• aboveground storage tanks. C. Vacuum Service property (Map ID #19) see attached for more details. For more details see attached excerpt from the FEIS.
☒Yes ☐No	• electrical and transformer equipment storage or evidence of release. Utilities are present; no indicators of release was evident.
☐Yes ☒No	• injection wells, cisterns, sumps, dry wells.
☐Yes ☒No	• groundwater monitoring wells and/or groundwater treatment systems.
☐Yes ☒No	• flooring, drains, or walls stained by substances other than water or emitting foul odors.
☐Yes ☒No	• vats, 55-gallon drums (labeled/unlabeled), canisters, barrels, bottles, etc.
☐Yes ☒No	• stockpiling, storage of material.
☐Yes ☒No	• evidence of liquid spills.
☒Yes ☐No	• surface dumping of trash, garbage, refuse, rubbish, debris half exposed/buried, etc. trash along roadway.
☐Yes ☒No	• damaged or discarded automotive or industrial batteries.
☐Yes ☒No	• stained, discolored, barren, exposed or foreign (fill) soil. Fill soil for new development in the area. Fill for new developments was present in the corridor.
☐Yes ☒No	• dead, damaged or stressed vegetation.

☐Yes ☒No	• oil sheen or films on surface water, seeps, lagoons, ponds, or drainage basins.
☐Yes ☒No	• pits, ponds, or lagoons associated with waste treatment or waste disposal.
☒Yes ☐No	• changes in drainage patterns from possible fill areas. New development and redevelopment.
☐Yes ☒No	• security fencing, protected areas, placards, warning signs.
☐Yes ☒No	• dead animals (fish, birds, etc.) possibly due to contamination.
☐Yes ☒No	• other concerns. Based on Railroad Commission of Texas GIS data, 20 of the approximately 117 oil and gas well sites in the proposed SH 99 Segment B study area would be within or adjacent to the Preferred Alternative ROW. Additionally, the Preferred Alternative would cross 42 petroleum pipelines. The pipelines range in size from 2.38 inches to 36 inches in diameter. During ROW acquisition, additional investigation would be required to determine if removal or adjustments to the pipelines would be necessary. For more details see attached excerpt from the FEIS.

6.3 Describe adjoining properties and any visible hazardous material concerns. List adjacent businesses, factories, abandoned sites, etc. that may be the source of hazardous materials concerns.

In addition to the documented sites listed in above the following sites were identified during a March 2014 field visit as a moderate risk because of their location in relation to the proposed ROW of the Preferred Alternative.

- Snider Transmission, Kwik Kar Brakes-Alignments & Inspections, and Kwik Kar Lube & Services are located along the north side of the SH 35 Bypass between FM 1462 and Mustang Road and would be adjacent to the Preferred Alternative ROW.
- Y&T Metal Recycling Center is located at 15902 SH 35 South, just south of FM 2917. ROW would be required from the facility for the construction of the Preferred Alternative.

The Shop and Alvin Marine is an automotive repair and boat repair shop located at 6202 SH 35 and would be adjacent to the Preferred Alternative ROW.

6.4 Describe Concerns Observed in the Site Survey. Indicate whether the concern is associated with existing ROW, proposed ROW acquisition or easements. As necessary, provide additional information about the evidence identified; include photographs as an attachment to the ISA. No additional concerns identified.

Section 7: Interviews
Section 7.1 Were interviews conducted? ☐Yes ☒No Possible interviewees include: local residents, TxDOT staff, fire department personnel, city or county department of health/environmental staff; city or county planning staff; TCEQ staff; TRC staff; current and former property owners or operators. If one or more Phase I ESAs were prepared for this project, please use applicable interview information from the Phase I ESAs to help complete this section of the ISA.
Section 7.2 Interview Summary: Complete this section if interviews were conducted. Add additional rows as needed. Attach record of communications to the ISA.

Name:	Title:	Date:
Describe any potential concerns:		
Name:	Title:	Date:
Describe any potential concerns:		
Name:	Title:	Date:
Describe any potential concerns:		

Section 8: Identified Hazardous Material Concerns
On the list below, indicate Yes or No whether the hazardous material concern was identified. If Yes, record the hazardous material concern on an Issues Identification and Resolution (IIR) Form in ECOS. If the ISA preparer is unsure how to complete the IIR Form, the responsibility to complete the Hazmat IIR may be assigned within ECOS to ENV Hazmat Staff. *Detailed instructions for completing an ECOS IIR Form are located in the Non-Project Documentation section of ECOS under the heading Hazmat. Contact the ECOS help desk for assistance preparing the IIR Form if necessary.* Hazardous materials concerns identified below will require additional assessment work. In most cases, resolution to the concerns should be completed prior to project letting. For additional information regarding scheduling considerations, internal/external coordination and recommended practices for resolving hazmat issues please refer to TxDOT's *Environmental Tool Kit* web site. Contact ENV Pollution Prevention and Abatement (PPA) for additional assistance.

8.1 Identify the Hazardous Material Concerns		
Concern Identified?	**Type of Concern** Record the hazardous material concerns on an Issues Identification and Resolution (IIR) Form in ECOS.	
☒**Yes** ☐**No** ☐**NA**	**Current or Past Land Use Concern:** This concern is associated with hazardous material issues identified in Section 4. *On the ECOS IIR, the Available Contaminated Media would be "Other".*	
	☒Yes ☐No	One or more concerns identified in Section 4.
	☐Yes ☐No	No obvious concerns were identified but additional research is needed as a result of unique or unusual current or past land use. Request additional assistance from ENV.

8.1 Identify the Hazardous Material Concerns		
Concern Identified?	**Type of Concern** Record the hazardous material concerns on an Issues Identification and Resolution (IIR) Form in ECOS.	
☒**Yes** ☐**No**	**Site Visit Concerns:** This is associated with any hazardous material issues discovered following the completion of Section 6. On the *ECOS* IIR, the Available Contaminated Media would be "Other".	
	☒Yes ☐No	One or more concerns identified.
	☐Yes ☐No	No listed concerns identified but additional research is needed as a result of unique or unusual project site conditions. Request assistance from ENV.
☐**Yes** ☐**No** ☒**NA**	**Interview Concerns:** This concern is associated with any hazardous material issues discovered during an interview listed in Section 7. In the IIR, the Available Contaminated Media would be "Other".	
	☐Yes ☐No	One or more concerns identified after completing interviews.
	☐Yes ☐No	No listed concerns identified but additional research is needed as a result of unique or unusual project site conditions. Request assistance from ENV.
☒**Yes** ☐**No**	**Asbestos and/or Lead in Paint Concerns:** The following are related to ACM and LBP identified in Section 2. Select below all that apply.	
	☐Yes ☒No	Bridge Demolition/ Renovation without Steel Structures
	☐Yes ☒No	Bridge Demolition/ Renovation with Steel Structures
	☒Yes ☐No	ROW Structure(s) Demolition
	☐Yes ☒No	Enhancement Project Demolition/Renovation
	☐Yes ☐No	Other- Describe
☒**Yes** ☐**No**	**Petroleum Storage Tank Concerns:** PSTs can be any underground or aboveground storage tanks that are used to store petroleum based fluids. Typically, these are gasoline and diesel refueling facilities. Select below all that apply.	
	☒Yes ☐No	ROW acquisition or partial acquisition of a parcel with one or more PSTs.
	☐Yes ☒No	Other- Describe:
☒**Yes** ☐**No**	**Leaking Petroleum Storage Tank (LPST) Concerns:** An LPST parcel will only need to be identified once in the following list. LPST sites are PSTs that have caused or suspected to have caused a release to the environment.	
	☐Yes ☒No	Additional Research is needed or uncertain of impacts from an LPST.
	☒Yes ☐No	Acquisition of a Parcel with an LPST.
	☒Yes ☐No	An LPST is located within 0.25 miles of the project.
	☐Yes ☒No	Other- Describe:

8.1 Identify the Hazardous Material Concerns		
Concern Identified?	**Type of Concern** Record the hazardous material concerns on an Issues Identification and Resolution (IIR) Form in ECOS.	
☒**Yes** ☐**No**	**Oil and Gas Production Activity Concerns**: TxDOT is concerned with the acquisition of oil and gas production wells (and ancillary equipment). Typically, these are oil/gas wells, piping, ancillary production equipment, pipelines, etc. Select below all that apply.	
	☐Yes ☒No	Additional Research needed or uncertain of impacts. Request assistance from ENV.
	☐Yes ☐No	Database search identified TRC VCP Site within 0.5 miles of project.
	☒Yes ☐No	Oil/ Gas Wells within Future ROW.
	☒Yes ☐No	Pipelines requiring adjustment.
	☐Yes ☒No	Other- Describe
☒**Yes** ☐**No**	**Non-LPST Source Contamination Concerns**: These parcels or locations have a potential for soil and/or groundwater contamination. Typically, they are contaminated locations (even potentially contaminated locations) that are not associated with LPST sites. Select below all that apply.	
	☒Yes ☐No	Additional Research is needed or uncertain of impacts from a Non-LPST site. Request assistance from ENV. Map ID #1, #7, #12, and #19 would be directly impacted by the proposed project, with the remaining sites being located adjacent to or in close proximity of the proposed ROW. It is anticipated that a Phase II Environmental Site Assessment would be required for each location, as well as for any high or moderate risk sites that would be adjacent to the Preferred Alternative ROW. For more details see attached excerpt from the FEIS.
	☐Yes ☒No	Database search identified a CERCLA NPL(s) site within 1 mile of project.
	☐Yes ☒No	Database search identified CERCLA (to include NFRAP) within 0.5 miles of project.
	☒Yes ☐No	Database search identified RCRA Corrective Action(s) site within 1 mile of project.
	☐Yes ☒No	Database search identified RCRA TSD Facilities within 0.5 miles of project.
	☒Yes ☐No	Database search identified TCEQ IHW Corrective Action Sites within 1 mile.
	☐Yes ☒No	Database search identified TCEQ Superfund Sites within 1 mile of project.
	☒Yes ☐No	Database search identified TCEQ VCP Sites within 0.5 miles of project.
	☐Yes ☒No	Database search identified TCEQ IOP Sites within 0.5 miles of project.
	☐Yes ☒No	Other- Describe:
☐**Yes** ☒**No**	**Landfills/ Waste Pits/ Dump Site Concerns:** This is associated with any known or unknown (based on visual observations) landfills, dump sites, or waste pits. Typically, the local Council of Governments (COG) should maintain a list of all closed and open landfills in your project area. Select below all that apply.	
	☐Yes ☐No	Additional research is needed or uncertain of impacts. Request assistance from ENV.
	☒Yes ☐No	Database search identified Texas COG closed/abandoned MSW landfill sites within .5 miles of the project.
	☐Yes ☐No	Other- Describe

8.1 Identify the Hazardous Material Concerns	
Concern Identified?	**Type of Concern** Record the hazardous material concerns on an Issues Identification and Resolution (IIR) Form in ECOS.

8.2 Did the ISA identify any potential Hazardous material concerns?

☐ No hazardous materials concerns were identified as a result of the ISA performed for the proposed action. No further hazardous materials action is required. The ISA is complete for this project. Any unanticipated hazardous materials impacts encountered during the project construction phase will be addressed in accordance with regulatory requirements. No further assessment is required. Complete Sections 9 and 10 and maintain a copy of the ISA and all applicable attachments in the project administrative record.

☒ Yes, the ISA identified one or more hazardous materials concerns for this project. Additional assessment work is required and an IIR form has been completed in ECOS. Complete Sections 9 and 10 and maintain a copy of the ISA and all applicable attachments in the project administrative record.

Section 9: Reference Materials Utilized (Identify any referenced materials attached to this ISA)

Referenced Materials Used	☒ Project Map	☒ USGS Topo Maps	☐ Aerial Photographs
	☒ ROW Maps/Files	☐ Sanborn Fire Insurance Maps	☐ Temporary Use Agreements
	☐ TxDOT As-Built Plans	☐ Notifications	☐ Photographs
	☐ Record of Communications	☒ Regulatory Database	☐ Record of Interviews
	☐ Other:		

Section 10: Contact/Completed by		
Name:	Angela McMurray	**Tel: 281-776-1243**
Title:	Environmental Planner-Scientist	
Firm (District Section):	Jacobs	
Address:	5995 Rogerdale Road Houston Texas, 77072	
Signature:	Angela M. Murray	**Date:** 3/3/2016

Appendix A

The following table shows the revision history for this guidance document.

Revision History	
Effective Date Month, Year	**Reason for and Description of Change**

Radius Report

Satellite view

Target Property:

SH 99

HILLCREST, Brazoria County, Texas 77511

Prepared For:

Jacobs-Houston

Order #: 32810

Job #: 73933

Date: 02/21/2014

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Report Summary of Locatable Sites

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address	City, Zip Code
1	LPST	112144	0.01 W	ALVIN FOOD MART 2	8332 S HWY 35	ALVIN, 77511
1	NOV	RN101245850	0.01 W	ALVIN FOOD MART 2	8332 S HIGHWAY 35	ALVIN, 77511
1	PST	66620	0.01 W	ALVIN FOOD MART 2	8332 S HIGHWAY 35	ALVIN, 77511
1	FRSTX	110033365515	0.01 W	ALVIN FOOD MART 2	8332 S HIGHWAY 35	ALVIN, 77511
1	GWCC	112144	0.01 W	KY VUN TONG	8332 S HWY 35, ALVIN	ALVIN
2	PST	73187	0.01 E	BUC EES 14	780 HIGHWAY 35 BYP N	ALVIN, 77511
2	FRSTX	110033527734	0.01 E	BUC-EES 14	780 HIGHWAY 35 BYP N	ALVIN, 77511
2	NOV	RN102494184	0.01 E	BUC-EES 14	780 HIGHWAY 35 BYP N	ALVIN, 77511
3	FRSTX	110024258916	0.01 S	NTB NO 762	130 NORTH HWY 35 BYPASS	ALVIN, 77511
3	FRSTX	110022531474	0.01 S	HOME DEPOT USA HD6539	140 N HIGHWAY 35 BYPASS	ALVIN, 77511
4	IHW	71336	0.02 NE	JAG BATTERY	1900 N BYPASS 35	ALVIN, 77511
5	LPST	096453	0.02 SE	LEE OIL CO INC	1655 BYPASS 35	ALVIN, 77512
5	PST	16742	0.02 SE	LEE OIL	1655 S BYPASS 35	ALVIN, 77511
5	TIERII	49EZ4S002LQC	0.02 SE	LEE OIL CO., INC.	1655 BYPASS 35	ALVIN, 77511
5	TIERII	5NAJUF002A56	0.02 SE	LEE OIL CO., INC.	1655 BYPASS 35	ALVIN, 77511
5	FRSTX	110039180310	0.02 SE	LEE OIL COMPANY, INC.	1655 BYPASS 35	ALVIN, 77512
5	FRSTX	110033880628	0.02 SE	LEE OIL ALVIN	1655 S LOOP 35	ALVIN, 77511
5	ICISNPDES	TXG830063	0.02 SE	LEE OIL COMPANY, INC.	1655 BYPASS 35	ALVIN, 77512
5	GWCC	096453	0.02 SE	LEE OIL CO INC	1655 BYPASS 35, ALVIN	ALVIN, 77511
6	PST	76318	0.02 NE	ALVIN EXPRESS	680 HIGHWAY 35 BYP N	ALVIN, 77511
6	FRSTX	110033543636	0.02 NE	ALVIN EXPRESS	680 HIGHWAY 35 BYP N	ALVIN, 77511
6	NOV	RN104793054	0.02 NE	ALVIN EXPRESS	680 BYPASS HWY 35 N, ALVIN, TX, 775	ALVIN
7	PST	70433	0.02 W	RED OAK 102	6735 S HIGHWAY 35	ALVIN, 77511
7	FRSTX	110034604649	0.02 W	RED OAK 102	6735 S HIGHWAY 35	ALVIN, 77511
7	NOV	RN101772002	0.02 W	RED OAK 102	6735 S HIGHWAY 35	ALVIN, 77511
8	FRSTX	110041739214	0.02 W	ALVIN PLANT 384	PORTABLE 3030 HWY 35 S	ALVIN, 77512
9	FRSTX	110037844517	0.02 SE	WAL-MART 462	1701 FAIRWAY DR STE 500	ALVIN, 77511
9	FRSTX	110005069996	0.02 SE	WAL-MART STORES INC	1701 FAIRWAY DR SUITE 500	ALVIN, 77511
10	LPST	110936	0.03 SE	EXXON 64197	1920 E HWY 6	ALVIN, 77511
10	PST	26708	0.03 SE	RACEWAY 6932	1920 E HIGHWAY 6	ALVIN, 77511
10	IHW	77054	0.03 SE	EXXON 64197	1920 E HIGHWAY 6	ALVIN, 77511
11	PST	79687	0.03 SE	ALVIN COMMUNITY COLLEGE	3110 MUSTANG RD	ALVIN, 77511
12	PST	75038	0.03 W	CORNER SPOT	1809 FM 646 RD W	DICKINSON, 77539
13	RCRAGR06	TXR000066357	0.04 SE	NTB NO 762	130 NORTH HWY 35 BYPASS	ALVIN, 77511
14	PST	27202	0.04 SE	YELLOW JACKET GROCERY	3202 FM 2403 RD	ALVIN, 77511
15	PST	69868	0.05 NW	7-ELEVEN STORE 36522	2480 S BYPASS 35	ALVIN, 77511

Report Summary of Locatable Sites

16	PST	59647	0.06 W	FORMER WENDELS TOOL RENTAL	1640 S BYPASS 35	ALVIN, 77511
16	LPST	110274	0.06 W	WENDELS TOOL RENTAL	1640 S BYPASS 35	ALVIN, 77511
17	RCRAGR06	TXR000080786	0.06 W	CVS PHARMACY 6727	1600 S BYPASS 35	ALVIN, 77511
17	IHW	91220	0.06 W	CVS PHARMACY 6727	1600 S BYPASS 35	ALVIN, 77511
18	IHW	71284	0.07 NW	ALVIN PEST CONTROL	206 FITZ RD	ALVIN, 77511
19	PST	64447	0.07 W	J C VACUUM SERVICE	4502 S HIGHWAY 35	ALVIN, 77511
19	IHW	86431	0.07 W	J C VACUUM SERVICES	4504 S HIGHWAY 35	ALVIN, 77511
20	PST	5469	0.07 W	NINDA CONOCO	102 OAK MANOR DR	ALVIN, 77511
21	PST	73788	0.07 W	ALVIN CHEVRON	1650 HIGHWAY 35 BYP N	ALVIN, 77511
22	NFRAP	TXD981048291	0.07 SE	MUSTANG AG SERVICES	SO.OF HWY.35;&E.OF WALMART	ALVIN, 77511
22	CERCLIS	TXD981048291	0.07 SE	MUSTANG AG SERVICES	SO.OF HWY.35;&E.OF WALMART	ALVIN, 77511
23	DCR	RN104656822	0.07 NW	MANCHESTER CLEANERS	1804 FM 646 RD W	DICKINSON, 77539
24	LPST	100420	0.08 SE	DIAMOND SHAMROCK STOP N GO 2382	2000 E HWY 6	ALVIN, 77511
24	LPST	115919	0.08 SE	CHIANTIS QUICK STOP	2000 E HWY 6	ALVIN, 77511
24	PST	23887	0.08 SE	CHANTIS QUICK STOP	2000 E HIGHWAY 6	ALVIN, 77511
24	LPST	097792	0.08 SE	FORMER CHARTER FOOD STORE 2698	2000 E HWY 6	ALVIN, 77511
25	PST	74864	0.08 NW	KROGER FUEL FACILITY 321	3100 S HIGHWAY 35	ALVIN, 77511
26	DCR	RN104093653	0.09 S	PILGRIM CLEANERS	2625 HIGHWAY 35 BYP S STE 163	ALVIN, 77511
26	DCR	RN103977336	0.09 S	ALPINE CLEANERS	2625 HIGHWAY 35 BYP S	ALVIN, 77511
27	PST	54267	0.09 N	DONALD ALFORD LOCATION	3904 COUNTY ROAD 60	ROSHARON, 77583
28	IHW	39170	0.1 SE	FARMS OF TEXAS CHOCOLATE BAYOU DIVISION	201 FM 2917 RD	ALVIN, 77511
29	IHWCA	30245	0.11 W	INPUT OUTPUT	1001 HIGHWAY 35 BYP N	ALVIN, 77511
29	LPST	094426	0.11 W	INPUT OUTPUT INC	1001 N HWY 35	ALVIN, 77512
29	LPST	101870	0.11 W	WESTERN GEOPHYSICAL	1001 N HWY 35	ALVIN, 77511
29	PST	22754	0.11 W	INPUT OUTPUT	1001 HIGHWAY 35 BYP N	ALVIN, 77511
29	IHW	30245	0.11 W	INPUT OUTPUT ALVIN	1001 HIGHWAY 35 BYP N	ALVIN, 77511
30	PST	58469	0.11 SE	WAL-MART STORE 462	1701 FAIRWAY DR	ALVIN, 77511
30	IHW	74071	0.11 SE	WAL-MART STORES	1701 FAIRWAY DR STE 500	ALVIN, 77511
31	PST	41022	0.11 NW	LLOYD SEABOLT	2411 S GORDON ST	ALVIN, 77511
31	PST	41020	0.11 NW	LLOYD Q SEABOLT CO	2411 1/2 S GORDON ST	ALVIN, 77511
32	PST	73180	0.12 W	ALVIN PLANT 458	3030 W HIGHWAY 6	ALVIN, 77511
33	PST	69205	0.12 S	H B RENTALS	8525 HIGHWAY 35 S	LIVERPOOL, 77577
34	IHW	71107	0.14 NW	SHERWIN WILLIAMS	2409 S GORDON ST	ALVIN, 77511
35	IHW	88365	0.14 SE	HOME DEPOT USA HD6539	140 N HIGHWAY 35 BYPASS	ALVIN, 77511
36	IHWCA	F0901	0.14 W	LARRY D SMITH PROPERTY ALVIN		

Report Summary of Locatable Sites

36	APAR	F0901	0.14 W	LARRY D SMITH PROPERTY ALVIN	1298 E HOUSE ST ALVIN TX	BRAZORIA
37	PST	66934	0.14 SE	HAWKINS LEASE SERVICE	3205 FM 2403 RD	ALVIN, 77511
38	PST	19175	0.14 NW	MUSTANG SOC	2300 MUSTANG RD	ALVIN, 77511
39	PST	76611	0.18 NW	HEB 28	2955 GULF FWY S	LEAGUE CITY, 77573
40	IHW	89344	0.18 W	AWARPHIL	1415 HIGHWAY 35 BYP N	ALVIN, 77511
41	PST	73783	0.19 W	MURPHY USA 6584	1580 E HIGHWAY 6	ALVIN, 77511
42	PST	76782	0.19 W	WAL-MART SUPERCENTER 462	400 S BYPASS 35	ALVIN, 77511
42	IHW	88769	0.19 W	WAL-MART SUPERCENTER 0462	400 S BYPASS 35	ALVIN, 77511
43	PST	78124	0.23 NE	MURPHY USA 7358	1721 W FM 646 RD	LEAGUE CITY, 77573
44	PST	54561	0.25 NW	TICK TOCK GROCERY 9	620 E SOUTH ST	ALVIN, 77511
45	PST	15833	0.25 NW	KMART 9677	1200 FM 1462 RD	ALVIN, 77511
46	IHW	38844	0.25 S	BAKER HUGHES LIVERPOOL	8820 HIGHWAY 35 S	LIVERPOOL, 77577
47	LPST	104430	0.33 SE	BRIDGE OIL CO	CR 155	ALVIN, 77511
48	LPST	106577	0.34 W	T & L LEASE SERVICE	427 E SOUTH ST	ALVIN, 77511
49	LPST	103530	0.39 E	PETCO	2548 S HWY 6	ALVIN, 77512
50	LPST	106056	0.4 SE	NATIONAL WEATHER SERVICE	2525 E HWY 6	ALVIN, 77511
51	LPST	115973	0.49 NW	SHELL RETAIL FAC	2700 FM 528	ALVIN, 77511
52	IHWCA	T1007	0.87 E	BAKER ATLAS	3358 E HIGHWAY 6	ALVIN, 77511
53	RCRAC	TXD001700806	0.96 E	ASCEND CHOCOLATE BAYOU PLANT	MORTESEN ; FM 2917 ALVIN TX	ALVIN, 77512

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Appendix G

Cultural Resources

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HISTORICAL RESOURCES STUDIES: PROPOSED GRAND PARKWAY SEGMENT B (STATE HIGHWAY 99) FROM STATE HIGHWAY 288 TO INTERSTATE HIGHWAY 45 SOUTH, BRAZORIA AND GALVESTON COUNTIES, TEXAS CSJ NOS. 3510-01-001, 3510-01-003, 3510-02-001, 3510-02-003, AND 3510-02-905

by

Terri Myers and Amy E. Dase

Principal Investigator: Amy E. Dase

LETTER REPORT NO. 893

submitted to

Texas Department of Transportation
Environmental Affairs Division
Historical Studies Branch
Austin, Texas

and
Texas Department of Transportation, Houston District
Houston, Texas

for Environmental Contractor
AECOM Technical Services, Inc.
Houston, Texas

and
for Primary Contractor
Atkins Global
Houston, Texas

on behalf of
The Grand Parkway Association
Houston, Texas

by

Prewitt and Associates, Inc.
Austin, Texas
PAI No. 213031

December 2014

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ABSTRACT

Prewitt and Associates, Inc., conducted historical resources studies for the proposed Grand Parkway Segment B (State Highway 99). The studies recorded 69 historic-age resources in the area of potential effects. Of these, 66 are recommended as not eligible for the National Register of Historic Places. No further work is warranted for resources recommended as not eligible.

Three resources are recommended as eligible for the National Register of Historic Places: the ca. 1908 American Rice Canal (Resource 54), the ca. 1925 Briscoe Canal (Resource 16), and the 1935 South Texas Water Company Canal (Resource 1). These structures are considered locally significant under Criterion A in the area of agriculture for their associations with rice cultivation; the Briscoe Canal may also be eligible under Criterion B in the area of agriculture for its associations with its founder; the South Texas Water Company Canal may also be eligible under Criterion C in the area of engineering as an excellent example of its type. These canal systems retain a high degree of integrity.

A determination of effects to these significant resources will require review of the most recent schematic drawings by the Texas Department of Transportation, Environmental Affairs Division, Historical Studies Branch, in consultation with the Texas Historical Commission. Preparation of schematic drawings is ongoing with plan views drafted and profiles generated; however, no survey has been conducted to date.

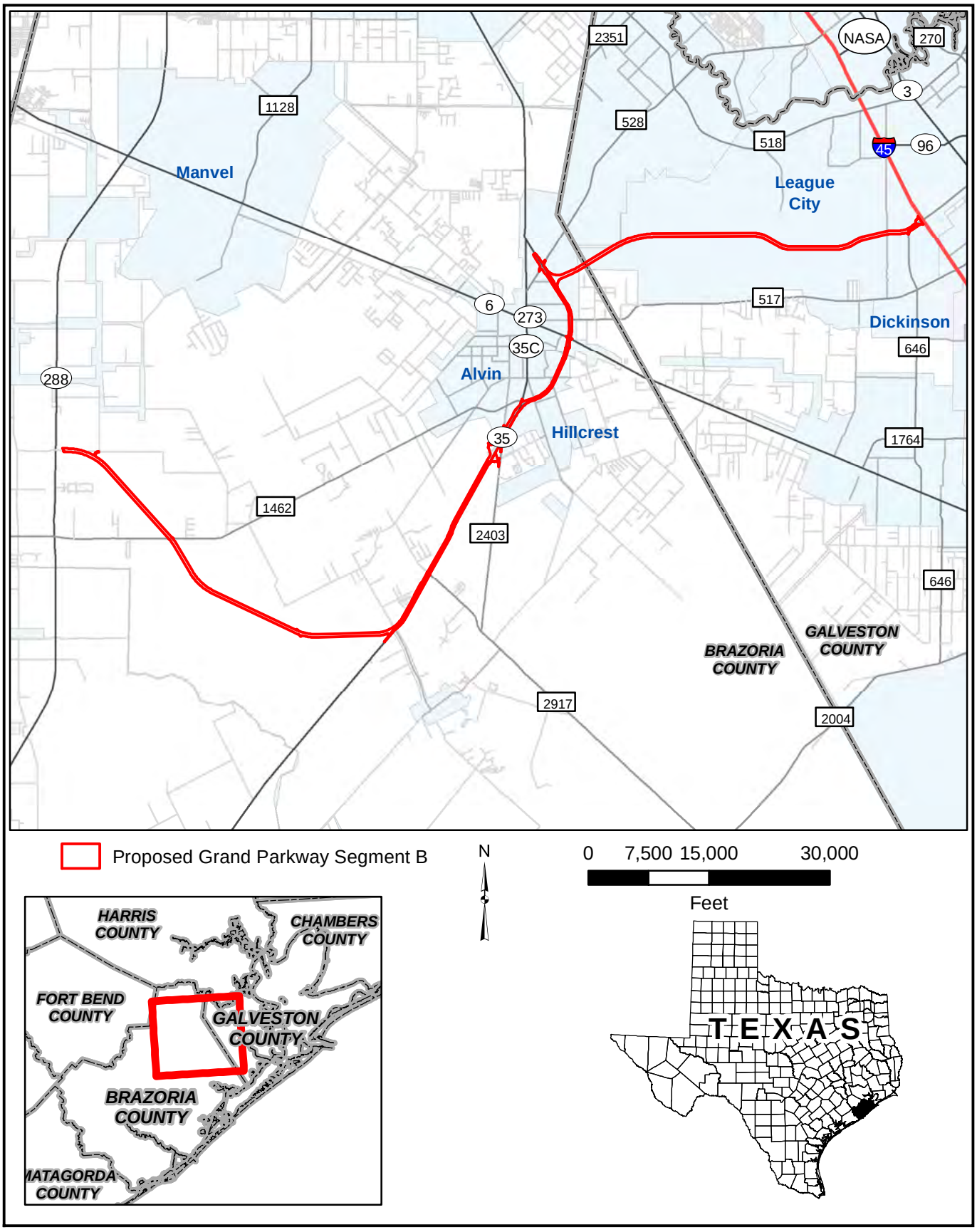
INTRODUCTION

Prewitt and Associates, Inc., a cultural resources consulting firm, conducted historical resources studies for The Grand Parkway Association, on behalf of primary contractor Atkins Global and environmental contractor AECOM Technical Services, Inc.

These studies were conducted for the proposed Grand Parkway Segment B (State Highway 99), a 28.2-mile alignment from State Highway 288 to Interstate Highway 45 South through Brazoria and Galveston Counties, Texas (Figure 1). The preferred alternative links new location segments east and west of State Highway 35 and its bypass near Alvin. The proposed right of way requires 1,468.79 acres: 396.75 acres along existing right of way and 1,072.04 acres along new location. The proposed controlled-access highway would have two main lanes in each direction in a 400-foot-wide right of way and auxiliary lanes between on- and off-ramps. The work would be performed under CSJ Nos. 3510-01-001 (four-lane tollway with interchanges and two noncontinuous two-lane frontage roads in Galveston County from Interstate Highway 45 South to the Brazoria County line), 3510-01-003 (four direct connectors at Interstate Highway 45 South in Galveston County), 3510-02-001 (four-lane tollway with interchanges and two noncontinuous two-lane frontage roads in Brazoria County from State Highway 288 to the Galveston County line), 3510-02-003 (four direct connectors at State Highway 35 in Brazoria County), and 3510-02-905 (four direct connectors at State Highway 288 in Brazoria County).

Figure 1. The proposed project area in Brazoria and Galveston Counties, Texas (figures follow the page on which they are referenced).

Figure 1


2351
NASA
270
3
1128
528
518
45
96
Manvel
League City
517
6
273
35C
Dickinson
646
288
Alvin
35
Hillcrest
1764
1462
2403
646
GALVESTON COUNTY
BRAZORIA COUNTY
2917
2004
Proposed Grand Parkway Segment B
N
0 7,500 15,000 30,000
Feet
HARRIS COUNTY
CHAMBERS COUNTY
FORT BEND COUNTY
GALVESTON COUNTY
BRAZORIA COUNTY
MATAGORDA COUNTY
TEXAS

Tasks associated with these historical resources studies included a preliminary study in 2003 (Dase 2003a); a file search, literature review, and development of a research design (Dase and Myers 2014); reconnaissance survey in May, June, and July 2014; and analysis incorporated into preparation of this report with findings in June and July 2014.

These historical resources studies were conducted in accordance with the provisions of the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation 48 Federal Regulation 44716–42) and take into consideration the National Historic Preservation Act of 1966, as amended (Public Law 96–515); the National Environmental Policy Act of 1969 (Public Law 90–190); the Archeological and Historical Preservation Act of 1974 (Public Law 93–291); Executive Order No. 11593 ("Protection and Enhancement of the Cultural Environment"); the First Amended Statewide Programmatic Agreement for Transportation Undertakings; and the Antiquities Code of Texas (Texas Natural Resources Code of 1977, Title 9, Heritage, Chapter 191). This reconnaissance survey report complies with the Texas Department of Transportation documentation standard for reconnaissance survey reports and provides sufficient documentation for determining the presence of historically significant properties in the area of potential effects for consultation with the Texas Historical Commission, the state historic preservation office (Texas Department of Transportation, Environmental Affairs Division, Historical Studies Branch 2014a).

The historical resources study area and area of potential effects for the proposed project comply with Texas Department of Transportation and Texas Historical Commission guidelines for transportation projects. The study area is defined as 1,300 feet beyond the proposed right of way of the preferred alternative route (Figure 2). The

area of potential effects along new location is defined as 300 feet beyond the proposed right of way and all land parcels partially or wholly therein; the area of potential effects along the existing transportation corridor (i.e., State Highway 35 and its Alvin bypass) is defined as 150 feet beyond the proposed right of way and all land parcels partially or wholly therein (see Figure 2). All resources in the area of potential effects constructed by 1975 were identified and, to the extent possible, documented during field investigations. The 1975 date accommodates the recommended 45-year guideline for identifying historic-age resources and the estimated March 1, 2020, construction-letting date for the proposed project.

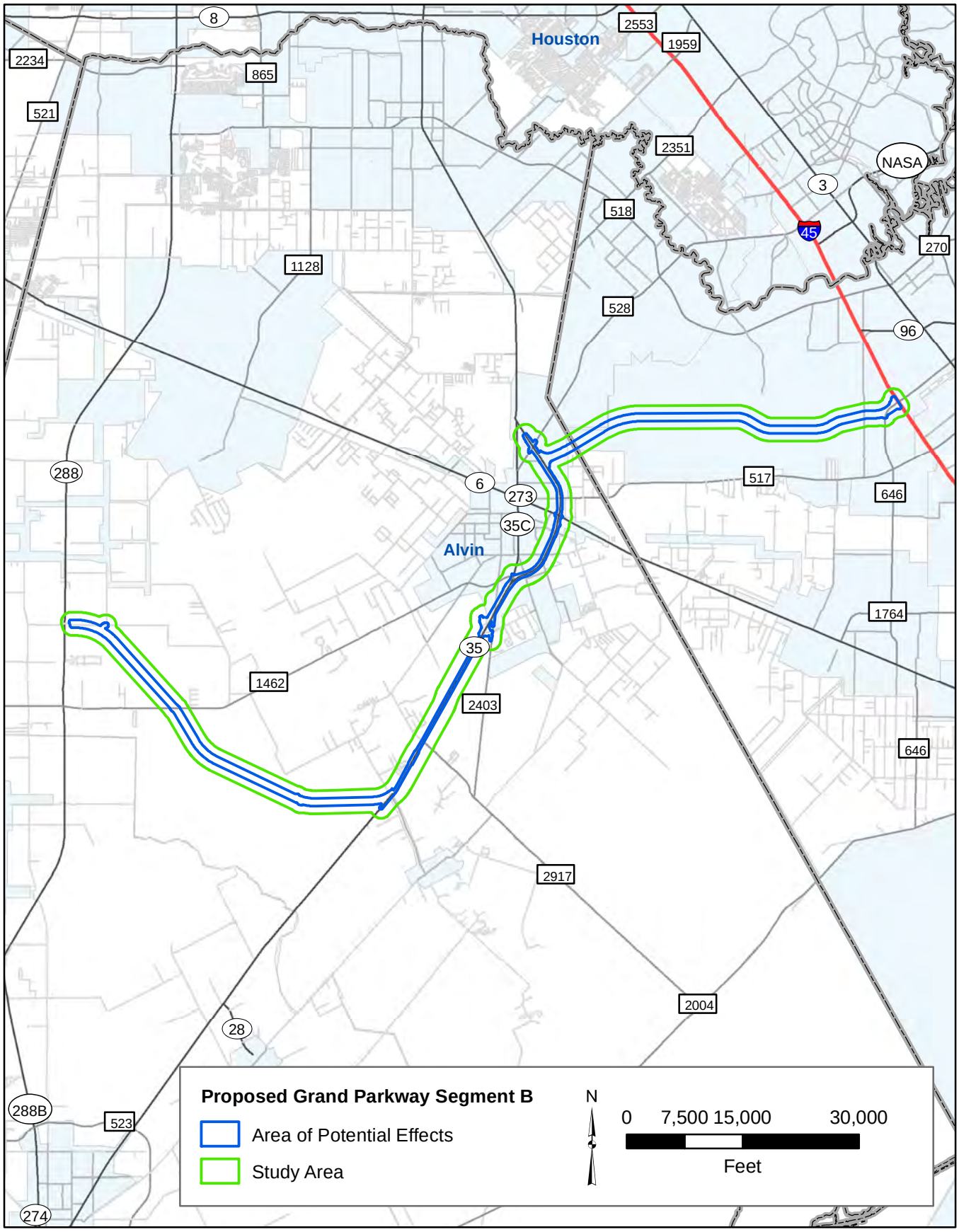
Figure 2. The study area and area of potential effects in Brazoria and Galveston Counties, Texas.

METHODOLOGY

File Searches and Results

A file search guided identification of designated historic properties and previously documented historic-age resources in the 1,300-foot study area. Information was gathered from the Texas Historical Commission's Texas Historic Sites Atlas documentation on National Historic Landmarks, National Register of Historic Places properties, State Antiquities Landmarks, Official Texas Historical Markers of all types, and cemetery, military, neighborhood, and museum surveys; the National Park Service's Historic American Buildings Survey, Historic American Landscapes Survey, and Historic American Engineering Record; and the Texas Department of Agriculture's Family Land Heritage Program. The Brazoria and Galveston County Historical

Figure 2


Houston
Alvin
NASA
8
2234
865
521
2553
1959
2351
3
518
45
270
1128
528
96
288
6
273
35C
517
646
1764
35
1462
2403
646
2917
2004
28
288B
523
274
Proposed Grand Parkway Segment B
Area of Potential Effects
Study Area
N
0
7,500
15,000
30,000
Feet

Commissions were contacted by e-mail on January 28, 2014 and by posted letter on April 24, 2014, to collect information about locally significant historical resources. These inquiries were sent to the Brazoria County Historical Commission chairman and marker chairman and the Galveston County Historical Commission chairman and marker chairman. No responses were received. The file search also included review of a 2003 preliminary study prepared for the Grand Parkway Segment B project, which covered a much larger study area and included a windshield survey to note common property types and extant historic-age resources (Dase 2003a).

The file search identified two designated Official Texas Historical Marker subject markers and a cemetery in the study area. One marker notes early settlement along Oyster Creek and Chocolate Bayou (Texas Historical Commission 1968a), and the other describes the Confederate Cemetery at Alvin, which was also recorded in a cemetery survey (Texas Historical Commission n.d., 1968b). No resources in the project area have National Historic Landmark, National Register, State Antiquities Landmark, or Recorded Texas Historical Marker designations. No resources in the project area have been previously identified or documented as part of military, neighborhood, or museum surveys; in the Historic American Buildings Survey, Historic American Landscapes Survey, or Historic American Engineering Record; or as part of the Family Land Heritage Program.

Literature Review and Results

A literature review guided identification of previously undocumented resources and relevant historic contexts in the study area. Maps, aerial images, and appraisal

district records were useful for detecting potential locations of previously undocumented historic-age resources. Twentieth-century topographic and highway maps trace mid- to late-twentieth-century development (Armstrong and Barrow 1939; Armstrong and Morriss 1947; Brazoria County Abstract Company 1918; Historic Aerials 1929, 1932, 1946, 1957; Tennessee Valley Authority 1943a–d; Texas State Highway Department 1939, 1940, 1961a, 1961b; U.S. Army Map Service 1943; U.S. Department of the Interior, U.S. Geological Survey 1932a, 1932b, 1952, 1955, 1956a, 1956b, 1963a–c, 1969a–c, 1974a, 1974b). Mid-century and recent aerial images were analyzed (U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service 1944a, 1944b; U.S. Department of Agriculture, National Agriculture Imagery Program 2013a, 2013b; U.S. Department of the Interior, U.S. Geological Survey 1961a, 1961b, 1969d, 1969e). Appraisal district records were reviewed for both Brazoria and Galveston Counties (Brazoria County Appraisal District 2014; Galveston Central Appraisal District 2014). These records often show approximate construction dates for improvements and are particularly reliable for those resources built in the last quarter of the twentieth century and later. Discrepancies in earlier dates are frequent, but these were rectified during field investigations.

Primary and secondary sources guided identification of historic contexts relevant to the study area. For a preliminary study of Grand Parkway Segment B, Dase (2003a) reviewed numerous primary and secondary sources at the Brazoria County Historical Museum in Angleton; branches of the Brazoria County Library System (Alvin Public Library and Angleton Public Library); the Helen Hall Library in League City and the Moore Memorial Public Library in Texas City; the Center for American History and the Perry Castañeda Library at the University of Texas in Austin; the Galveston and Texas

History Center of the Rosenberg Library in Galveston; and the Texas State Library and Archives and the Texas General Land Office in Austin. Texas Railroad Commission files provided documentation on pipelines (Texas Railroad Commission 2014a–l). Deed records, Texas Board of Water Engineeers reports, vital statistics, Secretary of State files, a court case, federal manuscript population schedules, and a directory of Texas industries were examined. The National Bridge Inventory Database listed information on bridges (National Bridge Inventory Database 2014a–f). Newspapers for Alvin, Angleton, Freeport, Galveston, and Houston provided information about resources. Published and unpublished histories were consulted (Alvin Community College 1979; Brazoria County Federation of Women's Clubs 1940; Creighton 1975; Daughters of the Republic of Texas, Cradle of Texas Chapter 1965; Gray n.d.; Hughes et al. 2000; Trippodo 1994). The Handbook of Texas Online and other websites supplied details on both local history and broad topics that apply to the study area (Blanchette 2014; Brazos River Authority 2014; Bryant 2014; City of Alvin 2014; Damon 2014; Dethloff 2014; Disney [1888]; Gulf Coast Water Authority 2014; The Handbook of Texas Online 2014a, 2014b; Jones 2014; Kleiner 2014a, 2014b; McComb 2014; Odom 2014; Olien 2014; Perry 2014; Rocap 2014; Sedona Lakes 2014; D. Smith 2014; J. C. Smith 2014; Texas Department of Transportation 2014a, 2014b). Additional secondary sources related to interpreting property types and stylistic influences and evaluating resources were consulted after completion of field investigations (Andrus and Shrimpton 2002; Dase 2003b; Foster 2004; Jakle et al. 1989; Jones 2003; Knight 2009; McAlester and McAlester 2000; Moore et al. 2013).

A research design was prepared to summarize the results of the file search and literature review and to guide field investigations based on the Texas Department of

Transportation documentation standard for historic resources research designs (Texas Department of Transportation, Environmental Affairs Division, Historical Studies Branch 2014b). The Texas Department of Transportation approved the research design on April 18, 2014. The literature review identified four relevant historic contexts for the 1850–1975 period of significance: early Anglo American settlement, community planning and development, agriculture, and industrial extraction and processing.

Field Investigations

Historians meeting the Secretary of the Interior's professional qualifications standards conducted the survey. The primary contractor supplied right of way and right-of-entry documentation, although access was not obtained for all land parcels.

The reconnaissance survey began with driving in and around the area of potential effects and adjacent and intersecting side roads to become familiar with the study area. The survey included photographic and resource-specific documentation of each building, structure, and object constructed by 1975. At least two digital photographs (generally 4,000x3,000-pixel resolution minimum) were taken of each identified historic-age resource. Information about each resource was recorded to develop an inventory that includes name, location (street address or geographic coordinates[1]), property type and subtype, stylistic influence or form, known or estimated construction date, integrity issues, and National Register eligibility recommendation. Since potential historic districts may have been present in the area of potential effects, photographs of

[1] Survey forms and tables indicate latitude and longitude to the nearest hundredth, GIS metadata on the disk provided indicates geographic points to $1x10^{-10}$.

representative historic-age and nonhistoric resources were taken. Historical resources survey forms with documentation information and photographs, and in many cases, topographic maps and aerial images, are in Appendix A. Additional research at the Brazoria County Historical Museum in Angleton was conducted during field investigations.

Minor limitations hampered documentation in the area of potential effects (Table 1). Despite every effort to learn about the formation and construction of the canal systems, it seems that very little records are readily available. Additional research conducted during field investigations was not fruitful, and the Gulf Coast Water Authority, a likely source, did not return repeated requests for sources like historical maps or documents. In addition, some resources were difficult to photograph. Traffic along some two-lane roads was difficult to negotiate, with slim to no shoulder along the rights of way. In some cases, the area of potential effects passed through large parcels of farmland that had no public road access or had locked field gates. One encounter with an alligator ended safely. Bright sunshine created shadows that masked architectural details. Oblique views are not obtainable for houses positioned on the Pennington Drive cul de sac. Foliage and vehicles obstructed some views, which made it difficult to capture images that have resources filling the frame, that show multiple views, or that portray relationships between the proposed roadway and the resources. Topographic maps and aerial images supplied sufficient documentation of the many underground pipelines. Despite these challenges, the resources were sufficiently documented to substantiate National Register eligibility recommendations.

Table 1. Documentation limitations

Resource Number	Limitations
Resource 1	Limited access points
Resource 8	Foliage
Resource 9	Vehicles
Resource 16	Limited access points
Resource 18	Foliage
Resource 19	Foliage
Resource 24	Vehicles
Resource 25	Vehicles
Resource 34	Cul de sac
Resource 35	Cul de sac
Resource 36	Cul de sac
Resource 37	Cul de sac
Resource 42	Foliage
Resource 44	Foliage
Resource 54	Limited access points

Analysis of Resources

After synthesizing the research and field investigations, the historian evaluated each historic-age resource in the area of potential effects to assess National Register eligibility. Eligible historic properties are buildings, structures, objects, sites, or districts that meet the National Register criteria for evaluation. The criteria call for properties considered eligible to be significant for historical associations with events or broad patterns in history (Criterion A), persons (Criterion B), architecture (Criterion C), or prehistoric or historic archeology (Criterion D) (Andrus and Shrimpton 2002). In general, properties that are eligible should be 50 years of age or older. To the extent possible, given the limited secondary research allocated for reconnaissance-level contextual documentation, resources in this area of potential effects were evaluated under Criterion A or B when associative qualities were obvious. Each historic-age resource was also evaluated under Criterion C. Criterion D, reserved for historic and prehistoric

archeological resources, has no application to resources documented as part of this reconnaissance survey. For each of the criterion, historic-age resources were evaluated within the relevant historic contexts.

Registration requirements applied to this area of potential effects guided examination of each resource's integrity, which informed recommendations regarding eligibility for the National Register. For resources to be considered eligible, they should retain historical and architectural authenticity, best articulated by the seven aspects of integrity: location, setting, design, materials, workmanship, feeling, and association (Andrus and Shrimpton 2002). However, differing levels of these aspects of integrity will apply in this area of potential effects, depending on the criterion under consideration.

Resources in the area of potential effects that may be considered eligible for the National Register under Criterion A or B are those associated with events or broad patterns in history or persons affiliated with those activities. Although it is necessary to consider physical integrity of resources evaluated under Criterion A or B, attributes of historical integrity will be more highly valued for these criteria. Thus, the most important aspects of integrity for evaluating resources under these criteria are location, feeling, and association. Resources evaluated under these criteria must also be assessed with respect to integrity of setting, design, materials, and workmanship, but will not be held to as high a standard for these physical attributes. Although stronger candidates will likely offer good representation of each of the seven aspects of integrity, at a minimum, resources eligible under Criterion A or B must be in their original location and retain much of their historic fabric, including building footprint, fenestration pattern, and character-defining details. These resources may have undergone one or more nonhistoric changes that would be acceptable if intrinsic physical features remain

intact. Those that have accumulated more than one change, causing a higher percentage of loss to original historic fabric and architectural design, are less likely to be eligible. Also less likely to be eligible are resources that have experienced major changes such as altered fenestration patterns, unsympathetic additions, or loss of important components. Those that are in poor physical condition or were moved from their original location and setting are not likely to be eligible. Historic-period changes are acceptable. Resources evaluated as eligible under Criterion A or B should retain notable integrity of feeling, best accomplished with an intact setting that conveys information about the germane period of significance. Integrity of association must be present with evidence, preferably archival research, that relates specific information about how the resource, or its owner or occupant, was affiliated with specific events or patterns related to the applicable historic contexts.

Resources in the area of potential effects that may be considered eligible for the National Register under Criterion C will embody the distinctive characteristics of a style, type, period, or method of construction, and may be representative or rare examples. Although it is necessary to consider the historical significance and integrity of resources evaluated under Criterion C, attributes of architectural significance and physical integrity will be more highly valued for this criterion. Thus, the most important aspects of integrity for evaluating resources under this criterion are design, materials, workmanship, and association. Resources evaluated under this criterion must also be assessed with respect to integrity of location, setting, and feeling, but will not be held to as high a standard for these less tangible attributes. Architectural significance and integrity are evaluated by comparing resources to others that are similar in and near the study area. They should have experienced no or few intrusive alterations that

permanently modify their design, materials, or workmanship. Consequently, they should be exemplary and retain character-defining features associated with these physical aspects of integrity. Historic-period changes are acceptable. Integrity of association must be present with an explanation that relates how a resource exudes representation or rarity. Resources eligible under Criterion C should remain in their original location and retain their historic-period setting. Integrity of feeling is best accomplished with an intact setting that conveys information about the germane period of significance.

HISTORICAL BACKGROUND

The proposed improvements are primarily in the northeast quadrant of Brazoria County, extending a short distance into western Galveston County (see Figure 1). Three marshy waterways course through the study area and flow into the Gulf of Mexico. Dickinson Bayou, the only waterway that maintains a constant flow, rises in western Galveston County, about 2 miles northeast of Alvin, and flows into Dickinson Bay. Bayous are slow-moving bodies of water in relatively flat terrain along the Gulf Coast. Their marshy with brackish waters support a large variety of plants and animals. Chocolate Bayou, which formed the eastern boundary of Stephen F. Austin's first colony, rises near Arcola in Fort Bend County and flows southeast to Chocolate Bay (Figure 3). Its upper reaches pass through the study area, but they are intermittent and thus an impermanent feature of the landscape. Mustang Bayou flows southeast from its rise just east of Missouri City, in Fort Bend County, to its junction with Persimmon Bayou and on to its mouth on New Bayou. It passes north of Alvin and, like Chocolate Bayou, is seasonal in its upper reaches.

Figure 3. Chocolate Bayou at its crossing with State Highway 35.

Early Anglo American settlement in Southeast Texas began with Stephen F. Austin's colony along the coast in the early 1820s. He succeeded in bringing 300 families to the mouths of the Brazos and Colorado rivers by late 1825. Most of Austin's colonists settled along the rivers, where the soil was rich and they had access to seagoing vessels for goods, news, and travel. Some colonists built substantial plantations along fertile river bottoms where sugar became the principal cash crop. Small towns like East Columbia and Brazoria were established along the lower Brazos River and had dry goods stores to supply nearby plantations like Peach Point and Eagle Island. Dedicated entrepreneurs among Austin's colonists settled on Galveston Island, where they began successful businesses and turned the uninhabited strip of land into a busy seaport. Galveston quickly advanced as the financial center of Texas. By 1870, the city was the state's largest, with 13,818 residents (McComb 2014).

Settlers in northeastern Brazoria and northwestern Galveston Counties from the 1830s into the 1860s were typically farmers raising livestock and food crops for their own consumption. Most slaveowners and their slaves lived in log dwellings in contrast with the stately plantation houses along some sections of the Brazos River. The Brazoria County pioneers who ventured into the interior eked out a meager existence for their families, relying on the inland Chocolate and Mustang Bayous for water. Among them were William Harris, who owned a sawmill and 2,362 acres of land on Chocolate Bayou by 1833. Other nineteenth-century residents along Chocolate Bayou included Joseph Clement, who came to the region in 1833, and Gottfried Moller, who arrived in 1841. Alexander Compton and his family came to Oyster Creek in 1845 and acquired 300 acres on or near Chocolate Bayou. The Thomas family settled on Mustang "slough" in the area

Figure 3

of present-day Alvin, although the exact location of their homestead is unknown (Figure 4). Slaves built the Thomas house with cedar logs cut at a Chocolate Bayou sawmill (Creighton 1975:191).

Figure 4. Mustang Bayou under a concrete bridge and pipeline on State Highway 35 in Alvin.

Local commerce in Chocolate Bayou was limited to the trading post and sawmill, which served scattered family farms in the immediate vicinity. People poled up and down the bayous by raft to visit trading posts and catch up on news, but such travel was tenuous as the water flow and depth were unreliable. Early inhabitants were fairly isolated and left no remnant buildings in these sections of Brazoria and Galveston Counties. However, the early settlement of this area is commemorated with a state historical marker on State Highway 35, near the bayou (Resource 11).

Although residents of the bayou country were not wealthy plantation owners or Galveston financiers who had a lot to lose if the Union prevailed, they typically supported the Southern cause. When the Civil War erupted, twin brothers Lige Thomas and Lish Thomas joined Terry's Texas Rangers and saw considerable action in the war (Creighton 1975:191). One of Frank Durant's boys, George W. Durant, organized the Magnolia Rangers and fought for the Confederacy. A Confederate artillery training ground was on the south side of Chocolate Bayou in 1861, where present-day Camp Mohawk is situated. Other sites in the vicinity associated with the Confederacy are the Nolan House, which served as a Confederate hospital, and the Galveston, Houston, and Henderson Railroad, one of the first built in Texas, which helped General John B. Magruder stage his successful retaking of Galveston in 1863 (Rocap 2014).

Figure 4

Transportation advances in the latter half of the nineteenth century finally encouraged more settlers and town builders to the inland reaches of Brazoria and Galveston Counties. In the 1860s, the Gulf, Colorado, and Santa Fe Railroad constructed a line through present-day Alvin along its Galveston-to-Richmond branch. Other rail and road improvements in the 1870s attracted modest growth. Farmers continued to raise livestock, a task made easier with rail transportation to carry cattle to market, yet most still engaged in subsistence farming.

Several individuals corroborated to build a townsite at a local railroad stop along Gulf, Colorado, and Santa Fe Railroad. In 1872, the railroad company hired Alvin Morgan (1842–1909) to oversee operations at a water stop on the prairie. His duties included loading cattle from livestock pens to box cars and maintaining pumping equipment for steam engines (Blanchette 2014; Jacob 1949). Morgan apparently visited the site and was impressed with its possibilities. He stayed with the Thomas family on Chocolate Bayou and may have been encouraged by their enthusiasm for the region (Creighton 1975:191). In 1879, Morgan built the first house at the station and encouraged others to settle nearby. Within a year, the population warranted a post office. The place was named for its first resident, but because a Morgan, Texas, already existed, the postal authorities called it Alvin. The enterprising Morgan opened a store in 1882. That year, he and the railroad company filed for a subdivision deed for Morgan's Addition. The railroad bargained for its right of way and a depot site and agreed to lay out 75 acres of surrounding land as town lots and blocks in Morgan's Addition. Morgan was to receive a one-half interest in the expected development profits (Creighton 1975:287). George W. Durant disputed Morgan's ownership. The State of Texas had appointed Durant as the Brazoria County surveyor and granted him three sections of

land, including one Morgan occupied. Durant's family had settled in north-central Brazoria County before the Civil War, so he was at home in the territory. Morgan insisted that he had paid a dollar per acre for 160 acres and that his "squatter's rights" should prevail. The two men worked out an agreement that profited both, and Durant is credited as the "father of Alvin" for his role in its development (Creighton 1975:287). In 1888, Durant filed for a subdivision deed for Alvin No. 1 Addition, which became the city's main commercial zone. Durant formed a partnership with L. M. Disney who immediately advertised the addition in northern newspapers (Creighton 1975:287).

Durant's aspirations grew as his town-building endeavors proved moderately successful. In addition to commercial and residential sales in Alvin, Durant and Disney subdivided large tracts of northeastern Brazoria County into small truck farms. Disney is credited with promoting undeveloped land near Alvin to farmers throughout the country. He called himself the "Pioneer land agent of the Alvin country," and took out full-page advertisements in newspapers and periodicals geared to attract Midwestern and Northern farmers to the Gulf Coast. He referred to Alvin as "The Center of the Gulf Coast Fruit Belt," and offered farms as small as 5 acres and as large as 50,000 acres on easy terms, where, according to Disney, pears, peaches, plums and grapes thrived (Figure 5). Initial response to Disney's entreaties was tepid; by 1890, only 100 people called Alvin home. Within six years, however, the population swelled to 2,000. In the 1890s, Alvin boasted six hotels, four churches, two weekly newspapers, a 10-ton ice plant, a bank, a pickle factory, a cotton gin, and an opera house. The Confederate Cemetery (Resource 48) was founded in 1891 on a plot of land near the south edge of town. The cemetery comprises several blocks divided into sectors with internal roads and paths. A state historical marker (Resource 49) embedded in one of the stone pillars at the

north entrance commemorates the cemetery. A public school and a normal school were built during this time, and fraternal orders included the Eastern Star, Woodmen of the World, and Knights of Pythias (Blanchette 2002). Early houses were frame dwellings scattered along dirt streets behind a handful of commercial buildings. By 1912, however, a fashionable enclave known as The Heights developed northwest of town.

Figure 5. Disney's ca. 1888 advertisement in the *Texas Land News* magazine espouses the merits of the Gulf Coast fruit belt (Disney [1888]).

Mustang Bayou, which flowed through the center of town, caused one of the city's early civic problems. The snake-like bayou was subject to flooding, jumping its banks and creating new channels, sometimes under houses or businesses. In January 1908, members of the Alvin Business League met with representatives of the railroad to enlist their cooperation in straightening the bayou. The railroad held a vested interest as it owned considerable land in the city. City leaders considered the bayou's potential for irrigation but decided it was too unreliable as a water source. Ultimately, a crew dug a 6-mile-long ditch that was 30 feet wide and 3 feet deep. The bayou was tapped about 3 miles above town, channeled in a southeasterly direction from there, and returned to the bayou's main branch about 6 miles south of town (*The Alvin Sun* 1908).

In the first decades of the twentieth century, Midwestern developers purchased large parcels of local farmland at rock-bottom prices. These developers subdivided the land into 10-acre plots for resale to other Midwesterners who were tired of long, harsh winters in their home states. One of the most successful of these companies in the project area was the Emigration Land Company, better known as the Iowa Colony, headed by B. J. Baird and George Huffman of Des Moines. The two men visited Texas in 1908 and

Figure 5

TEXAS LAND NEWS.

ALVIN

THE CENTER OF THE GULF COAST FRUIT BELT.

ALVIN is a town of about 1000 inhabitants, situated at the junction of the main line of the Santa Fe and the Houston Branch, being 20 miles from Galveston, 23 miles from Houston, and 30 miles from Velasco. In three years Alvin has developed from a mere railroad station into a flourishing town, whose population is composed of the best citizens of a number of the Western States, including a fair proportion from Texas. The degree of intelligence and morality possessed by its inhabitants greatly excels that usually found in the smaller towns.

. . . ALVIN ENJOYS THE ABSENCE OF SALOONS . . .

Being a local option town, which fact alone has induced the most desirable class of people to locate in and about it. It is well supplied with schools and churches. The Methodist and Christian denominations have each built commodious church buildings, and the Presbyterians and Baptists are now in process of building.

FOURTEEN PASSENGER AND EXPRESS TRAINS COME AND GO EACH DAY

Thus affording splendid shipping facilities for the large quantities of strawberries and vegetables grown.

The country about Alvin is prarie; the soil is a dark, sandy loam, with a clay subsoil, underlaid at a depth of from ten to fifteen feet with a stratum of water bearing quicksand, which furnishes splendid sub-irrigation. The average rainfall is about 45 inches, which is equally distributed through the year.

The different kinds of grain bring forth good crops: their cultivation thus far, however, has been neglected owing to the fact that much larger revenue is derived from the cultivation of fruits and vegetables. The following statistics taken from the reports of the Wells, Fargo Express Agent will show better than long paragraphs what is being accomplished at Alvin.

Shipments of Strawberries:

FEBRUARY—	235	Crates of	twenty-four	quarts each.
MARCH	2,007	"	"	"
APRIL	2,734	"	"	"

During the same period, **1,882** cases of vegetables were shipped, and in addition to the above crates, **Twenty-one car loads** were shipped in refrigerator cars, containing **6,159** crates of strawberries, besides a number of cases of vegetables. Total shipments made up to May 1st.—

STRAWBERRIES, 12,132 Crates.
VEGETABLES, 1,882 Cases, plus amount shipped in cars.

These are facts which can be verified by the records at any time. These shipments were distributed over the whole United States, some going as far as New York, in which market berries sold as high as $16.00 per crate. The sale of berries has averaged about $4.00 per crate, netting the producer about $3.00 per crate above shipping and commission expenses.

PEARS, PEACHES, PLUMS and GRAPES

Are fruits, the cultivation of which is making this portion of the Gulf Coast country famous as a fruit country. The Leconte, Garber and Keifer varieties of pears have been proven beyond a doubt to be a grand success. The Leconte is the earliest variety of pears grown anywhere in the United States, and we are able to place this variety on the market during the latter part of June, which is at least three weeks earlier than pears can be harvested in California.

The coast is fast becoming famous as a health resort. The salt gulf breezes are very invigorating, and help to produce a climate that is as near perfect as can be. Lands are very cheap, as compared with first-class lands of other countries, though prices are continually rising. If you desire a home in the best part of the Sunny South, and are interested in the culture of fruit, you are respectfully invited to call on or address L. M. Disney, the Pioneer Land Agent of the Alvin country, who will be pleased to give any information concerning the Alvin country that you may desire.

Lands for sale in any size tract, ranging from 5 to 50,000 acres. Fruit lands a specialty, though ranch and general farm lands are also handled. Prices range from $8.00 to $50.00 per acre, according to distance from railroad station. Terms easy.

L. M. DISNEY,

Land Agent, Alvin, Texas.

chartered their company later that year. They toured the country, touting the benefits of life in northeastern Brazoria County, and by the end of that year, they had recruited settlers from Iowa, Illinois, Ohio, New Jersey, and California (*Houston Chronicle* 1976).

The 22,000-acre townsite was named the Iowa Colony for the native state of most inhabitants (*Houston Chronicle* 1976). The community boundaries extended to Rosharon on the southwest; Bonney, Sandy Point, Juliff, and Arcola on the west; and Manvel on the northeast (Huffman n.d.). The colonists labored to build hard-surface and shell roads through the area. They financed the Iowa Colony Drainage District No. 5, which watered 78,000 acres of land, with $269,000 in bonds (Huffman n.d.). However, the great storm of 1915 damaged or destroyed nearly every building in the community and ruined their farms. Many of the colonists left after the hurricane. Nevertheless, the drainage district imprinted the landscape permanently with its road system, canals, feeder canals, ditches, and levees.

Another lasting contribution from the Iowa Colony was the establishment of the Gulf Coast Union Camp Meeting Grounds, a 40-acre wooded campground. In 1929, Iowa Colony residents Rosanna Hoskins Moller and William Anderson Moller founded the Gulf Coast Union Camp Meeting Association to honor the Federal effort in the Civil War. Surrounded by Southern sympathizers, they enlisted other northern transplants to their cause and purchased the former Confederate training ground for outdoor recreation and regular meetings. They built woodland trails, established permanent campsites, and dammed a bend in Chocolate Bayou for swimming (Resource 13C). The association eventually had 24 directors and hundreds of members. They erected cabins and dormitories for a children's camp. In 1951, the association built a swimming pool (Resource 13B), and in 1965 hired an architect to design a Contemporary Style brick

chapel (Resource 13A) on the grounds (*The Angleton Times* 1965). Although they originally came together to promote their Union heritage, the organization eventually welcomed other groups, especially church associations and children's groups. In 2001, the association conveyed the property to Brazoria County. The county improved the campground, now known as Camp Mohawk, with cabins, dormitories, and other amenities (James McKillop, park manager, personal communication, June 5, 2014).

In the early twentieth century, agriculture remained the backbone of the economy with the several canal systems built in the Alvin area supporting farmers with reliable water sources. The Holland-American Rice Canal and Colonization Company was charted in 1902 to construct a large canal system (Texas Secretary of State 1902). In 1903, the company was based in Houston and capitalized at $250,000 (Walton & Walton 1903:318). Later known as the American Rice Canal (Resource 54), the system was simply called "the American Canal" by the early 1940s. It was possibly built by about 1905, but little is known about the organization or construction of the system. The water travels as far as 150 miles from the Brazos River and is pumped through natural creeks before entering the manmade canal. The system's 1929 route appears largely unchanged in 1932 and 1946. By 1957, some sublaterals were no longer apparent (Historic Aerials 1929, 1932, 1946, 1957). In 1966, the system was joined with the later-developed Briscoe and Chocolate Canal systems. Today, the journey ends in a 900-acre reservoir in Texas City (Sedona Lakes 2014).

The Texas legislature authorized the formation of drainage districts in 1905, prompting the development of more systems. These organizations established irrigation canals, drains, ditches, and levees and provided for their maintenance (Smith 2014). Throughout the Gulf Coast region, irrigation systems prevented flooding in the rainy

winter months and distributed water to fields during the long hot seasons, creating a constant and reliable water source for crops and livestock. Rice cultivation, in particular, benefited from irrigation networks. Brazoria County had 6,000 acres in rice production by 1903, and the Cane and Rice Belt Irrigation Company began with a pump station on the Brazos River in 1908 (Dase 2003a). Additional pump and relift stations and canals were added to this system in the 1930s through to Brazoria and Galveston Counties. It is possible that the American Canal subsumed this system.

The Briscoe Irrigation Company Canal (Resource 16) served fields in northeast Brazoria and southwest Galveston counties (Jones 2014). Robert T. Briscoe (1881–1970) started his private operation in the 1920s, and his canal was irrigating 75 acres by 1925 with an annual appropriation of 150 acre-feet of pumped public water. He continued to investigate extending his system into the late 1920s (Texas Board of Water Engineers [1926]:38, [1928]:14, [1930]:10, 13; Texas Department of State Health Services, Vital Statistics Unit 1970; U.S. Department of the Interior, Census Office 1880). In 1900, Briscoe lived with his parents in Fort Bend County and worked as a salesman (U.S. Department of the Interior, Census Office 1900). The 28-year-old was a rice farmer in Wharton County by 1910, with a cook and a farmhand (U.S. Department of Commerce and Labor, Bureau of the Census 1910). In 1940, he was managing the irrigation system and renting a house on Mulberry Street in Angleton, where he lived with his wife, Jewell Morris Briscoe, and their two children (U.S. Department of Commerce, Bureau of the Census 1940a). Briscoe Irrigation Company Canal started its pumps on August 1941, initially watering more than 10,000 acres with three 230,000-gallon-capacity pumps; the following year it was extended 10 more miles to reach 15 new farms and irrigate about 24,000 acres. The McGinnes Brothers, a Houston construction company, built the

extension, adding siphons under road crossings and locks and bridges (*The Freeport Facts* 1942:3; *The Galveston Daily News* 1941a:9, 1941b:9). By the early 1940s, the structure was known locally as the Briscoe Canal.

The last major irrigation company to make improvements in the area was the South Texas Water Company, which built an irrigation system (Resource 1) west of Alvin. L. D. Clements, Robert Q. Pegram, and William E. Davant organized the company in 1934 to develop and operate an irrigation system to supply water from the Brazos River for the production of rice near Rosharon, where they had an office. In 1940, Clements resided in Wharton, and Pegram in Houston, and both worked for the irrigation company; Davant was a lawyer living in Bay City (U.S. Department of Commerce, Bureau of the Census 1940a–c). The same men also organized the South Texas Rice Production Company, reorganized as South Texas Rice Farms in 1941. The water company leased a vast amount of land, which the production company subleased. South Texas Rice Farms had farmers cultivate various tracts that belonged to absentee owners. The production company furnished the seed rice, the land, and the water, and paid half the cost of fertilizing. Half of the proceeds went to the farmers and half to the production company. The operations encompassed 20,000 and 30,000 acres annually. Land sales were predicated on rice production and adequate irrigation on the part of the company, with deeds expressly stating "the purpose for which this land is leased is the planting and cultivation of rice thereon." The water company maintained an easement to erect and maintain any irrigation features such as canals and ditches. The company had enticed about 75 rice farmers to the area between Alvin and Rosharon by 1940 (Brazoria County 1934; Jones 2014; U.S. Court of Appeals, Fifth Circuit 1955).

These irrigation systems were critical to the local economy. By 1948, Brazoria County led the nation in rice production valued at more than $10 million. Rice continued to be a principal agricultural crop into the second half of the twentieth century, and Alvin, in the midst of the rice belt, had a rice mill and three rice dryers to facilitate processing (Dase 2003a). Although the private owners of the Briscoe and American Rice Canals quibbled over routes for industrial water to Texas City in the late 1940s, each sold their interests to the Brazos River Authority between 1966 and 1967 (Brazos River Authority 2014; *The Galveston Daily News* 1947:1; Gulf Coast Water Authority 2014). In 1988, these systems were conveyed to the Galveston County Water Authority, now known as the Gulf Coast Water Authority, to supply water for irrigation, industry, and municipal use (Brazos River Authority 2014; Gulf Coast Water Authority 2014). In 2006, the authority purchased the Chocolate Bayou Water Company, also known as the Juliff Canal System, which included another pump station on the Brazos River and pump stations on Chocolate, Mustang, and Halls Bayous (Gulf Coast Water Authority 2014). Today, a daily average of 196 million gallons of water is shipped to 18 cities and industrial customers, including refineries and chemical plants in Texas City (Sedona Lakes 2014).

The alignments of the main canals and laterals remain essentially as they were originally engineered. Each of the three canals is comprised of features for diversion (diversion dams, inlet channels, lift and relift pumping stations, head gates, and settling basins), conveyance (main canals, laterals, reservoirs, flumes, siphons, culverts, and underground pipelines), distribution (check, head, take-out, and sand gates; gauging sheds, weirs, division boxes and gates, pump stands, surge chambers, diversion stands, and vents), and delivery (sublateral canals and surface and spray pipes). Related

infrastructure includes bridges, roads, drainage and seepage ditches, and levees. When the ditches were dug, the dirt was piled on the sides to form fairly steep embankments that protect the canals. The canals were designed with gradients that allow the water flow velocity to clean the structures and keep them free of silt deposits. Some were lined with concrete to prevent seepage, and drainage pipe was appended to facilitate adequate soil drainage and to control alkali.

Livestock raising had been a staple of the area's agricultural economy long before the railroad arrived, and local farmers raised range cattle that could survive on prairie grasses well into the twentieth century. The advent of irrigation made dairy farming profitable with water to grow alfalfa and other feed crops. Local dairy farms include the Winston Dairy (east of Alvin), the Hicks Dairy (near Manvel), and the Weigand Dairy (west of Dickinson) (Alvin Community College 1979; Odom 2014; Trippodo 1994). Small-scale dairy farms gave way to larger corporate farms in the 1930s. Such operations eclipsed family farms through mass production, lower prices, and their ability to pasteurize milk—by then a legal requirement—with new and expensive equipment. Unable to compete, small dairy farms declined locally, and by mid-century most had been consumed by conglomerates (Dase 2003a).

Transportation improvements played a central role in twentieth-century local development. In the early decades, farmers relied on the railroad to ship livestock and crops to market. Before state highway improvements, farmers traveled circuitous routes shell- or gravel-lined roads to markets. By the 1920s and 1930s, road projects such as State Highways 6 and 35 gave farmers well-maintained, all-weather roads to truck goods to large nearby cities as well as northern destinations. Both highways were on-system by 1939. State Highway 6, which intersects the study area, provided a path between

Galveston and Waco (Texas Department of Transportation 2014a). State Highway 35, which wends through much of the study area, linked local farms to the south with a direct route to Houston (Texas Department of Transportation 2014b). A bridge (Resource 12) to ford Chocolate Bayou and another (Resource 10) to traverse one of the waterway's meanderings were constructed in 1937; Resource 10 was rebuilt and widened in 1958 and Resource 12 was rebuilt and widened in 1998 (National Bridge Inventory Database 2014a, 2014b). A few families built modest dwellings along and near the road before World War II, including a side-gable house and garage (Resources 14A–B) and a Colonial Revival house (Resource 18), both built in about 1940. A row of ca. 1940 bungalows were between State Highway 35 Business and Mustang Road, although only one remains extant (Resources 26A–B).

Petroleum and natural gas exploration occurred in the study area a few decades into the twentieth century. In 1931, the Texas Oil Company opened the Manvel Oil Field. This discovery inspired further exploration: oil was discovered at Dickinson in 1934 and at Iowa Colony in 1948. The League City Oil Field (Resource 58) was in operation by 1952. This field is on the Upper Wilcox formation, which extends along the entire Gulf Coastal Plain. The League City field was very active in 1969 with well pads, oil tanks, and pit liners on a roadway system with worker's houses nearby (U.S. Department of the Interior, U.S. Geological Survey 1969e).

Oil and natural gas pipelines make a notable imprint on the local landscape. By the mid-1950s, four pipelines intersected the eastern portion of the area of potential effects (U.S. Department of the Interior, U.S. Geological Survey 1955, 1956a). Three of these are natural gas transmission pipelines: a 22-inch-diameter pipeline that extends 250 miles (Resource 23); an 8.63-inch-diameter pipeline that is 106 miles long (Resource

53); and an 18-inch-diameter pipeline that is 3,217 miles long (Resource 55) (Texas Railroad Commission 2014a, 2014b, 2014c). The fourth is an 8.63-inch-diameter crude oil gathering pipeline (Resource 43) that extends 53 miles but has been abandoned (Texas Railroad Commission 2014d). By 1963, six pipelines crisscrossed the western portion (U.S. Department of the Interior, U.S. Geological Survey 1961b; Texas State Highway Department 1961a; U.S. Department of the Interior, U.S. Geological Survey 1963a, 1963b, 1963c). Four of these were natural gas transmission pipelines: an 8.63-inch-diameter pipeline that is 152 miles long (Resource 2); a 30-inch-diameter pipeline that extends 1,228 miles (Resource 3); a 22-inch-diameter pipeline that is 250 miles long (Resource 4); and a 4.5-inch-diameter pipeline that is 3,217 mile long (Resource 7) (Texas Railroad Commission 2014e, 2014f, 2014g, 2014h). An 8.63-inch-diameter crude oil gathering pipeline extends 53 miles (Resource 5) (Texas Railroad Commission 2014i). A 6.63-inch-diameter propane pipeline stretches for 942 miles (Resource 6) (Texas Railroad Commission 2014j). By 1969, two more natural gas gathering pipelines had been built near the central portion: a 2.38-inch-diameter pipeline that extends 1.32 miles (Resource 17), and a 10.75-inch-diameter that is 158 miles long (Resource 20) (Texas Railroad Commission 2014k, 2014l; U.S. Department of the Interior, U.S. Geological Survey 1969a, 1969c, 1969d, 1969e).

In 1963, the State Highway Department built a divided bypass around the east side of Alvin that attracted new development. The railroad (Resource 45) was elevated over the new highway. Northbound and southbound concrete stringer bridges were built over Mustang Bayou(Resources 40 and 41) and State Highway 6 (Resources 46 and 47); the former two were rebuilt and widened in 1988. Concrete box culverts were constructed to traverse a ditch associated with the American Canal (Resources 51 and

52) (National Bridge Inventory Database 2014c–f). On the west side of the area of potential effects, the State Highway Department also rerouted and rebuilt State Highway 288 between 1970 and 1973. Other bridges and culverts along these roadways are of modern concrete construction. A ca. 1965 mill complex (Resource 44) at the intersection of the railroad with the State Highway 35 Bypass took advantage of the new road. Residential construction included a ca. 1961 Ranch Style house with garage (Resources 50A–B), ten 1963 Ranch and Minimal Composite Ranch Style houses on Pennington Drive (Resources 27 and 29–37), a ca. 1965 neo-Colonial Revival apartment complex (Resources 28A–D), and a ca. 1972 neo-Georgian Revival duplex (Resource 38). A ca. 1964 prefabricated metal building was erected on State Highway 25 Business (Resource 24) across the street from a ca. 1963 bulk terminal station (Resources 25A–D). On East South Street, a ca. 1942 Quonset hut (Resource 42) was moved to a location just east of the highway in about 1965, and a side-gable commercial building (Resource 39) was built just west of the bypass in about 1970. The new route inspired development to the south along and near the existing path of State Highway 35. The only commercial building on this section of the highway by about 1960 was small shed-roof store (Resource 9). The hub at the intersection with FM 2403 had two commercial buildings (Resources 21 and 22) by 1975. A ca. 1925 bungalow (Resource 19) had been moved to the vicinity on FM 2403 in about 1965. Farther south along State Highway 35, a ca. 1940 side-gable house (Resource 15) was moved to its location in about 1970, and a Ranch Style house (Resource 8) was constructed in about 1970. On the east side of the area of potential effects, double-circuit steel-lattice electrical transmission lines extended east to west (Resource 56) and northeast to southwest (Resource 57) by 1969.

Today, northeastern Brazoria and northwestern Galveston Counties are experiencing growth attributed to Houston's ever-increasing expansion. Houston's influence is particularly evident along State Highway 35 and Interstate Highway 45. New development in Alvin has taken place along the State Highway 35 Bypass. The oil and service industries offer residents a more diversified economy. New residential subdivisions (Figure 6) and shopping centers in the vicinity of Dickinson and big box stores, chain restaurants, and hotels have obscured the few older buildings once present. Despite this rampant modern development, large swaths of irrigated agricultural land remain in cultivation.

Figure 6. This house near Dickinson is typical of modern suburban development in the far east area of potential effects.

RECOMMENDATIONS

National Register Eligibility

Individual Resources

Reconnaissance survey identified and documented 69 historic-age resources constructed between about 1891 and about 1975 in the area of potential effects (Figures 7.1–7.14, Table 2, and Appendix A). Historic-age resources represented seven property types: domestic (25 resources), industrial (20 resources), transportation (9 resources), commercial (6 resources), recreation and culture (5 resources), funerary (1 resource), and agricultural (3 resources). The file search and literature review identified four relevant historic contexts for the 1850–1975 period of significance: early Anglo American

Figure 6

settlement, community planning and development, agriculture, and industrial extraction and processing. Resources associated with the latter three contexts were identified in the area of potential effects, but none associated with early Anglo American settlement were detected.

Table 2. Inventory of historic-age resources in the area of potential effects.

Figures 7.1–7.14. Identified historic-age resources in the area of potential effects.

Domestic resources are single-family dwellings, three with detached outbuildings (Resources 14B, 26B, and 50B), and an apartment complex. Architectural stylistic influences are nominal with two bungalows (Resources 19 and 26A) and a Colonial Revival house (Resource 18) representing pre-World War II–era designs; Ranch Style houses (Resources 27, 33, and 50A), Minimal Ranch Composite Style houses (Resources 29–32 and 34–37), and a neo-Georgian Revival duplex (Resource 38) represent postwar construction. Two houses (Resource 14A and 15) without notable design or ornament are best described by their side-gable roof form. Two of them (Resources 15 and 19) have been moved to their present locations. These buildings have experienced alterations to fenestration patterns and replacement of original windows, doors, siding, or porch components with nonhistoric materials. These resources are commonplace and without distinction; similarly, the sole related outbuilding possesses no special attributes. They do not impart historical or architectural qualities that are clearly distinguishable from other similar proximate examples. No individual house or outbuilding is exemplary of its style, type, period, or method of construction. As such, these resource are recommended

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Table 2. Inventory of historic-age resources in the area of potential effects

Resource No.	Name	Location	Property Type/Subtype	Style or Form	Construction Date	Integrity Issues	National Register Recommendation
1	South Texas Water Company Canal System	Latitude 29.38; longitude -95.42	Agriculture/irrigation facility	Landscape	1935	Retains a high degree of integrity	Eligible
2	Pipeline	Latitude 29.38; longitude -95.42	Industrial/natural gas transmission pipeline	Landscape	by 1963	Nonhistoric materials; not exemplary	Not eligible
3	Pipeline	Latitude 29.35; longitude -95.38	Industrial/natural gas transmission pipeline	Landscape	by 1963	Nonhistoric materials; not exemplary	Not eligible
4	Pipeline	Latitude 29.35; longitude -95.38	Industrial/natural gas transmission pipeline	Landscape	by 1963	Nonhistoric materials; not exemplary	Not eligible
5	Pipeline	Latitude 29.33; longitude -95.34	Industrial/crude oil gathering pipeline	Landscape	by 1963	Nonhistoric materials; not exemplary, poor condition	Not eligible
6	Pipeline	Latitude 29.32; longitude -95.33	Industrial/propane pipeline	Landscape	by 1963	Nonhistoric materials; not exemplary, poor condition	Not eligible
7	Pipeline	Latitude 29.32; longitude -95.31	Industrial/natural gas transmission pipeline	Landscape	by 1963	Nonhistoric materials; not exemplary, poor condition	Not eligible
8	House	8122 State Highway 35; latitude 29.33; longitude -95.29	Domestic/single-family dwelling	Ranch Style	ca. 1970	Nonhistoric windows, door; 1976 garage, 2004 mobile home; not exemplary, compromised setting, less than 50 years old	Not eligible
9	Commercial building	8012 State Highway 35; latitude 29.33; longitude -95.29	Commercial/retail store	Shed roof	ca. 1960	Nonhistoric fenestration pattern, windows, doors, siding, additions, 1996 metal shed; not exemplary, compromised setting	Not eligible
10	Bridge NBI# 120200017803024	State Highway 35; latitude 29.33; longitude -95.29	Transportation/vehicular bridge	Concrete T beam	1937/1958	Rebuilt, widened; not exemplary	Not eligible

Table 2, continued

Resource No.	Name	Location	Property Type/Subtype	Style or Form	Construction Date	Integrity Issues	National Register Recommendation
11	Official Texas Historical Marker, Oyster Creek and Chocolate Bayou	State Highway 35 at Chocolate Bayou; latitude 29.33; longitude -95.29	Recreation and Culture/historical marker	Aluminum plaque on post	1968	Not exemplary, less than 50 years old	Not eligible
12	Bridge NBI# 120200017803023	State Highway 35; latitude 29.34; longitude -95.28	Transportation/vehicular bridge	Concrete T beam	1937/1998	Rebuilt, widened; not exemplary	Not eligible
13A	Gulf Coast Union Camp Meeting Grounds church	State Highway 35; latitude 29.34; longitude -95.29	Recreation and Culture/campground	Contemporary Style	1965	Numerous modern resources on property; not exemplary, compromised setting, less than 50 years old	Not eligible
13B	Gulf Coast Union Camp Meeting Grounds swimming pool	State Highway 35; latitude 29.34; longitude -95.29	Recreation and Culture/campground	Landscape	1951/2000	Numerous modern resources on property; not exemplary, compromised setting	Not eligible
13C	Gulf Coast Union Camp Meeting Grounds lake	State Highway 35; latitude 29.34; longitude -95.29	Recreation and Culture/campground	Landscape	1929	Numerous modern resources on property; not exemplary, compromised setting	Not eligible
14A	House	6402 State Highway 35; latitude 29.35; longitude -95.28	Domestic/single-family dwelling	Side-gable roof	ca. 1940	Nonhistoric fenestration pattern, windows, porch components, siding; poor condition	Not eligible
14B	Garage	6402 State Highway 35; latitude 29.35; longitude -95.28	Domestic/garage	Front-gable roof	ca. 1940	Poor condition	Not eligible
15	House	5520 State Highway 35; latitude 29.36; longitude -95.27	Domestic/single-family dwelling	Side-gable roof	ca. 1940/ ca. 1970	Nonhistoric windows, door, siding; moved ca. 1970	Not eligible
16	Briscoe Irrigation Company Canal	Latitude 29.37; longitude -95.26	Agriculture/irrigation facility	Landscape	ca. 1925	Retains a high degree of integrity	Eligible
17	Pipeline	Latitude 29.38; longitude -95.26	Industrial/natural gas gathering pipeline	Landscape	by 1969	Nonhistoric materials; not exemplary, less than 50 years old	Not eligible

Table 2, continued

Resource No.	Name	Location	Property Type/Subtype	Style or Form	Construction Date	Integrity Issues	National Register Recommendation
18	House	3503 FM 2403; latitude 29.38; longitude -95.25	Domestic/single-family dwelling	Colonial Revival	ca. 1940	Nonhistoric windows, doors, screens, shutters, porch components, modern house on property; compromised setting	Not eligible
19	House	3431 FM 2403; latitude 29.38; longitude -95.25	Domestic/single-family dwelling	Bungalow	ca. 1925/ ca. 1965	Nonhistoric windows, doors, shutters, porch components, siding; moved ca. 1965, compromised setting, less than 50 years old	Not eligible
20	Pipeline	Latitude 29.39; longitude -95.25	Industrial/natural gas gathering pipeline	Landscape	by 1969	Nonhistoric materials; not exemplary, less than 50 years old	Not eligible
21	Commercial building	3202 FM 2403; latitude 29.39; longitude -95.25	Commercial/retail store	Front-gable roof	ca. 1975	Modern structure on property; not exemplary, less than 50 years old	Not eligible
22	Commercial building	3100 block FM 2403; latitude 29.39; longitude -95.25	Commercial/retail store	Side-gable roof	ca. 1975	Not exemplary, less than 50 years old	Not eligible
23	Pipeline	Latitude 29.40; longitude -95.25	Industrial/natural gas transmission pipeline	Landscape	by 1956	Nonhistoric materials; not exemplary	Not eligible
24	Commercial building	2424 1/2 South Gordon Street; latitude 29.40; longitude -95.25	Commercial/retail store	Prefabricated metal	ca. 1964	Nonhistoric siding; not exemplary	Not eligible
25A	Bulk terminal station service building	2411 South Gordon Street; latitude 29.40; longitude -95.24	Industrial/bulk terminal station	Oblong box	ca. 1963	Nonhistoric windows, doors, siding, canopy; not exemplary, compromised setting	Not eligible
25B	Bulk terminal station building	2411 South Gordon Street; latitude 29.40; longitude -95.24	Industrial/bulk terminal station	Prefabricated metal	ca. 1963	Not exemplary	Not eligible

Table 2, continued

Resource No.	Name	Location	Property Type/Subtype	Style or Form	Construction Date	Integrity Issues	National Register Recommendation
25C	Bulk terminal station building	2411 South Gordon Street; latitude 29.40; longitude -95.24	Industrial/bulk terminal station	Prefabricated metal	ca. 1963	Not exemplary	Not eligible
25D	Bulk terminal station filling and loading dock	2411 South Gordon Street; latitude 29.40; longitude -95.24	Industrial/bulk terminal station	Shed roof	ca. 1963	Not exemplary	Not eligible
26A	House	202 Fitz Road; latitude 29.40; longitude -95.24	Domestic/single-family dwelling	Bungalow	ca. 1940	Nonhistoric windows, doors, screens, porch components, siding, additions	Not eligible
26B	Garage	202 Fitz Road; latitude 29.40; longitude -95.24	Domestic/garage	Front-gable roof	ca. 1940	Nonhistoric fenestration pattern, doors, siding	Not eligible
27	House	300 Pennington Drive; latitude 29.40; longitude -95.24	Domestic/single-family dwelling	Ranch Style	ca. 1963	Nonhistoric doors, siding; not exemplary	Not eligible
28A	Apartment	2550 South Highway 35 Bypass; latitude 29.40; longitude -95.24	Domestic/apartment	Neo-Colonial Revival	ca. 1970	Nonhistoric doors, addition; not exemplary, less than 50 years old	Not eligible
28B	Apartment	2550 South Highway 35 Bypass; latitude 29.40; longitude -95.24	Domestic/apartment	Neo-Colonial Revival	ca. 1965	Nonhistoric windows, doors, addition; not exemplary, less than 50 years old	Not eligible
28C	Apartment	2550 South Highway 35 Bypass; latitude 29.40; longitude -95.24	Domestic/apartment	Neo-Colonial Revival	ca. 1965	Nonhistoric windows, doors, addition; not exemplary, less than 50 years old	Not eligible

Table 2, continued

Resource No.	Name	Location	Property Type/Subtype	Style or Form	Construction Date	Integrity Issues	National Register Recommendation
28D	Apartment	2550 South Highway 35 Bypass; latitude 29.40; longitude -95.24	Domestic/apartment	Neo-Colonial Revival	ca. 1965	Nonhistoric doors, addition; not exemplary, less than 50 years old	Not eligible
29	House	308 Pennington Drive; latitude 29.40; longitude -95.24	Domestic/single-family dwelling	Minimal Composite Ranch Style	ca. 1963	Nonhistoric doors; not exemplary	Not eligible
30	House	312 Pennington Drive; latitude 29.40; longitude -95.24	Domestic/single-family dwelling	Minimal Composite Ranch Style	ca. 1963	Nonhistoric windows, doors; not exemplary	Not eligible
31	House	318 Pennington Drive; latitude 29.40; longitude -95.24	Domestic/single-family dwelling	Minimal Composite Ranch Style	ca. 1963	Nonhistoric door; not exemplary	Not eligible
32	House	322 Pennington Drive; latitude 29.40; longitude -95.24	Domestic/single-family dwelling	Minimal Composite Ranch Style	ca. 1963	Nonhistoric windows, doors, carport addition; not exemplary	Not eligible
33	House	326 Pennington Drive; latitude 29.40; longitude -95.24	Domestic/single-family dwelling	Ranch Style	ca. 1963	Nonhistoric windows, doors; not exemplary	Not eligible
34	House	334 Pennington Drive; latitude 29.40; longitude -95.24	Domestic/single-family dwelling	Minimal Composite Ranch Style	ca. 1963	Nonhistoric windows, doors; not exemplary	Not eligible
35	House	336 Pennington Drive; latitude 29.40; longitude -95.24	Domestic/single-family dwelling	Minimal Composite Ranch Style	ca. 1963	Nonhistoric doors; not exemplary	Not eligible
36	House	340 Pennington Drive; latitude 29.40; longitude -95.24	Domestic/single-family dwelling	Minimal Composite Ranch Style	ca. 1963	Nonhistoric windows, doors; not exemplary	Not eligible

Table 2, continued

Resource No.	Name	Location	Property Type/Subtype	Style or Form	Construction Date	Integrity Issues	National Register Recommendation
37	House	344 Pennington Drive; latitude 29.40; longitude -95.24	Domestic/single-family dwelling	Minimal Composite Ranch Style	ca. 1963	Nonhistoric windows, doors, screens; not exemplary	Not eligible
38	Duplex	2524 State Highway 35; latitude 29.40; longitude -95.24	Domestic/duplex	Neo-Georgian Revival	ca. 1972	Not exemplary, compromised setting, less than 50 years old	Not eligible
39	Commercial building	1000 East South Street; latitude 29.41; longitude -95.23	Commercial/retail store	Side-gable roof	ca. 1970	Nonhistoric siding; not exemplary, less than 50 years old	Not eligible
40	Bridge NBI# 120200017803041	State Highway 35; latitude 29.41; longitude -95.23	Transportation/vehicular bridge	Concrete stringer	1963/1988	Rebuilt, widened; not exemplary	Not eligible
41	Bridge NBI# 120200017803040	State Highway 35; latitude 29.41; longitude -95.23	Transportation/vehicular bridge	Concrete stringer	1963/1988	Rebuilt, widened; not exemplary	Not eligible
42	Commercial building	1370 East South Street; latitude 29.41; longitude -95.23	Commercial/retail store	Quonset hut	ca. 1942/ ca. 1965	Nonhistoric fenestration pattern; nonhistoric windows, door; not exemplary, moved ca. 1965, compromised setting	Not eligible
43	Pipeline	Latitude 29.42; longitude -95.23	Industrial/crude oil gathering pipeline	Landscape	by 1956	Nonhistoric materials; not exemplary, abandoned, poor condition	Not eligible
44	Mill complex	1901 East House Street; latitude 29.42; longitude -95.23	Industrial/mill	Irregular roof	ca. 1965	Nonhistoric fenestration pattern, windows, doors, siding, additions, modern buildings on property; not exemplary, compromised setting, less than 50 years old	Not eligible
45	Railroad bridge	Latitude 29.42; longitude -95.23	Transportation/railroad bridge	Concrete	1963	Not exemplary, less than 50 years old	Not eligible

Table 2, continued

Resource No.	Name	Location	Property Type/Subtype	Style or Form	Construction Date	Integrity Issues	National Register Recommendation
46	Bridge NBI# 120200019203038	State Highway 35; latitude 29.42; longitude -95.23	Transportation/vehicular bridge	Concrete stringer	1963	Not exemplary	Not eligible
47	Bridge NBI# 120200019203037	State Highway 35; latitude 29.42; longitude -95.23	Transportation/vehicular bridge	Concrete stringer	1963	Not exemplary	Not eligible
48	Confederate Cemetery	600 block State Highway 35; latitude 29.43; longitude -95.23	Funerary/cemetery	Landscape	ca. 1891	Not exemplary	Not eligible
49	Official Texas Historical Marker, Confederate Cemetery	State Highway 35; latitude 29.43; longitude -95.23	Recreation and Culture/historical marker	Embedded aluminum plaque	1968	Not exemplary, less than 50 years old	Not eligible
50A	House	Latitude 29.43; longitude -95.23	Domestic/single-family dwelling	Ranch Style	ca. 1961	Nonhistoric windows; not exemplary, less than 50 years old, compromised setting	Not eligible
50B	Outbuilding	Latitude 29.43; longitude -95.23	Domestic/outbuilding	Front-gable roof	ca. 1964	Not exemplary, less than 50 years old, compromised setting	Not eligible
51	Culvert	State Highway 35; latitude 29.44; longitude -95.23	Transportation/culvert	Concrete box	1963	Not exemplary	Not eligible
52	Culvert	State Highway 35; latitude 29.44; longitude -95.23	Transportation/culvert	Concrete box	1963	Not exemplary	Not eligible
53	Pipeline	Dickinson Road; latitude 29.45; longitude -95.22	Industrial/natural gas transmission pipeline	Landscape	by 1956	Nonhistoric materials; not exemplary	Not eligible
54	Holland-American Rice Canal System	Latitude 29.46; longitude -95.21	Agriculture/irrigation facility	Landscape	ca. 1908	Retains a high degree of integrity	Eligible
55	Pipeline	Latitude 29.46; longitude -95.20	Industrial/natural gas transmission pipeline	Landscape	by 1956	Nonhistoric materials; not exemplary	Not eligible
56	Electrical transmission lines	Latitude 29.46; longitude -95.19	Industrial/electrical transmission lines	Double-circuit steel lattice	by 1969	Nonhistoric materials; not exemplary, less than 50 years old	Not eligible

Table 2, continued

Resource No.	Name	Location	Property Type/Subtype	Style or Form	Construction Date	Integrity Issues	National Register Recommendation
57	Electrical transmission lines	Latitude 29.46; longitude -95.17	Industrial/electrical transmission lines	Double-circuit steel lattice	by 1969	Nonhistoric materials; not exemplary, less than 50 years old	Not eligible
58	League City Oil Field	Latitude 29.46; longitude -95.11	Industrial/oil field	Landscape	by 1952	Not exemplary, poor condition, compromised setting	Not eligible

Figure 7-1

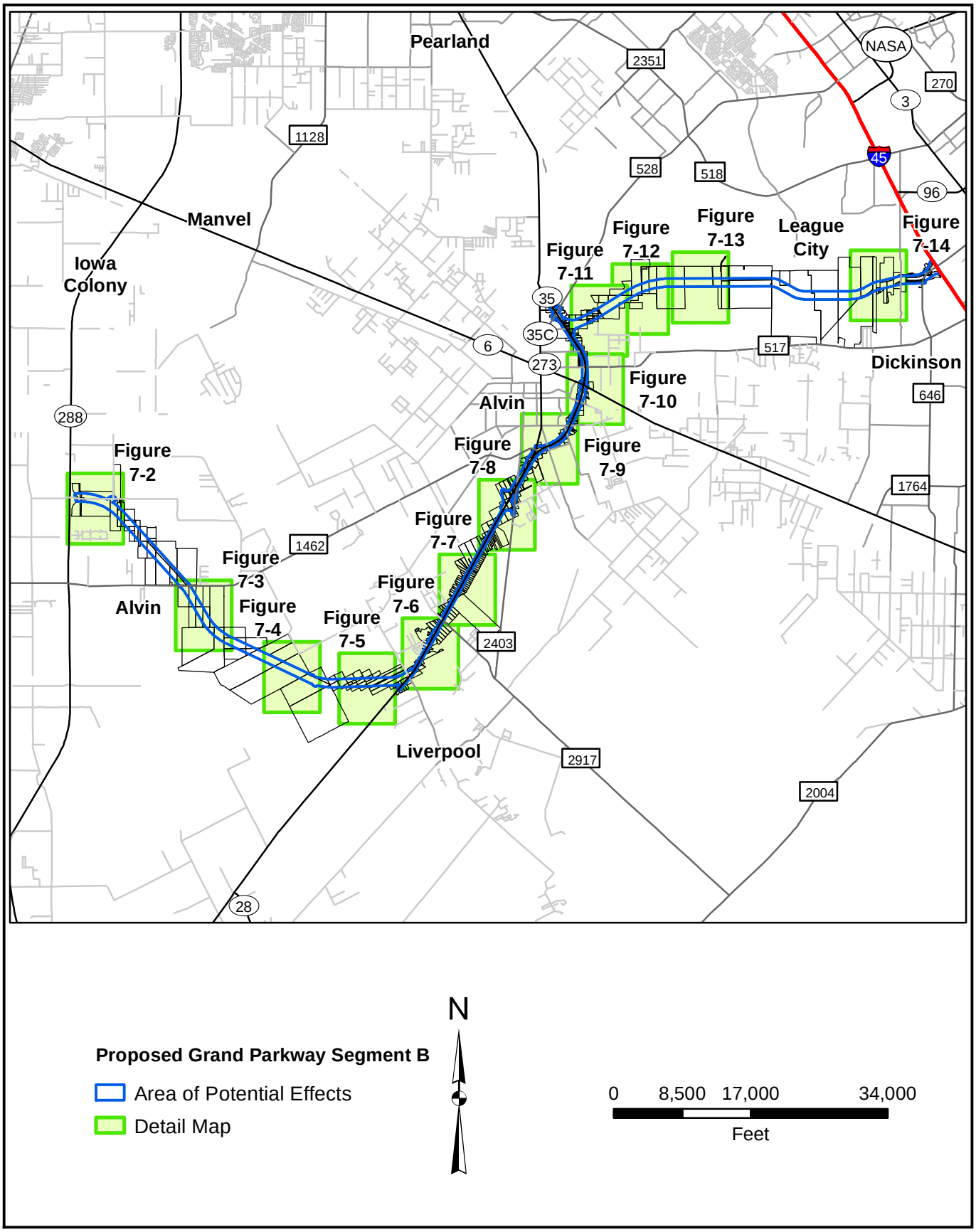
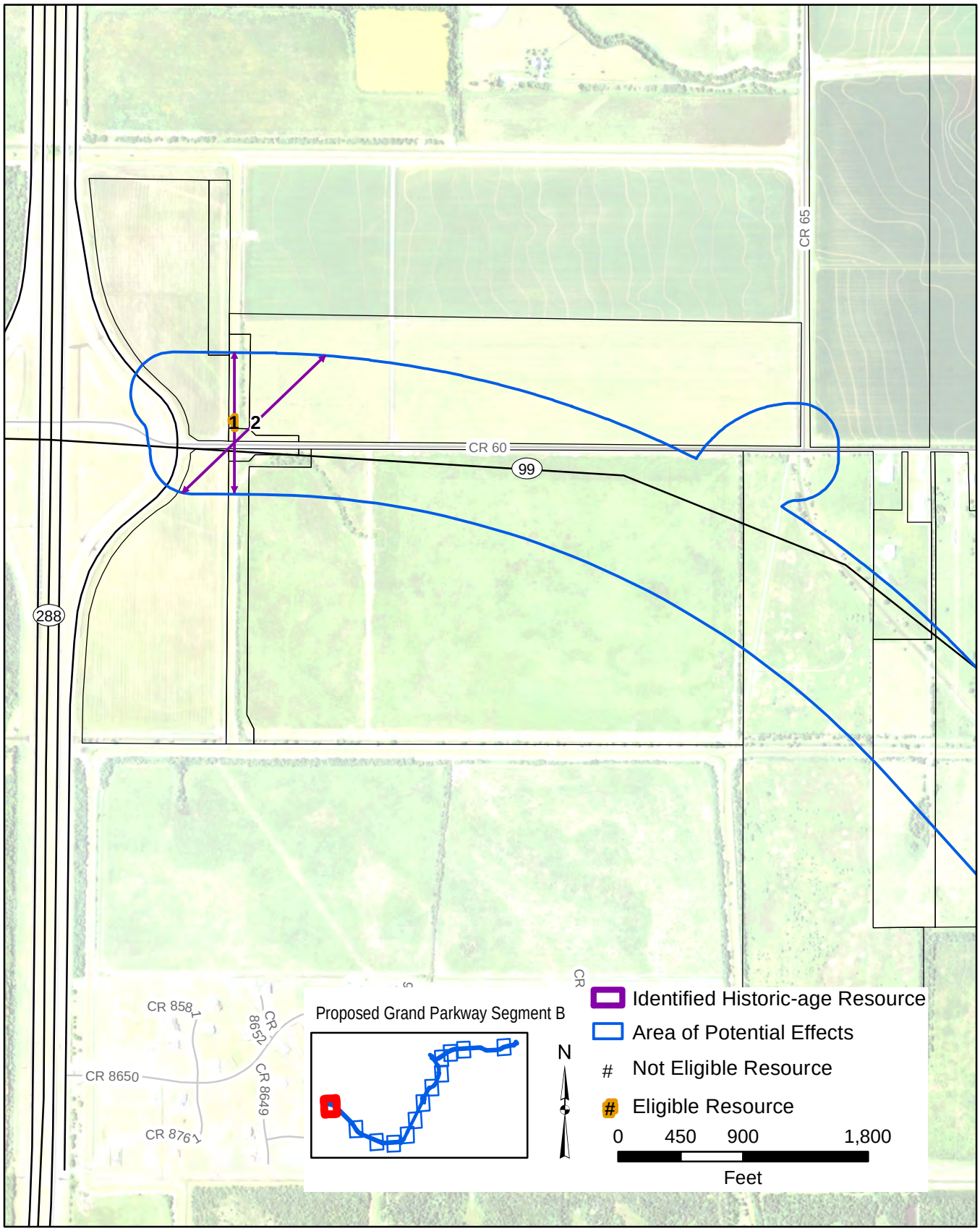

Pearland
NASA
2351
270
3
1128
528
518
45
96
Manvel
Figure 7-13
League City
Figure 7-14
Figure 7-12
Figure 7-11
Iowa Colony
35
35C
6
517
Dickinson
273
Figure 7-10
646
288
Alvin
Figure 7-8
Figure 7-9
Figure 7-2
1764
Figure 7-7
1462
Figure 7-3
Figure 7-6
Alvin
Figure 7-4
Figure 7-5
2403
Liverpool
2917
2004
28
N
Proposed Grand Parkway Segment B
Area of Potential Effects
Detail Map
0
8,500
17,000
34,000
Feet

Figure 7-2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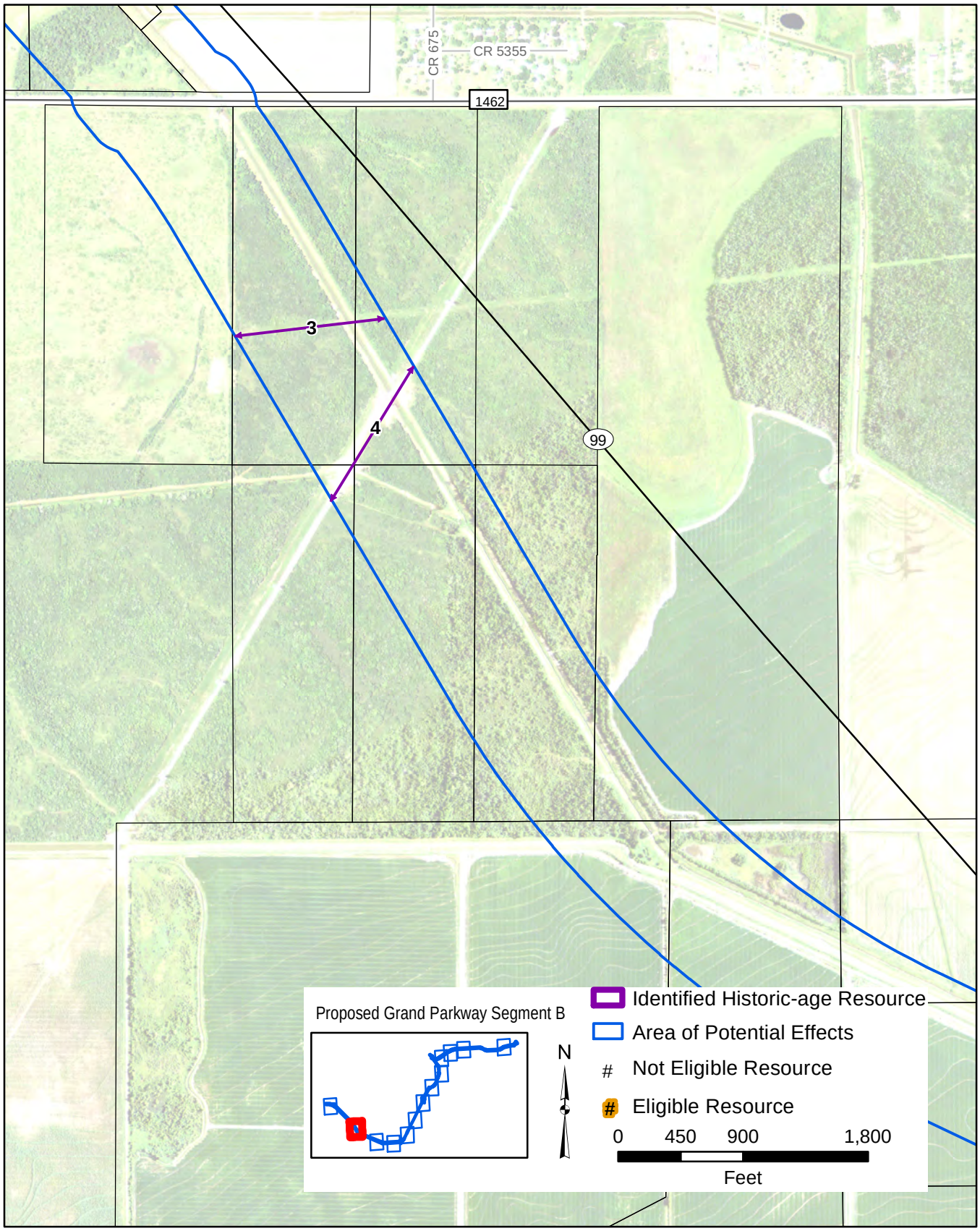
CR 60
99
288
1
2
CR 8587
CR 8652
CR 8650
CR 8649
CR 8761
Proposed Grand Parkway Segment B
N
Identified Historic-age Resource
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

Figure 7-3


CR 675
CR 5355
1462
99
3
4
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N
Identified Historic-age Resource
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

Figure 7-4

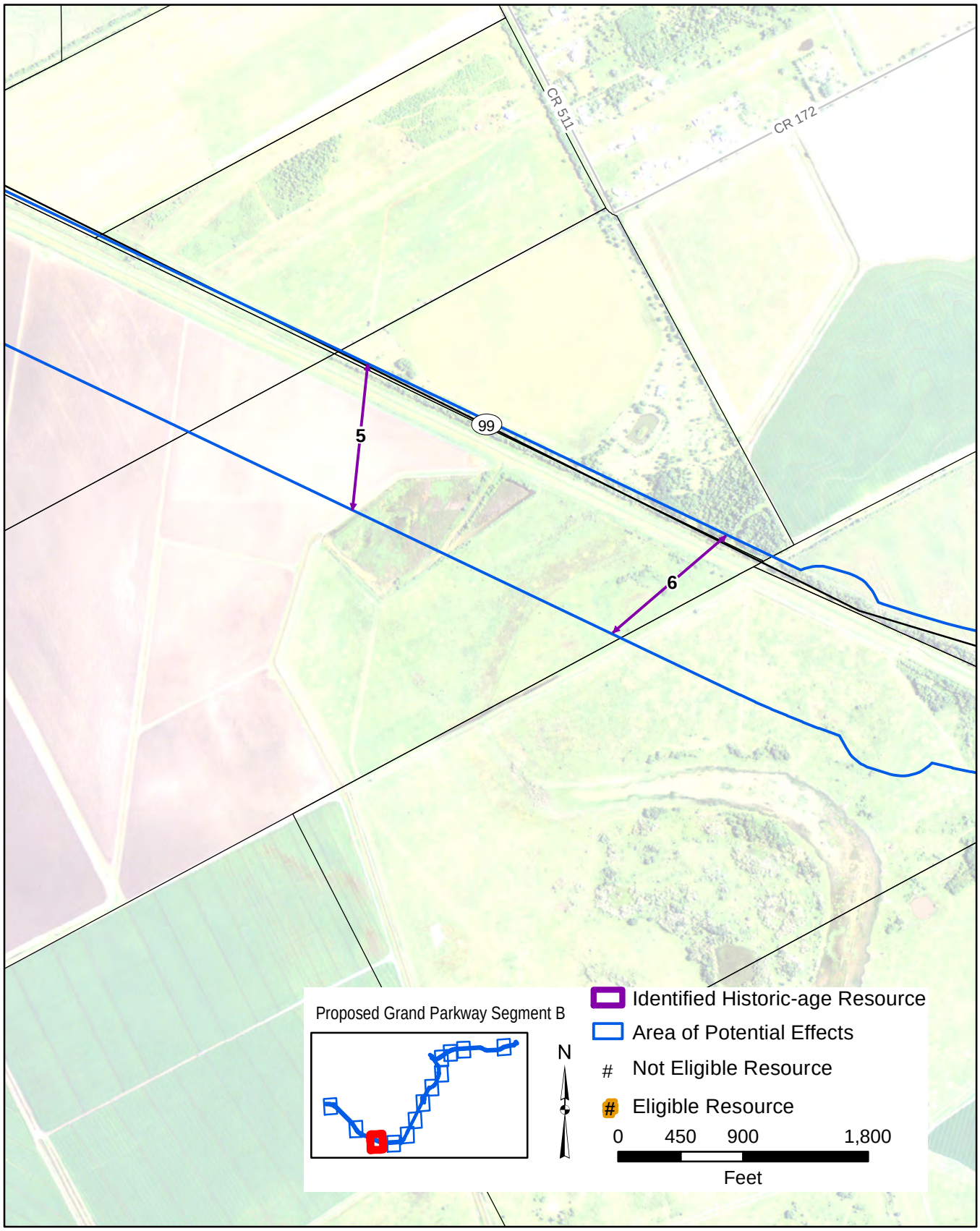

CR 511
CR 172
99
5
6
Proposed Grand Parkway Segment B
N
Identified Historic-age Resource
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

Figure 7-5

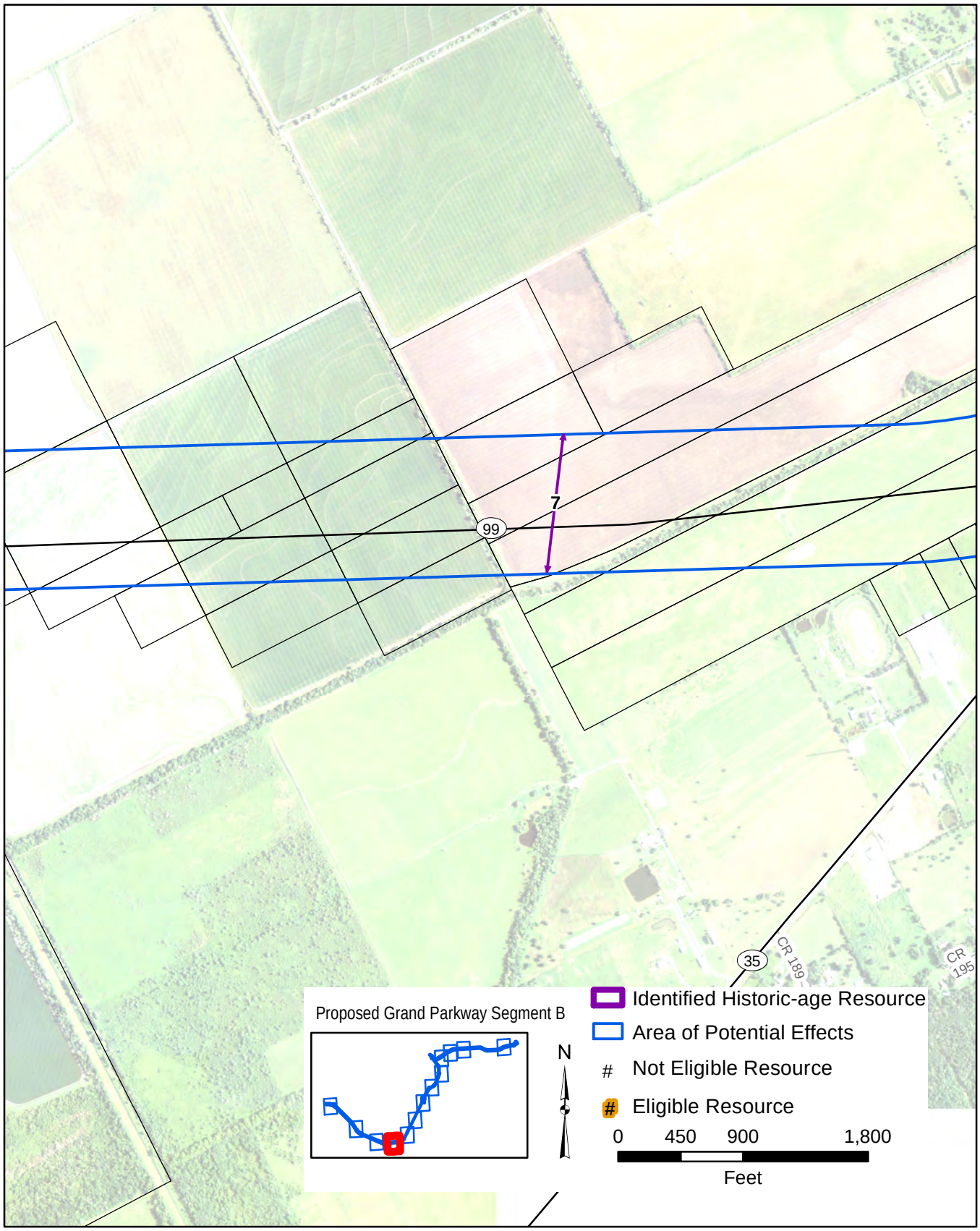
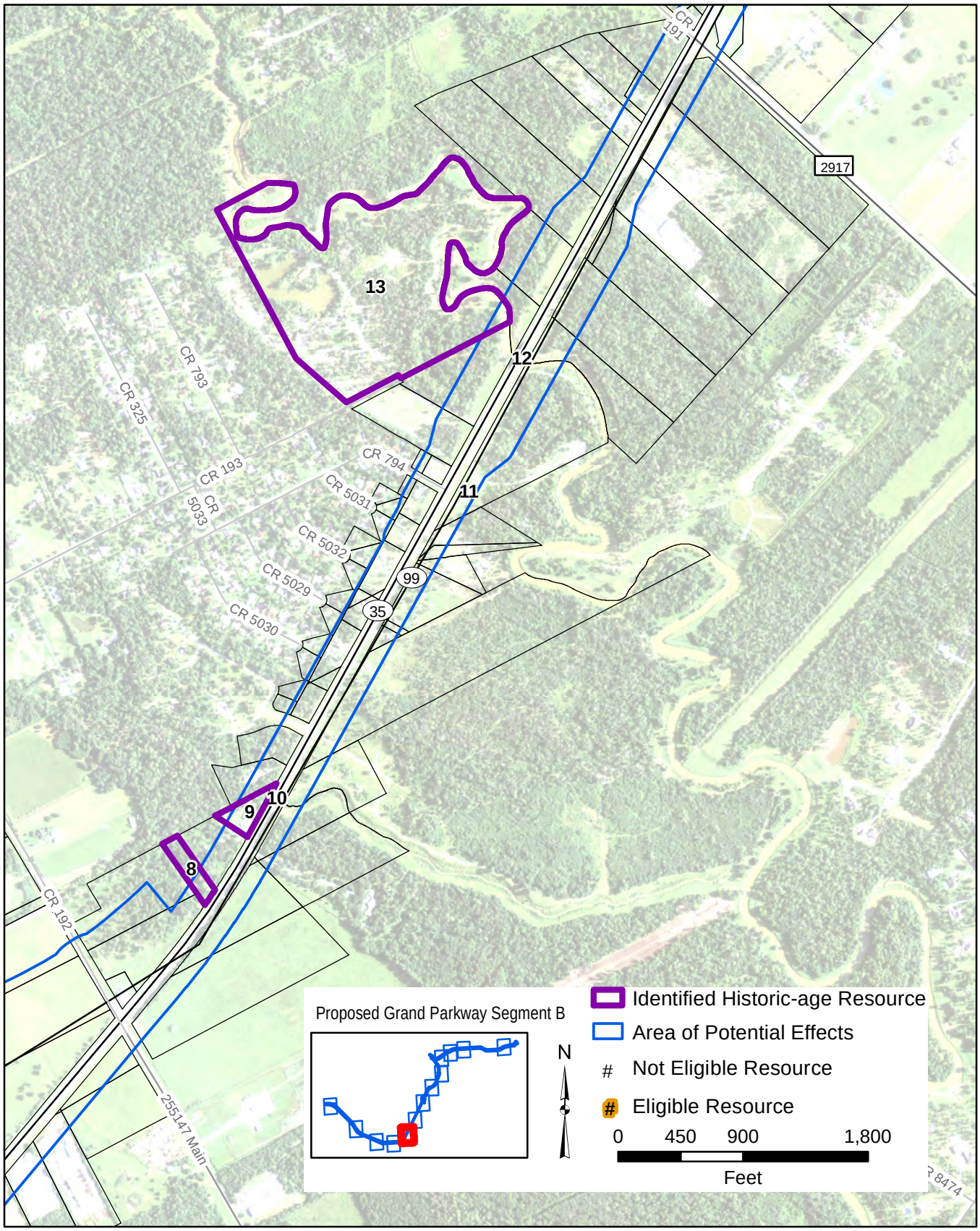

7
99
35
CR 189
CR 195
Proposed Grand Parkway Segment B
N
Identified Historic-age Resource
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

Figure 7-6


13
12
11
10
9
8
2917
CR 191
CR 793
CR 325
CR 193
CR 794
CR 5031
CR 5033
CR 5032
CR 5029
CR 5030
99
35
CR 192
255147 Main
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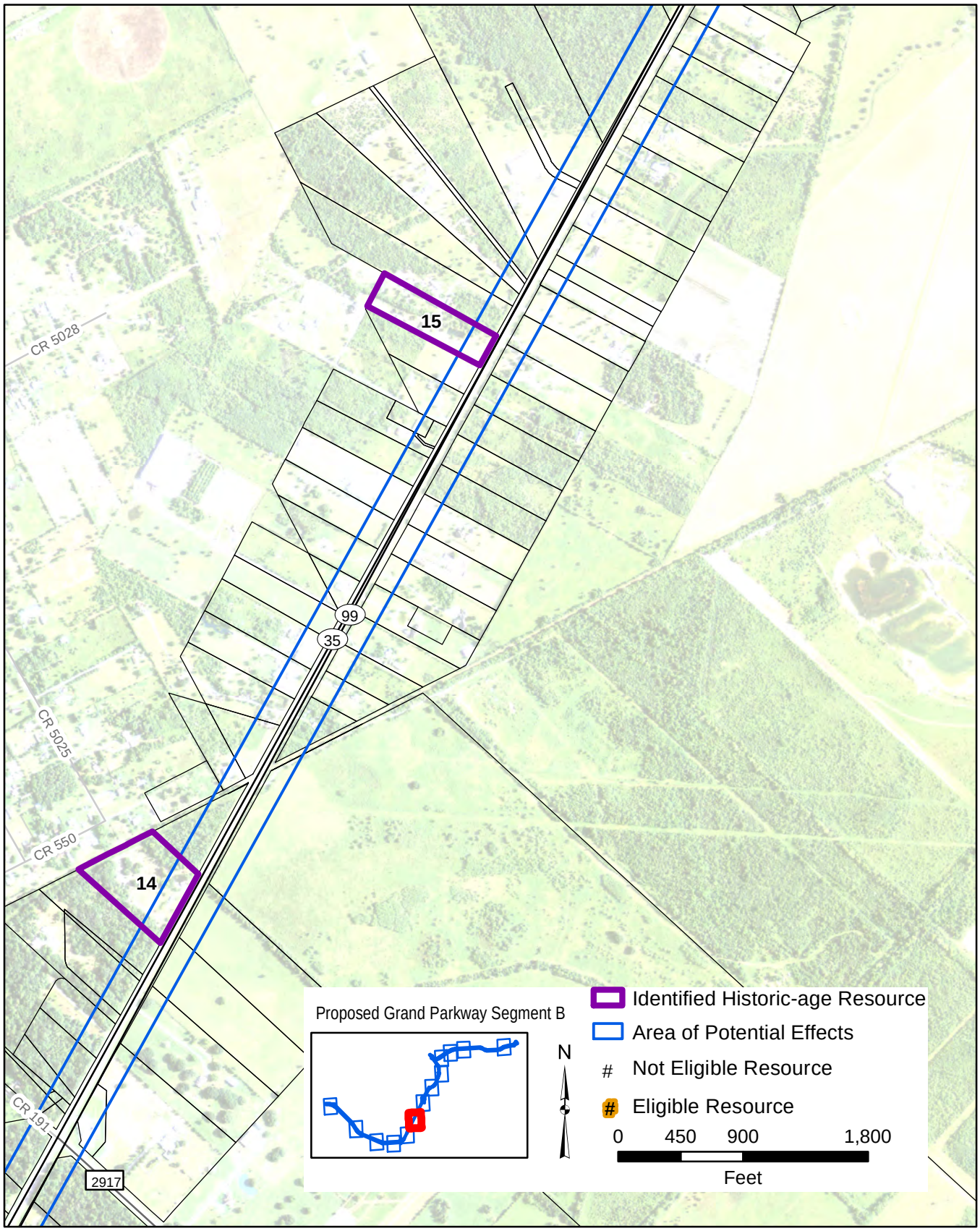
N
Identified Historic-age Resource
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

Figure 7-7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14
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CR 5025
CR 550
CR 191
2917
99
35
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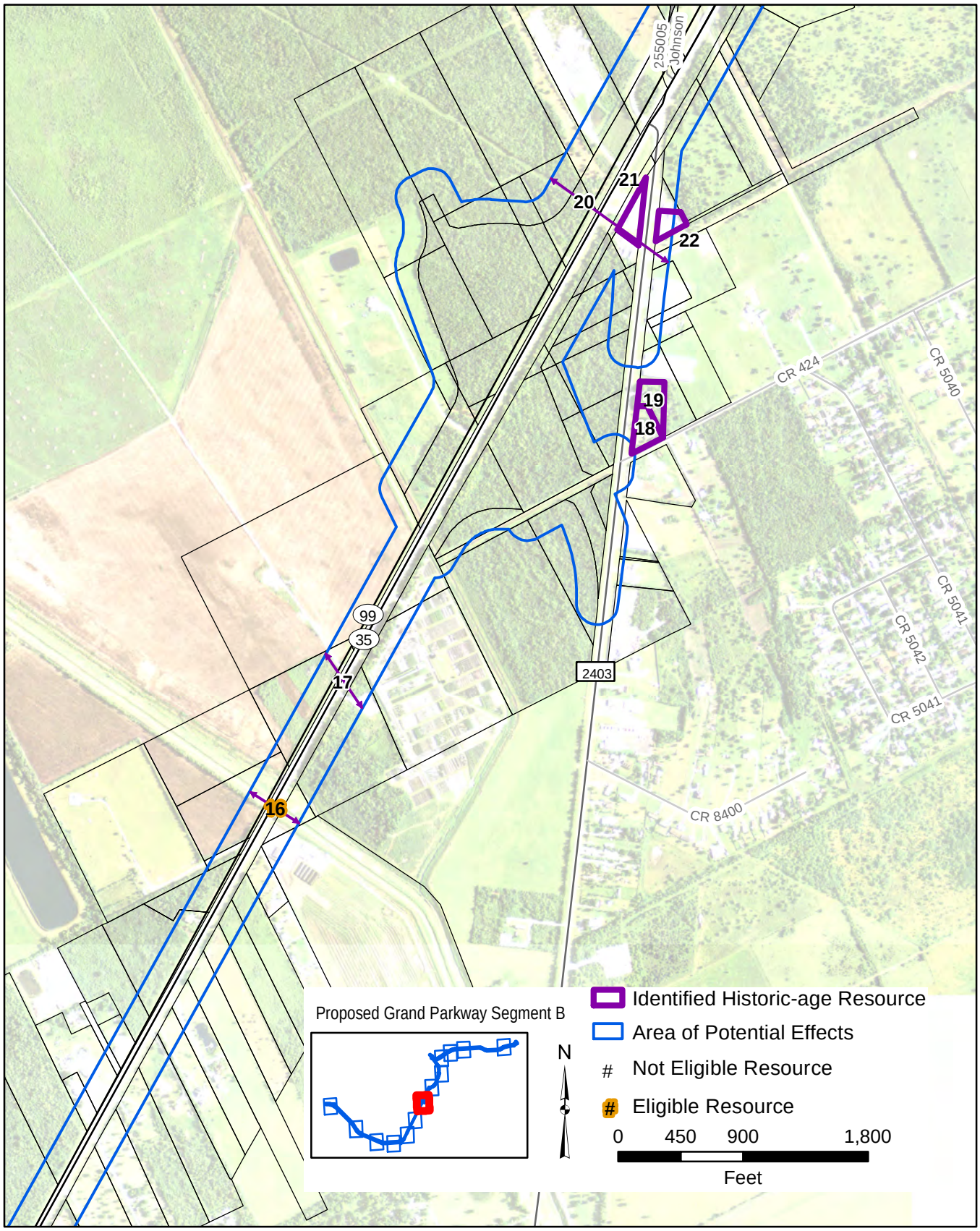
N
Identified Historic-age Resource
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

Figure 7-8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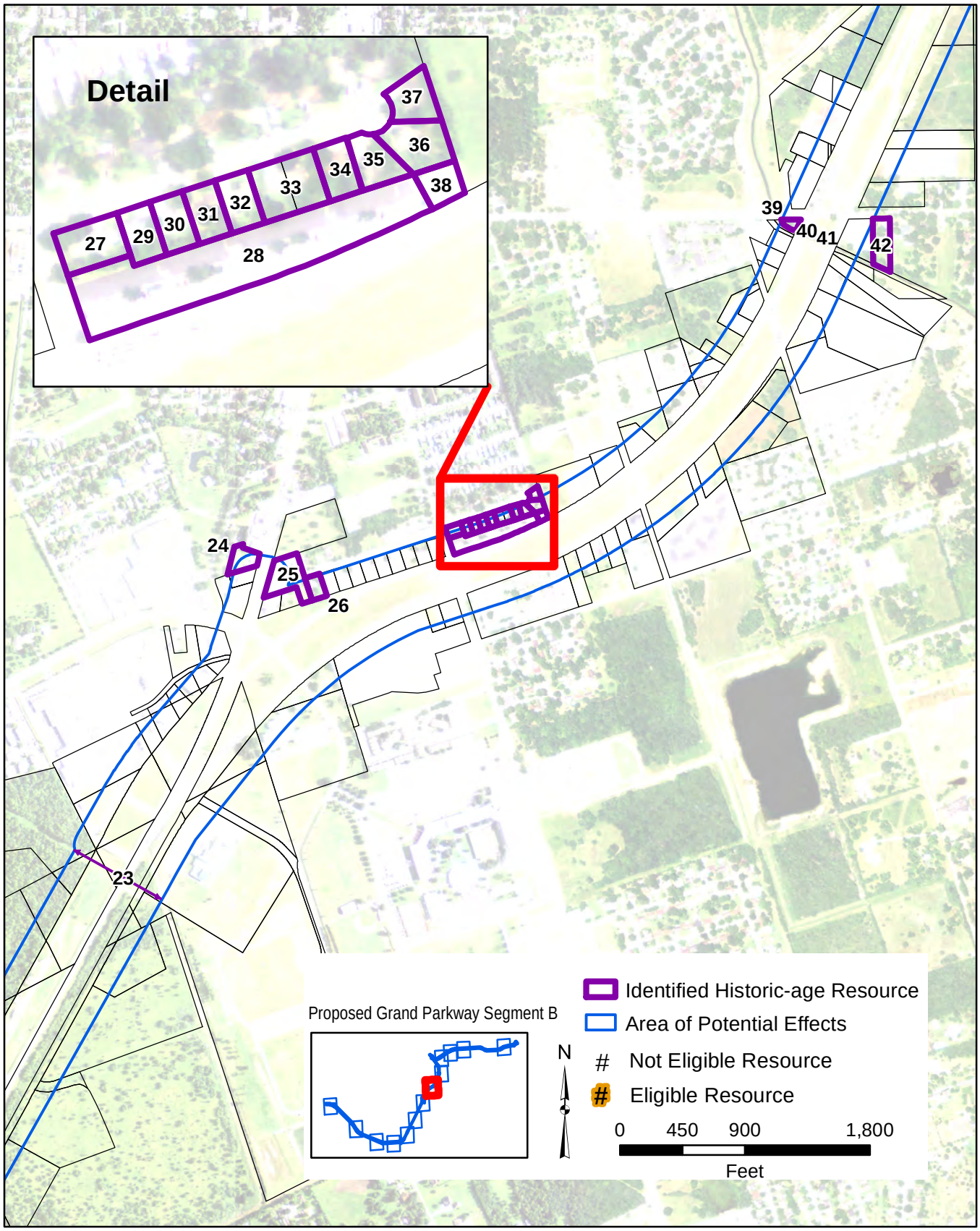
CR 5040
CR 5041
CR 5042
CR 5041
CR 8400
2403
99
35
16
17
18
19
20
21
22
Proposed Grand Parkway Segment B
N
Identified Historic-age Resource
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

Figure 7-9


Detail
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36
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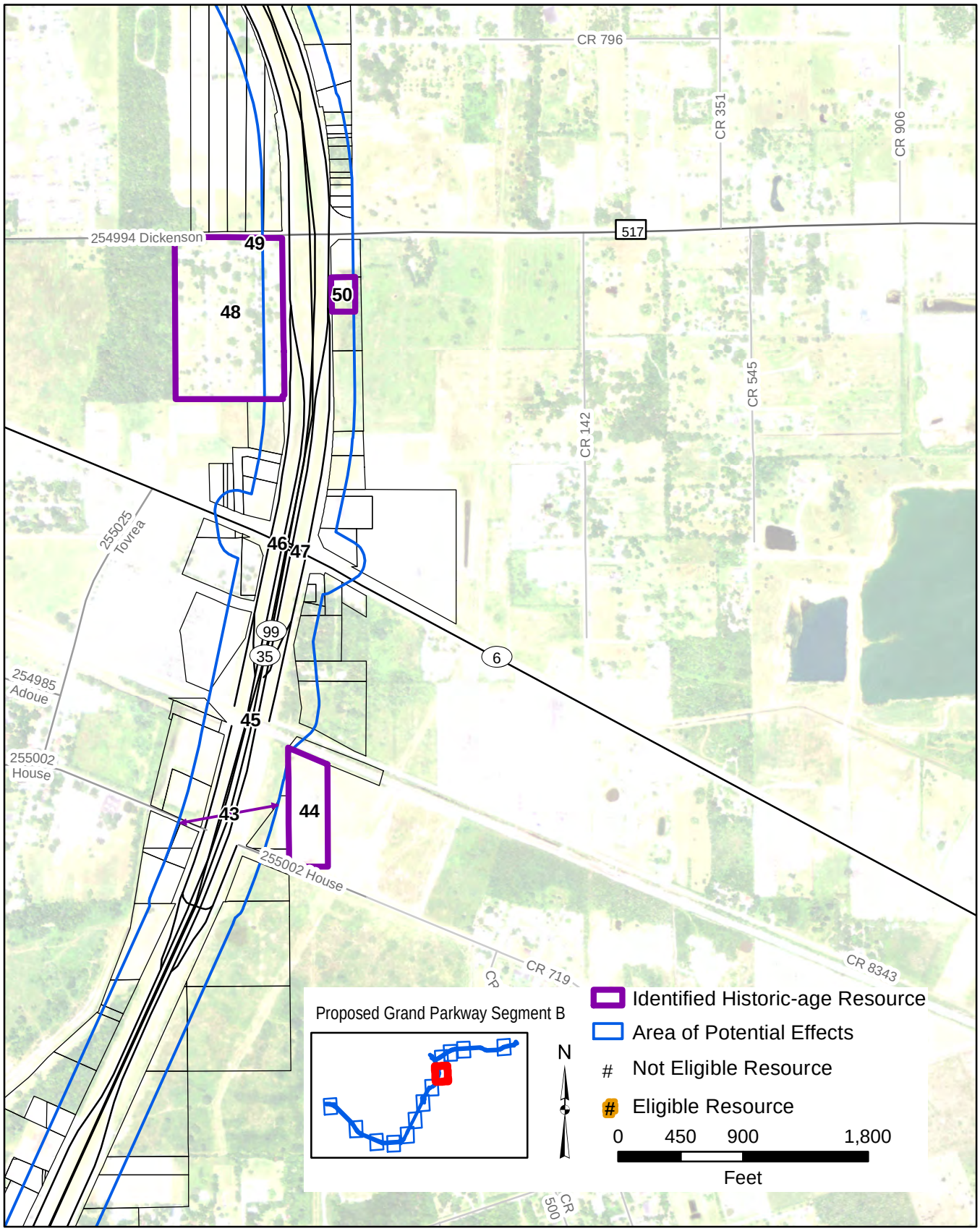
34
33
32
31
30
29
27
28
38
39
40
41
42
24
25
26
23
Proposed Grand Parkway Segment B
N
Identified Historic-age Resource
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

Figure 7-10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CR 351
CR 906
517
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49
48
50
CR 142
CR 545
255025 Tovrea
46
47
99
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254985 Adoue
45
255002 House
43
44
255002 House
CR 719
CR 8343
CR 500
Proposed Grand Parkway Segment B
N
Identified Historic-age Resource
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

Figure 7-11

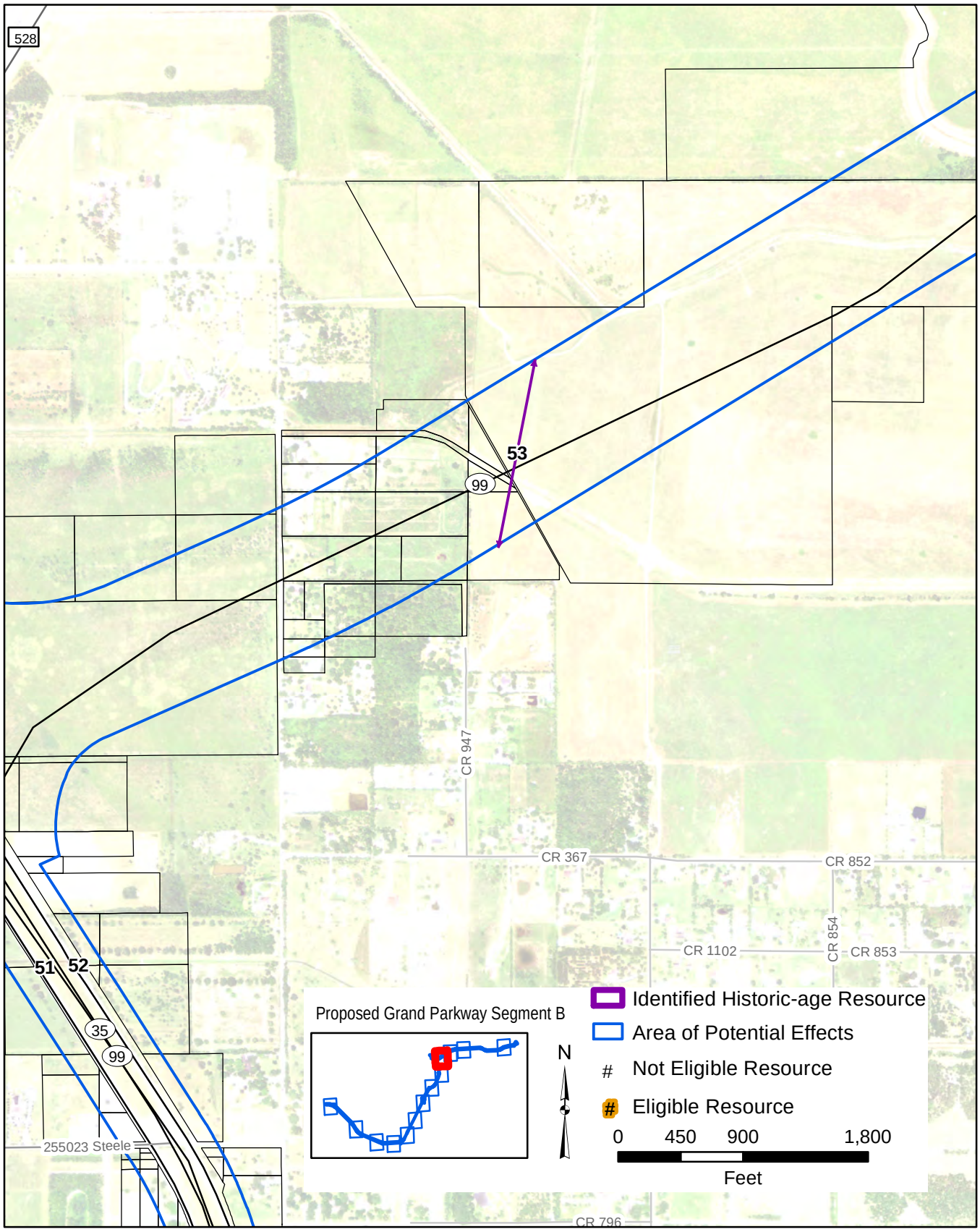
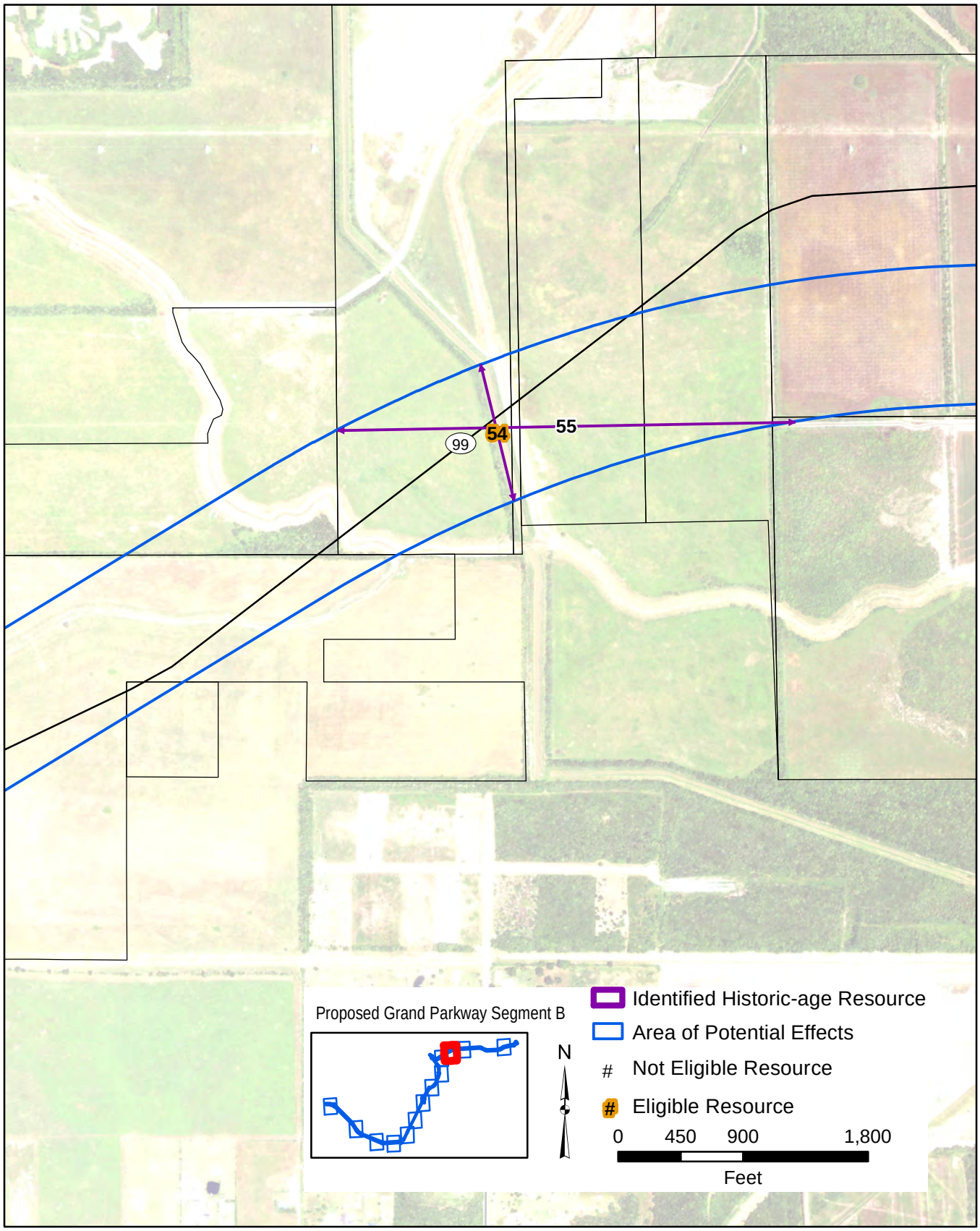

528
53
99
CR 947
CR 367
CR 852
CR 854
CR 1102
CR 853
51
52
35
99
255023 Steele
CR 796
Proposed Grand Parkway Segment B
N
Identified Historic-age Resource
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

Figure 7-12


54
55
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N
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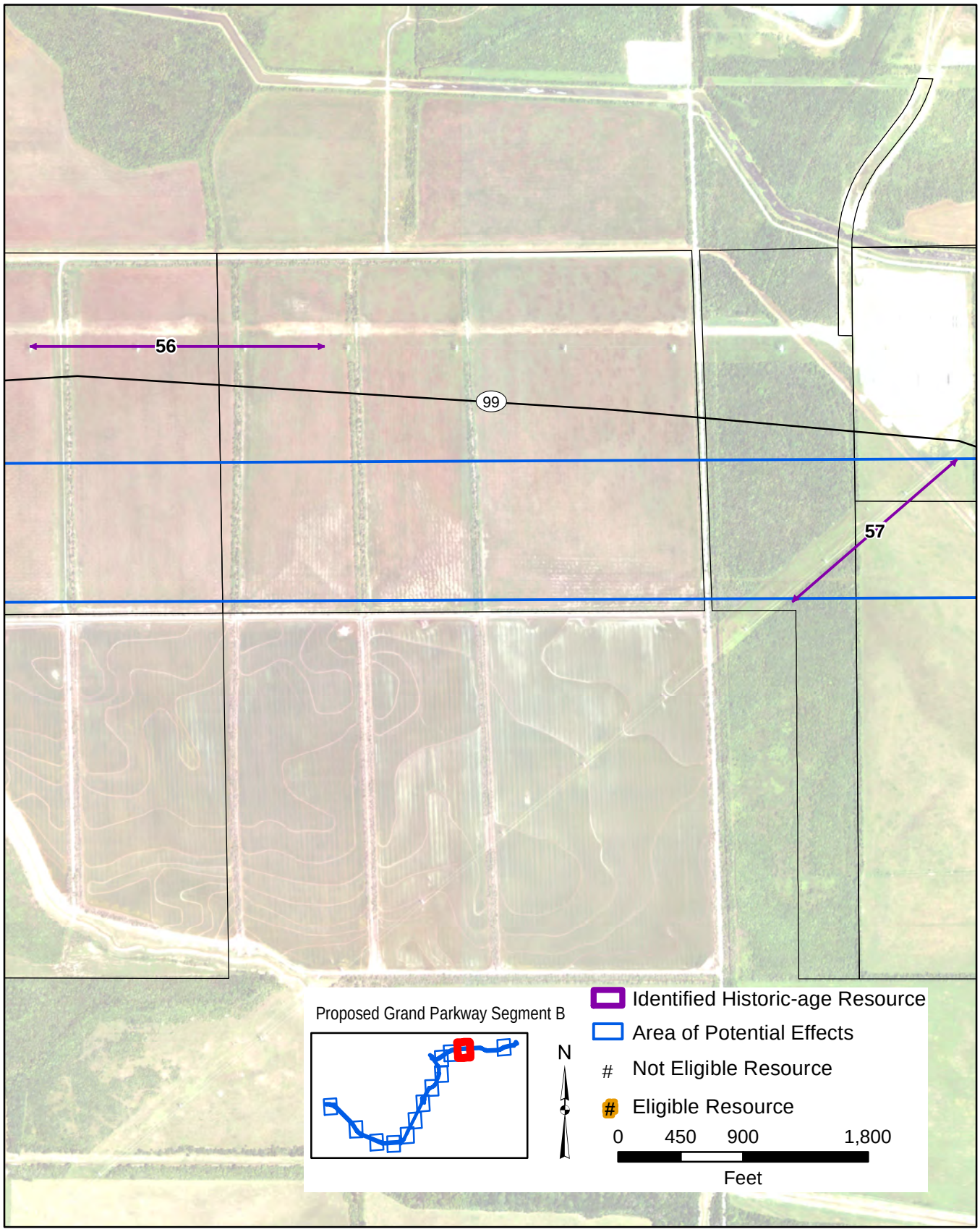
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

Figure 7-13


56
99
57
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Area of Potential Effects
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Eligible Resource
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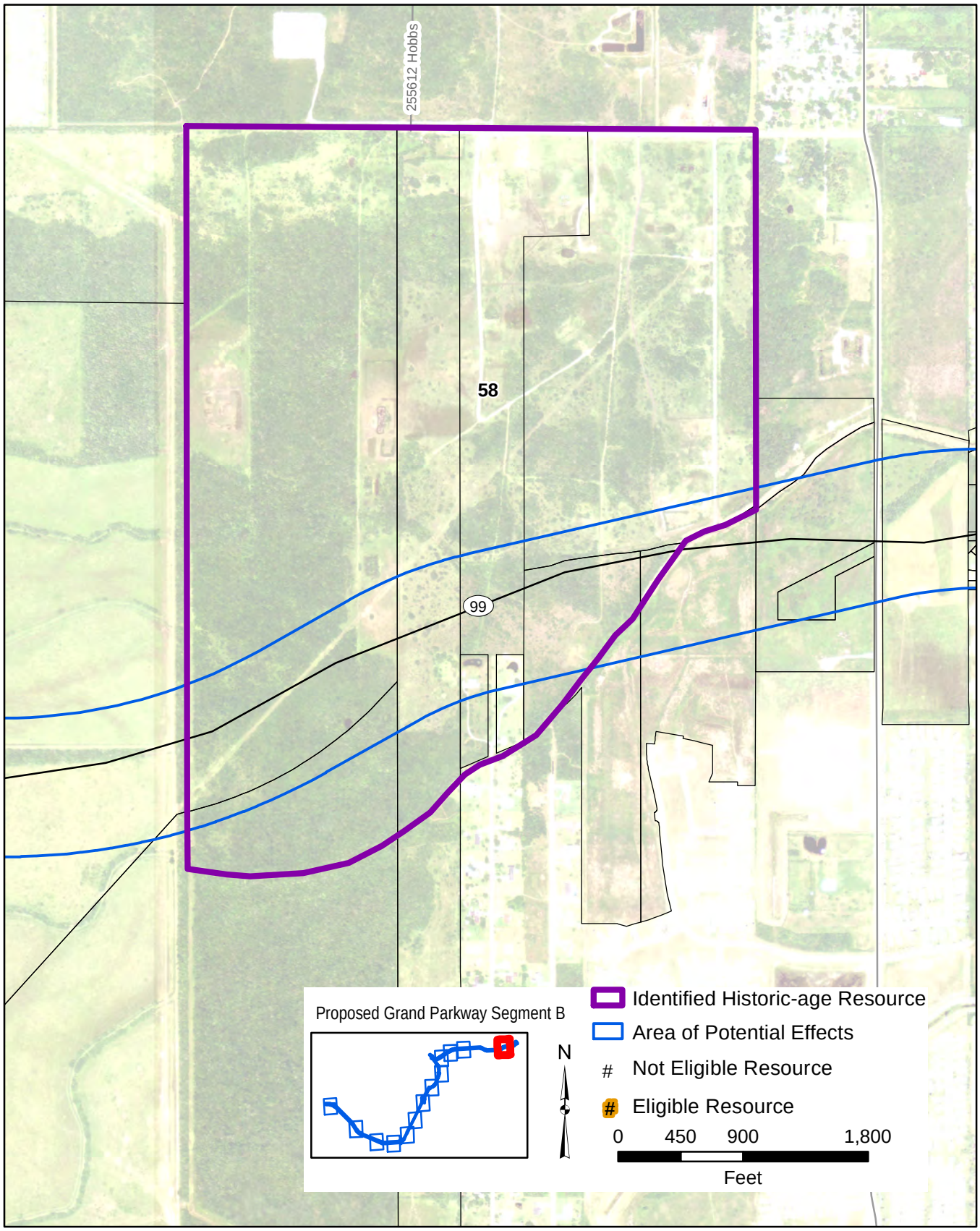
Feet

Figure 7-14


255612 Hobbs
58
99
Proposed Grand Parkway Segment B
N
Identified Historic-age Resource
Area of Potential Effects
Not Eligible Resource
Eligible Resource
0 450 900 1,800
Feet

as not eligible for the National Register under Criterion C. None of these resources have strong associations with important historical trends, events, or people, and they are recommended as not eligible for the National Register under Criteria A and B. In addition, Resources 8, 28A–D, and 38 are recommended as not eligible for the National Register because they are currently less than 50 years old; as they reach that temporal benchmark, these resources will be considered ineligible because of compromised physical integrity or lack of exemplary attributes.

Industrial resources in the area of potential effects are a mill complex (Resource 44), a bulk terminal station (Resources 25A–D), 12 pipelines (Resources 2–7, 17, 20, 23, 43, 53, and 55), two electrical transmission lines (Resources 56 and 57), and an oil field (Resource 58). The mill has undergone many renovations with various and large additions. As a result, the older portion has an altered fenestration pattern and modern windows, doors, and siding. At least two modern buildings are on the property, further compromising the setting. The bulk terminal station has a modern detached canopy that compromises the setting, and the service station building has been substantially altered. The pipelines are mostly underground. Some are in poor condition, and one has been abandoned. In most cases, modern parallel pipelines have been constructed within the rights of way so that as many as eight pipelines share the right of way originally developed for the historic-age resource. Over time, these pipelines have been altered with the introduction of nonhistoric replacement parts and materials. Aerial views show that the setting of the oil field has been severely compromised. The electrical transmission lines have undergone alterations and include modern replacement parts installed to keep pace with service changes. These resources are not exemplary of a style, type, period, or method of construction and are recommended as not eligible for the

National Register under Criterion C. None of these resources have strong associations with important historical trends, events, or people, and they are recommended as not eligible for the National Register under Criteria A and B. In addition, Resources 17, 20, 44, 56, and 57 are recommended as not eligible for the National Register because they are currently less than 50 years old; as they reach that temporal benchmark, these resources will be considered ineligible because of compromised physical integrity or lack of exemplary attributes.

The nine transportation resources in the area of potential effects are bridges and culverts. One is a railroad bridge over State Highway 35 (Resource 45), and six are vehicular bridges along State Highway 35 and its Alvin bypass (Resources 10, 12, 40, 41, 46, and 47). The remaining two are culverts on the bypass (Resources 51 and 52). One of these structures (Resource 10) was rebuilt and widened in 1958; three of these structures (Resources 12, 40, and 41) were rebuilt and widened in the last quarter of the twentieth century. None of these bridges or culverts display distinctive characteristics of a style, type, period, or method of construction. These resources are recommended as not eligible for the National Register under Criterion C. Their associative qualities with important historical trends, events, or people are limited, and they are recommended as not eligible for the National Register under Criteria A and B.

Six commercial buildings are in the area of potential effects (Resources 9, 21, 22, 24, 39, and 42). One is a Quonset hut (Resource 42) originally associated with World War II; the building was moved to its current location in about 1965 and has served in a commercial capacity since that time. The other commercial buildings are modest examples of their types. Some have experienced alterations, and all are unremarkable. They do not impart historical or architectural qualities that are clearly distinguishable

from other similar proximate examples, and are not exemplary of a style, type, period, or method of construction. They are recommended as not eligible for the National Register under Criterion C. They do not have strong associations with important historical trends, events, or people, and are recommended as not eligible for the National Register under Criteria A and B. In addition, Resources 21, 22, and 39 are recommended as not eligible for the National Register because they are currently less than 50 years old; as they reach that temporal benchmark, these resources will be considered ineligible because of compromised physical integrity or lack of exemplary attributes.

Of the five recreation and culture resources in the area of potential effects, two are Official Texas Historical Markers (Resources 11 and 49); the other three recreation and culture resources (Resources 13A–C) are assessed in the section on historic districts. Both historical markers were erected in 1968. The Chocolate Bayou historical marker (Resource 11) is a cast-aluminum sign mounted on a pole in a roadside park near a branch of Chocolate Bayou. The Confederate Cemetery historical marker (Resource 49) is a cast-aluminum plaque embedded in a stone entrance pillar at the Confederate Cemetery facing Dickinson Road/FM 517. These markers are recommended as not eligible for the National Register under Criteria A, B, and C. In addition, Resources 11 and 49 are recommended as not eligible for the National Register because they are currently less than 50 years old; as they reach that temporal benchmark, these resources will be considered ineligible because they lack exemplary attributes.

The single funerary resource in the area of potential effects is the Confederate Cemetery (Resource 48). Cemeteries are generally not considered eligible for the National Register. Although the cemetery has known associations with the Alvin community, it does not have graves of transcendent importance or distinctive design

features. The cemetery does not offer extraordinary characteristics of a style, type, period, or method of construction. Because the cemetery does not impart distinguishable historical or architectural qualities, it is recommended as not eligible for the National Register under Criterion C. The cemetery does not have strong associations with important historical trends, events, or people, and it is recommended as not eligible for the National Register under Criteria A and B.

Three agricultural properties in the area of potential effects are canal systems: the ca. 1908 American Rice Canal (Resource 54), the ca. 1925 Briscoe Irrigation Company Canal (Resource 16), and the 1935 South Texas Water Company Canal (Resource 1). These resources are recommended as eligible for the National Register at the local level of significance under Criterion A in the area of agriculture for their associations with rice cultivation; the Briscoe Canal may also be eligible under Criterion B in the area of agriculture for its associations with founder Robert T. Briscoe; the South Texas Water Company Canal may also be eligible under Criterion C in the area of engineering as an excellent example of its type. The period of significance for each of these canal systems extends through 1964, the 50-year cutoff date suggested for most properties, as they continued to function in their original capacity during that time. Boundaries for these resources are limited to the canal rights of way between where water is initially diverted into the system and where it terminates at the endpoint. This includes adjacent lift and pump stations but not agricultural acreage (Knight 2009:268–269). The boundaries for each of these canal systems likely extend substantially beyond the area of potential effects under consideration; however, for the purposes of these historic resources, they will be delimited to the rural portions of the area of potential effects.

Each of these canal systems retains a high degree of integrity.[2] Based on a comparison of historic-period topographic maps and aerial photographs with modern sources, they are in their original locations and follow their original alignments. Where realignments have taken place, they are minor and diverge minimally from the historic route. For example, a short stretch of the South Texas Water System canal was removed and reconstructed parallel and slightly to the east when State Highway 288 was reconstructed in the early 1970s. Otherwise new construction, such as underground pipelines replacing original open-air canals, was observed during field investigations or on detailed observation of aerial photographs. Surrounded by agricultural fields and vegetation, these canals remain in fundamentally unchanged rural settings. Although suburban development has crept outward from the Interstate 45 corridor and in the vicinity of Alvin, modern intrusions are minimal along the majority of these systems in the area of potential effects. The majority of their physical components—diversion, conveyance, distribution, and delivery features, plus related infrastructure—are intact. They retain integrity of design with natural and physical elements that shape their spatial organization. These canal systems effectively conveyed, distributed, and delivered water to farmlands by employing hydraulic engineering practices. Minor components, like gates and turnouts, have been replaced in-kind, but these small alterations do not detract from the overall design of these systems. Each of these canal systems have unlined earthen walls; some of the Briscoe and American Canals have been lined with concrete, but this occurred during the historic period, according to aerial photographs. Thus, integrity of materials remains intact to large degree, especially for the South Texas Water Company Canal, which remains an independent system, unlike

[2] Knight 2009 informed this evaluation.

the American and Briscoe Canals, which became subsets of the Gulf Coast Water Authority in 1966. However, as is often the case for operational infrastructure, lift plants, pump stations, and gates may have been modernized along each system. This is considered acceptable since the major character-defining features, like alignments and embankments, remain unaltered. The embankments of dirt dug to form the canals and the detailing of gates provide physical evidence of integrity of workmanship. These canals each function in their original capacity as water sources for crop production and thus retain their integrity of association as significant agricultural resources. The American Rice and Briscoe Canals evolved during the historic period to serve industrial and municipal water needs, and they also retain their association with those purposes. Overall, these canals retain integrity of feeling with their intact settings, continuous use since the first half of the twentieth century, and strong associative qualities.

Historic Districts

No potential historic districts are in or near the area of potential effects. Historic aerial photographs and maps guided initial identification of potential historic districts. Research, reconnaissance survey, and an examination of the distribution of historic-age resources found a lack of any unified or interconnected collection of resources that could be considered contributing elements to a potential historic district.

Irrigation systems like the American, Briscoe, and South Texas Water Company canals are each considered a single resource with multiple components (Knight 2009:223); however, the Gulf Coast Union Camp Meeting Campground (Resources 13A–C) was evaluated as a potential historic district. Most of the buildings, structures, and

other features were erected on the original 40-acre site between 2001 and 2007, after Brazoria County acquired the property. Although the camp retains integrity of location, these modern projects—the county-built dormitories, cabins, park manager's dwelling, and administration building—overwhelm the three historic-age resources: the 1929 lake (Resource 13C), a 1951 swimming pool (Resource 13B), and a 1965 chapel (Resource 13A). The lake is now closed to swimming, and the pool was modernized to accommodate accessibility. The topography has been altered to incorporate hiking trails, walking paths, and playscapes. As a result, the camp no longer retains integrity of setting, design, materials, workmanship, or feeling. Although the property still functions as a campground, it no longer retains associative qualities with the founding organization. Collectively, these resource offer neither an exemplary nor a typical grouping that comprise a historic district. Extant historic-age resources and landscape features, both in and near the area of potential effects, do not provide enough historic fabric to adequately portray associative qualities that would be necessary for a historic district. As a result, no potential National Register historic district is present.

Effects to Historic Properties

Historical resources studies documented 69 historic-age resources in the area of potential effects. Of these resources, 66 are recommended as not eligible for the National Register of Historic Places. They have no strong associations with important historical trends, events, people, or architecture, and none embody the distinctive characteristics of a style, type, period, or method of construction, as representative or rare examples. No

further work is warranted for resources recommended as not eligible. No potential historic districts or landscapes were identified.

Three resources are recommended as eligible for the National Register of Historic Places: the ca. 1908 American Rice Canal (Resource 54), the ca. 1925 Briscoe Canal (Resource 16), and the 1935 South Texas Water Company Canal (Resource 1). These structures are considered locally significant under Criterion A in the area of agriculture for their associations with rice cultivation; the Briscoe Canal may also be eligible under Criterion B in the area of agriculture for its associations with its founder; the South Texas Water Company Canal may also be eligible under Criterion C in the area of engineering as an excellent example of its type. These canal systems retain a high degree of integrity.

A determination of effects to these significant resources will require review of the most recent schematic drawings by the Texas Department of Transportation, Environmental Affairs Division, Historical Studies Branch, in consultation with the Texas Historical Commission. Preparation of schematic drawings is ongoing with plan views drafted and profiles generated; however, no survey has been conducted to date.

Consultation and coordination with the Brazoria County Historical Commission will ensure that the proposed Grand Parkway Segment B will not compromise the two historical markers in the Area of Potential Effects. The Chocolate Bayou historical marker (Resource 11) is both in the Area of Potential Effects and in the proposed right of way. This marker will be removed before construction begins, stored and protected, and installed in an appropriate location at the conclusion of construction activity in the vicinity. One possible location, which would require redesigning a small portion of the proposed roadway to adequately accommodate public access, is about 190 linear feet in a

southeasterly direction from the historical marker's current location. Alternate sites will be assessed and an approved location will be determined through coordination with the Brazoria County Historical Commission and the Texas Historical Commission. The Confederate Cemetery historical marker (Resource 49) faces Dickinson Road/FM 517 west of the State Highway 35 Bypass. Although the Confederate Cemetery historical marker is in the Area of Potential Effects, it is outside both the State Highway 35 Bypass and Dickinson Road/FM 517 rights of way. In this vicinity, the proposed improvements are confined to the existing State Highway 35 Bypass right of way with no work planned for Dickinson Road/FM 517. As a result, neither removing or relocating the Confederate Cemetery historical marker will be necessary.

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APPENDIX A: Historical Resources Survey Forms

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HISTORICAL RESOURCES SURVEY FORM

Resource #:	1
Resource Name:	South Texas Water Company Canal System
Location:	Latitude 29.38; longitude -95.42
Resource Type/Subtype:	Agriculture / irrigation facility
Stylistic Influence:	Landscape
Construction Date:	1935
NRHP Recommendation	Eligible
View:	1944 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #: 1

Location: Latitude 29.38; longitude -95.42

NRHP Recommendation Eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

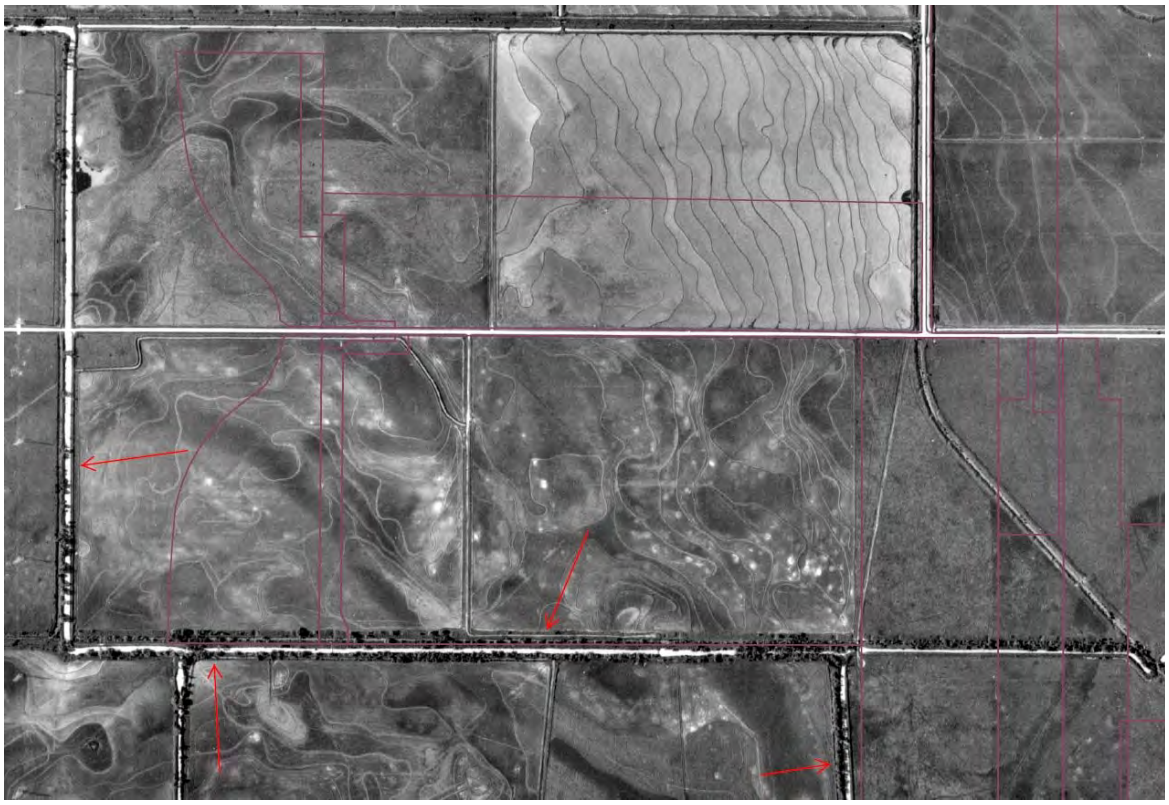
Additions: n/a

Other: Retains a high degree of integrity

2nd View: 1961 aerial

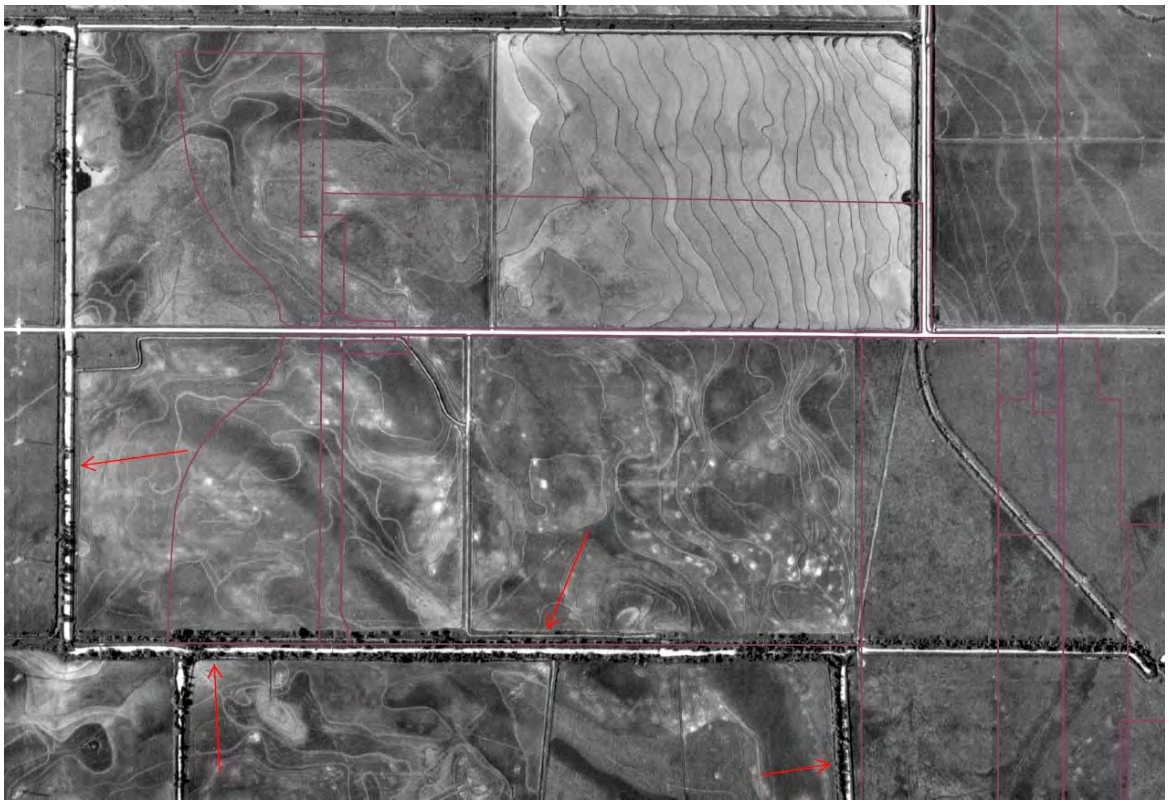
HISTORICAL RESOURCES SURVEY FORM

Resource #:	1
Location:	Latitude 29.38; longitude -95.42
NRHP Recommendation	Eligible
3rd View	1969 aerial



HISTORICAL RESOURCES SURVEY FORM

Resource #:	1
Location:	Latitude 29.38; longitude -95.42
NRHP Recommendation	Eligible
4th View	2013 aerial



HISTORICAL RESOURCES SURVEY FORM

Resource #:	1
Location:	Latitude 29.38; longitude -95.42
NRHP Recommendation	Eligible
5th View	East side of the main canal, looking north

HISTORICAL RESOURCES SURVEY FORM

Resource #:	1
Location:	Latitude 29.38; longitude -95.42
NRHP Recommendation	Eligible
6th View	Irrigated fields adjacent to County Road 60, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	1
Location:	Latitude 29.38; longitude -95.42
NRHP Recommendation	Eligible
7th View	Laterals on both sides of County Road 6, looking east

HISTORICAL RESOURCES SURVEY FORM

Resource #:	1
Location:	Latitude 29.38; longitude -95.42
NRHP Recommendation	Eligible
8th View	Juncture of laterals along County Roads 60 and 65, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	1
Location:	Latitude 29.38; longitude -95.42
NRHP Recommendation	Eligible
9th View	Headgate and juncture of County Roads 60 and 65, looking north

HISTORICAL RESOURCES SURVEY FORM

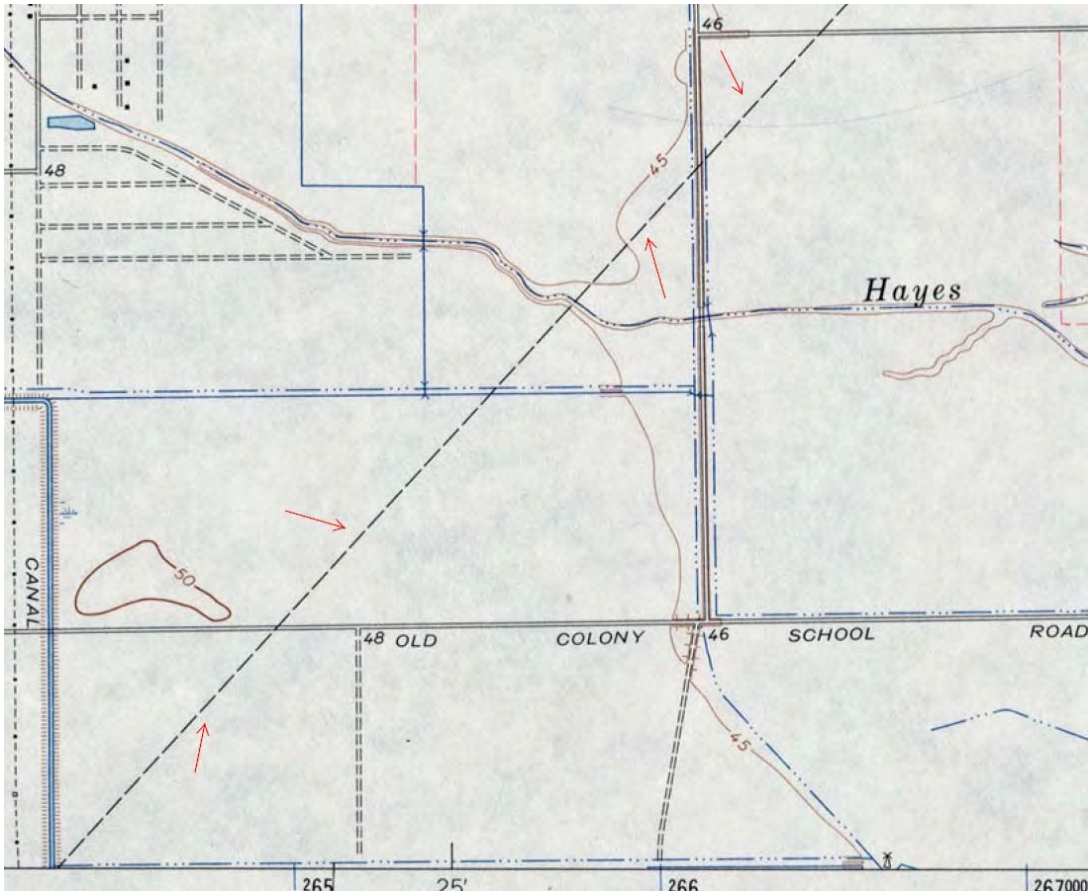
Resource #:	1
Location:	Latitude 29.38; longitude -95.42
NRHP Recommendation	Eligible
10th View	Headgate turning mechanism on County Road 60, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	1
Location:	Latitude 29.38; longitude -95.42
NRHP Recommendation	Eligible
11th View	Two-track road between two laterals, looking south

HISTORICAL RESOURCES SURVEY FORM

Resource #:	2
Resource Name:	Pipeline
Location:	Latitude 29.38; longitude -95.42
Resource Type/Subtype:	Industrial / natural gas transmission pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1963
NRHP Recommendation	Not eligible
View:	1963 topographic map



HISTORICAL RESOURCES SURVEY FORM

Resource #: 2

Location: Latitude 29.38; longitude -95.42

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

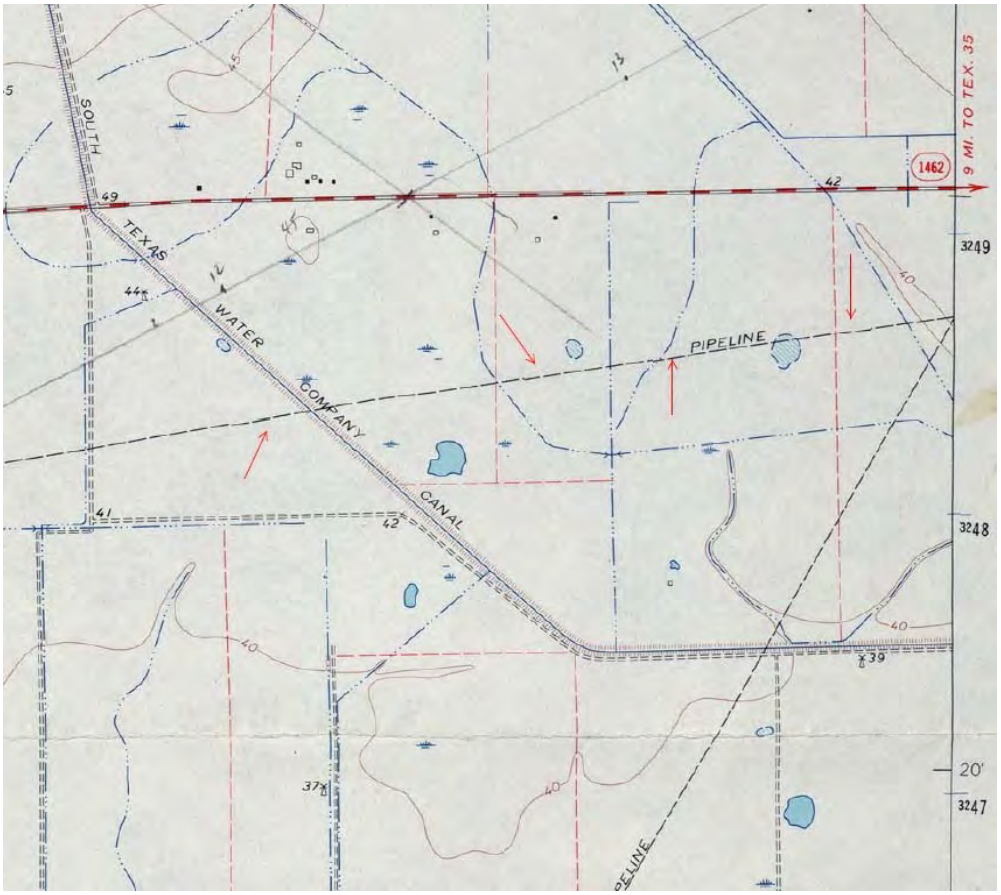
Additions: Nonhistoric materials

Other: Not exemplary

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	3
Resource Name:	Pipeline
Location:	Latitude 29.35; longitude -95.38
Resource Type/Subtype:	Industrial / natural gas transmission pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1963
NRHP Recommendation	Not eligible
View:	1963 topographic map



HISTORICAL RESOURCES SURVEY FORM

Resource #: 3

Location: Latitude 29.35; longitude -95.38

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

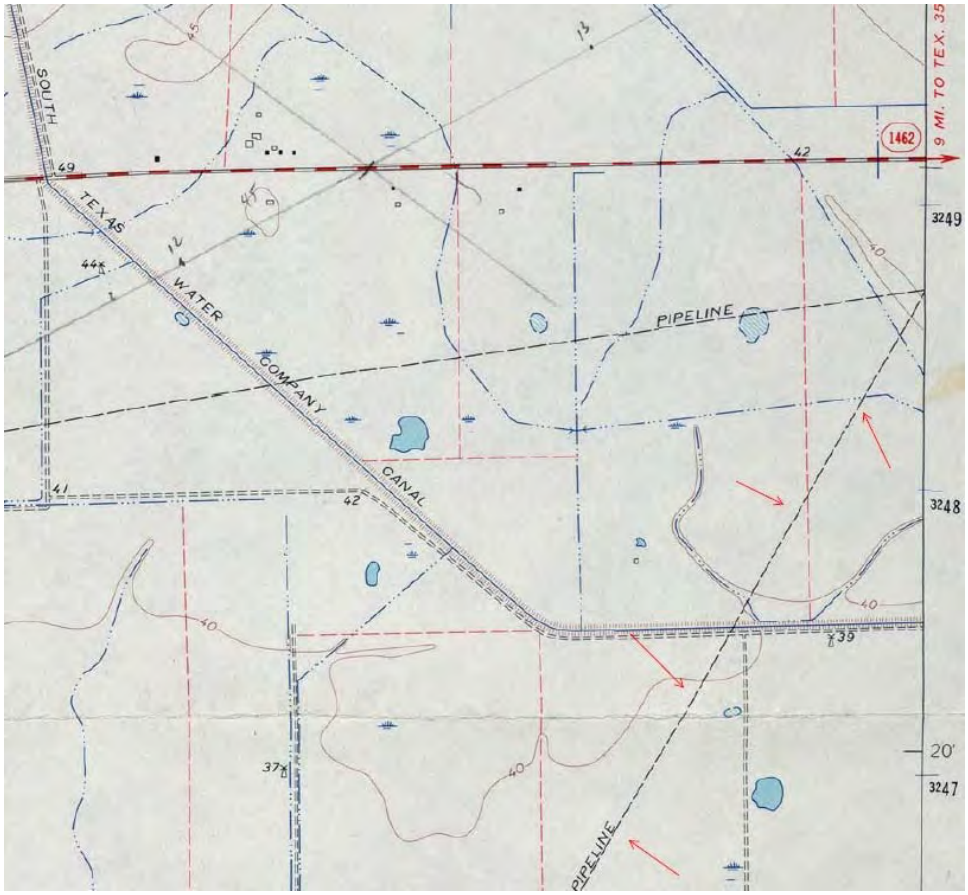
Additions: Nonhistoric materials

Other: Not exemplary

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	4
Resource Name:	Pipeline
Location:	Latitude 29.35; longitude -95.38
Resource Type/Subtype:	Industrial / natural gas transmission pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1963
NRHP Recommendation	Not eligible
View:	1963 topographic map



HISTORICAL RESOURCES SURVEY FORM

Resource #: 4

Location: Latitude 29.35; longitude -95.38

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

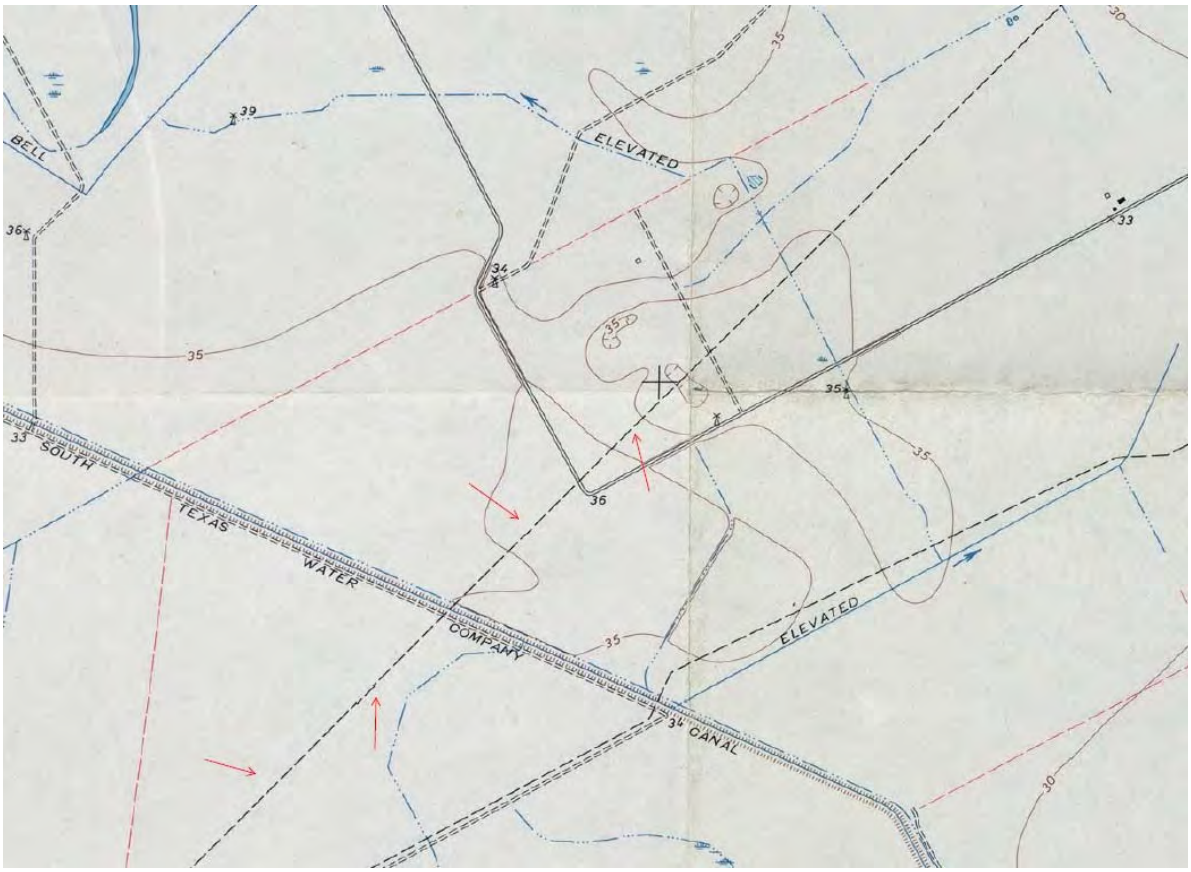
Additions: Nonhistoric materials

Other: Not exemplary

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	5
Resource Name:	Pipeline
Location:	Latitude 29.33; longitude -95.34
Resource Type/Subtype:	Industrial / crude oil gathering pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1963
NRHP Recommendation	Not eligible
View:	1963 topographic map



HISTORICAL RESOURCES SURVEY FORM

Resource #: 5

Location: Latitude 29.33; longitude -95.34

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

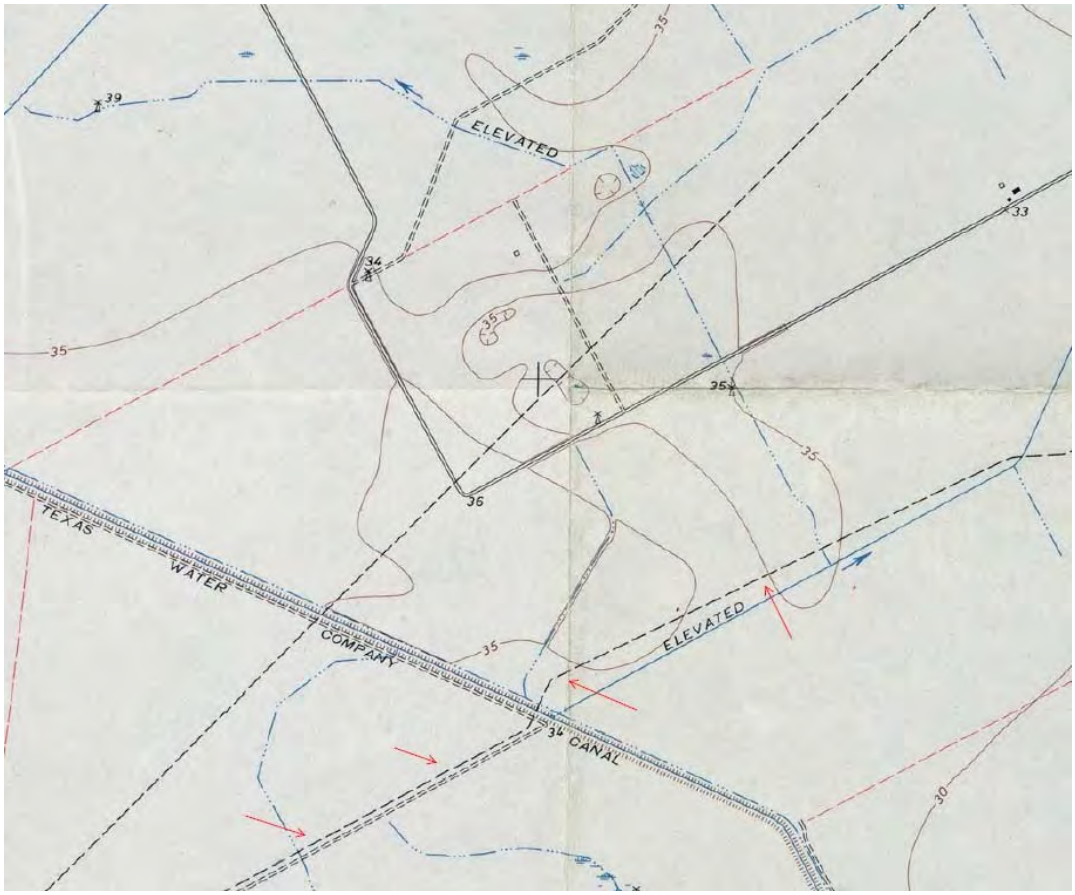
Additions: Nonhistoric materials

Other: Not exemplary, poor condition

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	6
Resource Name:	Pipeline
Location:	Latitude 29.32; longitude -95.33
Resource Type/Subtype:	Industrial / propane pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1963
NRHP Recommendation	Not eligible
View:	1963 topographic map



HISTORICAL RESOURCES SURVEY FORM

Resource #: 6

Location: Latitude 29.32; longitude -95.33

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

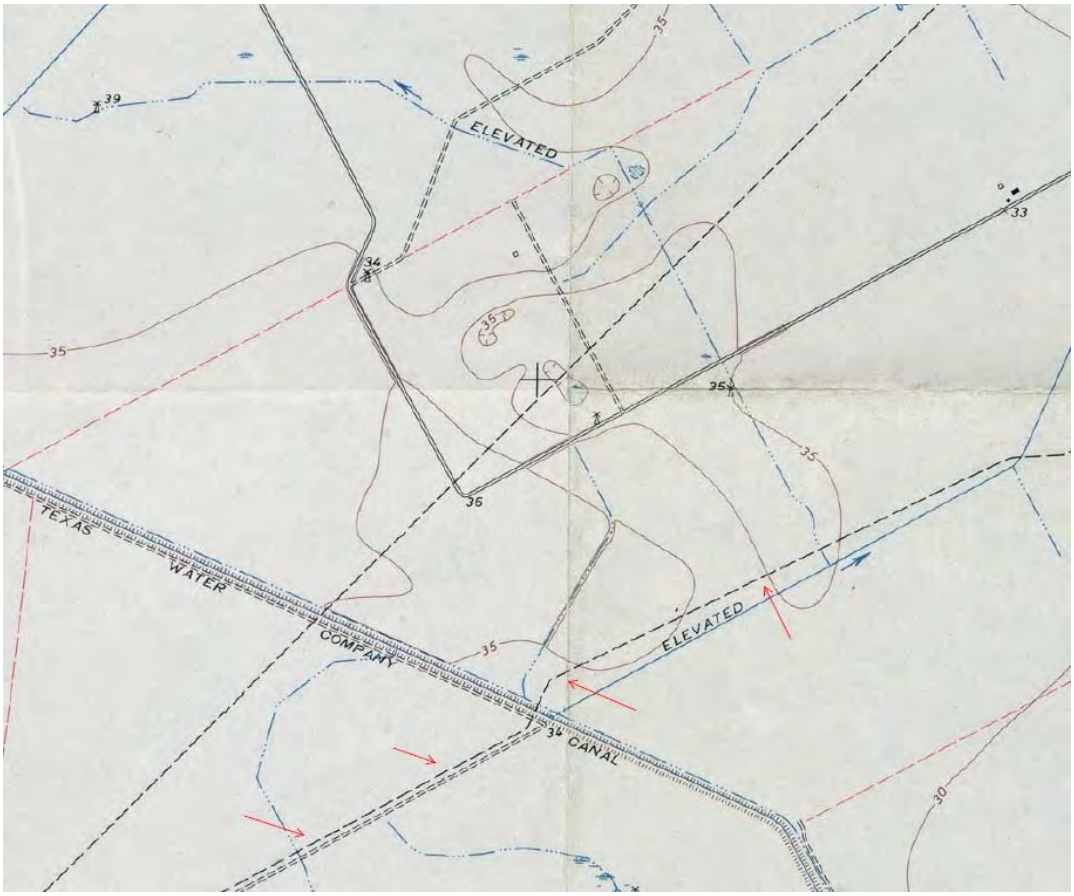
Front porch n/a

Siding: n/a

Additions: Nonhistoric materials

Other: Not exemplary, poor condition

2nd View: 2013 aerial



HISTORICAL RESOURCES SURVEY FORM

Resource #:	7
Resource Name:	Pipeline
Location:	Latitude 29.32; longitude -95.31
Resource Type/Subtype:	Industrial / natural gas transmission pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1963
NRHP Recommendation	Not eligible
View:	1963 topographic map

HISTORICAL RESOURCES SURVEY FORM

Resource #: 7

Location: Latitude 29.32; longitude -95.31

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: Nonhistoric materials

Other: Not exemplary, poor condition

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	8
Resource Name:	House
Location:	8122 State Highway 35; latitude 29.33; longitude -95.29
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Ranch Style
Construction Date:	ca. 1970
NRHP Recommendation	Not eligible
View:	Oblique, looking north

HISTORICAL RESOURCES SURVEY FORM

Resource #: 8

Location: 8122 State Highway 35; latitude 29.33; longitude -95.29

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows, door

Front porch n/a

Siding: n/a

Additions: 1976 garage, 2004 mobile home

Other: Not exemplary, compromised setting, less than 50 years old

2nd View: Side façade, looking north

HISTORICAL RESOURCES SURVEY FORM

Resource #:	9
Resource Name:	Commercial building
Location:	8012 State Highway 35; latitude 29.33; longitude -95.29
Resource Type/Subtype:	Commercial / retail store
Stylistic Influence:	Shed roof
Construction Date:	ca. 1960
NRHP Recommendation	Not eligible
View:	Front façade, looking north

HISTORICAL RESOURCES SURVEY FORM

Resource #: 9

Location: 8012 State Highway 35; latitude 29.33; longitude -95.29

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration:	Nonhistoric fenestration pattern
Windows/doors:	Nonhistoric windows, doors
Front porch	n/a
Siding:	Nonhistoric siding
Additions:	Nonhistoric additions, 1996 metal shed
Other:	Not exemplary, compromised setting

2nd View: Oblique, looking northwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	10
Resource Name:	Bridge NBI# 120200017803024
Location:	State Highway 35; latitude 29.33; longitude -95.29
Resource Type/Subtype:	Transportation / vehicular bridge
Stylistic Influence:	Concrete T-beam
Construction Date:	1937/1958
NRHP Recommendation	Not eligible
View:	Bridge, looking south

HISTORICAL RESOURCES SURVEY FORM

Resource #: 10

Location: State Highway 35; latitude 29.33; longitude -95.29

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: Reconfigured, widened

Other: Not exemplary

2nd View: Bridge, looking north

HISTORICAL RESOURCES SURVEY FORM

Resource #:	10
Location:	State Highway 35; latitude 29.33; longitude -95.29
NRHP Recommendation	Not eligible
3rd View	Street level, looking southwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	10
Location:	State Highway 35; latitude 29.33; longitude -95.29
NRHP Recommendation	Not eligible
4th View	1944 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	10
Location:	State Highway 35; latitude 29.33; longitude -95.29
NRHP Recommendation	Not eligible
5th View	1961 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	10
Location:	State Highway 35; latitude 29.33; longitude -95.29
NRHP Recommendation	Not eligible
6th View	2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	11
Resource Name:	Official Texas Historical Marker, Oyster Creek and Chocolate Bayou
Location:	State Highway 35 at Chocolate Bayou; latitude 29.33; longitude -95.29
Resource Type/Subtype:	Recreation and Culture / historical marker
Stylistic Influence:	Aluminum plaque on post
Construction Date:	1968
NRHP Recommendation	Not eligible
View:	Marker, looking north northeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 11

Location: State Highway 35 at Chocolate Bayou; latitude 29.33; longitude -95.29

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary, less than 50 years old

2nd View: Marker detail, looking north

HISTORICAL RESOURCES SURVEY FORM

Resource #:	12
Resource Name:	Bridge NBI# 120200017803023
Location:	State Highway 35; latitude 29.34; longitude -95.28
Resource Type/Subtype:	Transportation / vehicular bridge
Stylistic Influence:	Concrete T-beam
Construction Date:	1937/1958
NRHP Recommendation	Not eligible
View:	Bridge, looking north

HISTORICAL RESOURCES SURVEY FORM

Resource #: 12

Location: State Highway 35; latitude 29.34; longitude -95.28

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: Reconfigured, widened

Other: Not exemplary

2nd View: Bridge, looking northeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	12
Location:	State Highway 35; latitude 29.34; longitude -95.28
NRHP Recommendation	Not eligible
3rd View	Street level, looking east

HISTORICAL RESOURCES SURVEY FORM

Resource #:	12
Location:	State Highway 35; latitude 29.34; longitude -95.28
NRHP Recommendation	Not eligible
4th View	1944 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	12
Location:	State Highway 35; latitude 29.34; longitude -95.28
NRHP Recommendation	Not eligible
5th View	1961 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	12
Location:	State Highway 35; latitude 29.34; longitude -95.28
NRHP Recommendation	Not eligible
6th View	2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	13
Resource Name:	Gulf Coast Union Camp Meeting Grounds (A-C)
Location:	State Highway 35; latitude 29.34; longitude -95.29
Resource Type/Subtype:	Recreation and Culture / campground (A-C)
Stylistic Influence:	Contemporary Style (A), landscape (B-C)
Construction Date:	1965 (A), 1951/2000 (B), 1929 (C)
NRHP Recommendation:	Not eligible (A-C)
View:	1961 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #: 13

Location: State Highway 35; latitude 29.34; longitude -95.29

NRHP Recommendation: Not eligible (A-C)

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: Numerous modern resources on property (A-C)

Other: Not exemplary, compromised setting (A-C), less than 50 years old (A)

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	13
Location:	State Highway 35; latitude 29.34; longitude -95.29
NRHP Recommendation:	Not eligible (A-C)
3rd View	Church (A), looking west

HISTORICAL RESOURCES SURVEY FORM

Resource #:	13
Location:	State Highway 35; latitude 29.34; longitude -95.29
NRHP Recommendation:	Not eligible (A-C)
4th View	Oblique (A), looking southwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	13
Location:	State Highway 35; latitude 29.34; longitude -95.29
NRHP Recommendation:	Not eligible (A-C)
5th View	Swimming pool (B), looking north northeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	13
Location:	State Highway 35; latitude 29.34; longitude -95.29
NRHP Recommendation:	Not eligible (A-C)
6th View	Lake (C), looking west

HISTORICAL RESOURCES SURVEY FORM

Resource #:	14
Resource Name:	House (A) and garage (B)
Location:	6402 State Highway 35; latitude 29.35; longitude -95.28
Resource Type/Subtype:	Domestic / single-family dwelling (A), garage (B)
Stylistic Influence:	Side-gable roof (A), front-gable roof (B)
Construction Date:	ca. 1940 (A-B)
NRHP Recommendation:	Not eligible (A-B)
View:	Front façade (A), garage (B) at left, looking north

HISTORICAL RESOURCES SURVEY FORM

Resource #: 14

Location: 6402 State Highway 35; latitude 29.35; longitude -95.28

NRHP Recommendation: Not eligible (A-B)

Integrity Issues:

Fenestration: Nonhistoric fenestration pattern (A)

Windows/doors: Nonhistoric windows (A)

Front porch Nonhistoric porch components (A)

Siding: Nonhistoric siding (A)

Additions: n/a

Other: Poor condition (A-B)

2nd View: Front façade (A), garage (B) at left, looking northeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	15
Resource Name:	House
Location:	5520 State Highway 35; latitude 29.36; longitude -95.27
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Side-gable roof
Construction Date:	ca. 1940/ca. 1970
NRHP Recommendation:	Not eligible
View:	Front façade, looking north

HISTORICAL RESOURCES SURVEY FORM

Resource #: 15

Location: 5520 State Highway 35; latitude 29.36; longitude -95.27

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows, door

Front porch n/a

Siding: Nonhistoric siding

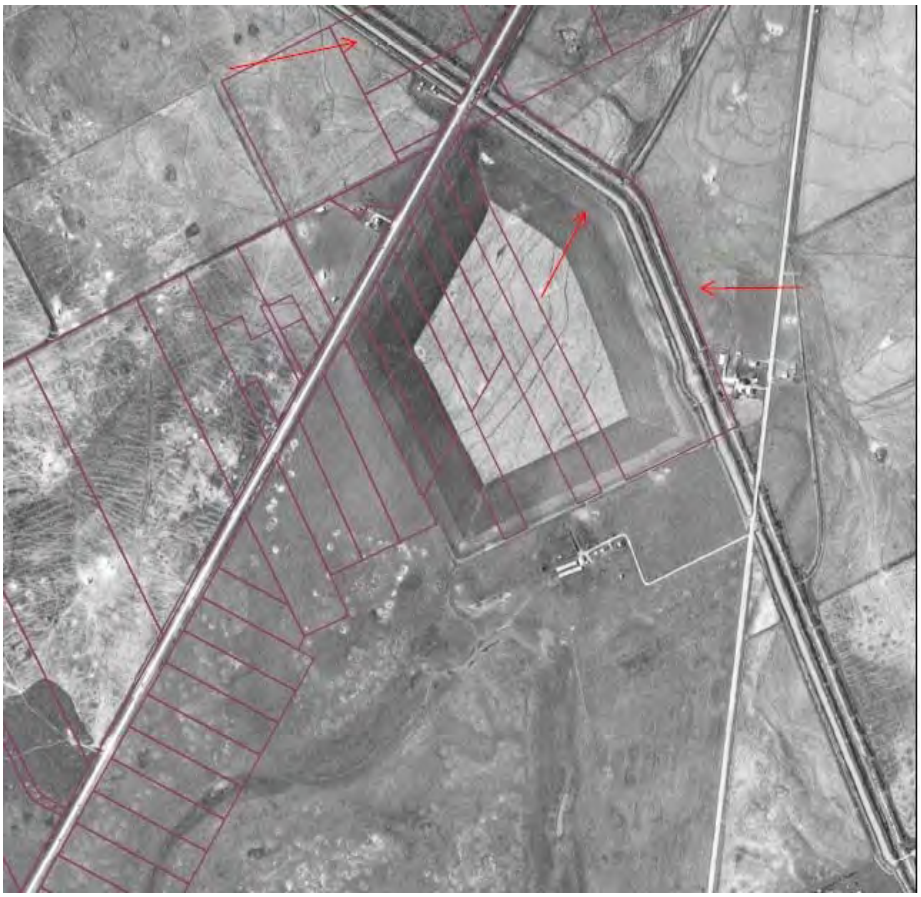
Additions: n/a

Other: Moved ca. 1970, compromised setting

2nd View: Oblique, looking northeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	16
Resource Name:	Briscoe Irrigation Company Canal
Location:	Latitude 29.37; longitude -95.26
Resource Type/Subtype:	Agriculture / irrigation facility
Stylistic Influence:	Landscape
Construction Date:	ca. 1925
NRHP Recommendation	Eligible
View:	1944 aerial



HISTORICAL RESOURCES SURVEY FORM

Resource #: 16

Location: Latitude 29.37; longitude -95.26

NRHP Recommendation Eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

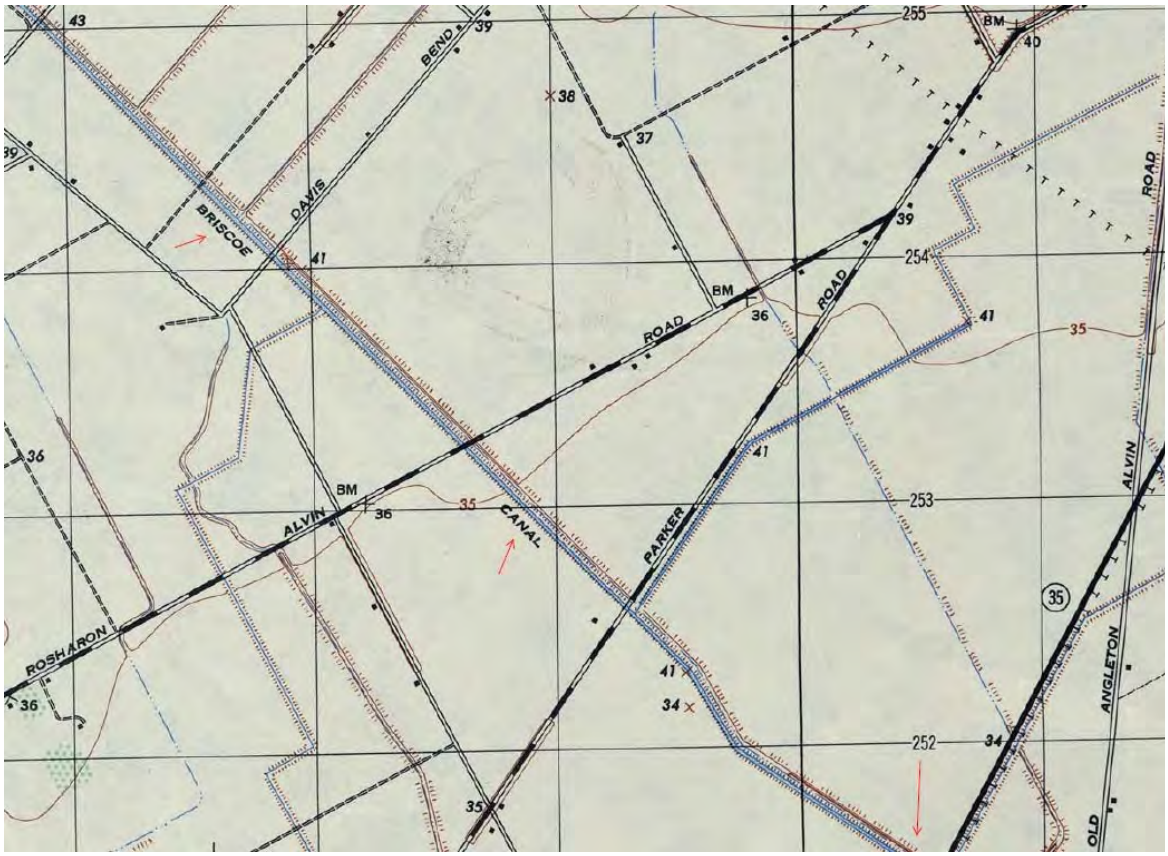
Front porch n/a

Siding: n/a

Additions: n/a

Other: Retains a high degree of integrity

2nd View: 1947 topographic map



HISTORICAL RESOURCES SURVEY FORM

Resource #:	16
Location:	Latitude 29.37; longitude -95.26
NRHP Recommendation	Eligible
3rd View	1961 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	16
Location:	Latitude 29.37; longitude -95.26
NRHP Recommendation	Eligible
4th View	1969 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	16
Location:	Latitude 29.37; longitude -95.26
NRHP Recommendation	Eligible
5th View	2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	16
Location:	Latitude 29.37; longitude -95.26
NRHP Recommendation	Eligible
6th View	Briscoe Canal with natural gas pipeline, looking southeast

HISTORICAL RESOURCES SURVEY FORM

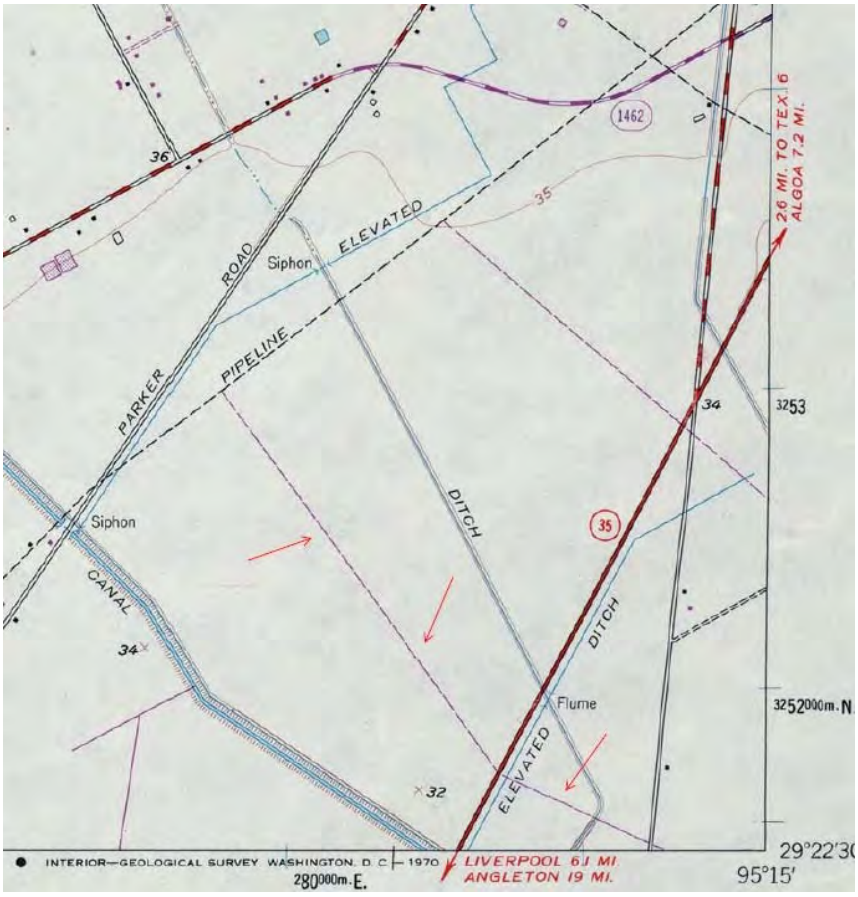
Resource #:	16
Location:	Latitude 29.37; longitude -95.26
NRHP Recommendation	Eligible
7th View	Main canal, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	16
Location:	Latitude 29.37; longitude -95.26
NRHP Recommendation	Eligible
8th View	Headgate at main canal, looking northeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	17
Resource Name:	Pipeline
Location:	Latitude 29.38; longitude -95.26
Resource Type/Subtype:	Industrial / natural gas gathering pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1969
NRHP Recommendation:	Not eligible
View:	1969 aerial



HISTORICAL RESOURCES SURVEY FORM

Resource #: 17

Location: Latitude 29.38; longitude -95.26

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: Nonhistoric materials

Other: Not exemplary, less than 50 years old

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	18
Resource Name:	House
Location:	3503 FM 2403; latitude 29.38; longitude -95.25
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Colonial Revival
Construction Date:	ca. 1940
NRHP Recommendation:	Not eligible
View:	Front façade, looking east

HISTORICAL RESOURCES SURVEY FORM

Resource #: 18

Location: 3503 FM 2403; latitude 29.38; longitude -95.25

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows, doors, screens, shutters

Front porch Nonhistoric porch components

Siding: n/a

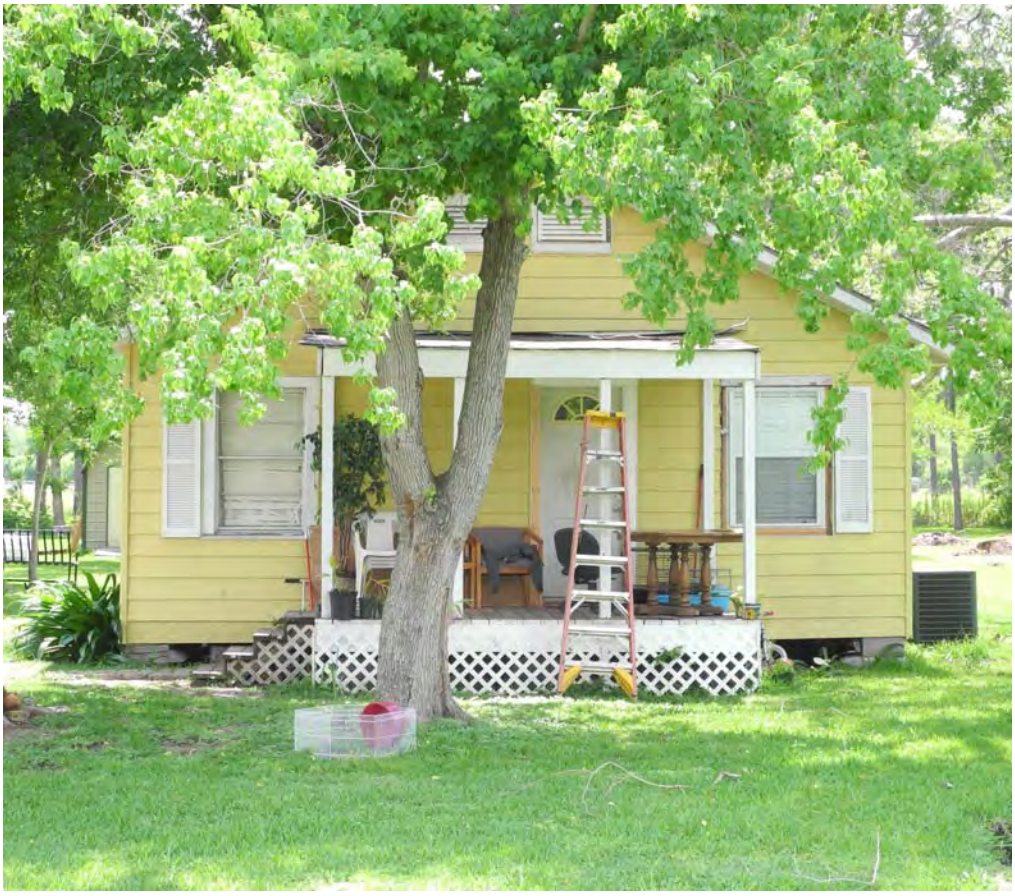
Additions: Modern house on property

Other: Compromised setting

2nd View: Oblique, looking northeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	19
Resource Name:	House
Location:	3431 FM 2403; latitude 29.38; longitude -95.25
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Bungalow
Construction Date:	ca. 1925/ca. 1965
NRHP Recommendation:	Not eligible
View:	Front façade, looking east



HISTORICAL RESOURCES SURVEY FORM

Resource #: 19

Location: 3431 FM 2403; latitude 29.38; longitude -95.25

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows, doors, shutters

Front porch Nonhistoric porch components

Siding: Nonhistoric siding

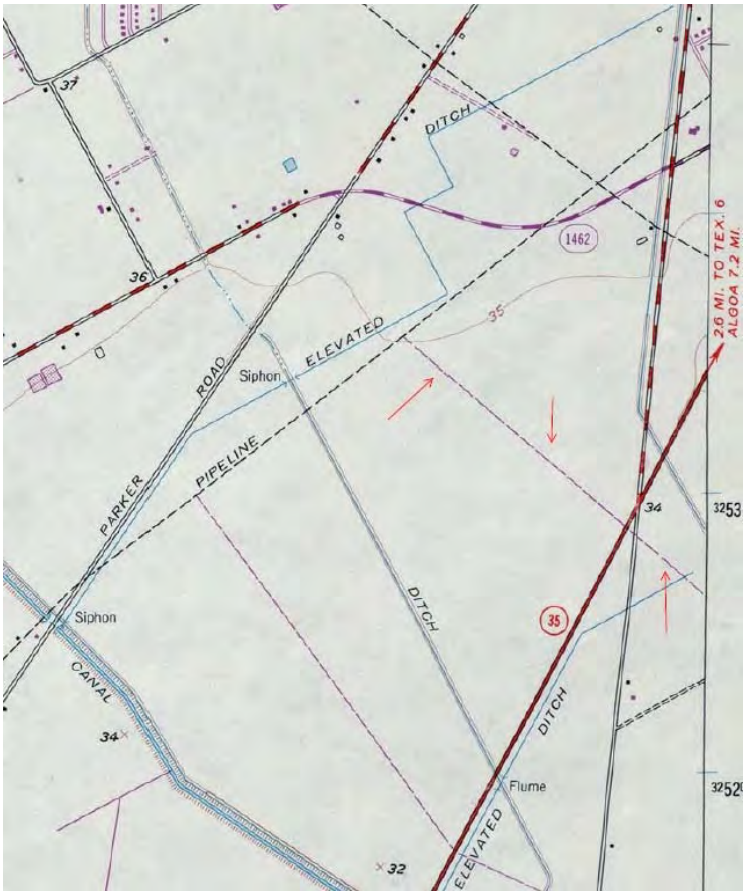
Additions: n/a

Other: Moved ca. 1965, compromised setting, less than 50 years old

2nd View: Oblique, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	20
Resource Name:	Pipeline
Location:	Latitude 29.39; longitude -95.25
Resource Type/Subtype:	Industrial / natural gas gathering pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1969
NRHP Recommendation:	Not eligible
View:	1969 topographic map



HISTORICAL RESOURCES SURVEY FORM

Resource #: 20

Location: Latitude 29.39; longitude -95.25

NRHP Recommendation: Not eligible

Integrity Issues:

- **Fenestration:** n/a
- **Windows/doors:** n/a
- **Front porch** n/a
- **Siding:** n/a
- **Additions:** Nonhistoric materials
- **Other:** Not exemplary, less than 50 years old

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	21
Resource Name:	Commercial building
Location:	3202 FM 2403; latitude 29.39; longitude -95.25
Resource Type/Subtype:	Commercial / retail store
Stylistic Influence:	Front-gable roof
Construction Date:	ca. 1975
NRHP Recommendation:	Not eligible
View:	Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 21

Location: 3202 FM 2403; latitude 29.39; longitude -95.25

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: Modern structure on property

Other: Not exemplary, compromised setting, less than 50 years old

2nd View: Oblique, looking southwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	22
Resource Name:	Commercial building
Location:	3100 block FM 2403; latitude 29.39; longitude -95.25
Resource Type/Subtype:	Commercial / retail store
Stylistic Influence:	Side-gable roof
Construction Date:	ca. 1975
NRHP Recommendation:	Not eligible
View:	Front façade, looking east

HISTORICAL RESOURCES SURVEY FORM

Resource #: 22

Location: 3100 block FM 2403; latitude 29.39; longitude -95.25

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary, less than 50 years old

2nd View: Oblique, looking northeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	22
Location:	3100 block FM 2403; latitude 29.39; longitude -95.25
NRHP Recommendation:	Not eligible
3rd View	Oblique, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	23
Resource Name:	Pipeline
Location:	Latitude 29.40; longitude -95.25
Resource Type/Subtype:	Industrial / natural gas transmission pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1956
NRHP Recommendation:	Not eligible
View:	1956 topographic map

HISTORICAL RESOURCES SURVEY FORM

Resource #: 23

Location: Latitude 29.40; longitude -95.25

NRHP Recommendation: Not eligible

Integrity Issues:

- **Fenestration:** n/a
- **Windows/doors:** n/a
- **Front porch** n/a
- **Siding:** n/a
- **Additions:** Nonhistoric materials
- **Other:** Not exemplary

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	24
Resource Name:	Commercial building
Location:	2424 1/2 South Gordon Street; latitude 29.40; longitude -95.25
Resource Type/Subtype:	Commercial / retail store
Stylistic Influence:	Prefabricated metal
Construction Date:	ca. 1964
NRHP Recommendation:	Not eligible
View:	Front façade, looking southwest

HISTORICAL RESOURCES SURVEY FORM

Resource #: 24

Location: 2424 1/2 South Gordon Street; latitude 29.40; longitude -95.25

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: Oblique, looking northwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	25
Resource Name:	Bulk terminal station (A-D)
Location:	2411 South Gordon Street; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Industrial / bulk terminal station (A-D)
Stylistic Influence:	Oblong box (A), prefabricated metal (B-C), shed roof (D)
Construction Date:	ca. 1963 (A-D)
NRHP Recommendation:	Not eligible (A-D)
View:	Service building (A), looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 25

Location: 2411 South Gordon Street; latitude 29.40; longitude -95.24

NRHP Recommendation: Not eligible (A-D)

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows, doors (A)

Front porch n/a

Siding: Nonhistoric siding (A)

Additions: Nonhistoric canopy (A)

Other: Not exemplary, compromised setting (A-D)

2nd View: Buildings (B-C), filling and loading dock (D), looking northeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	26
Resource Name:	House (A) and garage (B)
Location:	202 Fitz Road; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / single-family dwelling (A), garage (B)
Stylistic Influence:	Bungalow (A), front-gable roof (B)
Construction Date:	ca. 1940 (A-B)
NRHP Recommendation:	Not eligible (A-B)
View:	House (A), garage (B) at right, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 26

Location: 202 Fitz Road; latitude 29.40; longitude -95.24

NRHP Recommendation: Not eligible (A-B)

Integrity Issues:

Fenestration: Nonhistoric fenestration pattern (B)

Windows/doors: Nonhistoric windows, screens (A), doors (A-B)

Front porch Nonhistoric porch components (A)

Siding: Nonhistoric siding (A-B)

Additions: Nonhistoric addition (A)

Other: Compromised setting (A-B)

2nd View: Oblique (A), garage (B) at right, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	27
Resource Name:	House
Location:	300 Pennington Drive; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Ranch Style
Construction Date:	ca. 1963
NRHP Recommendation:	Not eligible
View:	Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 27

Location: 300 Pennington Drive; latitude 29.40; longitude -95.24

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric doors

Front porch n/a

Siding: Nonhistoric siding

Additions: n/a

Other: Not exemplary

2nd View: Oblique, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	28
Resource Name:	Apartment (A-D)
Location:	2550 South Highway 35 Bypass; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / apartment (A-D)
Stylistic Influence:	Neo-Colonial Revival (A-D)
Construction Date:	ca. 1970 (A), ca. 1965 (B-D)
NRHP Recommendation:	Not eligible (A-D)
View:	Oblique (A), looking northwest

HISTORICAL RESOURCES SURVEY FORM

Resource #: 28

Location: 2550 South Highway 35 Bypass; latitude 29.40; longitude -95.24

NRHP Recommendation: Not eligible (A-D)

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows (B-C), doors (A-D)

Front porch n/a

Siding: n/a

Additions: Nonhistoric addition (A-D)

Other: Not exemplary, less than 50 years old (A-D)

2nd View: Front façade (B), looking northwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	28
Location:	2550 South Highway 35 Bypass; latitude 29.40; longitude -95.24
NRHP Recommendation:	Not eligible (A-D)
3rd View	Front façade (C), looking northwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	28
Location:	2550 South Highway 35 Bypass; latitude 29.40; longitude -95.24
NRHP Recommendation:	Not eligible (A-D)
4th View	Front façade (D), looking northwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	29
Resource Name:	House
Location:	308 Pennington Drive; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Minimal Composite Ranch Style
Construction Date:	ca. 1963
NRHP Recommendation:	Not eligible
View:	Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 29

Location: 308 Pennington Drive; latitude 29.40; longitude -95.24

NRHP Recommendation: Not eligible

Integrity Issues:

- **Fenestration:** n/a
- **Windows/doors:** Nonhistoric doors
- **Front porch** n/a
- **Siding:** n/a
- **Additions:** n/a
- **Other:** Not exemplary

2nd View: Oblique, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	30
Resource Name:	House
Location:	312 Pennington Drive; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Minimal Composite Ranch Style
Construction Date:	ca. 1963
NRHP Recommendation	Not eligible
View:	Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 30

Location: 312 Pennington Drive; latitude 29.40; longitude -95.24

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows, doors

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: Oblique, looking southwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	31
Resource Name:	House
Location:	318 Pennington Drive; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Minimal Composite Ranch Style
Construction Date:	ca. 1963
NRHP Recommendation	Not eligible
View:	Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 31

Location: 318 Pennington Drive; latitude 29.40; longitude -95.24

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric door

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: Oblique, looking southwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	32
Resource Name:	House
Location:	322 Pennington Drive; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Minimal Composite Ranch Style
Construction Date:	ca. 1963
NRHP Recommendation	Not eligible
View:	Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 32

Location: 322 Pennington Drive; latitude 29.40; longitude -95.24

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows, doors

Front porch n/a

Siding: n/a

Additions: Nonhistoric carport addition

Other: Not exemplary

2nd View: Oblique, looking southwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	33
Resource Name:	House
Location:	326 Pennington Drive; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Ranch Style
Construction Date:	ca. 1963
NRHP Recommendation	Not eligible
View:	Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 33

Location: 326 Pennington Drive; latitude 29.40; longitude -95.24

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows, doors

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: Oblique, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	34
Resource Name:	House
Location:	334 Pennington Drive; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Minimal Composite Ranch Style
Construction Date:	ca. 1963
NRHP Recommendation	Not eligible
View:	Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 34

Location: 334 Pennington Drive; latitude 29.40; longitude -95.24

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows, doors

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	35
Resource Name:	House
Location:	336 Pennington Drive; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Minimal Composite Ranch Style
Construction Date:	ca. 1963
NRHP Recommendation	Not eligible
View:	Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 35

Location: 336 Pennington Drive; latitude 29.40; longitude -95.24

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric doors

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: No second photograph

HISTORICAL RESOURCES SURVEY FORM

Resource #:	36
Resource Name:	House
Location:	340 Pennington Drive; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Minimal Composite Ranch Style
Construction Date:	ca. 1963
NRHP Recommendation	Not eligible
View:	Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 36

Location: 340 Pennington Drive; latitude 29.40; longitude -95.24

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows, doors

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: No second photograph

HISTORICAL RESOURCES SURVEY FORM

Resource #:	37
Resource Name:	House
Location:	344 Pennington Drive; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / single-family dwelling
Stylistic Influence:	Minimal Composite Ranch Style
Construction Date:	ca. 1963
NRHP Recommendation	Not eligible
View:	Front façade, looking east

HISTORICAL RESOURCES SURVEY FORM

Resource #: 37

Location: 344 Pennington Drive; latitude 29.40; longitude -95.24

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows, doors, screens

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: No second photograph

HISTORICAL RESOURCES SURVEY FORM

Resource #:	38
Resource Name:	Duplex
Location:	2524 State Highway 35; latitude 29.40; longitude -95.24
Resource Type/Subtype:	Domestic / duplex
Stylistic Influence:	Neo-Georgian Revival
Construction Date:	ca. 1972
NRHP Recommendation	Not eligible
View:	Front façade, looking north

HISTORICAL RESOURCES SURVEY FORM

Resource #: 38

Location: 2524 State Highway 35; latitude 29.40; longitude -95.24

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

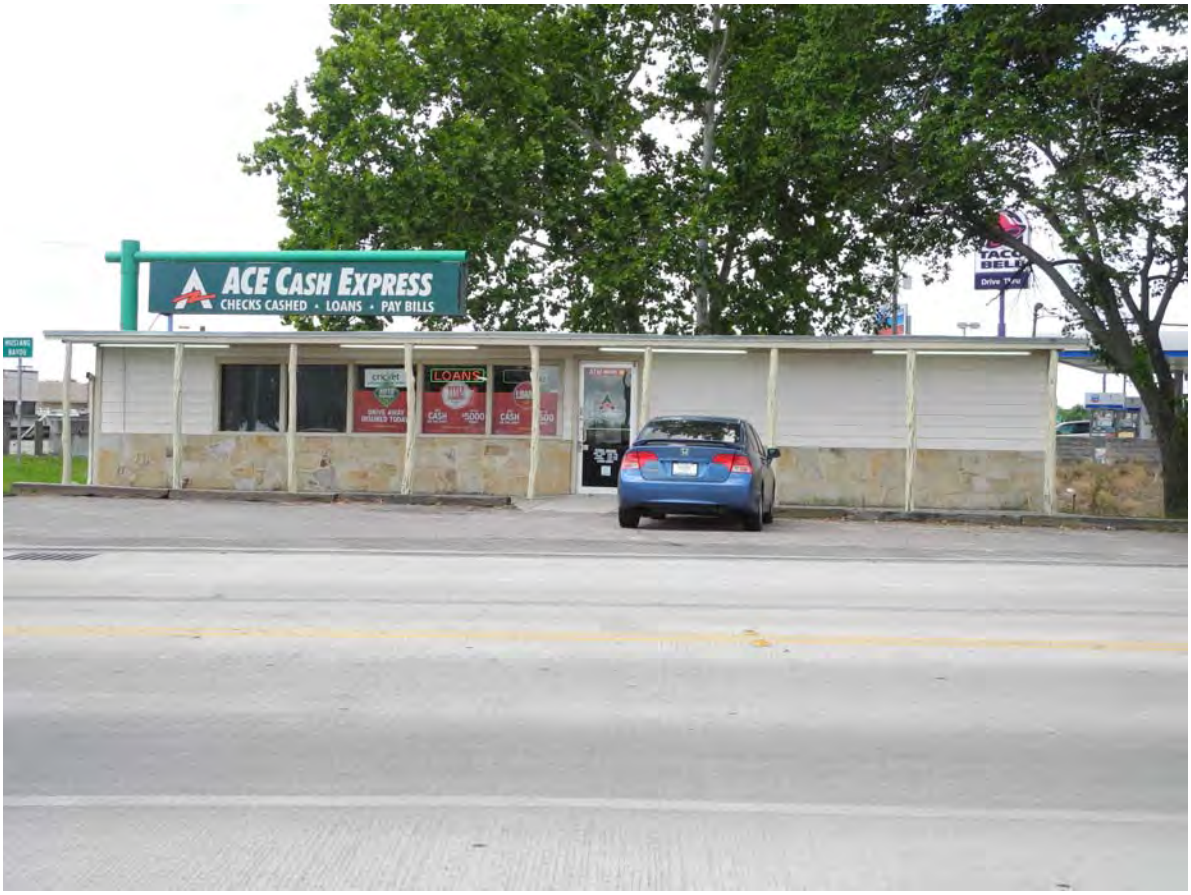
Additions: n/a

Other: Not exemplary, compromised setting, less than 50 years old

2nd View: Oblique, looking northwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	39
Resource Name:	Commercial building
Location:	1000 East South Street; latitude 29.41; longitude -95.23
Resource Type/Subtype:	Commercial / retail store
Stylistic Influence:	Side-gable roof
Construction Date:	ca. 1970
NRHP Recommendation	Not eligible
View:	Front façade, looking south



HISTORICAL RESOURCES SURVEY FORM

Resource #: 39

Location: 1000 East South Street; latitude 29.41; longitude -95.23

NRHP Recommendation Not eligible

Integrity Issues:

- **Fenestration:** n/a
- **Windows/doors:** n/a
- **Front porch** n/a
- **Siding:** Nonhistoric siding
- **Additions:** n/a
- **Other:** Not exemplary, less than 50 years old

2nd View: Oblique, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	40
Resource Name:	Bridge NBI# 120200017803041
Location:	State Highway 35; latitude 29.41; longitude -95.23
Resource Type/Subtype:	Transportation / vehicular bridge
Stylistic Influence:	Concrete stringer
Construction Date:	1963/1988
NRHP Recommendation	Not eligible
View:	Bridge, looking northeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 40

Location: State Highway 35; latitude 29.41; longitude -95.23

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: Rebuilt, widened

Other: Not exemplary

2nd View: Bridge, looking southwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	40
Location:	State Highway 35; latitude 29.41; longitude -95.23
NRHP Recommendation	Not eligible
3rd View	1969 aerial, Resource 40 at left

HISTORICAL RESOURCES SURVEY FORM

Resource #:	40
Location:	State Highway 35; latitude 29.41; longitude -95.23
NRHP Recommendation	Not eligible
4th View	2013 aerial, Resource 40 at left

HISTORICAL RESOURCES SURVEY FORM

Resource #:	41
Resource Name:	Bridge NBI# 120200017803040
Location:	State Highway 35; latitude 29.41; longitude -95.23
Resource Type/Subtype:	Transportation / vehicular bridge
Stylistic Influence:	Concrete stringer
Construction Date:	1963/1988
NRHP Recommendation	Not eligible
View:	Bridge, looking northeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 41

Location: State Highway 35; latitude 29.41; longitude -95.23

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: Rebuilt, widened

Other: Not exemplary

2nd View: Bridge, looking northwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	41
Location:	State Highway 35; latitude 29.41; longitude -95.23
NRHP Recommendation	Not eligible
3rd View	1969 aerial, Resource 41 at right

HISTORICAL RESOURCES SURVEY FORM

Resource #:	41
Location:	State Highway 35; latitude 29.41; longitude -95.23
NRHP Recommendation	Not eligible
4th View	2013 aerial, Resource 41 at right

HISTORICAL RESOURCES SURVEY FORM

Resource #:	42
Resource Name:	Commercial building
Location:	1370 East South Street; latitude 29.41; longitude -95.23
Resource Type/Subtype:	Commercial / retail store
Stylistic Influence:	Quonset hut
Construction Date:	ca. 1942/ca. 1965
NRHP Recommendation:	Not eligible
View:	Front façade, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 42

Location: 1370 East South Street; latitude 29.41; longitude -95.23

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: Nonhistoric fenestration pattern

Windows/doors: Nonhistoric windows, door

Front porch n/a

Siding: n/a

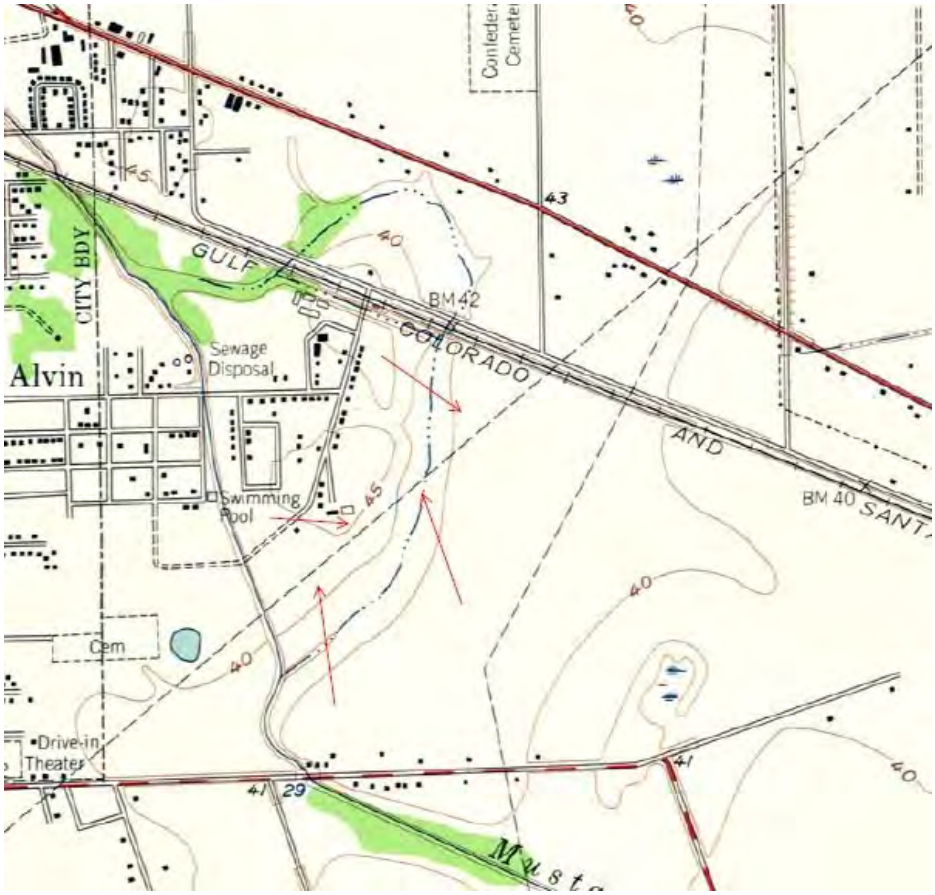
Additions: n/a

Other: Not exemplary, moved ca. 1965, compromised setting

2nd View: Oblique, looking south

HISTORICAL RESOURCES SURVEY FORM

Resource #:	43
Resource Name:	Pipeline
Location:	Latitude 29.42; longitude -95.23
Resource Type/Subtype:	Industrial / crude oil gathering pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1956
NRHP Recommendation:	Not eligible
View:	1956 topographic map



HISTORICAL RESOURCES SURVEY FORM

Resource #: 43

Location: Latitude 29.42; longitude -95.23

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: Nonhistoric materials

Other: Not exemplary, abandoned, poor physical condition

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	44
Resource Name:	Mill complex
Location:	1901 East House Street; latitude 29.42; longitude -95.23
Resource Type/Subtype:	Industrial / mill
Stylistic Influence:	Irregular roof
Construction Date:	ca. 1965
NRHP Recommendation:	Not eligible
View:	Front façade, looking northwest

HISTORICAL RESOURCES SURVEY FORM

Resource #: 44

Location: 1901 East House Street; latitude 29.42; longitude -95.23

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: Nonhistoric fenestration pattern

Windows/doors: Nonhistoric windows, doors

Front porch n/a

Siding: Nonhistoric siding

Additions: Nonhistoric additions, modern buildings on property

Other: Not exemplary, compromised setting, less than 50 years old

2nd View: Oblique, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	45
Resource Name:	Railroad bridge
Location:	Latitude 29.42; longitude -95.23
Resource Type/Subtype:	Transportation / railroad bridge
Stylistic Influence:	Concrete
Construction Date:	ca. 1963
NRHP Recommendation:	Not eligible
View:	Bridge, looking northwest

HISTORICAL RESOURCES SURVEY FORM

Resource #: 45

Location: Latitude 29.42; longitude -95.23

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary, less than 50 years old

2nd View: Bridge, looking south

HISTORICAL RESOURCES SURVEY FORM

Resource #: 45

Location: Latitude 29.42; longitude -95.23

NRHP Recommendation: Not eligible

3rd View 1969 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #: 45

Location: Latitude 29.42; longitude -95.23

NRHP Recommendation: Not eligible

4th View 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	46
Resource Name:	Bridge NBI# 120200019203038
Location:	State Highway 35; latitude 29.42; longitude -95.23
Resource Type/Subtype:	Transportation / vehicular bridge
Stylistic Influence:	Concrete stringer
Construction Date:	1963
NRHP Recommendation:	Not eligible
View:	Bridge, looking east

HISTORICAL RESOURCES SURVEY FORM

Resource #: 46

Location: State Highway 35; latitude 29.42; longitude -95.23

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: 1969 aerial, Resource 46 at left

HISTORICAL RESOURCES SURVEY FORM

Resource #:	46
Location:	State Highway 35; latitude 29.42; longitude -95.23
NRHP Recommendation:	Not eligible
3rd View	2013 aerial, Resource 46 at left

HISTORICAL RESOURCES SURVEY FORM

Resource #:	47
Resource Name:	Bridge NBI# 120200019203037
Location:	State Highway 35; latitude 29.42; longitude -95.23
Resource Type/Subtype:	Transportation / vehicular bridge
Stylistic Influence:	Concrete stringer
Construction Date:	1963
NRHP Recommendation:	Not eligible
View:	Bridge, looking west

HISTORICAL RESOURCES SURVEY FORM

Resource #: 47

Location: State Highway 35; latitude 29.42; longitude -95.23

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: 1969 aerial, Resource 47 at right

HISTORICAL RESOURCES SURVEY FORM

Resource #:	47
Location:	State Highway 35; latitude 29.42; longitude -95.23
NRHP Recommendation:	Not eligible
3rd View	2013 aerial, Resource 47 at right

HISTORICAL RESOURCES SURVEY FORM

Resource #:	48
Resource Name:	Confederate Cemetery
Location:	600 block State Highway 35; latitude 29.43; longitude -95.23
Resource Type/Subtype:	Funerary / cemetery
Stylistic Influence:	Landscape
Construction Date:	ca. 1891
NRHP Recommendation:	Not eligible
View:	Cemetery, looking southwest

HISTORICAL RESOURCES SURVEY FORM

Resource #: 48

Location: 600 block State Highway 35; latitude 29.43; longitude -95.23

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: Cemetery, looking southwest

HISTORICAL RESOURCES SURVEY FORM

Resource #:	49
Resource Name:	Official Texas Historical Marker, Confederate Cemetery
Location:	State Highway 35; latitude 29.43; longitude -95.23
Resource Type/Subtype:	Recreation and Culture / historical marker
Stylistic Influence:	Embedded aluminum plaque
Construction Date:	1968
NRHP Recommendation:	Not eligible
View:	Marker, looking south

HISTORICAL RESOURCES SURVEY FORM

Resource #: 49

Location: State Highway 35; latitude 29.43; longitude -95.23

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary, less than 50 years old

2nd View: Marker detail, looking south

HISTORICAL RESOURCES SURVEY FORM

Resource #:	50
Resource Name:	House (A-B)
Location:	Latitude 29.43; longitude -95.23
Resource Type/Subtype:	Domestic / single-family dwelling (A), outbuilding (B)
Stylistic Influence:	Ranch Style (A), front-gable roof (B)
Construction Date:	ca. 1961 (A), ca. 1964 (B)
NRHP Recommendation:	Not eligible (A-B)
View:	Front façade (A), looking east

HISTORICAL RESOURCES SURVEY FORM

Resource #: 50

Location: Latitude 29.43; longitude -95.23

NRHP Recommendation: Not eligible (A-B)

Integrity Issues:

Fenestration: n/a

Windows/doors: Nonhistoric windows (A)

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary, compromised setting (A-B)

2nd View: Oblique (A), looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 50

Location: Latitude 29.43; longitude -95.23

NRHP Recommendation: Not eligible (A-B)

3rd View Outbuilding (B), looking east

HISTORICAL RESOURCES SURVEY FORM

Resource #:	51
Resource Name:	Culvert
Location:	Latitude 29.44; longitude -95.23
Resource Type/Subtype:	Transportation / culvert
Stylistic Influence:	Concrete box
Construction Date:	1963
NRHP Recommendation:	Not eligible
View:	Culvert, looking southwest

HISTORICAL RESOURCES SURVEY FORM

Resource #: 51

Location: Latitude 29.44; longitude -95.23

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: Culvert, looking southeast

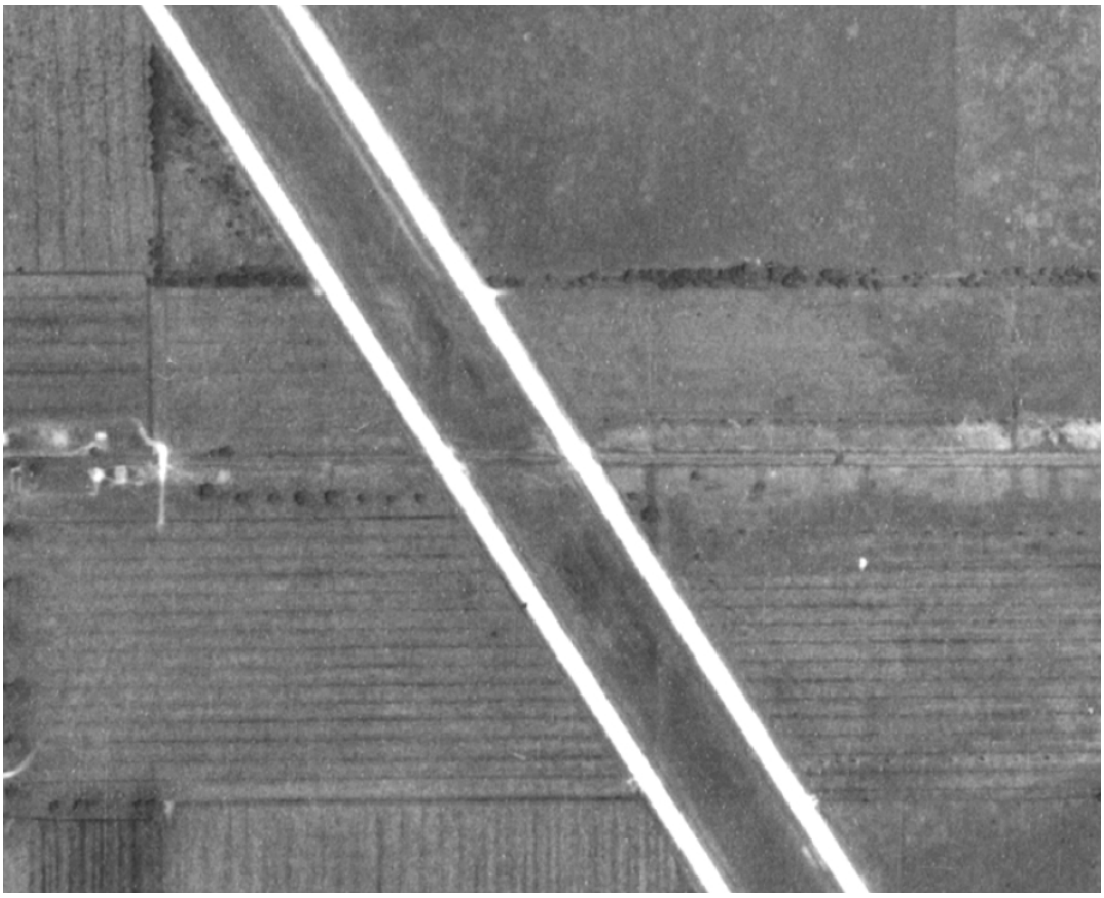
HISTORICAL RESOURCES SURVEY FORM

Resource #: 51

Location: Latitude 29.44; longitude -95.23

NRHP Recommendation: Not eligible

3rd View 1969 aerial, Resource 51 at left



HISTORICAL RESOURCES SURVEY FORM

Resource #:	51
Location:	Latitude 29.44; longitude -95.23
NRHP Recommendation:	Not eligible
4th View	2013 aerial, Resource 51 at left

HISTORICAL RESOURCES SURVEY FORM

Resource #:	52
Resource Name:	Culvert
Location:	Latitude 29.44; longitude -95.23
Resource Type/Subtype:	Transportation / culvert
Stylistic Influence:	Concrete box
Construction Date:	1963
NRHP Recommendation:	Not eligible
View:	Culvert, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 52

Location: Latitude 29.44; longitude -95.23

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary

2nd View: Culvert, looking northwest

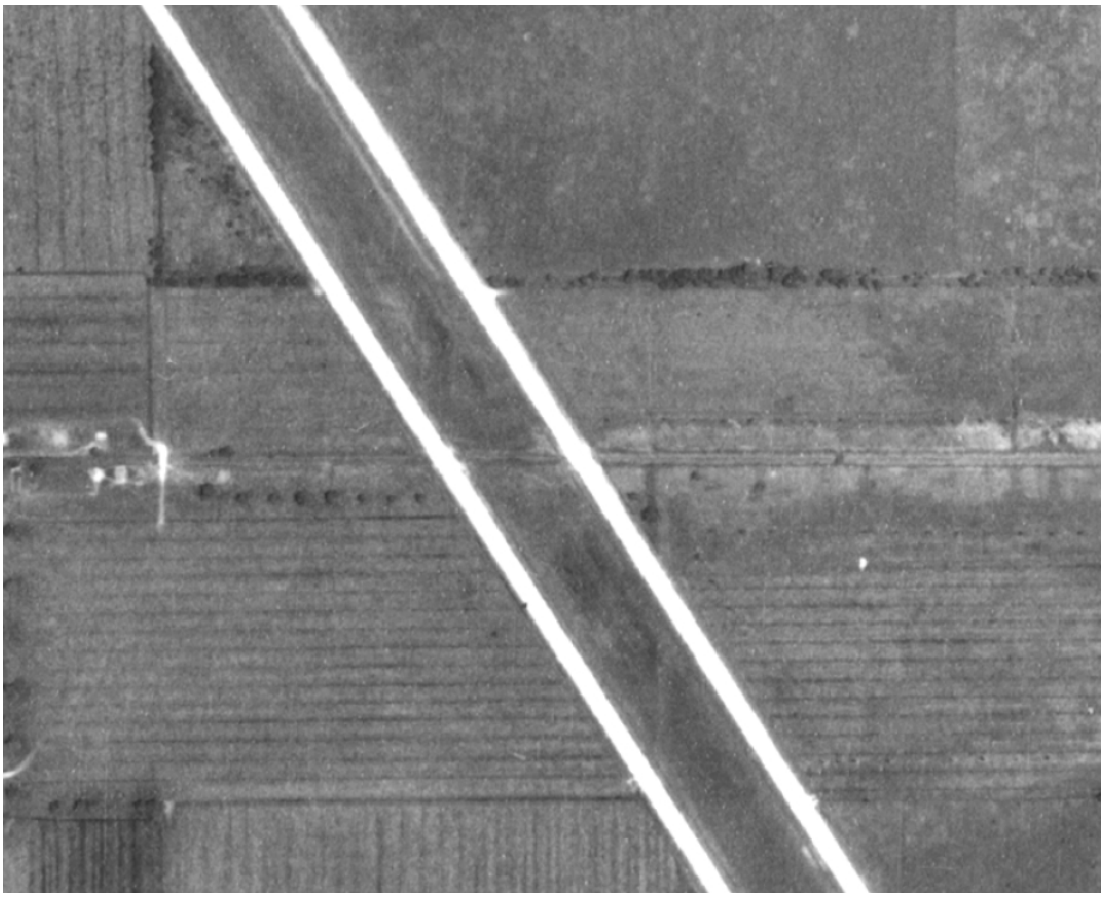
HISTORICAL RESOURCES SURVEY FORM

Resource #: 52

Location: Latitude 29.44; longitude -95.23

NRHP Recommendation: Not eligible

3rd View 1969 aerial, Resource 52 at right

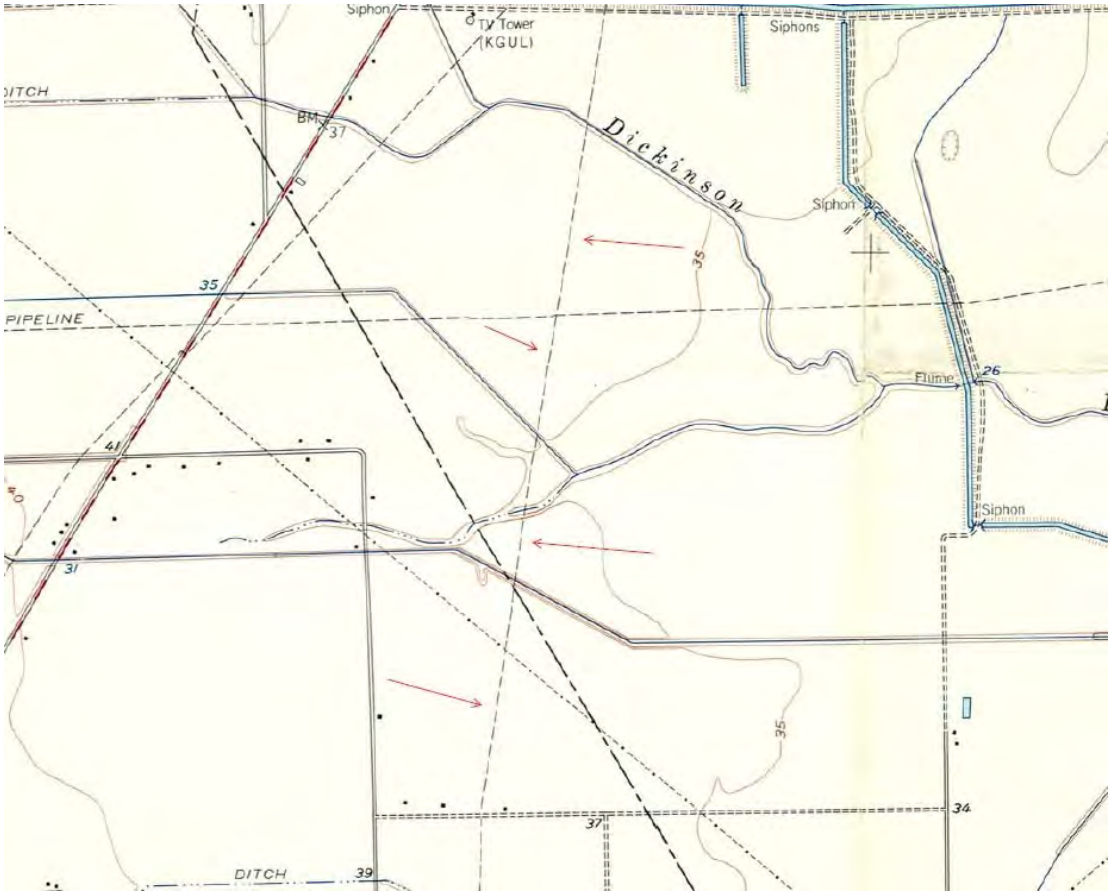


HISTORICAL RESOURCES SURVEY FORM

Resource #:	52
Location:	Latitude 29.44; longitude -95.23
NRHP Recommendation:	Not eligible
4th View	2013 aerial, Resource 52 at right

HISTORICAL RESOURCES SURVEY FORM

Resource #:	53
Resource Name:	Pipeline
Location:	Dickinson Road; latitude 29.45; longitude -95.22
Resource Type/Subtype:	Industrial / natural gas transmission pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1956
NRHP Recommendation:	Not eligible
View:	1956 topographic map



HISTORICAL RESOURCES SURVEY FORM

Resource #: 53

Location: Dickinson Road; latitude 29.45; longitude -95.22

NRHP Recommendation: Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

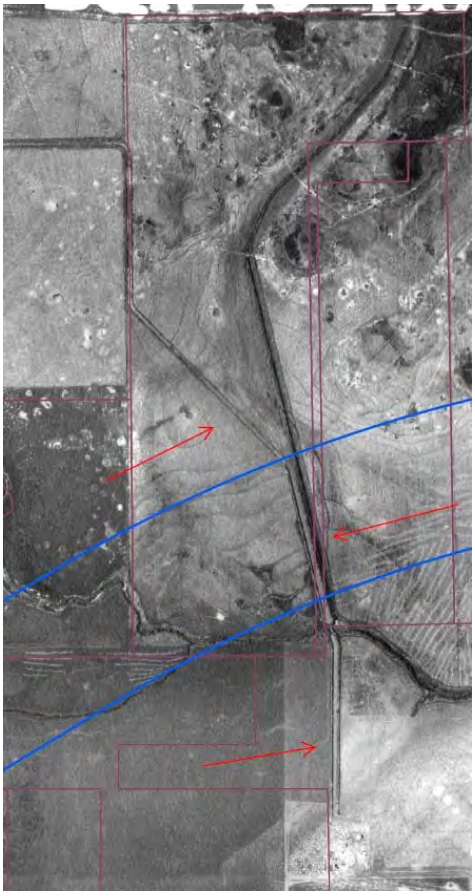
Additions: Nonhistoric materials

Other: Not exemplary

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	54
Resource Name:	Holland-American Rice Canal System
Location:	Latitude 29.46; longitude -95.21
Resource Type/Subtype:	Agriculture / irrigation facility
Stylistic Influence:	Landscape
Construction Date:	ca. 1908
NRHP Recommendation:	Eligible
View:	1944 aerial



HISTORICAL RESOURCES SURVEY FORM

Resource #: 54

Location: Latitude 29.46; longitude -95.21

NRHP Recommendation: Eligible

Integrity Issues:

- **Fenestration:** n/a
- **Windows/doors:** n/a
- **Front porch** n/a
- **Siding:** n/a
- **Additions:** n/a
- **Other:** Retains a high degree of integrity

2nd View: 1969 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #: 54

Location: Latitude 29.46; longitude -95.21

NRHP Recommendation: Eligible

3rd View 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	54
Location:	Latitude 29.46; longitude -95.21
NRHP Recommendation:	Eligible
4th View	American Canal with natural gas pipeline, looking west

HISTORICAL RESOURCES SURVEY FORM

Resource #:	54
Location:	Latitude 29.46; longitude -95.21
NRHP Recommendation:	Eligible
5th View	Laterial, looking west

HISTORICAL RESOURCES SURVEY FORM

Resource #:	54
Location:	Latitude 29.46; longitude -95.21
NRHP Recommendation:	Eligible
6th View	Bridge over a lateral, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	54
Location:	Latitude 29.46; longitude -95.21
NRHP Recommendation:	Eligible
7th View	Sublateral, looking west

HISTORICAL RESOURCES SURVEY FORM

Resource #:	54
Location:	Latitude 29.46; longitude -95.21
NRHP Recommendation:	Eligible
8th View	Sublateral, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #: 54

Location: Latitude 29.46; longitude -95.21

NRHP Recommendation: Eligible

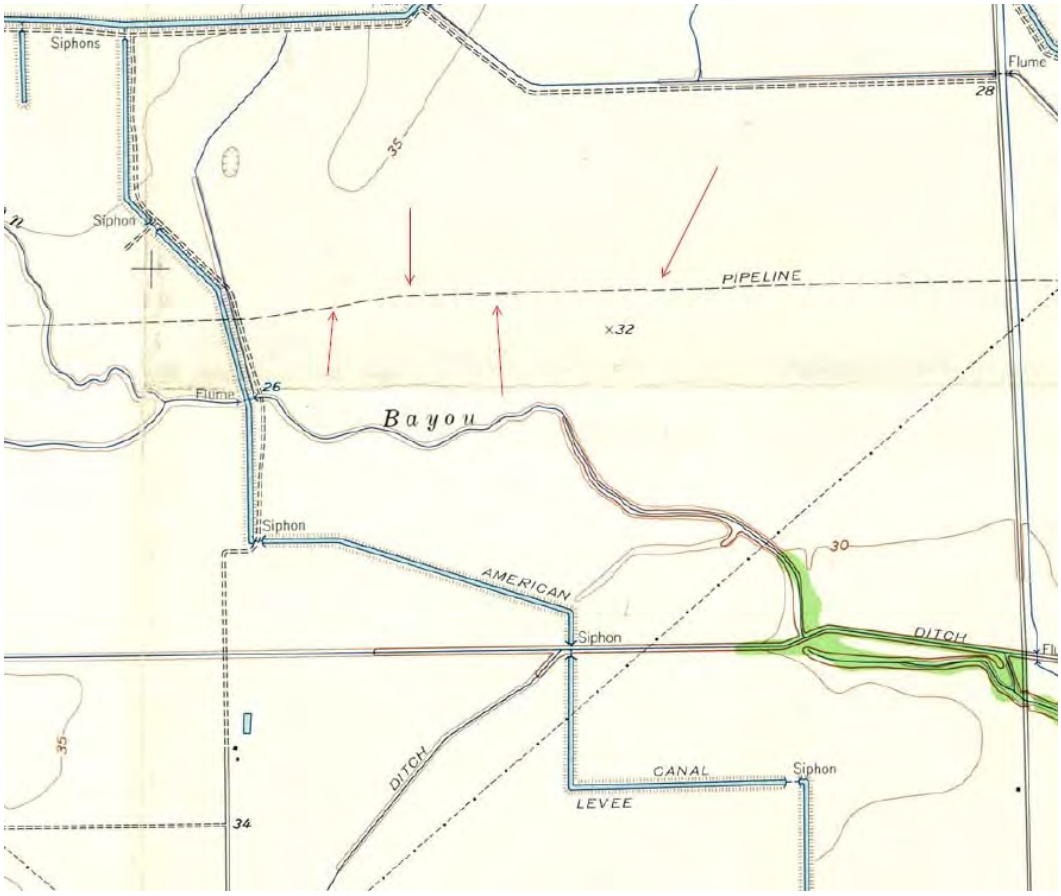
9th View Main canal, looking west

HISTORICAL RESOURCES SURVEY FORM

Resource #:	54
Location:	Latitude 29.46; longitude -95.21
NRHP Recommendation:	Eligible
10th View	Main canal, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	55
Resource Name:	Pipeline
Location:	Latitude 29.46; longitude -95.20
Resource Type/Subtype:	Industrial / natural gas transmission pipeline
Stylistic Influence:	Landscape
Construction Date:	By 1956
NRHP Recommendation	Not eligible
View:	1956 topographic map



HISTORICAL RESOURCES SURVEY FORM

Resource #: 55

Location: Latitude 29.46; longitude -95.20

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

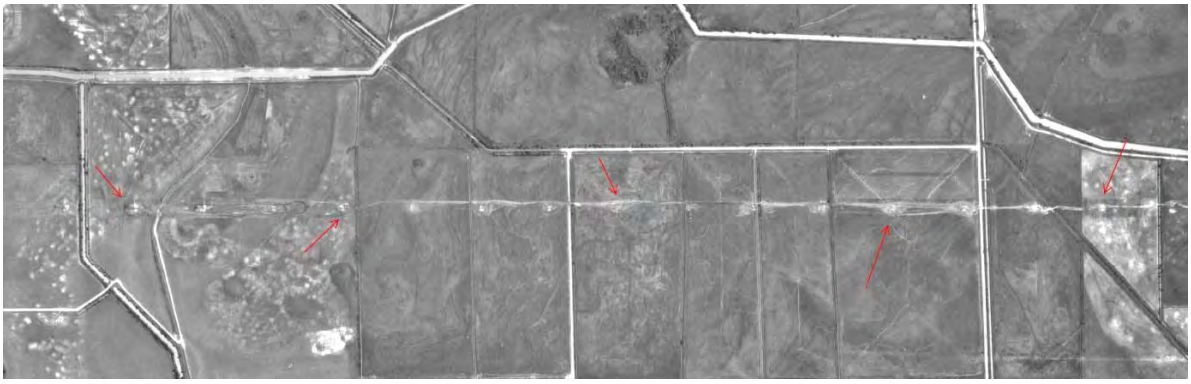
Additions: Nonhistoric matierals

Other: Not exemplary

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	56
Resource Name:	Electrical transmission lines
Location:	Latitude 29.46; longitude -95.19
Resource Type/Subtype:	Industrial / electrical transmission lines
Stylistic Influence:	Double-circuit steel lattice
Construction Date:	By 1969
NRHP Recommendation	Not eligible
View:	1969 aerial



HISTORICAL RESOURCES SURVEY FORM

Resource #: 56

Location: Latitude 29.46; longitude -95.19

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary, less than 50 years old

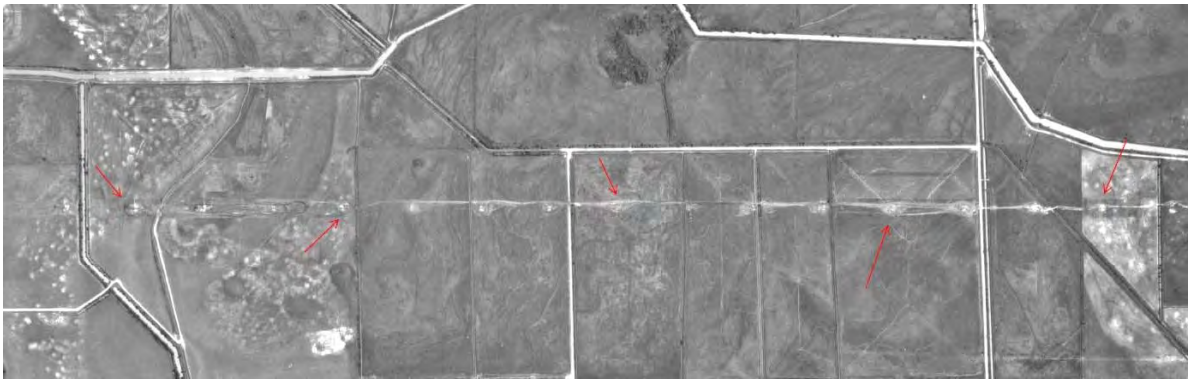
2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	56
Location:	Latitude 29.46; longitude -95.19
NRHP Recommendation	Not eligible
3rd View	Electric transmission lines, looking east

HISTORICAL RESOURCES SURVEY FORM

Resource #:	57
Resource Name:	Electrical transmission lines
Location:	Latitude 29.46; longitude -95.17
Resource Type/Subtype:	Industrial / electrical transmission lines
Stylistic Influence:	Double-circuit steel lattice
Construction Date:	By 1969
NRHP Recommendation	Not eligible
View:	1969 aerial



HISTORICAL RESOURCES SURVEY FORM

Resource #: 57

Location: Latitude 29.46; longitude -95.17

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary, less than 50 years old

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	57
Location:	Latitude 29.46; longitude -95.17
NRHP Recommendation	Not eligible
3rd View	Electric transmission lines, looking southeast

HISTORICAL RESOURCES SURVEY FORM

Resource #:	58
Resource Name:	League City Oil Field
Location:	Latitude 29.46; longitude -95.11
Resource Type/Subtype:	Industrial / oil field
Stylistic Influence:	Landscape
Construction Date:	By 1952
NRHP Recommendation	Not eligible
View:	1969 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #: 58

Location: Latitude 29.46; longitude -95.11

NRHP Recommendation Not eligible

Integrity Issues:

Fenestration: n/a

Windows/doors: n/a

Front porch n/a

Siding: n/a

Additions: n/a

Other: Not exemplary, poor condition, compromised setting

2nd View: 2013 aerial

HISTORICAL RESOURCES SURVEY FORM

Resource #:	58
Location:	Latitude 29.46; longitude -95.11
NRHP Recommendation	Not eligible
3rd View	North edge of the field, looking west

AN ARCHEOLOGICAL INVESTIGATION OF THE PROPOSED STATE HIGHWAY (SH) 99 (GRAND PARKWAY) SEGMENT B, IN BRAZORIA AND GALVESTON COUNTIES, TEXAS

DRAFT

Texas Antiquities Permit No. 6944

TxDOT CSJs: 3510-01-001, 3510-01-003, 3510-02-001, 3510-02-003, & 3510-02-905

For

AECOM

&

The Texas Department of Transportation

By
Douglas G. Mangum
Principal Investigator
&
Eleanor Stoddart
Project Archeologist

Moore Archeological Consulting, Inc.
Report of Investigations Number 633

November 2014

ABSTRACT

In August and September of 2014, Moore Archeological Consulting, Inc. of Houston, Texas conducted an intensive linear pedestrian archeological investigation of a proposed section of new state highway between SH 288 and IH 45 through Brazoria and Galveston Counties, Texas.

The proposed Project Corridor consists of a 46.3 kilometer (28.77 mile) long corridor with a 121 meter (400 foot) wide ROW. The project will involve construction of a section of new state highway with intermittent frontage roads and bridges where necessary. It is understood that the specifics of depth of impact will be determined later in the design phase. However, for the purposes of the archeological investigation it is assumed that significantly deep impacts will occur during construction of the entire project.

The investigations were conducted under TAC Permit Number 6944 for AECOM and the Texas Department of Transportation (TxDOT). The results will be subject to review by AECOM, TxDOT, and the Texas Historical Commission (THC). Property ownership within the project corridor is a mixture of public and private.

A total of 607 shovel tests were excavated. All but one of the shovel tests were sterile for cultural resources. A single piece of lithic debitage was found in one shovel test. Also a single potsherd was recovered from the surface at another locale. Additional investigation at both locations found no additional evidence of cultural resources. As a result both items were determined to be isolated artifacts and neither was kept.

Because of right of entry issues only a relatively small percentage of the overall project corridor requiring survey was investigated and no deep reconnaissance took place.

As a result of the investigation and the findings thereof it is the recommendation of Moore Archeological Consulting that construction of the proposed ROW addition should be allowed to proceed without further archeological examination in those areas which have been examined. However, it is further recommended that once the state has obtained ownership of the tracts not surveyed, additional shovel testing and the originally proposed backhoe reconnaissance should take place in those locales.

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INTRODUCTION

In August and September of 2014, a crew from Moore Archeological Consulting, Inc., of Houston, Texas conducted an intensive linear archeological pedestrian survey investigation of a proposed toll road between SH 288 and IH 45 in Brazoria and Galveston Counties, Texas. It falls under Texas Department of Transportation (TxDOT) jurisdiction and has been designated with TxDOT CSJ Numbers 3510-01-001, 3510-01-003, 3510-02-001, 3510-02-003, & 3510-02-905. It is found on the Juliff (299537), Rosharon (299545), Liverpool (299546), Manvel (299538), Algoa (299539), and Dickinson (299540) USGS Quadrangle maps (Figure 1-2, 3a-3h, and 4). The investigations were conducted under TAC Permit Number 6944 at the request of AECOM. The results will be subject to review by AECOM, TxDOT, and the Texas Historical Commission (THC).

The overall proposed Project Corridor consists of a 46.3 kilometer (28.77 mile) long corridor with a 121 meter (400 foot) wide ROW. The project will involve construction of a toll road with intermittent frontage roads and bridges where necessary. It is understood that the specifics of depth of impact will be determined later in the design phase and that at that time this information will be provided to Moore Archeological Consulting (MAC). However, for the purposes of the archeological investigation it is assumed that significantly deep impacts will occur during construction of the entire project. From an archeological perspective, deep impacts mean anything deeper than shovel testing of the sort utilized in pedestrian archeological surveys can reach (i.e. greater than 1 meter or 3 feet).

The properties involved in this project are a mix of privately and publicly owned. Any of the tracts that are privately owned will require acquisition of right of entry (ROE) and permission to excavate prior to the onset of the archeological survey. Acquisition of any requisite ROE and permission to excavate will be the responsibility of the Client.

The objective of the investigation was to determine the presence or absence of cultural materials within the alignment proposed for the new and expanded roadway. It also proposed to assess potentially impacted archeological sites and provide recommendations regarding mitigation measures, if any were necessary. Finally it was to provide a report of the results of the survey to AECOM, TxDOT, and the THC.

The crew excavated 607 shovel tests during the survey at preset intervals as described in the METHODS section of this report. Project Archeologists Eleanor Stoddart and Randy Ferguson, and Crewmembers Ruben Castillo, Anastasia Laurence, Brandy Hale, Jerry Hamilton, Tom Knuckols, and Rachel Goings conducted this investigation under the supervision of the Principal Investigator, Douglas G. Mangum.

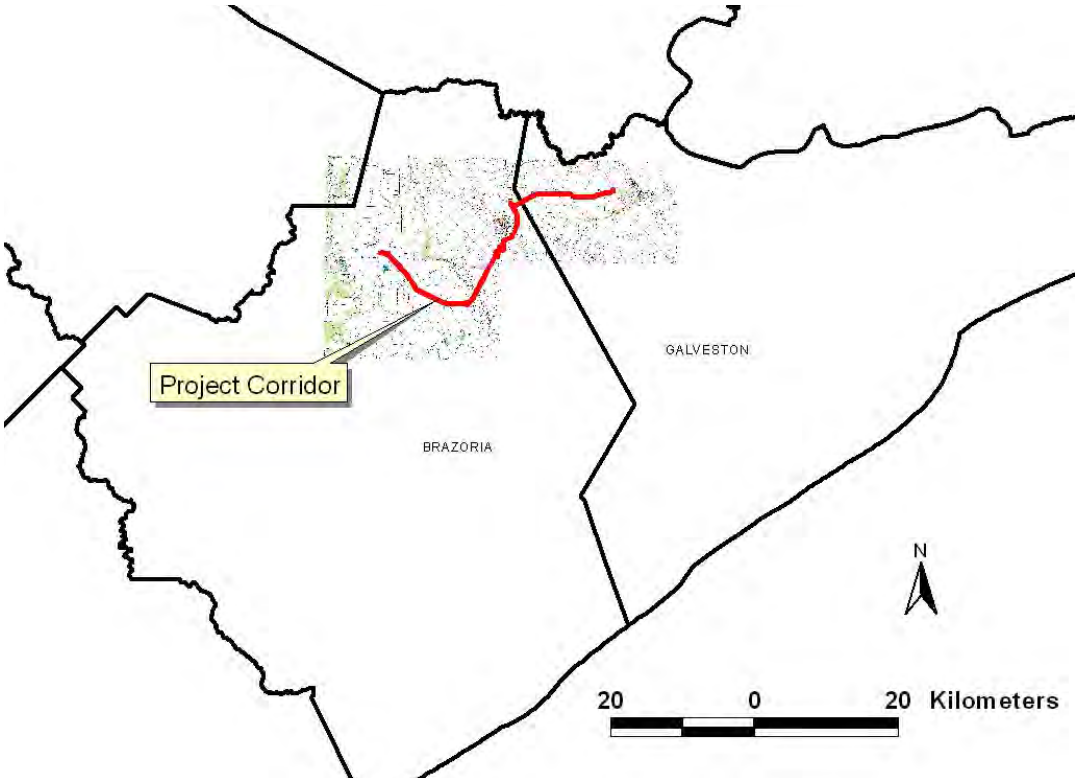

Figure 1: Project Area in Brazoria and Galveston Counties

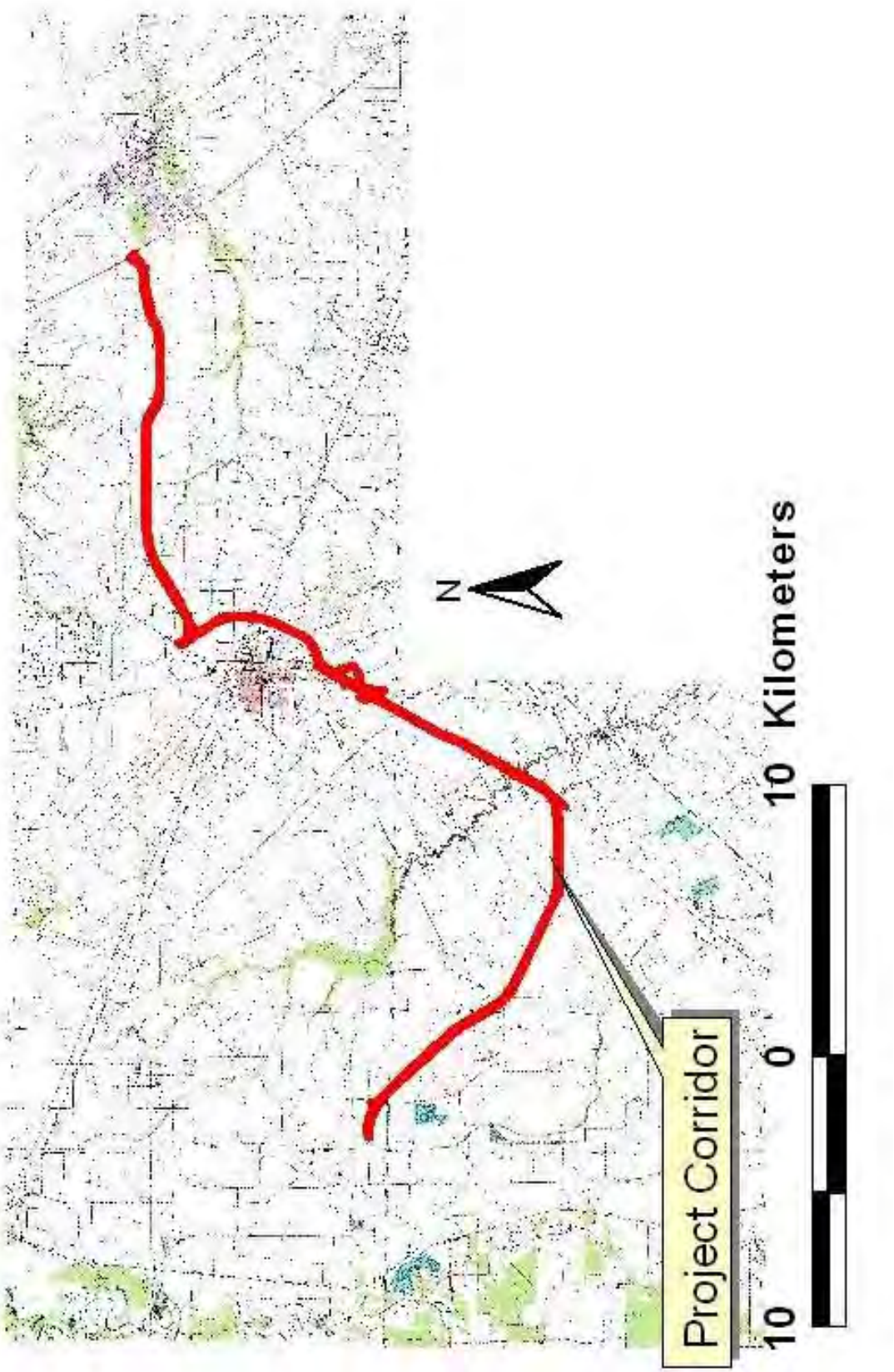

Figure 2: Project Area on the Juliff (299537), Rosharon (299545), Liverpool (299546), Manvel (299538), Algoa (299539), and Dickinson (299540) USGS Quadrangle maps

Figure 3a: Detail of Project Area.

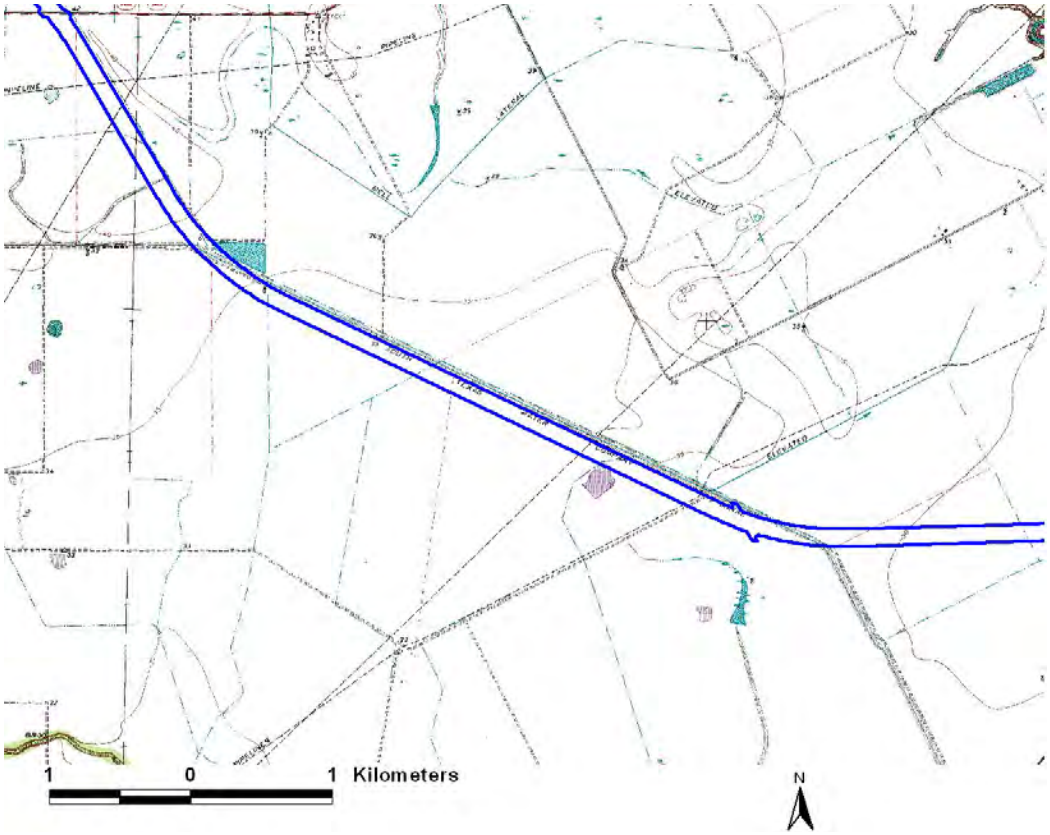

Figure 3b: Detail of Project Area.

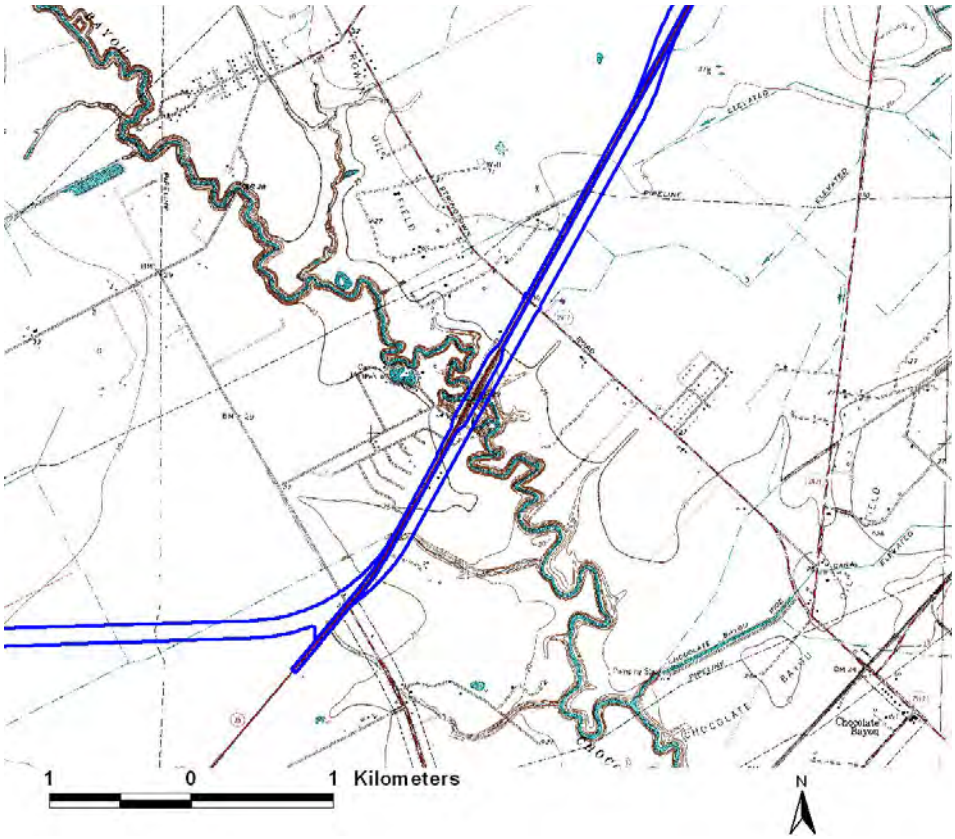

Figure 3c: Detail of Project Area.

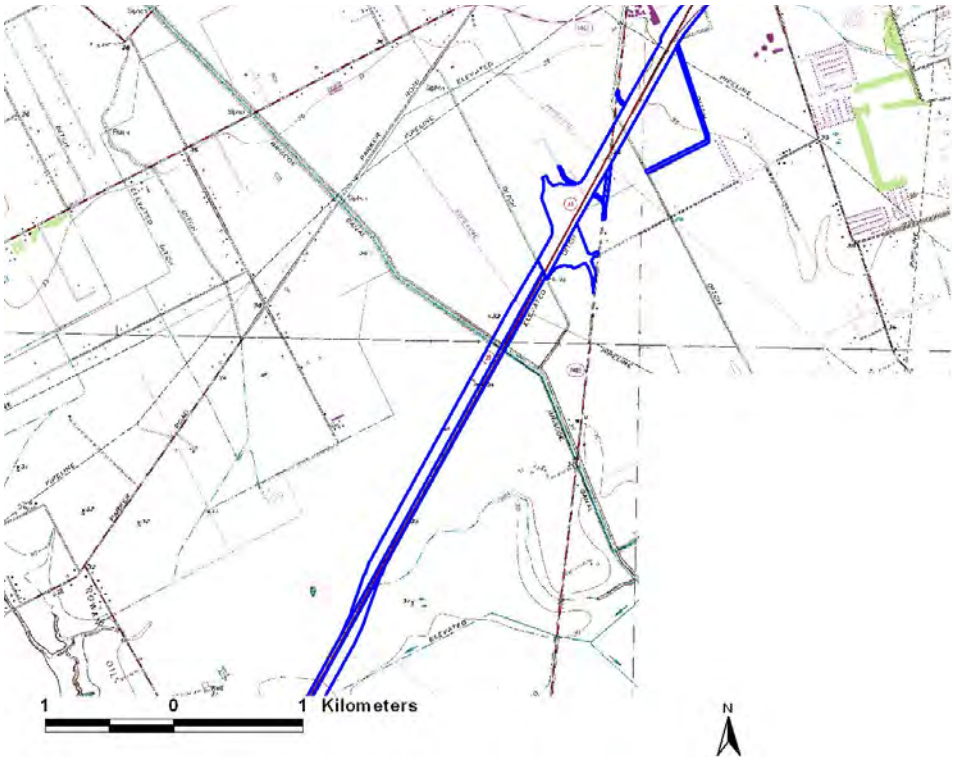

Figure 3d: Detail of Project Area.

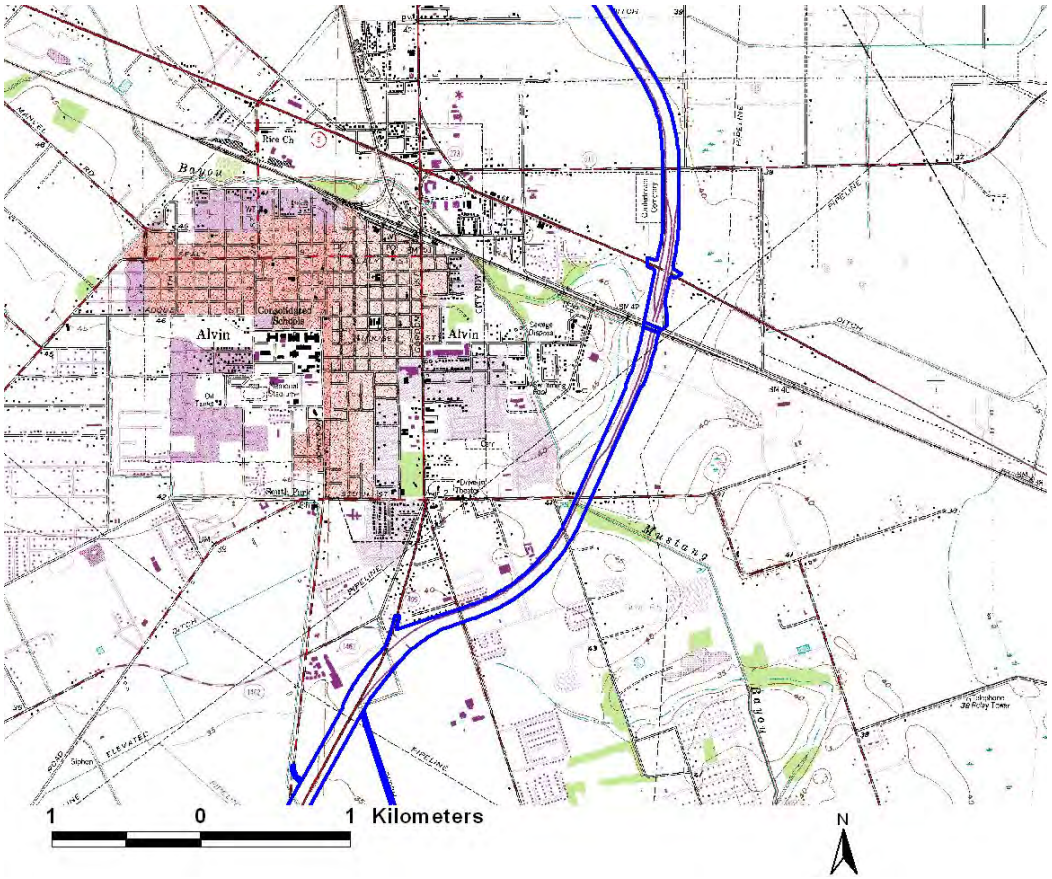

Figure 3e: Detail of Project Area.

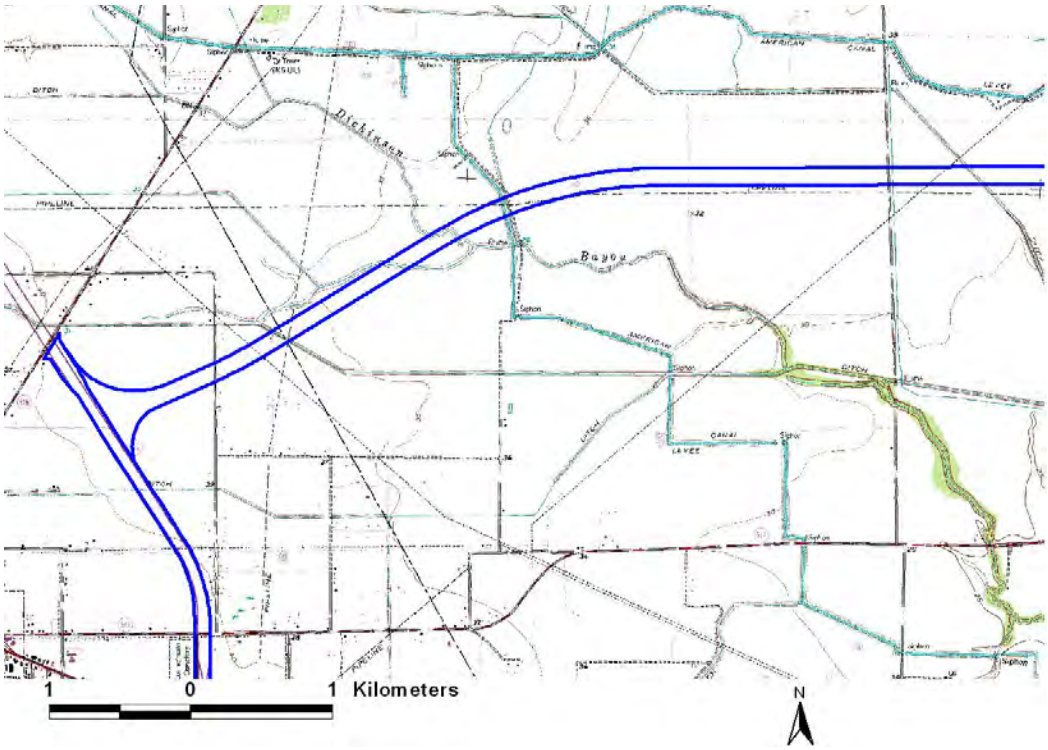

Figure 3f: Detail of Project Area.

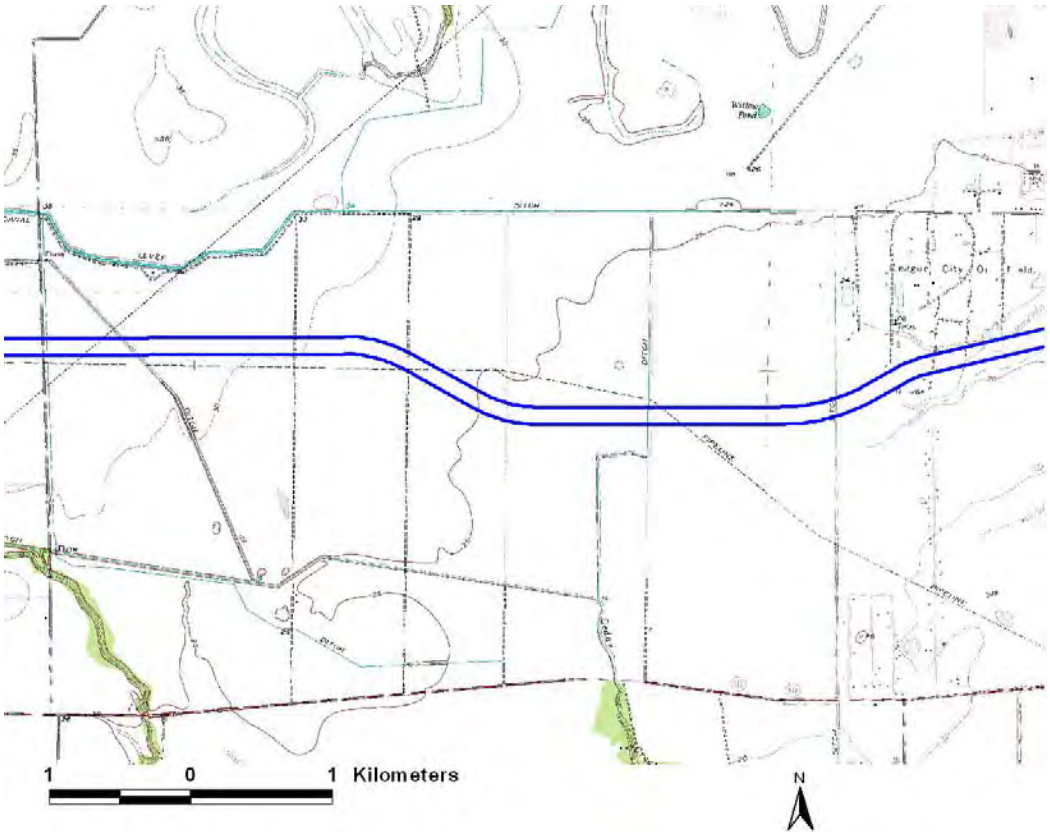

Figure 3g: Detail of Project Area.

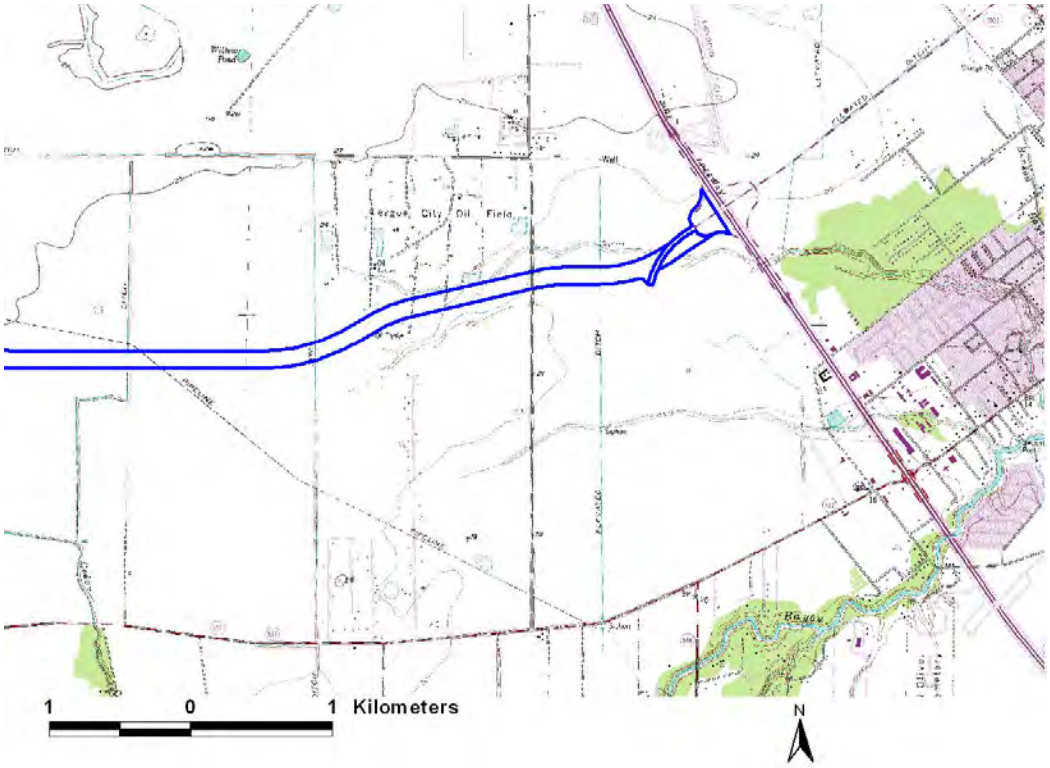

Figure 3h: Detail of Project Area.

Figure 4: Project Area over an aerial photograph (Google Earth).

ENVIRONMENTAL SETTING

Modern Climate

The modern climate of the Project Area can aptly be characterized as hot and wet for most of the year. The mean annual temperature for the Study Area region is about 20 °C (68 °F), with mean rainfalls of 117 centimeters (46"). Summer temperatures average about 34 °C (93 °F) with temperatures above 38 °C (100 °F) common, during the months of July and August (Carr 1967; St. Clair et al. 1975). The average winter temperature is a mild 18 °C (64 °F). Freezes are infrequent and of short duration, with an average of 271 frost-free days per year.

Rainfall in the Project Area varies from 7 centimeters (2.7") in March to 11 centimeters (4.3") in December, with July to December rainfalls often supplemented by tropical fronts and storms. The rainfall records range from a low of 45 centimeters (17.7") to a high of 185 centimeters (72.8"). Prevailing winds are usually from the southeast except during the winter months when 'Northers' sweep into the area.

Modern Flora and Fauna

Southeast Texas is within the Austroriparian biotic province near its western boundary with the Texan province (Blair 1950:98-101). This boundary, set by available moisture levels, is marked by pine-hardwood forests on the eastern Gulf coastal plain. The Project Area is situated within the pine-oak forest subdivision of the Austroriparian province and includes, within its western limits, portions of the coastal prairie (Tharp 1939).

Grasses within the coastal prairies and marshes vegetation area are described from a range-management perspective in Hoffman *et al.* (nd: 45). This 4,046,873 hectares (10,000,000-acre) area consists of 3,844,529 hectares (9,500,000 acres) of gulf prairies and 202,343 hectares (500,000 acres) of gulf marshes. The regional vegetation of the coastal prairies is characterized as follows:

> "The principal grasses of the prairies are tall bunchgrass, including big bluestem *(Andropogon gerardi)*, little bluestem, seacoast bluestem *(Schizachyrium scoparium*, var. *littorus)*, Indiangrass, eastern gamagrass *(Tripascum dactyloides)*, switchgrass, and gulf cordgrass. Seashore saltgrass is common on moist saline sites. Grazing pressures have changed the composition of the range vegetation so that the grasses now existing are broomsedge bluestem, smutgrass, threeawns, tumblegrass and many other inferior grasses. The other plants that have invaded the productive grasslands are oak underbrush, macartney rose, huisache, mesquite, pricklypear, ragweed, bitter sneezeweed, broomweed, and many other unpalatable annual weeds" (Hoffman *et al.* nd: 45).

The dominant floral species of the pine-oak forest subdivision of the Austroriparian biotic province include loblolly pine *(Pinus taeda)*, yellow pine *(Pinus echinata)*, red oak *(Quercus rubra)*, post oak *(Quercus stellata)*, and blackjack oak *(Quercus marilandica)*. Hardwood forests are found on lowlands within the Austroriparian and are characterized by such trees as sweetgum *(Liquidambar styraciflua)*, magnolia *(Magnolia grandiflora)*,

tupelo *(Nyssa sylvatica),* water oak *(Quercus nigra)* and other species of oaks, elms, and ashes, as well as the highly diagnostic Spanish moss *(Tillandsia usneiodes)* and palmetto *(Sabal glabra)*. Swamps are common in the region.

Blair (1950) and Gadus (Gadus and Howard 1990:12-15) define the following mammals as common within the Austroriparian province: white-tailed deer *(Odocoileus virginianus),* muskrat *(Ondatra zibethicus),* raccoon *(Procyon lotor),* coyote *(Canis latrans),* opossum *(Didelphis virginiana), common mole (Scalopus aquaticus), eastern pipistrelle (Pipistrellus subflavus), eastern red bat (Lasiurus borealis), eastern fox squirrel (Sciurus niger), eastern grey squirrel (Sciurus carolinensis), southern flying squirrel (Glaucomys volans), Baird's pocket gopher (Geomys breviceps), fulvous harvest mouse (Reithrodonomys fulvescens), white-footed mouse (Peromyscus leucopus), marsh rice rat (Oryzomys palustris),* cotton rat *(Sigmodon hispidus,),* packrat *(Neotoma floridana),* eastern cottontail *(Sylvilagus floridanus),* and swamp rabbit *(Sylvilagus aquaticus).* Bison *(Bison bison)* may have been present on nearby grasslands at various times in the past (Gadus and Howard 1990:15).

Common land turtles include eastern box turtle *(Terrapene carolina)* and desert box turtle (*Terrapene ornate),* while snapping turtle *(Chelydra serpentinia),* mud turtle *(Kinosteron* spp.*),* river cooter *(Chrysemys concinna),* and diamondback terrapin *(Malaclemys terrapin)* comprise common water turtles. Common lizards include Carolina anole (*Anolis carolinensis),* eastern fence lizard (*Sceloporus undulates), ground skink (Leiolopisma laterale), broad-headed skink (Eumeces laticeps),* six-lined racerunner (*Cnemidophorus sexlineatus),* and eastern glass lizard (*Ophiosaurus ventralis).* Snakes and amphibians are also present in considerable numbers and diversity.

The resources provided by river-influenced estuarine and marsh environments were undoubtedly of great importance to the littoral residents of southeast Texas. These resources are admirably summarized by Gadus (Gadus and Howard 1990: 12 - 15). Estuarine fish resources cited by Gadus include sand trout *(Cynoscion arenarius),* spotted sea trout *(Cynoscion nebulosus),* Atlantic croaker *(Micropogon undulatus),* striped mullet *(Mugil cephalus),* southern flounder *(Paralichthysis lethostigma),* shortnose gar *(Lepisosteus platostomus),* channel catfish *(Ictalurus punctatus),* freshwater drum *(Aplodinotus grunniens),* red drum *(Sciaenops ocellata),* and bluegill *(Lepomis macrochirus)* and other sunfishes. Common shellfish include rangia *(Rangia cuneata),* clams (*Macoma* spp.), dwarf surf clam *(Mulinia lateralis),* oyster *(Crassostrea virginica), Vioscalba louisianae,* and olive nerite *(Neritina [Vitta] reclivata).* Arthropods, such as shrimp and crab, are also numerous and highly productive.

Area marshes replete with plants such as cordgrasses *(Spartina* spp.*),* reeds *(Phragmites* spp.*),* giant millet *(Setaria magna),* and bullrushes *(Scirpus* spp.*)* would have formed a highly attractive and bountiful magnet for waterfowl (Gadus and Howard 1990).

During the investigation it was observed that the project corridor was a mix of undeveloped areas dominated by woods or cultivated field and developed areas with landscaped vegetation or none at all. Those trees adjacent to the project corridor included

a mixture of pine, oak, and sweet gum or some areas of dense Chinese tallow. The area around the city of Alvin was heavily urbanized with a mixture of business and residential development throughout. A review of older aerial photography dating back to 1944 suggests that bulk of the project corridor was under heavy cultivation, with many of the fields being used for rice farming. This last is based on man-made terracing visible in aerials. Rice cultivation is intensively disruptive of the natural terrain and it is rare for any but the most deeply buried cultural sites to survive this activity intact.

It is likely that, prior to the intensive cultivation, most of the landscape was dominated by open coastal prairie dominated by grasses with only scattered trees and the occasional motte or island of woods, usually centered on natural ponds or along the broad zone of various streams. This latter group would include Chocolate Bayou where dense woods dominated in the 1940s.

Soils and Geology

The segment of the Texas Gulf Coast encompassing the Project Area is on soils deposited over the last million to two million years. It sits on the Beaumont Formation, bands of alluvial deltaic soils running parallel to the coastline and laid down during a series of glacial/interglacial intervals during the Middle to Late Pleistocene epoch. Downcutting and erosion processes during the most recent glacial period incised and widened many of the river drainages running through the Beaumont Formation. After the sea levels rose during the Holocene, river valleys filled with alluvial soils creating broad, level floodplains.

The proposed project area is depicted on sheets 19, 20, 26, 27, 21, 17, and 12 of the Soil Survey of Brazoria County, Texas (Crenwelge et al. 1981) and sheets 8, 12, and 11 of the Soil Survey of Galveston County, Texas (Crenwelge et al. 1988). The project corridor falls within the Aris, Bacliff, Bernard, Edna, Lake Charles, Leton, Morey, and Verland soil series identified by the Soil Survey. Information on the distribution and properties of the soils in the project corridor (Web Soil Survey 2013) are presented in Table 1. The majority of the Project Area is a flat (0-1% slope), poorly drained landscape underlain by clayey to loamy fluviomarine deposits of late Pleistocene age. While the majority of the soils in the Project Area developed on flat landforms, several of the soils are associated with meander scrolls (Bernard clay loam, Bernard-Edna complex, and Verland silty clay loam) or depressions on flats (Bacliff clay).

Brazoria County, Texas							
Map Unit Symbol	***Map Unit Name***	***Acres in AOI***	***Percent of AOI***	***Landform***	***Slope***	***Drainage Class***	***Parent material***
1	Aris fine sandy loam	13.1	1.0%	Flats	0 to 1 percent	Poorly drained	Loamy fluviomarine deposits of late Pleistocene age
6	Bacliff clay	20.4	1.5%	Depressions on flats	0 to 1 percent	Poorly drained	Clayey fluviomarine deposits of late Pleistocene age
7	Bernard clay loam	160.4	12.0%	Meander scrolls	0 to 1 percent	Somewhat poorly drained	Loamy fluviomarine deposits of late Pleistocene age
8	Bernard-Edna complex	191.8	14.3%	Meander scrolls	0 to 1 percent	Somewhat poorly drained	Loamy fluviomarine deposits of late Pleistocene age
13	Edna fine sandy loam	77.7	5.8%	Flats	0 to 1 percent	Somewhat poorly drained	Loamy fluviomarine deposits of late Pleistocene age
15	Edna-Aris complex	21.6	1.6%	Flats	0 to 1 percent	Somewhat poorly drained	Loamy fluviomarine deposits of late Pleistocene age
24	Lake Charles clay	422.0	31.5%	Flats	0 to 1 percent	Moderately well drained	Clayey fluviomarine deposits of late Pleistocene age
27	Leton loam	3.6	0.3%	Flats	0 to 1 percent	Poorly drained	Loamy fluviomarine deposits of late Pleistocene age
28	Leton-Aris complex	.5	0.0%	Flats	0 to 1 percent	Poorly drained	Loamy fluviomarine deposits of late Pleistocene age
W	Water	10.8	0.8%				
Subtotals for County		**922.1**	**68.9%**				
Totals for Area of Interest		**1339.2**	**100%**				

Galveston County, Texas							
Map Unit Symbol	***Map Unit Name***	***Acres in AOI***	***Percent of AOI***	***Landform***	***Slope***	***Drainage Class***	***Parent material***
Ba	Bacliff clay	61.2	4.6%	Depressions on flats	0 to 1 percent	Poorly drained	Clayey fluviomarine deposits of late Pleistocene age
Be	Bernard clay loam	125.9	9.4%	Meander scrolls	0 to 1 percent	Somewhat poorly drained	Loamy fluviomarine deposits of late Pleistocene age
Bn	Bernard-Edna complex	25.8	1.9%	Meander scrolls	0 to 1 percent	Somewhat poorly drained	Loamy fluviomarine deposits of late Pleistocene age
LaA	Lake Charles clay	180.9	13.5%	Flats	0 to 1 percent	Moderately well drained	Clayey fluviomarine deposits of late Pleistocene age
Me	Morey silt loam	2.3	0.2%	Meander scrolls	0 to 1 percent	Somewhat poorly drained	Loamy fluviomarine deposits of late Pleistocene age
Ve	Verland silty clay loam	21.0	1.6%	Meander scrolls	0 to 1 percent	Somewhat poorly drained	Loamy fluviomarine deposits of late Pleistocene age
Subtotals for County		**417.1**	**31.1%**				
Totals for Area of Interest		**1399.2**	**100.0%**				

Table 1: Description of the soils in the Area of Interest (AOI) (Web Soil Survey 2013).

The Aris, Bacliff, Bernard, Edna, Lake Charles, Morey, and Verland soil series have a low geoarcheological potential while the Leton soil series has a low-moderate geoarcheological potential (Abbot 2001). However, it should be noted that the Edna soils commonly contain small pimple mounds of the sort that were often used by Native Americans for occupation. An examination of the aerial photographs shows clear evidence of such features in the Project Area. Additionally, meander scrolls (associated with Bernard clay loam, Bernard-Edna complex, and Verland silty clay loam) are indicative of paleochannels and may contain archaeological material, especially considering that oxbow lakes form when a meander gets cut off from the stream and will often retain water long after abandonment. Ponds were commonly used by Native Americans for resource acquisition, particularly when found in conjunction with pimple mounds.

During fieldwork the crew found the Project Area to be dominated by agricultural land in the rural areas and businesses and residences in the urban segments. Soils varied with some sandy loams, sands, sandy clays being found but clays dominating overall. Most of the shovel tests excavated hit the clay basal subsoil. Only a few encountered deposits of artificial fill.

Hydrology

Extant natural steams impact the project corridor. Chocolate Bayou crosses the corridor 10.5 km southwest of Alvin, Dickinson Bayou intersects 4.5 km northeast of Alvin, and an unnamed tributary of Dickinson Bayou traverses in multiple locations about 5 km to the west of Dickinson. A review of the Texas Archeological Sites Atlas shows that there are numerous prehistoric and historic sites along Chocolate Bayou. A comparison of aerial photographs and USGS 1943 and 1974 topographical maps of the Rosharon Quadrangle (299545) shows that Austin Bayou shifted course at some point prior to the publication of the 1943 topographic map. Meander scars can be seen in the 1944 aerial photograph, as well as subsequent aerial photographs to a lesser extent. These meander scars, which cross the alignment near SH 288 in the aerial photographs, are located farther to the north than the bayou is drawn in the topographic maps.

Though there are no other streams in the area, a review of the older USGS maps and aerials indicated that there were, at that time, numerous natural ponds close to the project footprint. Some of these were quiet large. The remnants of some of these ponds are still extant in modern topographical maps. Native Americans frequently utilized such ponds for water, food and other resources. While some of these ponds appear to have been erased, some portion of these features or their remnants may still be evident, particularly in the less developed areas of the project corridor.

CULTURAL HISTORY

The Project Area is in the Southeast Texas Archeological Region, which has been summarized by Patterson (1995). Other recent prehistoric summaries with the prehistory of the Houston area include Ensor (1991), and Moore and Moore (1991). The reader is referred to these works for detailed data on the prehistory of this region.

Previous investigations in Southeast Texas have demonstrated that occupation of this area began as early as 12,000 years ago. All through prehistory the inhabitants were nomadic hunter-gatherers. Ensor (1991) has proposed a prehistoric cultural sequence of periods for Southeast Texas which are as follows: Paleo-Indian (10,000-8,000 BC), Early Archaic (8,000-5,000 BC), Middle Archaic (5,000-1,000 BC), Late Archaic (1,000 BC–AD 400), Early Ceramic (AD 400-AD 800), and Late Ceramic (AD 800-AD 1750).

Evidence for prehistoric occupation of Southeast Texas is scarce in the Paleo-Indian period, and indeed, is ambiguous through the Middle Archaic period (Patterson 1983; Aten 1983:156-157). Although most previously recorded sites date to the Late Archaic and Ceramic periods, it is probable that earlier dating sites have been lost to erosion, channel cutting, and, in the case of very early sites, to rising sea level. In cases where early-dating artifacts have been found, such as Wheat's (1953) finds of projectile points dating from the Paleo-Indian through Middle Archaic periods at Addicks Reservoir in western Harris County, the materials occur in deposits with poor contextual integrity.

Sites dating from the Late Archaic through the Ceramic periods are more commonly found in the region. During the Late Archaic period, modern climatic conditions evolved, sea level rose and stabilized, and coastal woodlands expanded. Aten (1983) hypothesizes that an increase in population and the establishment of seasonal rounds, including regular movement from littoral to inland areas occurred during the Late Archaic period. Relevant to the prehistory of the Project Area are Hall's (1984) data from the Allens Creek project in nearby Austin County, Texas. Excavations of a large cemetery there suggest a Late Archaic trade system linking Southeast Texas to Central Texas and into Arkansas.

Aten (1983) has proposed that ceramics were introduced in the artifact assemblage on the Upper Texas Coast at AD 100. Ensor (1991) places the beginnings of the Early Ceramic period at AD 400, which may be more applicable for inland areas. The Early Ceramic period is characterized by a continued growth in population. Ensor places the beginning of the Late Ceramic at AD 800, coinciding with the introduction of the bow and arrow. Plain sand-tempered pottery dominates throughout both parts of the Ceramic era. Story et al. (1990) defined the Mossy Grove Cultural Tradition for Late Prehistoric cultures in Southeast Texas with sandy paste pottery being the principle diagnostic artifact.

Although European settlement did not begin to seriously disrupt aboriginal habitation in the areas inland from the Upper Texas Coast until after AD 1700 (Patterson 1995; 249), European diseases, probably introduced by explorers and early traders, began to have impacts as early as AD 1528. Seven *recorded* epidemics ran through the tribes of the

study area between that year and AD 1890 (Ewers, 1974). The Project Area appears to have been within the territory of the Akokisa in the 18th and 19th centuries (Aten 1983). Other groups that may have resided in Harris County include the Atakapan, Karankawa, and the Tonkawa. During the 18th and 19th century disease, the mission system, and the fur trade acted to reduce, and in some cases exterminate, the indigenous populations.

On the eastern edge of the city of Alvin there is a cemetery referred to as the Confederate Cemetery. This cemetery was established in the 1890's as a burial ground for Confederate veterans and the families thereof. However, it appears likely that graves predate that era as among the dead buried here are a handful of Union soldiers, suggesting of an 1860's date for the earliest burials. However, at some point in its history the cemetery was made available to the public at large and this burial ground has continued to be used into the modern era. The cemetery has a Texas Historical Marker (#9549).

PREVIOUS ARCHEOLOGICAL INVESTIGATIONS

Examination of the Texas Archeological Sites Atlas and of MAC internal records reveals that there have been previous archeological surveys within 1 kilometer of the Project Area. This included a survey conducted by Brazos Valley Research Associates (BVRA) at the proposed site of the Camp Mohawk County Park in 2000. This survey was located to the west of the current Project Area near Chocolate Bayou. An additional survey in the general vicinity of Camp Mohawk was conducted by the Corps of Engineers along the banks of Chocolate Bayou southeast of the Project Area in 1986. Surveys have also been conducted by the State Department of Highways and Public Transportation (SDHPT) north of Alvin along West Parkwood Avenue (in 1987) and Steele Road (in 1989), near their intersections with SH 35. The Bureau of Land Management (BLM) and the American Association of Professional Landmen (AAPL) conducted a survey along the American Canal in 1988, which runs parallel to an eastern segment of the Project Area. A survey conducted by Blanton and Associates in 2003 along 16th Street intersects with the proposed Project Area near the intersection of 16th Street and IH 45.

A review of the Texas Archeological Sites Atlas shows that there are cultural resource sites within 2 kilometers of the current Project Area. BVRA identified five pre-historic sites within their survey at Camp Mohawk. These sites were described as special activity areas related to specific tasks, including tool production and subsistence activities. Four of the sites were single component sites dating to the Late Prehistoric period based the presence of sandy paste pottery materials and diagnostic lithics. The age of the fifth site could not be determined because no diagnostic materials were found. Additionally, a historic Confederate Cemetery is directly adjacent to the proposed Project Area near the intersection of SH 35 with Shirley Avenue. At this time it is unknown as to whether additional archeological work will be necessary along the frontage of this cemetery. Such a decision will need to be made between TxDOT and the THC once final plans for that segment of the project are complete. However, regardless of that decision, any additional archeological work that might arise from such a determination is not included in or covered by this investigation.

METHODS

The intensive pedestrian cultural resources survey covered 100% of the proposed Project Area where right of entry (ROE) allowed and were defined as Units 1, 2, or 2a by TxDOT's Potential Archeological Liability Mapping (PALM) Model recommended. The Principal Investigator and/or the Project Archeologist and field assistants conducted the survey. All areas of exposed soil were examined for surface exposure of cultural remains and features. Particular attention was paid to any landforms or features that have been determined of high archeological probability. The survey was conducted in accordance with prevailing standards accepted by the Texas Historical Commission (THC), the Council of Texas Archeologists, and Section 106 regulations.

Shovel testing was conducted in an attempt to identify buried cultural resources. Within the project ROW four (4) transects were established and shovel tests were excavated along each transect at roughly 100 meter intervals. Based on the length of the project, what areas were deemed to need survey by the PALM model, and the interval it was originally expected that more than seven hundred (700) 40 cm by 40 cm (15" x 15") shovel test would be required. However this number was greatly reduced by lack of right of entry (see below) and due to observations made in the field that determined some tracts to be disturbed or impossible to survey. The final number of actual shovel tests was six hundred and seven (607).

All shovel tests were excavated in a manner that allowed for maximum coverage of the alignment while also allowing for the testing of locales chosen based on professional judgment. Shovel tests were excavated in 10-cm (3.9") arbitrary levels. Each test was excavated to at least one meter deep or until intact basal clay is reached. Each test was documented, including information on location (using WAAS enabled GPS units), soil profile and cultural yield (if any). Soil fill from tests was screened (when possible) through ¼-inch hardware cloth and examined for cultural materials, and the units were then backfilled immediately. Allowances were made in the shovel test interval to allow for the sampling of the features previously mentioned and to avoid areas of significant disturbance. Areas that were avoided due to disturbance and/or buried infrastructure were documented to explain the reason for avoidance.
(Figures 5a - 5h).

Alterations were made to transects and shovel test intervals when necessary to allow testing of better landforms or avoidance of disturbed areas or hazards. Since a review of soil types showed that some of the project corridor falls within soil types known to have small mound features that are common locales for prehistoric sites, such features were considered to have particular priority in such efforts. All visible surfaces were examined for historic or prehistoric archeological materials. Surface visibility varied throughout the Project Area, from 0%-100% due to various forms of ground cover. The more significant visibility areas were typically in recently plowed or otherwise under heavy agricultural use.

Based on the soils recorded as being present within the project corridor it was anticipated that deep reconnaissance (in the form of backhoe trenching) was necessary for this project, though only in a roughly 800 meter (2625 ft.) segment of the project corridor where it crosses Chocolate Bayou. It was anticipated that these backhoe trenches would be dug along the same four transects as the shovel testing with an interval of one per 200 meters. This methodology was proposed with an offset; i.e. transect 1 would have a BHT at 100, 300, 500 etc. meters and transect 2 would have them at 0, 200, 400, 600 etc. meters. It was expected that this would amount to roughly 16-18 backhoe trenches (depending on conditions in the field). This methodology was agreed upon in consultation with TxDOT and THC archeologists (personal communication with Allen Bettis of TxDOT and Mark Denton of THC, December 4, 2013). It was proposed that trenches would be dug to a maximum safe depth in order to achieve the most data recovery and would be 3-5 meters in length. One or more measured profile drawings would be made for each trench, and trench wall photographs would be taken. Trenches would be backfilled immediately after profiles and photographic documentation had been completed. The location of all backhoe trenches would be mapped utilizing a hand-held, WAAS-enabled GPS unit. Unfortunately insufficient right-of entry permission for backhoe work was obtained prior the onset of fieldwork for this to be a feasible opportunity to conduct that work. As a result the backhoe work was postponed until such a time as the state acquires all the land involved.

Any locality producing either prehistoric or historic cultural remains was recorded on State of Texas archeological site forms for submission to THC. In addition to form information, photographs, plan and stratigraphic sketches and measured drawings and crewmembers' daily field notes documented any sites and features. However no prehistoric or historic sites were observed during the investigation.

For buried or obscure sites, boundaries will be delineated through a combination of soil surface examination and shovel test excavation. Where necessary shovel tests will be dug at 10-meter (33') intervals radially in the cardinal directions from the presumed center of each site until no further artifacts are encountered in two successive units (or until the boundary of the Project Area is reached). The site boundary on each radius will be presumed to lie between the last artifact-producing test and the first sterile unit. Information on the depth and nature of the deposits will be derived from shovel test results, as well as available surface observations. This is as per THC/CTA survey standards. The only occasions when this policy came into play were when two singular artifacts were found at two separate locations. In each case multiple additional shovel tests were dug adjacent and surrounding the finds and no other artifacts were recovered. As a result these items were determined to be isolated artifacts.

The collection policy for this survey was as follows; (1) we will retain any prehistoric or potentially pre-1870 historic materials recovered from shovel tests or other subsurface investigations that do not prove, after extensive site delineation tests, to be isolated artifacts[1], and (2) for surface materials: only diagnostic cultural materials from the above

[1] These isolated artifacts, such as a single flake surrounded by multiple, negative shovel tests, will be reburied and the isolate will not be recorded as an archeological site.

periods will be collected and retained. As per this policy and the discussion above, the two artifacts recovered and then determined to be isolated artifacts were not retained.

Right of Entry

Because the tracts along the proposed ROW have mixed ownership it was necessary acquire permission for entry to conduct investigations of the land. Ultimately roughly 30% the landowners along the road ROW and within areas determined to need survey by the PALM model were willing to provide such permission before fieldwork started, and as a result it was not possible to examine the entire ROW corridor.

RESULTS

In August and September of 2014 a crew from Moore Archeological Consulting performed an intensive pedestrian archeological survey of a proposed toll road between SH 288 and IH 45 in Brazoria and Galveston Counties, Texas. As mentioned in the METHODS section, this survey was performed utilizing shovel testing along four (4) transects, as well as visual survey of all visible surfaces. This sampling methodology resulted in the excavation of 607 shovel tests.

All but one of the 607 shovel tests excavated during the investigation were sterile for cultural resources. The exception, discussed below, was a single piece of chert that appeared modified. Additionally a single piece of prehistoric pottery, also discussed below, was found on the surface. However, additional shovel testing around the location of this find did not recover any evidence of other cultural resources. Only a handful of structures were found within the footprint of the project corridor during the archeological survey, and none of these predate the 1980's based on a review of aerial imagery. No other structures or structural remnants were observed during the archeological investigation within the footprint of the project corridor.

A total of 26 parcels were surveyed during this investigation, the bulk of these separated from one another by properties which either did not require survey (according to the PALM model) or for which we did not have ROE. Because the number of parcels is relatively small it is possible to discuss observations made of each one below. The parcel numbers are those issued by the client.

Parcel Descriptions

Parcel 176679

This parcel is located near the western end of the proposed ROW, immediately south of County Road 60. At the time of survey, it was vegetated with rows of nearly-ripe soybeans. Four pedestrian transects were completed and 32 shovel tests were excavated (Figure 5a). All of the shovel tests showed evidence of Lake Charles clay. The land surface is generally flat and has been disturbed by cultivation. A line of trees is present along the south-eastern margin of the land parcel, which separates it from another field owned by a different land owner. Examination of air photographs indicated the plot of land has been under cultivation continuously since at least 1944. All shovel tests proved negative, and there is no evidence of any historic sites present.

Parcels 178606 and 511719

These two parcels of land were contiguous and thus were surveyed together. They are situated north of CR 1462, and bounded to the north-east by a drainage canal. Parcel 511719 is also bounded on the south east side by a single drainage canal. Additional disturbance in 511719 includes the previous construction of a large berm along the

southeastern boundary that parallels the single drainage canal and is set back from it (to the north-west) by about 30 m. The berm is approximately 2 m high and 5 m wide, and the area of land between it and the single drainage had been recently mowed at the time of survey.

Parcel 178606 is bisected by a heavily overgrown dirt roadway which runs generally north-south. In addition, the parcel of land has been divided into smaller fields by fences.

At the time of survey, both plots of land were heavily vegetated with a mixture of briars, poison ivy, yaupon, giant ragweed, and cane. The land was generally flat throughout the survey area. A total of 46 shovel tests were dug, all negative for cultural resources (Figure 5a). Lake Charles clay was noted immediately under the humic layer in all of the excavations. The earliest air photo of the plots of land dates from 1944 and indicates the area was under cultivation at that time. By 2005, the photographs show the fields were allowed to re-vegetate. Evidence of the overgrown road is first seen in 1995 and can still be clearly seen in the 2012 Google Earth picture. The drainage ditches to south and east are also noted in the 1944 air photo.

Parcel 178402

This parcel of land is currently vegetated by a mixture of yaupon, pine and Chinese tallow, along with an underbrush of long grasses intermixed with briars. The land surface is generally flat, with some disturbance from all-terrain vehicles or farm machinery. The plot of land is bounded to the north-east by a drainage ditch and to the east by a single drainage ditch. Cattle have evidently grazed this plot of land in the past, though none were seen at the time of survey.

Examination of air photographs of this parcel indicate the land was under cultivation from as early as 1944 (the date of the earliest air photo available). An air photo from 1965 shows the first evidence of trails crisscrossing the property, especially in the north-western portion, as well as along the fence line paralleling the drainage ditch. It is possible the land was used for grazing by cattle during this time period. By 1995, evidence of trees growing throughout the property can be seen, and more growth is noted in the 2004 air photo. From the mid-2000s to present day, the parcel of land appears to become more heavily forested, most likely by invasive Chinese tallow.

A total of 30 shovel tests were excavated within this parcel, all with negative results (Figure 5a). There was no evidence of any historic sites or structures present within the project corridor.

Parcel 501691

Parcel 501691 is a plot of land bounded to the southeast by FM 1462, and to the northeast by two drainage ditches. The study area is bisected by a man-made drainage ditch which runs in a generally northeast –south direction. The parcel of land is vegetated on the southeast side with Chinese tallow, yaupon and a mixed understory of grasses, while the

northwest side is covered with closely cropped grasses which are currently being grazed by cattle. Additional disturbances include trails made by cattle through the forested section, as well as evidence of previous cultivation. The ground surface of the study area was flat, with no evidence of pimple mounds or areas of higher archeological potential.

While the land is currently being used for grazing, examination of early aerial photographs show the entire parcel was under cultivation in 1944. CR 1462 is shown in the 1944 air photo as well as the drainage ditch. By 1965, a variety of trails (most likely cattle) can be seen crisscrossing the property. The wooded area noted during the current survey is present in the 1965 air photo, albeit in a much smaller form. By 2004, the plot of land appears to be mainly used for grazing, and the wooded area extends to its modern boundaries.

A total of 37 shovel tests were dug, all with negative results (Figure 5a). There was no evidence of any historic structures within the project corridor.

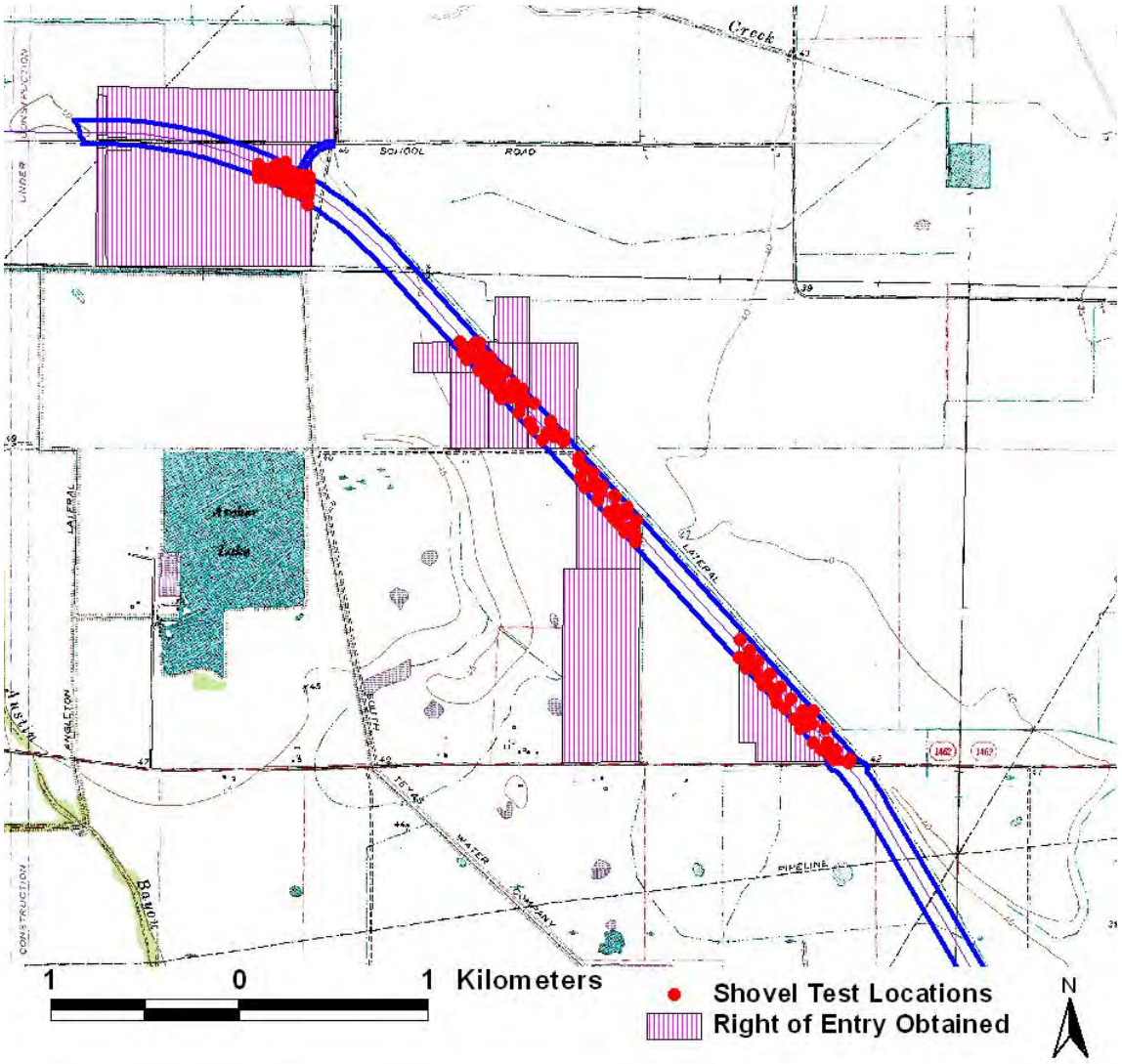

Figure 5a: Shovel tests in the project corridor

Parcel 556777

The entirety of parcel 556777 is bounded to the north-east by a double drainage ditch (the South Texas Water Company Canal). A water reservoir is located on the north-western margin of the property, and appears in a 1944 air photo. The land is flat and appears to have been cultivated continuously since at least 1944. At the time of survey, no crop was visible.

A total of 44 shovel tests were dug in this area, all with negative results (Figure 5b). There was no evidence of any historic structures within the project corridor.

Parcel 147967

This parcel of land is immediately southeast of parcel 556777 and similarly is bounded to the northeast by the South Texas Water Company Canal. A high berm (approximately 5 m high) separates the canal from the rest of the property. The northwestern margin of the tract is bounded by the supplementary drainage canal mentioned above. The western portion of the plot of land contains a man-made pond (known as Reservoir #3 by the land owners) formed by the excavation of soil which has been piled up around the margins of the reservoir. At the time of survey, the reservoir was dry, and was vegetated by long grasses and willows. Five shovel tests were specifically excavated around the margins of the pond area and resulted in negative results.

East of the pond, the ROW opens up to an area of flat land, vegetated with a variety of tallow, yaupon and tall grasses. The area has been used for grazing by cattle in the past, though not recently, and aerial photographs show it was under cultivation briefly in the mid-1990s. Recent disturbance includes the construction of a buried utility pipeline near the fence on the easternmost margin of the land parcel.

Examination of aerial photographs show the pond was in existence in the 1940s. A remnant ephemeral drainage channel was noted running across the property in a generally north-south direction in the 1944, 1965 and 1995 air photographs. However, by the time of the 2004 aerial images, the drainage is truncated and no longer runs across the property. At the time of survey, some portions of land were wet and marshy. No distinct margins of the drainage can be seen in the air photographs, and none were noted at the time of survey. Any evidence of this drainage was likely destroyed during the years the land was under cultivation.

A total of 44 shovel tests were dug in this area, all with negative results (Figure 5b). There was no evidence of any historic structures within the project corridor.

Parcel 176485

This parcel of land, immediately east of parcel 147967, is bounded to the northwest by a fence and dirt road which runs roughly east-west, and on the north and eastern margins by the South Texas Water Company Canal. A high berm (approximately 5 m high) separates the canal from the rest of the property. The parcel was previously under cultivation but is presently covered by grasses. The area has been used in the past for both cultivation and for cattle grazing.

The easternmost portion of the ROW is covered by a grove of mature oak and yaupon trees, with dirt trails used for driving surrounding it. These dirt roads appear as far back as 1944, as shown in aerial photographs, though the wooded area doesn’t appear in either the 1944 or 1965 air photographs.

Little undergrowth is currently present within the main part of the grove, and the entire wooded area has been heavily grazed by cattle. A series of drainage ditches (currently dry) have been excavated in this region, causing some land disturbance. The ROW will cross the South Texas Water Company Canal at the eastern edge of the property. Shovel tests were not excavated on the berm that separates the canal from the flatter fields and treed area, owing to the extent of the soil disturbance and the impossibility of excavating the hard-packed soil. A total of 35 shovel tests were excavated in this land parcel, all with negative results (Figure 5b).

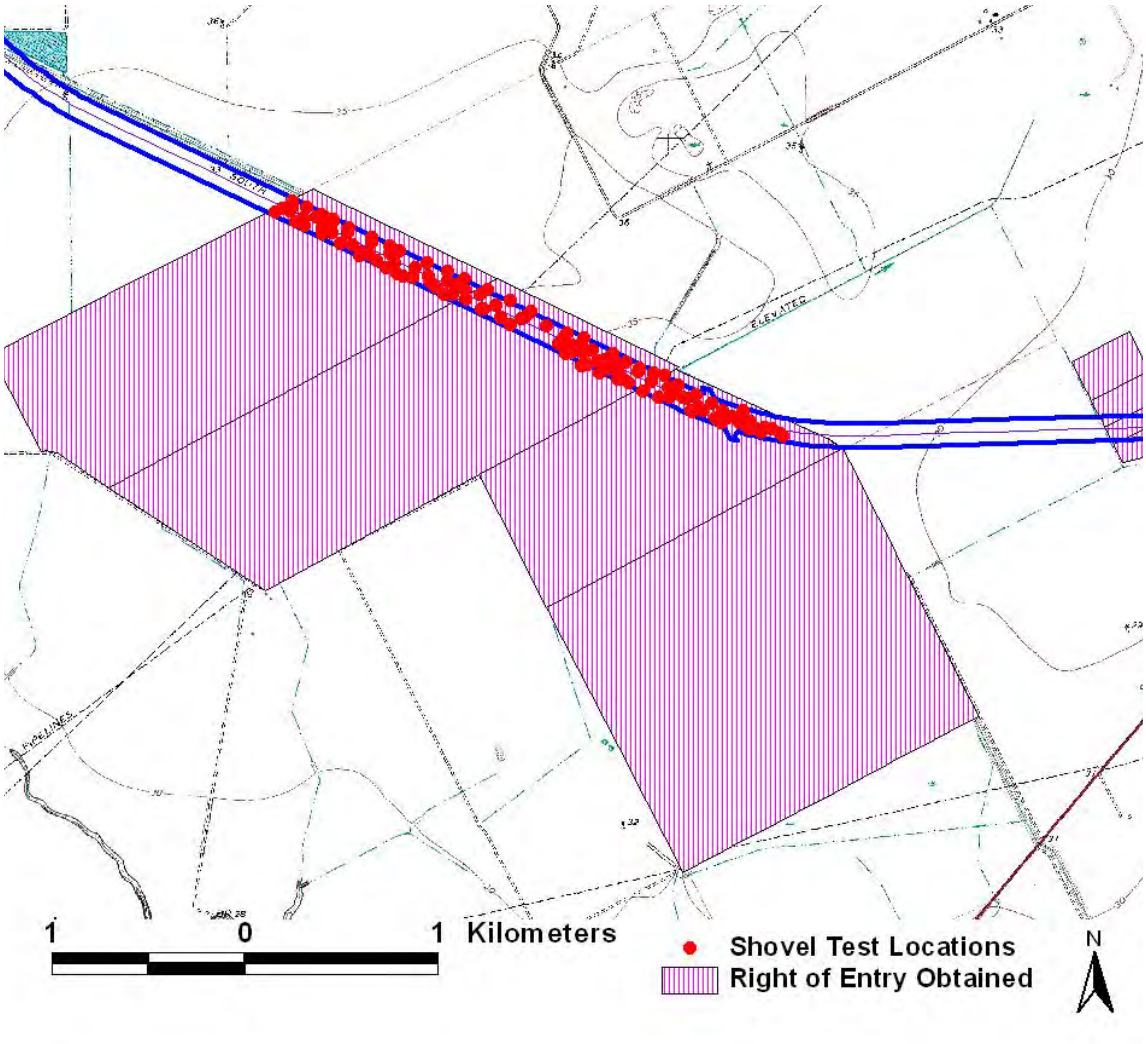

Figure 5b: Shovel tests in the project corridor

Parcel 147738

Parcel 147738 is located on the southwest bank of Chocolate Bayou. Only the southwest side of the bayou was shovel tested, owing to land access issues. SH 35 runs southwest-northeast, along the western margin of the ROW.

The southwestern portion of the land parcel is currently owned by Brazoria County Parks. A dirt road runs in a small loop southeast of SH 35, and contains an historic marker which describes Oyster Creek and Chocolate Bayou. The area around the historic marker was not tested, as it had been disturbed from previous road construction and the installation of various utility lines. The larger surrounding area appears to have been used previously as an RV park, as there are numerous cleared areas along with evidence of shell having been dumped to act as a road surface. Shovel tests were concentrated southeast of SH35, in areas that appeared to have been undisturbed, though nearly all shovel tests near roads produced evidence of modern debris, including broken glass, recent faunal remains, and aluminum pull tabs. A single shovel test located approximately 30 m south-east of SH 35 and east of the dirt road loop produced a piece of chert that appeared to have been culturally modified. Further shovel testing around the find spot did not yield any additional artifacts. As a result, and following the proposed collection policy, the chert piece was determined to be an isolated find and was not retained.

The believed to have formerly been an RV area is located on the upper margin edge of Chocolate Bayou, with a large flood plain down slope to the northeast. A line of shovel tests was excavated along the upper margin edge, all of which proved negative.

The lower bank which is part of the Chocolate Bayou flood plain was not systematically shovel tested, owing to its location, evidence of significant previous disturbance, and low elevation.

An intermittent drainage runs across part of the floodplain, southwest of the present-day Chocolate Bayou channel. The landscape is heavily wooded, and a number of dirt paths intersect across the generally low-lying area. Water was present in parts of this drainage at the time of survey; it was shallow and covered in algae.

On the western margin of the forested area, and east of SH 35, several dirt tracks parallel the forest edge along the flood plain. A single piece of sand-tempered prehistoric pottery was found eroding out of one of the ruts in an area that had been previously disturbed, between the forest and a steep bank on a terrace. Two shovel tests were dug in the vicinity of the find spot, along the edge of the bank, both of which were negative. Each shovel test produced pieces of chert embedded in concrete, proof of the level of disturbance and the potential for manuport artifacts. Because no other evidence of cultural resources was observed on the surface or in the shovel tests adjacent to the find it was determined that this artifact was an isolated object and it was not retained.

All exposures within the vehicle tracks were carefully visually inspected. Modern debris was noted scattered in the vicinity and especially within the trees, and included insulation, slabs of stone, lumber, abandoned sofas and building materials.

The banks of Chocolate Bayou were also visually inspected. The bayou appears to have been channelized at some point, as a high berm of earth has been piled up along the banks. Additional disturbance includes the presence of a dirt road which parallels the bayou. Pieces of asphalt and shell were also noted strewn across the area.

Aerial photo from 1995 shows the dirt road turnout southeast of SH 35. Trails are shown in this image that are still present today. The wooded area paralleling SH35 becomes more cleared as time progresses; by 2004 the trails by Chocolate Bayou are shown. By 2006, dirt roads that parallel the tree line appear (this being where the single potsherd was found), and the appearance of the land plot is very similar to what is seen currently.

A total of 23 shovel tests were dug in this area (Figure 5c). With the exceptions noted above (the single lithic flake found in a shovel test and the potsherd found on the surface) all of the shovel tests were negative. There was no evidence of any historic structures within the project corridor.

Parcel 619151

This parcel of land is located immediately s southeast of SH35. It is heavily forested with yaupon and Chinese tallow with an understory of briars. The ROW in this portion does not extend to its full width; as a result, only two pedestrian transects were completed.

Examination of air photographs showed that the area has remained heavily forested from 1965 (the date of the first photo available) to present day. An open grassy area to the west of the property near SH 35 is first shown in a 1995 photo and still exists today.

A total of 10 shovel tests were excavated in this parcel, all with negative results (Figure 5c).

Parcel 619792

This land parcel is currently occupied by Y&T International, Inc., a metal recycling plant. The plant is immediately south-east of SH 35, and is separated from the highway by an approximately 30 m strip of forest. This wooded area includes yaupon, Chinese tallow and an understory of briars, creepers and poison ivy. Several buildings associated with the metal recycling plant are currently within the proposed ROW. Because of the presence of buildings and disturbed areas only 4 shovel tests were dug in the northwestern portion of the land parcel; including one on what appeared to be a small mound (Figure 5c). However, all shovel tests proved negative. There was no evidence of any historic structures within the project corridor.

Aerial photographs from 1965 and 1995 show the land parcel as forested, with no evidence of buildings until 2010, when the recycling plant was in the process of being constructed. The disturbance shown in the air photo matches the footprint of the recycling plant today.

Parcel 506124

This parcel of land is located southeast of SH35, and northeast of CR 2917. At the time of survey, the land contained a convenience store and gas station. The flat land was generally low-lying and wet behind the convenience store. The grassy area to the north, east and south were shovel tested; all 4 shovel tests excavated in this parcel proved negative (Figure 5c). There was no evidence of any historic structures within the project corridor.

The earliest aerial image of this location dates from 1995. At that time, the land was part of a larger field and was used for grazing. The convenience store appears in 2004, and covers the same area as is seen today.

Parcel 516537

The parcel of land, located immediately east of SH35 consisted of a flat, newly-mown field at the time of survey. Ground visibility was excellent across the open field, which is currently being used for grazing. A total of 11 shovel tests were excavated across four pedestrian transects; all results were negative (Figure 5c). There was no evidence of any historic structures within the project corridor.

In aerial photographs dating from 1995 it appears that this parcel was being used for grazing. Ephemeral drainages can be seen in the imagery, though by 2006 they appear to have been channelized. By 2012, evidence of these drainages become less clear, and no remnants were noted at the time of survey.

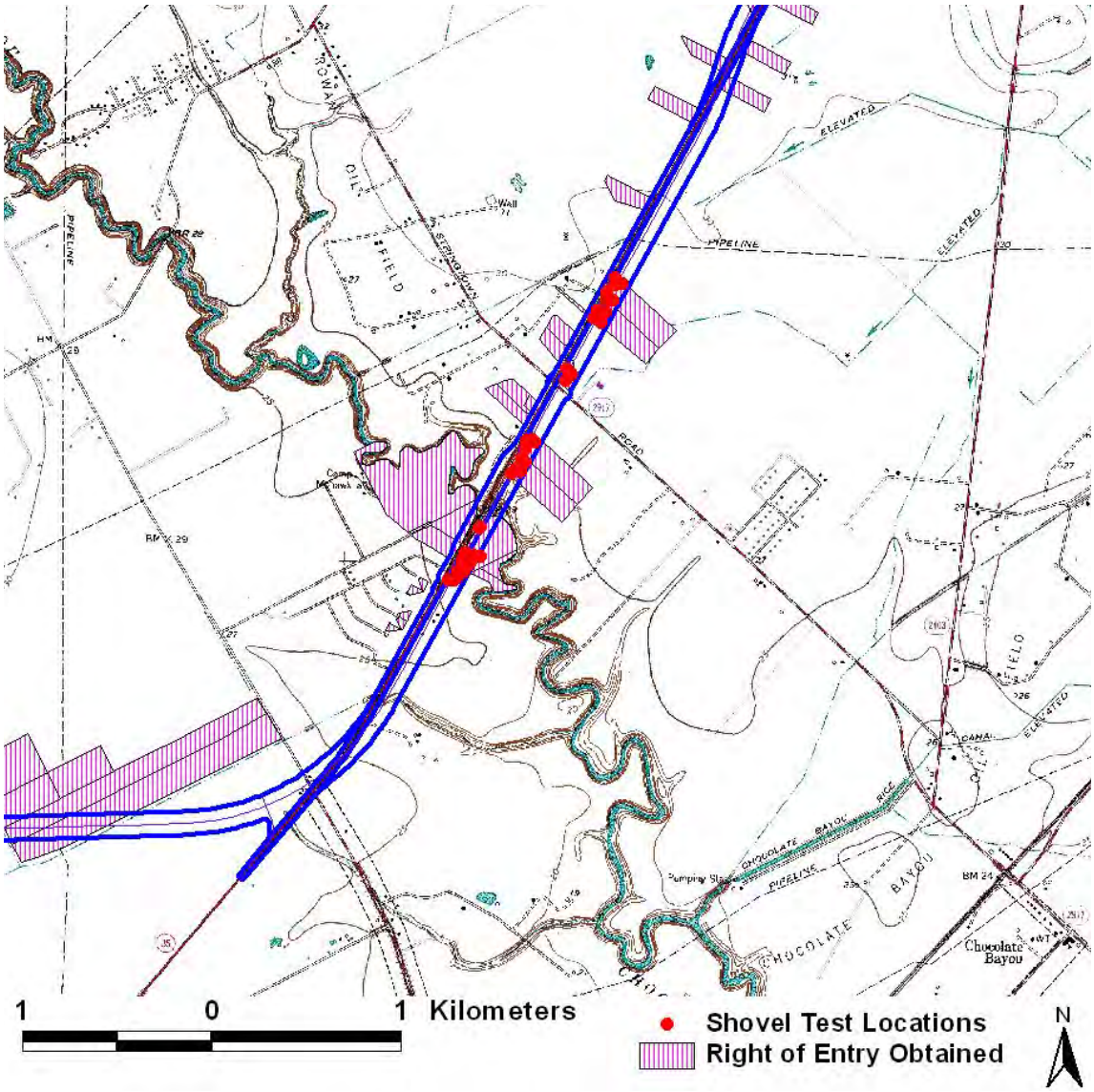

Figure 5c: Shovel tests in the project corridor

Parcels 165014 and 165015

These two parcels of land comprise the Confederate Cemetery in Alvin, TX (Figure 5d). It is bounded to the east by SH 35 and to the north by Dickinson Road. While the modern cemetery boundaries falls outside the proposed ROW, the margins of the cemetery closest to SH35 were visually inspected and photographed to ensure no obvious evidence of potential gravesites would be affected by the proposed Grand Parkway construction. No shovel tests were excavated, and it is believed no known existing gravesites will be affected. The cemetery was formally established sometime in the 1890's but it may have burial predating that decade.

The first air photo of the surrounding area dates from 1965, and the cemetery appears on it. Between 2002 and 2004 the cemetery extends west to its westernmost boundary, though the boundary next to SH 35 has been in place since at least 1965.

At this time it is unknown as to whether additional archeological work will be necessary along the frontage of this cemetery. Texas Administrative Code (Title 13, Part 2, Chapter 26, Subchapter E, Rule 26.25) requires an archeological investigation if construction will occur within 7.5 meters feet of a known cemetery. However, while the existing ROW falls within 5 meters of the cemetery (the precise limits are unclear as there is no fence or marked boundary along the highway access road), it is unclear if any actual construction will need to take place here, or at least within 7.5 meters of that boundary. Such a decision will need to be made between TxDOT and the THC once final plans for that segment of the project are complete. There was no evidence of any historic structures within the project corridor along the margins of these parcels.

Parcels 172630, 172670, 172661, 172676, 175331

The following parcels of land will make up a major interchange leading northeast from SH35 near Wheeler Road to Clifford Street in Alvin. Aerial photographs indicate the entire area was under cultivation at least as early as 1965 (the date of the earliest image available). Additionally, the drainage ditch which separates 172676 from plots 172670, 172669 and 172661 is shown in this air photo. The buildings present on the plots of land nearest SH 35 first appear in 1987.

All but one of these parcels (172670) was, at the time of the survey, open field. The exception is currently occupied by Bub's Icehouse. The majority of that parcel is occupied by buildings and a gravel parking lot. No shovel tests were excavated within this area, owing to prior disturbance from the buildings, the parking lot, and buried utility lines, as well as its close proximity to SH 35. It is located east of SH 35 and west of a small drainage ditch which was dry at the time of survey.

Most of the other parcels in this grouping appear to be fallow or used for pasturage. Most are covered with long grasses with occasional patches or lines of trees and small bushes. A total of 73 shovel tests were excavated across this group of parcels; all shovel tests yielded negative results (Figure 5d). There was no evidence of any historic structures within the project corridor.

Parcel 173593

This parcel of land is located near the eastern portion of Brazoria County, at the border with Galveston County. The earliest available aerial photographs for this tract date from 1965, and show the area under cultivation. By 1987, it is heavily wooded, though it was cleared and under cultivation again by 1990. Currently the land is covered by a number of horse paddocks.

A small pond appears in the in north-east corner of the property in the 1995 air photo, though it is not visible in the 2002 edition. No evidence of this pond was seen at the time of survey. By 2002, the east end of the property appears covered in long grasses, similar to what is seen today, encircled by dirt tracks. The power lines that cross the property first appear in the 2009 air photo.

The northwest corner of the parcel was not tested. This was due to the unexpected presence of a heavily fenced-in (electric) pasturage within which were five skittish horses. There was concern both for the safety of the field crew and of the horses and so a decision was made to skip this segment of the parcel altogether. .

A total of 5 shovel tests were excavated in this parcel (Figure 5d). All shovel tests yielded negative results and there was no evidence of any historic structures within the project corridor.

Parcel R231652

This parcel was the longest single segment of property requiring survey and for which we had ROE. It stretches from the westernmost border of Galveston County northeast to near Dickinson Bayou. A channel of Dickinson Bayou crosses the ROW near its northeast boundary, and a drainage ditch marks the south-westernmost edge, near the county line. At the time of survey, the land was being used as a large pasture.

The land appears to have been cultivated at least since 1965 (the first year aerial photographs were readily available) to the late 1990s, after which it was used for grazing. In the 1965 photo, the drainage ditch on the south-western margin is already present. Evidence of dirt trails crisscrossing the property can be seen, similar to today. Dickinson Bayou follows the same route as the present. It may have been channelized at one point in the past, possibly in the late 1980s-early 1990s, as the banks appear to have been built up and a change can be seen in air photographs from 1987 and 1990.
No evidence of pimple mounds or higher elevation were noted during the survey. The banks of the drainages had been built up artificially and compacted from vehicles driving along the edges.

There was on wooded area outside the immediate study area, but between it and Dickinson Bayou. This wooded area is a relatively recent addition as it only appears in aerials around 1987. Prior to that the area was clear open pasture.

A total of 115 shovel tests were excavated in this parcel (Figure 5d). All shovel tests yielded negative results and there was no evidence of any historic structures within the project corridor.

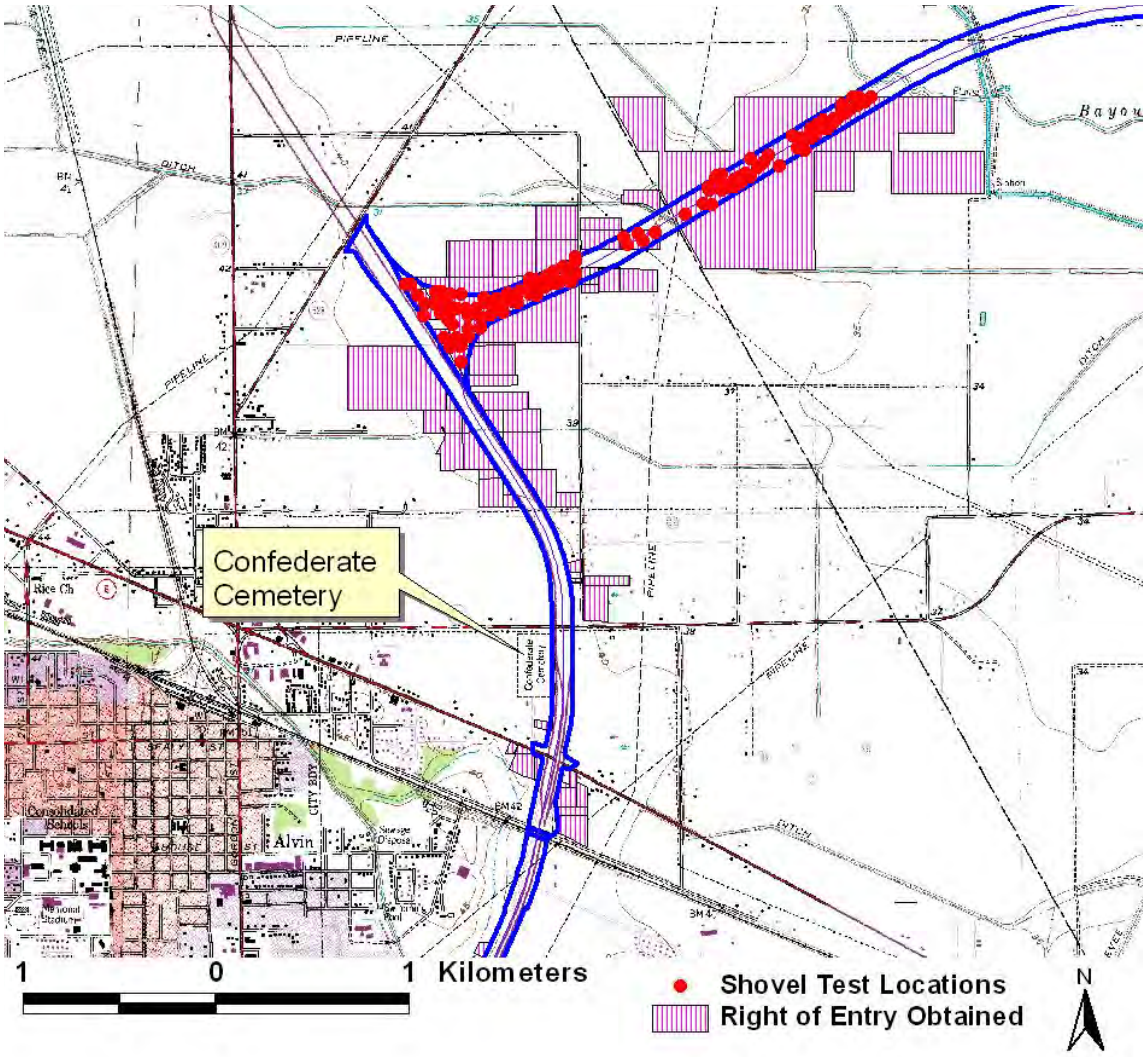

Figure 5d: Shovel tests in the project corridor and locale of the Confederate Cemetery in Alvin.

Parcel R231340

This plot of land is currently an open field, used for grazing. It is bounded to the north by a drainage ditch (constructed in the early 1990s) which was dry in places during the time of survey. The northeastern boundary of the property was marked by a fence line and another dry (at the time) ditch. Examination of aerial photographs show is was an open field at least as early as 1969. The air photo from 1987 shows a few changes, and it is possible it was used more intensively for grazing. By 1990, the parcel was cultivated, and was subdivided into two fields by 1995, both of which were cultivated. By 2002, the property had reverted back to one large field, and has been used for grazing since 2004.

A total of 34 shovel tests were excavated; all proved negative (Figure 5e). There was no evidence of any historic structures within the project corridor.

Parcel R161996

This small plot of land was heavily forested with Chinese tallow at the time of survey. The overgrown remains of a shell road running roughly north-south through the property near the north-western boundary were noted at the time of survey. Examination of aerial photographs indicated the shell road first appears in 1969 (the first year photographs were available). In addition, some disturbance can be seen in the 1969 image in the southern portion of the property, north of existing houses that can be seen today, though still outside the project corridor. It is possible that at one point the property boundaries of the existing houses extended further north.

A total of 9 shovel tests were excavated in this parcel; all proved negative and there was no evidence of any historic structures within the project corridor (Figure 5e). Several slabs of limestone and electrical cables were also noted on the ground surface at the time of survey, but these appear to have been debris rather than remnants of any structure.

Parcel R515293

This property is currently a flat, open field immediately east of Calder Dr. in League City. The land plot was under cultivation in 1969, the first year that aerial photographs are available for the parcel in Google Earth. Starting around 1987, the tract was used for grazing. This appears to have continued until very recently. At the time of survey, tall grasses and small bushes were noted covering the ground surface.

A total of 12 shovel tests were dug; all were negative (Figure 5e). There was no evidence of any historic structures within the project corridor.

Parcel R520561

This segment of ROW was the easternmost tract available for and needing survey within the project corridor. It is bounded to the northeast by SH 646, near I-45. The plot of land is between two housing subdivisions, with a small drainage on the northern side running west-east. At the time of survey, the two small plots of land immediately north of the proposed ROW were being bulldozed and excavated prior to the construction of a retention pond.

The property is bisected by a small man-made drainage that runs north-south. The west side of the plot of land is heavily forested with a mix of Chinese tallow, willow, and thick underbrush. It has previously been disturbed by the construction of several pipelines. The east side of the property is currently open, and vegetated with long grasses.

All aerial photographs available for this plot of land were examined. The 1969 photo showed the west side of the man-made drainage to be forested, similar to today. The eastern side appears to have been cultivated. All drainages present today are seen in the 1969 photo, the first that was available. SH646 first appears in the 1987 photo and no housing developments appear in the area until 2005.

A total of 39 shovel tests were dug; no evidence of prehistoric or historic cultural resources were found (Figure 5e).

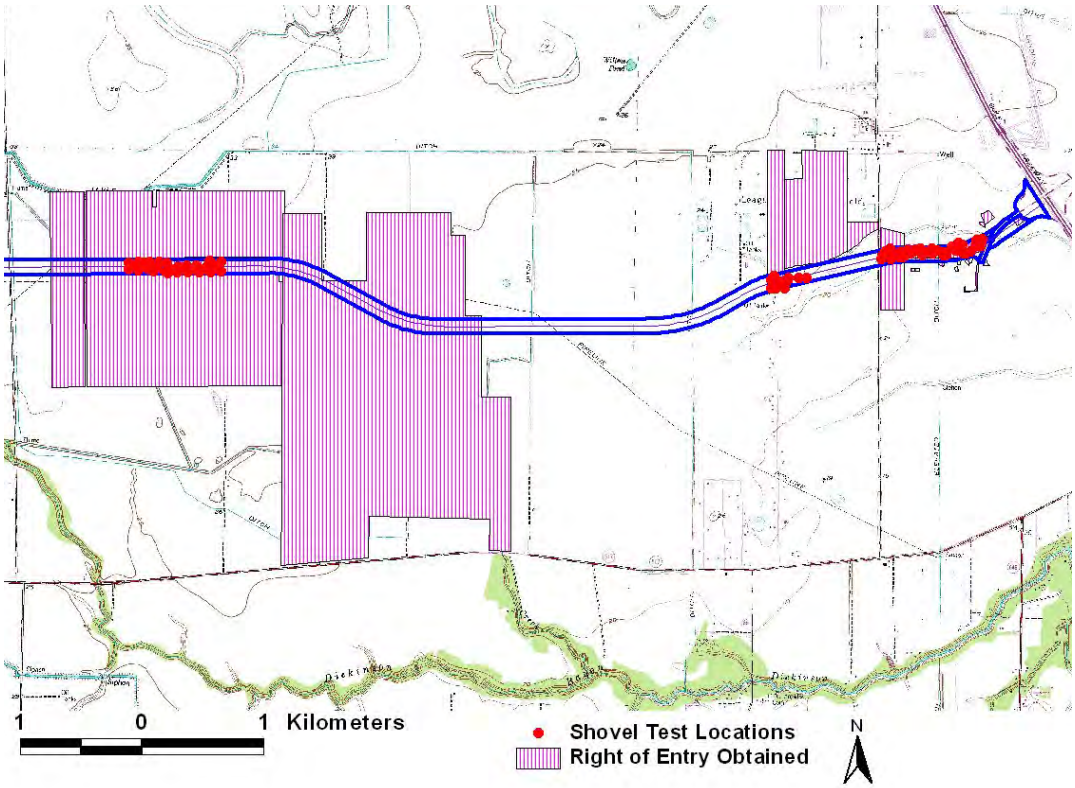

Figure 5e: Shovel tests in the project corridor

Summary

In total, 607 shovel tests were excavated along the entirety of the route. As previously mentioned, the intensive pedestrian survey was limited to those areas for which we had ROE and for which TxDOT's PALM model recommended survey. There were a few exceptions where the authors did not agree with the PALM model regarding designations; these having been discussed with the TxDOT ENV archeologist responsible for this project prior to the onset of the investigation (personal communication with Allen Bettis of TxDOT and Mark Denton of THC, December 4, 2013). These areas, when ROE was available, were also examined. With the exception of two isolated objects, one a lithic flake, the other a potsherd, there were no cultural resources or sites found.

Deep reconnaissance, in the form of backhoe trenching, had originally been proposed to be part of this project. This work would have been limited to the area adjacent to Chocolate Bayou where the PALM model recommended such work. However, ROE was not available for all but one of the properties associated with this part of the investigation and it was determined appropriate to separate the deep reconnaissance portion of the survey from intensive pedestrian element of the project.

RECOMMENDATIONS

It is the recommendation of Moore Archeological Consulting, Inc. that no further archeological investigation is necessary prior to the beginning of construction within those portions of the Project Corridor for which we were able to survey. This is based on the results of the intensive shovel testing discussed in this report, which revealed that there were no cultural resources within those parcels of the corridor,. It is felt that sufficient excavations occurred across that portion of the Project Area to suggest the absence of intact cultural resources other than those previously mentioned.

However, we recommend that an archeological investigation still needs to occur in those portion of the Project Area which we were not able to examine as part of this survey. Furthermore, we recommend that once ROE has been obtained for backhoe work, or once the state has taken ownership of the entirety of the corridor, that backhoe work needs to be conducted within the areas the PALM model recommended for deep reconnaissance. These areas retain moderate potential for prehistoric or historic cultural resources and have not yet been examined.

Should archeological deposits or features be encountered during construction, it is advised that construction cease in the immediate area of the finds and the Archeology Division of the Texas Historical Commission should be contacted for consultation.

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APPENDIX A: Photographs

Photograph 1: Typical overgrown field in project corridor.

Photograph 2: Existing ROW along Clifford Road.

Photograph 3: Example of a business driveway/parking lot on the ROW addition.

Photograph 4: Crew member excavating shovel test.

Photograph 5: Shovel testing in recently clear fields.

Photograph 6: Excavating in active pasture with horses.

Photograph 7: State Historic Marker at Chocolate Bayou.


Photograph 8: The ROW along the edge of the Confederate Cemetery in Alvin.

Photograph 9: The proposed project corridor passing through actively cultivated fields.

Photograph 10: View N towards Chocolate Bayou in project corridor

Photograph 11: View of wooded area near Chocolate Bayou.

Photograph 12: An example of ongoing disturbances within the project corridor.

Appendix B: Shovel Test Log

ST No.	Depth	Description
1	0 - 70 cm	Lake Charles clay (10yr 2/1)
2	0 - 20 cm	Lake Charles clay (10yr 2/1)
3	0 - 20 cm	Lake Charles clay (10yr 2/1)
4	0 - 20 cm	Lake Charles clay (10yr 2/1)
5	0 - 20 cm	Lake Charles clay (10yr 2/1)
6	0 - 20 cm	Lake Charles clay (10yr 2/1)
7	0 - 20 cm	Lake Charles clay (10yr 2/1)
8	0 - 20 cm	Lake Charles clay (10yr 2/1)
9	0 - 60 cm	Mottled w/ Lake Charles @42cm
10	0 - 40 cm	Mottled w/ Lake Charles clay @40cm
11	0 - 2 cm	sod layer, mottled clays
	2-26 cm	Lake Charles clay (10yr 2/1)
12	0 - 2 cm	sod layer, mottled clays
	2-25 cm	Lake Charles clay (10yr 2/1)
13	0 - 2 cm	sod layer, mottled clays
	2-30 cm	Lake Charles clay (10yr 2/1)
14	0 - 30 cm	Lake Charles clay (10yr 2/1)
15	0-30 cm	Lake Charles clay (10yr 2/1)
16	0 -2 cm	sod layer, mottled clays
	2-45 cm	Lake Charles clay (10yr 2/1)
17	0 - 32 cm	org. material
	32-40 cm	Lake Charles clay (10yr 2/1)
18	0 - 32 cm	Lake Charles @ surface
19	0 - 50 cm	Went to 50 cm, never encountered Lake Charles
20	0 - 40 cm	Lake Charles @ surface; 1 conglomerate ball (rust & dirt) @ 10 cm
21	0 - 40 cm	Lake Charles clay
22	0 - 70 cm	Mottled w/ Lake Charles @35cm (10yr 2/1)
23	0 - 10 cm	org. root
	10-50 cm	bioturbation
	50-80 cm	Lake Charles clay (10yr 2/1)
24	0 - 3 cm	org. material
	3-50 cm	Lake Charles clay (10yr 2/1)
25	0 - 3 cm	org. material
	3-60 cm	Lake Charles clay (10yr 2/1)
26	0 - 3 cm	org. material
	3-50 cm	Lake Charles clay (10yr 2/1)
27	0 - 3 cm	org. material
	3-50 cm	Lake Charles clay (10yr 2/1)
28	0 - 3 cm	org. material
	3-30 cm	Lake Charles clay (10yr 2/1) found beer bottle glass @20 cmbs
29	0 - 3 cm	org. material

	3-30 cm	Lake Charles clay (10yr 2/1)
30	0 - 5 cm	org. material
	5-30 cm	Lake Charles clay (10yr 2/1)
31	0 - 5cm	org. material
	5-30 cm	Lake Charles clay (10yr 2/1)
32	0 - 5 cm	org. material
	5-30 cm	Lake Charles clay (10yr 2/1)
33	0 - 5 cm	org. material
	5-20 cm	backfill (highly mottled 10yr 6/6)
	20-60 cm	Lake Charles clay (10yr 2/1)
34	0 - 5 cm	org. material
	5-30 cm	Lake Charles clay (10yr 2/1)
35	0 - 5 cm	org. material
	5-35 cm	Lake Charles clay (10yr 2/1)
36	0 - 5 cm	org. material
	5-30 cm	Lake Charles clay (10yr 2/1)
37	0 - 5 cm	org. material
	5-30 cm	Lake Charles clay (10yr 2/1)
38	0 - 5 cm	org. material
	5-30 cm	Lake Charles clay (10yr 2/1)
39	0 - 60 cm	Mottled w/ Lake Charles @40cm (10yr 2/1)
40	0 - 35 cm	0-30: strong brown mottled clay (7.5yr 5/8)
	35-40 cm	lens of mottled 10yr 2/1
	40-50 cm	Lake Charles clay (10yr 2/1)
41	0 - 50cm	Mottled strong brown clay (7.5yr 5/8)
	50-60 cm	Lake Charles clay (10yr 2/1)
42	0 - 65 cm	Lake Charles clay (10yr 2/1)
43	0 - 50 cm	Lake Charles clay (10yr 2/1)
44	0 - 60 cm	Lake Charles clay (10yr 2/1)
45	0 - 40 cm	mottled strong brown clay (7.5yr 5/8)
	40-50 cm	Lake Charles clay (10yr 2/1)
46	0 - 50 cm	Lake Charles clay (10yr 2/1)
47	0 - 40 cm	Lake Charles clay (10yr 2/1)
48	0 - 30 cm	Lake Charles clay (10yr 2/1)
49	0 - 40 cm	Lake Charles clay (10yr 2/1)
50	0 - 30 cm	Lake Charles clay (10yr 2/1)
51	0 - 20 cm	Lake Charles clay (10yr 2/1)
52	0 - 30 cm	Lake Charles clay (10yr 2/1)
53	0 - 30 cm	Lake Charles clay (10yr 2/1)
54	0 - 30 cm	Lake Charles clay (10yr 2/1)
55	0 - 20 cm	Lake Charles clay (10yr 2/1)
56	0 - 20 cm	Lake Charles clay (10yr 2/1)
57	0 cm	Lake Charles clay (10yr 2/1)

58	0 - 20 cm	Lake Charles clay (10yr 2/1)
59	0 - 20 cm	Lake Charles clay (10yr 2/1)
60	0 - 20 cm	Lake Charles clay (10yr 2/1)
61	0 - 20 cm	Lake Charles clay (10yr 2/1)
62	0 - 20 cm	Lake Charles clay (10yr 2/1)
63	0 - 20 cm	Lake Charles clay (10yr 2/1)
64	0 - 20 cm	Lake Charles clay (10yr 2/1)
65	0 - 20 cm	Lake Charles clay (10yr 2/1)
66	0 - 20 cm	Lake Charles clay (10yr 2/1)
67	0 - 20 cm	Lake Charles clay (10yr 2/1)
68	0 - 50 cm	Lake Charles with Tan Colored clay mixed In
69	0 - 40 cm	Light brown sandy loam; Organic material intermixed; encountered spotty Lake Charles @ 20cm
	40 cm	Lake Charles clay (10yr 2/1)
70	0 - 40 cm	Lake Charles clay
71	0 - 50 cm	Lake Charles clay
72	0 - 30 cm	Lake Charles clay
73	0 - 30 cm	Lake Charles clay; ground getting very dry & difficult to dig.
74	0 - 30 cm	Lake Charles; Ground very hard & difficult to dig.
75	0 - 15 cm	Lake Charles; Light black/brown soil; rock hard
76	0 - 40 cm	Lake Charles
77	0 - 40 cm	Lake Charles; numerous grain size pieces of rusty colored material, iron nodules? Fragment when finger pressure applied!
78	0 - 40 cm	Lake Charles clay (10yr 2/1)
79	0 - 40 cm	Lake Charles clay (10yr 2/1)
80	0 -5 cm	org. material
	5-30 cm	Lake Charles clay (10yr 2/1)
81	0 -25 cm	Lake Charles clay (10yr 2/1)
82	0 - 30 cm	Lake Charles clay (10yr 2/1)
83	0 -30 cm	Lake Charles clay (10yr 2/1)
84	0 -30 cm	Lake Charles clay (10yr 2/1)
85	0 - 40 cm	Lake Charles clay (10yr 2/1)
86	0 - 30 cm	Lake Charles clay (10yr 2/1)
87	0 - 40 cm	Lake Charles clay (10yr 2/1)
88	0 - 40 cm	Lake Charles clay (10yr 2/1)
89	0 - 30 cm	Lake Charles clay (10yr 2/1)
90	0 - 30 cm	Lake Charles clay (10yr 2/1)
91	0 - 30 cm	Lake Charles clay (10yr 2/1)
92	0 - 30 cm	Lake Charles clay (10yr 2/1)

93	0 - 30 cm	Lake Charles clay (10yr 2/1)
94	0 - 30 cm	Lake Charles clay (10yr 2/1)
95	0 - 30 cm	Lake Charles clay (10yr 2/1)
96	0 - 40 cm	Lake Charles clay (10yr 2/1)
97	0 - 1 cm	Grass/Sod layer
	1-20 cm	Lake Charles clay (10yr 2/1)
98	0 - 2 cm	Grass/Sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
99	0 - 2 cm	0-2: Sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
100	0 - 2 cm	Grass/Sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
101	0 - 2 cm	Grass/Sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
102	0 - 2 cm	Grass/Sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
103	0 - 2 cm	Grass/Sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
104	0 - 2 cm	Grass/Sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
105	0 - 2 cm	Grass/Sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
106	0 - 2 cm	Grass/Sod layer
	2-16 cm	Fill (rocks)
	16-36 cm	Lake Charles clay (10yr 2/1)
107	0 - 2 cm	Grass/Sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
108	0 - 2 cm	Grass/Sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
109	0 - 2 cm	Grass/Sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
110	0 - 70 cm	Unable to take to 80cm due to inability to remove soil from bottom of ST
111	0 - 20 cm	Lake Charles clay (10yr 2/1); some few rounded pebbles
112	0 - 20 cm	Lake Charles clay (10yr 2/1)
113	0 - 20 cm	Lake Charles clay (10yr 2/1); significant gravel/ fill stone from road
114	0 - 20 cm	Lake Charles clay (10yr 2/1)
115	0 - 20 cm	Lake Charles clay (10yr 2/1)
116	0 - 20 cm	Lake Charles clay (10yr 2/1)/ wood debris covering ground
117	0 - 20 cm	Lake Charles clay (10yr 2/1); no wood
118	0 -20 cm	Lake Charles clay (10yr 2/1)
119	0 -20 cm	Lake Charles clay (10yr 2/1)
120	0-30 cm	Lake Charles clay (10yr 2/1)

121	0-30 cm	Lake Charles clay (10yr 2/1)
122	0-30 cm	Lake Charles clay (10yr 2/1)
123	0-30 cm	Lake Charles clay (10yr 2/1)
124	0 - 30 cm	Lake Charles clay (5yr 3/1)
125	0 - 30 cm	Lake Charles clay (10yr 2/1)
126	0 - 16 cm	Lake Charles clay (10yr 2/1)
127	0 - 16cm	Lake Charles clay (5yr 3/1)
	16-30 cm	tan colored clay (10yr 5/4)
128	0 - 18 cm	Lake Charles clay
129	0 - 20 cm	Lake Charles clay down to 18 cm (5yr 3/1) then tan colored clay(10yr 5/4)
130	0 - 20 cm	Lake Charles clay (10yr 2/1)
131	0 - 30 cm	Lake Charles clay (10yr 2/1)
132	0 - 30 cm	Lake Charles clay (10yr 2/1)
133	0 - 2 cm	org. matt.
	2-25 cm	Lake Charles clay (10yr 2/1)
134	0 - 30 cm	Lake Charles clay (10yr 2/1)
135	0 - 40 cm	Lake Charles clay (10yr 2/1); possible mound
136	0 - 30 cm	Lake Charles clay (10yr 2/1)
137	0 - 30 cm	Lake Charles clay (10yr 2/1)
138	0 - 20 cm	Backfill
	20-50 cm	Lake Charles clay (10yr 2/1)
139	0 - 40 cm	Lake Charles clay (10yr 2/1)
140	0 - 30 cm	Lake Charles clay (10yr 2/1)
141	0 - 40 cm	Lake Charles clay (10yr 2/1)
142	0 - 40 cm	Lake Charles clay (10yr 4/1), very wet
143	0 - 40 cm	Lake Charles clay (10yr 2/1)
144	0 - 40 cm	Lake Charles clay (10yr 2/1)
145	0 - 40 cm	Lake Charles clay (10yr 2/1)
146	0 - 40 cm	Lake Charles clay (10yr 2/1)
147	0 - 40 cm	Lake Charles clay (10yr 2/1)
148	0 - 40 cm	Lake Charles clay (10yr 2/1)
149	0 - 40 cm	Lake Charles clay (10yr 2/1)
150	0 - 20 cm	Lake Charles clay(10 yr 4/1)
151	0 - 20 cm	Lake Charles clay(10 yr 4/1)
152	0 - 20 cm	Lake Charles clay(10 yr 4/1)
153	0 - 20 cm	Lake Charles clay(10 yr 4/1)
154	0 - 20 cm	Lake Charles clay; Color change: 5yr 5/4 mottled in 10yr 5/1
155	0 - 20 cm	Lake Charles clay (10yr 5/1)
156	0 - 20 cm	Lake Charles clay(10 yr 4/1)
157	0 - 20 cm	Lake Charles clay(10 yr 4/1); mottled w/ red; consistency is softer
158	0 - 20 cm	Lake Charles clay(10 yr 4/1); mottled w/ red; trend in consistency

159	0 - 2 cm	Org. mat
	2-20 cm	Lake Charles clay(10 yr 4/1)
160	0 - 20 cm	Lake Charles clay(10 yr 4/1)
161	0 - 20 cm	Lake Charles clay(10 yr 4/1)
162	0 - 20 cm	Lake Charles clay(10 yr 4/1)
163	0-2 cm	org. matt.
	2-22 cm	Lake Charles clay(10 yr 4/1)
164	0-2 cm	org. matt.
	2-22 cm	Lake Charles clay(10 yr 4/1)
165	0-2 cm	org. matt.
	2-22 cm	Lake Charles clay(10 yr 4/1)
166	0-2 cm	org. matt.
	2-30 cm	Lake Charles clay(10 yr 4/1)
167	0 - 20 cm	Lake Charles clay (10yr 2/1)
168	0 - 20 cm	Lake Charles clay (10yr 2/1)
169	0 - 5 cm	Gravel
170	0 - 25 cm	Lake Charles clay(10 yr 4/2)
171	0 - 25 cm	Lake Charles clay(10 yr 4/2)
172	0 - 25 cm	Lake Charles clay(10 yr 4/2)
173	0 - 25 cm	Lake Charles clay(10 yr 4/2)
174	0 - 20 cm	Lake Charles clay(10 yr 4/2)
175	0 - 30 cm	Lake Charles clay(10 yr 4/2)
176	0- 25 cm	Lake Charles clay(10 yr 4/2)
177	0 - 30 cm	Lake Charles clay(10 yr 4/2)
178	0 - 6 cm	Lake Charles clay(10 yr 4/2)
	6-30 cm	Light tan clay
179	0 - 6 cm	Lake Charles clay(10 yr 4/2)
	6-30 cm	Light tan clay
180	0 - 6 cm	Lake Charles clay(10 yr 4/2)
	6-30 cm	Light tan clay
181	0 - 30 cm	Lake Charles clay(10 yr 5/1)
182	0 - 20 cm	Lake Charles clay(10 yr 5/1)
183	0 - 30 cm	Lake Charles clay(10 yr 5/1)
184	0 - 30 cm	Lake Charles clay(10 yr 5/1)
185	0 - 2 cm	organic mat.
	2-50 cm	Lake Charles clay(10 yr 5/1)
186	0 - 5 cm	organic mat.
	5-40 cm	Lake Charles clay(10 yr 4/1)
187	0 - 2 cm	organic mat.
	02- 40 cm	Lake Charles clay(10 yr 3/1)
188	0 - 40 cm	Lake Charles clay(10 yr 2/1)
189	0 - 30 cm	Lake Charles clay(10 yr 2/1)
	30-50 cm	Lake Charles clay(10 yr 4/1)

190	0 - 20 cm	Lake Charles clay(10 yr 2/1)
	20-50 cm	Lake Charles clay(10 yr 4/1)
191	0 - 50 cm	Lake Charles clay(10 yr 2/1)
192	0 - 40 cm	Lake Charles clay(10 yr 2/1)
193	0 - 75 cm	Lake Charles clay(10 yr 2/1)
194	0 - 75 cm	Lake Charles clay(10 yr 2/1)
195	0 - 40 cm	Lake Charles clay(10 yr 2/1)
196	0 - 60 cm	Lake Charles clay(10 yr 2/1)
197	0 - 50 cm	Lake Charles clay(10 yr 2/1)
198	0 - 2 cm	organic mat.
	2-25 cm	Lake Charles clay(10 yr 2/1)
	25-35	very sticky Lake Charles clay(10 yr 2/1)
199	0 - 2 cm	organic mat.
	2- 35 cm	Lake Charles clay(10 yr 2/1)
200	0 - 2 cm	organic mat.
	2- 35 cm	Lake Charles clay(10 yr 2/1)
201	0 - 2 cm	organic mat.
	2-28 cm	Lake Charles clay(10 yr 2/1)
202	0-2 cm	organic mat.
	2-28 cm	Lake Charles clay(10 yr 2/1)
203	0-2 cm	organic mat.
	2-28 cm	Lake Charles clay(10 yr 2/1)
204	0-20 cm	Lake Charles clay(10 yr 2/1)
205	0-55 cm	Sandy clay loam mixed with Lake Charles clay (2.5 y 7/8)
206	0-30 cm	Lake Charles clay(10 yr 4/1)
207	0-35 cm	Lake Charles clay(10 yr 5/1)
208	0-33 cm	Lake Charles clay(10 yr 2/1)
209	0-30 cm	Lake Charles clay(10 yr 2/1)
210	0-20 cm	Lake Charles clay(10 yr 2/1)
211	0-20 cm	Lake Charles clay(10 yr 2/1)
212	0-30 cm	Lake Charles clay(10 yr 2/1)
213	0-30 cm	Lake Charles clay(10 yr 2/1)
214	0 - 25 cm	Lake Charles clay(10 yr 2/1)
215	0 - 60 cm	Lake Charles clay(10 yr 4/1)
	60-70 cm	Lake Charles clay(10 yr 3/1)
216	0 - 70 cm	Lake Charles clay(10 yr 5/1) clay loam
	70-80 cm	Lake Charles clay(10 yr 4/1), very dense
217	0 - 30cm	Lake Charles clay(10 yr 4/1) clay loam
	30-50 cm	Lake Charles clay(10 yr 4/1), very hard
218	0 - 50 cm	Lake Charles clay(10 yr 2/1)
219	0 - 30 cm	Lake Charles clay(10 yr 2/1)
220	0 - 30 cm	Lake Charles clay(10 yr 2/1)
221	0 - 30 cm	Lake Charles clay(10 yr 2/1)
222	0 - 10 cm	Lake Charles clay(10 yr 5/1), dry
	10-80 cm	Lake Charles clay(10 yr 4/1), moist with CaCO2
223	0 - 40 cm	Lake Charles clay(10 yr 2/1)

224	0 - 2 cm	Org mat.
	2-100 cm	Lake Charles clay(10 yr 5/1)
225	0 - 40 cm	Lake Charles clay(10 yr 2/1)
226	0 - 30 cm	Lake Charles clay(10 yr 2/1), very hard and dry
227	0 - 40 cm	Lake Charles clay(10 yr 2/1)
228	0 - 30 cm	Lake Charles clay(10 yr 2/1)
229	0 - 40 cm	Lake Charles clay(10 yr 2/1), very hard and dry
230	0 - 40 cm	Lake Charles clay(10 yr 2/1)
231	0 - 40 cm	Lake Charles clay(10 yr 2/1)
232	0 - 50cm	Lake Charles clay(10 yr 2/1)
233	0 - 50 cm	Lake Charles clay(10 yr 2/1)
234	0 - 30 cm	Lake Charles clay(10 yr 2/1)
235	0 - 50 cm	Lake Charles clay(10 yr 2/1)
236	0 - 50 cm	Lake Charles clay(10 yr 2/1)
237	0 - 50 cm	Lake Charles clay(10 yr 2/1)
238	0 - 40 cm	Lake Charles clay(10 yr 2/1)
239	0 - 40 cm	Lake Charles clay(10 yr 2/1)
240	0 - 40 cm	Lake Charles clay(10 yr 2/1)
241	0 - 25 cm	Lake Charles clay(10 yr 2/1), very silty
242	0 - 15 cm	Lake Charles clay(10 yr 2/1), silty
	15-35 cm	Lake Charles clay(10 yr 3/1)
243	0 - 15 cm	Lake Charles clay(10 yr 2/1), silty
	15-35 cm	Lake Charles clay(10 yr 3/1)
244	0 - 25 cm	Lake Charles clay(10 yr 2/1), silty
245	0 - 30 cm	Lake Charles clay(10 yr 2/1)
246	0 - 20 cm	Lake Charles clay(10 yr 2/1)
247	0 - 10 cm	Lake Charles clay(10 yr 3/2)
248	0 - 30 cm	Lake Charles clay(10 yr 2/1)
249	0 - 15 cm	Lake Charles clay(10 yr 2/1)
250	0 - 30 cm	Lake Charles clay(10 yr 3/2)
251	0 - 50 cm	Lake Charles clay (10yr 6/1)
252	0-30 cm	Lake Charles clay (10yr 6/1)
253	0-20 cm	Light gray sandy loam (10yr6/1)
	20-45 cm	Yellow clay (10yr 4/2)
254	0-30 cm	Lake Charles clay (10yr 6/1)
255	0-30 cm	Lake Charles clay (10yr 6/1)
256	0-10 cm	Light gray sandy clay (10yr 6/1)
	10-30 cm	Yellow clay (10yr 4/2)
257	0-20 cm	Sandy clay (10yr5/1)
	20-30 cm	Yellow clay (10yr 4/3)
258	0-22 cm	Sandy clay (10yr5/1)
	22-30	Yellow clay (10yr 4/3)
259	0-5 cm	Sandy clay (10yr5/1)
	5-20 cm	Yellow clay (10yr 4/3)
260	0-20 cm	Light gray sandy clay (10yr 6/1)
	20-30 cm	Yellow clay (10yr 4/2)
261	0-4 cm	sod

	4-34 cm	Lake Charles clay (10yr 2/1)
262	0-4 cm	sod
	4-30 cm	Lake Charles clay (10yr 2/1)
263	0-5 cm	sod
	5-40 cm	Lake Charles clay (10yr 4/1)
264	0-30 cm	Backfill
265	0-30 cm	Lake Charles clay (10yr 2/1)
	30-35 cm	Lake Charles clay (10yr 4/6) Very hard clay, impossible to dig deeper
266	0-2 cm	sod layer
	2-50 cm	Lake Charles clay(10 yr 5/1)
267	0-2 cm	sod layer
	2-30 cm	Lake Charles clay(10 yr 6/1)
	30-38 cm	Sandy Lake Charles clay (10yr 2/1)
	38-44 cm	Lake Charles clay (10yr 2/1), very hard
268	0-2 cm	sod layer
	2-15 cm	Lake Charles clay(10 yr 6/1)
	15-50 cm	Lake Charles clay(10 yr 5/1)
269	0-10 cm	Lake Charles clay(10 yr 4/1)
	10-60 cm	Lake Charles clay(10 yr 4/3)
270	0-12 cm	Sandy Lake Charles clay (10yr 5/1)
	12-50 cm	Lake Charles clay(10 yr 4/1)
271	0-2 cm	sod layer
	2-25 cm	Lake Charles clay (10yr 2/1)
	25-35 cm	Lake Charles clay (10yr 4/1)
272	0-2 cm	sod
	2-14 cm	shell road
	14-50 cm	Lake Charles clay (10yr 4/2)
273	0-2 cm	sod
	2-12 cm	sandy clay
	12-40 cm	very hard clay, trash
274	0-2 cm	sod
	2-35 cm	Lake Charles clay (10yr 2/1)
275	0-2 cm	sod
	2-45 cm	Lake Charles clay (10yr 2/1)
276	0- 3 cm	sod layer
	3-20 cm	disturbed brown clay
	20-50	Lake Charles clay (10yr 2/1)
278	0-4 cm	sod layer
	4-40 cm	Lake Charles clay (10 yr 4/2)
279	0-2 cm	sod layer
	2-20 cm	Light brown sandy clay
	20-40 cm	Lake Charles clay (10 yr 4/2)
280	0-20 cm	plowzone/organic mat.

	20-30 cm	Lake Charles clay(10 yr 4/1)
281	0-20 cm	Lake Charles clay (10yr 2/1)
282	0-33 cm	plowzone/organic mat.
	33-55 cm	Lake Charles clay(10 yr 4/1)
283	0-20 cm	humic layer
	20-30 cm	Lake Charles clay (10yr 2/1)
284	0-20 cm	Lake Charles clay (10yr 2/1)
285	0-5 cm	plowzone/organic mat.
	5-35 cm	Lake Charles clay (10yr 2/1)
286	0-20 cm	Lake Charles clay (10yr 2/1)
287	0-25 cm	Lake Charles clay (10yr 2/1)
	25-45 cm	Lake Charles clay(10 yr 4/1), many calcium deposits
288	0-20 cm	Lake Charles clay(10 yr 4/1), many calcium deposits
289	0-10 cm	topsoil
	10-40 cm	Lake Charles clay(10 yr 4/1)
290	0-10 cm	topsoil
	10-40 cm	Lake Charles clay(10 yr 4/1)
291	0-10 cm	topsoil
	10-40 cm	Lake Charles clay(10 yr 4/1)
292	0-30 cm	Lake Charles clay (10yr 2/1)
293	0-30 cm	Lake Charles clay (10yr 2/1)
294	0-30 cm	Lake Charles clay (10yr 2/1)
295	0-30 cm	Lake Charles clay (10yr 2/1)
296	0-40 cm	Lake Charles clay (10yr 2/1)
297	0-30 cm	Lake Charles clay (10yr 2/1)
298	0-30 cm	Lake Charles clay (10yr 2/1)
299	0-30 cm	Lake Charles clay (10yr 2/1)
300	0-30 cm	Lake Charles clay (10yr 2/1)
301	0-30 cm	Lake Charles clay (10yr 2/1)
302	0-30 cm	Lake Charles clay (10yr 2/1)
303	0-30 cm	Lake Charles clay (10yr 4/1)
304	0-30 cm	Lake Charles clay (10yr 2/1)
305	0-30 cm	Lake Charles clay (10yr 2/1)
306	0-30 cm	Lake Charles clay (10yr 2/1)
307	0-30 cm	Lake Charles clay (10yr 2/1)
308	0-2 cm	organic mat.
	2-40 cm	Lake Charles clay (10yr 2/1)
309	0-2 cm	organic mat.
	2-45 cm	Lake Charles clay (10yr 2/1)
310	0-50 cm	sandy clay 10 yr 4/3
311	0-40 cm	Lake Charles clay (10yr 2/1)
312	0-30 cm	Lake Charles clay (10yr 2/1)
313	0-30 cm	Lake Charles clay (10yr 2/1)
314	0-30 cm	Lake Charles clay (10yr 2/1)
315	0-30 cm	Lake Charles clay (10yr 2/1)
316	0-30 cm	Lake Charles clay (10yr 2/1)
317	0-30 cm	Lake Charles clay (10yr 2/1)

318	0-30 cm	Lake Charles clay (10yr 2/1)
319	0-40 cm	Lake Charles clay (10yr 2/1)
320	0-25 cm	Lake Charles clay (10yr 2/1)
321	0-25 cm	Lake Charles clay (10yr 2/1)
322	0-30 cm	Lake Charles clay (10yr 2/1)
323	0-30 cm	Lake Charles clay (10yr 2/1)
324	0-30 cm	Lake Charles clay (10yr 2/1)
325	0-30 cm	Lake Charles clay (10yr 2/1)
326	0-20 cm	Lake Charles clay (10yr 4/2)
327	0-20 cm	Lake Charles clay (10yr 2/1)
328	0-20 cm	Lake Charles clay (10yr 2/1)
329	0-30 cm	Lake Charles clay (10yr 2/1)
330	0-30 cm	Lake Charles clay (10yr 2/1)
331	0-30 cm	Lake Charles clay (10yr 2/1)
332	0-30 cm	Lake Charles clay (10yr 2/1)
333	0-30 cm	Lake Charles clay (10yr 2/1)
334	0-30 cm	Lake Charles clay (10yr 2/1)
335	0-30 cm	Lake Charles clay (10yr 2/1)
336	0-2 cm	sod layer
	2-22 cm	Lake Charles clay (10yr 2/1)
337	0-2 cm	sod layer
	2-30 cm	Lake Charles clay (10yr 2/1)
338	0-2 cm	sod layer
	2-30 cm	Lake Charles clay (10yr 2/1)
339	0-2 cm	sod layer
	2-30 cm	Lake Charles clay (10yr 2/1)
340	0-2 cm	sod layer
	2-30 cm	Lake Charles clay (10yr 2/1)
341	0-50 cm	Lake Charles clay (10yr 2/1)
342	0-40 cm	Lake Charles clay (10yr 2/1)
343	0-30 cm	Lake Charles clay (10yr 2/1)
344	0-30 cm	Lake Charles clay (10yr 2/1)
	30-35 cm	Lake Charles clay with CaCO3 concretions
	35-42 cm	Yellow-brown clay
345	0-40 cm	Lake Charles clay (10yr 2/1)
346	0-40 cm	Lake Charles clay (10yr 2/1)
347	0-40 cm	Lake Charles clay (10yr 2/1)
348	0-40 cm	Lake Charles clay (10yr 2/1)
349	0-30 cm	Lake Charles clay (10yr 2/1)
350	0-25 cm	Lake Charles clay (10yr 2/1)
351	0-25 cm	Lake Charles clay (10yr 2/1)
352	0-25 cm	Lake Charles clay (10yr 2/1)
353	0-25 cm	Lake Charles clay (10yr 2/1)
		greenish-tan clay at 15 cmbs
354	0-25 cm	Lake Charles clay (10yr 2/1)
355	0-25 cm	Lake Charles clay (10yr 2/1)
		some CaCO3 concretions
356	0-25 cm	Lake Charles clay (10yr 2/1)
		greenish-tan clay at 15 cmbs

357	0-25 cm	Lake Charles clay (10yr 2/1) some CaCo3 concretions
358	0-25 cm	Lake Charles clay (10yr 2/1)
359	0-25 cm	Lake Charles clay (10yr 2/1)
360	0-25 cm	Lake Charles clay (10yr 2/1)
361	0-25 cm	Lake Charles clay (10yr 2/1)
362	0-25 cm	Lake Charles clay (10yr 2/1)
363	0-25 cm	Lake Charles clay (10yr 2/1)
364	0-25 cm	Lake Charles clay (10yr 2/1)
365	0-25 cm	Lake Charles clay (10yr 2/1)
366	0-25 cm	Lake Charles clay (10yr 2/1)
367	0-30 cm	Lake Charles clay (10yr 2/1)
368	0-30 cm	Lake Charles clay (10yr 2/1)
369	0-30 cm	Lake Charles clay (10yr 2/1)
370	0-30 cm	Lake Charles clay (10yr 2/1)
371	0-30 cm	Lake Charles clay (10yr 2/1)
372	0-30 cm	Lake Charles clay (10yr 2/1)
373	0-30 cm	Lake Charles clay (10yr 2/1), sticky
374	0-30 cm	Lake Charles clay (10yr 2/1), sticky
375	0-40 cm	Lake Charles clay (10yr 2/1), sticky
376	0-40 cm	Lake Charles clay (10yr 2/1), sticky
377	0-40 cm	Lake Charles clay (10yr 2/1), sticky
378	0-40 cm	Lake Charles clay (10yr 2/1), sticky
379	0-40 cm	Lake Charles clay (10yr 2/1), sticky
380	0-40 cm	Lake Charles clay (10yr 2/1), sticky
381	0-40 cm	Lake Charles clay (10yr 2/1), sticky
382	0-40 cm	Lake Charles clay (10yr 2/1), sticky
383	0-40 cm	Lake Charles clay (10yr 2/1), sticky
384	0-40 cm	Lake Charles clay (10yr 2/1), sticky
385	0-40 cm	Lake Charles clay (10yr 2/1), sticky
386	0-40 cm	Lake Charles clay (10yr 2/1), sticky
387	0-40 cm	Lake Charles clay (10yr 2/1), sticky
388	0-40 cm	Lake Charles clay (10yr 2/1), sticky
389	0-40 cm	Lake Charles clay (10yr 2/1), sticky
390	0-35 cm	Lake Charles clay (10yr 2/1)
391	0-34 cm	Lake Charles clay (10yr 2/1)
392	0-35 cm	Lake Charles clay (10yr 2/1)
393	0-25 cm	Lake Charles clay (10yr 2/1)
394	0-30 cm	Lake Charles clay (10yr 2/1)
395	0-30 cm	Lake Charles clay (10yr 2/1)
396	0-30 cm	Lake Charles clay (10yr 2/1)
397	0-30 cm	Lake Charles clay (10yr 2/1)

398	0-30 cm	Lake Charles clay (10yr 2/1)
399	0-30 cm	Lake Charles clay (10yr 2/1)
400	0-30 cm	Lake Charles clay (10yr 2/1)
401	0-30 cm	Lake Charles clay (10yr 2/1)
402	0-30 cm	Lake Charles clay (10yr 2/1)
403	0-30 cm	Lake Charles clay (10yr 2/1)
404	0-30 cm	Lake Charles clay (10yr 2/1)
405	0-30 cm	Lake Charles clay (10yr 2/1)
406	0-30 cm	Lake Charles clay (10yr 2/1)
407	0-30 cm	Lake Charles clay (10yr 2/1)
408	0-30 cm	Lake Charles clay (10yr 2/1)
409	0-30 cm	Lake Charles clay (10yr 2/1)
410	0-30 cm	Lake Charles clay (10yr 2/1)
411	0-30 cm	Lake Charles clay (10yr 2/1)
412	0-20 cm	Lake Charles clay (10yr 2/1)
413	0-0 cm	standing water, not dug
414	0-20 cm	Lake Charles clay (10yr 2/1)
415	0-30 cm	Lake Charles clay (10yr 2/1)
416	0-30 cm	Lake Charles clay (10yr 2/1)
417	0-30 cm	Lake Charles clay (10yr 2/1)
418	0-55 cm	10 yr 4/2 sandy clay loam
	55-60 cm	10 yr 5/2 sand lens
	60-80 cm	mottled 10 yr 5/4 clay
419	0-6 cm	organic mat.
	6-40 cm	Lake Charles clay (10yr 5/4)
420	0-30 cm	Lake Charles clay (10yr 5/4)
	30-40 cm	Lake Charles clay (10yr 4/3)
421	0-10 cm	organic mat.
	10-30 cm	Lake Charles clay (10yr 2/1)
422	0-10 cm	organic mat.
	10-30 cm	Lake Charles clay (10yr 2/1)
423	0-10 cm	organic mat.
	10-30 cm	Lake Charles clay (10yr 2/1)
424	0-10 cm	organic mat.
	10-30 cm	Lake Charles clay (10yr 2/1)
425	0-10 cm	organic mat.
	10-30 cm	Lake Charles clay (10yr 2/1)
426	0-30 cm	Lake Charles clay (10yr 2/1)
427	0-30 cm	Lake Charles clay (10yr 2/1)
428	0-10 cm	Lake Charles clay (10yr 2/1)
	10 cm +	too compact to penetrate
429	0-30 cm	Lake Charles clay (10yr 2/1)
430	0-30 cm	Lake Charles clay (10yr 2/1)
431	0-30 cm	Lake Charles clay (10yr 2/1)
432	0-30 cm	Lake Charles clay (10yr 2/1)
433	0-30 cm	Lake Charles clay (10yr 2/1), some $CaCO_3$ concretions
434	0-3 cm	Gravel
435	0-25 cm	Lake Charles clay (10yr 2/1)
436	0-25 cm	Lake Charles clay (10yr 2/1)

437	0-30 cm	Lake Charles clay (10yr 2/1)
438	0-30 cm	Lake Charles clay (10yr 2/1)
439	0-30 cm	Lake Charles clay (10yr 2/1)
440	0-20 cm	Lake Charles clay (10yr 2/1)
	20-30 cm	Lake Charles clay (greyish tan)
441	0-30 cm	Lake Charles clay (10yr 2/1)
442	0-40 cm	Lake Charles clay (10yr 2/1)
443	0-40 cm	Lake Charles clay (10yr 2/1)
444	0-40 cm	Lake Charles clay (10yr 2/1)
445	0-40 cm	Lake Charles clay (10yr 2/1)
446	0-50 cm	Lake Charles clay (10yr 2/1)
447	0-80 cm	Sandy clay (10yr 4/1)
	80-100 cm	Sandy clay (10 yr 6/2) (light brown gray)
448	0-50 cm	Lake Charles clay (10yr 2/1)
449	0-50 cm	Lake Charles clay (10yr 2/1)
450	0-20 cm	Lake Charles clay (10yr 2/1)
451	0-50 cm	Lake Charles clay (10yr 2/1)
452	0-20 cm	sandy clay
	20-50 cm	Lake Charles clay (10yr 2/1)
453	0-80 cm	Lake Charles clay (10yr 2/1)
454	0-30 cm	Lake Charles clay (10yr 2/1)
455	0-30 cm	Lake Charles clay (10yr 2/1)
456	0-30 cm	Lake Charles clay (10yr 2/1)
457	0-30 cm	Lake Charles clay (10yr 2/1)
458	0-30 cm	Lake Charles clay (10yr 2/1)
459	0-40 cm	Lake Charles clay (10yr 2/1)
460	0-40 cm	Lake Charles clay (10yr 2/1)
461	0-40 cm	Lake Charles clay (10yr 2/1)
462	0-40 cm	Lake Charles clay (10yr 2/1)
463	0-2 cm	possible aeolian sand?
	2-30 cm	Lake Charles clay (10yr 2/1)
464	0-40 cm	Lake Charles clay (10yr 2/1)
465	0-40 cm	Lake Charles clay (10yr 2/1)
466	0-40 cm	Lake Charles clay (10yr 2/1)
467	0-40 cm	Lake Charles clay (10yr 2/1)
468	0-40 cm	Lake Charles clay (10yr 2/1)
469	0-40 cm	Lake Charles clay (10yr 2/1)
470	0-30 cm	Lake Charles clay (10yr 2/1)
471	0-30 cm	Lake Charles clay (10yr 2/1)
472	0-30 cm	Lake Charles clay (10yr 2/1)
473	0-25cm	Lake Charles clay (10yr 2/1)
474	0-25cm	Lake Charles clay (10yr 2/1)
475	0-25cm	Lake Charles clay (10yr 2/1)
476	0-30cm	Lake Charles clay (10yr 2/1)
477	0-30cm	Lake Charles clay (10yr 2/1)
478	0-30cm	Lake Charles clay (10yr 2/1)

479	0-30cm	Lake Charles clay (10yr 2/1)
480	0-30cm	Lake Charles clay (10yr 2/1)
481	0-30cm	Lake Charles clay (10yr 2/1)
482	0-30cm	Lake Charles clay (10yr 2/1)
483	0-30cm	Lake Charles clay (10yr 2/1)
484	0-30cm	Lake Charles clay (10yr 2/1)
485	0-30cm	Lake Charles clay (10yr 2/1)
486	0-30cm	Lake Charles clay (10yr 2/1)
487	0-30cm	Lake Charles clay (10yr 2/1)
488	0-30cm	Lake Charles clay (10yr 2/1)
489	0-30cm	Lake Charles clay (10yr 2/1)
490	0-30cm	Lake Charles clay (10yr 2/1)
491	0-30 cm	Lake Charles clay (10yr 2/1)
492	0-30 cm	Lake Charles clay (10yr 2/1)
493	0-30 cm	Lake Charles clay (10yr 2/1)
494	0-30 cm	Lake Charles clay (10yr 2/1)
495	0-30 cm	Lake Charles clay (10yr 2/1)
496	0-30 cm	Lake Charles clay (10yr 2/1)
497	0-30 cm	Lake Charles clay (10yr 2/1)
498	0-30 cm	Lake Charles clay 10yr 2/1
499	0-30 cm	Lake Charles clay (10yr 3/1)
500	0-30 cm	Lake Charles clay (10yr 3/1)
501	0-30cm	Lake Charles clay (10yr 3/1)
502	0-30cm	Lake Charles clay (10yr 3/1)
503	0-20cm	Lake Charles clay (10yr 3/1)
504	0-20cm	Lake Charles clay (10yr 3/1)
505	0-20cm	Lake Charles clay (10yr 2/1)
506	0-20cm	Lake Charles clay (10yr 2/1)
	20-30 cm	Mottled clay
507	0-2 cm	sod
	2-20 cm	loamy Lake Charles clay (10yr 2/1)
	20-30 cm	Light gray clay
508	0-2 cm	sod
	2-10 cm	disturbance from roadway
	10-30 cm	Lake Charles clay (10 yr 2/1)
509	0-2 cm	sod
	2-30 cm	Lake Charles clay (10yr 2/1) with CaCo3 concretions
510	0-2 cm	sod
	2-30 cm	Lake Charles clay (10 yr 2/1)
511	0-2 cm	sod
	2-25 cm	Lake Charles clay (10 yr 2/1)
512	0-2 cm	sod
	2-26 cm	Lake Charles clay (10 yr 2/1)
513	0-2 cm	sod
	2-25 cm	Lake Charles clay (10 yr 2/1)

514	0-2 cm	sod
	2-25 cm	Lake Charles clay (10 yr 2/1)
515	0-2 cm	sod
	2-25 cm	Lake Charles clay (10 yr 2/1)
516	0-30 cm	Lake Charles clay (10 yr 2/1) (Sticky)
517	0-30 cm	Lake Charles clay (10 yr 2/1) (Sticky)
518	0-30 cm	Lake Charles clay (10 yr 2/1) (Sticky)
519	0-30 cm	Lake Charles clay (10 yr 2/1) (Sticky)
520	0-30 cm	Lake Charles clay (10 yr 2/1) (Sticky)
521	0-30 cm	Lake Charles clay (10 yr 2/1) (Sticky)
522	0-30 cm	Lake Charles clay (10 yr 2/1) (Sticky)
523	0-30 cm	Lake Charles clay (10 yr 2/1) (Sticky)
524	0-30 cm	Lake Charles clay (10 yr 2/1)
525	0-30 cm	Lake Charles clay (10 yr 2/1)
526	0-30 cm	Lake Charles clay (10 yr 2/1)
527	0-30 cm	Lake Charles clay (10 yr 2/1)
528	0-30 cm	Lake Charles clay (10 yr 2/1)
529	0-30 cm	Lake Charles clay (10 yr 2/1)
530	0-30 cm	Lake Charles clay (10 yr 2/1)
531	0-30 cm	Lake Charles clay (10 yr 2/1)
532	0-30 cm	sod
	30-50 cm	Lake Charles clay (10 yr 2/1)
533	0-2 cm	sod
	2-35 cm	Lake Charles clay (10 yr 2/1)
534	0-2 cm	10yr 2/1
	2-35 cm	
535	0-10 cm	sod
	10-40 cm	Lake Charles clay (10 yr 2/1)
536	0-2 cm	sod
	2-35 cm	Lake Charles clay (10 yr 2/1)
537	0-2 cm	sod
	2-35 cm	Lake Charles clay (10 yr 2/1)
538	0-2 cm	sod
	2-30 cm	Lake Charles clay (10 yr 2/1)
539	0-2 cm	sod
	2-32 cm	Lake Charles clay (10 yr 2/1), with gray mottling
540	0-4 cm	sod
	4-35 cm	Lake Charles clay (10 yr 2/1)
541	0-2 cm	sod
	2-30 cm	Lake Charles clay (10 yr 2/1)
542	0-2 cm	sod
	2-30 cm	Lake Charles clay (10 yr 2/1)

543	0-2 cm	sod
	2-30 cm	Lake Charles clay (10 yr 2/1)
544	0-2 cm	sod
	2-30 cm	Lake Charles clay (10 yr 2/1)
545	0-2 cm	Gray clay
	2-10 cm	sod
	10-50 cm	Lake Charles clay (10 yr 2/1)
546	0-2 cm	sod
	2-40 cm	Lake Charles clay (10 yr 2/1)
547	0-2 cm	sod
	2-40 cm	Lake Charles clay (10 yr 2/1)
548	0-2 cm	sod
	2-40 cm	Lake Charles clay (10 yr 2/1)
549	0-2 cm	sod
	2-40 cm	Lake Charles clay (10 yr 2/1)
550	0-4 cm	sod
	4-40 cm	Lake Charles clay (10 yr 2/1)
551	0-4 cm	sod
	4-40 cm	Lake Charles clay (10 yr 2/1)
552	0-2 cm	sod
	2-30 cm	Lake Charles clay (10 yr 2/1)
553	0-2 cm	sod
	2-30 cm	Lake Charles clay (10 yr 2/1)
554	0-3 cm	sod
	3-30 cm	Lake Charles clay (10 yr 2/1)
555	0-3 cm	sod
	3-30 cm	Lake Charles clay (10 yr 2/1)
556	0-3 cm	sod
	3-30 cm	Lake Charles clay (10 yr 2/1)
557	0-3 cm	sod
	3-30 cm	Lake Charles clay (10 yr 2/1)
558	0-2 cm	sod
	2-30 cm	Lake Charles clay (10 yr 2/1)
559	0-2 cm	sod
	2-30 cm	Lake Charles clay (10 yr 2/1)
560	0-2 cm	sod
	2-30 cm	Lake Charles clay (10 yr 2/1)
561	0-28 cm	Clay, moist, 10 YR 3/1
	28-30 cm	10 YR 3/1 with 10 YR 5/4 mottles, clay, moist
562	0-30 cm	10 YR 3/1 moist firm clay
563	0-5 cm	10 YR 3/1 moist, friable clay loam
	5-30 cm	10 YR 3/1 moist, firm clay
564	0-30 cm	10 YR 2/1 wet, clay
565	0-30 cm	10 YR 3/1 moist, firm clay
566	0-30 cm	10 YR 3/1 moist, firm clay
567	0-30 cm	10 YR 2/1 wet (inundated at 10 cmbs), clay
568	0-30 cm	0-30 cm10 YR 3/1 moist, firm clay
569	0-30 cm	10 YR 3/1 moist, firm clay, common mottles
570	0-15 cm	mottled fill, clay, firm
	15-30 cm	10 YR 3/1 moist, firm clay, common red redox.

571	0-8 cm	10 YR 1/2 moist, friable clay loam
	8-30 cm	10 YR2/1 moist, firm clay
572	0-10 cm	10 YR 2/1 moist, firm clay
	10-30 cm	10 YR 3/1 moist, firm clay
573	0-8 cm	clay loam, 10 YR 3/1 moist, friable
	8-15 cm	clay, 10 YR 3/1 moist, firm
	15-30 cm	light grayish brown with yellowish red mottle
574	0-30 cm	dark gray clay with reddish orange mottles
575	0-30 cm	dark gray clay with reddish orange mottles
576	0-30 cm	dark gray clay with reddish yellow mottles
577	0-30 cm	dark gray clay with orange mottles
578	0-30 cm	10 YR 3/2 very dark grayish brown with 10 YR
579	0-30 cm	10 YR 3/2 very dark grayish brown with 10 YR 4
580	0-30 cm	10 YR 3/2 very dark grayish brown with 10 YR 4
581	0-30 cm	10 YR 3/2 very dark grayish brown with 10 YR 4
582	0-30 cm	10 YR 3/2 very dark grayish brown with 10 YR 4
583	0-30 cm	10 YR 3/1 dark gray with 10 YR 3/3 Dark brown
584	0-30 cm	10 YR 3/1 dark gray with 10 YR 3/3 Dark brown
585	0-25 cm	fill from drainage, mixed clay
	25-40 cm	10 YR 3/1 dark gray with 10 YR 5/4 mottling.
586	0-30 cm	10 YR 3/1 very dark gray clay
587	0-30cm	10 YR 3/1 very dark gray clay
588	0-30cm	10 YR 3/2 very dark grayish brown, no mottling
589	0-2 cm	humic layer
	2-30 cm	Very dk. gray Lake Charles clay
590	0-2 cm	humic layer
	2-32 cm	Very dk. gray Lake Charles clay
591	0-2 cm	humic layer
	2-35 cm	Very dk. gray Lake Charles clay
592	0-2 cm	humic layer
	2-35 cm	Very dk. gray Lake Charles clay
593	0-2 cm	humic layer
	2-30 cm	Very dk. gray Lake Charles clay
594	0-2 cm	humic layer
	2-35 cm	Very dk. gray Lake Charles clay (liquid)
595	0-2 cm	humic layer
	2-32 cm	Very dk. gray Lake Charles clay
596	0-2 cm	humic layer
	2-35 cm	Very dk. gray Lake Charles clay
597	0-2 cm	humic layer
	2-35 cm	Very dk. gray Lake Charles clay
598	0-2 cm	humic layer
	2-30 cm	Very dk. gray Lake Charles clay
599	0-2 cm	humic layer
	2-30 cm	Very dk. gray Lake Charles clay, Some mottling
600	0-2 cm	humic layer
	2-35 cm	Very dk. gray Lake Charles clay, Some mottling
601	0-2 cm	humic layer
	2-30 cm	Very dk. gray Lake Charles clay
602	0-2 cm	humic layer

	2-30 cm	Very dk. gray Lake Charles clay
603	0-2 cm	humic layer
	2-30 cm	Very dk. gray Lake Charles clay
604	0-2 cm	humic layer
	2-30 cm	Very dk. gray Lake Charles clay
605	0-1 cm	leaf litter
	1-30	Very dk. gray Lake Charles clay, friable
606	0-30 cm	10 YR3/1 very dark gray. Clay dense, moist
607	0-30 cm	10 YR 3/1 mottled with 10 YR5/4 yellowish brown clay

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Appendix H

Responses to Comments from the 2012 Public Hearing

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Table 1. Commenter Index

Last Name	First Name	Representing	Written or Verbal	Commenter Number	Comment Category (See Table 2 for Responses)
Arnold-Wilson	DeAnn	Self	Email	50	A2, C6, D1, D4, D10, F2, G2, G14
Brannen	Matt	Self	Hearing Speaker	13	A1, A10, B16, G6, G7
Buehler	Larry	Self	Email	46	C1
Burhani	Jivanji	Self	Written	26	G6
Burhani	Yasser	Self	Written	37	G6
Catalani Liles Brannen	Gloria William Matthew	Highland Resources Legacy Trust Co. Brown & Gay Engr.	Letter	53	B19
Chernosky	Dan	Brazoria County	Hearing Speaker	5	D5
Clark	Charles	Self	Written	31	A6, G2, G5
Clark	K. M.	Self	Written	32	B6, C1
Cook	Susan	Self	Written	27	A3, A12, D9, G11
Dewitt	Billy	Self	Hearing Speaker	12	C8, G4, G5
Dillmann	Suzanne	Self	Verbal	18	D7
Driskill	Sue	Self	Hearing Speaker	10a	A2, A6, A9, C5, D4, G3
Driskill	Susan F.	Self	Written	10b	C9, D1, D2
Driskill	John	Self	Verbal	17a	A3, A12, B15, C1, C10, D1, D2, D5, D6, G2
Driskill	John C.	Self	Written	17b	A3, A12, C1, C10, D1, D2, G2
Gemmill	Peter	Self	Hearing Speaker	40	B18, C1
Gemmill	Dawn	Self	Hearing Speaker	41	A2, A3, C1, C6, C9, C11, D1, D2, D4, G2
Gilbert	Cynthia	Self	Verbal	19	B15, C1, G2
Howard	Shannon & Bobbie	Self	Written	35	B13, C1, C3, C9, D1, G12
Jones	Scott A.	Galveston Bay Foundation	Letter	51	B12, D15
Kahn	Billy	Self	Email	44	B11, G5
Kahn	Kathy	Self	Email	45	A2, A6, B7, G2, G5

DEIS Comments

SH 99: SH 288 to IH 45 South
(Grand Parkway Segment B)

GRAND PARKWAY SEGMENT B STUDY

Last Name	First Name	Representing	Written or Verbal	Commenter Number	Comment Category (See Table 2 for Responses)
LeBlanc	Jena	Self	Written	33	B7
Liston	Mr.	Self	Verbal	43	B4, B10
Mannchen	Brandt	Houston Sierra Club	Hearing Speaker	42a	A4, E1, E2, F1, F2
Mannchen	Brandt	Houston Sierra Club	Letter	42b	Comments addressed in the attached comment-response matrix (Table 3)
McKissick	Thomas	Self	Email	2	B1
Mills	Clarence	Self	Hearing Speaker	9a	C1
Mills	Joseph	Self	Hearing Speaker	14	A3, B7, C5, C9, D1
Mills	Rosemary	Self	Written	25	B4, B13, C1
Mills	Clarence G. & Rosemary	Self	Email	9b	B4, B13
Minnis	Brenda Adams	Self	Email	3	B2, C1, D4
Mondragon	Ramiro	Self	Hearing Speaker	11	A2, C1, C6, C7, D1, G2, G8
Moore	Anna	Self	Written	28	G6, G16
Moore	C. Kenneth & Martha D.	Self	Letter	48	B4, C1, C4
Morrison	Mary	Self	Verbal	15	A11, C12
Paulus	Sandi & Fred	Self	Written	36	B9
Perkins	Jamie	Self	Email	1	C1, C2, D1, D2, G8
Perry	Marci	Citizens' Transportation Coalition	Letter	52	A2, A6, A7, A8, D3, D9, E3, F3, F4, F5, G2, G10
Ping	Alan	Self	Email	47	A3, A5, A12, C5, C6, C10, D2, D4, D9, G2, G5
Rhoades	Russell	Self	Written	29	C13
Rhoades	Dori	Self	Written	30	C13
Rutan	Sharon	Self	Written	23a-b	A3, B5, C5, D9, D10, G2
Rutan	Charles	Self	Written	24	A6, G2, G10

Last Name	First Name	Representing	Written or Verbal	Commenter Number	Comment Category (See Table 2 for Responses)
Salinas	Salvador	Natural Resources Conservation Service	Letter	4	D11
Schneble	Dee Ann	Self	Written	34	A3, B8
Sebesta	Matt	Brazoria County	Hearing Speaker	6	G1
Spears	Sheryl	Self	Verbal	20	G2
Spencer	Stephen R.	U.S. Department of the Interior	Email	49	D12, D13, D14
Stuksa	Roger	Self	Verbal	16	B14
Sturman	E. W.	Self	Verbal	21	A2, A6, G2, G5
Tacquard	George	Self	Hearing Speaker	7	B3
Unidentified		Self	Hearing Speaker	39	B10
Unsigned		Self	Written	38	G13
Wood	Kenneth	Self	Hearing Speaker	8a	A2, B15, C1, G2
Wood	Kenneth J.	Self	Written	8b	C4
Wood	Deborah	Self	Written	22a-c	B15, B17, C1, D8, G9

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Table 2. Comments and Responses

Comment Category	Comment	Response
A	**Need for and Purpose of the Project**	
A1	Commenter states that the project will enhance safety as a hurricane evacuation route.	Comment acknowledged. As described in Section 1, Volume I of the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS), one purpose of Segment B is to provide an additional hurricane and emergency evacuation route to create safer and more efficient evacuation conditions for the greater Houston area during mass evacuations per Minute Order Number (No.) 82325.
A2	Commenter is unsure or does not think the project will be an effective hurricane evacuation route.	As discussed in Section 1.2.3 of the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS), a study was conducted to analyze the improvements in evacuation time from Brazoria and Galveston Counties with both the proposed SH 99 Segments B and C. The construction of the proposed State Highway (SH) 99 Segment C would benefit the proposed SH 99 Segment B because the existing hurricane evacuation routes currently lead traffic into already congested transportation facilities in Houston, whereas the proposed SH 99 Segments B and C would direct traffic to United States Highway (US) 59, or farther north to Interstate Highway (IH) 10 along SH 99 Segment D, which has already been constructed. The model shows time savings as a result of the proposed project.
A3	Commenter states that the project will not relieve traffic congestion.	Anticipated population growth in the project area will increase traffic volumes and strain the existing roadways/roads. Segment B will provide additional capacity and an additional travel option to reduce the number of vehicles on existing roadways. Traffic analysis shows that congestion on existing arterials will be reduced with the addition of Segment B by providing an alternate route to State Highway (SH) 288 and Interstate Highway (IH) 45. See Section 2 of the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS).
A4	Commenter states that the hurricane evacuation analysis is flawed because it is dependent on the construction of Segment C.	As established by Minute Order Number (No.) 82325 on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area. Furthermore, the Grand Parkway is included in the Houston Galveston Area Council's (H-GAC) 2035 Regional Transportation Plan (RTP) as an emergency evacuation route for major storms, hurricanes, or chemical spills. The circumferential route connects to numerous "spoke" facilities that are often congested during an evacuation. The Grand Parkway could alleviate a portion of the congestion during mass evacuations, thus creating safer and more efficient evacuation conditions for the Houston area. In addition, the Grand Parkway would improve safety on existing study area roadways as through-traffic is diverted to the proposed limited access roadway/road. Emergency vehicles will be traveling on less congested roadways once the Grand Parkway is constructed. Although some congestion may be present at interchange locations, the time savings from traveling a free-flow interstate-quality roadway/road instead of congested roadways with traffic signals is expected to be greater.

Comment Category	Comment	Response
A5	Commenter states that mass transit alternatives would be more beneficial than the project.	Section 2 in Volume I of the Final Environment Impact Statement (FEIS) includes an assessment of Transportation System Management (TSM) and Travel Demand Management (TDM) alternatives, including rail transit. These transit alternatives do not adequately address the need for and purpose of the project. Analyses for both the Build and No Build Alternatives include all roadway-widening and planned improvement projects in the 2035 Regional Transportation Plan (RTP) for the study area.
A6	Commenter states the need and purpose for the project are not justified.	The Need and Purpose sections (Sections 1.1.1 and 1.1.2 of the Draft Environmental Impact Statement [DEIS] and the Final Environmental Impact Statement [FEIS]) were prepared in accordance with Federal Highway Administration (FHWA) Technical Advisory T 6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents (FHWA 1987), FHWA's memorandum titled, Need and Purpose in Environmental Documents (FHWA 1990), FHWA and Federal Transit Administration (FTA) joint memorandum titled Integration of Planning and National Environmental Policy Act (NEPA) Processes (FHWA and FTA 2005), and Texas Department of Transportation (TxDOT) memorandum titled, Guidance on Need and Purpose (TxDOT 2001). FHWA indicates that the need for and purpose of a project may, and should, evolve during the project development process as information is gathered and more is learned (FHWA 1990). Studies conducted for the proposed State Highway (SH) 99 Segment B included substantial interaction with stakeholders, including the general public, local businesses and landowners, local officials and community leaders, regulatory agencies, FHWA, and TxDOT.
A7	Commenter states that the project is not viable as a toll road.	Consistent with the April 2003 Texas Transportation Commission Minute Order Number (No.)109226 that states, "The completion of the Grand Parkway is essential and urgent, as construction of the projects would alleviate congestion and improve traffic flow in the Houston metropolitan area and the surrounding region…" and "The commission has determined that constructing the Grand Parkway as a toll facility is the most efficient and expeditious means of ensuring its development, and encourages the development of partnerships and the employment of innovative methods for its financing and construction." Houston-Galveston Area Council's (H-GAC) 2035 Regional Transportation Plan (RTP) Update (Appendix A) identifies the addition of tolled facilities, including the Grand Parkway, as necessary to address current congestion and future growth in the Houston region.
A8	Commenter states that the project does not have independent logical termini.	Segment B connects at two major transportation corridors (Interstate Highway [IH] 45 South and State Highway [SH] 288) to ensure independent utility, as well as independent significance, as required by Federal Highway Administration (FHWA) regulations 23 Code of Federal Regulations (CFR) 771.11[f]. The United States (U.S.) Congress confirmed this segment-by-segment development approach to be in compliance with federal law in the "Department of Transportation and Related Agencies Appropriations Bill of 1993."

Comment Category	Comment	Response
A9	Commenter is concerned about traffic safety after the project is constructed and especially at intersecting roadways.	The current design of the Recommended/Preferred Alternative Alignment includes a main lane overpass over intersecting roadways, with intermittent frontage roads. Texas Department of Transportation (TxDOT) safety design standards for railing and other safety features will be used along the Grand Parkway main lanes at the overpass locations and at the intersecting frontage roads in order to minimize the possibility of accidents at the frontage roads.
A10	Commenter states that the project will enhance regional mobility.	Comment acknowledged.
A11	Commenter states that traffic in Alvin would likely improve with the project, if the project results in fewer trucks on State Highway (SH) 35.	Comment acknowledged.
A12	Commenter states the project will increase traffic.	Comment acknowledged.
B	**Alternatives**	
B1	Commenter states that a route north of the City of Alvin represents a better alternative because a more southerly route would occur in lower elevation areas, and impact more coastal habitats, wetlands, and agricultural lands. Additionally, the northern route could be a better option for a hurricane evacuation route and provide a more direct route for suburban communities in the area.	During the public involvement process and coordination with resource agencies, it was determined that the South-New Alternative is the most desirable alternative. The selection of the Recommended Alternative is discussed in Section 2.3.5 and Table 2-1 in the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS). The selection of the Preferred Alternative is discussed in Section 2.3.5 and 2.3.6 and Tables 2-1 and 2-2 in the FEIS. The number of impacts to natural resources is minimized due to a majority of the South-New Alternative following the existing alignment of State Highway (SH) 35, which is preferred by the resource agencies. The South-New Alternative also received the most support from the general public and elected officials. Therefore, the South-New Alternative is recommended as the preferred alternative.
B2	Commenter would prefer that the existing State Highway (SH) 288 and Farm-to-Market Road (FM) 1462 be considered since FM 1462 is being widened.	As described in Section 2 of the Draft Environmental Impact Statement (DEIS) and shown on Exhibit 2-10, using FM 1462 east of SH 288 to SH 35 (Southern 2 Alternative) was analyzed as part of this DEIS; however, as shown in the DEIS Table 2-1 the Southern 2 Alternative would result in 187 displacements, 123 more than the next lowest number of displacements. Table 4-5 provides a detailed comparison of displacements for each Alternative considered. This analysis is also included in Section 2 of the Final Environmental Impact Statement (FEIS).
B3	Commenter states that the recommended alternative (South-New Alternative) has the least negative impacts, especially for nearby property owners and should be the most cost effective alternative with the use of the expansion at the State Highway (SH) 35 bridge.	Comment acknowledged.

Comment Category	Comment	Response
B4	Commenter requests an alignment revision of the recommended alternative.	Comment acknowledged. Requests for revisions to the alignment of the Recommended/Preferred Alternative will be given full consideration during planning and schematic design activities associated with preparation of the Final Environmental Impact Statement (FEIS) and detailed design of the proposed project.
B5	Commenter states that State Highway (SH) 35 cannot be used with Alternatives 3, 4, 5, 6, and 7 because of the railroad overpass of SH 35 near the Wal-Mart.	Details of the Grand Parkway Segment B design at the overpass of State Highway (SH) 35 near the Wal-Mart will be analyzed as part of the Final Environmental Impact Statement (FEIS) phase. The Segment B Alignment along SH 35 near Wal-Mart may consist of elevated main lanes over the railroad. With this design, the existing SH 35 frontage roads may be depressed under the existing railroad.
B6	Commenter would like the project moved to areas of farmland where there are no people to displace.	Portions of the alternative alignments developed for Segment B go through areas of farmland and pastureland, and areas of residential and commercial development. Displacement of residences and businesses is one of several parameters used in the Segment B alternatives evaluation process. The intent of the alternatives evaluation process is to identify alternatives that minimize impacts to the human and natural environment.
B7	Commenter requests the selection of Alternative 1 (Northern 2) or Alternative 2 (Northern Alternative).	As discussed in Section 2.3.3 of the Draft Environmental Impact Statement (DEIS), the Northern and Northern 2 Alternatives were not selected based on input from the public and elected officials, and because these alternatives had the highest number of displacements. Additionally, the Northern 2 Alternative has the highest potential for wetland impacts as shown in Table 2-1 in the DEIS. This analysis is also included in Section 2 of the Final Environmental Impact Statement (FEIS).
B8	Commenter requests that the project be located away from the City of Alvin.	Four of the seven alternative alignments developed for Segment B, including the Recommended Alternative, incorporate the portion of State Highway (SH) 35 that goes through the City of Alvin. During the alternatives evaluation process, the three alternative alignments that do not go through the City of Alvin exhibited parameter characteristics that made them less favorable than the Recommended Alternative. Refer to Table ES-1 and Table 2-1 in the Draft Environmental Impact Statement (DEIS) for reference. This analysis is also included in Section 2 of the Final Environmental Impact Statement (FEIS).
B9	Commenter states that Alternative 4 (Southern 2 Alternative) is the most favorable route because it is the most direct route to State Highway (SH) 288, results in fewer impacts to businesses, and provides a better opportunity for economic development in Alvin.	As described in Section 2 of the Draft Environmental Impact Statement (DEIS) and as shown on Exhibit 2-10, using Farm-to-Market Road (FM) 1462 east of SH 288 to SH 35 (Southern 2 Alternative) was analyzed as part of the DEIS; however, as shown in DEIS Table 2-1, the Southern 2 Alternative would result in 187 displacements, 123 more than the next lowest number of displacements. Table 4-5 provides a detailed comparison of displacements for each Alternative considered. This analysis is also included in Section 2 of the Final Environmental Impact Statement (FEIS).
B10	Commenter is concerned that the project will contribute to additional traffic congestion at the interchange of Farm-to-Market Road (FM) 646 and Interstate Highway (IH) 45.	Details of the Grand Parkway Segment B design at the interchange of FM 646 and IH 45 will be analyzed as part of the Final Environmental Impact Statement (FEIS) phase. The Segment B Alignment at the interchange of FM 646 and IH 45 may consist of direct connectors to facilitate traffic connections between Segment B and IH 45. Reference Section 2 of the FEIS.

Comment Category	Comment	Response
B11	Commenter states that of the alternatives provided in the Draft Environmental Impact Statement (DEIS) the Recommended Alternative is the best choice.	Comment acknowledged.
B12	Commenter recommends re-evaluation of the relocations as documented in the Draft Environmental Impact Statement (DEIS) resulting from the Southern 2 Alternative (Alternative 4).	An analysis was conducted as part of the DEIS to identify relocations resulting from the Southern 2 Alternative (Alternative 4). It was determined that 187 potential relocations would result from the Southern 2 Alternative (Alternative 4). Verification of these relocations was conducted in June 2013. The findings of the DEIS remain valid. This analysis is also included in Section 2 of the Final Environmental Impact Statement (FEIS).
B13	Commenter is concerned that the project will restrict access to the commenter's property.	The current design of the Recommended/Preferred Alternative Alignment includes a main lane overpass over intersecting roadways, with intermittent frontage roads. Texas Department of Transportation (TxDOT) safety design standards for railing and other safety features will be used along the Grand Parkway main lanes at the overpass locations and at the intersecting frontage roads in order to minimize the possibility of accidents at the frontage roads. Access to and from any existing development (e.g., commercial, business, residential, farm, etc.) would be provided and/or maintained before, during, and after construction.
B14	Commenter states that traffic will likely travel along Farm-to-Market Road (FM) 1462 to Alvin rather than travel on the recommended alternative.	Comment acknowledged.
B15	Commenter would prefer the selection of another alternative.	Comment acknowledged. See Section 2 of the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS) for the Alternatives Analysis history. See Sections 3 and 4 of the DEIS for analysis of Alternative impacts.
B16	Commenter would like to submit an alignment revision between Farm-to-Market Road (FM) 1462 and State Highway (SH) 35 to be considered.	Comment acknowledged. (See Comment B-19.)
B17	Commenter is opposed to using State Highway (SH) 35 as part of the project.	Comment acknowledged.
B18	Commenter is concerned the Recommended Alternative results in greater right-of-way (ROW) needed, and more bridge construction than the other alternatives.	The acreage of ROW required, number of bridges needed and number of displacements are several parameters used to determine the Recommended/Preferred Alternative. The intent of the alternatives evaluation process is to identify alternatives that minimize impacts to the human and natural environment.

Comment Category	Comment	Response
B19	Commenter requests that a specific suggested alignment revision of the Recommended Alternative be included in the environmental analysis of the Final Environmental Impact Statement (FEIS). Commenter states that the proposed realignment would have positive economic benefits and would not cause additional environmental impacts.	Comment acknowledged. Detailed data specific to the suggested alignment revision would be needed for the alignment revision to be evaluated in the FEIS. Requests for revisions to the alignment of the Recommended/Preferred Alternative will be given full consideration during planning and schematic design activities.
C	**Socioeconomic Issues**	
C1	Commenter is concerned about the loss of private property and/or displacement (individual property and/or business property).	Every effort is made to avoid and/or minimize impacts to both the natural and human environments, and it is often a balancing act between the two. The Texas Department of Transportation (TxDOT) offers relocation counseling and financial assistance to residences and businesses that are displaced by the acquisition of highway right-of-way (ROW) in accordance with the Federal Uniform Relocation and Real Property Acquisition Policies Act of 1970 (Public Law [PL] 91-646). Once it has been determined that a structure must be acquired to construct the highway, the property owner and/or tenant is contacted by a relocation counselor who provides information on exactly what benefits the owner/tenant is eligible, and the counselor assists the owner/tenant in applying or those benefits. In general, the relocation counselor will provide listings of comparable housing, transportation to inspect the housing (especially for elderly and handicapped persons), and referrals to other agencies that provide assistance for relocated persons. The same general process will apply if it is determined that a commercial business structure must be acquired to construct the highway. In general terms, the residence or business will be appraised and a fair market value price will be offered. Improvements made to the property or business will also be taken into consideration during the acquisition process.
C2	Commenter questions that if the recommended alternative is selected, will State Highway (SH) 35 become a toll road, and will other public roadways along other routes become toll roads.	For the Recommended/Preferred Alternative, a portion of SH 99 Segment B will be built in the median of SH 35 Bypass or along the existing SH 35 roadway boundaries. The only portion that will be tolled will be the new roadway lanes. After Segment B construction is complete, the same number of roadway lanes that presently exist will be available to the public as a free roadway. Other existing roads within the right-of-way (ROW) of the Segment B route will become part of Segment B, but there will be free lanes adjacent to the tolled section of Segment B for use by the public.
C3	Commenter asks if State Highway (SH) 35 becomes a toll road, will there be an option to drive on a frontage road.	See response to Comment C2.
C4	Commenter is concerned about being compensated for the loss of property and the negative impact on the commenter's business operation.	See response to Comment C1.

Comment Category	Comment	Response
C5	Commenter is concerned about the degradation of quality of life.	Development of the Build alternatives would be expected to result in an approximately three percent increase in developed acreage within the study area compared to the No Build alternative. The predicted land use changes would be expected to occur in areas of existing population concentrations and would include the development of residential and commercial areas that are near or adjacent to the proposed State Highway (SH) 99 Segment B or in the vicinity of an intersection of the proposed Segment B and a major roadway. Visual and aesthetic qualities of the project area are discussed in Sections 3 and 4 in Volume I of the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS). A discussion of indirect and cumulative effects that could influence quality of life in the project area is presented in Sections 5 and 6 in Volume I of the DEIS and the FEIS.
C6	Commenter is concerned about increasing property taxes.	Impacts on local tax revenues may include temporary impacts during the construction phase of the project. In the longer term, land purchased for right-of-way (ROW) will be removed from local tax rolls, thus potentially decreasing property tax revenues. As land becomes more urbanized and land use conversions occur, there would likely be additional local revenues from sales taxes and various miscellaneous fees and taxes assessed by municipal government. Tax revenues are anticipated to increase over time with secondary and induced economic activity.
C7	Commenter is concerned about the interruption of electrical service.	Electrical service would be maintained throughout construction of the Recommended/Preferred Alternative. There is no planned or anticipated interruption of electrical service to existing customers to construct or operate Segment B.
C8	Commenter would like the project to incorporate facilities for pedestrians and cyclists.	The Recommended/Preferred Alternative does not include construction of facilities for pedestrians or cyclists. Any existing facilities within the proposed right-of-way (ROW) would be maintained. The proposed ROW width would be sufficient to accommodate pedestrian and/or cycling facilities that could be constructed by others.
C9	Commenter is concerned about light pollution.	As discussed in the Draft Environmental Impact Statement (DEIS), some areas would experience and increase in ambient light levels. In general, roadway lighting would be restricted to those areas where on and off ramps are located. When practicable, visual mitigation measures could include preserving naturally vegetated medians, minimizing right-of-way (ROW) clearing, design specifications to blend into the existing landscape, and promoting roadside native wildflower planting programs. All landscaping would be in accordance with Executive Order (EO) 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping, including the use of regionally native plants for landscaping, and implementing design and construction practices that minimize adverse effects on the natural habitat. To the extent possible, the proposed State Highway (SH) 99 Segment B would be designed to create an aesthetically and visually pleasing experience for the user and the adjacent residents and landowners. As indicated in Section 4.18.2 in the Final Environmental Impact Statement (FEIS), "Ambient light levels would also be monitored and considered in final design so as to not impose an undue burden for those living near the Preferred Alternative."

Comment Category	Comment	Response
C10	Commenter is concerned that the project will increase local crime.	The Recommended/Preferred Alternative would be aligned on both existing roadways and new location. Populated areas within the project area are currently accessible by existing roads. The presence of Segment B would not be expected to influence the rate of crime.
C11	Commenter states that the project will not be a scenic highway.	Comment acknowledged.
C12	Commenter likes the Recommended Alternative the best because it would result in the fewest displacements and impacts to homes.	Comment acknowledged.
C13	Commenter likes the Recommended Alternative the best of all alternatives.	Comment acknowledged.
D	**Natural and Physical Environmental Issues**	
D1	Commenter is concerned about impacts from noise pollution.	During the development and preparation of the Final Environmental Impact Statement (FEIS) for Segment B, a noise analysis per Texas Department of Transportation's (TxDOT's) Guidelines for Analysis and Abatement of Roadway Traffic Noise will be performed. Refer to Section 4.7 of the Final Environmental Impact Statement (FEIS). The analysis will predict future noise levels and identify possible noise impacts. The noise impacts will be evaluated to determine possible mitigation measures. Per TxDOT guidance, noise mitigation must be determined to be both feasible and reasonable before being proposed for incorporation into the project. The final decision to implement any proposed noise mitigation would be made at the completion of project design and the public involvement process.
D2	Commenter is concerned about impacts from air pollution.	During the development and preparation of the Draft Environmental Impact Statement (DEIS), an air analysis was performed in accordance with Texas Department of Transportation's (TxDOT's) Air Quality Guidelines to identify possible air impacts. As stated in the DEIS Section 4.6.4, pages 4-53 to 4-56, Segment B will not lead to pollutants of either Carbon Monoxide (CO) or Ozone (O_3). Additionally Mobile Source Air Toxics (MSATs) as a result of the proposed Segment B are not expected to increase overall MSATs in the Houston metropolitan area in future years. Refer to Section 4.6 of the Final Environmental Impact Statement (FEIS).
D3	Commenter states that the project would impact coastal habitats and wetlands.	Avoidance and minimization of known natural resources was conducted during the alternatives evaluation process. Comments from the Segment B Public Hearing will be taken into consideration for the analysis of the Preferred Alternative in the Final Environmental Impact Statement (FEIS). Field surveys for wetlands and other waters of the United States will be performed for the proposed right-of-way (ROW) of the Preferred Alternative. Refer to Section 4.9 of the Final Environmental Impact Statement (FEIS).

Comment Category	Comment	Response
D4	Commenter is concerned about the loss of agricultural land/production.	Acquisition of the right-of-way (ROW) for the Recommended/Preferred Alternative will permanently remove some farmland from production. See Section 5.5.2 of the Draft Environmental Impact Statement (DEIS) for indirect impacts to farmlands. Refer to Section 5.4.2 of the Final Environmental Impact Statement (FEIS).
D5	Commenter is concerned about the impact of the project on existing storm water drainage.	Drainage for the Preferred Alternative will be evaluated during the development and preparation of the Final Environmental Impact Statement (FEIS) for Segment B. Refer to Section 4.12 of the Final Environmental Impact Statement (FEIS). Final design of the Preferred Alternative will include final drainage and mitigation analyses, which will be reviewed by regulatory agencies to confirm that adequate measures have been taken to ensure that the project does not increase the risk of flooding to adjacent property. All structures will be designed according to Federal Highway Administration (FHWA) and Texas Department of Transportation (TxDOT) standards. In accordance with these standards, the roadway would be designed such that there is a net zero effect on existing drainage patterns and systems. Any impacts to existing storm water detention areas would need to be offset by compensatory mitigation somewhere else, possibly within the limits of the proposed right-of-way (ROW). Mitigation of impacts includes best management practices (BMPs) during construction and detention facilities to offset increased flows. Existing canals will be accommodated and incorporated into the design of the Preferred Alternative.
D6	Commenter is concerned that the project will have a negative ecological impact on drainage systems (creeks, bayous).	See response to Comment D5. Additionally, see the discussion of wetlands and other waters of the United States in Sections 3 and 4 in Volume I of the Draft Environmental Impact Statement (DEIS), and indirect and cumulative effects discussions in Sections 5 and 6, Volume I of the DEIS. Field surveys will be conducted for wetlands and waters of the United States during the development and preparation of the Final Environmental Impact Statement (FEIS) for the Preferred Alternative. Design of the Preferred Alternative would minimize impacts to aquatic resources, and compensatory mitigation for unavoidable impacts would be accomplished according to federal regulations. See the discussion of wetlands and other waters of the United States in Sections 3 and 4 in Volume I of the Final Environmental Impact Statement (FEIS), and indirect and cumulative effects discussions in Sections 5 and 6, Volume I of the FEIS.
D7	Commenter would like to know if hazardous cargo will be allowed on the project.	Hazardous cargoes will be allowed to travel on Segment B. The Hazardous Materials Transportation Act of 1975 (HMTA) is the major transportation-related statute affecting the transportation of hazardous cargoes. In 1990, the United States Department of Transportation (DOT) comprehensively revised the hazardous materials regulations. The Texas Department of Public Safety (DPS) carries out and enforces federal and state regulations governing the transport of hazardous materials, and the procedures for the mitigation of hazardous material transportation emergencies. DPS is responsible for on-site coordination of transportation emergencies for all unincorporated areas, and may assume the on-site coordination role within cities when requested to do so by local government.

Comment Category	Comment	Response
D8	Commenter states that nesting eagles may be present along State Highway (SH) 35 and requests that the project be moved.	Documented occurrences of endangered, threatened, and rare species were reviewed during the alternatives evaluation process for the Draft Environmental Impact Statement (DEIS). Comments from the public hearing will be taken into consideration for the analysis of a Preferred Alternative in the Draft Environmental Impact Statement (FEIS). Field surveys for threatened and endangered species will be performed for the proposed right-of-way (ROW) of the Preferred Alternative. If any such species or their habitat is identified, necessary steps will be taken to avoid and minimize impacts per state and federal guidelines. Refer to Sections 3.11 and 4.11 of the Final Environmental Impact Statement (FEIS).
D9	Commenter is concerned the project will cause flooding.	See response to Comment D5.
D10	Commenter states that the project will displace wildlife.	See Sections 3 and 4 in Volume I of the Draft Environmental Impact Statement (DEIS) for a discussion of wildlife in the project area. Indirect impacts to wildlife habitat are discussed in Section 5, Volume I of the DEIS. The wildlife discussion in the Final Environmental Impact Statement (FEIS) will be focused on preserving high quality habitat. Although interruption of wildlife movements will likely occur, some impacts may be mitigated. This will be analyzed and discussed in the FEIS. Refer to Sections 3.10 and 4.10 of the Final Environmental Impact Statement (FEIS).
D11	The Natural Resources Conservation Service (NRCS) requests additional soil survey information for the project alternatives to complete the Conservation Planning and Assistance (CPA)-106 form to include in the Draft Environmental Impact Statement (DEIS).	The CPA-106 form has been completed and will be submitted to the NRCS for coordination. As coordination continues, all information would be updated in the Final Environmental Impact Statement (FEIS). Refer to Sections 4.22 of the Final Environmental Impact Statement (FEIS).
D12	The United States Fish and Wildlife Service (USFWS) recommends that consideration be given to candidate freshwater mussel species, and the use of best management practices (BMPs) to reduce sedimentation in area waters.	The review and assessment of threatened and endangered species conducted during the development and preparation of the Final Environmental Impact Statement (FEIS) for Segment B will include candidate freshwater mussel species. BMPs in accordance with applicable federal, state, and local regulations would be implemented during the construction phase of the project and during long-term operation to minimize the introduction of erosion and sedimentation materials into area waters. Refer to Sections 4.11 of the Final Environmental Impact Statement (FEIS).

Comment Category	Comment	Response
D13	The United States Fish and Wildlife Service (USFWS) recommends that wetland and floodplain habitats be conserved through avoidance or mitigation.	Avoidance and minimization of known natural resources was conducted during the alternatives evaluation process for Segment B. Wetlands and floodplains within the proposed right-of-way (ROW) of the Preferred Alternative will be identified during development and preparation of the Final Environmental Impact Statement (FEIS) for Segment B. Impacts will first be avoided and then minimized to the extent feasible and practicable, as balanced with other impacts to the human and natural environments. For unavoidable impacts, compensatory mitigation, as approved by the United States Army Corps of Engineers (USACE), Texas Parks and Wildlife Department (TPWD), Texas Commission on Environmental Quality (TCEQ), and other reviewing agencies for regulatory and non-regulatory resources, will be developed during the Section 404 permitting phase of the project, and prior to construction. Issuance of a Section 404 permit will not be pursued until project design is complete to allow for a complete Section 404 permit package, including the mitigation plan, which will not occur until after issuance of the Record of Decision (ROD). However, the public will be afforded the opportunity to comment on the issuance of the Section 404 permit. The opportunity is via the Secretary of the Army acting through the Chief of Engineers with the USACE. The USACE will post a notice of opportunity for public hearing on the issuance of Section 404 permits for the discharge of dredged or fill material into waters of the United States at specified sites.
D14	The United States Fish and Wildlife Service (USFWS) recommends that access routes avoid stream crossings and be designed to minimize habitat disturbance and fragmentation. Also any new roads should be designed to avoid streams and arroyos and should minimize the risk of erosion or impacts to the form, function or natural processes of water movement over the landscape, while avoiding all floodplain or wetland habitats.	Access routes during the construction of Segment B would use existing public roads to the maximum extent practicable. Additional roads necessary for equipment access to the project corridor would be expected to be temporary, and would be removed when construction access is no longer needed. Every effort would be made to avoid stream crossings for any necessary access roads. Because any additional access roads would be temporary, habitat disturbance would be temporary and there would be no expected habitat fragmentation. Any new roads would be designed to avoid stream crossings and would minimize the risk of erosion or impacts to the form, function, or natural processes of water movement over the landscape, while avoiding floodplain or wetland habitats.

Comment Category	Comment	Response
D15	Commenter recommends evaluation of water quality impacts in the Chocolate Bayou and Dickinson Bayou watersheds, and follow federal regulations for Section 10 and Section 404 waters.	Surface waters occurring within the proposed right-of-way (ROW) of the Preferred Alternative of Segment B will be identified during the development and preparation of the Final Environmental Impact Statement (FEIS), including stream segments of the Chocolate Bayou watershed, Dickinson Bayou watershed, and other watersheds associated with the Preferred Alternative. The Texas Commission on Environmental Quality (TCEQ) 303(d) list will be reviewed for impaired waters that may be located within the Preferred Alternative alignment. Water quality issues will be assessed in the FEIS for these surface waters. Refer to Sections 3.8 and 4.8 of the Final Environmental Impact Statement (FEIS). Development of the Preferred Alternative alignment, and the impacts and activities associated with the alignment, must be in compliance with Sections 401, 402, and 404 of the Clean Water Act, and Executive Order 11990 (Protection of Wetlands). Development activities affecting navigable waters that may be present in the Preferred Alternative alignment will be assessed for compliance with Section 10 of the Rivers and Harbors Act. A Storm Water Pollution Prevention Plan (SWPPP) would be prepared and best management practices (BMPs) would be implemented to minimize impacts to area waters. Additional coordination with Brazoria and Galveston Counties' local governments relative to storm water runoff pollution prevention may be required prior to project construction.
E	**Indirect and Cumulative Effects**	
E1	Commenter states that additional projects should be included in the cumulative impacts assessment.	A cumulative impacts analysis (CIA) was conducted as part of the Draft Environmental Impact Statement (DEIS). The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). A cumulative effects analysis was conducted for the preferred alternative following the five-step approach per TxDOT's 2014 Cumulative Impacts Analysis Guidelines. Refer to Section 6 of the Final Environmental Impact Statement (FEIS).
E2	Commenter states that the document failed to review cumulative impacts for wildlife.	Comments from the Public Hearing will be taken into consideration for the analysis of the Preferred Alternative in the Final Environmental Impact Statement (FEIS). A cumulative effects analysis will be conducted for the Preferred Alternative in the FEIS for Segment B. Resources carried through the analysis will be discussed in the resource-specific cumulative effects evaluations. Refer to Section 6 of the Final Environmental Impact Statement (FEIS).
E3	Commenter states that long-term toll agreements should be included in the Final Environmental Impact Statement (FEIS) or a supplemental Draft Environmental Impact Statement (DEIS) as indirect economic impacts.	It has not been determined at this time what tolling authority would be responsible for the proposed project. However, as the design is developed, should a tolling authority be identified, any necessary toll agreements that are needed would be developed and provided.
F	Environmental Documentation	

Comment Category	Comment	Response
F1	Commenter states the analyses in the document are incomplete and inadequate.	Comment acknowledged.
F2	Commenter states that the best and most recent data were not used.	The best available data at the time of development and production of the Draft Environmental Impact Statement (DEIS) were used. During development of the Final Environmental Impact Statement (FEIS), current available data will be incorporated into the FEIS.
F3	Commenter recommends that the project be analyzed in a supplemental or replacement Draft Environmental Impact Statement (DEIS) with other segments (A and C).	See response to Comment A8.
F4	Commenter states that the Texas Department of Transportation (TxDOT) must follow the National Environmental Policy Act (NEPA) process.	As stated throughout the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS), all resources were evaluated and documented in accordance with NEPA and other approved Federal Highway Administration (FHWA) technical advisories and guidance.
F5	Commenter states that Section 404 permits should be obtained prior to publishing additional documents or issuing a Record of Decision (ROD).	Section 404 permits issued by the United States Army Corps of Engineers (USACE) authorize discharges of dredged or fill material into jurisdictional waters of the United States. Jurisdictional waters of the United States are identified and quantified in the field, then verified by the USACE. Section 404 permits are issued for specific impacts to the identified and verified waters. The alternatives alignment evaluation for Segment B used available digital information relevant to wetlands and other waters of the United States to equitably compare the alternatives. Obtaining Section 404 permits during preparation of a Draft Environmental Impact Statement (DEIS), Final Environmental Impact Statement (FEIS), or prior to the issuance of a ROD would not be appropriate in this instance. Although waters of the United States, including wetlands, may be delineated and verified by the USACE within the right-of-way (ROW) and any ancillary areas of the Preferred Alternative, detailed design of the roadway and any ancillary facilities would not occur until after issuance of the ROD. Attempting to permit project impacts prior to design would be based on an assessment of presumed impacts and possibly erroneous information.
G	General Comments	
G1	Commenter expresses thanks to all attending for participating in the process.	Comment acknowledged.
G2	Commenter opposes the project.	Comment acknowledged. See Section 1 in Volume I of the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS) for the project need and purpose.
G3	Commenter states the longer route and additional bridges of the Recommended Alternative is not cost effective.	Comment acknowledged. A detailed cost estimate will be conducted during final design of the proposed project.
G4	Commenter would like the Alvin Bypass completed with overpasses.	Comment acknowledged.

Comment Category	Comment	Response
G5	Commenter opposes a toll road.	Comment acknowledged. See Section 1 in Volume I of the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS) for the project need and purpose.
G6	Commenter is in favor of the project.	Comment acknowledged.
G7	Commenter would like the project developed in a timely manner.	Comment acknowledged.
G8	Commenter asks when plans will be finalized for the roadway alignment, and what is the timeframe for constructing the project.	For up to date project status and construction schedule postings, please visit the Grand Parkway project website at: http://www.grandpky.com/downloads/SH99%20Schedule%20of%20Activities%202013-04-25.pdf. At this time, the earliest date for construction to begin is 2017. A conservative estimate on construction time for Segment B would be two to four years; however, a more exact length of construction time will be established during the final design phase. It should also be noted that construction will only begin after all appropriate approvals and permits are secured and right-of -way (ROW) has been acquired.
G9	Commenter is disappointed that Texas Department of Transportation (TxDOT) right-of-way (ROW) representatives were unavailable to answer questions.	Comment acknowledged.
G10	Commenter states that project funds could be used to maintain existing roadways/roads.	In today's current fiscal environment, transportation funds are exceptionally limited. In 2003, the Texas Transportation Commission (TTC) determined that "The completion of the Grand Parkway is essential and urgent, as construction of the projects would alleviate congestion and improve traffic flow in the Houston metropolitan area and the surrounding region..." Because of constraints on state and federal transportation funding, the TTC also determined that "constructing and operating the Grand Parkway as a toll facility is the most efficient and expeditious means of ensuring its development, and encourages the development of partnerships and the employment of innovative methods for its financing and construction."
G11	Commenter asks why a zip code change is being proposed.	No zip code changes are proposed as part of the project.
G12	Commenter is concerned that the project will be unsafe for children.	The proposed project would be constructed as a limited access tollway, with overpass main lanes at intersections with existing roadways. While pedestrian facilities would not be designed on the main lanes, pedestrian access at intersecting current roadways will not change. Texas Department of Transportation (TxDOT) safety design standards for railing and other features will be used along the Grand Parkway main lanes at the overpass locations and at the frontage road intersections.
G13	Commenter would like to know how to be fully informed about the project.	Commenter can visit the Grand Parkway website at www.grandpky.com to get the latest available information. The commenter can also contact the Grand Parkway Association (GPA) to leave contact information that will be added to the mailing list (if not already on the list) for this project.

Comment Category	Comment	Response
G14	Commenter is concerned about increased population growth in the project area as a result of the project.	Development of the Build alternatives would be expected to result in an approximately three percent increase in developed acreage within the study area compared to the No Build alternative. The predicted land use changes would be expected to occur in areas of existing population concentrations and would include the development of residential and commercial areas that are near or adjacent to the proposed State Highway (SH) 99 Segment B or in the vicinity of an intersection of Segment B and a major roadway.
G15	Commenter does not oppose the toll road concept.	Comment acknowledged.

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Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
1	The definitions for the GPB purpose and need are so narrowly constricted by the requirement that any alternative meet all four purposes simultaneously (system linkage, expanded capacity, safety, and economic development) that they eliminate any reasonable alternative except a limited-access toll road.	Purpose and Need is too narrowly defined	Section 1 of the DEIS and FEIS, Project Need and Purpose, was prepared in accordance with FHWA's Technical Advisory T 6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents (FHWA, 1987), FHWA's memorandum titled Need and Purpose in Environmental Documents (FHWA, 1990), FHWA's and Federal Transit Administration's (FTA) joint memorandum titled Integration of Planning and NEPA Processes (FHWA and FTA, 2005), and TxDOT's memorandum titled Guidance on Need and Purpose (TxDOT, 2001). Studies conducted for the proposed Grand Parkway involved interaction with project stakeholders, including the general public, local businesses, landowners, local officials, community leaders, regulatory agencies, FHWA, and TxDOT.
2	The DEIS ignores existing circumferential connections that are found in the GPB study area including Farm-to-Market (FM) 1462 and SH 6 and does not analyze their current and potential use in the future.	Circumferential connections are ignored	Widening of existing arterials such as FM 1462, SH 6 and SH 35 was included in the Alternatives Analysis. As stated in Section 2.1.1.6 of the DEIS - Currently, there are several existing arterials traversing the proposed SH 99 (Grand Parkway) Segment B (GP B) study area that are planned to be widened and improved per the 2040 RTP, including SH 6, FM 1462, and SH 35. However, due to existing development along the arterials, any transportation improvement alternative that requires additional ROW could result in residential relocations and/or commercial and community facility displacements. In addition, arterials in densely developed areas tend to have lower speeds and more traffic control devices. While widening and realigning one or more of these roadways would increase capacity, improve local mobility, and decrease congestion at certain points within the study area, these improvements would not relieve future regional congestion or provide additional hurricane evacuation capacity. Refer to Section 2 for Alternatives Analysis information in the FEIS. The Alternatives Analysis was prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
3	The DEIS assumes that differences, no matter how small, between the Build and No-Build Alternatives with respect to forecasts for roadway miles and minutes of travel are significant even if these differences are less than the percent error of the model used to make forecasts. Many of these differences are on the order of 0-2% or 0-2 minutes. No documentation is provided in the DEIS that differences this small are significant with regard to model performance and results.	Differences between the Build and No-Build Alternatives are assumed to not be significant	There is no statement regarding significance involving travel pattern forecasts in the DEIS. Time savings in travel patterns are based on the H-GAC travel models and updated through the Study Team analysis. See Section 4.3.4.2 and Table 4-10 in the FEIS for more detailed travel pattern analysis.
4	The DEIS does not allow combination alternatives that resolve the perceived system linkage, expanded capacity, safety, and economic development issues. The construction costs alone for the solution favored, a limited-access toll road, are about $1.08 billion (financing costs could double or triple this amount) are not analyzed so all reasonable alternatives are not pursued in the DEIS as required by NEPA.	Combinations of Reasonable Alternatives are not pursued in the DEIS	TxDOT is not required to analyze combinations of alternatives, rather, TxDOT must analyze reasonable alternatives. All project purpose and need statements should be met, and a multi-step alternatives evaluation process was followed to evaluate transportation system management alternatives, travel demand management alternatives, modal alternatives, added SOV capacity alternatives, and build alternatives. The Alternatives Analysis was prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
5	The environmental evaluation criteria did not include indirect and cumulative impacts. Indirect and cumulative impacts were ignored when rating the alternatives for the construction of the proposed GPB. This is not good, fair, or sufficient environmental analysis and planning.	Indirect and cumulative impacts were not included in the environmental evaluation of the alternatives	Indirect and cumulative impacts analyses are provided in Sections 5 and 6 of the DEIS and FEIS. The indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
6	The DEIS does not discuss or analyze qualitatively and quantitatively a number of community character/cohesion impacts in the GPB study area that were provided in Sierra Club scoping comments. The DEIS does not recognize rural agricultural areas as communities.	Community character/cohesion impacts were not fully addressed	Neighborhoods and community cohesion are evaluated in Sections 3.3.2 and 4.3.2 of the DEIS and Sections 3.3.2 and 4.3.1 of the FEIS. These sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
7	The DEIS fails to designate people's homes as sensitive receptors when analyzing the impacts of all air pollution or MSAT on the GPB study area.	Homes were not analyzed as Sensitive Receptors	GP B is considered a project with low potential MSAT effects since the project falls under the criteria examples provided in TxDOT's guidelines, specifically that the projected design year is not expected to exceed 140,000 average annual daily traffic. TxDOT's 2006 Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum were followed for the analysis of the GP B project, which do not require the evaluation of sensitive receptors. The analysis was reviewed and approved by FHWA.
8	The DEIS does not present a complete emissions inventory (EI) for air pollutants emitted or projected to be emitted in the study area, area of influence (AOI), and resource study area (RSA).	The emissions inventory for air pollutants is incomplete	As stated Section 3.6 of the DEIS, the air quality analyis was conducted under the 2006 TxDOT Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum which was the current standard at the time of the DEIS preparation. The MSAT qualitative analysis in the FEIS provides MSAT emissions for the Build Alternative (Preferred Alternative). As stated in Section 5.7.6, any increased air pollutant or MSAT emissions resulting from the potential development of the area must meet regulatory emissions limits established by the TCEQ and EPA, as well as obtain appropriate authorization from the TCEQ. Regulatory emission limits set by the TCEQ and EPA are established to attain and maintain the NAAQS by assuring any emissions sources resulting from new development or redevelopment will not cause or contribute to a violation of those standards. TxDOT's Air Quality Guidelines were followed for the analysis of the GP B project, which do not require the evaluation of sensitive receptors. The analysis was reviewed and approved by FHWA. FHWA's Air Quality Guidelines were followed for the analysis of the GP B project and were reviewed and approved by FHWA. FHWA's MSAT guidance can be found at the following website: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/. Additionally, the emissions inventories are utilized under an air quality regulator scheme under the jurisdiction of TCEQ and EPA. This project does not speak directly to greenhouse gases or potential impacts to climate change in accordance current federal regulations and guidelines for transportation projects.
9	The DEIS does not calculate the additional NOx air pollution and potentially more ozone that increased speeds on roads mean due to the GPB.	No calculation of additional NOx	NOx quantification is not required. The EPA has identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 2006 National Air Toxics Assessment, and NOx is not currently listed as a compound to be analyzed through the MSAT process.
10	The DEIS fails to conduct a fragmentation analysis which documents current and future predicted fragmentation for the GPB corridor and its impacts on ecosystems, animals, plants, and humans.	No fragmentation analysis was conducted for animals/plants/ ecosystems	Fragmentation of wildlife habitat and vegetation communities is recognized in the DEIS for existing conditions (Section 3.10), for possible project impacts (Section 4.11), and for indirect impacts (Section 5.5.11). Refer to Sections 3.10, 4.10, 5.4, and 6.2 of the FEIS for discussions of habitat fragmentation.
11	The DEIS does not present complete economic information like estimated financial costs, operation costs, maintenance costs, repair costs, and replacement costs.	Economic (costs) information is incomplete	Cost estimates for the Grand Parkway are updated yearly and include present day costs for construction, ROW, and utilities. The current total GP B cost is approximately $1,254,000,000 in present day value.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
12	The DEIS uses a Houston-Galveston Area Council report, "Regional Cumulative and Indirect Effects of Toll Facilities," that is incomplete in its analysis of environmental impacts and has not been released to the public for review and comment.	The H-GAC ICI report on toll facilities is incomplete in its analysis of environmental impacts	The H-GAC report information contained in the DEIS is a summary of the work efforts conducted by the H-GAC. The H-GAC 2009 report is available for public review on the H-GAC Website at http://www.h-gac.com/taq/publications/default. aspx. The H-GAC 2009 report was prepared consistent with Joint Guidance for Project and Network Level Environmental Justice, Regional Network Land Use and Air Quality Analyses for Toll Roads dated April 23, 2009 by the FHWA and TxDOT. The RTP and the Regional Cumulative and Indirect Effects of Toll Facilities report were updated in 2010 to consider the impact of changes in toll rates on EJ populations. The RTP was again updated in 2011 to address changes in the projects that are included in the 2035 roadway network. The guidance requires that planning-level analyses be conducted for specific resources, not for all environmental resources, nor does it require public review and comment. The information included in the DEIS is a summary of the 2009 report but includes updated data from the H-GAC with regard to updated network model evaluations. H-GAC has confirmed that the network updates do not change the overall findings of the 2009. The H-GAC network updates and their confirmation of the finding results are contained in the project's technical files. Additionally, the project level analysis for all resource investigations including vegetation and wildlife contained in the DEIS and FEIS meets the requirements of NEPA and other related federal and state laws, rules, and regulations. The methodologies and impact analyses used in the DEIS and FEIS are approved by and the findings reviewed by all applicable federal, state, and local agencies and authorities who exercise jurisdictional authority or special expertise. The Sierra Club's concerns with this report are noted.
13	The DEIS fails to analyze all past, present, and future foreseeable cumulative actions and their cumulative environmental impacts including Interstate 69, drainage projects, local road projects, water projects, wastewater projects, and other public infrastructure projects.	Analysis of cumulative environmental impacts is incomplete	A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
14	The economic study is deficient in its analysis of costs and benefits and biased because it is based upon self-fulfilling prophecies.	The economic study is deficient and biased	The "Small Area Forecasts: The Economic Impact of the Grand Parkway, Brazoria County Segment, Population and Employment by Regional and Transportation Analysis Zones" was developed by Barton Smith, Professor of Economics at the University of Houston, a local economic expert. This study was developed to estimate population and employment based on information available in 2003. The economic sections of the DEIS were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations. Section 3.4.2 of the FEIS uses more current information from H-GAC and U.S. Census to describe employment trends.

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15	Fails to provide eight alternatives in a comparative fashion for all direct, indirect, and cumulative impacts.	All 8 Alternatives not analyzed equally	Selection of the Recommended/Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), and in accordance with the FHWA Technical Advisory T 6640.8A. FHWA guidance to prepare the DEIS and FEIS was followed. This guidance requires environmental impacts be analyzed and reported accurately as well as consideration of public input on the alignment chosen as the Recommended/Preferred Alternative. FHWA's website (http://environment.fhwa.dot.gov/projdev/index.asp) states the following: It is FHWA's policy that (23 CFR § 771.105): - To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. - Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals. - Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions. - Measures necessary to mitigate adverse impacts be incorporated into the action.
16	The estimated cost of $1.08 billion underestimates the true cost to the public. What is needed is a cost that includes an estimate of construction, finance, operation, maintenance, repair, and replacement costs. Then the public knows what money is invested in this toll road.	$1.08 billion is not the true cost	As stated in the response to Comment 11: Cost estimates for the Grand Parkway are updated yearly and include present day costs for construction, ROW, and utilities. Current total GP B cost is approximately $1,254,000,000 in present day value.
17	Pages ES-1 through ES-3, Executive Summary and Pages 1-1 through 1-3, 1.1.1 Need and 1.1.2 Purpose, the total cost of the entire 185 mile proposed GP, including an estimate of construction, finance, operation, maintenance, repair, and replacement costs should be presented in the DEIS so the public will then know what money will be invested in this toll road.	All costs (construction, finance, operation, maintenance, repair, and replacement) should be included in the DEIS	As stated in the response to Comment 11: Cost estimates for the Grand Parkway are updated yearly and include present day costs for construction, ROW, and utilities. The current total GP B cost is approximately $1,254,000,000 in present day value.
18	Pages ES-1 through ES-3, Executive Summary and Pages 1-1 and 1.2, System Linkage, by stating that this is a need the sponsors admit that the proposed GPB does not have independent utility. This means that the proposed GPB should really have its environmental impacts assessed with, because it is connected to, GP A and C. In fact, when the so-called hurricane analysis is done in this DEIS it is predicated on GPC being built. Therefore this DEIS is deficient because it does not assess all the environmental impacts of the linked GP A, B, and C. Pages ES-1 through ES-3, Executive Summary and Pages 1-1 through 1-3, Safety (Hurricane Evacuation Route), this DEIS has an analysis about hurricane evacuation that is predicated on Segment C being built. The hurricane evacuation analysis is properly done when only GPB is analyzed by itself. However, GPB and C cannot function without each other and either must be evaluated together as one under NEPA or hurricane evacuation must be dropped as a need and purpose because it cannot be analyzed alone with the proposed GPB only and therefore cannot be evaluated whether it is successful only considering the proposed GPB.	Segment B does not have independent utility from Segment C	As discussed in Volume I, Sections 1.2.2.3 of the DEIS and FEIS, each segment of the Grand Parkway connects at least two existing major transportation corridors to ensure independent utility as required by FHWA regulations. Per the U.S. Department of Transportation and Related Agencies Appropriations Bill, 1993 (adopted in July 1993) as well as HR 5518 (Report accompanying the Bill, Page 103) signed by President Bush October 6, 1992, Congress accepted that the Grand Parkway be studied and developed on a segment-by-segment basis and specifically instructed the FHWA to prepare EISs for each segment of the Grand Parkway. The FEIS fully meets the requirements of NEPA and other related federal and state laws, rules, and regulations. Additionally, as established in Minute Order 82325, on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area.

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19	There is nothing to document that contra-flow does not work and the inflow of goods cannot be addressed by some other means than spending $1.08 billion for a new road. The DEIS states that the GPB would alleviate a portion of the congestion during mass evacuations and provide an additional hurricane and emergency evacuation route. The portion of congestion that would be alleviated by GPB must be provided in the DEIS. The DEIS does not recognize that radial routes leading to San Antonio, Austin, and other inland cities were virtually gridlocked during the Hurricane Rita evacuation. The DEIS should explain how a circumferential route would speed evacuations when it reaches gridlocked major corridors.	Other Alternatives should be considered	As discussed in Section 1.2.3 of the DEIS and FEIS, the hurricane evacuation study evaluates evacuation times with and without the GP B and with and without contra-flow. The results of the study show that contra-flow does reduce evacuation times alone. With the implementation of GP B and contra-flow, the evacuation rates are further reduced.
20	The assumption that gridlock will occur without the proposed GPB is nonsense. The gridlock, if it occurs, will do so on large highways that the GPB feeds into like IH-45, U.S. 59, SH 288, etc. That is how Rita in 2005 worked and the same will occur again if a large storm comes in and everyone needs to evacuate because storm prediction is not so good that it can be done far enough in advance to prevent last minute mass evacuations and traffic jams. Contra-flow lanes help but even then if over 1 million people have to evacuate in two days there will be traffic gridlock no matter what is done.	Gridlock will occur regardless of GP Seg B	As discussed in Section 1.2 of the DEIS and FEIS, SH 288 and IH 45 are two radial highways connecting Houston to its suburbs and beyond. No reasonable freeway alternative connecting major radial facilities exists in the GP B study area. Currently there is no primary east-west thoroughfare in the GP B study area. There are minor arterials; however, none provide a continuous connection from SH 288 and IH 45 other than SH 6, which is projected to run at a LOS D by 2035 without the implementation of GP B. Section 1.2.3 of the DEIS and FEIS demonstrates that evacuation clearance times decrease with the implementation of GP B alone, and reduced even further when combined with contra-flow, than without the implementation of GP B. The FEIS fully meets the requirements of NEPA and other related federal and state laws, rules and regulations. Additionally, per the U.S. Department of Transportation and Related Agencies Appropriations Bill, 1993 (adopted in July 1993) as well as HR 5518 (Report accompanying the Bill, Page 103) signed by President Bush October 6, 1992, Congress accepted that the Grand Parkway be studied and developed on a segment-by-segment basis and specifically instructed the FHWA to prepare EISs for each segment of the Grand Parkway. The FEIS fully meets the requirements of NEPA and other related federal and state laws, rules, and regulations. Additionally, as established in Minute Order 82325, on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area.

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21	No documentation is provided which shows that there is any further need, other than expansion of existing roads. East and west access is already provided by SH 6 which could be expanded and grade separations installed to take care of congestion problems.	Existing roads could be expanded, so there is no need for Segment B	As stated in the response to Comment 2: Widening of existing arterials such as FM 1462, SH 6 and SH 35 was included in the Alternatives Analysis. As stated in Section 2.1.1.6 of the DEIS - Currently, there are several existing arterials traversing the proposed GP B study area that are planned to be widened and improved per the 2040 RTP, including SH 6, FM 1462, and SH 35. However, due to existing development along the arterials, any transportation improvement alternative that requires additional ROW could result in residential relocations and/or commercial and community facility displacements. In addition, arterials in densely developed areas tend to have lower speeds and more traffic control devices. While widening and realigning one or more of these roadways would increase capacity, improve local mobility, and decrease congestion at certain points within the study area, these improvements would not likely relieve future regional congestion or provide additional hurricane evacuation capacity. Additionally, per the U.S. Department of Transportation and Related Agencies Appropriations Bill, 1993 (adopted in July 1993) as well as HR 5518 (Report accompanying the Bill, Page 103) signed by President Bush October 6, 1992, Congress accepted that the Grand Parkway be studied and developed on a segment-by-segment basis and specifically instructed the FHWA to prepare EISs for each segment of the Grand Parkway. The FEIS fully meets the requirements of NEPA and other related federal and state laws, rules, and regulations. Additionally, as established in Minute Order 82325, on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area. The Need and Purpose and the Alternatives Analysis was prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations. Refer to Section 2 for a discussion of the Alternatives Analysis for the FEIS.
22	In addition, the DEIS never states how long the proposed GPB will remain under utilized and thus free to provide an uncongested route east and west. When does traffic congestion on the proposed GPB begin and when will TxDOT fall behind in providing sufficient capacity for it?	Segment B would be underutilized only temporarily	The proposed GP B design would meet the criterion for a toll road using 2035 design year traffic.
23	The sponsors propose a $1.08 billion subsidy to promote growth and development in an area that currently is growing slowly and is a farming community.	Segment B area has slow growth and is a farming community - therefore, no need for Segment B	Population and economic growth are expected to continue in the project area. The DEIS and FEIS analyzes the needs for transportation improvements in accordance with TxDOT and Federal policies and procedures. As discussed in Sections 1.2 and 3.3 of the DEIS and FEIS, population and economic growth are expected to continue in the project area. GP B would provide additional roadway capacity to accommodate the anticipated future growth. Additionally, as stated in Section 1.1 in the DEIS, consistent with the April 2003 Texas Transportation Commission Minute Order 109226 that states, “The completion of the Grand Parkway is essential and urgent, as construction of the projects would alleviate congestion and improve traffic flow in the Houston metropolitan area and the surrounding region…” and “The commission has determined that constructing the Grand Parkway as a toll facility is the most efficient and expeditious means of ensuring its development, and encourages the development of partnerships and the employment of innovative methods for its financing and construction.” Houston-Galveston Area Council’s (H-GAC) 2040 Regional Transportation Plan (RTP) Update (Appendix A) identifies the addition of tolled facilities, including the Grand Parkway, as necessary to address current congestion and future growth in the Houston region.

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24	The question, which the DEIS does not analyze, is whether it is the best use of taxpayers' dollars to spend $1.08 billion to subsidize private development the tax base of which will not be able to pay fully the further public services that it requires? This is a key question but the DEIS is silent and ignores that the real job of TxDOT is not to subsidize wealthy developers with public money but is to take care of transportation problems where the people and jobs are. The people and jobs are not out in rural, farm dominated, Brazoria and Galveston Counties but near Pearland, Alvin, Dickinson, and other urbanized areas.	Segment B would subsidize private development	Population and economic growth are expected to continue in the project area. As stated in the response to Comment 24: The DEIS analyzes the needs for transportation improvements in accordance with TxDOT and Federal policies and procedures; the analysis does not conduct a cost-benefit analysis. As discussed in Sections 1.2 and 3.3 of the DEIS and FEIS, population and economic growth are expected to continue in the project area.
25	The Sierra Club is very concerned that the purpose and need does not justify construction. This occurs in at least three ways: the purpose and need has been too narrowly defined which precludes all other alternatives. The assumptions used in the analysis of alternatives to meet the purpose and need are simplistic and the reasoning is flawed, conclusions are not reasonable and are contrary to facts, and alternatives that could make the proposal unnecessary are not considered adequately. Changes in economic conditions that will reduce the need for the project are not taken into account.	The project need and purpose does not justify construction of Segment B	As stated in the response to Comment 1: Section 1 of the DEIS and FEIS, Project Need and Purpose, was prepared in accordance with FHWA's Technical Advisory T 6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents (FHWA, 1987), FHWA's memorandum titled Need and Purpose in Environmental Documents (FHWA, 1990), FHWA's and Federal Transit Administration's (FTA) joint memorandum titled Integration of Planning and NEPA Processes (FHWA and FTA, 2005), and TxDOT's memorandum titled Guidance on Need and Purpose (TxDOT, 2001). Studies conducted for the proposed Grand Parkway involved interaction with project stakeholders, including the general public, local businesses, landowners, local officials, community leaders, regulatory agencies, FHWA, and TxDOT.
26	Safety and grade separation improvements to local roads could do more for safety and hurricane evacuation than the seven alignments of the same limited-access toll road alternative even if such an alternative does not address congestion, linkage, or growth. Smart Streets is an alternative that better addresses congestion than the seven limited-access toll road alternatives even though it does not address safety directly. An alternative or alternatives could be devised which combines the best solution for each of the needs and could be more effective than the seven limited-access toll road alternatives. However, requiring each alternative to meet all four needs simultaneously favors the seven limited-access toll road alternatives. The purpose and needs analysis pre-ordains that the only alternatives that are acceptable are the seven limited-access toll road alternatives. This goes against standard principles of transportation planning where alternatives are fairly evaluated and compared.	Safety and grade separation improvements to existing/local roads could be better for hurricane evacuation than the proposed alternatives	As stated in the response to Comment 2: Widening of existing arterials such as FM 1462, SH 6 and SH 35 was included in the Alternatives Analysis. As stated in Section 2.1.1.6 of the DEIS - Currently, there are several existing arterials traversing the proposed SH 99 Segment B study area that are planned to be widened and improved per the 2040 RTP, including SH 6, FM 1462, and SH 35. However, due to existing development along the arterials, any transportation improvement alternative that requires additional ROW could result in residential relocations and/or commercial and community facility displacements. In addition, arterials in densely developed areas tend to have lower speeds and more traffic control devices. While widening and realigning one or more of these roadways would increase capacity, improve local mobility, and decrease congestion at certain points within the study area, these improvements would not likely relieve future regional congestion or provide additional hurricane evacuation capacity. Refer to Section 2 for a discussion of the Alternatives Analysis for the FEIS. The Alternatives Analysis was prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
27	There are different ways to get circumferential connections. For instance, SH 6 and FM 1462 already provide circumferential connections (east-west) but the DEIS ignores this reality.	Circumferential connections are ignored	As stated in the response to Comment 2: Widening of existing arterials such as FM 1462, SH 6 and SH 35 was included in the Alternatives Analysis. As stated in Section 2.1.1.6 of the DEIS - Currently, there are several existing arterials traversing the proposed SH 99 Segment B study area that are planned to be widened and improved per the 2040 RTP, including SH 6, FM 1462, and SH 35. However, due to existing development along the arterials, any transportation improvement alternative that requires additional ROW could result in residential relocations and/or commercial and community facility displacements. In addition, arterials in densely developed areas tend to have lower speeds and more traffic control devices. While widening and realigning one or more of these roadways would increase capacity, improve local mobility, and decrease congestion at certain points within the study area, these improvements would not likely relieve future regional congestion or provide additional hurricane evacuation capacity. Refer to Section 2 for a discussion of the Alternatives Analysis for the FEIS. The Alternatives Analysis was prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.

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28	Better connections, like overpasses/grade separations and or underpasses which would convey traffic more quickly throughout the area or could be made much more cheaply than the construction of a $1.08 billion limited-access toll road which will probably cost 50%-200% more as financing costs and other underestimated costs are added in.	Connections could be accomplished with existing roads rather than constructing Segment B	As stated in the response to Comment 2: Widening of existing arterials such as FM 1462, SH 6 and SH 35 was included in the Alternatives Analysis. As stated in Section 2.1.1.6 of the DEIS - Currently, there are several existing arterials traversing the proposed SH 99 Segment B study area that are planned to be widened and improved per the 2040 RTP, including SH 6, FM 1462, and SH 35. However, due to existing development along the arterials, any transportation improvement alternative that requires additional ROW could result in residential relocations and/or commercial and community facility displacements. In addition, arterials in densely developed areas tend to have lower speeds and more traffic control devices. While widening and realigning one or more of these roadways would increase capacity, improve local mobility, and decrease congestion at certain points within the study area, these improvements would not likely relieve future regional congestion or provide additional hurricane evacuation capacity. Refer to Section 2 for a discussion of the Alternatives Analysis for the FEIS. The Alternatives Analysis was prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
29	In December 2000 research was published in the Journal of Urban Planning and Development entitled "Effect of Beltways on Metropolitan Economic Activity" as prepared by A.C. Nelson and Mitchell Moody. This article states "constructing beltways that open up vast new areas of land for exploitation. The resulting development pattern may be characterized as "urban sprawl," which carries with it certain costs. To date, those costs have been characterized as higher infrastructure capital and operating costs per unit of development served, higher taxes and fees per capital to operate general government functions, loss of open spaces (with attendant losses in the ability of the natural environment to cleanse the air and reduce flooding), and weakened ability of central cities to revitalize themselves. There is no discussion or analysis in the DEIS about this problem and how it relates to GPB.	Urban Sprawl equals environmental costs	Refer to Section 5.4 of the FEIS. Under each resource discussed in Section 5.4, there is an induced growth discussion. Development that may occur as a result of GP B would be regulated by the local community and local authorities. As stated in the response to Comment 1: Section 1 of the DEIS and FEIS, Project Need and Purpose, was prepared in accordance with FHWA's Technical Advisory T 6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents (FHWA, 1987), FHWA's memorandum titled Need and Purpose in Environmental Documents (FHWA, 1990), FHWA's and Federal Transit Administration's (FTA) joint memorandum titled Integration of Planning and NEPA Processes (FHWA and FTA, 2005), and TxDOT's memorandum titled Guidance on Need and Purpose (TxDOT, 2001). Studies conducted for the proposed Grand Parkway involved interaction with project stakeholders, including the general public, local businesses, landowners, local officials, community leaders, regulatory agencies, FHWA, and TxDOT.

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30	If the response by the sponsors is that the part of the study area where the proposed GPB goes is not serviced by circumferential connections the Sierra Club points to a map that shows the fallacy of such thoughts or statements since the two existing circumferential roads mentioned above cross these areas in addition to a supporting network of local county roads. There are few people that live in the area where the proposed GPB is proposed for construction so there is little service to be provided in these undeveloped and mostly agricultural lands unless a new limited-access toll road is constructed which attracts additional development and traffic congestion.	Circumferential roads and a network of local county roads exist in the Segment B project area	As stated in the response to Comment 2: Widening of existing arterials such as FM 1462, SH 6 and SH 35 was included in the Alternatives Analysis. Section 2.1.1.6 of the DEIS states - Currently, there are several existing arterials traversing the proposed GP B study area that are planned to be widened and improved per the 2040 RTP, including SH 6, FM 1462, and SH 35. However, due to existing development along the arterials, any transportation improvement alternative that requires additional ROW could result in residential relocations and/or commercial and community facility displacements. In addition, arterials in densely developed areas tend to have lower speeds and more traffic control devices. While widening and realigning one or more of these roadways would increase capacity, improve local mobility, and decrease congestion at certain points within the study area, these improvements would not relieve future regional congestion or provide additional hurricane evacuation capacity. As stated in the DEIS: "The rate and distribution of population and employment growth within the proposed SH 99 Segment B study area influences travel demand and thus the need for and practicality of transportation improvements and alternative solutions. ...serious and severe levels of future congestion would not be relieved solely through current recommendations for increased public transportation and traffic management. The proposed SH 99 Segment B would provide necessary additional roadway capacity for the movement of goods and services in the region. In addition, the proposed SH 99 Segment B would provide an alternative circumferential route that would avoid local traffic conflicts and connect to local communities, thus addressing and accommodating existing and future growth." Refer to Section 2 of the FEIS for Alternatives Analysis.
31	There is nothing in the analysis that states the level of use that truckers will make of the proposed GPB. Truckers frequently avoid toll roads to reduce their cost of transporting loads. If truckers avoid the proposed GPB then other roads in the area will have to take up this additional use which will lead to additional air pollution, noise pollution, deteriorated road conditions, time delays due to accidents, breakdowns, and other slowdowns that occur when light car and truck traffic is mixed with heavy trucks. More truck use leads to degradation of road surfaces and higher maintenance costs for local, state, and federal transportation agencies and the public.	Truckers tend to avoid toll roads and deteriorate road conditions	H-GAC traffic volumes, which would include heavy truck volumes, would be used for the FEIS analyses. A table with traffic volumes would be included in the FEIS. Refer to Section 1.2.2.2 - Traffic Analysis and Table 1-1 of the FEIS for projected traffic volumes for the Preferred Alternative. These traffic volumes include truck drivers. Currently heavy trucks use Beltway 8, Hardy Toll Road, and surrounding toll roads in the Houston area.
32	The DEIS defines the need of the project as capacity expansion instead of the reduction of traffic congestion.	The DEIS defines the need of the project as capacity expansion not reduction of traffic congestion	Expanded capacity is a goal of GP B that would help to address transportation demand, traffic congestion and provide travel options.
33	Page 1-3, 1.2.1 System Linkage, if Alvin Community College (ACC) "generates a large amount of traffic within the study area" how is this helped by building a toll road that is 28 miles long and miles from where ACC is located? Where does the traffic that goes to ACC come from? How can an east-west route help when much of the population in the area is north and south of ACC?	Alvin Community College traffic is not just east-west, but also north-south	As stated in the DEIS and FEIS Sections 1.2.1, Alvin Community College (ACC) generates a large amount of traffic within the study area. Of the roadways serving ACC, only two extend to SH 288 (FM 1462 and SH 6) and only three extend to IH 45 South (SH 6, FM 517, and FM 646). GP B would relieve future regional congestion and provide an alternate route for students traveling to and from ACC.

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34	There is no documentation of how many "major incidents" occur on nearby roads, what a "major incident" is, and how this is worth spending $1.08 billion on a 28 mile road for these infrequent occurrences. Where is the documentation that says that this is justified socially, environmentally, and economically for TxDOT?	No documentation for major incidents on nearby roads	Major incidents/accidents refers to conditions where a vehicle accident or other emergency situation requires the temporary closure of one or more, or possibly all, main lanes of an arterial roadway (i.e., IH 45 South or SH 288), thereby necessitating the diversion of through traffic around the accident area. Although such incidents are typically infrequent, GP B would provide an alternate travel route to reduce travel delays. This alternate travel route would be of particular importance for emergency response personnel to avoid traffic stoppages or extreme delays should a major incident/accident occur on an arterial roadway, and for evacuees traveling away from coastal areas during hurricane evacuation.
35	Page 1.4, 1.2.1 Expanded Capacity, the DEIS states "Much of this growth would be concentrated in the study area." Most of the projected regional population growth of 5.8 million to 8.8 million will not occur in the study area. In fact, the number of households (outdated 2003 data is used when 2010 census data should be used) is projected to increase 51,073 and the number of jobs is projected to increase to 45,162. This is not equate to 3 million more people in the study area.	Basis for expanded capacity uses 2003 census data	A study for the DEIS conducted by the University of Houston (Appendix B of the DEIS) estimated employment and household growth in the study area. 2010 census data was not available at the time of the DEIS preparation and approval. 2010 census data, and other data as available, would be used during preparation of the FEIS. Refer to Section 3.3 of the FEIS for updated U.S. Census information. The regional population growth referenced in the comment applies to the 8-county Houston-Galveston region, and not to the study area.
36	Where current and future workers may or do work we are not told.	No indication of where workers live	Residents living in the study area may or may not be employed in the study area. Where a person works would be a personal choice, likely influenced by many factors. The economic benefits of employment are estimated on a regional basis. Employment data, as available, would be obtained during preparation of the FEIS. Refer to Section 3.4 of the FEIS for updated employment information.
37	The DEIS confuses what a large increase in percentage growth means versus a high number of people. If you begin at a low population (like you do in Brazoria County in the study area) even high percentage growth does not mean an increase of very many people.	Percentage growth does not equate to a large number of people	Comment acknowledged. Percentage increases/decreases are a means of representing relative changes in absolute numbers. Anticipated increases in the number of households and employment in the study area are presented in Sections 1.2.2 of the DEIS and FEIS.
38	The DEIS points to Roadway Congestion Index and an Urban Mobility Report for Houston. However, since this index and report are general about the Houston area as a whole there is no specific data that documents how much congestion occurs in the study area. Also there is no specific data that shows how much the proposed GPB will help to reduce congestion and increase mobility. The document says "However, even with the planned investment in the transportation system over the next 25 years, the trend of increasing congestion is expected to continue because of the continued population and employment growth in the region. The proposed SH 99 Segment B study area is no exception to the metropolitan trend" and provide zero data to back up this assumption.	No specific data provided for congestion reduction and increased mobility	As discussed in Section 1.2.2 of the DEIS and FEIS, a traffic analysis was conducted for the project area. The study concluded that assuming all planned and programmed transportation improvements were implemented, without GP B, a Level-of-Service of D or F would be experienced on local roadways within the study area by 2035.
39	In addition, the reference to 25 years is incorrect since the HGAC RTP refers to 2035 which is 23 years away, not 25 years away.	RTP refers to 2035 which is 23 years away now	The reference to 25 years is a typographical error and should have been 20 years. This will be corrected in the FEIS.
40	Pages 1-5 through 1-8, 1.2.2.2 Traffic Analysis, the DEIS fails to state what the percent error of the HGAC regional travel demand model is.	DEIS does not state the percent error of the H-GAC regional travel demand model	The H-GAC model is the regionally approved model and is accepted for these predictions. The percent error of the H-GAC model is not known.
41	In addition, HGAC often models the future with the assumption that the proposed GPB already is part of the system and thus constructed and any population or development growth generated by the proposed GPB is assumed to have occurred.	H-GAC regional travel demand model assumes growth resulting from Segment B	Comment acknowledged.

Table 3. Sierra Club Letter Comment-Response Matrix

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42	Pages 1-8, 1-9, and 1.11, 1.2.2.3 Grand Parkway and proposed SH 99 Segment B Independent Utility and Logical Termini and 1.2.3 Safety (Hurricane Evacuation route), the Sierra Club disagrees that "The Grand Parkway ... each of which has logical termini and independent utility ... to ensure independent utility as well as independent significance."	The Grand Parkway segments do not have independent utility	As stated in the response to Comment 19: As discussed in Volume I, Sections 1.2.2.3 of the DEIS and FEIS, each segment of the Grand Parkway connects at least two existing major transportation corridors to ensure independent utility as required by FHWA regulations. Per the U.S. Department of Transportation and Related Agencies Appropriations Bill, 1993 (adopted in July 1993) as well as HR 5518 (Report accompanying the Bill, Page 103) signed by President Bush October 6, 1992, Congress accepted that the Grand Parkway be studied and developed on a segment-by-segment basis and specifically instructed the FHWA to prepare EISs for each segment of the Grand Parkway. The FEIS fully meets the requirements of NEPA and other related federal and state laws, rules, and regulations. Additionally, as established in Minute Order 82325, on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area.
43	The current hurricane evacuation analysis is flawed because it documents a lack of independent utility for the proposed GPB.	The hurricane evacuation analysis does not document independent utility for Segment B	As stated in the response to Comment 19: As discussed in Volume I, Sections 1.2.2.3 of the DEIS and FEIS, each segment of the Grand Parkway connects at least two existing major transportation corridors to ensure independent utility as required by FHWA regulations. Per the U.S. Department of Transportation and Related Agencies Appropriations Bill, 1993 (adopted in July 1993) as well as HR 5518 (Report accompanying the Bill, Page 103) signed by President Bush October 6, 1992, Congress accepted that the Grand Parkway be studied and developed on a segment-by-segment basis and specifically instructed the FHWA to prepare EISs for each segment of the Grand Parkway. The FEIS fully meets the requirements of NEPA and other related federal and state laws, rules, and regulations. Additionally, as established in Minute Order 82325, on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area.
44	The Sierra Club agrees that hurricane evacuation is a critical public safety issue. For this reason, the DEIS should state that construction of the proposed GPB will put more people in harm's way by inducing growth in hurricane prone areas. If the proposed GPB were not built then there would be far less need for hurricane evacuation because fewer people would live in the area. Page 6-19 of the DEIS states that 8,300 acres to 33,100 acres of additional land will be developed due to the construction of the proposed GPB. This means that tens of thousands of additional people will be put in harm's way by a hurricane.	Build it and they will come idea is bad for hurricane evacuation	As discussed in Section 1.2.2 of the DEIS, population and employment growth is expected to continue in the GP B study area. Per the U.S. Department of Transportation and Related Agencies Appropriations Bill, 1993 (adopted in July 1993) as well as HR 5518 (Report accompanying the Bill, Page 103) signed by President Bush October 6, 1992, Congress accepted that the Grand Parkway be studied and developed on a segment-by-segment basis and specifically instructed the FHWA to prepare EISs for each segment of the Grand Parkway. As established by Minute Order 82325 on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area. Furthermore, the Grand Parkway is included in the H-GAC 2040 RTP as an emergency route for major storms, hurricanes, or chemical spills. The need for an additional hurricane evacuation route already exists without the development of GP B. Future development within the project area, which is regulated by the local authorities, would also benefit from the construction of GP B. Refer to Section 1.2.2 of the FEIS.

Table 3. Sierra Club Letter Comment-Response Matrix

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45	Page 1-11, Evacuation Trip Generation, 2008 data is used to estimate for 2035 for the evacuation model. Yet on page 1-4, household and employment data from 2003 is used to estimate from 2004 to 2025. These data dates are inconsistent and therefore do not give an analysis of the same timeframe. This table [Table 1-7] uses 2000 census data when 2010 census data is available and should be used. Page 3-9, 3.3.1.1 Population, 2000 census figures are used when 2010 census figures are available. The best, current, scientific data must be used. Tables 3-4, 3-5, and Table 3-6 and several sections of the report are out of date because they were put together before Hurricane Ike occurred, before the 2010 census, and before the recession and economic slowdown which still affects use today. Therefore the figures for Galveston County are incorrect because the City of Galveston lost a lot of its population due to people leaving after Hurricane Ike. Pages 3-13 through 3-20, 3.3.2 Housing, Neighborhoods, and Community Cohesion, Table 3-6, the figures in this table are inaccurate because figures for the 2010 census are available, and Hurricane Ike resulted in the reduction of the population in Galveston County, and the recession and slow economic conditions are not reflected and continue today. Figures are needed which track what is actually happening today. Pages 3-20 through 3-24, 3.4 Economics, Tables 3-7, 3-8, 3-9, and 3-10, these tables are inaccurate because the 2010 census is available, Galveston County lost population due to Hurricane Ike, and these figures do not reflect the recession and continued slow economic times that we have experiences from 2007 through 2012. Pages 4-5 through 4-9, 4.3.1 Population and Demographics, the data used is from 2004 and is not the newest information available about population. The 2010 census data is available and should be used. The date used for the end of the study is 2025 which does not coincide with the data used for traffic and other impacts of 2035. This analysis does not show all the environmental impacts that will occur due to the GPB and population and employment. Using 2000 census figures is not acceptable when 2010 census figures are available. The Sierra Club also objects to the use of 12 year old census data (2000) when 2010 census data is available. 2010 census data has not been used in the DEIS, which gives a biased look at what the real environmental impacts due to population and growth are in the study area, AOI, and RSA.	Outdated U.S. Census data	At the time the DEIS was prepared, some U.S. Census 2010 data analysis categories were not available. For those categories where 2010 data was available, 2010 data was utilized and reported. 2010 U.S. Census data and other data, as available, would be used during preparation of the FEIS. Refer to Section 3.3 of the FEIS for updated U.S. Census information.
46	Page 1-15, Evacuation Clearance Times, the clearance times are not valid because the analysis uses both GPB and C so the actual clearance time for GPB by itself is not provided to the public. In addition, the percent error of the model is not given so the public does not know what the noise or baseline level is that the model starts from.	Evacuation clearance times are not valid because Segments B and C were analyzed together	Evacuation clearance times were assessed with both GP B and GP C being in place to convey evacuating traffic for Galveston County. Recognition of GP C being in place to assess evacuation times does not invalidate the times presented. Rather, the assessment emphasizes the merit of the Grand Parkway segments working in conjunction to significantly improve evacuation congestion.
47	There is no estimate of the total number of people that live in the area where both GPB and C will be and what percent evacuees would make up of the total.	No total number of people in area provided	The Rice University and Texas Safety Center study provides the best available data on hurricane evacuation in the Houston metropolitan area. Specific information directly related the project area was not provided in the report.
48	Expanded Capacity, it has already been shown that "self-contained with their own…employment centers" that the jobs created will be far less than the number of households projected. So people will have to leave the study area to get jobs.	Concern that people will have to leave the study area to get to jobs	Comment acknowledged. Persons/households residing in the GP B study area may travel outside the study area for employment opportunities.

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49	There is no documentation provided that shows that the study area will grow consistent with suburban growth trends nationally" or that "businesses to function efficiently." The idea that there will be "additional roadway capacity for the movement of "goods and services" is not documented either in the DEIS.	No documentation that study area will grow with trends	There are other factors that influence growth patterns besides the development of roadways, such as utilities and infrastructure, local government development regulations and guidance, and available land. The proposed project would add capacity in the project area, and if the transportation needs for the area change in the future, future studies would be warranted.
50	There is no mention that the proposed GPB will create more traffic congestion, population growth, and development and this will actually create inefficiencies. How do these inefficiencies compare and what is the cost/benefit of them versus business efficiencies that supposedly are generated?	No mention about the inefficiencies to traffic and population growth resulting from Segment B	The DEIS and FEIS analyze the needs for transportation improvements in accordance with TxDOT and Federal policies and procedures. The analysis does not conduct a cost-benefit analysis. As discussed in Sections 1.2 and 3.3 of the DEIS and FEIS, population and economic growth are expected to continue in the project area. GP B would provide additional roadway capacity to accommodate the anticipated future growth.
51	However, no documentation is provided that the proposed GPB is needed as an evacuation route.	No documentation is provided that Grand Parkway is needed as a hurricane evacuation route	As established by Minute Order 82325 on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area. Furthermore, the Grand Parkway is included in the H-GAC 2040 RTP as an emergency route for major storms, hurricanes, or chemical spills. The need for an additional hurricane evacuation route already exists without the development of Segment B. Future development within the project area, which is regulated by the local authorities, would also benefit from the construction of GP B. The Minute Order has been added to the FEIS, Appendix A.
52	There is no documentation that states that the proposed GPB is necessary as an evacuation route and are the best alternatives for evacuation routes in the study area.	Is Segment B needed as a hurricane evacuation route, and are the alternative evaluated the best alternatives	Please see responses to Comment 54 regarding hurricane evacuation, and Comment 15 regarding the analysis of alternatives
53	The DEIS does not address that even if the proposed GPB is constructed this road cannot get people out of harm's way because they lead to north, south, east, and west routes (US 59, I-45, and I-10) that Hurricane Rita showed would be clogged with congestion from too many people trying to use the same major roads at the same time to evacuate.	Segment B is not a solution for a hurricane evacuation route	As stated in the response to Comment 20: As discussed in Section 1.2.3 of the DEIS and FEIS, the hurricane evacuation study evaluates evacuation times with and without the GP B and with and without contra-flow. The results of the study show that contra-flow does reduce evacuation times alone; however, with the implementation of GP B and contra-flow, the evacuation rates are further reduced.
54	The idea that GPB will provide needed hurricane evacuation capacity is not analyzed to demonstrate what is needed for hurricane evacuation in the Houston area as a whole. Where is the hurricane evacuation plan that demonstrates a need for the GPB? There is no hurricane preparedness study that shows GPB is needed over better coordination and communication, adequate personnel, appropriate training, and the acquisition and maintenance of necessary equipment. Capacity without thought will not help hurricane preparedness.	No analysis/support that GP Seg B would be a good hurricane evacuation route	As stated in the response to Comment 50: The Rice University and Texas Safety Center study provides the best available data on hurricane evacuation in the Houston metropolitan area. Specific information directly related the project area was not provided in the report.
55	The DEIS treats GPB and C as one project and not two projects. The individual hurricane evacuation needs cannot be individually determined and deciphered for the two segments from all analyses used to determine the level of impacts.	Hurricane evacuation needs cannot be determined individually for Segment B	GP B and GP C are separate projects; however, to effectively meet the needs for a hurricane evacuation route, both facilities must be constructed. As stated in the response to Comment 20: As discussed in Section 1.2.3 of the DEIS and FEIS, the hurricane evacuation study evaluates evacuation times with and without the GP B and with and without contra-flow. The results of the study show that contra-flow does reduce evacuation times alone; however, with the implementation of GP B and contra-flow, the evacuation rates are further reduced.

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56	The DEIS should state what are the separate safety needs for GPB. The DEIS should state how can safety be addressed and how much will it be addressed if only one of the two segments is constructed.	DEIS should state how evacuation safety would be addressed by Segment B	GP B and GP C are separate projects; however, to effectively meet the needs for a hurricane evacuation route, both facilities must be constructed. As discussed in Section 1.2.3 of the DEIS and FEIS, the hurricane evacuation study evaluates evacuation times with and without the GP B and with and without contra-flow. The results of the study show that contra-flow does reduce evacuation times alone; however, with the implementation of GP B and contra-flow, the evacuation rates are further reduced. By reducing evacuation times, evacuees are safely moved from the area. In addition, with the reduction of evacuation times, evacuees who may not have been able to evacuate otherwise would have the opportunity to evacuate should a storm rapidly increase in speed and intensity.
57	Pages ES-3 through ES-8 and pages 2-1 through 2-16, there are unreasonable assumptions and flawed analysis in the alternative analysis because many key assumptions are not founded on sound logic and evidence.	There are unreasonable and flawed analyses in the Alternative Analysis section	As stated in the response to Comment 15: Selection of the Recommended/Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), and in accordance with the FHWA Technical Advisory T 6640.8A. FHWA guidance to prepare the DEIS and FEIS was followed. This guidance requires environmental impacts be analyzed and reported accurately as well as consideration of public input on the alignment chosen as the Recommended/Preferred Alternative. FHWA's website (http://environment.fhwa.dot.gov/projdev/index.asp) states the following: It is FHWA's policy that (23 CFR § 771.105): - To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. - Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals. - Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions. - Measures necessary to mitigate adverse impacts be incorporated into the action.
58	Land use assumptions were developed at a time when the economic conditions of the region and the nation were much better than now. Development in Houston has occurred at a much slower rate than assumed in population and employment projections used in the DEIS due to the recession and its after affects. Thus, the DEIS overstates future traffic levels and the need for the project. If the assumptions of growth under the No-Build Alternative are unreasonably optimistic, then accurate alternatives analysis which meets professional standards will show the No-Build Alternative to be a better solution to the transportation problems than the DEIS acknowledges.	Growth and traffic level assumptions are overstated	Growth projections are developed with the understanding that there will be fluctuations over time in the variables that are used (i.e., demographic, employment, and land use indicators). Periods of recession are part of those fluctuations. The traffic projections, while linked with these other projections, are stand-alone projections. Growth and traffic models are developed at a regional level and are maintained by the H-GAC.
59	Page 2-1, 2.1.1.1 Bus Transit, the DEIS states "An evaluation to expand ... into adjacent counties has not been conducted because projected low ridership ... The planning study for the SH 288 corridor includes proposed new park and ride lots." What documentation is available that states that a park/ride bus will result in low ridership. There are many people in Alvin and nearby areas that drive to Houston and the Texas Medical Center. The DEIS should have an alternative that takes advantage of park/ride lots in the SH 288 corridor and its link to the study area.	Alternative needed incorporating park and ride lots on SH 288	There is currently no provider of bus transit within the study area. METRO does not provide service to Brazoria or Galveston counties. An evaluation to expand METRO's original Regional Bus Plan into adjacent counties has not been conducted because of projected low ridership. See Volume 1, Section 2.1.1 of the DEIS and FEIS.

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60	There should be alternatives with HOV/HOT lanes.	There should be alternatives with HOV/HOT lanes	The managed lane concept was analyzed as part of the Alternatives Analysis (see Volume 1, Section 2.1.1.3 of the DEIS and FEIS). The HOV lane concept does not meet the project's need and purpose because a congested freeway corridor, which could be improved with the addition of an HOV lane, does not exist in the study area.
61	Page 2-3, 2.1.1.4 Rail Transit and 2.1.1.5 Bicycle and Pedestrian Facilities, there should be a multi-mode transportation alternative that includes rail or bus transit and bicycle/pedestrian facilities. This would ensure that all reasonable alternatives are analyzed.	Multi-mode transportation alternative needed that includes rail or bus transit and bicycle/pedestrian facilities	Rail Transit was analyzed and discussed in Volume 1, Section 2.1.1.4 of the DEIS and FEIS, Bicycle and Pedestrian Facilities were analyzed and discussed in Section 2.1.1.5 of the DEIS and FEIS, and Bus Transit was analyzed and discussed in Section 2.1.1.1 of the DEIS and FEIS.
62	Page 2-4, Widening of Existing Arterials, there is no analysis which looks at an alternative with grade separations at key points on SH 6, FM 1462, and SH 35.	No alternative evaluated with grade separations on SH 6, SH 35, and FM 1462	As stated in the response to Comment 2: Widening of existing arterials such as FM 1462, SH 6 and SH 35 was included in the Alternatives Analysis. As stated in Section 2.1.1.6 - Currently, there are several existing arterials traversing the proposed GP B study area that are planned to be widened and improved per the 2040 RTP, including SH 6, FM 1462, and SH 35. However, due to existing development along the arterials, any transportation improvement alternative that requires additional ROW could result in residential relocations and/or commercial and community facility displacements. In addition, arterials in densely developed areas tend to have lower speeds and more traffic control devices. While widening and realigning one or more of these roadways would increase capacity, improve local mobility, and decrease congestion at certain points within the study area, these improvements would not relieve future regional congestion or provide additional hurricane evacuation capacity. The Alternatives Analysis was prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.

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63	DEIS states "In addition, the general rural character of the proposed SH 99 Segment B study area and prevalence of undeveloped land facilitates the planning of alternative roadway alignments on new ROW for a controlled access facility." TxDOT ignores the ecosystem services that rural land has and their economic benefits. TxDOT must include all costs in its environmental evaluations or it short-changes ecosystem values, benefits, and monetary worth. The planning study for the SH 288 corridor includes proposed new park/ride lots. The DEIS fails to discuss what ecosystem services are provided in the area, how much these are worth, and what the monetary losses due to the loss of ecosystem services. The DEIS does not calculate ecosystem service losses that will no longer accrue to the public. The DEIS fails to discuss what ecosystem services losses and what the monetary value of these are. The DEIS fails to analyze the environmental impacts of the proposal on ecosystems. Ecosystems are a better way to determine impacts because they include not just vegetation but the other living and non-living components that make an area unique and productive.	Ecosystem services are ignored and not discussed	NEPA requires that environmental impacts be disclosed and the DEIS and FEIS accomplish all NEPA requirements. The DEIS and FEIS for GP B were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations. Sections 3 and 4 of the DEIS and FEIS discuss ecosystem-related topics. As stated in the response to Comment 11: Cost estimates for the Grand Parkway are updated yearly and include present day costs for construction, ROW, and utilities. The current total GP B cost is approximately $1,254,000,000 in present day value. Land Use analyses for the Build Alternative and No Build Alternative are in Sections 3.1 and 4.1 of the DEIS and FEIS. Economic analyses for the Build Alternative and No Build Alternative are in Sections 3.4 and 4.4 of the DEIS and FEIS. Other resources associated with the ecosystem are discussed in Section 4 of the FEIS. As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations. As stated in the response to Comment 15: Selection of the Recommended/Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), and in accordance with the FHWA Technical Advisory T 6640.8A. FHWA guidance to prepare the DEIS and FEIS was followed. This guidance requires environmental impacts be analyzed and reported accurately as well as consideration of public input on the alignment chosen as the Recommended/Preferred Alternative. FHWA's website (http://environment.fhwa.dot.gov/projdev/index.asp) states the following: It is FHWA's policy that (23 CFR § 771.105): - To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. - Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals. - Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions. - Measures necessary to mitigate adverse impacts be incorporated into the action.

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64	Pages 2-4 and 2-5, 2.12 Transportation System Management (TSM) Alternatives and page 2-7, 2.2.1.2 TSM Alternatives, since this is a farming and agricultural area, is not highly populated, and its residents value a rural and less populated lifestyle the DEIS should state how TSM fits in with this rural way of life. There should be alternatives that use TSM in a multi-mode transportation fashion to provide an alternative way of getting people around in the study area, AOI, and RSA.	How do TSM alternatives accommodate the rural lifestyle of the study area	As stated in Section 2.2.1.2 of the DEIS, "As small-scale projects targeting improvement of existing roadway system efficiency, TSM alternatives can improve traffic operations, but these alternatives cannot provide the long-range capacity required to reduce congestion and improve regional mobility. Examples of proposed TSM projects in the proposed SH 99 Segment B study area are the addition of Intelligent Transportation Systems communications and surveillance systems at SH 288 and FM 1462, and the addition of a turn lane on FM 517 at the entrance to Bayou Wildlife Park. Additionally, TSM alternatives do not provide sufficient mobility improvements for additional emergency evacuation. As such, the TSM alternatives were also eliminated from further consideration." The FEIS addresses TSM alternatives in Section 2.2.1.2. The Alternatives Analysis was prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations. Additionally, as stated in the response to Comment 15: Selection of the Recommended/Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), and in accordance with the FHWA Technical Advisory T 6640.8A. FHWA guidance to prepare the DEIS and FEIS was followed. This guidance requires environmental impacts be analyzed and reported accurately as well as consideration of public input on the alignment chosen as the Recommended/Preferred Alternative. FHWA's website (http://environment.fhwa.dot.gov/projdev/index.asp) states the following: It is FHWA's policy that (23 CFR § 771.105): - To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. - Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals. - Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions. - Measures necessary to mitigate adverse impacts be incorporated into the action.
65	The DEIS calls TSM "small-scale projects" yet on pages 2-4 and 2-5, TSM s listed include park/ride lots, HOV lanes, and ridesharing program, none of which are "small-scale projects".	Referenced TSM projects are not "small-scale projects"	The use of the term "small-scale" refers to projects that do not require considerable financial, ROW, or eminent domain commitments. HOV lanes are added to roadways that have an established footprint and are less expensive to implement in comparison to other roadway widening and maintenance projects. Ridesharing programs require no use of eminent domain or ROW. Park n' ride lots are often donated parcels from landowners or are negotiated through agency existing landholdings.
66	The DEIS does not propose combination alternatives that resolve the perceived system linkage, expanded capacity, safety (hurricane evacuation route), and economic development issues that are stated in the DEIS.	No combination of alternatives proposed to address project needs	As stated in the response to Comment 4: All project purpose and need statements should be met, and a multi-step alternatives evaluation process was followed to evaluate transportation system management alternatives, travel demand management alternatives, modal alternatives, added SOV capacity alternatives, and build alternatives. The Alternatives Analysis was prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.

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67	Pages 2.5 and 2.6, 2.1.3 Travel Demand Management (TDM) Alternatives and page 2-8 2.2.1.3 TDM Alternatives, the DEIS dismisses TDM, like regional vanpools, which reduces volume, because it does not address expanded capacity although TDM is a well established strategy for resolving congestion. Reasonable alternatives which utilize TDM are needed for the DEIS. One the greatest flaws in the DEIS is the lack of information about what the public in the study area, AOI, and RSA wants with regard to transportation. There is no survey which shows what the transportation needs are of the public in the Alvin, League City, Dickinson, and Friendswood areas.	Reasonable alternatives using TDM are needed	As stated in Section 2.2.1.4 of the DEIS, "TDM alternatives are also small-scale projects and programs designed to improve the efficiency of existing traffic systems. The low-density rural character of a large portion of the proposed SH 99 Segment B study area coupled with limited accessibility to transit and other alternatives to driving all limit the application of many TDM options. TDM alternatives would not address the need for additional capacity to accommodate predicted future growth in traffic and corresponding decline in roadway LOS. TDM alternatives would also not materially contribute to congestion relief, improvement of regional mobility, or provide an additional emergency evacuation route. Therefore, the TDM alternatives were eliminated from further consideration." TDM alternatives are discussed in Section 2.2.1.3 in the FEIS. The Alternatives Analysis was prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations. Additionally, as stated in the response to Comment 15: Selection of the Recommended/Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), and in accordance with the FHWA Technical Advisory T 6640.8A. FHWA guidance to prepare the DEIS and FEIS was followed. This guidance requires environmental impacts be analyzed and reported accurately as well as consideration of public input on the alignment chosen as the Recommended/Preferred Alternative. FHWA's website (http://environment.fhwa.dot.gov/projdev/index.asp) states the following: It is FHWA's policy that (23 CFR § 771.105): - To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. - Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals. - Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions. - Measures necessary to mitigate adverse impacts be incorporated into the action.
68	Page 2-8, the DEIS calls TCB "small-scale projects and programs." But on page 2-6, TCBs include mass transit, carpool/vanpool programs, and flextime/telecommuting programs none of which are "small-scale projects."	Referenced TDM projects are not "small-scale projects"	As stated in the response to Comment 69: The use of the term "small-scale" refers to projects that do not require considerable financial, ROW, or eminent domain commitments. HOV lanes are added to roadways that have an established footprint and are less expensive to implement in comparison to other roadway widening and maintenance projects. Ridesharing programs require no use of eminent domain or ROW. Park n' ride lots are often donated parcels from landowners or are negotiated through agency existing landholdings.
69	Page 2-7, 2.2.1 Transportation System Improvements Eliminated From Further Study, the DEIS states "However, most would not effectively improve long-term regional mobility within the study area." The DEIS should state what "effectively improve" means. The DEIS should state what "mobility" means in the context it discusses this proposal.	Regional mobility relative to the proposed project is not adequately explained	Transportation Systems Management (TSM) strategies are used as a method for congestion management, and regional mobility is a by-product of those strategies. When technologies such as intersection and signal improvements, freeway bottleneck removal programs, turn lanes, grade separations, etc. are implemented, the thru-movement (mobility) is improved. However, it was determined that the regional mobility and roadway network of the entire project area for GP B would not benefit enough (i.e. "would not effectively improve") from TSM strategies to eliminate the implementation of GP B.

Table 3. Sierra Club Letter Comment-Response Matrix

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70	Page 2-9, 2.2.2 Transportation System Improvements Selected For Further Study, the DEIS ignores Smart or Complete Street Alternatives even though they would improve traffic operations along the study area roadways.	Smart or Complete Street Alternatives are ignored	The Complete Street initiative provides safe access for all users, including pedestrians, bicyclists, motorists and transit riders. Section 2.1.1.1 of the DEIS provides a description of current and future bus transit; 2.1.1.2 describes the current and future public transit system; Section 2.1.1.3 describes the current and future HOV efforts; Section 2.1.1.4 describes the current and future rail transit; and Section 2.1.1.5 describes the current and future bicycle and pedestrian facilities. As described in Section 2.2.1.1, "...based on projected growth and development within the region, these alternatives would not adequately address regional mobility issues and anticipated traffic congestion. The modal alternatives would also not provide an additional emergency evacuation route of sufficient capacity to serve the evacuation needs of the study area and larger Houston metropolitan area. Therefore, the modal alternatives as stand-alone options to solve the mobility issues of the area were eliminated from further consideration." Alternative transportion modes are discussed in Section 2.1.1 of the FEIS. As stated in the response to Comment 15: Selection of the Recommended/Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), and in accordance with the FHWA Technical Advisory T 6640.8A. FHWA guidance to prepare the DEIS and FEIS was followed. This guidance requires environmental impacts be analyzed and reported accurately as well as consideration of public input on the alignment chosen as the Recommended/Preferred Alternative. FHWA's website (http://environment.fhwa.dot.gov/projdev/index.asp) states the following: It is FHWA's policy that (23 CFR § 771.105): - To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. - Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals. - Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions. - Measures necessary to mitigate adverse impacts be incorporated into the action.

Table 3. Sierra Club Letter Comment-Response Matrix

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71	Page 2-16, 2.3.1.5 No-Build Alternative Summary, the DEIS states "the No-Build alternative would represent a cost savings compared to build design concepts; however, there would be higher maintenance requirements and user costs ... would also require additional short-term restoration and safety improvements." The DEIS should provide documentation to support these assertions. The DEIS should state what assumptions were made and how many of the different issues would the non-Build alternative meet.	Analysis of the No-Build Alternative is incomplete	As stated in Section 2.2.2.1 of the DEIS and FEIS, "The No-Build Alternative assumes the existing transportation system as presently configured, but also includes planned and committed construction and improvements to existing transportation facilities. Anticipated future population growth and development within the proposed SH 99 Segment B study area will increase traffic volumes on the existing roadway network, resulting in increased congestion. Exhibit 2-2 shows traffic operations within the study area based on Year 2001 and Year 2002 traffic data from TxDOT. Exhibit 2-3 shows the projected traffic operations for Year 2035 for the proposed SH 99 Segment B study area with the No-Build Alternative. The projected traffic operations show that roadways that are currently operating at acceptable LOS D or better are projected to be near or over capacity in Year 2035 with the No-Build Alternative. LOS F with volume-to-capacity ratios of more than 1.0 are projected on several roadway segments. Initially, the No-Build Alternative would represent a cost savings compared to build design concepts; however, there would be higher maintenance requirements and user costs on existing roadways due to the increased traffic volumes and travel delays. The No-Build Alternative would also require additional short-term restoration and safety improvements for continued enhanced operational efficiency and safe travel on existing roadways. Traffic congestion during periods of required roadway maintenance and reconstruction would be more frequent under this alternative resulting in increased user costs. The No-Build Alternative would not provide an additional emergency evacuation route to relieve anticipated congestion on existing major arterial roadways leading away from the coast. While the No-Build Alternative fails to satisfy the need and purpose of the proposed SH 99 Segment B, it is retained as a basis for comparison with the alternative transportation modes carried forward for detailed study as required by Council on Environmental Quality (CEQ) regulations." As stated in the response to Comment 15: Selection of the Recommended/Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), and in accordance with the FHWA Technical Advisory T 6640.8A. FHWA guidance to prepare the DEIS and FEIS was followed. This guidance requires environmental impacts be analyzed and reported accurately as well as consideration of public input on the alignment chosen as the Recommended/Preferred Alternative. FHWA's website (http://environment.fhwa.dot.gov/projdev/index.asp) states the following: It is FHWA's policy that (23 CFR § 771.105): - To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. - Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals. - Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions. - Measures necessary to mitigate adverse impacts be incorporated into the action.
72	The DEIS should examine what happens when people can drive faster on the GPB and whether this will lead to more or more severe crashes on it.	Increased speed on Segment B may lead to more frequent or more severe accidents	The proposed configuration of GP B would be based on a highway design speed of 70 mph. The Preferred Alternative would be designed to current TxDOT and AASHTO safety standards and specifications. GP B would improve safety on existing study area roadways as through traffic is diverted to the proposed limited access facility.

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73	Page 2-11, 2.3.2 Development of Preliminary Build Alternatives, the DEIS must explain what "to the extent practicable" means with regard to avoiding sensitive natural features.	Development of preliminary build alternatives relative to sensitive natural features	The DEIS is a document that provides alternatives and impacts associated with each alternative so to better be able to select the best alternative with the least environmental and social impacts. By selecting the alternative with the least environmental and social impacts, "to the extent practicable" means that there are many factors to consider when selecting the least impactful alternative. For instance, public involvement has occurred for many years on this proposed project. TxDOT is required to take into consideration impacts to homes and businesses and the input from the public as well as natural features. The agency and public involvement process is described in Section 7 of the DEIS and Section 8 of the FEIS. Also as explained in Section 4.9.3 of the DEIS "Upon selection of a preferred alternative, additional efforts would be made to refine the alignment to avoid wetlands and to incorporate practicable measures to minimize unavoidable impacts to wetlands." Avoidance (to the extent practicable while taking into consideration design standards for safety) would continue throughout the final design of the project. Various human and natural resource parameters were compared and evaluated for the preliminary build alternatives. The comparison and evaluation led to the selection of build alternatives that were carried forward for analysis of environmental impacts in the DEIS (CEQ regulations 40 CFR Part 1502 Section 1502.14). The environmental impacts of the alternatives not carried forward in the DEIS were not analyzed. Based on the DEIS analysis and public comments recieved on the DEIS, the FEIS presents the Preferred Alternative that is analyzed in more detail in the FEIS. Refer to Section 7 of the FEIS for permit, mitigation and commitments associated with the Preferred Alternative. As stated in the response to Comment 15: Selection of the Recommended/Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), and in accordance with the FHWA Technical Advisory T 6640.8A. FHWA guidance to prepare the DEIS and FEIS was followed. This guidance requires environmental impacts be analyzed and reported accurately as well as consideration of public input on the alignment chosen as the Recommended/Preferred Alternative. FHWA's website (http://environment.fhwa.dot.gov/projdev/index.asp) states the following: It is FHWA's policy that (23 CFR § 771.105): - To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. - Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals. - Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions. - Measures necessary to mitigate adverse impacts be incorporated into the action.
74	Page 2-12, 2.3.4 Traffic Analysis for Selected Alternatives, the DEIS states that "Because of similarities ... year 2035 traffic volumes were determined ... only for three of seven Alternative Alignments." The DEIS fails to provide the public with a list and explanation of what these similarities are. This failure to create traffic volumes, which could have easily been done in the past 9 years that this DEIS has been under preparation (certainly a record for delay), undermines NEPA and CEQ Section 1502.14, Alternatives including the proposed action.	What are similarities of alternatives for traffic volume determinations	Similarities in the alternatives refer to variations in the alignment of a particular alternative where the variation is generally near or parallel to another alignment, or incorporates a portion of another alignment, such that traffic volumes would not be materially altered.

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75	Page 2-16, Table 2-1 Alternative Alignment Evaluation Matrix, the environmental evaluation criteria do not include indirect and cumulative impacts. Indirect and cumulative impacts are ignored when rating the alternatives for the construction of the proposed GPB.	The environmental evaluation criteria do not include indirect and cumulative impacts	Table 2-1 of the DEIS and the FEIS provides a summary of direct impacts and was not intended to include a summary of indirect or cumulative impacts. Indirect and cumulative impacts analyses are provided in Sections 5 and 6. The indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
76	The alternative chosen, the South-New Alternative, is the longest alternative and goes through the most rural and undeveloped area and allows the most development of master planned subdivisions because the large land parcels needed for this type of development that has been the major development force in Houston exists on the South-New alternative.	Recommended/Preferred alternative would favor development of rural/undeveloped area	The South-New Alternative was found to have the least impacts (including natural resources, socioeconomic and relocations, etc.) per the results of the studies conducted as part of the DEIS. Additionally, public comments received at two public meetings and additional public involvement activities were considered in the selection of the Recommended/Preferred Alternative. Comments on the approved DEIS were considered for the Preferred Alternative. Refer Section 8 of the FEIS for the public involvment summaries. As stated in the response to Comment 15: Selection of the Recommended/Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), and in accordance with the FHWA Technical Advisory T 6640.8A. FHWA guidance to prepare the DEIS and FEIS was followed. This guidance requires environmental impacts be analyzed and reported accurately as well as consideration of public input on the alignment chosen as the Recommended/Preferred Alternative. FHWA's website (http://environment.fhwa.dot.gov/projdev/index.asp) states the following: It is FHWA's policy that (23 CFR § 771.105): - To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. - Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals. - Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions. - Measures necessary to mitigate adverse impacts be incorporated into the action.
77	Page 3-6, 3.2.1.3 Subsidence, the DEIS states "The land subsidence already experienced is reversible." The Sierra Club disagrees. Land subsidence is "irreversible" not "reversible." In addition, there is no discussion here or under 3.2.2 Soils, about the location and activation of faults due to land subsidence. This should be in the DEIS. The soil section should also talk about high groundwater which occurs in many of the soils found in the GPB study area.	Subsidence, fault activation, and high groundwater discussions are incomplete	Sections 3.2.1 and 3.2.2 of the DEIS were prepared in accordance with all federal, state and local regulations. Detailed resource-specific analyses (including subsidence, fault activation and groundwater) would occur in the next phase of the project for the Preferred Alternative and the results of those analyses would be documented in the FEIS. Refer to Sections 3.2.1 and 4.2.1 of the FEIS for a discussion of subsidence and faults. Refer to Sections 3.8.2, 4.8.3, and 7.5.2 of the FEIS for the discussion of groundwater.
78	Page 3-11 and 3-12, Table 3-3, the DEIS talks about "dramatic employment growth rates." However, the DEIS has already shown that most people will have to leave the study area to get jobs. Growth rates are not what is important. What is important is the total number of jobs versus the total number of people who want a job in the study area.	Percentage growth does not indicate the number of people and jobs	Anticipated increases in the number of households and employment in the study area are presented in Section 1.2.2 of the DEIS and FEIS. This section was prepared in accordance with all federal, state and local regulations.
79	Page 3-40, 2.8.2 Groundwater, the discussion ignores shallow water aquifers which are used as wells for people to drink but which also provide flow to streams and keeps wetlands alive and functioning. In addition, this section states that 93 wells and 95 wells exist in the study area. Which figure is correct?	Discussion of groundwater is incomplete	The number of wells identified in the study area is 93. The reference to 95 wells is a typographical error. An analysis of groundwater relative to the Preferred Alternative would be performed during preparation of the FEIS. Refer to Sections 3.8.2, 4.8.3, and 7.5.2 of the FEIS for the discussion of groundwater.

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80	Pages 3-41 through 3-45, 3.9 Wetlands and Other Waters of the United States, a Section 404 draft permit is needed now in the DEIS so that the public can see the actual number of regulated and unregulated wetlands that will be affected by each of the eight alternatives. Right now there is no indication how many of the wetlands that are stated to exist in each alternative are jurisdictional or non-jurisdictional and how many will be mitigated.	Draft Section 404 permit has not been prepared	Per federal, state and local regulations, for the DEIS, National Wetlands Inventory maps and other publically available information was used as a base of information for screening the alternatives. More detailed analysis of the Preferred Alternative would occur in the next phase of the project and would be documented in the FEIS. Additionally, information regarding whether a Section 404 Permit is required based on the more detailed studies would be documented in the FEIS. Refer to Sections 3.9, 4.9, and 7.6 of the FEIS for the discussion of wetlands and other waters of the United States.
81	How is it that the GPB is supposed to allow people to evacuate when it will encourage to live in an area that is subject to severe storm damage and destruction? Why is this not discussed in the DEIS? The GPB will actually make hurricane damages, loss of life, and injuries more likely because it encourages development in a historically storm prone area. The DEIS also does not discuss that Alvin had one of the greatest rains ever documented in the United States where about 40 inches of rain fell in 24 hours. Why does the DEIS fail to discuss these flood hazards?	Proposed project would potentially put a greater number of people at risk from storm damage	As stated in the response to Comment 47: As discussed in Section 1.2.2 of the DEIS and FEIS, population and employment growth is expected to continue in the GP B study area. This growth would occur with or without GP B. As established by Minute Order 82325 on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area. Furthermore, the Grand Parkway is included in the H-GAC 2040 RTP as an emergency route for major storms, hurricanes, or chemical spills. The need for an additional hurricane evacuation route already exists without the development of GP B. Future development within the project area, which is regulated by the local authorities, would also benefit from the construction of GP B. The Indirect Impacts section is found in Section 5 of the DEIS and FEIS. Indirect impacts associated with floodplains are discussed in Section 5.5.9 in the DEIS and Section 5.4.7 in the FEIS.
82	Land use assumptions for the seven Build and one No-Build Alternatives differ primarily by density and location of development rather than its extent according to the expert work group. Land use assumptions were developed at a time when the economic conditions of the region and the nation were much better than now. Development in Houston has occurred at a much slower rate than assumed in population and employment projections used in the DEIS. Thus, the DEIS overstates future traffic levels and the need for the project.	Growth assumptions are overstated	As stated in the response to Comment 61: Growth projections are developed with the understanding that there will be fluctuations over time in the variables that are used (i.e., demographic, employment, and land use indicators). Periods of recession are part of those fluctuations. The traffic projections, while linked with these other projections, are stand-alone projections. Growth and traffic models are developed at a regional level and are maintained by the H-GAC. The latest available growth and traffic models were presented in the DEIS when it was prepared and approved. Additionally, the latest available growth and traffic models will be presented in the FEIS when it is prepared. Refer to Section 2.3.4 of the FEIS for updated traffic data based on the 2040 RTP. Refer to Section 4.1 of the FEIS for updated land use data. Refer to Section 4.4 for updated economic analysis information.
83	On page 4-2, instead of using the future date of 2035, as the RTP does and the sponsors do in other places in the DEIS, the sponsors use a date of 2025 which does not fully reflect what the growth and other impacts will be on land and underestimates how much land will be developed. The Table 4-1 contradicts what is stated in the cumulative effects section, page 6-19, which states that additional development will be 8,300 acres to 33,100 acres in the RSA depending on which build alternative is constructed.	Document should use more recent information for analysis/discussion	Per federal, state and local regulations, the latest available growth and traffic models were presented in the DEIS when it was prepared and approved. Additionally, the latest available growth and traffic models based on 2035 land use data are presented in the FEIS in Section 4.1. Refer to Section 2.3.4 of the FEIS for updated traffic data based on the 2040 RTP. Refer to Section 4.4 for updated economic analysis information.
84	"The projected growth would have a greater influence on development densities in areas already experiencing growth rather than on the amount of acreage consumed for development." This statement must be explained. In particular, since the GPB will cause large parcels to be developed in master planned subdivisions the GPB will create leapfrog sprawl which will fragment the landscape and make it impossible for wildlife to migrate and not be affected by road kill, pet predation, meso-predator predation, and other urban threats. This results in prematurely depopulating undeveloped areas and causing downward population pressures on wildlife.	Development will fragment the landscape, negatively affecting wildlife	As stated in the response to Comment 10: Fragmentation of wildlife habitat and vegetation communities is recognized in the DEIS for existing conditions (Section 3.10), for possible project impacts (Section 4.11), and for indirect impacts (Section 5.5.11). The DEIS sections that analyzed impacts to wildlife were prepared in accordance with federal, state and local regulations. More detailed studies for all environmental categories will be conducted as part of, and will be documented in, the FEIS. Refer to Sections 3.10, 4.10, 5.4.1, and 6.2.9 of the FEIS for information on habitat fragmentation.

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85	Page 4-3, 4.2.1 Geology, the DEIS states "Where unavoidable impacts occur, mitigation measures would offset the impact to these resources." The DEIS should state what this means. What unavoidable impacts are being talked about? What mitigation measures would be used? Where are faults in the study area, AOI, and RSA? What can be done about faults?	Where are faults in the study area. What unavoidable impacts to faults are there? What mitigation measures are suggested for faults?	Unavoidable impacts is referring to the impacts to soils and topography. Mitigation for these unavailable impacts includes erosion and sediment control measures, such as reseeding and phasing vegetation removal, to minimize erosion and soil loss during construction. Additionally detailed investigation of the soils would be conducted during final design and special consideration would be given to the selection of fill materials. This information can be found in Section 4.2.1 of the DEIS and FEIS. Also Section 4.8.2 of the DEIS and FEIS describes additional erosion and sediment stabilization techniques. Section 4.2.1 of the DEIS and FEIS were prepared in accordance with all federal, state and local regulations. Detailed resource-specific analyses (including subsidence, fault activation and groundwater) would occur in the next phase of the project for the Preferred Alternative. The detailed analysis would address whether there are any avoidable impacts to faults and what, if any, mitigation is required. See Sections 3.2.1 and 4.2.1 in the DEIS and FEIS for a discussion on faults.
86	Page 4-3, 4.2.2 Soils, the DEIS states "Special consideration should be given to the selection of materials for fill and the design of the roadbed." The DEIS should state what this means. What special consideration is referred to?	Discussion of soils is incomplete. What does "special considerations" with regard to soils mean?	Many of the soils in the study area have a high shrink-swell potential. "Special consideration" relates to design specifications and contractor decisions as to how best to address soils with shrink-swell potential that could affect roadway construction and maintenance.
87	Pages 4-3 through 4-5, 4.2.3 Farmlands, the DEIS should have the Farmland Conservation Impact Rating Form completed so the public can review and comment on its accuracy and completeness.	No Farmland Conservation Impact Rating Form provided	Section 4.2.3 of the DEIS was prepared in accordance with all federal, state and local regulations. As stated in Section 4.2.3, "Coordination with the NRCS is in progress for impacts to farmland...the total score for the seven Alternative Alignment has not been determined at this time; however, coordination with the NRCS for impacts to farmlands will continue, and the completed NRCS-CPA-106 forms will be appended to this DEIS (Appendix A of this EIS)." The completed NRCS-CPA-106 forms have been included in Appendix A of the DEIS and are available for the public to view at Grandpky.com. Refer to Section 4.2.2 of the FEIS for an updated discussion of the coordination.
88	In addition, the DEIS states that the GPB "…would increase efficiency of accessibility to FM roads" but does not demonstrate or provide any data that there is any need for an increase in efficiency of accessibility for farmers to FM roads. The DEIS states the GPB "...would improve highway safety for the transport of farm products and equipment but does not provide data or documentation that this is a problem in the study area for farmers. Further, the DEIS does not state that the construction of the GPB will result in the development of farmland in the study area.	What is the inefficiency of accessibility to FM roads for farmers	As discussed in Section 1.2.2.2 of the DEIS and the FEIS, a traffic analysis was conducted for the project area. The study concluded that assuming all planned and programmed transportation improvements were implemented, without the GP B, a Level-of-Service of D or F would be experienced on local roadways within the study area by 2035. Therefore, with the implementation of GP B congestion on local roadways (including FM roads) would decrease, thus improving safety for all local roadway uses, including the transport of farm products and equipment.
89	The DEIS does not provide the environmental impacts that occur due to induced growth and development from the GPB like additional air pollution, water pollution, fragmentation of wildlife habitat, road kill of wildlife, noise, waste generation and disposal, etc. All of these are secondary impacts due to the GPB and should be quantified and provided in the DEIS for the public to review and comment on.	Indirect/Cumulative impacts should be quantified	Indirect and cumulative impact analyses were conducted as part of the DEIS and FEIS. The analyses comply with CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). The indirect impact analysis is described in Section 5 of the DEIS and FEIS. Resource categories considered in the cumulative analysis included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS.

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90	The sponsors fail in Table 4-4 to conduct a social economic study on all alternatives. This failure to document the increase in number of households and total employment within the social economic study area, which could have easily been done in the past 9 years that this DEIS has been under preparation (certainly a record for delay}, undermines NEPA and CEQ Section 1502.14, Alternatives including the proposed action.	A social economic study was not conducted for all alternatives	As discussed in the DEIS, a study conducted by the University of Houston (Appendix B of the DEIS) estimated employment and household growth in the study area. The findings of the study were used to analyze the potential social economic effects of the proposed project alternatives. Refer to Sections 4.3 and 4.4 of the FEIS for a discussion of social and economic characteristics.
91	The DEIS does not explain how similar alternatives are and why the sponsors could not have produced four more household and employment figures for the four alternatives not covered. If cost is a factor then explain the cost for each computer run and state why this is too much money to spend. The analysis misses what happened from 2007-2012 because it was done before the recession and the slow economic conditions that exist after the recession occurred. By ignoring the recession and its aftermath the analysis does not properly provide the impacts that have occurred to households and employment.	Household and employment data not provided for four of the seven alternatives, and the analysis does not include the slowed economic conditions	As discussed in the DEIS, a study conducted by the University of Houston (Appendix B of the DEIS) estimated employment and household growth in the study area. The findings of the study were used to analyze the potential social economic effects of the proposed project alternatives. Refer to Sections 4.3 and 4.4 of the FEIS for a discussion of social and economic characteristics.
92	The actual amount or number of environmental impacts that potentially will occur are not given. For instance, how much will noise increase? How much will air pollution increase, both during construction of the GPB and afterward when there are emergencies, road incidents, construction projects, and when traffic backs up and how does this impact community cohesion? All factors and aspects of community cohesion are not covered by the DEIS. For instance, what community groups exist in the study area, AOI, or RSA and how will these be impacted by the GPB? What community attitudes and lifestyles, including the history of area voting patterns, exist in the study area, AOI, and RSA and how will these be impacted by the GPB? What religious patterns and characteristics are found in the study area, AOI, and RSA and how will they be impacted by GPB?	What are the environmental impacts of Segment B, and community cohesion is not fully discussed	Affected environment and direct impacts associated with community cohesion are discussed in Sections 3.3.2 and 4.3.2 in the DEIS and Sections 3.3.2 and 4.3.1 in the FEIS. Indirect impacts for neighborhoods and communities are discussed in the DEIS, Section 5.5.3 and Table 6-1. Section 5.5.3 reads "All of the seven Alternative Alignments would bisect existing communities within the AOI, potentially affecting neighborhood and/or community continuity and cohesion. Property values may increase in the area of the selected preferred alternative, as the proposed SH 99 Segment B would provide access to areas that were previously inaccessible, or had only limited access via public roads." Additional discussions about community cohesion can be found in Section 5.5.3. These sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations. Refer to Section 5 of the FEIS for the discussion of indirect effects of the Prerferred Alternative.

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93	There is no comparison given among the alternatives to determine how each will do and compare. These impacts can be quantified by looking at what happened when other parts of the GP were built (like Segment D) and other roads were built. How much will mobility be improved for each alternative? For how long will mobility be improved for each alternative? It is not just the No Build Alternative that will exhibit environmental impacts over time. How do these alternatives compare to each other and the No-Build? The DEIS does not say.	No comparison of the impacts of the alternatives	Refer to Table ES-1 - Summary of Impacts by Alternative Alignment in the DEIS for a comparison of impacts by Alternative. Under each of the resouces discussed in Section 4, a No Build scenario is discussed. Additionally, the Cumulative Impacts Section (Section 6) in the DEIS provides a discussion of the combined effects of the proposed project along with other projects within the Resource Study Area. The Alternatives Analysis was prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations. As stated in the response to Comment 15: Selection of the Recommended/Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), and in accordance with the FHWA Technical Advisory T 6640.8A. FHWA guidance to prepare the DEIS and FEIS was followed. This guidance requires environmental impacts be analyzed and reported accurately as well as consideration of public input on the alignment chosen as the Recommended/Preferred Alternative. FHWA's website (http://environment.fhwa.dot.gov/projdev/index.asp) states the following: It is FHWA's policy that (23 CFR § 771.105): - To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. - Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals. - Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions. - Measures necessary to mitigate adverse impacts be incorporated into the action. Refer to Section 2 of the FEIS for the discussion and History of the Alternative Analysis.

Table 3. Sierra Club Letter Comment-Response Matrix

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94	Page 4-12, how could school bus service be improved if the buses have to pay a toll? The DEIS states that the GPB will " ... provide improved police protection, fire protection, and EMS access to rural area" but does not say that the rural area will disappear because the GPB will induce urban development. The DEIS does not say that the police, fire, and EMS will be scattered over larger areas with more people to take care of with the GPB.	Induced development would adversely affect the rural character of the study area	Induced growth is discussed in Section 5.5 of the DEIS under each resource. As stated in Section 5.5.1 "Development would increase the local tax base and would be expected to have a positive effect on the local economy as additional residential properties, commercial establishments, and public and private services and facilities are developed." Also stated in Section 5.5.3 "Induced residential and commercial development would provide housing and purchasing opportunities for area residents. Increasing population and economic growth could induce additional development, thereby creating a demand for additional needs such as medical facilities, child care, educational facilities, and social services. Induced growth would be expected to increase the availability of social resources within the AOI." Therefore, Section 5.5 does provide specific examples of how the induced growth would impact the Area of Influence including the increased number of social services. As stated in the response to Comment 96: Indirect and cumulative impact analyses were conducted as part of the DEIS and FEIS. The analyses were conducted to comply with CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). The indirect impact analysis is described in Section 5 of the DEIS and FEIS. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS and Sectiom 6.2 of the FEIS. Also, as stated in the response to Comment 47: As discussed in Section 1.2.2 of the DEIS and FEIS, population and employment growth is expected to continue in the GP B study area. As established by Minute Order 82325 on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area. Furthermore, the Grand Parkway is included in the H-GAC 2040 RTP as an emergency route for major storms, hurricanes, or chemical spills. The need for an additional hurricane evacuation route already exists without the development of GP B. Future development within the project area, which is regulated by the local authorities, would also benefit from the construction of GP B.
95	The DEIS should describe what park activities occur and how specifically they will be effected by the GPB.	Additional discussion of parkland use needed	Section 3.3.3.5 of the DEIS identifies the parks located within the GP B study area. Section 4.3.3.5 of the DEIS further discusses parks directly adjacent to the alternatives. The Preferred Alternative (as identified in the FEIS) does not have any Section 4(f) impacts. Section 3.3.3.5 of the FEIS discusses the affected environment for Section 4(f) properties.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
96	Pages 4-14 and 4-15, 4.3.3.6 Traffic and Public Safety, the DEIS states that GPB would " ... be expected to improve mobility, public safety, and efficiency of the roadway systems ... is needed to relieve traffic congestion occurring in and near cities." What roadway systems will have improved mobility, public safety, and efficiency? How much will mobility, public safety, and efficiency be improved? How long will this increase in mobility, public safety, and efficiency last? Where specifically in and near what cities will traffic congestion be relieved? How long will this relief last?	What are mobility, public safety, and efficiency benefits of Segment B	As stated in Section 1.2.4 of the DEIS "…H-GAC predicts that because of the size of the projected increase in traffic, serious and severe levels of future congestion would not be relieved solely through current recommendations for increased public transportation and traffic management. The proposed SH 99 Segment B would provide necessary additional roadway capacity for the movement of goods and services in the region." Also, as stated in the response to Comment 47: As discussed in Section 1.2.2 of the DEIS and FEIS, population and employment growth is expected to continue in the GP B study area. As established by Minute Order 82325 on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area. Furthermore, the Grand Parkway is included in the H-GAC 2040 RTP as an emergency route for major storms, hurricanes, or chemical spills. The need for an additional hurricane evacuation route already exists without the development of GP B. Future development within the project area, which is regulated by the local authorities would also benefit from the construction of GP B. Also, as discussed in Section 1.2.2.2 of the DEIS and FEIS, a traffic analysis was conducted for the project area. The study concluded that assuming all planned and programmed transportation improvements were implemented, without the GP B, a Level-of-Service of D or F would be experienced on local roadways within the study area by 2035. Therefore, with the implementation of GP B congestion on local roadways (including FM roads) would decrease, thus improving safety for all local roadway uses, including the transport of farm products and equipment.
97	The DEIS states "In the long term, public safety would be improved and traffic congestion would be decreased." There is no documentation to show that public safety, in general, will be improved. The DEIS must provide the analysis that documents this statement.	How would public safety be improved with Segment B	The proposed configuration of GP B would be based on a highway design speed of 70 mph. The Preferred Alternative would be designed to current TxDOT and AASHTO safety standards and specifications. GP B would improve safety on existing study area roadways as through traffic is diverted to the proposed limited access facility. Also, as stated in Section 1.2.4 of the DEIS "…H-GAC predicts that because of the size of the projected increase in traffic, serious and severe levels of future congestion would not be relieved solely through current recommendations for increased public transportation and traffic management. The proposed GP B would provide necessary additional roadway capacity for the movement of goods and services in the region." Also, as stated in the response to Comment 47: As discussed in Section 1.2.2 of the DEIS and FEIS, population and employment growth is expected to continue in the GP B study area. As established by Minute Order 82325 on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area. Furthermore, the Grand Parkway is included in the H-GAC 2040 RTP as an emergency route for major storms, hurricanes, or chemical spills. The need for an additional hurricane evacuation route already exists without the development of GP B. Future development within the project area, which is regulated by the local authorities, would also benefit from the construction of GP B.
98	Page 4-15 through 4-16, 4.3.3.7 Travel Patterns and Accessibility, the DEIS uses traffic data from 2001 and 2002. This data is much too old (10-11 years old) to represent what traffic is like now. The analysis must be redone with more recent traffic data. Then the DEIS states that " ... would improve mobility for some rural areas and provide route alternatives for over-utilized roadways."	Traffic analysis data is outdated	Traffic data used in the DEIS was the latest available. The latest available traffic data will also be used in the FEIS. Refer to Section 2.3.4 of the FEIS for the traffic analysis for the Selected Alternatives.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
99	What rural areas, route alternatives and over-utilized roadways are being talked about? How much would mobility be improved for each of these? How long would mobility be improved for each of these?	How much and how long would mobility be improved	SH 288, IH 45, SH 6, and SH 35 are the major roadways in the project study area. The design year for GP B is 2035. It is anticipated that mobility would be improved up until or near that time horizon; however, population growth is subject to fluctuations in the community and the economy. As stated in Section 1.2.4 of the DEIS "…H-GAC predicts that because of the size of the projected increase in traffic, serious and severe levels of future congestion would not be relieved solely through current recommendations for increased public transportation and traffic management. The proposed SH 99 Segment B would provide necessary additional roadway capacity for the movement of goods and services in the region." Also, as stated in the response to Comment 47: As discussed in Section 1.2.2 of the DEIS and FEIS, population and employment growth is expected to continue in the GP B study area. As established by Minute Order 82325 on October 25, 1984, the Grand Parkway would provide an additional hurricane and emergency evacuation route for the greater Houston area. Furthermore, the Grand Parkway is included in the H-GAC 2040 RTP as an emergency route for major storms, hurricanes, or chemical spills. The need for an additional hurricane evacuation route already exists without the development of GP B. Future development within the project area, which is regulated by the local authorities would also benefit from the construction of GP B. Also, as discussed in Sections 1.2.2.2 of the DEIS and FEIS, a traffic analysis was conducted for the project area. The study concluded that assuming all planned and programmed transportation improvements were implemented, without the GP B, a Level-of-Service of D or F would be experienced on local roadways within the study area by 2035. Therefore, with the implementation of GP B, congestion on local roadways (including FM roads) would decrease, thus improving safety for all local roadway uses, including the transport of farm products and equipment.
100	Page 4-19, 4.3.4 Displacements and Relocations, the DEIS states for the No-Build Alternative, "Continued growth and development, however, could require the displacement and relocation of residents and existing structures." The DEIS must state how this is possible for a No-Build Alternative. If in fact this is possible for the No-Build Alternative would this also not be possible and even cause greater impacts due to the seven build alternatives because they cause even more growth and development?	How are displacements and relocations possible for the No-Build Alternative	The statement in Section 4.3.4 of the DEIS refers to potential impacts to existing residents and structures that may, through normal real estate sales and property acquisitions, move to other locations or have structures removed and replaced with other structures as land use changes occur as part of the continued population and economic increases in the study area. A more detailed analysis of potential relocations would be conducted in the FEIS for the Preferred Alternative and the No-Build Alternative. Refer to Section 4.3.3 of the FEIS for the discussion of displacements and relocations.
101	The DEIS states "Anticipated benefits include the following: Decreased traffic congestion on area roadways ... Creation of short- and long-term jobs." Which area roadways will benefit? How much will each one benefit? For how long will each one benefit? How many short-term jobs will be created? How many long-term jobs will be created? What types of jobs will be created? What do these jobs pay?	Additional information needed for the anticipated benefits of decreased traffic congestion and job creation	The proposed GP B would provide an alternate travel route, thereby relieving some congestion on area roadways. New development provides potential for new jobs and increased economic utility. Additionally, employment opportunities could be available during the construction phase of the project; however, the number, type, and possible wage ranges of the jobs created is unknown. Job creation is discussed in Section 4.4.2 of the DEIS and FEIS. Calculations for potential jobs created during construction are based on an economic multiplier provided by the Texas State Comptroller's office from internal economic modeling conducted by the state. These economic models do not provide specific information on benefits to individuals, types of jobs, and amount of pay. These jobs are expected to be created during the duration of the roadway project.
102	How much will each one benefit? For how long will each one benefit? How many short-term jobs will be created? How many long-term jobs will be created? What types of jobs will be created? What do these jobs pay?	Additional job creation information needed	New development provides potential for new jobs and increased economic utility. Additionally, employment opportunities could be available during the construction phase of the project. Job creation is discussed in Section 4.4.2. of the DEIS and the FEIS. Calculations for potential jobs created during construction are based on an economic multiplier provided by the Texas State Comptroller's office from internal economic modeling conducted by the state. These economic models do not provide specific information on the benefit jobs will have on individuals, types of jobs, and amount of pay. These jobs are expected to be created during the duration of the roadway project.

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
103	Page 4-25 states "It is not anticipated that there would be any direct impacts to minority or low-income populations." This statement is incorrect. Do minority or low-income people not breathe air and therefore will not be exposed to air pollution from GPB?	Inaccurate statement regarding project impacts	Sections 3.6 and 4.6 of the DEIS and FEIS discuss air quality impacts. Sections 3.3, 3.4, 4.3 and 4.4 of the DEIS and the FEIS discuss environmental justice impacts. As stated in Section 4.6.4 of the DEIS, "Under the regulations, added capacity projects may advance to construction only if they are part of the Regional Transportation Plan and Transportation Improvement Plan, which has been determined to conform to the State Implement Plan." Therefore, prior to NEPA clearance and construction the proposed project will be found to conform to the State Implementation Plan and thus in compliance with all applicable air quality regulations. Additionally, "Generally, industrial facilities that emit air pollutants are governed and permitted through TCEQ. MSATs as a result of the proposed SH 99 Segment B are not expected to increase overall MSATs in the Houston metropolitan area in the future years."
104	The Houston-Galveston Area Council (HGAC) study is flawed and no public review and comment period has ever been provided by HGAC for this study. Therefore the entire EJ analysis, any analysis about the toll road system, and any environment impacts that the toll road system has is flawed because it is based upon and uses HGAC's flawed analysis.	The H-GAC study is flawed	As stated in the response to Comment 12: The H-GAC report information contained in the DEIS is a summary of the work efforts conducted by the H-GAC. The H-GAC 2009 report is available for public review on the H-GAC Website at http://www.h-gac.com/taq/publications/default. aspx. The H-GAC 2009 report was prepared consistent with Joint Guidance for Project and Network Level Environmental Justice, Regional Network Land Use and Air Quality Analyses for Toll Roads dated April 23, 2009 by the FHWA and TxDOT. The RTP and the Regional Cumulative and Indirect Effects of Toll Facilities report were updated in 2010 to consider the impact of changes in toll rates on EJ populations. The RTP was again updated in 2011 to address changes in the projects that are included in the 2035 roadway network. The guidance requires that planning-level analyses be conducted for specific resources, not for all environmental resources, nor does it require public review and comment. The information included in the DEIS is a summary of the 2009 report but includes updated data from the H-GAC with regard to updated network model evaluations. H-GAC has confirmed that the network updates do not change the overall findings of the 2009. The H-GAC network updates and their confirmation of the finding results are contained in the project's technical files. Additionally, the project level analysis for all resource investigations including vegetation and wildlife contained in the DEIS and FEIS meets the requirements of NEPA and other related federal and state laws, rules, and regulations. The methodologies and impact analyses used in the DEIS and FEIS are approved by and the findings reviewed by all applicable federal, state, and local agencies and authorities who exercise jurisdictional authority or special expertise.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
105	Using the HGAC report is inadequate and flawed as a basis for assessment environmental impacts of a toll road or toll system and is not appropriate for use in this DEIS.	The H-GAC report is inadequate and flawed	As stated in the response to Comment 12: The H-GAC report information contained in the DEIS is a summary of the work efforts conducted by the H-GAC. The H-GAC 2009 report is available for public review on the H-GAC Website at http://www.h-gac.com/taq/publications/default. aspx. The H-GAC 2009 report was prepared consistent with Joint Guidance for Project and Network Level Environmental Justice, Regional Network Land Use and Air Quality Analyses for Toll Roads dated April 23, 2009 by the FHWA and TxDOT. The RTP and the Regional Cumulative and Indirect Effects of Toll Facilities report were updated in 2010 to consider the impact of changes in toll rates on EJ populations. The RTP was again updated in 2011 to address changes in the projects that are included in the 2035 roadway network. The guidance requires that planning-level analyses be conducted for specific resources, not for all environmental resources, nor does it require public review and comment. The information included in the DEIS is a summary of the 2009 report but includes updated data from the H-GAC with regard to updated network model evaluations. H-GAC has confirmed that the network updates do not change the overall findings of the 2009. The H-GAC network updates and their confirmation of the finding results are contained in the project's technical files. Additionally, the project level analysis for all resource investigations including vegetation and wildlife contained in the DEIS and FEIS meets the requirements of NEPA and other related federal and state laws, rules, and regulations. The methodologies and impact analyses used in the DEIS and FEIS are approved by and the findings reviewed by all applicable federal, state, and local agencies and authorities who exercise jurisdictional authority or special expertise.
106	The DEIS talks about Fort Bend County and toll policies. However the GPB is in Brazoria and Galveston Counties and is not in Fort Bend County. Use of Fort Bend County is inappropriate for this analysis.	Use of Fort Bend County toll information is inappropriate	Currently Galveston and/or Brazoria County do not have a toll authority. Therefore, discussion of Fort Bend County Toll Road Authority and HCTRA in the DEIS and FEIS is used as a comparison of toll policies of other toll authorities within the greater Houston area.
107	Page 4-28, Methods of Toll Collections, because there will be no toll booths this means that a major credit card, or direct debit payment must be used for access to the GPB. Many EJ or poor people do not have these cards because they cannot afford them. In addition, on page 4-29, Table 4-10, most poor people will not be able to prepay deposits of $40, $80, and $120. These types of deposits are not affordable for many low income people. Because of this, on page 4-30, the statement "Since the ETC system does not require the installation of toll booths, there would be no disproportionate impact to EJ communities regarding toll booth placement" is inaccurate because it does not state the ETC system will have a disproportionate impact on poor people because they cannot afford credit cards and prepayments.	The proposed electronic toll collection system will have a disproportionate impact on low-income populations	Section 4.3.5.3 of the DEIS and Section 4.3.4.2 of the FEIS discuss the EZ Tag program and the electronic toll collection system proposed for Segment B. For travelers preferring not to pay a toll, public roadways with free access (e.g., FM 1462, SH 35, and FM 517) are available to traverse the study area from SH 288 to IH 45 South. Economically disadvantaged citizens would have other, non-tolled travel options to travel across the study area, as the proposed GP B would not be the only travel route available to traverse from SH 288 to IH 45 South.
108	Page 4-31, Tolling Environmental Justice, if the sponsors are going to link GPB and C together in other places in the DEIS then for this analysis the no build scenario should exclude both GPB and GPC.	The tolling analysis for the No-Build Alternative should exclude Segments B and C	Refer to Section 6.2 of the DEIS and FEIS for the regional tolling cumulative impacts. Also, as stated in the response to Comment 19: As discussed in Volume I, Section 1.2.2.3, each segment connects at least two existing major transportation corridors to ensure independent utility as required by FHWA regulations. Per the U.S. Department of Transportation and Related Agencies Appropriations Bill, 1993 (adopted in July 1993) as well as HR 5518 (Report accompanying the Bill, Page 103) signed by President Bush October 6, 1992, Congress accepted that the Grand Parkway be studied and developed on a segment-by-segment basis and specifically instructed the FHWA to prepare EISs for each segment of the Grand Parkway. The FEIS fully meets the requirements of NEPA and other related federal and state laws, rules, and regulations.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
109	DEIS does not talk about how property taxes will rise and therefore could negatively affect residents by being so high that they cannot be easily paid which would force them to sell their property and leave. In addition, there is no discussion about weather property taxes in the area actually pay for all the services that the people who live on land that will be developed want.	Rising property taxes may become unaffordable, requiring some residents to sell their property	Over time, it is likely that property values would increase in the general area of GP B, and in the study area through continued population and economic growth. Much of the development is anticipated to occur under the No-Build scenario also; thus, taxes may increase over time regardless of GP B. GP B may initiate additional development beyond what would occur under the No-Build scenario and cause the development to occur at a faster rate. It is too speculative to predict property values based on a transportation project because many things such as the economy, supply and demand, etc. affect property values and property taxes.
110	The DEIS also fails to talk about the impacts that the GPB will have on businesses in town versus those businesses either moving out-of-town to the toll road or being replaced by new businesses that move to the toll road. What economic, social, and community cohesion impacts does this have.	What are economic, social, and community cohesion impacts of Segment B	Neighborhoods and community cohesion are discussed in Section 3.3 and Section 4.3 of the DEIS and FEIS. Indirect and cumulative impacts to social resources related to GP B are discussed in Sections 5 and 6 of the DEIS and FEIS.
111	Will this actually be labor from the study area or will others fill these jobs and take this income out of the area.	Will employee income remain in the project area	TxDOT encourages the use of localized labor but is not authorized to oversee the hiring of labor by contractors.
112	The DEIS states that "It is anticipated that any secondary development would occur gradually." Where is the comparative analysis that the CEQ NEPA regulations require.	No comparative analysis of secondary impacts	Indirect and cumulative impacts to land use related to GP B are discussed in Sections 5 and 6 of the DEIS and the FEIS.
113	Noise - The comprehensive traffic noise analysis should be done now	Comprehensive noise analysis should already have been conducted	The DEIS noise analysis followed the TxDOT guidelines for analysis at the appropriate level of detail. The FEIS has updated the noise analysis using the current 2011 TxDOT Analysis and Abatement of Roadway Traffic Noise.
114	Threatened and Endangered Species - The field investigation should already be done	Field investigations for threatened and endangered species should already have been conducted	Field investigations for threatened and endangered species for the 7 build alternatives would require extensive field work, which would be cost prohibitive. Investigations for threatened and endangered species would be conducted for the Preferred Alternative alignment. Refer to Sections 3.11 and 4.11 of the FEIS for the discussion of Threatened and Endangered species.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
115	A plan draft should be in the DEIS to document that TxDOT is ready to do a cultural resources right.	A draft cultural resources protection plan should already have been prepared	Cultural Resources have been reviewed and evaluated in the FEIS per all approved review standards and research design methods and any mitigation/protection plan required has been included. Sections 3.16 and 4.16 of the FEIS provide the finding of the historic and archeological surveys conducted as part of the FEIS effort. As stated in Section 4.16.1 (Cultural Resources - Archeological Resources), "Of the 30 percent of the APE that was examined for cultural resources, no further archaeological work is recommended. However, investigation should still occur in those portions of the study area where right-of-entry was not granted prior to construction. Additionally, once the state has taken ownership of the Preferred Alternative ROW, backhoe work should be conducted within the areas the PALM model recommends for deep reconnaissance. The proposed SH 99 Segment B will be coordinated according to the First Amended PA-TU among the FHWA, TxDOT, the THC, and the ACHP and MOU between TxDOT and the THC (13 TAC 26.14(e)(1)Final Environmental Impact Statement SH 99 Segment B: From SH 288 to IH 45 South Environmental Consequences and 43 TAC 2.24(e)(1)) to ensure that any archeological materials associated with proposed SH 99 Segment B construction would be properly evaluated, including any accidental discovery that arises following the archeological field survey. If archeological materials or human remains are identified within the Preferred Alternative ROW during construction, or a department-designated material source, all construction and related activities must cease. The find is to be reported to the TxDOT project inspector or the area engineer in accordance with TxDOT's Emergency Discovery Guidelines. If archeological materials or human remains are introduced into the Preferred Alternative ROW or easements in materials obtained from a material source under option to the contractor, all use of materials from the source must cease and the find reported to TxDOT project inspector or the area engineer in accordance with TxDOT's Emergency Discovery Guidelines." As stated in Section 4.16.2.2 of the FEIS "Because the Preferred Alternative would require no property from the parcel on which the three resources (Historic Non-Archeological sites) are located, it is anticipated that there would be no direct effect to the resources. It is recommended that the design plans protect each resource with a design that the resource be spanned by pilings or bents separated from the resource by a 20-foot buffer. No components of the Preferred Alternative would physically impact the three resources, and their historic function, the ability to carry water, would be maintained....Because the design is preliminary and detailed design plans are not yet available, it is not currently possible to evaluate effects to historic-age resources. Further information concerning the avoidance of direct and indirect impacts to NRHP-eligible resources will be addressed later in the project development process. TxDOT ENV will determine if the proposed SH 99 Segment B would have no adverse effect to any historic-age resources. Because the proposed SH 99 Segment B is a major federal action requiring the preparation of an FEIS, individual project coordination with the SHPO is anticipated."
116	Oil and Gas Well Installations and Pipelines - There is no comparative data for oil/gas well sites for each alternative.	No comparative data for oil and gas wells for the alternatives	The number of oil and wells (current and past) is discussed in Section 4.18.1 of the DEIS for all the alternatives and Section 4.17.4 of the FEIS for the Preferred Alternative.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
117	Visual and Aesthetic Quality - The DEIS does not provide the criteria and methodology used to determine that "none of the landscape features within the study area are particularly unique within the region." The DEIS also does not provide "where feasible and reasonable" where noise barriers will be proposed for each alternative.	Why are visual and aesthetic features not unique, and where would noise barriers be proposed for each alternative	Section 3.18 (Visual and Aesthetics) of the DEIS includes the following discussion of what constitutes a visual experience and aesthetic quality, "The visual experience and aesthetic quality of an area depends upon the land (the topography), water bodies, vegetation, and human development patterns. More specifically, factors used to assess the visual experience and aesthetic qualities of an area may include the following: Uniqueness of the landscape in relation to the region as a whole; Whether the scenic area is a foreground, middle-ground, or background view; Focus of the view; Scale of the elements in the scene; Number of potential viewers; Duration of the view; and Amount of disturbance to the landscape." Additionally, the language states that the GP B study area has been impacted by agricultural practices and urban development. Lands within the study area are generally level, exhibiting little to no apparent topographic relief. This Section (3.18) states the following: "Potential natural visual scenic resources within the study area include streams, wetlands, riparian areas, and rangeland. Other than the riparian areas adjacent to Chocolate Bayou and its tributaries and Dickinson Bayou, none of the landscape features within the study area are particularly unique within the SH 99 Study Area." Refer to Sections 3.18 and 4.18 of the FEIS for discussion of Visual and Aesthetic Qualities. The location of noise barriers would be determined during final design of the Preferred Alternative.
118	The DEIS does not provide estimates for each of the eight alternatives of how much energy will be used, how much energy will be conserved, and what mitigation measures will be used to reduce energy usage.	No energy estimates for the 8 alternatives	Energy for GP B is discussed in Section 4.20 of the DEIS and Section 4.19 of the FEIS. Energy use for construction, maintenance, and repair of GP B would be dependent on the length of the roadway and features incorporated into the design. Design work would be conducted for the Preferred Alternative, not for each of the build alternatives.
119	The DEIS does not discuss "maintenance and enhancement of long-term productivity." The DEIS fails to state what the "some compensation may be available through management and possible enhancement of remaining habitat areas" is for the eight alternatives that are proposed.	No discussion of maintenance and enhancement relative to long-term productivity	The text of Section 4.22 of the DEIS and Section 4.21 of the FEIS relates to future conditions within the project area. By not constructing the proejct (No-Build Alternative), GP B would not contribute to changes in long-term productivity. Population and economic growth are expected to continue in the region with or without GP B. As growth continues, there may be opportunities for organizations and entities to preserve, manage, and possibly enhance habitat areas for the benefit of wildlife.
120	The DEIS does not document how accurate such a statement (roads converted to another use) is and how often this has happened with TxDOT roads.	How often are TxDOT roads converted to another use	TxDOT rarely converts highway ROW to other uses; therefore, land converted to roadway use is generally irreversibly dedicated as roadway. The statement in the DEIS and FEIS indicates that highway ROW could be converted to another use, although this would occur only in limited circumstances, such as when roadway improvements occur that cause existing roadway to be demolished, leaving excess ROW that could be sold or donated for another use.
121	There is no safety data provided about existing roads within the study area and how they are or are not affected by the GPB.	No safety data for existing roads provided	Analysis of crash data was not conducted for existing roads within the study area. A measure of roadway congestion is level of service, with poorer levels of service generally relating to higher crash rates. As shown in Table 1-6 in Section 1.2.2.2 of the DEIS, projected increases in average daily traffic through 2035 are anticipated to degrade level of service ratings on several roadways in the study area, which would be expected to increase crash rates on study area roadways. Refer to Section 1.2 of the FEIS for transportation needs analysis.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
122	Indirect Impact Analysis - Other indirect impacts that the DEIS should cover include people who pay more taxes as land prices rise near the road; people who lose their business when in-town people move near the GPB and so do other businesses; people who have to sell their land because they can no longer afford the taxes; increased road kill, increased fragmentation, increased herbicide use, etc.	Indirect impact analysis is incomplete	The Indirect Impacts Analysis (Section 5) of the DEIS and FEIS is an analysis of reasonably foreseeable circumstances. The circumstances described in the comment are not reasonably foreseeable. An indirect impact analysis was conducted as part of the DEIS and FEIS. The analysis was conducted to comply with CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). The indirect impact analysis is described in Section 5 of the DEIS and FEIS.
123	But there is no analysis about this deterioration (deterioration over time of the reduction of time-cost of travel) of what is considered to be a benefit of the proposed GPB and no analysis of when does this action become a cost.	No analysis of the initial reduced time-cost of travel that deteriorates over time	Comment noted. A cost-benefit analysis was not conducted for GP B.
124	The DEIS states "The temporal boundary for the indirect effects analysis is to 2035." On page 5-4 data is used for households and population increases from 2025 and is not updated.	Planning horizon dates are inconsistent	As stated in the response to Comment 89: The DEIS incorporated data available at the time the document was prepared. The FEIS would provide updated data as a result of the updated RTP, U.S. Census, and other data. The latest land use projection data was used in FEIS Sections 3.1 and 4.1. The information used for the analyses in Sections 3.1 and 4.1 was carried forward with consideration into the indirect and cumulative impacts sections (Sections 5 and 6) of the FEIS. Refer to Section 3.3 of the FEIS for updated U.S. Census information.
125	Use of data from 2008, four year old, ensures that a lot of development has occurred since that time is not recognized and analyzed in the DEIS.	2008 data seems outdated	Updated data, as available, would be used during preparation of the FEIS. Refer to Sections 3.1 and 4.1 of the FEIS for updated land use information.
126	The DEIS states that land use changes for the year 2025 were predicted yet on page 5-3 the DEIS states that the temporal boundary for indirect effects in 2035. The DEIS should have predicted land use changes to 2035.	Planning horizon dates are inconsistent	As stated in the response to Comment 89: The DEIS incorporated data available at the time the document was prepared. The FEIS would provide updated data as a result of the updated RTP, U.S. Census, and other data. The latest land use projection data was used in FEIS Sections 3.1 and 4.1. The information used for the analyses in Sections 3.1 and 4.1 was carried forward with consideration into the indirect and cumulative impacts sections (Sections 5 and 6) of the FEIS. Refer to Section 3.3 of the FEIS for updated U.S. Census information.
127	For how long will regional mobility be improved? We know that a road reaches capacity and has negative impacts on traffic of surrounding roads. When will this occur with the proposal?	How long will regional mobility be improved	The GP B design year is 2035. It is anticipated that mobility would be improved up until or near that time horizon.
128	The Katy Prairie Conservancy does not do work in the study area so it really is pointless to name this organization as a potential way to protect farmland in the study area. The KPC is not dedicated to preservation of farmland but is dedicated to preservation of a sustainable portion of the Katy Prairie.	Not appropriate to reference Katy Prairie Conservancy for preservation in Seg B study area	The Katy Prairie Conservancy was referenced as an example conservation organization.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
129	The DEIS does not address all the social ills that large toll road projects create and compare the eight alternatives as required by CEQ NEPA regulations, Section 1502.14 and (b). Increased noise, air pollution, solid waste, traffic, land use conflicts, and less healthful environment lead to social problems.	Social issues not addressed for all alternatives	Analyses of the affected environment and/or impacts to the following resources are included in the DEIS and FEIS: Noise, Air Quality, Construction Impacts, Traffic Analysis for Selected Alternatives, Transportation Planning, and Social Characteristics. As stated in the response to Comment 15: Selection of the Recommended/Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), and in accordance with the FHWA Technical Advisory T 6640.8A. FHWA guidance to prepare the DEIS and the FEIS was followed. This guidance requires environmental impacts be analyzed and reported accurately as well as consideration of public input on the alignment chosen as the Recommended/Preferred Alternative. FHWA's website (http://environment.fhwa.dot.gov/projdev/index.asp) states the following: It is FHWA's policy that (23 CFR § 771.105): - To the fullest extent possible, all environmental investigations, reviews, and consultations be coordinated as a single process, and compliance with all applicable environmental requirements be reflected in the environmental document required by this regulation. - Alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals. - Public involvement and a systematic interdisciplinary approach be essential parts of the development process for proposed actions. - Measures necessary to mitigate adverse impacts be incorporated into the action.
130	The DEIS estimates income, but does not show the figures and does not compare them for the eight alternatives. (Ecosystem comment combined with #66)	Income figures not compared for the alternatives	Income estimates for each of the build alternatives are provided in Table 4-16 of the DEIS. The direct impacts discussions are included in Sections 4 of the DEIS and of the FEIS.
131	Secondary impacts on vegetation, including wetlands and riparian habitat, are caused by the proposed GPB and must be assessed here for the eight alternatives.	Secondary impacts to vegetation from all alternatives must be addressed	As stated in the response to Comment 132: An indirect impact analysis was conducted as part of the DEIS and FEIS. The analysis was conducted to comply with CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). The indirect impact analysis is described in Section 5 of the DEIS and FEIS.

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
132	The DEIS fails to provide a quantitative discussion about road kill of wildlife, both vertebrates and invertebrates, pet predator damage, and fragmentation of habitat.	No quantitative discussion of indirect wildlife impacts	Indirect Impact Analysis as it pertains to wildlife habitat is in Section 5.5.11 of the DEIS. Table 6-1 explains the reasons why wildlife was not carried forward in the Cumulative Impacts Section. One of those reasons includes the fact that animals do adapt to altered conditions or relocate into similar habitat. It is also stated that the overall populations of wildlife would not perish. The indirect and cumulative effects analysis concerns those effects that are reasonably foreseeable. The summary of the direct impacts to wildlife is found in Table 6-1. The details about the direct impacts to wildlife can be found in Section 4.11.2. The details about the affected environment (or existing conditions) and direct impacts associated with fragmentation of habitat can be found in Sections 3.10 and 4.10. Indirect and cumulative impact analyses were conducted as part of the DEIS. The analyses were conducted to comply with CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). The indirect impact analysis is described in Section 5 of the DEIS. Resource categories considered in the cumulative analysis included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1. Table 6-1 lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Sections 3.10, 4.10, 5 and 6 of the FEIS for discussions of wildlife impacts. The indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
133	The Sierra Club highly recommends "Ecological Consequences of Artificial Night Light," edited by Catherine Rich and Travis Longcore, Island Press, 2006. The DEIS should comprehensively address the environmental impacts of light pollution.	DEIS should discuss impacts of light pollution	Comment noted. The GP B project would include landscaping along the GP B alignment, including planting trees. The safety of the traveling public and the location of underground utilities are major concerns with regard to the location of planted trees adjacent to or between roadways. Lighting incorporated into the design of the Preferred Alternative would be installed as warranted to meet safety standards, which would include merge/diverge areas, toll collection areas, or ramp/thoroughfare intersections. The remainder of GP B would be planned to be unlit. A detailed illumination plan would be developed during the final design phase and would be in accordance with state and local guidelines.
134	Determination of Resources/Issues Considered in Cumulative Effects Analysis - The Sierra Club opposes the use of data that is 15-20 years old (1992-1997) on page 6-2, Farmland, to assess farmland that has been developed in the DEIS.	Farmland data is outdated	Updated data, as it was available, was used during preparation of the FEIS. Table 6-2 of the FEIS includes the cumulative analysis and whether to bring forward farmlands in the more detailed cumulative impacts analysis. Table 6-2 provides a summary based on updated information in the Farmlands Direct Impacts Section (Section 4.4) and determined that soils and farmlands will not be carried forward to the more detailed analysis for cumulative impacts.

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
135	The DEIS states "Displaced wildlife would adapt to the altered conditions or relocate into similar available habitat. Individual animals may perish, but overall populations of wildlife would not be adversely affected." What if the habitat is not available? What information backs up these assertions? No information is provided about any wildlife populations.	Cumulative Impact information/discussion is incomplete	Indirect Impact Analysis as it pertains to wildlife habitat is in Section 5.5.11 of the DEIS. Table 6-1 explains the reasons why wildlife was not carried forward in the Cumulative Impacts Section. One of those reasons includes the fact that animals do adapt to altered conditions or relocate into similar habitat. It is also stated that the overall populations of wildlife would not perish. The indirect and cumulative effects analysis concerns those effect that are reasonably foreseeable. The summary of the direct impacts to wildlife is found in Table 6-1. The details about the direct impacts to wildlife can be found in Section 4.11.2. As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations. Refer to Section 6 of the FEIS for the discussion of reasonably foreseeable cumulative impacts to wildlife. The indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
136	The sponsors have not assessed all the cumulative impacts of these cumulative actions as pointed out under comment 29), Water Quality, Waters of the United States, and Floodplains and comments 14) and 15), Section 5: Indirect Impact Analysis, of this comment letter. The Sierra Club asserts that the cumulative effects analysis by sponsors is deficient for the DEIS of the GPB and at a minimum 1. Must identify the past, present, and reasonably foreseeable actions of the sponsors and other parties affecting each particular aspect of the affected environment. 2. Must provide quantitative information regarding past changes in habitat quality and quantity, water quality, resource values and other aspects of the affected environment that are likely to be altered by sponsor actions 3. Must estimate incremental changes in these conditions that will result from sponsor actions in combination with actions of other parties, including synergistic effects 4. Must identify any critical thresholds of environmental concern that may be exceeded by the sponsors actions in combination with actions of other parties. 5. Must identify specific mitigation measures that will be implemented to reduce or eliminate such effects. Cumulative effects need to be analyzed in terms of the specific resource, ecosystem, and human community being affected (a failure that this DEIS perpetuates). The sponsors should utilize the CEQ document to the maximum extent possible so that a full and legal cumulative impacts assessment is conducted.	Cumulative Impact information/discussion is incomplete	Table 6-1 of the DEIS analyzes each alternative and whether the alternative should be carried forward for further consideration. Water quality (Section 6.1.5), floodplains (Section 6.1.6) and wetlands and waters of the U.S. (Section 6.1.7) were all carried forward in the analysis. The Indirect Impacts Analysis is found in Section 5. As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations. Refer to Section 6 of the FEIS for cumulative impact discussions for the proposed project.
137	The DEIS states "The year 1975 was selected as the baseline year for the cumulative effects analysis." No justification is presented for selection of this year especially since NEPA requires that all past, present, and reasonable foreseeable cumulative actions and their cumulative impacts must be analyzed.	Selection of the cumulative impacts baseline year was not explained/justified	The year 1975 was selected because it was the year construction began for SH 288, the western logical terminus for GP B.
138	In addition, by using data that is 8 years old (2004) many of the cumulative actions that have caused cumulative environmental impacts are missed.	2004 data seems outdated	The DEIS incorporated data available at the time the document was prepared. The FEIS has been updated in Section 6 - Cumulative Impacts.
139	The DEIS states "The temporal boundary for land use is from 1975 to 2035." This range of cumulative effects is contradicted by the use of 1995 to 2004 as present actions since present actions should be include those at least through 2012.	Cumulative effects timeframes are inconsistent	The DEIS incorporated data available at the time the document was prepared. The FEIS has been updated in Section 6 - Cumulative Impacts.
140	The DEIS on page 6-16 refers to the Houston economy from 2000-2005. This period of time does not take in the great recession and its aftermath that has occurred from 2007-2012 and is still ongoing.	The 2000-2005 time period seems outdated	The DEIS incorporated data available at the time the document was prepared. The FEIS has been updated in Section 6 - Cumulative Impacts.

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
141	There is no listing of past, present, and future foreseeable local, state, and federal government projects in the study area, AOI, and RSA to analyze for land use impacts.	The cumulative impacts analysis in the DEIS is deficient	Section 6.1.2 of the DEIS and Section 6.2.1 of the FEIS analyzes the cumulative impacts to land use. Section 6.1.2 of the DEIS and Section 6.2.1 of the FEIS discusses the local historical, present and continued construction of Alvin, Friendswood, League City, Manvel, Pearland and Santa Fe. The land development and construction as indicated includes residential, commercial and industrial land uses. Government projects fall within these general land use classifications, but there is no specific "government project land use classification" to discuss. As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
142	The DEIS mentions "Similarly, planned flood control improvements such as channel modifications and detention construction" but then does not inventory the past, present, and future foreseeable flood control projects and discuss how they have altered the land and natural ecosystems.	The cumulative impacts analysis in the DEIS is deficient	Section 6.1.6 of the DEIS and Section 6.2.4 of the FEIS analyzes the cumulative impacts to floodplains. Section 6.1.6 discusses how older developments have contributed to an increase in storm water runoff flows within the region and how stricter development regulations have been resulting in reduced impacts to the 100-year floodplain. This section also discusses EO 11988 which has helped to avoid negative impacts to floodplains. This section continues to discuss the present day efforts made by counties and other local agencies to develop and will continue to develop more stringent floodplain regulations. As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
143	The DEIS does not provide a comparison of how much of the future foreseeable cumulative actions will occur due to each of the eight alternatives.	The cumulative impacts analysis in the DEIS is deficient	Section 6 (Cumulative Impacts) of the DEIS discusses the current health of each resource. Table 6-1 of the DEIS provides a description of the current health of each resource, then provides specific examples of how the conclusion was made. For example, refer to Section 6.1.2.2 of the DEIS specifically for Land Use. The discussion includes the existing Galleria area, Greenway Plaza and the Medical Center. Historical context is discussed as well as the current health in consideration of these land uses. Refer throughout Section 6 of the DEIS for existing land use discussion in relation to the current health of each resource. Also in Section 6 of the DEIS, there are discussions of how the reasonably foreseeable projects would potentially affect the existing health of each resource. As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
144	The DEIS lumps noise and visual and aesthetic impacts in with social cumulative actions and impacts when in Section 4: Environmental Consequences these two issues are handled individually.	Cumulative impact discussions for noise, visual and aesthetics, and social impacts should be separated	The DEIS combined noise, visual and aesthetic impacts in the Cumulative Impacts Section because those resources were analyzed on a regional level. Indiviudal impacts to noise can found in Section 4.9 of the DEIS. As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
145	All social concerns are not covered under Social that should be. For instance, there are numerous cumulative impacts on community character/cohesion in the study area, AOI, and RSA that the DEIS for the proposed GPB does not discuss or analyze quantitatively or qualitatively in comparison form for the eight alternatives.	Cumulative impacts to social resources are incomplete	Refer to Sections 3.3.2 and 4.3.2 of the DEIS for discussions of community cohesion. Refer to Sections 3.3.3 and 4.3.1 of the FEIS for discussions of community cohesion. As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
146	The DEIS uses 1999 household income, 13 year old data, and 2000 census population data, 10 year old data.	Data sources are outdated	2010 U.S. Census data and other data, as available, would be used during preparation of the FEIS. Refer to Sections 3.3 and 3.4 of the FEIS for updated U.S. Census information.
147	The DEIS does not discuss anywhere in this cumulative actions section anything about the cumulative impacts of noise for the study area, AOI, and RSA. There is no mitigation for the road itself, not just construction, in this section.	No discussion of cumulative impacts from noise	Section 5 and Section 6 of the DEIS and FEIS discuss that GP B would induce regional growth within the AOI. With the construction of residential and commercial developments, the seven Alternative Alignments would be expected to result in higher ambient noise levels and potential impacts from those increased noise levels. Noise mitigation for the roadway itself would be discussed as a direct impact in Chapter 4 of the FEIS. Refer to Section 4.7 of the FEIS for the discussion of noise impacts.
148	The DEIS fails to discuss in a comparative form the seven build alternatives and the reduction of mobility that will occur as induced population growth and development happens due to proposed GPB and as this toll road approaches it capacity.	Reduction of mobility not discussed for the build alternatives	The design year for GP B is 2035. It is anticipated that mobility will be improved up until or near that time horizon for any of the build alternatives.
149	The DEIS fails to include all cumulative actions/impacts in comparative form for the eight alternatives including commercial development, industrial development, drainage projects, utilities, water supply projects and pipelines, wastewater projects and pipelines, and state, local, and federal governmental projects.	The cumulative impacts analysis in the DEIS is incomplete	As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
150	The DEIS states "Reasonably foreseeable projects in the area include roadway projects, master planned communities, and commercial developments." There is no listing of current strip centers, malls, and other commercial developments in the study area, AOI, and RSA and no listing of any light, medium, or heavy industry development that has occurred, past, present, or future foreseeable in the analysis.	The cumulative impacts analysis in the DEIS is incomplete	Section 6 (Cumulative Impacts) of the DEIS discusses the current health of each resource. Table 6-1 of the DEIS provides a description of the current health of each resource, then provides specific examples of how the conclusion was made. For example, refer to Section 6.1.2.2 of the DEIS specifically for Land Use. The discussion includes the existing Galleria area, Greenway Plaza and the Medical Center. Historical context is discussed as well as the current health in consideration of these land uses. Refer throughout Section 6 of the DEIS for existing land use discussion in relation to the current health of each resource. Also in Section 6 of the DEIS, there are discussions of how the reasonably foreseeable projects would potentially affect the existing health of each resource. As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
151	There is no listing of past, present, and future foreseeable local, state, and federal government projects in the study area, AOI, and RSA to analyze for land use impacts. This includes drainage and flood control projects, wastewater treatment plants and pipelines, water supply projects and pipelines, police, fire, EMS, hospitals, schools, etc. There is no list of roads that are not on the HGAC 2035 RTP that will be built or that already has been built. There is no listing of churches that have been built. In other words, not all reasonably foreseeable projects have been listed and have had their environmental impacts taken into account.	The cumulative impacts analysis in the DEIS is incomplete	Section 6 (Cumulative Impacts) of the DEIS discusses the current health of each resource. Table 6-1 of the DEIS provides a description of the current health of each resource, then provides specific examples of how the conclusion was made. For example, refer to Section 6.1.2.2 of the DEIS specifically for Land Use. The discussion includes the existing Galleria area, Greenway Plaza and the Medical Center. Historical context is discussed as well as the current health in consideration of these land uses. Refer throughout Section 6 of the DEIS for existing land use discussion in relation to the current health of each resource. Also in Section 6 of the DEIS, there are discussions of how the reasonably foreseeable projects would potentially affect the existing health of each resource. As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
152	The DEIS does not discuss comparatively for the eight alternatives how many all of these reasonably foreseeable projects there are and the impacts each of these alternatives will have on existing wildlife and native vegetation.	The cumulative impacts analysis in the DEIS is incomplete	As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
153	The DEIS should use the study area as the localized air pollution effects is where people living in the area will be directly impacted by the proposed GPB and the air pollution it generates and the air pollution generated by growth it induces.	DEIS should use the study area for localized air pollution rather than the eight-county region	Refer to Sections 3.6 and 4.6 of the DEIS and FEIS for the air quality impacts analysis. The federally approved H-GAC Regional Transportation Plan (RTP) analysis includes the GP B project and study area. This conforms to the State Implementation Plan (SIP). The FEIS has updated the air quality analysis using the 2006 TxDOT Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum and includes a qualitative analysis of MSAT emissions.
154	There is nothing on pages 6-55 through 6-67, that addresses air quality, water quality, vegetation, and land use impacts caused by regional tolled facilities and managed lanes network. In fact, the HGAC study did not include managed lanes in its analysis but only looked at a regional toll roads network. The HGAC study is deficient for the natural resources as specifically pointed out in these Sierra Club comments.	No discussion of air quality, water quality, vegetation, and land use impacts from regional tolled facilities and managed lanes network	As stated in the response to Comment 12: The H-GAC report information contained in the DEIS is a summary of the work efforts conducted by the H-GAC. The H-GAC 2009 report is available for public review on the H-GAC Website at http://www.h-gac.com/taq/publications/default. aspx. The H-GAC 2009 report was prepared consistent with Joint Guidance for Project and Network Level Environmental Justice, Regional Network Land Use and Air Quality Analyses for Toll Roads dated April 23, 2009 by the FHWA and TxDOT. The RTP and the Regional Cumulative and Indirect Effects of Toll Facilities report were updated in 2010 to consider the impact of changes in toll rates on EJ populations. The RTP was again updated in 2011 to address changes in the projects that are included in the 2035 roadway network. The guidance requires that planning-level analyses be conducted for specific resources, not for all environmental resources, nor does it require public review and comment. The information included in the DEIS is a summary of the 2009 report but includes updated data from the H-GAC with regard to updated network model evaluations. H-GAC has confirmed that the network updates do not change the overall findings of the 2009. The H-GAC network updates and their confirmation of the finding results are contained in the project's technical files. Additionally, the project level analysis for all resource investigations including vegetation and wildlife contained in the DEIS and FEIS meets the requirements of NEPA and other related federal and state laws, rules, and regulations. The methodologies and impact analyses used in the DEIS and FEIS are approved by and the findings reviewed by all applicable federal, state, and local agencies and authorities who exercise jurisdictional authority or special expertise. The Sierra Club's concerns with this report are noted.

Table 3. Sierra Club Letter Comment-Response Matrix

Comment Number	Sierra Club Letter Text/Comment	Main Idea	Response
155	It is not only MSAT that the sponsors should be concerned about but all environmental impacts due to air pollution in the study area as NEPA requires.	All air pollution environmental impacts should be evaluated, not just MSATs	Refer to Sections 3.6 and 4.6 of the DEIS and FEIS for the air quality impacts analysis. GP B is considered a project with low potential air quality effects since the project falls under the criteria examples provided in TxDOT's guidelines, specifically that the projected design year is not expected to exceed 140,000 average annual daily traffic. TxDOT's 2006 Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum were followed for the analysis of the GP B project, which do not require the evaluation of all air pollution. The analysis was reviewed and approved by FHWA. The DEIS fully meets the laws and requirements of NEPA and other related federal and state laws, rules, and regulations.
156	There is not one word in the DEIS under any of its air pollution chapters or sections about welfare effects of air pollutants and how the proposed GPB and its induced, secondary, and cumulative growth and development actions/impacts will affect welfare effects (climate change, corrosion and deterioration of materials, visibility, damage to corps, forests, ornamental plants and other vegetation, etc.)	DEIS should discuss direct welfare effects of air pollutants, as well as induced, secondary and cumulative impacts	GP B is considered a project with low potential air quality effects since the project falls under the criteria examples provided in TxDOT's guidelines, specifically that the projected design year is not expected to exceed 140,000 average annual daily traffic. TxDOT's 2006 Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum were followed for the analysis of the GP B project, which do not require the evaluation of all air pollution. In addition, as discussed in Sections 3.6 and 4.6 of the DEIS and FEIS, potential impacts from air pollution on human health are outlined; however, criteria levels have not been established to use as a comparison to the pollution levels associated with GP B. The analysis was reviewed and approved by FHWA. The DEIS and FEIS fully meet the laws and requirements of NEPA and other related federal and state laws, rules, and regulations. FHWA's Air Quality Guidelines were followed for the analysis of the GP B project and were reviewed and approved by FHWA. FHWA's MSAT guidance can be found at the following website: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/. Additionally, the emissions inventories are utilized under an air quality regulatory scheme under the jurisdiction of TCEQ and EPA. MSAT Factor (MOBILE) model is a computer-based model used to estimate planning and regulation for estimating emissions of CO, VOCs, NOx and for predicting the effects of emissions-reduction programs. However, MOBILE is not currently able to accurately predict human health effects related to mobile source emissions.
157	Page ES-15, the DEIS states "The Clean Air Act ... has established toxic emission levels at which these emissions (toxics) would be considered a major source ... some sensitive receptors do exist, but their exposure will decrease from the design year and beyond." This statement is not true. It is the U.S. Environmental Protection Agency that establishes regulatory controls for air toxics under the Clean Air Act.	The DEIS should state that the EPA establishes regulatory controls for air toxics under the Clean Air Act	Refer to Sections 3.6 and 4.6 of the DEIS and FEIS for discussions regarding air quality impacts. The FEIS air quality analysis was conducted following FHWA's current Air Quality Guidelines. Emissions levels at which emissions (toxics) would be considered a major source is defined by the CAA which is implemented by EPA. The analysis was reviewed and approved by FHWA.
158	The DEIS states "Thus, 03 is a regional problem and not a local condition… some of these VOCs contribute to 03 and smog formation." Ozone and smog are used interchangeably and mean the same thing so this reference should be corrected. On the Houston Ship Channel ozone levels can exceed the National Ambient Air Quality Standard so although ozone is usually thought of as a regional air pollutant it can also be a local one.	Ozone/smog should be viewed as a local problem, not just regional	Air quality is analyzed on a regional level by H-GAC per federal requirements.The federally approved H-GAC Regional Transportation Plan (RTP) analysis includes the GP B project and study area. This conforms to the State Implementation Plan (SIP), for Ozone and other criteria air pollutants. The word "smog" is not used in the FEIS. GP B is considered a project with low potential air quality effects since the project falls under the criteria examples provided in TxDOT's guidelines, specifically that the projected design year is not expected to exceed 140,000 average annual daily traffic. TxDOT's 2006 Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum were followed for the analysis of the GP B project, which do not require the evaluation of all air pollution. The analysis was reviewed and approved by FHWA.

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159	The air monitors that are used for modeling Mobile Source Air Toxics (MSAT) are located too far away (Deer Park and Clinton Drive 8 to 13 miles away) to provide accurate and representative emission estimates of toxic air pollutants.	DEIS should provide accurate and representative emission estimates for air pollutants	GP B is considered a project with low potential air quality effects since the project falls under the criteria examples provided in TxDOT's guidelines, specifically that the projected design year is not expected to exceed 140,000 average annual daily traffic. In addition, air monitors were not used for the modeling of MSATs, but only as a reference of measured monitors in comparison to the modeled data. The two TCEQ monitor stations used were the closest monitors to the proposed project. Lastly, TxDOT's 2006 Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum were followed for the analysis of the GP B project, which do not require the discussion of emission rates for all air pollutants. The analysis was reviewed and approved by FHWA.
160	Air Quality, modeling carbon monoxide (CO) levels is not appropriate for this analysis because CO levels even with high traffic counts have not traditionally been elevated near or above the NAAQS standards. The sponsors never provide an at-capacity figure or an estimate when capacity will be reached.	The DEIS should state that CO is not the air pollutant of greatest concern and the DEIS does not provide air quality levels at-capacity	GP B is considered a project with low potential air quality effects since the project falls under the criteria examples provided in TxDOT's guidelines, specifically that the projected design year is not expected to exceed 140,000 average annual daily traffic. TxDOT's 2006 Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum were followed for the analysis of the GP B project, which do not require an at-capacity evaluation. The analysis was reviewed and approved by FHWA.
161	The sponsors do not take into account that VMT have fallen since 2008 due to the economic recession. The analysis does not take into account the "rebound effect" which occurs when people buy more fuel efficient cars and then drive them more.	The DEIS does not address economic recession and "rebound effect" on VMT	Traffic modeling projections take into account the average growth patterns, purchasing trends, economic influences, as well as traffic behaviors. The VMT, as provided by the Houston-Galveston Area Council, is the most reliable tool that is available at this time.
162	The analysis fails to state that people if they can do so, travel at least 10-20 mph faster than the posted speed limit and that more NOx are generated. So the GPB, which allows faster speeds will create more NOx air pollution.	The DEIS air quality analysis does not take into consideration that people exceed the speed limit	The tendency of the public to exceed the speed limit is a legal matter for the police to enforce. The GP B DEIS and FEIS air quality analysis was conducted following TxDOT's 2006 Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum, which calls for the roadway to be modeled using design standards. The analysis was reviewed and approved by FHWA. Additionally, NEPA does not require TxDOT to address hypothetical situations or speculate. TxDOT utilized the best available information at the time of the DEIS and FEIS preparation.
163	The DEIS states "The proposed project is required to be consistent with the updated and amended 2035 RTP." The DEIS should state the estimated financial cost for the proposed GPB.	DEIS should state the estimated financial cost for the GPB	Partial cost of GP B is provided in the Introduction; however, since the 2040 RTP does not include the SH 288/GP B direct connectors a total cost could not be provided. The current total GP B cost is approximately $1,254,000,000 in present day value.
164	"FHWA and TxDOT cannot evaluate the validity of these studies, but more importantly, these studies do not provide information that would be useful to alleviate the uncertainties associated with MSAT analysis and enable us to perform a more comprehensive evaluation of the health impacts specific to this project." The DEIS states "Therefore, the proposed SH 99 Segment B is justified." The DEIS should provide the public with a definition for "justified" as it relates to professional transportation planning. What data documents that the proposed GPB is "justified?"	Define justification of GPB as it relates to professional transportation planning	As stated in Section 4.6.3, the DEIS states that according to H-GAC, the congestion reduction strategies would help alleviate congestion in the SOV boundary of GP B, but would not eliminate it. Therefore, if congestion is to be further reduced, additional roadway projects such as GP B are needed (justified) to further address congestion within the area. Refer to Section 4.6.1.2 of the FEIS for discussions of traffic congestion.
165	The DEIS states "According to HGAC, the congestion reduction strategies considered for the proposed SH 99 Segment B would help alleviate congestion in the SOV study boundary but would not eliminate it." The DEIS should state what congestion reduction strategies were considered; what congestion reduction strategies were actually approved for implementation; how much congestion will be or has been alleviated; and how much congestion remains.	DEIS should state what congestion reduction strategies were considered, what strategies were approved for implementation and how much congestion remains	As stated in Section 4.6.3 of the DEIS, congestion reduction strategies are provided through the Congestion Mitigation Air Quality program, the CMP, and the RTP, which can be reviewed on the H-GAC website. Refer to Section 4.6.1.2 of the FEIS for discussions of traffic congestion.

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166	It is required that the eight alternatives be compared with regard to secondary impacts. This is not done in this section. This is required by CEQ NEPA regulations, Section 1502.14 and (b). The public must have this information so that it can review, comment on, and understand the proposal.	DEIS should provide air pollution estimates due to construction impacts	As discussed in Section 4.21, the DEIS and FEIS outline that there may be short-term, localized effects to air quality in the immediate area adjacent to the proposed GP B through dust and exhaust gases associated with construction equipment. The DEIS and FEIS also state that measures would be put in place to control dust during the design and construction of GP B.
167	The DEIS fails to provide information about how many more VMT/day will be in the study area in 2035.	DEIS should state the VMT/day, in the study area, for 2035	The DEIS indicates the VMT/year in Section 4.6.2.3, which is appropriate for the MSAT analysis as conducted by TxDOT Air Quality Guidelines. The analysis was reviewed and approved by FHWA. Refer to Section 4.6.1.4 of the FEIS for discussions of an updated MSAT analysis.
168	Page 1, Part 1: General Air Quality Background - The DEIS states "VOCs in motor vehicle emissions are created by incomplete combustion." Volatile Organic Compounds (VOCs) are also emitted via evaporated emissions.	DEIS should state that VOCs are also emitted via evaporative emissions	As stated in the response to Comment 177: The FEIS air quality analysis was conducted following TxDOT's 2006 Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum. These guidelines include language and terminology for use in environmental documents, including the statement in question. TxDOT and ultimately FHWA will review and make the determination if this language should be revised prior to issuing approval. No change was made in the FEIS.
169	Page 1, Part 1: General Air Quality Background - The DEIS states "NOx emissions per mile increase as vehicles go either slower or faster, so simply increasing or decreasing average traffic speed can increase NOx emission." The DEIS should discuss this. The TCEQ has stated publicly that NOx emissions increase as speed increases. The proposed GPB will create conditions where people can drive 70-90 mph. Although the posted speed may be 70 mph the Sierra Club's observation is that people go from 10-20 mph faster than the posted speed when the traffic level allows them to do this. This would result in much greater NOx emissions with the proposed GPB.	Need discussion of NOx emission increases	As stated in the response to Comment 9: The FEIS has updated the air quality analysis using the 2006 TxDOT Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum and includes a qualitative analysis of MSAT emissions. Results of the revised analysis can be found in Section 4.6. The EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 2006 National Air Toxics Assessment, and NOx is not currently listed as a compound to be analyzed through the MSAT process.
170	Grand Parkway MSAT Emissions Analysis - The DEIS should state clearly all the inaccuracies of the Mobile 6.2 model and or any other models that were used for this analysis.	DEIS should state all inaccuracies of Mobile 6.2	GP B is considered a project with low potential for air quality effects since the project falls under the criteria examples provided in TxDOT's Guidelines, specifically that the project design year is not expected to exceed 140,000 average annual daily traffic and therefore a quantitative (modeled) MSAT analysis is not required. TxDOT's 2006 Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum were followed for the analysis of the GP B project and were reviewed and approved by FHWA.
171	Figures 8, 9, 10, and 12, on pages 17-19 - For benzene, 1,3 butadiene, formaldehyde, and polycyclic organics (following the same pattern of an initial reduction then an increase), expect with these four air toxics instead of simply increasing by 2035 they exceed the 2009 baseline. The narrative does not mention that fact.	DEIS needs to disclose that benzene, 1,3 butadiene, formaldehyde, and polycyclic organics exceed the 2009 baseline	The figures referenced in this comment do not occur in the text of the GP B DEIS or FEIS; therefore, no response can be offered for the observations associated with this comment. The comment may have been intended for a different segment of the Grand Parkway. GP B is considered a project with low potential for air quality effects since the project falls under the criteria examples provided in TxDOT's Guidelines, specifically that the project design year is not expected to exceed 140,000 average annual daily traffic and therefore a quantitative (modeled) MSAT analysis is not required. TxDOT's 2006 Air Quality Guidelines and the 2011 TxDOT Air Quality Guidelines Addendum were followed for the analysis of the GP B project and were reviewed and approved by FHWA.

Table 3. Sierra Club Letter Comment-Response Matrix

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172	The lack of a draft Section 404 permit means that the public is left blind about what the proposed environmental impacts are, what mitigation will be required, and just how many waters of the U.S. will be affected. In addition, without any information about jurisdictional versus non-jurisdictional wetlands the public has no idea about the magnitude and intensity of impacts that will occur for the eight alternatives proposed. The estimated wetlands and waters of the U.S. acreage is not broken down according to jurisdictional or non-jurisdictional wetlands. It should be. Again, the DEIS does not provide actual data for the eight alternatives about jurisdictional and non-jurisdictional wetlands in comparative form.	A draft Section 404 permit has not been prepared to compare jurisdictional versus non-jurisdictional waters of the U.S. for all the alternatives	As stated in the response to Comment 86: National Wetlands Inventory maps and other publically available information were used as a common base of information for screening the alternatives. Preparation of draft Section 404 permit application that includes all 8 alternatives would require extensive field work to identify and delineate waters of the United States. Roadway design information would be needed to accurately calculate project impacts. A Section 404 permit application would be prepared following investigation of the Preferred Alternative alignment and design of the Preferred Alternative.
173	The hydraulic study, which essentially tells what drainage will be required for the GPB, but which will be done only after the decision notice is signed, is similar to what occurred with the GPE. This leaves the public blind with regard to environmental impacts and mitigation for comparison for the eight alternatives presented.	A hydraulic study is needed for the alternatives	Streams, floodplains, and aquatic features were used as a common base of information for screening the alternatives. The number and location of stream crossings can be anticipated during the screening process; however, roadway design information would be needed to quantify the impacts of drainage crossings. A detailed hydraulic analysis would be conducted as part of design for the Preferred Alternative.
174	There is no comparison between the eight alternatives with regard to how water quality will be impacted and mitigated. How shallow water aquifers will be impacted or mitigated by the eight alternatives is also not compared.	Water quality and shallow aquifer impacts are not compared for the alternatives	Sections 3.8 and 4.8 of the DEIS and FEIS discuss surface water and groundwater. Anticipated impacts would be similar for the build alternatives. Implementation of best management practices, vegetated drainage swales, and detention/retention facilities would mitigate anticipated impacts.
175	Page 3-40, two different figures are given for water wells. One is 93 and the other is 95 water wells. Which is correct?	Conflicting information regarding the number of water wells	The discrepancy noted in the number of water wells in the study area is apparently a typographical error. Current information on documented water wells relative to the Preferred Alternative would be obtained during preparation of the FEIS. Refer to Section 4.8.5 for a discussion of the water well information in the FEIS.
176	The DEIS states "The facility would permit the conveyance of the 100-year flood, inundation of the roadway being acceptable." The DEIS should document for the public a comparison of how many linear feet of the proposed GPB will be inundated by the 100-year or lesser floods for each of the eight alternatives.	How many linear feet of each alternative would be inundated by the 100-year or lesser floods	Drainage criteria for the proposed roadway would apply to any of the build alternatives. Determining the number of linear feet of each alternative that would be inundated by the 100-year or lesser floods would require a drainage study and preliminary roadway design for each alternative. A detailed hydraulic analysis would be conducted as part of design for the Preferred Alternative.
177	The DEIS states "Construction and roadway use activities are not expected to adversely impact water quality in the proposed SH 99 Segment B study area." The DEIS should document the studies that show that this statement is true. No best management practices (BMP's) are 100% effective for construction especially since few inspections of construction sites occur. The DEIS should state how well implemented the SWPPP and seeding requirements are and how often they are checked.	How will the SWPPP be implemented	A SWPPP would be prepared during the design phase of the project. Best management practices identified in the SWPPP would be implemented to reduce/minimize the introduction of pollutants into area waters. Additionally, the project would comply with the terms of the TPDES Construction General Permit, which specifies the requirements for site inspections.
178	After the construction there is the operation, maintenance, repair and replacement of the proposed GPB and the control of water pollutants from these activities. The DEIS does not address water pollution effects due to operation, maintenance, repair, and replacement activities (for example, mowing, herbicide use, fertilizer use, etc.) for the proposed GPB. The DEIS does not discuss the development of developed buffer zones, usually 150 feet on both sides of the road, which may drain into the GPB ROW and which will carry additional non-point source water pollution. This is a subsidy for those private interests that develop along the proposed GPB since public funds are used to carry this drainage and non-point source water pollution.	Discussion of water quality impacts is incomplete	Roadway operation, maintenance, repair, and replacement activities would be conducted in accordance with TxDOT guidelines to minimize degradation of water quality (e.g., herbicide and fertilizer use would be conducted by certified applicators). Storm water runoff associated with development that occurs beyond the right-of-way of the proposed roadway would be required to comply with applicable regulations and guidelines related to storm water discharges. The DEIS and FEIS fully meet the laws and requirements of NEPA and other related federal and state laws, rules, and regulations.

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179	There are no studies provided which document the effectiveness in the Houston area of BMP's long-term over the life of a road. In addition, the induced growth and development will create more impervious surface which will add to non-point source water pollution volume and extent. However, little or nothing is mentioned about how much the watersheds (in percent) will be paved with impervious surface in the long-term and what affect this will have on water quality. The DEIS states that ..."any of the seven alternative Alignments would represent a small fraction of the total area of the existing watershed....the percentage increase in total runoff from the watershed would be expected to be minimal" but the DEIS fails to tell the public what "minimal" is and fails to state that the access the proposed GPB will provide will result in a sea change in land use and with it reduced water quality.	The proposed roadway will change land use and reduce water quality	Section 5.5.7 of the DEIS discusses growth and development within the Area of Influence, and potential impacts to water quality. The DEIS and FEIS fully meet the laws and requirements of NEPA and other related federal and state laws, rules, and regulations. Refer to Section 5.4.5 of the FEIS for discussions of indirect effects of water quality.
180	There is no comparison of the eight alternatives and the surface water quality impacts and mitigation required.	What are water quality impacts and required mitigation for all the alternatives	As stated in the response to Comment 226: Sections 3.8 and 4.8 of the DEIS and FEIS discuss surface water and groundwater. Anticipated impacts would be similar for the build alternatives. Implementation of best management practices, vegetated drainage swales, and detention/retention facilities would mitigate anticipated impacts for the Preferred Alternative.
181	The DEIS states "Continued development in the proposed SH 99 Segment B study area would increase the amount of impermeable surface area and would potentially slow recharge flow to the aquifer. However, the amount of net increase of impermeable surface area ... in comparison to the area of the watershed would be minimal." The DEIS should state what "minimal" means.	Discussion of groundwater impacts is incomplete	The minimal reference relates to the small number of acres of impervious surface resulting from construction of any of the build alternatives as compared to the number of acres within the watersheds associated with the study area.
182	Following project construction, substantially new pathways would be created for the highway storm water runoff to the regional aquifers. The DEIS should state where this will occur and provide a map regarding this. The DEIS should also discuss what an appropriate spill response action plan is and how this is different from what is done currently on highways.	Discussion of groundwater impacts is incomplete	As discussed in Section 4.8.2 of the DEIS and FEIS, storm water control measures and best management practices would be implemented to minimize impacts to regional groundwater resources. The DEIS and FEIS fully meet the laws and requirements of NEPA and other related federal and state laws, rules, and regulations.
183	The DEIS also should provide information about the private wells where groundwater pollution prevention measures might be required. The DEIS should document how impacts to public wells is a "minimal" environmental impact. The DEIS should also state how operation, maintenance, repair, and replacement activities (for example, mowing, herbicide use, fertilizer use, etc.) may affect groundwater.	Discussion of groundwater impacts is incomplete	Water wells occurring on private property outside the proposed project right-of-way would not be expected to be adversely affected by GP B. As discussed in Section 4.8.2 of the DEIS and FEIS, storm water control measures and best management practices would be implemented to minimize impacts to regional groundwater resources. The DEIS and FEIS fully meet the laws and requirements of NEPA and other related federal and state laws, rules, and regulations.
184	The DEIS states that "Some bank stabilization may also be required to protect stream banks from erosive forces of storm flows." This is the type of environmental impact that occurs from roads and induced development. There is no comparison about how many streams miles or linear feet will be impacted by each of the eight alternatives.	No comparison of the miles/linear feet of stream impacts for the alternatives	Table 2-1 in Section 2.0 in the DEIS and FEIS provides the number of bridges or drainage structures estimated to be required for each alternative. Linear feature (e.g., bridges and culverts) impacts to streams for the Preferred Alternative would be determined in the FEIS and during design of the Preferred Alternative.
185	The DEIS states "Any water quality impacts would be expected to be shot-term and localized as sediments should quickly settle from the water column downstream of disturbed areas." The DEIS should define "short-term," "localized," and "quickly settle" so the public understands what this means.	More information needed for short-term disturbance impacts	The statement indicates that short duration disturbances to water bodies during construction would not adversely affect water quality. BMPs would be implemented during construction and incorporated into the design of any of the build alternatives.

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186	The DEIS states " ... included efforts to avoid impacts to wetlands resources ... the geometric configuration of the roadway design made complete avoidance impractical ... No practicable alternatives to construction in wetlands are available." The DEIS should show and compare the specific geometric configurations for roadway design for each alternative that made complete avoidance impractical.	Show and compare roadway geometric configurations relative to wetlands	Exhibits 2-4 and 2-5 in Volume II in the DEIS and FEIS show the corridor components and the alternatives that were developed during the initial phase of the project. Potential wetlands occurring within the corridor components and alternatives are presented in Section 2.0, Table 2-1 in the DEIS and FEIS.
187	The DEIS should also show and compare for each alternative where elevation of the roadway is practical or not.	No comparison of roadway elevation practicality for the alternatives	The location(s) and practicality of elevating the roadway would be determined during design of the Preferred Alternative.
188	The DEIS fails to tell the public what PUB, PEM, PSS, PFO, and similar terms mean.	Wetland terms used should be defined	The specified terms are defined in Section 3.9.3, and are included in the List of Acronyms in the DEIS. These wetland terms are not used in the FEIS.
189	The DEIS states "Construction of detention facilities as part of roadway construction would reduce long-term sediment and pollutant loads entering into these watersheds." The DEIS should state and compare how much long-term sediment and pollutant loads would be reduced for each of the eight alternatives.	No comparison of the reduction of sediment and pollutant loads for the alternatives	A detailed hydraulic analysis would be conducted as part of design of the Preferred Alternative. BMPs would be incorporated into the design of the Preferred Alternative.
190	The DEIS states "To the extent practicable, aquatic resource functions would be replaced ... as part of mitigation ... To the extent practicable, compensatory mitigation would be sufficient to replace lost aquatic resource functions associated with the stream bed." What does "To the extent practicable" mean? The DEIS should show and compare how the eight alternatives will replace aquatic resource functions as part of mitigation for wetlands and for streams.	How will aquatic resource functions be replaced for the alternatives	Impacts to identified jurisdictional waters of the United States, and compensatory mitigation requirements necessary to replace aquatic resource functions of impacted wetlands and streams, would be determined through Section 404 permitting activities following design of the Preferred Alternative.
191	Page 4-69, the DEIS should have a draft non-point source permit for construction and for operation, maintenance, repair, and replacement so that the public can review and understand and compare the environmental impacts and mitigation of the eight alternatives.	A draft non-point source permit should already have been prepared	A Storm Water Pollution Prevention Plan would be developed for the Preferred Alternative and filed with a Notice of Intent prior to the initiation of construction of GP B in compliance with the TCEQ's Construction General Permit. The SWPPP would include identified best management practices for construction. BMPs relative to operation of GP B would be incorporated into design of the Preferred Alternative.
192	The DEIS states "To the extent practicable, the design would also minimize the area of a floodplain impacted by the roadway." The DEIS should define what "To the extent practicable" and "minimize" mean.	Minimize the area of an impacted floodplain	A detailed hydraulic analysis would be conducted as part of design for the Preferred Alternative. The design would follow required policies and guidelines regarding floodplains.
193	The seven Build Alternatives will generate more induced growth than the No-Build Alternative. There is no comparison between the eight alternatives about the flood impacts (amount of water that will be generated by the road and induced development).	No comparison of alternatives and induced development on flood impacts	An indirect impact analysis was conducted as part of the DEIS and FEIS. The analysis was conducted to comply with CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). The indirect impact analysis, which includes floodplains, is described in Section 5 of the DEIS and FEIS. Design of the Preferred Alternative would follow required policies and guidelines regarding floodplains. Similarly, development projects would be required to follow policies and guidelines relative to development in floodplains.

Table 3. Sierra Club Letter Comment-Response Matrix

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194	The DEIS fails to quantify the impervious surface and compare this water quality information for the eight alternatives.	Water quality impacts are not compared for the alternatives	Indirect and cumulative impact analyses were conducted as part of the DEIS and FEIS. The analyses were conducted to comply with CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). The indirect impact analysis is described in Section 5 of the DEIS and FEIS. Resource categories considered in the cumulative analysis for the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS and Section 6.2 of the FEIS. Table 6-1 of the DEIS and Table 6-2 of the FEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. The indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
195	The DEIS should state what local regulations and standards it refers to. The DEIS should tell which local entities have what regulations and standards that address water quality. The DEIS should discuss the effectiveness of local regulations and standards.	What local regulations and standards address water quality	A Storm Water Pollution Prevention Plan would be developed for the Preferred Alternative and filed with a Notice of Intent prior to the initiation of construction of GP B in compliance with the TCEQ's Construction General Permit.
196	The DEIS should state how many spill events it expects each year and the potential volume of these spills. The DEIS should also state that litter, herbicides, and fertilizers are also water pollutants that runoff from road corridors.	What is the expected number and volume of spill events, and state that litter, herbicides, and fertilizers are pollutants	Estimating a number of future spill events and volume of material involved would be speculative. TxDOT employs certified applicators to apply herbicides and fertilizers to avoid or minimize impacts beyond a roadway ROW.
197	The DEIS should state how effective are the erosion and sediment controls implemented during construction. The DEIS should discuss what regulatory monitoring and enforcement of these requirements finds when visiting road sites. The DEIS should state how often large road projects are visited by local, state, and federal investigators during the lifetime of the project. The DEIS should talk about what regulatory authorities have found at similar local roads with regard to compliance and water pollution from local roads and their corridors.	How effective are erosion and sediment controls, and how are they monitored	A Storm Water Pollution Prevention Plan would be developed for the Preferred Alternative and filed with a Notice of Intent prior to the initiation of construction of GP B in compliance with the TCEQ's Construction General Permit. The SWPPP would include identified best management practices and a monitoring plan to be implemented during the construction phase of the project.
198	The DEIS should discuss what the monitoring plan will consist of including what methodologies will be used, how often will monitoring occur, over what time period will the monitoring occur, what is the procedure for correcting a problem, etc. In addition, monitoring should not be done only for construction activities but should also be done for operation, maintenance, repair, and replacement activities.	How will monitoring be conducted	A monitoring plan would be incorporated into the SWPPP.

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199	The DEIS does not estimate what the water pollution impacts are of developing 8,300 to 33,100 acres of land and the loss of 14,000-15,000 acres of wetlands via residential, commercial, industrial, and institutional development and population growth including fertilizers, pesticides, pet wastes, oil, automatic transmission fluid, brake fluid, etc. that comes from these developments.	What are the estimated water pollution impacts from induced development	Indirect and cumulative impact analyses were conducted as part of the DEIS amd FEIS. The analyses were conducted to comply with CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). The indirect impact analysis is described in Section 5 of the DEIS and the FEIS. Resource categories considered in the cumulative analysis included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS and FEIS. Table 6-1 of the DEIS and Table 6-2 of the FEIS list the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. The indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
200	The DEIS states "It is likely that impacted wetlands would lose functions and values ... Direct impacts to non-wetland waters of the U.S. cannot be assessed until design plans are prepared." These statements are inaccurate. First, it is not "likely" but guaranteed that impacted wetlands, in other words, destroyed wetlands, will lose functions and values. Therefore it should be easy to make such a statement especially since earlier in the DEIS the sponsors stated that some wetlands will have to be destroyed because they cannot be avoided.	Impacted wetlands would lose functions and values	The locations of wetlands and waters located within the proposed right-of-way are discussed in Section 3.9 of the DEIS and FEIS. As stated in Section 4.9 "specific impacts cannot be assessed until a preferred alternative is selected and final design plans are completed." The FEIS will include the determination of the Preferred Alternative; however, final design plans have not been developed. Therefore, a determination of specific impacts to wetlands and waters of the U.S. has not been determined. Section 4.9 (Wetlands and Other Waters of the U.S.) of the FEIS will provide more detail and updated wetland and waters information. It is anticipated an Individual Permit would be needed from the USACE. When this is prepared a detailed mitigation plan will be developed to off-set any impacts the proposed project has on wetlands and waters. TxDOT will work with USACE to develop the mitigation plan in accordance with all applicable federal, state and local environmental policies and regulations.
201	Direct impacts to non-wetland waters of the U.S. for the eight alternatives must be assessed and compared. Linear feet of streams that may be impacted (notice the may which connotes to estimated) can be calculated with the proviso that these are estimates.	What are impacts to non-wetland waters of the U.S. for the alternatives	Table 2-1 in Section 2.0 in the DEIS and the FEIS provides the number of bridges or drainage structures estimated to be required for each alternative. An identification and delineation of jurisdictional waters of the U.S. would be conducted for the Preferred Alternative. Specific impacts to identified jurisdictional waters of the U.S. would be determined following design of the Preferred Alternative.
202	The DEIS states "as some wetland areas would be avoided." This is a misleading statement unless the DEIS adds that wetlands will be isolated and then degraded and their hydrology changes as they are surrounded by growth and development. 14,000-15,000 acres of wetlands destroyed is more significant than "some wetlands would be avoided."	Wetland avoidance is a misleading statement	The Clean Water Act regulates the discharge of dredged or fill material into jurisdictional waters of the U.S., including wetlands. Department of the Army permitting is not required if jurisdictional waters of the U.S. are avoided. Compensatory mitigation must offer equivalent functions and services for waters/wetlands unavoidably impacted by projects involving discharges into jurisdictional waters of the U.S.
203	The DEIS states "It is not possible to predict the amount of unauthorized wetland filling activities that may occur." This is an inaccurate and misleading statement. The Corps has documented illegal fills and aerial photos can document additional dredge/fill activities that are illegal. Estimates of illegal dredge/fill activities can be determined via past Section 404 activities, studies, and reports on this issue.	Illegal fill activities can be estimated	Review of USACE files and records to identify Section 404 activities specific to the project area, and interpretation of aerial photographs to identify possible unauthorized fill activities within the project area would be time intensive and cost prohibitive.
204	The DEIS states "Impacts to floodplains would not be anticipated because of the proposed SH 99 Segment B encroaching into new areas." This statement is inaccurate. The volume of water and the speed the water leaves the GPB will affect the natural stream geomorphology leading to a change in drainage patterns and additional erosion and scouring due to greater volumes of water at higher speeds.	The proposed roadway will lead to a change in drainage patterns, erosion, and scouring	A detailed hydraulic analysis would be performed for the Preferred Alternative, which would identify design features and mitigation necessary to maintain storm flows as close as possible to existing conditions.

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205	Every flood control structure has an engineering limit above which the detention pond or other flood structure will not be able to prevent non-point source water pollution and flood water runoff. The DEIS should state what this limit is. In addition, with cumulative impacts due to development this limit could be reached much more rapidly in the road ROW or nearby development than occurs if there is just a road. The DEIS should analyze alternatives that bridge all of the floodplains and wetlands and thus minimizes encroachment on regulatory floodways and floodplains.	The DEIS should analyze bridging all floodplains and wetlands	The proposed roadway would be designed to convey a 100-year storm event. Appropriate bridging would be determined during design of the Preferred Alternative. Development outside the roadway would be required to comply with regulatory policies and guidelines related to floodways and floodplains.
206	Where are the estimates of water quality and linear feet of stream vegetation that may be lost or as on page 6-42 states "are likely to occur, or are probable, rather than those that are possible."	No estimate of water quality or linear feet of stream vegetation losses	Water quality and vegetation are discussed in Section 6.1.5 and Section 6.1.8, respectively, in the DEIS and Section 6.2.3 and 6.2.6, respectively, in the FEIS.
207	(Water quality and stream vegetation) is a tremendous cumulative impact and is not a minor degradation or loss. The DEIS should state what assumptions and criteria were used to make this determination. As the sponsors understand there are not enough Corps and TCEQ inspectors in the field to determine if mitigation is done, done right, and continues to exist into the 2035 future.	How were impacts to water quality and stream vegetation determined	Refer to Section 4.10 (Permits) of the DEIS that discusses required permits (and associated mitigation) for the proposed project. Refer to Section 7 (Permits, Mitigation and Commitments for the Preferred Alternative) of the FEIS for a more detailed discussion of environmental policies and regulations set forth to protect the environment and how the Preferred Alternative would meet the regulations through permits, mitigation and commitments. TxDOT also has best management practices (BMPs) that are discussed specific to cumulative impacts to Water Quality in Section 5.5.7 of the DEIS and Section 6.2.3 of the FEIS. All permits, mitigation and commitments that are not completed prior to the start of construction would be the responsibility of the Contractor to implement. TxDOT develops very detailed instructions (through Technical Provisions as well as Environmental, Permits, Issues and Commitments plan sheets that are included in the design plan sets) and on how to follow through with those actions and TxDOT is responsible for continued oversight of those actions being completed.
208	The DEIS states " ... stricter development regulations have been implemented to aid in the reduction of impacts that developments have on the 100-year floodplain." The DEIS should document this assertion. Currently, flood impacts are higher (more expensive) than they were in the past. In addition, drainage districts have channelized streams and destroyed floodplain functions. Therefore, floodplains have often grown in size within urban areas as drainage districts have attempted to shrink their size.	Floodplain impacts may be more extensive	Urban development outside the roadway would be required to comply with regulatory policies and guidelines related to floodways and floodplains.
209	The DEIS does not explain how mitigation measures will be successful now which in the past have failed.	How will mitigation measures work	Refer to Section 4.10 (Permits) of the DEIS that discusses required permits (and associated mitigation) for the proposed project. NEPA requires federal agencies to integrate environmental impacts of a proposed project and it's alternatives into their decision-making processes. NEPA also requires the permits, mitigation and commitments (based on federal, state and local environmental policies and regulations) be documented so to ensure future follow through with the required actions. Refer to Section 7 (Permits, Mitigation and Commitments for the Preferred Alternative) of the FEIS for a more detailed discussion of environmental policies and regulations set forth to protect the environment and how the Preferred Alternative would meet those regulations through permits, mitigation and commitments.
210	(Stream crossings) will affect the costs of each alternative so at least an estimate of which streams will be crossed via bridges or culverts and how many linear feet will be impacted for each alternative is needed. In addition, information is needed about what the sponsors are willing to provide in acres of wetlands compensation for jurisdictional and non-jurisdictional wetlands for each alternative. The wetlands analysis is unfinished so the public does not know what each of the eight alternatives will look like and what the impacts will be.	DEIS should have an estimate of steam crossings and the acreage of wetlands compensation for the alternatives	Table 2-1 in Section 2.0 in the DEIS and FEIS provides the number of bridges or drainage structures estimated to be required for each alternative. An identification and delineation of jurisdictional waters of the U.S. would be conducted for the Preferred Alternative. Specific impacts to identified jurisdictional waters of the U.S. would be determined following design of the Preferred Alternative. Mitigation to compensate for lost aquatic functions would be developed as part of Department of the Army permitting.

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211	The list of cumulative actions/impacts is deficient. Cumulative actions (future reasonably foreseeable actions - which means until 2035) that are not defined or are cursorily defined so that the full cumulative impacts to wetlands and waters of the U.S. are underestimated include: 1. Commercial developments 2. Industrial developments 3. Roads not found on the HGAC RTP list 4. Drainage and flood control projects 5. Water supply projects and pipelines 6. Fiber optic and other communication projects (like cell towers) 7. Electric utilities 8. Wastewater treatment facilities and pipelines 9. Churches 10. Schools 11. Hospitals 12. Cemeteries 13. Parks 14. Police facilities 15. Fire facilities 16. Emergency medical service facilities 17. Local, state, and federal government office and maintenance buildings 18. Interstate 69 The DEIS does not provide a comparison between the eight alternatives that takes this important information into account.	The cumulative impacts assessment is deficient	As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.
212	The DEIS does not provide a comparison between the eight alternatives that takes this important information (cumulative actions/impacts listed above) into account.	All cumulative actions/impacts are not compared for the alternatives	As stated in the response to Comment 13: A cumulative impacts analysis (CIA) was conducted as part of the DEIS and FEIS. The CIA was conducted to comply with the CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). Resource categories considered in the cumulative analysis of the DEIS included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1 of the DEIS. Table 6-1 of the DEIS lists the determinations for resources included in the cumulative effects analysis and the reasons for not including them in the analysis. Refer to Section 6.1.1 for those resources carried forward as part of the cumulative impacts analysis for the FEIS. The Indirect and cumulative impacts sections were prepared in accordance with the requirements of NEPA and other related federal and state laws, rules, and regulations.

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213	The use of data which is eight years out-of-date (2004) to assess the development rate and impacts to wetlands is not justified or scientific. More recent data is available and must be used. Use of this old data biases the analysis because it shows less wetlands and waters of the U.S. impacts than has occurred. The DEIS fails to provide a comparison between the eight alternatives that takes this important information into account.	Impact analysis is based on outdated information	Updated wetland information, as available, would be used during the preparation of the FEIS. Refer to Sections 3.9 and 4.9 of the FEIS for updated information on waters of the U.S, including wetlands.
214	The DEIS states " ... compensation may not occur within the same immediate geographic area as the development ... Off-site mitigation would not replace wetland functions in the immediate geographic area as the area of impact." If this is so how will this affect water quality, wetlands, and waters of the U.S. protection within the study area, AOI, or RSA? In one instance, the Corps of Engineers, several years ago, proposed mitigation at a mitigation bank in the Sabine River Watershed when the environmental impacts would be in the Clear Creek Watershed. What happens to watersheds in the study area, AOI, and RSA if this type of out-of-watershed mitigation continues?	What is the effect on impacted watersheds if wetlands mitigation is out-of-watershed	The functions and services of impacted jurisdictional waters/wetlands would be replaced through compensatory mitigation as approved through the Department of the Army permitting process. Development projects within project area watersheds would be required to follow TCEQ regulations relative to water quality (i.e., filing NOIs and SWPPPs prior to construction).
215	The DEIS states "Numerous waters of the U.S. would be impacted by anticipated development that is induced by construction of the proposed SH 99 Segment B." The DEIS should provide an estimate and comparison of the number and location of these waters for each of the eight alternatives and what this means for the quality of wetlands and waters of the U.S.	What are the impacts to waters of the U.S. from anticipated development	Table 2-1 in Section 2 in the DEIS and FEIS provides an estimate of the number and acreage of wetlands potentially impacted by each of the alternatives. Wetlands and waters of the U.S. relative to indirect and cumulative impacts are discussed in Section 5.5.8 and Section 6.1.7, respectively, in the DEIS and Section 5.4.6 and Section 6.2.5, respectively, in the FEIS.
216	The DEIS states" ... drainage improvements would not increase flood flows or raise the 100-year base flood elevations." What is this statement based upon? Precisely what drainage improvements do is increase flood flows into streams.	Drainage improvements increase flood flows	Drainage improvements incorporated into construction and development projects would be required to adhere to floodplain policies and guidelines regulating storm water flows.
217	The DEIS should state why the environmental impacts are not at this time quantifiable. An estimate of construction, operation, maintenance, repair, and replacement impacts is possible by using reasonable assumptions and clearly stating why these assumptions are being used.	Environmental impacts are not quantified	Assumptions about future growth and the combined effects with the proposed project were made and are documented in the DEIS and FEIS in the Indirect and Cumulative Impacts Sections. Refer to Sections 5 and 6 of the DEIS and FEIS. Also as stated in the response to Comment 96: The Indirect and cumulative impact analyses conducted as part of the DEIS and FEIS comply with CEQ regulations (40 CFR 1500–1508), the FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010). The indirect impact analysis is described in Section 5 of the DEIS and FEIS. Resource categories considered in the cumulative analysis included Land Use, Social, Air Quality, Water Quality, Waters of the U.S., including Wetlands, Floodplains, and Vegetation. The analysis of the resources is described in the subsections of Section 6.1. The DEIS and FEIS fully meet the laws and requirements of NEPA and other related federal and state laws, rules, and regulations.

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218	Appendix E, Cultural Resource Reports, page 5, (states) that the 1900 hurricane destroyed or severely damaged Alvin and the surrounding areas. Today, we are more vulnerable than ever since more people and property lie within the hurricane and flood zones. Prairie, grasslands and wetlands act as a buffer so make the storm surge, rain, and wind damage less. Yet the economic study does not recognize this. The ecosystem benefit and the dis-benefit of destroying these natural and farm lands is not even acknowledged or recognized in the economic study and no price is placed upon this as a benefit or ignoring it, a cost. Therefore, in the future when a hurricane affects this area the costs, loss of lives, and injuries together could be even greater and people will wonder what happened. This economic study lures people into a false sense of security and the University of Houston as well as the sponsors, in part, are responsible for these events.	The benefits of ecosystems are not recognized, so future hurricanes would be more costly in terms of costs, loss of lives, and injuries	NEPA requires federal agencies to integrate environmental impacts of a proposed project and it's alternatives into their decision-making processes. Refer to the following sections of the DEIS for discussion of impacts to water quality (Section 4.8), wetlands and waters of the U.S. (Section 4.9), vegetation and wildlife (Section 4.11), threatened and endangered species (Section 4.12) and farmlands (Sections 4.2). Refer to the following sections of the FEIS for discussion of impacts to water quality (Section 4.8), wetlands and waters of the U.S. (Section 4.9), vegetation and wildlife (Section 4.10), threatened and endangered species (Section 4.11) and farmlands (Sections 4.2).