



Draft Environmental Assessment

McHard Road Extension

From Cullen Blvd. to Mykawa Road

CSJ: 0912-31-290

Brazoria County, Texas

January/2017

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT.

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LIST OF ACRONYMS AND ABBREVIATIONS

- ACS** – American Community Survey
- APE** – Area of Potential Effect
- BMP** – Best Management Practice
- CEQ** – Council on Environmental Quality
- CFR** – Code of Federal Regulations
- CO** – Carbon Monoxide

DOT – Department of Transportation

EA – Environmental Assessment

EMST – Ecological Mapping Systems of Texas

EO – Executive Order

EPA – Environmental Protection Agency

FEMA – Federal Emergency Management Agency

FHWA – Federal Highway Administration

FWCA – Fish and Wildlife Coordination Act

ISA – Initial Site Assessment

LEP – Limited English Proficiency

LOS – Level of Service

MBTA – Migratory Bird Treaty Act

MOU – Memorandum of Understanding

MPO – Metropolitan Planning Organization

MS4 – Municipal Separate Storm Sewer System

MSAT – Mobile Source Air Toxics

MTP – Metropolitan Transportation Plan

NEPA – National Environmental Policy Act

NCHRP – National Cooperative Highway Research Program

NHD – National Hydrography Dataset

NOI – Notice of Intent

NRCS – Natural Resources Conservation Service

NRHP – National Register of Historic Places

NWI – National Wetlands Inventory

PA-TU – First Amended Programmatic Agreement among FHWA, TxDOT, the TSHPO, and the Advisory Council on Historic Preservation Regarding the Implementation of Transportation Undertakings

PCN – Pre-Construction Notification

SAL – State Antiquities Landmark

SGCN – Species of Greatest Conservation Need

SH – State Highway

SHPO – (Texas) State Historic Preservation Office

SW3P – Stormwater Pollution Prevention Plan

TAC – Texas Administrative Code

TCEQ – Texas Commission on Environmental Quality

THC – Texas Historical Commission

TIP – Transportation Improvement Program

TPDES – Texas Pollutant Discharge Elimination System

TPWD – Texas Parks and Wildlife Department

TxDOT – Texas Department of Transportation

USACE – United States Army Corps of Engineers

USFWS – United States Fish and Wildlife Service

USGS – United States Geological Survey

VPD – Vehicles per Day

1.0 INTRODUCTION

The City of Pearland, in cooperation with the Texas Department of Transportation (TxDOT) proposes constructing an extension of McHard Road from Cullen Boulevard to Mykawa Road. The project would consist of a four-lane divided, storm sewer/curb-and-gutter, urban cross-section connecting to the existing McHard Road at Cullen Boulevard to the west and Mykawa Road to the east. The total project length is approximately 3.45 miles (see **Appendix A** for the **Project Location Map**). Also included in the project is the construction of three storm water detention features.

The extension of McHard Road between Cullen Boulevard and Mykawa Road would facilitate east/west traffic through north Pearland and north Brazoria County and provide relief for congested travel conditions on West Broadway Street.

The purpose of this EA is to study the potential environmental consequences of the project and determine whether such consequences warrant preparation of an EIS. The EA is prepared to comply with TxDOT's environmental review rules and with the requirements of the National Environmental Policy Act (NEPA). The EA will be made available for public review. Following the prescribed comment period, TxDOT will consider any comments submitted. If TxDOT determines that there are no significant adverse effects, it will prepare and sign a FONSI, which will be made available to the public.

2.0 PROJECT DESCRIPTION

2.1 EXISTING FACILITY

There is no existing roadway throughout much of the area along the proposed McHard Road alignment. There is approximately 0.7 mile of existing two-lane roadway, Brookside Road, from Cullen Blvd to Stone Road. Existing Brookside Road has a short 100' section adjacent to Cullen Blvd with 3-10' lanes (to allow for a left turn lane). Along the remainder of its route, it is a 20-foot wide pavement, undivided, (2-10' lanes) with no shoulders, open ditches, within 60 feet of ROW.

2.2 PROPOSED PROJECT

The proposed 3.45-mile-long facility would extend from Cullen Boulevard to Mykawa Road in the City of Pearland, Texas (**Appendix A, Project Location Map**). These project limits were chosen because there is no existing east-west thoroughfare in this location, which would link to disconnected sections of McHard Road east of Mykawa Road and west of Cullen Boulevard. After construction, McHard Road would remain a city street. The proposed McHard Road will be a four-lane major thoroughfare with intersections planned at Cullen Blvd, Adamo, Stone, Max, Roy, Garden, O' Day, Hatfield, Woody, and Mykawa Roads. With the exception of Cullen Blvd and Mykawa Road, these intersecting side streets would include pavement widenings and transitions on McHard Road to meet the proposed class of roadway for each side street ROW as shown on the City of Pearland Thoroughfare Plan (<http://pearlandtx.gov/home/showdocument?id=5938>). The widening of Adamo extends 200' to the south only and will be 2-12' lanes. The widening of Stone Rd, Max Rd, Roy Rd, Garden Rd, O' Day Rd, Hatfield Rd and Woody Rd each extends to the north and south approximately 400' and will be 2-12' lanes with a 12' left turn lane. (O' Day Rd will also have added width- near the intersection of McHard- for two future lanes on the south side only, to match the City's Future Transportation Plan).

The proposed McHard Road would have an urban cross-section consisting of a four-lane divided, curb-and-gutter roadway within a typical 120-foot ROW with an 18-foot raised median. Each travel lane would be 12 feet wide with a 10-foot-wide shared pedestrian/bicycle path. The proposed facility would have median openings and left turn lanes as required. Drainage improvements would include roadside ditches extending along either side of the roadway. These ditches would connect at intervals to drainage inlets which would be required behind the proposed back of curb. The ditches and inlets would drain toward the proposed storm sewer which will be located in the median of the roadway. There are 10 planned outfalls along the proposed roadway. The project would also include three stormwater detention ponds. These pond properties would be sized as follows: Pond 1 - 5.4 acres, Pond 2 - 3.0 acres, and Pond 3 - 13.7 acres. The latest estimated total project cost is \$48 million. Of this amount 80% is federal funds and 20% is local funds.

The proposed McHard Road project consists of an independent utility project as the roadway construction between the logical termini consists of a usable roadway improvement to the traveling public and a reasonable expenditure of funds even if no additional transportation improvements are made in the general project area. The urban/suburban development and associated vehicular congestion warrants the proposed roadway improvements within the project limits.

The proposed project is included in the 2017- 2020 STIP/TIP which was approved on December 19, 2016. It is also included in the 2040 Regional Transportation Plan (RTP) (See **Appendix E**).

The Project Schematic and Typical Sections are shown in **Appendices C and D**, respectively.

3.0 PURPOSE and NEED

3.1 Need

This project is needed because (1) there is insufficient east/west connectivity through the City of Pearland between Pearland Parkway and State Highway 288; (2) there is reduced mobility and increased traffic congestion along Farm to Market (FM) Road 518/Broadway Street; and (3) the area planned to be served by the project has insufficient access to amenities found within the City of Pearland and areas of Brazoria and Harris Counties.

3.2 Supporting Facts and/or Data

Brazoria County, including the proposed project area, is experiencing tremendous population growth (see **Table 1**). Growth in population and employment creates demands on the existing local and regional transportation network, FM 518/Broadway Street. Continued growth and urbanization in the Houston-Galveston region, specifically near the proposed project in Brazoria County, has resulted in the need for more efficient transportation systems to reduce existing congestion and accommodate future traffic demands and thus improve mobility. Presently the most direct way to travel west from McHard Road at Mykawa Road to Cullen Blvd through the project area would be to turn north from McHard onto Mykawa and then turn west onto Scott Lane to Woody Road. The traveler would then turn south on Woody Road to Rice Street and turn west. At the Oday intersection, the traveler would turn south to Butler Road and turn west. At Stone Road the traveler would turn north and continue to Brookside Road at which point the traveler would turn left to Cullen Boulevard. There is a somewhat more direct route farther north along Brookside Road; however, Brookside Road is located outside of the City of Pearland and would not serve the residents and businesses of the project area in the City of Pearland. Due to the absence of a

continuous route between Cullen Boulevard and Mykawa Road in the project area, and the need to presently make many turns to travel this route, this is an undesirable situation for travelers on these roadways since most of these intersections have no traffic lights and no channelized turn lanes. In addition, the roads are narrow with no shoulders to allow drivers to avoid turning vehicles which is common due to the high numbers of driveways opening onto these streets. In addition, most of these roads have open ditches alongside them.

The present (2016) traffic volumes along FM 518/Broadway Street range from over 32,000 average daily traffic (adt) to over 43,000 adt. The projected (2040) traffic volumes on FM 518 range from over 35,000 adt to over 66,000 adt, depending on the road segment (TxDOT TPP Traffic Analysis FM 518 June 2016). The base year (2017) traffic volume for McHard Road is over 12,000 adt. Traffic volume for the proposed project is projected to increase to over 17,000 adt in 2037 and to over 19,000 adt by 2047 (TxDOT TPP Traffic Analysis McHard Road November 2015). The LOS for FM 518 in 2035 even with the proposed McHard Road project in place is projected to be level F (CDM Smith, 2015). Without the proposed McHard Road extension, this large number of vehicles would have to travel over the convoluted route comprised of narrow local roads described above, other local nearby roadways, or divert to FM 518/Broadway Street with projected high traffic volumes. This congestion and indirect transportation route in the event that McHard Road is not constructed would likely result in many persons choosing to avoid the area, limiting access into the area, but would also likely discourage local residents from travel.

Table 1 Regional and Community Growth

Area	Year			Percent Increase 2000-2010	Year 2030 (Projected)
	1990	2000	2010		
City of Pearland	18,927 ¹	37,640 ¹	91,252 ²	142.4%	129,166 ³
Brazoria County	191,707 ¹	241,767 ¹	313,166 ²	29.5%	401,684 ³

Sources: ¹ Texas Almanac (2014) ² U.S. Census (2010), ³ Texas Water Development Board; accessed 2014 (2012 State Water Plan Population Projections, 2030)

Growth trends in population and employment indicate that the area would continue to experience increased travel demand and thus result in increased traffic. As a consequence, improved mobility has become an essential need both locally and regionally. The lack of adequate mobility causes citizens to have limited access to job opportunities, and employers are denied full access to the region’s pool of skilled workers. Inadequate mobility also results in increasing time spent moving people and goods from one point to another.

3.3 Purpose

The purpose of the project is to:

- 1) Improve connectivity between Pearland Parkway and SH 288;
- 2) Improve mobility on FM 518/Broadway Street;
- 3) Provide residents in the project area better access to amenities in the City of Pearland and Harris and Brazoria Counties.

4.0 ALTERNATIVES

4.1 Build Alternative

The Preferred (Build) Alternative 1 (North): Intersects Cullen Boulevard at existing Brookside Road and follows Brookside Road for approximately 3,500 feet. It departs the alignment of Brookside Road eastward and then angles southward just past the Stone Road intersection. At Max Road, the proposed alignment turns eastward again and continues eastward until just past Garden Road where it veers slightly southeastward and then turns back east just west of Oday Road. Just east of Oday Road the alignment again veers slightly southeastward and then turns back to the east at Woody Road where it veers slightly northeastward and then continues east to Mykawa Road.

The proposed project would improve connectivity between Pearland Parkway and SH 288 by providing a direct route and modern roadway between these two points in the northern portion of Pearland where one does not currently exist. An informal survey conducted by the City of Pearland Comprehensive Planning Advisory Committee indicated that respondents felt that the main method to improve mobility in Pearland was to improve east/west mobility (City of Pearland, 2015). It would improve mobility on FM 518/Broadway Street by attracting some of the current vehicle load, especially in the area north of FM 518 and taking some of these vehicles off of FM 518. The current projected Level of Service (LOS) for FM 518 for the year 2035 is projected to be Los F even with McHard Rd in place (CDM Smith, 2015). Without McHard Road to attract vehicular traffic in the project area, the situation would only be worse. McHard Road would provide residents in the project area better access to amenities in the City of Pearland and Harris and Brazoria Counties by offering a more direct route between the project area and intersecting roadways, as well as improve access to SH 288 and SH 35 which lead into Harris County and the City of Houston.

The Preferred (Build) Alternative 1 (North) would also construct 3 detention ponds totaling 13.35 acres. Two detention ponds connected by a culvert would be constructed on the north side of the proposed McHard Road, between Adamo Lane and Stone Road. These ponds would be oriented north/south and would be 2.7 acres and 1.23 acres. A third pond would be constructed on the south side of the proposed roadway, between Hatfield Road and Woody Road. This pond would run east/west and would be 9.42 acres.

4.2 No Build Alternative

Under the No Build Alternative, the proposed extension of McHard Road would not be constructed. The No Build Alternative would not convert approximately 45 acres of primarily fallow and undeveloped land to road right-of-way and an additional 22 acres to detention ponds. The No Build Alternative would not provide increased connectivity between Cullen Boulevard and Mykawa Road or reduce congestion on West Broadway Street. The existing conditions would continue to deteriorate with increased congestion as future development in and around this area of Brazoria County continues. The No Build Alternative would not meet the purpose and need for the project. For the sake of comparison with the Preferred Alternative, the No Build Alternative will be evaluated for impacts throughout the EA.

4.3 Preliminary Alternatives Considered but Eliminated from Further Consideration

Two build alternatives were initially screened and evaluated for the proposed project. Both alternatives involved extending McHard as a four-lane divided urban section from Cullen Blvd to Mykawa Rd as well as constructing proposed storm water detention ponds. The viable build alternatives are shown on the Alternatives Map in Appendix A. The environmental screening factors for the two build alternatives considered included impacts to parks and cemeteries, commercial, public property and residential

takings and acreage required, total additional ROW required, potential cultural resource impacts, detentions basins required, length of project in floodplains, existing detention basins/ponds impacted, threatened and endangered species habitat impacted, potentially jurisdictional wetland impacts, potentially jurisdictional stream impacts, number of noise receptors, churches and schools impacted, visual impacts adverse community impacts, environmental justice and Limited English Proficiency Impacts and the presence of nearby Superfund Sites (See Appendix J). Both alternatives would share the same cross-section. The build alternatives are expected to satisfy each component of the purpose statement.

Build Alternative 2 (South): Intersects Cullen Boulevard at existing Brookside Road and follows Brookside Road for approximately 500 feet where it departs the alignment of Brookside Road eastward and then angles southward to just past Alamo Lane where it turns back to the east. The alignment continues eastward until just past Stone Road where it veers slightly to the southeast and turns back eastward at Max Road. The alignment turns slightly southeast just west of Roy Road, turning back to the east just past Roy Road until just west of Garden Road where it turns northeastward and then back to the east slightly eastward of Garden Road. Just west of Oday Road the alignment veers slightly northeastward and turns back to the east just past Oday Road. It then continues east until Hatfield Road where it turns slightly northeastward until it meets the alignment of Build Alternative 1 at Woody Road. Both alternatives traverse eastward along the same alignment from Woody Road to Mykawa Road.

At the public meeting held on March 24, 2015, attendees were generally in favor of the project with 93 persons supporting the project, 10 persons not supporting the project, seven persons who were undecided and 17 not answering the question on the form. Of the persons who indicated a preference of alignments, 84 preferred Alignment 1 (North), 21 preferred Alignment 2 (South), one was undecided, one expressed no preference for either alignment, and one wanted neither alignment.

Alignment 1 was chosen as the preferred alternative and Alignment 2 was eliminated based on both the public meeting responses and the analysis and comparison of environmental impacts. Many impacts were similar between the two alternatives, however, Alignment 1 had fewer residential and commercial displacements, and less of its length in floodplains. Alignment 1 had more linear feet of drainage ditches in its ROW, but the jurisdictional status of these ditches is not known. The comparison of the two alignments is shown in **Appendix A**.

5.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

In support of this EA, the following technical reports were prepared and approved and are currently available for review at the TxDOT Houston District by visiting the District Office at 7600 Washington Avenue, Houston, Texas 77007, or by calling (713) 802-5885 and requesting a copy:

Air Quality Technical Report

Archeological Survey Report

Biological Evaluation Form

Community Impacts Assessment Technical Report

Hazardous Materials Initial Site Assessment

Noise Analysis Technical Report

Report for Historical Resources Survey

Water Resources Technical Report

Indirect Impacts Technical Report

Cumulative Impacts Technical Report

5.1 Right of Way/Displacements

The project objectives and environmental issues were a primary focus in the planning, design, and environmental analysis processes. The project would require approximately 45 acres of new road right of way along with 22 acres of detention ponds primarily in undeveloped land formerly used as agricultural land. The new ROW would be acquired by the City of Pearland prior to construction of the proposed project. There would be 12 residences and three businesses displaced due to the proposed project. The displaced businesses are: MSF Electrics, a Kinder Morgan remote facility (no employees present), and Advanced Crane & Hoist Services.

The project area is located within the City of Pearland which is a rapidly growing city that is seeing development of new residential subdivisions and business centers that could afford plentiful relocation sites nearby. Sufficient sites appear to be available for displaced residents and businesses. In addition, the development of McHard Road on new location should provide numerous relocation sites for businesses in the immediate area due to the improved access in this portion of Pearland. The proposed roadway traverses through areas planned as a major retail node, the Cullen Mixed Use District and large area indicated as industrial land use according to the City's Future Land Use Plan.

The acquisition of the required parcels by the City of Pearland would be conducted in accordance with Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

5.2 Land Use

The project is located primarily within the City of Pearland, south of Houston in Brazoria County. Within the project area, the proposed McHard Road traverses a largely undeveloped area. Demographic data indicate that the project area is sparsely populated, which is supported by a review of aerial photography and the results of site visits. Low density residential areas are scattered throughout the project area, with one small subdivision located north of the proposed alignment on the east side of Oday Road. A small mobile home park is located adjacent to the south side of the proposed roadway on the west side of Garden Road. Scattered commercial buildings are located along the north/south thoroughfares that intersect proposed McHard Road. An electrical transmission corridor extends north/south between Garden Road and Roy Road, just to the west of the mobile home park. The majority of the land in the project area appears to be undeveloped or fallow agricultural land and pasture.

The proposed project is not anticipated to alter current trends in development in the project area and will likely expedite development. Overall, the construction of a continuous roadway connecting Mykawa Road and Cullen Boulevard in the northern portion of Pearland is considered to be consistent with future land use plans for the area. The McHard Road extension is contained in Section 3, *Mobility*, of the City of Pearland's 2015 Comprehensive Plan (City of Pearland, 2015).

The implementation of the No Build Alternative would not directly affect land uses within the project area; however, this alternative would not be consistent with the 2010-2035 MTP.

5.3 Farmlands

Natural Resources Conservation Service (NRCS) data indicate that Bernard, Bernard clay loam, and Lake Charles Clay soils are classified as prime farmland; however, the project area is within the City Limits of Pearland, is classified as suburban residential, low density residential, medium density residential, the Garden/O'Day Mixed Use District or industrial (City of Pearland, 2015), and there is no active farming evidenced in the project area, for this reason the soils were not considered prime farmland.

5.4 Utilities/Emergency Services

The proposed project may require the relocation of underground or overhead utilities. At this stage of the project, the locations of utilities potentially requiring adjustment or relocation have not been identified. Subsurface and overhead utility locating would be an element of the detailed design, and coordination with the utility owners on possible relocation options would take place at that time. Utility relocations and adjustment would be accomplished with the minimum practicable disruption in service to customers. Access throughout the project area would be maintained during construction of the proposed project; therefore, emergency services would not be affected.

The No Build Alternative would not require utility relocations or affect/improve emergency services.

5.5 Pedestrian and Bicycle Facilities

The proposed McHard Road would have an urban cross-section consisting of a four-lane divided, curb-and-gutter roadway within a typical 120-foot ROW with an 18-foot median. Each travel lane would be 12 feet wide with a 10-foot shared pedestrian/bicycle path. The pedestrian/bicycle path would extend the length of the project along the south side. There are currently few or no pedestrian/bicycle paths in the area.

The No Build Alternative would not construct any pedestrian/bicycle paths.

5.6 Community Impacts

There would be 12 residences that would be displaced or impacted in a manner that would prevent them from being occupied. There is adequate housing available in the area for relocations. The residences displaced are scattered across the length of the project and do not occur in one area. In addition to the 12 residential displacements, there would be three commercial displacements. These businesses are: MSF Electrics, a Kinder Morgan remote facility (no resident employees), and Advanced Crane & Hoist Services.

The displacements do not represent a substantive proportion of the residences and businesses in the area. The project area is located within the City of Pearland which is a rapidly growing city that is seeing development of new residential subdivisions and business centers that could afford plentiful relocation sites nearby. Sufficient sites appear to be available for displaced residents and businesses. In addition, the development of McHard Road on new location should provide numerous relocation sites for businesses in the immediate area due to the improved access in this portion of Pearland. While some residences were located in areas that had over 50% minority populations, it does not appear that impacts disproportionately affected minorities. The area is not identified as a separate community with a common community/district name or any community specific facilities and the residences displaced are scattered across the length of the project and do not occur in one area. There were no signs indicating that these businesses support a specific ethnic group or other sensitive population.

The proposed project would facilitate the way people in the project area access other parts of the community by providing a more direct travel path within the project area. It would provide a much more direct link between Mykawa Road and Cullen Boulevard in the northern portion of the City of Pearland. Currently, there is no direct east/west route through this part of Pearland and north Brazoria County. Travelers must presently make numerous turns from east/west roadways to north/south roadways and back to east/west roadways to travel in an easterly or westerly direction. McHard Road would make travel to shopping, schools, religious centers, and employment centers much easier. The proposed roadway would also relieve traffic congestion on nearby east/west roadways, such as Broadway Street in Pearland and Brookside Road. It would also provide a dedicated east/west pedestrian and bicycle path where none presently exist. The proposed improvements would remove traffic from Broadway Street and Brookside Road, relieving congestion. Access to the intersecting north/south streets would be improved allowing for better north/south access throughout the project area. As a result, access to areas within the project area and to areas outside the project area by residents in the project area will be improved as will access to the area from other areas of Pearland and Brazoria County.

The proposed project will not have a substantive impact on community cohesion. The project area consists of many scattered business and residences with small, disjunct groups of housing widely dispersed throughout the area. There would be no direct impact to any community facilities. Twelve residences and three businesses would be displaced by the project. These do not represent a cohesive community nor are they a part of what would appear to be a cohesive community. The proposed roadway and shared use bicycle/pedestrian path would facilitate access between local residents and community amenities scattered throughout the area and would, therefore, serve to more closely tie these disjunct areas together.

5.6.1 Environmental Justice

An environmental justice analysis was completed in accordance with Executive Order (EO) 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."

None of the census block groups in the project area had a majority of households with incomes below the poverty level. There are census geographies with predominantly minority populations present in the project area. While most of the displacements occur in areas that have a majority of minority populations, there are only nine residences impacted in these areas and it is not known whether these displacements

involve minorities. There would be some noise, air quality and potential hazardous materials impacts, but these would not be disproportionately high since the magnitude of any of these impacts would be small.

Census geographies that have more than 50% minority populations are listed in **Table 2** and shown in **Appendix F**. In all project area census geographies, whites comprise 44.8% of the population, Hispanics comprise 28.1% of the population, blacks or African Americans comprise 14.1% of the population and Asians comprise 10.5% of the population. Other races and persons of two or more races comprise the remaining 2.5% of the population. Minority races or ethnic groups that comprise more than 10% of the population or more than 100 persons in any project area census geography are indicated in bold in **Table 2**.

Table 2. Census Geographies with over 50% Minority Populations

	Block 2078, Block Group 2, Census Tract 6605, Brazoria County, Texas	Block 5002, Block Group 5, Census Tract 6605, Brazoria County, Texas	Block 5009, Block Group 5, Census Tract 6605, Brazoria County, Texas	Block 6001, Block Group 6, Census Tract 6605, Brazoria County, Texas	Block 6003, Block Group 6, Census Tract 6605, Brazoria County, Texas	Block 6011, Block Group 6, Census Tract 6605, Brazoria County, Texas	Block 6013, Block Group 6, Census Tract 6605, Brazoria County, Texas	Block Group 2, Census Tract 6605, Brazoria County, Texas	Block Group 5, Census Tract 6605, Brazoria County, Texas	Block Group 6, Census Tract 6605, Brazoria County, Texas	Block Group 1, Census Tract 6606.01, Brazoria County, Texas	Census Tract 6605, Brazoria County, Texas	Census Tract 6606.01, Brazoria County, Texas
Percent Minorities	52.0%	75.6%	56.3%	64.8%	55.6%	55.6%	68.3%	63.2%	60.6%	58.9%	58.2%	51.1%	54.6%
Total:	25	180	48	91	81	239	126	940	1,883	2,885	2,532	8,987	11,893
Hispanic or Latino	11	117	24	27	34	87	83	564	939	1,041	370	3,481	1,659
White	12	44	21	32	36	106	40	342	739	1,185	1,057	4,387	5,381
Black or African American	0	0	2	28	10	11	0	9	107	414	611	676	2,341
American Indian/Alaska Native	2	0	1	0	0	4	1	6	9	14	12	40	29
Asian	0	19	0	4	1	30	2	12	65	195	368	292	2,154
Native Hawaiian/Other Pacific Islander	0	0	0	0	0	0	0	0	2	0	1	2	1
Some Other Race	0	0	0	0	0	0	0	4	3	1	2	10	16
Two or More Races	0	0	0	0	0	1	0	3	19	35	111	99	312

The displaced businesses are: MSF Electrics, a Kinder Morgan remote facility with no permanent employees in residence, and Advanced Crane & Hoist Services. One of the commercial displacements is in a predominantly minority area, while two are in a non-minority area. Approximately 70% of the proposed roadway is in an area that traverses minority census geographies. The percentage of households in all project area block groups with incomes greater than \$25,000 per year ranged from 77% to 100%.

The overall impact to minority and low income populations would be beneficial due to improved access to community amenities from areas with minority populations and by emergency responders to these areas.

Access and travel pattern impacts will be similar in both minority and non-minority areas. In both cases, access should be greatly improved for residents within the project area to surrounding community amenities. The portions of the project area that are not predominantly minority areas are near both project termini where access to main roadways is easier. The center of the project corridor is predominantly minority and residents in these areas have a more disjunct travel route when wishing to access other parts of Pearland and Brazoria County. Travel patterns for the entire corridor will be more direct rather than having to make numerous turning movements between disjointed east/west road segments and north/south roadways in order to travel east/west through the project area; however, the greatest effects will be in the center of the project area since reductions of travel time to reach surrounding areas will be more pronounced. In both minority and non-minority areas, the introduction of the shared bicycle/pedestrian trail will facilitate other modes of transportation, especially for shorter trips. The time for emergency responders to reach persons living in the project area should be reduced as well.

The impacts in predominantly minority areas would include increased noise and some worsening of air quality due to the construction of a new roadway where none presently exists. While McHard Road will provide a direct route through the study area which will reduce noise and air emissions from local traffic, the addition of a new direct thoroughfare to the area will likely draw new traffic into the area, thereby increasing noise levels and reducing air quality somewhat. The roadway itself should not cause any additional hazardous materials impacts, but could attract trucks that may carry hazardous materials which, if spilled, could impact the project area. Since the area occupied by non-minority populations is smaller than that occupied by minority populations, there could be a slightly higher chance of exposure to hazardous materials to minority populations in the event of a spill. There are no census tracts, block groups or blocks with predominantly low income households. No census area has a median household income below the 2015 poverty level. The percentage of households with incomes above \$20,000 ranges from 82.4 percent to 96.9 percent across all census geographies.

Although there are minority populations in the project area, the project would not have adverse community impacts – few displacements, beneficial changes in access, and no effects to community cohesion.

For all of the reasons provided above, the Build Alternative would not cause disproportionately high and adverse effects on minority populations and is consistent with EO 12898.

The No Build Alternative would not cause disproportionately high and adverse effects on minority populations or low-income populations.

5.6.2 Limited English Proficiency

Based on data from the 2009-2013 ACS for the project area block groups, the percentage of persons with limited English proficiency (LEP) in the project area ranges from approximately 0.0 percent to 20.7 percent. Overall, 960 persons, or 10.4 percent, of the 9216 persons over 5 years old in the project area block groups are considered LEP. The language most often spoken by LEP persons in the project area is Spanish (7.2 percent of the total population), while 0.5 percent speak other Indo-European languages, 1.0 percent speak Asian and Pacific Island languages, and 1.7 percent speak other languages.

A public meeting was held on March 24, 2015. To ensure full and fair public participation, the information regarding the meeting was published in both English and Spanish. The Public Meeting notice and Public Meeting handout were also both available in Spanish. The Public Meeting notice stated that a translator would be available upon request. A copy of the Public Meeting Summary Report is attached to this document. The City of Pearland reached out to both a Buddhist monastery and Islamic center and mosque in February 2015 to determine if either entity or the communities they support required assistance in understanding the project. Both the monastery and mosque stated that no special assistance was required.

Any additional public involvement will be planned with a sensitivity toward LEP populations.

5.7 Visual/Aesthetics Impacts

The proposed project would follow the existing alignment of Brookside Road, an existing two-lane roadway, for a distance of 0.7 mile from Cullen Blvd to Stone Road and would be constructed in part within the existing right of way. Street lighting would be provided on both sides of proposed McHard Rd and spaced approximately every 200 feet.

No changes to existing visual and aesthetic qualities are anticipated.

East of Stone Road the proposed construction of McHard Road be on new location. In this area McHard Road would have an effect on the visual resources within the project area. Construction of the new location would require the removal of trees that are within a contiguous, forested stand. Tree removal and new construction would alter the landscape. However, the resulting landscape would be consistent with the landscape of the entire project area, consisting primarily of subdivisions, scattered residences and businesses and fallow land. Few residences are near enough to the roadway to potentially see this as obstructing existing viewshed of areas that are now scrub or wooded.

The No Build Alternative would not change existing visual and aesthetic qualities in the project area.

5.8 Cultural Resources

Cultural resources are structures, buildings, archeological sites, districts (a collection of related structures, buildings, and/or archeological sites), cemeteries, and objects. Both federal and state laws require consideration of cultural resources during project planning. At the federal level, National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA) of 1966, among others, apply to transportation projects such as this one. In addition, state laws such as the Antiquities Code of Texas apply to these projects. Compliance with these laws often requires consultation with the Texas Historical

Commission (THC)/State Historic Preservation Officer (SHPO) and/or federally recognized tribes to determine the project's effects on cultural resources. Review and coordination of this project followed approved procedures for compliance with federal and state laws.

5.8.1 Archeology

An intensive archeological survey was completed in order to inventory and evaluate archeological resources within the footprint of the proposed widening improvements. The APE is 75.76 acres or 30.65 hectares. This is the APE that was used for the archeological survey, which was a larger footprint based on a preliminary design. A total of 66.9 acres or 27.1 hectares of the total is new ROW, so the actual project footprint is smaller than the APE. Typical roadway construction would occur within 2 feet or 0.6 meters, with possible deeper impacts for construction of drainage elements and a presumed depth of up to 10 feet or 3 meters at detention ponds. Fieldwork was conducted in August 2016 under Texas Antiquities Permit (TAP) 7666. Based on the review of the Houston Potential Archeological Liability Map (PALM), most of the project area (63.92 ac or 25.87 ha) was determined to fall within Map Unit 2a, for which survey is recommended only on pimple mounds. The review of the PALM also indicated that a small portion of the northernmost proposed detention pond is located within Map Unit 2, for which surface survey is recommended. The remaining area is located within Map Unit 4, for which no survey is recommended. A majority of the acreage on which intensive survey was conducted was determined to have been subjected to ground-disturbing activities associated with agriculture, erosion, and construction and maintenance of the existing road. No new archeological sites were identified during the survey and no artifacts were identified or recovered. The project was coordinated with the SHPO under the Programmatic Agreement between ACHP, SHPO, and TxDOT, and that the SHPO (THC) concurred that the project would have no effect on any archeological historic properties or State Archeological Landmarks, and therefore no further coordination under Section 106 of the National Historic Preservation Act.

No public controversy exists regarding the project's potential impacts on archeological sites or cemeteries. In the event that unanticipated archeological deposits are encountered during construction, work in the immediate area would cease, and TxDOT archeological staff would be contacted to initiate post-review discovery procedures.

Tribal coordination was initiated on April 22, 2016 via a letter sent to area tribal representatives. No comments were received. The only response was from the Tonkawa Tribe, which provided a concurrence signature on the coordination letter.

Under the No-Build Alternative, no impacts to archeological sites are anticipated.

5.8.2 Historic Properties

A review of the National Register of Historic Places (NRHP), the list of State Antiquities Landmarks (SAL), and the list of Recorded Texas Historic Landmarks (RTHL) indicated no previously identified resources located within the area of potential effects (APE), which was defined as the proposed ROW plus 150 feet beyond each side of the proposed ROW in existing transportation corridors and the proposed ROW plus 300 feet beyond each side of the proposed ROW in areas of new location roadway and detention ponds. The historic properties tech report was based on a larger footprint than what the actual footprint of the proposed project would be, and no resources were found in the larger footprint.

A reconnaissance-level survey was conducted of the entire APE in June 2016. In all, 61 historic-age resources (constructed before 1974) located on 30 parcels were documented. Additionally, 12 non-historic-age resources associated with historic-age resources were also documented in the inventory, but are not described in this report. None of the documented resources are recommended eligible for the National Register of Historic Places as a result of the survey. Therefore, in accordance with the terms of the Programmatic Agreement for Transportation Undertakings (PA-TU) among TxDOT, FHWA, the Advisory Council for Historic Preservation, and the THC, no further consultation under Section 106 of the National Historic Preservation Act is required.

Under the No-Build Alternative, additional ROW would not be acquired; therefore, no impacts to historic resources are anticipated.

5.9 DOT Act Section 4(f), LWCF Section 6(f) and PWC Chapter 26

There are no publicly owned parklands, waterfowl or wildlife refuges, or significant historic sites in the vicinity of the proposed project area. Therefore, the proposed project would not result in the use of any Section 4(f) properties as defined in 23 CFR 774 and Section 4(f) of the U.S. Department of Transportation Act. There are no LWCF 6(f) or PWC Chapter 26 properties in the project area.

5.10 Water Resources

5.10.1 Clean Water Act Section 404

Section 404 of the Clean Water Act (CWA) regulates the placement of fill or dredged material into waters of the U.S. Prior to the field efforts, a desktop review of a variety of spatial data was reviewed to evaluate the presence of waters of the U.S., including (but not limited to) USFWS National Wetland Inventory (NWI) data, National Hydrography Dataset (NHD), US Geological Survey (USGS) 7.5-minute topographical maps, FEMA floodplain maps, soil survey data, recent and historic aerial imagery, etc. Site reconnaissance was performed in December 16-18, 2015 and January 18-20, 2016. Using criteria set forth in the 1987 Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0), the wetland delineation evaluated hydric soil indicators, wetland hydrological indicators, and wetland plant communities within the proposed ROW.

Potential jurisdictional waters, including wetlands, were mapped using sub-meter accuracy GPS. Vegetation communities were evaluated and documented during the wetland delineation; these observed plant communities are described in the Biological Evaluation Form. Plant and soil descriptions and classifications, as well as hydrologic conditions, from each of the sample areas were also recorded on USACE Wetland Determination Data Forms included in **Attachment A** of the **Water Resources Technical Report**. Site photographs taken during the survey are included in **Attachment B** of this document. A map of water resources is included in **Appendix F, Resource Specific Maps, Water Resources**.

Although final design is yet to be determined, based on the amount of potential waters of the U.S.

occurring within the project footprint, Nationwide Permit 14 (Linear Transportation Projects) with Pre-Construction Notification (PCN) will be required from the USACE. The PCN would be submitted to be conservative, although it may not be required. This is based upon a preliminary assessment as to the jurisdictional status of impacted wetlands. Only the USACE may make a determination as to the jurisdictional status of waters. If the USACE determines that over 0.5 acre of impacted wetlands are jurisdictional in any separate crossing, an individual permit would be required. A summary of potentially-regulated waters occurring within the project footprint is presented in **Table 3**.

Impacts to the resources listed in Table 3 will include filling or filling and paving for those resources in the proposed ROW. Resources in the footprints of the detention pond will be excavated. Those resources on the upland periphery of the detention ponds will be filled.

Section 404 (b) (1) guidelines allow the discharge of dredged or fill material only if there is no practicable alternative that would have less adverse effects on the aquatic ecosystem. The southern alternative considered had greater impacts to wetlands in the project area than does the preferred alternative. The no-build alternative does not meet the project’s purpose and need and was, therefore, not considered practicable. As a result, there was no practicable alternative to the preferred alternative that would have less impacts to wetlands.

Table 3 Ponds, Wetlands, and Ditches Mapped Within the Proposed McHard Rd. Extension Project ROW, Brazoria County, TX.

Field Name	Waterbody Type	Jurisdictional*	Acres
Pond 1	Stock Pond	No	0.03
Pond 2	Stock Pond	No	0.04
Pond 3	Stock Pond	No	0.06
Pond 4	Stock Pond	Yes	0.09
Pond 5	Stock Pond	No	0.14
Pond 6	Stock Pond	No	0.01
Wetland 1	Shrub/Scrub Wetland	No	0.05
Wetland 2	Shrub/Scrub Wetland	No	0.10
Wetland 3	Shrub/Scrub Wetland	No	0.07
Wetland 4	Emergent Wetland	No	0.29
Wetland 5	Forested Wetland	No	0.26
Wetland 6	Forested Wetland	No	0.22
Wetland 7	Emergent Wetland	No	2.45
Wetland 8	Forested Wetland	No	0.13
Wetland 9	Emergent Wetland	No	0.02
Wetland 10	Forested Wetland	No	0.19
Wetland 11	Emergent Wetland	No	0.23
Wetland 12	Emergent Wetland	No	0.02
Wetland 13	Emergent Wetland	No	0.13
Wetland 14	Emergent Wetland	No	0.04
Wetland 15	Emergent Wetland	No	0.13
Ditch Wetland 1	Drainage Ditch/Emergent Wetland	No	0.07

Field Name	Waterbody Type	Jurisdictional*	Acres
Ditch Wetland 2	Drainage Ditch/Emergent Wetland	No	0.02
Ditch Wetland 3	Drainage Ditch/Emergent Wetland	No	0.73

*Jurisdictional status based on project sponsor’s interpretation. Jurisdictional status of any water body can only be determined by the USACE

5.10.2 Clean Water Act Section 401

The Clean Water Act (CWA) of 1977 (33 U.S.C. § 1251 et seq.), established the basic structure for regulating discharges of pollutants to Waters of the U.S. Pursuant to Section 401 of the CWA, a certification must be obtained from the state before any activity that may result in a pollution discharge into Waters of the U.S. can be permitted by a federal agency. The Texas Commission on Environmental Quality (TCEQ) issues 401 certifications for TxDOT activities. It is anticipated that the proposed project would meet the TCEQ’s Section 401 Water Quality Certification Tier I (Small Projects), because it would impact < 3 acres of waters of the U.S. including wetlands (or 1,500 linear feet of stream). The proposed project will incorporate the following BMPs at appropriate stages during construction. For erosion control, seeding of embankments and sodding of areas more susceptible to erosion would be conducted throughout construction. For sedimentation, a combination of silt fencing along the ROW, hay bales within roadside ditches, and rock filter dams at the culvert locations would be utilized and remain in place until project completion. For post-construction TSS control, vegetative filter strips (in the roadside ditches) would be utilized to control total suspended solids after construction. If more vegetative filter strips are needed, areas within the interchanges could be incorporated.

5.10.3 Executive Order 11990 Wetlands

Executive Order (EO) 11990 on wetlands will apply because since wetlands will be impacted. There is no practicable alternative to construction in the impacted wetlands and all practicable measures to minimize harm to wetlands will be implemented. If mitigation is required for impacted wetlands, this mitigation would be through purchase of credits from an approved mitigation bank. For this reason the project will be in compliance with EO 11990.

5.10.4 Rivers and Harbors Act

This project does not involve work in or over a navigable water of the U.S., therefore Section 10 of the Rivers and Harbors Act does not apply.

5.10.5 Clean Water Act Section 303 (d)

The TCEQ’s Texas Clean Water Act Section 303(d) List identifies impaired waters (i.e., water bodies that do not meet minimum water quality standards in specific categories). The proposed project area drains into Hickory Slough which drains into Clear Creek approximately 2.3 miles downstream of the eastern project terminus. Clear Creek above tidal (Segment 1102_03 of Clear Creek) is an impaired water body due to the presence of PCBs in edible tissue, according to the TCEQ 2014 303(d) list (approved November 19, 2015). Clear Creek is located approximately two miles downstream via Hickory Slough from the project site. Therefore, the project is within five miles upstream of an impaired stream segment and coordination with the TCEQ is required. There are EPA approved TMDLs for this stream for chlordane (approved on June 14, 2001) and VOCs (approved on May 9, 2003). The project and

associated activities will be implemented, operated, and maintained in a manner that is consistent with the approved Implementation Plan.

5.10.6 Clean Water Act Section 402

This project would include five or more acres of earth disturbance. TxDOT would comply with TCEQ's Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit (CGP). A Storm Water Pollution Prevention Plan (SW3P) would be implemented, and a construction site notice would be posted on the construction site. A Notice of Intent (NOI) would be required.

5.10.7 Floodplains

The City of Pearland and Brazoria County are participants in the National Flood Insurance Program (NFIP). The Flood Insurance Rate Map (FIRM) numbers covering this project are 48039C0030I and 48039C0035I, both dated 1999.

The project would result in a significant encroachment on a floodplain. Approximately 23% of the project ROW and other easements occur within the 100-year floodplain and floodway of Hickory Slough. The extension of McHard Road would result in the addition of approximately 8.51 acres of pavement (impervious surface) within the 100-yr floodplain. Under existing conditions, stormwater drainage from the project site is by sheet flow and local drainage ditches northward to Clear Creek or southward to Hickory Slough. The eastern project terminus is located within a floodplain. Moving the terminus out of the floodplain would mean that there would be no continuous roadway extending westward from the existing McHard/Mykawa intersection. Additionally, the southern alignment alternative had almost twice as much of its length in floodplains. As designed, the action would conform to applicable state or local floodplain protection standards. These impacts to the floodplain would be mitigated with detention ponds. The project requires a Conditional Letter of Map Revision (CLOMR).

The eastern terminus of the proposed project is located in the 100-yr floodplain of Hickory Slough., therefore, the floodplain cannot be avoided if the project is to connect with the eastern existing McHard Road. The route alternative to the south traverses a much greater expanse of floodplain than does the preferred alternative. Moving the roadway further north would cause it to traverse a much more densely developed area and would result in many more residential displacements, therefore, there is no practicable alternative to the project that would traverse less distance through floodplains.

The hydraulic design practices for this project would be in accordance with current TxDOT design criteria and standards. The proposed project would have no adverse impacts to receiving waterways up to and including the 100-year event. The facility would permit conveyance of the design-year flood levels, inundation of the roadway being acceptable, without causing substantial damage to the roadway, stream or other property. The proposed project would not increase the base flood elevation to a level that would violate the applicable floodplain regulations or ordinances. All appropriate coordination with the local Floodplain Administrator would be performed prior to construction.

5.10.8 Wild and Scenic Rivers

The National Wild and Scenic Rivers System was created by Congress in 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

There are no water bodies within the proposed project area that are designated to be within the National Wild and Scenic River System. The project would have no impacts on any present, proposed, or potential unit of the National Wild and Scenic River System.

5.10.9 Trinity River Corridor Development Certificate

The project is not within the Trinity River Corridor Development Regulatory Zone; therefore, a Corridor Development Certificate (CDC) permit would not be required.

5.10.10 Coastal Barrier Resources

The project is not located in any Coastal Barrier Resource Area or otherwise protected coastal area.

5.10.11 Coastal Zone Management

The project is not within the Texas Coastal Zone Boundary; therefore, coordination with the Texas Coastal Zone Management Program would not be required.

5.10.12 Edwards Aquifer

The project is not within the Edwards Aquifer Recharge, Transition or Contributing Zones; therefore, coordination with or permits from the TCEQ or Edwards Aquifer Authority are not required.

5.10.13 International Boundary and Waters Commission

The proposed project would not perform work or place structures within a floodway or right-of-way under the jurisdiction of the United States Section, International Boundary and Water Commission (IWBC); therefore, a permit from or coordination with the IWBC is not required.

5.11 Biological Resources

5.11.1 Vegetation

The Ecological Mapping Systems of Texas (EMST) Geographic Information Systems (GIS) database was searched in order to assess vegetation that would potentially be impacted by the proposed project. The original EMST data categorize the project area vegetation into 11 EMST categories:

Mapped EMST	Verified EMST
Gulf Coast: Coastal Prairie	Gulf Coast: Coastal Prairie
Native Invasive: Deciduous Woodland;	Native Invasive: Deciduous Woodland;
Non-Native Invasive: Chinese Tallow Forest, Woodland, or Shrubland	Non-Native Invasive: Chinese Tallow Forest, Woodland, or Shrubland
Urban Low Intensity	Urban Low Intensity
Mapped but not verified EMST	
Barren	
Gulf Coast: Coast Prairie Pondshore	
Native Invasive: Baccharis Shrubland	
Native Invasive: Huisache Woodland or Shrubland	
Pineywoods: Disturbed or Tame Grassland	
Post Oak Savannah: Live Oak Motte and Woodland	
Urban High Intensity	

	Verified but not mapped EMST
	Deciduous Woodlands
	Disturbed or Tame Grassland
	Native Invasive: Baccharis Shrubland
	Open Water
	Tallow/Shrubland
	Wetland

Following the site investigations of December 2015 and January 2016, the above 10 EMSTs were verified as being present in the project area. Maps of the field verified EMSTs are shown in **Appendix F, Resource Specific Maps**. Photos showing the environment within the project area are in **Appendix B**.

Impacts to vegetation would be avoided or minimized by limiting disturbance to only that which is necessary to construct the proposed project. The removal of native vegetation, particularly mature native trees and shrubs, would be avoided to the greatest extent practicable. An approved seed mix would be used in the landscaping and revegetation of disturbed areas.

In accordance with EO 13112 on invasive species, native plant species would be used in the landscaping and in the seed mixes where practicable according to TxDOT standard specifications. In addition, the project would have landscaped medians. Landscaping included with this project would be in compliance with the Executive Memorandum and the guidelines for environmentally and economically beneficial landscape practices to the extent practicable.

As detailed in 43 TAC 2.206 of the 2013 MOU, coordination with TPWD is required for projects based on certain triggers, including the disturbance of habitat in an area equal to or greater than the area of disturbance indicated in the Threshold Table Programmatic Agreement. Because the proposed project would impact approximately 4.76 acres of South Texas Wetlands, 25.3 acres of Mixed Woodlands and Forests, 3.20 acres of Disturbed Prairie, and 5.52 acres of Coastal Grassland and, therefore, exceeds the disturbance threshold for these MOU types (TxDOT 2014h), coordination with the TPWD was required and subsequently completed on August 1, 2016 (see **Appendix G**).

If the No Build Alternative were implemented, the proposed project would not be constructed. No effects to vegetation or wildlife habitat related to the construction of the proposed project would occur. Existing land use and activities would continue to periodically affect vegetation communities.

5.11.2 Wildlife

Common wildlife species that may be present in the project area include raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), armadillo (*Dasyus novemcinctus*), eastern cottontail (*Sylvilagus floridanus*), fox squirrel (*Sciurus niger*), gray squirrel (*S. carolinensis*), hispid cotton rat (*Sigmodon hispidus*), white-footed mouse (*Peromyscus leucopus*), mockingbird (*Mimus polyglottos*), blue jay (*Cyanocitta cristata*), common grackle (*Quiscalus quiscula*), scissor-tailed flycatcher (*Muscivora furficata*), Texas rat snake (*Elaphe obsoleta lindheimeri*), eastern hog nosed snake (*Heterodon platirhinis*), brown snake (*Storeria dekayii*), green anole (*Anolis carolinensis*), green tree frog (*Hyla cinerea*), and Gulf Coast toad (*Bufo valliceps*). Impacts to these and other species that may occur in the project area will be loss of and fragmentation of habitat along with expected increases in mortality, especially of non-avian species, where the road bisects remaining habitat.

Migratory Bird Treaty Act (MBTA)

Migratory birds were observed during December, 2015 and January and April 2016 field investigations and may be in the project area to breed during construction of the proposed project. Appropriate measures would be taken to avoid adverse impacts on migratory birds (see **Section 8.1**)

Migratory birds protected under the MBTA would not be impacted by the No Build Alternative.

5.11.3 Threatened and Endangered Species

Federally Listed Species

The USFWS lists five federally endangered, four threatened species and three candidate species as occurring in Brazoria County. Endangered species include: whooping crane (*Grus americana*), West Indian manatee (*Trichechus manatus*), hawksbill sea turtle (*Eretmochelys imbricata*), Kemp's Ridley sea turtle (*Lepidochelys kempii*), and leatherback sea turtle (*Dermochelys coriacea*). Threatened species include: piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), green sea turtle (*Chelonia mydas*), and loggerhead sea turtle (*Caretta caretta*). Candidate species include: Sprague's pipit (*Anthus spragueii*), smooth pimpleback (*Quadrula houstonensis*), and Texas fawnsfoot (*Truncilla macrodon*).

Of the endangered, threatened, and candidate species, the only species for which potential habitat exists in the project area is the Sprague's pipit. The sea turtles and manatee would not be expected to occur in the project area since they are confined to aquatic, primarily salt water, habitats. The whooping crane nests in Canada and, in Texas, winters at and near Aransas National Wildlife Refuge in south Texas. The project area is not suitable for a stopover area due to the lack of large open foraging areas and degree of development. The red knot winters in Texas and is primarily found on seacoasts, on tidal flats and beaches, herbaceous wetland, and tidal flats and shorelines. The only one of these habitats that is present in the project area is herbaceous wetlands which occur in small mostly separated areas which would not likely be visited by the red knot. The piping plover occurs as a winter migrant on beaches and bayside mud or salt flats, none of which occur in the project area.

Sprague's pipit is a federal candidate species that occupies prairie habitat. Potential prairie habitat exists within the project area for Sprague's Pipit, however, the habitat is not ideal. Prairie habitat within the project area is highly fragmented and altered, and receives regular disturbance from cattle grazing and anthropogenic sources. The project would not be expected to negatively affect the Sprague's Pipit or its preferred habitat. The project will have no effect on any of the listed endangered or threatened species, and therefore no consultation under Section 7 of the ESA is required.

State-listed Species

Potential habitat for three state-listed threatened species was identified within the proposed project area. State-listed species are protected from direct harm, but there is no current regulatory protection for their habitat. Impacts to these species will include loss of potential habitat, potential displacement of resident species, if present.

White-faced ibises (*Plegadis chihi*), wood storks (*Mycteria americana*) and alligator snapping turtles (*Macrochlemys temminckii*) could occur in the freshwater habitats in the project area with the alligator snapping turtle (*Macrochlemys temminckii*) occurring in the deeper water bodies.

If any state listed species are present in the project area, expected impacts would include loss of habitat including nesting and foraging habitat for white-faced ibises, loss of mainly winter foraging habitat for wood storks and loss of habitat, primarily in the large drainage ditch, for alligator snapping turtles which may be exacerbated due to their lack of mobility.

The two state threatened species with no habitat in the area include the Smooth pimpleback and Texas fawnsfoot. The smooth pimpleback inhabits water bodies with mixed mud, sand, and fine gravel, tolerates slow to moderate flow rates. No water bodies with mixed mud, sand and fine gravel are present in the project area. The Texas fawnsfoot possibly inhabits water bodies with sand, gravel, and perhaps sandy-mud substrates in moderate flows. No water bodies with sand/gravel or mixed mud/sand and fine gravel substrate are present in the project area.

Species of Greatest Conservation Need (SGCN)

According to TPWD, 22 SGCNs occur in Brazoria County. Of these species, only four have habitat present in the project area and have the potential to be impacted. These four species are: awnless bluestem (*Bothriochloa exaristata*), coastal gay-feather (*Liatris bracteata*), giant sharpstem umbrella-sedge (*Cyperus cephalanthus*), and south Texas spikesedge (*Eleocharis austrotexana*).

Awnless bluestem (*Bothriochloa exaristata*) occurs on coastal prairies of black clay, coastal gay-feather (*Liatris bracteata*) occurs in coastal prairie grasslands, giant sharpstem umbrella-sedge (*Cyperus cephalanthus*) grows on saturated, fine sandy loam soils or heavy black clay and south Texas spikesedge (*Eleocharis austrotexana*) grows in wetlands in scattered locations in the coastal plain.

More detailed information is found in the Water Quality Technical Report and Biological Evaluation Form.

In accordance with TPWD regulations and the TxDOT-TPWD Best Management Practices Programmatic Agreement, if any individuals of state-listed species are encountered during construction, protective measures would be instituted to avoid a take of any state listed species.

5.12 Air Quality

This project is located in Brazoria County which has been designated by the U. S. Environmental Protection Agency (EPA) as a marginal nonattainment area for the 2008 ozone National Ambient Air Quality Standards (NAAQS); therefore, transportation conformity rules apply. The project is included in and is consistent with both the area's Transportation Improvement Program (TIP) and Regional Transportation Plan (RTP) (**Appendix E**).

Design year (2039) traffic for this project is 25,767 vehicles per day (VPD). A prior TxDOT modeling study and previous analyses of similar projects demonstrated that it is unlikely that a carbon monoxide (CO) standard would ever be exceeded as a result of any project with an AADT below 140,000. The AADT projections for the project do not exceed 140,000 VPD; therefore, a traffic air quality analysis is not required.

Because it will add capacity in a nonattainment area, the project has been coordinated under the TxDOT-TCEQ MOU.

The construction of McHard Road would lead to higher MSAT emissions for the Build Alternative along the roadway corridor, along with a decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOVES2010b model, emissions of all of the priority MSAT decrease as speed increases. Also, regardless of the alternative chosen (Build vs No Build), emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The congestion management process (CMP) serves as a systematic process implemented to provide safe and effective integrated multimodal transportation system management and operations. The CMP includes:

- Development of congestion management objectives
- Establishment of measures of multimodal transportation system performance;
- Collection of data and system performance monitoring to define the extent and duration of congestion and determine the causes of congestion
- Identification of congestion management strategies
- Implementation activities, including identification of an implementation schedule and possible funding sources for each strategy
- Evaluation of the effectiveness of implemented strategies.

A CMP is required in metropolitan areas with populations exceeding 200,000, known as Transportation Management Areas (TMAs). A CMP is required by federal regulations to be developed and implemented as an integrated part of the metropolitan transportation planning process. Since the Houston-Galveston Region exceeds 200,000 population, a CMP for the Region is required (H-GAC, 2015).

Committed congestion reduction strategies and operational improvements in the project area may include computerized transportation management systems, "smart street" improvements, roadway reconstruction and roadway widening. The following CMP measures will be included as part of this project:

- The existing signals at Cullen and Mykawa will be modified to fit new McHard roadway section.
- There will be new signals at Existing Max Road which will be relocated to the future realigned section of Max Road. There will other new signals at Roy Rd, Garden Rd, O' Day Rd, Hatfield Road.
- The City plans to manage/synchronize these signals with a fiber optic system. This system will optimize the signalization system in the corridor and link it with rest of McHard Corridor. Additionally, the City will install cameras at intersections and will monitor traffic within

the corridor and will make adjustments as traffic demand changes to optimize the system. Signal timing will be part of the standard start-up operation. This signal timing will be refined to meet traffic demand as traffic volumes on the road increases.

- All signalized intersections will have pedestrian crossing signals, ramps and landing pads.
- There will be a 10-foot-wide shared path for pedestrian and bike traffic along south side of the roadway from Cullen to Mykawa. Future improvements to the intersecting streets will extend the sidewalk system to the north and south. There is no planned sidewalk along the north side of McHard Rd.
- The future Max road on new alignment could potentially have a 10-foot pedestrian/bike shared facility. The future Max Road will have 120-foot ROW. All other roads will have 6-foot sidewalks. Mykawa Road is proposed as a 4-lane divided roadway with sidewalks.

The proposed project is not a committed congestion reduction strategy, but there are approved congestion mitigation measures within the CMS to reduce congestion within Brazoria County (see **Table 4**). CMS projects can include transit, intelligent transportation, and commuter oriented projects. Specific programs include Vanpool programs, additional buses and other transit vehicles, Metro Rail enhancements and expansions, Park-and-Ride facilities, and traffic optimization.

Location	Congestion Mitigation Measure	Anticipated Let Date
County Rd 48, FM 518 to CR 894	Widen to 4-lane divided rural road	Not known
County Rd 59, CR 48 to Business Center Drive	Widen to 4-lanes with bridge	Not known
Max Road, Hughes Ranch Rd to FM 518	Widen to 4-Lane Divided	Not known
Fite Road, McLean Rd to Veterans Dr.	Construct 4-lane divided Rd	Not known
Smith Ranch Road, Hughes Rd to North of Broadway (FM 518)	Row acquisition for widening to 4-lanes	Not known
SH 35, S of FM 1462 to FM 2403	Add auxiliary lane	Not known

In an effort to reduce congestion and the need for SOV lanes in the region, TxDOT and H-GAC will continue to promote appropriate congestion reduction strategies through the federal Congestion Mitigation and Air Quality (CMAQ) program, the CMP, and the 2040 RTP. The congestion reduction strategies considered for this project would help alleviate congestion in the SOV study boundary, but would not eliminate it.

Therefore, the proposed project is justified. The CMP analysis for added SOV capacity projects in the TMA is on file and available for review at H-GAC.

Air quality impacts related to construction are discussed in Section 5.16.2, below.

5.13 Hazardous Materials

A review of environmental regulatory databases and an Initial Site Assessment (ISA) was performed in March 2016 to identify sites or facilities that could potentially result in hazardous materials impacts to the proposed project. A total of 33 records at 27 sites were identified in the regulatory database search. An evaluation of the sites in the project area that were identified in the database searches found that all of the site-specific hazardous materials issues are expected to have low potential for impacts.

The review of federal and state environmental databases identified three facilities with environmental registrations or records along or near the study corridor that required further review. These three properties were reviewed and observed during the site visit. It was determined that each of the facilities present a low environmental concern to the study corridor.

The Advanced Crane and Hoist Services facility is located at 13430 Roy Road in Pearland, Texas within one half mile from the study corridor. The facility was listed in the TCEQ's Hazardous Waste Generators database (HW). The facility is listed as an active generator of waste. No violations were found in the record. Based on available regulatory records, the facility appears to pose a low environmental concern to the study corridor.

The Heldenfelds Construction Site is located at the intersection of Highway 288 and McHard Road in Pearland, Texas within one half mile from the study corridor. The facility, used for staging during construction activities, was listed in the TCEQ's Petroleum Storage Tank database (PST). The facility has one temporary 8,000-gallon aboveground diesel storage tank onsite for use during construction activities. No violations were found in the record. Based on available regulatory records, the facility appears to pose a low environmental concern to the study corridor.

The third record found was for a site located at 13311 Garden Road near the study corridor. The site is listed in the Emergency Response Notification System (ERNS) database for a reported dumping of three 55-gallon drums of unknown oil at the site in 1997. Emergency responders resolved the release. Based on available regulatory records and the time since the release occurred, the facility appears to pose a low environmental concern to the study corridor.

During the March 2013 field visit for the ISA, it was observed that the study corridor and surrounding area are predominantly developed for residential and light commercial purposes. A few key commercial and industrial facilities were observed along the proposed alignment that may pose a potential REC for the proposed project. These commercial/industrial properties include a Conoco service station located at 2620 McHard Road directly to the east of its intersection with Highway 288, the country club maintenance facility, which is part of the Country Place Golf Club located at 3123 Flower Field Lane near the intersection of West Country Place Boulevard, a boat service center located at 8302 Brookside Road, and a railroad yard located at 1871 Mykawa Road.

No evidence of any evidence of improper use, storage, or disposal of hazardous substances or petroleum products was observed within the study corridor. No obvious indicators of environmental contamination, such as stressed vegetation, stained soils, or relic storage containers were observed in the study corridor. No evidence of significant environmental concerns on adjacent sites with the potential to adversely affect the study corridor was found. Additionally, no evidence of significant environmental concern was discovered along the study corridor during the site visit.

5.14 Traffic Noise

The FHWA traffic noise modeling software was used to calculate existing and predicted traffic noise levels at representative receivers adjacent to the proposed roadway expansion project that might be impacted by traffic noise. All modeled receivers with exception of one place of worship were residential. For either a residential or place of worship receiver, a noise impact occurs if the predicted noise level is equal to or greater than 66 dB(A) or if the predicted noise level exceeds the existing noise level by more than ten (10) dB(A). When a traffic noise impact occurs, noise abatement measures must be considered. Before an abatement measure can be proposed for incorporation into the proposed interchange project, it must be both feasible and reasonable. In order to be "feasible," the abatement measure must be able to reduce the noise level at greater than 50% of impacted, first row receivers by at least five (5) dB(A); and to be "reasonable," it must not exceed the cost-effectiveness criterion of \$25,000 for each receiver that would benefit by a reduction of at least five (5) dB(A). The abatement measure must be able to reduce the noise level of at least one impacted, first row receiver by at least seven (7) dB(A).

Eleven total receivers (which represent 22 residences) were predicted to have a noise impact due to predicted noise levels exceeding existing noise levels by more than ten (10) dB(A). No predicted noise levels were greater than or equal to 66 dB(A). Noise barriers are the most commonly used noise abatement measure, and noise barrier analyses were completed for the 11 impacted receiver locations. Noise barriers would not be both feasible and reasonable for nine receivers (representing 15 residences), and accordingly, noise barriers at these nine locations are not proposed for incorporation into the project. For the remaining two (2) impacted receivers (representing 7 residences located on a single property), an approximately 12-foot high noise barrier would be both feasible and reasonable, and is therefore proposed. A noise workshop will be held to determine whether the proposed noise barrier will be incorporated into the project.

To avoid noise impacts that may result from future development of properties adjacent to the project, local officials responsible for land use control programs should ensure, to the maximum extent possible, no new construction activities within certain distances from the right of way. No "Category B&C" land uses like residential, playgrounds, and churches should be allowed within 60 feet of the right of way. No "Category E" land uses like hotels and other developed lands should be allowed within 10 feet of the right of way.

5.15 Indirect and Cumulative Impacts Summary

The induced growth and cumulative impacts analyses for the proposed project were developed using the following TxDOT publications: *Environmental Handbook - Indirect and Cumulative Impacts* (TxDOT 2014), *Indirect Impacts Analysis Guidance* (TxDOT 2015), and *Cumulative Impacts Analysis Guidelines* (TxDOT 2014). Additional guidance utilized throughout the indirect impacts analysis includes the 2002 National Cooperative Highway Research Program (NCHRP) report entitled *NCHRP Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (NCHRP 2002), and the NCHRP Project 25-25 Task 22 report entitled *Forecasting Indirect Land Use Effects of Transportation Projects* (NCHRP 2007). Separate technical reports were prepared to document the analysis of the potential indirect and cumulative effects of the proposed project. Summaries of the technical reports are provided below.

5.15.1 Induced Growth

Because the proposed project is a new-location roadway extension, it has the potential to open up new areas for development and substantially change access for adjacent parcels. During an interview held in July 2016, the City of Pearland's Director of Community Development commented on growth trends in the area and provided information regarding the potential for development within the area of influence (AOI). The Director confirmed that no specific planned developments were filed or planned within the AOI at the time of the interview. There had been no recent platting activity within the project's AOI nor were there pending building permits or zoning change applications. However, it is the Director's professional opinion that this lack of pre-development activity is not likely to continue if the McHard Road Extension is constructed.

The interview with the Director of Community Development indicated that undeveloped tracts of land within the AOI are likely to develop within the confines of the existing zoning regulations and Future Land Use Plan. According to the interview results, the Director stated the AOI would likely experience development pressure if McHard Road is extended, and noted that the proposed extension of McHard Road would likely increase the rate of land development. The areas of potential development within the AOI total approximately 324 acres and accounts for approximately 43 percent of the AOI (749 acres). The exact type, location, timing, and density of future developments are unknown at this stage of project development.

The following resources are present in the areas of potential development (approximately 342 acres) within the AOI: waters of the U.S., including wetlands; floodplains; vegetation and wildlife habitat; threatened and endangered species; prime farmland soils; air quality (related to potential industrial land uses); and community resources (specifically businesses and residences). No formal surveys have been conducted throughout all of the areas of potential development at the time of this report preparation for historic-age properties and archeological resources. Preliminary consultation with TxDOT-developed potential archeological liability maps (PALM) indicates low to medium potential for archeological impacts within the areas of potential development.

Future land development activities would generally be private ventures regulated by the City of Pearland's Unified Development Code. The regulations in the Code address environmental and social impacts by requiring mitigation as part of site design and construction such that development is in accordance with overall city objectives. In addition, the agencies and programs that would guide any development of a potential project would be similar to the typical mitigation and permitting measures required of TxDOT. For example, all development (public or private developers) must comply with flood control regulations under Federal Emergency Management Agency (FEMA) and the local floodplain administration, the Endangered Species Act, the Clean Water Act (CWA), CWA Section 401 Water Quality Certification requirements, CWA Section 404 permits for projects impacting waters of the U.S., and the Endangered Species Act.

Ultimately, because the proposed project is not anticipated to conflict with study area development goals or cause substantial negative indirect induced growth impacts, the consideration of mitigation for environmental impacts would be limited to mitigating only the direct impacts associated with this proposed project. Any mitigation for project-induced land development impacts that may arise after construction of the proposed project would be overseen by the City of Pearland and would be the

responsibility of the land developer. Mitigation for indirect induced growth impacts would not be required of the proposed project sponsors based on the analysis presented in the indirect impacts technical report.

In summary, the overall consensus is that the proposed project would influence future land use within the AOI; however, such project-induced land use change is not only accounted for by the City of Pearland's future planning documents and corresponding objectives, but is also considered positive for the future of Pearland.

5.15.2 Cumulative Impacts

Cumulative effects are defined as effects "on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR § 1508.7). Based on the results of TxDOT's cumulative impacts risk assessment, supported by the information presented in the cumulative impacts technical report and in the technical reports prepared for the proposed project, a cumulative impacts analysis is required for the proposed project. The resources/issues for which the proposed project may potentially have cumulative impacts are water resources (specifically waters of the U.S., including wetlands and water quality).

The resource study area (RSA) for potential impacts to water resources (including both waters of the U.S. and water quality impacts) is the Clear Creek-Frontal Galveston Bay sub-watershed (approximately 190,566 acres), which encompasses the entire McHard Road Extension project area. The RSA includes portions of Brazoria, Fort Bend, Harris, and Galveston Counties, including a small segment of Galveston Bay. The temporal boundary for this analysis is from 1970 to 2040. This timeframe captures the population and residential growth surrounding the Houston metropolitan area that has been a result of residential, commercial, and transportation-based development. While the RSA has experienced growth throughout the region, the RSA is currently approximately 36 percent undeveloped.

Waters of the U.S., including Wetlands

Approximately 8,815 acres of NWI-mapped wetlands, 22,763 acres of NWI-mapped waters associated with the Galveston Bay, and 602.16 linear miles of waters of the U.S. are present within the RSA. Of those areas, up to 2,426 acres of NWI mapped wetlands and 69.7 linear miles of waters of the U.S. within this area have been identified within areas designated as reasonably foreseeable development. Based on the projected growth within Brazoria, Fort Bend, Harris, and Galveston counties, additional roadway, residential, commercial, and industrial developments are expected within the RSA. Reasonably foreseeable developments and their future impacts to water resources may also occur from placement of fill within waters and wetlands of the U.S as a result of future development in the RSA.

Water Quality

There are approximately 131.2 linear miles of impaired waters mapped within the RSA. Of those, approximately 14.9 linear miles occur within areas of future development projected by the H-GAC. Any reasonably foreseeable projects could cause potential temporary and permanent degradation or loss of water resources from an increase in stormwater runoff caused by the addition of impervious cover and possible stream modifications from an increase in stormwater runoff. Developer adherence to

regulations and guidance related to stormwater quality would avoid or minimize adverse impacts to the quality of surface water within the RSA.

Table 5 provides a summary of impacts that result in cumulative effects to water resources (specifically waters of the U.S., including wetlands and water quality).

Table 5: Summary of Cumulative Impacts				
Resource	Direct Impacts + Indirect Impacts + Other Actions = Cumulative Impacts			
	Direct Impacts	Indirect Impacts¹	Other Past, Present, and Foreseeable Actions²	Cumulative Impacts³
Waters of the U.S., including Wetlands	Permanent fill impacts to 0.09 acres of jurisdictional waters. An additional 5.43 acres of presumed non-jurisdictional wetlands and ponds would be impacted.	Approximately 23 acres of wetlands and 3,336 linear feet of NWI-mapped waters are located in the AOI and therefore potentially could be indirectly impacted.	2,426 acres of NWI mapped wetlands and 69.7 linear miles of waters of the U.S. within this area have been identified within areas designated as reasonably foreseeable development (totaling approximately 26,013 acres).	Given the projected 13.7% increase of impervious cover within the RSA, the effect to water resources stemming from this project are not considered substantial contributions to cumulative impacts. Future development projects would be required to comply with various local, state, and federal regulations to protect waters of the U.S., including wetlands and surface water quality.
Water Quality	The proposed project area drains to Clear Creek (Segment 1102), which is listed as impaired. Approximately 41.3 acres of impervious cover would be added from project construction.	Two impaired stream segments and approximately 0.4 linear stream miles of impaired segments occur within the AOI.	Approximately 14.9 linear stream miles of impaired waters occur within areas project for future development.	

¹ The areas of potential development within the AOI total approximately 324 acres.

² Reasonably foreseeable development was identified from the H-GAC data, projecting out to 2040. The 324 acres of induced development in the AOI is included in the RSA calculations.

³ Calculation of impervious cover increase is based on total acreage calculations from the RSA using H-GAC future development data.

The following mitigation measures were identified for consideration of cumulative effects associated with the proposed project.

Waters of the U.S., including Wetlands

Impacts to waters of the U.S., including wetlands, whether direct, indirect, or cumulative, would be regulated through the USACE Section 404 permit process. A Nationwide Permit 14 is expected for the proposed project; however, no USACE regulated mitigation for direct, indirect, or cumulative impacts to wetlands or waters of the U.S. is proposed.

Activities to minimize the impacts to vegetative or undeveloped habitats from construction include minimizing vegetation removal within the construction area where practicable, decreasing the amount of fill placement, and implementing BMPs, including an erosion and sedimentation control plan. Specific impact minimization to wetland, floodplain, and stream areas may include using bridge crossings instead of filled embankment; using retention basins and revegetated swales to minimize runoff, sedimentation, turbidity, leaching of soil nutrients, and leaching of chemicals from petroleum products, pavement, and waste material; and maintaining flow patterns to ensure wetland hydrology is preserved.

Water Quality

Because the proposed project would disturb more than 5 acres (approximately 67 acres), the City of Pearland and TxDOT are required to comply with the Texas Pollutant Discharge Elimination System (TPDES) Permit No. TXR150000 for Stormwater Discharges Associated with Construction Activities. A Notice of Intent (NOI) would be submitted stating that a Stormwater Pollution Prevention Plan (SW3P) would be developed and filed with the TCEQ in accordance with TxDOT policies. Potential impacts to water quality would be mitigated through implementation of the SW3P, which would address measures to prevent or correct erosion that may develop during construction. BMPs for temporary and permanent soil erosion and sedimentation controls would be implemented, along with measures to prevent or control hazardous material spills during construction. Stormwater detention areas or vegetation open drainage ways with culverts would be designed to collect stormwater discharges and to promote settling of suspended solids and reduce potential pollutant concentrations.

Impacts to waters of the U.S., including wetlands, whether direct, indirect, or cumulative, would be regulated through the USACE Section 404 permit process. A Nationwide Permit 14 is expected for this project; however, no USACE regulated mitigation for impacts to wetlands or waters of the U.S. is anticipated. Should mitigation be required, mitigation would be through purchase of credits from an approved mitigation bank.

The proposed project may incorporate the following BMPs at appropriate stages during construction. For erosion control, seeding of embankments and sodding of areas more susceptible to erosion would be conducted throughout construction. For sedimentation, a combination of silt fencing along the right-of-way, hay bales within roadside ditches, and rock filter dams at the culvert locations would be utilized and remain in place until project completion. For post-construction total suspended solids (TSS) control, vegetative filter strips (in the roadside ditches) would be utilized to control total suspended solids after construction. TxDOT would reseed or vegetate disturbed areas in accordance with TxDOT standard specifications and in compliance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping.

5.16 Construction Phase Impacts

5.16.1 Noise Impacts

Noise associated with the construction of the proposed project is difficult to predict. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises are more tolerable. None of the receivers are expected to be exposed to construction noise for a long duration; therefore, extended disruption of normal activities is not expected. Provisions would be included in the plans and specifications that require that contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

5.16.2 Air Quality Impacts

During the construction phase of the proposed project, temporary increases in air pollutant emissions could occur from construction activities. The primary construction-related emissions are particulate matter (fugitive dust) from site preparation. These emissions are temporary in nature (only occurring during actual construction); it is not possible to reasonably estimate impacts from these emissions due to limitations of existing models. However, the potential impacts of particulate matter emissions would be minimized by using fugitive dust control measures such as covering or treating disturbed areas with dust suppression techniques, sprinkling, covering loaded trucks, and other dust abatement controls, as appropriate. The construction activity phase of this project could generate a temporary increase in MSAT emissions from construction activities, equipment and related vehicles. The primary construction-related MSAT emission is diesel particulate matter from diesel powered construction equipment and vehicles. The Texas Emissions Reduction Plan (TERP) includes incentive programs to encourage the development of multi-pollutant approaches to ensure that the air in Texas is both safe to breathe and meets minimum federal standards. TxDOT encourages construction contractors to utilize this program to the fullest extent possible to minimize diesel emissions. Information about the TERP program can be found at: <http://www.tceq.state.tx.us/implementation/air/terp>. However, considering the temporary and transient nature of construction-related emissions, as well as the mitigation actions to be utilized, it is not anticipated that emissions from construction of this project would have any substantive impact on air quality in the area. A qualitative MSAT discussion is included in the Air Quality Technical Report.

5.16.3 Vegetation and Wildlife Impacts

Temporary and permanent impacts to natural resources due to construction could result from the implementation of the proposed project and include disturbances to wildlife and vegetative communities. Implementation of the Build Alternative would involve the removal of grasses and shrubs during the construction phase, affecting the natural, erosion-inhibiting ground cover and resulting in the loss of habitat for both resident and migratory species. Disturbed areas would be restored, reseeded, and recontoured as necessary according to TxDOT specifications, making these effects largely temporary; however, disturbance to early successional woodlands would be permanent.

5.16.4 No Build Alternative

No construction would occur under the No Build Alternative; therefore, no construction-phase effects would occur.

6.0 Agency Coordination

Because the proposed project would impact approximately 4.76 acres of South Texas Wetland, 25.3 acres of Mixed Woodlands and Forests, 3.20 acres of Disturbed Prairie, and 5.52 acres of Coastal Grassland and therefore exceed the disturbance threshold for these MOU types, coordination with TPWD was initiated and was completed on August 1, 2016 (see **Appendix G**).

The project has been coordinated with the TCEQ for air impacts. The draft EA will be coordinated with TCEQ for water in accordance with the TxDOT-TCEQ MOU codified at 43 T.A.C. Chapter 2, Subchapter I.

The conclusions of the archeological resources investigations were coordinated with TxDOT and the THC under the provisions of the PA-TU and the TxDOT/THC MOU. Concurrence regarding the recommendations made for archeological resources was received on September 15, 2016. The results of the historical resources survey indicated that no coordination was required.

7.0 Public Involvement

A public meeting for the proposed project was held on March 24, 2015, at Glenda Dawson High School, 2050 Cullen Boulevard, Pearland, TX 77581. Approximately 225 members of the general public and six public officials attended the meeting. Attendees were generally supportive of the project with 93 persons supporting the project, 10 persons not supporting the project, seven persons who were undecided and 17 not answering the question on the form. Of the persons responding to their preference of alignments, 84 preferred Alignment 1 (North), 21 preferred Alignment 2 (South), one was undecided, one expressed no preference for either alignment, one wanted neither alignment and 19 left the response blank. Comments received as a result of the public meeting and responses to these comments are included in **Appendix H**.

TxDOT intends to hold a public hearing on this project.

After the environmental review process has concluded, but before earthmoving or other activities requiring heavy equipment, a notice of impending construction will be provided to owners of adjoining property and affected local governments and public officials. This notice may be provided via a sign or signs posted in the ROW, mailed notices, printed notices distributed by hand, or notice via website if the recipient has previously been informed of the relevant website address.

8.0 Environmental Permits, Issues and Commitments

8.1 Vegetation and Wildlife Habitat

The following EPICs would be implemented during project construction. Appropriate measures would be taken to avoid adverse impacts on migratory birds and would include the following:

1. Disturbing, destroying, or removing active migratory bird nests, including ground nesting birds, would be prohibited during the nesting season;
2. The removal of unoccupied, inactive nests, would be avoided, where practicable;
3. The establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair would be prevented; and,

4. The collection, capture, and relocation, or transportation of birds, eggs, young, or active nests without a permit would be prohibited.

Best management practices (BMPs) detailed in the TxDOT-TPWD Best Management Practices Programmatic Agreement would be implemented to avoid or minimize impacts to species of concern and would include the following:

5. Contractors would be advised of the potential occurrence any state or federally listed species of concern with habitat in the project area, and to avoid harming the species if encountered.

For vegetation, including invasive species, EPICS would include:

6. The contractor would restore and reseed disturbed areas in accordance with TxDOT's Vegetation Management Guidelines, TxDOT Special Provision 164-006, and in compliance with the intent of Executive Order 13112 and the FHWA Executive Memorandum on Environmentally and Economically Beneficial Landscape Practices.
7. BMPs detailed in the TxDOT-TPWD Best Management Practices Programmatic Agreement would be implemented to avoid or minimize impacts to vegetation and prevent the spread and colonization of invasive species and would include the following:
8. Vegetation clearing would be minimized and disturbance limited to only that which is necessary to construct the proposed project;
9. Removal of native vegetation, particularly mature native trees and shrubs, would be avoided to the greatest extent practicable;
10. Locally adapted native species, including seed mix, would be used in landscaping and revegetation;
11. Colonization by invasive plants would be actively prevented. Vegetation management would include the removal of invasive species as soon as practicable while allowing the existing native plants to revegetate disturbed areas.

8.2 Traffic Noise

Eleven total receivers (which represent 22 residences) were predicted to have noise impacts. Noise barriers would not be both feasible and reasonable for 9 receivers (representing 15 residences), and accordingly, noise barriers at these 9 locations are not proposed for incorporation into the project. For the remaining two (2) impacted receivers (representing 7 residences located on a single property), an approximately 12-foot high noise barrier would be both feasible and reasonable, and is therefore proposed. A noise workshop will be held to determine whether the proposed noise barrier will be incorporated into the project.

8.3 Water Quality

Because the project may require placement of fill in a jurisdictional water that exceeds either the requirements of NWP 14 with or without PCN. The USACE is currently reviewing the jurisdictional status of all potential waters of the U. S. in the project area.

12. Pending this review, a PCN or IP application may be required. The project will be reviewed pending USACE jurisdictional determination and the appropriate permitting documentation will be submitted to the USACE and prior to construction.

13. The project cannot proceed with any activity requiring authorization from the USACE without having obtained the required authorization. EPICs regarding water quality include:
14. The contractor will implement methods to minimize impacts to all wetlands to the extent practicable.
15. The project would involve five or more acres of earth disturbance; therefore, the contractor would be required to comply with the requirements of the Texas Commission on Environmental Quality's (TCEQ's) Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit.
16. A Storm Water Pollution Prevention Plan (SW3P) would be implemented, and a construction site notice would be posted at the construction site. A Notice of Intent (NOI) would be required.
17. The TPDES requirements would be met by implementing approved erosion controls, sediment controls, and post-construction total suspended solids controls. All temporary erosion controls, such as silt fences and rock berms, would be in compliance with TxDOT Standard Specifications and would be in place, according to the construction plans, prior to commencement of construction-related activities and inspected on a regular basis.
18. BMPs required under the TCEQ's Section 401 Water Quality Certification Tier I (Small Projects) will be implemented.
19. The project and associated activities will be implemented, operated, and maintained in a manner that is consistent with the approved TMDL Implementation Plan for impaired water bodies within 5 miles downstream of the project area.

The project is located within the boundaries of the City of Pearland Phase II Municipal Separate Storm Sewer System (MS4), therefore:

20. the contractor would be required to comply with the applicable MS4 requirements.

Floodplain EPICs include:

21. Prior to construction, the contractor will coordinate with the local floodplain administrator (City of Pearland).
22. If required, will prepare the Conditional Letter of Map Revision (CLOMR) for submittal to the City/FEMA.

8.4 Archeological Resources

Results of the survey indicate that extensive disturbances within the APE due to previous construction activities, utility installation, commercial and residential development, and farming practices have greatly affected the potential for identifying any intact archeological deposits. No evidence was found of any preserved deposits with a high degree of integrity, associations with distinctive architectural and material culture styles, rare materials and assemblages, the potential to yield data important to the study of preservation techniques and the past in general, or potential attractiveness to relic hunters (13 TAC 26.10; 36 CFR 60.4). No additional archeological investigations are warranted prior to construction activities.

23. If any unanticipated cultural materials or deposits are found at any stage of clearing, preparation, or construction, the work should cease in that area and TxDOT personnel should be notified immediately. During evaluation of any unanticipated finds and coordination between TxDOT and

THC, clearing, preparation, and/or construction could continue in any other areas along the corridor where no such deposits or materials are observed.

8.5 Hazardous Materials

EPICs involving hazardous materials are as follow:

24. Any unanticipated hazardous materials and/or petroleum contamination encountered during construction would be handled according to applicable federal and state regulations per TxDOT Standard Specifications. Section 6.10 of the “General Provisions of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges,” which applies to all highway projects, includes guidelines addressing the contractor’s responsibilities regarding the discovery of hazardous materials.

During a site visit for the proposed project, no evidence of any evidence of improper use, storage, or disposal of hazardous substances or petroleum products was observed within the study corridor. No obvious indicators of environmental contamination, such as stressed vegetation, stained soils, or relic storage containers were observed in the study corridor. No evidence of significant environmental concerns on adjacent sites with the potential to adversely affect the study corridor was found. Additionally, no evidence of significant environmental concern was discovered along the study corridor during the site visit.

The review of federal and state environmental databases identified three facilities with environmental registrations or records along or near the study corridor that required further review. These three properties were the Advanced Crane and Hoist Services facility located at 13430 Roy Road in Pearland, Texas within one half mile from the study corridor, the Heldenfelds Construction Site located at the intersection of Highway 288 and McHard Road in Pearland, Texas within one half mile from the study corridor, and a site located at 13311 Garden Road near the study corridor. Based on available regulatory records, these facilities appear to pose a low environmental concern to the study corridor.

8.6 Construction

General construction EPICS are as follow:

25. The contractor would observe proper maintenance and idling of construction equipment to control emissions of particulate matter.
26. The contractor would control the generation of dust by site watering.
27. Disruptions during the construction phase would be minimized to the extent possible by the timely notification of affected residents and business owners through posted notices, personal contact, or other notification procedures. These procedures could include rerouting traffic, barricading, using traffic cones, or any other measures deemed necessary and prudent by TxDOT and the construction contractor to comply with all local, state, and federal traffic and safety regulations.
28. Signage and barrier placement should be used to alert drivers of the inevitable reordering of travel patterns, both during construction and in the long term, as drivers find cut-through routes to shorten travel times.

29. During construction, procedures to minimize traffic congestion, noise, dust and risk to public safety should be specifically adapted to the circumstances of the proposed project.
30. Provisions would be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

9.0 Conclusion

The final EA and reports contained in the file of record have been independently evaluated by TxDOT and determined to adequately and accurately discuss the need, purpose, alternatives, environmental issues, impacts of the proposed project, and appropriate mitigation measures. These documents provide sufficient evidence and analysis for determining that preparation of an Environmental Impact Statement is not required. These documents are incorporated by reference into this decisional document. As a result of the findings of the EA, it is recommended that a FONSI be issued for this project.

Literature Cited

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Accessed: June 9, 2016

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<https://www.tsl.texas.gov/ref/abouttx/popcnty12000.html>

Texas State Library and Archives Commission. City and County Population Estimates. 2010 Census.
<https://www.tsl.texas.gov/ref/abouttx/popcity12010.html>

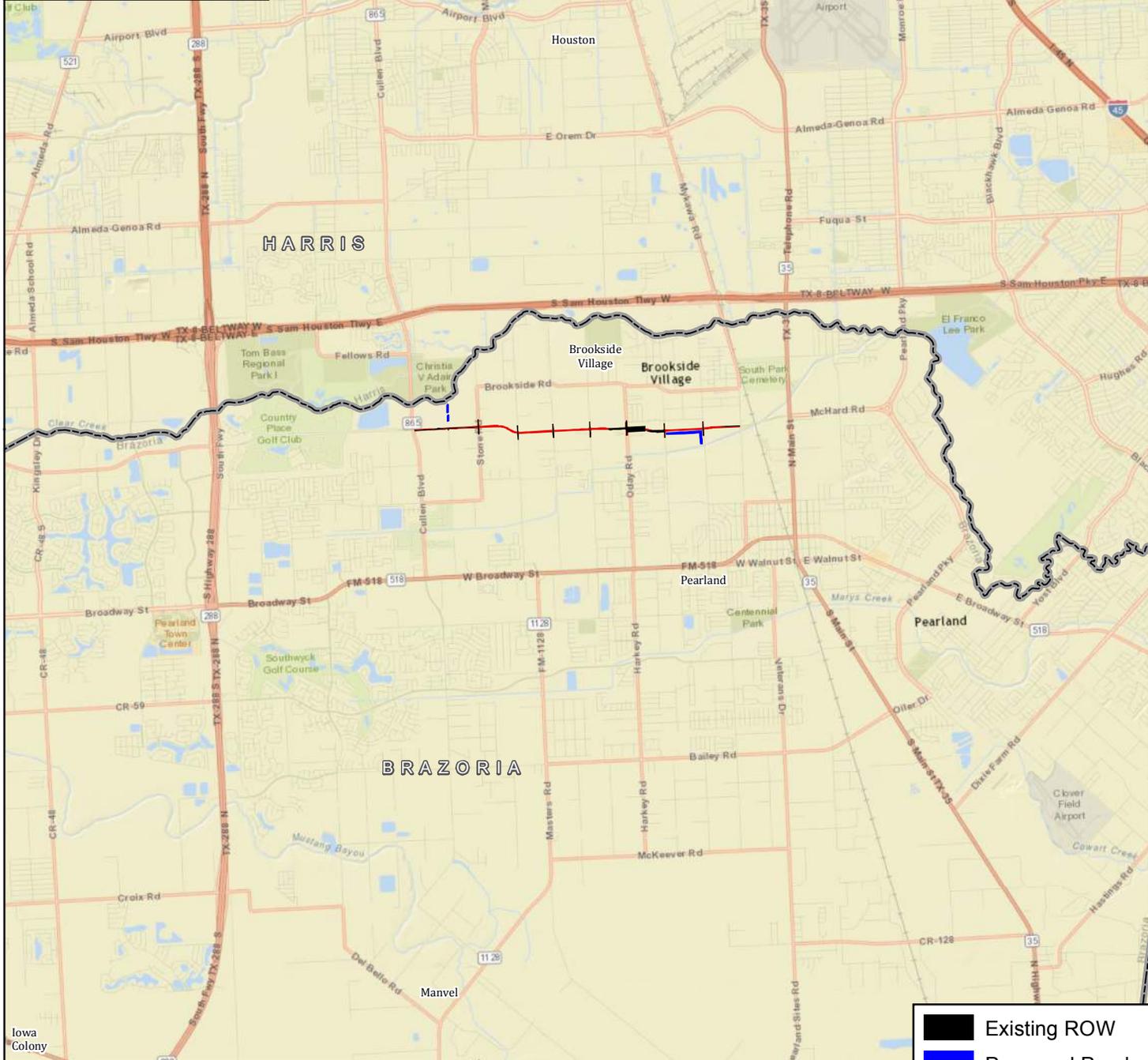
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TxDOT TPP Traffic Analysis McHard Road November 2015. Traffic Analysis for McHard Road by TxDOT TPP

TxDOT TPP Traffic Analysis FM 518 June 2016. Traffic Analysis for FM 518 by TxDOT TPP

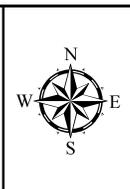
Appendix A

Project Location Map



- Existing ROW
- Proposed Ponds
- Proposed ROW

FREASE AND NICHOLS
 FREASE AND NICHOLS, INC.
 4055 International Plaza, Suite 200
 Fort Worth, TX 76109 - 4895
 Phone - (817) 735 - 7300



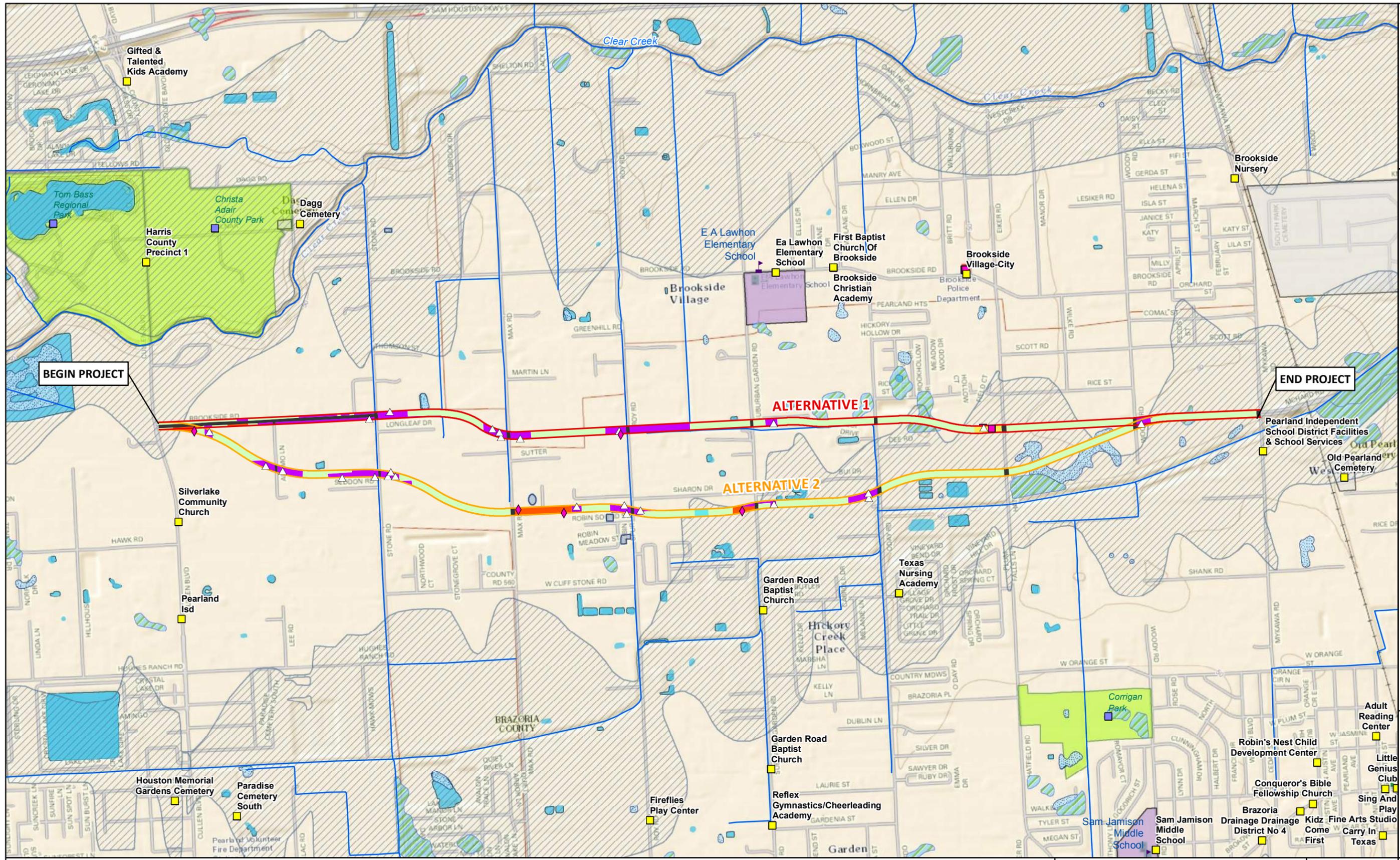
CITY OF PEARLAND
McHard Road Extension
Vicinity Map

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FILE NAME	1_Vicinity_Map.mxd
DATE	5/11/2016
SCALE	1:100,000
DESIGNED	SSJ
DRAFTED	SSJ

4

FIGURE

Alternatives Map



PRL14465
 3/20/2015
 DATUM & COORDINATE SYSTEM
 NAD83 State Plane (feet) Texas North Central
 FILE NAME
 PREPARED BY
 Constraints 03/20/2015
 SSI

CITY OF PEARLAND
McHard Road Extension
Preliminary Constrains Map

FRESE AND NICHOLS
 FRESE AND NICHOLS
 11200 Broadway, Suite 2332
 Pearland, Texas 77584
 832-456-4700

<ul style="list-style-type: none"> — Alignment Alternative 1 — Alignment Alternative 2 Institution Public Building Recreational Areas ▲ School Freshwater Emergent Wetland Freshwater Forested/Shrub Wetland Freshwater Pond/Detention Pond Flood Risk Zones ◆ Commercial Structures ▲ Residential Structures Govt. Building Commercial ROW Residential Undeveloped, Pasture, Agriculture, Vacant Cemeteries — NHDFlowline 	<p>1:18,000</p> <p>0 750 1,500 3,000 Feet</p>	<p>1</p> <p>FIGURE</p>
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Appendix B
Project Photos
(Taken December 16-18, 2015)



Photo 1: Photo faces west to the eastern extent of the project ROW at Brookside Road and Cullen Boulevard.



Photo 2: Facing east along Brookside Road within urban low intensity EMST.



Photo 3: Facing south at the intersection of Brookside Road and Stone Road, within urban low intensity EMST.



Photo 4: Facing west in ROW within coastal prairie EMST.



Photo 5: Facing north in forested wetland (Wetland 2), surrounded by deciduous woodland EMST



Photo 6: Emergent wetland area (Wetland 6), with farm infrastructure to the north.



Photo 7: Facing west from center ROW off Roy Road.



Photo 8: Facing northeast to open water (Pond 3) and coastal prairie EMST.



Photo 9: Facing east along boundary of mapped wetland (Wetland 5) and upland deciduous woodland.



Photo 10: Open water feature (Pond 5) surrounded by deciduous forested wetland (Wetland 6). Photo faces east along ROW.



Photo 11: Eastward view across disturbance or tame grassland EMST with urban low intensity in the background. Deciduous woodland EMST to the left.



Photo 12: Facing north in open area of deciduous woodland EMST.



Photo 13: Deciduous woodland EMST adjacent mapped wetland (Wetland 7), photo faces east.

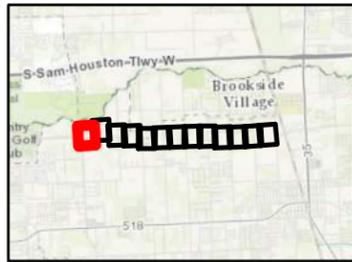


Photo 14: Facing west along ROW in transition between coastal prairie EMST and deciduous woodland EMST at fence line.

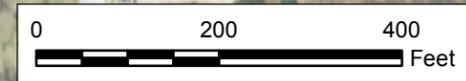


Photo 15: The western extent of the project ROW at Mykawa Road and McHard Road.
Photo faces east.

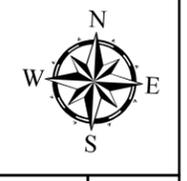
Appendix C
Schematic



- Proposed ROW
- Proposed Ponds
- No Access Tract (PJD Requested)
- County
- Proposed Edge of Pavement
- Proposed Drainage



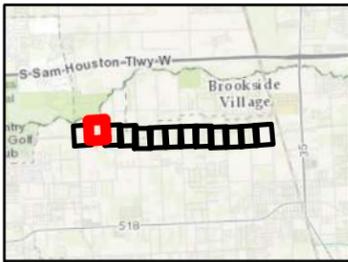
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DATE CREATED	Date: 11/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: Schematic_MB_2016112
PREPARED BY	



CITY OF PEARLAND
McHard Road Extensions
Proposed Improvements

FRESE AND NICHOLS, INC.
10431 MORADO CIRCLE
SUITE 300
AUSTIN, TEXAS 78759
PHONE: 512-617-3100
FAX: 512-617-3101

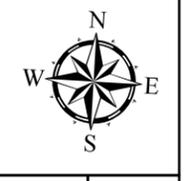
FIGURE
1



- Proposed ROW
- Proposed Ponds
- No Access Tract (PJD Requested)
- County
- Proposed Edge of Pavement
- Proposed Drainage



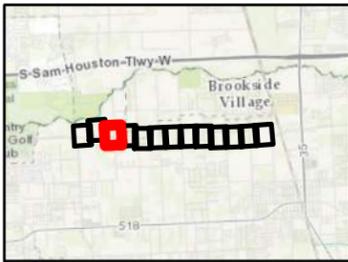
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 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas South Central
 FILE NAME Name: Schematic_MB_2016112
 PREPARED BY



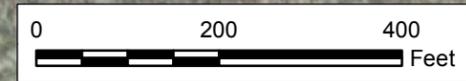
CITY OF PEARLAND
 McHard Road Extensions
Proposed Improvements

FRESE AND NICHOLS, INC.
 10431 MORADO CIRCLE
 SUITE 300
 AUSTIN, TEXAS 78759
 PHONE: 512-617-3100
 FAX: 512-617-3101

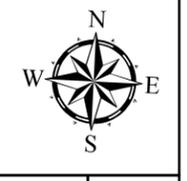
FIGURE
2



- Proposed ROW
- Proposed Ponds
- No Access Tract (PJD Requested)
- County
- Proposed Edge of Pavement
- Proposed Drainage



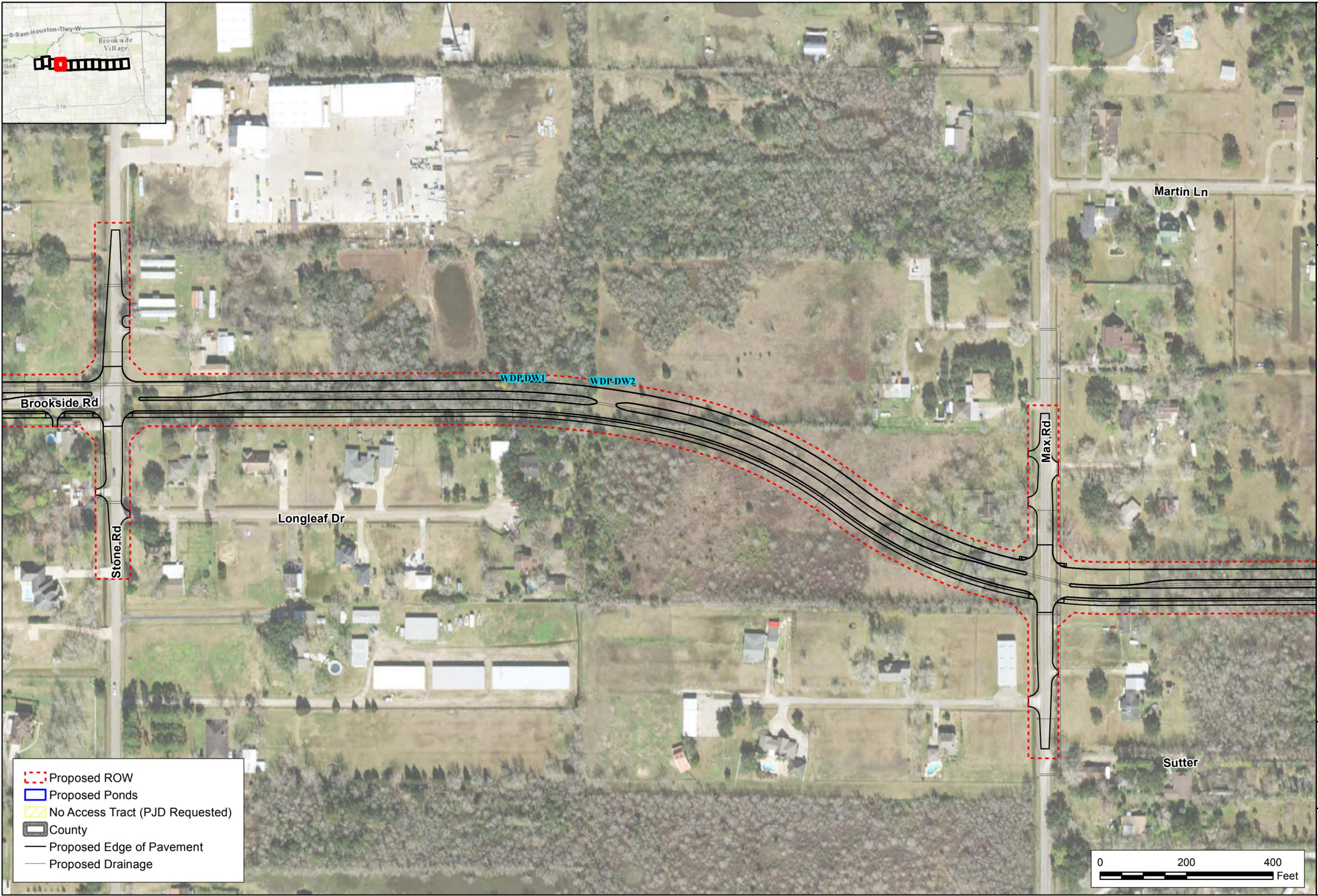
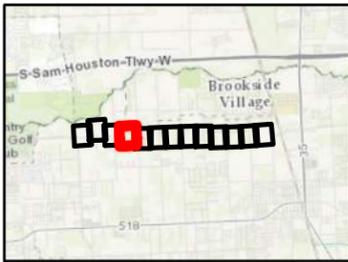
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DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: Schematic_MB_2016112
PREPARED BY	



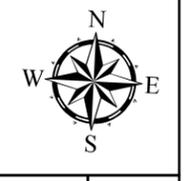
CITY OF PEARLAND
McHard Road Extensions
Proposed Improvements

FRESE AND NICHOLS, INC.
10431 MORADO CIRCLE
SUITE 300
AUSTIN, TEXAS 78759
PHONE: 512-617-3100
FAX: 512-617-3101

FIGURE
3



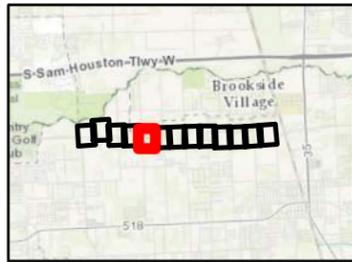
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DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: Schematic_MB_2016112
PREPARED BY	



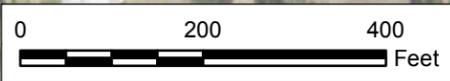
CITY OF PEARLAND
McHard Road Extensions
Proposed Improvements

FRESE AND NICHOLS, INC.
10431 MORADO CIRCLE
SUITE 300
AUSTIN, TEXAS 78759
PHONE: 512-617-3100
FAX: 512-617-3101

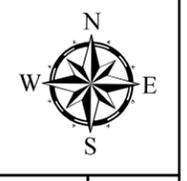
FIGURE
4



- - - Proposed ROW
- Proposed Ponds
- No Access Tract (PJD Requested)
- County
- Proposed Edge of Pavement
- Proposed Drainage



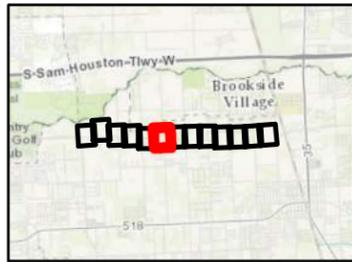
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 DATE CREATED Date: 11/22/2016
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas South Central
 FILE NAME Name: Schematic_MB_2016112
 PREPARED BY



CITY OF PEARLAND
 McHard Road Extensions
Proposed Improvements

FRESE AND NICHOLS, INC.
 10431 MORADO CIRCLE
 SUITE 300
 AUSTIN, TEXAS 78759
 PHONE: 512-617-3100
 FAX: 512-617-3101

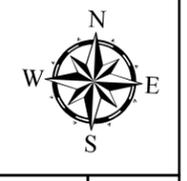
FIGURE
5



- Proposed ROW
- Proposed Ponds
- No Access Tract (PJD Requested)
- County
- Proposed Edge of Pavement
- Proposed Drainage



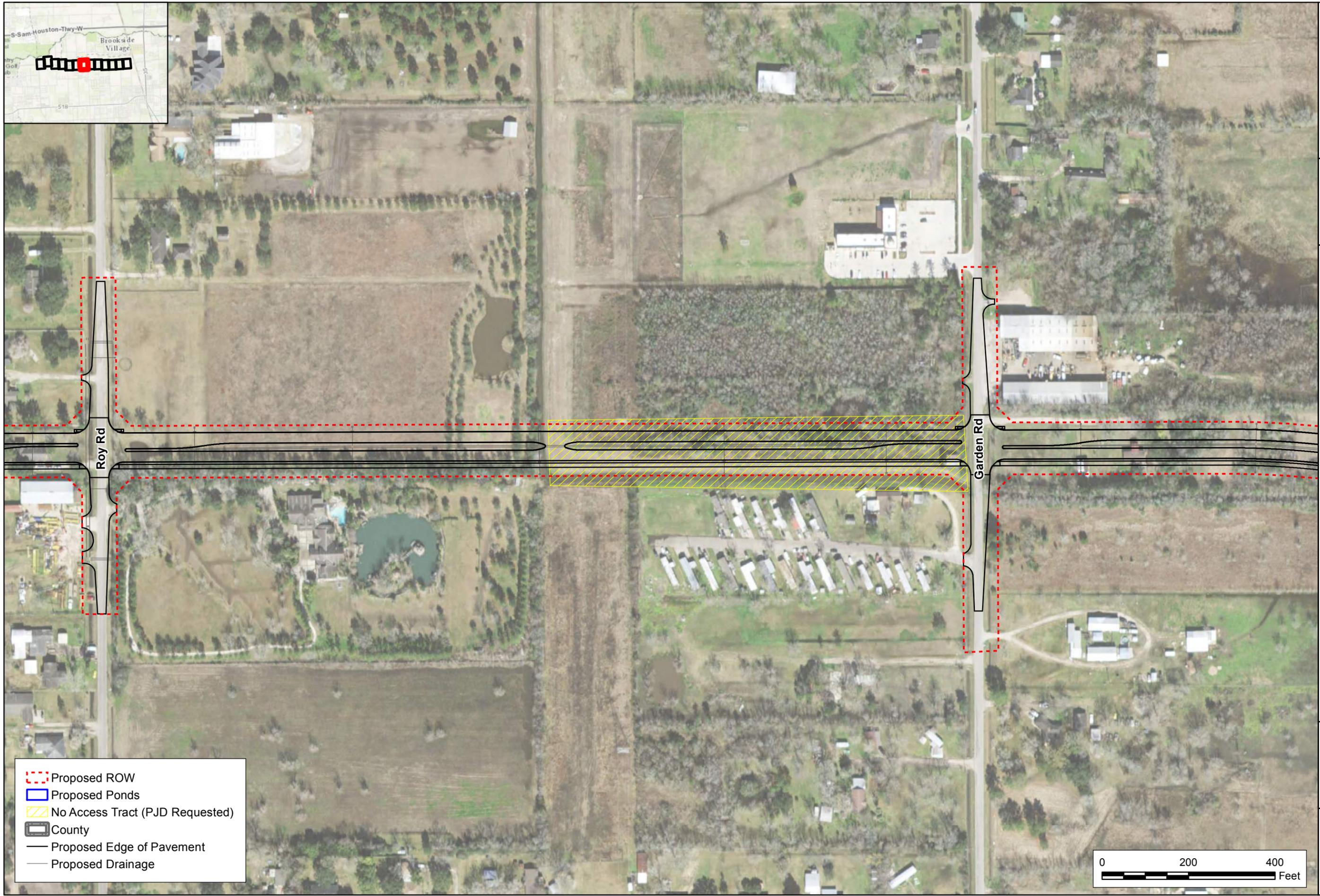
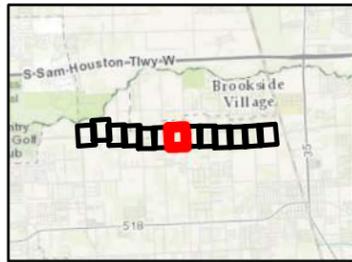
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 DATE CREATED Date: 11/22/2016
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas South Central
 FILE NAME Name: Schematic_MB_2016112
 PREPARED BY



CITY OF PEARLAND
 McHard Road Extensions
Proposed Improvements

FRESE AND NICHOLS, INC.
 10431 MORADO CIRCLE
 SUITE 300
 AUSTIN, TEXAS 78759
 PHONE: 512-617-3100
 FAX: 512-617-3101

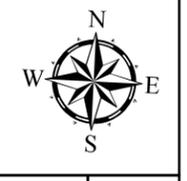
FIGURE
6



- - - Proposed ROW
- Proposed Ponds
- No Access Tract (PJD Requested)
- County
- Proposed Edge of Pavement
- Proposed Drainage

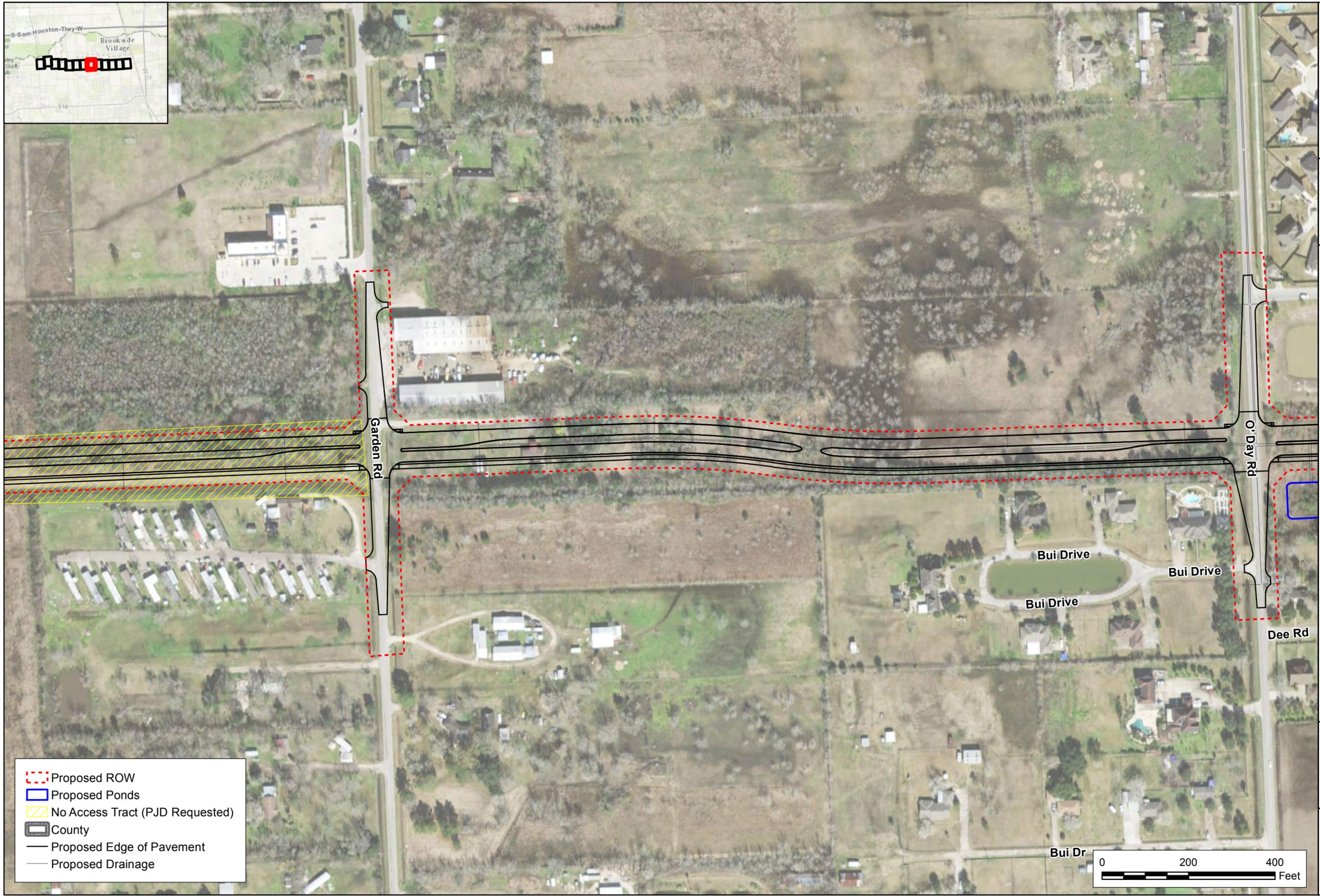
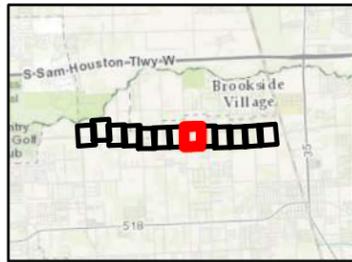


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 PREPARED BY

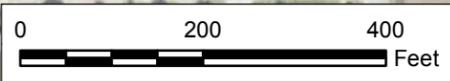


CITY OF PEARLAND
 McHard Road Extensions
Proposed Improvements

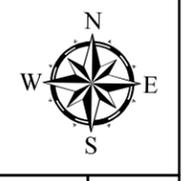
FRESE AND NICHOLS, INC.
 10431 MORADO CIRCLE
 SUITE 300
 AUSTIN, TEXAS 78759
 PHONE: 512-617-3100
 FAX: 512-617-3101



- Proposed ROW
- Proposed Ponds
- No Access Tract (PJD Requested)
- County
- Proposed Edge of Pavement
- Proposed Drainage

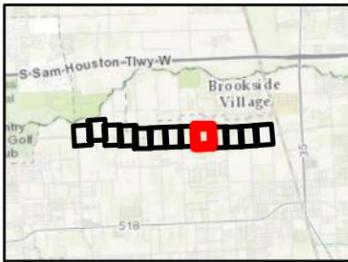


PN PROJECT NO.	PRJ11485
DATE CREATED	Date: 11/22/2016
DRAWN & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: Schematic_MB_2016112
PREPARED BY	



CITY OF PEARLAND
McHard Road Extensions
Proposed Improvements

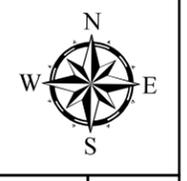
FRESE AND NICHOLS, INC.
10431 MORADO CIRCLE
SUITE 300
AUSTIN, TEXAS 78759
PHONE: 512-617-3100
FAX: 512-617-3101



- Proposed ROW
- Proposed Ponds
- No Access Tract (PJD Requested)
- County
- Proposed Edge of Pavement
- Proposed Drainage

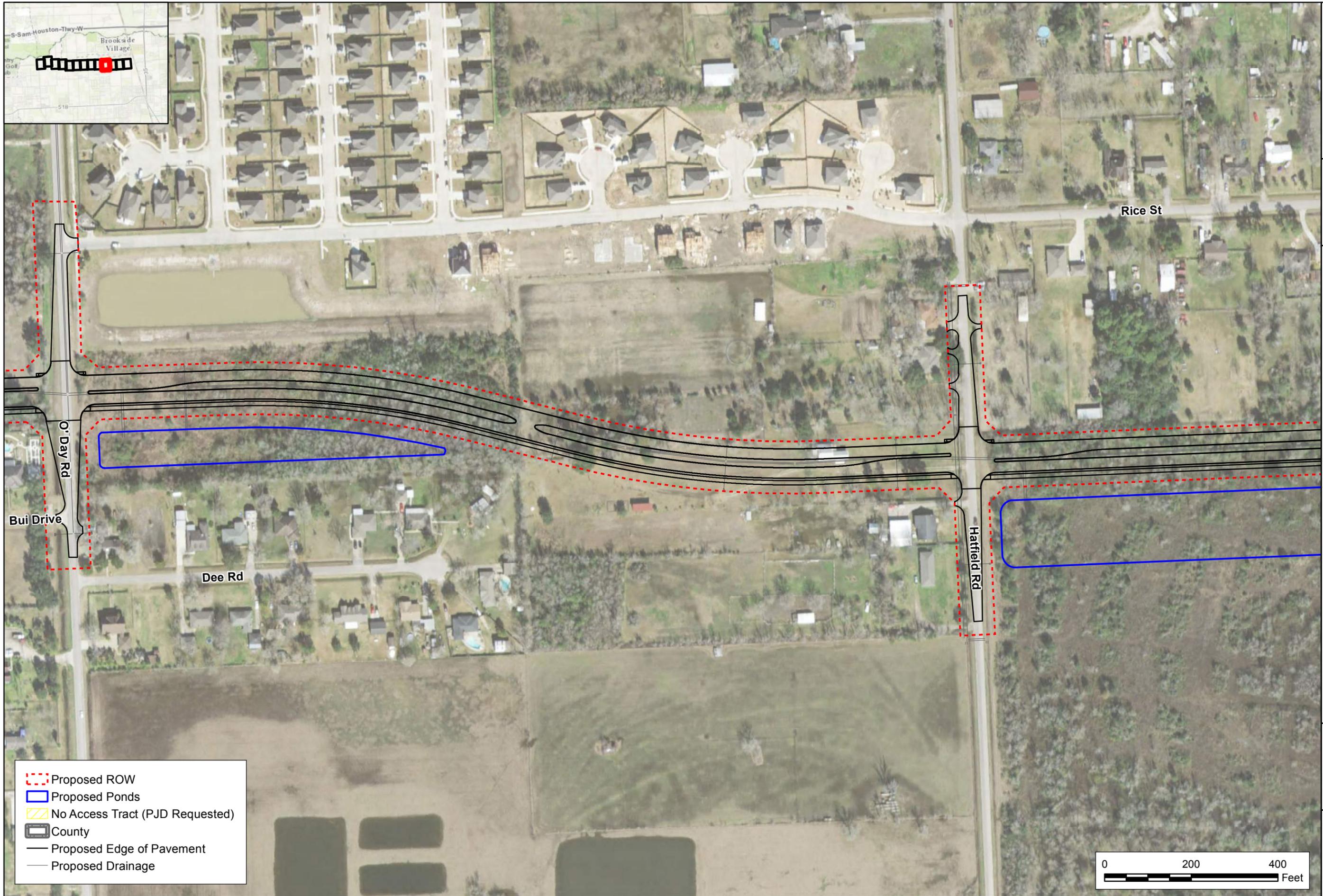


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 FILE NAME: Schematic_MB_2016112
 PREPARED BY:

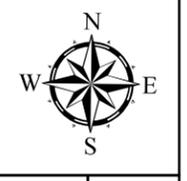


CITY OF PEARLAND
 McHard Road Extensions
Proposed Improvements

FRESE AND NICHOLS, INC.
 10431 MORADO CIRCLE
 SUITE 300
 AUSTIN, TEXAS 78759
 PHONE: 512-617-3100
 FAX: 512-617-3101



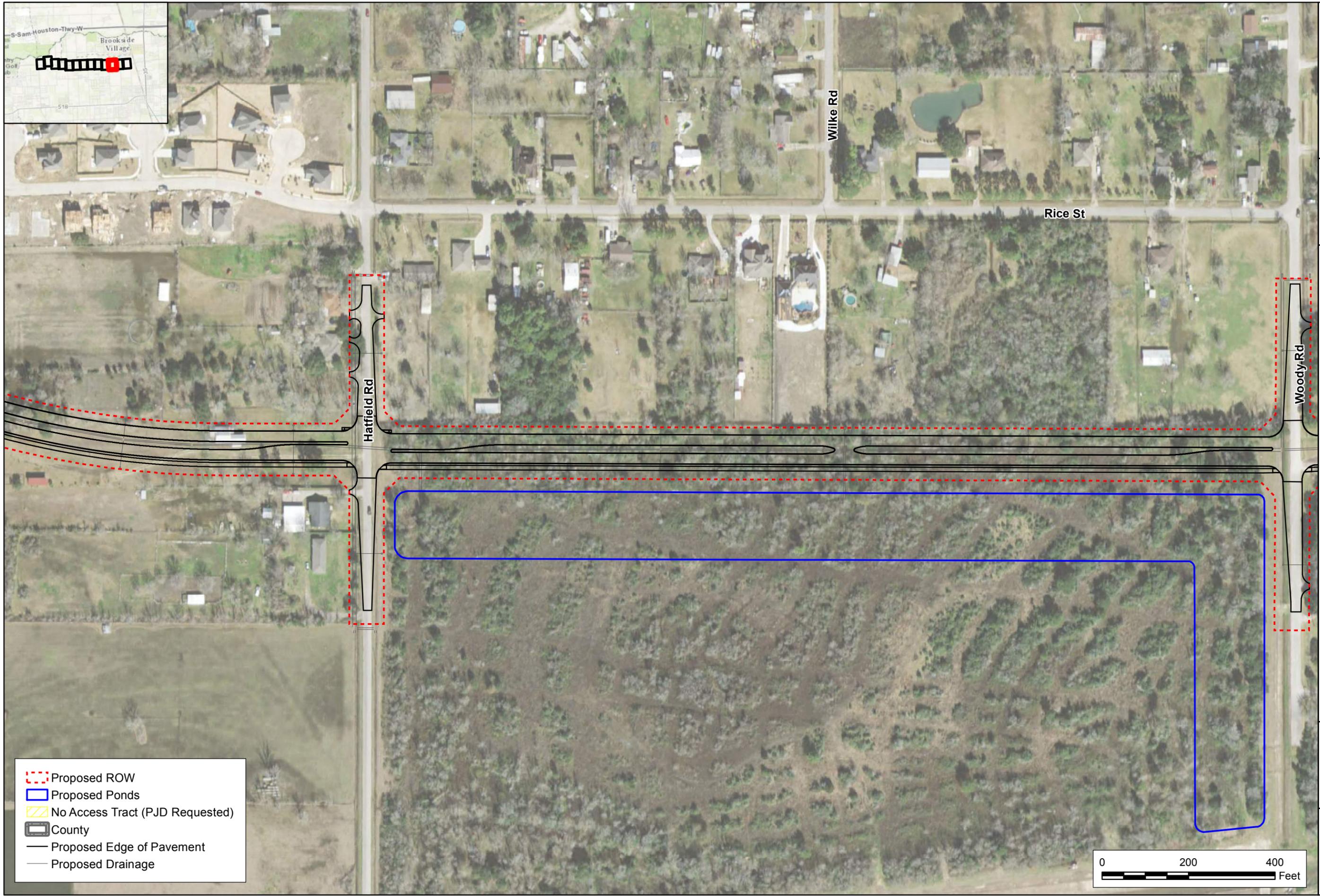
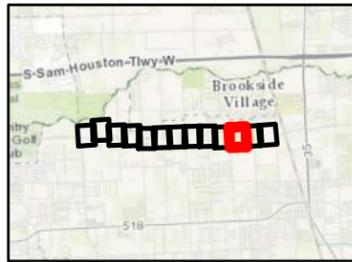
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 PREPARED BY: Name: Schematic_MB_2016112



CITY OF PEARLAND
 McHard Road Extensions
Proposed Improvements

FRESE AND NICHOLS, INC.
 10431 MORADO CIRCLE
 SUITE 300
 AUSTIN, TEXAS 78759
 PHONE: 512-617-3100
 FAX: 512-617-3101

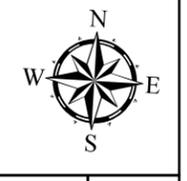
FIGURE
10



- Proposed ROW
- Proposed Ponds
- No Access Tract (PJD Requested)
- County
- Proposed Edge of Pavement
- Proposed Drainage

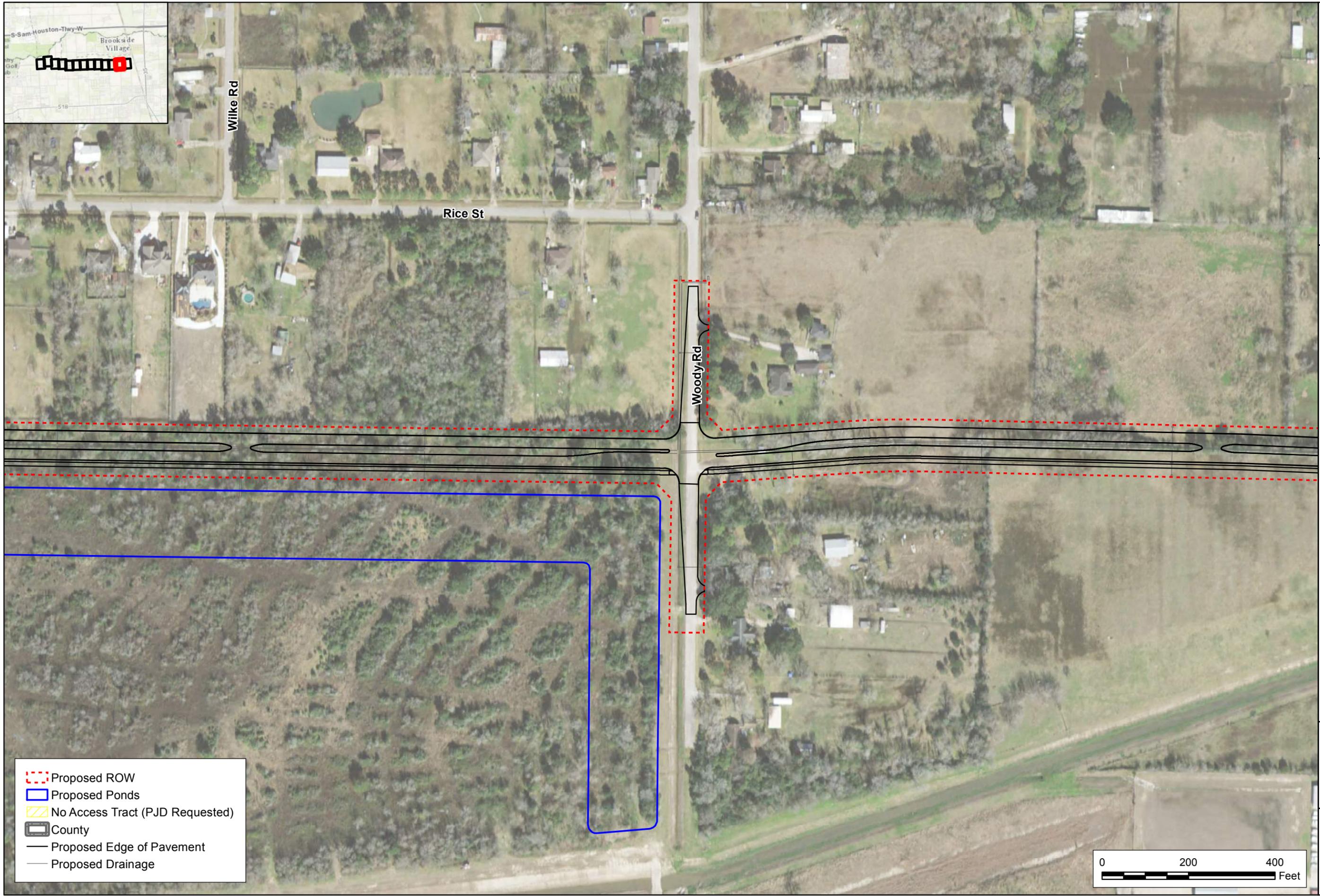
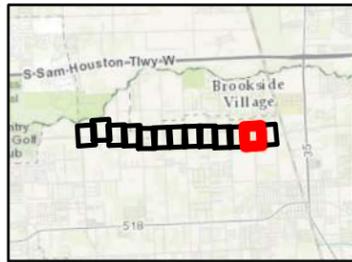


PRL1446
 DATE CREATED: 11/22/2016
 DYNAMIC COORDINATE SYSTEM: NAD83 State Plane (feet) Texas South Central
 FILE NAME: Schematic_MB_2016112
 PREPARED BY:



CITY OF PEARLAND
 McHard Road Extensions
Proposed Improvements

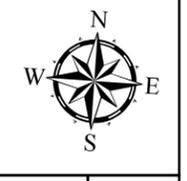
FREESE AND NICHOLS, INC.
 10431 MORADO CIRCLE
 SUITE 300
 AUSTIN, TEXAS 78759
 PHONE: 512-617-3100
 FAX: 512-617-3101



- Proposed ROW
- Proposed Ponds
- No Access Tract (PJD Requested)
- County
- Proposed Edge of Pavement
- Proposed Drainage



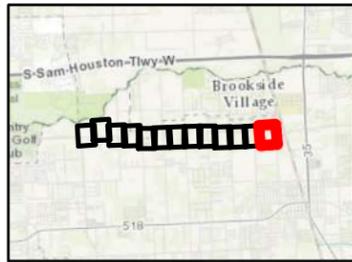
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 DATE CREATED Date: 11/22/2016
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas South Central
 FILE NAME Name: Schematic_MB_2016112
 PREPARED BY



CITY OF PEARLAND
 McHard Road Extensions
Proposed Improvements

FRESE AND NICHOLS, INC.
 10431 MORADO CIRCLE
 SUITE 300
 AUSTIN, TEXAS 78759
 PHONE: 512-617-3100
 FAX: 512-617-3101

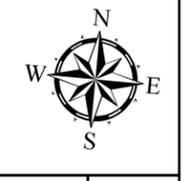
FIGURE
12



- Proposed ROW
- Proposed Ponds
- No Access Tract (PJD Requested)
- County
- Proposed Edge of Pavement
- Proposed Drainage



FN PROJECT NO.	PRL1445
DATE CREATED	Date: 11/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: Schematic_MB_2016112
PREPARED BY	BECK



CITY OF PEARLAND
McHard Road Extensions

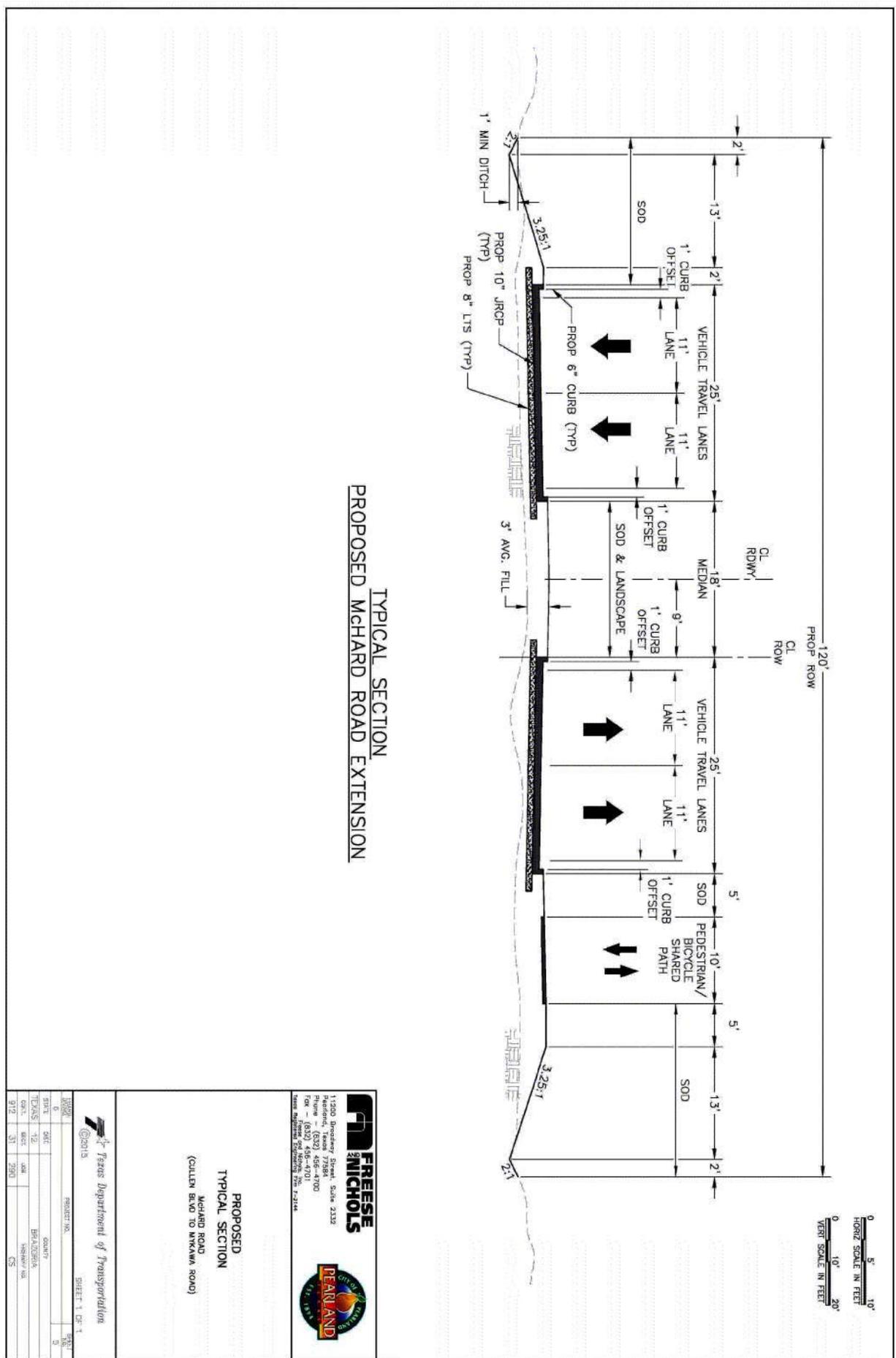
Proposed Improvements

FRESE AND NICHOLS, INC.

10431 MORADO CIRCLE
SUITE 300
AUSTIN, TEXAS 78759
PHONE: 512-617-3100
FAX: 512-617-3101

FIGURE
13

Appendix D
Typical Sections



**TYPICAL SECTION
PROPOSED MCHARD ROAD EXTENSION**

1200 Broadway Street, Suite 2132
PEARLAND, TEXAS 77584
 Phone: (832) 796-4700
 Fax: (832) 796-4700
 Email: info@fnandn.com
 www.fnandn.com

**PROPOSED
TYPICAL SECTION**

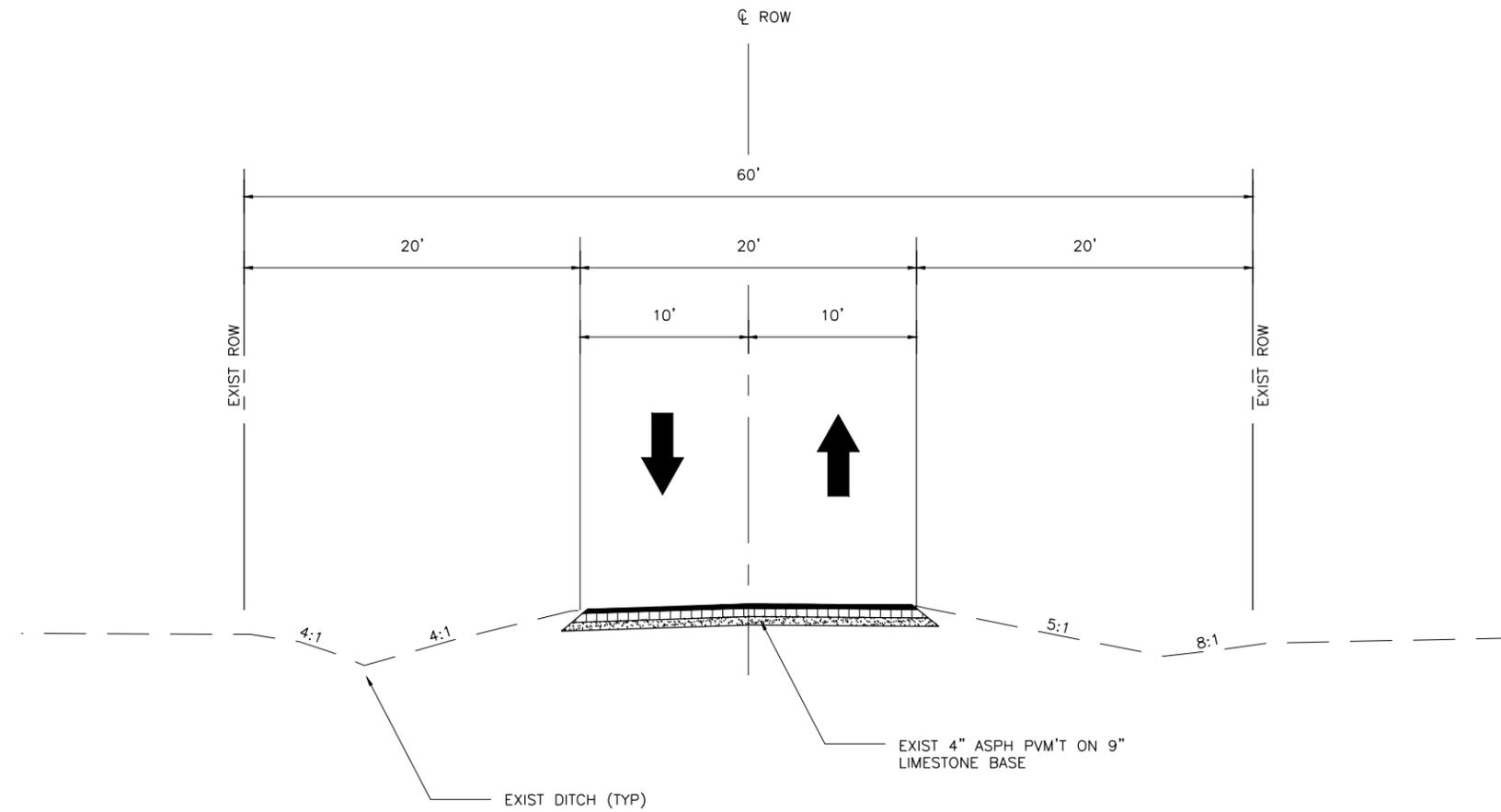
McHard Road
(Colleen Blvd to Nivkama Road)

Freese and Nichols
 Texas Department of Transportation

PROJECT NO. _____ SHEET 1 OF 1

DATE	DATE	COUNTY	SHEET
12/12	08/12	BRADSHAW	0
CON.	PROP.	BRADSHAW	0
912	31	290	CS

LOCATION	EXISTING PAVEMENT SECTION
McHARD ROAD	4" ASPHALT OVER 9" LIMESTONE BASE



McHARD RD
EXISTING TYPICAL SECTION
(CULLEN BLVD TO STONE ROAD)
STA 0+00 TO STA 36+00

NOT FOR CONSTRUCTION
THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF MEHRAN BAVARIAN P.E. TEXAS NO: 48811 ON DATE: 11/21/2016. IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.



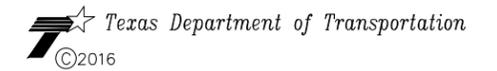
11200 Broadway Street, Suite 2332
Pearland, Texas 77584
Phone - (832) 456-4700
Fax - (832) 456-4701
Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

**McHARD ROAD EXTENSION
(CULLEN BLVD TO MYKAWA RD)**

**EXISTING
TYPICAL SECTION**

McHARD ROAD
(CULLEN BLVD TO STONE ROAD)

SHEET 1 OF 2



FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP 2014 (326) MM		5
STATE	DIST.	COUNTY	
TEXAS	12	BRAZORIA	
CONT.	SECT.	JOB	HIGHWAY NO.
912	31	290	CS

Appendix E
Plan and Program Excerpts



Logged in as Andrew Leske [Log Out](#)

[Project Management](#) | [Reports](#) | [Support](#)

Project Management > Area List > STIPs (M-HOUSTON-GALVESTON) > Revisions () > TIP Instances (Unassigned) > Highway Projects (Unassigned) > Project Details

Color Key: - Business rule violation - Value changed in current session - Different from DCIS or latest approved copy [Data](#)

Statewide TIP Revision Phase Construction
 District County
 MPO Highway
 CSJ - - TIP FY

- Construction
- Engineering
 - Environmental
 - Engineering
- Right-of-Way
 - Acquisition
 - Utilities
- Transfer

Total Project Cost Information	
Prelim Engineering	\$2,650,195
ROW Purchase	\$3,855,469
Construction Cost	\$34,650,000
Const Engineering	\$1,386,000
Contingencies	\$3,465,000
Indirect Costs	\$1,760,220
Bond Financing	\$0
Potential Chg Ord	\$0
Total Project Cost	\$47,766,884

Revision Date NOX (Kg /D):
 Project Sponsor VOC (Kg /D):
 MPO Proj Number PM10 (Kg /D):
 MTP Reference PM2.5 (Kg /D):
 City CO (Lbs /D):

YOE Cost
 Toll
 TCM

Limits From

Limits To

Project Description

P7 Remarks

Project History

Authorized Funding by Category/Share

Category	Federal	State	Regional	Local	Local Contributions	Total
7	\$27,720,000	\$0	\$0	\$6,930,000	\$0	\$34,650,000
Total	\$27,720,000	\$0.00	\$0.00	\$6,930,000	\$0.00	\$34,650,000

DISTRICT	MPO	COUNTY	CSJ	HWY	PHASE	CITY	YOE COST		
HOUSTON	HOUSTON-GALVESTON	BRAZORIA	0912-31-290	CS	C	PEARLAND	\$34,650,000		
LIMITS FROM: CULLEN BLVD		PROJECT SPONSOR: CITY OF PEARLAND							
LIMITS TO: MYKAWA RD		REVISION DATE: 07/2016							
PROJECT: CONSTRUCT 4-LANE DIVIDED ON NEW LOCATION							MPO PROJ NUM: 7874		
DESCR:							FUNDING CAT(S): 7		
REMARKS P7: Facility: MCHARD RD							PROJECT HISTORY:		
TOTAL PROJECT COST INFORMATION				AUTHORIZED FUNDING BY CATEGORY/SHARE					
PRELIM ENG: \$	2,650,195	COST OF APPROVED PHASES \$ 34,650,000	CATEGORY	FEDERAL	STATE	REGIONAL	LOCAL	LC	TOTAL
ROW PURCH: \$	3,855,469		7	\$27,720,000	\$0	\$0	\$6,930,000	\$0	\$34,650,000
CONST COST: \$	34,650,000		TOTAL	\$27,720,000	\$0	\$0	\$6,930,000	\$0	\$34,650,000
CONST ENG: \$	1,386,000								
CONTING: \$	3,465,000								
INDIRECT: \$	1,760,220								
BOND FIN: \$	0								
POT CHG ORD: \$	0								
TOTAL COST: \$	47,766,884								

TIP History

2017-2020 STIP		07/2016 Revision: Approved 12/19/2016					
DISTRICT	MPO	COUNTY	CSJ	HWY	PHASE	CITY	YOE COST
HOUSTON	HOUSTON-GALVESTON	BRAZORIA	0912-31-290	CS	C	PEARLAND	\$34,650,000

HOUSTON	HOUSTON-GALVESTON	BRAZORIA	0912-31-290	CS	C	PEARLAND	\$ 34,650,000	
LIMITS FROM: CULLEN BLVD						PROJECT SPONSOR: CITY OF PEARLAND		
LIMITS TO: MYKAWA RD						REVISION DATE: 07/2016		
PROJECT: CONSTRUCT 4-LANE DIVIDED ON NEW LOCATION						MPO PROJ NUM: 7874		
DESCR:						FUNDING CAT(S): 7		
REMARKS P7: Facility: MCHARD RD				PROJECT HISTORY:				
TOTAL PROJECT COST INFORMATION		AUTHORIZED FUNDING BY CATEGORY/SHARE						
PRELIM ENG: \$	2,650,195	CATEGORY	FEDERAL	STATE	REGIONAL	LOCAL	LC	TOTAL
ROW PURCH: \$	3,855,469	7	\$ 27,720,000	\$ 0	\$ 0	\$ 6,930,000	\$ 0	\$ 34,650,000
CONST COST: \$	34,650,000	COST OF APPROVED PHASES						
CONST ENG: \$	1,386,000	TOTAL	\$ 27,720,000	\$ 0	\$ 0	\$ 6,930,000	\$ 0	\$ 34,650,000
CONTING: \$	3,465,000	\$ 34,650,000						
INDIRECT: \$	1,760,220							
BOND FIN: \$	0							
POT CHG ORD: \$	0							
TOTAL COST: \$	47,766,884							

2015-2018 STIP 07/2014 Revision: Administrative 04/27/2016

DISTRICT	MPO	COUNTY	CSJ	HWY	PHASE	CITY	YOE COST	
HOUSTON	HOUSTON-GALVESTON	BRAZORIA	0912-31-290	CS	C	PEARLAND	\$ 34,650,000	
LIMITS FROM: CULLEN BLVD						PROJECT SPONSOR: Pearland		
LIMITS TO: MYKAWA RD						REVISION DATE: 07/2014		
PROJECT: CONSTRUCT 4-LANE DIVIDED ON NEW LOCATION						MPO PROJ NUM: 7874		
DESCR:						FUNDING CAT(S):		
REMARKS P7: Facility: MCHARD RD				PROJECT HISTORY: ADMIN MOD - Amendment #45 - 2/26/16 - Delay to FY 2017.				
TOTAL PROJECT COST INFORMATION		AUTHORIZED FUNDING BY CATEGORY/SHARE						
PRELIM ENG: \$	2,650,195	CATEGORY	FEDERAL	STATE	REGIONAL	LOCAL	LC	TOTAL
ROW PURCH: \$	3,855,469	7	\$ 27,720,000	\$ 0	\$ 0	\$ 6,930,000	\$ 0	\$ 34,650,000
CONST COST: \$	34,650,000	COST OF APPROVED PHASES						
CONST ENG: \$	1,386,000	TOTAL	\$ 27,720,000	\$ 0	\$ 0	\$ 6,930,000	\$ 0	\$ 34,650,000
CONTING: \$	3,465,000	\$ 34,650,000						
INDIRECT: \$	1,760,220							
BOND FIN: \$	0							
POT CHG ORD: \$	0							
TOTAL COST: \$	47,766,884							

2015-2018 STIP 07/2014 Revision: Approved 12/02/2014

DISTRICT	MPO	COUNTY	CSJ	HWY	PHASE	CITY	YOE COST	
HOUSTON	HOUSTON-GALVESTON	BRAZORIA	0912-31-290	CS	C	PEARLAND	\$ 34,650,000	
LIMITS FROM: CULLEN BLVD						PROJECT SPONSOR: Pearland		
LIMITS TO: MYKAWA RD						REVISION DATE: 07/2014		
PROJECT: CONSTRUCT 4-LANE DIVIDED ON NEW LOCATION						MPO PROJ NUM: 7874		
DESCR:						FUNDING CAT(S): 7		
REMARKS P7: Facility: MCHARD RD				PROJECT HISTORY:				
TOTAL PROJECT COST INFORMATION		AUTHORIZED FUNDING BY CATEGORY/SHARE						
PRELIM ENG: \$	2,650,195	CATEGORY	FEDERAL	STATE	REGIONAL	LOCAL	LC	TOTAL
ROW PURCH: \$	3,855,469	7	\$ 27,720,000	\$ 0	\$ 0	\$ 6,930,000	\$ 0	\$ 34,650,000
CONST COST: \$	34,650,000	COST OF APPROVED PHASES						
CONST ENG: \$	1,386,000	TOTAL	\$ 27,720,000	\$ 0	\$ 0	\$ 6,930,000	\$ 0	\$ 34,650,000
CONTING: \$	3,465,000	\$ 34,650,000						
INDIRECT: \$	1,760,220							
BOND FIN: \$	0							
POT CHG ORD: \$	0							
TOTAL COST: \$	47,766,884							

2013-2016 STIP 06/2013 Revision: Approved 08/12/2013

DISTRICT	MPO	COUNTY	CSJ	HWY	PHASE	CITY	YOE COST	
HOUSTON	HOUSTON-GALVESTON	BRAZORIA	0912-31-290	CS	C	PEARLAND	\$ 34,650,000	
LIMITS FROM: CULLEN BLVD						PROJECT SPONSOR: Pearland		
LIMITS TO: MYKAWA RD						REVISION DATE: 06/2013		
PROJECT: CONSTRUCT 4-LANE DIVIDED ON NEW LOCATION						MPO PROJ NUM: 7874		
DESCR:						FUNDING CAT(S): 7		
REMARKS P7: Facility: MCHARD RD				PROJECT HISTORY: Amendment #31 - 5/24/13 - Program 2013-2016 Call for Projects awards.				
TOTAL PROJECT COST INFORMATION		AUTHORIZED FUNDING BY CATEGORY/SHARE						
PRELIM ENG: \$	2,650,195	CATEGORY	FEDERAL	STATE	REGIONAL	LOCAL	LC	TOTAL
ROW PURCH: \$	3,855,469	7	\$ 27,720,000	\$ 0	\$ 0	\$ 6,930,000	\$ 0	\$ 34,650,000
CONST COST: \$	34,650,000	COST OF APPROVED PHASES						
CONST ENG: \$	1,386,000	TOTAL	\$ 27,720,000	\$ 0	\$ 0	\$ 6,930,000	\$ 0	\$ 34,650,000
CONTING: \$	3,465,000	\$ 34,650,000						
INDIRECT: \$	1,760,220							
BOND FIN: \$	0							
POT CHG ORD: \$	0							
TOTAL COST: \$	47,766,884							

2013-2016 STIP 07/2012 Revision: Approved 11/01/2012

DISTRICT	MPO	COUNTY	CSJ	HWY	PHASE	CITY	YOE COST	
HOUSTON	HOUSTON-GALVESTON	BRAZORIA	0000-00-000	CS	C,E,R	PEARLAND	\$ 38,050,000	
LIMITS FROM: CULLEN						PROJECT SPONSOR: PEARLAND		
LIMITS TO: MYKAWA						REVISION DATE: 07/2012		
PROJECT: CONSTRUCT 4-LANE DIVIDED ON NEW LOCATION						MPO PROJ NUM: 7874		
DESCR:						FUNDING CAT(S): 3LC		
REMARKS P7: Facility: MCHARD RD				PROJECT HISTORY:				
TOTAL PROJECT COST INFORMATION		AUTHORIZED FUNDING BY CATEGORY/SHARE						
PRELIM ENG: \$	1,251,477	CATEGORY	FEDERAL	STATE	REGIONAL	LOCAL	LC	TOTAL
ROW PURCH: \$	6,385,085	3LC	\$ 0	\$ 0	\$ 0	\$ 38,050,000	\$ 0	\$ 38,050,000
CONST COST: \$	25,540,341	COST OF APPROVED PHASES						
CONST ENG: \$	1,021,614	TOTAL	\$ 0	\$ 0	\$ 0	\$ 38,050,000	\$ 0	\$ 38,050,000
CONTING: \$	2,554,034	\$ 38,050,000						
INDIRECT: \$	1,297,449							
BOND FIN: \$	0							
POT CHG ORD: \$	0							
TOTAL COST: \$	38,050,000							

Comment History

Time User Comment

Related Approval

2016/09/20 11:31:52	Jose Campos		07/2016: Approved
2014/12/03 16:46:44	Lori Morel	TPP approval for FHWA, letter dated (12/2/2014)	07/2014: Approved
2014/11/03 19:04:28	Lori Morel	All project information consistent w/ .pdf submittal.	
2014/01/13 15:42:24	Lori Morel	TPP approval for FHWA 8/12/2013	06/2013: Approved
2013/07/11 08:33:28	Lori Morel	All project information consistent w/ .pdf submittal.	
2013/03/01 11:26:46	Lori Morel	TPP approval for FHWA (11/01/12).	07/2012: Approved
2013/02/25 14:36:25	Michelle Conkle	Project information consistent w/ .pdf submittal.	



REGIONAL INVESTMENT PROGRAMS, EXEMPT AND NOT REGIONALLY SIGNIFICANT PROJECTS IN FIRST TEN YEARS (FY2015-2025)

MPOID	CSJ	County	Sponsor	Facility	From	To	Description	Fiscal Year	Total Project Cost (M, YOY)
THOROUGHFARE DEVELOPMENT									
12760	0912-31-305	Brazoria	BRAZORIA COUNTY	CR 59	CR 48	KIRBY DR	RECONSTRUCT AND WIDEN TO 4-LANE DIVIDED CONCRETE BLVD WITH RAISED MEDIANS AND CURB AND GUTTERS	2023	\$ 10.50
11633		Brazoria	CITY OF PEARLAND	CULLEN BLVD	SOUTHFORK DR	BAILEY RD	WIDEN FROM 2 TO 4-LANES DIVIDED CURB AND GUTTER	2022	\$ 9.45
7628	0912-31-272	Brazoria	CITY OF PEARLAND	FITE RD	MCLEAN RD	VETERANS DR	CONSTRUCT 4-LANE UNDIVIDED ROAD	2016	\$ 4.42
10555		Brazoria	CITY OF ALVIN	FM 528	DAVIS BEND RD	FM 1462	EXTEND ROADWAY 2-LANES ON NEW LOCATION AND ALONG CR 284. NEW SIGNALS AT FM 1462 & CR 190.	2022	\$ 17.49
11639		Brazoria	CITY OF PEARLAND	HARKEY RD	BROADWAY	BAILEY	WIDEN FROM 2 TO 4-LANES DIVIDED CURB AND GUTTER	2022	\$ 22.29
11611		Brazoria	CITY OF ANGLETON	HENDERSON RD	SH 35	SH 288B	RECONSTRUCT & WIDEN TO A 3-LANE URBAN SECTION	2020	\$ 32.06
671		Brazoria	CITY OF PEARLAND	HUGHES RANCH RD	SMITH RANCH RD	CULLEN BLVD	RECONSTRUCT AND WIDEN FROM 2-LANES TO 4-LANES, ADD MEDIAN & SHOULDERS, ADD SIDEWALKS	2019	\$ 41.10
11635		Brazoria	CITY OF PEARLAND	MAX RD	MCHARD RD	HUGHES RANCH RD	WIDEN FROM 2 TO 4-LANES DIVIDED CURB AND GUTTER	2021	\$ 8.90
13565		Brazoria	CITY OF PEARLAND	MAX RD	BW 8	MCHARD RD	WIDEN FROM 2 TO 4-LANES UNDIVIDED CURB AND GUTTER	2021	\$ 13.96
11636	0912-31-273	Brazoria	CITY OF PEARLAND	MAX RD	HUGHES RANCH RD	FM 518	WIDEN FROM 2 TO 4-LANES DIVIDED CURB AND GUTTER	2017	\$ 6.45
7874	0912-31-290	Brazoria	CITY OF PEARLAND	MCHARD RD	CULLEN BLVD	MYKAWA RD	CONSTRUCT 4-LANE DIVIDED ON NEW LOCATION	2017	\$ 45.86
11655		Brazoria	CITY OF PEARLAND	O'DAY RD	MCHARD RD	BROADWAY	WIDEN FROM 2 TO 4-LANE DIVIDED CURB AND GUTTER	2024	\$ 20.71
7630		Brazoria	CITY OF PEARLAND	PEARLAND PKWY	DIXIE FARM RD	FM 235 I	CONSTRUCT 4-LANE DIVIDED ON NEW LOCATION	2022	\$ 19.53
7619		Brazoria	CITY OF PEARLAND	SH 288	FM 518	CR 59	CONSTRUCT 2-LANE NORTHBOUND FRONTAGE ROAD WITH PEDESTRIAN AND BICYCLE ACCOMODATIONS	2025	\$ 17.50
11599		Brazoria	CITY OF ANGLETON	SHANKS RD	CEMENTARY RD	SH 288B/AIRPORT RD	RECONSTRUCT TO 3-LANE URBAN SECTION	2020	\$ 6.84
11654	0912-31-293	Brazoria	CITY OF PEARLAND	SMITH RANCH RD	HUGHES RANCH RD	N OF BROADWAY (FM 518)	WIDEN FROM 2 TO 4-LANE DIVIDED CURB AND GUTTER	2018	\$ 4.80
11640		Brazoria	CITY OF PEARLAND	VETERANS DR	WALNUT W	BAILEY RD	WIDEN FROM 2 TO 4-LANES DIVIDED CURB AND GUTTER	2021	\$ 24.81
14573	0762-03-018	Chambers	CHAMBERS COUNTY	FM 1409	FM 565 N OF IH 10	FM 565 S OF IH 10	CONSTRUCTION OF 2-LANE NEW LOCATION FM ROADWAY EXTENSION AND BRIDGE/INTERCHANGE	2015	\$ 24.92

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

Appendix F
Resource-specific Maps

Field Verified EMST Maps

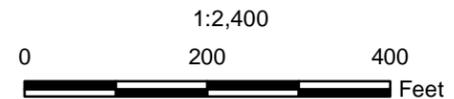


Base Map: 2015 0.5 Meter NAIP Aerial Imagery

- ⊕ Photo Locations
- Proposed Edge of Pavement
- ▭ Existing ROW
- ▭ Proposed Ponds
- ▭ Proposed ROW
- ▭ Deciduous Woodlands
- ▭ Disturbed or Tame Grassland
- ▭ Gulf Coast: Coastal Prairie
- ▭ Native Invasive: Baccharis Shrubland
- ▭ Native Invasive: Deciduous Woodland
- ▭ Non-Native Invasive: Chinese Tallow Forest, Woodland, or Shrubland
- ▭ Open Water
- ▭ Tallow/Shrubland
- ▭ Urban Low Intensity
- ▭ Wetland

- Canal/Ditch
- Stream

2.1 2.2 2.3 2.4 2.5 2.6 2.7



FN PROJECT NO. PRL14465
 DATE CREATED 5/11/2016
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas North Central
 FILE NAME 2_Field_Verified_EMST
 PREPARED BY SSJ

CITY OF PEARLAND
McHard Road Extensions
 Project Area with Field Verified
 Ecological Mapping Systems of Texas

FREESE & NICHOLS
 FREESE AND NICHOLS
 4055 International Plaza Suite 200
 Fort Worth, Texas 76109-4895
 (817) 735-7300

2.1
FIGURE

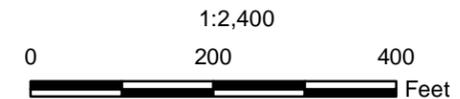


Base Map: 2015 0.5 Meter NAIP Aerial Imagery

- ⊕ Photo Locations
- Proposed Edge of Pavement
- ▭ Existing ROW
- ▭ Proposed Ponds
- ▭ Proposed ROW
- ▭ Deciduous Woodlands
- ▭ Disturbed or Tame Grassland
- ▭ Gulf Coast: Coastal Prairie
- ▭ Native Invasive: Baccharis Shrubland
- ▭ Native Invasive: Deciduous Woodland
- ▭ Non-Native Invasive: Chinese Tallow Forest, Woodland, or Shrubland
- ▭ Open Water
- ▭ Tallow/Shrubland
- ▭ Urban Low Intensity
- ▭ Wetland

- Canal/Ditch
- Stream

2.1 2.2 2.3 2.4 2.5 2.6 2.7

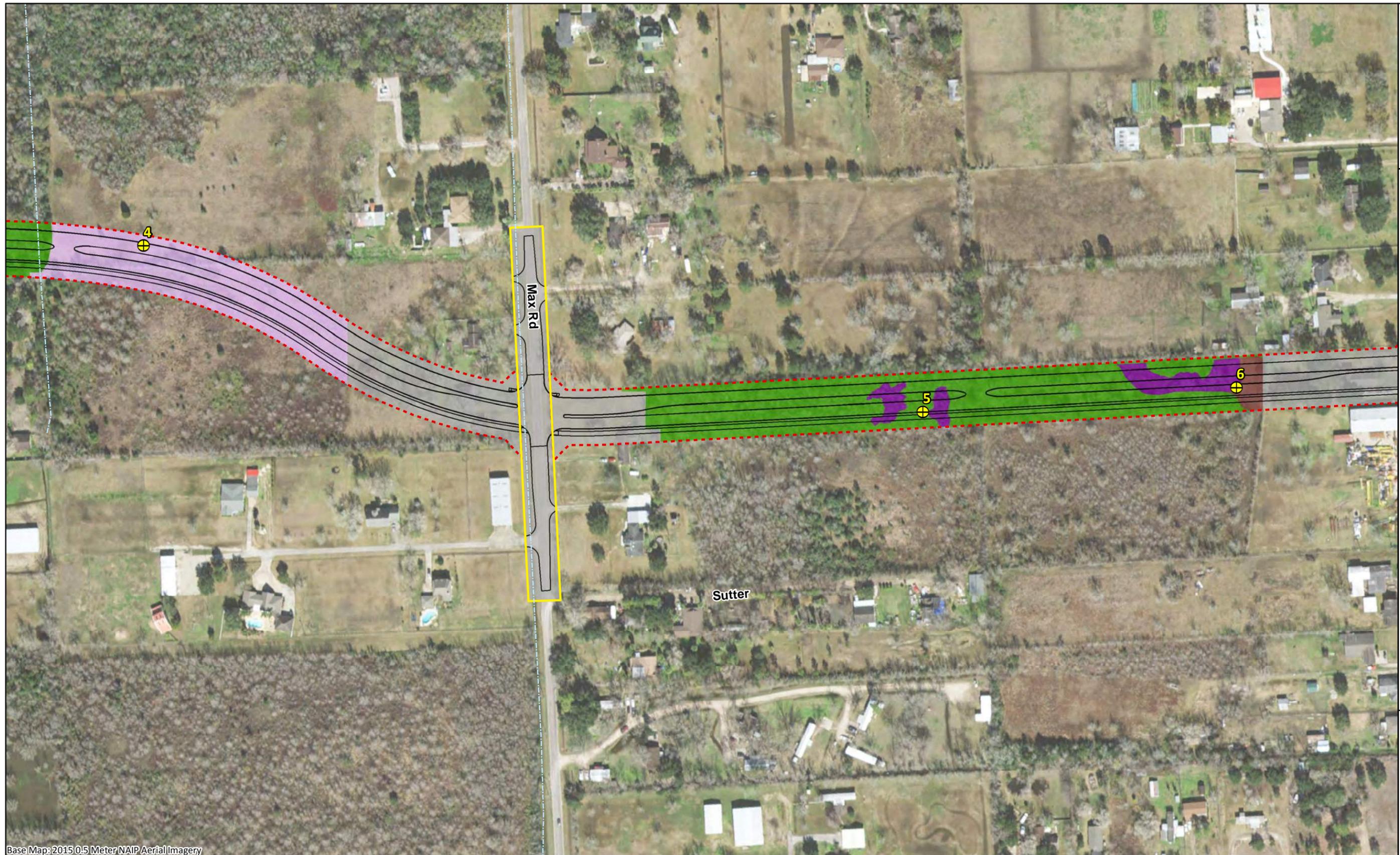


FN PROJECT NO.	PRL14465
DATE CREATED	5/11/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas North Central
FILE NAME	2_Field_Verified_EMST
PREPARED BY	SSJ

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2.2
FIGURE

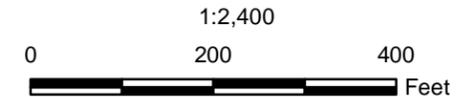


Base Map: 2015 0.5 Meter NAIP Aerial Imagery

- | | | |
|---------------------------|--------------------------------------|--|
| Photo Locations | Deciduous Woodlands | Non-Native Invasive: Chinese Tallow Forest, Woodland, or Shrubland |
| Proposed Edge of Pavement | Disturbed or Tame Grassland | Open Water |
| Existing ROW | Gulf Coast: Coastal Prairie | Tallow/Shrubland |
| Proposed Ponds | Native Invasive: Baccharis Shrubland | Urban Low Intensity |
| Proposed ROW | Native Invasive: Deciduous Woodland | Wetland |

- Canal/Ditch
- Stream

2.1 2.2 2.3 2.4 2.5 2.6 2.7

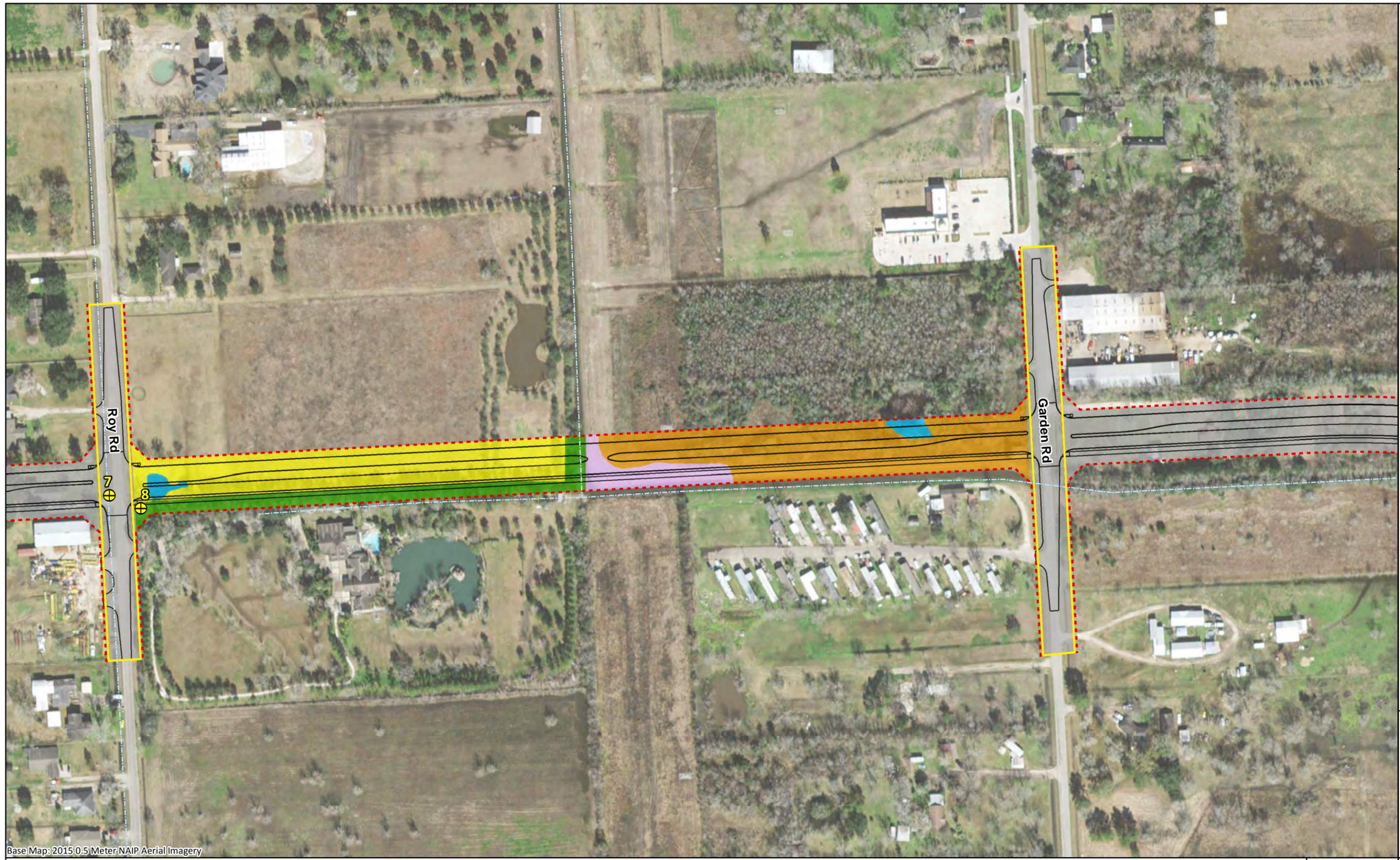


FN PROJECT NO. PRL14465
 DATE CREATED 5/11/2016
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas North Central
 FILE NAME 2_Field_Verified_EMST
 PREPARED BY SSJ

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2.3
FIGURE

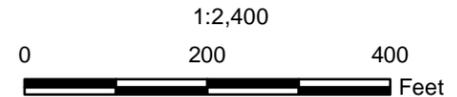


Base Map: 2015 0.5 Meter NAIP Aerial Imagery

- | | | |
|-----------------------------|--------------------------------------|--|
| ⊕ Photo Locations | Deciduous Woodlands | Non-Native Invasive: Chinese Tallow Forest, Woodland, or Shrubland |
| — Proposed Edge of Pavement | Disturbed or Tame Grassland | Open Water |
| Existing ROW | Gulf Coast: Coastal Prairie | Tallow/Shrubland |
| Proposed Ponds | Native Invasive: Baccharis Shrubland | Urban Low Intensity |
| Proposed ROW | Native Invasive: Deciduous Woodland | Wetland |

- Canal/Ditch
- Stream

2.1 2.2 2.3 2.4 2.5 2.6 2.7

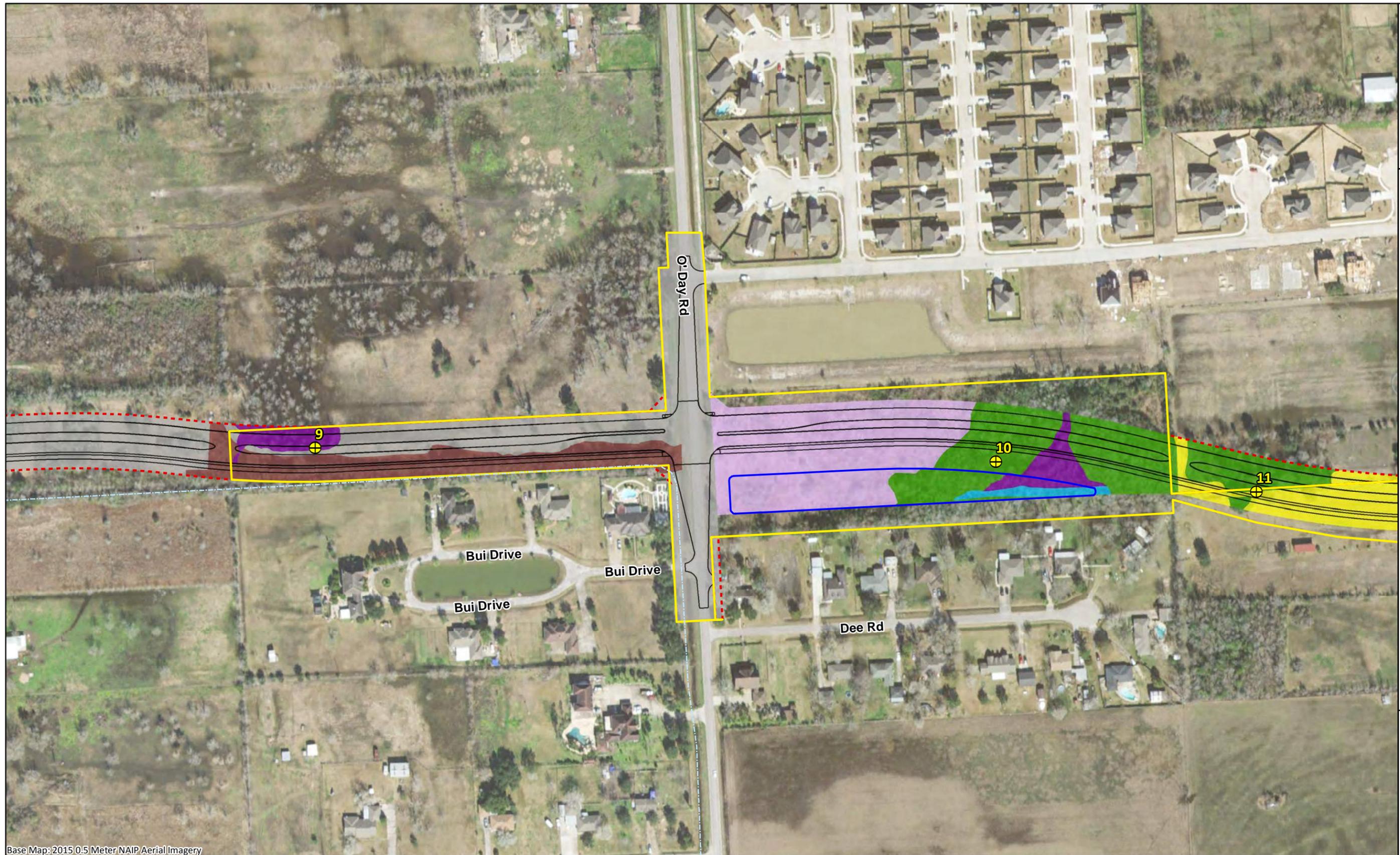


PROJECT NO.	PRL14465
DATE CREATED	5/11/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas North Central
FILE NAME	2_Field_Verified_EMST
PREPARED BY	SSJ

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2.4
FIGURE

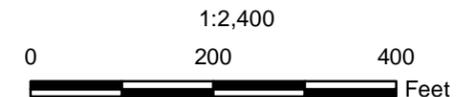


Base Map: 2015 0.5 Meter NAIP Aerial Imagery

- | | | |
|---------------------------|--------------------------------------|--|
| Photo Locations | Deciduous Woodlands | Non-Native Invasive: Chinese Tallow Forest, Woodland, or Shrubland |
| Proposed Edge of Pavement | Disturbed or Tame Grassland | Open Water |
| Existing ROW | Gulf Coast: Coastal Prairie | Tallow/Shrubland |
| Proposed Ponds | Native Invasive: Baccharis Shrubland | Urban Low Intensity |
| Proposed ROW | Native Invasive: Deciduous Woodland | Wetland |

- Canal/Ditch
- Stream

2.1 2.2 2.3 2.4 2.5 2.6 2.7

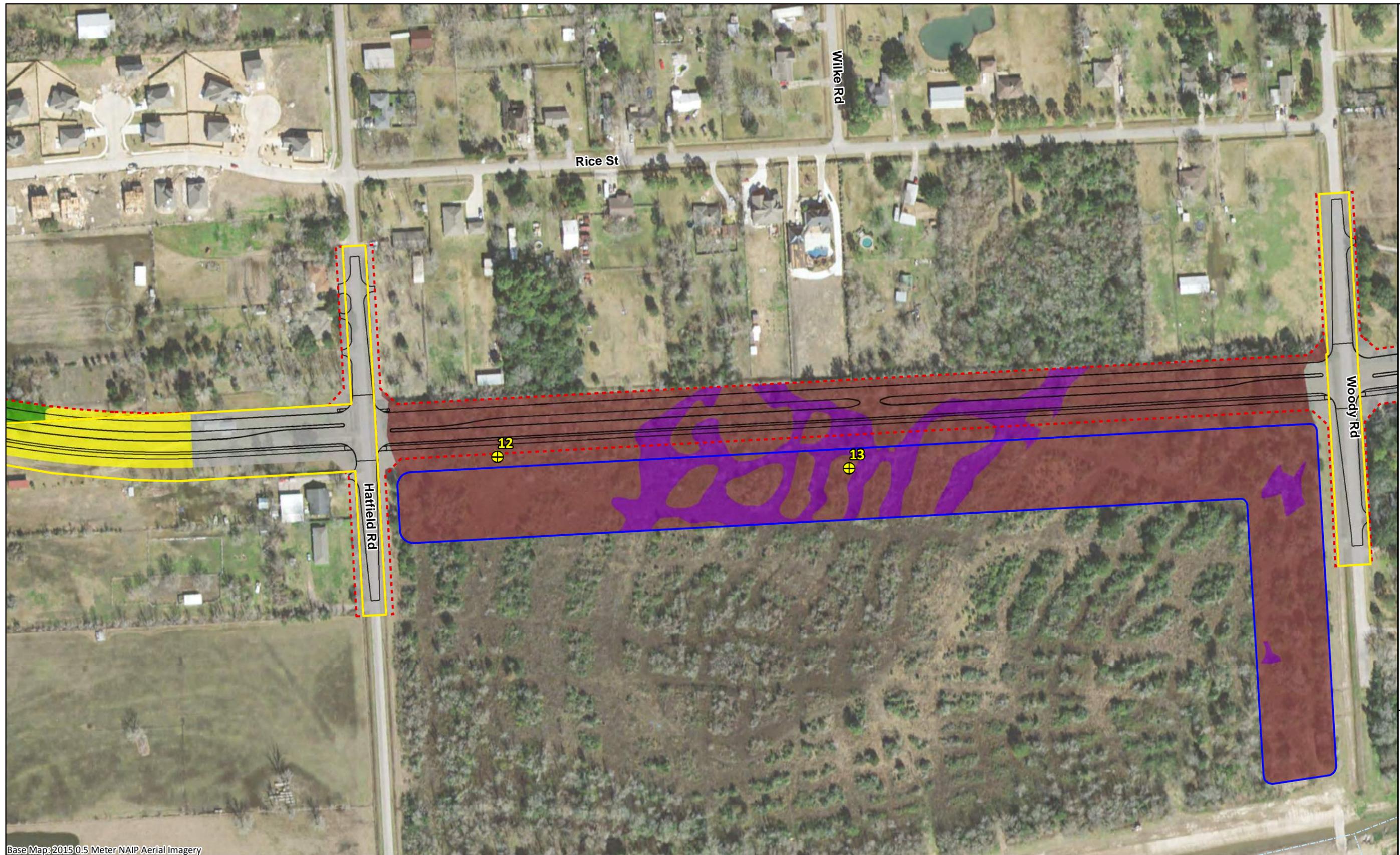


PROJECT NO.	PRL14465
DATE CREATED	5/11/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas North Central
FILE NAME	2_Field_Verified_EMST
PREPARED BY	SSJ

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2.5
FIGURE

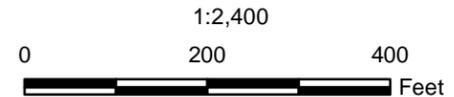


Base Map: 2015 0.5 Meter NAIP Aerial Imagery

- Photo Locations
- Proposed Edge of Pavement
- Existing ROW
- Proposed Ponds
- Proposed ROW
- Deciduous Woodlands
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- Canal/Ditch
- Stream

2.1 2.2 2.3 2.4 2.5 2.6 2.7



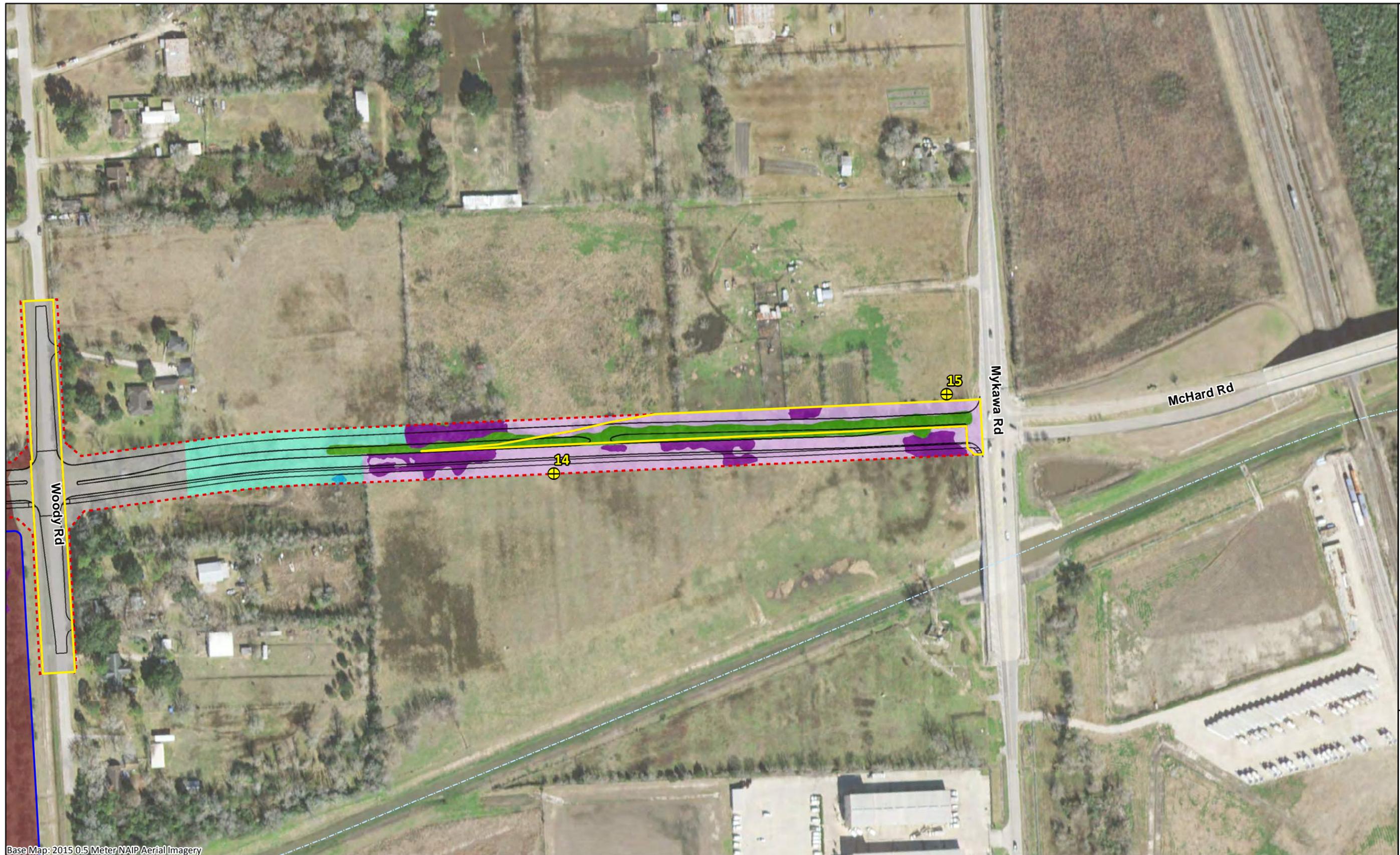
PROJECT NO.	PRL14465
DATE CREATED	5/11/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas North Central
FILE NAME	2_Field_Verified_EMST
PREPARED BY	SSJ

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2.6

FIGURE

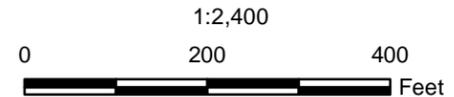


Base Map: 2015 0.5 Meter NAIP Aerial Imagery

- | | | |
|-----------------------------|--------------------------------------|--|
| ⊕ Photo Locations | Deciduous Woodlands | Non-Native Invasive: Chinese Tallow Forest, Woodland, or Shrubland |
| — Proposed Edge of Pavement | Disturbed or Tame Grassland | Open Water |
| Existing ROW | Gulf Coast: Coastal Prairie | Tallow/Shrubland |
| Proposed Ponds | Native Invasive: Baccharis Shrubland | Urban Low Intensity |
| Proposed ROW | Native Invasive: Deciduous Woodland | Wetland |

- Canal/Ditch
- Stream

2.1 2.2 2.3 2.4 2.5 2.6 2.7



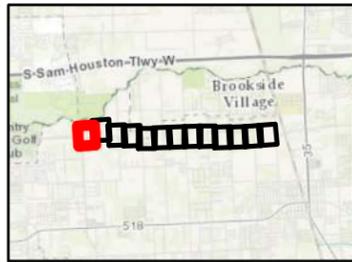
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 DATE CREATED 5/11/2016
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas North Central
 FILE NAME 2_Field_Verified_EMST
 PREPARED BY SSI

CITY OF PEARLAND
McHard Road Extensions
 Project Area with Field Verified
 Ecological Mapping Systems of Texas

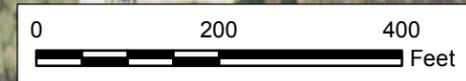
FREESE & NICHOLS
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 Fort Worth, Texas 76109-4895
 (817) 735-7300

2.7
FIGURE

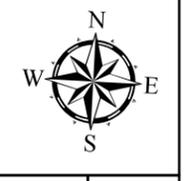
Water Resources



Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County



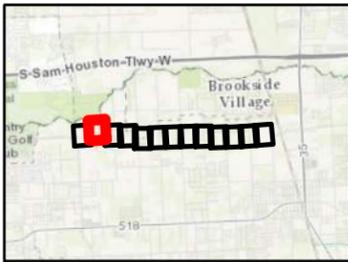
PROJECT NO.	PRJ1448
DATE CREATED	Date: 11/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: PW_Mapbook_TxDOT_20112
PREPARED BY	



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Potential Waters of the US

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 AUSTIN, TEXAS 78759
 PHONE: 512-617-3100
 FAX: 512-617-3101

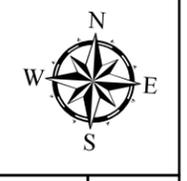
FIGURE
1



Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County



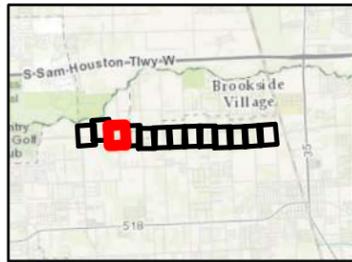
PROJECT NO.	PRJ1448
DATE CREATED	Date: 11/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: PW_Mapbook_TxDOT_20112
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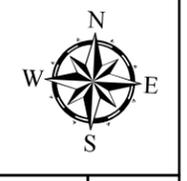
FIGURE
 2



Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County



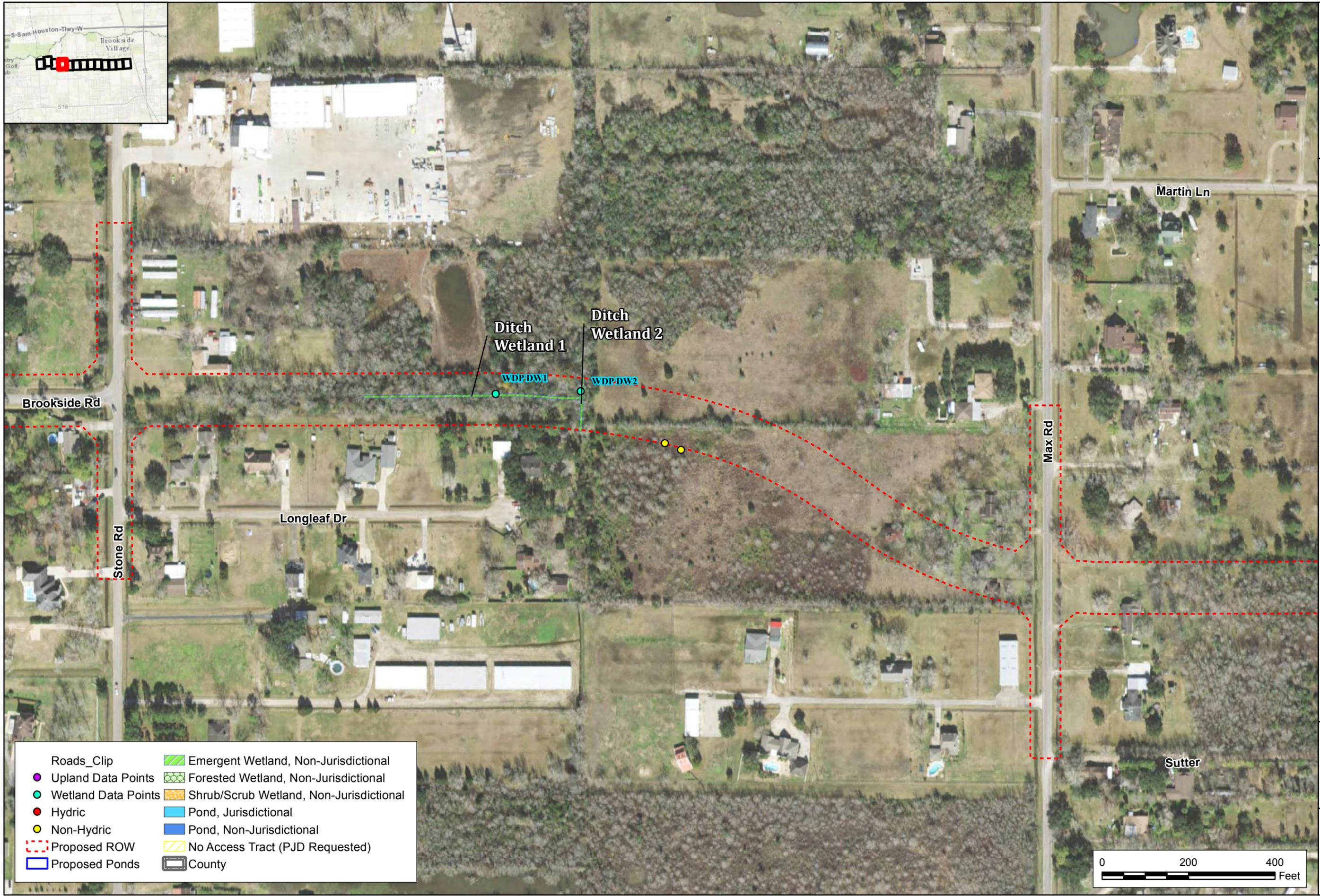
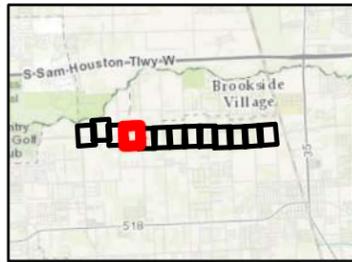
PN PROJECT NO.	PRJ1446
DATE CREATED	Date: 11/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: PW_Mapbook_TxDOT_20112
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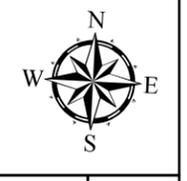
FIGURE
 3



Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County

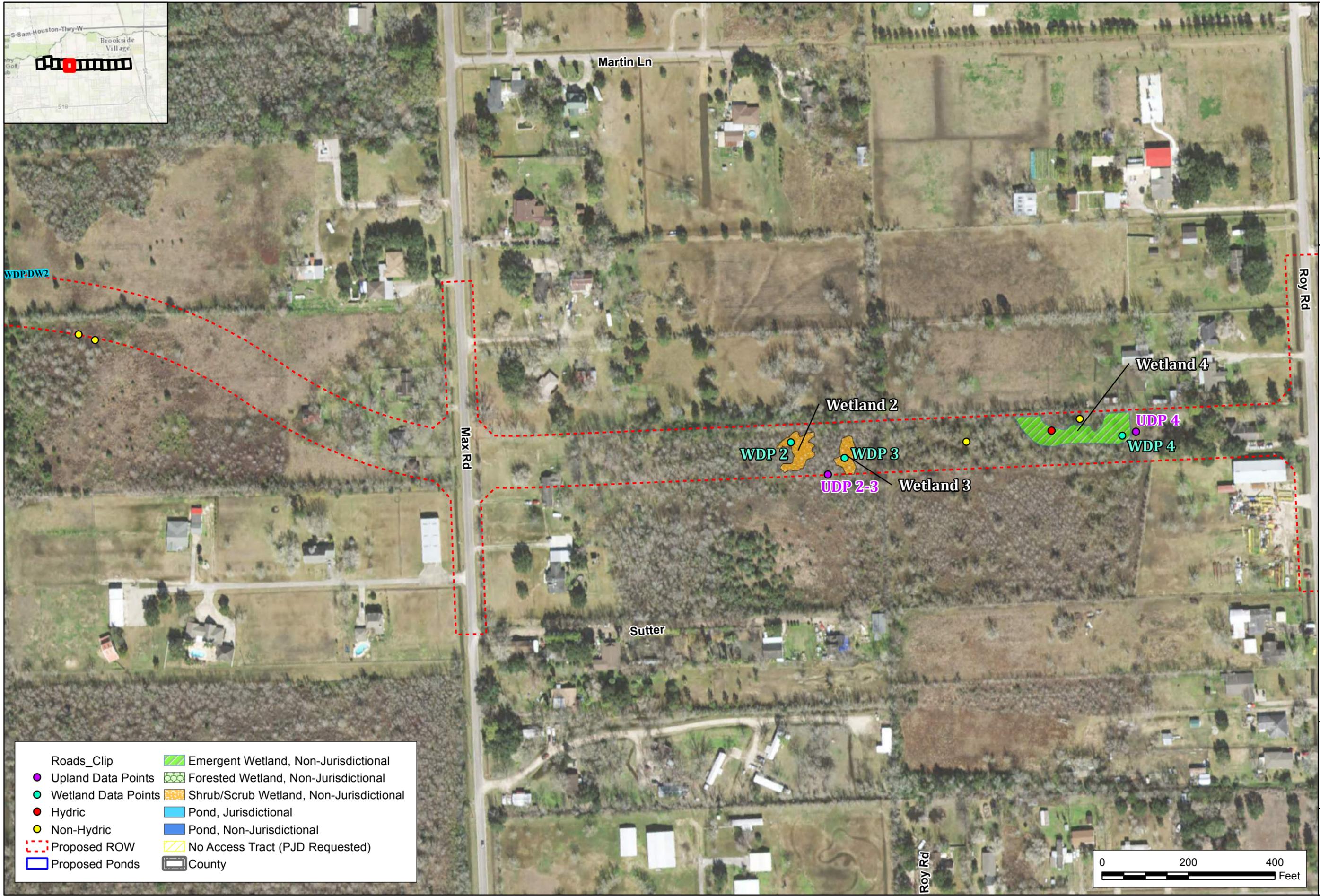
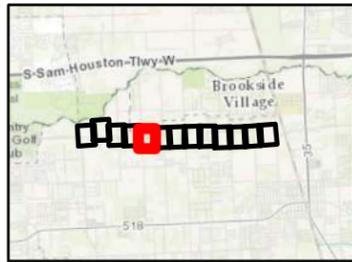


FN PROJECT NO: PRL1445
 DATE CREATED: 11/22/2016
 DATUM & COORDINATE SYSTEM: NAD83 State Plane (feet) Texas South Central
 FILE NAME: PW_Mapbook_TxDOT_20112
 PREPARED BY:

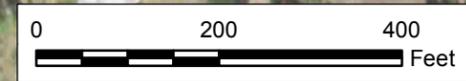


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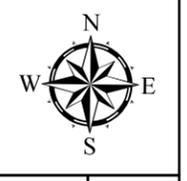
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Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County



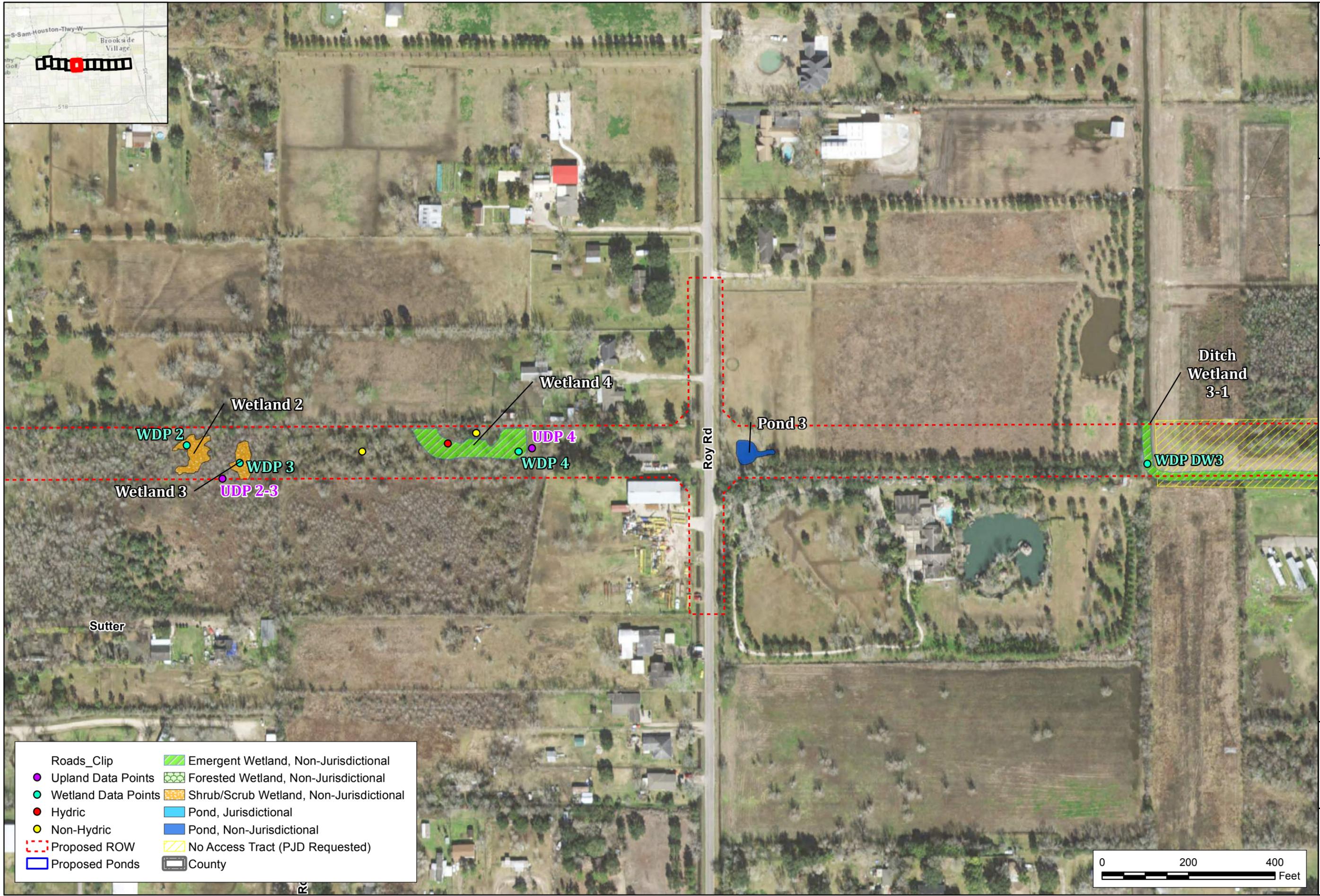
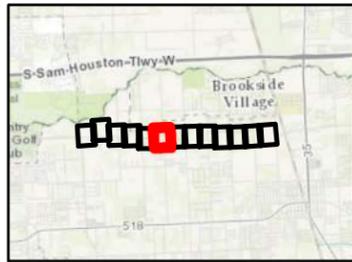
PROJECT NO.	PRJ14485
DATE CREATED	Date: 11/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: PW_Mapbook_TxDOT_20112
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PHONE: 512-617-3100
FAX: 512-617-3101

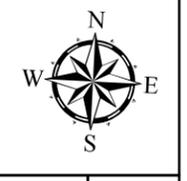
FIGURE
5



Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County



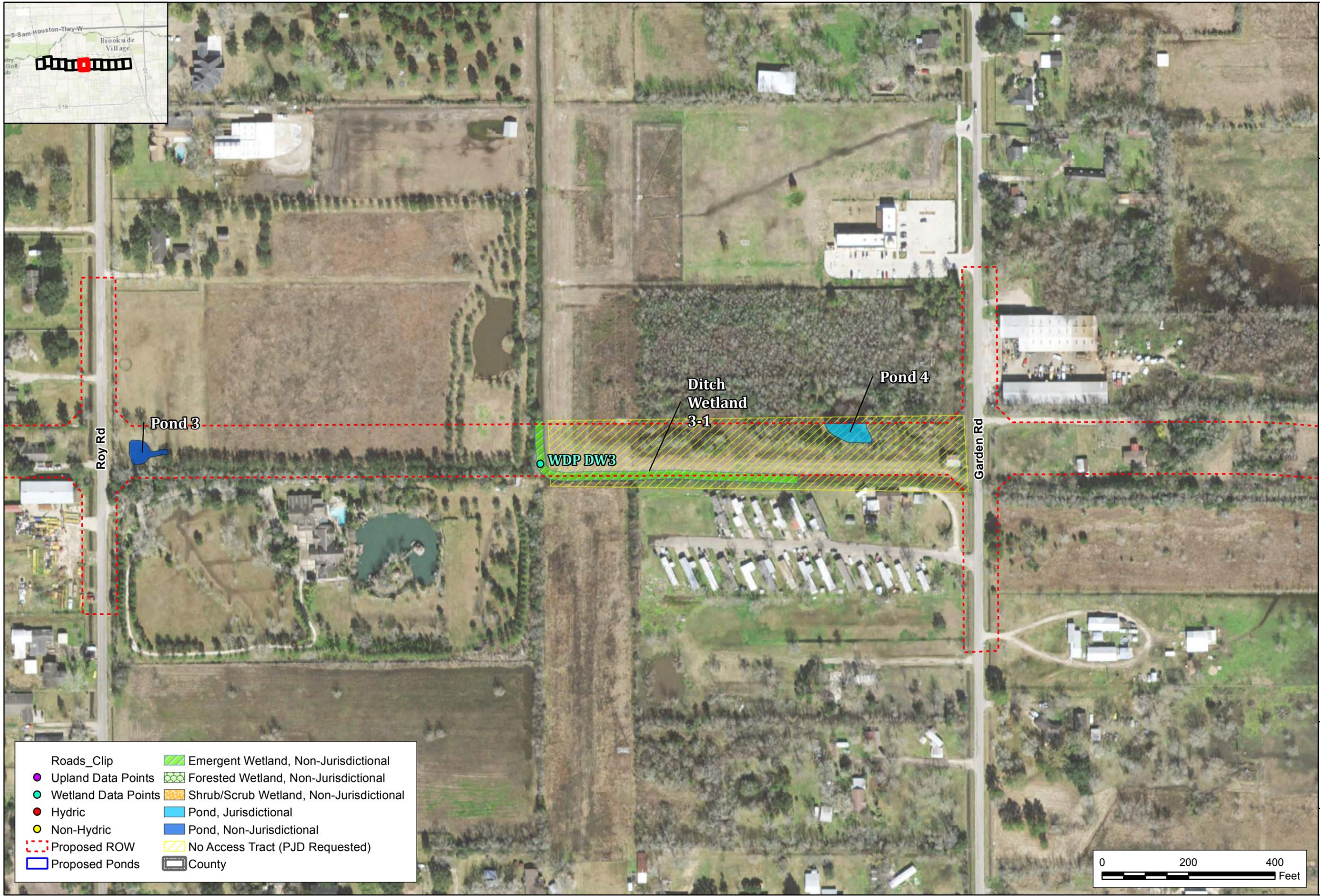
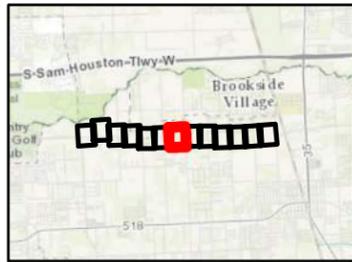
FN PROJECT NO: PRL1446
 DATE CREATED: 11/22/2016
 DATUM & COORDINATE SYSTEM: NAD83 State Plane (feet) Texas South Central
 FILE NAME: PW_Mapbook_TxDOT_20112
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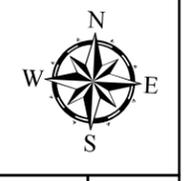
FIGURE
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Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County

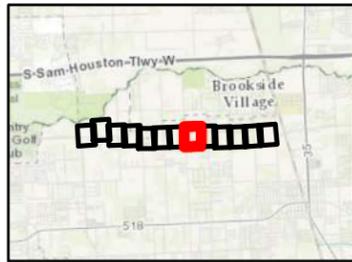


PROJECT NO.	PRJ1446
DATE CREATED	Date: 11/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: PW_Mapbook_TxDOT_20112
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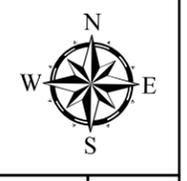
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Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County



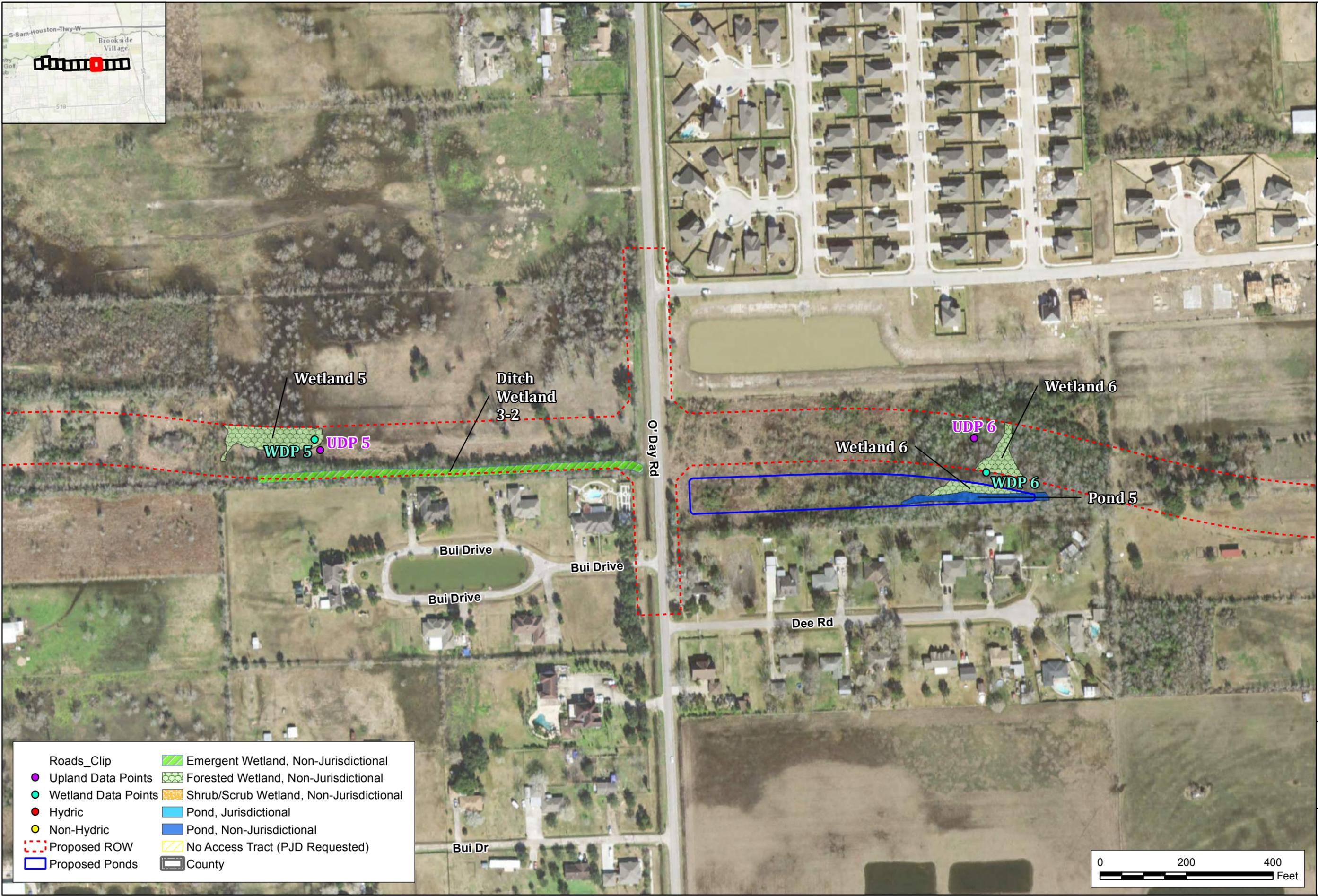
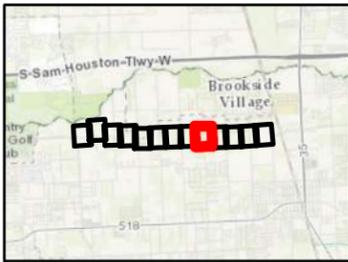
PROJECT NO.	PRJ11485
DATE CREATED	Date: 11/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: PW_Mapbook_TxDOT_20112
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 PHONE: 512-617-3100
 FAX: 512-617-3101

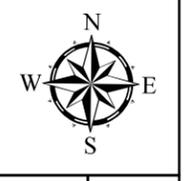
FIGURE
8



Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County

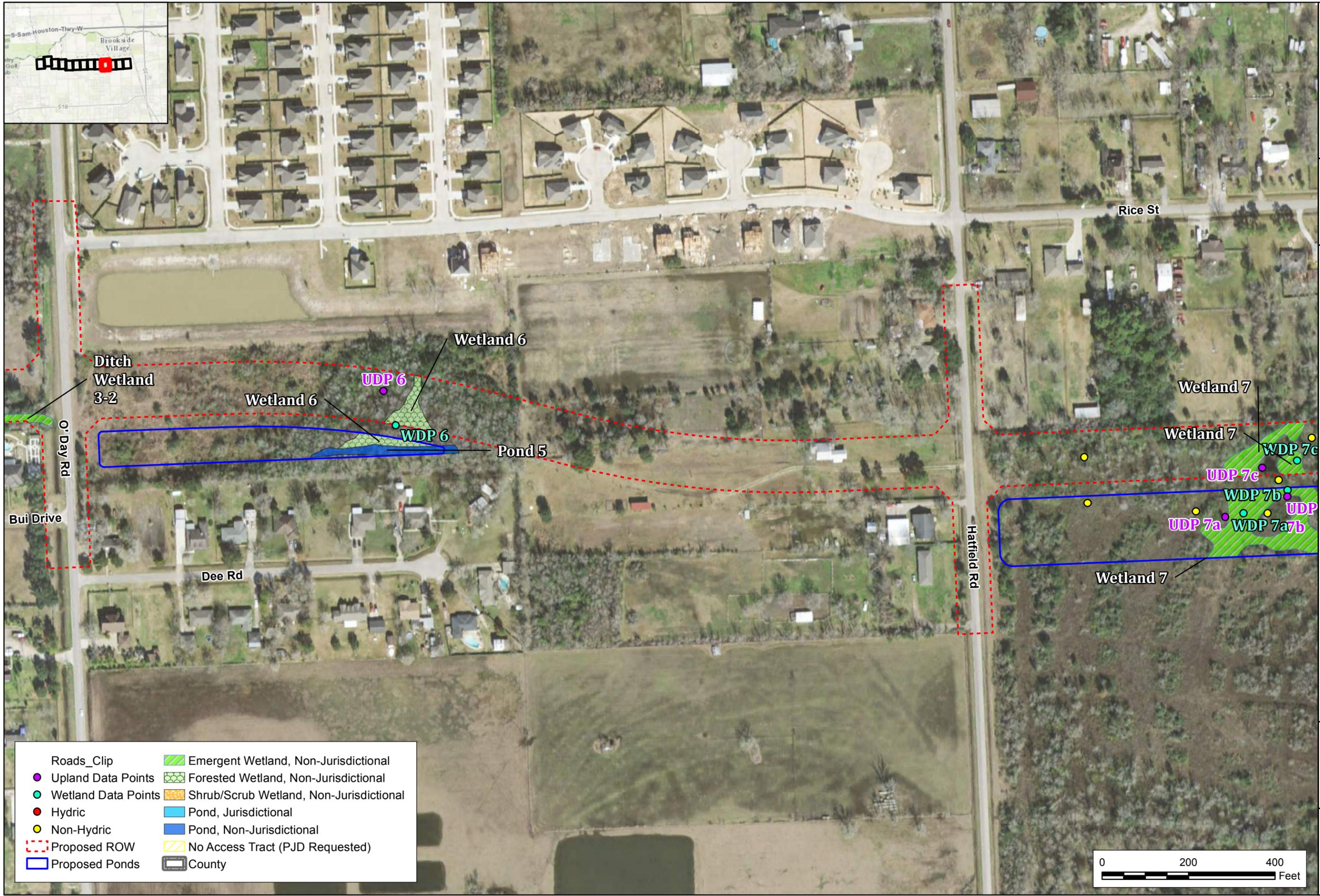
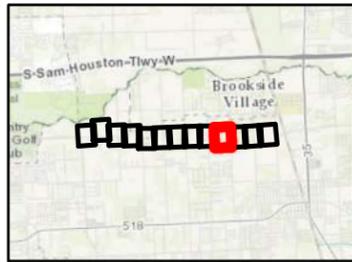


PROJECT NO.	PRJ11485
DATE CREATED	Date: 11/22/2016
DATA & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: PW_Mapbook_TxDOT_20112
PREPARED BY	BACK



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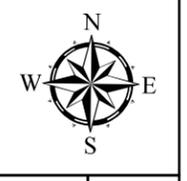
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 AUSTIN, TEXAS 78759
 PHONE: 512-617-3100
 FAX: 512-617-3101



Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County



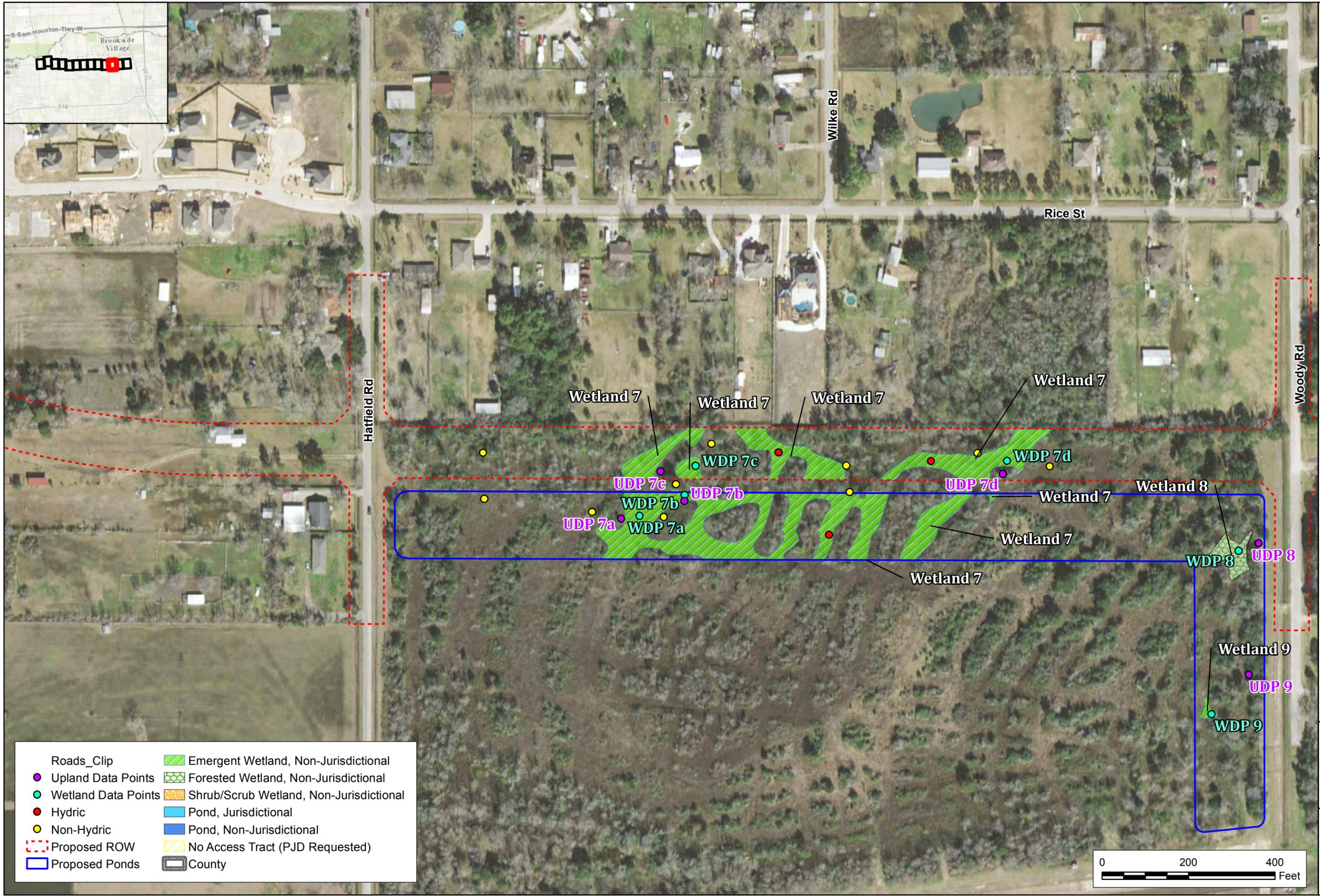
FN PROJECT NO: PRL1446
 DATE CREATED: 11/22/2016
 DATUM & COORDINATE SYSTEM: NAD83 State Plane (feet) Texas South Central
 FILE NAME: PW_Mapbook_TxDOT_20112
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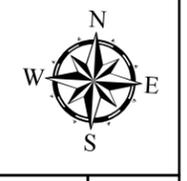
FIGURE
 10



Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County



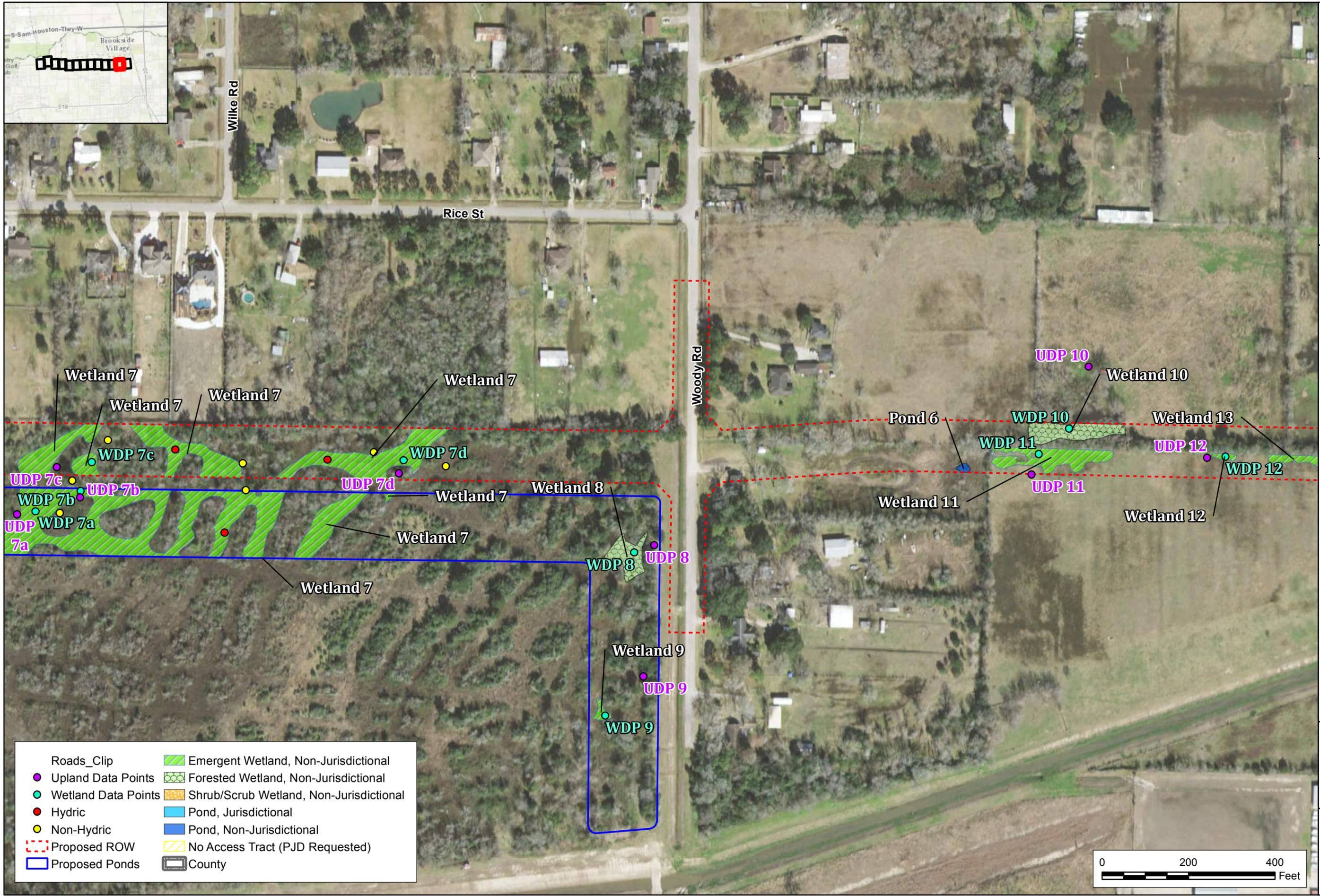
PROJECT NO.	PRJ1448
DATE CREATED	Date: 11/22/2016
DRAWN & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: PW_Mapbook_TxDOT_20112
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 FAX: 512-617-3101

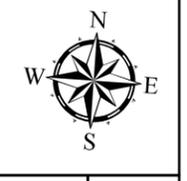
FIGURE
 11



Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County



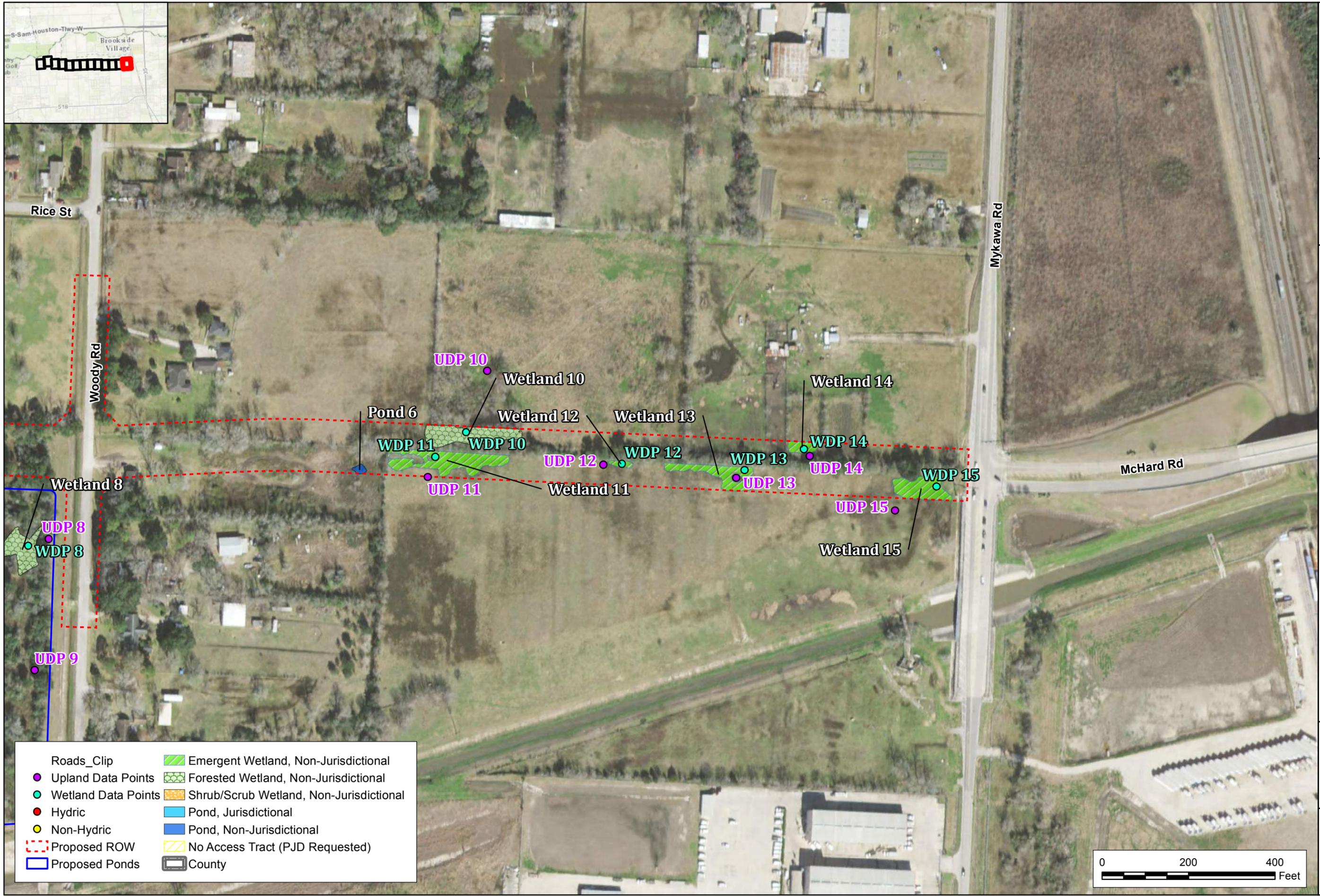
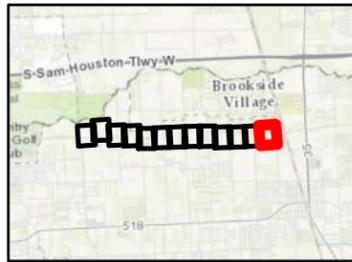
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 DATE CREATED Date: 11/22/2016
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas South Central
 FILE NAME Name: PW_Mapbook_TxDOT_20112
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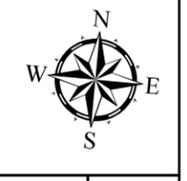
FIGURE
 12



Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County



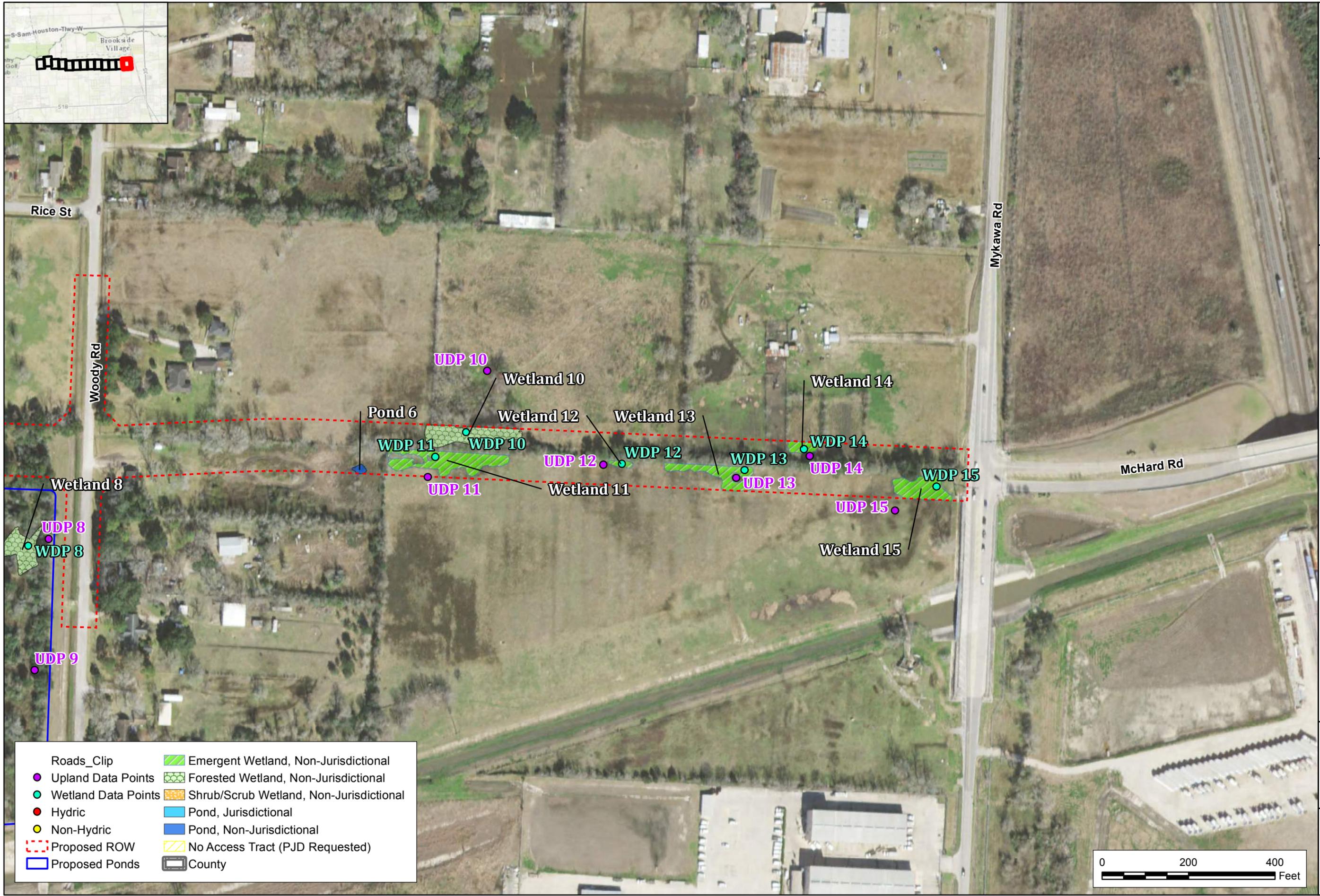
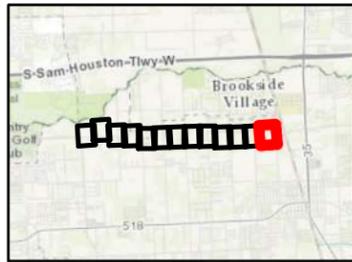
PROJECT NO.	PRJ14485
DATE CREATED	Date: 11/22/2016
DRAWN & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas South Central
FILE NAME	Name: PW_Mapbook_TxDOT_201112
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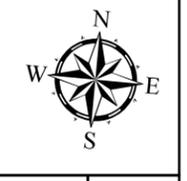
FIGURE
 13



Roads_Clip	Emergent Wetland, Non-Jurisdictional
Upland Data Points	Forested Wetland, Non-Jurisdictional
Wetland Data Points	Shrub/Scrub Wetland, Non-Jurisdictional
Hydric	Pond, Jurisdictional
Non-Hydric	Pond, Non-Jurisdictional
Proposed ROW	No Access Tract (PJD Requested)
Proposed Ponds	County



FN PROJECT NO. PRL1448
 DATE CREATED Date: 11/22/2016
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas South Central
 FILE NAME Name: PW_Mapbook_TxDOT_20112
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FIGURE
13

Noise



PROJECT NO.	PRL14465
DATE CREATED	8/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas North Central
FILE NAME	1_Prop_Yr_2039_MB_11x17
PREPARED BY	SSJ

CITY OF PEARLAND
McHard Road Extension
 Noise Impact Analysis- Proposed Year 2039

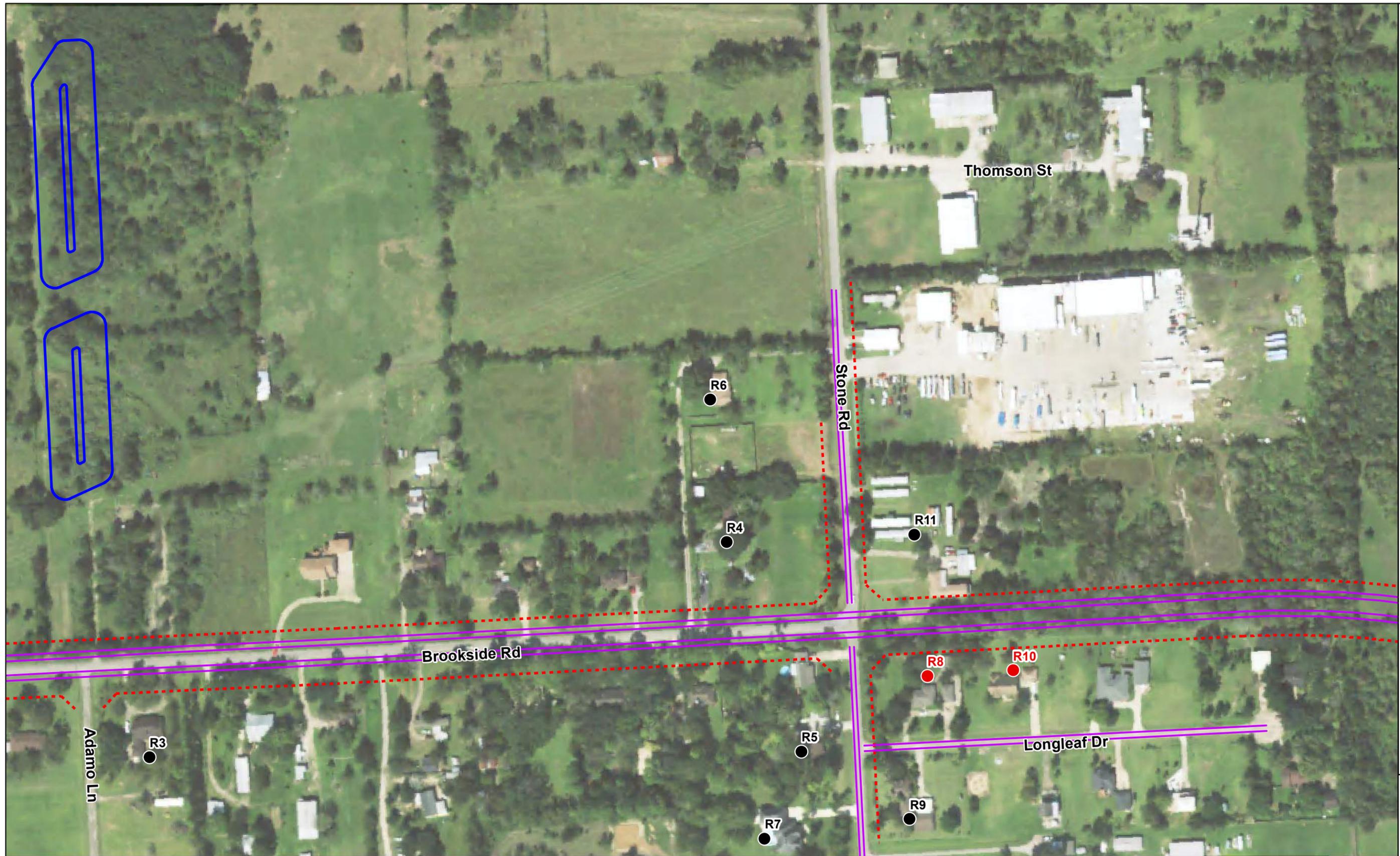


- Modeled Travel Lanes
- Proposed Barrier
- - - Proposed ROW
- Proposed Pond
- Benefitted Receiver
- Impacted Receiver
- Non-impacted Receiver

1.1 1.2 1.3 1.4 1.5 1.6 1.7

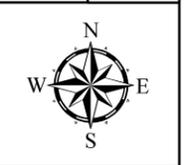
1:2,400
 0 200 400 Feet
 Base Map: 2014 -1 Meter NAIP Aerial Imagery

1.1
FIGURE

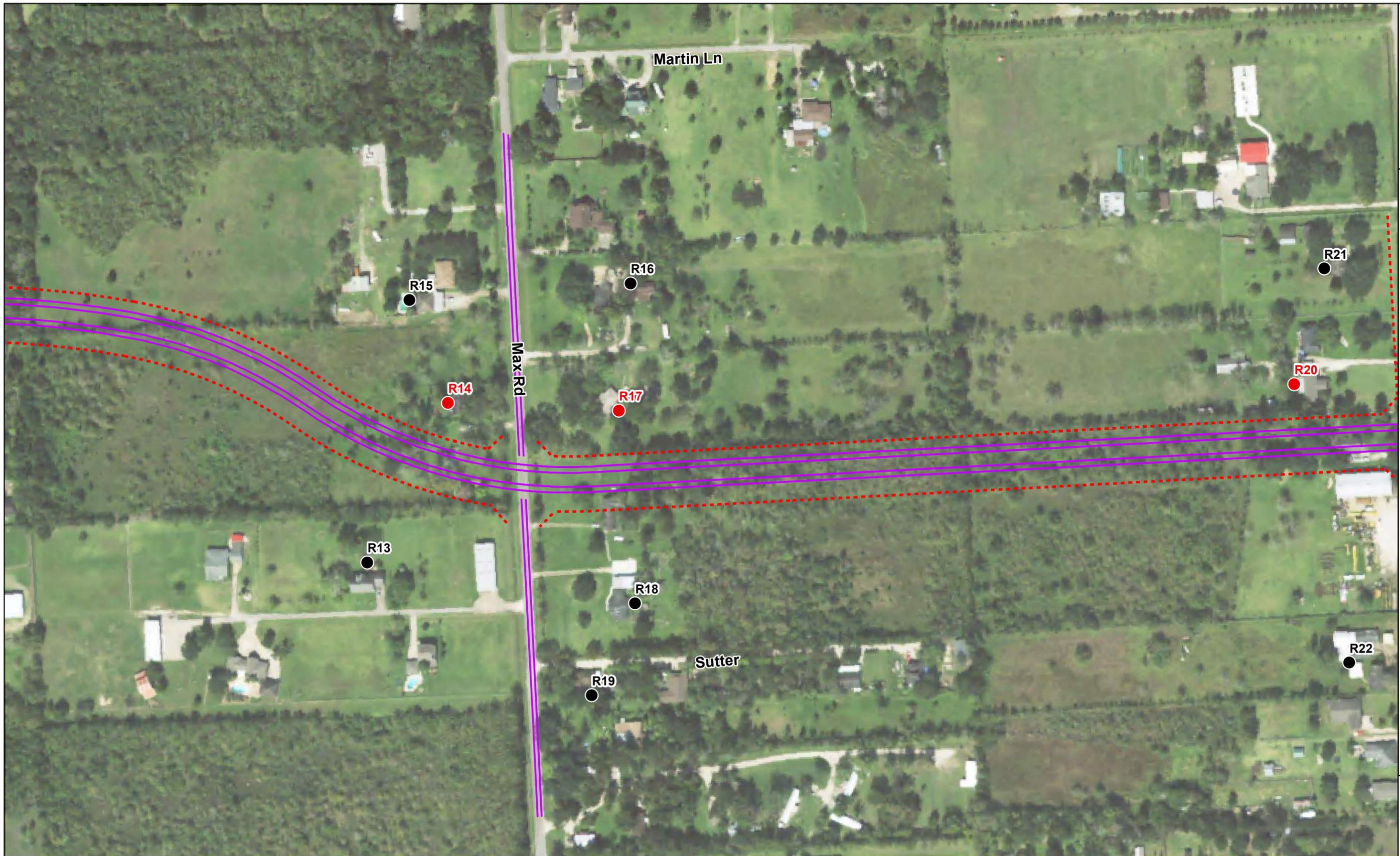


PROJECT NO.	PRL14465
DATE CREATED	8/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas North Central
FILE NAME	1_Prop_Yr_2039_MB_11x17
PREPARED BY	SSJ

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McHard Road Extension
 Noise Impact Analysis- Proposed Year 2039



<ul style="list-style-type: none"> — Modeled Travel Lanes — Proposed Barrier - - - Proposed ROW — Proposed Pond 	<ul style="list-style-type: none"> ● Benefitted Receiver ● Impacted Receiver ● Non-impacted Receiver 	<p>1:2,400</p> <p>0 200 400</p> <p>Feet</p> <p>Base Map: 2014 -1 Meter NAIP Aerial Imagery</p>	<p>1.2</p> <p>FIGURE</p>
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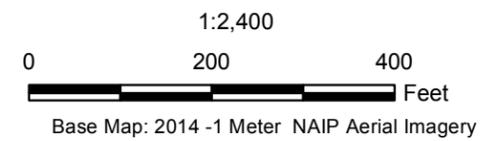
FN PROJECT NO. PRL14465
 DATE CREATED 8/22/2016
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas North Central
 FILE NAME 1_Prop_Yr_2039_MB_11x17
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 Noise Impact Analysis- Proposed Year 2039

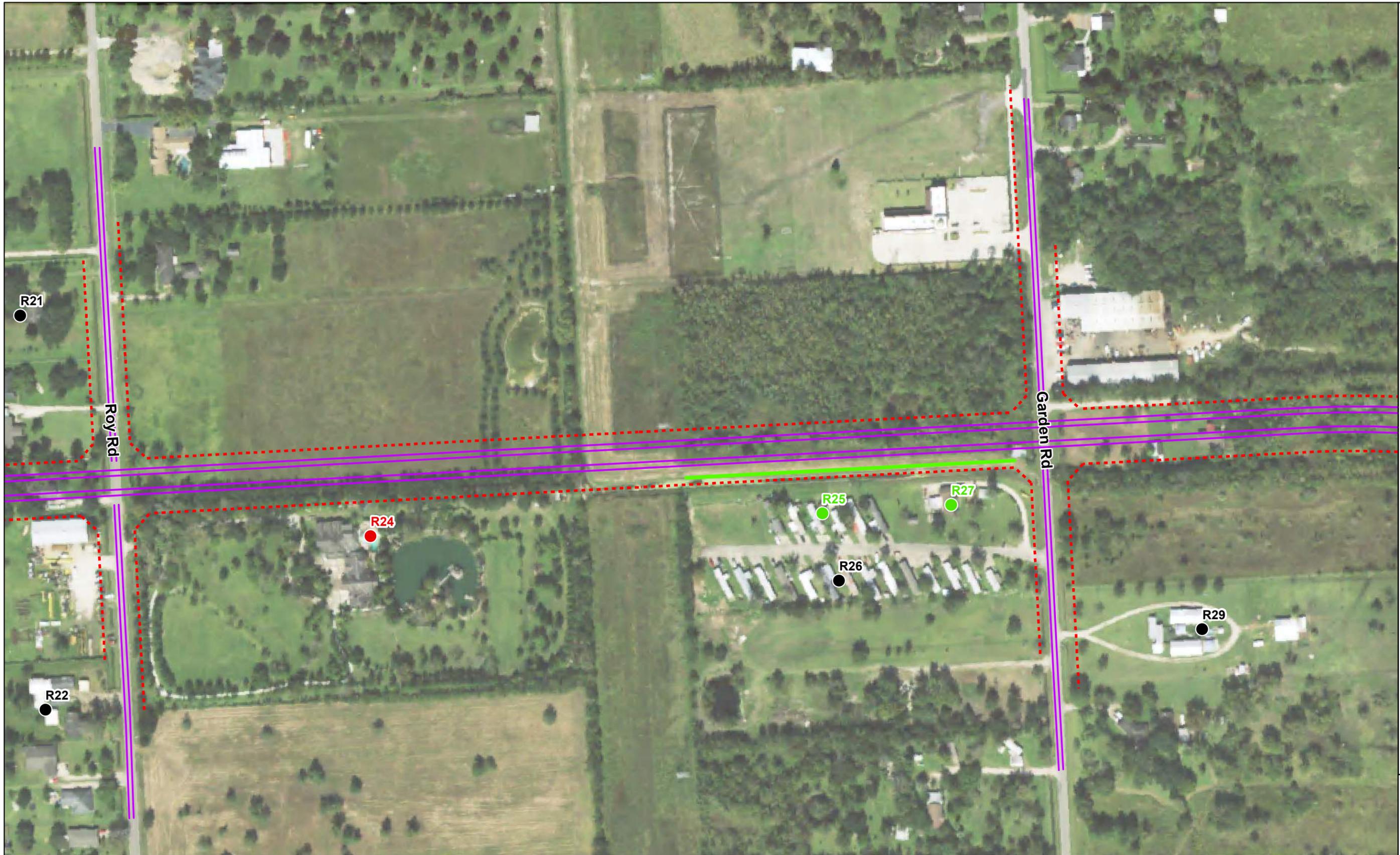


- Modeled Travel Lanes
- Proposed Barrier
- - - Proposed ROW
- Proposed Pond
- Benefitted Receiver
- Impacted Receiver
- Non-impacted Receiver

1.1 1.2 **1.3** 1.4 1.5 1.6 1.7

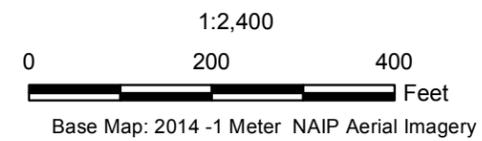


1.3
FIGURE



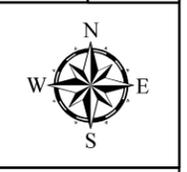
- Modeled Travel Lanes
- Proposed Barrier
- - - Proposed ROW
- Proposed Pond
- Benefitted Receiver
- Impacted Receiver
- Non-impacted Receiver

1.1 1.2 1.3 1.4 1.5 1.6 1.7

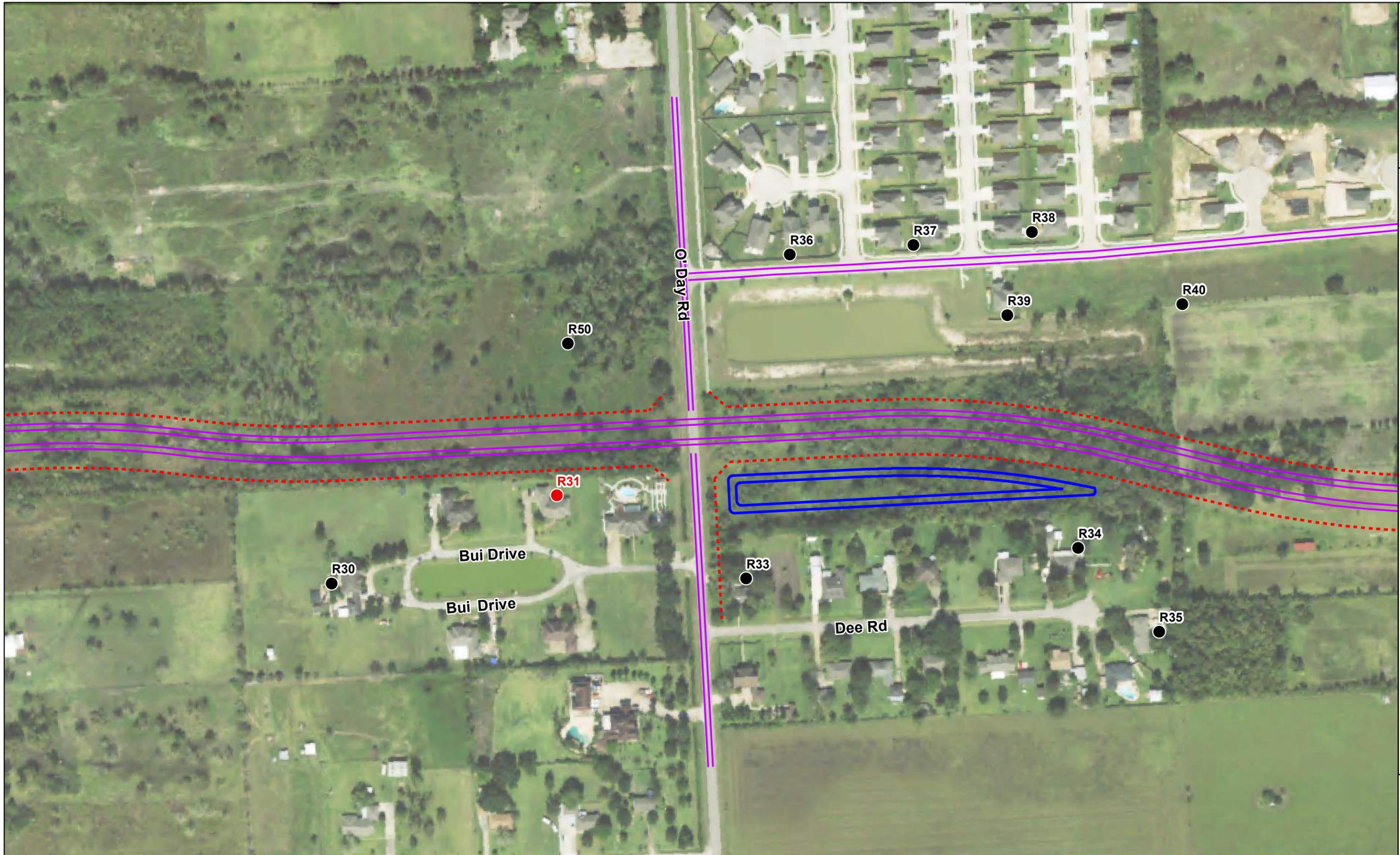


PROJECT NO.	PRL14465
DATE CREATED	8/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas North Central
FILE NAME	1_Prop_Yr_2039_MB_11x17
PREPARED BY	SSJ

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 Noise Impact Analysis- Proposed Year 2039

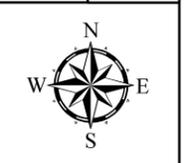


1.4
FIGURE

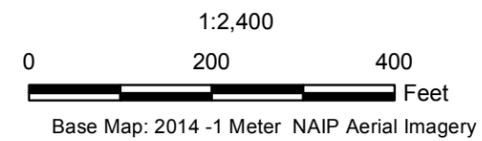


FN PROJECT NO. PRL14465
 DATE CREATED 8/22/2016
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas North Central
 FILE NAME 1_Prop_Yr_2039_MB_11x17
 PREPARED BY SSI

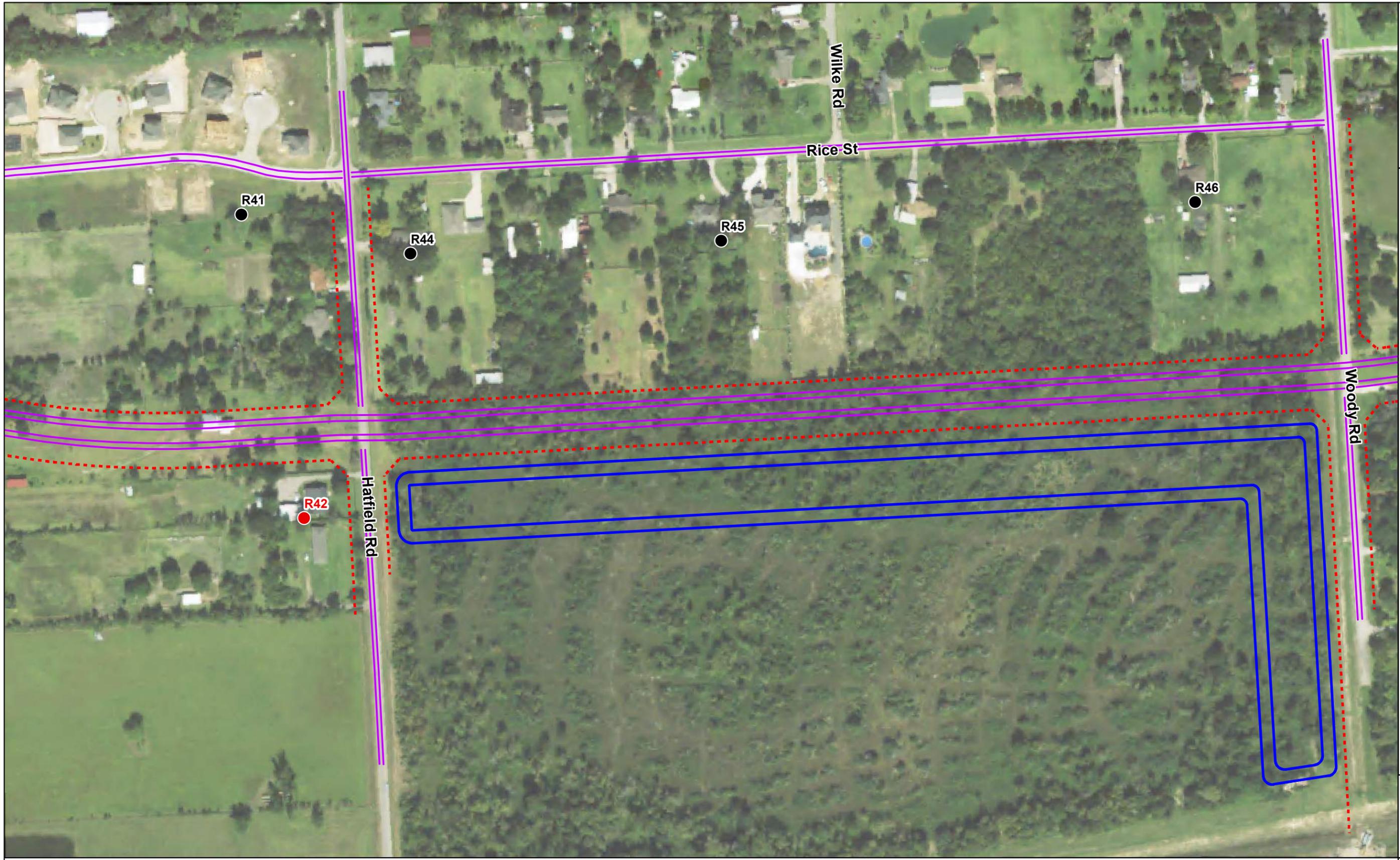
CITY OF PEARLAND
McHard Road Extension
 Noise Impact Analysis- Proposed Year 2039



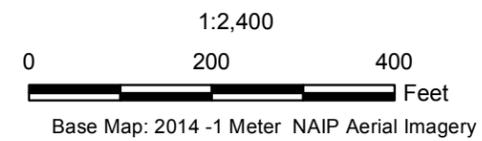
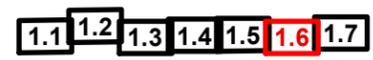
- Modeled Travel Lanes
- Benefitted Receiver
- - - Proposed Barrier
- Impacted Receiver
- - - Proposed ROW
- Non-impacted Receiver
- Proposed Pond



1.5
FIGURE



- Modeled Travel Lanes
- Proposed Barrier
- - - Proposed ROW
- Proposed Pond
- Benefitted Receiver
- Impacted Receiver
- Non-impacted Receiver

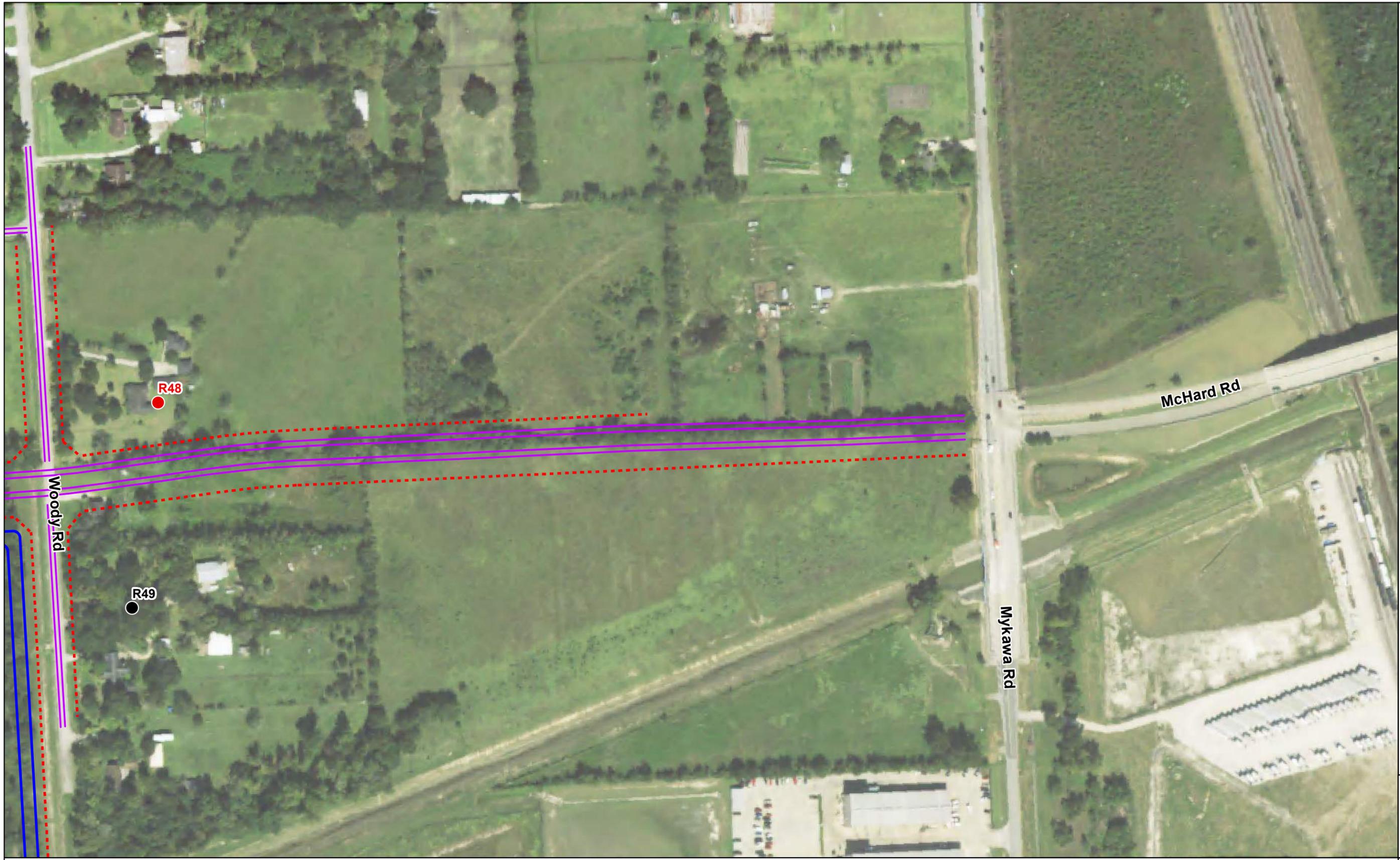


FN PROJECT NO.	PRL14465
DATE CREATED	8/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas North Central
FILE NAME	1_Prop_Yr_2039_MB_11x17
PREPARED BY	SSJ

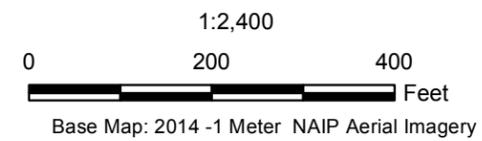
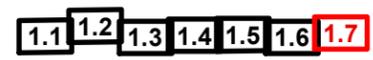
CITY OF PEARLAND
McHard Road Extension
 Noise Impact Analysis- Proposed Year 2039



1.6
FIGURE

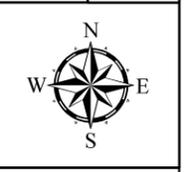


- Modeled Travel Lanes
- Proposed Barrier
- - - Proposed ROW
- Proposed Pond
- Benefitted Receiver
- Impacted Receiver
- Non-impacted Receiver



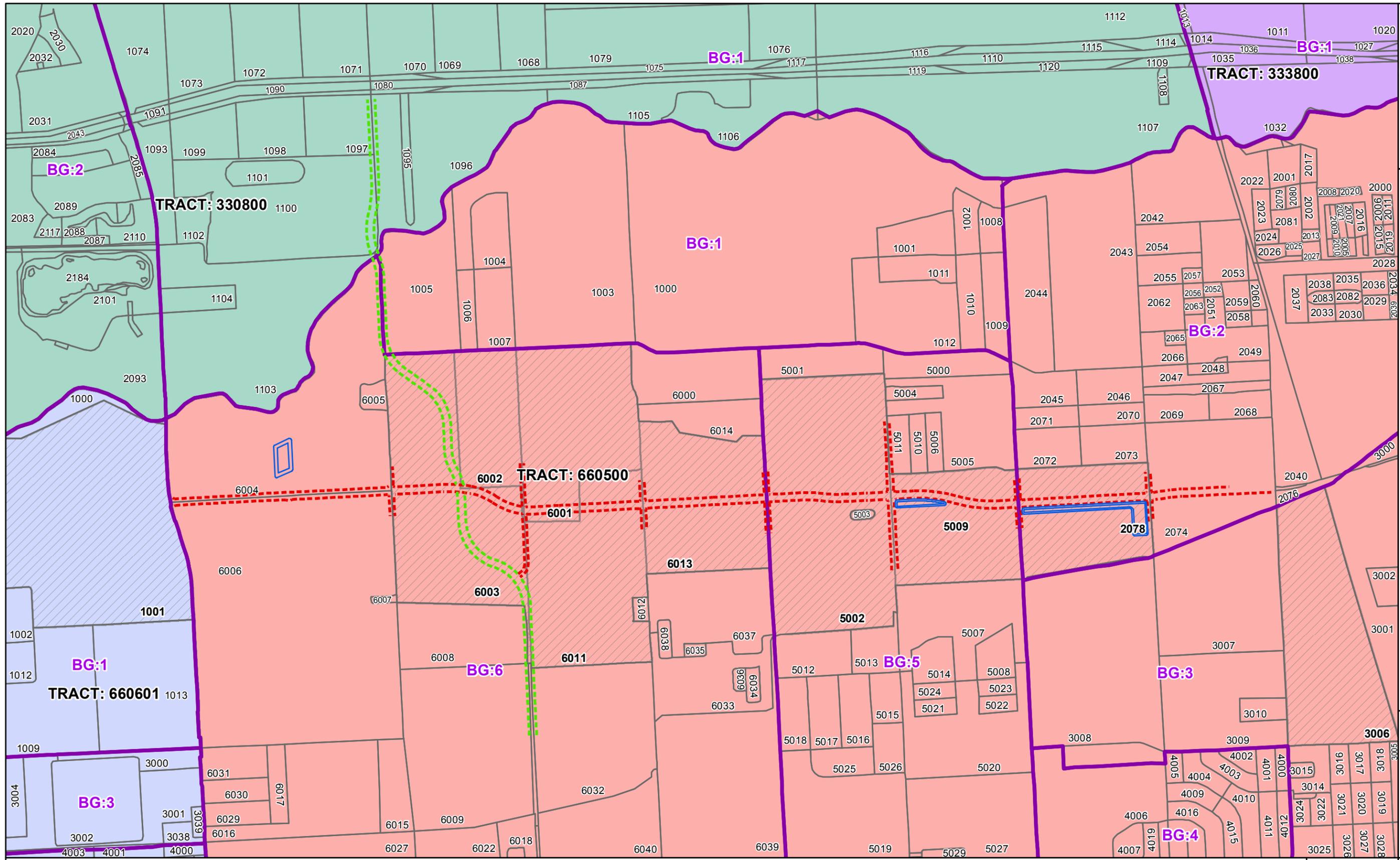
PROJECT NO.	PRL14465
DATE CREATED	8/22/2016
DATUM & COORDINATE SYSTEM	NAD83 State Plane (feet) Texas North Central
FILE NAME	1_Prop_Yr_2039_MB_11x17
PREPARED BY	SSJ

CITY OF PEARLAND
McHard Road Extension
 Noise Impact Analysis- Proposed Year 2039



1.7
FIGURE

Census Geographies and Minority Populations

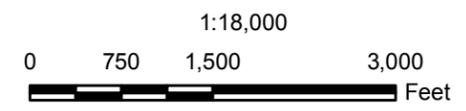


PRL-14465
 DATE CREATED 12/16/2015
 DATUM & COORDINATE SYSTEM NAD83 State Plane (feet) Texas North Central
 FILE NAME
 PREPARED BY
 SSJ

CITY OF PEARLAND
McHard Road Extension
2010 Census

FREES & NICHOLS
 FREES AND NICHOLS
 4055 International Plaza Suite 200
 Fort Worth, Texas 76109-4895
 (817) 735-7300

- | | | | |
|-------------------|--------|---|-------------------------|
| 2010 Census Tract | 660500 | 2010 Block Groups | Proposed ROW |
| 330800 | 660601 | 2010 Census Blocks | Future Max Road ROW |
| 333800 | | Census Blocks with over 50% Minority Population | Proposed Detention Pond |



X
FIGURE

Appendix G
Resource Agency Coordination

Agency	Comment	Response
<p>Texas Parks and Wildlife Department (TPWD)</p> <p><u>Detention ponds.</u></p>	<p>It appears that detention ponds will be situated in wetlands. Detention ponds should be situated in uplands, to avoid impacting existing flood detention that is functioning well in the area. The project would be removing detention to create detention, and not making a net benefit. This is particularly important in Pearland, which floods frequently, and where the addition of impervious cover should be accompanied by generous detention. If it is not possible to avoid wetlands, I suggest the addition of retention ponds with wetland borders. These will not mitigate for the natural wetlands entirely, but will provide water quality, detention, and habitat functions as well as being aesthetically pleasing and possibly provide a recreation opportunity.</p>	<p>Due to the size and number of wetlands present it is almost impossible to avoid wetlands in that area when constructing facilities the size of detention ponds. Most of the wetlands impacted are low quality – either emergent wetlands that resulted from former rice farming activities and/or tallow tree infested areas. The measures necessary to avoid wetlands in the area would result in a convoluted feature that would be difficult to maintain and less efficient to operate, and potentially unreasonably costly. It is likely that the detention ponds will function as emergent wetlands most of the year and would, therefore, not require fringe wetlands. Constructing fringe wetlands would increase the size of the detention ponds, creating additional requirements for takings. The small amount of flood abatement and storage provided by the existing wetlands is much less than that provided by the proposed detention ponds due to the larger footprint of the detention ponds coupled with the much greater depth.</p>
<p>Follow on</p>	<p>Regarding the wetlands, has there been a functional assessment to determine that they are low quality? Dry detention ponds are inferior to wetlands in their ability to remove pollutants, provide wildlife habitat, and maintain plant diversity. Former rice fields provide significant flood detention benefits on the coast, as did the wetlands that preceded them in that location. The Houston area continues to flood in part because constructed detention basins do not replace the function of the wetlands that</p>	<p>A functional assessment is being performed (as required) for mitigation purposes, to ensure that functional capacities are appropriately mitigated. The detention ponds would be designed to have greater flood storage capacity than the wetlands that they are impacting by having a larger surface area and greater depth. The capacity of the detention ponds is based upon hydrological studies. To compensate for impacted wetlands, the City proposes to purchase credits in a nearby mitigation bank. The ratio of these credits to impacted wetlands has yet to be determined but will likely be no less than a 1:1 ratio or will be based on functional capacity</p>

	<p>they replace on the landscape. Avoiding wetlands is the ideal, as codified in Section 404 of the Clean Water Act. TPWD also is concerned the proximity of the avoided wetlands to the detention basin may result in a change in hydrology due to lateral movement of water through the soil to the lower level of the basin, therefore depriving adjacent wetlands of hydrology. While the proposed detention basin may provide attenuation of stormwater runoff and filtering of sediments, the existing wetlands provide a consistent habitat resource for wildlife species that will not be provided by the detention basin. I recommend considering all wetlands jurisdictional in TxDOT's delineation of wetlands for this project, and mitigating for any wetlands that are converted to detention basins.</p>	<p>replacement. In order to purchase these credits, the impacted wetlands will be evaluated using an evaluation methodology based on the requirements of the mitigation bank and the USACE. These wetlands will be of higher quality than the impacted wetlands. The City will coordinate with the USACE to determine the jurisdictional status of the wetlands. The USACE will have final say over the jurisdictional status of any impacted wetlands. All proposed actions regarding wetland and floodplain impacts and mitigation would fully comply with all applicable regulations.</p>
<p>TPWD <u>EMST.</u></p>	<p>The EMST revision errs generously on the side of urban habitat type. I think this misrepresents what is on the ground in the area and underestimates impacts. I recommend that the EMST be re-evaluated.</p>	<p>The area in question is a disturbed area in north Pearland. It was at one time predominantly rice fields, but has been altered in many locations due to suburban development and machinery and is bisected by many roadways and scattered development. The predominant woody species is Chinese tallow tree (<i>Triadica sebifera</i>), which is an invasive species in southeast Texas.</p>
<p>Follow on</p>	<p>Tallow trees, while invasive and widely despised, do provide habitat functions. They certainly provide more valuable habitat than pavement, which is the major component of the urban habitat type. If areas are infested with tallow trees they should be designated as</p>	<p>We have reviewed the general definitions of various cover types within the EMST and "Urban – Low Intensity" best describes most of the project ROW; however, there are a few tracts that are best categorized as "Non-Native Invasive – Chinese Tallow Forest, Woodland, and Shrubland" and we have edited the figures and</p>

	<p>“Native Invasive” or similar, not urban. Former rice fields provide valuable wildlife habitat and ecosystem services such as flood abatement and aquifer recharge. Again, they are a different habitat type than paved urban areas.</p>	<p>BEF accordingly. The acreage of this cover type was reduced from 34.42 to 28.91 acres while the “Native Invasive” and “Non-native Invasive” increased from 24.56 acres to 29.69 acres.</p>
<p>TPWD <u>SGCN plant species.</u></p>	<p>There are several plant species that the project may impact, as noted in Table 1 that you included with the package. I recommend that a plant survey (or surveys) be performed during appropriate seasons to detect those species. If feasible, prior to construction, cultivars of the plants could be removed from harm’s way or at the least, populations could be documented in TXNDD</p>	<p>The habitat for the various plants mentioned in Table 1 is very general in nature, therefore, there much of the region could provide habitat with little likelihood of occurrence. Additionally, due to the large amount of past and present disturbance in the area, while it is possible the plants mentioned could occur, it is unlikely they would occur.</p>
<p>Follow on</p>	<p>There are plant species listed in the BEF as potentially impacted. Where habitat exists for SGCN plant species, I request that TxDOT perform surveys for them. This is a new location road going through habitat for those species.</p>	<p>The City of Pearland’s construction manager will coordinate with the construction contractor and engineering design and environmental team to perform surveys prior to construction and to assist the contractor’s staff in recognizing SGCN species with potential habitat in the project area.</p>
<p>TPWD <u>Timber rattler.</u></p>	<p>Please confirm that you can include the species BMP for the Timber rattler.</p>	<p>We will include the species BMP for the Timber rattler as well as other required species.</p>

Troy Olney-C

From: NEPA <NEPA@tceq.texas.gov>
Sent: Wednesday, May 18, 2016 10:38 AM
To: Troy Olney-C
Subject: RE: Response to Request for TCEQ Conformity Review

Re: Revised Response to Request for TCEQ Environmental Review

The Texas Commission on Environmental Quality (TCEQ) received a request from the Texas Department of Transportation (TxDOT) regarding the following project: McHard Project, McHard Road from Cullen Boulevard to Mykawa Road, TxDOT 15-36 (CJS:0912-31-290).

In accordance with the Memorandum of Understanding between TxDOT and TCEQ addressing environmental reviews, which is codified in Chapter 43, Subchapter I of the Texas Administrative Code (TAC) and 30 TAC § 7.119, TCEQ is responding to your request for review by providing the below comments.

This project is in an area of Texas classified by the United States Environmental Protection Agency as marginal nonattainment for the 2008 ozone National Ambient Air Quality Standard. Air Quality staff has reviewed the document in accordance with transportation and general conformity regulations codified in 40 Code of Federal Regulations Part 93 Subparts A and B. We concur with TxDOT's assessment.

TxDOT will still need to follow all other applicable laws related to this project, including applying for applicable permits.

If you have any questions, please feel free to contact the NEPA Coordinator at (512) 239-3500 or NEPA@tceq.texas.gov.

Shannon Stoker
NEPA Coordinator
TCEQ, MC-119
NEPA@tceq.texas.gov
512-239-3500

From: Troy Olney-C [mailto:TOLNEY-C@txdot.gov]
Sent: Wednesday, May 18, 2016 9:16 AM
To: NEPA <NEPA@tceq.texas.gov>
Subject: FW: Response to Request for TCEQ Conformity Review

Please see the below comment from Tim Wood regarding TCEQ's response to our request for review of the McHard Rd. project.

It appears that the wrong response letter was sent.
Let me know if you have any questions.

Thank you,

Troy Olney

Environmental Affairs Division
Texas Department of Transportation
512-416-2522
TOLNEY-C@txdot.gov

From: Tim Wood
Sent: Wednesday, May 18, 2016 8:36 AM
To: Troy Olney-C; Andrew Leske
Subject: RE: Response to Request for TCEQ Conformity Review

This is the wrong form letter from TCEQ. This is the letter they would use for a project with a federal lead other than FHWA. They have a different form letter that they use for roadway projects. It is transportation conformity, not general conformity, that applies to this project. I recommend letting them know that they sent the wrong form letter.

Tim Wood
TxDOT ENV Air Specialist
512-416-2659

From: Troy Olney-C
Sent: Tuesday, May 17, 2016 11:04 AM
To: Andrew Leske
Cc: Tim Wood
Subject: FW: Response to Request for TCEQ Conformity Review

FYI, the response I received from TCEQ on their review of the McHard Rd. Air Tech Report.
I will upload to ECOS.

From: NEPA [<mailto:NEPA@tceq.texas.gov>]
Sent: Tuesday, May 17, 2016 11:00 AM
To: Troy Olney-C
Subject: Re: Response to Request for TCEQ Conformity Review

The Texas Commission on Environmental Quality (TCEQ) received a request from the Texas Department of Transportation (TxDOT) regarding the following project: McHard Project, McHard Road from Cullen Boulevard to Mykawa Road, TxDOT 15-36 (CSJ:0912-31-290).

In accordance with the Memorandum of Understanding between TxDOT and TCEQ addressing environmental reviews, which is codified in Chapter 43, Subchapter I of the Texas Administrative Code (TAC) and 30 TAC § 7.119, TCEQ is responding to your request for review by providing the below comments.

A review of the project for General Conformity impact in accordance with 40 CFR Part 93 indicates that the proposed project is located in Brazoria County, which is currently classified by the United States Environmental Protection Agency as marginal nonattainment for the 2008 ozone National Ambient Air Quality Standard. Therefore, general conformity rules apply.

The two primary precursors to ozone formation are volatile organic compounds (VOCs) and nitrogen oxides (NO_x). A general conformity analysis may be required when a project results in an emissions increase of 100 tons per year or greater for either VOCs or NO_x. Because the emissions

from this proposed project are expected to be below these thresholds it is not anticipated to impact the state implementation plan; therefore a general conformity analysis is not required.

TxDOT will still need to follow all other applicable laws related to this project, including applying for applicable permits.

If you have any questions, please feel free to contact the NEPA Coordinator at (512) 239-3500 or NEPA@tceq.texas.gov.

NEPA Coordinator
TCEQ, MC-119
NEPA@tceq.texas.gov
512-239-3500





125 EAST 11TH STREET, AUSTIN, TEXAS 78701-2483 | 512.463.8588 | WWW.TXDOT.GOV

September 9, 2016

Transmittal of Cox/McLain Intensive Archeological Survey Report: *McHard Road Extension from Cullen Boulevard to Mykawa Road*. Brazoria County, Houston District.

CSJ: 0912-31-290

THC Antiquities Permit No. 7666

Ms. Pat Mercado-Allinger,
Division of Archeology, Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

Dear Ms. Mercado-Allinger:

The above proposed project will be undertaken with local and federal funds. As required by the First Amended Programmatic Agreement (PA, 2005) and the Memorandum of Understanding with your agency, we are continuing consultation with your office on this project and are enclosing for your review and processing a draft report of an archeological survey recently conducted by Cox/McLain Environmental Consulting, Inc. for the undertaking.

On behalf of TxDOT's Houston District, Cox/McLain conducted an Intensive Archeological Survey with systematic shovel testing within the area of potential effects (APE) of a proposed extension of McHard Road between Cullen Boulevard and Mykawa Road in Brazoria County. The work was conducted in compliance with Section 106 of the National Historic Preservation Act and the Texas Antiquities Code. The project is approximately 3.5 miles in length and typically between 120 and 163 feet wide, and up to 675 feet wide at detention pond locations. The total APE is 75.76 acres, 59.12 acres of which is new right-of-way (ROW). Typical roadway construction depths would reach two feet, with possible deeper impacts for construction of drainage elements and a planned depth of up to ten feet at detention ponds.

According to the Houston Potential Archeological Liability Map (PALM), most of the project area (63.92 acres) is designated as Map Unit 2a, for which survey is recommended only on simple mounds which, as high spots on the landscape, were attractive for prehistoric occupation. The PALM also indicated that a small portion of the northernmost proposed detention pond is located within Map Unit 2, for which surface survey is recommended based on presence of Holocene deposits. The remaining area is within Map Unit 4, for which no survey is recommended due to Pleistocene landforms, urban land, and/or dredge soil. The majority of the intensively surveyed APE was determined to have been subjected to ground-disturbing activities associated with agriculture, erosion, and construction and maintenance of the existing road. No new archeological sites were identified during the survey and no artifacts were identified or recovered. A report of the investigations is enclosed.

OUR VALUES: People • Accountability • Trust • Honesty

OUR MISSION: Through collaboration and leadership, we deliver a safe, reliable, and integrated transportation system that enables the movement of people and goods.

An Equal Opportunity Employer

A TxDOT archeologist has reviewed the report by Cox/McLain and concurs with the results.

TxDOT seeks THC concurrence that:

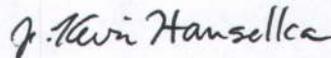
1. Per our MOU, no archeological historic properties (36 CFR Part 800.16(1) or State Archeological Landmarks (13 TAC 26.12) are present within the 75.76 acre APE examined by Cox/McLain (see attached report), and none will be affected by the proposed undertaking. No further archeological investigations are warranted.

2. Since the survey was conducted under an individual THC Antiquities Permit, we are forwarding the draft for your review and processing in partial fulfillment of THC Antiquities Permit No. 7666. TxDOT finds the report acceptable as a draft and pending any final report review comments from your office, we request your concurrence that the report may proceed toward production and that it provides sufficient documentation that the proposed undertaking will have no effect on an archeological historic properties or State Archeological Landmarks.

In the event that unanticipated archeological deposits are encountered during construction, work in the immediate area will cease and TxDOT archeological staff will be contacted to initiate post-review discovery procedures under the provisions of the PA (2005) and the Memorandum of Understanding between TxDOT and the THC.

Thank you for your consideration of this matter. If you have any questions regarding the survey report, please contact Melissa Green at (469) 647-4866. If you have any other questions or have need of further information, please contact me at (512) 416-2639. Thank you for your consideration in this matter.

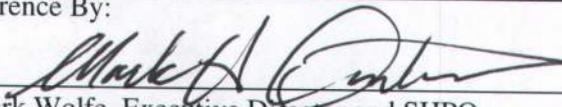
Sincerely,



J. Kevin Hanselka, Archeological Studies Program
Environmental Affairs Division

Cc w/attachment: Andrew Leske TxDOT Houston District Environmental Coordinator; Juan Valera-Lema, ENV-PD; Kevin Hanselka, ENV-Arch; ENV Arch Project File

Cc w/o attachments: ECOS Scan

Concurrence By:	
	<i>9-15-16</i>
for: Mark Wolfe, Executive Director and SHPO Texas Historical Commission	Date

Intensive Archeological Survey for a Proposed Extension of
McHard Road from Cullen Boulevard to Mykawa Road,
City of Pearland, Brazoria County, Texas

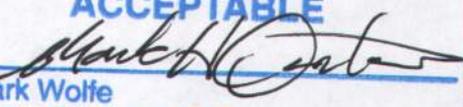
(CSJ: 0912-31-290)

Prepared by:
David Sandrock
Melissa M. Green, MA, RPA (Principal Investigator)
Cox | McLain Environmental Consulting, Inc.
6010 Balcones Drive, Suite 210
Austin, TX 78731

For
City of Pearland
and
Freese and Nichols, Inc.

Under
Texas Antiquities Permit 7666

Cox | McLain Environmental Consulting
Archeological Report 129
(CMEC-AR-129)

DRAFT REPORT ACCEPTABLE	
by _____	
for Mark Wolfe	
Executive Director, THC	
Date _____	9-15-16
Track# _____	



COX | McLAIN
Environmental Consulting

September 9, 2016

From: [Sue Reilly](#)
To: [Andrew Leske](#)
Subject: RE: McHard Road Extension CSJ 0912-31-290
Date: Friday, July 29, 2016 3:14:07 PM
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)

Andrew,

Thank you for submitting the following project for early coordination: McHard Road new location road from Cullen to Mykawa (CSJ 0912-31-290). TPWD appreciates TxDOT's commitment to implement the practices listed in the Biological Evaluation Form submitted on 5/13/2016 and in subsequent communications (below). Based on a review of the documentation, the avoidance and mitigation efforts described, and provided that project plans do not change, TPWD considers coordination to be complete. However, please note it is the responsibility of the project proponent to comply with all federal, state, and local laws that protect plants, fish, and wildlife.

Thank you,

Sue Reilly
Transportation Assessment Liaison
TPWD Wildlife Division
512-389-8021

From: Andrew Leske [mailto:Andrew.Leske@txdot.gov]
Sent: Friday, July 29, 2016 11:29 AM
To: Sue Reilly
Subject: RE: McHard Road Extension CSJ 0912-31-290

Good Morning Ms. Reilly,

Responses to TPWD comments regarding the McHard Road Expansion Project are in Red.

1. Detention ponds. Regarding the wetlands, has there been a functional assessment to determine that they are low quality? Dry detention ponds are inferior to wetlands in their ability to remove pollutants, provide wildlife habitat, and maintain plant diversity. Former rice fields provide significant flood detention benefits on the coast, as did the wetlands that preceded them in that location. The Houston area continues to flood in part because constructed detention basins do not replace the function of the wetlands that they replace on the landscape. Avoiding wetlands is the ideal, as codified in Section 404 of the Clean Water Act. TPWD also is concerned the proximity of the avoided wetlands to the detention basin may result in a change in hydrology due to lateral movement of water through the soil to the lower level of the basin, therefore depriving adjacent wetlands of hydrology. While the proposed detention basin may provide attenuation of stormwater runoff and filtering of

sediments, the existing wetlands provide a consistent habitat resource for wildlife species that will not be provided by the detention basin. I recommend considering all wetlands jurisdictional in TxDOT's delineation of wetlands for this project, and mitigating for any wetlands that are converted to detention basins.

A functional assessment is being performed (as required) for mitigation purposes, to ensure that functional capacities are appropriately mitigated. The detention ponds would be designed to have greater flood storage capacity than the wetlands that they are impacting by having a larger surface area and greater depth. The capacity of the detention ponds is based upon hydrological studies. To compensate for impacted wetlands, the City proposes to purchase credits in a nearby mitigation bank. The ratio of these credits to impacted wetlands has yet to be determined but will likely be no less than a 1:1 ratio or will be based on functional capacity replacement. In order to purchase these credits, the impacted wetlands will be evaluated using an evaluation methodology based on the requirements of the mitigation bank and the USACE. These wetlands will be of higher quality than the impacted wetlands. The City will coordinate with the USACE to determine the jurisdictional status of the wetlands. The USACE will have final say over the jurisdictional status of any impacted wetlands. All proposed actions regarding wetland and floodplain impacts and mitigation would fully comply with all applicable regulations.

2. EMST. Tallow trees, while invasive and widely despised, do provide habitat functions. They certainly provide more valuable habitat than pavement, which is the major component of the urban habitat type. If areas are infested with tallow trees they should be designated as "Native Invasive" or similar, not urban. Former rice fields provide valuable wildlife habitat and ecosystem services such as flood abatement and aquifer recharge. Again, they are a different habitat type than paved urban areas.

We have reviewed the general definitions of various cover types within the EMST and "Urban – Low Intensity" best describes most of the project ROW; however, there are a few tracts that are best categorized as "Non-Native Invasive – Chinese Tallow Forest, Woodland, and Shrubland" and we have edited the figures and BEF accordingly. The acreage of this cover type was reduced from 34.42 to 28.91 acres while the "Native Invasive" and "Non-native Invasive" increased from 24.56 acres to 29.69 acres.

3. SGCN plant species. There are plant species listed in the BEF as potentially impacted. Where habitat exists for SGCN plant species, I request that TxDOT perform surveys for them. This is a new location road going through habitat for those species.

The City of Pearland's construction manager will coordinate with the construction contractor and engineering design and environmental team to perform surveys prior to construction and to assist the contractor's staff in recognizing SGCN species with potential habitat in the project area.

4. Timber rattler. Please confirm that you can include the species BMP for the Timber rattler. *We will include the species BMP for the Timber rattler as well as other required species.*

Please let me know if you have any questions

Many Thanks

Andrew Leske

Environmental Specialist
TxDOT – Houston District
(713) 802-5885
Andrew.Leske@TxDOT.gov

From: Sue Reilly [<mailto:Sue.Reilly@tpwd.texas.gov>]
Sent: Wednesday, July 06, 2016 12:03 PM
To: Andrew Leske
Cc: Colleen Roco; Mark Fisher
Subject: RE: McHard Road Extension CSJ 0912-31-290

Andrew,

Here are my thoughts on the attached responses from TxDOT. I think there is some misunderstanding of the function of undeveloped land in this area, and its function for flood control, wildlife habitat, and plant habitat. These areas may appear as just previously disturbed farmland and neglected areas, but in fact their functions are quite important in the coastal plain. While the ideal is to have undisturbed coastal prairie, these previously disturbed areas provide numerous services for wildlife, water quality, and plant diversity. They recharge aquifers, provide flood control, attenuate pollutants and sediment, and provide significant habitat for wildlife. While they may appear poor quality, their functions are badly needed on the landscape.

1. Detention ponds. Regarding the wetlands, has there been a functional assessment to determine that they are low quality? Dry detention ponds are inferior to wetlands in their ability to remove pollutants, provide wildlife habitat, and maintain plant diversity. Former rice fields provide significant flood detention benefits on the coast, as did the wetlands that preceded them in that location. The Houston area continues to flood in part because constructed detention basins do not replace the function of the wetlands that they replace on the landscape. Avoiding wetlands is the ideal, as codified in Section 404 of the Clean Water Act. TPWD also is concerned the proximity of the avoided wetlands to the detention basin may result in a change in hydrology due to lateral movement of water through the soil to the lower level of the basin, therefore depriving adjacent wetlands of hydrology. While the proposed detention basin may provide attenuation of stormwater runoff and filtering of sediments, the existing wetlands provide a consistent habitat resource for wildlife species that will not be provided by the detention basin. I recommend considering all wetlands jurisdictional in TxDOT's delineation of wetlands for this project, and mitigating for any wetlands that are converted to detention basins.
2. EMSI. Tallow trees, while invasive and widely despised, do provide habitat functions. They certainly provide more valuable habitat than pavement, which is the major component of the urban habitat type. If areas are infested with tallow trees they should be designated as "Native Invasive" or similar, not urban. Former rice fields provide valuable wildlife habitat and ecosystem services such as flood abatement and aquifer recharge. Again, they are a different habitat type than paved urban areas.

3. SGCN plant species. There are plant species listed in the BEF as potentially impacted. Where habitat exists for SGCN plant species, I request that TxDOT perform surveys for them. This is a new location road going through habitat for those species.
4. Timber rattler. Please confirm that you can include the species BMP for the Timber rattler.

Thank you,

Sue Reilly
Transportation Assessment Liaison
TPWD Wildlife Division
512-389-8021

From: Andrew Leske [<mailto:Andrew.Leske@txdot.gov>]
Sent: Friday, June 10, 2016 3:08 PM
To: Sue Reilly
Subject: RE: McHard Road Extension CSJ 0912-31-290

Good Afternoon Ms. Reilly,

Attached are responses to your comments.

The water technical report should be in ECOS now. I do not have anything for the biology chapter of the EA yet.

Please let me know if you have any questions or if you need any additional information.

Have a great weekend!

Many Thanks

*Andrew Leske
Environmental Specialist
TxDOT – Houston District
(713) 802-5885
Andrew.Leske@TxDOT.gov*

From: Sue Reilly [<mailto:Sue.Reilly@tpwd.texas.gov>]
Sent: Friday, June 03, 2016 4:39 PM
To: Andrew Leske
Subject: FW: McHard Road Extension CSJ 0912-31-290

Andrew,

Here are my comments on the BEF and materials for McHard Road extension, a new location road in

Pearland, TX. Do you have a Biology or Water chapter for the EA yet?

There are reptile BMPs listed for the Timber Rattler. Please be sure to include the species BMPs for the snake, which include contractor notification.

It appears that detention ponds will be situated in wetlands. Detention ponds should be situated in uplands, to avoid impacting existing flood detention that is functioning well in the area. The project would be removing detention to create detention, and not making a net benefit. This is particularly important in Pearland, which floods frequently, and where the addition of impervious cover should be accompanied by generous detention. If it is not possible to avoid wetlands, I suggest the addition of retention ponds with wetland borders. These will not mitigate for the natural wetlands entirely, but will provide water quality, detention, and habitat functions as well as being aesthetically pleasing and possibly provide a recreation opportunity.

The EMST revision errs generously on the side of urban habitat type. I think this misrepresents what is on the ground in the area and underestimates impacts. I recommend that the EMST be re-evaluated.

There are several plant species that the project may impact, as noted in Table 1 that you included with the package. I recommend that a plant survey (or surveys) be performed during appropriate seasons to detect those species. If feasible, prior to construction, cultivars of the plants could be removed from harm's way or at the least, populations could be documented in TXNDD.

Thank you,

Sue Reilly
Transportation Assessment Liaison
TPWD Wildlife Division
512-389-8021

From: WHAB_TxDOT
Sent: Friday, May 13, 2016 9:01 AM
To: Andrew Leske; WHAB_TxDOT
Cc: Sue Reilly
Subject: RE: McHard Road Extension CSJ 0912-31-290

Good morning,

The TPWD Wildlife Habitat Assessment Program has received your request for Early Coordination and has assigned it project ID #36587. The Habitat Assessment Biologist who will complete your project review is copied on this email.

*Thank you,
Gloria Garza
Administrative Assistant
Texas Parks and Wildlife Dept
Wildlife Division - [Habitat Assessment Program](#)
4200 Smith School Rd
Austin, TX 78744*

*Office: (512) 389-4571
Fax: (512) 389-4599*

gloria.garza@tpwd.texas.gov

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From: Andrew Leske [<mailto:Andrew.Leske@txdot.gov>]
Sent: Friday, May 13, 2016 8:21 AM
To: WHAB_TxDOT <WHAB_TxDOT@tpwd.texas.gov>
Subject: McHard Road Extension CSJ 0912-31-290

Good Moring,

Submittal for Early Coordination for Subject Project

McHard Road Extension; From Cullen Boulevard to Mykawa Road, in Brazoria County.

TxDOT CSJ 0912-31-290

Project includes the construction of a divided 4-lane roadway, with storm sewers/curb and gutter, on new location.

Attachments include;

1. Biological Evaluation Form with all applicable exhibits; Aerial Map, State/Federal Threatened/Endangered Species List, NDD map, EMST map and excel table, IPAC, site photos, and all applicable BMPs

If you have any questions, need further clarification, or need any additional information/exhibits, please let me know.

Many Thanks

Andrew Leske
Environmental Specialist
TxDOT – Houston District
(713) 802-5885
Andrew.Leske@TxDOT.gov



April 22, 2016

RE: CSJ: 0912-31-290; McHard Road, New-Location Extension, Section 106 Consultation;
Brazoria County, Houston District

To: Representatives of Federally-recognized Tribes with Interest in this Project Area

The above referenced transportation project is being considered for construction by the Federal Highway Administration (FHWA) and the Texas Department of Transportation (TxDOT). Environmental studies are in the process of being conducted for this project. The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT.

The purpose of this letter is to contact you in order to consult with your Tribe pursuant to stipulations of the Programmatic Agreement among the Federal Highway Administration, the Texas Department of Transportation, the Texas State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Implementation of Transportation Undertakings (PA-TU). The project is located in an area that is of interest to your Tribe.

Undertaking Description

TxDOT's Houston District is proposing to construct a new-location extension of McHard Road in the City of Pearland, Brazoria County, Texas (Exhibit A).

The proposed facility would extend McHard Road, which presently exists as a discontinuous roadway, between Mykawa Road and Cullen Boulevard. The proposed road would be a four-lane major thoroughfare with intersections at Cullen Boulevard, Max Road, Roy Road, Garden Road, O'Day Road, Hatfield Road, and Mykawa Road. Associated proposed drainage improvements include roadside ditches, a median storm sewer, and three stormwater detention ponds (Exhibit B). A cumulative 59 acres of new right-of-way (ROW) would be required for roadway construction and detention ponds. No new easements are anticipated.

Area of Potential Effects

The project's area of potential effects (APE) comprises the following area.

- The project limits extend from Mykawa Road to Cullen Boulevard, connecting discontinuous sections of McHard Road on either end. Thus the total project length is about 3.4 miles.
- The project width is typically about 120 feet.
- The existing ROW comprises an area estimated at 16.4 acres.

Re: Section 106 Consultation, National Historic Preservation Act;
Proposed Texas Department of Transportation Project
CSJ: 0912-31-290; McHard Road from Mykawa Rd. to Cullen Blvd., Extension, Brazoria County

- New ROW for roadway construction amounts to about 45.98 acres in a corridor between Mykawa Road and Cullen Boulevard; an additional 13.06 acres would be required for three retention ponds (3.68, 2.14, and 7.24 acres, respectively) distributed along the proposed APE (Exhibit B).
- Estimated depths of impact for roadway construction are typically within two feet; while the depth of the detention ponds is yet to be determined, they are presumed to be up to 10 feet in depth.
- For the purposes of this cultural resources review, the APE also includes an additional 50-foot area around the previously-described horizontal dimensions to account for potential alterations to the proposed APE included in the final project design. Consultation would be continued if potential impacts extend beyond this additional area, based on the final design.

Identification Efforts

For this project, TxDOT has conducted a desktop-based study of available background information, which indicates that further field investigation is warranted.

- The project is a largely new-location roadway spanning undeveloped land.
- The APE occurs in a setting with the potential to bury and preserve archeological materials.
- The APE occurs in a setting favorable for occupation.

Findings and Recommendations

Based on the above, TxDOT proposes the following findings and recommendations

- while archeological sites occur rarely even under favorable circumstances for their presence and preservation, field investigation of the APE to identify potential archeological historic properties (36 CFR 800.16(l)) is warranted to verify that archeological historic properties do not occur within the APE;
- that a zone of 50 feet beyond the horizontal project limits be considered as part of the cultural resources evaluation; and
- if any future changes to the project APE extend beyond the additional 50-foot zone or if archeological deposits are discovered, your Tribe would then be contacted for further consultation.

According to our procedures and agreements currently in place regarding consultation under Section 106 of the National Historic Preservation Act, we are writing to request your comments on historic properties of cultural or religious significance to your Tribe that may be affected by the proposed project APE and the area within the above defined buffer. Any comments you may have on the TxDOT findings and recommendations should also be provided. Please provide your comments within 30 days of receipt of this letter. Any comments provided after that time will be addressed to the fullest extent possible. If you do not object that the proposed findings and recommendations are appropriate, please sign below to indicate your concurrence. In the event that further work discloses the presence of archeological deposits, we will contact your Tribe to continue consultation.

Re: Section 106 Consultation, National Historic Preservation Act;
Proposed Texas Department of Transportation Project
CSJ: 0912-31-290; McHard Road from Mykawa Rd. to Cullen Blvd., Extension, Brazoria County

Thank you for your attention to this matter. If you have questions, please contact Kevin Hanselka (TxDOT Archeologist) at 512/416-2639 (email: Kevin.Hanselka@txdot.gov) or Chantal McKenzie at 512/416-2770 (email: Chantal.McKenzie@txdot.gov). When replying to this correspondence by US Mail, please ensure that the envelope address includes reference to the Archeological Studies Branch, Environmental Affairs Division.

Sincerely,



Scott Pletka, Supervisor
Archeological Studies Branch
Environmental Affairs Division



Concurrence by:



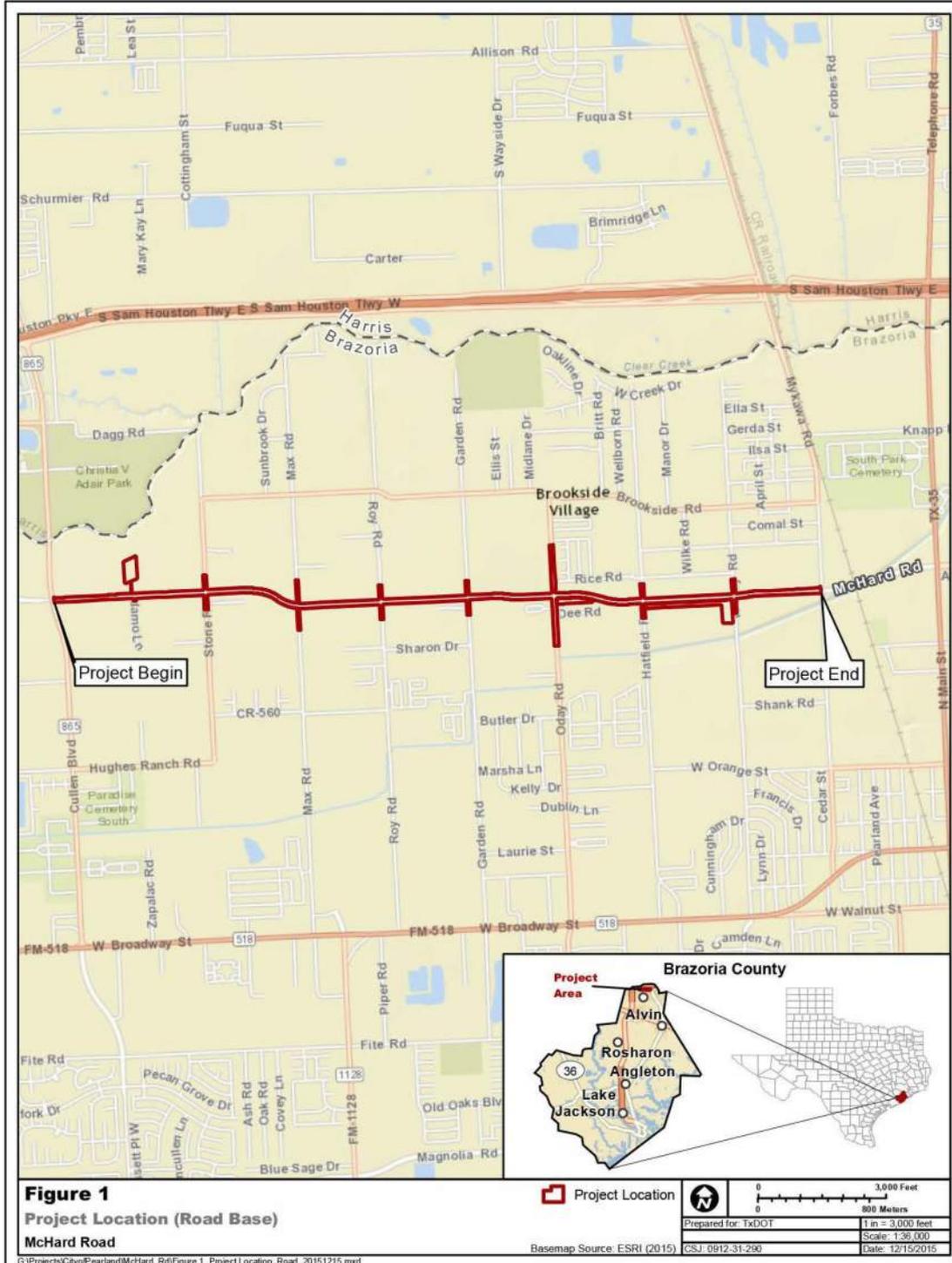
Date:

Attachments

cc w/attachments: ENV-ARCH ECOS

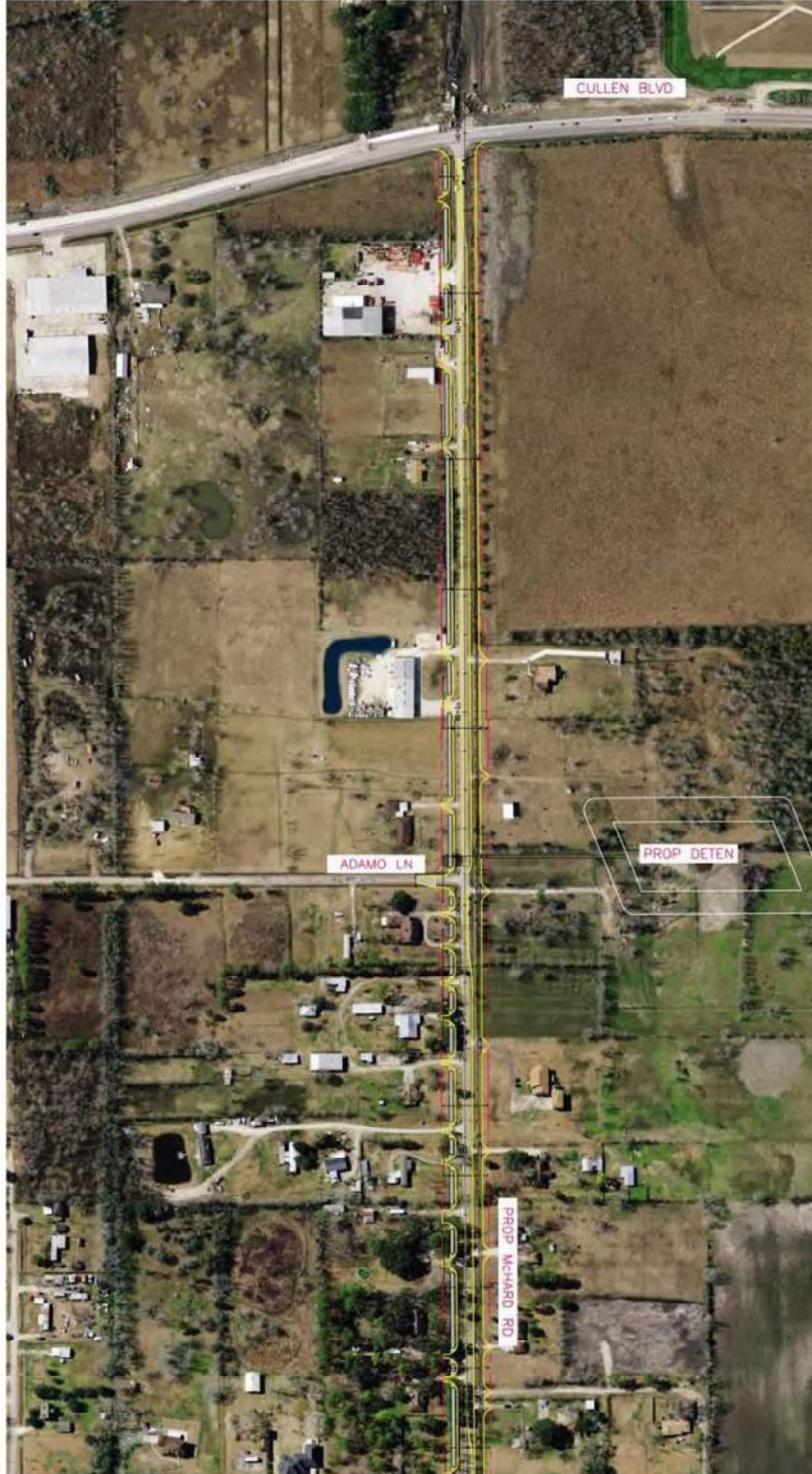
Re: Section 106 Consultation, National Historic Preservation Act;
 Proposed Texas Department of Transportation Project
 CSJ: 0912-31-290; McHard Road from Mykawa Rd. to Cullen Blvd., Extension, Brazoria County

Exhibit A. Project area and location within Brazoria County.



Re: Section 106 Consultation, National Historic Preservation Act;
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CSJ: 0912-31-290; McHard Road from Mykawa Rd. to Cullen Blvd., Extension, Brazoria County

Exhibit B. Project plan.



Re: Section 106 Consultation, National Historic Preservation Act;
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Appendix H

Comment and Response Matrix from Public Meeting

Section 2						
Public Meeting Comment and Response Report						
#	Name, Representing	How did you hear about this meeting?	Do you support the prop project?	If yes, which alignment do you prefer?	Comment	Pearland / TxDOT Response
1	Aaron Bowen	Other	Yes	1	#1 proposal project has less home development	Your comment is noted.
2	Alicia Salinas			1	PLEASE...VOTING FOR PROJECT 1.	Your support and vote is noted
3	Allan Patished	Other	Yes	1		Your support and vote is noted
4	Amber Carlson	Other	No	1		Your opposition is noted
5	Augusto Preza			1	Concerning the McHard Road Extension (Cullen Blvd to Mykawa Rd) I prefer Alignment 1. I am interested in the project from the standpoint of a residential property owner at 7128 Robin Sound St, Pearland TX 77581. Alignment 2 would cause an increase of noise and traffic on my currently quiet, calm street. Alignment 2 is also the more expensive of the two options, which makes myself and my neighbors wonder why it is even an option! Please mark my name down as supporting Alignment 1 of the proposed extension.	Your support and vote is noted. As part of Environmental Assessment process, 2 alternative routes are required to be studied and presented for feedback.
6	Bailey	Newspaper		1	Have lived in Pearland over 5 years and we both are 90 years old and really don't want noisy and busy road as our back yard. We already have pipeline next-door to us.	Noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input.
7	Brandon Sparks	Newspaper	Yes	1		Your support and vote is noted
8	Carolyn Allison	Notice in the Mail	Yes	1	I do NOT want Alignment #2	Your support and vote is noted.
9	Dale A Pistill	Other	Yes	1	No need to cut threw backyards use existing street but widen. Do not buy more land that is now my backyard.	City's Thoroughfare Plan calls for McHard Road Extension be a 4-lane divided corridor. This will not fit in existing 60' ROW and majority of alignment does not have any ROW.
10	Dennis Closston	Notice in the Mail	Yes	1	Less impact and cheaper cost	Your comment is noted.

11	Dennis Gautney	Newspaper	Yes	1		Your support and vote is noted
12	Donald & Linda Shake	Other	Undecided	1	We do not want this road in our backyard	This corridor has been on City's Thoroughfare Plan for a long time. This extension will complete McHard Road from Pearland Parkway to SH 288 and improves mobility.
13	Donald J Bryce	Other	Yes	1		Your support is noted.
14	Elizabeth Owens				Orange Rd. would be a more viable option than the current thinking.	The current Orange Street does not line up with McHard Road segments to east of SH 35 and west of Cullen. The presented options are only viable options to connect the 2 segments.
15	Harold Briggs	Notice in the Mail	Yes	1		Your support is noted
16	Henry	Other		1	I have lived in Pearland since 1957. I wished it would of stayed country but I know it will continue growing. The growth has pushed a lot of people out that has lived here a long time. I hate the traffic and the old parts of Pearland are being neglected. The roads are "terrible" and I don't want this road in my backyard!!! Already dealing with the pipeline next-door to me!!	This corridor has been on City's Thoroughfare Plan for a long time. This extension will complete McHard Road from Pearland Parkway to SH 288 and improves mobility.
17	Hugo Crespo	Other	Yes	1	I prefer alignment 1 "Reason being" it crosses vacant lot from O 'Day Rd to Garden Rd. Otherwise alignment 2 will need to evacuate family oriented homes.	Alignment 1 crosses more vacant properties.
18	Ivan Figueroa			1	As an HOA member for the Spring Meadow subdivision (Pearland, Texas) I would like to see the new McHard Road extension run on the Alternative 1 path.	Your support and vote is noted.
19	Jamie Castille	Newspaper	Yes	Undecided	I would like to see the hike and bike trail extend to both sides of the roadway completing a full circle of 7 mi. I would like to see covered rest areas with benches water fountains and a parking area on both sides of the trail to allow residents use of the trail.	The hike and bike path presented are within the limits of this TxDOT-funded project. Extension of this trail and other amenities are beyond scope of this project.
20	Janiece S. Gautney	Other	Yes	1		Your support and vote is noted.

21	Jeff Potts			1	<p>My name is Jeff Potts, and I am the owner of the 4.85 acres at 1801 Adamo Lane, Pearland, Texas 77581. My property would be directly affected by the McHard Road expansion, Alternative Alignment #2. I am currently building a house, two garages, pool and a barn on that property, relying on the prior planning statements by the City of Pearland that the McHard Road expansion would go along McHard I Brookside, Alternative Alignment # 1. The new and unexpected Alignment # 2 would run right through my house and north garage.</p> <p>1. The City has for years said the expansion plan was Alternative Alignment # 1, never mentioning Alternative Alignment # 2.</p> <p>Up until Monday, March 16, 2015, all of the information that I received from the City of Pearland and reviewed was that the McHard Road expansion would follow Alternative Alignment # 1. There was never any mention or suggestion that an alternative was being considered to run the expansion south of Brookside, through the property that I now own.</p>	<p>1. As part of Environmental Assessment process, 2 alternative routes are required to be studied and presented to public for feedback. From the public feedback and evaluation, Alignment 1 is now the preferred choice and there will be no impact to properties along alignment #2.</p>
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					<p>I have been in the process of building the home (more than 50% complete) and garages (essentially complete), pool (planning I contract stage) and bam (planning I contract stage) for many months. I have had a number of communications with the City of Pearland regarding permitting and also the road and drainage for the property. At these meeting, much was discussed as to the timing of improvements to Adamo Lane and the expansion that would occur along Brookside. At none of these meetings was an alternative expansion mentioned. To the contrary, the City officials always confirmed that the expansion would occur along Brookside.</p> <p>2. The City has given inadequate notice of Alternative Alignment# 2.</p> <p>I was never notified by the City of Alternative Alignment #2. Instead, I learned from a neighbor on Adamo Lane on March 16, 2015. I am sure that many other people potentially affected by Alternative # 2 are in my same position. When I called the city and asked why I had gotten no notice, I was told</p>	<p>2. In coordination with TxDOT, notice of Public Meeting was published in newspaper, placed on City website, mailed with Utility Billings, and mailed to affected property owners from data received from Brazoria County Appraisal District. We apologize if as property owner you did not receive the mail out. However, feedback is appreciated.</p>
					<p>Alignment # 1 also provides a more direct and therefore less costly thoroughfare, takes advantage of existing roads, does less to subdivide properties, and appears to impact fewer people and properties. Alternative Alignment# 2, to the contrary, does not take into account the new development that has occurred and is occurring in that area, most notably that Alternative Alignment # 2 would go directly through the north side of my house and one of my garages, as well as wiping out all residents (2 slab or pier homes and 5 trailers) on the north side of Seddon Road, a higher density road than Brookside. It also probably would affect the new housing on Stone and Max roads, which do not appear to have been taken into account on the outdated satellite survey.</p>	<p>3. Based on Public Meeting feedback and votes, Alignment 1 is the preferred choice therefore there is not need to study or develop the Alignment 2 route.</p>
22	Jeni Jenkerson	Other	Yes	1		Your support and vote is noted.
23	Jessica Maldonado	Other	Yes	1		Your suport and vote is noted.

24	Jimmy Plank					Your support and vote is noted.
25	John Dejesus	Other	Yes	1		Your support and vote is noted
26	John McDonald		Yes	1		Your support and vote is noted.
27	John S Hallmack Jr.	Other	Yes	1		Your support and vote is noted.
28	John S. Hallmark III	Other	Yes	1		Your support and vote is noted.
29	Jonathan Bursnall	Other	Yes	1	Alignment 1 has been on the books for years. People have made plans based on it. I think #1 will be cheaper because it is more direct. In new location (#2) it will be closer to planned expansion of Hughes Roads. Roads should be more spread out. Several intersections on #2 look crowded. Noise near my house is a concern for #2, and traffic.	Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. Alignment 1 has been on City Thoroughfare Plan for number of years.
30	Karen Bryce		Yes	1		Your support and vote is noted.
31	Kayla Hallmark	Other	Yes	1		Your support and vote is noted
32	Linda Hall		Yes	1		Your support and vote is noted.
33	Lisa & Larry Patrick	Other	Yes	1	Alternate alignment #2 puts an undue burden on Robin Cove and will have an extreme negative impact on property values.	Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice and therefore, there will be no negative impacts on Robin Cove which could have possibly come from Alignment 2.
34	Lynda Sparks	Other	Yes	1	#1 project has less home developments	Your comment and vote is noted.
35	Marvin Ashton	Other	Yes	1	Alignment 1 = no home; alignment 2 = has several homes	Your vote is noted. Alignment 1 has the potential to impact 11 homes. Alignment 2 has the potential to impact 16 homes.

36	Maria Alicia Salinas	Notice in the Mail	Yes	1	I am very upset on this project 2, it affects my home of at least 25 years, looking at the map it seems that proposed I would be least expensive and a lot of homes will not be affected we are in the middle of building another home on 1806 O 'Day and were not told about this proposal 2, if the city knew about this why would they issue us a building permit. I only knew about a meeting that was held on March 24th.	Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. Building permits were issued based on the alignment that was on City's Major Thoroughfare Plan which is Alignment 1. As part of Environmental Assessment process, 2 alternative routes are required to be studied and presented for feedback.
37	Mario Cantu		Yes	1		Your support and vote is noted.
38	Mary Ann Clogston	Notice in the Mail	Yes	1	Less impact and cheaper cost	Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
39	Mary Hinson	Water Bill Insert	Yes	Either	I am concerned about the coyotes, bobcats, and birds that make their home in the wooded area across from my home. Also, I understand that these meetings are required, but I came away thinking that it will be another ten years before anything happens. Jennifer Lee was explaining as best she could and the TxDOT lady from Austin was very nice and helpful. I feel like I will be on an island at the end of Woody Road.	An Environmental Assessment will be conducted and impacts to different species will be looked at. Project schedule was presented in the meeting. Proposed bid date is 3rd quarter 2017 and then 24 months of construction.
40	Michelle Armour	Other	Yes	1		Your support and vote is noted.
41	Mike Knuckey	Notice in the Mail	Yes	1	If route #2 is used my area will suffer from increased traffic, increased noise. It will also negatively effect my property values. Please stay with the original plan of using Route #1. I purchased this home primarily due to the quietness of this area.	Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
42	Mike Maddux					Your support and vote is noted.
43	Milton O Gautney Jr.		Yes	1		Your support and vote is noted.
44	Pam McDonald		Yes	1		Your support and vote is noted.

45	Remigo & Maria Chapa	Other	Yes	1	<p>First of all we would like to inform you that we were not aware of the public meeting that was held on March 24, 2015. We were not notified by mail or any other source. Our neighbor notified us after the fact but did provide us with this comment form and a website where we could obtain more information on this project.</p> <p>My husband and I support the proposed project and would prefer alignment #1. It appears that this route is a more direct route and would be a straight continuation from Cullen to Stone Rd. We believe that less residential property owners who have established homes would be affected with alignment #1, We also believe that property owners that do not have a home built on the property and just have land should be considered first for this project.</p>	In coordination with TxDOT, notice of Public Meeting was published in newspaper, placed on City website, mailed with Utility Billings, and mailed to affected property owners from data received from Brazoria County Appraisal District. We apologize if as property owner you did not receive the mail out. However, feedback is appreciated. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
46	Richard Meyers	Notice in the Mail	Undecided	1	Alignment 2 does not make sense to route it so far south.	Your vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
47	Robbert Ortiz	Other	Yes	1		Your support and vote is noted.
48	Roberto & Fabiola Serrano		Yes	1		Your support and vote is noted.
49	Santiago Solis	Notice in the Mail	Yes	1	We do not support the project route #2 that affects Robin Cove.	Your vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
50	Sharon Tessena-Anthony					NA
51	Stephen Clark	Other	Yes	1	Recently purchased home and was not aware of alternate 2. This proposal is very close to my new home and I believe it would devalue the property, create undue traffic and congestion at the entrance to the subdivision and my home.	Your vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.

52	Steve Rudenko				<p>I am emailing to express my concern regarding the proposed McHard Road routes in Pearland, TX.</p> <p>We are located at the Spring Meadow subdivision at Rice and O 'Day and are strongly against the Alternative Route #1 which runs right behind the retention pond in our subdivision and houses located on Rice Rd. We prefer route #2 a lot more which puts the road farther south and away from our neighborhood.</p> <p>Please consider going with Alternative Route #2 vs #1</p>	<p>Your vote is noted. Based on Public Meeting feedback and assessment of 2 alignments, Alignment 1 is the preferred choice. Alignment 1 has been on City's Thoroughfare Plan for number of years. As provided in Public Meeting information, project will provide better mobility, increased connectivity, expand evaluation route options, reduce traffic on FM 518, and improves EMS response time.</p>
53	Steven Wherry	Notice in the Mail	Yes	1	<p>I primarily support alignment 1 cause of its location. Alignment 2 would increase street noise, lower property value, increase chances of crime, delay the improvement of Brookside road near Cullen Blvd and eliminate the house at the end of our street. Please keep Robin Lane a quite and peaceful neighborhood.</p> <p>P.s. Is there any plans for city utilities? I would like more information on city water/sewer hook ups if that is possible in the near future.</p>	<p>Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. This project does not include utility installation. Under separate, non-TxDOT project, City will install water and sanitary sewer lines in the McHard Road corridor per their Capital Improvement Plan schedule.</p>
54	Summer Burshall	Other	No	1	<p>If the project is approved, I only support the original alignment #1. The new second proposed alignment would run too close to the back of our home. So close that a concrete sound barrier would need to be installed just outside my kitchen window. The Alt route #2 would also cause traffic problems in my neighborhood. the proposed traffic light location would make it difficult to enter/exit the new road from the ONLY entrance to my neighborhood & home. Keep it alt #1!</p>	<p>The project has received approval. The Public Meeting was held to provide feedback and evaluation of the two proposed alignments. This allows the project to proceed to design and eventual construction. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.</p>
55	Tommy Coler	Notice in the Mail	Yes	1		<p>Your support and vote is noted.</p>
56	Victor Gonzales	Other	Yes	1		<p>Your support and vote is noted.</p>
57	Virginia		Yes	1		<p>Your support and vote is noted.</p>
58	Wendy Isaacks	Other	Yes	1		<p>Your support and vote is noted.</p>

59	Stanley Bradley	Other	Yes	1	Much prefer rt. 1 original route	Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
60	Tom and Angie Nguyen	Notice in the Mail	Yes	1	If alignment #1 is selected we would like the City to take care the drainage that run throughout my property for many years, also we would appreciate if the City will erect the sound wall to keep traffic noise to my home. Thank you. Note: Existing drainage channel along alignment	Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. McHard Road Corridor drainage will be studied as part of the design of the roadway. Noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input.
61	JW Spitz	Notice in the Mail	Yes	1	This route will effect less wetland area's if will effect fewer home owners, it will cost less to tax payers because even as 80% - 20% - the 20% will be more. As far as the number of commercial businesses we have enough in this area north of 518. By keeping this area a medium density housing area the City will benefit much more in tax revenue.	Your vote and comment are noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
62	Mihn Thivo		Yes	1	Good	Your support and vote is noted
63	Caharles Buck Stevens, I am an elected official, Constable	Other	Yes	1	Nothing North of McHard going to BW8	Your support and vote is noted
64	Ly Thu			1	Good	Your vote is noted.
65	Paul Humphrey	Other	Yes	1		Your support and vote is noted.

66	William Alexander	Other	Yes	1	No zoning officials were here to discuss what nasty commercial strip centers and leaky gas stations will be installed.	Public Meeting was held to receive feedback on the alternative route alignments for the McHard Road Corridor project . Pearland has zoning and unless variance is granted, the developments will occur in compliance with the zoning ordinance and designated Land Use type.
67	David P. Reyna	Water Bill Insert	Yes	1	Flooding issues with gully because it's the primary drain for property	McHard Road Corridor drainage will be studied as part of the design of the roadway. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. Property appraisal will be conducted later for the properties that will be impacted. The appraisal will define and measure the extent of the impact on the property and will help determine the compensation value. If total relocation of residence is required, a program is available that will work with owners to find equitable relocation site.
68	No Name - Stone Road	Notice in the Mail	Yes	1	I am a resident who will be displaced by alignment #1. I understand the need to move traffic and feel alignment 1 the best most cost effective, least damaging to other commercial/residential properties. Sadly I say NO to alignment #2.	Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
69	Chuck Valore	Notice in the Mail	Yes	1	I would like to know why the owner of the north east corner of Brookside Dr and Cullen will not lose any property like the rest of us. Deep pockets or do they know someone at TxDOT or Pearland?	The proposed right-of-way (ROW) extends approx. 20' north of existing 60' ROW, then there is a 50' pipeline easement, forcing the rest of ROW to be taken from the south and allows the road to line with McHard west of Cullen.

70	John & Karen Pate	Other	Yes	1	Do not want any extra land zoned commercial near O 'Day & McHard!!! We would like to minimize the number of homeowners who are displaced. However, we also think there should be sound barriers along the backs of the houses on Rice Road.	Project by itself does not change current zoning of lands. Unless a variance for different land use is petitioned and approved by Council, the properties will develop according to current land use. The intent of the project is to minimize displacements as much as possible. Noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input.
71	Paul Stapleton	Notice in the Mail	Yes	1	On Alignment #2 where it hits Max Road the property on the west side (14AL) is owned by Pearland ISD. It is set aside for a future elementary school or junior high.	Your vote and support is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. Therefore there will be no impact to this tract of land.
72	Beatrice R. Jajsal	Notice in the Mail	Yes	1	I want a decent speed limit.	Your support and vote is noted. The Proposed roadway Design Speed is 40 mph. The posted speed will be determined after a Speed Study is conducted after opening of Road and/or as defined by Council.
73	Valerie Marvin	Other	Yes	1	Project will fill a gap and provide connectivity along a much needed east-west corridor, to alleviate traffic on 518 and provide general alternative route. Would like to see impact to property owners minimized as best possible.	Project will connect the east segment of McHard to west segment and adds another major east-west thoroughfare to City's roadway network. The intent of project is to minimize displacements as much as possible.
74	Robert Lira	Newspaper	Yes	1	Original plan, not the alternate Will remove traffic from Brookside Road.	Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.

75	Rion & Sharon Greene	Newspaper	Yes	1	Definitely in favor of the expansion, the growth in the area has made the upgrade necessary. My only comment is hoping it would start sooner. But it appears its completion will be around the same time as the toll road on 288. Pearland is growing!! Please keep providing the email updates & links, very helpful!	Your support and vote is noted.
76		Other	Yes	1	Prefer to not be in a flood zone. Possibility with option 2. Hoping for Option 1.	Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. Alignment will go through flood zone on eastern end but all impacts will be studied and mitigated.
77	Crystal Amos	Notice in the Mail	Yes	1	Need plan for Hughes Ranch Rd. due to single lane road and high risk for harm to like due to congestion, speed narrow road. It will be used as an alternate road during this project and will be in further disrepair.	Hughes Ranch Road is a separate project being undertaken by City. Since majority of McHard Road extension will be on new alignment, it does not appear it would have an impact on Hughes Ranch Road traffic.
78	Jeff Potts	Other	Yes	1	PS - A vote is crazy. Particularly considering many people on alternative #2 do not know about it.	Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. Alignment 2 was introduced as part of Environmental Assessment process for public feed feedback
79	Jimmy Plank	Other	Yes	1		Your support and vote is noted
80		Notice in the Mail	Yes	1	We are next to proposed project #1 and we'd like to be connected to the sewer line.	Under separate, non-TxDOT project, City will install water and sanitary sewer lines in the McHard Road corridor per their Capital Improvement Plan schedule.

81	Nellie Vazquez	Other	Yes	1	Hopefully this will put an end to the high traffic and speeders driving through Sharon Drive.	Your support and vote is noted. The project will provide a Thoroughfare Road for area traffic to use and would minimize/eliminate cut-through traffic on local roads.
82	Dave Habada	Other	Yes	1	Need dates!	Your support and vote is noted. The proposed project schedule was provided in one of the exhibits. Construction is proposed for 3rd quarter of 2017 with a 24-months construction time.
83	Jonathan D. Miller	Other	Yes	1	I have been a resident of Southdown Subdivision since 1995. In that time Pearland population has doubled if not tripled. Also in that time road improvement has been little to none. Hughes Ranch Road, Smith Ranch Road and Hawk Road are in terrible condition and need to be improved. The McHard road extension is needed to improve east-west traffic. Please allow this project to move forward as quick as possible. I will work for free to support this project. Thank you.	McHard Road extension will improve east-west traffic. City is currently working on providing funding for Hughes Ranch Road. Improvement to other Roads is noted.
84	David Lampton	Water Bill Insert	Yes	1	Can't start soon enough	Your support and vote is noted.
85	Thelmsa West	Notice in the Mail	Yes	1	Roadway alignment ONE seems more direct in regard to current and future traffic flow. In addition to roadwork progress already in progress and completed, along with careful study of info provided this #1 seems much less disruptive to traffic flow and least intrusive to residents along a scarcely populated route of travel - i.e. not a newly developed neighborhood w/high \$ income families who can afford displacement...We cannot. Would leave us homeless. Please NO to #2.	Noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input.

86	Shane West	Notice in the Mail	Yes	1	Moving traffic is essential. Align. #1 allows the most direct and least intrusive to residential or commercial property as well as moving traffic in a shorter straight line. Alignment Route 2 is the most invasive to residential property requiring total residential displacement vs encroachment on properties associated with alignment 1. NO TO ALIGNMENT 2!!!	Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
87	Trey Meyers	Notice in the Mail	Yes	1	Effectively moving traffic is essential. Route 1 is the most effective route to accomplish this. Route 2 IS NOT. Route/Alignment 2 is longer costlier and more destructive to residential areas. NO TO ALIGNMENT 2!!	Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
88	Brett Posey	Notice in the Mail	Yes	1	I would like to see where the detention ponds will be placed and be told how the drainage will be effected in the surrounding areas.	Detention pond sites will be part of the Drainage Study which will be conducted for the preferred Alignment (#1). The intent is to mitigate any and all impacts resulting from the development of this project.
89	Benito Valadez	Other	Yes	1	Alignment 2 goes through my residence.	Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. There will be no impact to residence.
90	Charlotte Gates	Notice in the Mail	Yes	1	Alternate 1 was designed in the 1990s and was drawn a "little" further north to avoid taking all of Brookside Rd's southern border and take the acreage at 1617 Stone to avoid the neighbors south of the fence row. We are all happy with that situation and are for using the old Freese & Nichols design. A wall would be requested for that border to protect those neighbors.	The McHard Road alignment was refined from the original route. It is not clear if the requested wall is for noise. If the reference is to a Noise Wall, a noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input.

91	George Flores	Notice in the Mail	Yes	2	Option 2 would have the least impact on our personal property and security. We feel that the alternate option 1 is too close to our property. That will make the peace and quiet of our neighborhood go away. Crime is more likely and easier to happen.	Your vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. McHard Road has been on City's Thoroughfare plan for number of years. It is a critical east-west corridor for traffic through the City. No data is available to respond to the crime comment. However, a thorough Environmental Assessment will be conducted for the corridor which the Public Meeting was one part of it.
92	Chris Satterwhite	Notice in the Mail	Yes	2	Option 2 has least impact on my personal property and security. The alternate option 1 will be too close to my property which make the peace and quiet gone. Will be accessible for crime.	Your vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. The Environmental Assessment will define and assess impacts to properties, directly or indirectly. No data is available to respond to the crime comment.
93	Perez	Notice in the Mail	Yes	2	I am on alignment 1. Property effected on side and front of property will be effected by ROW for extra turning lane. On the side it takes part of our property plus D.A. Fernandez store.	Your vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. Property appraisal which will be conducted later for the properties that will be impacted by the project. The appraisals will define and measure the extent of the impact to the property and will help determine the compensation value. If total relocation of residence is required, a program is available that will work with owners to find equitable relocation site.

94	Aaron & Sheryl Karolinski	Other	No	2	What purpose will this project serve? We don't see it relieving 518 traffic. Use Beltway 8 to move traffic going east & west to (McHard/Monroe).	Your opposition and vote is noted. With construction of this segment, McHard Road will become a fully connected major thoroughfare extending from Pearland Pkwy. to SH 288. This will relieve traffic on FM 518 by providing an alternative for local residents and for pass through traffic using this road. If such east-west roads like McHard, Magnolia, and Bailey are not constructed the FM 518 will be a gridlock during much of the day.
95	Steve Alsup	Other	Yes	2	Sound barriers (need) or Berms flood control during and after project, install telephone, water and sewer at the same time as road project, what about security during project for land owners and contractor? Will existing drain ditches be tied into the new system?	Your opposition and vote is noted. Noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input. Franchise utility companies will use the corridor to install their facility but not part of this project. Under a separate, non-TxDOT project, the City will install water and sanitary sewer lines in the McHard Road corridor per their Capital Improvement Plan schedule. The contractor will be required to put up fence along the new ROW during construction. Drainage ditches along existing roads will be maintained by placing culverts under the new McHard Road. If the project removes a parallel ditch in the ROW, it will be included in the McHard Storm sewer system. Based on

96	Kathleen Knuckey	Notice in the Mail		2	Noise from pipe yard already and now add traffic more pollution in the air will be a problem.	Your vote is noted. Noise along corridor will be studied as part of environmental assessment process. Because of new Road there will be more traffic in the corridor. Based on Public Meeting feedback, Alignment 1 is the preferred choice.
97	Mike Knuckey	Notice in the Mail		2	I strongly oppose alignment 1 as it displaces more people and creates a lot more noise for more people and more pollution.	Your vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
98	Mary Wagner	Notice in the Mail	Yes	2		Your support and vote is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
99	Susan Mathis	Notice in the Mail	Yes	2	I prefer alignment 2 because we moved to our Brookside Rd address in order to have a peaceful place for our horses. The road would be about 1/4 of our property making it dangerous for the animals. One horse has sight problems and would be frightened easily. We would have to move if we planned to keep our life style.	Based on Public Meeting feedback, Alignment 1 is the preferred choice. Any displacement of residents will follow the TxDOT procedures which includes finding a compatible home in the general area.
100	James D. & Susan E. Mathis, Jr	Notice in the Mail	Yes	2	Moved to Pearland, live on Brookside road since 1977 - looking for a quiet peaceful home - option 1 would force us to eventually move with the noise and danger - in the last 6 years cars have plowed our mailbox and drive through the front yard - the road would put them in the house. Please use option 2.	Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. If displacement of a resident is required it will follow the TxDOT procedures which includes finding a compatible home in general area.
101	Gerry Mills, Brookside Village Council	Other	Yes	2		Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.

102	Gina Alsup	Other	Yes	2	We propose sound barriers and berms. We would like reassurance that flooding will be prevented during and after construction. Install telephone lines (much needed) water and sewer concurrently with road. We would like to know what steps would be taken to help prevent crime during project (esp. if homes need to be vacated) (cameras, etc.) will existing drainage ditches be tied into the system?	Noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input. Environmental Assessment will study all aspects of direct and indirect impacts. A complete drainage impact analysis will be performed for the project to make sure all impacts are adequately mitigated. The project will have detention pond for mitigation. Franchise utility companies will use the corridor to install their facility but not as part of this project. Under a separate, non-TxDOT project, the City will install water and sanitary sewer lines in the McHard Road corridor per their Capital Improvement Plan schedule. Drainage ditches along existing roads will be maintained by placing culverts under
103		Notice in the Mail	Yes	2	I'd rather see the road designed for 45 mph rather than 40 mph. Considering the inconvenience of the construction project and residential impacts, this would make the project more worthwhile.	40 mph is the Design Speed due to certain radii along the corridor. A speed study will be conducted once the road is open to see what would be the max. speed allowed on the road. City will then choose what they would like the posted speed to be.
104	Annette Hill	Notice in the Mail	Yes	2		Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
105	Melissa Hill		Yes	2		Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
106	Mike Hill	Notice in the Mail	Yes	2		Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.

107	Encarnacion Aguilar	Notice in the Mail	Yes	2		Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
108	Brian Hill		Yes	2		Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
109	Ronald Edwin Wagner	Notice in the Mail	Yes	2		Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
110	Ronald Jason Wagner	Notice in the Mail	Yes	2		Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.
111	Jonathan Young	Other	Yes	2	Prefer the City to minimize impact on established residents.	The proposed alignments were determined to have the least overall impact to the community and the environment. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. All impacts will be studied as part of Environment Assessment.
112	Blake & Kristine Powitzky	Other	Undecided		Our primary concern is the proposed 288 toll ramp to Hughes Ranch Road. We feel McHard at 288 would be a more appropriate location for this project as its already developed for this type of infrastructure and zoned for commercial developments. As Hughes Ranch Road is primarily residential this would create hazards for children's safety and environment with the increase in traffic. For McHard road extension, we suggest a gravel trail in the median for jogging and walking.	McHard Road Extension limits does not go to 288 to consider such ramp. McHard Road is not expected to have a negative impact to Hughes Road. However, it could potentially take some through traffic off of Hughes Ranch Road.

113	Paul Hanson	Other	Undecided		Concerned about drainage issues, not enough so causing flooding. Policing and traffic control. Abuse of eminent domain. Loss of Ranch/farmland - financial impact to livelihood. Property valuation impact.	A complete drainage impact analysis will be preformed for the project to make sure all impacts are adequately mitigated. The project will have detention ponds for mitigation. The ROW acquisition will follow standard TxDOT procedures. All environmental impacts will be studied as part of the project including direct and indirect impacts. The project will improve connectivity and mobility of traffic in the corridor and should enhance property values.
114	Romo Casas	Notice in the Mail	Undecided		It seems there is a bigger road at 2234 and South Fork. Case in point: take the exit/entrance /overpass to those streets and simply improve Hughes Ranch to benefit all school children who walk and ride their bikes to and from Challenger elementary and Dawson High. Why make it busier than what it already is?? In addition you know if you invade Hughes our property values will plummet. This is not right.	The purpose of McHard Road extension is to address east-west connectivity from east end of Pearland to Cullen. The FM 2234 is to west of 288. Hughes Ranch Road is a project the City is considering improving by trying to secure funding for it. The Hughes Ranch project is not related to McHard Road.
115	Shirley Gates	Other	Undecided	1		Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice.

116		Did not get or receive notice in any form.	No	Neither	This was not really a meeting but a pretense of a meeting. As I mentioned this is not the proper format to have a "meeting" . There should have been a sit down format and the plans presented to everyone at the same time. Then we could continue with the format that you organized. Sound barriers are needed regardless of the plan.	The Public Meeting format follows the standard TxDOT initial meeting procedures as defined and executed for the Environmental Assessment approval. Additional meeting(s) might be warranted. Information about the project and exhibits were presented to the Public at the same time. Noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input.
117	Loretta Ann Brown	Notice in the Mail	No		Our only hope is to get sewer and water and a retainer wall after 16 years of paying City of Pearland taxes.	This project does not include utility installation. Under separate, non-TxDOT project, City will install water and sanitary sewer lines in the McHard Road corridor per their Capital Improvement Plan schedule.
118	Terry Wenhoff	Newspaper	No		My house is adjacent to the 1st proposed route (south). I am concerned about how much the route could deviate to the south. If it is changed towards the south, my property (backyard) will be destroyed. I have 35 year old live oak trees on my property and do not want them destroyed. Approximately 12 oaks and approximately 20 other types of trees. I also have concerns about noise pollution from the road noise and would like to know if a sound barrier will be constructed.	Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. Although not expected, any deviation from Alignment 1 would be very minor. The project includes a Tree Survey and Protection plan which will be developed to protect trees away from the proposed ROW. Noise analysis/modeling will be performed as part of the Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input.

119		Other	No		Either way - yes or no it's going through. But noise and traffic can affect us. We will need a noise retention wall and traffic light.	Your opposition and vote is noted. Noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input. A Traffic Warrant Study is also included in the scope of the project to determine the location of traffic signals.
120	Betty Philbrook	Newspaper			My comments concern Hughes Ranch Rd. I speak for the community which is already impacted by Dawson Field lights which shine into living and bedrooms VERY brightly. We are concerned that any street lights which may be planned should consider light pollution of our neighborhood and lights added. Please keep low and focused. Do not light up homes. Cars have lights! We only need one at our entrance. Lets make Pearland a good place to live and enjoy. An environmental study should include lights (or lack of). If cars add their lights how much other light is needed?	Hughes Ranch Project is not related to the McHard Road Extension. It is a separate project. A Traffic Warrant Study is also included in the scope of the project to determine the location of traffic signals.
121	Robert Philbrook	Notice in the Mail			The overhead lights should be not 22-24 feed light. Keep them lower to reduce light pollution.	Street lights will go through proper lighting analysis and design to meet certain min. illumination for roadway safety.

122	Cynthia Nemons	Other	No		I thoroughly disagree with both proposals. However, if it is a must, then water, sewage and sound-barrier walls are a must for effected residents.	Your opposition is noted. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice. Under a separate, non-TxDOT project, the City will install water and sanitary sewer lines in the McHard Road corridor per their Capital Improvement Plan schedule. Noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input.
123	Joyce Koenig				Although we are not in the pathway of this new road, I would like to suggest a noise retaining wall to help filter out road noise and the constant noise from the several pipe yards, the honing company and the chemical company that runs the railroad trains. All of these companies run 24 hours a day. A night of sleep never takes place. We moved to our house in 1964, after we built.	Noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input.

124	Linda Grant	Water Bill Insert	No		Has project been voted on or has this already been decided? 1 Taxes - increase; 2. Traffic - increase noise; 3. Crime - increase; 4. Flooding - pamphlet comments on more drainage it really need to be a main focus for house owner concern.	The project has been approved, however, this Public Meeting is to gather feedback and evaluation of the alignments; this allows the project to pceed to design and eventual construction. The issue of taxes beyond scope of this project. Noise analysis/modeling will be performed as part of Environmental Assessment Report. If Noise Walls are warranted, a noise wall workshop will be conducted to gather public input. Environmental Assessment will study all aspects of direct and indirect impacts. A complete drainage impact analysis will be preformed for the project to make sure all impacts are adequately mitigated. The project will have detention pond for mitigation.
125	Robert & Theresa Warren	Notice in the Mail	No		It will be unsafe for children to walk to school and be an invasion of the property owner in the community. It will also be more noise and traffic traveling down Hughes Ranch Road. It will also cause the property value to decrease.	Your opposition is noted. McHard Road Extension is not related to Hughes Ranch Road.

126	Joseph H. Phoenix		Yes		<p>There were no comment cards available so please accept my comments here. 1. I am in favor of the McHard Rd. Extension project. 2. Please consider a major renovation of Mykawa Road. It is a major thoroughfare and needs urgent repair. 3. Please consider installing a sidewalk on Hatfield to join Broadway with new McHard. 4. Please consider extending Martin L. King underneath Beltway 8 to connect new McHard. Thank you and Good Luck with the project.</p>	<p>1. Based on Public Meeting feedback and evaluation, Alignment 1 is the preferred choice and this allows project to proceed to design and eventual construction. 2. Project connects to Mykawa at east end. That section is already improvement. The City is trying to secure funding for the rest of Mykawa. 3. Sidewalk on Hatfield is not part of this scope of this project but this comment can help in the City's sidewalk improvement program. 4. Extending MLK is not within the scope of the McHard Road Extension.</p>
127	John Millet	Other	Undecided		<p>*My concern is with the expansion of Hughes Ranch Road and flyovers to the 288 Toll Lanes. *Proposed medians could block left turns onto/from Hughes Ranch from neighborhoods. *Additional traffic dangerous to kids at Challenger Elementary *Additional traffic on Miller Ranch & Smith Ranch would be troublesome *McHard Road is the more logical access point to 288 - it's already divided and able to hold additional traffic *Why was this changed to Hughes Ranch Rd? *Who stands to make money from this change? * Southdown, Autumn Lakes and South Hampton subdivisions stand to suffer property value degradation. * Hughes Ranch Road requires large eminent domain exercises and will cost taxpayers lots of money * The Hughes Ranch Road studies are 9-10 years old and did not take into account the 288 toll lane proposal.</p>	<p>Hughes Ranch Road project is not related to McHard Road Extension.</p>

Appendix I

TMDL Information for Impaired Water Bodies



TNRCC Approval: October 2001

Implementation Plan for Clear Creek Volatile Organic Compound TMDLs

For Segments 1101 and 1102

Prepared by the:
Strategic Assessment Division, TMDL Team

printed on
recycled paper

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Distributed by the
Total Maximum Daily Load Team
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MC-150
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Implementation Plans are also available on the TNRCC Web site at:
<http://www.tnrcc.state.tx.us/water/quality/tmdl/>



Implementation Plan for Clear Creek Volatile Organic Compound TMDLs

Introduction

In keeping with the Texas commitment to restore and maintain water quality in impaired water bodies, the Commission recognized from the inception of the Total Maximum Daily Load (TMDL) Program that implementation plans would need to be established for each TMDL developed.

The TMDL is a technical analysis that:

- 1) determines the maximum loadings of the pollutant a water body can receive and still both attain and maintain its water quality standards, and
- 2) allocates this allowable loading to point and non-point source categories in the watershed.

Based on the TMDL, an implementation plan is then developed. An implementation plan is a detailed description of regulatory and voluntary management measures that can be effective and appropriate to achieve the pollutant reductions identified in the TMDL, and a schedule under which the commission anticipates TMDL implementation will proceed. The plan is a flexible tool that governmental and non-governmental agencies involved in TMDL implementation will use to guide their program management. Actual implementation will be accomplished by the participating entities by rule, order, guidance, or other appropriate formal or informal action, depending on the nature of the entity's program and the procedures the entity follows.

The implementation plan contained herein will provide the following components:

- (1) a description of control actions and management measures¹ that generally will be implemented to achieve the water quality target;
- (2) legal authority under which the participating agencies may require implementation of the control actions;
- (3) the procedure TNRCC will use to develop a schedule for implementing activities to achieve TMDL objectives;
- (4) a follow-up surface water quality monitoring plan to determine the effectiveness of the control actions and management measures undertaken;

¹ Control actions refer to point source pollutant reduction strategies, generally TPDES permits. Management measures refer to nonpoint source pollutant reduction strategies, generally voluntary best management practices.

-
- (5) a statement of why TNRCC has concluded that the implementation of voluntary management measures will achieve the load allocations for nonpoint sources; and
 - (6) identification of measurable outcomes TNRCC will review to determine whether the implementation plan has been properly executed and whether water quality standards are being achieved.

This implementation plan is designed to guide the achievement of reductions in concentrations of volatile organic compounds in fish tissue in Clear Creek as defined in the adopted TMDLs.

This implementation plan was prepared by the TMDL Team in the Strategic Assessment Division of the Office of Environmental Policy, Analysis, and Assessment of the Texas Natural Resource Conservation Commission (TNRCC).

Technical assistance in the form of published reports and consultations was provided by:

- C the municipalities of League City, Friendswood, Pearland, and Webster
- C the Seafood Safety Division of the Texas Department of Health
- C the Galveston County Health District, and
- C the Harris County Flood Control District

This implementation plan was approved by the Texas Natural Resource Conservation Commission on October 12, 2001. This implementation plan, combined with the TMDL, establishes a Watershed Action Plan (WAP). A WAP provides local, regional, and state organizations a comprehensive strategy for restoring and maintaining water quality in an impaired water body. TNRCC has ultimate responsibility for ensuring that water quality standards are restored and maintained in impaired water bodies.

Summary of TMDLs

The water bodies addressed by the TMDL document *Four Total Maximum Daily Loads for Two Volatile Organic Compounds in Clear Creek* (TNRCC 2000) are portions of the tidal and above tidal segments of Clear Creek in the San Jacinto-Brazos Coastal Basin (see Figure 1). These water bodies were included on the State of Texas 1998 and 1999 §303(d) lists as a result of the issuance of a fish consumption advisory by the Texas Department of Health (TDH) on November 18, 1993. TDH advised against consuming fish from Clear Creek upstream and west of State Highway 3. The fish consumption advisory was issued following determinations of unacceptable human health risk due to elevated tissue concentrations of chlordane and volatile organic chemicals including 1,2-dichloroethane and 1,1,2-trichloroethane. The impacted portions of Clear Creek and their watersheds lie within Harris, Galveston, Fort Bend, and Brazoria counties (see Figure 1).

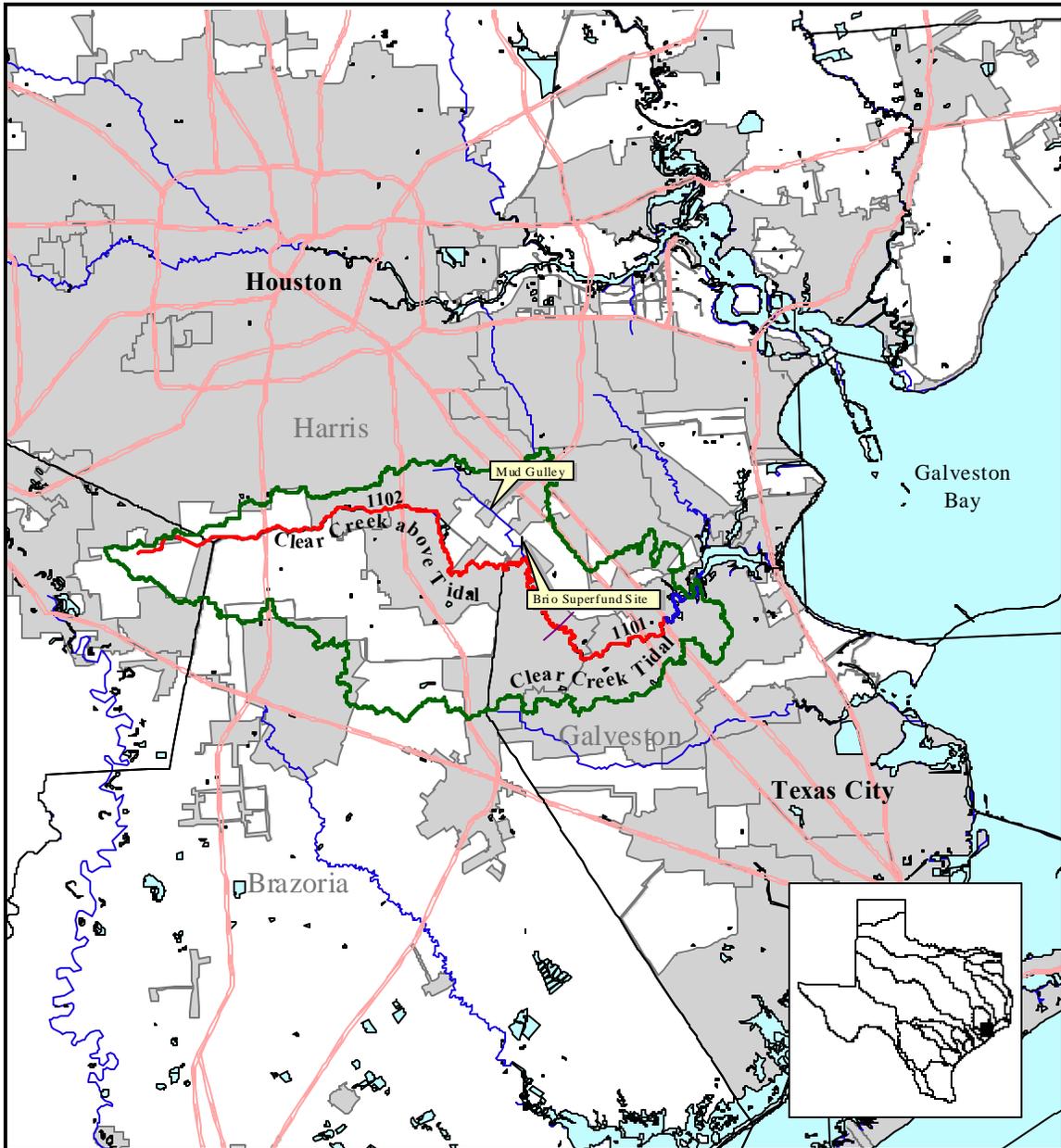


Figure 1. Study Area - Clear Creek Watershed

1,2-dichloroethane and 1,1,2-trichloroethane are associated primarily with chemical manufacturing. Twenty-six domestic sewage treatment plants and two industrial facilities are currently permitted to discharge wastewater to Clear Creek. These are not considered to be significant sources of these compounds. Nonpoint sources of these compounds are also thought to be minor contributors. All currently available evidence indicates that the principal sources of VOC contamination in Clear Creek are directly related to the Brio Refining site, a National Priority Listed (NPL) Superfund site located along Clear Creek near the tidal segment boundary.

The TMDLs adopted for Clear Creek describe allowable loads of 1,2-dichloroethane and 1,1,2-trichloroethane based on acceptable, risk-based fish tissue concentrations. EPA guidance (1997) and TDH assumptions concerning risk levels, consumer body weight, and fish consumption rates were used to develop endpoint targets for tissue contaminant levels that result in an acceptable risk level. The endpoint target of these TMDLs is the reduction of fish tissue contaminant concentrations to levels that constitute an acceptable risk to fish consumers, allowing TDH to remove the advisories on fish consumption (Table 1). Therefore, the ultimate endpoint goal for the affected water bodies is the complete removal of the fish consumption advisories.

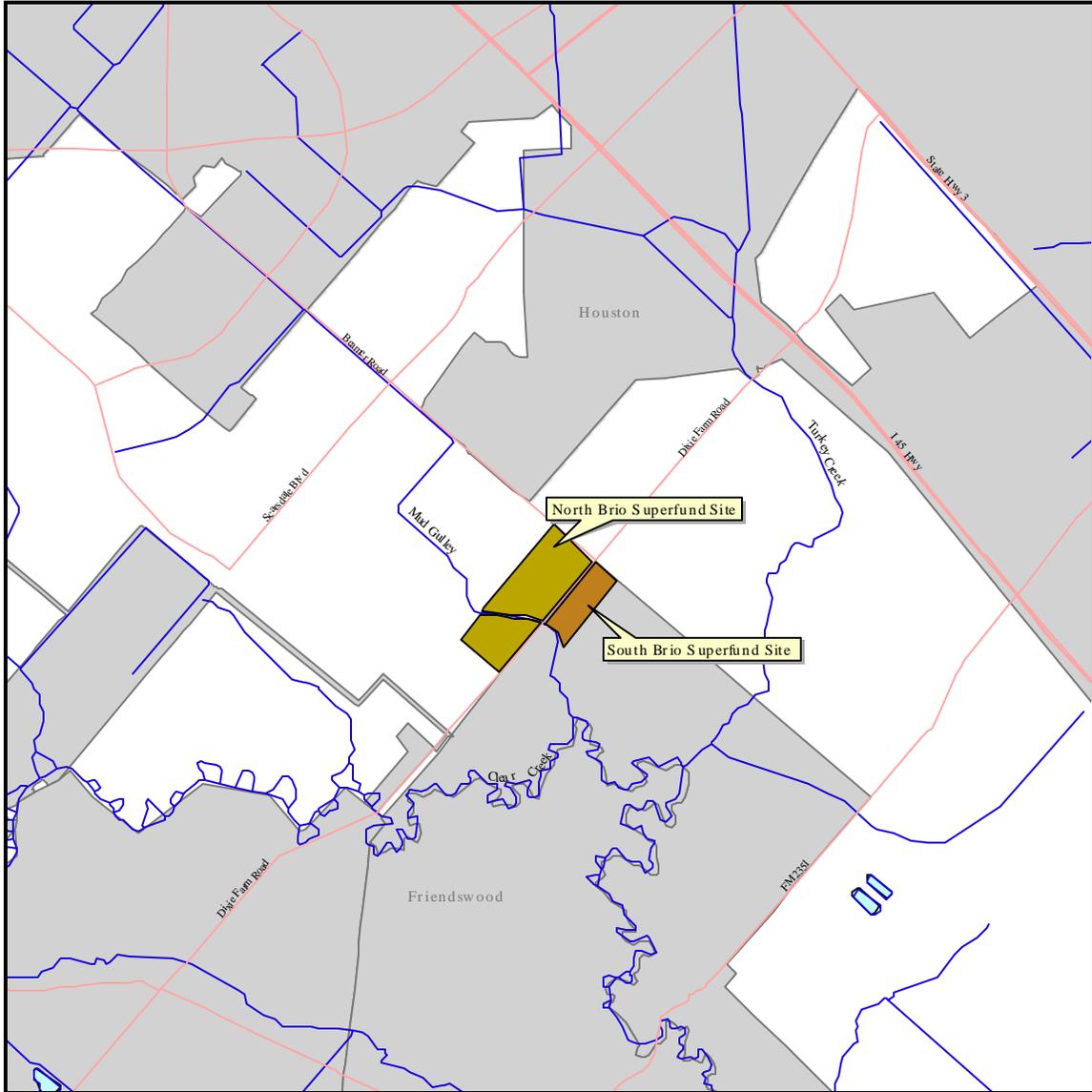
Table 1. Segments of Clear Creek listed on the 303(d) list due to VOC concentrations in fish tissue and fish consumption advisories by the Texas Department of Health, and endpoint targets necessary to meet the fish consumption use.

Segment	Primary Endpoint (Concentrations)
Clear Creek Tidal (1101)	≤ 49.3 µg/L 1,2-dichloroethane in water (HH) ≤ 11,300 µg/L 1,2-dichloroethane in water (AL) ≤ 420 µg/L 1,1,2-trichloroethane in water (HH) ≤ 430 µg/L 1,1,2-trichloroethane in water (AL)
Clear Creek Above Tidal (1102)	≤ 73.9 µg/L 1,2-dichloroethane in water (HH) ≤ 32,000 µg/L 1,2-dichloroethane in water (AL) ≤ 420 µg/L 1,1,2-trichloroethane in water (HH) ≤ 302 µg/L 1,1,2-trichloroethane in water (AL)

Control Actions and Management Measures

The Brio Refining, Inc. waste site is an abandoned refinery located on approximately fifty-eight acres along Mud Gully, a tributary to Clear Creek in Friendswood, Harris County (Figure 2). The Brio facility was operated from the late 1950s until 1982. Past operations at the site included copper catalyst regeneration, oil blending and refining, chemical by-product recycling, petroleum recovery, and hydrocarbon cracking. Chemical spills at this facility have entered Mud Gully and contaminated soils and groundwater. Additionally, raw and process chemical mixtures were stored on-site in unlined pits which continued to contaminate groundwater after operations ceased at the facility. Investigations revealed that soils and shallow groundwater were contaminated with high concentrations of 1,2-dichloroethane, 1,1,2-trichloroethane, vinyl chloride, fluorene, anthracene, phenanthrene, pyrene, and other hydrocarbons and copper. Contaminated groundwater from the Brio Refining site discharged to Mud Gully, which flows into Clear Creek.

Groundwater from the Brio site is pumped, treated, and discharged to Mud Gully under a U.S. EPA Record of Decision amended in 1997 (EPA/541/R-97/122). This discharge and the direct migration of groundwater to Mud Gully are believed to be the only significant continuing sources of 1,2-dichloroethane and 1,1,2-trichloroethane to Clear Creek. The Record of



Decision states that “recovered groundwater shall be treated to meet relevant standards within the receiving water.”

Figure 2. Location of Brio Refining NPL Superfund Site

In 1989, the Brio Refining, Inc. Site was added to the National Priorities List under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Several measures were taken to reduce the contamination of Mud Gully and Clear Creek. Approximately 100,000 gallons of highly contaminated sludges and solids, and over 40,000 gallons of dense non-aqueous phase liquids have been removed from the site. Over 18 million gallons of ground water have been extracted and treated.

Following these remedial measures, the concentrations of contaminants in Mud Gully and Clear Creek declined by more than 97%. This demonstrates that the Brio Refining, Inc. site was the source for these contaminants in Clear Creek. Currently, 1,2-dichloroethane is seldom detected in surface water from either Mud Gully (Figure 3) or Clear Creek (Figure 4). 1,1,2-Trichloroethane concentrations in Mud Gully (Figure 5) and Clear Creek (Figure 6) are well below the water quality targets, averaging approximately 10 µg/L and 3 µg/L, respectively.

The TMDLs for 1,2-dichloroethane and 1,1,2-trichloroethane adopted for Clear Creek will result in compliance with water quality standards. All allowable loading is allocated to remedial actions at the Brio Refining Site. Because concentrations of 1,2-dichloroethane and 1,1,2-trichloroethane are now below the water quality targets for protection of the fish consumption use, no further reduction in their concentrations is required by the adopted TMDLs. Continuing natural attenuation of 1,2-dichloroethane and 1,1,2-trichloroethane is expected via volatilization from the creek to the atmosphere. Concentrations in fish tissue are expected to decline rapidly by metabolism and excretion following a decline in the concentrations in water. Thus, concentrations of these volatile organic compounds in fish tissue have likely declined (as they have in water) to safe levels.

Continued periodic monitoring will be required to confirm that concentrations of volatile organic compounds in Mud Gully and Clear Creek water do not exceed the water quality targets, and thus will be protective of the fish consumption use. Additional monitoring of 1,2-dichloroethane and 1,1,2-trichloroethane concentrations in fish tissue will be required to verify that fish are safe for consumption.

A U.S. EPA Record of Decision amended in 1997 (EPA/541/R-97/122) outlines several additional measures that will continue to reduce contamination of Clear Creek by the Brio Refining site. These include installing a sub-grade vertical barrier wall enclosing the site, capping the site with a liner and clay cover, and pumping and treating groundwater from fourteen recovery wells.

As the remedial actions at the Brio Refining Site curtail discharges of 1,2-dichloroethane and 1,1,2-trichloroethane to Clear Creek, the allowable loading may be re-allocated.

Legal Authority

Texas statutory provisions require the commission to establish the level of quality to be maintained in, and to control the quality of, water in the state (Texas Water Code (TWC) §26.011). Texas fulfills its obligations under Section 303(d) of the Clean Water Act to list impaired segments and create TMDLs through functions assigned by the legislature to TNRCC. The §303(d) list is prepared by TNRCC as part of its monitoring, planning and assessment duties (TWC §26.0135).

TMDLs are part of the state water quality management plans that TNRCC is charged by statute to prepare (TWC §26.036). As the state environmental regulatory body, the Commission has primary responsibility for implementation of water quality management functions within the State (TWC §26.0136 and §26.127). The Executive Director of the TNRCC must prepare and develop, and the Commission must approve, a comprehensive plan for control of water quality in the state (TWC § 26.012). The list of impaired segments and resulting TMDLs are tools for water quality planning.

Texas Surface Water Quality Standards are contained in Title 30, Chapter 307 of the Texas Administrative Code (30 TAC Chapter 307). TNRCC procedures for implementing the these standards are described in *Implementation of the Texas Natural Resource Conservation Commission Standards Via Permitting* (RG-194, August 1995).

Figure 3. 1,2-Dichloroethane in Mud Gully at Brio Refining Site (Station SW-1)

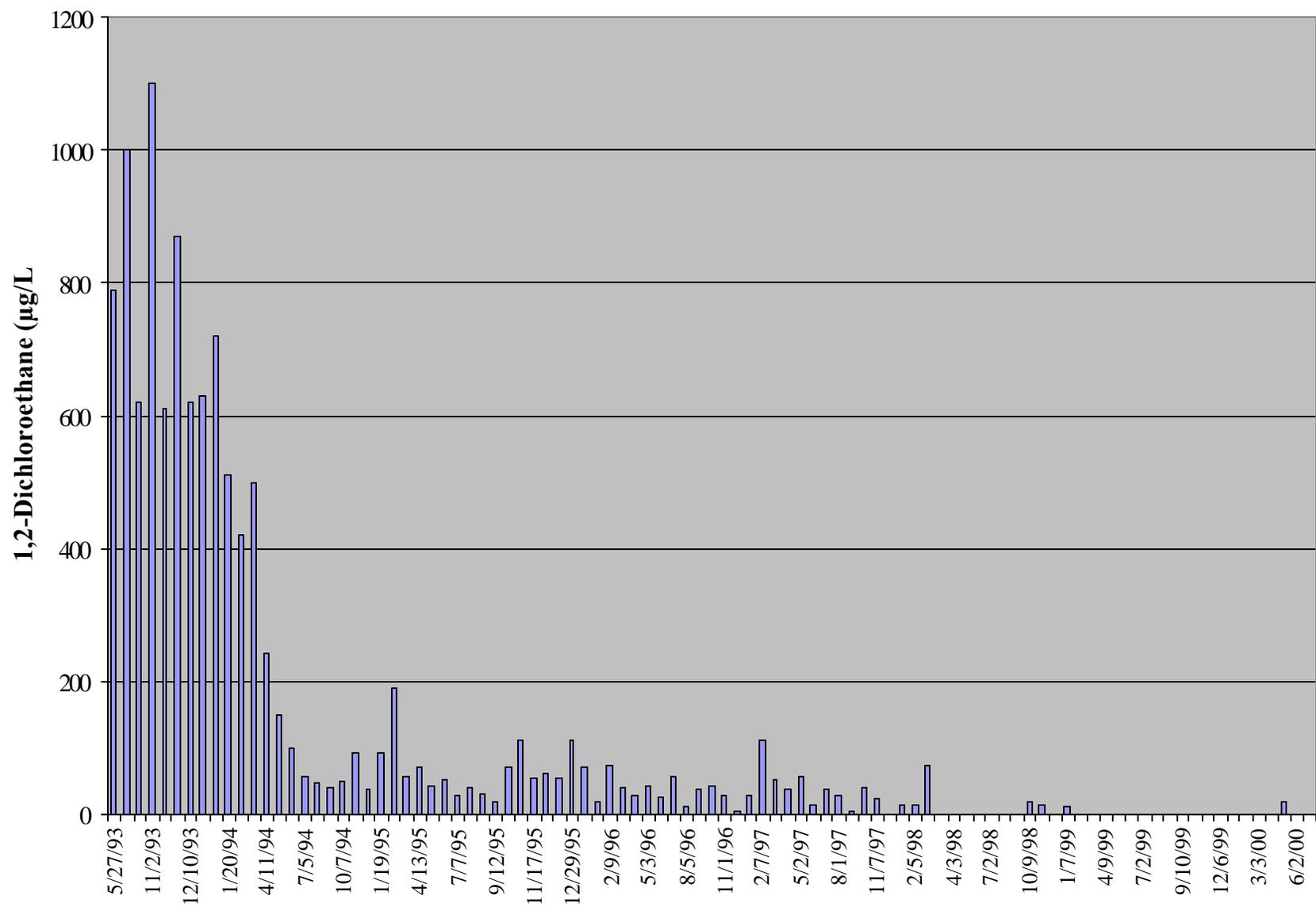


Figure 5. 1,1,2-Trichloroethane in Mud Gully at Brio Refining Site (Station SW-1)

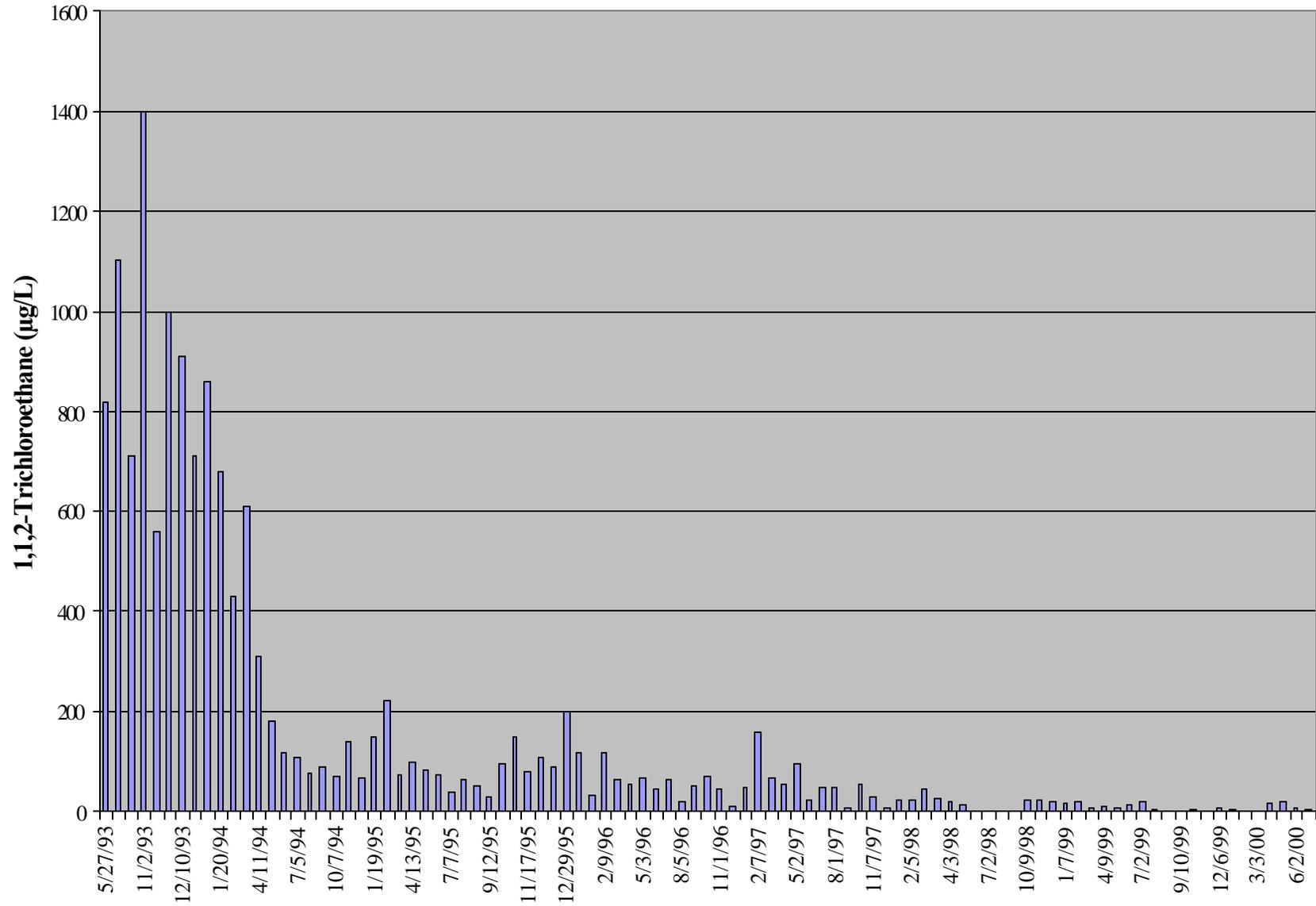
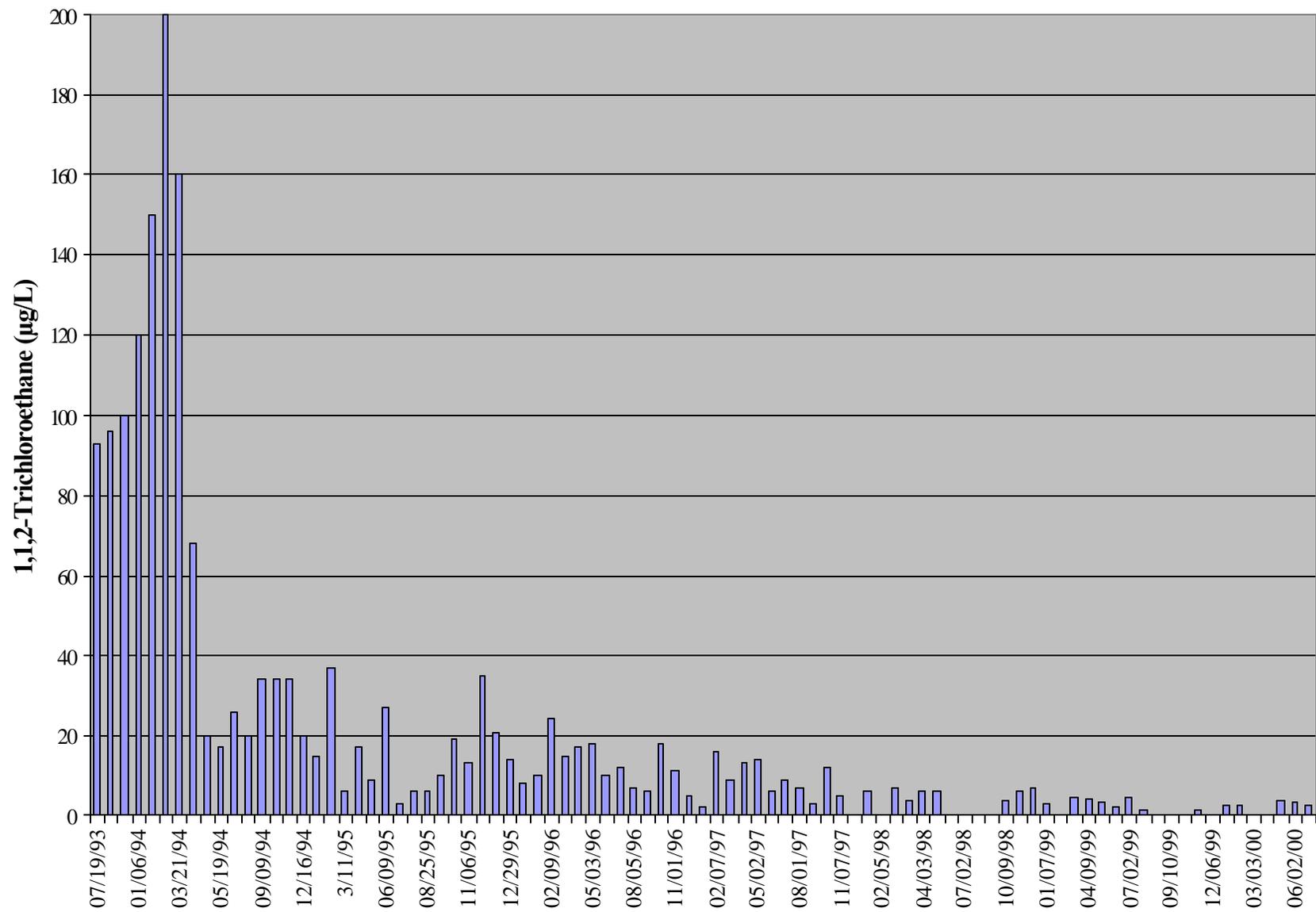


Figure 6. 1,1,2-Trichloroethane in Clear Creek below Mud Gully (Station SW-21)



The TNRCC received delegation of the NPDES program from EPA on September 14, 1998, and is authorized to implement the Texas Pollutant Discharge Elimination System (TPDES), the regulatory program to control discharges of pollutants to surface waters. The TPDES program covers all permitting, surveillance and inspection, public assistance, and enforcement regulatory processes associated with waste discharges into or adjacent to any water in the state. This includes discharges of waste from industry and municipal treatment works, and discharges of storm water associated with industrial activities, construction sites, and municipal separate storm sewer systems (MS4s).

No point source wastewater permits currently authorize the discharge of VOCs into any of the water bodies addressed by these TMDLs. Any necessary regulatory action concerning the discharge of VOCs will be addressed through the Texas Risk Reduction Standards and/or through the storm water requirements described below:

- C TNRCC assumed jurisdiction and administration of the EPA Multi-Sector Storm Water General Permit for industrial activities on September 29, 2000. TNRCC is in the process of renewing that permit as TPDES General Permit No. TXRO5000.
- C Discharges of storm water associated with construction projects covering five acres or more are currently regulated by EPA under the Phase I Construction Storm Water General Permit. TNRCC will assume jurisdiction and administration of the construction permit by July 7, 2003, and will develop a state permit for renewal.
- C Discharges of storm water associated with construction projects one to five acres in size, or smaller than one acre if designated, will be regulated under Phase II of the storm water program. Phase II rules were published by EPA on December 8, 1999, and became effective on December 22, 1999. TNRCC must issue a Phase II Construction General Permit by December 9, 2002. Phase II construction sites must begin obtaining permit coverage within 90 days of permit issuance.
- C Discharges of storm water associated with MS4s in cities and counties with populations greater than 100,000 are currently regulated by individual MS4 permits issued by EPA under Phase I of the storm water program. TNRCC will assume jurisdiction upon expiration of each MS4 permit. MS4 permittees will apply for renewal with the TNRCC.
- C Cities and counties with populations less than 100,000 will be regulated under the Phase II storm water rules. TNRCC must designate additional small MS4s, and must issue a Phase II MS4 permit by December 9, 2002. Small MS4s must obtain permit coverage within 90 days of permit issuance. Phase II MS4s will be required to identify BMPs, along with associated measurable goals and implementation schedules, for efforts such as the identification and elimination of illicit discharges, construction site runoff control, and post-construction storm water management in new development and redevelopment areas.

The TNRCC also has the regulatory authority to oversee the cleanup of sites contaminated with industrial and municipal hazardous and solid wastes. In general, remediation and closures at solid and hazardous waste facilities must comply with the requirements of 30 TAC Chapter 335, which contains the Risk Reduction Standards, the state cleanup regulations that became effective in June 1993. Remediation and closures initially reported on or after May 1, 2000 must comply with the Texas Risk Reduction Program (TRRP) rules in 30 TAC Chapter 350.

Implementation Schedule

Several monitoring and remediation projects are planned or underway as part of this implementation plan (see Table 2). Additional details of the various monitoring efforts are described in the Monitoring Plan section of this document.

The TNRCC and the USEPA will further evaluate the need for, and effectiveness of, the various mitigation and remediation options, including the management measures specified in the Record of Decision and site-specific natural attenuation, based on periodic evaluation of monitoring results. Timetables for additional monitoring and/or the implementation of any BMPs, and estimates of the time necessary for restoration of the fish consumption uses, will be further developed as the results of the ongoing monitoring are known. Interim evaluations will be made as appropriate, with final evaluations to be performed following completion of all ongoing efforts, probably in mid- to late 2002. The following subsections outline a general approach (summarized in Table 3) to possible subsequent actions that will depend upon results of the efforts described above.

Table 2. Implementation schedule for monitoring and evaluation of management measures.

Entity	Activity	Implementation Schedule
Brio Task Force	(1) Ambient water quality monitoring in Mud Gully and Clear Creek (2) Groundwater monitoring (3) Groundwater recovery and treatment (4) Plume delineation (5) Vertical barrier wall and cover system	(1) Quarterly for a minimum of five years (2) Semiannually for a minimum of five years (3) Continuous operation; evaluated every five years (4) Ongoing (5) cover system is in-place; barrier wall construction will be completed by June, 2001
Texas Department of Health (TDH)	(1) Collection and analysis of fish tissue (2) Additional collection and analysis of fish tissue (3) Reassessment of tissue contaminant risk	(1) Completed September of 2000 (2) Every five years (3) Expected in October of 2001 and (if warranted) every five years
Texas Natural Resource Conservation Commission (TNRCC)	(1) Ambient water quality and sediment quality monitoring in Clear Creek	(1) Quarterly; monitoring schedule is reviewed and evaluated on a yearly basis.

Analysis of historical data

If historical trends determined from ambient water and fish tissue concentrations indicate recent or continuing contaminant input into Clear Creek, current and on-going mitigation/remediation measures will be re-evaluated and/or additional investigation may be needed to isolate sources. Water quality and fish tissue monitoring results will be evaluated to identify persistent source areas. Additional monitoring will be performed, if necessary, to further isolate the source(s). If the evaluations indicate the source of VOCs continues to be the Brio Refining NPL Superfund site, remedial actions at the site will be re-evaluated and appropriate measures will be taken to mitigate contaminant releases into Clear Creek.

Table 3. Evaluation outline for any subsequent actions found to be necessary based on the results of ongoing monitoring.

Any subsequent activities will be coordinated by TNRCC, TDH, USEPA, and the Brio Task Force. See text for additional details.

Activity	Results	Subsequent Action
(1) Historical pollutant trends determined from monitoring data	<p>(a) No substantial recent input; any existing pollutants are confined to Brio site.</p> <p>(b) Pollutant concentration in water suggests recent or continuing input</p>	<p>(a) No additional action is likely to be necessary</p> <p>(b) Evaluate monitoring data from Brio site</p> <p>(i) Use site monitoring data and ambient monitoring data to pinpoint source; evaluate need for modification of remedial actions and/or additional investigation</p> <p>(ii) Modify remedial actions at Brio site</p> <p>(iii) Conduct additional investigation</p>
(2) Fish tissue contaminant concentrations (TDH)	<p>(a) Removal of consumption advisories by TDH due to reduction of tissue contaminant concentrations</p> <p>(b) Consumption advisories remain in effect, but trend in reduction of tissue contaminant concentrations is evident</p> <p>(c) No evidence of reduction in tissue contaminant concentrations based on samples collected in 2000-2005</p>	<p>(a) No action necessary other than follow-up tissue sampling five years after removal of the advisory</p> <p>(b) (i) Continue tissue monitoring every five years to verify continuing contaminant reductions</p> <p>(ii) Conduct follow-up tissue monitoring five years after endpoint targets are achieved and advisories are removed</p> <p>(c) (i) Continue addressing pollutant sources and monitoring fish tissue</p> <p>(ii) Reevaluate TMDL time frames and need for additional approaches</p>

Current Pollutant Loading

Concentrations of VOCs in surface water samples from Clear Creek have declined sharply since January, 1994 (Figures 4 and 6) and individual concentrations of 1,2-dichloroethane and 1,1,2-trichloroethane in Clear Creek have been below 10 ug/L since 1998 (TNRCC 2000). These results suggest that there has been a significant reduction of contaminant loadings into Clear Creek and that any remaining contaminant contributions to Clear Creek are below the amounts allocated under the adopted TMDLs. Although loading of 1,2-dichloroethane and 1,1,2-trichloroethane will continue to persist from diffusion and advection from shallow groundwater, these contributions are expected to decline to below detectable levels in surface water within a period of five to ten years.

Fish Tissue Contaminant Concentrations

A large number of factors associated with fish physiology, environmental conditions, and the form of the contaminant have been found to influence contaminant elimination from fish tissue. The time necessary for elimination can be both long and variable. Long-term field studies have generally found that elimination rates are considerably longer than in those measured in laboratory studies.

The endpoint target of these TMDLs is the reduction of fish tissue contaminant concentrations to levels that constitute an acceptable risk to fish consumers, allowing the TDH to remove the advisories on fish consumption. If fish tissue data collected in 2000-2005 indicate that endpoint targets have been reached in a given water body, follow-up sampling will be conducted to verify that tissue contaminants remain at acceptable levels. The TDH may choose to conduct additional monitoring in any of the water bodies at any time.

If fish tissue data collected in 2000-2005 indicate that endpoint targets have not yet been reached in a water body, it will be necessary to continue tissue monitoring. Additional tissue sampling may be the only step necessary if the tissue data indicate a clear trend in the reduction of tissue contamination. Because the natural attenuation of contaminants in fish tissue occurs gradually, collection and analysis of fish tissue on a five-year cycle beginning in 2000 should be adequate to track continuing declines and allow for periodic reassessment of consumption risk by the TDH. Tissue sampling will be performed by the TDH, or by another entity through an arrangement with the TDH. Sampling will continue until endpoint targets have been reached and the consumption advisories are removed. Follow-up sampling will be conducted approximately five years later to verify that tissue contaminants remain at acceptable levels.

Subsequent to the fish tissue collection and analysis conducted by TDH in 1993, only one other fish tissue collection event has been conducted in Clear Creek. This event was completed in September of 2000; the analytical results of this event are expected to be released in June, 2001. Because of the volatile nature of chlorinated solvents, decreases in fish tissue concentrations of VOCs are expected to occur more rapidly than fat soluble pesticides and PAHs. Reductions in the concentrations of 1,2-dichloroethane and 1,1,2-trichloroethane in fish tissue commensurate with the observed decline in VOCs concentrations in surface water are likely. If tissue samples collected in 2000-2005 indicate no reduction of contaminants in Clear Creek, reevaluation of the TMDL approach may be required.

Restoration of Fish Consumption Use

The results of fish tissue monitoring efforts, and any subsequent need to implement one or more additional activities, will likely affect any estimates of the time necessary for restoration of the fish consumption use to these water bodies. Given the current knowledge of the metabolism of fish tissue contaminant concentrations and existing site-specific sources of VOCs, restoration of the fish consumption use in these water bodies is expected within the next five to ten years.

Findings of the ongoing monitoring efforts and reassessment of tissue contaminant risk by the TDH may require revision of this estimate.

Monitoring Plan

The TNRCC, the TDH, and the Brio Task Force are continuing a variety of efforts to (1) monitor VOC concentrations currently in Mud Gully and Clear Creek (2) verify the effectiveness of current management measures at the suspected source (the Brio Refining NPL Site), and (3) verify decreasing pollutant loadings and fish tissue concentration trends.

- Ⓒ The TNRCC will continue to monitor surface water in the non-tidal and tidal segments of Clear Creek below Mud Gully on a quarterly basis.
- Ⓒ The Brio Task force will continue to monitor groundwater at fourteen wells located within the Brio Refining NPL Superfund Site on a semi-annual basis and will also monitor surface water at Mud Gully and Clear Creek on a quarterly basis indefinitely. Brio's monitoring program will be evaluated for modifications and discontinuation every five years.
- Ⓒ The TDH will collect and analyze fish tissue samples in Clear Creek and risk from ingestion will be re-assessed

The TNRCC will evaluate historical trends in the occurrence of VOCs in surface water from monitoring data and will also continue to monitor the non-tidal and tidal segments of Clear Creek indefinitely as part of its Surface Water Quality Monitoring Program.

The TDH received funding from the TNRCC to conduct fish tissue sampling on a number of water bodies throughout the state for a two-year period that began in mid-2000 including Clear Creek. The TDH will reassess tissue contaminant levels in these water bodies when sampling is complete. Similarly, the TNRCC will cooperate with the TDH to conduct additional fish tissue collection and analysis efforts in Clear Creek on five year time intervals. The results of this effort will be used to re-assess the current risk to the local population from fish consumption. Fish tissue monitoring will continue in order to verify acceptable risk levels, establish spatial and/or temporal trends in fish tissue contamination, and to better define the extent and severity of the impairment.

The TNRCC will further evaluate the need for additional monitoring activities based on the results of the various ongoing efforts. The necessary extent of any additional monitoring will be developed as the results of the TNRCC/ TDH and Brio Task Force monitoring projects are known (see "Implementation Schedule" section of this document). The TDH may also choose to conduct additional fish tissue monitoring in any of the water bodies at any time.

Additional monitoring may also be necessary to assess the effectiveness of mitigation/remediation activities at the Brio Refining NPL Superfund Site.

Reasonable Assurance of Success

Continuing decreases in VOC levels in surface water and fish tissue in Clear Creek are expected, although the time frame necessary to achieve acceptable VOC concentrations in fish tissue is subject to debate.

Available surface water data from Mud Gully and Clear Creek and shallow ground water data from the Brio Refining NPL Superfund Site indicate that VOC concentrations have decreased dramatically and are continuing to decrease as a result of remedial and mitigative actions conducted at the Brio site. These actions have effectively reduced contaminant loadings into Mud Gully and Clear Creek to levels that are below those specified in the adopted TMDLs. Continuing natural attenuation of these pollutants in fish tissue is expected via volatilization, continuing degradation and metabolism of the contaminants.

The most recent data on fish tissue in Clear Creek was collected in September, 2000. The results of this (September 2000) sampling event are expected to be released in June, 2000. Additional fish tissue collection efforts and a more current fish consumption risk assessment is planned for this water body. If the results of the risk assessment show acceptable human health risk levels, the TDH will remove the consumption advisories for the affected water bodies and follow-up monitoring will be conducted every five years subsequent to removal of the advisories.

If the results of the updated risk assessment show risk levels continue to exceed acceptable limits for human health, but the concentrations are lower than previously observed, fish tissue collection will continue to verify a downward trend in fish tissue voc concentration with time. Fish tissue monitoring will be conducted every five years until target concentrations are achieved and the consumption advisories are removed.

If the results of the updated risk assessment show risk levels continue to exceed acceptable limits established for the protection of human health, and if fish tissue voc concentrations do not show evidence of a downward trend with time, TMDL loading estimates may be revisited and efforts to identify additional sources of contamination will be instituted. The time frames necessary for achieving the specified target concentrations will also be revised accordingly. Regardless of any renewed efforts associated with revision of established TMDL loading limits, additional source identification, and/or problem re-definition, fish tissue monitoring will be conducted every five years until target concentrations are achieved and the consumption ban is removed.

Because of the apparent historical link between VOC contamination in Clear Creek and the Brio Refining NPL Superfund site, pollution control efforts in Clear Creek will focus first on the evaluation and improvement of mitigative and remedial activities at this Brio site. Efforts to identify additional sources of contamination will be conducted only after clear evidence is shown that the impact to Clear Creek is in excess of the contributions from the Brio site.

Measurable Outcomes

The following outcomes will denote the attainment of various implementation steps:

- (1) Completion of the mitigative/remedial measures at the Brio Refining NPL Superfund Site
- (2) Completion of reassessment of fish tissue risk by TDH (of September 2000 sampling event)
- (3) Completion of a five year decision of record evaluation for the Brio Refining NPL Superfund Site
- (4) Completion of additional fish tissue sampling at five-year intervals
 - (a) sampling events and laboratory analyses
 - (b) reassessment of fish tissue risk by TDH
- (5) Data analysis and re-evaluation of established TMDL loading limits
- (6) Evaluation of mitigation/remediation measures and planning and implementation of additional mitigation/remediation strategies
- (7) Data analysis and re-evaluation of source areas

The most significant outcome for determining the success of the TMDLs and the implementation plan will be the removal of the fish consumption bans by the TDH. Interim outcomes that indicate progress towards this goal are:

- C Continued reductions in fish tissue contaminant concentrations
- C Reduction of fish tissue contaminant concentrations to a level that allows the TDH to modify a consumption advisory by removing one or more contaminants, or by shifting to an advisory for certain groups at greater risk, and
- C Reduction of fish tissue pollutant concentrations to levels that meet the endpoint target concentrations and acceptable risk levels, but where the TDH has not yet removed the consumption advisory.

The TDH has the authority and jurisdiction for the decision to issue, or to modify or remove, fish consumption bans and advisories. Subsequent risk assessments by the TDH may result in one or more of these options for the various water bodies addressed by this implementation plan. The ultimate endpoint goal for the affected water bodies is the protection of all groups and complete removal of the fish consumption advisories.

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Approved: September 14, 2001

Implementation Plan for Clear Creek Chlordane TMDLs

For Segments 1101 and 1102

Prepared by the:
Strategic Assessment Division, TMDL Team

printed on
recycled paper

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

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Implementation Plans are also available on the TNRCC Web site at:
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Implementation Plan for Clear Creek Chlordane TMDLs

Introduction

In keeping with the Texas commitment to restore and maintain water quality in impaired water bodies, the Texas Natural Resource Conservation Commission (TNRCC) recognized from the inception of the total maximum daily load (TMDL) program that implementation plans would need to be established for each TMDL developed.

The TMDL is a technical analysis that:

- (1) determines the maximum loadings of the pollutant a water body can receive and still both attain and maintain its water quality standards, and
- (2) allocates this allowable loading to point and non-point source categories in the watershed.

Based on the TMDL, an implementation plan is then developed. An implementation plan is a detailed description of regulatory and voluntary management measures that can be effective and appropriate to achieve the pollutant reductions identified in the TMDL, and a schedule under which the commission anticipates TMDL implementation will proceed. The plan is a flexible tool that governmental and non-governmental agencies involved in TMDL implementation will use to guide their program management. Actual implementation will be accomplished by the participating entities by rule, order, guidance, or other appropriate formal or informal action, depending on the nature of the entity's program and the procedures the entity follows.

The implementation plan contained herein will provide the following components:

- (1) a description of control actions and management measures¹ that generally will be implemented to achieve the water quality target;
- (2) legal authority under which the participating agencies may require implementation of the control actions;
- (3) the procedure TNRCC will use to develop a schedule for implementing activities to achieve TMDL objectives;
- (4) a follow-up surface water quality monitoring plan to determine the effectiveness of the control actions and management measures undertaken;

¹ Control actions refer to point source pollutant reduction strategies, generally Texas Pollution Discharge Elimination System (TPDES) permits. Management measures refer to nonpoint source pollutant reduction strategies, generally voluntary best management practices.

-
- (5) a statement of why TNRCC has concluded that the implementation of voluntary management measures will achieve the load allocations for nonpoint sources; and
 - (6) identification of measurable outcomes TNRCC will review to determine whether the implementation plan has been properly executed and whether water quality standards are being achieved.

This implementation plan is designed to guide the achievement of reductions in concentrations of chlordane in fish tissue in Clear Creek as defined in the adopted TMDLs.

This implementation plan was prepared by the TMDL Team in the Strategic Assessment Division of the Office of Environmental Policy, Analysis, and Assessment of the TNRCC.

Technical assistance in the form of published reports and consultations was provided by:

- C the municipalities of League City, Friendswood, Pearland, and Webster
- C the Seafood Safety Division of the Texas Department of Health
- C the Galveston County Health District
- C the Harris County Flood Control District, and
- C the Houston-Galveston Area Council

This implementation plan was approved by the TNRCC on September 14, 2001. This implementation plan, combined with the TMDL, establishes a Watershed Action Plan (WAP). A WAP provides local, regional, and state organizations a comprehensive strategy for restoring and maintaining water quality in an impaired water body. TNRCC has ultimate responsibility for ensuring that water quality standards are restored and maintained in impaired water bodies.

Summary of TMDLs

The water bodies addressed by the TMDL document *Two Total Maximum Daily Loads for Chlordane in Clear Creek* (TNRCC 2000) are portions of the tidal and above tidal segments of Clear Creek in the San Jacinto-Brazos Coastal Basin (see Figure 1). These water bodies were included on the State of Texas 1998 and 1999 §303(d) lists as a result of the issuance of a fish consumption advisory by the Texas Department of Health (TDH) on November 18, 1993 (TDH 2001). TDH advised against consuming fish from Clear Creek upstream and west of State Highway 3. The fish consumption advisory was issued following determinations of unacceptable human health risk due to elevated tissue concentrations of chlordane and volatile organic chemicals including 1,2-dichloroethane and 1,1,2-trichloroethane. The impacted portions of Clear Creek and their watersheds lie within Harris, Galveston, Fort Bend, and Brazoria counties (see Figure 1). Within the context of this document, chlordane refers to technical chlordane

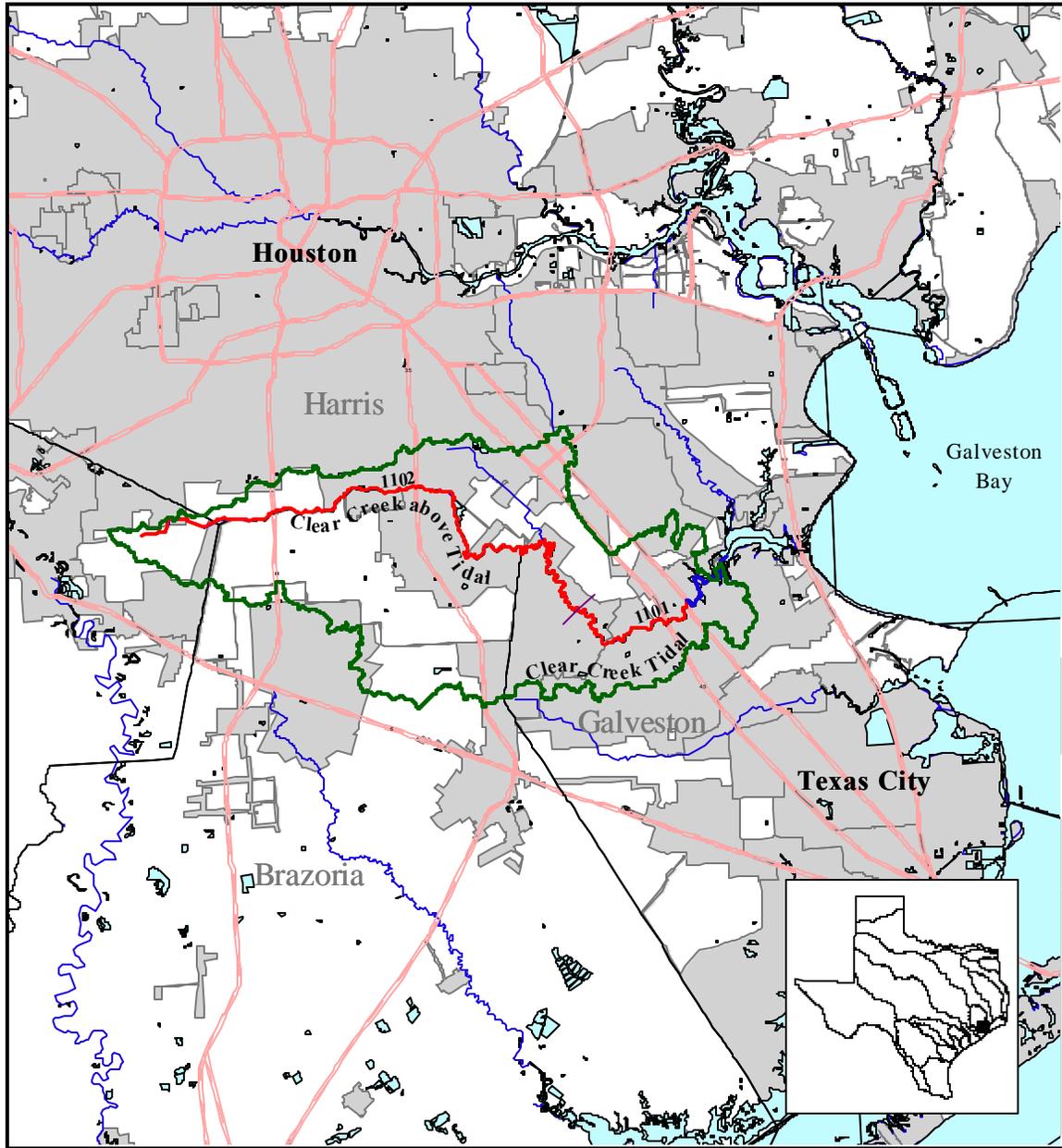


Figure 1. Study Area - Clear Creek Watershed

(CAS 12789-03-6), a mixture of chlorinated hydrocarbons including cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, heptachlor, octachlordane, chlordene isomers, and other compounds.

Chlordane is a legacy pollutant, a term used to describe substances whose use has been banned or severely restricted by the U.S. Environmental Protection Agency (EPA). Because of their slow rate of decomposition, many of these substances frequently remain at elevated levels in the environment for many years after their widespread use has ended. No additional loading of legacy pollutants is allowed or expected due to the EPA restrictions. Gradual declines in environmental legacy pollutant concentrations occur as a result of natural attenuation processes.

Twenty-six domestic sewage treatment plants and two industrial facilities are currently permitted to discharge wastewater to Clear Creek. These dischargers are not considered to be significant sources of these compounds. Nonpoint sources of these compounds are considered to be the main contributors of chlordane in fish tissue in the tidal and above tidal segments of Clear Creek.

The TMDLs adopted for Clear Creek describe allowable loads of chlordane based on acceptable, risk-based fish tissue concentrations (TNRCC 2000a). EPA guidance (1997) and TDH assumptions concerning risk levels, consumer body weight, and fish consumption rates were used to develop endpoint targets for tissue contaminant levels that result in an acceptable risk level. The endpoint target of these TMDLs is the reduction of fish tissue contaminant concentrations to levels that constitute an acceptable risk to fish consumers, allowing TDH to remove the advisories on fish consumption (Table 1). The ultimate endpoint goal for the affected water bodies is the complete removal of the fish consumption advisories.

Table 1. Segments of Clear Creek listed on the 303(d) list due to chlordane concentrations in fish tissue and fish consumption advisory by the Texas Department of Health, and endpoint targets necessary to meet the fish consumption use.

Segment	Primary Endpoint Target
Clear Creek Tidal (1101)	≤ 1.17 mg/kg chlordane in fish tissue for adults ≤ 0.5 mg/kg chlordane in fish tissue for children
Clear Creek above Tidal (1102)	≤ 1.17 mg/kg chlordane in fish tissue for adults ≤ 0.5 mg/kg chlordane in fish tissue for children
All Water bodies	Removal of fish consumption advisories

Control Actions and Management Measures

Gradual declines in environmental legacy pollutant concentrations occur as a result of natural attenuation processes. Legacy pollutants in these water bodies are considered background sources that reflect site-specific application histories and loss rates. Any continuing sources of pollutant loadings occur from nonpoint source runoff, leaching, or erosion of sinks that may exist within the watersheds. Additional loading of chlordane may also be the result of illicit use of this restricted pesticide within the Clear Creek watershed. However, illicit use of chlordane-based insecticides is believed to play a very minor role in its observed occurrence and illicit use is expected to cease completely due to chlordane's lack of availability as a banned pesticide. No authorized point source discharges of chlordane are allowed by law.

Available evidence suggests that chlordane concentrations are generally declining in fish tissue in several other watersheds in Texas and throughout the nation. Chlordane fish tissue concentrations in the Trinity and Nueces-Rio Grande Coastal Basins were found to be less than the TMDL endpoint target in recent sample collections (TNRCC 2000b and TNRCC 2000c; see Reasonable Assurance of Success section of this document). Continuing natural attenuation is expected via degradation and metabolism of remaining chlordane, and scouring and redistribution of sediments in Clear Creek.

Although tissue contaminant levels are expected to continue to decline through natural attenuation processes, investigations are planned to address any remaining pollutant loads to these water bodies. As part of an interagency agreement between the EPA and the United States Geological Survey (USGS), observed historical trends in chlordane occurrence in Clear Creek are being investigated to verify declining environmental concentrations in the watershed (see *Work Plan Summary -Historical Trends in Chlordane Occurrence in Clear Creek as Recorded in Bottom Sediments Deposited in Distributary Channels and Coastal Embayments Near the Confluence with Clear Lake, May, 2001*).

The cities in which these water bodies are located have storm water quality programs in place. These four cities are covered by individual Phase II storm water permits which will be issued by TNRCC (see Legal Authority section of this document). Various control actions and management measures have already been implemented under these local programs, and have likely reduced any remaining legacy pollutant input into Clear Creek. These include:

- (1) erosion control requirements on construction sites, and
- (2) routing of a significant portion of the storm water runoff to detention/retention impoundments before releasing it into Clear Creek, allowing for a certain amount of sedimentation of silt and debris.

Furthermore, as part of the preparation for implementation of Phase II storm water regulations, many of the municipalities in the Clear Creek watershed are working with the Houston-Galveston Area Council (HGAC) and the TNRCC's Galveston Bay Estuary Program to

implement additional measures related to the improvement of storm water quality. These include:

- (1) formation of a storm water committees to oversee implementation of all aspects of Phase II storm water regulations
- (2) implementation of public education programs addressing proper use and disposal of household chemicals

The TNRCC and local authorities will further evaluate the need for, and effectiveness of, the various mitigation and remediation efforts, including site-specific natural attenuation, based on the results of the EPA/USGS study. These evaluations will gauge the effectiveness of the various storm water control actions. Decisions concerning the need for, and implementation of, any additional control actions or management measures, including additional (best) management practices (BMPs) will be better developed as the results of the ongoing studies are known (see Implementation Schedule section of this document).

Legal Authority

TNRCC

Texas statutory provisions require the commission to establish the level of quality to be maintained in, and to control the quality of, water in the state (Texas Water Code (TWC) §26.011). Texas fulfills its obligations under Section 303(d) of the Clean Water Act to list impaired segments and create TMDLs through functions assigned by the legislature to TNRCC. The §303(d) list is prepared by TNRCC as part of its monitoring, planning and assessment duties (TWC §26.0135).

TMDLs are part of the state water quality management plans that TNRCC is charged by statute to prepare (TWC §26.036). As the state environmental regulatory body, the Commission has primary responsibility for implementation of water quality management functions within the State (TWC §26.0136 and §26.127). The Executive Director of the TNRCC must prepare and develop, and the Commission must approve, a comprehensive plan for control of water quality in the state (TWC § 26.012). The list of impaired segments and resulting TMDLs are tools for water quality planning.

Texas Surface Water Quality Standards are contained in Title 30, Chapter 307 of the Texas Administrative Code (30 TAC Chapter 307). TNRCC procedures for implementing the these standards are described in *Implementation of the Texas Natural Resource Conservation Commission Standards Via Permitting* (RG-194, August 1995).

The TNRCC received delegation of the NPDES program from EPA on September 14, 1998, and is authorized to implement the Texas Pollutant Discharge Elimination System (TPDES), the regulatory program to control discharges of pollutants to surface waters. The TPDES program covers all permitting, surveillance and inspection, public assistance, and enforcement regulatory

processes associated with waste discharges into or adjacent to any water in the state. This includes discharges of waste from industry and municipal treatment works, and discharges of storm water associated with industrial activities, construction sites, and municipal separate storm sewer systems (MS4s).

No point source wastewater permits currently authorize the discharge of any legacy pollutant into any of the water bodies addressed by these TMDLs. Any necessary regulatory action concerning the discharge of legacy pollutants will be addressed through storm water requirements:

- C TNRCC assumed jurisdiction and administration of the EPA Multi-Sector Storm Water General Permit for industrial activities on September 29, 2000. TNRCC is in the process of renewing that permit as TPDES General Permit No. TXRO5000.
- C Discharges of storm water associated with construction projects covering five acres or more are currently regulated by EPA under the Phase I Construction Storm Water General Permit. TNRCC will assume jurisdiction and administration of the construction permit by July 7, 2003, and will develop a state permit for renewal.
- C Discharges of storm water associated with construction projects one to five acres in size, or smaller than one acre if designated, will be regulated under Phase II of the storm water program. Phase II rules were published by EPA on December 8, 1999, and became effective on December 22, 1999. TNRCC must issue a Phase II Construction General Permit by December 9, 2002. Phase II construction sites must begin obtaining permit coverage within 90 days of permit issuance.
- C Discharges of storm water associated with MS4s in cities and counties with populations greater than 100,000 are currently regulated by individual MS4 permits issued by EPA under Phase I of the storm water program. TNRCC will assume jurisdiction upon expiration of each MS4 permit. MS4 permittees will apply for renewal with the TNRCC.
- C Cities and counties with populations less than 100,000 will be regulated under the Phase II storm water rules. TNRCC must designate additional small MS4s, and must issue a Phase II MS4 permit by December 9, 2002. Small MS4s must obtain permit coverage within 90 days of permit issuance. Phase II MS4s will be required to identify BMPs, along with associated measurable goals and implementation schedules, for efforts such as the identification and elimination of illicit discharges, construction site runoff control, and post-construction storm water management in new development and redevelopment areas.

Other State Agencies

The Texas Department of Agriculture (TDA) regulates the agricultural application of pesticides, as directed by Chapter 76 of the Texas Agriculture Code. Non-agricultural application of pesticides is regulated by the Structural Pest Control Board of Texas, as per the Structural Pest Control Act.

Implementation Schedule

Monitoring and evaluation projects are planned or underway as part of this implementation plan (see Table 2). Additional details of monitoring efforts are described in the Monitoring Plan section of this document.

The EPA has provided funding to the USGS for an investigation involving sediment coring in areas of the affected water bodies located near the confluence with Clear Lake. The objectives of the project are as follows:

- a more accurate characterization of chlordane occurrence in the Clear Creek watershed
- a qualitative assessment of current chlordane loading into Clear Creek; and
- the investigation of temporal trends in chlordane loading into Clear Creek

The major project activities, and the schedule for each, are as follows:

- site selection - Spring 2001;
- preparation of a Quality Assurance Project Plan - Spring/Summer 2001;
- collection of core samples - Summer 2001;
- analysis of core samples - Summer/Fall 2001; and
- reporting of data - December 2001

The TNRCC will base its assessment of the effectiveness of current mitigation efforts on the results of the investigation and on the results of the September 2000 TDH fish tissue collection and additional fish tissue sampling planned for 2005. The TNRCC will evaluate the need for, and potential effectiveness of, additional mitigation and remediation options, including management measures and/or institutional controls. The results of the USGS investigation and fish tissue monitoring will also be used to estimate site-specific rates of natural attenuation of chlordane in Clear Creek.

Table 2. Implementation schedule for monitoring and evaluation of potential management measures.

ENTITY	ACTIVITY	IMPLEMENTATION SCHEDULE
U.S. Geological Survey (USGS)	(1) Collection and evaluation of sediment cores collected in Clear Creek	(1) Summer/Fall 2001
Texas Department of Health (TDH)	(1) Collection of fish for tissue analysis (2) Reassessment of tissue contaminant risk	(1) Completed in September 2000 (2) Expected by October 2001
Texas Natural Resource Conservation Commission (TNRCC)	Evaluation of results of the activities conducted by USGS and TDH Coordination and planning with local authorities for any additional monitoring and/or BMP implementation; See Table 3 for details	Following completion of all scheduled activities and receipt of all resulting data - probably early to mid 2002; Interim meetings and evaluations will be conducted as appropriate; See Table 3 for details

Timetables for additional monitoring and/or the implementation of any BMPs, and estimates of the time necessary for restoration of the fish consumption uses, will be further developed as the results of the ongoing monitoring efforts are known. Interim evaluations will be made as appropriate, with final evaluations to be performed following completion of all planned and ongoing efforts, probably in early to mid 2002. The following subsections outline a general approach (summarized in Table 3) to possible subsequent actions that will depend upon results of the efforts described above.

Table 3. Evaluation outline for any subsequent actions found to be necessary based on the results of ongoing monitoring and related studies. Any subsequent activities will be coordinated by the TNRCC and local authorities. See text for additional details.

ACTIVITY	RESULTS	SUBSEQUENT ACTION
(1) Historical pollutant trends determined from sediment cores (USGS)	<p>(a) No substantial recent input - any existing pollutants in deeper layers of sediment</p> <p>(b) Pollutant concentration and depth in core suggest recent or continuing input</p>	<p>(a) Evaluate within framework of USGS conclusions - no additional action is likely to be necessary</p> <p>(b) Evaluate within framework of USGS conclusions, initiate activities to identify current source(s), and evaluate potential BMPs and additional mitigation/remediation needs</p>
(2) Fish tissue contaminant concentrations (TDH)	<p>(a) Removal of consumption ban by TDH due to reduction of tissue contaminant concentrations</p> <p>(b) Consumption ban remains in effect, but trend in reduction of tissue contaminant concentrations is evident</p> <p>(c) No evidence of reduction in tissue contaminant concentrations based on samples collected in 2000-2006</p>	<p>(a) No action necessary other than follow-up tissue sampling five years after removal of the ban</p> <p>(b) (i) Continue tissue monitoring every five years to verify continuing contaminant reductions (ii) Conduct follow-up tissue monitoring five years after endpoint target is achieved and ban is removed</p> <p>(c) (i) Continue addressing pollutant sources and monitoring fish tissue (ii) Reevaluate TMDL time frames and need for additional approaches</p>

Historical Loading Trends

Contaminants present in sediments degrade slowly, and may be present for long periods of time (Oliver *et al.* 1989; Rhee *et al.* 1993; Sokol *et al.* 1998; EPA 1999). Van Metre *et al.* (1998) analyzed sediment core samples from 11 reservoirs, and determined mean sediment half-lives of 7.7 to 17 years for chlordane. Contaminant levels in lake sediment cores have shown good agreement with production and usage histories of the parent compounds, with peak concentrations appearing at the times of peak use (Ricci *et al.* 1983; Oliver *et al.* 1989; Van Metre and Callender 1997; Van Metre *et al.* 1998). Higher concentrations generally appeared deeper in the cores, indicating that input and accumulation were decreasing with time.

If historical trends determined from the Clear Creek sediment cores indicate recent or continuing contaminant input and the results of recent fish tissue sampling by the TDH show concentrations

exceed the endpoint target concentrations specified in the adopted TMDLs, additional investigation will be needed to identify sources. Suspended sediment sampling will be performed, if necessary, to further isolate the source(s). If the USGS evaluations indicate unexpectedly large sediment concentrations, the need for dredging will also be evaluated. However, natural attenuation is expected to reduce contaminant concentrations, while ongoing sedimentation will continue to bury any remaining contaminated sediment in the depositional environments of the water course. Although residues can continue to persist in the deeper parts of the sediment column, burial by more recently deposited sediments may result in effective removal of the contaminants from bioavailability to aquatic life (Ricci *et al.* 1983).

Current Pollutant Loading

Numerous studies have documented the long-term persistence of organochlorine pesticides and their degradation products in soil. Pesticide residue concentrations in soils can span several orders of magnitude, and are a reflection of application history and loss rates (Lichtenstein *et al.* 1971; Harner *et al.* 1999). Degradation rates of organochlorine residues are highly variable, and soil half-lives of as much as 20 to 35 years have been reported (Nash and Woolson 1967; Dimond and Owen 1996; Mattina *et al.* 1999).

The release of pollutants from undisturbed soils is not generally a major problem. Mattina *et al.* (1999) examined an experimental site 38 years after chlordane application, and found vertical and horizontal movement to be minimal. Bennett *et al.* (1974) observed little lateral movement of chlordane and dieldrin residues 21 years after application, except in areas that had experienced erosion. The primary method of transport of legacy pollutants into aquatic systems is by erosion of soil and attached contaminants (Munn and Gruber 1997).

If the analysis of core samples collected in Clear Creek indicates continuing contaminant input to the affected water bodies, additional sampling will be performed as necessary to further investigate and isolate source areas. Suspended sediment sampling will be planned and performed through a contract with USGS, with input and/or participation by local authorities. Identified source areas will be addressed by the most appropriate management measures and/or institutional controls.

Fish Tissue Contaminant Concentrations

A large number of factors associated with fish physiology, environmental conditions, and the form of the contaminant have been found to influence contaminant elimination from fish tissue (see literature surveyed in TNRCC 2000b). Long-term field studies have generally found that elimination rates are considerably longer than in those measured in laboratory studies (de Boer *et al.* 1994; Delorme *et al.* 1999).

The endpoint target of these TMDLs is the reduction of fish tissue contaminant concentrations to levels that constitute an acceptable risk to fish consumers, allowing TDH to remove the bans on fish consumption. If the results of the fish tissue collection completed in September of 2000

indicate that endpoint targets have been reached in Clear Creek, follow-up sampling will be conducted in 2005 to verify that tissue contaminants remain at acceptable levels. However, the TDH may choose to conduct additional monitoring in Clear Creek at any time.

If fish tissue data collected in 2000-2005 indicate that endpoint targets have not yet been reached in a water body, it will be necessary to continue tissue monitoring. Additional tissue sampling may be the only step necessary if the tissue data indicate a clear trend in the reduction of tissue contamination. Because the natural attenuation of legacy pollutants occurs gradually, collection and analysis of fish tissue on a five-year cycle beginning in 2000 should be adequate to track continuing declines and allow for periodic reassessment of consumption risk by the TDH. Tissue sampling will be performed by the TDH, or by another entity through an arrangement with the TDH. Sampling will continue on this schedule until endpoint targets have been reached and the consumption ban removed. Follow-up sampling will be conducted approximately five years later to verify that tissue contaminants remain at acceptable levels. As in the above case, TDH may choose to conduct additional monitoring in any of the water bodies at any time.

Decreases in fish tissue concentrations of organochlorine insecticides have been observed where no major additional inputs are occurring (see Moore and Ramamoorthy 1984; Brown *et al.* 1985; Bremle and Larsson 1998). If tissue samples collected in 2000-2005 indicate no reduction of contaminants in a water body, reevaluation of the current TMDL approach will be required.

Monitoring After Additional Action

Subsequent remediation of source(s), implementation of BMPs, institutional controls, or other regulatory or enforcement activities will be dependent upon the nature of the source(s). Additional monitoring may be necessary to assess the adequacy of any of these additional efforts. TNRCC and local authorities will cooperate in planning this assessment monitoring when a decision is made to take a particular action in a designated location.

Restoration of Fish Consumption Use

The results of current monitoring efforts, and any subsequent need to implement one or more additional activities, will likely affect any estimates of the time necessary for restoration of the fish consumption use to these water bodies. Given current knowledge of fish tissue chlordane concentrations and potential existing environmental reservoirs of chlordane, restoration of the fish consumption use in Clear Creek is expected within the next ten years. Findings of the planned and ongoing monitoring efforts, and reassessment of tissue contaminant risk by TDH, may require revision of these estimates.

Monitoring Plan

As noted in previous sections of this document, the USEPA has provided funding to the USGS for an investigation that is using sediment coring to describe historical trends in the occurrence of legacy pollutants in Clear Creek to determine qualitatively if there are continuing sources of chlordane in the Clear Creek watershed and to estimate site-specific rates of natural attenuation of this pesticide. The study will use sampling approaches and protocols of the USGS National Water-Quality Assessment Program (NAWQA) Reconstructed Trends Study (Van Metre and Callender, 1997). The study will include the following activities:

- ***Site Selection***
 - (1) A coring site will be selected that is likely to receive sediment input from as much of the Clear Creek watershed as possible given the additional criteria described below.
 - (2) The coring location will be selected based on factors that enhance the likelihood of encountering appreciable, undisturbed, sequential sedimentation.
 - (3) The coring location selected will minimized the effects of tidal influence on sedimentation, such as flow reversal and sediment dilution.

- ***Preparation of Quality Assurance Project Plan (QAPP)***
 - (1) A QAPP will be prepared and submitted to USEPA for approval prior to the initiation of core sampling activities; protocols specified under EPA quality assurance document QA-R5 will be followed.

- ***Collection of Core Samples***
 - (1) The cores will be collected with a 2-meter long piston corer and/or a 50-cm box corer to minimize sediment disturbance.
 - (2) The cores will be sub-sampled in 1-5 cm increments depending on the total core sample depth

- ***Analysis of Core Samples***
 - (1) Core sub-samples will be dated using Cs¹³⁷ analysis and analyzed for chlorinated organic compounds and major and trace elements. First occurrence of and peaks in Cs¹³⁷, corroborated with peaks in lead and DDT, will be combined with sampling date to provide age-date markers in the core.

- ***Reporting of Data***
 - (1) a data report containing sampling locations, tabulated data, and a graphic representation of the data will be submitted to the EPA and the TNRCC
 - (2) the data report will contain a limited interpretation of the data as well as recommendations for any further work deemed necessary.

The TNRCC will cooperate with the TDH to monitor fish tissue in Clear Creek. Tissue monitoring is intended to better define the extent and severity of the impairments, establish spatial and temporal trends in fish tissue contamination, and monitor the reduction of tissue concentrations to levels that allow removal of the fish consumption advisories. TDH received funding from TNRCC to conduct fish tissue sampling which was completed in September of 2000. TDH will reassess tissue contaminant levels in these water bodies when the results of the September 2000 sampling are established.

- Twenty fish were sampled, at three locations in Clear Creek in September of 2000.
- Fish tissue collected in September of 2000 were be analyzed in the Fall of 2000.
- The results of the tissue analyses will be evaluated and a re-assessment of risk to human health is scheduled to occur in the Summer of 2001.

The process described above for fish tissue collection, analysis, and assessment will be repeated within a five year time span to confirm results observed in 2000 and/or to re-assess the fish consumption impairment in Clear Creek.

The TNRCC and local authorities will further evaluate the need for additional monitoring activities based on the results of the various planned and ongoing studies. The necessary extent of any additional monitoring will be developed as the results of the EPA/USGS and TNRCC/TDH projects (see also Implementation Schedule section of this document). Additional monitoring can be planned in cooperation with individual cities, or through the regional storm water monitoring program coordinated by the HGAC, as appropriate. TDH may also choose to conduct additional fish tissue monitoring in any of the water bodies at any time.

- If sediment coring indicates continuing input of chlordane into Clear Creek, suspended sediment sampling will be needed to isolate and delineate the source area(s). Additional sampling will be planned and performed through a contract with USGS, with input and/or participation by local authorities.
- If fish tissue data collected in 2000 indicate that endpoint targets have been reached in a given water body, follow-up sampling will be conducted in 2005 to verify that tissue concentrations remain at acceptable levels. Tissue sampling will be performed by TDH, or by another entity through an arrangement with TDH.
- If fish tissue data collected in 2000 indicate that endpoint targets have not been reached in a water body, additional tissue monitoring will be conducted on a five-year cycle beginning in 2005 to track contaminant declines and allow for periodic reassessment of consumption risk by TDH. Tissue sampling will be performed by TDH, or by another entity through an arrangement with TDH. Sampling will continue on this schedule until endpoint targets have been reached and the consumption advisories are removed. Follow-up sampling will be conducted approximately five years after removal of the consumption advisories to verify that tissue contaminants remain at acceptable levels.
- Additional monitoring may be necessary to assess the adequacy of any subsequent source remediation, BMP implementation, or regulatory activities that are undertaken.

This monitoring may include fish tissue and/or suspended sediment sampling, and will be coordinated with local authorities.

Reasonable Assurance of Success

Restrictions on the use of legacy pollutants generally have resulted in a slow but steady decline in environmental residues (Smith *et al.* 1988). Reconstructed contaminant trends in lake sediment cores have shown good agreement with production and usage histories of the parent compounds, with peak concentrations appearing at the times of peak use (Ricci *et al.* 1983; Oliver *et al.* 1989; Van Metre and Callender 1997; Van Metre *et al.* 1998). Higher concentrations generally appeared deeper in the cores, indicating that input and accumulation were decreasing with time. Although residues continue to persist in deeper parts of the cores, burial by more recently deposited sediments may result in effective removal of the contaminants from bioavailability to aquatic life (Ricci *et al.* 1983).

Decreases in fish and human tissue concentrations of organochlorine insecticides have been observed where no major additional inputs are occurring (see Moore and Ramamoorthy 1984; Brown *et al.* 1985; Hovinga *et al.* 1992; Bremle and Larsson 1998; Schiff and Allen 2000). Reviews of tissue data collected from a variety of water bodies in northern Europe between 1967 and 1995 have found a significant decrease in organochlorine concentrations over time (Skåre *et al.* 1985; Bignert *et al.* 1998). Fish tissue concentrations of total DDT, chlordane, and dieldrin have declined across the U.S. since uses of these substances were discontinued (Schmitt *et al.* 1990; USGS 2000). Total chlordane levels were stable, although a shift from the *cis*- to the *trans*-isomer between the mid-1970s and mid-1980s suggested a smaller influx of chlordane to the environment (Schmitt *et al.* 1990). In Lake Ontario, chlordane residues were found to be near the detection limit in shiner samples (Suns *et al.* 1991).

Continuing decreases in environmental legacy pollutant levels are expected, although the necessary time frame is subject to debate. In addition to degradation and biotransformation of compounds, there may also be a shift towards the atmosphere in the overall partitioning of some organochlorines (see Jones and de Voogt 1999; Geva *et al.* 2000). Although residues may continue to persist in deeper sediments, burial by more recently deposited sediments may result in effective removal of the contaminants from bioavailability to aquatic life (Bopp *et al.* 1982; Ricci *et al.* 1983). Contaminants can also become so strongly attached to sediment particles over time that bioavailability may decline as a result. Severe extraction procedures used during analysis may not always reflect actual availability to biota (see Jones and de Voogt 1999).

Planned Investigations and Subsequent Action

The EPA/USGS investigation will use sediment cores to describe historical trends in the occurrence of chlordane. The study will also attempt to determine the probability of any existing source of pollutants (see Monitoring Plan section of this document for details). The use of sediment coring has proven to be an effective approach to identifying temporal trends in pollutant occurrence in other

water bodies in the state of Texas (Town Lake in Austin, White Rock Lake in Dallas, and several urban lakes in Fort Worth).

If sediment coring indicates the probability of a significant continuing source of chlordane in the Clear Creek watershed, implementation of one or more BMPs may be appropriate. Furthermore, delineation of potential source areas through suspended sediment collection and analysis or other sampling techniques may help optimize the implementation of selected BMPs. Evaluation by the TNRCC and local governmental entities will assist in determining which BMPs may be most successful should it be necessary to implement one or more of these measures. Local storm water programs also provide a mechanism for implementing many of the potential BMPs.

More drastic alternatives, such as dredging and/or the eradication of contaminated fish communities and restocking, have also been successful in restoring a fish consumption use (O'Meara *et al.* 2000); however, this approach is probably better justified at heavily contaminated sites impacted by point source discharges and major spills due to its expense and accompanying environmental concerns.

Measurable Outcomes

The following outcomes will denote the attainment of various implementation steps:

- (1) Collection of core samples and completion of data analysis and reconstruction of historical trends from Clear Creek sediment cores and evaluation of current pollutant loading
- (2) Completion of reassessment of fish tissue risk by TDH in 2001.
- (3) Completion of additional fish tissue sampling at five-year intervals
 - (a) sampling events and laboratory analyses
 - (b) reassessment of fish tissue risk by TDH
- (4) Completion of additional sampling (suspended sediments or other methods)
 - (a) planning/completion of sampling events and laboratory analyses
 - (b) data analysis and evaluation of source areas
- (5) Planning and implementation of any additional remediation activities, BMPs, and/or regulatory strategies as needed.

The most significant outcome for determining the success of the TMDLs and the implementation plan will be the removal of the fish consumption advisories by TDH. Interim outcomes that indicate progress towards this goal are:

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- , Continued reductions in fish tissue contaminant concentrations beyond those already observed,
 - , Reduction of fish tissue contaminant concentrations to a level that allows TDH to modify a consumption advisory by removing some of the contaminants, or by shifting to an advisory for certain groups at greater risk, and
 - , Reduction of fish tissue contaminant concentrations to levels that meet the endpoint target concentrations and acceptable risk levels, but where TDH has not yet removed the consumption advisory.

TDH has the authority and jurisdiction for the decision to issue or remove fish consumption bans and advisories. Subsequent risk assessments by TDH may result in no change to an advisory, removal of the advisory, or a shift to an advisory for certain groups at greater risk. The ultimate endpoint goal for the affected water bodies is the protection of all groups from contaminant exposure via consumption of fish and the complete removal of the fish consumption advisories from Clear Creek.

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Appendix J

Alternatives Matrix

