ENVIRONMENTAL ASSESSMENT

FM 1488

JOSEPH ROAD TO FM 2978

MONTGOMERY AND WALLER COUNTIES, TEXAS

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

TEXAS DEPARTMENT OF TRANSPORTATION

MONTGOMERY COUNTY

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Table of Contents

I. NEED FOR AND PURPOSE OF PROPOSED ACTION 1
- A. Introduction 1
- B. Proposed Action 1
- C. Need for the Proposed Project 2
  - *Population and Economic Growth* 2
  - *Mobility* 4
  - *Safety* 4
  - *Congestion* 5
  - *System Linkage/Roadway Connectivity* 5
- D. Purpose of the Proposed Project 6

II. PROJECT DESIGN 6
- A. Project Location and Limits 6
- B. Project Length/Right-of-Way 6
- C. Type of Facility 6
  - *Existing* 6
  - *Proposed* 7

III. ALTERNATIVES ANALYSIS 7
- A. No-Build Alternative 8
- B. Alternatives Considered but Dismissed 8
  - *Alternative A* 8
  - *Alternative B* 8
  - *Alternative C1* 8
- C. Preferred Build Alternative 9

IV. PROJECT SETTING 10
- A. Land Use 10
- B. Soils 11

V. POTENTIAL SOCIAL, ECONOMIC, AND ENVIRONMENTAL EFFECTS OF THE PREFERRED ALTERNATIVE 13
- A. Regional Socioeconomic Data 13
  - *Employment and Income Data* 13
  - *Land Values and Tax Base* 14
  - *Community Cohesion* 14
  - *Environmental Justice* 14
  - *Limited English Proficiency* 16
- B. Right-of-Way Acquisition/Displacements 17
- C. Farmlands 18
- D. Beneficial Landscape Practices 18
- E. Invasive Species 19
- F. Vegetation Impacts 19
  - *Existing Vegetation* 19
  - *Upland Forest* 19
  - *Maintained Grass/Lawn* 20
  - *Pasture* 20
  - *Riparian* 21
  - *Forested Wetlands* 21
  - *Non-Forested Wetlands* 21
  - *Proposed Vegetation Impacts* 21
  - *Mitigation* 22

G. Area Wildlife 22
H. Threatened and Endangered Species 23
I. Essential Fish Habitat 29
J. Cultural Resources 29
Archeological Properties *29*
Historic Structures *30*
K. Parklands 32
L. Floodplains 32
M. Wetlands and Waters of the U.S. 32
Delineated Features *32*
Wetland Functions and Values *33*
Avoidance/Minimization of Impacts to Wetlands *34*
Proposed Impacts to Wetlands and Waters of the U.S. *34*
Mitigation *34*
N. Water Quality 35
O. Coastal Zone Management Plan 36
P. Hazardous Materials 36
Visual Observation *36*
Regulatory Records Review *36*
Conclusion *40*
Q. Air Quality Analysis 40
Congestion Management System *40*
Mobile Source Air Toxics (MSATs) *41*
R. Traffic Noise Analysis 47
S. Indirect and Cumulative Impacts 52
Biological Resources *59*
Water Resources *60*
Land Use *64*
Air Quality *65*
T. Mitigation and Monitoring Commitments 67
U. Visual and Aesthetic Quality 68
V. Permits 68
U.S. Army Corps of Engineers *68*
U.S. Coast Guard *68*
Texas Commission on Environmental Quality *68*
W. Railroads 69
X. Aircraft Clearance 69
Y. Construction Impacts 69
VI. SUMMARY 70

List of Tables

Table 1: Population and Employment Trends and Projections 4
Table 2: FM 1488 Accident Rates Per 100 Million Vehicle Miles 4
Table 3: FM 1488 Traffic Volumes 5
Table 4: Environmental Constraints Comparative Evaluation 9
Table 5: Soil Types Located Within the Project Area 11
Table 6: Household Incomes in 1999 13
Table 7: Racial and Ethnic Composition of the Population in the Year 2000 15
Table 8: Median Family Incomes and Poverty Status - 1999 16
Table 9: Percentage LEP Population (1999) 17
Table 10: Upland Forest Tree Species Within the Project Area 20
Table 11: Riparian Tree Species Within the Project Area 21
Table 12: Forested Wetland Tree Species Within the Project Area 21
Table 13: Potential Impacts to Vegetation Communities Within the Project Area 22
Table 14: State and Federal Threatened and Endangered Species of Montgomery County 24
Table 15: State and Federal Threatened and Endangered Species of Waller County 25
Table 16: Wetlands and Waters of the U.S. Within the Project Area 33
Table 17: RCRA Facilities Within 1 mi of the Project Area 37
Table 18: ERNS Facilities Within 1 mi of the Project Area 37
Table 19: UST Facilities Within 1 mi of the Project Area 38
Table 20: LUST Facilities Within 1 mi of the Project Area 39
Table 21: FINDS Facilities Within 1 mi of the Project Area 39
Table 22: AST Facilities Within 1 mi of the Project Area 39
Table 23: Industrial and Hazardous Waste Facilities Within 1 mi of the Project Area 39
Table 24: Sensitive Receptors by Distance 44
Table 25: Common Sound/Noise Levels 48
Table 26: FHWA Noise Abatement Criteria 49
Table 27: Traffic Noise Levels (dBA Leq) 50
Table 28: Noise Contours 51
Table 29: TxDOT's Eight-Step Approach to the Indirect and Cumulative Impact Analysis 53
Table 30: Resource Indicators and Study Areas for the Cumulative Effects Analysis 54
Table 31: Summary of Existing Resource Conditions and Potential Impacts 58

List of Figures

Figure 1: Population Trends and Projections 3

List of Exhibits

Exhibit 1: Location Map
Exhibit 2: USGS Topographic and FEMA Floodplain Map
Exhibit 3: Environmental Constraints Map
Exhibit 4: Schematics
Exhibit 5: Existing and Proposed Typical Sections
Exhibit 6: Census Tract Block Groups
Exhibit 7: Houston-Potential Archeological Liability Map (PALM)
Exhibit 8: Site Photographs
Exhibit 9: MSATs Sensitive Receptor Map

List of Appendices

Appendix A Agency Correspondence
Appendix B Hazardous Materials Database Search
Appendix C Red-Cockaded Woodpecker Survey

List of Acronyms

%	percent
ac	acre
ACHP	Advisory Council on Historic Preservation
ADT	Average Daily Traffic
APE	Area of Potential Effect
AST	Aboveground Storage Tank
BG	block group
BNSF	Burlington Northern Santa Fe
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CDP	Census Designated Place
CMS	Congestion Management System
CMSA	Consolidated Metropolitan Statistical Area
CFR	Code of Federal Regulations
CT	census tract
dB	decibel
dBA	A-weighted decibel
dbh	diameter at breast height
DHHS	Department of Health and Human Services
EA	Environmental Assessment
EDR	Environmental Data Resources, Inc.
EFH	Essential Fish Habitat
EO	Executive Order
EPA	Environmental Protection Agency
EPIC	Environmental Permits, Issues, & Commitments
ERNS	Emergency Response Notification System
ETC	Estimated Time of Completion
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FINDS	Facility Index System
FIRM	Flood Insurance Rate Map
ft	feet
FM	Farm-to-Market
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FY	Fiscal Year
H-GAC	Houston-Galveston Area Council
IH	Interstate Highway
in.	inch
LEP	Limited English Proficiency
Leq	Equivalent sound level
LOS	Level of Service
LOW	Letter of Waiver
LUST	Leaking Underground Storage Tank
m	meter
mi	mile
MLS	multiple listing service

MOU	Memorandum of Understanding
mph	miles per hour
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
MSATs	Mobile Air Source Toxics
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NDD	Natural Diversity Database
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NLEV	National Low Emission Vehicle
NMHC	non-methane hydrocarbon
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NTCHS	National Technical Committee for Hydric Soils
NRHP	National Register of Historic Places
NRCS	Natural Resource Conservation Service
NWP	Nationwide Permit
PA	Programmatic Agreement
PALM	Potential Archeological Liability Map
PS&E	Plan, Specification and Estimate
RAZ	Regional Analysis Zone
RCRIS	Resource Conservation and Recovery Information System
RCW	Red-cockaded woodpecker
ROW	Right-of-Way
RFG	Reformulated Gasoline
RR	Railroad
RTP	Regional Transportation Plan
SAL	State Archeological Landmark
SH	State Highway
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SOC	Species of Concern
SOV	Single Occupancy Vehicle
SW3P	Storm Water Pollution Prevention Plan
TAC	Texas Antiquities Code
TAQA	Traffic Air Quality Analysis
TCEQ	Texas Commission on Environmental Quality
TCM	Transportation Control Measures
TDM	Traffic Demand Management
THC	Texas Historical Commission
TIP	Transportation Improvement Plan
TMA	Transportation Management Area
TNM	Traffic Noise Model
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TSM	Traffic System Management
TSS	Total Suspended Solids
TxDOT	Texas Department of Transportation

TX IHW	Texas Industrial and Hazardous Waste
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USC	U.S. Code
USDOT	U.S. Department of Transportation
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
VMT	Vehicle Miles Traveled
vpd	vehicles per day

I. NEED FOR AND PURPOSE OF PROPOSED ACTION

A. Introduction

This Environmental Assessment (EA) discusses the social, economic, and environmental impacts of the proposed Montgomery County improvements to Farm-to-Market Road (FM) 1488 from approximately 1,100 feet (ft) west of Joseph Road in Waller County to FM 2978 in Montgomery County. The total project length is approximately 16 miles (mi) (**Exhibits 1** and **2**).

Montgomery County, in cooperation with the Texas Department of Transportation (TxDOT), is proposing improvements to the existing FM 1488 roadway. These improvements would increase the operational efficiency and safety of the FM 1488 facility. This section of FM 1488 crosses through the City of Magnolia. The existing facility would be widened from two to four lanes and would include a continuous center left-turn lane. A grade separation would also be constructed over the Burlington Northern Santa Fe (BNSF) Railroad (RR) crossing and FM 149 intersection. The improvements would address public safety and roadway deficiency problems that exist along FM 1488, within the project limits.

In addition to improving the operational efficiency and safety conditions of FM 1488, the upgrading of this roadway is warranted based on projected population growth, current and projected economic growth and development, and a projected increase in traffic volumes within the project limits.

B. Proposed Action

The proposed roadway improvements would upgrade the existing two-lane FM 1488 facility to increase safety, access, and mobility for the traveling public. The proposed project would also serve the local transportation needs of communities and towns surrounding the FM 1488 corridor including Conroe, Magnolia, and The Woodlands. There has been strong community interest in developing and enhancing east-west corridors in southern Montgomery County to accommodate the increasing traffic levels resulting from population growth and development in the area.

The proposed roadway would consist of a four-lane undivided facility with a continuous center left-turn lane, and a proposed grade separation at the BNSF RR and FM 149 intersection. Alternatives discussed in Section V, Alternatives Analysis, include widening the FM 1488 alignment equally to both sides of the existing roadway, widening to the north or south of the existing roadway, and a no-build alternative.

Construction costs are estimated to be $58,706,000. Costs are planned to be funded 80% by the Federal Highway Administration (FHWA) and 20% by TxDOT. TxDOT and Montgomery County would be responsible for 100% funding of the utility relocations. The proposed project is listed on the 2006-2008 Transportation Improvement Plan (TIP). The U.S. Department of Transportation (USDOT)-Federal Highway Administration/Federal Transit Administration-found the Fiscal Year's (FY) 2006-2008 and 2025 Regional Transportation Plans (RTPs) to conform on October 31, 2005 and June 3, 2005, respectively. On April 22, 2005, the Houston-Galveston Area Council (H-GAC) adopted the FY 2006-2008 TIP with 2005 supplement TIP and 2025 RTP. TxDOT is in the process of updating the TIP for this proposed project.

Public participation has included three rounds of public meetings. Public meeting summaries are on file with the TxDOT Houston District office. The first public meeting was held in August

2001. This meeting consisted of an information-gathering forum. The results of this meeting indicated that the people living along the project were in favor of improving the FM 1488 corridor.

In December 2001, two more public meetings were held to present the alternatives for the proposed FM 1488 alignment. These public meetings showed alternatives for the roadway improvements within the project limits discussed in this EA. These meetings also included alternatives for FM 1488 from FM 2978 to Interstate Highway (IH) 45. The results of these meetings also indicated that the people living along the project area were in favor of improving the FM 1488 corridor, due to concerns for current traffic levels and safety issues.

Public comments received included a majority in favor of an 'overpass' at FM 149 during both meetings, an equal number for an 'overpass' versus an 'at-grade' separation at FM 1774 at the December 5th meeting, held at the Willie E. Williams Elementary School, and a majority in favor of an 'overpass' at FM 1774 at the December 6th meeting, held at Montgomery College.

A third public meeting, held at Montgomery College on June 18, 2002, yielded comments that included requests to expedite the project, comments that the design would improve safety and congestion, and requests for traffic signals and turning lanes at several intersections. Comments concerning additional ROW through Magnolia and potential business impacts were also received.

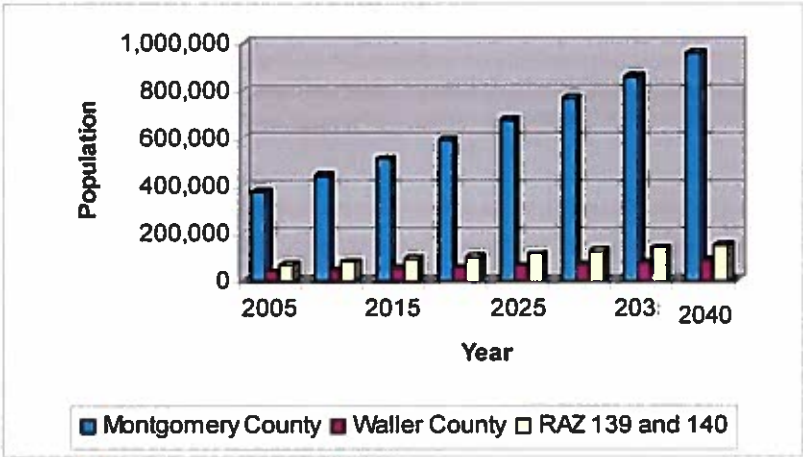
The FM 1488 roadway warrants changes to the existing design for roadway deficiencies that do not meet current design standards. The hydraulic design in some areas would be improved to increase the capacity of drainage features in low lying areas and bring the roadway to or above the 100-year flood level. Additionally, roadway design would be upgraded to meet current standards. To meet the current design standards, the portion of FM 1488 between Yancey Street and Roy Street in the City of Magnolia is being proposed as an urban roadway section consisting of two travel lanes in each direction with a continuous center left-turn lane, 10-ft shoulders, and a curb and gutter system. The remainder of the proposed roadway would consist of two 12-ft travel lanes in each direction, a 16-ft continuous center left-turn lane, 10-ft shoulders, and drainage swales on both sides.

C. Need for the Proposed Project

Population and Economic Growth

The proposed project is located in Montgomery and Waller counties. Most of the growth affecting FM 1488 is forecast to be in Montgomery County. Montgomery is the dominant county with a year 2000 population of 293,768, compared to 32,663persons in Waller County. Montgomery County has experienced consistent growth over the past 40 years and is expected to continue this strong growth through year 2040, as shown in **Figure 1.** During the 1990s, Montgomery County was the sixth fastest growing county in Texas.

Figure 1: Population Trends and Projections



Source: Houston-Galveston Area Council 2025 Regional Growth Forecast. Aggressive Scenario. May 2003.

Montgomery County's growth is largely due to it being a suburban county adjacent to Harris County, the core county of the metropolitan area. Although the number of local employees has been growing, many residents commute to work in Houston and other parts of Harris County. Most of the growth is estimated to be people moving into the county from other parts of the United States or other countries. The two counties through which the proposed project crosses are expected to experience significant growth over the next 35 years.

In recent years, a number of commercial and industrial firms have established operations in Montgomery County. The more traditional elements of the county's economy, including the timber industry, oil production, greenhouse crops, cattle, horses, hay, poultry, goats, and Christmas trees, are still important aspects of the county's economy.

Montgomery County is expected to continue growing at an average annual rate of 2.7% between 2000 and 2040. The H-GAC prepared regional forecasts and county allocations for all 13 counties within the metropolitan planning organization (MPO) region. The county population forecasts were distributed into smaller areas called Regional Analysis Zones (RAZ). A RAZ is a grouping of adjacent census tracts (CTs). The proposed project is located primarily within RAZ 139, but extends into RAZ 140 at the west end of the project. Refer to **Table 1** for a comparison of population and employment trends and projections from 1990 to 2025 for Montgomery County and RAZ 139.

Table 1: Population and Employment Trends and Projections

Year	Population		Wage and Salary Employment	
	Montgomery Co.	RAZ 139	Montgomery Co.	RAZ 139
1990	183,304	17,278	42,789	N/A
1995	228,353	21,614	N/A	N/A
2000	293,768	29,248	98,931	4,311
2005	346,700	33,634	116,397	5,191
2010	399,541	38,909	134,249	6,092
2015	455,031	44,426	148,874	6,829
2020	514,636	50,332	162,153	7,498
2025	574,125	56,541	175,188	8,152

Source: H-GAC. *Small Area Allocation Forecast by County, 1990-2025.* November 1999.
N/A: not available

Mobility

Mobility problems exist along FM 1488 since the capacity of this roadway is not sufficient to meet an acceptable level of service (LOS), which currently varies from C to E. LOS A represents the best traffic flow conditions while LOS F represents the worst traffic flow conditions on any given roadway. Less than 2 mi of the project corridor, from Joseph Road to Lakeshore Road, currently operates at LOS C. Approximately 5 mi, from Lakeshore Road to Goodson Road and Roy Street to Spur 149, currently operates at LOS D. Approximately 9 mi, from Goodson Road to Roy Street and Spur 149 to FM 2978, currently operates at LOS E. With the proposed action, all highway segments along FM 1488 in the project area are projected to operate at an acceptable LOS B in the year 2027.

Safety

The accident reports compiled by Texas Department of Public Safety for Montgomery and Waller counties document that the two counties experienced increases in the total number of motor vehicle traffic accidents in 1998 and 1999. Montgomery County increased from 3,817 accidents in 1998 to 4,000 in 1999, which is a 5% increase. Waller County increased from 427 accidents in 1998 to 467 accidents in 1999; a 9% increase in the total number of accidents in that county. Within the FM 1488 project area, TxDOT accident data shows a total of 33 accidents per year in 1998 and 1999.

The statewide traffic accident rates, compiled by TxDOT, indicate that Texas roadways generally experienced a decrease in the number of accidents from 1997 to 1999. Conversely, the traffic accident data compiled by TxDOT documents that the FM 1488 project area experienced an increase in the number of motor vehicle traffic accidents during that time. The proposed improvements to FM 1488 address these safety concerns. **Table 2** lists accident rates per 100 million vehicle miles traveled along the FM 1488 the project area in comparison to statewide traffic accident rates over a 3-year period.

Table 2: FM 1488 Accident Rates Per 100 Million Vehicle Miles

Location		Accident Rates		
From	To	1997	1998	1999
Joseph Road	FM 1774	66.2	131.3	139.5
FM 1774	FM 149	75.3	90.5	104.4
FM 149	FM 2978	82.9	84.3	76.2
Statewide Traffic Accident Rate		104.6	101.2	102.8

Source: Texas Department of Public Safety, Accidents Records Division and Wilbur Smith Associates

At FM 149, the interchange would be elevated to a 23-ft clearance over the existing railroad track and FM 149 intersection, with two 12-ft lanes in each direction, a 16-ft center flush median, and 10-ft shoulders on both sides of the roadway. Each of the local at grade access roads in this area would consist of two 12-ft lanes in each direction, with 4-ft inside shoulders and 8-ft outside shoulders. These proposed improvements are designed to enhance the safety and mobility of traffic through this area. The public comments received during the planning stages identified this area as a specific safety concern of the community.

Congestion

The FM 1488 improvements address the traffic volume increases projected for the year 2027. Existing average daily traffic (ADT) for the years 2007 and 2027 for the project area are listed in **Table 3**. The project is expected to be let for construction in 2007 with an estimated completion date of 2009.

Table 3: FM 1488 Traffic Volumes

Limits	2007 ADT (vpd)	2027 ADT (vpd)
Joseph Road to Yancey Street	9,200	17,800
Yancey Street to FM 2978	18,200	37,500

The 23 Code of Federal Regulations (CFR) 450.320(b) states that no single occupancy vehicle (SOV) capacity may be built in Transportation Management Areas (TMA) designated as nonattainment for ozone or carbon monoxide unless the project complies with a Congestion Management System (CMS). The 2025 RTP for the Houston-Galveston TMA, which includes Montgomery County, contains a CMS. The CMS was adopted by the MPO on October 10, 1997 and later amended in December 1997 and May 1998. It is an ongoing process that is designed to systematically evaluate, select, and implement cost-effective strategies to manage new and existing transportation facilities. The CMS identifies appropriate Transportation Control Measures (TCMs) for implementation in various congested areas, today and in the future.

The proposed improvements would conform to the Houston-Galveston area CMS. Congestion Management Analyses (CMAs) are performed by the local MPO, and the local MPO for this project area is the H-GAC. The H-GAC has provided letters of waiver (LOW) for the proposed project CSJs 0523-08-007, 0523-09-009, and 0523-10-016 as they are not on the CMS Network and as such do not require a CMA. The project with CSJ number 0523-10-034 is not an added capacity project. It is a Transportation System Management (TSM) grade separation project and as such, does not require a CMA. (**Appendix A**)

System Linkage/Roadway Connectivity

The existing FM 1488 is generally an east-west facility that connects many small communities from Conroe to Magnolia. FM 1488 serves a high volume of traffic traveling to and from the Houston area by connecting to IH 45, a north-south interstate roadway located approximately 6.5 mi from FM 2978, the eastern limit of the FM 1488 project. See **Exhibit 1** for the location of the project area relative to other major roadways. FM 1488 connects with other FM roads within the study area, such as FM 1774 and FM 2978, to provide part of the regional network in Montgomery County. FM 2978 extends in a generally southerly direction to State Highway (SH) 249 in nearby Tomball. FM 1774, which extends in a southeasterly direction from Anderson in Grimes County to SH 249 south of Pinehurst, intersects with FM 1488 in Magnolia. FM 1488, from FM 2978 to IH 45, is currently under construction and will also provide a five-

lane facility with a similar typical section, which this project would tie into. Other plans to increase mobility in the area include widening FM 2978 and FM 1774 from two to four travel lanes; both of which are listed in the short range TIP.

D. Purpose of the Proposed Project

The purpose and objective of the proposed action is to improve mobility and accessibility for people and goods in Montgomery and Waller counties, reduce congestion of existing roadways and highways, enhance safety, and provide improved connectivity.

II. PROJECT DESIGN

A. Project Location and Limits

The proposed FM 1488 improvements would begin approximately 1,100 ft west of Joseph Road in Waller County, and would continue east to FM 2978 in the community of Egypt, in Montgomery County. Refer to **Exhibit 1** for the project location map. The majority of improvements would occur within Montgomery County, with the exception of approximately 1,800 ft of pavement tapering and improvements to occur within Waller County to tie into the proposed roadway at the western terminus of the project. Joseph Road, located in Waller County approximately 700 ft west of the county line, was chosen as the project terminus as traffic sharply decreases along FM 1488 at this rural intersection. The 2006 ADT for FM 1488 at Joseph Road was 3,800 vehicles per day (vpd), compared with the projected 2007 ADT of 9,200 vpd between the Montgomery/Waller County line and Yancey Street. The 2027 projected ADT at the FM 1488/Joseph Road intersection is 5,500 vpd; while the projected 2027 ADT for the section of road between the Montgomery/Waller County line and Yancey Street is 13,800 vpd. Refer to **Table 3** for traffic volumes and **Exhibit 4** for roadway schematics in the project area.

B. Project Length/Right-of-Way

The proposed project length is approximately 16 mi. The existing right-of-way (ROW) width varies from 100 ft to 120 ft. The proposed ROW width would vary from 150 ft to 770 ft in the rural sections, with a typical rural ROW of 150 ft. The rural sections extend from 1,100 ft west of Joseph Road to Yancey Street and from Roy Street to FM 2978. For the urban section, extending from Yancey Street to Roy Street in the City of Magnolia, the proposed typical ROW width would vary from 100 ft to 120 ft. At the FM 149/BNSF RR intersection, the BNSF RR and FM 149 crossings would be grade-separated with connector ramps to FM 149. The proposed project would require a total of 127.8 acres (ac) of proposed ROW. Refer to **Exhibit 4** for schematics of the proposed facility.

C. Type of Facility

Existing

FM 1488 currently consists of an at-grade, undivided, two-lane roadway (two 12-ft travel lanes in each direction) with 8-ft outside shoulders and roadside ditches. The railroad crossings at FM 1774 and FM 149 are at-grade. The existing ROW varies from 100 ft to 120 ft. The majority of the project is functionally classified as a rural major collector (**Exhibits 4** and **5**). Refer to **Exhibit 5** for existing typical sections.

Proposed

The proposed project would require 127.8 ac of additional ROW. The proposed roadway facility for FM 1488 would be a rural four-lane roadway with a continuous center left-turn lane. From 1,100 ft west of Joseph Road to Joseph Road, roadway improvements would consist of pavement work and tapering the existing roadway to the widening that begins at Joseph Road. The proposed roadway from Joseph Road to Yancey Street and from Roy Street to FM 2978 would consist of an open ditch section with four 12-ft lanes, a 16-ft flush median (continuous center left-turn lane), and two 10-ft outside shoulders. From Yancey Street to Roy Street in the City of Magnolia, the roadway would consist of a curb and gutter section with four 12-ft travel lanes, a 16-ft flush median (continuous center left-turn lane), and 12-ft outside shoulders for use as bike lanes. No additional ROW is proposed for the urban section of FM 1488 from 10th Street to FM 1774; however, from Yancey Street to 10th Street and from FM 1774 to Roy Street, a maximum of 20 ft of additional ROW would be required. The proposed ROW for the rural sections of the roadway varies from 150 ft to 770 ft, with 150 ft being typical. The proposed project would generally follow the existing vertical and horizontal alignment except in areas where changes are required for design and safety standards. Flush medians would allow for continuous left turning movements.

Intersections along FM 1488 would remain at-grade, except at FM 149, where FM 1488 would be a grade separation over the FM 149 and BNSF RR intersection. In this area, the main roadway would consist of two 12-ft lanes in each direction with a center 16-ft flush median and 10-ft shoulders on each side, with a 770 ft ROW. Connector ramps would provide access to and from FM 149 in both directions. Access roads to Magnolia High School and local businesses on the north and south sides of the grade separation would consist of two 12-ft lanes in each direction with 4-ft inside and 8-ft outside shoulders on each side of the main roadway (**Exhibit 4**).

III. ALTERNATIVES ANALYSIS

Five build alternatives were evaluated along the existing alignment including north, south, and center alignments, and two modified or "best fit" alignments—one for the rural sections of the project, and one for the urban section through Magnolia—to accommodate the proposed roadway widening. Alignments were initially evaluated based on a desired ROW width of 180 ft. However, based on public comments, alternatives were modified to 150-ft widths for rural sections and a 120-ft section requiring no additional ROW for the urban alignment. The no-build, or no-action, alternative was also considered. Design and environmental constraints, as well as public comments, were considered during the evaluation of the preliminary alternative alignments. **Table 4** shows the alternative analysis performed in the early planning stages of the environmental process. The environmental constraints were identified and mapped along the project corridor (**Exhibit 3**) to assist in the comparative analysis of alternatives.

The proposed project would be constructed with a rural design section except for the portion through the City of Magnolia, which would be designed as an urban roadway section. More specifically, the western most rural section of FM 1488 would extend from approximately 1,100 ft west of Joseph Road to Yancey Street, west of Magnolia. The easternmost rural section would extend from Roy Street in Magnolia to FM 2978. The urban section of FM 1488 is primarily between Yancey Street and Roy Street. This section consists of a greater number of buildings and residences because of its location in the City of Magnolia.

The alignment alternatives evaluated along the FM 1488 project corridor include the following:

A. No-Build Alternative

Due to current and future increases in population, the no-build alternative would not accommodate the mobility needs of the public resulting from the increased growth of businesses and residential developments, nor would it improve the operational efficiency and safety conditions along FM 1488 within the project limits. Therefore, the no-build alternative would not meet the project's purpose and need.

B. Alternatives Considered but Dismissed

Three preliminary build alignments were studied with 180-ft ROW requirements.

Alternative A
Alternative A is the northern alignment for urban and rural sections. Alternative A would acquire all additional ROW primarily from the north side of the existing roadway. The total proposed ROW width in this area would be 180 ft. This alternative is not preferred because of increased impacts to floodplains, wetlands, and residential and commercial displacements. Public comments did not favor this alternative and it was dismissed in the early planning stages.

Alternative B
Alternative B is the southern alignment for urban and rural sections. Alternative B would require additional ROW primarily from the south side of the existing FM 1488 roadway. The total proposed ROW width in this area would be 180 ft. This alternative is not preferred due to an increased amount of ROW acreage as well as impacts to floodplains, potential historic structures, and hazardous material sites. Public comments did not favor this alternative and it was dismissed in the early planning stages.

Alternative C1
Alternative C1 is the centered alignment for rural and urban sections. Alternative C1 would center the proposed alignment along the existing FM 1488 facility, thus dividing the additional ROW needs from both the north and south sides of the roadway as a best fit scenario. The total proposed ROW width of this alternative would be 180 ft. This alternative was not preferred due to an increased amount of ROW acreage as well as impacts to floodplains, potential historic structures, and hazardous material sites. Public comments did not favor this alternative and it was dismissed in the early planning stages.

Table 4 compares the proposed impacts of the early planning alternatives resulting from an environmental constraints analysis performed in the early project development process.

Table 4: Environmental Constraints Comparative Evaluation

Environmental Constraint	180 ft of ROW	180 ft of ROW	180 ft of ROW	150/120 ft of ROW
	Alternative A (Widen Highway on North Side)	Alternative B (Widen Highway on South Side)	Alternative C1 (Widen Highway on Both Sides)	Preferred (C2 & D) (Widen Highway North, South, and Both Sides)
Additional ROW Required (ac)	168.9	168.9	178.6	127.8
100-year Floodplains (ac)	32.9	34.9	33.1	30.2
National Wetland Inventory (ac)	0.98	0.34	0.67	0.18
Hydric Soils (ac)	28.5	30.9	28.9	26.8
Potential Historic Structures-within 500 ft. of ROW (#)	2	2	2	2
Buildings Partly or Completely within Proposed ROW (#)	36	43	29	15
Hazardous Material Sites (#)	5	6	8	2
Vegetated Areas with 1-33% Canopy Cover	21.2	20.3	20.6	16.7
Vegetated Areas with 34-66% Canopy Cover	4.2	8.0	6.1	2.8
Vegetated Areas with 67-99% Canopy Cover	94.1	95.3	97.2	75.8
Pasture	22.3	18.8	19.0	15.7
Trees in Pasture	1.4	2.3	2.3	2.1
Undeveloped	1.3	2.0	1.6	1.1

C. Preferred Build Alternative

Two preferred build alternatives, C2 (for the rural sections) and D (for the urban section through Magnolia), resulted from the early planning process. The rural and urban preferred build alternatives were combined to form a single preferred build alternative. This alternative and the no-build alternative were carried through the remainder of the preliminary planning process. Refer to **Exhibit 4**, for the proposed project design.

The preferred alternative would require additional ROW from both the north and south sides of the existing FM 1488 alignment in the rural sections (**Exhibit 4**). The westernmost rural section of FM 1488 would extend from approximately 1,100 ft west of Joseph Road eastward to Yancey Street, west of Magnolia. The easternmost rural section would extend from Roy Street, on the east end of Magnolia, to FM 2978. Proposed ROW acquisition would vary from being taken evenly from the north and south of the existing alignment to being taken all from the north or south throughout the project corridor. The total proposed ROW width of this alternative would typically be approximately 150 ft, though the proposed ROW varies from 150 to 770 ft east of Magnolia.

To accommodate the grade separation at FM 149, a maximum of 770 ft of ROW would be required for local access roads in the area of the grade separation. Refer to **Exhibit 4** (Sheets 15 and 16) for the schematic drawings of the proposed intersection. Response from the public meetings showed that the public preferred the grade separation at FM 149/BNSF RR tracks, to ease traffic movement through the area, and reduce accidents at the intersection.

The preferred alternative would center the alignment along the existing FM 1488, thus dividing the additional ROW needs from both the north and south sides of the roadway for a best-fit

scenario between Yancey Street and Roy Street in the City of Magnolia (**Exhibit 4**). The modified typical proposed ROW width of this alternative would vary from 100 ft to 120 ft. A maximum of 20 ft of additional ROW would be required for this alternative from Yancey to 10th Street and from FM 1774 to Roy Street. No additional ROW is proposed within the urban section from 10th Street to FM 1774.

The preferred alternative is recommended because it meets the future traffic and safety needs of the area and minimizes the amount of environmental impacts. In addition, it includes a proposed curb and gutter system and would result in the least amount of impacts to adjacent property owners within the urban section of FM 1488. The roadway design was based on current design and safety standards and an impact analysis for the surrounding communities, traveling public, and the environment. A concerted effort was made during the preliminary design phase to avoid numerous impacts to adjacent commercial and residential structures, as requested by public comment. The preferred design also considered various environmental constraints along the length of the facility that, to avoid completely, would have required numerous curves in the roadway.

IV. PROJECT SETTING

A. Land Use

The FM 1488 project area consists of mixed land use areas. Within the City of Magnolia and the community of Egypt, the land use adjacent to FM 1488 is primarily commercial. In Texas, cities have been granted zoning power but counties have not. Neither Magnolia nor Egypt has enacted a zoning ordinance. Further, since much of the proposed project would be in unincorporated Montgomery County, a variety of land uses occur throughout the project area. The small section of the project that falls in Waller County is also unincorporated. Land uses include the following:

- Single-family residential neighborhoods
- Institutional properties
- Commercial properties
- Vacant (platted) areas
- Vacant mixed-use areas
- Ranch land
- Farmland
- Forested land

All of these types of land uses are represented within the project area to some extent. Refer to **Exhibit 3** for an aerial photograph of the project area with constraints and **Exhibit 8** for site photographs of the project area.

Scattered residences, churches, schools, and small retail establishments are found throughout the project corridor, with most having access directly onto the roadway. A significant portion of the land west of Egypt is being developed as low density upper-middle income residential subdivisions. A significant development adjacent to the highway and east of FM 149 is the new Magnolia High School.

B. Soils

The project area, located approximately 40 mi north of Houston in Montgomery County and partially within Waller County, is situated in what is considered to be the Timber Belt or Piney Woods/East Texas Forest ecological region of Texas, as defined by the Texas Parks and Wildlife Department (TPWD). This natural region is characterized by extensive pine and pine-hardwood forests with intermittent swamps and occasional cultivated pasture land, and represents the most mesophytic area in Texas. It serves as the southwestern terminus of the vast southeastern United States pine-hardwood forest that extends east to Florida and northeast at least to Virginia.

The project area's land surface is undulating with slopes that are generally south to southeast. Several creeks and tributaries of the San Jacinto River, which flows directly into the Gulf of Mexico, provide drainage along the FM 1488 project corridor. Along this corridor, the landscape in some areas has been altered for commercial or industrial uses; private residential developments in the area have also increased in recent years.

FM 1488 crosses 16 different soil types within the project area. Due to the numerous land features crossed by the existing roadway, including forested areas, streams, prairies, and farmlands, the soil ranges from fine sands to clays. **Table 5** lists the different soil types and hydric soil status as indicated by the local Natural Resources Conservation Service (NRCS) and the National Technical Committee for Hydric Soils (NTCHS).

Soils in the project area are predominantly sandy or loamy and well drained to poorly drained. Soil series located along the project route are described in general terms in the following table.

Table 5: Soil Types Located Within the Project Area

Soil Map Unit	Description	Hydric Status
Bibb soils, frequently flooded (Bb)	Slopes of less than 1%; occupy the floodplain of streams	Hydric (AL0033)
Blanton fine sand, 0 to 5% slopes (BlC)	Occupies convex slopes on ridge crests; used mainly for pine timber.	Non-hydric
Boy fine sand (Bo)	Level to gently sloping soil occupying convex areas; moderately well drained soils; used mainly for pine timber.	Possible hydric inclusions
Bruno loamy fine sand (Br)	Occupies natural levees next to the channel in the floodplain of streams; has a plane to slightly convex slope of less than 1%; used primarily for hardwood and pine timber.	Non-hydric
Burleson clay (Bu)	Level to slightly convex soil with slopes up to 3%; occupies stream terraces and upland prairies.	Non-hydric
Conroe gravelly loamy fine sand, 0 to 5% slopes (CnC)	Nearly level to gently sloping soil on broad ridges with convex slopes; moderately well drained to well drained; used mainly for pine timber.	Non-hydric

Table 5: Soil Types Located Within the Project Area

Soil Map Unit	Description	Hydric Status
Conroe loamy fine sand, 0 to 5% slopes (CoC)	Nearly level to gently sloping soils occupying broad ridges and has convex slopes; moderately well drained to well drained; used mainly for pine timber.	Non-hydric
Edna-Katy complex (Ek)	Consists of Katy soils on mounds 2 to 10 in. high and 50 to 300 ft long and of adjoining nearly level or slightly depressional areas of Edna soils. The Edna soils are nearly level, poorly drained loamy soils; used for crops and pasture.	Non-hydric
Fuquay loamy fine sand (Fs)	Consists of slightly convex slopes of 0 to 3%; well drained soils used primarily for pine timber.	Possible hydric inclusions
Hockley fine sandy loam (Ho)	Consists of plane to slightly convex slopes that are generally 0.3 to 2%; moderately well drained to well drained soils; used primarily for growing vegetables, corn, small grain, and forage crops.	Non-hydric
Katy fine sandy loam (Ka)	Nearly level to gently sloping soil occurring on convex ridges; slopes dominantly 0.5 to 2% but range up to 4%; used for crops and pasture.	Non-hydric
Splendora fine sandy loam (Sp)	Consists of a plane slope of less than 1%; somewhat poorly drained; used mainly for pine timber.	Non-hydric
Sunsweet soils (Ss)	Gently sloping soils on ridge tops; slopes mainly 2 to 5% but may range up to 6%; most areas are bare of vegetation.	Non-hydric
Waller loam (Wa)	Level to slightly depressional with a slope of less than 0.3%; poorly drained and water is removed from the surface very slowly; used mainly for hardwood and scattered pine timber.	Hydric (TX0061)
Waller soils, ponded (We)	Occupy depressional areas from 1 to 4 ft below the surrounding soil areas; slopes are less than 0.3%; support only water-loving sedges; water stands on the surface for long periods.	Hydric (TX0926)
Wicksburg loamy fine sand, 1 to 5% slopes (WkC)	Occupies broad interstream divides; has convex slopes; used mainly for pine timber.	Non-hydric

Note: The parenthetical reference numbers in the Hydric Status column refer to the NTCHS hydric soil identification number.
Source: USDA NRCS Soil Surveys of Montgomery (1972) and Waller (1984) Counties.

V. POTENTIAL SOCIAL, ECONOMIC, AND ENVIRONMENTAL EFFECTS OF THE PREFERRED ALTERNATIVE

A. Regional Socioeconomic Data

The proposed FM 1488 project is located within eight census tract (CT) block groups (BGs) as shown on **Exhibit 6**. BGs are generally defined so they contain approximately 400 housing units; thus depending upon the population density in the area, the sizes of BGs may vary widely. They are the smallest area for which reasonably detailed census information is available. These areas are sufficiently small to provide a reasonably close representation of actual community composition. Population data at the CT BG level obtained from the U.S. Census Bureau (USCB) for the year 2000 has been used in this socioeconomic analysis. The project area consists of eight BGs within five CTs: 6806, 6902, 6903, 6904, and 6946 (**Exhibit 6**).

Employment and Income Data

Many Montgomery County and Waller County residents commute to work in Houston and other portions of Harris County. Others work in Conroe, The Woodlands, and Hempstead and other areas of the two counties. Timber is the primary industry in Montgomery County; agribusiness is the primary industry in Waller County. Other areas of employment are oil production, government, and commercial services.

Median household income in the project area ranged from $32,139 to $63,875 (**Table 6**). Generally, household incomes within the project area were significantly higher east of FM 149 than those for all of Montgomery County ($50,864), the Houston-Galveston-Brazoria Consolidated Metropolitan Statistical Area (CMSA) ($44,761), or the Houston Primary Metropolitan Statistical Area (MSA) ($44,655). The 1999 median household income was $41,875 in the City of Magnolia and $42,946 in the Pinehurst census designated place (CDP).

Table 6: Household Incomes in 1999

County/Project Area Census Tract Block Group	Total Households	Median Household Income	Households of <$20,000		Households of $20,000-$49,999		Households of >$50,000	
			#	%	#	%	#	%
Montgomery Co.	103,447	$50,864	17,320	16.7	33,407	32.3	52,720	51.0
Waller County	10,574	$38,136	2,120	20.1	4,346	41.1	4,108	38.8
CT 6806, BG 1	770	$41,042	89	11.6	368	47.8	313	40.6
CT 6806, BG 2	1,159	$51,383	94	8.1	444	38.3	621	53.6
CT 6902, BG 1	959	$62,379	63	6.6	250	26.0	646	67.4
CT 6902, BG 2	464	$43,000	103	22.2	165	35.6	196	42.2
CT 6903, BG 1	947	$44,769	200	21.1	334	35.3	413	43.6
CT 6903, BG 2	439	$32,139	125	28.5	160	36.4	154	35.1
CT 6904, BG 1	1,991	$63,875	196	9.8	559	28.1	1,236	62.1
CT 6946, BG 3	818	$46,121	152	18.6	273	33.4	393	48.0
Project Area	7,547	--	1022	15.8	2,553	35.1	3,972	49.0

Source: USCB. Census 2000. http://factfinder.census.gov.
Note: CT = census tract; BG = block group

Land Values and Tax Base

Widening FM 1488 from two lanes to four lanes would likely have a positive effect on the value of adjacent properties. Improved accessibility, traffic flow, visibility, and safety are all likely benefits to land values. As new development occurs, the local tax base would be enhanced, tending to offset the relatively small tax base loss associated with ROW acquisition.

During actual construction, the proposed project would temporarily increase employment and income in the local economy as construction-related expenditures are utilized. However, the proposed project is not expected to affect long-term employment or income levels.

Community Cohesion

Community cohesion is a term that refers to an aggregate quality of a residential area. Cohesion is a social attribute that indicates a sense of community, common responsibility, and social interaction within a limited geographic area. It is the degree to which residents have a sense of belonging to their neighborhood or community or a strong attachment to neighbors, groups, and institutions as a continual association over time. Community cohesion would likely remain intact since all of the proposed improvements would occur on an existing facility that serves as a boundary between neighborhoods and communities.

There are no distinct neighborhoods, ethnic groups, or other specific groups directly adjacent to the proposed project. As a result, the proposed project would not affect, separate, or isolate any distinct neighborhoods, ethnic groups, or other specific groups.

Environmental Justice

In response to Executive Order (EO) 12898, signed by President Clinton on February 11, 1994, the USDOT developed an environmental justice strategy that follows within the framework of the National Environmental Policy Act (NEPA) and Title IV of the Civil Rights Act. EO 12898 requires that federally funded projects identify and address any disproportionately high and adverse human health effects from environmental impacts to minority and low-income. FHWA Order 6640.23 defines minority as a person who is:

- Black or African American (having origins in any of the black racial groups of Africa);
- Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
- Asian American (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands, or;
- American Indian and Alaska Native (having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition) (USDOT 1998).

A disproportionate environmental impact occurs when the risk or rate of exposure to an environmental hazard is significantly greater for minority or low-income populations than for the general population or other appropriate comparison groups, where available. The potential effects of the proposed action have been evaluated in accordance with the requirements of the EO. The *Census 2000* CT BG data for the area was used for the population analysis. As shown in **Table 7**, the project area population is primarily white, non-Hispanic.

Table 7: Racial and Ethnic Composition of the Population in the Year 2000

Area	Total Population	Non-Hispanic or Latino				Hispanic or Latino	Minority Population	
		White	Black or African American	Asian	Other		#	%
Montgomery County	293,768	238,587 81.2%	9,899 3.4%	3,039 1.0%	5,177 1.8%	37,066 12.6%	55,181	18.8
Waller County	32,663	16,351 50.1%	9,458 28.9%	140 0.4%	369 1.1%	6,345 19.4%	16,312	49.9
City of Magnolia	1,081	874 80.8%	107 9.9%	2 0.2%	26 2.4%	72 6.7%	207	19.1
CT 6806, BG 1	2,223	1,713 77.1%	83 3.7%	0 0.0%	0 0.0%	427 19.2%	510	22.9
CT 6806, BG 2	3,233	2,988 92.4%	0 0.0%	24 0.7%	0 0.0%	221 6.8%	245	7.6
CT 6902, BG 1	2,999	2,795 93.2%	0 0.0%	0 0.0%	91 3.0%	113 3.8%	204	6.8
CT 6902, BG 2	1,257	1,192 94.8%	0 0.0%	0 0.0%	11 0.9%	54 4.3%	65	5.2
CT 6903, BG 1	2,782	2,319 83.4%	128 4.6%	0 0.0%	51 1.8%	284 10.2%	463	16.6
CT 6903, BG 2	1,214	1,023 84.3%	108 8.9%	0 0.0%	13 1.1%	70 5.7%	191	15.7
CT 6904, BG 1	6,245	5,422 86.8%	126 2.0%	0 0.0%	117 1.9%	580 9.3%	823	13.2
CT 6946, BG 3	2,494	2,159 86.6%	40 1.6%	0 0.0%	21 0.8%	274 11.0%	335	13.4
Project Area	22,447	19,611 87.33	485 2.60%	24 0.09%	304 1.19%	2,023 8.79%	2,836	12.6

Source: USCB. Census 2000. http://factfinder.census.gov.
Note: CT = census tract; BG = block group

Overall, the minority population in the project area accounts for 12.6% of the population. Only 8.79% of the project area is Hispanic and 2.6% is non-Hispanic, black or African American. The Federal government considers race and Hispanic origin to be two separate and distinct concepts.

Low-income is defined as a household income at or below the Department of Health and Human Services (DHHS) poverty guidelines (2007). Low-income means a person whose household income (or in the case of a community or group, whose median household income) is at or below the DHHS poverty guidelines. The U.S. Census Bureau uses a set of income thresholds that vary by family size and composition to determine poverty level. For the year 2007, the DHHS weighted average threshold for a four-person family is $20,650. The only data regarding the number of people in poverty for areas smaller than counties is the decennial census.

Family incomes in the project area are relatively high compared to those in the State of Texas (**Table 8**). According to *Census 2000*, the median family income for the State was $45,861 in 1999. The overall project area incomes are generally comparable to those of the City of Magnolia, Montgomery County, and Waller County with median family incomes in CT 6902, BG 1, and CT 6904, BG 1, being significantly higher than the other project area CT BGs.

Table 8: Median Family Incomes and Poverty Status - 1999

Area	Total Families	Median Family Income	Families With Income in 1999 Below Poverty Level	Percent Families Below Poverty Level
State of Texas	5,283,474	$45,861	632,676	12.0
Montgomery County	80,723	$58,983	5,766	7.2
Waller County	7,837	$45,868	1,644	21.0
City of Magnolia	307	$50,417	25	8.1
CT 6806, BG 1	591	$49,659	78	5.9
CT 6806, BG 2	945	$57,669	43	4.6
CT 6902, BG 1	819	$70,083	9	1.1
CT 6902, BG 2	347	$51,417	26	7.5
CT 6903, BG 1	761	$50,129	45	5.9
CT 6903, BG 2	320	$45,909	43	13.4
CT 6904, BG 1	1,739	$65,852	120	6.9
CT 6946, BG 3	675	$51,008	40	5.9
Project Area	6,197	--	404	6.4

Source: USCB. Census 2000. Summary File 3. http://factfinder.census.gov.

As the socioeconomic data in **Table 8** indicates, it does not appear that the project would result in disproportionately high and adverse impacts on any minority or low-income population. Displacements would be spread throughout the length of the 16-mi corridor since the proposed project would widen an existing highway. Within the project area, two CT BGs (CT 6902, BG 2 and CT 6903, BG 2) exhibited poverty levels higher than that found in Montgomery County. Many of these people do not live adjacent to FM 1488 and would not suffer direct adverse impacts from the project.

During the public involvement phase of the project, public input was solicited at several rounds of public meetings and the results did not indicate that there would be disproportionately high adverse impacts to minority populations. The community and agency involvement process described in this report has included all residents and population groups in the project area.

Limited English Proficiency

EO 13166, Improving Access to Services for Persons with Limited English Proficiency (LEP), requires federal agencies to examine the services they provide and identify any need for services to those with LEP. The EO requires Federal agencies to work to ensure that recipients of federal financial assistance provide meaningful access to their LEP applicants and beneficiaries. Failure to ensure that LEP persons can effectively participate in or benefit from federally assisted programs and activities may violate Title VI of the Civil Rights Act of 1964, 42 U.S.C. 2000d and Title VI regulations against national origin discrimination.

Census BG data was obtained from the *Census 2000* database. The census data tabulates the ability to speak English for the population 5 years of age and older. As shown in **Table 9**, 1.98% of the population 5 years old and older speaks English less than very well (i.e. not well or not at all). The census data indicate that the LEP population in the project area speaks Spanish. In a windshield survey along the project corridor, English was observed on billboards and signs.

Table 9: Percentage LEP Population (1999)

Area Census Tract Block Group	Total Population 5 Years and Older	Total Number Who Speak English Not Well or Not at All	Percent LEP
CT 6806, BG 1	2,089	66	3.1%
CT 6806, BG 2	2,960	94	3.1%
CT 6902, BG 1	2,726	26	0.1%
CT 6902, BG 2	1,165	8	0.7%
CT 6903, BG 1	2,648	41	1.5%
CT 6903, BG 2	1,092	19	1.7%
CT 6904, BG 1	5,650	268	4.7%
CT 6946, BG 3	2,292	20	0.9%
Project Area	20,622	542	1.98%

Source: USCB. *Census 2000.* http://factfinder.census.gov. Table P19.

Preparation for the public meetings included published announcements in English in the *Conroe Courier*, which informed citizens of the opportunity to request an interpreter (for language or other special communication needs) to be present at the public meetings. Legal notices for the public hearing would be published in English and Spanish and afford the opportunity to request an interpreter (for language or other special communication needs) to be present at the public hearing. Such steps would continue to be taken to ensure that such persons have meaningful access to the programs, services, and information that TxDOT provides. None of the LEP populations would be discriminated against as a result of the proposed project or the no-build alternative. Therefore, the requirements of EO 13166 appear to be satisfied.

B. Right-of-Way Acquisition/Displacements

The proposed project would require 127.8 ac of additional ROW. The proposed FM 1488 project would result in several displacements within the proposed ROW limits that include both residential and commercial properties. Based on current proposed design for the preferred alternative, one vacant building east of Alford Road and one residence west of Abney Lane would be displaced. The parking lots of two businesses on the north side of FM 1488, one near Smith Street and one near Yancey Street, in Magnolia would be displaced. Three single-family residences, a vacant building, a fruit stand, and a business in a modular building north of FM 1488, and west of the FM 149/BNSF RR intersection, would be displaced by the construction of the proposed grade separation and access ramps to FM 149. TxDOT and Montgomery County would be responsible for the ROW acquisitions of any affected properties. Acquisition and relocation assistance would be in accordance with the TxDOT ROW Acquisition and Relocation Assistance Program.

During 2006, an estimated 8,434 houses were sold in Montgomery County (Real Estate Center, 2007). The multiple listing service (MLS) for Montgomery County listed 7,378 homes for sale in March 2007; 640 of which are located in Magnolia (Homes.com, 2007). The median house price is $169,000 and the median family income yields a housing affordability index of 1.62 (Real Estate Center, 2007). The housing affordability index is the ratio of the local area median family income to the income required to qualify for an 80%, fixed-rate mortgage to purchase the median-priced home in the area. A housing affordability index number over 1 is favorable to the average home-buyer in the area. As a result of the volume of houses available for sale and the very limited displacement of homes anticipated, relocation is expected to be easily accomplished.

Consistent with USDOT policy, as mandated by the Uniform Relocation Assistance and Real Properties Acquisitions Act of 1970 as amended in 1987, TxDOT provides relocation resources to all displaced persons without discrimination. All property owners from whom property is needed are entitled to receive just compensation for their land and property. Just compensation is based upon the fair market value of the property. TxDOT also provides, through its Relocation Assistance Program, payment and services to aid in movement to a new location.

Relocation assistance is available to all individuals, families, businesses, farmers, and non-profit organizations displaced as a result of a State Highway project or other transportation project. This assistance applies to tenants as well as owners occupying the real property needed for the project. Replacement structures must be located in the same type of neighborhood and be equally accessible to public services and places of employment. The TxDOT Relocation Office would also provide assistance to displaced businesses and non-profit organizations to aid in their satisfactory relocation with a minimum delay. The proposed project would proceed to construction only when all displaced families have been provided the opportunity to be relocated to adequate replacement sites. The available structures must also be open to persons regardless of race, color, religion, or nationality and be within the financial means of those individuals affected.

The no-build alternative would not require any additional ROW, or result in displacements. However, the no-build alternative would not meet the project's need and purpose; therefore, it was not selected as the preferred alternative.

C. Farmlands

The Farmland Protection Policy Act (FPPA of 1981, P.L. 97-98 and amendments, 7 US Code (USC) 4201(b)), authorizes the U.S. Department of Agriculture's NRCS to develop criteria for identifying the effects of federal programs on the conversion of farmland to non-agricultural uses. Projects considered exempt under the FPPA include those that require no additional ROW or projects that require additional ROW that is developed, urbanized or zoned for urban use. The proposed FM 1488 roadway widening project would require additional ROW in areas that are both developed and undeveloped and, as such, is considered non-exempt under the FPPA and must be scored using the Form AD-1006.

Approximately 1 ac of prime farmland would be directly impacted by the Preferred Alternative. A Farmland Conversion Impact Rating form (Form AD-1006) has been completed for this project. The project scored less than 60 points. Therefore, coordination with the NRCS is not required. A copy of the Form (AD-1006) is on file and can be obtained from the TxDOT Houston District office.

The no-build alternative would not impact prime farmlands. However, the no-build alternative would not meet the project's need and purpose; therefore, it was not selected as the preferred alternative.

D. Beneficial Landscape Practices

In accordance with the Executive Memorandum of August 10, 1995, all agencies shall comply with NEPA as it relates to vegetation management and landscape practices for all federally assisted projects. The Executive Memorandum directs that where cost-effective and to the extent practicable, agencies would (1) use regionally native plants for landscaping; (2) design, use, or promote construction practices that minimize adverse effects on the natural habitat;

(3) seed to prevent pollution by, among other things, reducing fertilizer and pesticide use; (4) implement water-efficient and run-off reduction practices; and (5) create demonstration projects employing these practices. Landscaping included with this project would be in compliance with the Executive Memorandum and the guidelines for environmentally and economically beneficial landscape practices.

E. Invasive Species

In accordance with EO 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping, landscaping would be limited to seeding and replanting the ROW with native species of plants where possible. A mix of native grasses and forbs would be used to revegetate the ROW, as available.

F. Vegetation Impacts

Existing Vegetation

The project is located within the Piney Woods Natural Regions of Texas which consists primarily of gently rolling or hilly country with extensive pine and pine-hardwood forests (TPWD, 2002). Typical prairie vegetation is present on restricted clay prairie sites throughout the woods. The *Vegetative Types of Texas* map produced by TPWD in 1984 indicates that the project is found within the Pine-Hardwood Forest: Subtype 1 (Loblolly Pine-Sweetgum) vegetative type of Texas. Commonly associated plants may include water oak (*Quercus nigra*), white oak (*Quercus alba*), shortleaf pine (*Pinus echinata*), southern red oak (*Quercus falcata*), winged elm (*Ulmus alata*), American beautyberry (*Callicarpa Americana*), American hornbeam (*Carpinus caroliniana*), yaupon (*Ilex vomitoria*), Virginia creeper (*Parthenocissus quinquefolia*), poison oak (*Toxicodendron quercifolia*), greenbriar (*Smilax* spp.), and blackberry (*Rubus* spp.). The climax vegetation of the Piney Woods is largely pine and pine-hardwood forests with numerous but not extensive swamp, marsh, and bog areas. Frequent species found in and along forests are the cool-season grasses, Virginia wildrye (*Elymus virginicus*), Texas wildrye (*E. canadensis*) and blackseed needlegrass (*Stipa avenacea*); numerous warm-season grasses found in this area include purpletop tridens (*Tridens flavus*), little bluestem (*Schizachyrium scoparium* var. *divergens*), Indian sea-oats (*Chasmanthium latifolium*), and slender spikegrass (*C. laxum*), as well as several species of *Paspalum*, *Panicum*, and *Andropogon*. Characteristic of the Piney Woods is the giant cane (*Arundinaria gigantea*) and the ever-present representatives of *Dichanthelium* (McMahan, 1984).

Field visits confirmed the general vegetative composition of the project area to be typical of what is described for the Piney Woods Region. Six vegetation types were identified within the project area. Refer to **Exhibit 3** for an aerial photograph of the land use and vegetation within the project area.

Upland Forest

Upland forest vegetation accounts for 75.8 ac within the project area. Loblolly pine (*Pinus taeda*) is dominant within this vegetation type and accounts for approximately 57% of the total trees. Other abundant species within the upland forest include: post oak (*Quercus stellata*), sweetgum (*Liquidambar styraciflua*), water oak, and winged elm (*Ulmus alata*).

Non-dominant canopy species include: American holly (*Ilex opaca*), American sycamore (*Plantanus occidentalis*), black tupelo (*Nyssa sylvatica*), black walnut (*Juglans nigra*), black willow (*Salix nigra*), Chinese tallow tree (*Sapium sebiferum*), live oak (*Quercus virginiana*), northern catalpa (*Catalpa speciosa*), pecan (*Carya illinoensis*), and southern red oak.

Vines such as Alabama supplejack (*Berchamia scandens*), blackberry (*Rubus* spp.), greenbriar, muscadine grape (*Vitis rotundifolia*), pepper-vine (*Ampelopsis arborea*), poison ivy (*Toxicodendron radicans*), poison oak, and Virginia creeper are also present within this vegetation type. Additional species in the area surveyed include dog fennel (*Eupatorium capillifolium*) and ragweed (*Ambrosia artemisiifolia*).

Table 10 lists the tree species within the upland forest vegetation type, their diameter at breast height (dbh) in inches (in.), height, and canopy cover.

Table 10: Upland Forest Tree Species Within the Project Area

Common Name	Scientific Name	dbh Range (in.)	Height Range (ft)	Canopy Cover (%)
American holly	*Ilex opaca*	8	35	90%
American sycamore	*Plantanus occidentalis*	14	40	
Black tupelo	*Nyssa sylvatica*	10	40	
Black walnut	*Juglans nigra*	22	55	
Black willow	*Salix nigra*	10	40	
Chinese tallow tree	*Sapium sebiferum*	6-24	30	
Live oak	*Quercus virginiana*	14-18	40-50	
Loblolly pine	*Pinus taeda*	4-33	20-80	
Northern catalpa	*Catalpa speciosa*	12	40	
Pecan	*Carya illinoensis*	16	45	
Post oak	*Quercus stellata*	4-38	20-75	
Southern red oak	*Quercus falcata*	10-24	35-80	
Sweetgum	*Liquidambar styraciflua*	7-16	35-55	
Water oak	*Quercus nigra*	6-16	25-60	
Winged elm	*Ulmus alata*	4-24	25-55	

Maintained Grass/Lawn

Maintained grass/lawn vegetation accounts for 114 ac within the project area. The existing FM 1488 ROW has primarily been cleared of all mature woody vegetation except for an occasional willow tree in a ditch or at a creek crossing. The ROW is well maintained and is the primary reason why the vegetative composition within the ROW is different from the general area. The ROW is composed of various herbaceous flowering species such as beebalm (*Monarda* spp.), brown-eyed Susan (*Rudbeckia hirta* var. *angustifolia*), bull nettle (*Cnidoscolus texanus*), cardinal flower (*Lobelia cardinalis*), erect dayflower (*Commelina erecta*), fine-leaf bluets (*Hedyotis nigricans*), golden-aster (*Heterotheca latifolia*), Indian blanket (*Gaillardia pulchella*), Mexican hat (*Ratibida columnaris*), phlox (*Phlox* spp.), ruellia (*Ruellia* spp.), sensitive briar (*Shrankia uncinata*), sunflower (*Helianthus* spp.), thistle (*Cirsium* spp.), vervain (*Verbena* spp.), and wild onion (*Allium canadense* var. *mobilense*).

Grass species within the maintained grass/lawn vegetation community consist of brown seed paspalum (*Paspalum plicatulum*), bushy bluestem (*Andropogon glomeratus*), Johnsongrass (*Sorghum halapense*), long leaf spikegrass (*Chasmanthium sessiliflorum*), oldfield threeawn (*Aristida oligantha*), purple top tridens, southern carpet grass (*Axonopus affinis*), vasey grass (*Paspalum urveillei*), and west Indian dropseed (*Sporobolus indicus*).

Pasture

Pasture vegetation accounts for 15.7 ac within the project area. Typical vegetation within pastures consists of cream false indigo (*Baptisia bracteata*), dog fennel, golden tickseed

(*Coreopsis tinctoria*), Johnsongrass, southern carpet grass, vasey grass, and variable witchgrass (*Dichanthelium commutatum*).

Riparian

Riparian vegetation located adjacent to creeks and streams accounts for 0.84 ac within the project area. Vegetation primarily consists of Chinese tallow tree, loblolly pine, post oak, southern red oak, weeping willow, and winged elm. Typical understory vegetation includes American beautyberry, greenbriar, peppervine, Virginia creeper, and yaupon. **Table 11** lists the tree species within the riparian vegetation type, their dbh, height, and canopy cover.

Table 11: Riparian Tree Species Within the Project Area

Common Name	Scientific Name	dbh Range (in.)	Height Range (ft)	Canopy Cover (%)
Chinese tallow tree	*Sapium sebiferum*	6-24	30	90%
Loblolly pine	*Pinus taeda*	4-33	20-80	
Post oak	*Quercus stellata*	4-38	20-75	
Southern red oak	*Quercus falcata*	10-24	35-80	
Weeping willow	*Salix babylonica*	9	30	
Winged elm	*Ulmus alata*	4-24	25-55	

Forested Wetlands

Forested wetlands account for 0.11 ac within the project area. Forested wetland vegetation within the project area includes black tupelo, black willow, Chinese tallow tree, southern red oak, sweetgum, and winged elm.

Table 12 lists the tree species within the forested wetland vegetation type, their dbh, height, and canopy cover.

Table 12: Forested Wetland Tree Species Within the Project Area

Common Name	Scientific Name	dbh Range (in.)	Height Range (ft)	Canopy Cover (%)
Black tupelo	*Nyssa sylvatica*	10	40	75%
Black willow	*Salix nigra*	10	40	
Chinese tallow tree	*Sapium sebiferum*	6-24	30	
Southern red oak	*Quercus falcata*	10-24	35-80	
Sweetgum	*Liquidambar styraciflua*	7-16	35-55	
Winged elm	*Ulmus alata*	4-24	25-55	

Non-Forested Wetlands

Non-forested wetlands account for 0.52 ac within the project area. Dominant vegetation found within non-forested wetlands included alligator weed (*Alternanthera philoxeroides*), creeping spikerush (*Eleocharis palustris*), dotted smartweed (*Polygonum punctatum*), green flatsedge (*Cyperus virens*), Mexican seedbox (*Ludwigia octovalvis*), ovate false fiddle leaf (*Hydrolea ovata*), sand spikerush (*Eleocharis montevidensis*), short bristle beakrush (*Rhynchospora corniculata*), soft rush (*Juncus effusus*), spreading dayflower (*Commelina diffusa*), and Virginia buttonweed (*Diodia virginiana*).

Proposed Vegetation Impacts

Table 13 identifies the approximate aerial extent of vegetation communities within the proposed ROW that could potentially be impacted by the preferred alternative:

Table 13: Potential Impacts to Vegetation Communities Within the Project Area

Vegetation Community Type	Acreage of Potential Impact
Upland Forest	75.8
Maintained Grass/Lawn	114.0
Pasture	15.7
Riparian	0.84
Forested Wetlands	0.11
Non-Forested Wetlands	0.52
TOTAL	**206.97**

Mitigation

Forests and woodlands in the area are valuable resources from wildlife habitat, natural heritage, and aesthetic standpoints. In accordance with Provision (4) (A) (ii) of the TxDOT-TPWD Memorandum of Understanding (MOU), habitats given consideration for non-regulatory mitigation include:

1. Habitat for federal candidate species (impacted by the project) if mitigation would assist in the prevention of listing the species;
2. Rare vegetation series (S1, S2, S3) that also locally provides habitat for a state-listed species;
3. All vegetation communities listed as S1 or S2, regardless of whether or not the series in question provides habitat for state-listed species;
4. Bottomland hardwoods, native prairies, riparian sites; and
5. Any other habitat feature considered locally important that the Houston District TxDOT chooses to consider.

The existing vegetation within the project area meets the criteria for non-regulatory mitigation. Efforts have been made to minimize the total acreage of these vegetation types that would be impacted by the proposed project. TxDOT would avoid and preserve hardwood forest stands where possible within the proposed ROW. The TxDOT Houston District would coordinate with the TxDOT Environmental Affairs Division and the TPWD for compensatory mitigation for any vegetation community impacts in accordance with Provision (4) (A) (ii) of the TxDOT-TPWD MOU.

The no-build alternative would not result in impacts to vegetation. However, the no-build alternative would not meet the project's need and purpose; therefore, it was not selected as the preferred alternative.

G. Area Wildlife

The majority of the proposed project area may support a limited variety of birds, mammals, reptiles, and amphibians normally found in similar rural and small-town areas of Montgomery County and rural areas of Waller County, and those species that may be found migrating through this area. A diversity of wildlife is supported by the natural habitats found in Montgomery and Waller counties. The animals found in these areas are species that are able to adapt to urbanization and pasturelands. Mammals commonly found in this type of setting include raccoons, squirrels, opossums, and skunks. Various reptiles, amphibians and birds are typically found in these habitat types as well. During the field visit, pigeons and cattle egrets were the only wildlife observed.

A cursory bird nest survey was conducted during the initial site investigations, and nests were noted along the project corridor on the north side of the project east of FM 1774. The no-build alternative would not adversely impact the area wildlife. However, the no-build alternative would not meet the project's need and purpose. Therefore it was not selected as the preferred alternative. To avoid effects to migratory birds and their habitat with the Preferred Alternative, construction should be avoided during the peak-nesting season. Construction would be accomplished in compliance with the guidance concerning migratory birds that is in effect at the time construction begins. Measures would be taken to avoid impacts to migratory birds, their nests, their eggs, and their young during construction.

It is difficult to evaluate impacts, especially short-term and long-term indirect impacts, to wildlife from roadway improvement projects. The amount or extent of secondary development and the rate of development that may result from the proposed improvements to FM 1488 is uncertain. Projections may be made based upon previous county data or data from adjacent counties. Some species adapt to and tolerate urban type conditions more readily than others. Increased traffic, noise, and residential and commercial construction that drastically alter land use eliminate species presence, depending upon the rate of the improvements and the individual vulnerabilities of each species. Oftentimes, it may be a combination of factors that actually eliminate the presence of certain species, both from direct and indirect impacts. Some species may be able to adapt to the changing conditions and remain for some time.

H. Threatened and Endangered Species

The Endangered Species Act requires consideration of potential influence attributed to proposed project activities upon federally protected species. This document section contains the Montgomery and Waller Counties threatened or endangered species list, habitat and site survey information for listed species, and references agency correspondence regarding listed species. The U.S. Fish and Wildlife Service (USFWS) and the TPWD have compiled information on threatened and endangered species, as well as species of concern (SOC), located in Montgomery and Waller Counties (2006).

The TPWD Natural Diversity Database (NDD) was reviewed to determine the known occurrences of threatened, endangered, and rare species. The NDD did not report any previously recorded occurrences of state- or federally-listed species within the project area (TPWD 2005). However, the red-cockaded woodpecker is known to forage and nest east of the project corridor. In accordance with the TxDOT-TPWD MOU, TxDOT will coordinate with TPWD on potential effects to state-listed species.

Table 14 lists the state- and federally-listed species of plants and animals indigenous to Montgomery County.

Table 14: State and Federal Threatened and Endangered Species of Montgomery County

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Habitat Present
BIRDS					
American Peregrine Falcon	*Falco peregrinus anatum*	E	DM†	Potential migrant, nest in west Texas	N
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	T	DM†	Potential migrant	N
Bald Eagle (Nesting-Wintering)	*Haliaeetus leucocephalus*	T	DM*[1]	Near water areas, in tall trees	N
Red-cockaded Woodpecker	*Picoides borealis*	E	E	Nest in 60+ year pine, forages in 30+ pine	Y
White-faced Ibis	*Plegadis chihi*	T	*	Freshwater marshes, but some brackish or salt marshes	N
Wood Stork	*Mycteria americana*	T	*	Prairie ponds and flooded pastures	N
FISHES					
Creek Chubsucker	*Erimyzon oblongus*	T	*	Variety of small rivers and creeks, prefers headwaters	N
Paddlefish	*Polydon spathula*	T	*	Large, free-flowing rivers	N
MAMMALS					
Louisiana Black Bear	*Ursus americanus luteolus*	T	T†	Bottomland hardwoods; large, undisturbed forested areas	N
Rafinesque's Big-Eared Bat	*Corynorhinus rafinesquii*	T	*	Cavity trees in hardwood forest, concrete culverts, abandon buildings	Y
Red Wolf	*Canis rufus*	E	E†	Extirpated, brushy, forested areas, coastal prairies	N
REPTILES					
Alligator Snapping Turtle	*Macroclemys temminckii*	T	*	Deep water of rivers and canals	N
Louisiana Pine Snake	*Pituophis melanoleucus ruthveni*	T	C†	Sandy, longleaf piney woods	N
Texas Horned Lizard	*Phrynosoma cornutum*	T	*	Open, semi-arid regions, with bunch grass	N
Timber/Canebrake Rattlesnake	*Crotalus horridus*	T	*	Swamps/floodplains of hardwood/upland pine	Y

* These species occur on the State listing of threatened or endangered species; however, they are not Federally listed at this time by the USFWS (2006).

† These species are listed by the USFWS, however, they are not listed to occur within this county by the Clear Lake office of the USFWS (2006).

[1] Protected by the Bald Eagle Protection Act of 1940

-- Not listed for TPWD for this county

E = endangered T = threatened C = candidate species SOC = species of concern DM = delisted taxon, recovered, being monitored first five years AD = proposed delisting

Table 15 lists the state- and Federally-listed species of plants and animals indigenous to Waller County.

Table 15: State and Federal Threatened and Endangered Species of Waller County

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Habitat Present
AMPHIBIANS					
Houston Toad	*Bufo houstonensis*	E	E†	Sandy soil, breeds in ephemeral pools	N
BIRDS					
American Peregrine Falcon	*Falco peregrinus anatum*	E	DM†	Potential migrant, nest in west Texas	N
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	T	DM†	Potential migrant	N
Attwater's Greater Prairie Chicken	*Tympanuchus cupido attwateri*	E	E†	Thick 1-3' tall grass from 0'-200' above sea level along coast	N
Bald Eagle (Migrant)	*Haliaeetus leucocephalus*	T	DM*[1]	Near water areas, in tall trees	N
Interior Least Turn	*Sterna antillarum athalassos*	E	†	Nests along sand and gravel bars; manmade structures	N
White-faced Ibis	*Plegadis chihi*	T	*	Freshwater marshes, but some brackish or salt marshes	N
White-tailed Hawk	*Buteo albicaudatus*	T	*	Coastal Prairies	N
Whooping Crane	*Grus americana*	E	E†	Winters in Aransas NWR	Y
Wood Stork	*Mycteria americana*	T	*	Prairie ponds and flooded pastures	N
FISHES					
Creek Chubsucker	*Erimyzon oblongus*	T	*	Variety of small rivers and creeks, prefers headwaters	N
Sharpnose Shiner	*Notropis oxyrhynchus*	–	C	Shallow, open sandy channels: Brazos river basin	N
MAMMALS					
Louisiana Black Bear	*Ursus americanus luteolus*	T	T†	Bottomland hardwoods; large, undisturbed forested areas	N
Red Wolf	*Canis rufus*	E	E†	Extirpated, brushy, forested areas, coastal prairies	N
REPTILES					
Alligator Snapping Turtle	*Macroclemys temminckii*	T	*	Deep water of rivers and canals	N
Texas Horned Lizard	*Phrynosoma cornutum*	T	*	Open, semi-arid regions, with bunch grass	N
Timber/Canebrake Rattlesnake	*Crotalus horridus*	T	*	Swamps/floodplains of hardwood/upland pine	Y

* These species occur on the State listing of threatened or endangered species; however, they are not Federally listed at this time by the USFWS (2006).

† These species are listed by the USFWS, however, they are not listed to occur within this county by the Clear Lake office of the USFWS (2006).

[1] Protected by the Bald Eagle Protection Act of 1940

– Not listed for TPWD for this county

E = endangered T = threatened C = candidate species SOC = species of concern DM = delisted taxon, recovered, being monitored first five years AD = proposed delisting

Tables 14 and **15** list species that have a geographic range including Montgomery and Waller counties, respectively, that are considered by USFWS and TPWD to be endangered, threatened or rare species or SOC. It should be noted that inclusion on the table does not imply that a species is known to occur in the project area, but only acknowledges the potential for occurrence. The following paragraphs present distributional data concerning each federally listed or state-listed species, along with a brief evaluation of the potential for the species to occur within the project area.

The **Houston toad** is endemic to southeast central Texas and inhabits areas with deep, friable, sandy soils which contain varying degrees of overstory vegetation. All known populations occur within two separate bands of geologic formations, which contain the deepest surface sands of the region. Vegetative cover within Houston toad habitat usually contains some degree of forested vegetation, with post oak woodlands comprising one of the predominant vegetation type in Montgomery County. Breeding habitat consists of either ephemeral pools or permanent water bodies. Historically, breeding activity occurred primarily in ephemeral ponds and low-lying depressions; however, as a result of landscape modifications that have occurred to date, the majority of breeding sites at present are stock ponds and similar impoundments (USFWS and IUCN/SSC Captive Breeding Specialist Group, 1994). During wetter years, breeding sites may occur under a variety of situations as long as ample water is present. The breeding season typically lasts from late January to June, with a peak occurring in February and March. There are no essential components of Houston toad habitat within the project area; therefore, no impacts are anticipated for this species.

The **American peregrine falcon**, a state-listed endangered species, occurs worldwide, but has become rare throughout almost all of its range. Habitat destruction has also played a role in the falcon's population decline. The American peregrine falcon is a resident of the Trans-Pecos region, including the Chisos, Davis, and Guadalupe mountain ranges. In Texas, these falcons are usually found in areas with high, massive cliffs, preferably near water where avian prey densities are high. Preferred hunting areas are cropland, meadows, riverbottoms, marshes, and lakes. Preferred nesting habitats are high cliffs, usually in mountainous areas near water or lakes with elevations of at least 200 feet above sea level. There are no essential components of American peregrine falcon habitat within the project area; therefore, no impacts are anticipated for this species.

The **arctic peregrine falcon** lives mostly along mountain ranges, river valleys, and coastlines. Peregrines from Alaska, Canada, and Greenland migrate in the fall to Central and South America, returning north in the spring. Arctic peregrine falcons may potentially occur throughout Texas, including the project area, during fall and spring migrations. In Texas, Arctic peregrine falcons are most likely to occur on the barrier islands of the Gulf of Mexico coast, where they hunt during seasonal migrations (Oberholser, 1974). There are no essential components of Arctic peregrine falcon habitat within the project area; therefore, no impacts are anticipated for this species.

The **Attwater's great prairie chickens** live on coastal prairie grasslands with tall grasses such as little bluestem, Indian grass, and switchgrass. These birds like a variety of tall and short grasses in their habitat. They gather to choose a mate in an area of bare ground or short grass where the males can be easily seen by the females. Small green leaves, seeds, and insects form the diet of the Attwater's prairie chicken. Tall grass coastal prairies are essential to the survival of this species. Attwater's prairie chickens are found only on the coastal prairies of Texas. Due to the lack of preferred habitat, this species would not occur within the project area and no impacts are anticipated for this species.

The **bald eagle** is an uncommon to rare migrant and winter resident throughout Texas. It is generally found in coastal areas and around large bodies of water such as reservoirs, lakes, and rivers. Nesting in Texas is largely restricted to the eastern one-third of the state and to the coastal prairies region. In Texas, wintering and migrating bald eagles frequently stop over along the shores and large rivers, which provide the eagle with the bulk of its dietary requirements. The project area contains Spring Creek to the north; however, the project area does not contain

any portion of a documented bald eagle management zone. No impacts are anticipated for this species.

The **interior least tern** nests along sand and gravel bars and mad-made structures. Due to the lack of preferred habitat within the project corridor, this species would not occur within the project area and no impacts are anticipated for this species.

The **red-cockaded woodpecker** inhabits mature pine forests of the southeastern United States and nests almost exclusively in old living pines infected with red heart disease (*Fomes pini*). The USFWS was contacted on September 15, 2003 for information regarding potential effects on any federally-listed threatened or endangered species in the area of the proposed project. In a response dated October 6, 2003, the USFWS stated that if suitable nesting or foraging habitat occurs within the project impact area, or within a 0.5-mi radius of the project site, a qualified biologist would need to conduct a presence/absence survey for the red-cockaded woodpecker (RCW). The RCW is found within the general region of the project and potential habitat exists immediately adjacent to the existing FM 1488 ROW at various locations throughout the project corridor. A presence/absence survey for the RCW and its preferred habitat was performed in accordance with approved USFWS guidelines. From this survey, a No Effect determination for the RCW was made. A copy of the RCW survey report is included as **Appendix C**. Coordination with the USFWS on this finding was completed in October 2004. Copies of all correspondence with the USFWS for the proposed project are included in **Appendix A**.

The **white-faced ibis** forages bays, marshes, lakes, and ponds. While the entirety of Montgomery County is within the known range of the white-faced ibis, the lack of lacustrine habitat prohibits the occurrence of this species within the project area.

The **white-tailed hawk** is found on the coastal plain of southern Texas. The northern limits of this hawk's range extend to include Waller County. The white-tailed hawk hunts on coastal prairies and pastures. The proposed project would have a negligible impact on pasture habitat and would not adversely affect any white-tailed hawks that might be present in the vicinity of the project. No impacts are anticipated for this species.

The **whooping crane**, a federally-listed endangered species, winters in the Aransas National Wildlife Refuge and adjacent areas of the central Texas Gulf Coast. During seasonal migrations, the whooping crane forages and roosts in palustrine wetlands, usually with water depths of 1-6 in. The project area is included in the whooping crane's migratory range and contains shallow palustrine wetlands; therefore, the whooping crane could potentially be found within the project area during season migrations. However, no impacts are anticipated for this species.

The **wood stork** is an uncommon to common post-breeding visitor to the central and upper coastal prairies and a regular visitor of lakes and reservoirs in central and east Texas. The wood stork forages in shallow standing water, including salt-water, and usually roosts communally in tall snags; however, the wood stork has not been known to nest in Texas since 1960. Therefore, no impacts are anticipated for this species.

The **creek chubsucker** occurs in eastern Texas streams from the Red River southward to the San Jacinto Drainage. The fish spawns in river mouths or pools, lake outlets, riffles, and upstream creeks. Due to the lack of spawning types preferred by the fish, potential habitat for the creek chubsucker does not occur within the project area.

The **paddlefish** is one of the largest freshwater fishes and is native only to North America. The fish historically ranged throughout much of the Mississippi River drainage eastward to the Appalachian Mountain range and the Great Lakes region. In Texas, paddlefish are known to occur in major river drainages in eastern and northern parts of Texas; including the Red River, the Sulphur River, Big Cypress Bayou, the Sabine River, the Neches/Angelina River, and the Trinity River. Paddlefish may inhabit water impoundments, but prefers large, free-flowing rivers where it is able to spawn over gravel bars with fast-flowing shallow water (TPWD, 2002). Due to the absence of free-flowing rivers, potential habitat for the paddlefish does not occur within the project area.

The **sharp noised shiner** is endemic to Brazos River drainage and has been introduced into adjacent Colorado River drainage. It prefers a large turbid river, with bottom a combination of sand, gravel, and clay-mud. The preferred habitat of this species is not present within the proposed project corridor; therefore, no impacts are anticipated for this species.
The **Louisiana black bear** historically inhabited east Texas, Louisiana, and southern Mississippi, but is now confined to small numbers in Mississippi close to the Mississippi River, and to core populations in Texas and the Atchafalaya River basins in Louisiana. The last native bear of east Texas was believed to have been killed in the late 1950s in Polk County near the town of Livingston. There are no other recent records from Montgomery County. Bears are unlikely to occur within the project area, or to be affected by the proposed project.

Rafinesque's big-eared bat occurs throughout the southeastern United States, with east Texas being at the western limit of its range. The bat roosts in hollow trees, crevices behind loose tree bark, abandoned buildings, and culverts. As the range and habitat of this species are broadly defined, a possibility exists that it could occur in the project area. While culverts are present within the ROW, it is unlikely that a bat would be found within a culvert within the project area. There are no mines or caves in the project area, negating the possibility for hibernating colonies to occur. No impacts are anticipated for this species.

The **red wolf** prefers brushy, forested areas and coastal prairies. The red wolf has been extirpated in Texas. Preferred brushy habitat for the red wolf does not uniquely exist within the project corridor, and the potential for an occurrence of this species is unlikely, therefore no impacts are anticipated for this species.

The **alligator snapping turtle** is an inhabitant of deep rivers, lakes, and large streams with muddy bottoms. Potential habitat for the alligator snapping turtle includes larger drainages and associated marshes and sloughs. Like the common snapping turtle, the alligator snapping turtle lives in a primarily aquatic environment, such as slow moving streams, lakes, or swamps. Typically only nesting females will venture onto land. They are capable of staying submerged for as long as 50 minutes at a time. The turtle's preferred habitat is not uniquely found within the project area; therefore, no impacts are anticipated for this species.

The **Louisiana pine snake** is an inhabitant of mature longleaf pine forests with sandy soil in east Texas and west central Louisiana. This forest type has been heavily harvested in east Texas for its economic value and replaced with loblolly pine communities, which do not provide suitable habitat for the snake. There are no old growth longleaf pine forests within the project area; therefore, the potential for the presence of the Louisiana pine snake is unlikely. No impacts are anticipated for this species.

The **Texas horned lizard** is a burrowing animal found in sparsely vegetated arid and semi-arid regions. The piney woods ecoregion of Texas, which includes the project area, does not have

an arid or semi-arid climate but rather receives moderate rainfall throughout the year. The Texas horned lizard was historically found throughout the state in areas with open terrain, scattered vegetation, and sandy or loamy soils. In recent decades, it has nearly vanished from the eastern half of the state, east of a line from Fort Worth to Austin to Corpus Christi. Although its occurrence in the project area is remotely possible, no impacts are anticipated for this species.

The **timber/canebrake rattlesnake** inhabits heavily vegetated riparian waterways in the eastern part of the Texas, typically occurring within the floodplains of major creeks and rivers (Tennant, 1998). It is considered widely distributed, but generally uncommon (Dixon, 1987). The diet of this snake consists mainly of rodents, birds, and rabbits. While habitat for this rattlesnake may exist within the project corridor, the potential for an impact to the species is unlikely, therefore no impacts are anticipated for this species.

Recommendation
USFWS requirements dictate that a recommendation is done by the biologist performing the studies as to the likely results the proposed project would have on Federally listed species. Habitat may occur within the project area for four of the species listed in **Tables 14** and **15**, namely the RCW (state and federally endangered), Rafinesque's big-eared bat (state threatened), whooping crane (state and federally endangered), and the timber/canebrake rattlesnake (state threatened); however, no listed species were observed within the proposed project area during field investigations conducted during 2004 and 2005.

A survey for the RCW was conducted for the project area in 2004. From these surveys, a No Effect determination for the RCW was made and coordination with the USFWS on this finding was completed in October 2004. A copy of the RCW survey report and coordination is included as **Appendix C**.

Based on the background research and field work performed for the project, a No Effect recommendation for this project has been made. Neither the proposed project, no the no-build alternative would affect listed species.

I. Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act, as amended on October 11, 1996, directs that all Federal agencies whose actions would impact essential fish habitat (EFH) must consult with the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) regarding potential adverse effects to EFH. No tidally influenced waters exist within the project area; therefore, no impacts to EFH would result from the proposed action or the no-build alternative.

J. Cultural Resources

The National Historic Preservation Act (NHPA) (16 USC. 470) states the national policy of preserving, restoring, and maintaining cultural resources (i.e., historic buildings, sites, districts, structures, or objects as well as archeological sites, artifacts, records, or remains, etc.) within the United States.

Archeological Properties
According to the Houston-Potential Archeological Liability Map (PALM) GIS database compiled by the TxDOT Austin Environmental Affairs Division, this project is located in the areas identified

as Map Units 1, 2, 3, and 4 (**Exhibit 7**). For those areas identified as Map Unit 1, a surface survey is recommended and a deep reconnaissance is recommended if deep impacts are anticipated. For areas identified as Map Unit 2, a surface survey is recommended, and no deep reconnaissance is recommended. For those areas identified as Map Unit 3, no surface survey is recommended, and a deep reconnaissance is recommended if deep impacts are anticipated. For areas identified as Map Unit 4, no survey is recommended. There are no bridges within the limits of the FM 1488 ROW. Box culverts would be removed and new box culverts would replace them. This action would require some excavation of creek beds and stream bottoms.

In May and June of 2004, a qualified archeological consultant performed a surface survey of the proposed ROW widening. A total of 191 shovel tests were performed during the survey and an additional nine shovel tests were dug to delineate a site. One prehistoric locality was found. No other artifacts where observed. No further surveying is recommended at this locality, and it is recommended that construction of the proposed FM 1488 ROW expansion be permitted to proceed on the properties studied without further cultural resource investigation. The Texas Historical Commission (THC) concurred with the finding of no effect on any archeological historic properties or National Register properties, and that the project may proceed without further archeological work on December 17, 2004 (**Appendix A**).

In the unlikely event of the accidental discovery of archeological materials, work in the immediate area of discovery would cease, TxDOT archeologists would be notified, and the emergency procedures covering accidental discoveries would be implemented as outlined and in accordance with the provisions stated in the Programmatic Agreement (PA) between the Advisory Council on Historic Preservation (ACHP), FHWA, TxDOT, and the THC and the MOU between TxDOT and the THC.

Historic Structures

The National Register of Historic Places (NRHP) is the mechanism by which historic properties can be protected. Any property or building, etc., found in the NRHP, or eligible for inclusion in the NRHP, is expressly protected from certain types of activities and can receive federal funding for restoration and maintenance operations. Although the National Park Service is responsible for determining the eligibility of NRHP sites, the State Historic Preservation Officer (SHPO) is responsible for enforcement of the NHPA within the State.

Historical cultural resources include historical structures and archeological sites. Those resources located on land owned by or under the administration of the State of Texas, its cities, counties, or other political subdivisions are statutorily covered by the Texas Antiquities Code (TAC). Under the TAC, any historic property on state land may be eligible as a State Archeological Landmark (SAL). Chapter 26 of the THC Rules of Practice and Procedure for the Antiquities Code of Texas determines eligibility for SAL status.

If projects are federally permitted, licensed, funded, or partially funded, Section 106 of the 1966 NHPA applies, requiring federal agencies to evaluate the project's effects on historic properties. Under Section 106, any property listed in or eligible for listing in the NRHP is considered historic. These properties may be buildings, structures, objects, sites, districts, or archeological resources. "Protection of Historic Properties" 36 CFR 800 regulates the ACHP process.

Federally-funded highway projects must also evaluate the project's effects on publicly owned parks, recreation areas, wildlife management areas, and significant historic sites. Section 4(f) of the 1966 Department of Transportation Act (USDOT Act) and the 1966 Federal Highway Act details regulations for those procedures.

Background Research
In order to evaluate NRHP eligibility, a qualified historic preservation specialist documented all buildings, sites, and structures that date before 1957 in the project area and evaluated their eligibility for listing on the NRHP. The project area consisted of an area of potential effect (APE) of 500 ft on either side of proposed ROW acquisition for the FM 1488 project corridor. In addition, records and files in the THC NRHP, Texas Historic Sites Atlas, and THC Historic Marker files were examined for previously recorded historic buildings, sites, districts, and markers. Readily available historical and archival sources were used to determine the historical background of the area, and historical maps and state agency resources were consulted for further reference. Building construction dates in the online resources of the Montgomery Central Appraisal District were consulted and proved useful, if not exact, for some buildings.

Summary of Historical Buildings and Structures Survey
The project area's historic-age resources are buildings, sites, structures, or objects that are usually at least 50 years old at the time of project construction. This survey reviewed all structures built prior to 1957 within an APE of 500 ft. A qualified historic preservation specialist performed a Reconnaissance Standing Structure Survey for FM 1488 between the Joseph Road and FM 2978 in July 2003 and March 2005.

No buildings, sites, structures or objects within the APE have been listed on the NRHP. However, 43 historic-age resource sites in the survey area appear to have been built prior to 1957, and one Historical Marker is located within the APE. A Texas Historical Marker is located in the Magnolia City Park commemorating the history of Magnolia; however, the marker is not located within the existing or proposed ROW and would not be impacted or relocated as a result of the proposed project.

Conclusions
None of the buildings in the project area built before 1957 individually meet the standards of historical significance for inclusion in the NRHP or comprise a historic district. One Texas Historical Marker is located within the project's APE.

In order to qualify for listing in the NRHP, a site, building, structure, or object must meet certain criteria for historical significance on a national, state, or local level and must retain sufficient historical integrity to display that significance. Standing structures may be significant under one or more of three criteria:

1. Association with an important event or pattern of history;
2. Association with an important person; or
3. As the work of a master builder or architect; as an outstanding example of a particular architectural style; or if possessing the distinctive characteristics of a type, period or method of construction.

The County Historical Commission was contacted to determine the existence of any known historical or archeological sites eligible for inclusion in, or nomination to, the NRHP. In a response dated February 25, 2004, the County Historical Commission concurred that the project area did not contain any eligible sites (**Appendix A**).

In accordance with the PA between the FHWA, the THC, the Advisory Council on Historic Preservation, and TxDOT and the MOU among TxDOT and the THC, TxDOT individually coordinated this project with the THC in December 2005. On December 15, 2005, the THC concurred with TxDOT's determination that all properties within the proposed project's APE are

not eligible for the NRHP (**Appendix A**). Neither the build nor the no-build alternative would impact cultural resources in the project area.

K. Parklands

Neither the proposed project nor the no-build alternative would impact any wildlife or waterfowl refuges, publicly-owned parklands, recreational areas, or historic sites; therefore, a Section 4(f) evaluation is not required. In addition, the proposed project would not impact any areas of unique scenic beauty or other lands of national, state, or local importance.

L. Floodplains

Flood Insurance Rate Maps (FIRMs), published by the Federal Emergency Management Agency (FEMA), were reviewed to assess flood prone areas (areas within the 100-year flood zone) within the project area. Within the boundary of the project area, flood prone areas were observed at Bear Branch, Mill Creek, Arnold Branch, and two crossings of Mink Branch (FIRM Nos.: 48339C0505C, 48339C0485C, 48339C0480C, 48339C0478C, 48339C0459C, and 48339C0460C). The City of Magnolia is a participant in the National Flood Insurance Program (NFIP). Montgomery and Waller counties also participate in the NFIP, thus the unincorporated portions of the counties are included in the program. There are approximately 21 ac of 100-year floodplains within the proposed ROW. Of the 21 ac, 8 ac are within the additional proposed ROW and 13 ac are within the existing ROW.

The hydraulic design of the proposed roadway improvements would be in accordance with the current TxDOT and FHWA policy standards. The facility would permit the conveyance of a 100-year flood, inundation of the roadway being acceptable, without causing significant damage to the roadway or other property. The proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances.

The no-build alternative would not impact floodplains in the project area. However, the no-build alternative does not meet the project's need and purpose, and therefore was not chosen as the preferred alternative.

Coordination with the Montgomery County Floodplain Administrator would take place in future environmental studies in order to determine if there would be any impacts to floodplains by the proposed project and to obtain any necessary floodplain-related approvals. Additionally, if wetlands are identified within any of these floodplain areas, the concurrence of no impacts to floodplains would need to be forwarded to the U.S. Army Corps of Engineers (USACE) for review of any necessary wetland permits.

M. Wetlands and Waters of the U.S.

Delineated Features

A wetland delineation was completed for the project area in January 2004, in accordance with the USACE 1987 Wetland Delineation Manual. A total of 26 features were delineated, totaling 1.64 ac within the existing and proposed ROW. A copy of the final wetland delineation report is on file and can be obtained from the Houston District office of TxDOT.

The wetland verification was conducted with the USACE on October 21, 2004. The USACE determined that approximately 1.42 ac of the delineated features were considered jurisdictional

waters of the U.S., including wetlands, and approved the Jurisdictional Determination on November 23, 2004 (D-16324). Refer to **Appendix A** for a copy of the Jurisdictional Determination letter. Refer to **Table 16** and **Exhibit 3** for the sizes and locations of the delineated features.

Table 16: Wetlands and Waters of the U.S. Within the Project Area

Area	Isolated Wetland (ac)	Jurisdictional Wetland (ac)	Jurisdictional Water of the U.S. (ac)	Total Jurisdictional Area (ac)
1			0.062	0.062
2		0.002	0.028	0.030
3			0.019	0.019
4		0.002	0.049	0.051
5			0.029	0.029
6		0.031	0.016	0.047
7			0.105	0.105
8		0.023	0.018	0.041
9		0.075	0.056	0.131
10			0.069	0.069
11		0.014	0.013	0.027
12		0.007		0.007
13			0.006	0.006
14			0.145	0.145
15			0.016	0.016
16		0.056	0.018	0.074
17		0.021		0.021
18			0.003	0.003
19	0.023			0.000
20		0.110	0.008	0.118
21			0.004	0.004
22		0.274		0.274
23			0.012	0.012
24		0.013	0.050	0.063
25	0.193			0.000
26			0.067	0.067
TOTALS	**0.216**	**0.628**	**0.793**	**1.420**

Wetland Functions and Values

Generally wetland areas serve the following functions and values: ground water recharge, ground water discharge, flood storage and velocity reduction, shoreline anchoring, sediment trapping, nutrient retention, food chain support, fishery habitat, wildlife habitat, general diversity, active recreation, passive recreation and heritage. In general, the wetlands throughout the project corridor do not serve the purposes of ground water discharge, shoreline anchoring, active recreation, passive recreation, fishery habitat, and heritage. Although all wetlands along the project would serve for ground water recharge, flood storage and velocity reduction, sediment trapping, nutrient retention, food chain support, wildlife habitat and general diversity, these functions and values would vary in importance for each site.

Avoidance/Minimization of Impacts to Wetlands
Consistent with the National Policy, as expressed in EO 11990 FHWA Rules, this "Wetlands Finding" is provided in summary form.

There are no practical alternatives to the proposed project that completely avoid the jurisdictional wetlands identified within the project area. Avoidance of these wetland impacts is not feasible due to the fact that the proposed improvements involve an existing facility. The preferred alternative, which utilizes a combination of Alternatives C2 and D, was found to be the most feasible alignment in terms of minimizing overall impacts. In Montgomery County, many areas qualify as wetlands due to the prevalence of hydric soils in the county or soils with possible hydric inclusions. In many areas, changes in the horizontal alignment of the proposed facility would only impact other wetland areas. In some areas, changes in the horizontal alignment would also displace businesses that support the small, local communities for which the proposed improvements are meant to serve, thus possibly causing socioeconomic impacts. The following measures to minimize impacts to wetlands were used throughout the entire project limits.

To the extent possible, jurisdictional wetlands would be avoided along the FM 1488 project corridor. Where avoidance is not practicable, wetland impacts would be minimized. Minimization efforts to wetland impacts can be seen throughout the project where roadway alignments and ROW limits have been reduced or adjusted, within design and safety standards, to reduce impacts to wetlands.

Proposed Impacts to Wetlands and Waters of the U.S.
A total of 1.42 ac of jurisdictional waters of the U.S., including wetlands, are located within the project area. Refer to **Table 16** for a list of each area and the acreage within the ROW. Each crossing would be considered a single and complete project. The proposed crossings would be culverts. Detailed design information, regarding fill quantities, could not be determined based upon the preliminary design information at the time of report preparation. Once the final design has been completed for the proposed project, fill quantities and exact impact amounts to wetlands and waters of the U.S. would be determined.

Based on the preliminary design information, the proposed project would require a Section 404 Nationwide Permit (NWP) 14 (Linear Transportation Crossings) due to the discharge of fill material into jurisdictional waters of the U.S., including wetlands, within the project area. A compensatory mitigation proposal would also be required for impacts to wetlands.

The no-build alternative would not impact any wetlands. However, the no-build alternative does not meet the project's need and purpose, and therefore was not chosen as the preferred alternative.

Mitigation
On-site mitigation would not be feasible due to the type and quality of wetlands impacted, which could not be appropriately created and maintained within the roadway corridor. On-site mitigation would also limit future plans for improvements to the FM 1488 roadway facility.

For those wetlands where avoidance and minimization efforts are not possible, mitigation for wetland impacts would be proposed at a USACE approved mitigation site.

N. Water Quality

No long-term water quality impacts are expected as a result of the proposed project. In view of the terrain along the project route, construction would not appear to entail a serious problem for erosion. Activities that disturb the soil and result in its transport during construction would be managed using standard TxDOT specifications and methods. The proposed project would incorporate best management practices (BMPs) at appropriate stages during construction. BMPs for erosion, sedimentation, and post construction total suspended solids (TSS) control would be in compliance with Section 401 – State Water Quality Certification, and the BMPs implemented would be from the Texas Commission on Environmental Quality's (TCEQ) list of water quality conditions for USACE NWPs. Erosion and sedimentation would be controlled by job specifications, on-site inspections during construction, and by seeding and sodding during and at the completion of the project. Barriers, such as a combination of silt fencing and hay bale dikes, would be utilized and remain in place until project completion. Outfalls to streams would be protected using barriers such as rock filter dams. For post-construction TSS control, a combination of retention and vegetative filter strips would be utilized. Subsurface construction activities such as storm sewer and utility construction would be protected by using sediment control measures and siltation fencing. All disturbed soils would be permanently reseeded with grass.

Subsurface water would not be required for this project. Therefore, no adverse effects to groundwater are expected to occur. The proposed project is not expected to alter rainfall drainage patterns or contaminate or otherwise adversely affect the public water supply, water treatment facilities, or water distribution systems.

The project area lies within the San Jacinto River Basin. According to data derived from the topographic and soil resources reviewed during this investigation, the overall project area is extremely undulating with slopes as high as 10%. As a consequence of the overall land development activities within the urban areas of the project limits, surface drainage features have been altered through dredging and the installation of various water control structures (e.g., culverts, cross drainages, storm sewers, etc.).

Roadside ditches are located along FM 1488 to convey storm water drainage within the project limits. Ditches and other drainage features (i.e., streams, creeks, etc.), some of which are considered waters of the U.S., also provide local drainage and cross drainage beneath FM 1488. These culvert crossings would be replaced, and channel excavation and scraping would occur at these sites. As evidenced through a review of topographic maps, the FM 1488 project area conveys roadside drainage into the Spring Creek watershed area. Water bodies within the project area include Mink Branch, Mill Creek, Woodlake, Log Creek, Arnold Branch, Nickaburr Creek, and Bear Branch. Mill Creek flows southeast into Spring Creek, which then flows east to the San Jacinto River, which flows south to the Gulf of Mexico.

Storm water runoff from this proposed construction would flow into several creeks which flow into Spring Creek, segment number 1008 of the San Jacinto River Basin. This feature is listed in the TCEQ Water Quality Inventory. This segment is designated as threatened or impaired for depressed dissolved oxygen and bacteria in the 2002 Clean Water Act Segment 303(d) list. However, the project is more than 5 mi upstream from the impaired segment. Therefore, coordination with the TCEQ regarding total maximum daily loads is not required.

Although runoff from highways can have an impact on water quality, no substantial impacts are anticipated to the ambient water quality of this segment because the area of impervious cover in

the project is small compared to the total area of the watershed. The public water supply in the vicinity of the project is obtained from groundwater wells; therefore, surface impacts caused by this project are not anticipated to affect the public water supply. Subsurface water would not be required for this project. Therefore, no adverse effects to groundwater are expected to occur. Neither the proposed project nor the no-build alternative are expected to alter rainfall drainage patterns or contaminate or otherwise adversely affect the public water supply, water treatment facilities, or water distribution systems.

O. Coastal Zone Management Plan

The proposed project area is not located within the jurisdictional boundaries of the Texas Coastal Zone Management Program. Therefore, neither the build nor the no-build alternative would have a direct or significant adverse effect on any coastal natural resource areas. Coordination with the Coastal Coordination Council is not required.

P. Hazardous Materials

Visual Observation

A visual observation was conducted in July 2003 for evidence of hazardous substances and/or contamination within the project area. The visual observation evaluated properties located within and immediately adjacent to the ROW boundaries of the project corridor for the purpose of identifying released or threatened releases of petroleum products or hazardous substances. The observation did not reveal any obvious areas where hazardous substances could have been released. The observation did reveal transmission lines, overhead power service lines, underground telephone cables, and petroleum pipelines paralleling the ROW and traversing the highway. In addition, the observation included verifying the results of the hazardous materials database search discussed below. Specifically, field personnel were tasked to identify suspect hazardous materials facilities not listed in the database and/or listed facilities that were not mapped correctly. As a result of the visual observation, no additional facilities were identified. No obvious indications (such as spills, stains or leaks) of hazardous materials were identified along the FM 1488 project corridor.

Regulatory Records Review

On July 7, 2003, Environmental Data Resources, Inc. (EDR) conducted a regulatory database search for the project corridor to determine whether any known sites producing, storing, and/or disposing of toxic or hazardous materials might affect the project area. Several environmental lists, including those published by the Environmental Protection Agency (EPA) and the TCEQ, were reviewed during this search. Refer to **Appendix B** for a copy of the hazardous material database search.

The Resource Conservation and Recovery Information System (RCRIS) database revealed the following two entries within a 1-mi radius of the project area (**Table 17**).

Table 17: RCRA Facilities Within 1 mi of the Project Area

Map ID	Listing	Location	Status
9	Master Downhole 5434 FM 1488	East Quadrant, Subject Property	No Violations Found
13	Magnolia Paint and Body 1119 Yancey Drive	Southwest Quadrant, Subject Property	No Violations Found

The Emergency Response Notification System (ERNS) database revealed the following entry within a 1-mi radius of the project area (**Table 18**).

Table 18: ERNS Facilities Within 1 mi of the Project Area

Map ID	Listing	Location	Status
6	1 mi N of St Rt 1488 and 3	East Quadrant, Subject Property	N/A

The State Underground Storage Tank (UST) database revealed the following 18 entries within a 1-mi radius of the project area (**Table 19**).

Table 19: UST Facilities Within 1 mi of the Project Area

Map ID	Listing	Location/Distance	Status
1	CO Haynes HWY 149 and FM 10	West Quadrant, Subject Property	2 - 1,000 gal. filled in place 1 - 550 gal. filled in place
2	MDN Drilling Corporation 14703 W. FM 1488	West Quadrant, Subject Property	2 - 10,000 gal. removed
4	Heritage Farms 1 Heritage Trail	East Quadrant, Adjacent Property	2 gal. gasoline
7	Royal Oaks County Store 11507 FM 1488	East Quadrant, Subject Property	3 - 8,000 gal. gasoline
7	Refugio Drilling CO 11510 FM 1488	East Quadrant, Subject Property	1 - 1,000 gal. removed 3 - 750 gal. removed
8	Kenneths Grocery 356 Rt 15	East Quadrant, Subject Property	2 - 8,000 gal. gasoline
8	Texas Star Chevron 10940 FM 1488	East Quadrant, Subject Property	2 - 12,000 gal. gasoline
9	Webbs Grocery 33030 FM 2978	East Quadrant, Subject Property	2 - 10,000 gal. removed
10	Time Mart 11 6730 FM 1488 Rd	East Quadrant, Subject Property	2 - 12,000 gal. gasoline
11	Fast Track Groceries 2178 FM 1488 W	Southwest Quadrant, Subject Property	2 - 10,000 gal. removed 3 - 6,000 gal. gasoline
12	Amatos 3 17529 FM 1488	Southwest Quadrant, Subject Property	2 - 6,000 gal. removed 1 - 10,000 gal. removed 1 - 3,000 gal. removed 1 - 2,000 gal. removed
13	Pedlers Junction 415 Magnolia Blvd	Southwest Quadrant, Subject Property	3 removed
13	Magnolia Foods 619 Magnolia Blvd	Southwest Quadrant, Subject Property	4 - 10,000 gal. gasoline
13	Handi Stop 15-Chevron 18903 FM 1488	Southwest Quadrant, Subject Property	4 - 12,000 gal. gasoline
13	007 Food Service 831 S. Magnolia Blvd	Southwest Quadrant, Subject Property	2 - 8,000 gal. gasoline 1 - 4,000 gal. gasoline 1 - 6,000 gal. gasoline
13	Muliflex, Inc FM 1774	Southwest Quadrant, Subject Property	1 - 5875 gal. removed 1 - 9724 gal. removed
13	Handi Stop 36 18655 FM 1488	Southwest Quadrant, Subject Property	3 - 12,000 gal. gasoline
13	Brookshire Brothers 48 18535 FM 1488	Southwest Quadrant, Subject Property	1 - 20,000 gal. gasoline 1 - 18,000 gal. gasoline

The State Leaking Underground Storage Tank (LUST) database revealed the following four entries within a 1-mi radius of the project area (**Table 20**).

Table 20: LUST Facilities Within 1 mi of the Project Area

Map ID	Listing	Location	Status
11	Fast Track Groceries 2178 FM 1488 W	Southwest Quadrant, Subject Property	Preassessment/Release Determination
13	Pedlers Junction 415 Magnolia Blvd	Southwest Quadrant, Subject Property	Site Assessment
13	Handi Stop 15-Chevron 18903 FM 1488	Southwest Quadrant, Subject Property	Monitoring
13	Muliflex, Inc FM 1774	Southwest Quadrant, Subject Property	Final Concurrence Issued, Case Closed

The Facility Index System (FINDS) database revealed the following three entries within a 1-mi radius of the project area (**Table 21**).

Table 21: FINDS Facilities Within 1 mi of the Project Area

Map ID	Listing	Location	Status
9	Master Downhole 5434 FM 1488	East Quadrant, Subject Property	Facility Registry System RCRIS
13	Amistad Environmental 19503 FM 1488	Southwest Quadrant, Subject Property	Facility Registry System Permit Compliance System
13	Magnolia Paint and Body 1119 Yancey Drive	Southwest Quadrant, Subject Property	Facility Registry System RCRIS

The Aboveground Storage Tank (AST) database revealed the following two entries within a 1-mi radius of the project area (**Table 22**).

Table 22: AST Facilities Within 1 mi of the Project Area

Map ID	Listing	Location	Status
5	AMOCO Pipeline Trucking 13703 FM 1488	East Quadrant, Subject Property	1 - 3,000 gal. gasoline
13	Campbell Concrete and Materials - 19503 FM 1488	Southwest Quadrant, Subject Property	1 - 12,000 not in use 1 - 10,000 gal. gasoline

The Industrial and Hazardous Waste Database (TX IHW) revealed the following three entries within a 1-mi radius of the project area (**Table 23**).

Table 23: Industrial and Hazardous Waste Facilities Within 1 mi of the Project Area

Map ID	Listing	Location	Status
2	MND Drilling Corporation 14703 W FM 1488	West Quadrant, Subject Property	Inactive
3	MND Drilling Corporation 14703 FM 1488	West Quadrant, Subject Property	Inactive
9	Master Downhole 5434 FM 1488	East Quadrant, Subject Property	Inactive

Conclusion

The proposed project would include the demolition and/or relocation of building structures. During the ROW acquisition process, prior to construction and any demolition and/or relocation of structures from the ROW, asbestos inspections, notifications, and abatement would be completed. Additionally, asbestos inspections, specification, notification, license, accreditation, abatement, and disposal, as applicable, would be performed in compliance with federal and state regulations.

Upon review of the information gathered during the investigation, it has been concluded that proposed ROW would be taken from two gas stations and a BP pumping station. There is no known portion of the storage tank system or ancillary equipment within the proposed ROW for either of the gas stations or pumping station, as currently proposed. One of the reported LUST sites is located within the proposed ROW. A records search of the TCEQ LUST data noted that groundwater has been impacted within the existing and proposed ROW. The impacted groundwater is approximately 50 ft below the surface, and therefore no impacts resulting from construction activities are anticipated. However, if during construction any hazardous materials or substances are discovered, construction would cease immediately, and TxDOT and other relevant agencies would be notified.

The no-build alternative would not impact any potential hazardous materials sites. However, the no-build alternative does not meet the project's need and purpose, and therefore was not chosen as the preferred alternative.

Q. Air Quality Analysis

The proposed project is located within Montgomery and Waller counties, which are within the Houston area moderate ozone nonattainment area. Therefore, the transportation conformity rules apply. Estimated time of completion (ETC) year traffic (2009) is estimated to range from 9,800 vpd from Joseph Road to Magnolia to 19,564 vpd between FM 1774 and FM 2978. ETC plus 20 years traffic (2029) is estimated to range from 19,035 vpd from Joseph Road to Magnolia to 40,305 vpd between FM 1774 and FM 2978. Design year traffic data is estimated to be 37,500 vehicles per day. According to TxDOT's 2006 Air Quality Guidelines, because these traffic projections do not exceed 140,000 vpd, this project is exempt from a traffic air quality analysis. Previous analyses of similar projects did not result in a violation of the National Ambient Air Quality Standards (NAAQs). The no-build alternative would not reduce congestion. Conversely, continued land development in the surrounding area would result in increased congestion, resulting in increased air pollution in the vicinity of the roadway.

All projects in the H-GAC's TIP that are proposed for Federal or state funds were initiated in a manner consistent with federal guidelines in Section 450, of Title 23 CFR and Section 613.200, Subpart B, of Title 49 CFR. Energy, environment, air quality, cost, and mobility considerations are addressed in the programming of the TIP. The proposed action is consistent with the area's financially constrained Metropolitan Transportation Plan ("2025 RTP") and the 2006-2008 TIP as proposed by the H-GAC. The RTP was found to conform to the State Implementation Plan (SIP) on June 3, 2005; the TIP was found to conform on October 31, 2005 in conjunction with the FY 2006-2008 STIP approval.

Congestion Management System

The congestion management system (CMS) is a systematic process for managing traffic congestion. It is an ongoing process that is designed to systematically evaluate, select, and

implement cost-effective strategies to manage new and existing transportation facilities. The CMS identifies appropriate TCMs for implementation in various congested areas, today and in the future. The CMS provides information on: transportation system performance; alternative strategies for alleviating congestion; enhancing the mobility of persons and goods to levels that meet state and local needs.

It is stated in 23 Code of Federal Regulations (CFR) 450.320(b) that no single SOV capacity may be built in the TMA designated as nonattainment for ozone or carbon monoxide unless the project complies with a CMS. The 2025 RTP for the Houston-Galveston TMA, which includes Montgomery and Waller counties, includes a CMS. The proposed improvements to the facility would conform to the Houston-Galveston area CMS. The FM 1488 project was developed from the H-GAC operational CMS, which meets all requirements of CFR 500.109. The CMS was adopted by the MPO on October 10, 1997 and later amended in December 1997 and May 1998.

Operational improvements and travel demand reduction strategies are commitments made by the region at two levels: program level and project level implementation. Program level commitments are inventoried in the regional CMS, which was adopted by H-GAC; they are included in the financially constrained RTP, and future resources are reserved for their implementation.

The CMS element of the plan carries an inventory of all project commitments (including those resulting from major investment studies) detailing type of strategy, implementing responsibilities, schedules and expected costs. At the project programming stage, travel demand reduction strategies and commitments would be added to the regional TIP or included in the construction plans. The regional TIP provides for programming of these projects at the appropriate time with respect to the SOV facility implementation and project specific elements.

Committed congestion reductions strategies and operational improvements within the proposed FM 1488 project study boundary would consist of intersection improvements. These projects, which are included in the regional CMS, would be managed by TxDOT, Metropolitan Transit Authority of Harris County, H-GAC, and local government under the Congestion Mitigation and Air Quality (CMAQ) Improvement Program.

In an effort to reduce congestion and increase the number of SOV lanes in the region, TxDOT and the H-GAC continue to promote appropriate congestion reduction strategies through the CMAQ program, the CMS, and the RTP.

The proposed improvements would conform to the Houston-Galveston area CMS. The H-GAC has provided LOWs for the proposed project CSJ numbers 0523-08-007, 0523-09-009, and 0523-10-016 as they are not on the CMS Network and as such do not require a CMA. The project with CSJ number 0523-10-034 is not an added capacity project. It is a Transportation System Management (TSM) grade separation project and as such, does not require a CMA. Traffic System Management (TSM) and Traffic Demand Management (TDM) actions alone are not sufficient to mitigate congestion; therefore, added SOV capacity is necessary for the FM 1488 facility. The H-GAC has provided LOWs for the proposed project (**Appendix A**).

Mobile Source Air Toxics (MSATs)

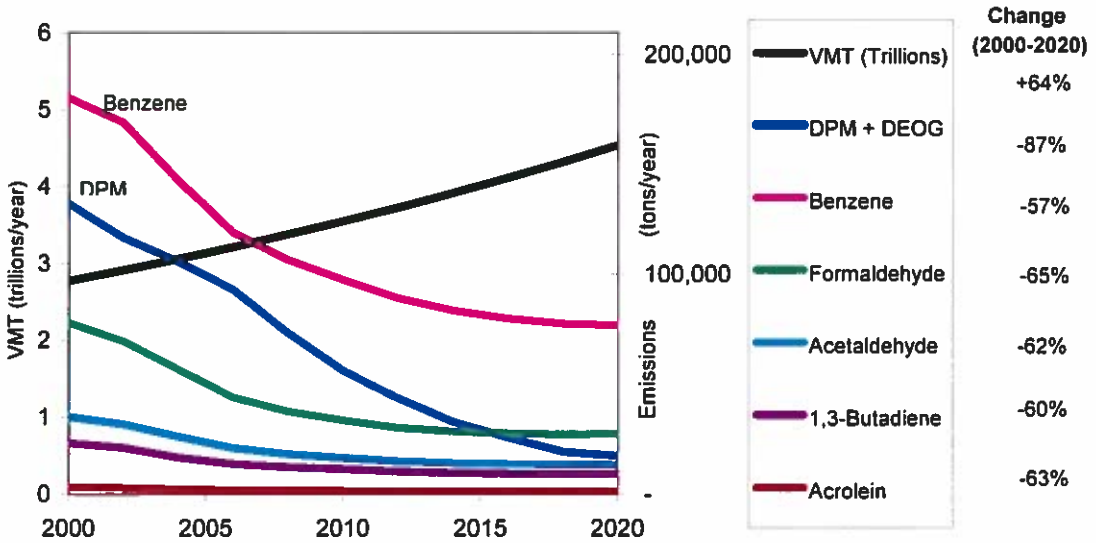
The purpose of this project is to improve mobility and safety within the FM 1488 corridor. In addition to the criteria air pollutants for which there are NAAQS, the U.S. Environmental Protection Agency (EPA) also regulates air toxics. Most air toxics originate from human-made

sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act (CAA). The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA is the lead Federal agency for administering the CAA and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on *Controlling Emissions of Hazardous Air Pollutants from Mobile Sources* (66 FR 17229, March 29, 2001). This rule was issued under the authority in Section 202 of the CAA. In its rule, the EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, the FHWA projects that even with a 64 percent increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 to 65%, and will reduce on-highway diesel PM emissions by 87%, as shown in the following graph:

Vehicle Miles Traveled (VMT) vs.
Mobile Source Air Toxics Emissions, 2000-2020



Notes: For on-road mobile sources. Emissions factors were generated using MOBILE6.2. MTBE proportion of market for oxygenates is held constant, at 50%. Gasoline RVP and oxygenate content are held constant. VMT: *Highway Statistics 2000*, Table VM-2 for 2000, analysis assumes annual growth rate of 2.5%. "DPM + DEOG" is based on MOBILE6.2-generated factors for elemental carbon, organic carbon and SO4 from diesel-powered vehicles, with the particle size cutoff set at 10.0 microns. 1 short ton = 907,200,000 mg.

In an ongoing review of MSATs, the EPA finalized additional rules under authority of CAA Section 202(l) to further reduce MSATs emissions that are not reflected in the above graph.

The EPA issued Final Rules on Control of Hazardous Air Pollutants from Mobile Sources (72 FR 8427, February 26, 2007) under Title 40 Code of Federal Regulations Parts 59, 80, 85 and 86. The rule changes were effective April 27, 2007. As a result of this review, the EPA adopted the following new requirements to significantly lower emissions of benzene and the other MSATs by: (1) lowering the benzene content in gasoline; (2) reducing non-methane hydrocarbon (NMHC) exhaust emissions from passenger vehicles operated at cold temperatures (under 75 degrees Fahrenheit); and (3) reducing evaporative emissions that permeate through portable fuel containers.

Beginning in 2011, petroleum refiners must meet an annual average gasoline benzene content standard of 0.62 percent by volume, for both reformulated and conventional gasolines, nationwide. The national benzene content of gasoline in 2007 is about 1.0 percent by volume. The EPA standards to reduce NMHC exhaust emissions from new gasoline-fueled vehicles will become effective in phases. Standards for light-duty vehicles and trucks (less than or equal to 6000 pounds [lbs]) become effective during the period of 2010 to 2013, and standards for heavy light-duty trucks (6,000 to 8,000 lbs) and medium-duty passenger vehicles (up to 10,000 lbs) become effective during the period of 2012 to 2015. Evaporative requirements for portable gas containers become effective with containers manufactured in 2009. Evaporative emissions must be limited to 0.3 grams of hydrocarbons per gallon per day.

The EPA has also adopted more stringent evaporative emission standards (equivalent to current California standards) for new passenger vehicles. The new standards become effective in 2009 for light vehicles and in 2010 for heavy vehicles. In addition to the reductions from the 2001 rule, the new rules will significantly reduce annual national MSATs emissions. For example, the EPA estimates that emissions in the year 2030, when compared to emissions in the base year prior to the rule, will show a reduction of 330,000 tons of MSATs (including 61,000 tons of benzene), reductions of more than 1,000,000 tons of volatile organic compounds, and reductions of more than 19,000 tons of PM2.5.

Project Specific MSATs Information

Numerous technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSATs emissions and effects of this project (see "Unavailable Information for Project Specific MSATs Impact Analysis" at the end of this section for more information). However, it is possible to qualitatively assess the levels of future MSATs emissions under the project. Although a qualitative assessment cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSATs emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, found at:

www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm

Because the estimated VMT under each of the alternatives is nearly the same it is expected there would be no appreciable difference in overall MSATs emissions among the various alternatives. Also, regardless of the alternative chosen, 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 MSATs emissions by 57 to 87% between 2000 and 2020. 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 MSATs emissions in the project area are likely to be lower in the future in nearly all cases.

The additional travel lanes proposed as part of the project alternatives would have the effect of moving some traffic closer to nearby homes, schools and businesses; therefore, there may be localized areas where ambient concentrations of MSATs could be higher under the build alternative than under the no-build alternative. The localized increases in MSATs concentrations would be most pronounced along the expanded roadway sections that would be built near Spur 149. However, as discussed previously, the magnitude and duration of these potential increases compared to the no-build alternative cannot be accurately quantified due to the inherent deficiencies of current models. In sum, when the highway is widened and, as a result, moves closer to receptors, the localized levels of MSATs emissions for the build alternative could be higher relative to the no-build alternative, but this offset is due to increases in speeds and reductions in congestion (which are associated with lower MSATs emissions). Also, MSATs will be lower in other locations when traffic shifts away from receptors. However, on a regional basis, the EPA's vehicle and fuel regulations coupled with fleet turnover will cause region-wide MSATs levels to be significantly lower than today in almost all cases.

Sensitive Receptor Assessment

There may be localized areas where ambient concentrations of MSATs are slightly higher in any build scenario than in the no-build scenario. Dispersion studies have shown that the "roadway" air toxics start to drop off at about 100 meters (m). By 500 m, most studies have found it very difficult to distinguish the roadway from background toxic concentrations in any given area. An assessment of potential sensitive receptors within both 100 and 500 m was conducted. Sensitive receptors include those facilities most likely to contain large concentrations of the more sensitive population (hospitals, schools, licensed day cares, and elder care facilities). Five sensitive receptors are located within 500 m of the FM 1488 project ROW (**Exhibit 9**). As shown in **Table 24**, two of these sensitive receptors are within 100 m of the proposed ROW.

Table 24: Sensitive Receptors by Distance

Sensitive Receptor ID	Facility Name	Address	Located within 100 m (328 ft) of the Roadway	Located within 500 m (1,640 ft) of the Roadway
SR 1	Alpha Academy	919 Cloyd St. Magnolia, TX 77355	X	
SR 2	Project Restore High School	829 S. Magnolia St. Magnolia, TX 77355		X
SR 3	Willie E. Williams Elementary School	18101 FM 1488 Magnolia, TX 77353		X
SR 4	Magnolia High School	14250 FM 1488 Magnolia, TX 77353	X	
SR 5	Bear Branch Elementary School	8909 FM 1488 Magnolia, TX 77354		X

Unavailable Information for Project Specific MSATs Impact Analysis

This document includes a basic analysis of the likely MSATs emission impacts of this project. However, available technical tools do not enable the prediction of project-specific health impacts of the emission changes associated with the alternatives in this project. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22[b]) regarding incomplete or unavailable information:

Information that is Unavailable or Incomplete

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling

in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSATs health impacts of this project.

1. Emissions: The EPA tools to estimate MSATs emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While MOBILE6.2 is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE6.2 is a trip-based model-emission factors are projected based on a typical trip of 7.5 miles, and on average speeds for this typical trip. This means that MOBILE6.2 does not have the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE6.2 can only approximate the operating speeds and levels of congestion likely to be present on the largest-scale projects, and cannot adequately capture emissions effects of smaller projects. For particulate matter, the model results are not sensitive to average trip speed, although the other MSATs emission rates do change with changes in trip speed. Also, the emissions rates used in MOBILE6.2 for both particulate matter and MSATs are based on a limited number of tests of mostly older-technology vehicles. Lastly, in its discussions of PM under the conformity rule, EPA has identified problems with MOBILE6.2 as an obstacle to quantitative analysis.

These deficiencies compromise the capability of MOBILE6.2 to estimate MSATs emissions. MOBILE6.2 is an adequate tool for projecting emissions trends, and performing relative analyses between alternatives for very large projects, but it is not sensitive enough to capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations. However, MOBILE6.2 is currently the only available tool for use by FHWA/TxDOT and may function adequately for larger scale projects for comparison of alternatives.

2. Dispersion. The tools to predict how MSATs disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The NCHRP is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. This work also will focus on identifying appropriate methods of documenting and communicating MSATs impacts in the NEPA process and to the general public. Along with these general limitations of dispersion models, the FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSATs background concentrations.

3. Exposure Levels and Health Effects. Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel

patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs
Research into the health impacts of MSATs is ongoing. For different emission types there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database *Weight of Evidence Characterization* summaries. This information is taken verbatim from EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- **Acrolein:** The potential carcinogenicity of acrolein cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1, 3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- **Diesel exhaust** is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases. Diesel exhaust also represents chronic respiratory effects, possibly the primary non-cancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

There have been other studies that address MSATs health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by the EPA, the FHWA, and

industry, has undertaken a major series of studies to research near-roadway MSATs hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes, particularly respiratory problems. Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more importantly, they do not provide information that would be useful to alleviate the uncertainties listed above and enable us to perform a more comprehensive evaluation of the health impacts specific to this project.

Relevance of Unavailable or Incomplete Information
While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSATs emissions from each of the project alternatives and MSATs concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects. Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have significant adverse impacts on the human environment.

In this document, a qualitative assessment has been provided relative to the various alternatives of MSATs emissions and has acknowledged that the build alternative may result in increased exposure to MSATs emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.

R. Traffic Noise Analysis

A traffic noise analysis was accomplished in accordance with TxDOT's (FHWA approved) *1996 Guidelines for Analysis and Abatement of Highway Traffic Noise*.

Sound from highway traffic is generated primarily from a vehicle's tires, engine and exhaust. It is commonly measured in decibels and is expressed as "dB."

Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear; therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dBA."

Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as "Leq."

Table 25 lists examples of common sound and noise levels for comparison.

Table 25: Common Sound/Noise Levels

Outdoor	dBA	Indoor
Pneumatic hammer	100	Subway Train
Gas lawn mower at 1 m		
	90	Food blender at 1 meter
Downtown (large city)	80	Garbage disposal at 1 meter
Lawn mower at 30 m	70	Vacuum cleaner at 3 m
		Normal speech at 1 meter
Air conditioning unit	60	Clothes dryer at 1 meter
Babbling brook		Large business office
Quiet urban (daytime)	50	Dishwasher (next room)
Quiet urban (nighttime)	40	Library

The traffic noise analysis typically includes the following elements:

- Identification of land use activity areas that might be impacted by traffic noise;
- Determination of existing noise levels;
- Prediction of future noise levels;
- Identification of possible noise impacts; and
- Consideration and evaluation of measures to reduce noise impacts.

Table 26 outlines the Noise Abatement Criteria (NAC) established by the FHWA for various land use activity areas that are used as one of two means to determine when a traffic noise impact would occur.

Table 26: FHWA Noise Abatement Criteria

Activity Category	dBA Leq	Description of Land Use Activity Areas
A	57 (exterior)	Lands on which serenity and quiet are of extra-ordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 (exterior)	Developed lands, properties or activities not included in categories A or B above.
D	--	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

NOTE: Primary consideration is given to exterior areas (Category A, B or C) where frequent human activity occurs. However, interior areas (Category E) are used if exterior areas are physically shielded from the roadway, or if there is little or no human activity in exterior areas adjacent to the roadway.

A noise impact occurs when either the absolute or relative criterion is met:

Absolute criterion: The predicted noise level at a receiver approaches, equals or exceeds the NAC. "Approach" is defined as one dBA below the NAC. For example, a noise impact would occur at a Category B residence if the noise level is predicted to be 66 dBA or above.

Relative criterion: The predicted noise level substantially exceeds the existing noise level at a receiver even though the predicted noise level does not approach, equal or exceed the NAC. "Substantially exceeds" is defined as more than 10 dBA. For example, a noise impact would occur at a Category B residence if the existing level is 54 dBA and the predicted level is 65 dBA (11 dBA increase).

When a traffic noise impact occurs, noise abatement measures must be considered. A noise abatement measure is any positive action taken to reduce the impact of traffic noise on an activity area.

The FHWA traffic noise modeling (TNM) software was used to calculate existing and predicted traffic noise levels. The model primarily considers the number, type and speed of vehicles; highway alignment and grade; cuts, fills and natural berms; surrounding terrain features; and the locations of activity areas likely to be impacted by the associated traffic noise. ADTs for years 2007 and 2027 used in the TNM software are listed in **Table 3**.

Existing and predicted traffic noise levels were modeled for receivers (**Table 27** and **Exhibit 3**) that represent the land use activity of areas adjacent to the proposed project which might be impacted by traffic noise, and potentially benefit from feasible and reasonable noise abatement.

Table 27: Traffic Noise Levels (dBA Leq)

Receiver*		NAC Category	NAC Level	Existing 2007	Predicted 2027	Change (+/-)	Noise Impact
R-1	Residence	B	67	43	46	+3	N
R-4	Residence	B	67	42	45	+3	N
R-6	Residence	B	67	55	59	+4	N
R-8	Residence	B	67	57	62	+5	N
R-15	Residence	B	67	61	65	+4	N
R-16	Residence	B	67	58	61	+3	N
R-17	Residence	B	67	61	64	+3	N
R-20	Magnolia City Park (playground)	B	67	64	63	-1	N
R-21	Residence	B	67	58	59	+1	N
R-22	Windmill Estates Recreational Area	B	67	63	65	+2	N
R-25	Church - St. Paul's Lutheran (Interior)	E	52	40	45	+5	N
R-39	Residence	B	67	63	68	+5	Y
R-40	Church - Piney Grove Baptist (Interior)	E	52	41	46	+5	N
R-50	Residence	B	67	55	60	+5	N
R-53	Residence	B	67	57	62	+5	N
R-54	Church - St. Matthew Missionary Baptist (Interior)	E	52	40	45	+5	N
R-55	Residence	B	67	62	66	+4	Y
R-59	School - Magnolia High School (Interior)	E	52	40	44	+4	N
R-64	Residence	B	67	51	55	+4	N
R-71	Residence	B	67	53	57	+4	N
R-80	Residence	B	67	53	58	+5	N
R-86	Residence	B	67	57	62	+5	N
R-93	Residence	B	67	57	61	+4	N
R-96	Residence	B	67	64	67	+3	Y
R-99	Residence	B	67	64	68	+4	Y
R-101	School - Bear Branch Elementary (Interior)	E	52	40	44	+4	N
R-104	Residence	B	67	61	64	+3	N
R-110	Residence	B	67	54	59	+5	N
R-121	Residence	B	67	55	60	+5	N
R-128	Residence	B	67	53	58	+5	N
R-129	Residence	B	67	50	54	+4	N
R-137	Church - Selah Church (Interior)	E	52	40	43	+3	N
R-141	Residence	B	67	60	66	+6	Y

** Unless otherwise noted, receivers are exterior locations.*

As indicated in **Table 27**, the proposed project would result in a traffic noise impact and the following noise abatement measures were considered: traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone and the construction of noise barriers.

Before any abatement measure can be incorporated into the project, the measure must be both feasible and reasonable. In order to be feasible, the measure should reduce noise levels by at least 5 dBA at impacted receivers; and to be reasonable it should not exceed $25,000 for each benefited receiver.

Traffic management: Control devices could be used to reduce the speed of the traffic; however, the minor benefit of one dBA per 5 miles per hour (mph) reduction in speed does not outweigh the associated increase in congestion and air pollution. Other measures such as time or use restrictions for certain vehicles are prohibited on state highways.

Alteration of horizontal and/or vertical alignments: Any alteration of the existing alignment would displace existing businesses and residences, require additional ROW and not be cost effective/reasonable.

Buffer zone: the acquisition of undeveloped property to act as a buffer zone is designed to avoid, rather than abate traffic noise impacts, and therefore is not feasible.

Noise barriers: This is the most commonly used noise abatement measure. Noise barriers were considered for each of the impacted receiver locations with the following results.

Receiver R-39 and R-141 represent two individual residences. A noise barrier that would achieve the maximum feasible reduction of 5 dBA would exceed the reasonable, cost-effective criterion of $25,000.

Receiver R-55 represents an individual residence that is located northeast of the intersection of FM 1488 and FM 149. The proposed roadway would involve a grade separation and elevated direct connectors. Due to the proposed elevation of the roadway, noise barriers would not be feasible in this area.

Receivers R-96 and R-99 represent 13 residences in a subdivision north of FM 1488. Noise barrier cases were modeled with varying heights between 8 ft and 22 ft. Noise barriers achieving the minimum feasible reduction of at least 5 dBA would exceed the reasonable, cost-effectiveness criterion of $25,000 per benefited receiver.

None of the above noise abatement measures are both feasible and reasonable; therefore, no abatement measures are proposed for this project.

Numerous land use activity areas along FM 1488 are currently Category D, undeveloped land. There is no NAC for undeveloped land. However, 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, that no new activities are planned or constructed along or within the following predicted contours listed in **Table 28**.

Table 28: Noise Contours

Undeveloped Area	Land Use	Impact Contour	Distance from ROW
Joseph Road to FM 1774	Residential	66 dBA	150 ft

Noise associated with the construction of the 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, any extended disruption of normal activities is not expected. 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.

The no-build alternative would not impact any noise receivers. However, the no-build alternative does not meet the project's need and purpose. Therefore it was not chosen as the preferred alternative.

A copy of this traffic noise analysis will be made available to local officials to ensure, to the maximum extent possible, future developments are planned, designed, and programmed in a manner that would avoid traffic noise impacts. On the date of approval of this document (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project.

S. Indirect and Cumulative Impacts

FM 1488 is an established east-west transportation route extending from US 290 in Hempstead across Waller and Montgomery counties to IH 45. Over the next 30 years, Montgomery County is expected to experience an additional 492,000 residents, growing from an estimated 373,000 in 2005 to 865,000 in 2035 (H-GAC, 2006). This growth will be accompanied by land development that will serve the residents, including new schools, additional shopping centers, and employment centers. Such growth may, in turn, attract additional growth, depending upon the development policies followed by local governments in the area.

The Council on Environmental Quality (CEQ) defines indirect impacts as those "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR Section 1508.8). Indirect impacts differ from those directly associated with the construction and operation of the proposed project and are caused by another action or actions that have an established relationship or connection to the proposed project. These induced actions are those that would not or could not occur except for the implementation of the proposed project. The potential for indirect impacts to occur is determined in a large part by municipal planning objectives and the location of the project. These effects may not necessarily be restricted to just the project area.

Land use changes within the surrounding resource study area would occur regardless of whether the proposed FM 1488 improvements are implemented. However, it is anticipated that development opportunities within the study area would be facilitated by the proposed improvements. Undeveloped areas within and surrounding the resource study area would likely be developed primarily for single family detached residential and commercial land uses.

A positive indirect impact to the local economy can reasonably be expected to occur because of the circulation of money related to construction spending; an increase in work force related to the construction; and improved access to employment opportunities, markets, goods, and services. Increased commercial property values in the proposed project area could reasonably be expected to occur due to improved accessibility and mobility. Increased property values, in turn, would increase city and county tax revenues.

The CEQ defines cumulative impacts (i.e., effects) as "the impact on the environment which results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions" (40 CFR Section 1508.7). As this regulation

suggests, the purpose of cumulative effects analysis is to view the direct and indirect impacts of the proposed project within the larger context of past, present, and future activities that are independent of the proposed project, but which are likely to affect the same resources in the future. This approach allows the decision maker to evaluate the incremental impacts of the proposed build alternative in light of the overall health and abundance of selected resources. In essence, a cumulative effects evaluation creates a model of the predicted condition of each resource that is independent of the proposed project, and then analyzes the expected direct and indirect impacts of the project within that context to determine if there is a cumulative effect. The evaluation process for each resource considered may be expressed in shorthand form as follows:

BASELINE + PROJECT IMPACTS + EFFECTS OF OTHER PROJECTS = CUMULATIVE EFFECTS
(historical and current) (direct and indirect) (past, present, and reasonably foreseeable actions)

The evaluation of cumulative effects discussed in this report follows the eight steps in TxDOT's *Guidance on Preparing Indirect and Cumulative Impact Analyses* (December 2006), which reflects the requirements of controlling case law. To conduct the cumulative impact analysis, it was essential to build on information derived on the direct and indirect impacts analyses. Unlike direct impacts, quantifying indirect and cumulative impacts may be difficult, since a large part of the analysis requires an eye to the future and what may happen in the project area. This eight-step approach was utilized to assess the potential cumulative impacts of the past, present, and reasonably foreseeable actions on the resources in the proposed project area. The eight-step methodology from TxDOT's *Guidance* is depicted in **Table 29**. Each of the eight steps is identified in the evaluation that follows **Table 29**, but the steps have been grouped to allow most aspects of the analysis to be consolidated by each resource studied. The methodology used to prepare this evaluation is also in accordance with guidance from the CEQ, *Considering Cumulative Effects under the National Environmental Policy Act* (1997).

Table 29: TxDOT's Eight-Step Approach to the Indirect and Cumulative Impact Analysis

Step No.	Step
1	Identify the resources to consider in the analysis.
2	Define the study area for each affected resource.
3	Describe the current health and historical context for each resource.
4	Identify direct and indirect impacts that may contribute to a cumulative impact.
5	Identify other reasonably foreseeable actions that may affect resources.
6	Assess potential cumulative impacts to each resource.
7	Report the results.
8	Assess and discuss mitigation issues for all adverse impacts.

Source: *Guidance on Preparing Indirect and Cumulative Impact Analyses*, TxDOT. December 2006.

Identify Resources and Define Resource Study Areas (Steps 1-2)

Step 1: The initial step of the cumulative effects analysis uses information from the evaluation of direct and indirect impacts in the selection of environmental resources that should be evaluated for cumulative effects. TxDOT's *Guidance* states: "If a project will not cause direct or indirect impacts on a resource, it will not contribute to a cumulative impact on the resource. The cumulative impact analysis should focus only on: (1) those resources significantly impacted by the project; and (2) resources currently in poor or declining health or at risk even if the project

impacts are relatively small (less than significant)." Similarly, the CEQ guidance recommends narrowing the focus of the cumulative effects analysis to important issues of national, regional, or local significance so as to count what counts, not produce superficial analysis of a long list of issues that have little relevance to the effects of the proposed action or eventual decisions. Thus, the cumulative effects analysis should focus only on the resources that are substantially affected by the proposed project by direct and/or indirect impacts. Whether a resource is substantially affected is a function of the existing abundance and condition of the resource, and would include resources that are currently in poor or declining health, or are at risk even if the proposed project impacts are not major.

Applying the foregoing criteria, the resources or environmental issues related to the proposed project with the potential for cumulative effects are listed in **Table 30**. As recommended by the CEQ guidance, specific indicators of each resource's condition have been identified and are shown in **Table 30**. The use of indicators of a resource's health, abundance, and/or integrity are helpful tools in formulating quantitative or qualitative metrics for characterizing overall effects to resources. These indicators are also key aspects of each resource that have already been evaluated in terms of the project's direct and indirect impacts and facilitate greater consistency and objectivity in the analysis of cumulative effects.

Table 30: Resource Indicators and Study Areas for the Cumulative Effects Analysis

Resource Category	Indicators of Resource Condition and Potential Impacts	Resource Study Area (RSA)
Biological Resources	Wildlife Habitat: the amount and quality of upland wooded areas suitable for sustaining a diversity of wildlife species.	Spring Creek watershed
Water Resources	Waters of the U.S., including Wetlands: the amount/quality of areas affected.	Spring Creek watershed
	Floodplains: amount of area within the 100-year floodplain affected by an action.	
	Water Quality: expected change in water quality to Spring Creek.	
Land Use	Land Use Plan: consistency with the local comprehensive land use plans.	H-GAC Gulf Coast Planning Region
Air Quality	8-Hour Ozone Standard: ability of the region to meet this air quality standard.	8-county (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller) non-attainment area for the Houston-Galveston Metropolitan Area.

Step 2: Cumulative impacts are considered within spatial and temporal boundaries. Each resource has its own resource study area (RSA) to best assess the impacts to that individual impact. The second step of this analysis seeks to evaluate the direct and indirect effects of the proposed project as far away from the project area as the effects are expected to be felt on each of the resources studied.

Because the resources/issues vary widely, the appropriate geographical context for evaluating cumulative effects depends upon a myriad of factors. The setting of spatial limits for resource indicators was established using TxDOT and CEQ criteria, and considered factors such as each

resource's physical characteristics, biological relationships, and affected institutional jurisdictions. The RSAs defined for the examination of each indicator of resource condition and potential impacts are also shown in **Table 30.**

The temporal boundary set for each resource differs slightly, as noted in Step 3, however the "future" date of the temporal boundary was set at 2025, based on the H-GAC's 2025 RTP. The H-GAC 2025 RTP was created by community leaders to address regional mobility, air quality and safety, under the current growth projections for the eight-county area over the next two decades. Therefore, this timeframe was considered to be the most appropriate for this area.

The RSA (also known as zone of potential impact), evaluated for the biological and water resources, was a portion of the Spring Creek watershed upstream and downstream of the proposed project area. The proposed project area either drains directly into Spring Creek or drains into a tributary that drains into Spring Creek. A watershed represents a bounded hydrologic system wherein natural resources are interconnected and integrated through a common water course. This water-centered integration of resources is linked directly to the indicators of water resources noted above, as well as the biological resources. Moreover, as a practical matter, while little detailed information is available on wildlife populations in the project area, inferences may be drawn from a study of habitat that is known to support a diversity of animal species. Key wildlife habitat, in turn, is often proximate to water sources that characterize local watersheds. In addition, a watershed approach was also taken for characterizing impacts to developable land (i.e., land that is outside designated floodplain areas that has not yet been developed). Conversion of this resource would affect the hydrology and ecology that currently characterizes the Spring Creek watershed.

The remaining RSAs were tailored to the nature of each resource studied as well as the political/management realities for each resource or issue. The RSA for evaluating air quality was designated as the Houston-Galveston 8-hour ozone nonattainment area. This large area represents the management unit for mobile source pollutants as regulated by Federal, state, and local government agencies. Unlike the other resources evaluated, air quality impacts from mobile sources are evaluated and managed on a regional basis primarily through the H-GAC, in coordination with the EPA.

Describe Resources, Identify Impacts, Assess Cumulative Effects, Report Results, and Assess Mitigation (Steps 3-8)

The remainder of the cumulative effects analysis consolidates the remaining six steps from the TxDOT *Guidance* so that the analytical steps may be grouped within the discussion about each resource (December 2006).

Step 3: The examination of the current health and historical context of each resource is necessary to establish a baseline for determining the effects of the proposed action and other reasonably foreseeable actions on the resource. For the four resource categories of special interest identified earlier, each resource's abundance and quality at the present time was evaluated considering the effects of historical activities, the resource's response to change, and the continuing stresses imposed on the resource and its capacity to withstand these stresses. Collectively, these factors capture the influences that have shaped and are shaping the amount and quality of each resource, and which would continue to shape each given resource in the future.

The discussion below describes the historical and current condition of each resource within the context of its RSA. A summary of existing conditions is included in **Table 31** below, where it

serves as a point of reference for summaries of impacts from the proposed project and from other projects within each resource's RSA. Demographic and land use information was obtained from local government planning offices and websites. Vegetation and wildlife habitat were generally characterized through interpretation of high resolution aerial photography for the year 2006. FEMA maps were reviewed for the 100-year floodplain within the Spring Creek watershed, and USFWS NWI maps were utilized for information regarding potential waters of the U.S., including wetlands. Information on the various resources studied was digitized, and spatial data was developed through the use of geographic information system software.

Step 4: The analysis of cumulative impacts must look at the impacts of the proposed action in combination with the impacts of other past, present, or reasonably foreseeable actions within the RSAs. Identification of the direct and indirect impacts of the proposed action will also assist in determining the project's contribution to the cumulative impact on the resource. The direct and indirect effects expected from the proposed project were discussed in detail earlier in this document. The results of the study of direct and indirect effects are summarized in **Table 31** in the next subsection; where they may be viewed along side the expected impacts from reasonably foreseeable future projects (**Step 5**) for the resources that were selected for cumulative effects analysis.

Step 5: CEQ regulations indicate that cumulative effects analyses must add an assessment of reasonably foreseeable future actions affecting the resources studied (40 CFR Section 1508.7). This portion of the cumulative effects analysis sought out other transportation projects and planned large-scale public or private developments in the Spring Creek watershed. The identification of the reasonably foreseeable future actions for the watershed RSA was based on a review of proposed and ongoing development projects that are associated with the City of Magnolia and surrounding areas. Transportation projects were determined from H-GAC and TxDOT databases and engineering documents.

In addition to site-specific development plans, the anticipated impacts from the eventual development of the watershed RSA as reflected in comprehensive land use plans or zoning ordinances were considered in reviewing future impacts to biological and water resources. Qualitative inferences as to potential impacts on the resources studied were drawn from the description of each proposed future project or plan. Individual projects were not identified for the ozone nonattainment area because air quality is regulated and managed on a regional level, with expected development projects with substantial air emissions included in air pollution budgets, dispersion modeling, and air quality implementation plans. Similarly, individual development projects were not inventoried for the entire RSA because the nature of the land use plans already integrates the future land development actions that necessarily accompany the estimated increases in population growth.

The results of reviewing reasonably foreseeable future actions for potential impacts are summarized in **Table 31**. These results are shown with a summary of existing conditions (**Step 3**) and a summary of the combined direct and indirect impacts for the proposed project (**Step 4**). Note that the expected direct and indirect impacts from the proposed project and the expected impacts from foreseeable future projects shown in **Table 31** reflect potential impacts; that is, the analysis to this point does not consider the mitigation that would be required as part of the regulatory programs that are reviewed in the last step (**Step 8**) of the cumulative effects analysis.

It should be noted that continued population growth in the area would ultimately result in substantial changes in land use throughout the Spring Creek watershed. Although planning

documents do not reflect specific future projects, this information is an indication of what the H-GAC envisions as the eventual configuration of land use within the RSA. Future developments anticipated, but not yet proposed, would likely result in the removal of forested areas that are not included within the floodplain and parks.

Table 31: Summary of Existing Resource Conditions and Potential Impacts

Resource Category	Indicator of Resource Condition (Step 1)	Resource Study Area (Step 2)	Summary of Existing Resource Condition and Potential Impacts		
			Existing Condition (Step 3)	Proposed Project Direct/Indirect Impacts[1] (Step 4)	Impacts from Other Foreseeable Projects[2] (Step 5)
Biological Resources	Wildlife Habitat	Portion of Spring Creek watershed	Commercial/residential development with isolated pockets of undeveloped land; existing ROW frequently mowed and woody species planted for landscape purposes	Loss of vegetated areas: Herbaceous: 129.7 ac Upland woodland: 75.8 ac Riparian: 0.84 ac Forested Wetland: 0.11 ac Non-forested wetlands: 0.52 ac Total = 206.97 ac	Transportation-related loss of vegetated areas: Herbaceous: 31.2 ac Upland woodland: 289.4 ac Development-related loss: Herbaceous: 5,700 ac Upland wooded: 2,000 ac Total = 8,020.6 ac
Water Resources	Waters of the U.S., including Wetlands	Portion of Spring Creek watershed	Proposed project includes waters that flow into Spring Creek, but does not cross the creek. Waters include: Mink Branch, Mill Creek, Woodlake, Log Creek, Arnold Branch, Nickaburr Creek, and Bear Branch	1.42 ac	17.69 ac
	Floodplains	Portion of Spring Creek watershed	Proposed project is adjacent to six designated flood hazard area inundated by 100-year flood	8 ac	1.39 ac
	Water Quality	Portion of Spring Creek watershed	Spring Creek is threatened or impaired in meeting standards for public water supply, high aquatic life, and contact recreation	Roadway corridor area increase from approx. 77 ac to 162 ac	Approx. 263 ac increase of impervious surface area
Land Use	Effects on Land Use Plan	City of Magnolia, Montgomery and Waller counties	Population of 11,000 within city limits of 2.5 square miles	Improvements are part of planned developments; project caused by past growth and would facilitate future growth	Majority of existing undeveloped land without constraints will be developed, including two developments totaling 8,200 ac
Air Quality	Effects on 8-hour Ozone Standard	8-County Non-Attainment Area for Houston-Galveston Region	Air Quality Control Region is currently non-attainment for ozone	Decrease in congestion on existing roadway would likely benefit air quality	Increase in urbanization would likely have a negative effect on air quality

NOTES:
1. Acreages and other data are approximate estimates and are based on information presented earlier in this document.
2. Acreages and other data are approximate. Foreseeable transportation systems that factor into the cumulative impacts of the proposed improvements include the SH 249, FM 2978, FM 1774, and other FM 1488 improvements. The two master planned communities are Woodard Ranch and Woodforest, located north of the project area in Montgomery County. Expected future conditions (2025) do not take into consideration potential mitigation or other measures stipulated/required by regulatory authorities.

Steps 6, 7, and 8: The information contained in **Table 31** represents the starting point for assessing (**Step 6**) and reporting (**Step 7**) cumulative impacts in this subsection. Cumulative impacts were evaluated using the following factors: the historical context of each resource, current condition and trend, future land use and zoning plans, and the pertinent regulations and standards associated with each resource. These factors capture the influences that have shaped and are shaping the amount and quality of each resource, and which would continue to shape the resources into the future. Several key assumptions that are implicit in the approach to predicting the future condition of resources include:

- All reasonably foreseeable actions would be completed as currently planned;
- The relationships between the resources, ecosystems, and human communities that have been identified from historical experience would continue into the future; and
- The sponsors of government and private projects would abide by relevant Federal, state, and local laws designed to protect each resource, and regulatory agencies would perform their duties in accordance with legal requirements and internal guidelines.

Of particular importance is the assumption concerning compliance with relevant environmental laws designed to ensure the sustainability of resources. Over the past several decades, Federal, state, and local lawmaking bodies have enacted statutes, regulations, and ordinances designed to preserve and enhance the abundance and quality of natural resources by requiring project sponsors to avoid, minimize, and mitigate the environmental impacts of their projects or actions. The cumulative impacts analysis focuses on the net effects on each resource that remain after full compliance with the regulatory requirements at all levels. To this point in this analysis, the approach has been to identify and report the potential unmitigated impacts to each of the resources, but net cumulative effects must consider the long-term impacts in light of mitigation that would likely be applied. The discussion of cumulative effects for each resource studied first outlines key regulatory measures government leaders and agencies have implemented to manage and sustain the resource for long-term use, then evaluates expected net cumulative effects for each of the resources analyzed. This discussion of key mitigation measures affecting the expected potential cumulative impacts is an integral part (**Step 8**) of the cumulative effects analysis. More detailed discussions of specific regulatory measures to control adverse impacts to various resources is contained in earlier discussions of direct impacts to specific resources in this document.

Biological Resources

Background and Condition

The Spring Creek watershed is located within the Pine-Hardwood Forest natural region of Texas. This region is part of a much larger area of pine-hardwood forest that extends into Louisiana, Arkansas, and Oklahoma. This area can be described as pine and pine-hardwood forests with scattered areas of cropland, planted pastures, and native pastures. Timber and cattle production are important industries in the region. Farms and ranches are relatively small in size compared to the state average. Longleaf pine forests once dominated the southeastern part of this region but only a few pockets of longleaf pine may still be seen today. Mixed pine-oak forests occur to the west and north of the longleaf pine area. Dominant trees include loblolly pine, blackjack oak, and post oak. Hardwood forests of sweetgum, magnolia, tupelo, elm, and ash occur in the lowlands. Swamps are common and are most outstanding in the southern part of the pine-oak forest.

Mitigation: Regulatory Controls

The Texas Transportation Code (§201.607) directs TxDOT to adopt an MOA with appropriate environmental resource agencies, including TPWD. The responsibilities of the TPWD relate

primarily to its function as a natural resource agency, including its resource protection functions, designated by Parks and Wildlife Code. The TPWD acts as the state agency with primary responsibility to protect the states fish and wildlife resources. The MOA between TxDOT and TPWD (see Texas Administrative Code) provides an efficient and consistent methodology for describing habitats, transportation impacts to those habitats after avoidance and minimization efforts, and mitigation to be considered as a result of those impacts. The MOA sets forth resources that would be given consideration for compensatory mitigation. With regard to the protection of state-listed threatened or endangered species, the TPWD implements regulatory controls for the State of Texas.

The TPWD designates animals which are "threatened with statewide extinction" as endangered within the State of Texas. Those species which are "likely to become endangered in the future" are listed as threatened. Listed species are protected under the Texas Administrative Code (§65.171) from being killed, removed, transported, owned, sold, released, or exported without an appropriate permit. Violators are penalized under TPWD Code (§ 68.021) with a Class C Parks and Wildlife Code misdemeanor. Some species listed by the State are protected by Federal regulations as well; these are listed by the USFWS.

Municipal governments have the authority to avoid, minimize, and mitigate the impacts of private property development to habitat within their jurisdictions through application of regulations that guide the intensity, type, and location of new development. The zoning and land use regulations of the City of Magnolia is designed to minimize the adverse effects of growth and urbanization.

Cumulative Impacts

As summarized in **Table 31**, the proposed project's direct impacts to upland habitat would cause the loss of 75.8 ac of wooded and 129.7 ac of herbaceous habitat. Reviews of reasonably foreseeable transportation projects and master planned development communities in the RSA indicate an expected loss of approximately 2,289.4 ac of upland wooded habitat and 5,731.2 ac of herbaceous habitat.

Based on the availability of park and floodplain vegetated habitat in the RSA, and assuming appropriate implementation of regulated avoidance, minimization, and mitigation strategies for vegetation and habitat impacts, the proposed project would not contribute to significant cumulative impacts to the area's vegetation and habitat.

Water Resources

Waters of the U.S.

Background and Condition

Waters of the U.S., including wetlands, are resources that serve a variety of functions including sediment filtering, upland and aquatic wildlife habitat, and reduction of flood water velocity. From the mid-1800s until about 1970, approximately one-half of Texas' historic wetlands acreage was converted from natural systems in response to society's demand for urban development and sustenance. In the Spring Creek watershed, the conversion of prairies and some forested areas to agricultural and urban uses has already resulted in the impoundment, excavation, and filling of some of the area's natural streams and wetlands. Based on information in FEMA maps, water bodies within the RSA include Mink Branch, Mill Creek, Woodlake, Log Creek, Arnold Branch, Nickaburr Creek, and Bear Branch. Mill Creek flows southeast into Spring Creek, which then flows east to the San Jacinto River, which flows south to the Gulf of Mexico.

Mitigation: Regulatory Controls

Waters of the U.S. are regulated by the USACE under authority of Section 404 of the CWA. Section 404 of the CWA authorizes the USACE to issue permits for the discharge of dredged or fill material into waters of the U.S., including wetlands. The intent of this law is to protect the nation's waters from the indiscriminate discharge of material capable of causing pollution, and to restore and maintain their chemical, physical, and biological integrity. Any discharge into waters of the U.S. must be in accordance with Section 404(b)(1) guidelines developed by the EPA in conjunction with the USACE.

In 1991, Texas adopted state goals for "no net loss" of acreage or aquatic function of wetlands. These goals reflect the regulatory program in the CWA legislation that prohibits the discharge of soil into waters of the U.S. unless authorized by a permit issued under CWA Section 404. The USACE has authority over such actions and may require the permittee to restore, create, enhance, or preserve nearby aquatic features as compensation to offset unavoidable adverse impacts to the aquatic environment. This means compensatory mitigation is intended to comply with the general goals of the CWA and the specific goal of "no net loss" of aquatic functions.

Future trends in the regulation of waters of the U.S., including wetlands, are likely to focus on compensatory mitigation requirements. Regulatory agencies are expected to develop procedures to track the success and completion of mitigation efforts as the focus moves toward replacement of specific aquatic functions, rather than replacement of total area. Consequently, regulatory controls are expected to continue the trend of stabilizing the amount of existing waters of the U.S., including wetlands, through vigorous application of mitigation requirements under the CWA.

Cumulative Impacts

The proposed project would have direct impacts of 1.42 ac of waters of the U.S., including wetlands. A review of available information indicates the reasonably foreseeable transportation projects in the project area would have an impact of greater than approximately 17.69 ac to waters of the U.S, including wetlands. For the reasonably foreseeable private developments in the project area, information as to specific potential impacts with regard to waters of the U.S. was not available. The proposed project's impact to waters of the U.S. would be avoided or minimized by compliance with the USACE Nationwide Permit program and the Federal "No Net Loss" policy. The cumulative impact of reasonably foreseeable future actions to waters of the U.S. would be minimized by enforcement of applicable USACE, USFWS, TPWD, and USCG regulations for projects subject to state and Federal jurisdiction.

Assuming appropriate implementation of regulation control strategies and policies, future potential impacts to the area's waters of the U.S., including wetlands could be expected to be reduced, or at a minimum have no net loss. The proposed project would not contribute to significant cumulative impacts to the area's waters of the U.S.

Floodplains

Background and Condition

In their natural condition, floodplains serve vital functions including temporary storage of floodwaters, moderation of peak flood flows, maintenance of water quality, groundwater recharge, prevention of erosion, and provision of habitat for wildlife. They also provide recreational opportunities and establish aesthetic qualities. These functions are best served if floodplains are kept in their natural state. Consequently, the utilization of land within a floodplain may be used as an indicator of potential impacts to these and other water-related resources; that is, construction within the 100-year floodplain suggests a need to examine

closely the potential impacts on flooding, waters of the U.S., including wetlands, and water quality. Local floodplains have been affected both physically by urban and rural land development within flood conveyance areas, and indirectly by increased storm water runoff from impervious surfaces as well as past agricultural and drainage activities. Land clearing, soil compaction, riparian corridor encroachment, and modifications to the surface water drainage network have all accompanied urbanization in the Houston area, and, to a much lesser degree, the Spring Creek watershed. That is, floodplain encroachment in the RSA has been limited such that nearly all of the floodplain areas within the watershed remain vacant even though urban development has occurred around the floodplain. Compatible land uses, such as parks and open space, have been established in portions of the floodplain.

Mitigation: Regulatory Controls

The protection of floodplains and floodways is required by EO 11988 *Floodplain Management* and is implemented by the FHWA through 23 CFR 650 Subpart A, *Location and Hydraulic Design of Encroachments on Floodplains*. At the local level, floodplain regulations are contained in local zoning and land use regulations. The intent of the regulations is to avoid or minimize highway encroachments within base floodplains, where practicable, and to avoid land use development that is incompatible with floodplain values. To comply with EO 11988, the action must be designed to avoid floodplain impacts, when practicable, and to adequately mitigate unavoidable impacts.

Local municipalities, TCEQ, USACE, and FEMA have the regulatory authority to control encroachment upon floodways and floodplains within the RSA, and provide compensatory mitigation as required. The applicable resource agencies enforce a policy of "no net loss" of floodplains through the regulation of development within floodplains, and ensure that any development that does occur in the floodplain would not raise flood water levels or reduce flood storage.

Cumulative Impacts

The proposed project crosses six areas designated as within the 100-year floodplain. Approximately 8 ac of the 100-year floodplain is within the ROW. Proposed improvements to other foreseeable transportation projects would potentially affect 1.39 ac of floodplain. However, the actual impacts to the flood conveying function of the floodplains and associated tributaries within this watershed RSA are expected to be slight because these road projects would involve construction or expansion of bridges and culverts that would either span the floodplain or accommodate the flow of storm water within the floodplain. The hydraulic design practices for these transportation projects would be in accordance with current TxDOT design policy and standards. These projects would be subject to the requirements of all applicable federal, state, and local regulations, including EO 11988, ensuring floodplain impacts would be mitigated.

Assuming appropriate implementation of regulation and control strategies, future impacts to the area's floodplains could be expected to be substantially reduced. The proposed project would not contribute to significant cumulative impacts to the area's floodplains.

Water Quality

Background and Condition

Water quality is important as an indicator of potential construction and operations that may contribute to pollutant loading of surface waters (i.e., increased runoff from impervious surfaces), with further impacts on aquatic and upland wildlife that depend on these waters, as well as human use and enjoyment of aquatic resources. Storm water and other runoff from the

Spring Creek watershed flows into the San Jacinto River Basin. This suite of water uses increases the importance of maintaining water quality within the watershed, particularly within the floodplain.

As noted above, agricultural activities and urbanization in the watershed area have likely contributed to degradation of water quality from prehistoric pine-hardwood forest conditions by contributing pollutants such as sediment from disturbed areas, herbicides/pesticides from lawns and agricultural activities, and petro-chemicals from parking lots and streets. Commercial, residential, and municipal discharges, along with storm water runoff from construction sites, developed sites, lawns, agricultural fields, and impervious surfaces such as roads and parking lots are the primary contributors to impairment of area water quality. The continued urbanization of the watershed in light of the uses for water in the San Jacinto River Basin may heighten the need to mitigate adverse effects on water quality.

Mitigation: Regulatory Controls

Under Section 401 of the CWA, the TCEQ is authorized to certify that federally issued permits would meet the state's water quality standards. The TCEQ regulates this section under the USACE permit programs and requires the installation of temporary and permanent storm water BMPs. As noted above, the USACE regulates impacts to jurisdictional waters and wetlands through implementation of the permitting process under Section 404 of the CWA. Projects that disturb more than one acre are required to comply with the Texas Pollution Discharge Elimination System (TPDES) permit requirements. Controlling storm water pollution in urban areas and from industrial activity runoff is viewed by the EPA as a key to maintaining and improving the quality of the nation's waterways. The H-GAC was designated as the area-wide water quality management planning agency for the urbanizing portion of the region. The H-GAC's water quality management plan includes regulatory and non-regulatory programs, activities, and BMPs to control pollution to achieve water quality goals.

Cumulative Impacts

As noted in **Table 31**, the amount of land dedicated to transportation corridor land use created by the proposed project would increase from approximately 77 ac to 162 ac. Approximately 263 ac of reasonably foreseeable future projects are expected to be impervious surfaces. As noted above, control of construction sites to reduce erosion and engineering projects to accommodate storm water are standard requirements of local, state, and federal regulatory programs. The measures to prevent degradation of water bodies are also part of the function served by local government policies to preserve floodplains and riparian corridors. These areas provide natural filtering of sediment and other debris that would otherwise reach the San Jacinto River Basin.

The proposed project's impact to water quality would be avoided or minimized by implementing storm water BMPs to control the discharge of pollutants as required by the CWA and Federal and state storm water regulations. These measures include compliance with Section 401 and Section 404 permit requirements, TPDES requirements, and the preparation and implementation of a Storm Water Pollution Prevention Plan (SW3P). Similarly, the cumulative impact of reasonably foreseeable private development projects to water quality would be minimized by enforcement of applicable federal and state storm water regulations as required by the CWA. These include EPA/TCEQ regulation of large-scale construction activities under the TPDES permit program. TCEQ provides water quality certification under Section 401 of the CWA, which is mandatory for all projects requiring Section 404 permits.

Assuming appropriate implementation of regulation and control strategies, future potential

impacts to the area's water quality could be expected to be substantially reduced. The proposed project would not contribute to significant cumulative impacts to the area's water quality.

Land Use

Background and Condition

The proposed project lies within the City of Magnolia. The proposed project has been examined in terms of its potential for a cumulative impact on (i.e., inconsistency with) the future land use plan with the associated municipality. Cumulative impacts result from the accumulation of known direct and indirect impacts related to development projects (including transportation, residential, commercial and public projects). The extent that FM 1488 improvements may contribute to these types of cumulative land use change impacts in an area is dependent upon many factors: distance from the project, real estate speculation, other anticipated and planned projects in the area, zoning regulations, municipal planning, size and closeness of the nearest metropolitan area, local and State regulations and the extent to which they are enforced, to mention a few.

FM 1488 is an established transportation route and land use changes within the surrounding RSA would occur regardless of the proposed improvements. The magnitude and timing of future growth within Montgomery and Waller counties is influenced by many variables, including local, state, and national social and economic policies as well as the presence of adequate infrastructure to support the future growth. The proposed action's contribution to the cumulative impact on the resources studied is difficult to predict, but is considered minor, as it is well documented that the area has experienced considerable land development prior to any improvements to the area highway system. However, it is anticipated that development opportunities within the study area would be facilitated by the proposed improvements. Undeveloped areas within and surrounding the RSA would likely be developed primarily for commercial and residential uses. Both single and multi-family residential land uses are anticipated to be dispersed in nominal amounts throughout the RSA.

Existing zoning and future land use plans by the City of Magnolia and Montgomery and Waller counties reveal residential (both single and multi-family), as well as general business development as the main drivers of land development. While the rate of population immigration and physical development in this area has been relatively high during the last decade, Montgomery and Waller counties still maintain the potential to continue to develop as long as vacant parcels are available for conversion to residential or commercial land uses. Montgomery County has decided to allow for future development of vacant land within this area through the establishment of zoning regulations and future land use plans.

Montgomery County transportation improvement projects listed in H-GAC's 2025 RTP total $3,709,760,000, including $2,274,710,000 in added capacity projects and $198,660,000 in smart street improvements. These projects are distributed throughout Montgomery County. Specifically, within the project vicinity, FM 1774, FM 2978 and another section of FM 1488, from FM 2978 to IH 45, are other proposed highway widening projects in the area. The extension of SH 249 from south of FM 149 north into Grimes County, bypassing Magnolia to the east is another major transportation project being planned. A Magnolia Bypass, taking FM 1488 traffic around to the north of the City of Magnolia is also being considered.

Mitigation: Regulatory Controls

Local city and county governments have the authority to avoid, minimize, and mitigate the impacts of development and urbanization through local controls and comprehensive land use

planning. Land use in the proposed project area is regulated by the City of Magnolia through zoning plans and land use ordinances designed to minimize the adverse effects of growth and urbanization. The municipal zoning and land use regulations control the intensity and type of development and control where land should be developed and where land should be preserved. Montgomery County's future land use plans focus on preserving and enhancing the socio-economic conditions and natural resources within the county boundaries, and have adopted other measures to balance future development with preservation of resources (e.g., plans for parks and open space, floodplain protection, and landscaping ordinances).

Cumulative Impacts

As noted above, Magnolia has grown in recent years and expects growth trends to continue. The continued population growth in the area is reflected in the future land use plans to ultimately result in increases in urban land uses. The majority of the land use changes indicated by the future land use plans are expected to be the result of urban development of vacant or agricultural land. FM 1488 is an established east-west transportation route extending from US 290 in Hempstead across Waller and Montgomery counties to IH 45. Over the next 30 years, Montgomery County is expected to experience an additional 492,000 residents, growing from an estimated 373,000 in 2005 to 865,000 in 2035 (H-GAC 2006). This growth will be accompanied by land development that will serve the residents, including new schools, additional shopping centers, and employment centers. Such growth may, in turn, attract additional growth, depending upon the development policies followed by local governments in the area. The proposed improvements to it are driven by existing traffic demands and traffic conditions expected in the future. Similarly, there are other planned improvements to adjacent roadways throughout the RSA.

Two master planned communities, Woodard Ranch and Woodforest, are currently proposed in Montgomery County, north of the project area. Woodard Ranch consists of 5,700 ac of vacant land previously used for ranching and farming. Plans for this development are currently in early stages. Woodforest consists of is 2,500 ac of wooded land north of an existing development and golf course. The initial plans for the Woodforest development include mixed use residential and commercial lots and reserving more than 500 ac within the 100-year floodplain in its current natural state for recreational purposes.

The proposed project would not change existing or future planned land use and development patterns, and would not result in substantial induced changes in the pattern of land use or population density within the project area. However, these transportation improvements would likely increase the attractiveness of the area to developers, and thus could influence the rate of development in the area. Assuming appropriate implementation of applicable land use planning regulations and control strategies, related effects on air and water and other natural systems, including ecosystems, would be avoided and minimized. The proposed project would not contribute to significant adverse cumulative impacts to the planned growth in the area.

Air Quality

Background and Condition

The amount of pollution emitted into the local atmosphere has been the net effect of population growth. The Houston area has seen significant population growth in recent decades and the trend is for that growth to continue. With growth, comes increased development, an increase in vehicles, and an increase in daily vehicle miles traveled on the area's transportation systems. Traffic congestion has become one of the greatest challenges facing the Houston area, and is a primary contributor to regional air quality. Throughout recent decades, multiple regional and local initiatives have been planned and implemented in an effort to reduce dispersion of

pollutants into the air. Several of these initiatives specific to the area's transportation system included increased capacity highways and roadways (through construction of additional travel lanes and bottleneck improvements), construction of high-occupancy vehicle lanes, and the promoting of alternative transportation (e.g., hike and bike trails, bus, and light rail).

The EPA establishes limits on atmospheric pollutant concentrations through enactment of the NAAQS for six principal criteria pollutants. The EPA designated eight counties in the Houston-Galveston region as nonattainment for the 8-hour ozone standard in accordance with the NAAQS. The Houston-Galveston region (including Montgomery and Waller counties) is currently in attainment for all criteria pollutants, with the exception of ozone. Even though the number of daily exceedances of the Federal standards for ozone has decreased within the past decade, the Houston-Galveston region remains in non-attainment for ozone. Although there have been year-to-year fluctuations, the ozone trend continues to show improvement. The trend of improving air quality in the Houston-Galveston region is attributable in part to the effective integration of highway and alternative modes of transportation, cleaner fuels, improved emission control technologies, and H-GAC's regional clean air initiatives.

Mitigation: Regulatory Controls

A variety of Federal, state, and local regulatory controls as well as local plans and projects have had a beneficial impact on regional air quality. The CAA, as amended, provides the framework for Federal, state, tribal, and local rules and regulations to protect air quality. The CAA required the EPA to establish NAAQS for pollutants considered harmful to public health and the environment. In Texas, the TCEQ has the legal authority to implement, maintain, and enforce the NAAQS. The TCEQ establishes the level of quality to be maintained in the state's air and to control the quality of the state's air by preparing and developing a general comprehensive plan. Authorization in the Texas Clean Air Act (TCAA) allows the TCEQ to do the following: collect information and develop an inventory of emissions; conduct research and investigations; prescribe monitoring requirements; institute enforcement; formulate rules; establish air quality control regions; encourage cooperation with citizens' groups and other agencies and political subdivisions of the state as well as with industries and the federal government; and to establish and operate a system of permits for construction or modification of facilities. Local governments having some of the same powers as the TCEQ can make recommendations to the commission concerning any action of the TCEQ that may affect their territorial jurisdiction, and can execute cooperative agreements with the TCEQ or other local governments. In addition, a city or town may enact and enforce ordinances for the control and abatement of air pollution not inconsistent with the provisions of the TCAA or the rules or orders of the TCEQ.

The CAA also requires states with areas that fail to meet the NAAQS prescribed for criteria pollutants to develop a SIP. The SIP describes how the state would reduce and maintain air pollution emissions in order to comply with the federal standards. Important components of a SIP include emission inventories, motor vehicle emission budgets, control strategies, and an attainment demonstration. The TCEQ develops the Texas SIP for submittal to the EPA. One SIP is created for each state, but portions of the plan are specifically written to address each of the non-attainment areas. These regulatory controls, as well as other local transportation and development initiatives implemented throughout the Houston-Galveston region by local governments (and others) provide the framework for growth throughout the area consistent with air quality goals. As part of this framework, all major transportation projects (including the proposed project) are evaluated at the regional level by the HGAC for conformity with the SIP.

Cumulative Impacts

The cumulative impact on air quality from the proposed project and other reasonably foreseeable transportation projects are addressed at the regional level by analyzing the air quality impacts of transportation projects in the TIP and H-GAC's 2025 RTP. The proposed project and the other reasonably foreseeable transportation projects were included in the RTP and the TIP and have been determined to conform to the SIP. Planned transportation improvements are intended to cumulatively reduce congestion on a regional scale, with a resultant decrease in pollutant emissions. Therefore, when combined, the proposed transportation improvements in the project area are anticipated to have a cumulatively beneficial impact on air quality.

The Houston-Galveston region is expected to continue to experience substantial population growth, urbanization, and economic development. The cumulative impact of reasonably foreseeable future growth and urbanization on air quality would be minimized by enforcement of federal and state regulations, including the EPA and TCEQ, which are mandated to ensure that such growth and urbanization would not prevent compliance with the ozone standard or threaten the maintenance of the other air quality standards.

T. Mitigation and Monitoring Commitments

Wildlife: ROW clearing would be avoided during the peak nesting season to avoid adverse effects to migratory birds and their habitat.

Vegetation: When possible, mature woody vegetation would be avoided and preserved within the ROW.

Wetlands: To the extent possible, jurisdictional wetlands would be avoided along the FM 1488 project corridor. Where avoidance is not practicable, wetland impacts would be minimized. For those wetlands where avoidance and minimization efforts are not possible, mitigation for wetland impacts should be accomplished at a USACE approved mitigation site.

Archeological Resources: In the unlikely event that evidence of archeological deposits is encountered during construction, work in the immediate area would cease and TxDOT archeological staff would be contacted to initiate accidental discovery procedures under the provisions of the PA among TxDOT, the THC, the FHWA, and the ACHP, and the Memorandum of Understanding between TxDOT and the THC.

Hazardous Materials: Although no hazardous materials impacts are anticipated, additional ROW would be taken from several areas that have the potential to be of concern. These areas are two gas stations and a BP pumping station. A records search of the TCEQ LUST data noted that groundwater is approximately 50 ft below the surface, and therefore would not be impacted by construction activity. However, if during construction any hazardous materials or substances are discovered, construction would cease immediately, and TxDOT and other relevant agencies would be notified.

Construction Impacts: TxDOT would ensure that the public has ingress and egress to all business establishments and other properties during the construction phase of the project.

The mitigation and monitoring commitments discussed above would be incorporated into the Environmental Permits, Issues, and Commitments (EPIC) sheets included in the next design phase of the project, the FM 1488 specification and estimate (PS&E) plans.

U. Visual and Aesthetic Quality

Aesthetics is the science or philosophy concerned with the quality of visual experience. Aesthetic values are determined by the highly variable and often very subjective responses of individuals to physical objects in their surroundings. The development of large public facilities, such as major transportation improvements, would usually have an impact on the aesthetic quality and identity of the surroundings. Aesthetics play a key role in how land, roadway, and visual appeal can be conceived harmoniously. It is the goal of the project sponsors and designers to ensure that all elements of the FM 1488 improvements work together to offer an experience that is visually cohesive and compatible with the area's natural and man-made scenery.

The existing visual environment along FM 1488 is comprised of a mixture of rural and urban elements. The proposed wider roadway along the project corridor and grade separation at FM 149 would change the current aesthetics in the project area. During the design stage, attempts would be made to blend the proposed project and the surrounding area in such a way as to maintain a pleasing and compatible appearance. One of the ways this would be achieved is utilizing the Green Ribbon Project *Design Guidelines for the Construction of Highways, Streets, and Bridges* for aesthetic designs on the grade separation at FM 149 during the design phase of the project.

V. Permits

U.S. Army Corps of Engineers

As required by the USACE, per Section 404 of the Clean Water Act, the discharge of dredged or fill material into waters of the United States, including wetlands, generally requires notification or the issuance of a permit from the USACE (33 CFR 320-330). A total of 1.42 ac of jurisdictional waters of the U.S., including wetlands, are located within the project ROW (**Table 16**). Detailed design information, regarding fill quantities, could not be determined based upon the preliminary design information at the time of report preparation. Once the final design has been completed for the proposed project, fill quantities and exact impact amounts to wetlands and waters of the U.S. would be determined.

Based on the preliminary design information, the proposed project would require a Section 404 NWP 14 (Linear Transportation Crossings) due to the discharge of fill material into jurisdictional waters of the U.S., including wetlands, within the project area. A pre-construction notification including a compensatory mitigation proposal would also be required for impacts to wetlands.

U.S. Coast Guard

This roadway does not cross any navigable waters; therefore, a U.S. Coast Guard permit would not be required.

Texas Commission on Environmental Quality

The proposed project meets the TCEQ's Section 401 Tier I (Small Projects) criteria because it would impact less than 3 ac of "waters of the U.S." According to the Tier I Checklist, all projects must implement at least one BMP from each of the three categories: erosion, sedimentation, and post-construction TSS control.

The proposed project would incorporate the following BMPs at appropriate stages during construction. For Category I erosion control, sod would be utilized and remain in place until the area has been stabilized. For Category II sedimentation control, a combination of silt fencing

and hay bale dikes would be utilized and remain in place until the project completion. For Category III post-construction TSS control, a combination of retention and vegetative filter strips would be utilized to control TSS after construction. The vegetation within the existing ditches would not be disturbed and would act as vegetative filter strips.

The Clean Water Act makes it unlawful to discharge storm water from construction sites into waters of the U.S. unless authorized by the TCEQ's TPDES General Permit. If more than 5 ac of ROW are disturbed during construction, a Notice of Intent (NOI) must be filed with the TCEQ. Construction activities would disturb more than 5 ac. Therefore, TxDOT would be required to file an NOI with the TCEQ prior to the beginning of the construction phase stating that a SW3P has been developed.

A SW3P would be required because more than 1 ac would be disturbed by this project. Measures would be taken to prevent or correct erosion that may develop during construction. All temporary erosion controls would be in compliance with TxDOT's 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 to ensure maximum effectiveness.

W. Railroads

The Union Pacific Rail Road (UPRR) and BNSF each have single track facilities running in a northwest-southeast direction in the project corridor. The railroad ROW width varies from 100 to 200 ft. FM 1488 crosses the UPRR track at FM 1774 in Magnolia and crosses the BNSF track at the proposed interchange of FM 149. The proposed FM 1488 project would construct a grade separation over the BNSF track at the FM 149 intersection, with access roads to FM 149. The UPRR rail crossing at FM 1774 will be addressed under TxDOT's proposed FM 1774 widening project. TxDOT would coordinate with the UPRR and BNSF during the design phase of the project.

X. Aircraft Clearance

The proposed project would have no impact on aviation resources.

Y. Construction Impacts

The contractor would take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction staging area. The use of construction equipment within sensitive areas will be minimized or eliminated entirely. In all cases where the potential for encountering hazardous substances during construction exists, as well as any time suspicious soils or liquids are encountered, the contractor would halt work until a proper determination can be made of the material encountered. Upon determining that the substance is a contaminant, the proper disposal methods would be determined and appropriate action initiated. During any construction project there exists some potential to encounter contaminated soil or water. Should hazardous materials/substances be encountered, the TxDOT Houston District Hazardous Materials Section would be notified and steps would be taken to protect personnel and the environment. All construction materials used for this project would be removed as soon as work schedules permit. 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.

Any changes to ambient water quality during construction of the proposed project would be prohibited. If ambient water quality impacts occur during construction, water quality control measures would be implemented and the incident would be reported to the TCEQ within 24 hours of awareness of the impacts. The contractor would practice good housekeeping measures, as well as grade management techniques to help ensure that proper precautions are in place throughout construction of the proposed project.

To minimize impacts to water quality during construction, the proposed project would utilize temporary erosion and sedimentation control practices from TxDOT's manual *Standard Specifications for the Construction of Highways, Streets, and Bridges*. Where appropriate, these measures would be in place prior to the initiation of construction, and would be maintained throughout the duration of the construction. Clearing of vegetation would be limited and/or phased in order to maintain a natural water quality buffer and minimize the amount of erodible earth exposed at any one time. Upon completion of the earthwork operations, disturbed areas would be restored and reseeded according to TxDOT's specifications for *Seeding for Erosion Control*.

Construction may temporarily degrade air quality through dust and exhaust gases associated with construction equipment. The control of particulate matter emanating from various construction activities would be in accordance with TCEQ regulation and would be incorporated into the final design and construction specifications. To minimize exhaust emissions, contractors would be required to use emission control devices and limit unnecessary idling of construction vehicles.

Due to operations normally associated with road construction, the possibility exists that during construction, noise levels would be greater than normal in areas adjacent to the ROW. Construction is normally limited to daylight hours when occasional loud noises are more tolerable. Due to the relatively short exposure periods imposed on any one reciever, extended disruption of normal activities is not considered likely. Every reasonable effort would be made to minimize construction noise.

Construction of the proposed project would be carried out in a phased approach. Construction would begin at FM 2978 and proceed west to Joseph Road.

VI. SUMMARY

The proposed project involves the widening of the existing undivided two-lane roadway to a four-lane facility with a continuous left turn lane, as well as a grade separation at the FM 149/BNSF RR crossing. Approximately 127.8 ac of additional ROW would be required for the proposed alternative.

The proposed build alternative would have minimal impacts on noise, air, and water quality. This alternative would result in an optimum gain in roadway efficiency, level of service, and safety while minimizing construction costs and overall environmental impacts. The proposed build alternative would impact an estimated 1.42 ac of jurisdictional wetlands.

The studies and evaluations performed thus far in project planning indicate that the proposed project would result in minimal adverse social, economic, and environmental impacts. Therefore, a Finding of No Significant Impact (FONSI) is anticipated.

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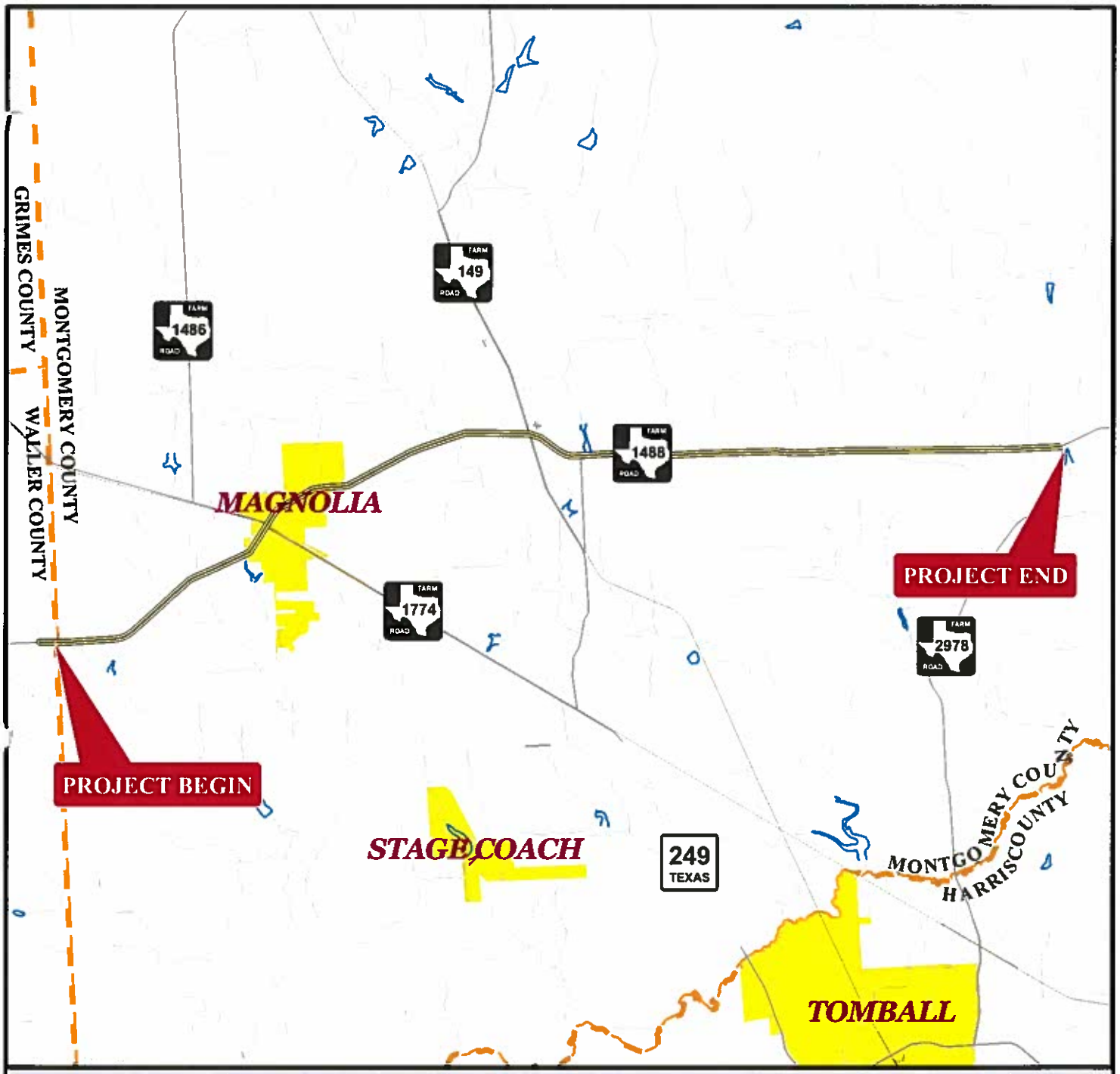
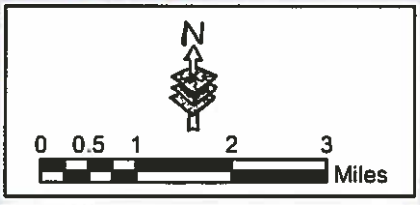
EXHIBITS





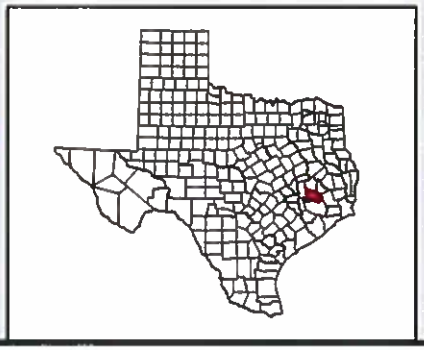


EXHIBIT 1
LOCATION MAP

FM 1488
From Joseph Road to FM 2978
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MONTGOMERY COUNTY, TEXAS

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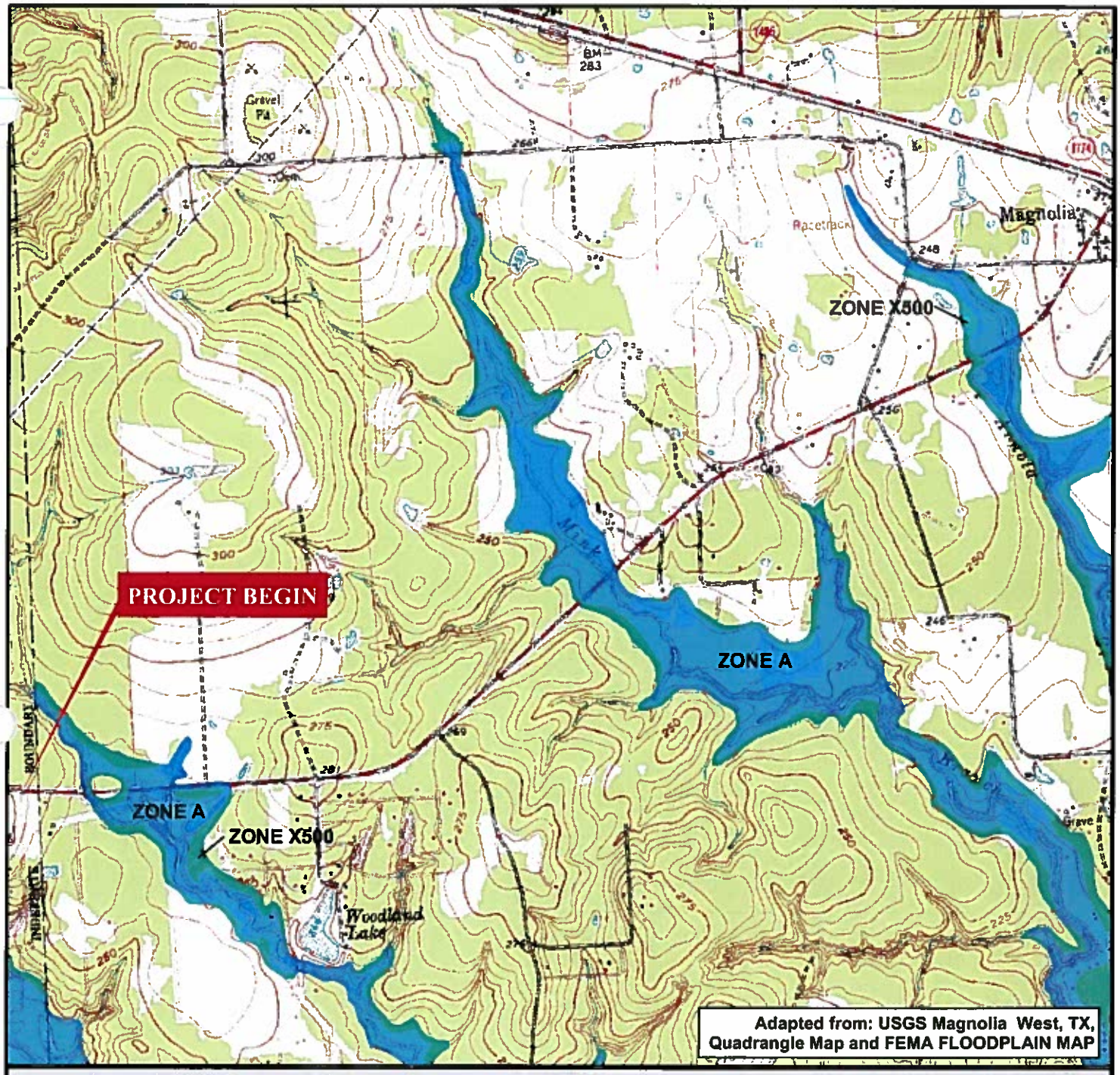

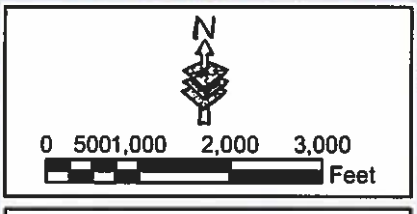

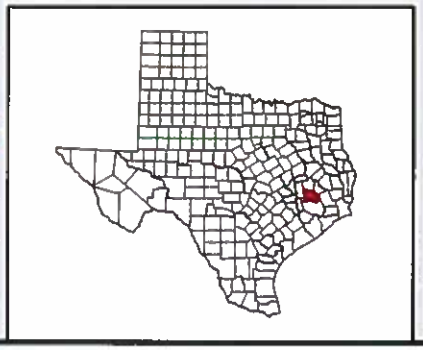

EXHIBIT 2
USGS TOPOGRAPHIC & FEMA FLOODPLAIN MAP

SHEET 1 of 5

FM 1488
From Joseph Road to FM 2978
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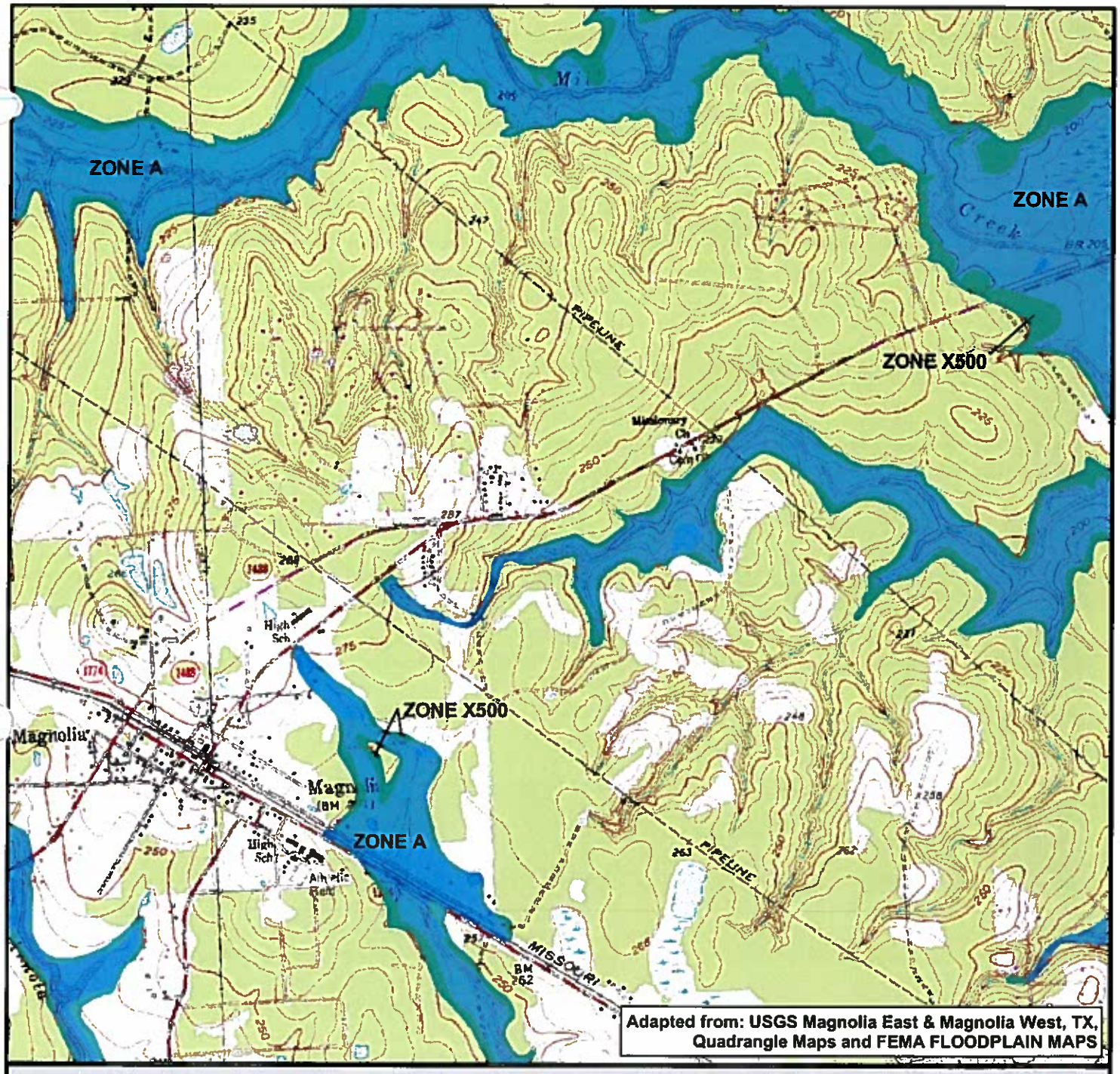

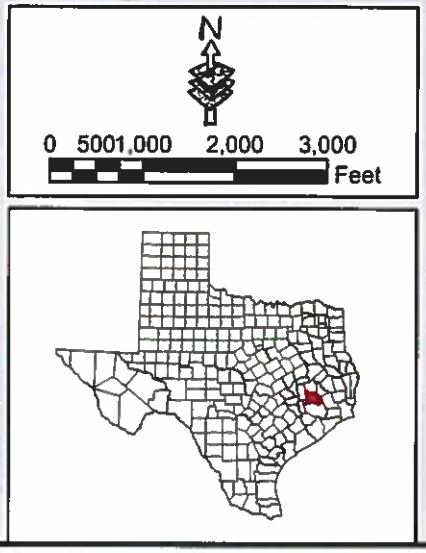

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SHEET 2 of 5

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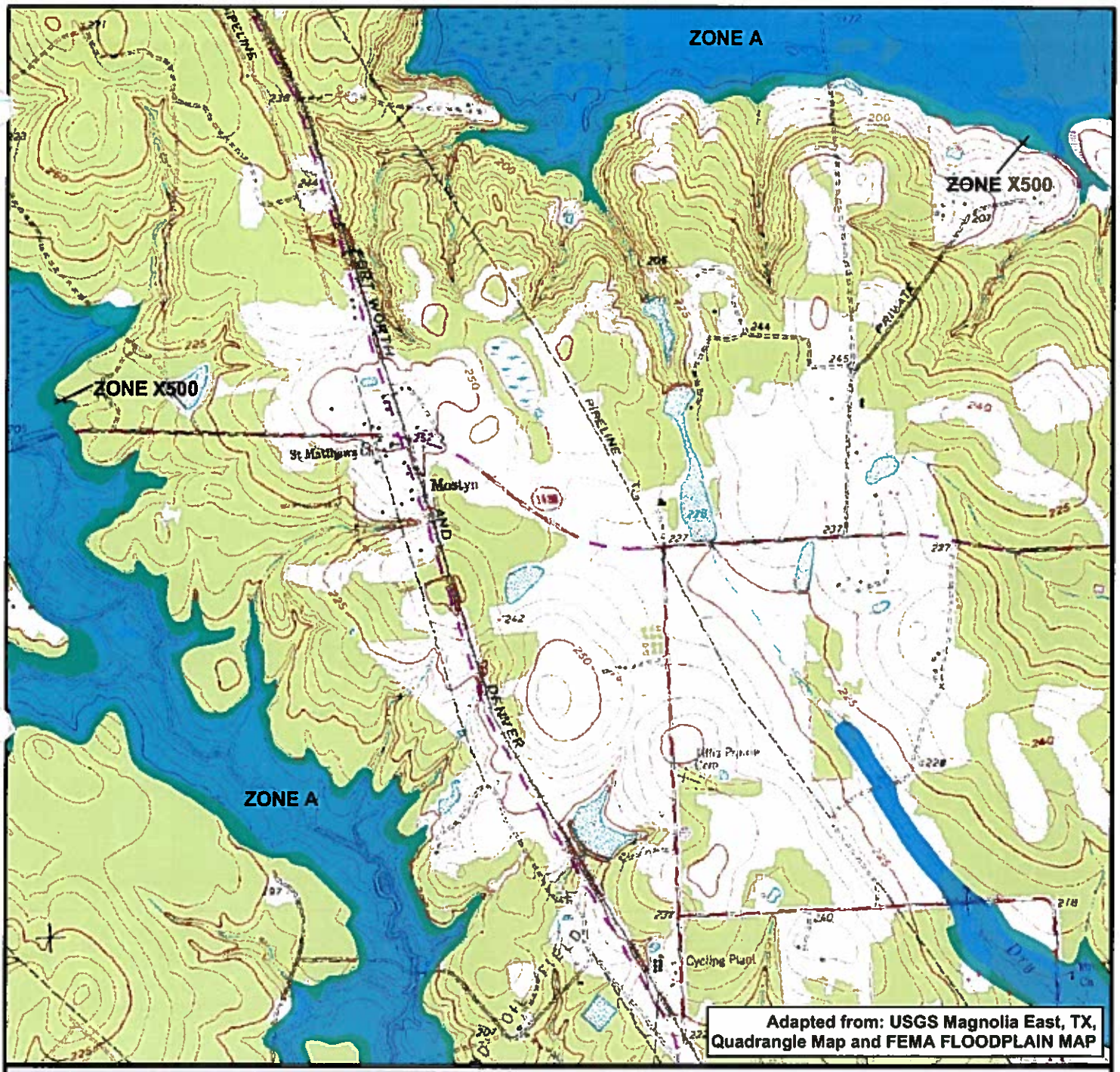

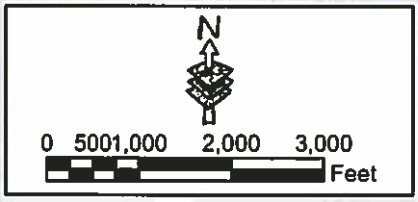

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SHEET 3 of 5

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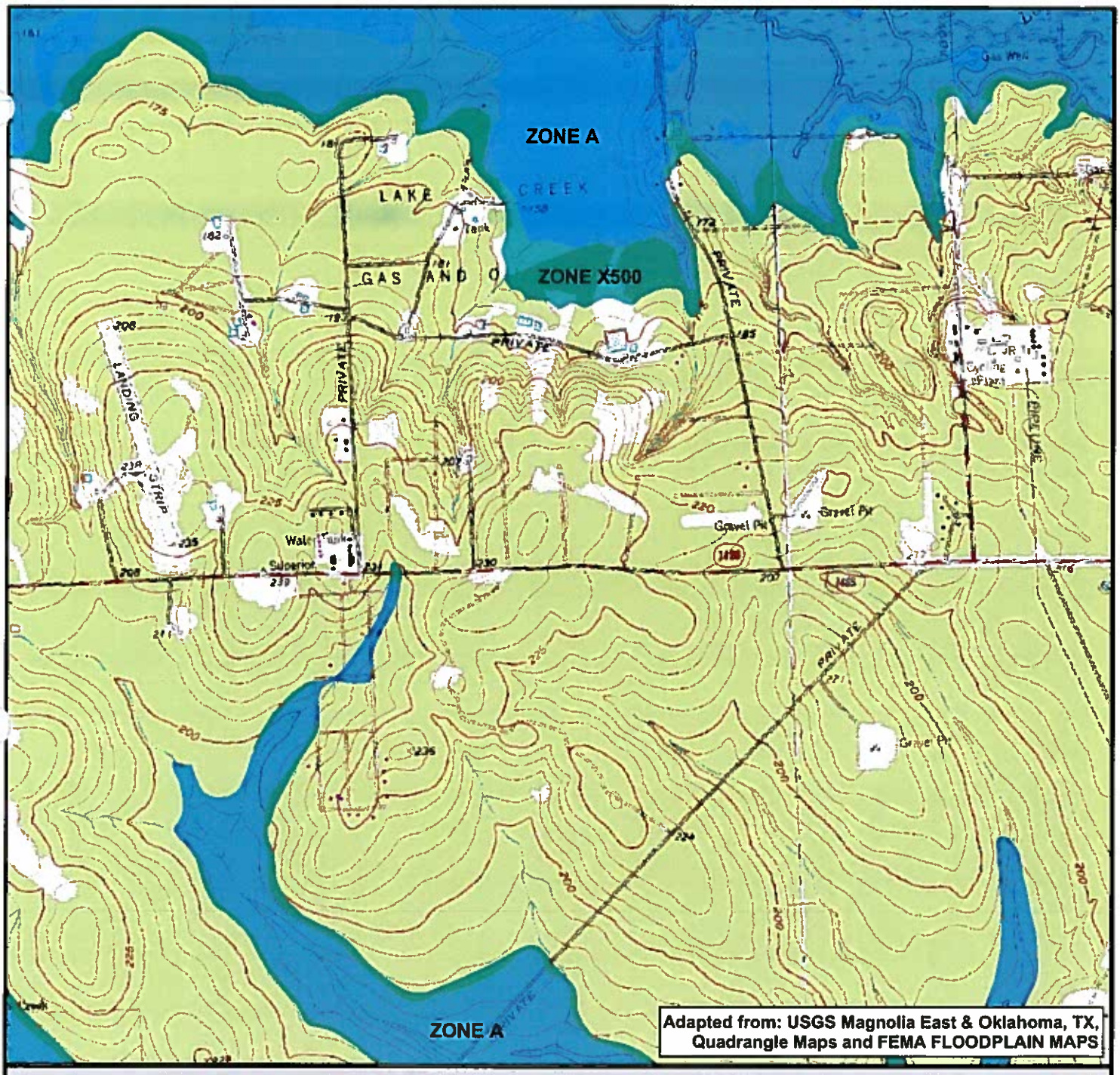

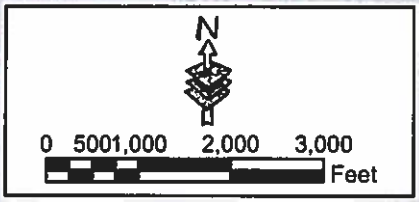

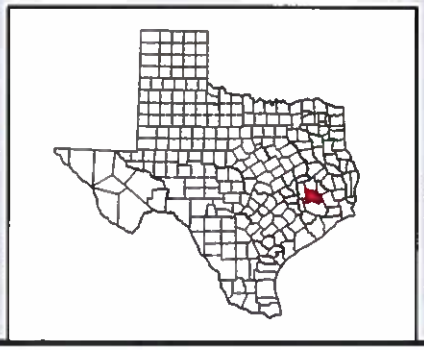

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USGS TOPOGRAPHIC & FEMA FLOODPLAIN MAP

SHEET 4 of 5

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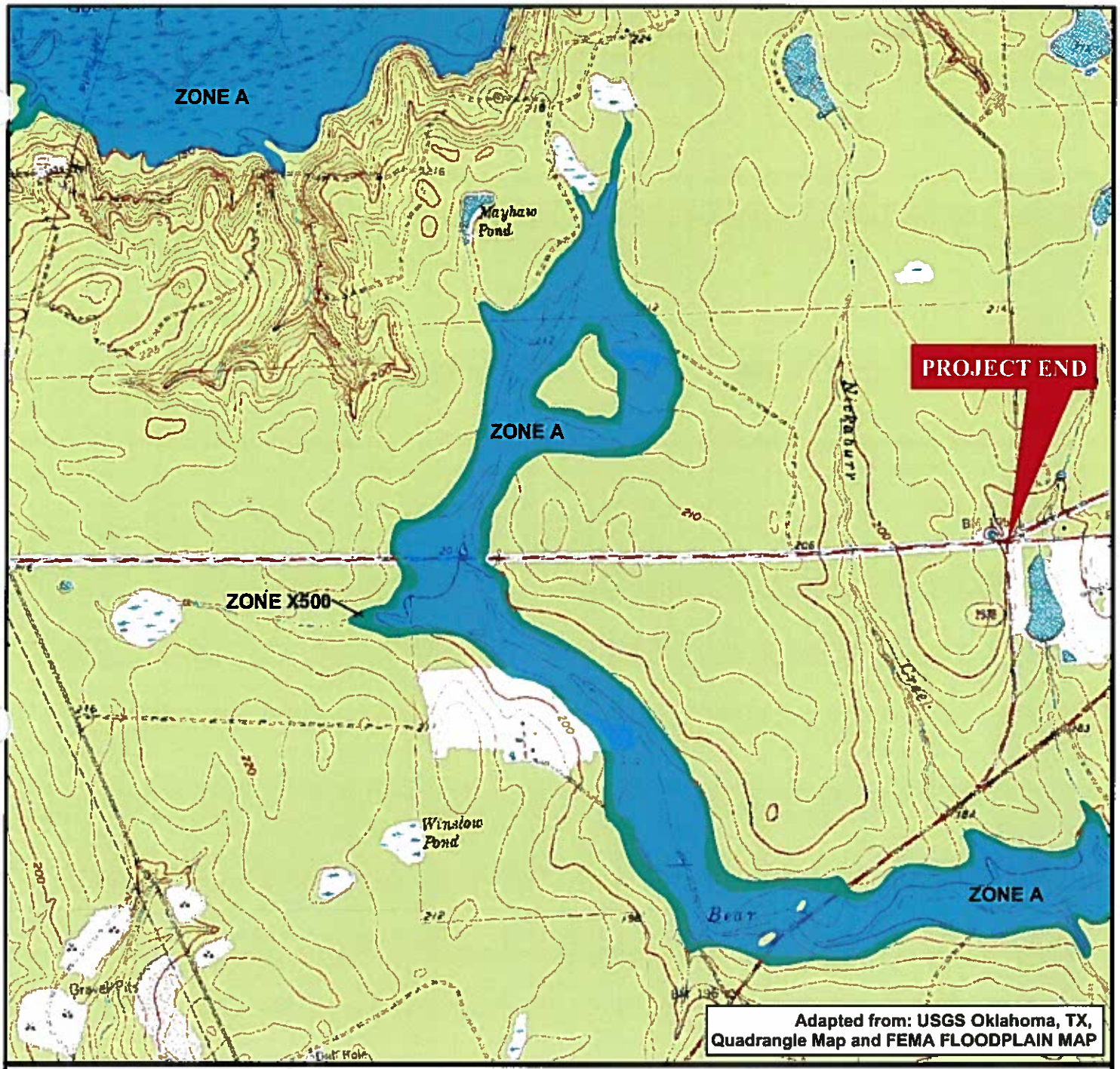

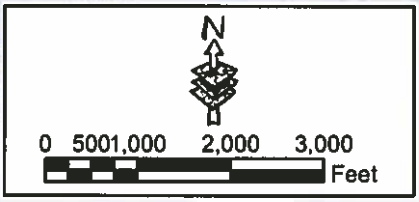

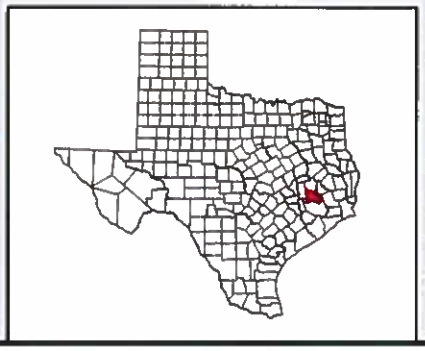

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USGS TOPOGRAPHIC & FEMA FLOODPLAIN MAP

SHEET 5 of 5

FM 1488
From Joseph Road to FM 2978
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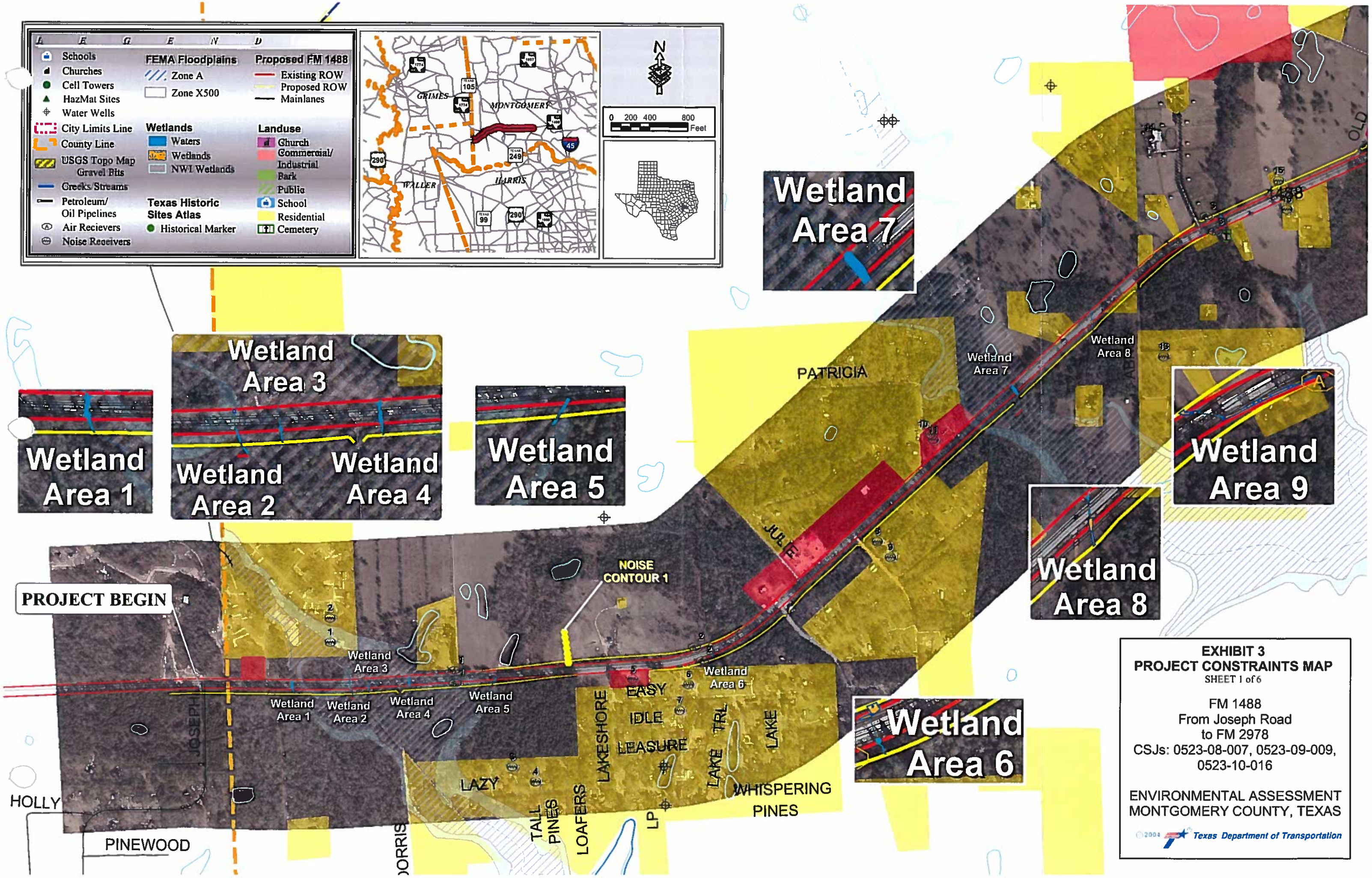
LEGEND
Schools
Churches
Cell Towers
HazMat Sites
Water Wells
City Limits Line
County Line
USGS Topo Map Gravel Pits
Creeks/Streams
Petroleum/ Oil Pipelines
Air Recievers
Noise Receivers
FEMA Floodplains
Zone A
Zone X500
Wetlands
Waters
Wetlands
NWI Wetlands
Texas Historic Sites Atlas
Historical Marker
Proposed FM 1488
Existing ROW
Proposed ROW
Mainlanes
Landuse
Church
Commercial/ Industrial
Park
Public
School
Residential
Cemetery
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PROJECT BEGIN
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JULIE
JOSEPH
HOLLY
PINEWOOD
MORRIS
LAZY
TALL PINES
LOAFERS
LAKESHORE
EASY
IDLE
LEASURE
LAKE TRL
LAKE
WHISPERING PINES
LP
OLD
EXHIBIT 3
PROJECT CONSTRAINTS MAP
SHEET 1 of 6
FM 1488
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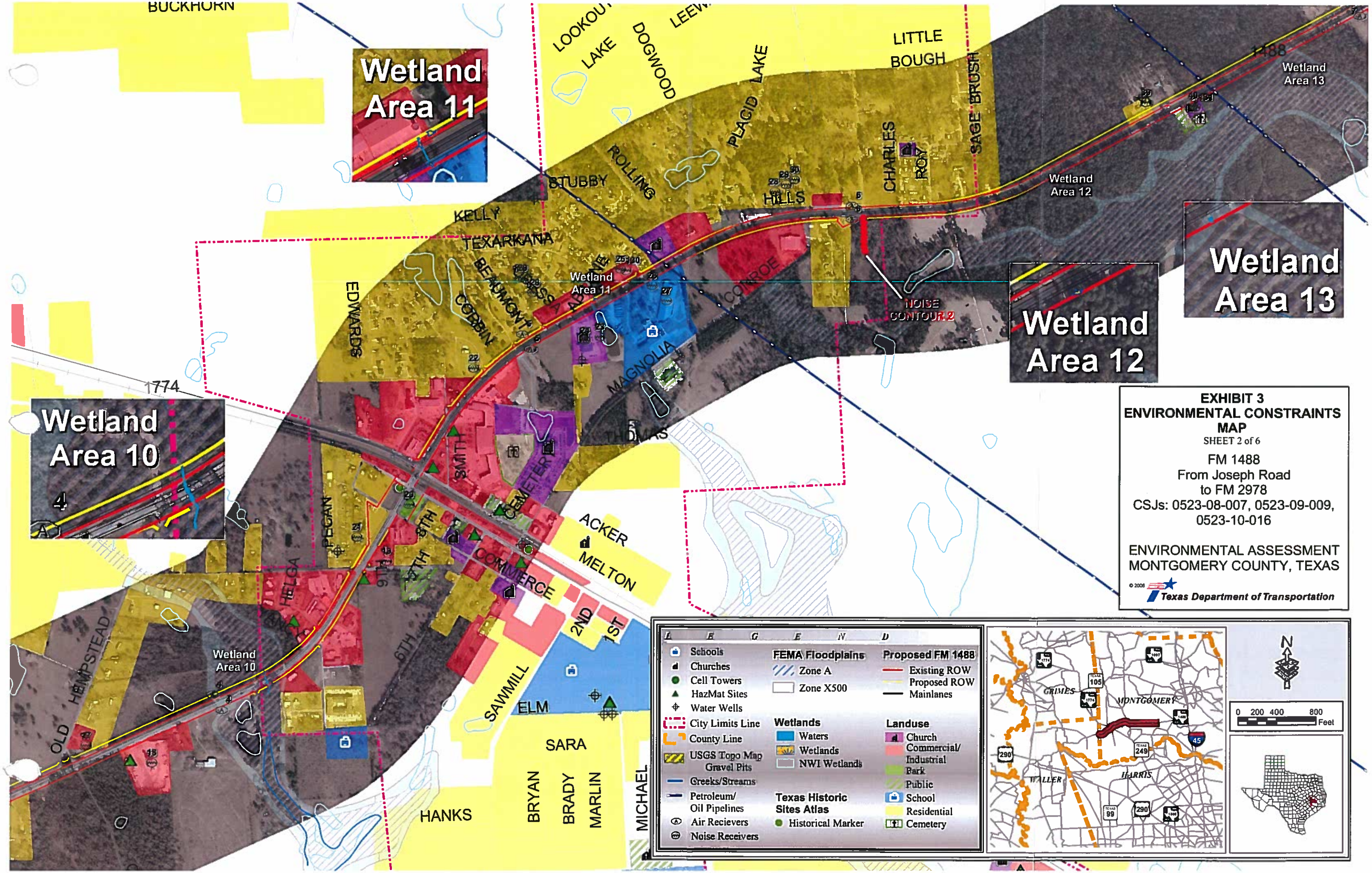

EXHIBIT 3
ENVIRONMENTAL CONSTRAINTS MAP
SHEET 2 of 6

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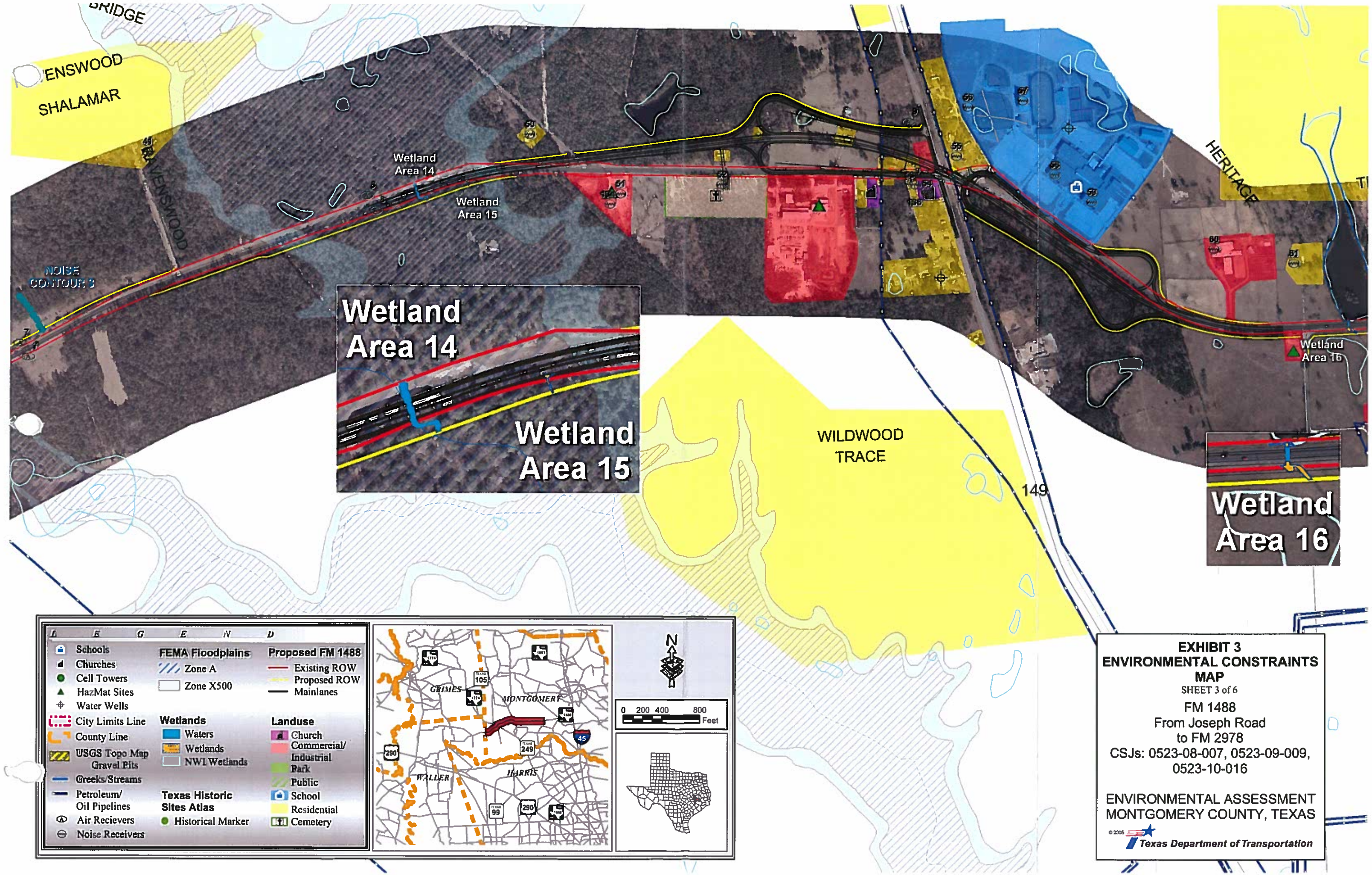
BRIDGE
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RAVENSWOOD
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Wetland Area 15
NOISE CONTOUR 3
HERITAGE
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WILDWOOD TRACE
149
Wetland Area 14
Wetland Area 15
Wetland Area 16
LEGEND
Schools
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EXHIBIT 3
ENVIRONMENTAL CONSTRAINTS MAP
SHEET 3 of 6
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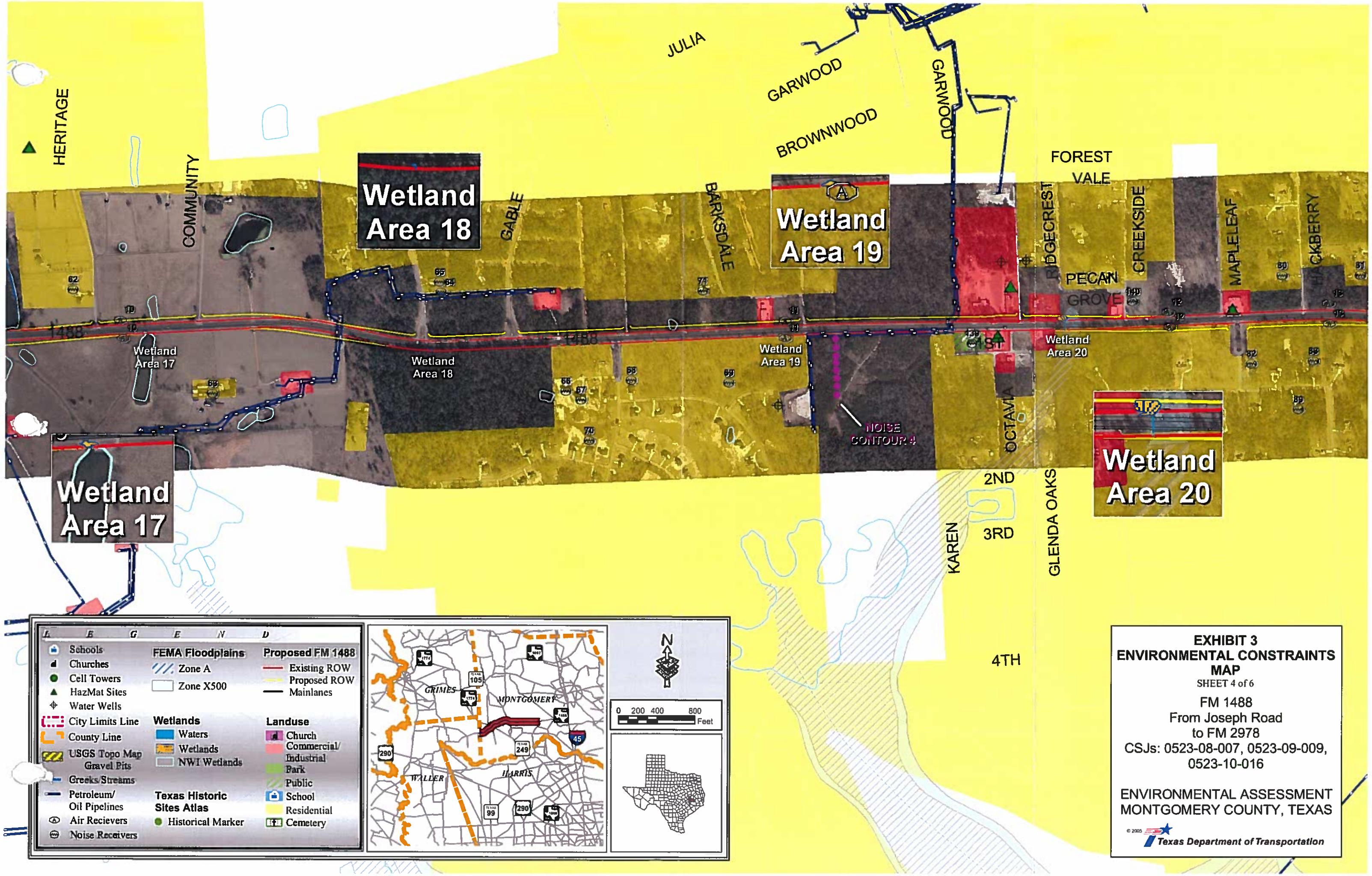
HERITAGE
COMMUNITY
JULIA
GARWOOD
BROWNWOOD
GARWOOD
FOREST
VALE
Wetland Area 18
GABLE
BARKSDALE
Wetland Area 19
RIDGECREST
PECAN
GROVE
CREEKSIDE
MAPLELEAF
HACKBERRY
1488
Wetland Area 17
Wetland Area 18
Wetland Area 19
Wetland Area 20
NOISE CONTOUR 4
OCTAVIA
Wetland Area 17
Wetland Area 20
2ND
3RD
4TH
KAREN
GLENDA OAKS
LEGEND
Schools
Churches
Cell Towers
HazMat Sites
Water Wells
City Limits Line
County Line
USGS Topo Map Gravel Pits
Creeks/Streams
Petroleum/ Oil Pipelines
Air Recievers
Noise Receivers
FEMA Floodplains
Zone A
Zone X500
Wetlands
Waters
Wetlands
NWI Wetlands
Texas Historic Sites Atlas
Historical Marker
Proposed FM 1488
Existing ROW
Proposed ROW
Mainlanes
Landuse
Church
Commercial/ Industrial
Park
Public
School
Residential
Cemetery
GRIMES
MONTGOMERY
WALLER
HARRIS
105
249
45
290
99
N
0 200 400 800
Feet
EXHIBIT 3
ENVIRONMENTAL CONSTRAINTS MAP
SHEET 4 of 6
FM 1488
From Joseph Road
to FM 2978
CSJs: 0523-08-007, 0523-09-009, 0523-10-016
ENVIRONMENTAL ASSESSMENT
MONTGOMERY COUNTY, TEXAS
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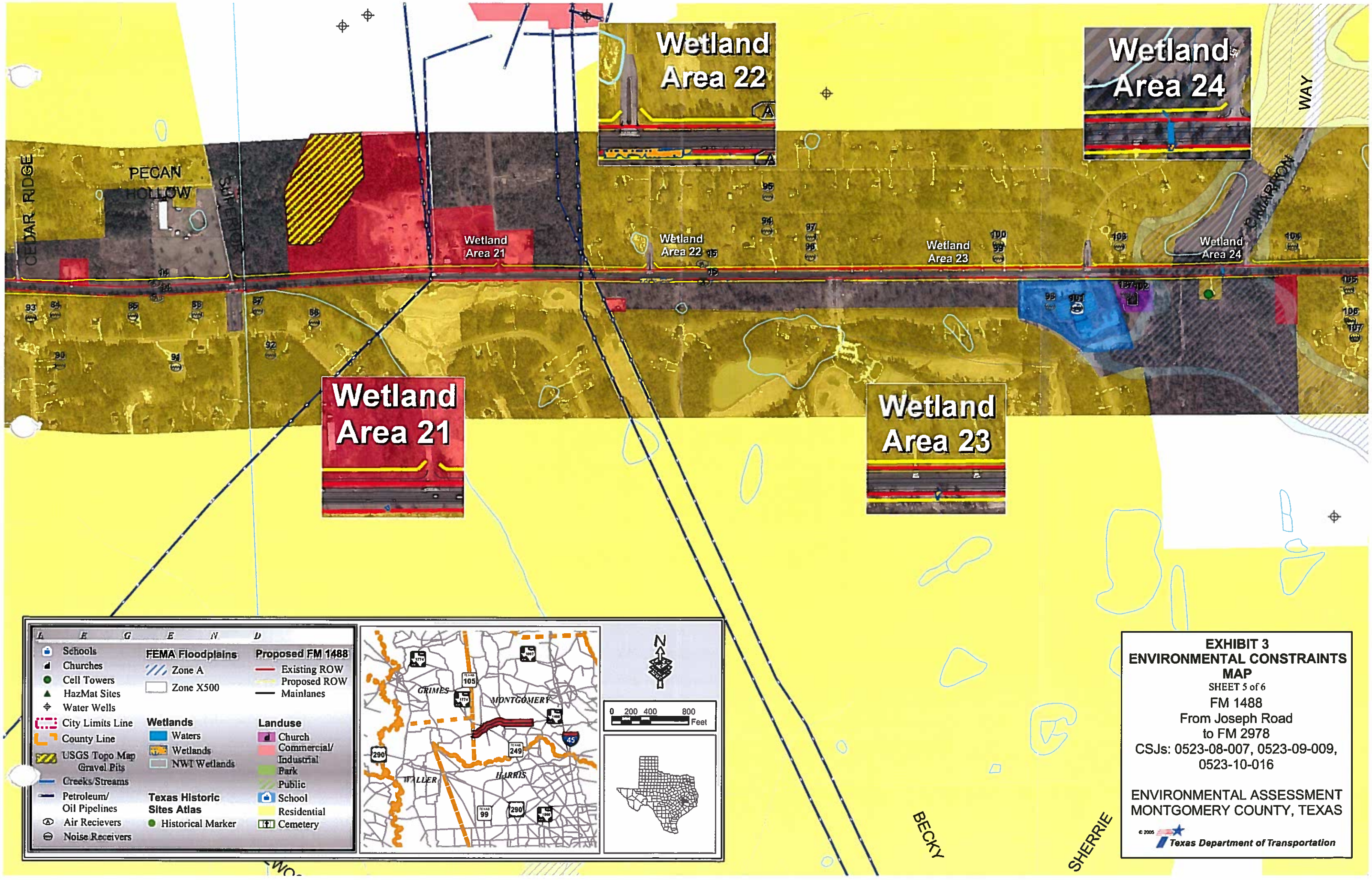
Texas Department of Transportation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Wetland Area 23
PECAN HOLLOW
CEDAR RIDGE
SUPERIOR
CIMARRON
WAY
Wetland Area 21
Wetland Area 22
Wetland Area 23
Wetland Area 24
BECKY
SHERRIE
LEGEND
Schools
Churches
Cell Towers
HazMat Sites
Water Wells
City Limits Line
County Line
USGS Topo Map Gravel Pits
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Cemetery
GRIMES
MONTGOMERY
WALLER
HARRIS
105
249
290
99
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N
0 200 400 800 Feet
EXHIBIT 3
ENVIRONMENTAL CONSTRAINTS MAP
SHEET 5 of 6
FM 1488
From Joseph Road
to FM 2978
CSJs: 0523-08-007, 0523-09-009, 0523-10-016
ENVIRONMENTAL ASSESSMENT
MONTGOMERY COUNTY, TEXAS
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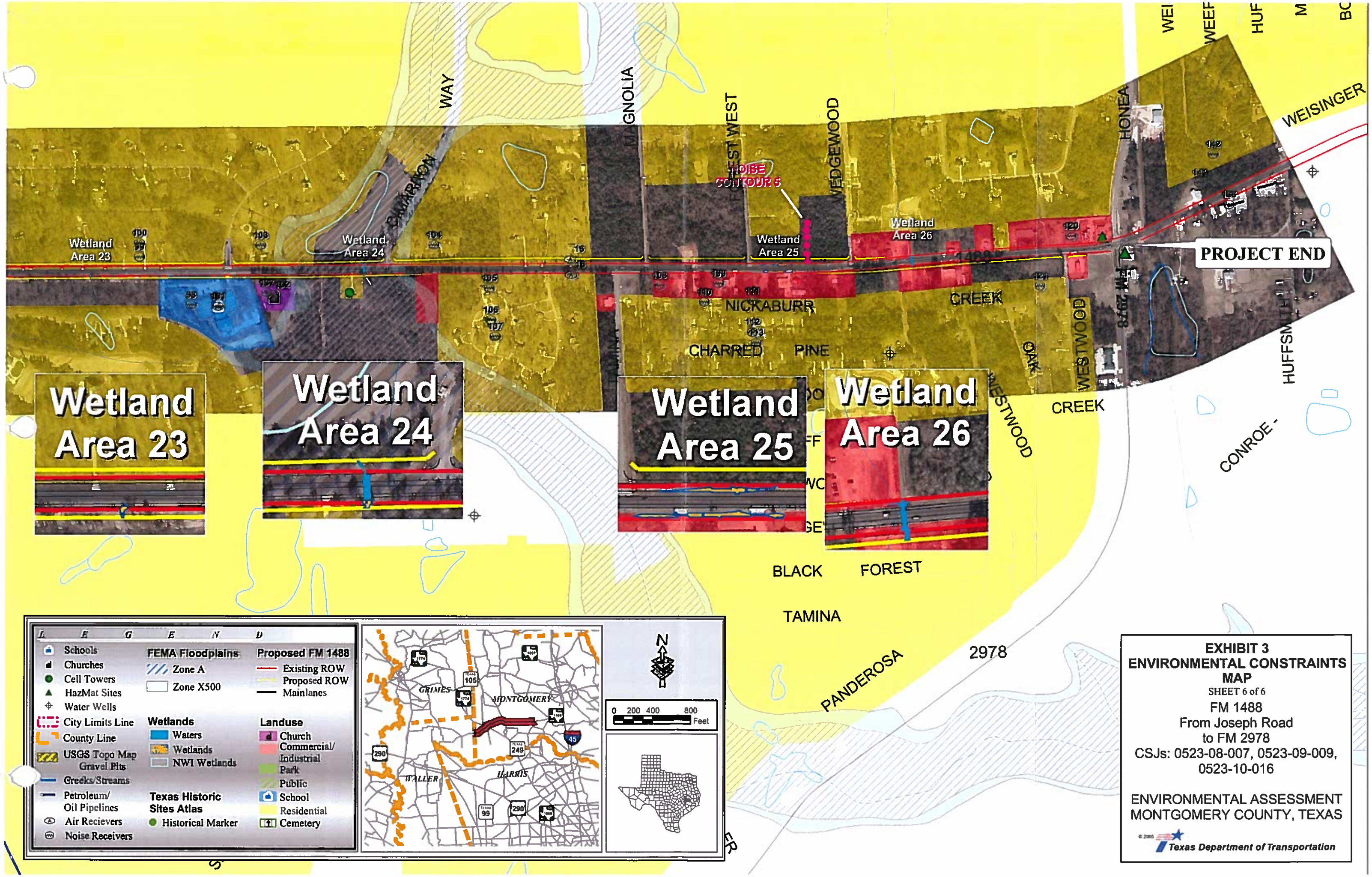
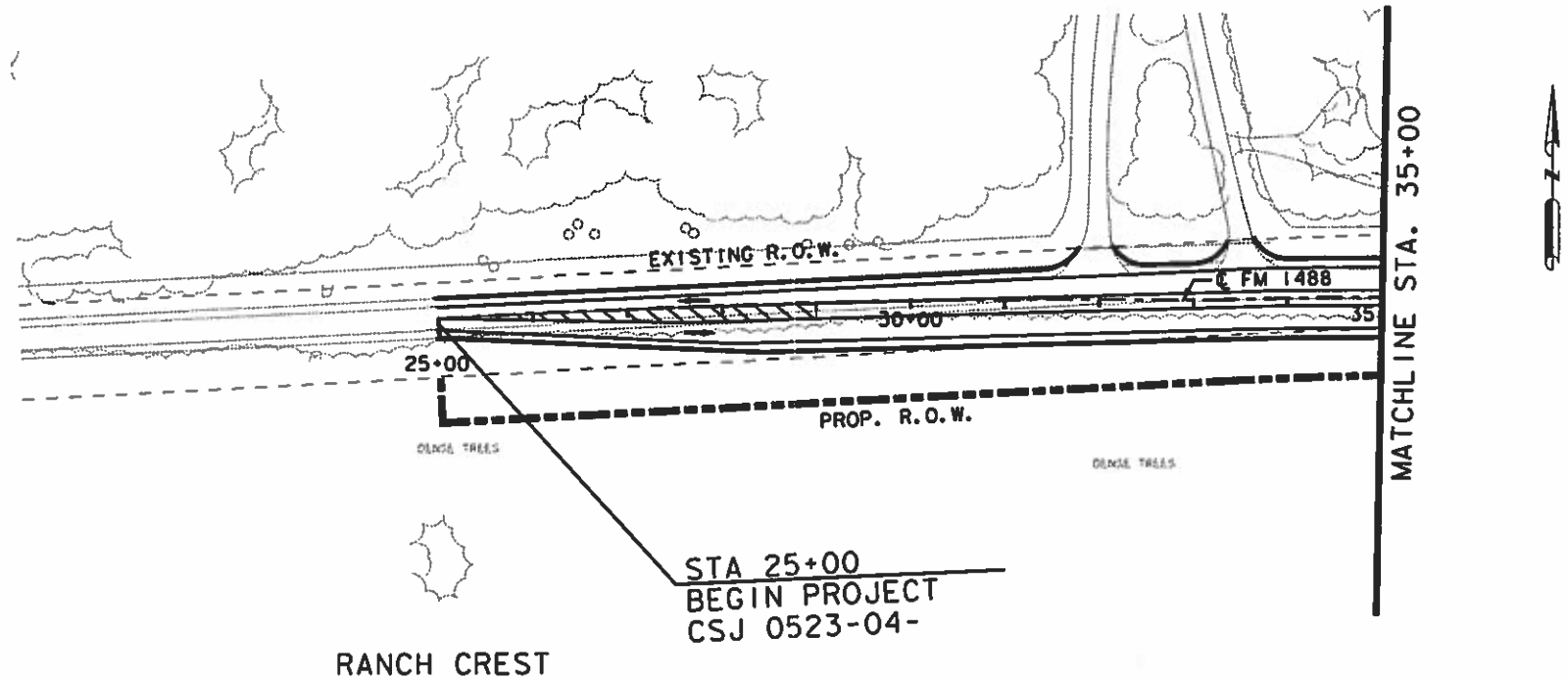
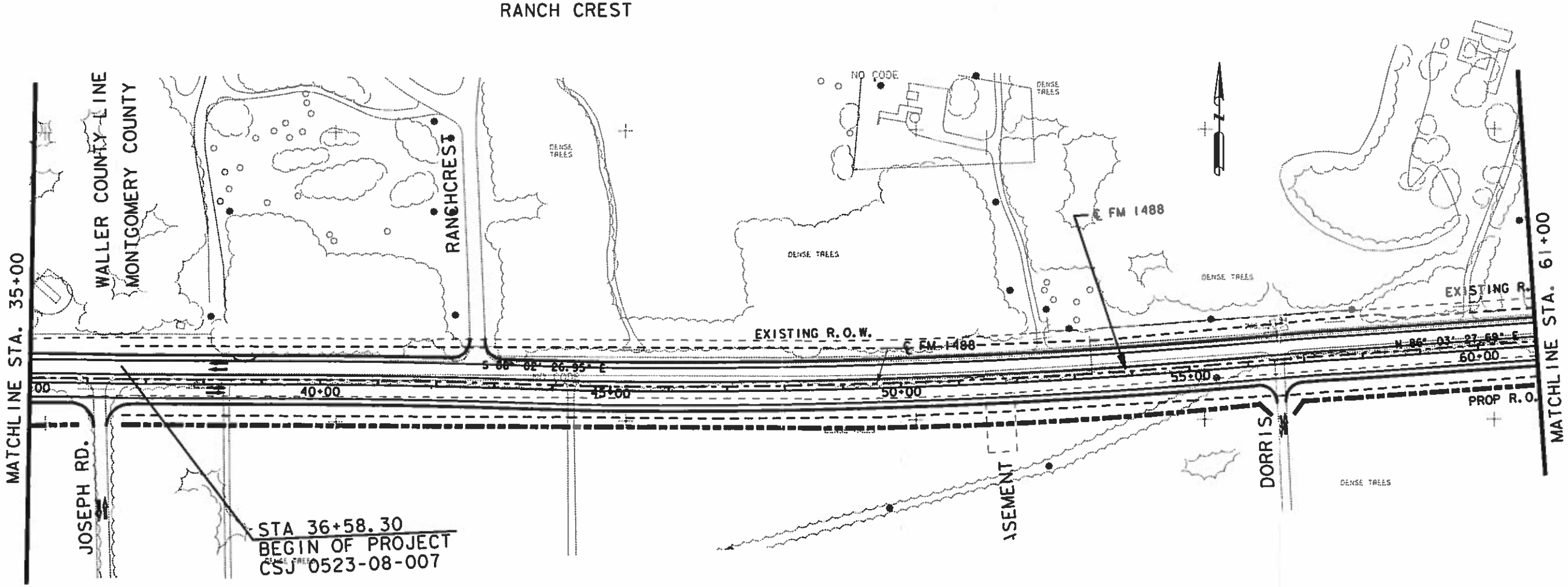


EXHIBIT 3
ENVIRONMENTAL CONSTRAINTS MAP
SHEET 6 of 6
FM 1488
From Joseph Road
to FM 2978
CSJs: 0523-08-007, 0523-09-009, 0523-10-016

ENVIRONMENTAL ASSESSMENT
MONTGOMERY COUNTY, TEXAS

Texas Department of Transportation





Plotted on 0 JG-2007 15:04

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HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

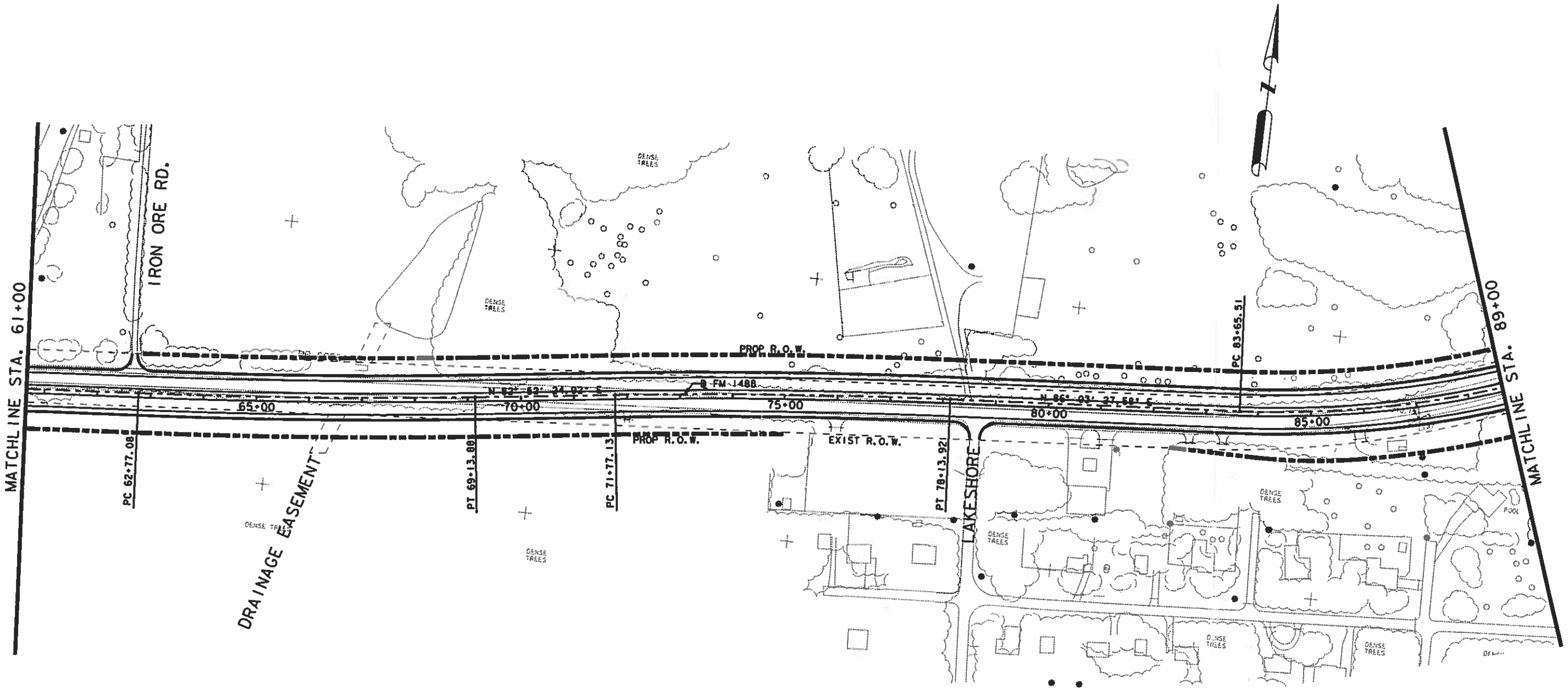
0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 1 of 29

Design Filename: J:\36099\PL 001 7 mile\TECHPROD\CADD\Ex4Schm01.dgn



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The HNTB Companies

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Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 2 of 29

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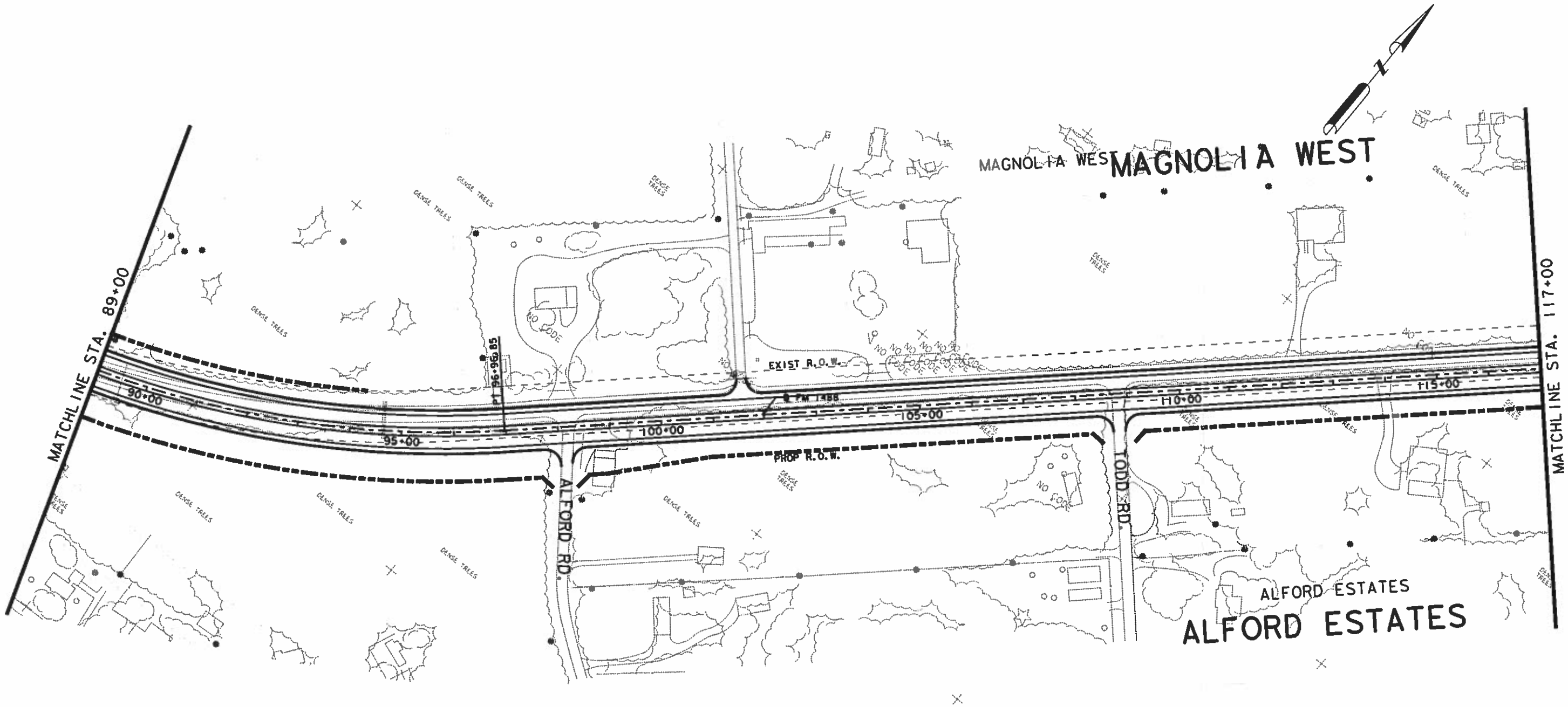

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The HNTB Companies

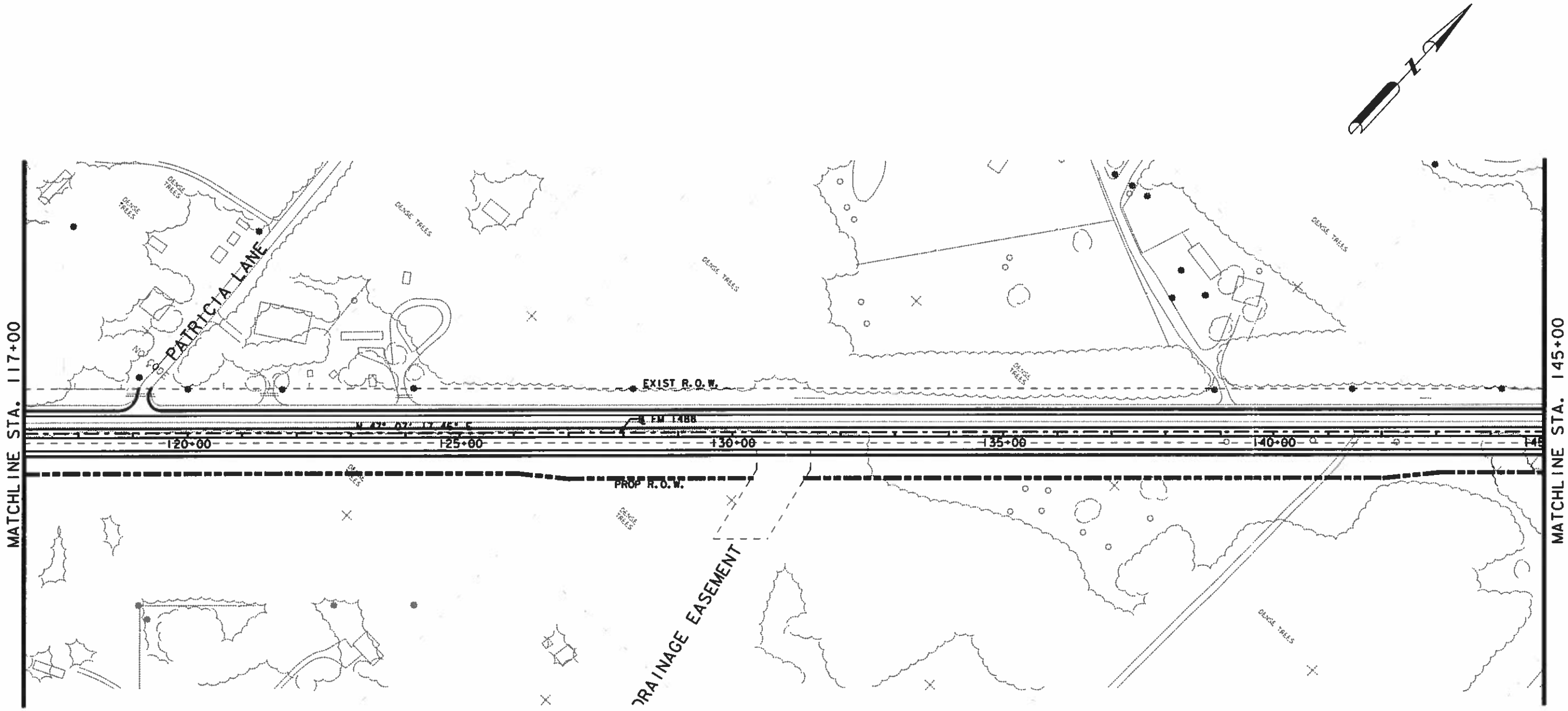
0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 3 of 29

Design Filename: J:\36099\PL 001 7 mile\TECHPROD\CADD\Ex4Schm03.dgn



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The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 4 of 29

Plotted on: 2-AUG-2007 15:04

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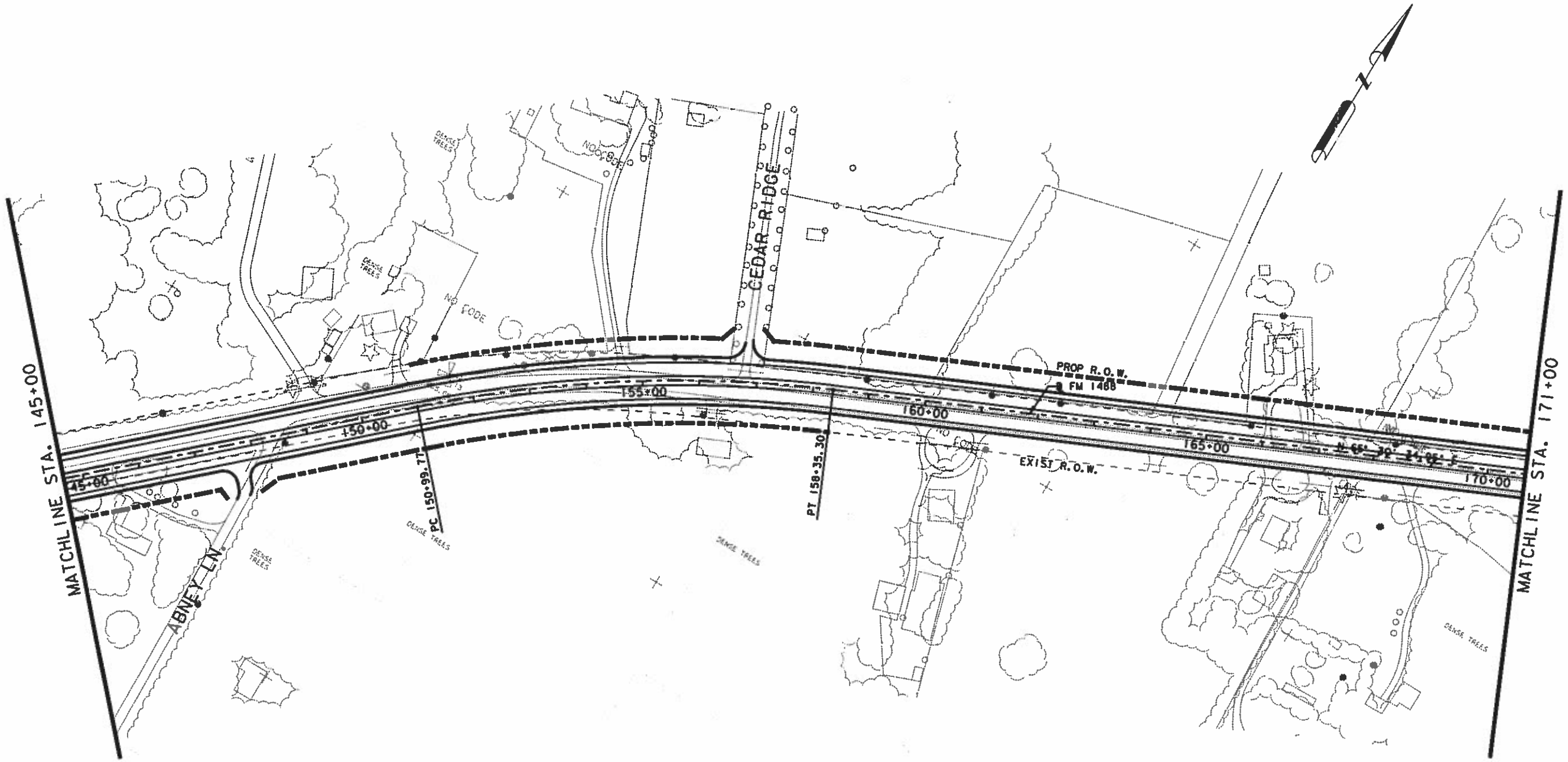

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The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 5 of 29

Plotted on: 2-2007 15:04

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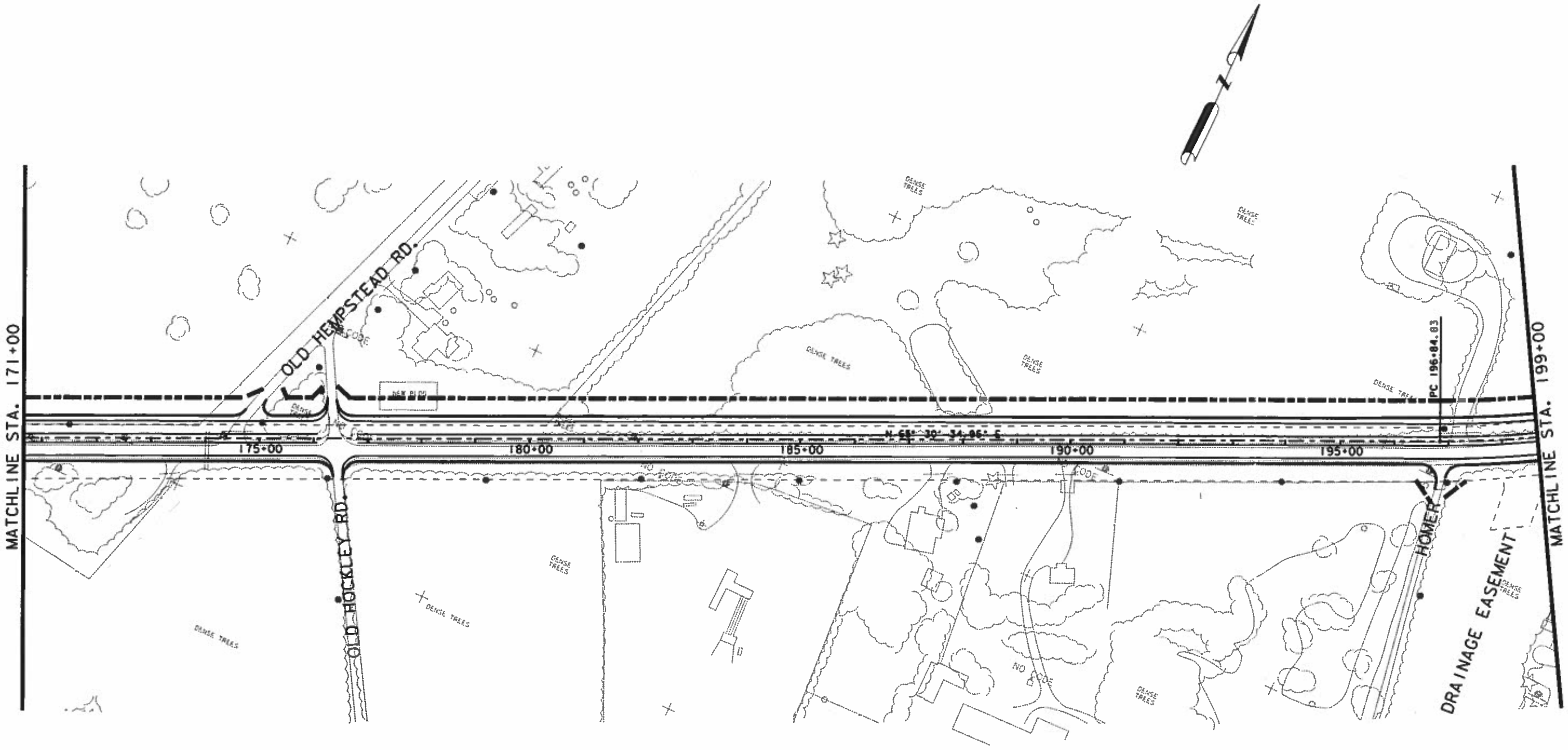

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The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 6 of 29

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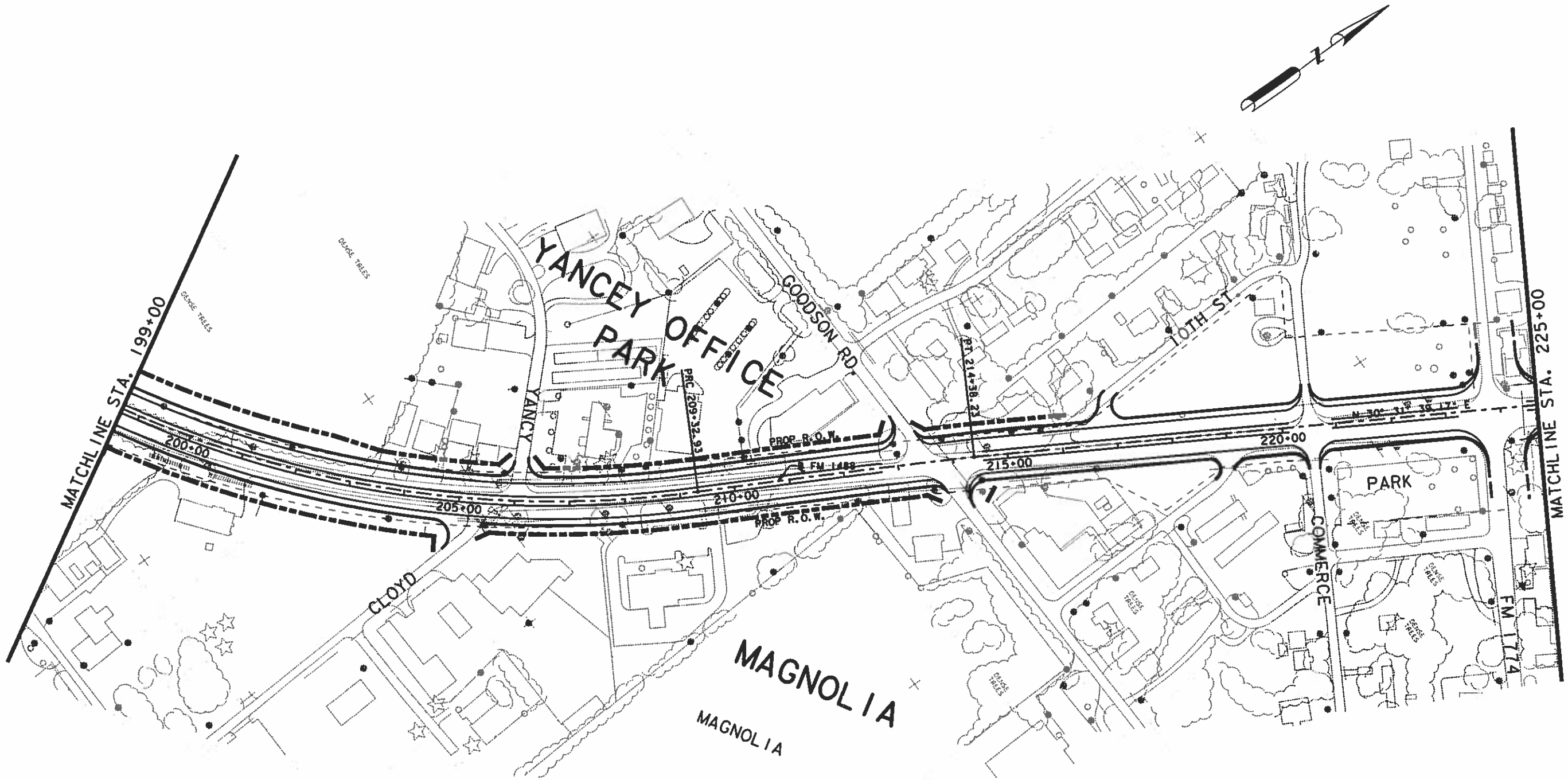

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Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 7 of 29

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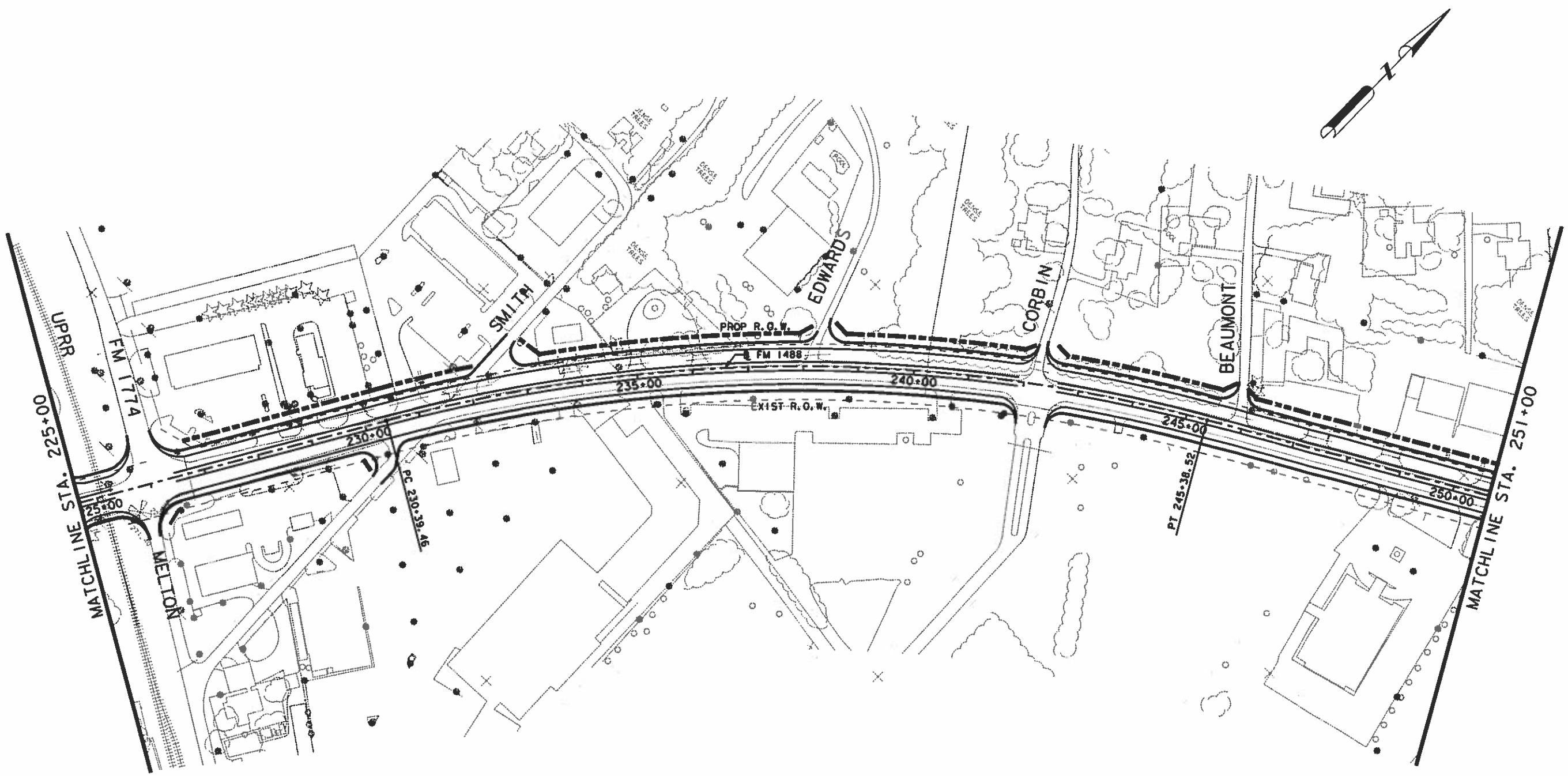

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Scale: 1" = 200'

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FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 8 of 29

Plotted on: 0G-2007 15:05

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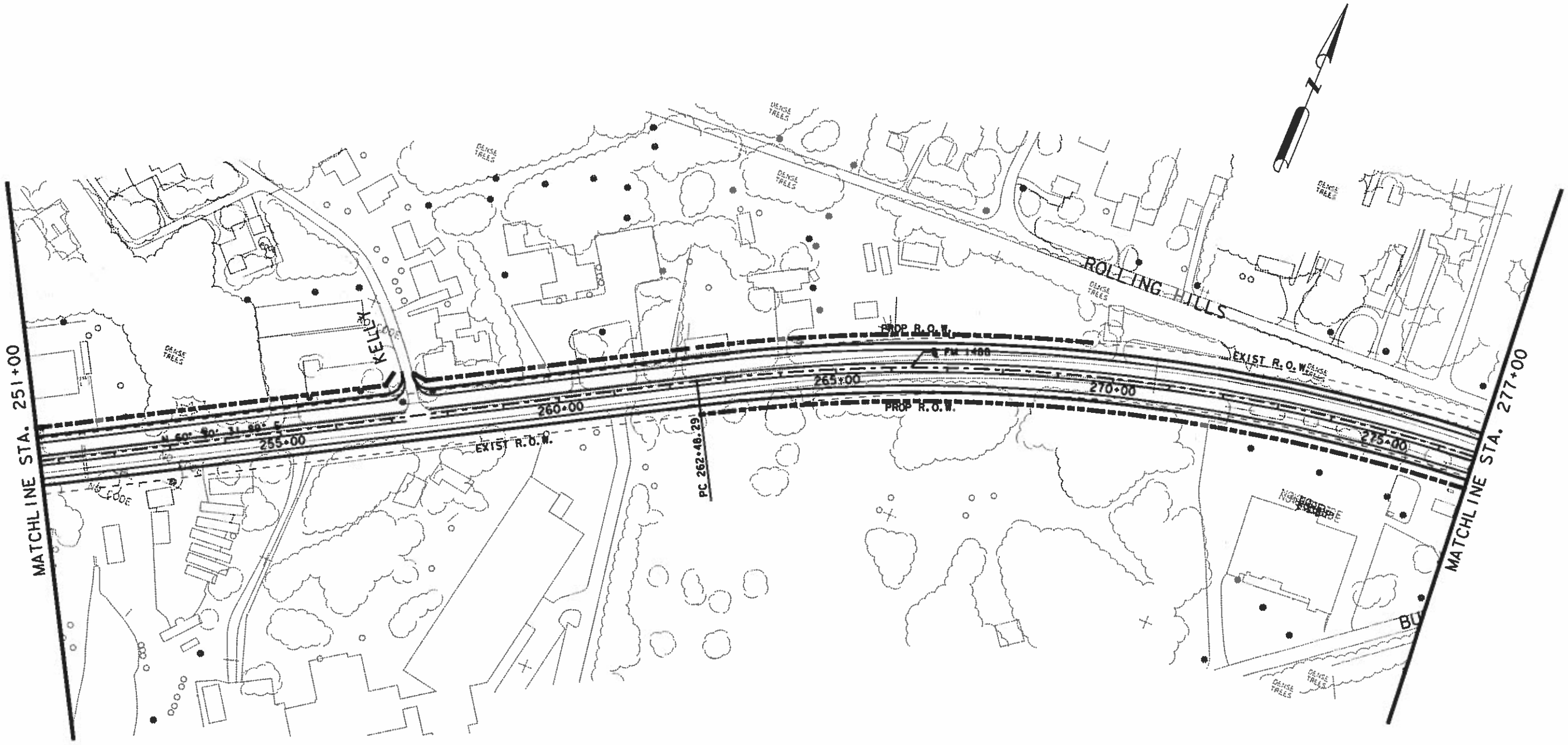

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0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 9 of 29

Plotted on: 9-AUG-2007 15:05

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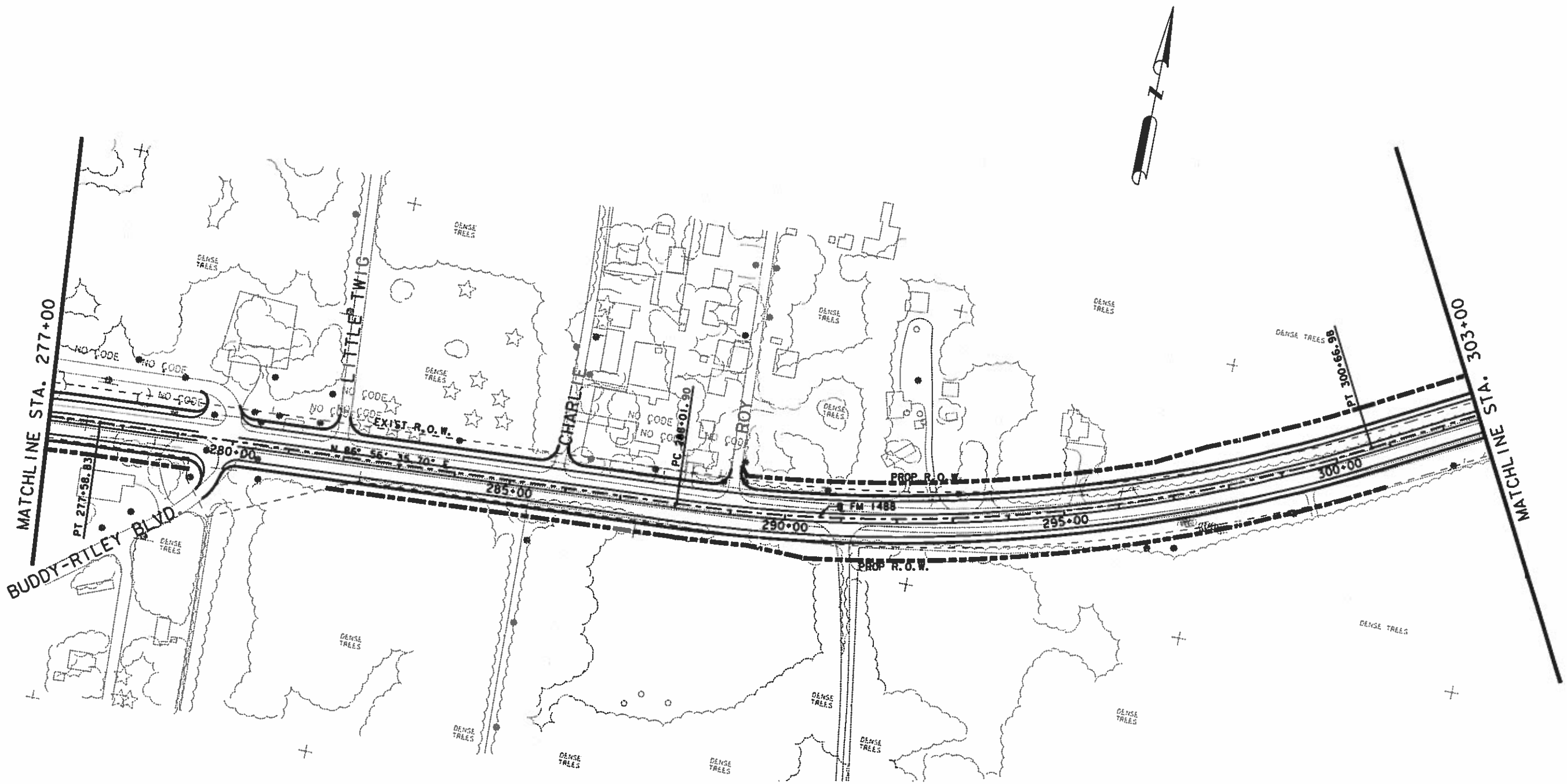

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The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 10 of 29

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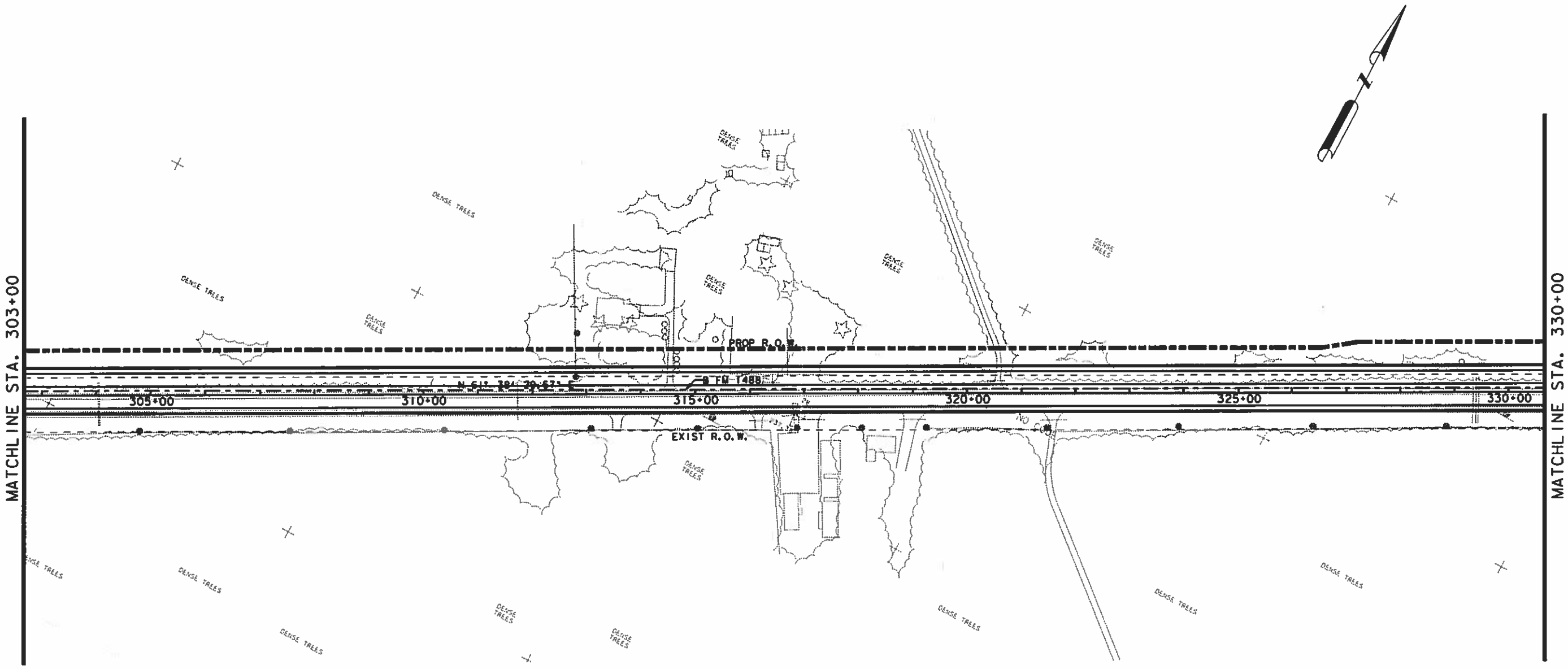

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The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

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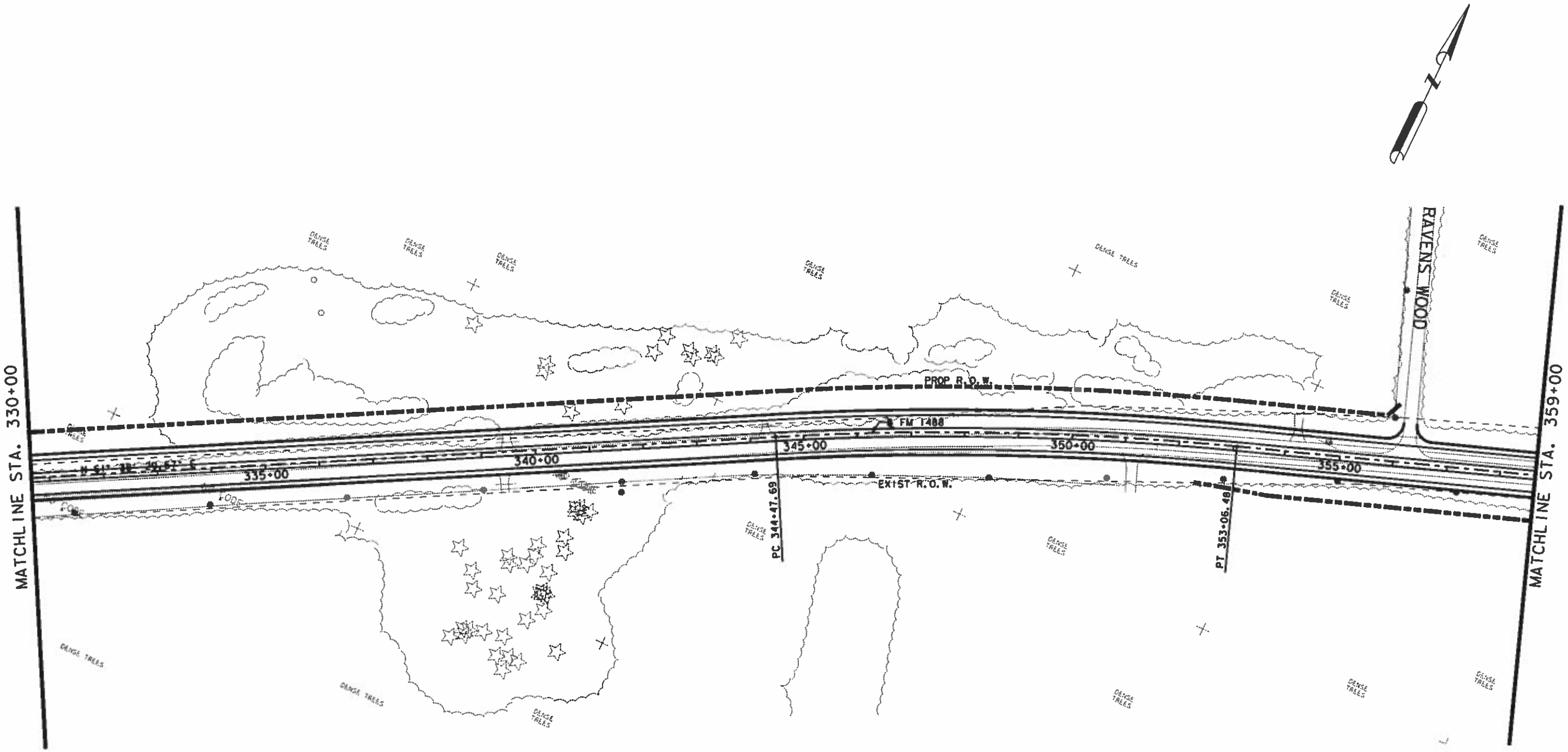

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The HNTB Companies

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Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 12 of 29

Plotted on AUG-2007 15:05

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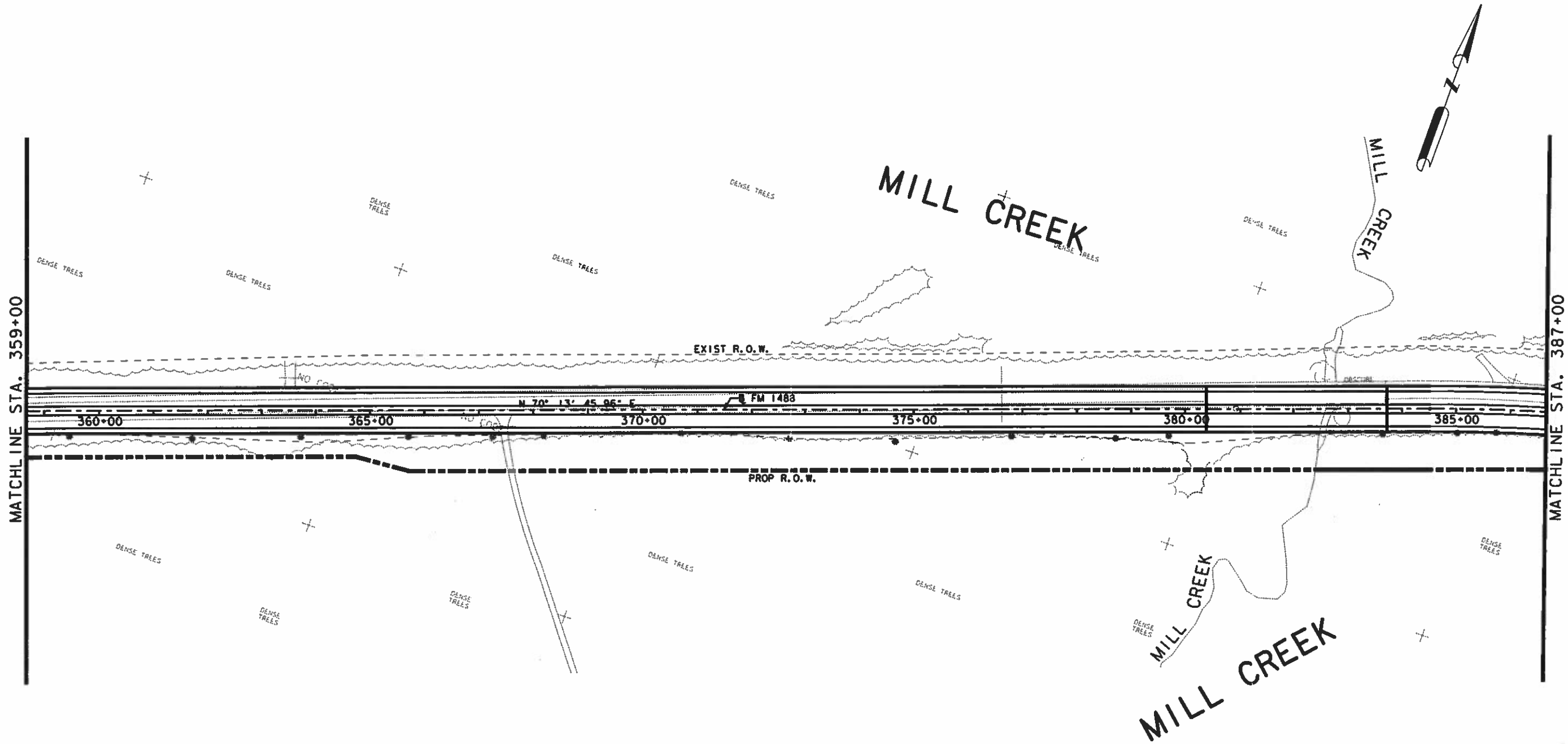

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The HNTB Companies

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Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 13 of 29

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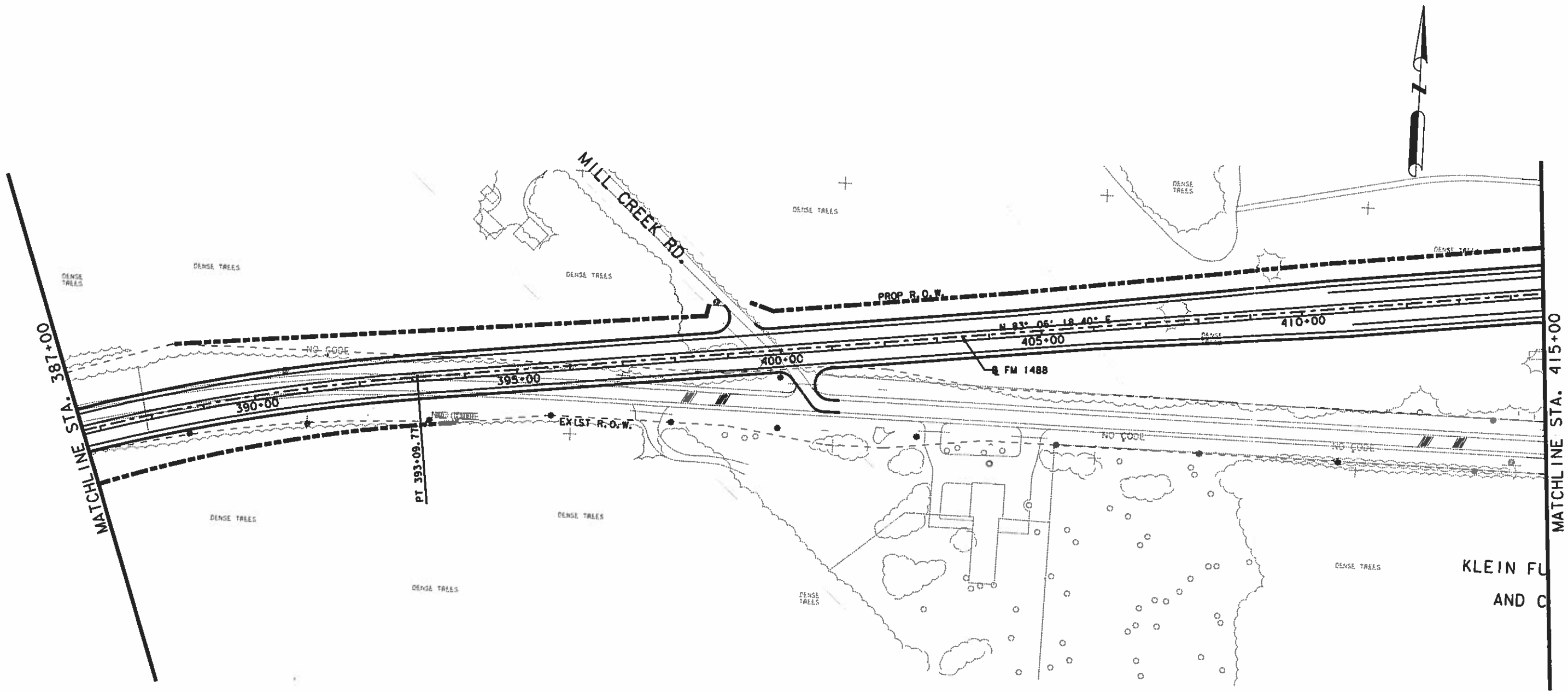

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The HNTB Companies

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Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 14 of 29

Plotted on: UG-2007 15:05

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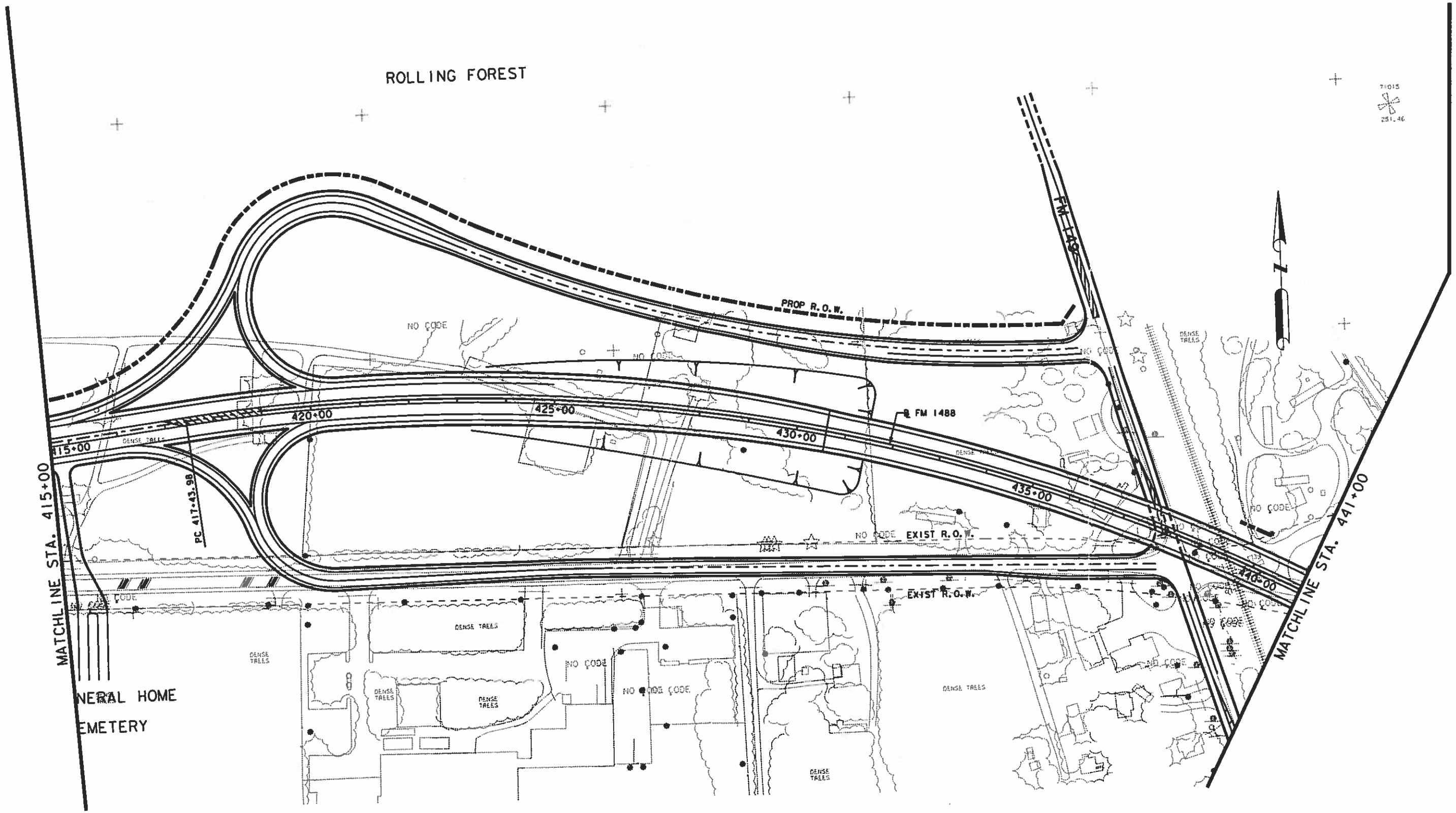

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The HNTB Companies

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Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

Plotted on: AUG-2007 15:05
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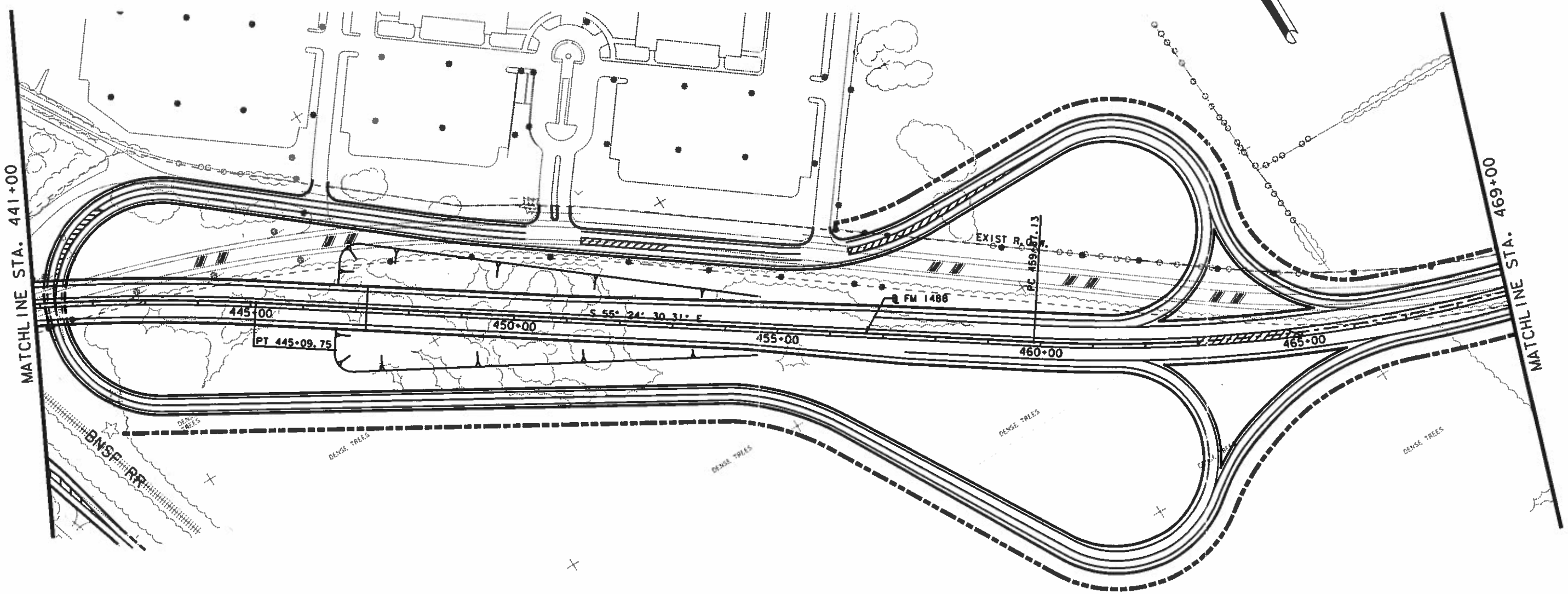

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The HNTB Companies

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Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 16 of 29

Plotted on 6-AUG-2007 15:06

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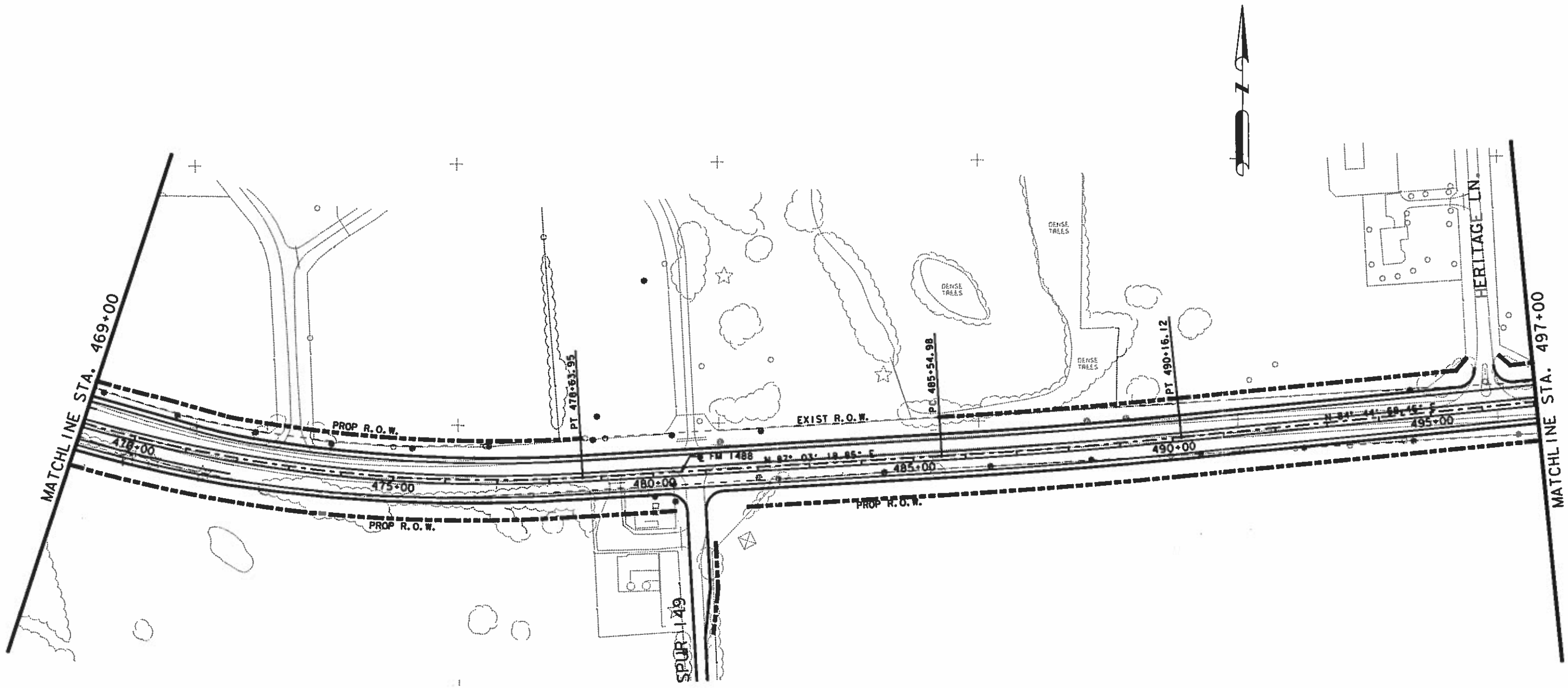

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The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 17 of 29

Plotted on: UG-2007 15:06

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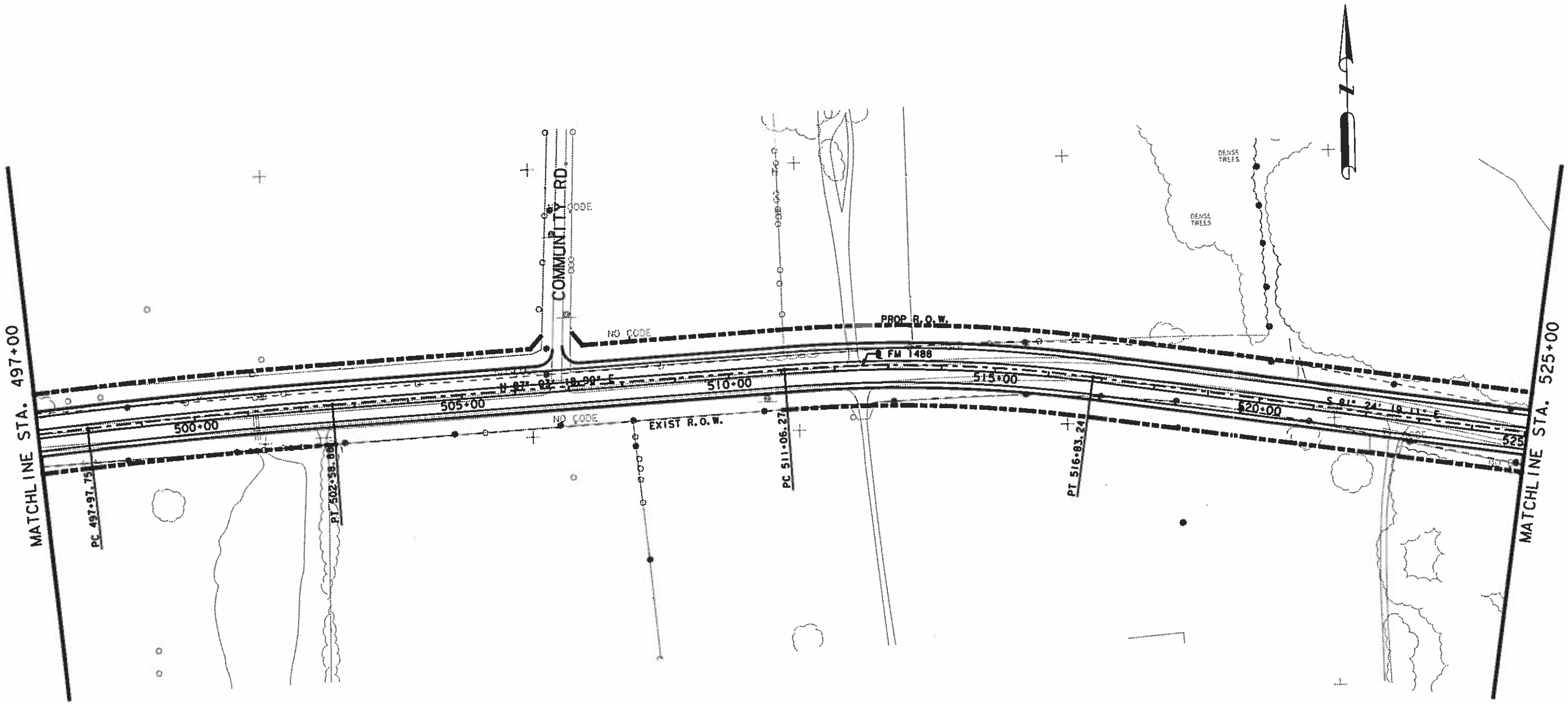

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The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 18 of 29

Plotted on AUG-2007 15:06

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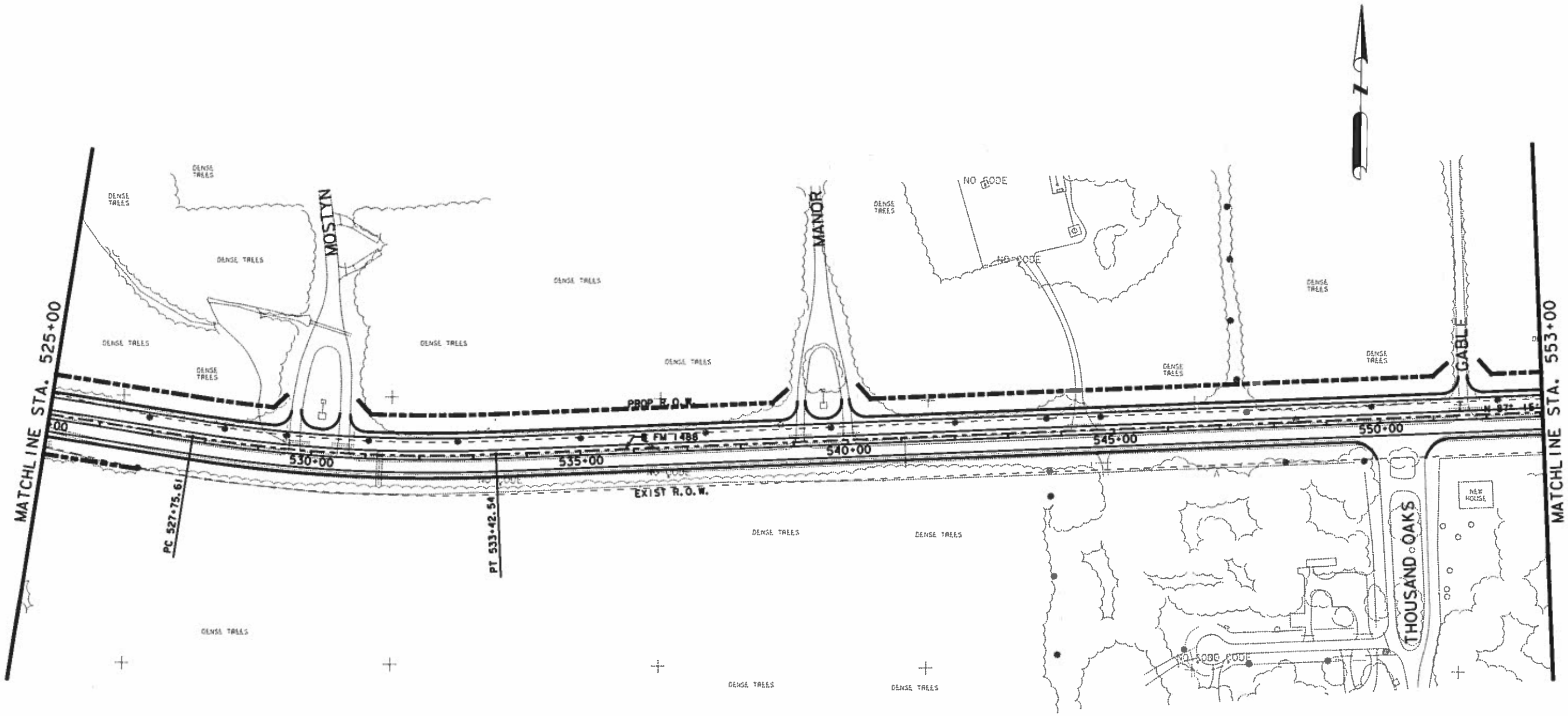

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The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 19 of 29

Plotted on: AUG-2007 15:06

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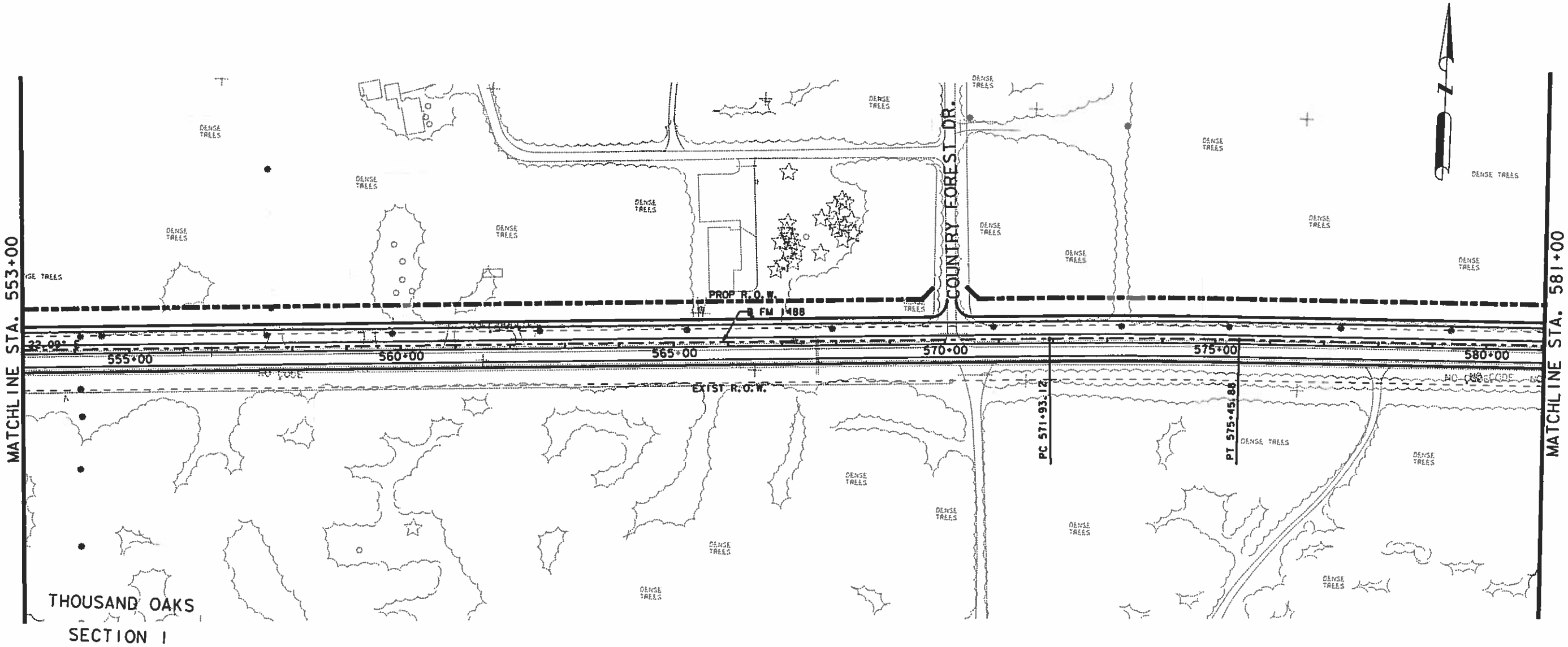

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The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 20 of 29

Plotted on: UG-2007 15:06

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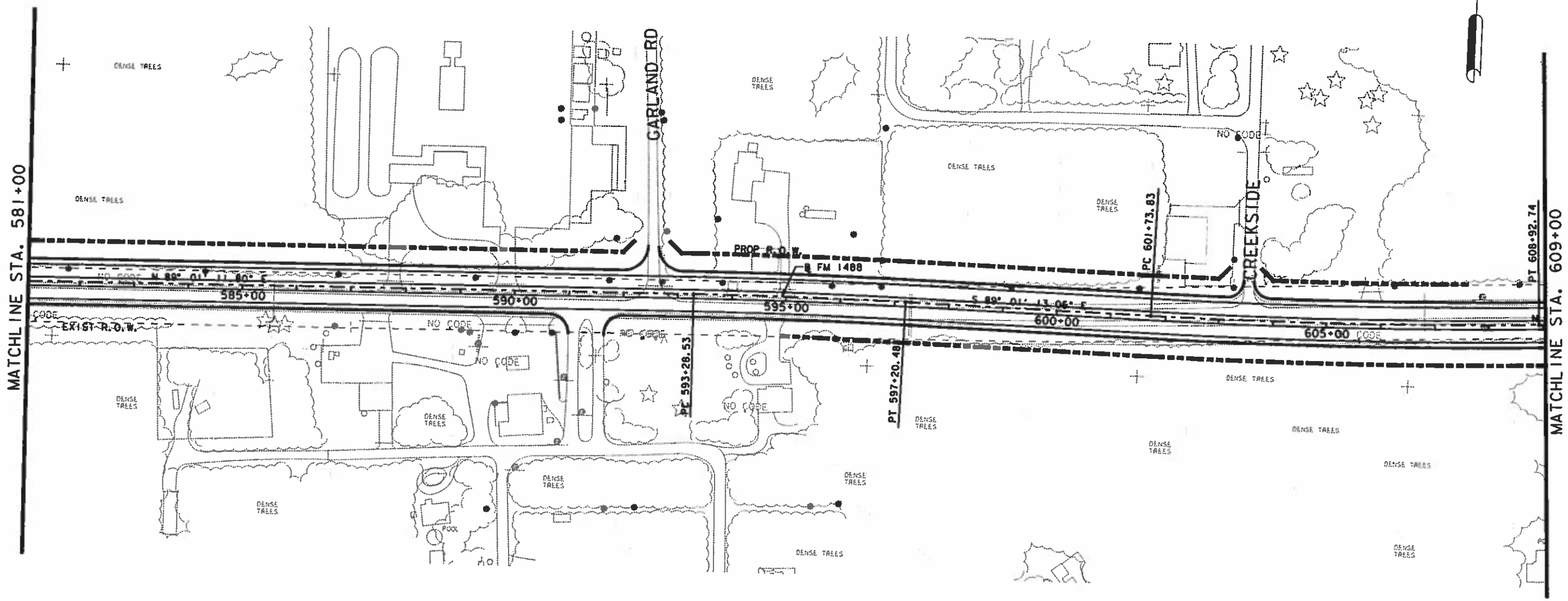

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The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 21 of 29

Plotted on 0 UG-2007 15:06

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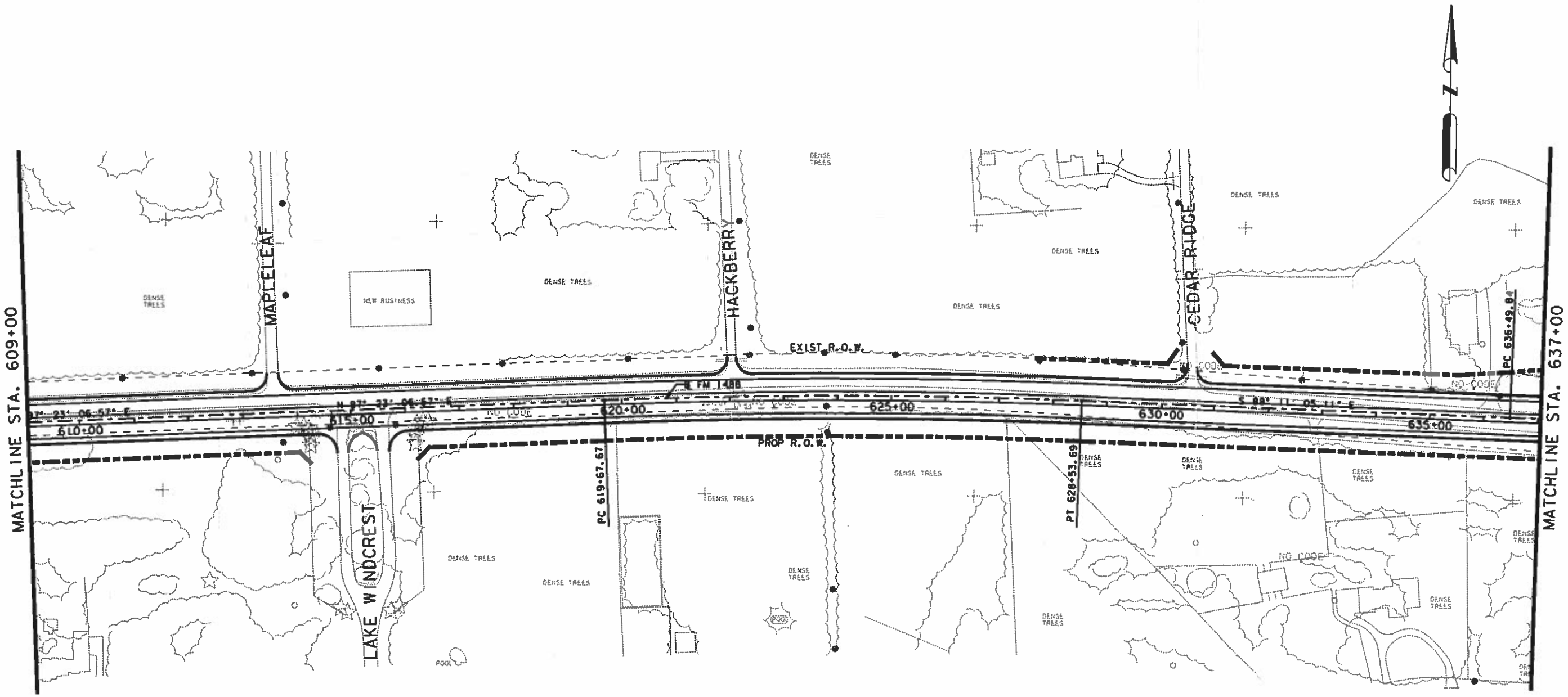

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The HNTB Companies

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Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 22 of 29

Plotted on: AUG-2007 15:06

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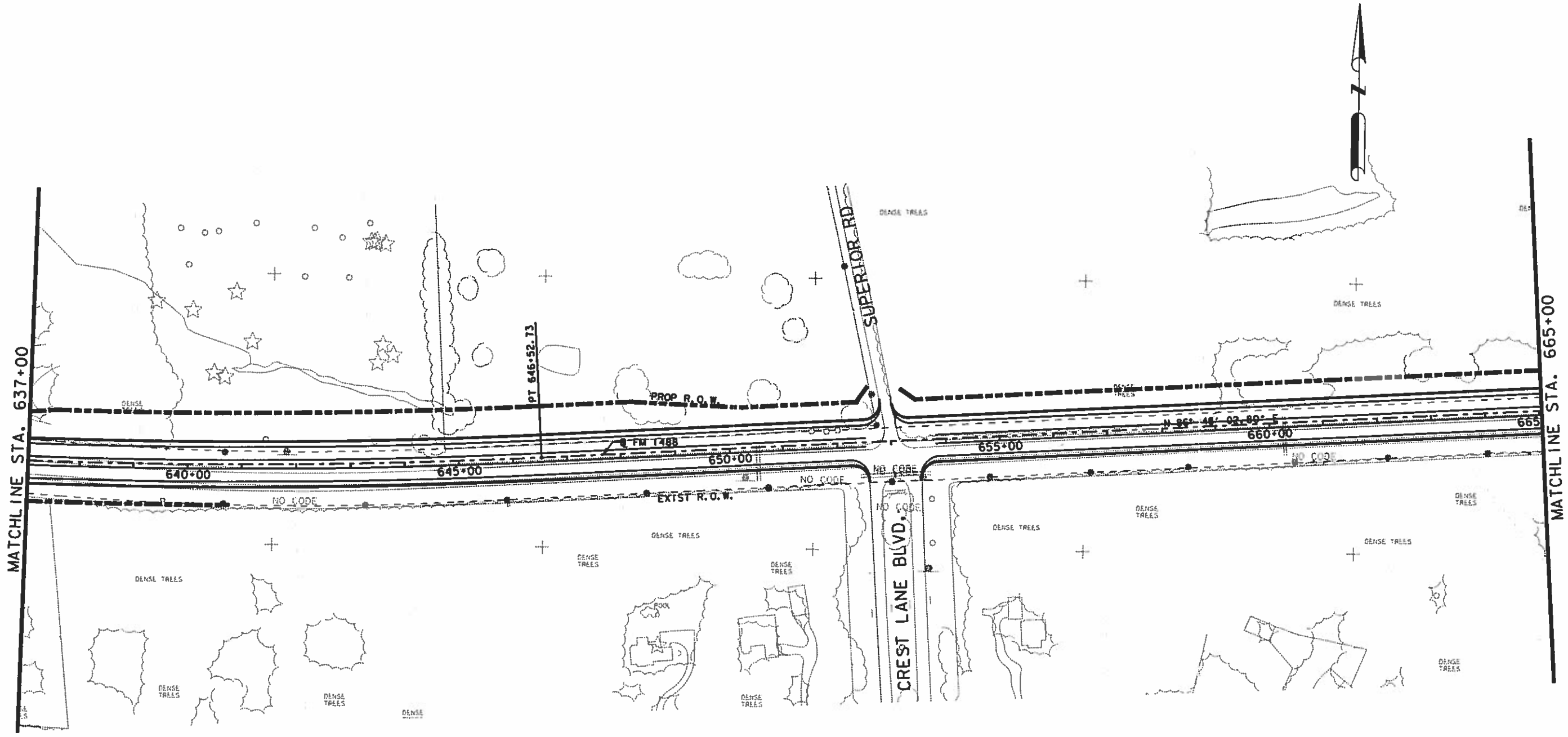

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The HNTB Companies

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Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 23 of 29

Plotted on: AUG-2007 15:06

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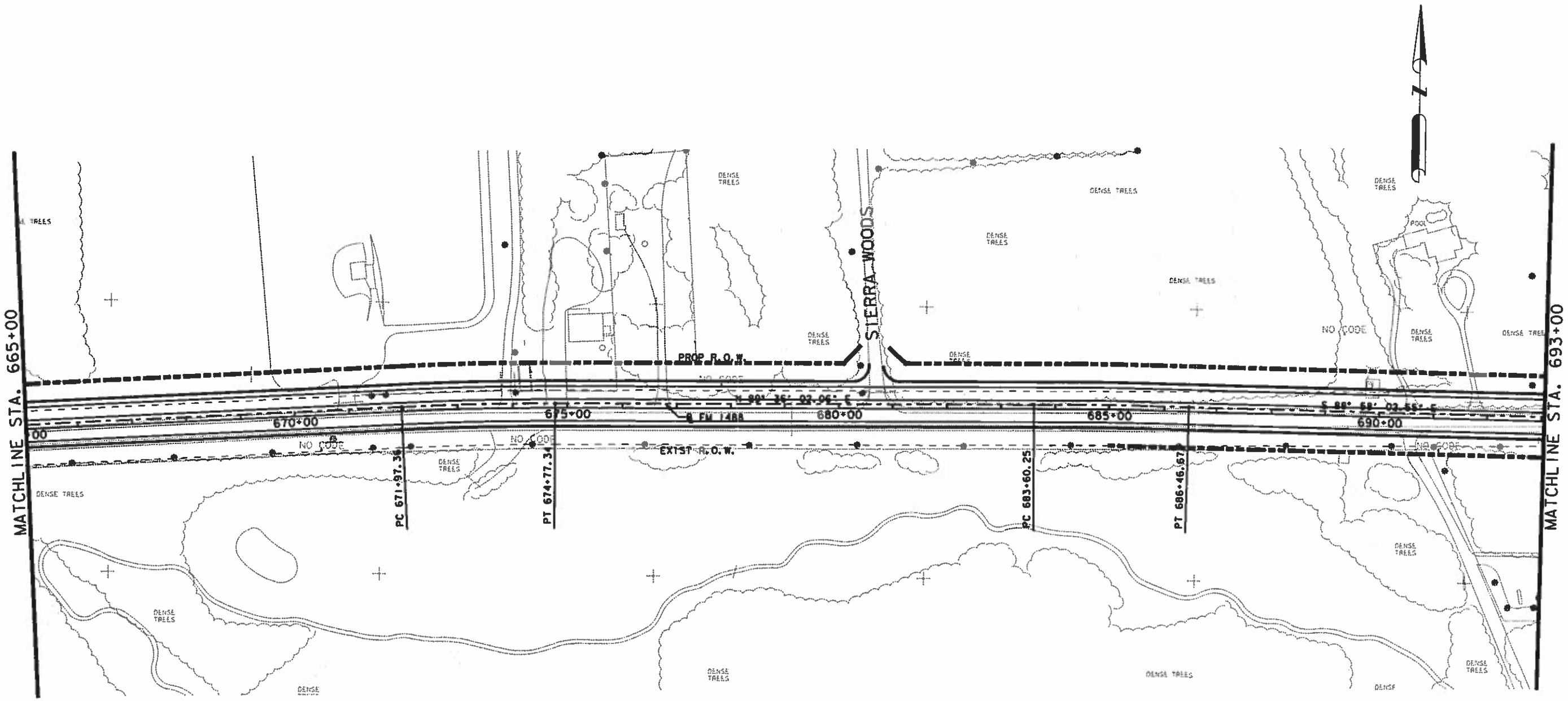

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The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 24 of 29

Plotted on: JG-2007 15:06

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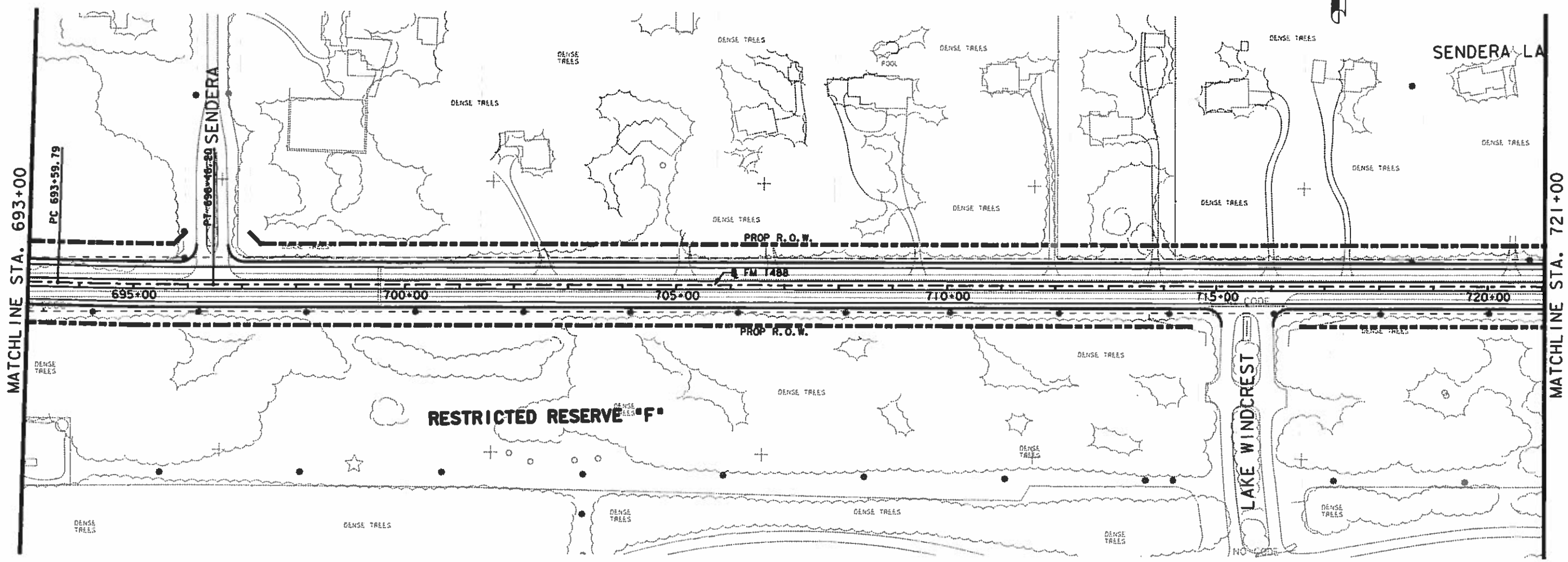

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0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

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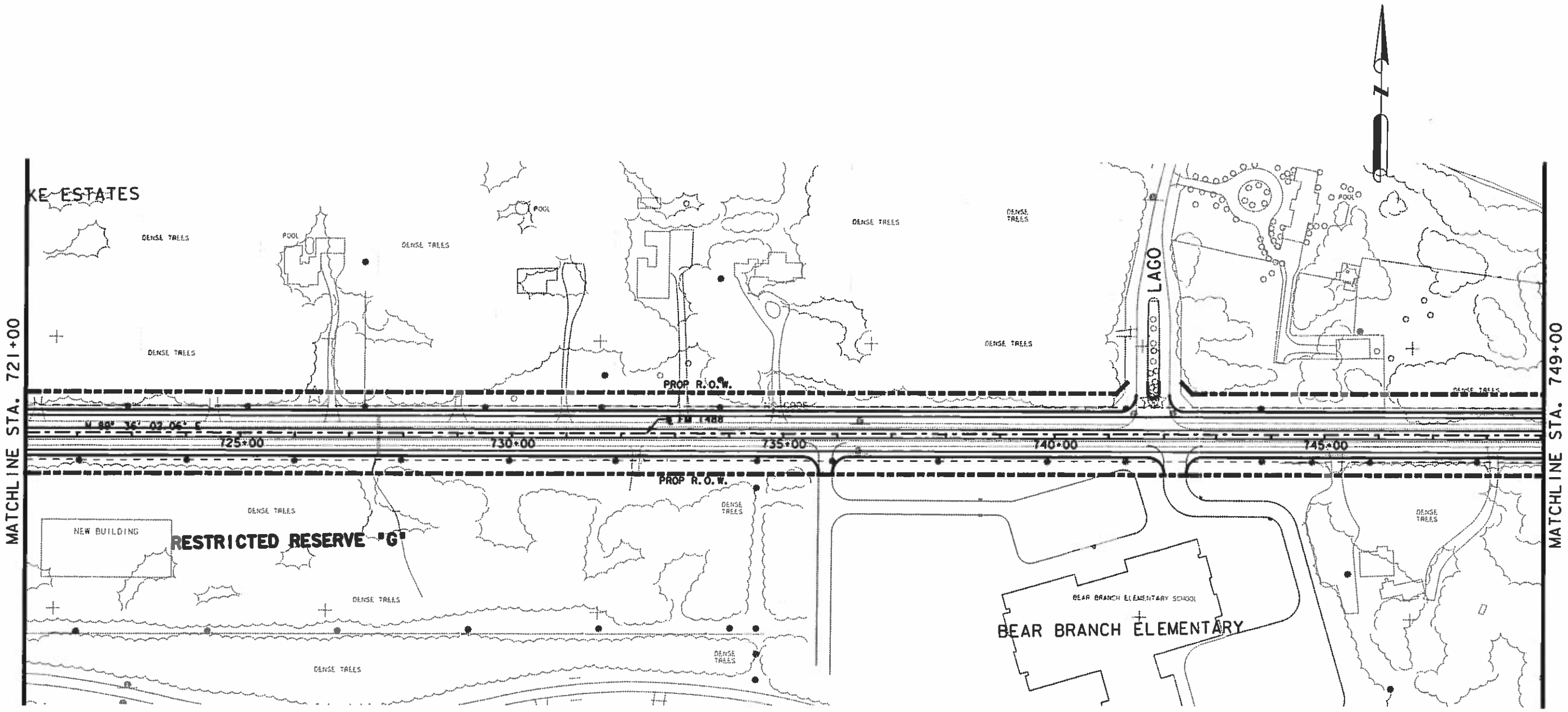

Plotted on: AUG-2007 15:07

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HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

0 100 200 300 400
Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 26 of 29

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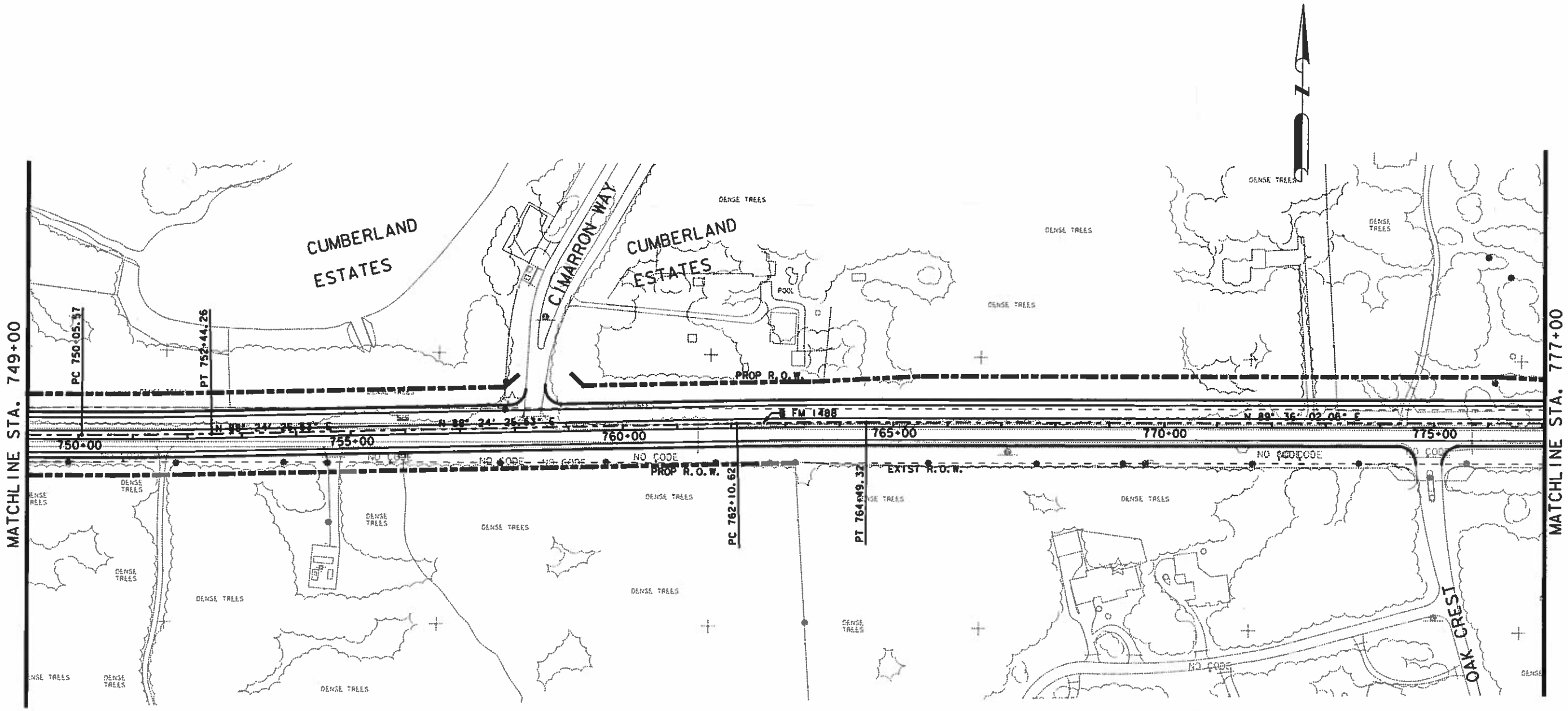

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The HNTB Companies

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Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 27 of 29

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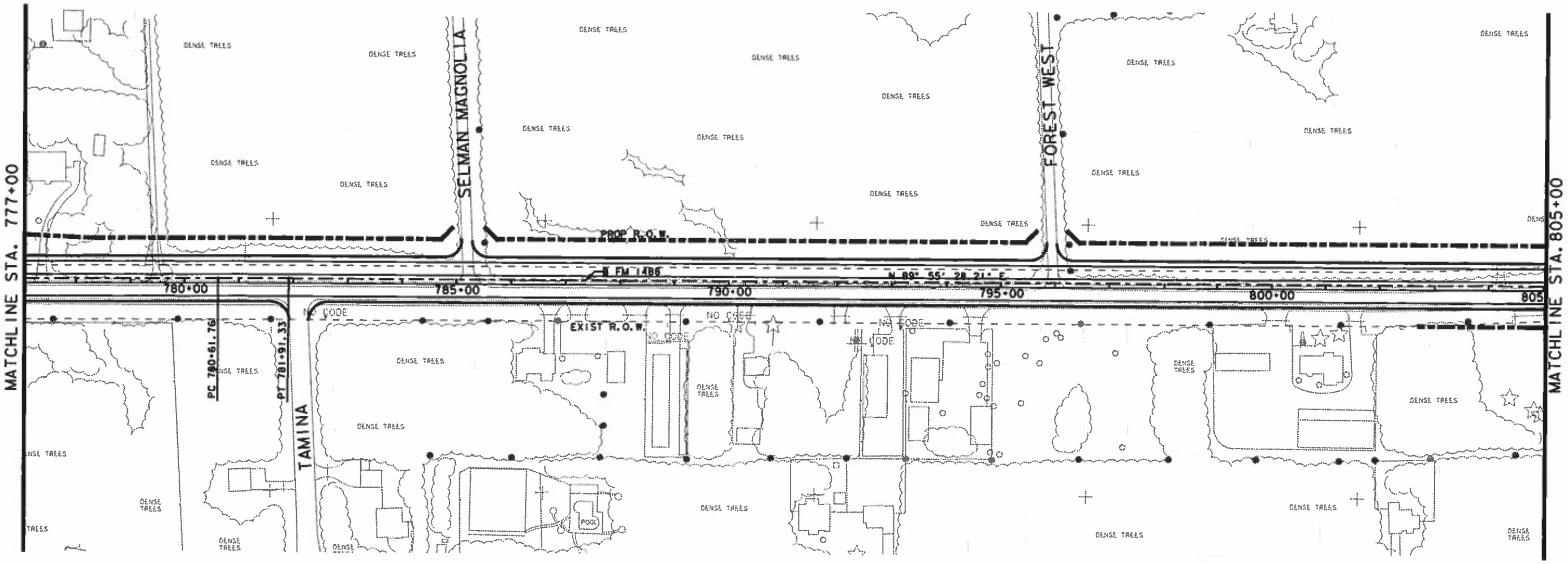

Plotted on AUG-2007 15:07

	© 2002 Texas Department of Transportation	HNTB ARCHITECTS ENGINEERS PLANNERS The HNTB Companies	0 100 200 300 400 Scale: 1" = 200'	EXHIBIT 4 – SCHEMATICS FM 1488 JOSEPH RD (WALLER COUNTY LINE) TO FM 2978 MONTGOMERY COUNTY SHEET 28 of 29

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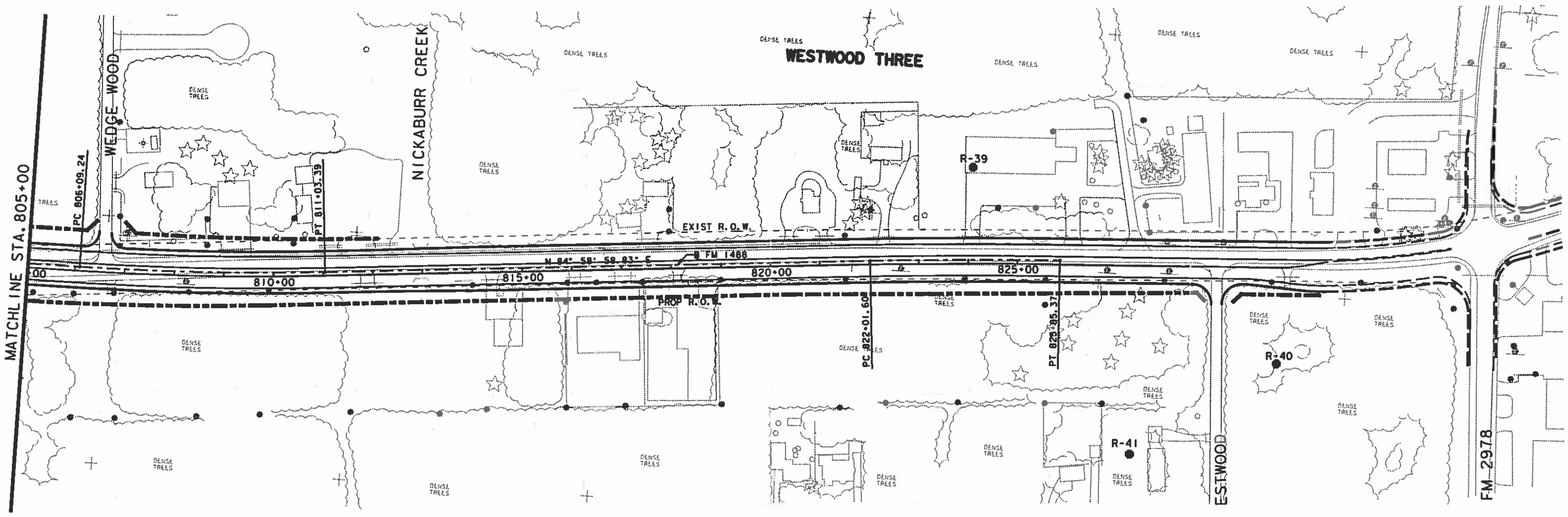

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HNTB ARCHITECTS ENGINEERS PLANNERS
The HNTB Companies

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Scale: 1" = 200'

EXHIBIT 4 – SCHEMATICS

FM 1488
JOSEPH RD (WALLER COUNTY LINE) TO FM 2978
MONTGOMERY COUNTY

SHEET 29 of 29

Plotted on: JG-2007 15:07

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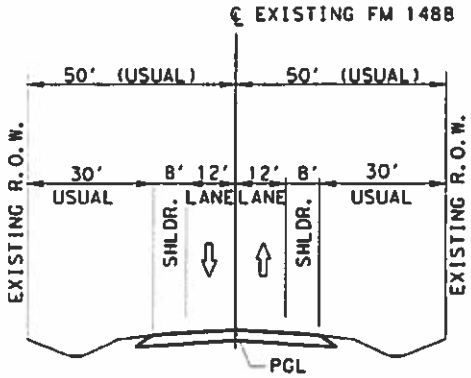
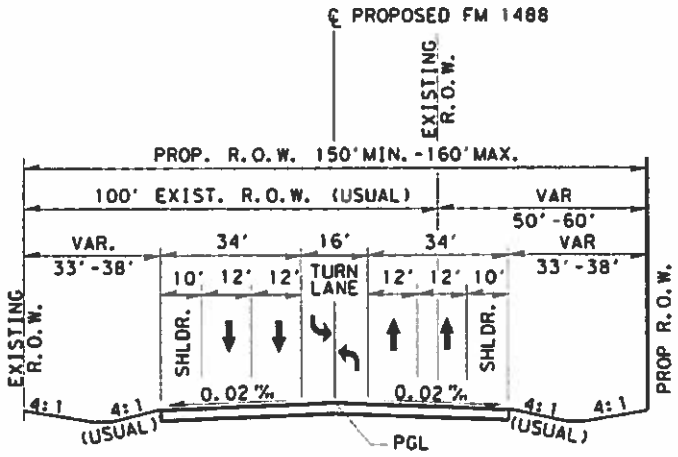
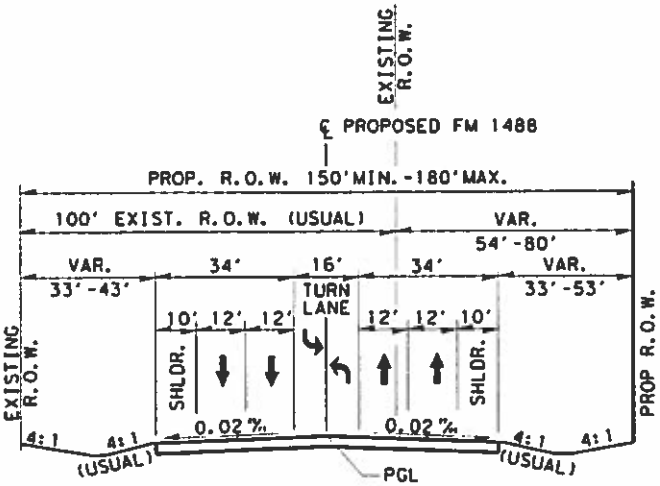


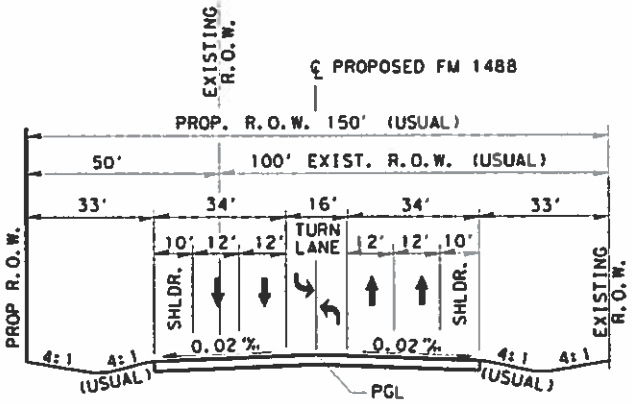
FM 1488 TYPICAL
(EXISTING ROADWAY)
FROM WALLER COUNTY LINE TO FM 2978



FM 1488 TYPICAL SECTION
(WITH 16' FLUSH MEDIAN)
FROM WALLER COUNTY LINE
TO LAKESHORE



FM 1488 TYPICAL SECTION
(WITH 16' FLUSH MEDIAN)
FROM LAKESHORE TO CEDAR RIDGE



FM 1488 TYPICAL SECTION
(WITH 16' FLUSH MEDIAN)
FROM CEDAR RIDGE TO OLD HOCKLEY ROAD

EXHIBIT 5
TYPICAL SECTIONS

SHEET 1 of 4

FM 1488
From Joseph Road to FM 2978
CSJs: 0523-08-007, 0523-09-009, 0523-10-016

ENVIRONMENTAL ASSESSMENT
MONTGOMERY COUNTY, TEXAS

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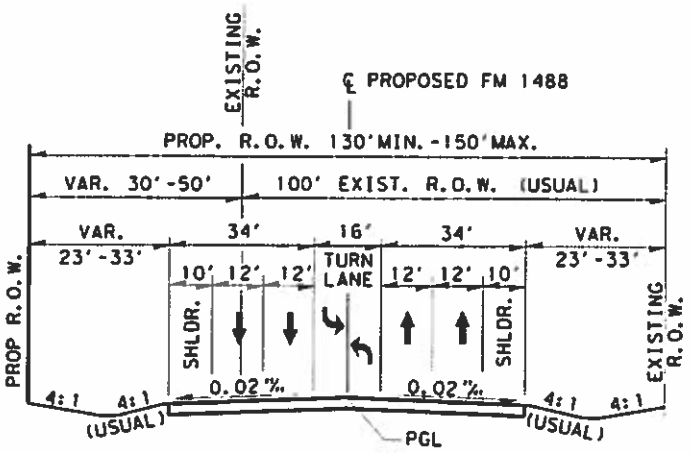
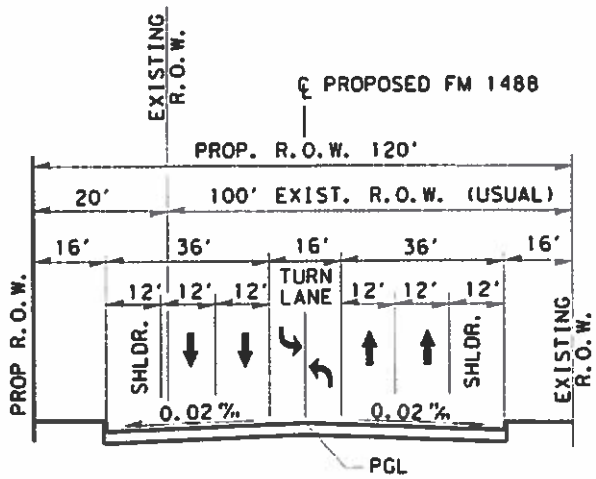
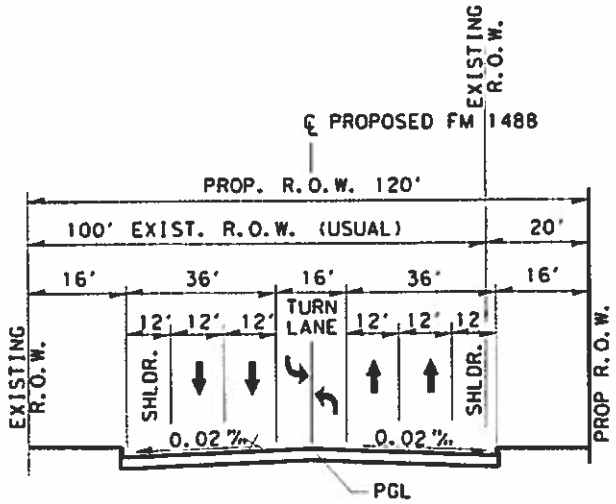


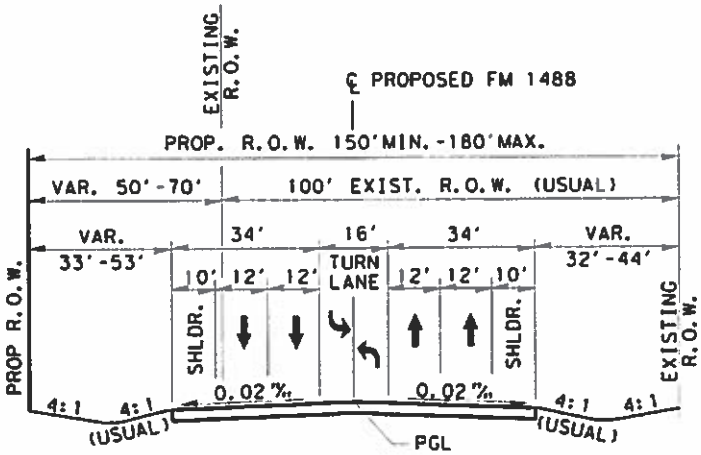
FM 1488 TYPICAL SECTION
(WITH 16' FLUSH MEDIAN)
FROM OLD HOCKLEY ROAD TO YANCEY



FM 1488 TYPICAL SECTION
(WITH 16' FLUSH MEDIAN)
FROM YANCEY TO BUDDY-RILEY



FM 1488 TYPICAL SECTION
(WITH 16' FLUSH MEDIAN)
FROM BUDDY-RILEY TO ROY



FM 1488 TYPICAL SECTION
(WITH 16' FLUSH MEDIAN)
FROM ROY TO RAVENS WOOD

EXHIBIT 5
TYPICAL SECTIONS

SHEET 2 of 4

FM 1488
From Joseph Road to FM 2978
CSJs: 0523-08-007, 0523-09-009, 0523-10-016

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MONTGOMERY COUNTY, TEXAS

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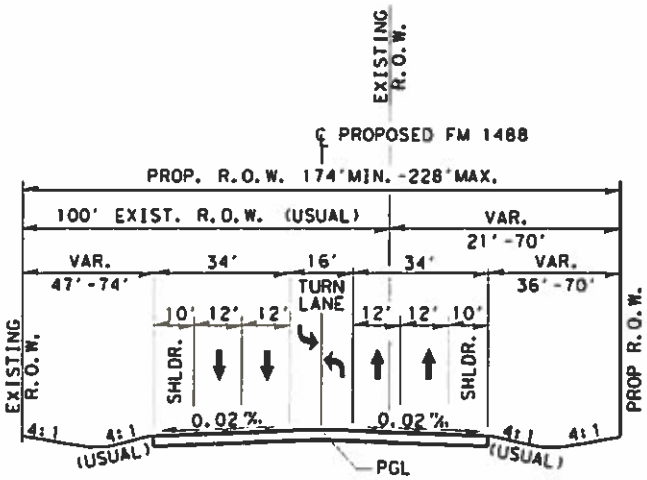
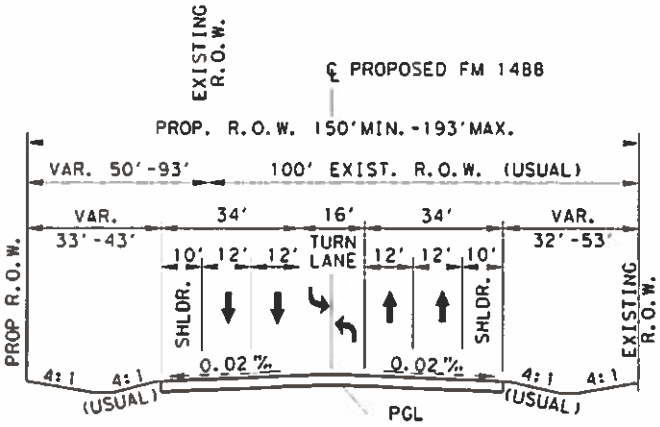
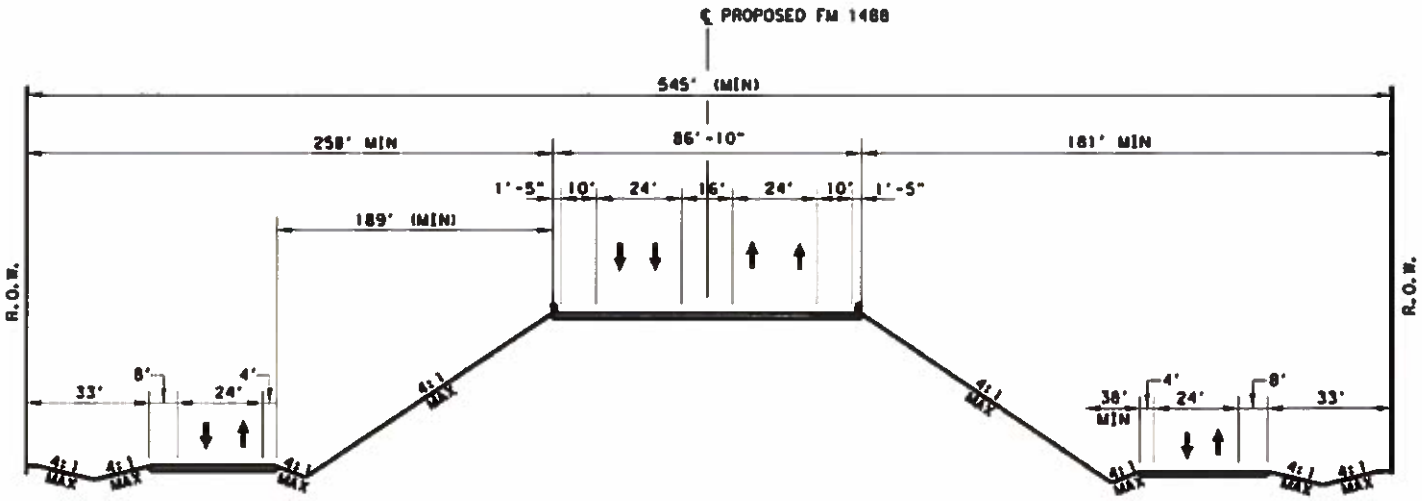


FM 1488 TYPICAL SECTION
(WITH 16' FLUSH MEDIAN)
FROM RAVENS WOOD TO MILL CREEK BAYOU



FM 1488 TYPICAL SECTION
(WITH 16' FLUSH MEDIAN)
FROM FM 149 TO COMMUNITY ROAD



FM 1488 OVERPASS AT FM 149

EXHIBIT 5
TYPICAL SECTIONS

SHEET 3 of 4

FM 1488
From Joseph Road to FM 2978
CSJs: 0523-08-007, 0523-09-009, 0523-10-016

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MONTGOMERY COUNTY, TEXAS

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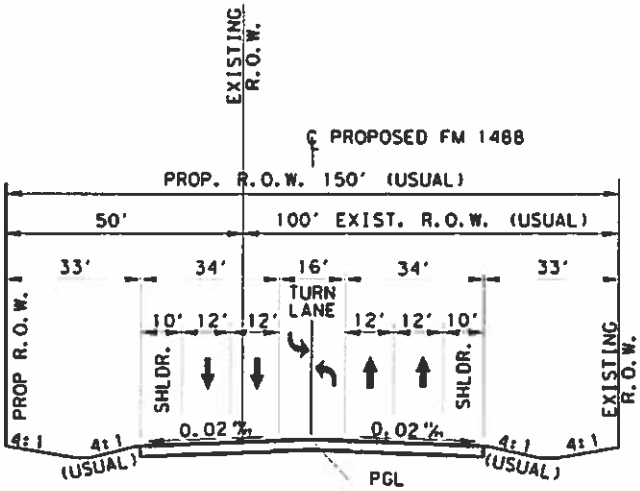
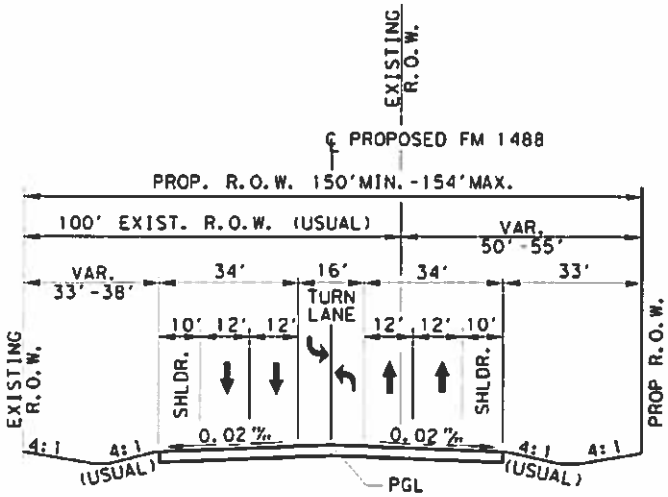


FM 1488 TYPICAL SECTION

(WITH 16' FLUSH MEDIAN)

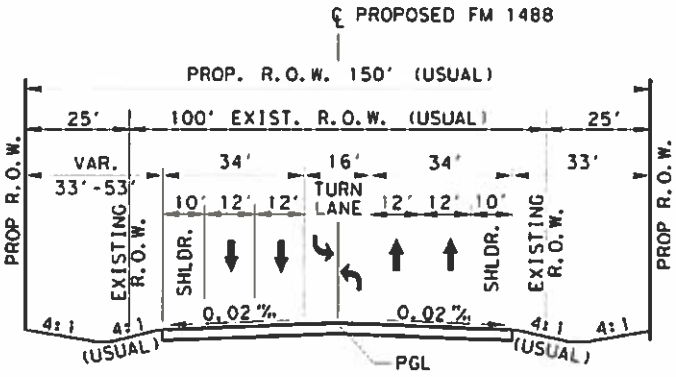
FROM COMMUNITY ROAD TO COUNTRY FOREST DRIVE



FM 1488 TYPICAL SECTION

(WITH 16' FLUSH MEDIAN)

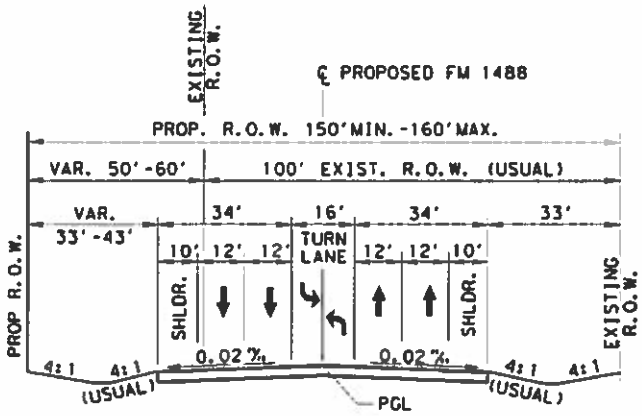
FROM MAPLELEAF TO CEDAR RIDGE



FM 1488 TYPICAL SECTION

(WITH 16' FLUSH MEDIAN)

FROM CREST LANE BLVD. TO CIMARRON WAY



FM 1488 TYPICAL SECTION

(WITH 16' FLUSH MEDIAN)

FROM CIMARRON WAY TO NICKABURR CREEK

EXHIBIT 5
TYPICAL SECTIONS

SHEET 4 of 4

FM 1488
From Joseph Road to FM 2978
CSJs: 0523-08-007, 0523-09-009, 0523-10-016

ENVIRONMENTAL ASSESSMENT
MONTGOMERY COUNTY, TEXAS

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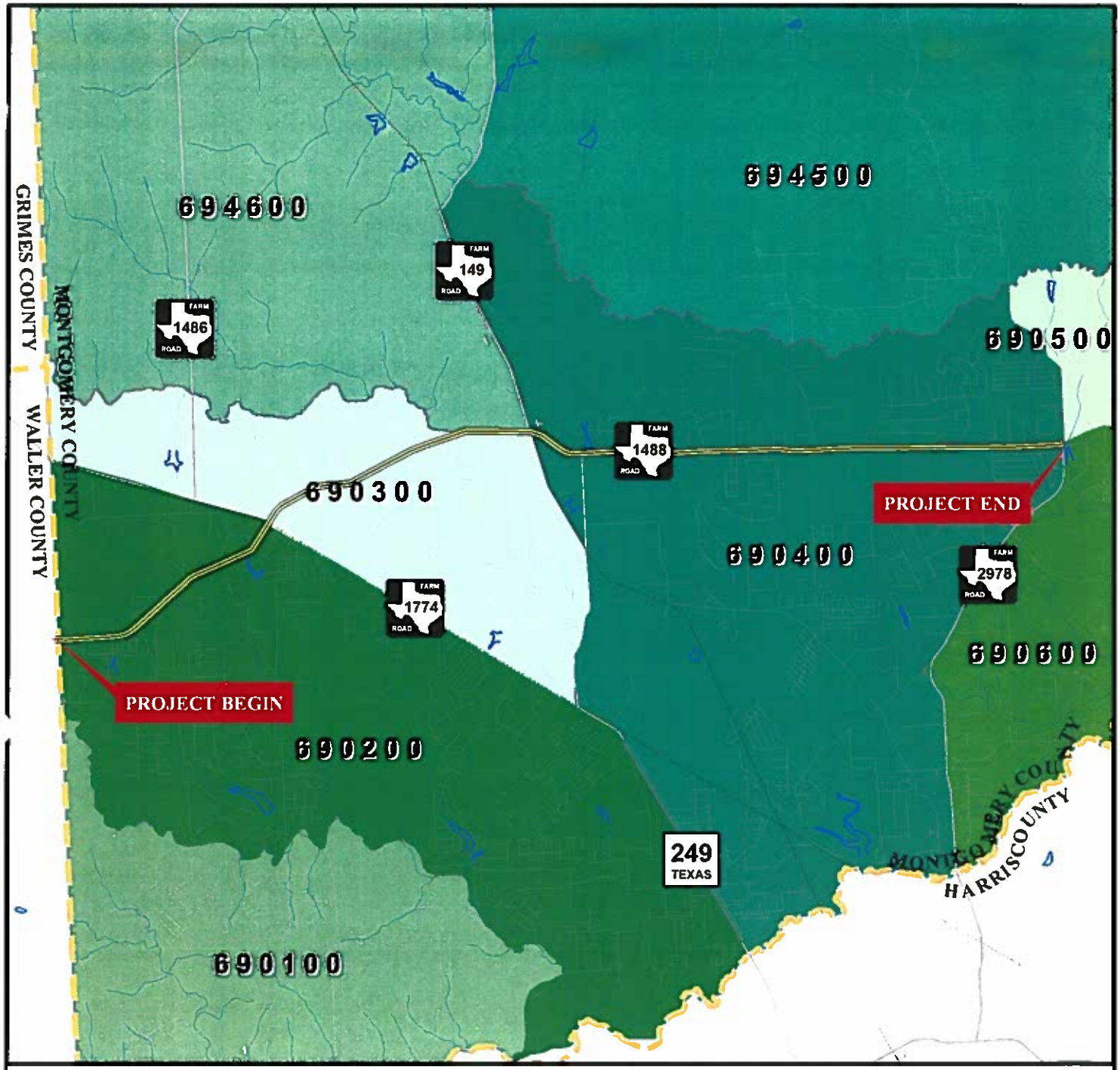

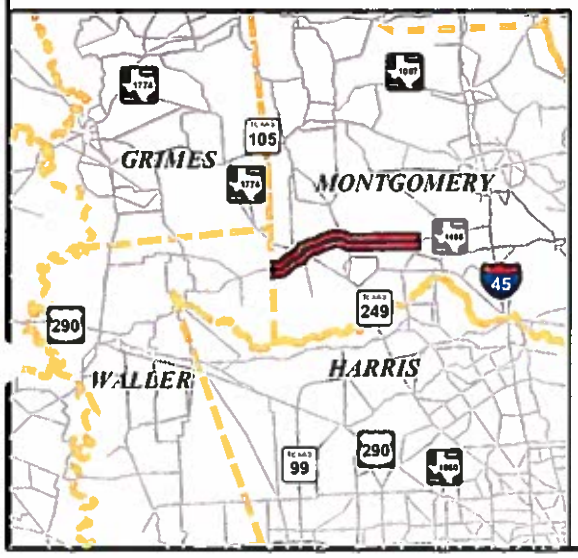

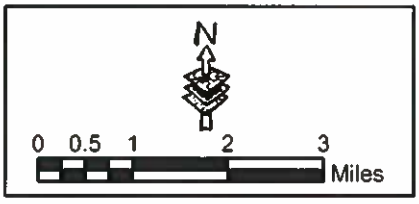

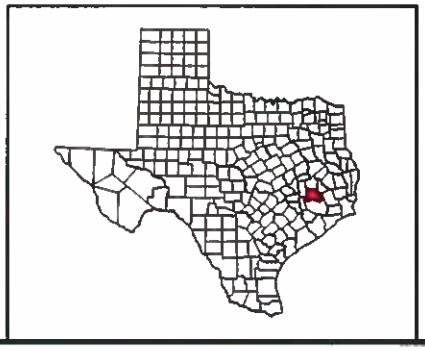

EXHIBIT 6
2000 CENSUS TRACTS

FM 1488
From Joseph Road to FM 2978
CSJs: 0523-08-007, 0523-09-009, 0523-10-016

ENVIRONMENTAL ASSESSMENT
MONTGOMERY COUNTY, TEXAS

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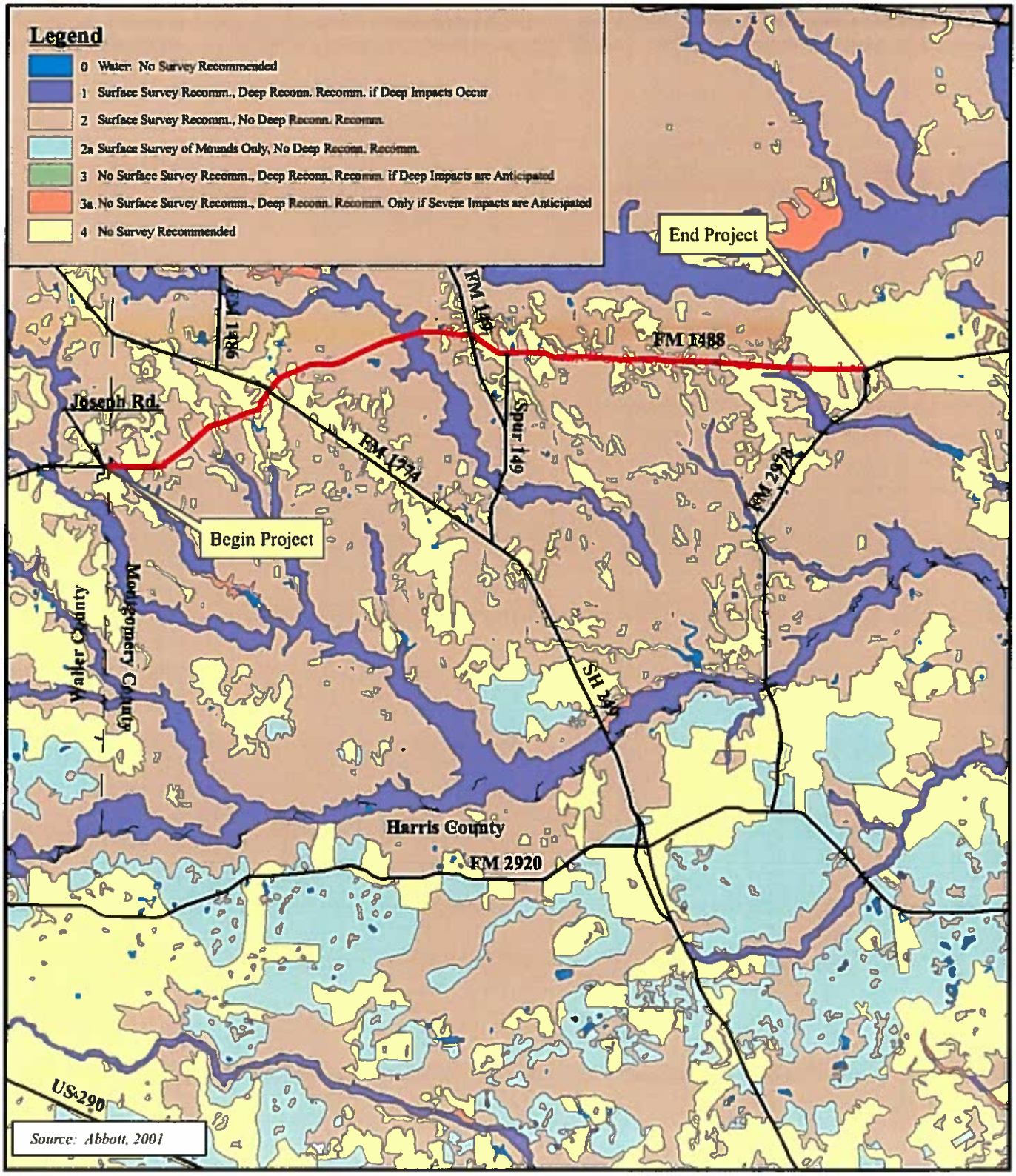
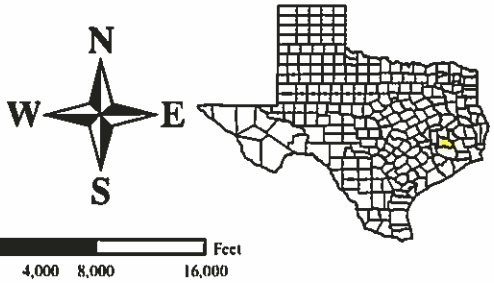




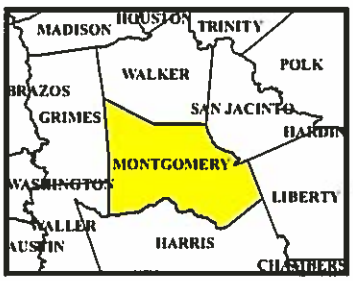


EXHIBIT 7

Potential Archeological Liability Map (PALM)

FM 1488

From Joseph Road to FM 2978
Montgomery County

CSJs: 0523-08-007
0523-09-009
0523-10-016

FM 1488: From Joseph Road to FM 2978
Site Photographs

Photo 1: View facing south of vegetation along the south side FM 1488, near Joseph Road.

Photo 2: View facing west of Wetland Area 1, south side of FM 1488.

FM 1488: From Joseph Road to FM 2978
Site Photographs

Photo 3: View facing southeast of Wetland Area 10, north side of FM 1488.

Photo 4: View facing west of commercial development along the south side of FM 1488 in Magnolia, Texas.

FM 1488: From Joseph Road to FM 2978
Site Photographs

Photo 5: View facing east along FM 1488 approaching the FM 1774 intersection.

Photo 6: View facing northwest of the FM 1488 bridge over Mill Creek, from the south side of FM 1488.

FM 1488: From Joseph Road to FM 2978
Site Photographs

Photo 7: View facing west of the FM 1488 intersection with Spur 149.

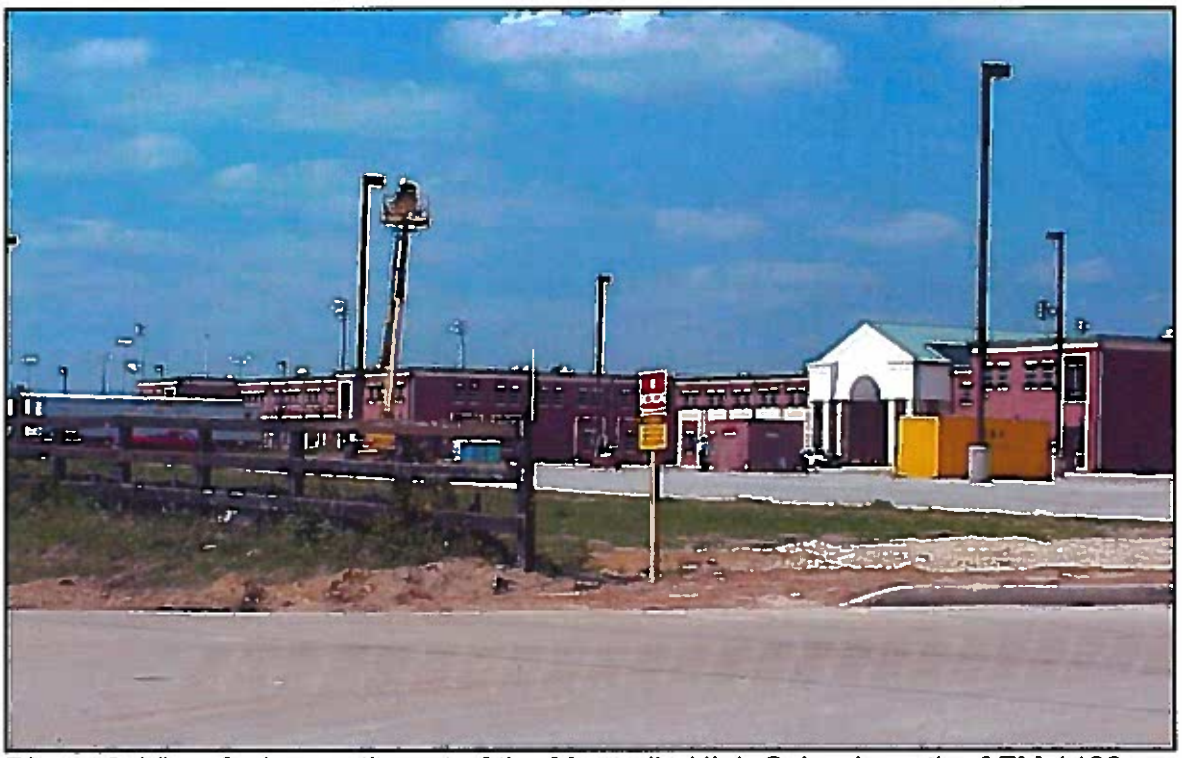
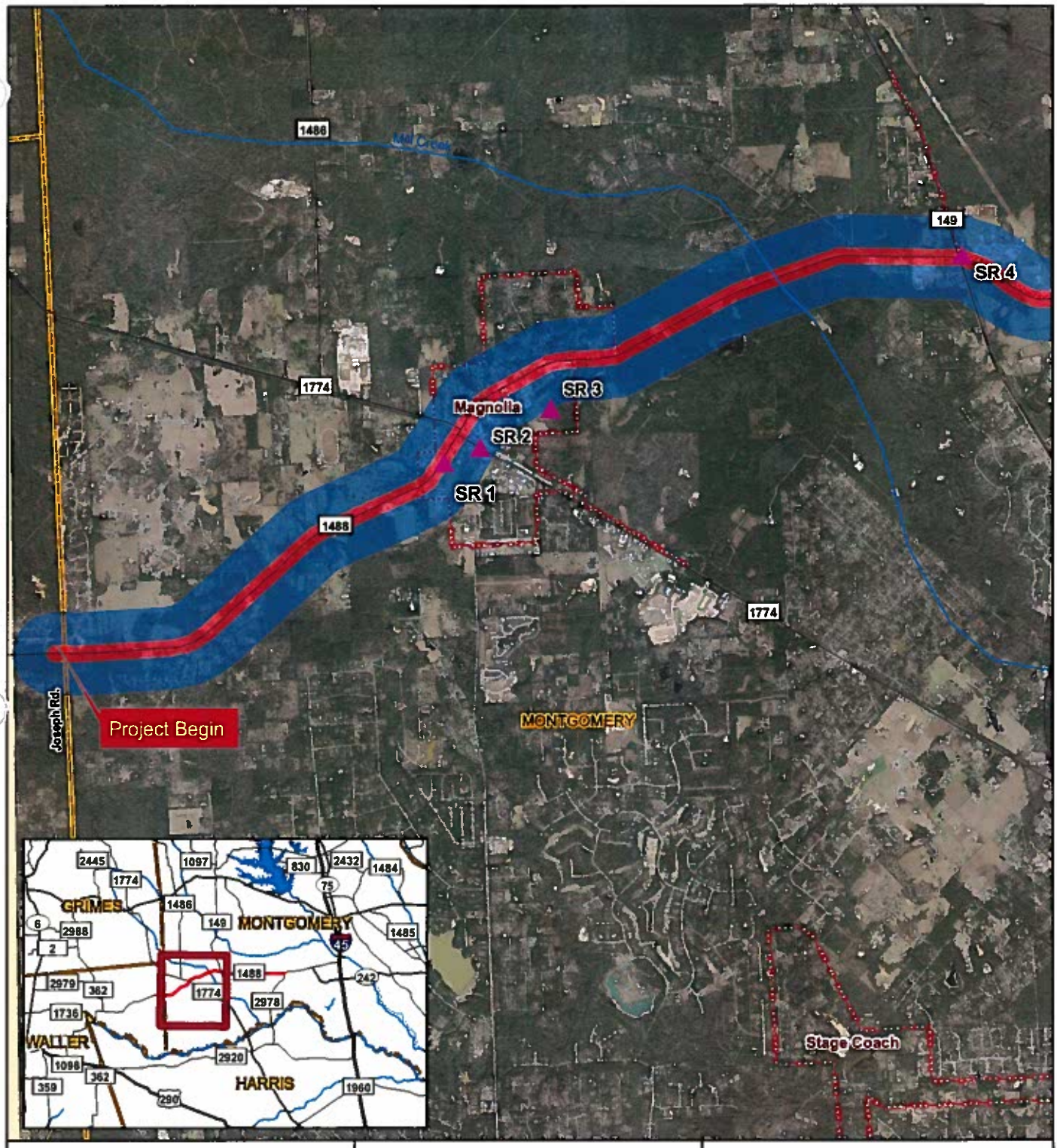


Photo 8: View facing northwest of the Magnolia High School, north of FM 1488 and east of the Spur 149 intersection.

FM 1488: From Joseph Road to FM 2978
Site Photographs

Photo 9: View facing east of the Bear Branch Elementary School, located on the south side of FM 1488 near Cimarron Way.

Photo 10: View facing north of Wetland Area 25, south side of FM 1488.



Legend

- Project Location
- US Highway
- State Highway
- FM Road
- County Boundary
- City Boundary
- Rivers/Streams
- Bodies of Water
- 100-m buffer
- 500-m buffer
- Sensitive Receptor (SR)

Miles
0 0.25 0.5 1

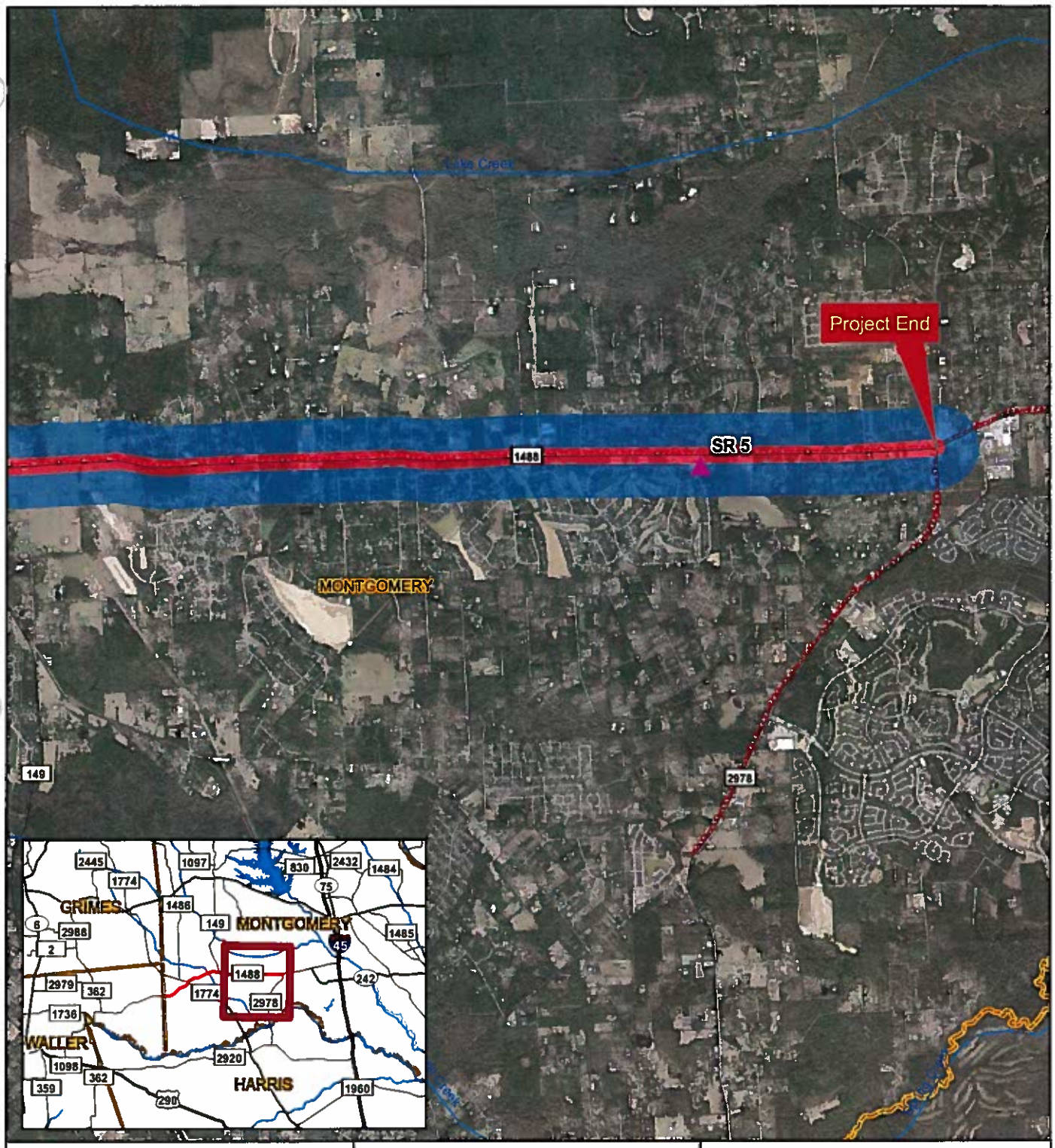
N W E S

Texas Department of Transportation

EXHIBIT 9
MSATs
SENSITIVE RECEPTOR MAP
Sheet 1 of 2

FM 1488
Joseph Road to FM 2978
CSJs: 0523-08-007; 0523-09-009; 0523-10-016; 0523-10-034

ENVIRONMENTAL ASSESSMENT
MONTGOMERY COUNTY, TEXAS



Legend

- Project Location
- US Highway
- State Highway
- FM Road
- County Boundary
- City Boundary
- Rivers/Streams
- Bodies of Water
- 100-m buffer
- 500-m buffer
- Sensitive Receptor (SR)

Texas Department of Transportation

0 0.25 0.5 1 Miles

N W E S

EXHIBIT 9
MSATs
SENSITIVE RECEPTOR MAP
Sheet 2 of 2

FM 1488
Joseph Road to FM 2978
CSJs: 0523-08-007; 0523-09-009; 0523-10-016; 0523-10-034

ENVIRONMENTAL ASSESSMENT
MONTGOMERY COUNTY, TEXAS

APPENDIX A
Agency Correspondence

Tx DOT RECEIVED
AUG 2 2 2007
HOUSTON MAIL OPERATIONS

HOUSTON-GALVESTON AREA COUNCIL
PO Box 22777 • 3555 Timmons Lane • Houston, Texas 77227-2777• 713/627-3200

August 21 - 2007

James Roscher
Texas Department of Transportation
Houston District
7721 Washington Avenue
Houston, TX 77007

REF. Letter of Waiver of Single Occupancy Vehicle (SOV) Analysis For:
CSJ#: 0523-08-007 – FM 1488: Joseph Road Till FM 1774
Lead Agency: TxDOT

Dear James Roscher.

The Congestion Management System (CMS) Roadway Network, as adopted in 1997 and later revised in 1998 and 2004, is defined as roadways classified principal (or major) arterials and above in the urban areas and selected major collectors and above in the rural area, as defined in the TxDOT Roadway Inventory Log (RI-2) and other roadways designated by the TPC. Added capacity roadway projects, NOT on the adopted CMS network, are not subject to Congestion Mitigation Analysis (CMA) requirements. In addition, added capacity projects on the adopted CMS network, which have current environmental findings (FONSI/ROD) are also exempt from CMA. Currents FONSI/ROD should be within the last three years. Also added-capacity projects less than 1-Mile are considered insignificant and again exempt from CMA. Moreover any project of the nature of Transportation Demand Management (TDM) or Transportation System Management (TSM) is considered waived from the requirements of CMS Plan.

H-GAC is issuing this Letter of Waiver (LOW) of CMA for the above referenced project, as it is not on the CMS Network (Other Undivided Arterial In Rural Area) and as such not requiring CMA. Please include this LOW in the Environmental Assessment (EA) document of this project.

If you have any questions about this CMA waiver and the CMS amendment, please contact me at (713) 993-4564.

Sincerely.

ILyas H. Choudry
Transportation Department H-GAC

SCANNED ON
AUG 2 2 2007
MAIL OPERATIONS HOUSTON

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AUG 2 2 2007
HOUSTON MAIL OPERATIONS

HOUSTON-GALVESTON AREA COUNCIL
PO Box 22777 • 3555 Timmons Lane • Houston, Texas 77227-2777• 713/627-3200

August 21 - 2007

James Roscher
Texas Department of Transportation
Houston District
7721 Washington Avenue
Houston, TX 77007

REF. Letter of Waiver of Single Occupancy Vehicle (SOV) Analysis For:
CSJ#: 0523-09-009 – FM 1488: FM 1774 Till W. Of FM 149
Lead Agency: TxDOT

Dear James Roscher.

The Congestion Management System (CMS) Roadway Network, as adopted in 1997 and later revised in 1998 and 2004, is defined as roadways classified principal (or major) arterials and above in the urban areas and selected major collectors and above in the rural area, as defined in the TxDOT Roadway Inventory Log (RI-2) and other roadways designated by the TPC. Added capacity roadway projects, NOT on the adopted CMS network, are not subject to Congestion Mitigation Analysis (CMA) requirements. In addition, added capacity projects on the adopted CMS network, which have current environmental findings (FONSI/ROD) are also exempt from CMA. Currents FONSI/ROD should be within the last three years. Also added-capacity projects less than 1-Mile are considered insignificant and again exempt from CMA. Moreover any project of the nature of Transportation Demand Management (TDM) or Transportation System Management (TSM) is considered waived from the requirements of CMS Plan.

H-GAC is issuing this Letter of Waiver (LOW) of CMA for the above referenced project, as it is not on the CMS Network (Other Undivided Arterial In Rural Area) and as such not requiring CMA. Please include this LOW in the Environmental Assessment (EA) document of this project.

If you have any questions about this CMA waiver and the CMS amendment, please contact me at (713) 993-4564.

Sincerely.

ILyas H. Choudry
Transportation Department H-GAC

SCANNED ON
AUG 2 2 2007
MAIL OPERATIONS HOUSTON

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August 21 - 2007

James Roscher
Texas Department of Transportation
Houston District
7721 Washington Avenue
Houston, TX 77007

REF. Letter of Waiver of Single Occupancy Vehicle (SOV) Analysis For:
CSJ#: 0523-10-016 – FM 1488: E. Of FM 149 Till FM 2978
Lead Agency: TxDOT

Dear James Roscher.

The Congestion Management System (CMS) Roadway Network, as adopted in 1997 and later revised in 1998 and 2004, is defined as roadways classified principal (or major) arterials and above in the urban areas and selected major collectors and above in the rural area, as defined in the TxDOT Roadway Inventory Log (RI-2) and other roadways designated by the TPC. Added capacity roadway projects, NOT on the adopted CMS network, are not subject to Congestion Mitigation Analysis (CMA) requirements. In addition, added capacity projects on the adopted CMS network, which have current environmental findings (FONSI/ROD) are also exempt from CMA. Currents FONSI/ROD should be within the last three years. Also added-capacity projects less than 1-Mile are considered insignificant and again exempt from CMA. Moreover any project of the nature of Transportation Demand Management (TDM) or Transportation System Management (TSM) is considered waived from the requirements of CMS Plan.

H-GAC is issuing this Letter of Waiver (LOW) of CMA for the above referenced project, as it is not on the CMS Network (Other Undivided Arterial In Rural Area) and as such not requiring CMA. Please include this LOW in the Environmental Assessment (EA) document of this project.

If you have any questions about this CMA waiver and the CMS amendment, please contact me at (713) 993-4564.

Sincerely.

ILyas H. Choudry
Transportation Department H-GAC

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August 21 - 2007

James Roscher
Texas Department of Transportation
Houston District
7721 Washington Avenue
Houston, TX 77007

REF. Letter of Waiver of Single Occupancy Vehicle (SOV) Analysis For:
CSJ#: 0523-10-034 – FM 1488: W. Of FM 149 Till E. Of FM 149
Lead Agency: TxDOT

Dear James Roscher.

The Congestion Management System (CMS) Roadway Network, as adopted in 1997 and later revised in 1998 and 2004, is defined as roadways classified principal (or major) arterials and above in the urban areas and selected major collectors and above in the rural area, as defined in the TxDOT Roadway Inventory Log (RI-2) and other roadways designated by the TPC. Added capacity roadway projects, NOT on the adopted CMS network, are not subject to Congestion Mitigation Analysis (CMA) requirements. In addition, added capacity projects on the adopted CMS network, which have current environmental findings (FONSI/ROD) are also exempt from CMA. Currents FONSI/ROD should be within the last three years. Also added-capacity projects less than 1-Mile are considered insignificant and again exempt from CMA. Moreover any project of the nature of Transportation Demand Management (TDM) or Transportation System Management (TSM) is considered waived from the requirements of CMS Plan.

H-GAC is issuing this Letter of Waiver (LOW) of CMA for the above referenced project, as it is not an added-capacity project: It is in fact a Transportation System Management (TSM) Grade Separation Project and as such not requiring CMA. Please include this LOW in the Environmental Assessment (EA) document of this project.

If you have any questions about this CMA waiver and the CMS amendment, please contact me at (713) 993-4564.

Sincerely.

ILyas H. Choudry
Transportation Department H-GAC

SCANNED ON AUG 22 2007 MAIL OPERATIONS HOUSTON

DPD

Roger Moore, Moore Archeological Consulting Inc.

Texas Department of Transportation

DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-8588

December 15, 2004

Section 106/Antiquities Code of Texas: Individual Coordination Letter
FM 1488: Intensive survey from FM 2978 to Montgomery/Waller County Line
Houston District; Montgomery County (0523-08-007, 0523-09-009, & 0523-10-016)

Dr. James E. Bruseth
Department of Antiquities Protection
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

Dear Dr. Bruseth:

The proposed project will be undertaken with Federal funding. In accordance with Section 106 (and the Programmatic Agreement among the TxDOT, FHWA, the Advisory Council on Historic Preservation, and the THC) and the Antiquities Code of Texas (and the Memorandum of Understanding between TxDOT and the THC), this letter continues consultation for the proposed undertaking.

The proposed project would widen and improve FM 1488, from FM 2978 in Montgomery County westward to the Waller County line, in Montgomery County, Texas. Moore Archeological Consulting, Inc. (MAC) conducted a 100% intensive pedestrian survey over the 16 mile length of this proposed project. The report of these efforts was submitted directly to your office on July 23, 2004 by the consultant instead of through TxDOT. We have not been able to confirm that the report was received by your office. On November 16, 2004 TxDOT submitted an addendum to this report, erroneously thinking the original draft was in your possession. THC concurred with recommendations made in the addendum (see attached).

Attached to this letter is 1) the draft final intensive survey report prepared by MAC and 2) the addendum to that report. In the MAC report, the consultant recommended that the portion of the APE that had been surveyed did not require any additional archeological work. The one archeological site encountered was not recommended for further archeological work since delineation of the site revealed that the one artifact recovered, a projectile point, was in fact an isolated find. However, the report recommends additional work for the remainder of the proposed project area in those areas where right-of-entry (ROE) had not been obtained. In my review of this report I inquired why no observations had been made concerning the integrity and potential of these areas without ROE. MAC addressed this question by preparing an addendum that evaluated the portions of the APE where ROE was denied. TxDOT recommends that the inventory of the proposed project area is adequate for the whole project APE since there is very low potential for intact, significant archeological properties within the APE and no further archeological work is needed.

We request your concurrence that the proposed project would have no effect on any archeological historic properties, SAL or National Register properties and that the project is allowed to proceed with no further need for archeological work or consultation with your office. In the unlikely event of an accidental discovery of archeological deposits, work in the immediate area of discovery will cease, TxDOT archeologists will be contacted, and the accidental discovery procedures will be implemented as outlined in, and in accordance with, the provisions as stated in the PA between the Advisory Council, the Federal Highway Administration, TxDOT, and the THC and the MOU between TxDOT and the THC. Please review the recommendations in this letter and consider its attachments. If you agree that a finding of "no historic properties affected" is appropriate, please sign below to indicate your concurrence. Thank you for your consideration in this matter. If you have any questions or further need of assistance, please contact Allen Bettis of the TxDOT Archeological Studies Program at (512) 416-2747.

Sincerely,

Allen C. Bettis Jr.
Archeological Studies Program
Environmental Affairs Division

Attachment
cc: Roger Moore, Moore Archeological Consulting, Inc. -Houston
Craig Rollins-Houston District OL ACB

Concurrence by: 12-17-04
for F. Lawerence Oaks, State Historic Preservation Officer Date

Texas Department of Transportation
DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-8585

December 8, 2005

SECTION 106: DETERMINATION OF NATIONAL REGISTER ELIGIBILITY

Montgomery County (Houston District)
CSJ# 0523-08-007, 0523-09-009, 0523-10-016

Farm to Market Road 1488 from Joseph Road to Farm to Market Road 2978

Ms. Adrienne Campbell
History Programs
Texas Historical Commission
Austin, Texas 78711

DEC 08 2005
Texas Historical Commission

Dear Ms. Campbell:

In accordance with 36 CFR 800 and the Statewide Programmatic Agreement for Cultural Resources, we are initiating Section 106 consultation for the above reference project, which will be carried out with federal funding. We request agency review regarding the National Register eligibility of properties located within the proposed project's area of potential effects (APE).

INTRODUCTION

The Texas Department of Transportation (TxDOT), Houston District, proposes to upgrade and widen approximately 16 miles of existing Farm to Market Road (FM) 1488 roadway from Joseph Road to FM 2978 in Montgomery County, Texas. The existing FM 1488 roadway is a two lane undivided roadway and the proposed undertaking calls for widening it to a four lane roadway with a continuous center turn lane. The proposed project requires **127.8 acres of new right-of-way**. An attached map shows the project location.

IDENTIFICATION EFFORTS TO IDENTIFY HISTORIC PROPERTIES

The methodology used to identify recorded and potentially eligible properties located in the Area of Potential Effect (APE) included a records search of public records and a windshield survey. Background research was conducted at the Texas Historical Commission's (THC) *Texas Historic Sites Atlas* to identify properties listed on the National Register of Historic places (NRHP) and State Archeological Landmarks (SAL), Recorded Texas Historic Landmarks (RTHL) as well as Official State Historical Markers (OSHM). The record search revealed no previously recorded NRHP, SAL or RTHL properties were identified located within the project APE. One OSHM, Site #5, which commemorates the history of Magnolia, Texas is located within the APE. This OSHM will not be impacted or relocated as part of the proposed undertaking. The APE for the project was determined to be 500-feet from the existing right-of-way. A site visit conducted by TxDOT personnel revealed **forty-four** historic-age resources (built in or prior to 1957) are located within the APE.

DETERMINATIONS OF NATIONAL REGISTER ELIGIBILITY

I have evaluated forty-four sites through application of the Criteria of Eligibility for listing in the NRHP and I have determined that all the inventoried resources are **not eligible** for the NRHP. These properties are **not eligible** for inclusion in the register, as they do not have associations with significant historical figures or events. These resources are ubiquitous and they do no clearly reflect the distinctive characteristic of type, period, method of construction, work of a master, or high artistic value. Additionally, the properties evidence unsympathetic alterations, which have compromised their integrity, such as Site #6, #10, #12, #13, and #15.

CONCLUSION

In accordance with 36 CFR 800 and the Programmatic Agreement, I hereby request your signed concurrence with these determinations of eligibility.

Thank you for your cooperation in this federal review process. If you have any questions or comments concerning these evaluations, please call me at 416-2628.

Sincerely,

Lisa J. Hart

Lisa J. Hart, Supervisor
Historical Studies Branch
Environmental Affairs Division

LJH: mrf

Attachments

CONCUR
NO HISTORIC PROPERTIES WITHIN THE APE

NAME: _____ DATE: 12-15-05

for F. Lawerence Oaks, State Historic Preservation Officer

RECEIVED

NOV 2 4 2004

HNTB

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1229
GALVESTON, TEXAS 77553-1229

November 23, 2004

REPLY TO
ATTENTION OF:

Compliance Section

SUBJECT: D-16324; FM 1488 (Joseph Road to FM 2978), Montgomery County, Texas

Ms. Debbie Taylor
The HNTB Companies
2 Northpoint Drive, Suite 650
Houston, Texas 77060

Dear Ms. Taylor:

This concerns your verification request for the expansion of a 16-mile segment of FM 1488. The proposed project will be in the existing right-of-way of FM 1488 between Joseph Road and FM 2978 on FM 1488 in Montgomery County, Texas. The wetland delineation report was submitted on behalf of Montgomery County and the Texas Department of Transportation.

Based on your November 1, 2004 revised wetland delineation report and our October 21, 2004 site visit, we concur that the site contains a total of 1.41-acres of waters of the United States subject to our jurisdiction. Specifically, the area contains 0.62-acre of adjacent wetlands and 0.79-acre waters of United States. Therefore, any discharge of dredged or fill material (including mechanized land clearing) into these areas will require a Department of the Army permit prior to the initiation of any work. The wetlands met the criteria of the 1987 Wetland Delineation Manual and are subject to Corps jurisdiction pursuant to Section 404 of the Clean Water Act.

This determination has been conducted to identify the limits of the Corps Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

This approved jurisdictional determination, based on the information provided with your request, is valid for 5 years from the date of this letter, unless new information warrants a revision of the determination prior to the expiration date. Please reference determination file number D-16324 in future correspondence pertaining to this subject. The enclosed sheets

Applicant: **Montgomery County** Agent: **The HNTB Companies**	File Number: **D-16324**	Date: **11-23-04**

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of Permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/inet/functions/cw/cecwo/reg/ or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved jurisdictional determination (JD) or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

HNTB ARCHITECTS ENGINEERS PLANNERS

2 Northpoint Drive
Suite 650
Houston, Texas
77060
(281) 931-2700
Fax (281) 931-0932
www.hntb.com

February 20, 2004

Ms. Gertie Spencer
Montgomery County Historical Commission
587 Texas Park
Conroe, TX 77302

Re: FM 1488 Roadway Expansion Project
Montgomery County, TX
From: Montgomery/Waller County Line
To: Intersection with FM 2978
CSJ: 0523-08-007, 0523-09-009, 0523-10-016

Dear Ms. Spencer:

The HNTB Corporation, on behalf of Montgomery County and the Texas Department of Transportation (TxDOT), is in the process of preparing an Environmental Assessment for proposed roadway improvements along FM 1488 from the Montgomery/Waller County line to the intersection with FM 2978, in Montgomery County. FM 1488 currently consists of a two-lane roadway facility and is proposed for expansion to a four-lane facility with a continuous, center left turn lane. The total project length is approximately 15 miles and will require up to 50 feet of new right-of-way adjacent to the existing TxDOT right-of-way along this corridor. Please see the attached vicinity map.

Your knowledge concerning the location of any historically or archaeologically significant properties in the subject area which might be eligible for inclusion in, or under nomination to, the National Register of Historic Places would be appreciated. If the project area under consideration contains no historical or archaeological sites, your signature below would be sufficient verification.

If you should need further information concerning this project, please feel free to contact me at (281) 931-2715 or Fred Land at (281) 931-2747.

Sincerely,

Debbie C Taylor

Ms. Debbie Taylor
Director of Environmental Planning
HNTB Corporation

Cc: Michael Beitler, P.E. - Montgomery County, Texas
Ms. Melba Alfred - Texas Department of Transportation Houston District

Gertie Spencer
Montgomery County Historical Commissioner

2-25-04
Date

HNTB ARCHITECTS ENGINEERS PLANNERS

2 Northpoint Drive
Suite 650
Houston, Texas
77060
(281) 931-2700
Fax (281) 931-6932
www.hntb.com

October 1, 2004

Mr. Frederick T. Werner
U.S. Fish and Wildlife Service
17629 El Camino Real, Suite 211
Houston, Texas 77058

Re: FM 1488: Joseph Road (Waller County line) to FM 2978
Roadway Expansion Project
Montgomery County, TX
CSJs: 0523-08-007, 0523-09-009, 0523-10-016

Dear Mr. Werner:

The HNTB Corporation, on behalf of Montgomery County and the Texas Department of Transportation (TxDOT), is in the process of preparing an Environmental Assessment for proposed roadway improvements to FM 1488 from Joseph Road (Waller County line) to FM 2978 in Montgomery County.

In response to your letter dated October 6, 2003, HNTB Corporation performed extensive surveys as per the survey protocol in Appendix 4 of the *Recovery Plan for the Red-cockaded Woodpecker (Picoides borealis), Second Revision*, and per conversations with Mr. Jeff Reid of the East Texas Sub Office of the USFWS.

Please find enclosed a copy of the report summarizing the results of the Red-cockaded Woodpecker Survey performed for this project.

HNTB Corporation, Montgomery County, and TxDOT have made a "no effect" determination and request concurrence from the USFWS. Your verification and concurrence with our determination of "no effect" to threatened/endangered species would be provided by affixing your stamp and signature on this letter and returning it to HNTB Corporation.

If you should need further information concerning this project, please feel free to contact me at (281) 931-2715 or Mr. Fred Land at (281) 931-2711.

Sincerely,

Debbie C. Taylor

Ms. Debbie Taylor
Director of Environmental Planning
HNTB Corporation

Attachment: Red-cockaded Woodpecker Survey Report
Cc: Michael Beitler, P.E. – Montgomery County, Texas
Jeff Reid – US Fish and Wildlife Service, East Texas Sub Office, Lufkin
Craig Rollins – Texas Department of Transportation, Houston District

TEXAS PARKS & WILDLIFE

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EXECUTIVE DIRECTOR

March 19, 2004

Ms. Debbie Taylor
Director of Environmental Planning
HNTB Architects, Engineers, and Planners
2 Northpoint Drive, Suite 650
Houston, TX 77060

RE: Proposed Roadway Expansion: FM 1488 from Montgomery/Waller County Line to Intersection with FM 2978, Montgomery County, CSJs 0523-08-007, 0523-09-009, 0523-10-016

Dear Ms. Taylor:

Thank you for providing the additional information requested: copy of the response to early coordination from the U.S. Fish and Wildlife Service (USFWS) concerning survey information for the endangered Red-cockaded Woodpecker and an aerial photograph of the project area.

The proposed roadway expansion will impact pine and hardwood trees along the route and will cross Mill Creek where impacts will involve a riparian area. Therefore, as we discussed during our telephone conversation yesterday, the Texas Parks and Wildlife Department has concerns regarding mitigation for the loss of this vegetation as well as concurrence with the USFWS concerning a survey to determine possible suitable nesting or foraging habitats for the Red-cockaded Woodpecker.

Information regarding sensitive species and natural communities near the proposed project area can be obtained by contacting Ms. Celeste Brancel in Austin (512) 912-7021.

The Department appreciates the opportunity to participate in early coordination of this project. If I can be of further assistance, please contact me in Tyler (903) 566-2162.

Sincerely,

Ray C. Telfair II

Ray C. Telfair II, Ph.D.
Wildlife Habitat Assessment Program
Wildlife Division

RCT

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Recvd 3/24/04 DC

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Suite 650
Houston, Texas
[illegible]
(281) 931-2700
fax (281) 931-[illegible]
www.hntb.com

March 5, 2004

Dr. Telfair
Texas Parks and Wildlife Department
Management and Research Station
11942 FM 847
Tyler, Texas 75707

Re: FM 1488 Roadway Expansion Project
Montgomery County, TX
From: Joseph Road
To: Intersection with FM 2978
CSJ: 0523-08-007, 0523-09-009, 0523-10-016

Dear Dr. Telfair:

The HNTB Corporation, on behalf of Montgomery County and the Texas Department of Transportation (TxDOT), is in the process of preparing an Environmental Assessment for proposed roadway improvements along FM 1488 from Joseph Road, near the Montgomery/Waller County line, to the intersection with FM 2978, in Montgomery County. FM 1488 currently consists of a two-lane roadway facility and is proposed for expansion to a four-lane facility with a continuous, center left turn lane. The total project length is approximately 15 miles and will require up to 50 feet of new right-of-way adjacent to the existing TxDOT right-of-way along this corridor. Please see the attached vicinity map.

As per your recent request for additional information on the proposed project, we are forwarding you the response to early coordination from the USFWS as well as an aerial photograph of the project area. We welcome your input on this project. Any information or knowledge you have concerning the location of any environmentally sensitive areas along the project corridor would be very useful to us.

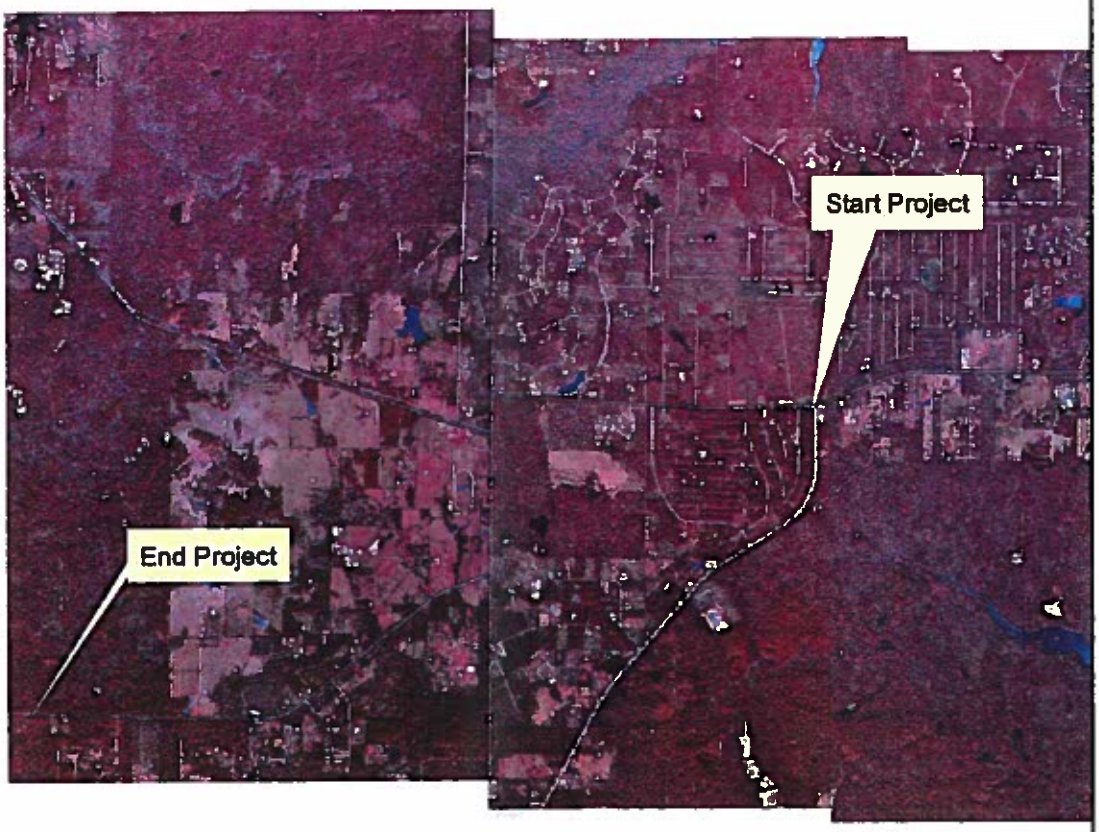
If you should need further information concerning this project, please feel free to contact me at (281) 931-2715 or Fred Land at (281) 931-2711.

Sincerely,

Debbie C. Taylor

Ms. Debbie Taylor
Director of Environmental Planning
HNTB Architects, Engineers, Planners

Attachment: Location Map, Aerial Photograph, USFWS Coordination Letter
Cc: Mr. Craig Rollins, Texas Department of Transportation Houston District
Ms. Melba Alfred, Texas Department of Transportation Houston District
Mr. Mike Beitler, P.E. Montgomery County



HNTB

Texas Department of Transpo

EXHIBIT1
AERIAL MAP

Texas Department of Transportation
FM 1488
from Joseph Road to FM 2978
Montgomery County, Texas

CSJ: 0523-08-007
CSJ: 0523-09-009
CSJ: 0523-10-016

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051
281/286-8282 / (FAX) 281/488-5882

RECEIVED
NOV 0 2 2004
HNTB

October 29, 2004

Debbie Taylor
HNTB
2 Northpoint Drive, Suite 650
Houston, Texas 77060

Dear Ms. Taylor:

This responds to your October 1, 2004 letter requesting Service concurrence with your "no effect" determination for TxDOT's proposed expansion of FM 1488 from Joseph Road to FM 2978, Montgomery County, Texas. Due to a recent increase in the number of requests received, we no longer concur with "no effect" determinations.

Under Section 7(a)(2) of the Endangered Species Act, the federal action agency, or its designated representative, is responsible for determining the effects of their actions on listed species or critical habitat (50 CFR § 402.14 [a]) and is ultimately responsible for section 7 obligations. If the action agency determines its proposed action will have no effect on federally listed species or critical habitat, no contact with the Service is necessary. However, you should maintain a complete record of your evaluation, including steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles. The Service's Consultation Handbook (http://endangered.fws.gov/consultations/s7hndbk/s7hndbk.htm) is available online for further information on definitions and process.

If you have any questions, or if we can be of further assistance, please contact Catherine Yeargan at 281-286-8282.

Sincerely,

Frederick T. Werner
Assistant Supervisor, Clear Lake ES Field Office

cc:
Jeff Reid, East Texas Field Office, Lufkin, Texas

TAKE PRIDE IN AMERICA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051
281/286-8282 / (FAX) 281/488-5882

October 6, 2003

Debbie Taylor
HNTB
2 Northpoint Drive, Suite 650
Houston, Texas 77060

Dear Ms. Taylor:

This responds to your letter dated September 15, 2003, requesting information on behalf of Montgomery County and the Texas Department of Transportation for the proposed widening of FM 1488 from the Montgomery/Waller County line to the intersection with FM 2978 in Montgomery County, Texas. FM 1488 is currently a two-lane roadway facility, and is proposed for expansion to a four-lane facility with a continuous, center left turn lane. The total project length is approximately 15 miles and will require up to 50 feet of additional right-of-way.

Based upon a review of U.S. Fish and Wildlife Service files and the project information you provided, the Service is unable to concur with your determination that the proposed project would have "no effect" on threatened and endangered species.

U.S. Fish and Wildlife Service files indicate that populations of the endangered red-cockaded woodpecker (RCW), *Picoides borealis*, occur to the north and east of this location. However, no information specific to your project site was located. If suitable nesting or foraging habitat occurs within the project impact area, and within ½ mile of the project site, a qualified individual would need to conduct a survey to determine the presence or absence of RCWs.

Guidelines for Surveys to Assess Potential Project Impacts to Red-cockaded Woodpecker Nesting and/or Foraging Habitat are enclosed for your use. This survey protocol can be found in Appendix 4 of the *Recovery Plan for the Red-cockaded Woodpecker (Picoides borealis), Second Revision*, available online at < http://rcwrecovery.fws.gov/recoveryplan.htm >. The East Texas Sub Office should be contacted for additional information on RCWs at (936) 639-8546.

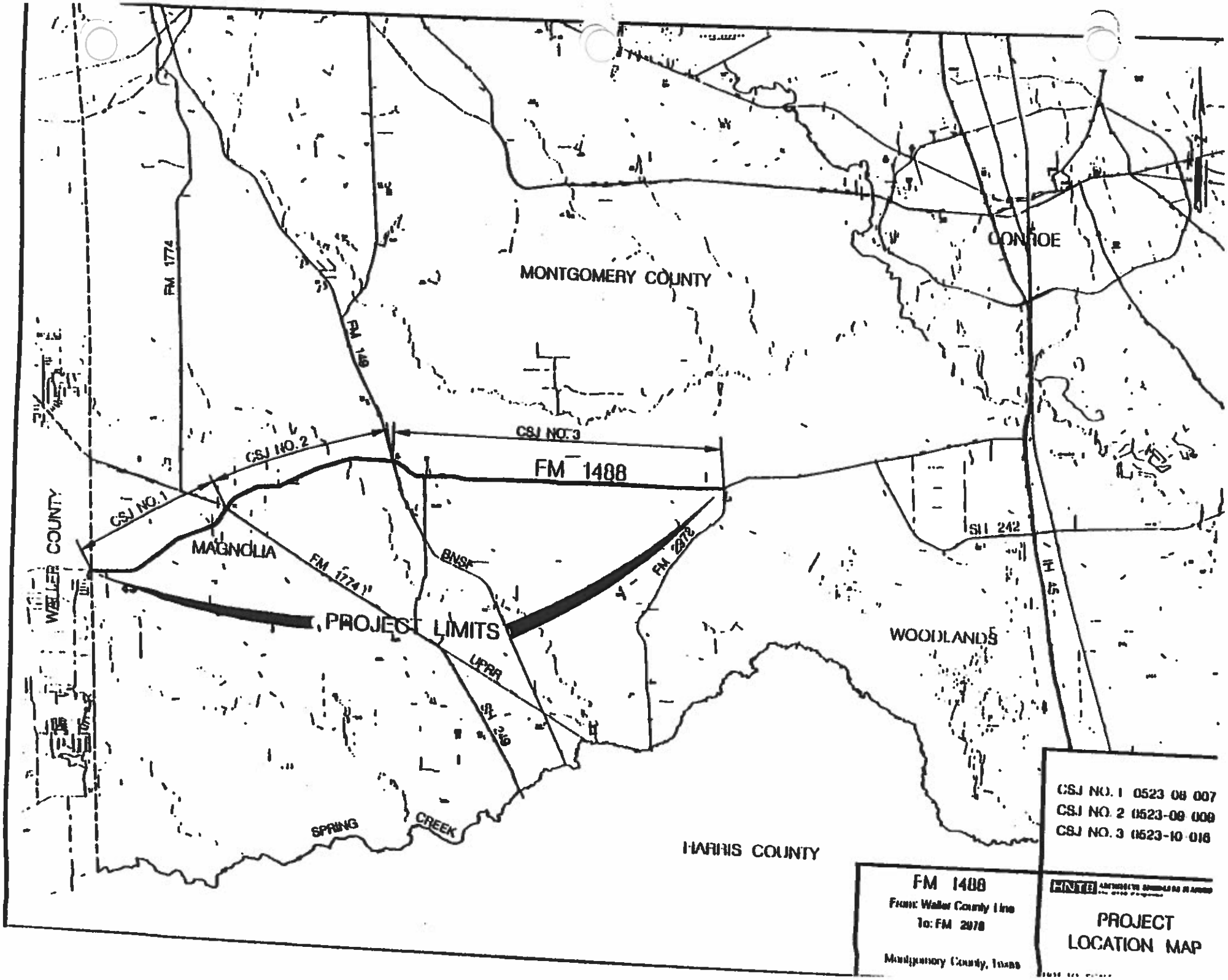
If you have any questions or if we can be of further assistance, please contact Catherine Yeargan at 281/286-8282.

Sincerely,

Frederick T. Werner
Assistant Field Supervisor, Clear Lake ES Field Office

Enclosure
cc: Jeff Reid, US Fish and Wildlife, East Texas Sub Office, Lufkin, TX

TAKE PRIDE IN AMERICA


MONTGOMERY COUNTY
CONROE
WOODLANDS
HARRIS COUNTY
WELLER COUNTY
MAGNOLIA
FM 1774
FM 149
FM 1488
FM 2978
CSJ NO. 1
CSJ NO. 2
CSJ NO. 3
PROJECT LIMITS
BNSF
UPRR
SH 242
SH 249
IH 45
SPRING CREEK
CSJ NO. 1 0523 08 007
CSJ NO. 2 0523-09 009
CSJ NO. 3 0523-10 016
FM 1488
From: Waller County Line
To: FM 2978
Montgomery County, Texas
HNTB
PROJECT LOCATION MAP

HNTB ARCHITECTS ENGINEERS PLANNERS

2 Northpoint Drive
Suite 650
Houston, Texas
[illegible]
(281) 931-2700
Fax (281) 931-0932
www.hntb.com

September 15, 2003

Mr. Carlos H. Mendoza
U.S. Fish and Wildlife Service
17629 El Camino Real, Suite 211
Houston, Texas 77058

Re: FM 1488 Roadway Expansion Project
Montgomery County, TX
From: Montgomery/Waller County Line
To: Intersection with FM 2978
CSJ: 0523-08-007, 0523-09-009, 0523-10-016

Dear Mr. Mendoza:

The HNTB Corporation, on behalf of Montgomery County and the Texas Department of Transportation (TxDOT), is in the process of preparing an Environmental Assessment for proposed roadway improvements to FM 1488 from the Montgomery/Waller County line to the intersection with FM 2978, in Montgomery County. FM 1488 currently consists of a two-lane roadway facility and is proposed for expansion to a four-lane facility with a continuous, center left turn lane. The total project length is approximately 15 miles and will require up to 50 feet of new right-of-way adjacent to the existing TxDOT right-of-way along this corridor. Please see the attached vicinity map.

This letter is in reference to a determination of "no effect" on threatened or endangered wildlife and vegetation species in the proposed project area as listed below.

Wildlife Species	Common Name	Threatened/Endangered
Haliaeetus leucocephalus	Bald Eagle	Threatened
Picoides borealis	Red-cockaded Woodpecker	Endangered

Your verification and concurrence with our determination of "no effect" to threatened/endangered species would be provided by affixing your signature in the space provided below.

If you should need further information concerning this project, please feel free to contact me at (281) 931-2715 or Fred Land at (281) 931-2711.

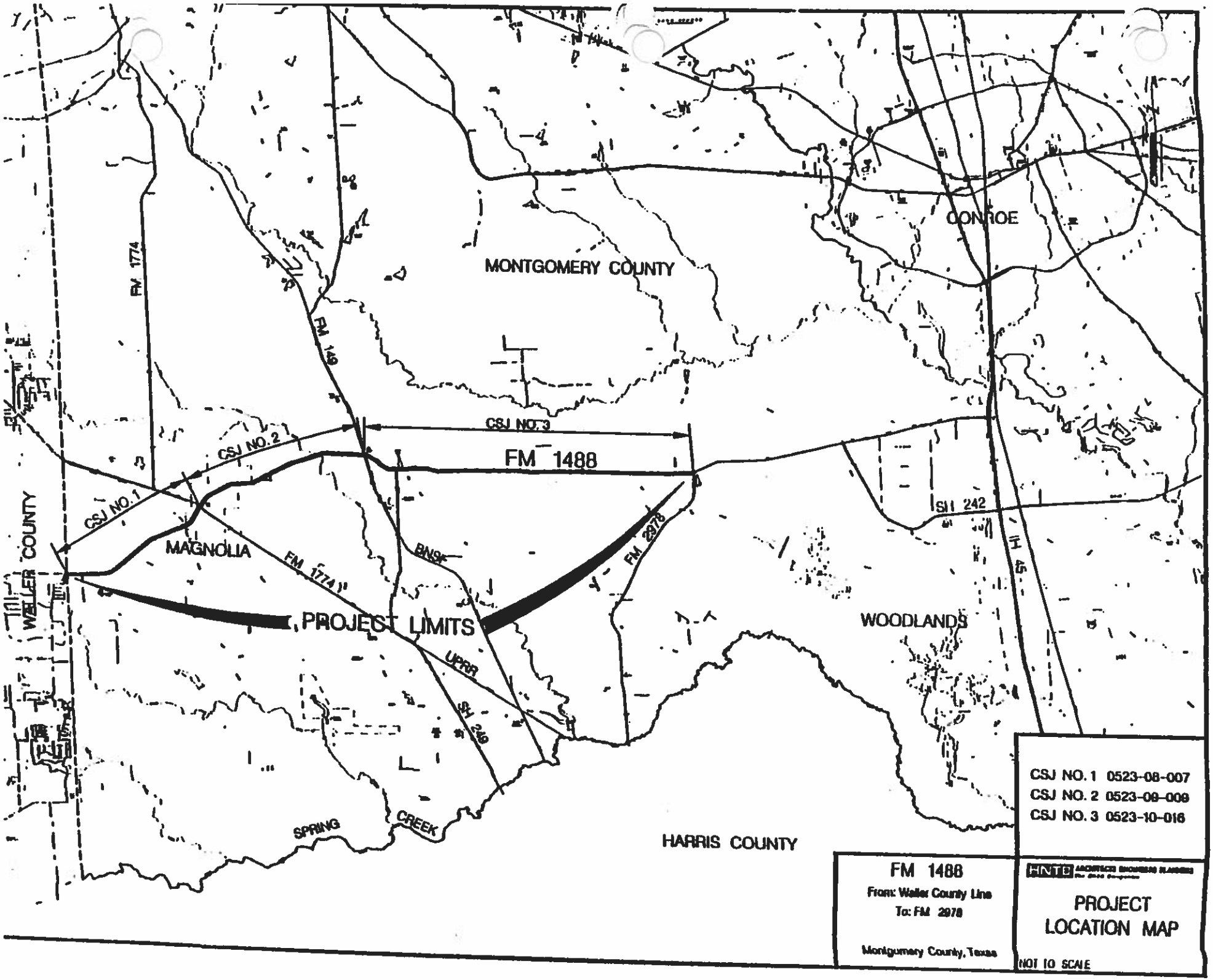
Sincerely,

Ms. Debbie Taylor
Director of Environmental Planning
HNTB Corporation

Attachment: Location Map
Cc: Michael Beitler, P.E. – Montgomery County, Texas
Ms. Melba Alfred - Texas Department of Transportation Houston District

U.S. Fish and Wildlife Service Representative

Date


MONTGOMERY COUNTY
CONROE
FM 1774
FM 149
CSJ NO. 3
CSJ NO. 2
CSJ NO. 1
FM 1488
SH 242
MAGNOLIA
FM 1774
BNSF
FM 2978
PROJECT LIMITS
WOODLANDS
WELLER COUNTY
UPRR
SH 249
SPRING
CREEK
HARRIS COUNTY
CSJ NO. 1 0523-08-007
CSJ NO. 2 0523-09-009
CSJ NO. 3 0523-10-016
FM 1488
From: Weller County Line
To: FM 2978
Montgomery County, Texas
HNTB
PROJECT
LOCATION MAP
NOT TO SCALE

HNTB ARCHITECTS ENGINEERS PLANNERS

2 Northpoint Drive
Suite 650
Houston, Texas
77060
(281) 931-2700
Fax (281) 931-0932
www.hntb.com

February 3, 2004

Ms. Kathy Boydston
Wildlife Habitat Assessment Program
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

Re: FM 1488 Roadway Expansion Project
Montgomery County, TX
From: Montgomery/Waller County Line
To: Intersection with FM 2978
CSJ: 0523-08-007, 0523-09-009, 0523-10-016

Dear Ms. Boydston:

The HNTB Corporation, on behalf of Montgomery County and the Texas Department of Transportation (TxDOT), is in the process of preparing an Environmental Assessment for proposed roadway improvements along FM 1488 from the Montgomery/Waller County line to the intersection with FM 2978, in Montgomery County. FM 1488 currently consists of a two-lane roadway facility and is proposed for expansion to a four-lane facility with a continuous, center left turn lane. The total project length is approximately 15 miles and will require up to 50 feet of new right-of-way adjacent to the existing TxDOT right-of-way along this corridor. Please see the attached vicinity map.

We welcome your input on this project. Any information or knowledge you have concerning the location of any environmentally sensitive areas along the project corridor would be very useful to us.

If you should need further information concerning this project, please feel free to contact me at (281) 931-2715 or Fred Land at (281) 931-2711.

Sincerely,

Debbie C. Taylor

Ms. Debbie Taylor
Director of Environmental Planning
HNTB Architects, Engineers, Planners

Attachment: Location Map
Cc: Ms. Melba Alfred
Texas Department of Transportation Houston District

APPENDIX B
Hazardous Materials Database Search

The EDR Corridor Study Report

Study Area
FM 1488
Magnolia, TX 77354

July 07, 2003

Inquiry number 1005832.2s

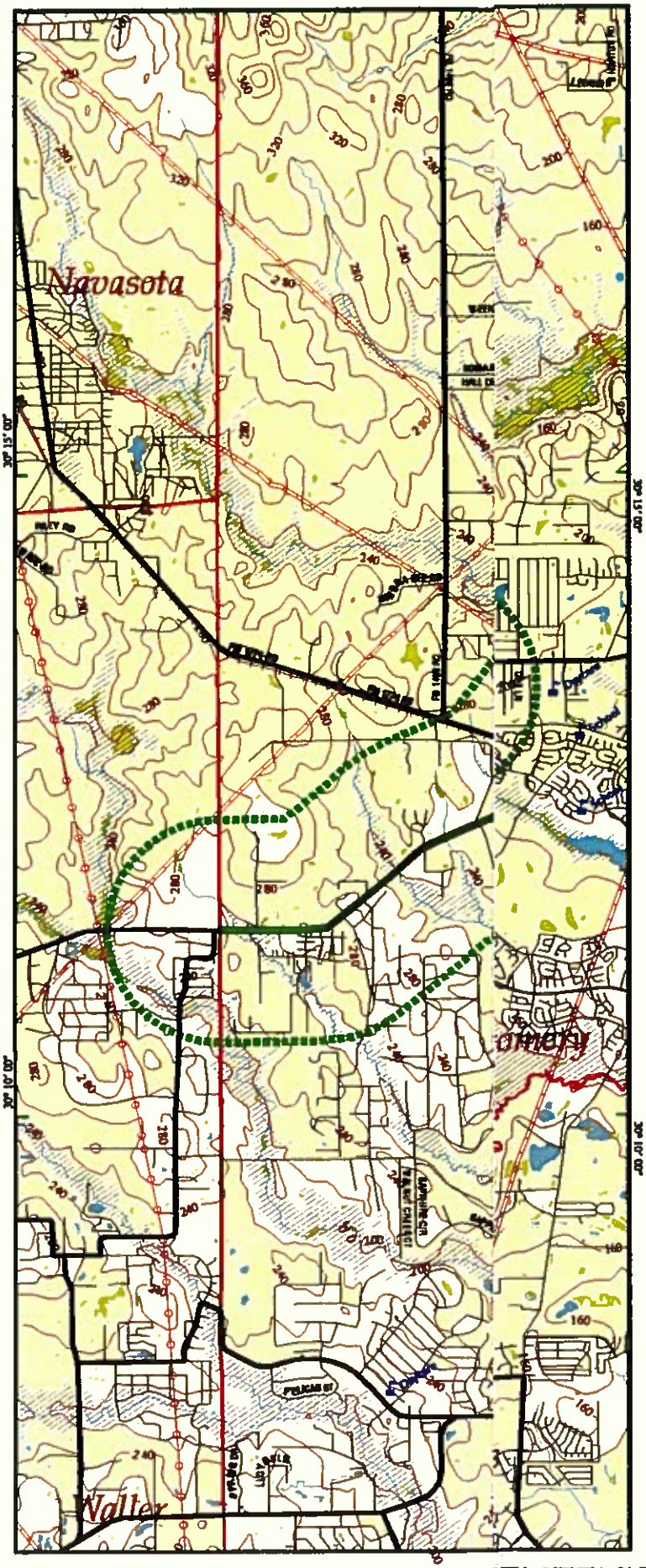
Environmental Data Resources, Inc.

The Source For Environmental Risk Management Data

3530 Post Road
Southport, Connecticut 06890

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com



FM 1488

- Listed Sites
- Earthquake Epicenters (Richter 5 or greater)
- Search Boundary
- Roads
- Major Roads
- Waterways
- Railroads
- Contour Lines
- Pipelines
- Powerlines
- Fault Lines
- Water
- Superfund Sites
- 100-Yr Flood Zones
- Wetlands

N

Magnolia, TX

0 1 2

Scale in Miles

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR).

TARGET PROPERTY INFORMATION

ADDRESS

FM 1488
MAGNOLIA, TX 77354

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records within the requested search area for the following databases:

FEDERAL ASTM STANDARD

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
CORRACTS	Corrective Action Report
RCRIS-TSD	Resource Conservation and Recovery Information System
RCRIS-LQG	Resource Conservation and Recovery Information System

STATE ASTM STANDARD

SHWS	State Superfund Registry
SWF/LF	Permitted Solid Waste Facilities
CLL	Closed Landfill Inventory
TX VCP	Voluntary Cleanup Program Database

FEDERAL ASTM SUPPLEMENTAL

CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
Delisted NPL	National Priority List Deletions
HMIRS	Hazardous Materials Information Reporting System
MLTS	Material Licensing Tracking System
MINES	Mines Master Index File
NPL Liens	Federal Superfund Liens
PADS	PCB Activity Database System
DOD	Department of Defense Sites
RAATS	RCRA Administrative Action Tracking System
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act

EXECUTIVE SUMMARY

SSTS..... Section 7 Tracking Systems
FTTS..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

TX Spills..... Spills Database
IOP..... Innocent Owner/Operator Program
Multimedia..... Multi Media Enforcement Cases
WasteMgt..... Commercial Hazardous & Solid Waste Management Facilities
AIRS..... Current Emission Inventory Data

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas..... Former Manufactured Gas (Coal Gas) Sites

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL ASTM STANDARD

RCRIS: The Resource Conservation and Recovery Act database includes selected information on sites that generate, store, treat, or dispose of hazardous waste as defined by the Act. The source of this database is the U.S. EPA.

A review of the RCRIS-SQG list, as provided by EDR, and dated 05/09/2003 has revealed that there are 2 RCRIS-SQG sites within the searched area.

Site	Address	Map ID	Page
MASTER DOWNHOLE	***5434 FM 1488***	***9***	***37***
MAGNOLIA PAINT & BODY	***1119 YANCEY DR***	***13***	***61***

ERNS: The Emergency Response Notification System records and stores information on reported releases of oil and hazardous substances. The source of this database is the U.S. EPA.

A review of the ERNS list, as provided by EDR, and dated 12/31/2002 has revealed that there is 1 ERNS site within the searched area.

Site	Address	Map ID	Page
1 MI NORTH OF ST RT 1488 AND 3	1 MI NORTH OF ST RT 148	6	17

EXECUTIVE SUMMARY

STATE ASTM STANDARD

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Texas Commission on Environmental Quality's Leaking Petroleum Storage Tank Database.

A review of the LUST list, as provided by EDR, and dated 04/18/2003 has revealed that there are 4 LUST sites within the searched area.

Site	Address	Map ID	Page
FAST TRACK GROCERIES	***2178 FM 1488 W***	***11***	***44***
PEDLERS JUNCTION	***415 MAGNOLIA BLVD***	***13***	***61***
HANDI STOP 15-CHEVRON	***18903 FM 1488***	***13***	***73***
MULIFLEX INC	***FM 1774***	***13***	***86***

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Texas Commission on Environmental Quality's Petroleum Storage Tank Database.

A review of the UST list, as provided by EDR, and dated 04/28/2003 has revealed that there are 18 UST sites within the searched area.

Site	Address	Map ID	Page
CO HAYNES	INTERSEC HWY 149 FM 10	1	3
MND DRILLING CORPORATION	***14703 W FM 1488***	***2***	***7***
HERITAGE FARMS	1 HERITAGE TRAIL	4	13
ROYAL OAKS COUNTRY STORE	11507 FM 1488	7	17
REFUGIO DRILLING CO	11510 FM 1488	7	22
KENNETHS GROCERY 356	RT 15	8	28
TEXAS STAR CHEVRON	10940 FM 1488	8	31
WEBBS GROCERY	33030 FM 2978	9	34
TIME MART 11	6730 FM 1488 RD	10	41
FAST TRACK GROCERIES	***2178 FM 1488 W***	***11***	***44***
AMATOS 3	17529 FM 1488	12	52
PEDLERS JUNCTION	***415 MAGNOLIA BLVD***	***13***	***61***
MAGNOLIA FOODS	619 MAGNOLIA BLVD	13	66
HANDI STOP 15-CHEVRON	***18903 FM 1488***	***13***	***73***
007 FOOD STORE	831 S MAGNOLIA BLVD	13	79
MULIFLEX INC	***FM 1774***	***13***	***86***
HANDI STOP 36	18655 FM 1488	13	89
BROOKSHIRE BROTHERS 48	18535 FM 1488	13	94

FEDERAL ASTM SUPPLEMENTAL

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS;

EXECUTIVE SUMMARY

DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 03/19/2003 has revealed that there are 3 FINDS sites within the searched area.

Site	Address	Map ID	Page
MASTER DOWNHOLE	***5434 FM 1488***	***9***	***37***
AMISTAD ENVIRONMENTAL	19503 FM 1488	13	61
MAGNOLIA PAINT & BODY	***1119 YANCEY DR***	***13***	***61***

STATE OR LOCAL ASTM SUPPLEMENTAL

AST: The Aboveground Storage Tank database contains registered ASTs. The data come from the Texas Commission on Environmental Quality's Petroleum Storage Tank Database.

A review of the AST list, as provided by EDR, and dated 04/28/2003 has revealed that there are 2 AST sites within the searched area.

Site	Address	Map ID	Page
AMOCO PIPELINE TRUCKING	13703 FM 1488	5	16
CAMPBELL CONCRETE & MATERIALS	19503 FM 1488	13	60

TX IHW: The Industrial and Hazardous Waste Database contains summary reports by waste handlers, generators and shippers in Texas.

A review of the Ind. Haz Waste list, as provided by EDR, has revealed that there are 3 Ind. Haz Waste sites within the searched area.

Site	Address	Map ID	Page
MND DRILLING CORPORATION	***14703 W FM 1488***	***2***	***7***
MND DRILLING CORPORATION	14703 FM 1488	3	12
MASTER DOWNHOLE	***5434 FM 1488***	***9***	***37***

EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.

MAP FINDINGS SUMMARY

Database	Total Plotted
FEDERAL ASTM STANDARD	
NPL	0
Proposed NPL	0
CERCLIS	0
CERC-NFRAP	0
CORRACTS	0
RCRIS-TSD	0
RCRIS Lg. Quan. Gen.	0
RCRIS Sm. Quan. Gen.	2
ERNS	1
STATE ASTM STANDARD	
State Haz. Waste	0
State Landfill	0
CLI	0
LUST	4
UST	18
TX VCP	0
FEDERAL ASTM SUPPLEMENTAL	
CONSENT	0
ROD	0
Delisted NPL	0
FINDS	3
HMIRS	0
MLTS	0
MINES	0
NPL Liens	0
PADS	0
DOD	0
RAATS	0
TRIS	0
TSCA	0
SSTS	0
FTTS	0
STATE OR LOCAL ASTM SUPPLEMENTAL	
AST	2
TX Spills	0
IOP	0
Multimedia	0
Ind. Haz Waste	3
WasteMgt	0
AIRS	0

MAP FINDINGS SUMMARY

Database	Total Plotted
EDR PROPRIETARY HISTORICAL DATABASES	
Coal Gas	0

NOTES:

Sites may be listed in more than one database

APPENDIX C
Red-Cockaded Woodpecker Survey

RED-COCKADED WOODPECKER SURVEY

FM 1488

From Joseph Road to FM 2978
Montgomery County, Texas

CSJs: 0523-08-007; 0523-09-009; 0523-10-016

Prepared for

Montgomery County

Prepared by

HNTB Corporation
2 Northpoint Drive, Suite 650
Houston, Texas 77060

September 2004

FM 1488 Proposed ROW Evaluation for Potential RCW Habitat

It is the purpose of the Endangered Species Act (ESA) of 1973 to conserve ecosystems upon which endangered species and threatened species depend and to conserve the species that are federally listed as either endangered or threatened. It is also a requirement of the ESA that all Federal departments and agencies not only conserve these species, but that they utilize their authorities in furtherance of this purpose. Section 7(a)(2) states that each Federal agency shall, in consultation with the Secretary, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

Sufficient data must be provided to the United States Fish and Wildlife Service (USFWS) to obtain approval for a highway improvement project or to receive concurrence from the USFWS that the project is not likely to adversely affect or jeopardize the continued existence of any federally listed species that may be found within the project limits. The Red-cockaded Woodpecker (*Picoides borealis)* was listed in 1970 and received Federal protection in 1973 when the ESA was passed. The Red-cockaded Woodpecker (RCW) is found within Montgomery County and may be found within the general area of the FM 1488 project. Known populations or groups are found within the W.G. Jones State Forest and on private properties or ranches.

Debbie Taylor at HNTB Corporation received a letter dated October 6, 2003 from the USFWS – Clear Lake Field Office. This letter states that, "*If suitable nesting or foraging habitat occurs within the project impact area, and within ½ mile of the project site, a qualified individual would need to conduct a survey to determine the presence or absence of RCWs.*" In order to comply with the ESA, the current Recovery Plan for the Red-cockaded Woodpecker (*Picoides borealis), Second Revision* dated January 2003, and the USFWS letter dated October 6, 2003, a four phase approach was undertaken to determine whether this project would have an effect upon RCWs.

The first phase of this project was an analysis of aerial photography to determine the presence of potential RCW habitat within the proposed right-of-way (ROW) for FM 1488. The second phase, a field survey, was undertaken to confirm the presence or absence of potential RCW habitat within the proposed ROW as indicated in the first phase. The third phase was undertaken to analyze aerial photography for potential RCW nesting habitat within one-half mile of the potential RCW foraging and nesting habitat found in the second phase. The fourth phase of this project was undertaken to identify the presence or absence of RCWs within the areas identified in the third phase.

PHASE I

The first phase of the approach included plotting the proposed roadway improvements on the most recent aerial photographs available. Portions of the project where additional ROW is required were delineated, and the habitat within these areas was compared to

aerial photographs of known quality RCW nesting and foraging habitat found within the same general area. In this case, aerials of the W.G. Jones State Forest were used. Seventeen areas of proposed ROW that may have potential RCW habitat present were identified on the aerials by a qualified biologist (Exhibit A). RCW habitat is defined as either foraging or nesting habitat as designated in the Survey Protocols in Appendix 4 of the current Recovery Plan for the Red-cockaded Woodpecker *(Picoides borealis), Second Revision* dated January 2003.

PHASE II

In the second phase, a qualified and federally permitted biologist conducted a field survey in which each of these areas or sites were evaluated based upon the Survey Protocols provided by the USFWS in Appendix 4 of the current recovery plan. The Survey Protocols define suitable foraging habitat as pine or pine/hardwood forest, woodland, or savannah in which 50% or more of the dominant trees are pines and the dominant pines are generally 30 years in age or older. The protocol also defines suitable nesting habitat as pine, pine/hardwood, and hardwood/pine stands that contain trees 60 years in age or older. Older trees may be found within younger stands.

Mr. John Warner of the Texas Forest Service was consulted for assistance in determining the age of trees within the general area. Ten trees were picked at random throughout the project length. Each of these ten trees was bored using a standard incremental borer. These data were compiled and tabulated (Table 1). It is understood that the projection of pine tree age in relation to diameter at breast height (dbh) is difficult to determine and is approximate at best because each tree may be exposed to different growing conditions such as amounts of available sunlight, nutrients, water, and different soil types. Ten random trees were sampled throughout the project to help account for the variables in growing conditions that exist. To further account for the variables in growth conditions, the lowest six dbhs were used for projecting the average dbh of a 30-year-old tree, and the highest six dbhs were used for projecting the average dbh of a 60-year-old tree. The formulas used to make these projections are shown at the bottom of Table 1. The dbh for a 30-year-old tree was found to be approximately 11 inches, and the dbh for a 60-year-old tree was found to be approximately 25 inches.

TABLE 1
SAMPLED PINE TREES FOR FM 1488

#	dbh (inches)	Age (years)
1	32	76
2	12	31
3	28	65
4	12	20
5	11	38
6	14	40

#	dbh (inches)	Age (years)
7	14	33
8	26.5	58
9	30	68
10	13	36
Average	**19.25**	**46.50**
Average highest 6	**24.08**	**56.67**
Average lowest 6	**12.67**	**33**
30 year old pine	**11.51**	**~30**
60 year old pine	**25.49**	**~60**

Projected 30 year old tree dbh = Avg. lowest 6 dbhs (12.67)/ Avg. lowest 6 Ages (33) X 30 years
Projected 60 year old tree dbh = Avg. highest 6 dbhs (24.08)/ Avg. highest 6 Ages (56.67) X 60 years

Of the 17 areas of proposed ROW that were evaluated, one area (Area 3) was found to have potential RCW nesting habitat on the western 1000-foot portion of the area (Table 2). The eastern portion of Area 3 was found not to have potential habitat. Six areas were found to have potential foraging habitat: Areas 4, 5, 6, 7, 8, and 15. The eastern 900 feet of Area 7 was found to be potential foraging habitat, but the western portion was not found to be potential foraging habitat. Within Area 8, only areas 8A, 8B, and 8E were found to be potential foraging habitat. Areas 8C, 8D, and 8F were not found to be potential habitat. The eastern 500 feet of Area 15 was found to be potential foraging habitat, and the western portion was not found to be potential habitat. Ten areas (Areas 1, 2, 9, 10, 11, 12, 13, 14, 16, and 17) were found not to have potential habitat of any kind for Federally listed species.

TABLE 2
HABITAT SURVEY RESULTS

Area	Potential Foraging Habitat	Potential Nesting Habitat
1	No - #, ^	No
2	No - #, ^	No
3	Eastern portion – No - #, ^	Western 1000 ft. - Yes
4	Yes	No
5	Yes	No
6	Yes	No
7	Eastern 900 ft. – Yes Western portion – No - #,^	No
8	8A, 8B, & 8E – Yes 8C, 8D, & 8F – No *,^	No

Area	Potential Foraging Habitat	Potential Nesting Habitat
9	No - #, ^	No
10	No - #, ^	No
11	No - #, ^	No
12	No - #, ^	No
13	No - #, ^	No
14	No - #, ^	No
15	Eastern 500 ft. –Yes Western portion – No - #, ^	No
16	No - #, ^	No
17	No - #, ^	No

= 50% composition of area is not pine
* = 50% composition is pine, but pines are not generally 30 years of age
^ = 60-year-old pine trees not found in area

PHASE III

The current Survey Protocol requires that a survey be conducted within one-half mile of the foraging or nesting habitat for the RCW that would be impacted by the project. Recent aerial photographs were evaluated for suitable nesting habitat within one-half mile of each of the impacted sites. Impacted sites are defined as those areas where ROW is being proposed and that exhibit RCW habitat. Of the seven areas that were found to have foraging or nesting habitat present, all were found to have potentially suitable nesting habitat within one-half mile based upon the analysis of the recent aerial photographs. The areas that indicated older growth or suitable nesting habitat were marked on the appropriate aerial photographs (Exhibit A1–A7).

PHASE IV

Before these areas were surveyed, HNTB Corporation requested right-of-entry (ROE) from property owners in three separate mailings: November 11, 2003; January 26, 2004; July 26, 2004. The third mailing was only sent to property owners who owned land adjacent to one of the seven identified sites and who had not responded to the previous requests. These requests were sent via registered mail to ensure receipt of request. No responses were received from property owners at Areas 3, 4, 5, or 8. As a result, these areas could not be directly accessed. All other areas received ROE and an on site survey was performed.

Survey standards for methodology are again indicated in Appendix 4 (Survey Protocols) of the current Recovery Plan for the Red-cockaded Woodpecker *(Picoides borealis), Second Revision* dated January 2003. This methodology requires that a presence and absence survey be conducted within one-half mile of the impacted foraging or nesting habitat. These standards, in this case, are applied to a linear transportation project. The extent of the replies from property owners in regard to permission for ROE was poor and inadequate. Property owners seemed to be aware of the economic impacts that might result from the confirmation of the presence of RCWs or possibly RCW nesting habitat on their property. This poor response left very few areas (28% of frontage) available to be

surveyed. To compensate for this inadequate response and provide more applicable data, the survey areas were modified. All areas where proposed ROW coincided with potential RCW habitat and all areas within 200 feet of these sites were carefully surveyed. This approach corresponded to recent communications between Mr. Craig Rollins of the Texas Department of Transportation (TxDOT), and Mr. Jeff Reid of the USFWS in regard to the applicability of recommended survey methodology to the proposed project. In areas where ROE was granted, properties were surveyed using standard transect methodology with transects not exceeding 100-foot intervals. In areas where ROE was not granted, the habitat and area were slowly and carefully viewed by two qualified biologists from numerous angles along the FM 1488 roadway. Due to limited access and other limitations, approximately 10 to 20 minutes were spent at each vantage point in areas where habitat was found to reflect any kind of quality foraging or nesting characteristics for the RCW. Some of these areas were also revisited on different days at different times in an attempt to detect the RCW.

No RCWs were heard or found, and no signs including nest cavities, sap runs, or tree bark scaling were detected throughout the project length. However, other woodland bird species, including five different species of woodpeckers, were identified (Table 3). Though habitat met the general guide parameters mentioned in the current protocols for foraging habitat and one area for nesting habitat, the habitat quality was considered poor in general. It was not anticipated that any RCW habitat within the project area would match that found within state forest that are managed for quality habitat. It is difficult to determine at what point RCW habitat is no longer useable, and this is another reason why considerable time was spent at many of the observation points where habitat showed any quality advantages whatsoever. Most of the areas exhibited poor composition with little or no old growth; (Table #2). Extensive understory growth was very noticeable in most of the areas. Conversations with local property owners indicated that some properties were or had been on a set harvest cycle for timber which seemed to be confirmed by the young age of the pines and less understory growth within those areas.

In addition to the RCW habitat survey and the RCW presence and absence survey, many other surveys have been conducted within the project area including a cursory site survey, a land use survey, a tree survey, and a wetland survey. During each of these surveys, a qualified biologist observed the area for any indicators of the presence of RCWs. No RCWs were heard or seen during any of the additional surveys. Furthermore, no land owners who were interviewed during any of the site visits reported observing RCWs on their property or within the project area.

TABLE 3
WOODLAND BIRD SPEICES OBSERVED

Bird Common Name	Bird Scientific Name
Turkey Vulture	*Cathartes aura*
Black Vulture	*Coragyps atratus*
Red-tailed Hawk	*Buteo jamaicensis*
Yellow-billed Cuckoo	*Coccyzus americanus*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Downy Woodpecker	*Picoides pubescens*
Red-bellied Woodpecker	*Melanerpes carolinus*
Hairy Woodpecker	*Picoides villosus*
Pileated Woodpecker	*Dryocopus pileatus*
Blue Jay	*Cyanocitta cristata*
American Crow	*Corvus brachyrhynchos*
Tufted Titmouse	*Parus bicolor*
Mourning Dove	*Zenaida macroura*
Carolina Chickadee	Parus carolinensis
White-breasted Nuthatch	*Sitta carolinensis*
Brown-headed Nuthatch	*Sitta pusilla*
Carolina Wren	*Thryothorus ludovicianus*
Blue-gray Gnatcatcher	*Polioptila nigriceps*
Loggerhead Shrike	*Lanius ludovicianus*
Northern Mockingbird	*Mimus polyglottos*
Northern Cardinal	*Cardinalis cardinalis*
European Starling	*Sturnus vulgaris*
White-eyed Vireo	*Vireo griseus*
Orange-crowned Warbler	*Vermivora celata*
Yellow-throated Warbler	*Dendroica dominica*
Pine Warbler	*Dendroica pinus*

CONCLUSIONS

No definable or useable RCW nesting habitat or utilized foraging habitat exists within the proposed ROW or within 200 feet beyond the proposed ROW. No RCW speciments or habitat characteristics commonly associated with the presence of RCWs were identified as a result of the survey. Further, the RCW was neither seen nor heard during any of the field investigations.

Montgomery County and TxDOT have made a "No Effect" determination and request concurrence from the USFWS.

J:\36099\PL 004 16mile EA\Techprod\GIS\RCW_Habitat(5-19-04)1

Base Map Source: H-GAC - True Color Aerial Photography, 2002.

N

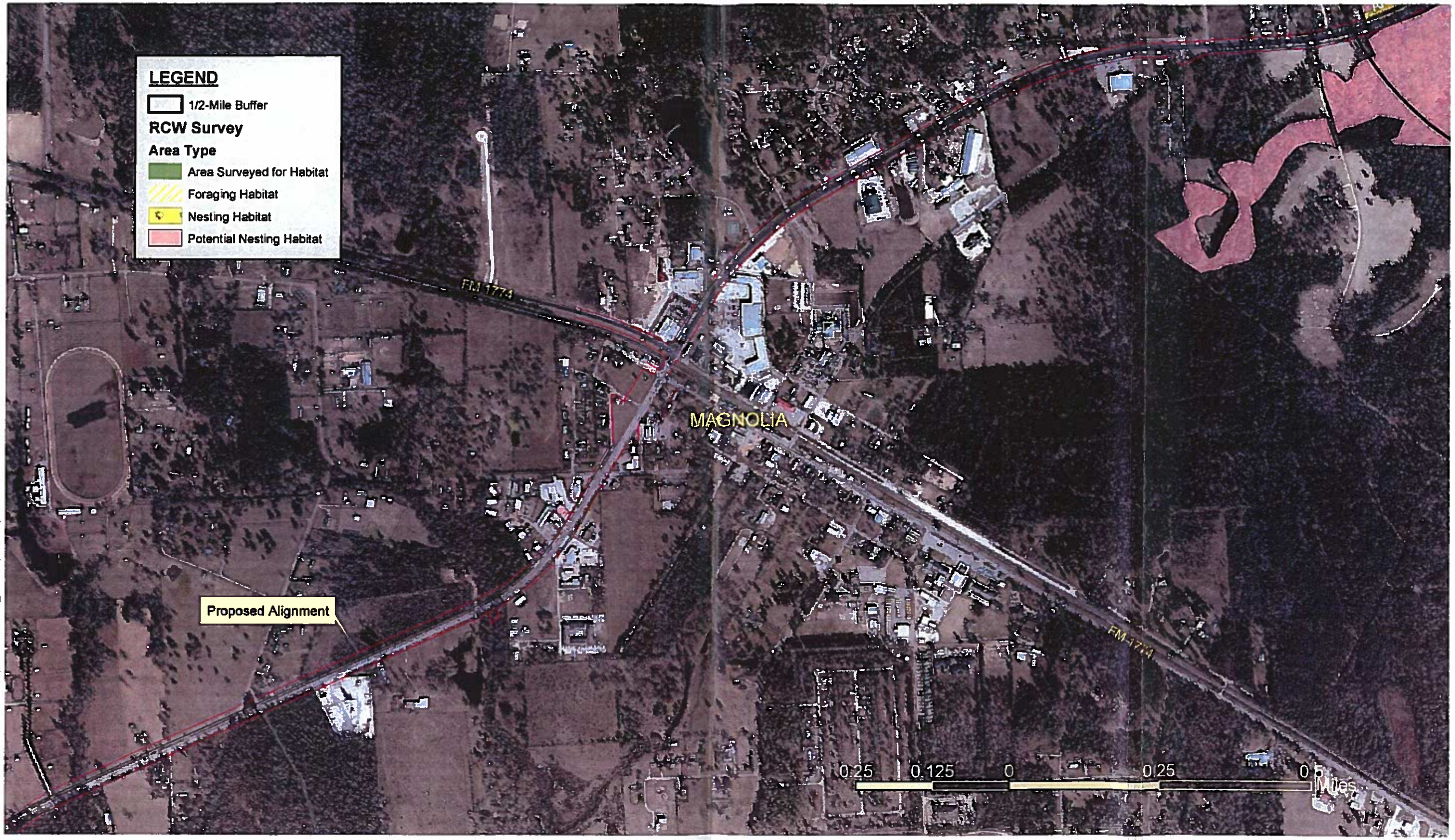
EXHIBIT A1

FM 1488 Red-cockaded Woodpecker Habitat Survey

Montgomery County, Texas

Survey: May 2004

CSJs: 0523-08-007, 0523-09-009, 0523-10-016



J:\36099\PL 004 16mile EA\Techprod\GIS\RCW_Habitat(5-19-04)2

Base Map Source: H-GAC - True Color Aerial Photography, 2002.

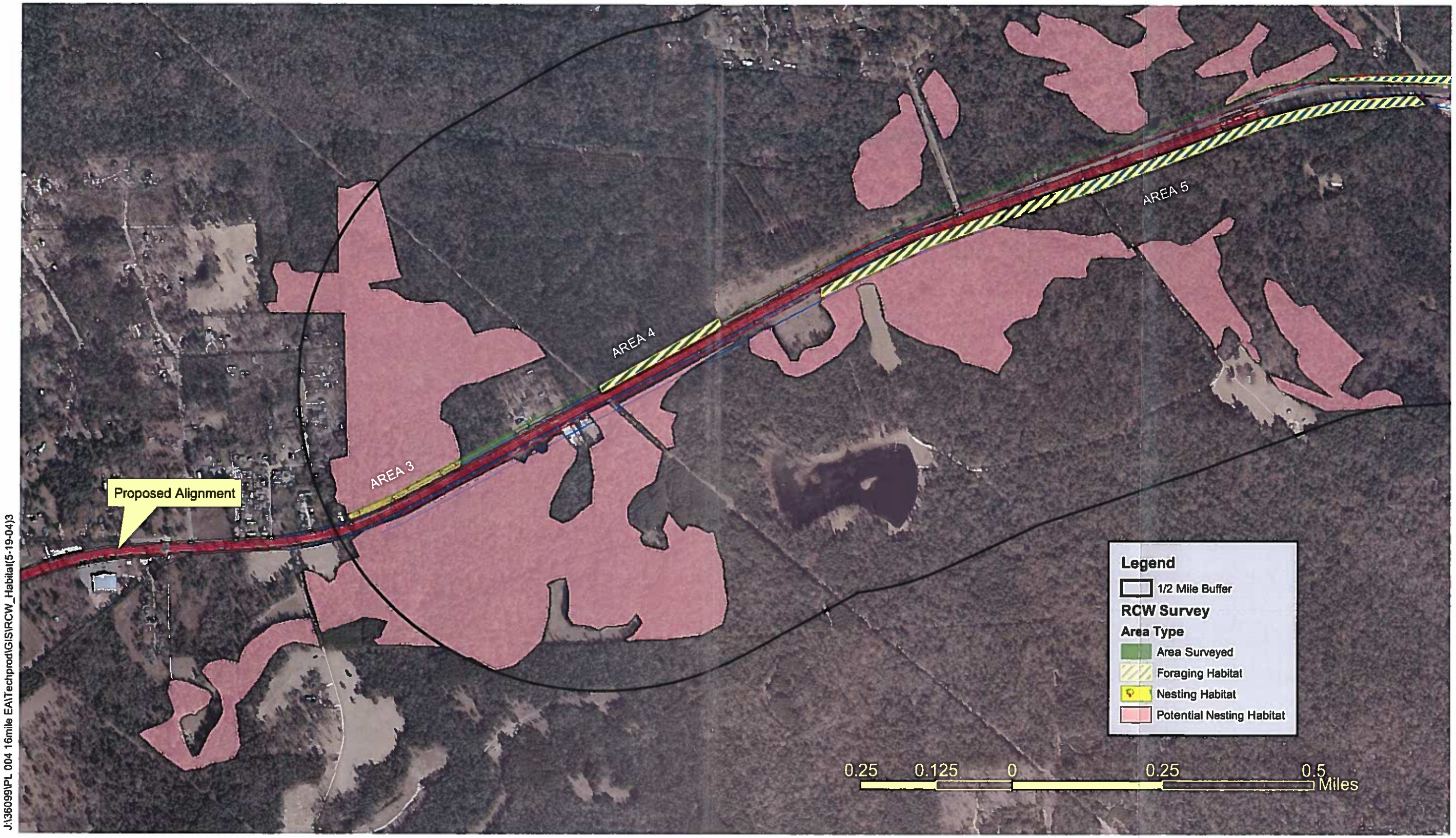
EXHIBIT A2

FM 1488 Red-cockaded Woodpecker Habitat Survey

Montgomery County, Texas

Survey: May 2004

CSJs: 0523-08-007, 0523-09-009, 0523-10-016



J:\36099\PL 004 16mile EA\Techprod\GIS\RCW_Habitat(5-19-04)3

N

Base Map Source: HGAC - True Color Aerial Photography, 2002.

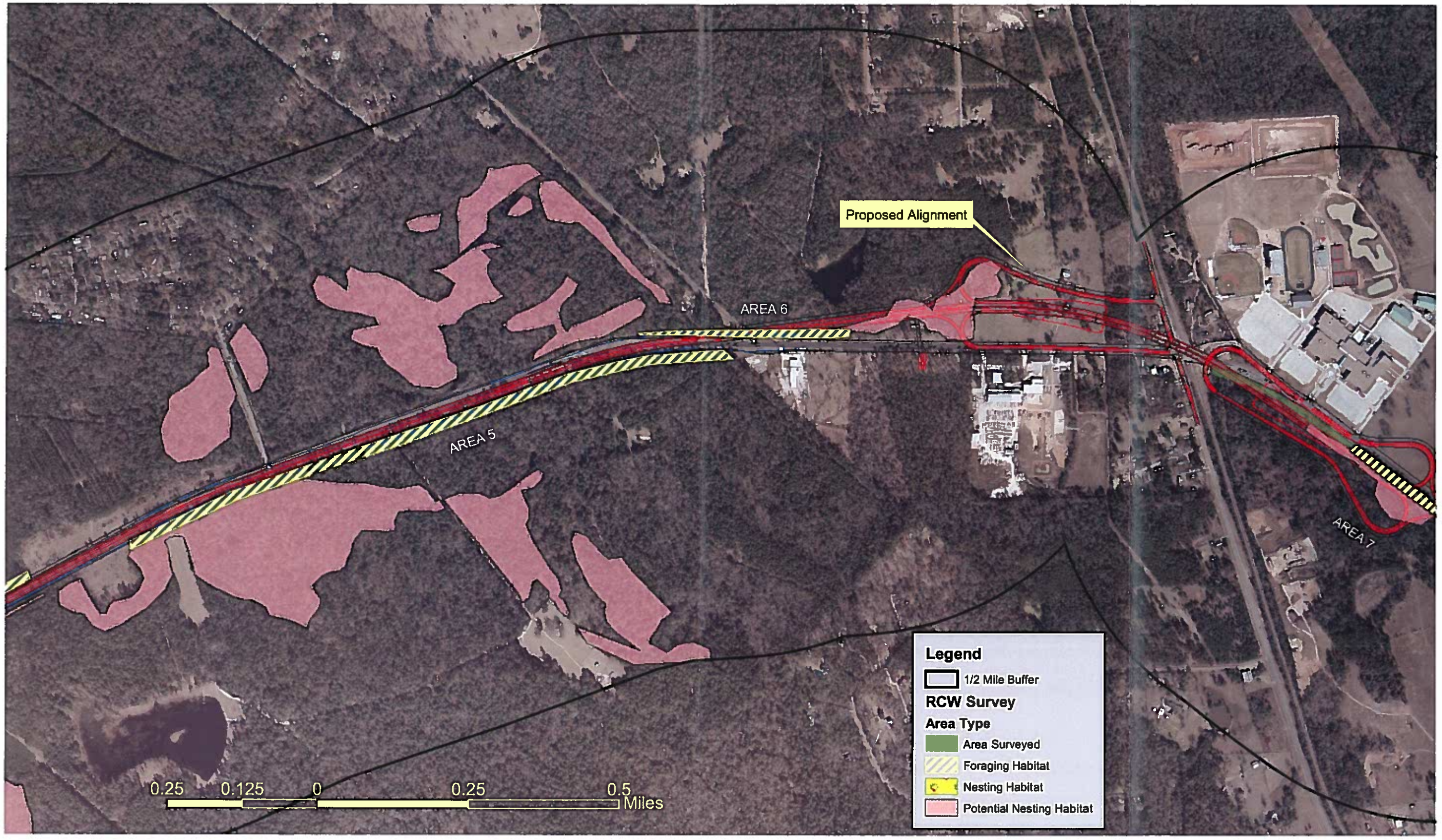
EXHIBIT A3

FM 1488 Red-cockaded Woodpecker Habitat Survey

Montgomery County, Texas

Survey: May 2004

CSJs: 0523-08-007, 0523-09-009, 0523-10-015



J:\36099\PL_004 16mile EA\Techprod\GIS\RCW_Habitat(5-19-04)4

N

Base Map Source: HGAC - True Color Aerial Photography, 2002.

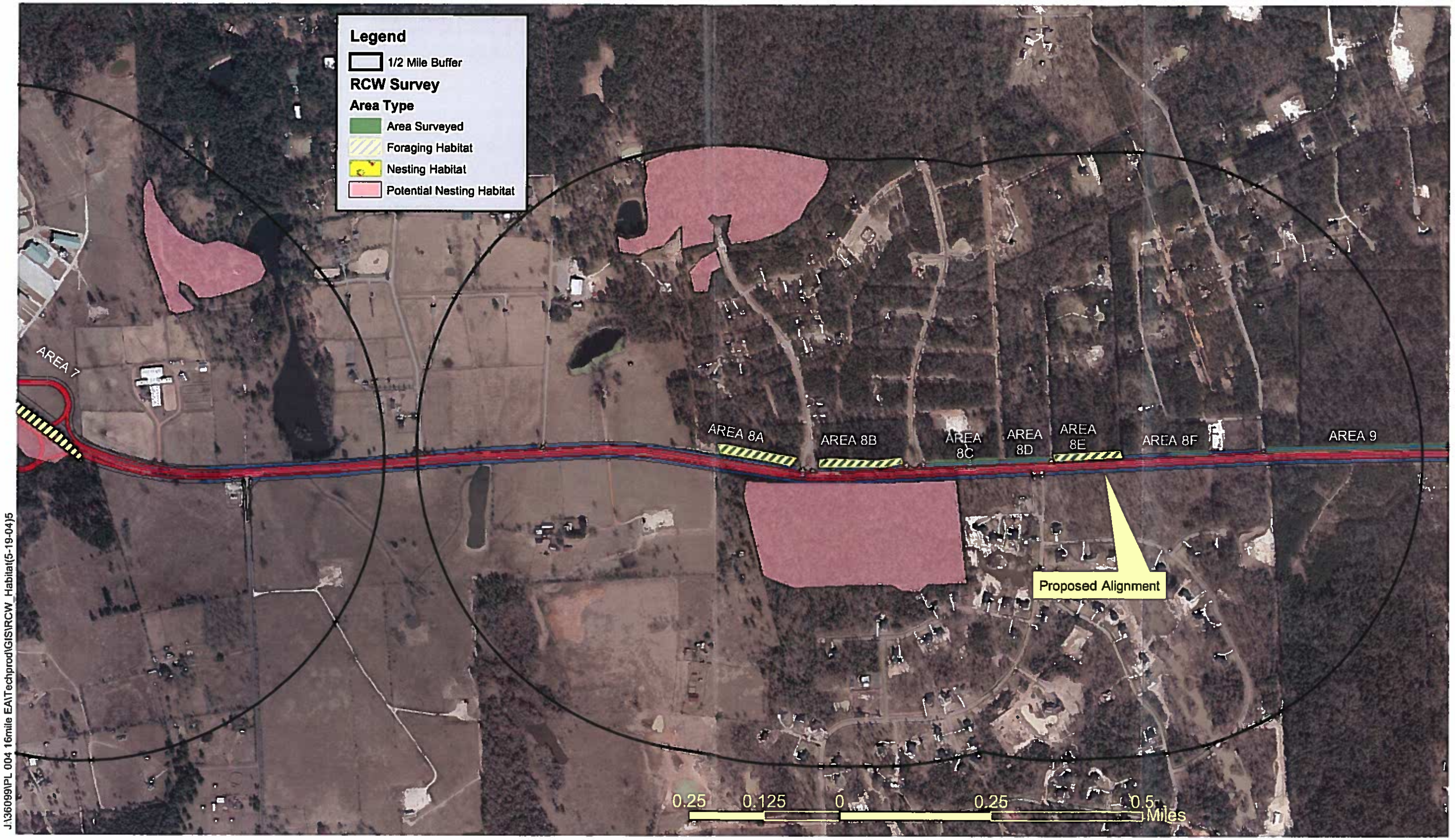
EXHIBIT A4

FM 1488 Red-cockaded Woodpecker Habitat Survey

Montgomery County, Texas

Survey: May 2004

CSJs: 0523-08-007, 0523-09-009, 0523-10-015



J136099\PL_004 16mile EA\Techprod\GIS\RCW_Habitat(5-19-04)5

Base Map Source: HGAC - True Color Aerial Photography, 2002.

N

EXHIBIT A5

FM 1488 Red-cockaded Woodpecker Habitat Survey

Montgomery County, Texas

Survey: May 2004

CSJs: 0523-08-007, 0523-09-009, 0523-10-015

HNTB

J:\36099\PL_004 16mile EA\Techprod\GIS\RCW_Habitat(5-19-04)6

Base Map Source: H-GAC - True Color Aerial Photography, 2002.

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EXHIBIT A6

FM 1488 Red-cockaded Woodpecker Habitat Survey

Montgomery County, Texas

Survey: May 2004

CSJs: 0523-08-007, 0523-09-009, 0523-10-016

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Base Map Source: H-GAC - True Color Aerial Photography, 2002.

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EXHIBIT A7

FM 1488 Red-cockaded Woodpecker Habitat Survey

Montgomery County, Texas

Survey: May 2004

CSJs: 0523-08-007, 0523-09-009, 0523-10-016