

# US 41 (SR 45)

From Kracker Avenue to South of SR 676 (Causeway Boulevard)  
Project Development and Environment (PD&E) Study



## Final Location Hydraulics Memorandum



January 2017

# **US 41 (SR 45)**

**From Kracker Avenue to South of SR 676 (Causeway Boulevard)**

Project Development & Environment (PD&E) Study

## ***Final Location Hydraulics Memorandum***

Work Program Item Segment No. 430056-1

ETDM Project No. 5180

Hillsborough County

Prepared for:

Florida Department of Transportation

District Seven



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January 2017

## EXECUTIVE SUMMARY

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The Florida Department of Transportation (FDOT) conducted a Project Development and Environment (PD&E) Study to evaluate alternative improvements for US 41 (SR 45) from Kracker Avenue (milepoint 15.784) to south of SR 676 (Causeway Boulevard – milepoint 22.791) in Hillsborough County (**Figure 1-1**), a distance of approximately 7.0 miles. Study objectives included: determine proposed typical sections and develop preliminary conceptual design plans for proposed improvements, while minimizing impacts to the environment; consider agency and public comments; and ensure project compliance with all applicable federal and state laws. Improvement alternatives were identified which will improve safety and satisfy future transportation demand. A *State Environmental Impact Report* (SEIR) was prepared for this study and approved on January 12, 2017.

A *Location Hydraulics Memorandum* (LHM) has been prepared for this PD&E study. This LHM was prepared to evaluate potential impacts to the floodplain associated with improvements considered by this study in accordance with the regulations listed in Chapter 24 (rev. 01-07-08) of the FDOT PD&E manual. The information presented in this document is subject to change until the SEIR is approved. This LHM is preliminary and used as an engineering tool to identify potential floodplain encroachments as a result of the conceptual improvements.

Based on the evaluation of anticipated improvements, the applicable floodplain statement according to the FDOT PD&E Manual Part 2 Chapter 24 is Statement 4- Projects on Existing Alignment involving Replacement of Existing Drainage Structures with No Record of Drainage Problems:

“The proposed drainage structures will perform hydraulically in a manner equal to or greater than the existing structures, and backwater surface elevations are not expected to increase. As a result, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.”

There is little or no risk to the floodplain associated with the proposed alternatives for the improvements to US 41 (SR 45) being considered. A public notification for floodplain impacts does not appear to be warranted.

*Bridge Hydraulics Reports* (BHR) will be prepared for the bridges within the study limits during the design phase. Proposed bridge structures will be hydraulically equivalent to existing bridges.

A *Pond Sizing Report* is being prepared for the project to identify project stormwater management requirements, including provision for providing water quality treatment for surface water runoff from proposed impervious areas prior to discharge to receiving waters.

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## **SECTION 1 INTRODUCTION**

### **1.1 PD&E STUDY PURPOSE**

The objective of this Project Development and Environment (PD&E) study was to assist the Florida Department of Transportation (FDOT) in reaching a decision on the type, location, and conceptual design of the proposed improvements for widening US 41 (SR 45) from Kracker Avenue to south of Causeway Boulevard (SR 676). The PD&E study satisfied all applicable requirements in order for this project to qualify for state funding of subsequent project development phases (design, right of way [ROW] acquisition, and construction).

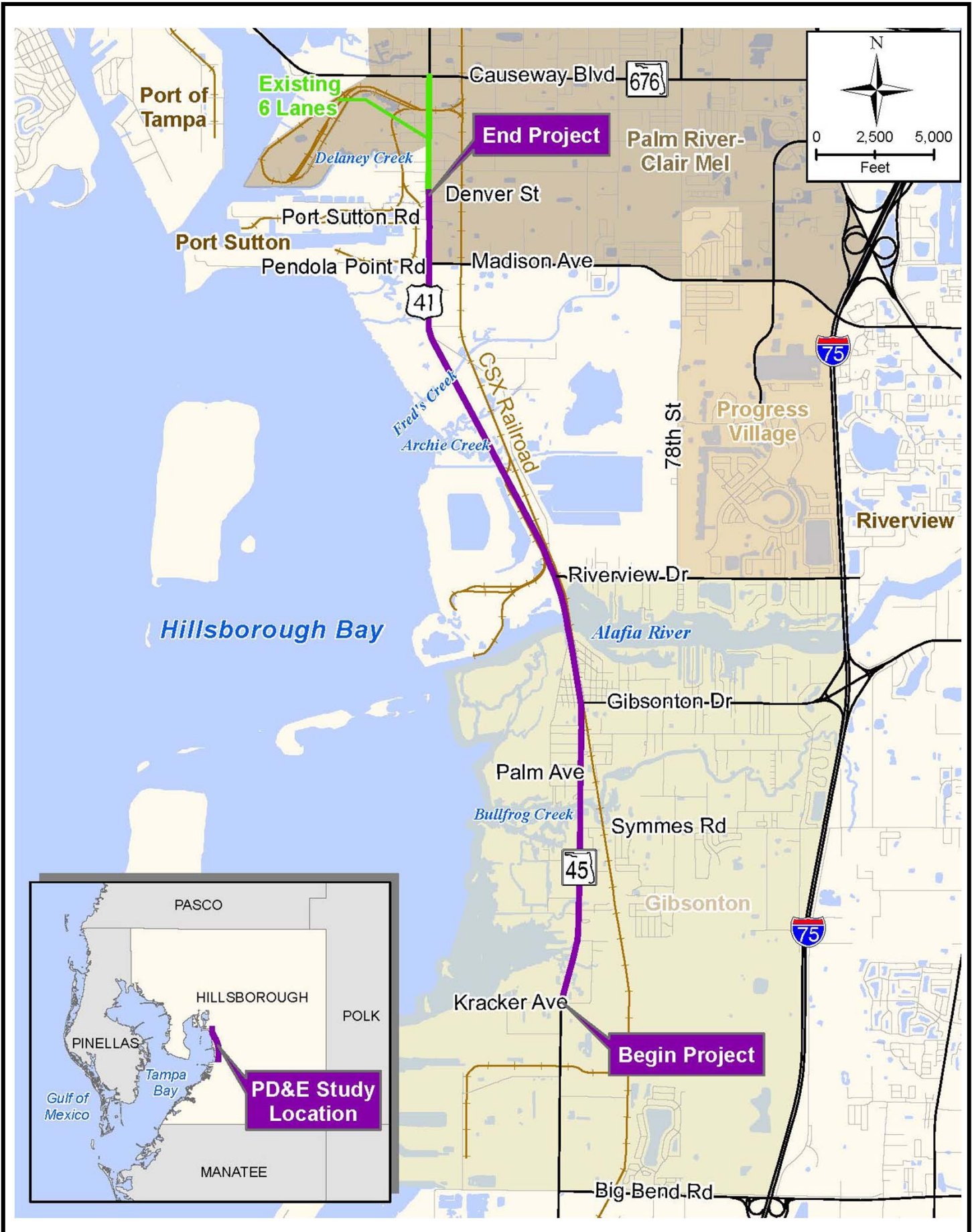
US 41 is a major north-south arterial of regional significance that parallels Interstate 75 (I-75) and US 301 in Hillsborough County. This project was screened through FDOT's Efficient Transportation Decision Making (ETDM) process as Project #5180. A *Final Programming Screen Summary Report* was published on April 10, 2013. A *State Environmental Impact Report* (SEIR) was prepared as part of this study and approved on January 12, 2017.

### **1.2 PROJECT DESCRIPTION**

The FDOT conducted a PD&E study to evaluate alternative capacity and operational improvements to US 41 from Kracker Avenue (milepoint 15.784) to south of Causeway Boulevard (milepoint 22.791) in Hillsborough County (**Figure 1-1**), a distance of approximately 7.0 miles. The highway is to be improved from an existing, four-lane divided rural and urban facility to a six-lane divided facility. Bridges over Bullfrog Creek and the Alafia River are planned to be replaced. The planned improvements will include construction of stormwater management and floodplain compensation facilities and various intersection improvements, in addition to multimodal facilities (trail, pedestrian, bicycle and transit accommodations). However, the PD&E study for the proposed project did not evaluate specific stormwater management facilities and floodplain compensation sites as these locations will be identified during the proposed project's future design phase.

### **1.3 EXISTING FACILITY AND PLANNED IMPROVEMENTS**

US 41 currently has both four-lane divided rural and urban typical sections (**Figure 1-2**). In addition, a 0.9-mile segment near the north end, between Denver Street and SR 676, was previously widened to a six-lane urban section. Existing lane widths vary from 11 to 12 feet and median widths vary from 19 to 40 feet. The rural typical section areas include 4-foot paved shoulders. The posted speed limit is 50 miles per hour (mph) in the north Gibsonton area and 55 mph in the areas to the south and north. The existing right of way width varies from 100 feet in north Gibsonton to 182 feet in the areas to the south and north. Existing bridge typical sections are shown in **Figure 1-3**.



**US 41(SR 45) PD&E Study**  
 From Kracker Avenue to South of SR 676  
 (Causeway Blvd)  
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**Location and Study Area Map**

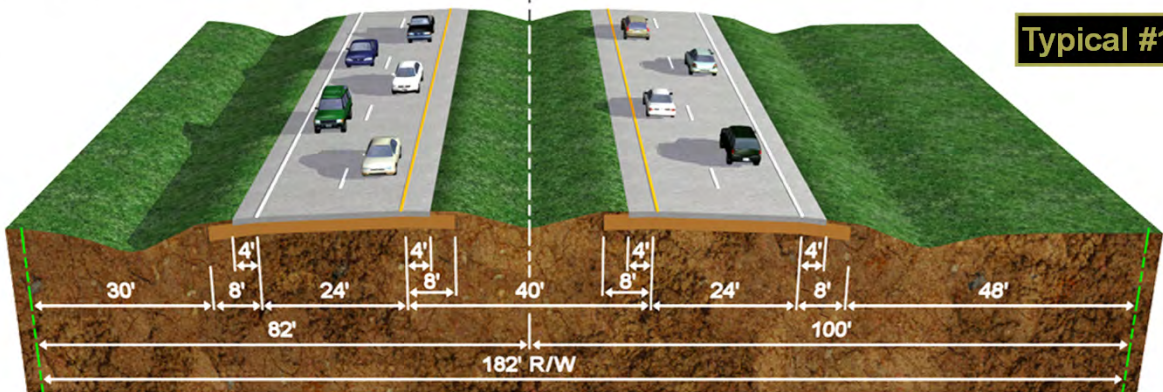
**Figure 1-1**



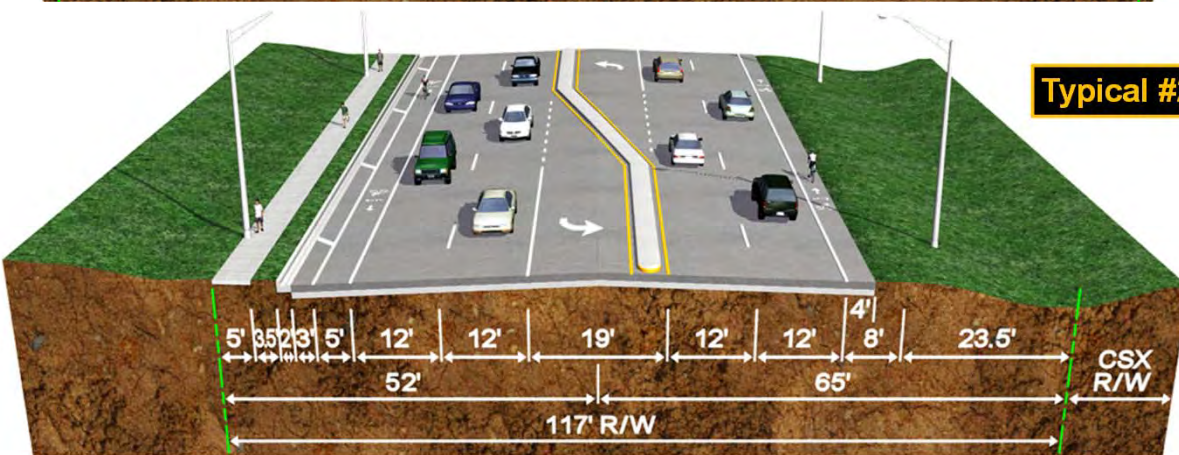


(All views are looking north)

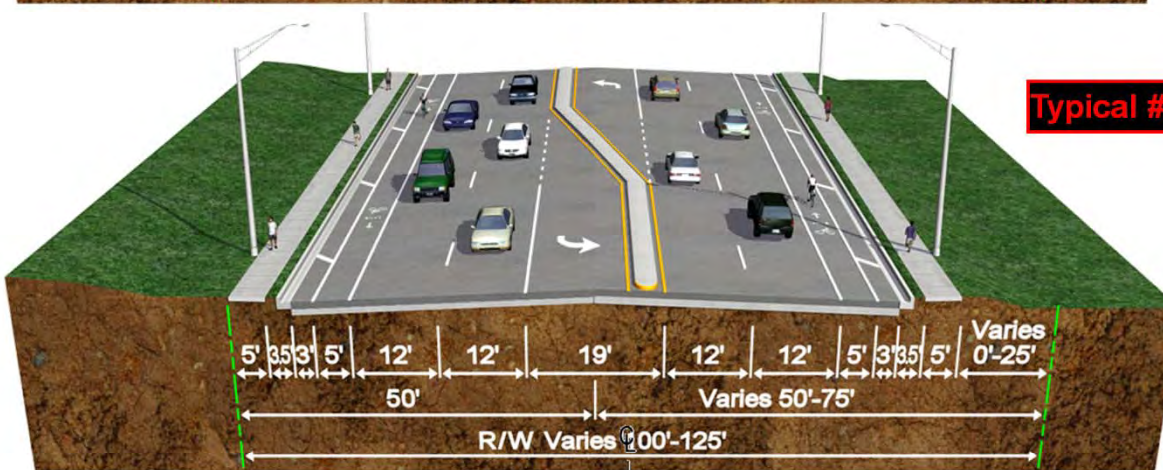
- 23 Causeway Blvd
- 6-Lane Urban**
- 23 Delaney Creek
- Denver Street
- Port Sutton Rd
- 22 Madison Av/ Pendola Pt
- #1**
- 21 Fred's Creek
- Archie Creek 1
- Archie Creek 2
- 20
- Riverview Drive
- Alafia River Br
- Alafia River Br
- Lula St
- #2**
- 18 Gibsonton Drive
- #3**
- Palm Avenue
- Bullfrog Creek
- Symmes Road
- 17
- #4**
- 16 Kracker Avenue



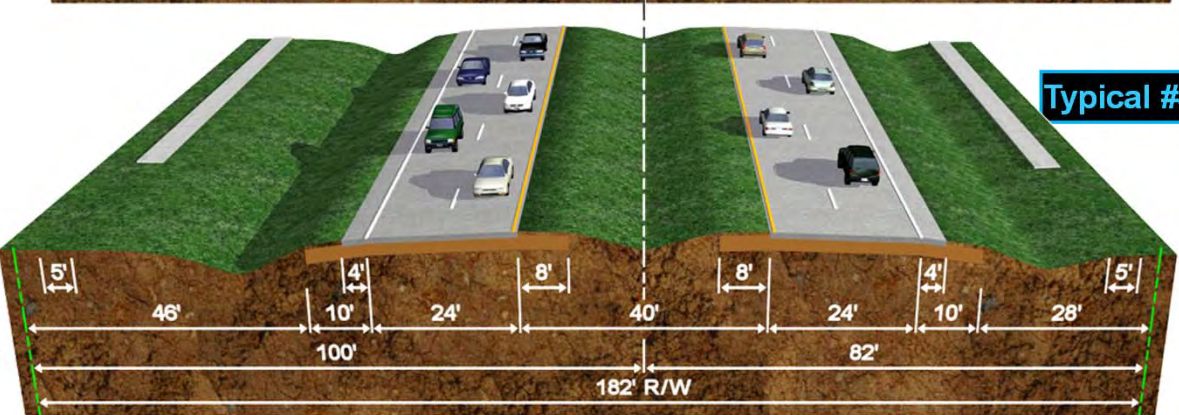
**Typical #1**



**Typical #2**



**Typical #3**



**Typical #4**



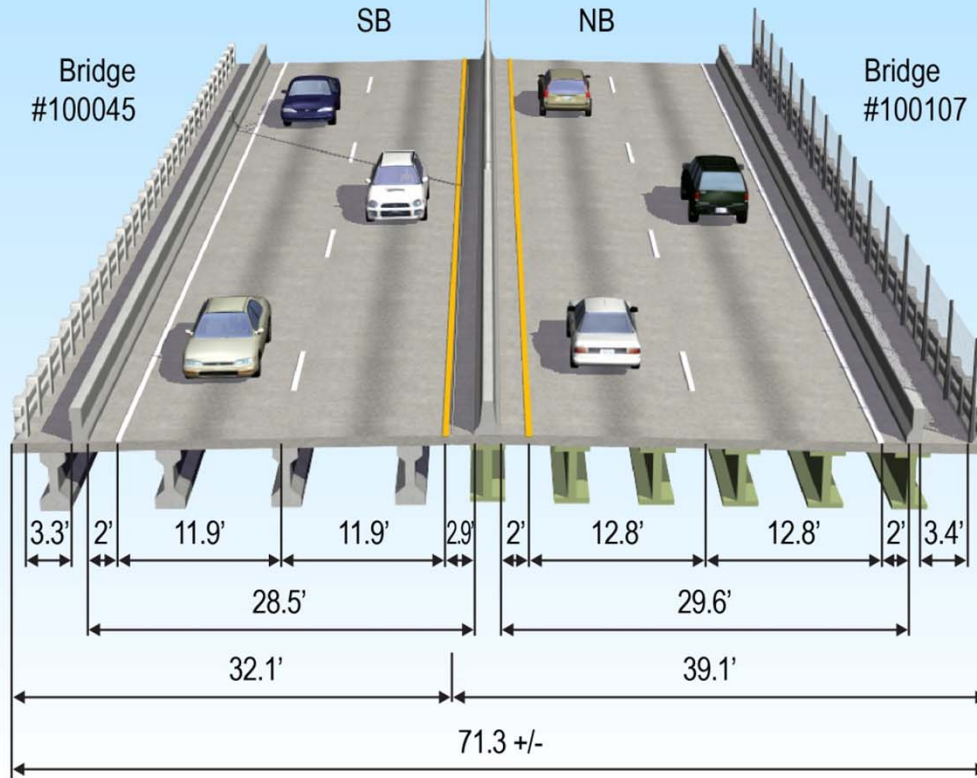
**US 41(SR 45) PD&E Study**  
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**Existing Roadway  
 Typical Sections**

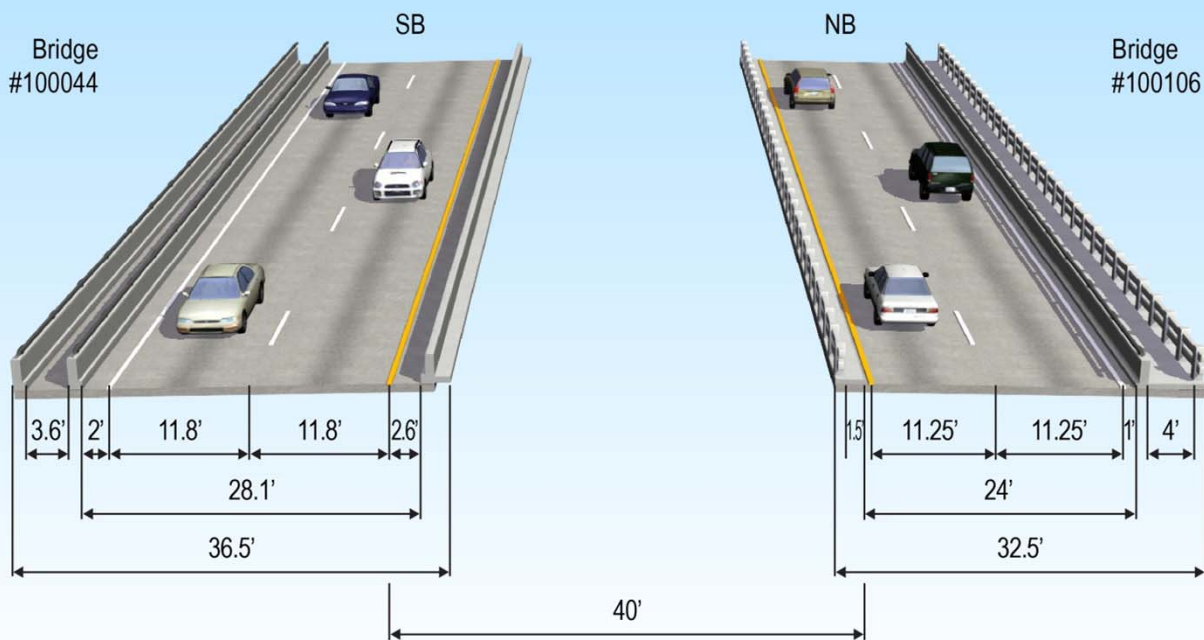
**Figure 1-2**



### Existing Bridges over the Alafia River (Looking North)



### Existing Bridges over Bullfrog Creek (Looking North)



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**Existing Bridge  
 Typical Sections**

**Figure 1-3**

Planned improvements include widening to six lanes as well as intersection improvements, construction of stormwater management and floodplain compensation facilities and multimodal facilities. Planned typical sections include both suburban and urban typical sections. Additional right of way will be required in the north Gibsonton area for the planned improvements. Alternatives to replace the bridges at Bullfrog Creek and the Alafia River were evaluated. Planned typical sections are shown in **Figures 1-4, 1-5 and 1-6**. A “No-Build” Alternative was also evaluated. No future phases for this proposed project are included in FDOT’s current adopted 5-year work program (Fiscal Years 16/17 through 20/21).

#### **1.4 PROJECT PURPOSE AND NEED**

US 41 within the study area plays a significant role in connecting southern Hillsborough County to the Tampa Bay region. The purpose of the proposed project is to accommodate future traffic demands on US 41 due to growth within the project limits and surrounding areas. Segments within this corridor are projected to operate at level of service (LOS) F in the design year (2040) if no increase in capacity is provided. Additional factors which support the need for the project include:

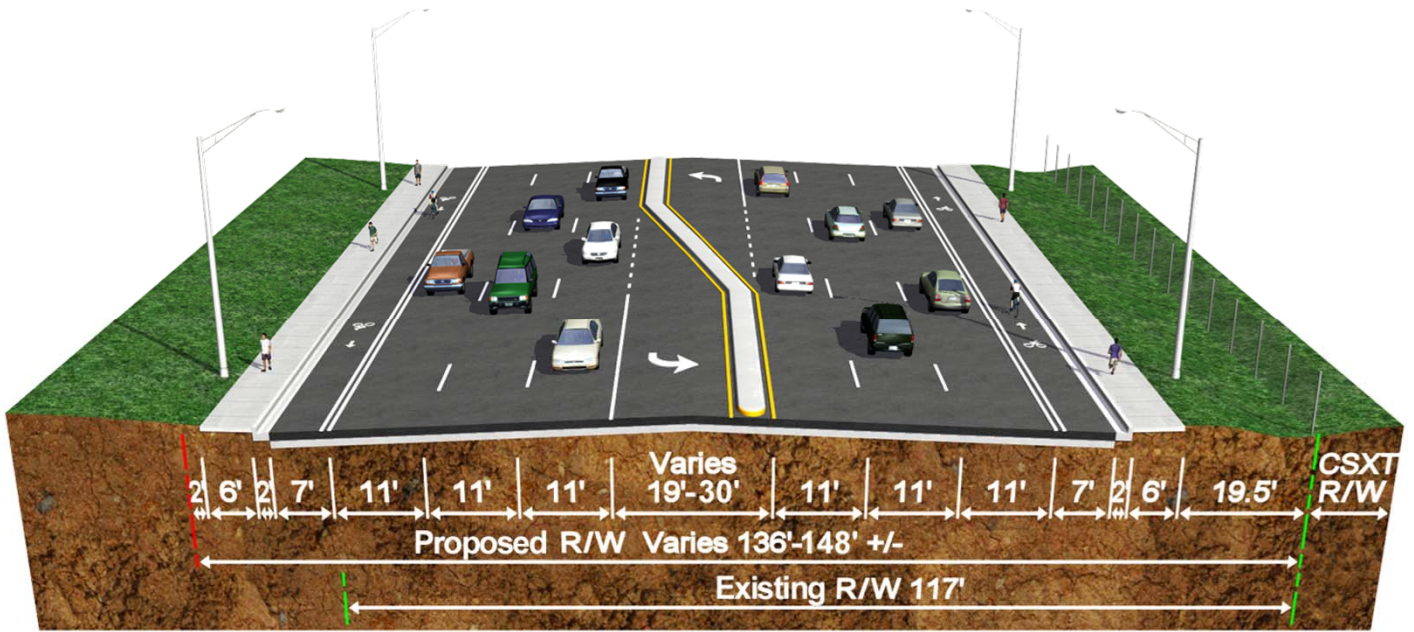
**Regional Connectivity** - US 41 is a major north-south regional arterial that parallels I-75 and US 301 and connects south Hillsborough County to the Tampa Bay region. It provides connectivity between the communities of Apollo Beach, Riverview, and Gibsonton. US 41 is a “regional road” according to the West Central Florida Metropolitan Planning Organization’s (MPO’s) Chairs Coordinating Committee (CCC). US 41 also provides highway access to the Port of Tampa facilities at Pendola Point and Port Sutton.

**Safety** - With the additional capacity provided in the corridor by the widening of US 41 from four to six lanes, roadway congestion will be reduced, which will decrease potential conflicts with other vehicles and potentially increase safety. An analysis of traffic crash data for years 2008 thru 2012 revealed that the overall average crash rate within the study limits was lower than the statewide average crash rate for similar type facilities. While not structurally deficient, the bridges over both Bullfrog Creek and the Alafia River are classified as *functionally obsolete* due to substandard-width shoulders. In addition, the sidewalks on the bridges are very narrow and there are no dedicated bicycle facilities.

**Plan Consistency** - This project is consistent with the Comprehensive Plan for Unincorporated Hillsborough County. The Hillsborough County *Imagine 2040 Long-Range Transportation Plan (LRTP)* indicates a need to widen US 41 to 6-lanes from 19<sup>th</sup> Avenue to north of Madison Avenue, “beyond 2040”. In addition, a short segment between Madison Avenue and Causeway Boulevard is shown as 6 lanes in the Cost Feasible FDOT Strategic Intermodal System Projects, with design after year 2026.

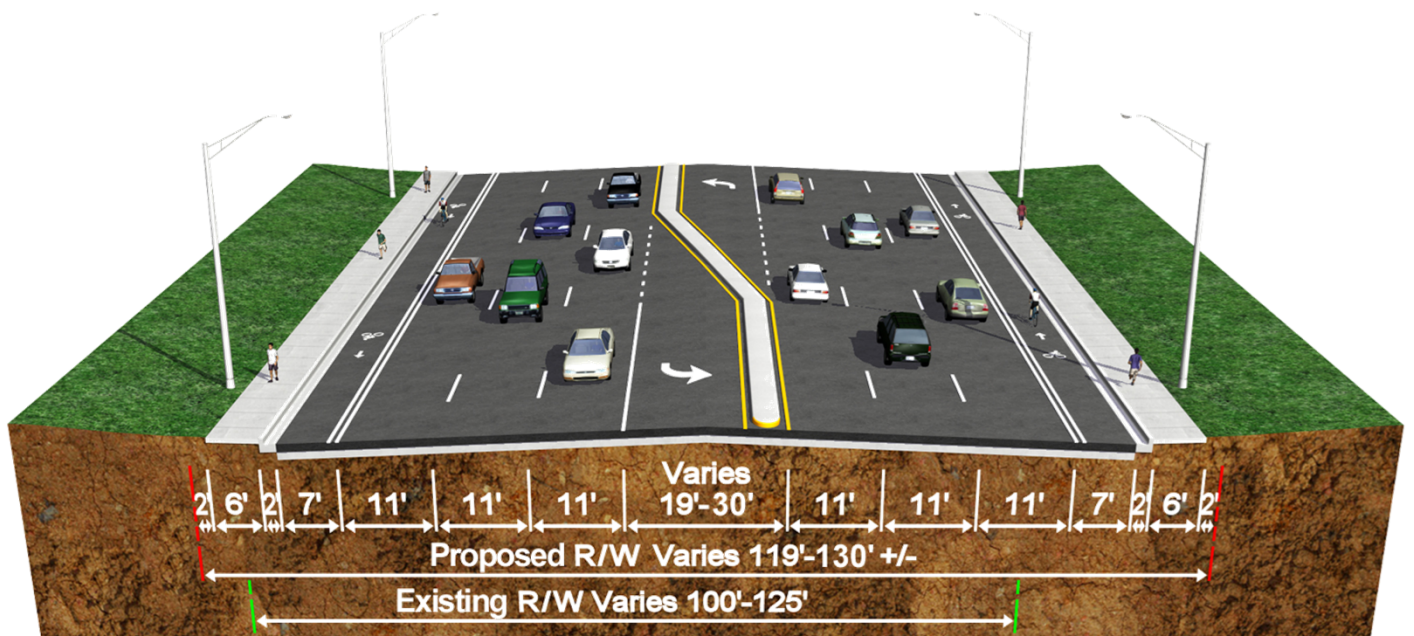


(All views are looking north)



**From Gibsonton Drive to Lula Street**

Design Speed = 45 mph



**From Palm Avenue to Gibsonton Drive**

Design Speed = 45 mph

Rev. 3/14/16

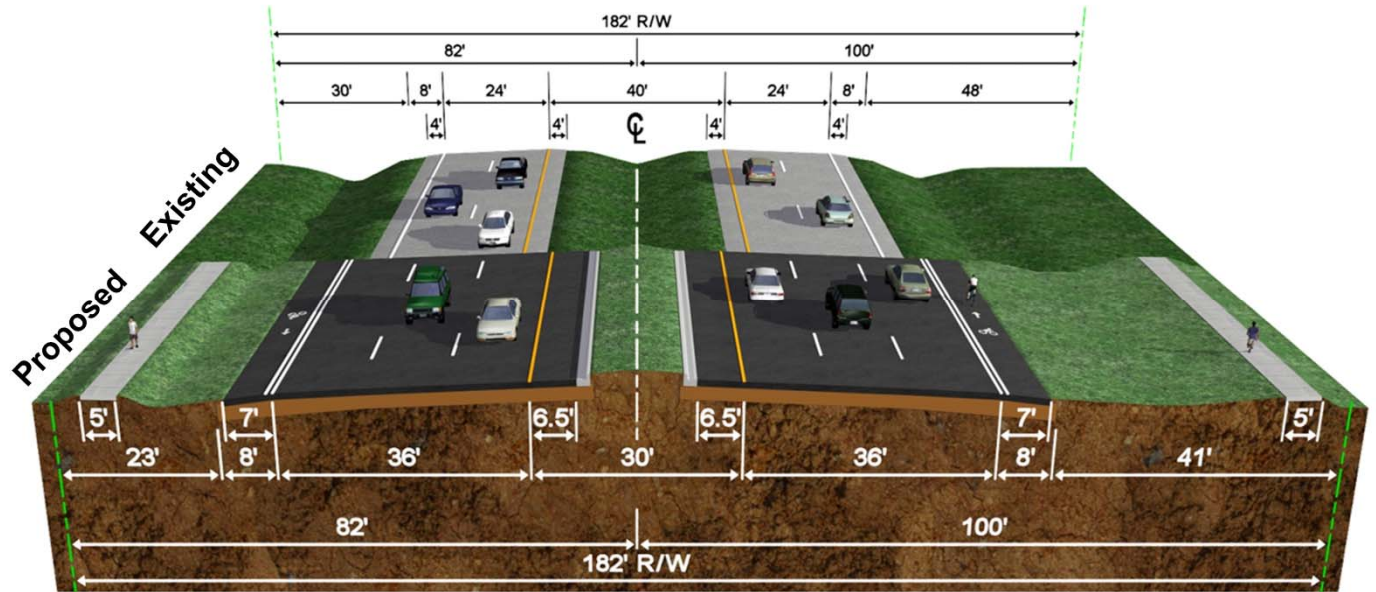


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**Planned Urban  
 Typical Sections**

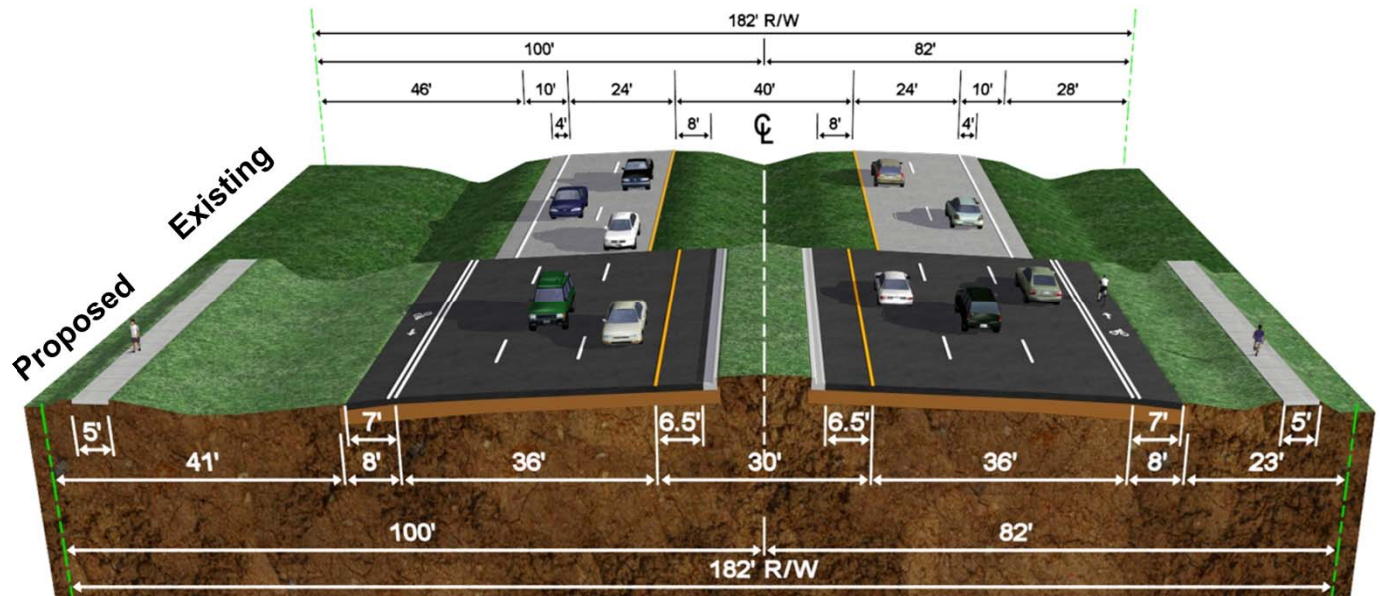
**Figure 1-4**

## Suburban Alternatives Utilizing the Existing Pavement



- Provides 50 mph design speed (required for SIS Connector Segment north of Pendola Point)
- No design variation for border width required
- No additional ROW required

### Between Alafia River Bridge & Denver Street (Near the North End of the Project)



- Provides 50 mph design speed
- No design variation for border width required
- No additional ROW required

### Between Kracker Ave. & Palm Ave. (Near the South End of the Project)

(All views are looking north)

Rev. 12/12/14



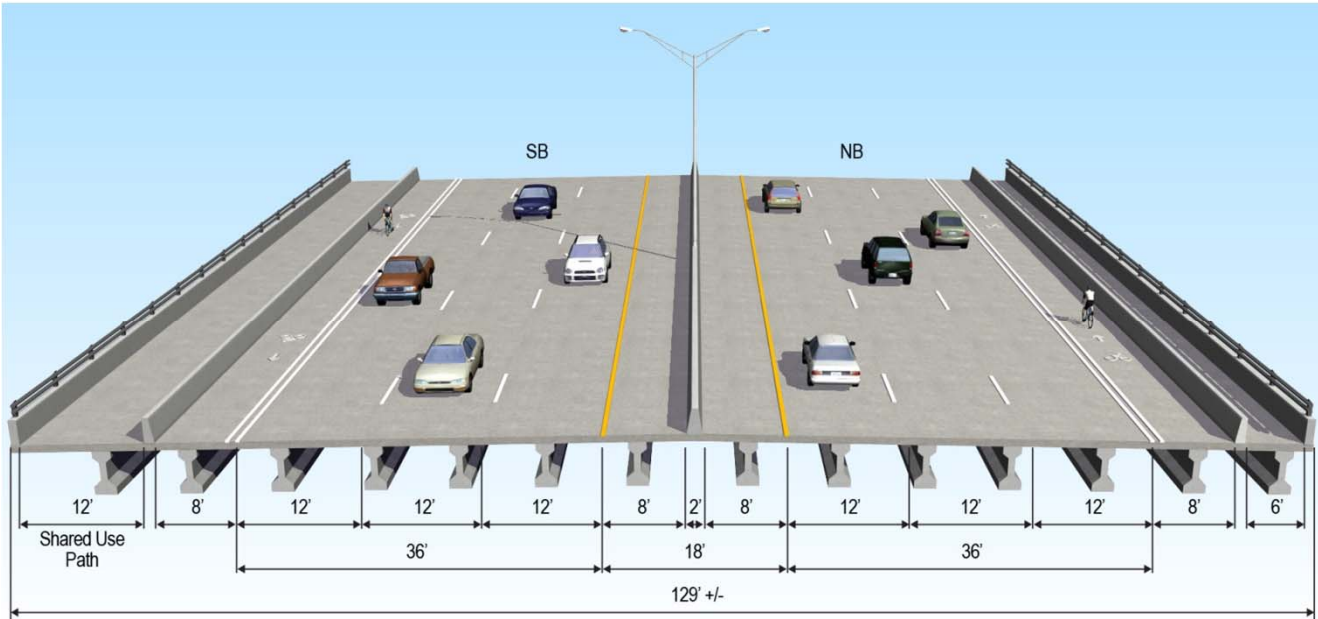
**US 41(SR 45) PD&E Study**  
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**Recommended Suburban  
 Typical Sections**

**Figure 1-5**

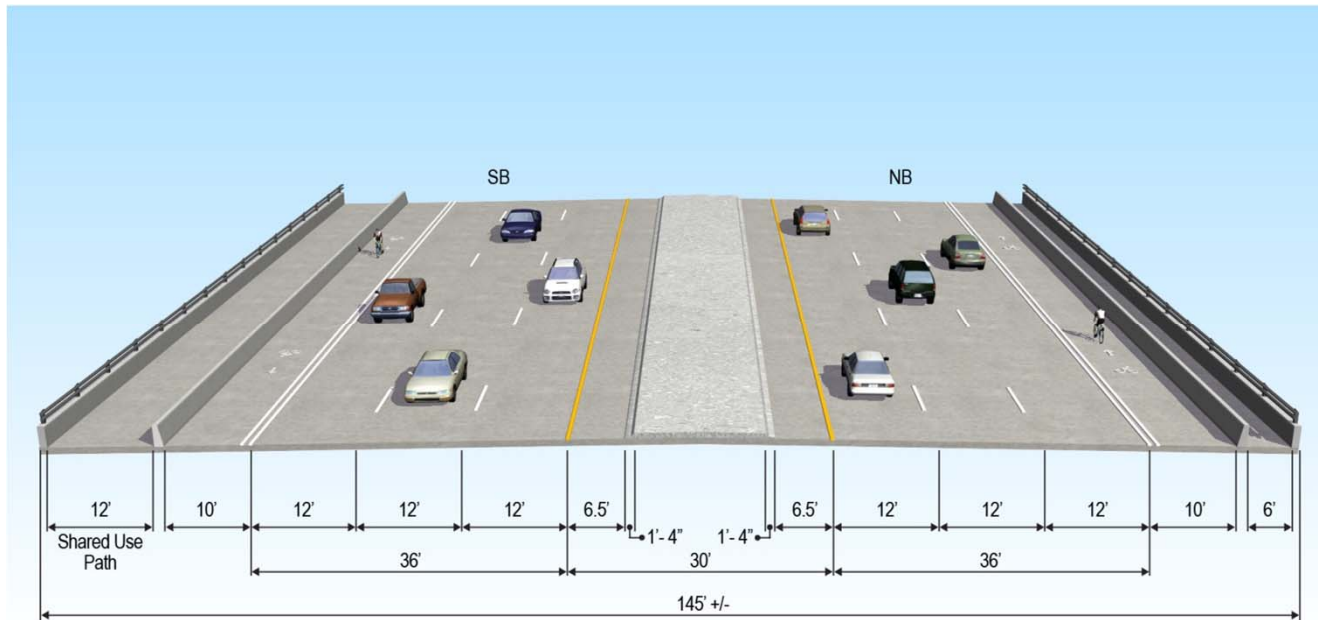


(All views are looking north)



**Bridge at Alafia River**

Design Speed = 50 mph



**Bridge at Bullfrog Creek**

Design Speed = 50 mph

Rev. 10/12/16



**US 41(SR 45) PD&E Study**  
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**Planned Bridge  
 Typical Sections**

**Figure 1-6**

**Emergency Evacuation** - US 41 is listed as an evacuation route by the Hillsborough County Emergency Management and shown on the Florida Division of Emergency Management's evacuation route network. US 41 provides access to I-75 via interchanges with east-west connections on Gibsonton Drive, Big Bend Road (CR 672) and SR 60 in close proximity to the study limits.

**Current and Future Transportation Demand** - Traffic in the corridor is expected to increase due to projected population and employment growth along the corridor. In 2013, the Annual Average Daily Traffic (AADT) ranged between 23,400 vehicles per day (VPD) (Level of Service [LOS] B) and 36,400 VPD (LOS B) within the study area according to the *Traffic Technical Memorandum*. With a maximum AADT of 32,350 VPD over the four lane section, US 41 is at 88 percent capacity for the adopted level of service standard of D. In 2040, AADTs are expected to range between 38,800 VPD and 61,000 VPD. The existing four lane cross section would result in a LOS F in some segments with the future projected traffic volumes. The widening of this facility is also intended to provide relief to parallel facilities such as I-75 and US 301.

**Modal Interrelationships** – Expansion of the existing roadway would help improve mobility for the Hillsborough Area Regional Transit (HART) Authority local bus route 31 within the corridor. Bicycle and pedestrian accommodations will also be considered as part of the proposed improvements.

US 41 is part of the highway network that provides access to regional intermodal facilities such as the Port of Tampa and Port Manatee. The segment of US 41 between Madison Avenue/Pendola Point Road and SR 676 is designated as a Strategic Intermodal System (SIS) *connector*. The SIS is a statewide network of highways, railways, waterways, and transportation hubs that handle the bulk of Florida's passenger and freight traffic. Improvements to US 41 would enhance access to activity centers in the area and would improve movement for goods and freight in the Tampa Bay region and across the State.

## **1.5 REPORT PURPOSE**

This *Location Hydraulics Memorandum* (LHM) is one of several documents prepared as part of this PD&E study. This LHM was prepared to identify potential impacts to the floodplain and regional drainage characteristics including flood zones, and cross drains. The information presented in this document is subject to change until the SEIR is approved. This LHM is preliminary and used as an engineering tool to identify potential floodplain encroachments as a result of the proposed improvements.

## SECTION 2 HYDRAULIC ANALYSIS

The study limits of the US 41 corridor traverses 9 regional basins with ultimate discharge to Tampa Bay. There are 12 cross drains and 6 bridge pair/bridge culverts within the study limits. See **Table 2-1** for basin locations and **Tables 2-2 & 2-3** for cross drain and bridge locations.

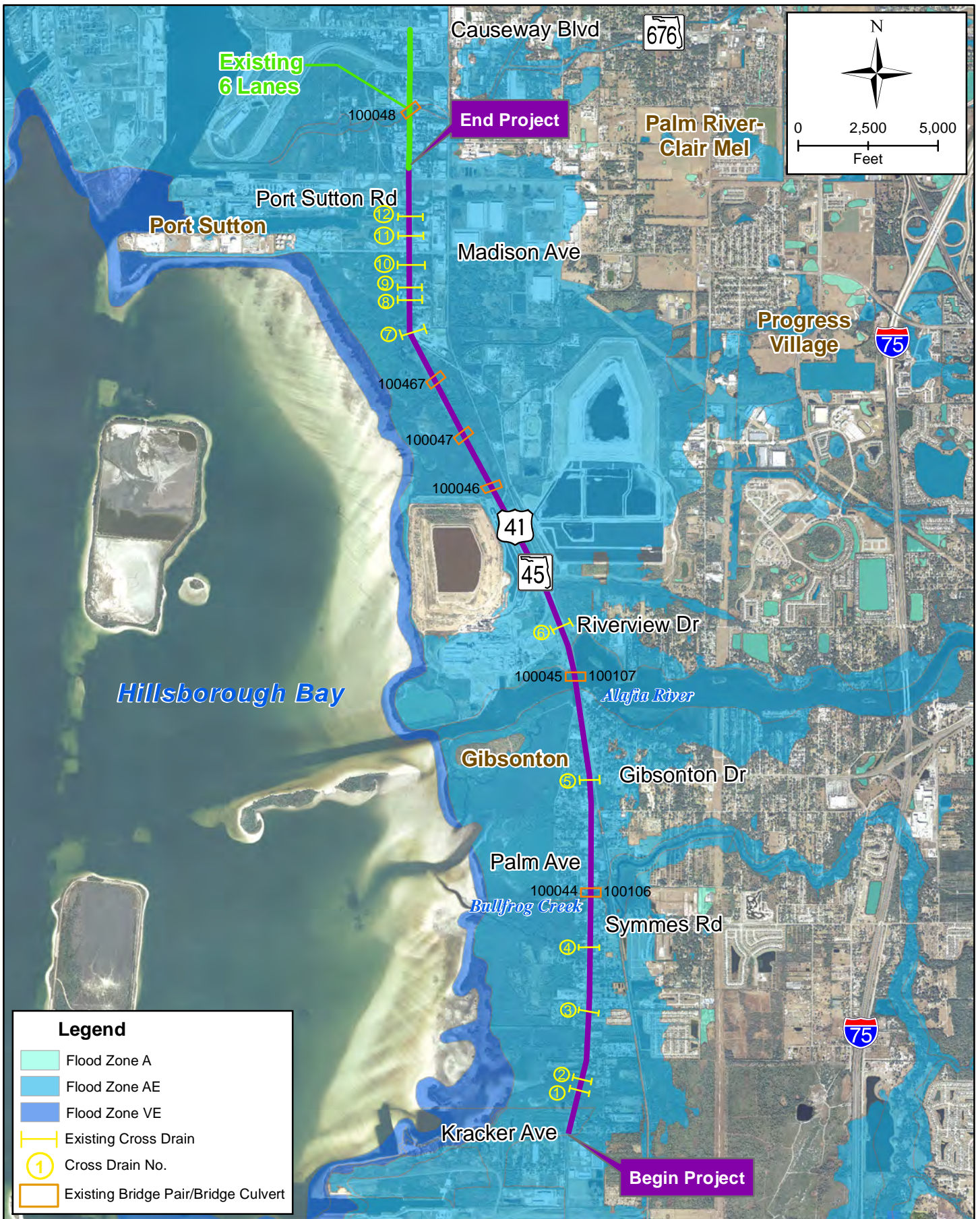
**Table 2-1 Drainage Basin Data**

Regional Basins	Project Basin No.	Project Basin Boundaries	Project Basin Acreage (ac)	Outfall Location
Kitchen Branch	1	Sta 831+00 to Sta 848+90	7.48	Sta 844+41
	2	Sta 848+90 to Sta 869+91	8.78	Sta 848+90
Direct Runoff to Bay	3	Sta 869+91 to Sta 892+40	9.40	Sta 875+14
Bullfrog Creek	4	Sta 892+40 to Sta 917+37	10.43	Sta 917+37
	5	Sta 917+37 to Sta 946+99	12.38	Sta 917+37
Direct Runoff to Bay	6	Sta 946+99 to Sta 995+51	20.27	Sta 956+44
North Prong Alafia R	7	Sta 995+51 to Sta 96+75	30.21	Sta 1011+93
Archie Creek	8	Sta 96+75 to Sta 118+66	9.15	Sta 96+75
Unnamed Canal	9	Sta 118+66 to Sta 139+67	8.78	Sta 139+67
	10	Sta 139+67 to Sta 160+58	8.74	Sta 139+67
Black Point Channel	11	Sta 160+58 to Sta 189+78	12.20	Sta 176+36
Black Point Drain	12	Sta 189+78 to Sta 208+79	7.94	Sta 204+56
	13	Sta 208+79 to Sta 220+62	4.94	Sta 204+56
<b>Total</b>			<b>150.69</b>	

**Table 2-2 Existing Cross Drains**

Cross Drain No.	Mile Post	Description
1	16.038	10'x5' CBC
2	16.123	10'x5' CBC
3	16.620	10'x8' CBC
4	16.989	36" CC
5	18.160	2-36" CC
6	19.211	30" CC
7	21.423	15" CC
8	21.727	36" CC
9	21.779	2-36" CC
10	21.968	2-36" CC
11	22.166	15" CC
12	22.313	10'x7' CBC





**Legend**

- Flood Zone A
- Flood Zone AE
- Flood Zone VE
- Existing Cross Drain
- 1 Cross Drain No.
- Existing Bridge Pair/Bridge Culvert

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**Existing Cross Drain and Bridge Locations**

**Figure 2-1**

**Table 2-3 Existing Bridge Pair/Bridge Culvert**

<b>Bridge No.</b>	<b>Mile Post</b>	<b>Pipe Size/Type &amp; Water Body</b>
100044	17.422 (SB)	Bridge Pair (Bullfrog Creek)
100106	17.422 (NB)	Bridge Pair (Bullfrog Creek)
100045	18.914 (SB)	Bridge Pair (Alafia River)
100107	18.914 (NB)	Bridge Pair (Alafia River)
100046	20.271	36' Bridge Culvert (Archie Creek)
100047	20.686	31' Bridge Culvert (Archie Creek)
100467	21.084	26' Bridge Culvert (Fred's Creek)
100048	23.003	36' Bridge Culvert (Delaney Creek)

**2.1 HISTORY OF FLOODING**

Based on correspondence with District 7 Drainage Office and District 7 Maintenance Office there are three flood investigation sites and several locations of maintenance concern within the project limits. No history of roadway flooding was identified.

Flood investigation sites include flood investigation Nos. 1001032008834, 1005262005805, and 1006222010925.

Maintenance related issues identified include:

- US 41 at Palm Ave M.P. 17.642 southbound complaints related to ponding issue at roadside.
- At Florence St. MP. 16.862 there is a low area that retains water during wet season due to minimal outflow.
- At Dover St. MP.21.828 there is a low area that holds water during wet season. The outfall is to a creek flowing west to Tampa Bay. The outfall ditch needs clearing. This may be a County drainage easement and may be County maintained.
- At Bullfrog Creek, MP. 17.406 the utility strip leaches water over sidewalk area for several blocks to the north.
- At Raleigh St.MP. 23.018 the old Chloride Battery Facility site has contaminated soil and is a Superfund site. Special attention needed in this area.

These current maintenance related issues have been taken into consideration in regards to the widening of US 41.

**2.2 AVOIDANCE ALTERNATIVES**

The floodplain encroachments resulting from the proposed improvements may be reduced during the design phase by adjusting the typical sections within the encroachment areas and steepening the side slopes or possibly adding retaining walls. Additionally, the stormwater management facilities (SMF) serving the project will be located to avoid or minimize impacts to floodplain resources and functions where reasonable and feasible.



### **2.3 EMERGENCY SERVICES AND EVACUATIONS**

US 41 (SR 45) has no history of stormwater overtopping due to the existing floodplain and the existing roadway elevation will not be lowered, therefore no emergency services or evacuation opportunities will be adversely affected.

During construction there will be potential impacts to traffic, including emergency vehicle services. The traffic control plan for the project should provide for minimal disruption to traffic and maintain access to side streets and driveways at all times.

### **2.4 BASE FLOODPLAIN**

The FEMA FIRMs dated August 28, 2008: 12057C0484H, 12057C0482H, 12057C0369H and 12057C0367H indicate that the study limits are within Flood Zone AE (EI 11.0 ft) from approx. Station 831+00 to approx. Station 840+00 and Zone AE (10.0 ft) for the remainder of the study limits. FEMA Maps are provided in **Appendix A**. Per SWFWMD the FEMA elevations are based on storm surge conditions and base floodplain impacts will be assessed based on the lower riverine floodplain elevations.

Hillsborough County provided the following studies that establish the base floodplain for the project limits:

- Bullfrog Creek/ Wolf Branch Watershed Management Plan, dated October 2000
- Countywide Masterplan Update for the Alafia River Watershed, dated November 2010
- Delany Creek Area Stormwater Master Plan Update, dated April 2007

Hillsborough County provided GIS data along with the reports that identifies model node locations as well as other information. A nodal diagram is provided in **Appendix B** along with excerpts from these reports. Floodplain elevations for each project basin are identified in **Table 2-4**. Bullfrog Creek elevations are provided in NGVD 29, however these elevations have been converted to NAVD 88 based on a conversion factor of -0.9.

The project's drainage design will be consistent with local FEMA, FDOT, and Southwest Florida Water Management District (SWFWMD) design guidelines, which state that no net encroachment into the floodplain, up to that encompassed by the 100-year event, which will adversely affect conveyance, storage, water quality or adjacent lands will be allowed., and that any required compensating storage shall be equivalently provided. Therefore, no significant changes in base flood elevations or limits will occur.

## **2.5 REGULATORY FLOODWAY**

The FEMA FIRMs identify designated floodways associated with the Bullfrog Creek, Alafia River, and Delany Creek water bodies. Bridge hydraulics reports will be prepared for each bridge and a No-Rise certification will be performed for modifications to bridge associated with each regulated floodway during the design of this project.

## **2.6 NATURAL AND BENEFICIAL FLOODPLAIN VALUES**

The proposed roadway will follow the same general alignment as the existing roadway and compensating storage will be provided equivalent to any proposed encroachments. Therefore, no natural and beneficial floodplain values will be significantly affected.

## **2.7 FLOODPLAIN CONSISTENCY AND DEVELOPMENT**

The proposed improvements are designed to accommodate increased future traffic volumes within the region as a result of the region's anticipated population growth. The proposed improvements are designed to allow an increased volume of traffic to pass through the region. This could directly increase commercial development within the vicinity of the improvements and lead to an increase in floodplain development. All future development within the vicinity of the proposed improvements must comply with the National Flood Insurance Program, which stipulates that all floodplain impacts will be compensated for by an equivalent volume. The proposed improvements are consistent with the Future of Hillsborough Transportation Element, which is the comprehensive plan for Unincorporated Hillsborough County. The proposed improvements are also included within the Hillsborough County Metropolitan Planning Organization's 2040 Long Range Transportation Plan as an unfunded need. Any future development will be in accordance with designated land uses according to the Hillsborough County adopted comprehensive plan and land development regulations. Therefore, no significant changes in base flood elevations or limits will occur.

## 2.8 FLOODPLAIN INVOLVEMENT

The project limits have been evaluated to determine potential impacts to the base floodplain. **Table 2-4** identifies estimated floodplain elevations. Cup for cup compensation has been programmed for any fill placed within the riverine floodplain. Alternatively, per discussion with SWFWMD, modeling and documentation could be provided to demonstrate that the fill placed within the riverine floodplain will not adversely affect conveyance, storage, water quality or adjacent lands. Therefore, it is anticipated that much of the floodplain mitigation provisions identified by this evaluation could be eliminated or reduced through more detailed analysis and modeling. Approximate required floodplain compensation site area requirements will be estimated and reported in the *Pond Sizing Report* being prepared for this study.

**Table 2-4 Preliminary Floodplain Encroachment Summary**

Regional Basins	Project Basin No.	Project Basin Boundaries	Model Node ID	Zone AE-Hillsborough County 100 yr flood EL (ft – NAVD 88) ①
Kitchen Branch	1	Sta 831+00 to Sta 848+90	822100	2.8
	2	Sta 848+90 to Sta 869+91	822000	1.1
Kracker Ave	3	Sta 869+91 to Sta 892+40	821200	5.0
Bullfrog Creek	4	Sta 892+40 to Sta 917+37	810020,810110	5.1
	5	Sta 917+37 to Sta 946+99	810100	5.6
Gibsonton	6	Sta 946+99 to Sta 995+51	700050	1.8
North Prong Alafia R	7	Sta 995+51 to Sta 96+75	280015	3.9
Archie Creek	8	Sta 96+75 to Sta 118+66	260040	4.5
Palm River-Clair Mel	9	Sta 118+66 to Sta 139+67	240040	4.9
	10	Sta 139+67 to Sta 160+58	200305	7.4
Black Point Channel	11	Sta 160+58 to Sta 189+78	200300,200340	5.1
Black Point Drain	12	Sta 189+78 to Sta 208+79	200025	7.6
	13	Sta 208+79 to Sta 220+62	200080	5.5

① The estimated 100-year elevations are taken from Bullfrog Creek/Wolf Branch Watershed Management Plan, Countywide Masterplan Update for the Alafia River Watershed, and the Delany Creek Area Stormwater Master Plan Update.



## SECTION 3 CONCLUSIONS AND RECOMMENDATIONS

Based on the evaluation of anticipated improvements, the applicable floodplain statement according to the FDOT PD&E Manual Part 2 Chapter 24 is Statement 4- Projects on Existing Alignment involving Replacement of Existing Drainage Structures with No Record of Drainage Problems:

“The proposed drainage structures will perform hydraulically in a manner equal to or greater than the existing structures, and backwater surface elevations are not expected to increase. As a result, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.”

There is little or no risk to the floodplain associated with the proposed alternatives for the improvements to US 41 (SR 45) being considered. A public notification for floodplain impacts does not appear to be warranted.

*Bridge Hydraulics Reports* (BHR) will be prepared for the bridges within the study limits during the design phase. Proposed bridge structures will be hydraulically equivalent to existing bridges.

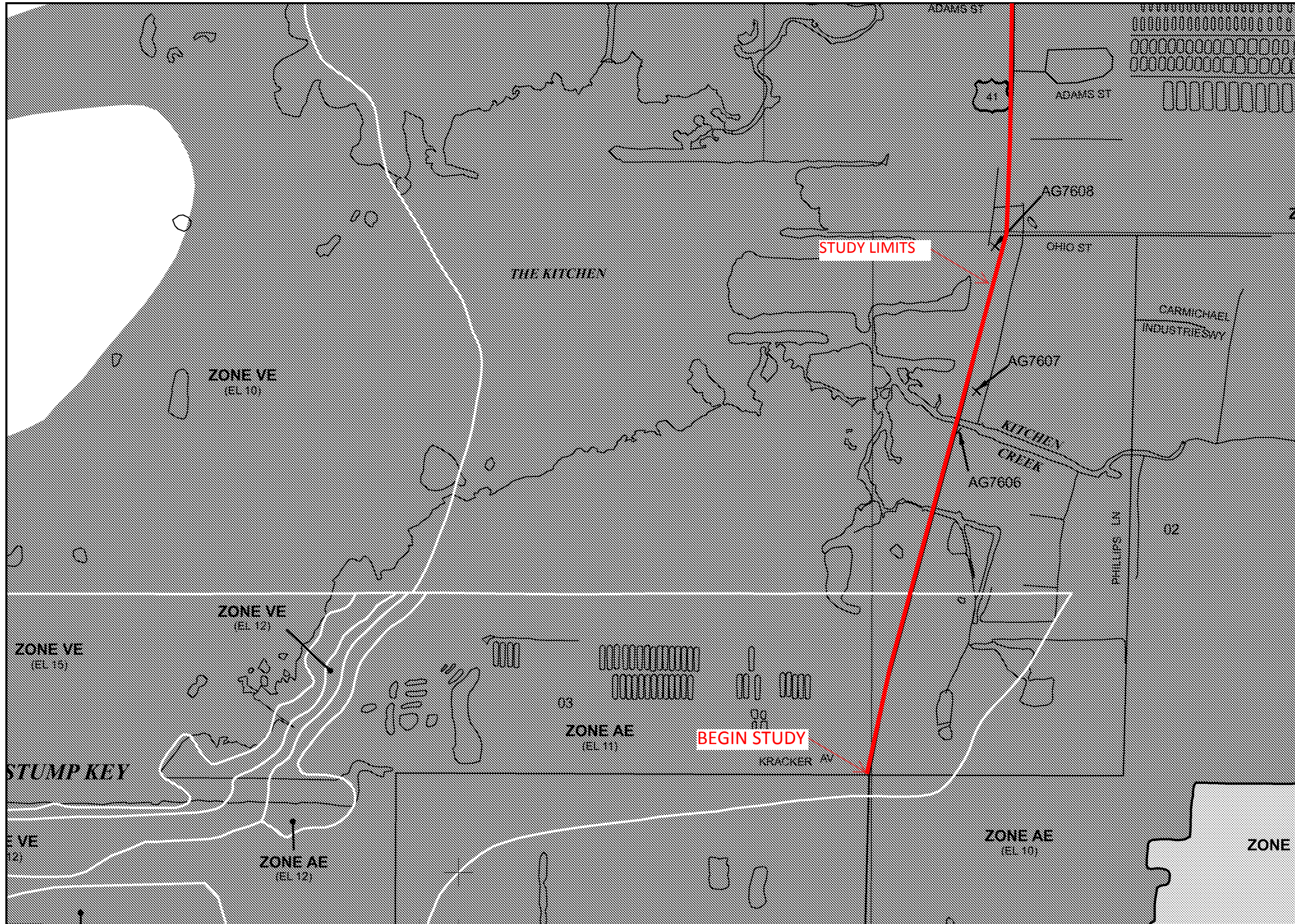
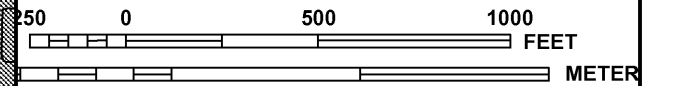
A *Pond Sizing Report* is being prepared for the project to identify project stormwater management requirements, including provision for providing water quality treatment for surface water runoff from proposed impervious areas prior to discharge to receiving waters.

# APPENDIX A

## FEMA MAPPING



MAP SCALE 1" = 500'



PANEL 0484H

NATIONAL FLOOD INSURANCE PROGRAM

# FIRM

FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 484 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0484	H

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER  
12057C0484H

EFFECTIVE DATE  
AUGUST 28, 2008

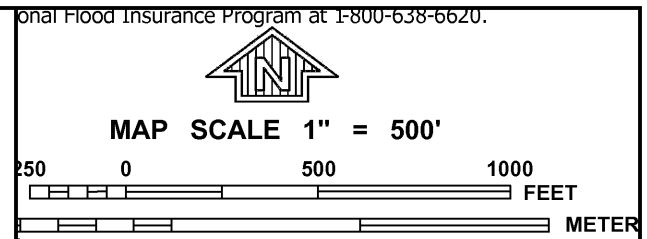
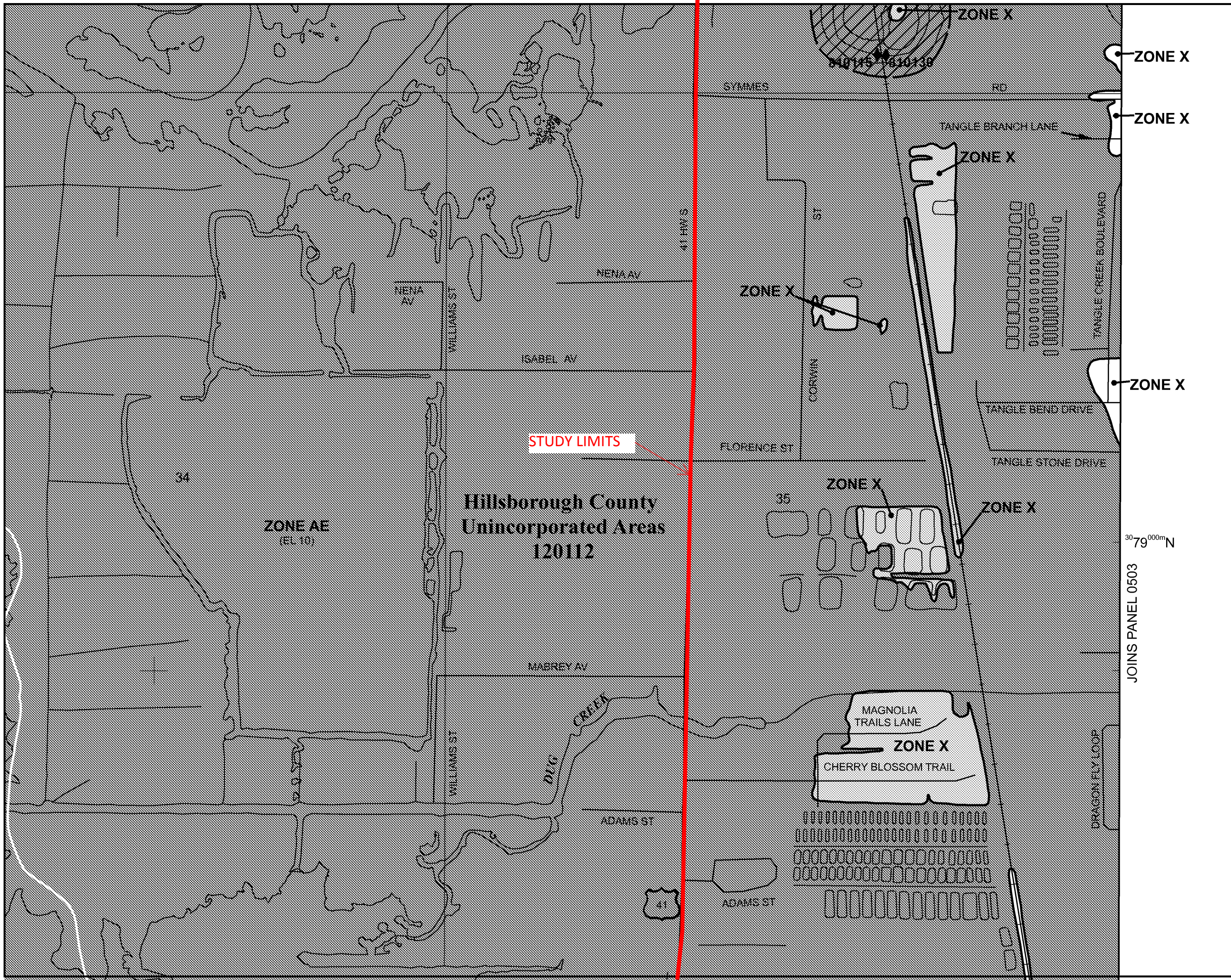
Federal Emergency Management Agency

363<sup>000m</sup>E JOINS PANEL 0492

364<sup>000m</sup>E

ZONE AE  
(EL 10)

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0484H

**FIRM**  
FLOOD INSURANCE RATE MAP

**HILLSBOROUGH COUNTY, FLORIDA**  
AND INCORPORATED AREAS

**PANEL 484 OF 801**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0484	H

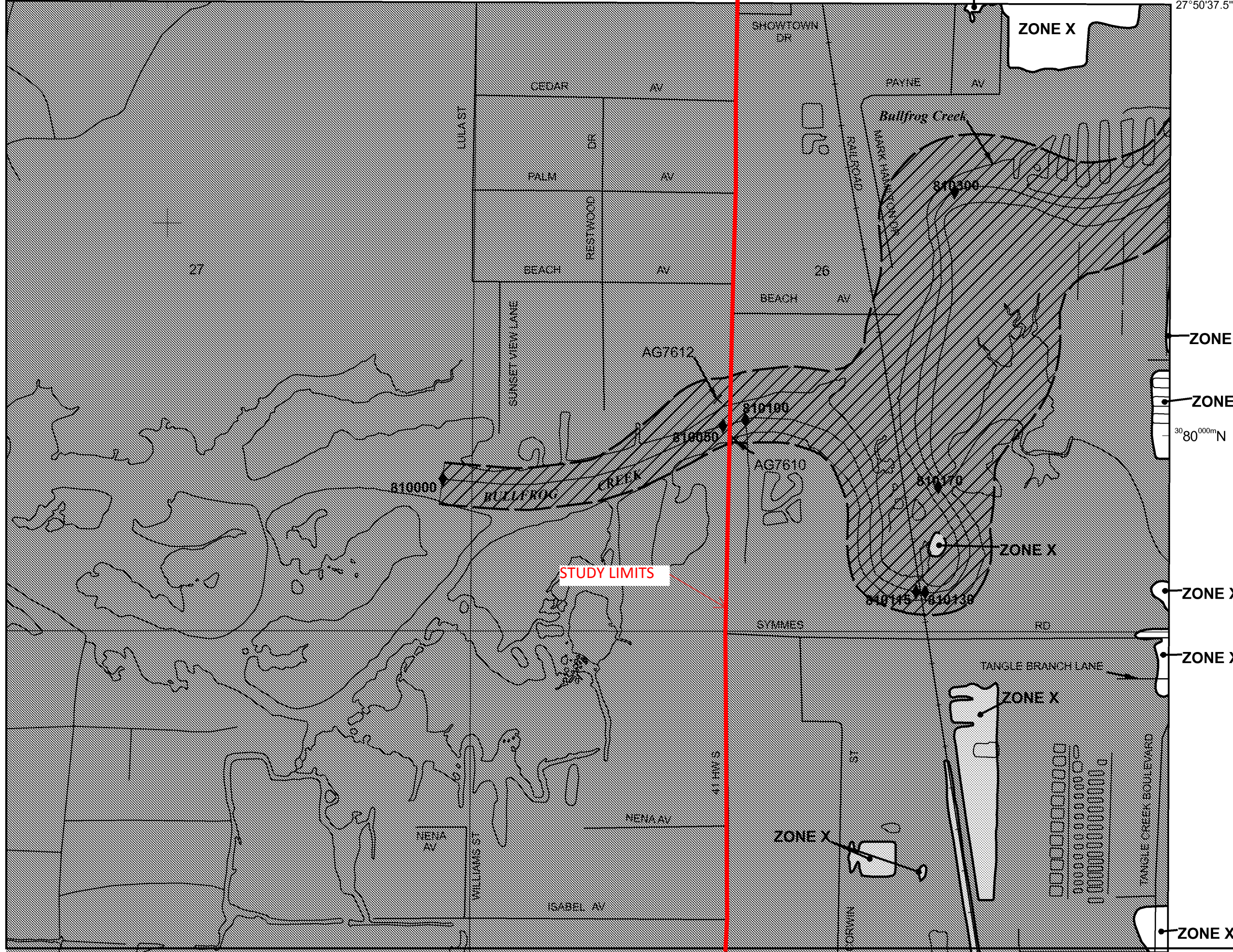
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
12057C0484H

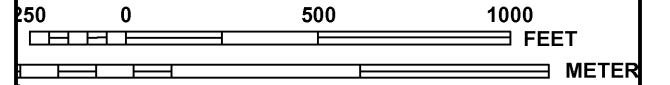
**EFFECTIVE DATE**  
AUGUST 28, 2008

Federal Emergency Management Agency

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MAP SCALE 1" = 500'



PANEL 0484H

**FIRM**  
FLOOD INSURANCE RATE MAP

**HILLSBOROUGH COUNTY,  
FLORIDA**  
AND INCORPORATED AREAS

**PANEL 484 OF 801**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0484	H

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**MAP NUMBER**  
12057C0484H

**EFFECTIVE DATE**  
AUGUST 28, 2008


Federal Emergency Management Agency





30° 82' 00" N  
 30° 81' 00" N  
 3° 63' 00" E JOINS PANEL 0484  
 3° 64' 00" E  
 27° 50' 37.5"  
 82° 22' 30"

National Flood Insurance Program at 1-800-638-6620.



**MAP SCALE 1" = 500'**

250 0 500 1000 FEET

METER

**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0482H

**FIRM**  
 FLOOD INSURANCE RATE MAP


**HILLSBOROUGH COUNTY, FLORIDA**  
 AND INCORPORATED AREAS

**PANEL 482 OF 801**  
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0482	H

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

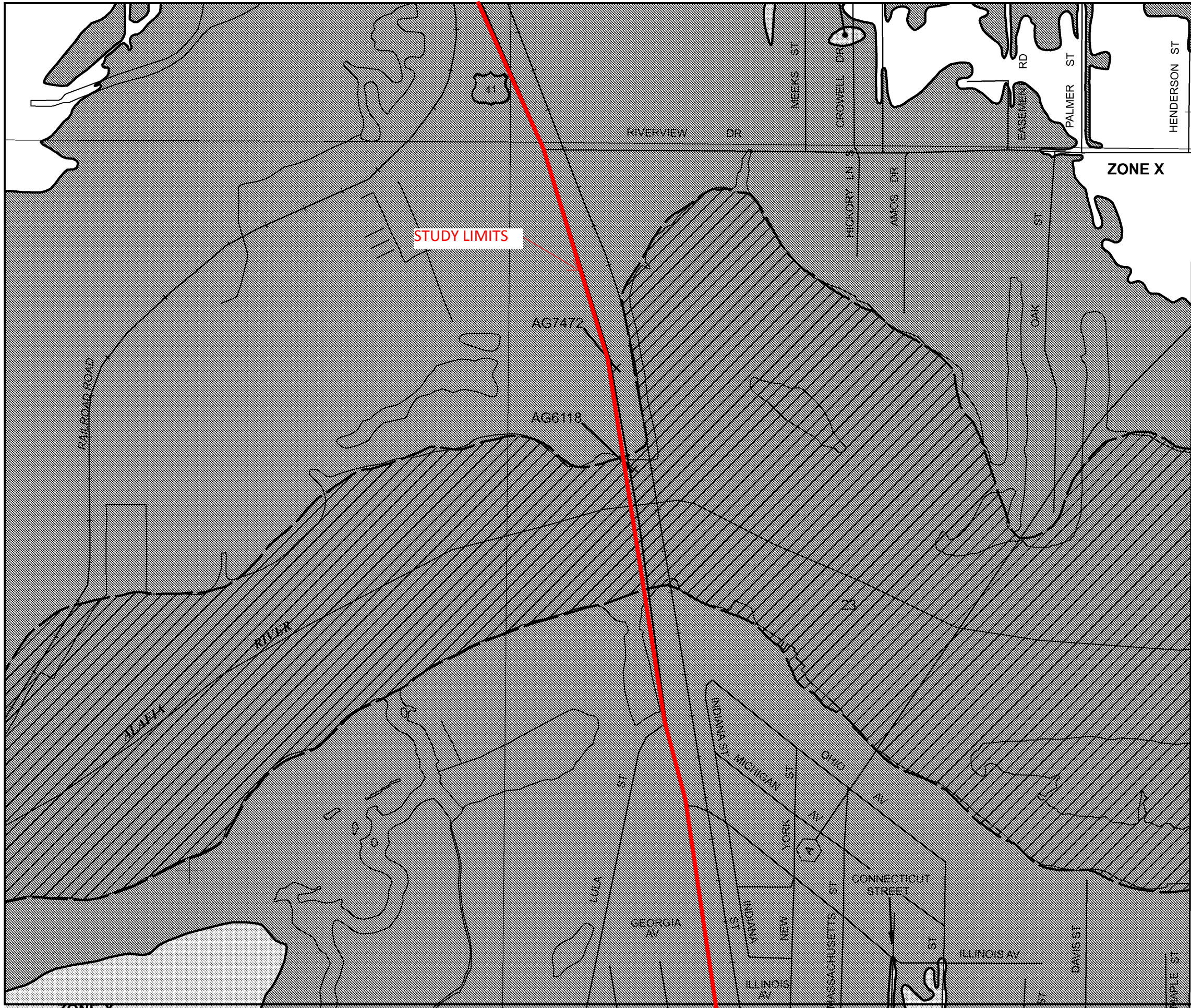


**MAP NUMBER**  
 12057C0482H

**EFFECTIVE DATE**  
 AUGUST 28, 2008

Federal Emergency Management Agency

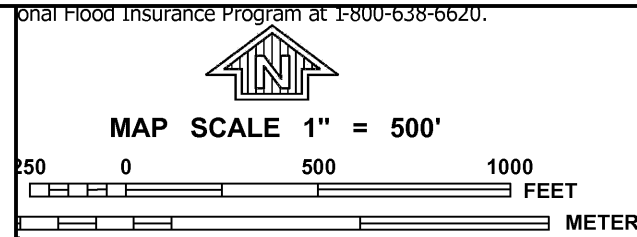
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



30° 83' 00.00\"/>

JOINS PANEL 0501

30° 82' 00.00\"/>



PANEL 0482H

**FIRM**  
FLOOD INSURANCE RATE MAP


**HILLSBOROUGH COUNTY,  
FLORIDA**  
AND INCORPORATED AREAS

**PANEL 482 OF 801**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0482	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.



**MAP NUMBER**  
12057C0482H

**EFFECTIVE DATE**  
AUGUST 28, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

JOINS PANEL 0369 530000 FT

82°22'30"  
27°52'30"

30°84'000m"N

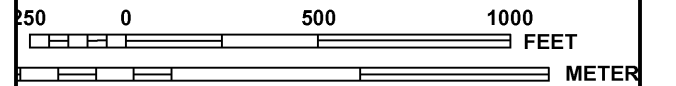
30°83'000m"N



National Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 500'



PANEL 0482H

**FIRM**  
FLOOD INSURANCE RATE MAP

**HILLSBOROUGH COUNTY,  
FLORIDA**  
AND INCORPORATED AREAS

**PANEL 482 OF 801**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0482	H

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**MAP NUMBER**  
12057C0482H

**EFFECTIVE DATE**  
AUGUST 28, 2008

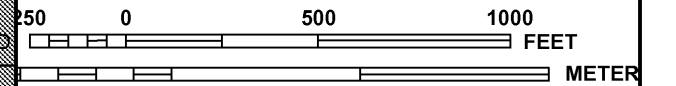
Federal Emergency Management Agency

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MAP SCALE 1" = 500'



1290000 FT

ZONE VE  
(EL 10)

STUDY LIMITS

AG7469

AG7466

AG7465

Hillsborough Bay

Tampa Bay

Archie Creek

ZONE X

27°52'30"

82°24'22.5"

362°000m E

363°000m E JOINS PANEL 0482

PANEL 0369H

# FIRM

FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY,  
FLORIDA  
AND INCORPORATED AREAS

PANEL 369 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0369	H

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER  
12057C0369H

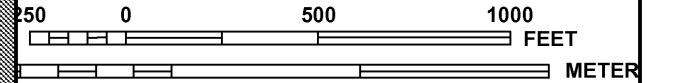
EFFECTIVE DATE  
AUGUST 28, 2008

Federal Emergency Management Agency

Unincorporated Areas  
120112



MAP SCALE 1" = 500'



1295000 FT

ZONE AE  
(EL 10)

BLOOMINGDALE AV

Denaley Creek Popoff

STUDY LIMITS

JENSEN RD

JOINS PANEL 0368

09

Denaley Creek Popoff Canal

CHANCEY RD

10

North

BURTS RD

41

**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0369H

**FIRM**  
FLOOD INSURANCE RATE MAP

**HILLSBOROUGH COUNTY,  
FLORIDA  
AND INCORPORATED AREAS**

**PANEL 369 OF 801**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:


COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0369	H

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER  
12057C0369H**

**EFFECTIVE DATE  
AUGUST 28, 2008**

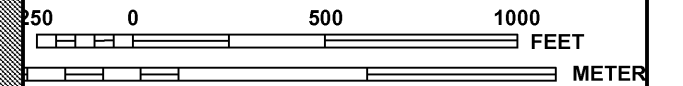
Federal Emergency Management Agency



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MAP SCALE 1" = 500'



82°24'22.5"  
525000 FT  
27°54'22.5"

530000 FT JOINS PANEL



**NFP**

PANEL 0369H

**FIRM**  
FLOOD INSURANCE RATE MAP

**HILLSBOROUGH COUNTY,  
FLORIDA  
AND INCORPORATED AREAS**

**PANEL 369 OF 801**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0369	H

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**MAP NUMBER**  
12057C0369H

**EFFECTIVE DATE**  
AUGUST 28, 2008

Federal Emergency Management Agency

**NATIONAL FLOOD INSURANCE PROGRAM**

Hillsborough County  
Unincorporated Areas  
120112

ZONE AE  
(EL 10)

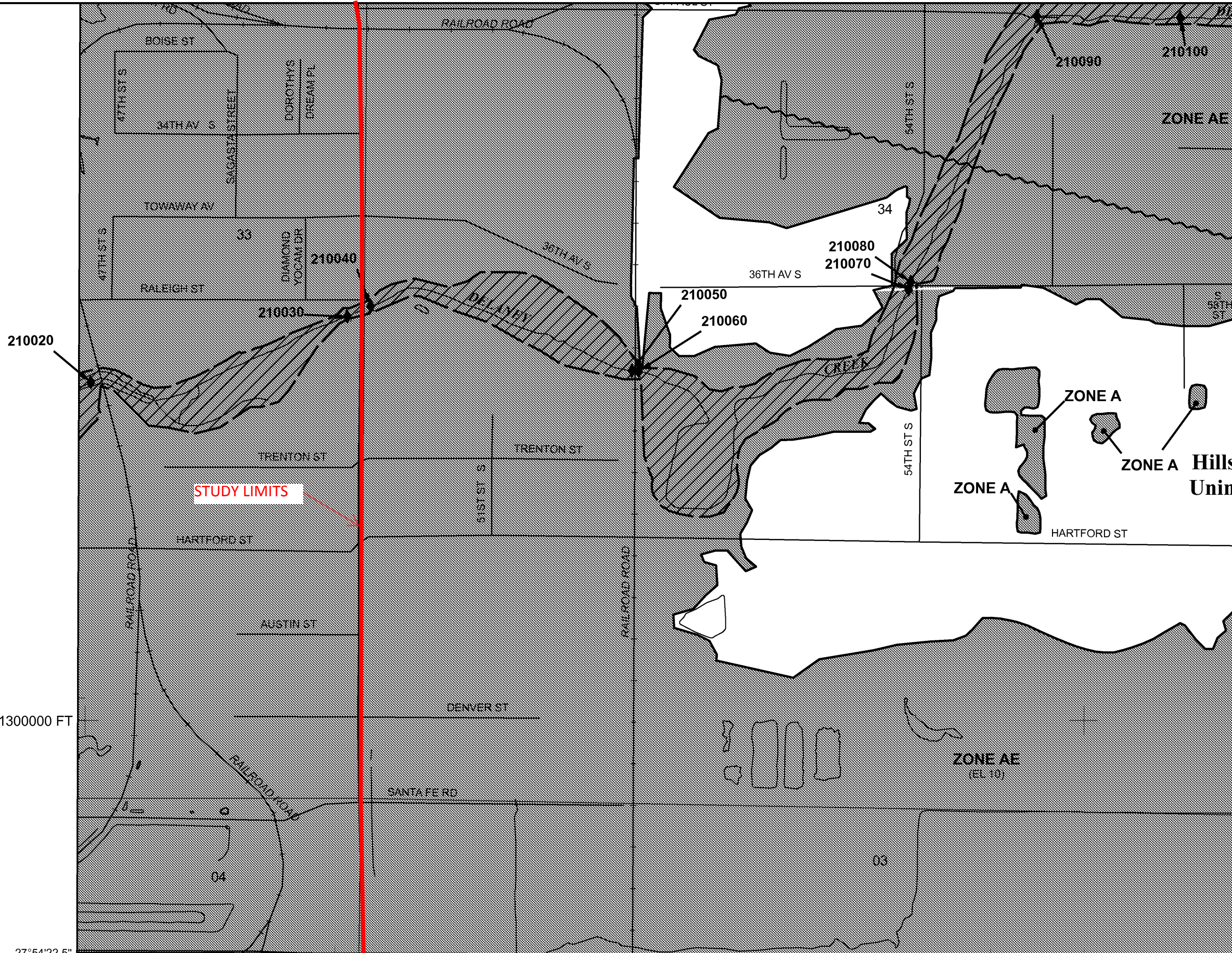
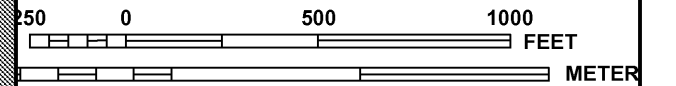
STUDY LIMITS

1295000 FT





MAP SCALE 1" = 500'



STUDY LIMITS

**NFIP**

PANEL 0367H

**FIRM**  
FLOOD INSURANCE RATE MAP

**HILLSBOROUGH COUNTY, FLORIDA**  
AND INCORPORATED AREAS

PANEL 367 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0367	H

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
12057C0367H

**EFFECTIVE DATE**  
AUGUST 28, 2008

Federal Emergency Management Agency

1300000 FT

27°54'22.5"

82°24'22.5"

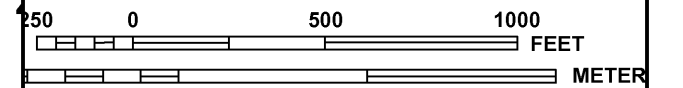
62°00'00" E

63°00'00" E JOINS PANEL 0369

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 500'



24TH AV S  
Delaney Creek

**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0367H

**FIRM**  
FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY,  
FLORIDA  
AND INCORPORATED AREAS

PANEL 367 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0367	H

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**MAP NUMBER**  
12057C0367H

**EFFECTIVE DATE**  
AUGUST 28, 2008

Federal Emergency Management Agency

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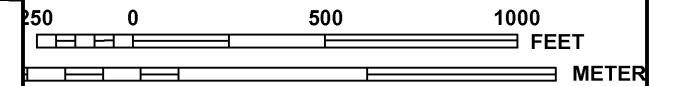
82°24'22.5"  
525000 FT  
27°56'15"

530000 FT JOINS PANEL 0359

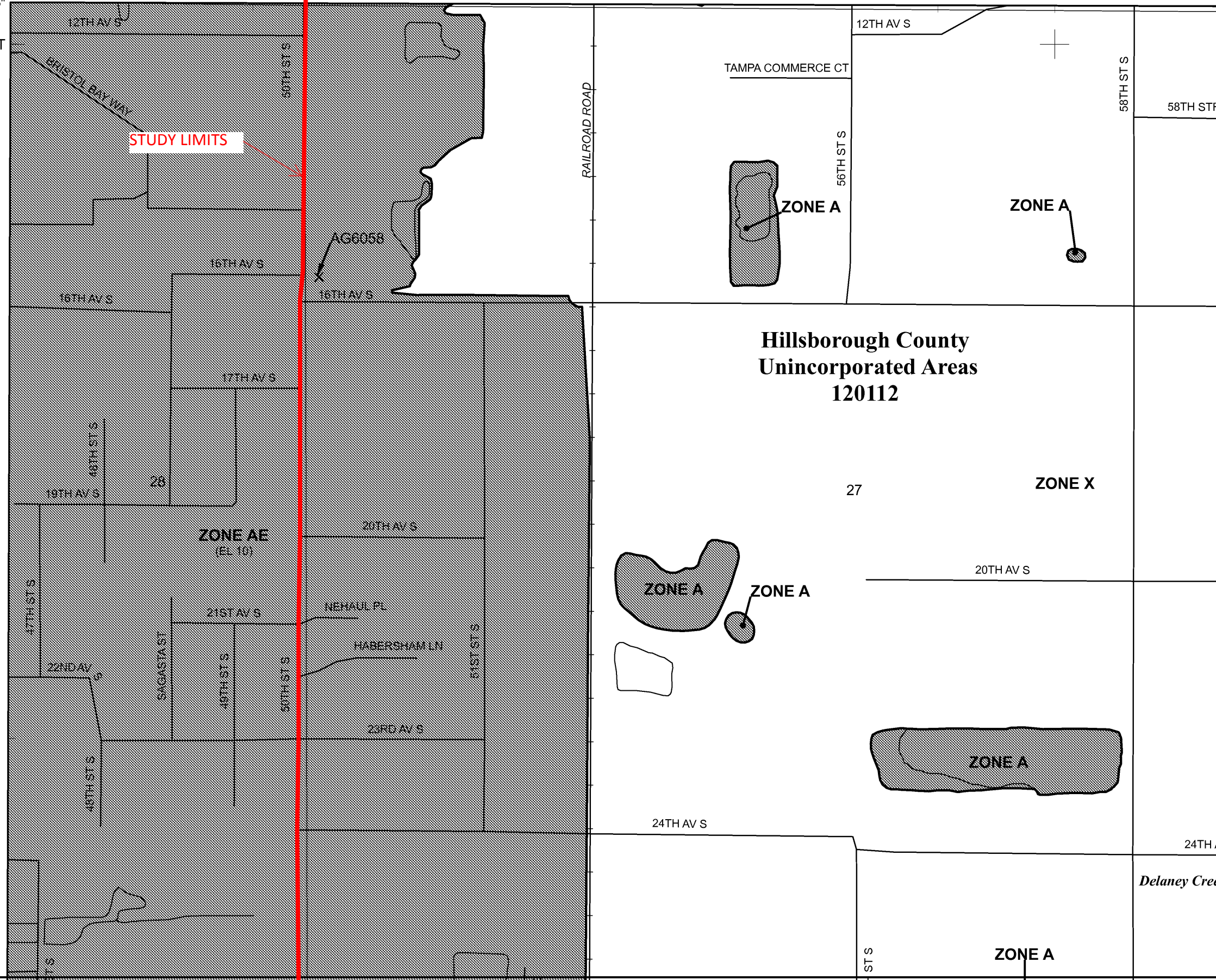
National Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 500'



1310000 FT



**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0367H

**FIRM**  
FLOOD INSURANCE RATE MAP  
HILLSBOROUGH COUNTY,  
FLORIDA  
AND INCORPORATED AREAS

PANEL 367 OF 801  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0367	H

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**MAP NUMBER**  
12057C0367H

**EFFECTIVE DATE**  
AUGUST 28, 2008

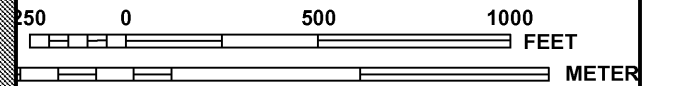
Federal Emergency Management Agency

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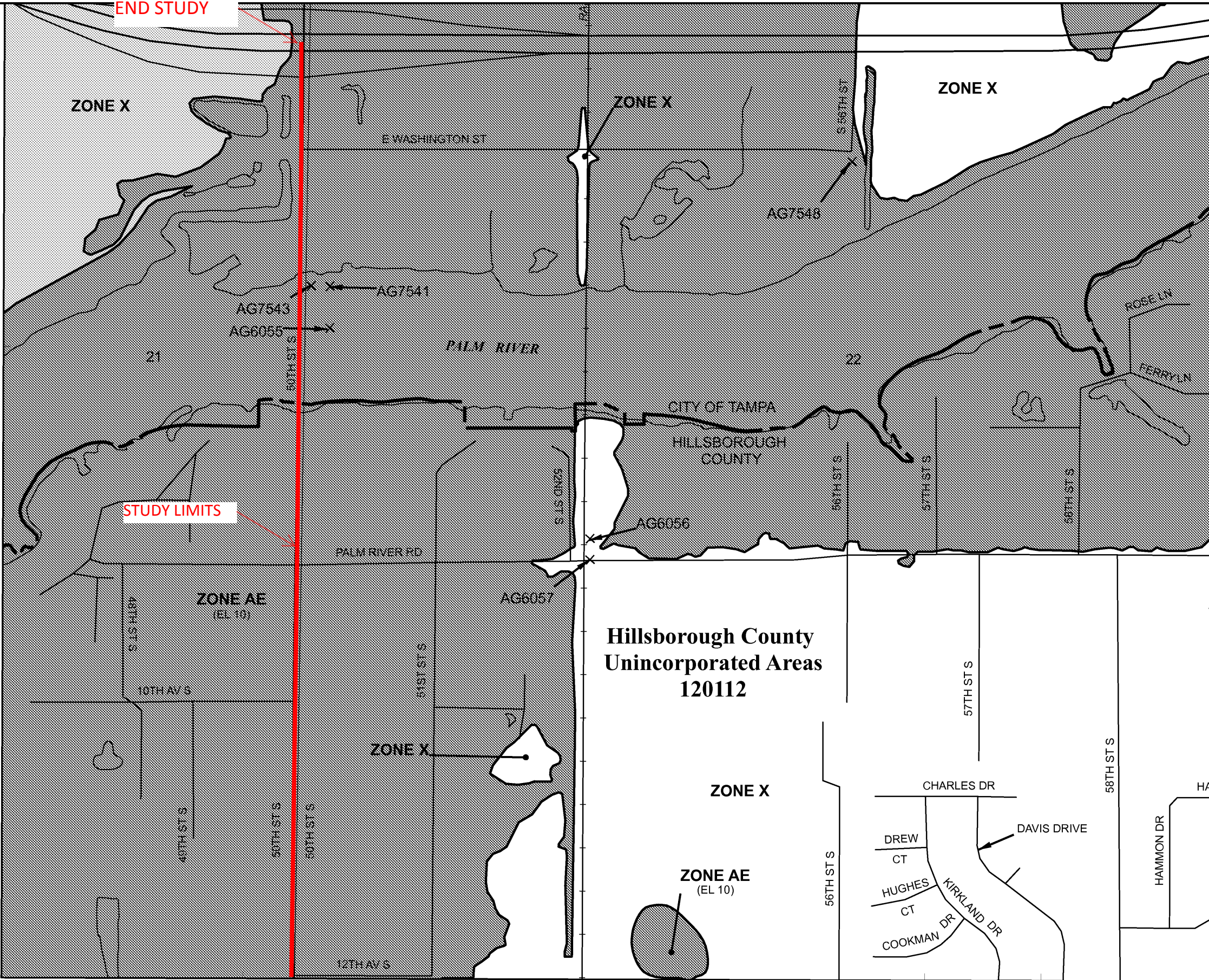


MAP SCALE 1" = 500'



END STUDY

STUDY LIMITS



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0359H

**FIRM**  
FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY,  
FLORIDA  
AND INCORPORATED AREAS

PANEL 359 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0359	H
TAMPA, CITY OF	120114	0359	H

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER  
12057C0359H

EFFECTIVE DATE  
AUGUST 28, 2008

Federal Emergency Management Agency

**Hillsborough County  
Unincorporated Areas  
120112**

525000 FT

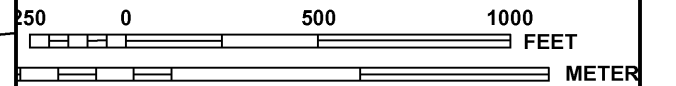
27°56'15" 82°24'22.5" 62°00'00"E

63°00'00"E JOINS PANEL 0367

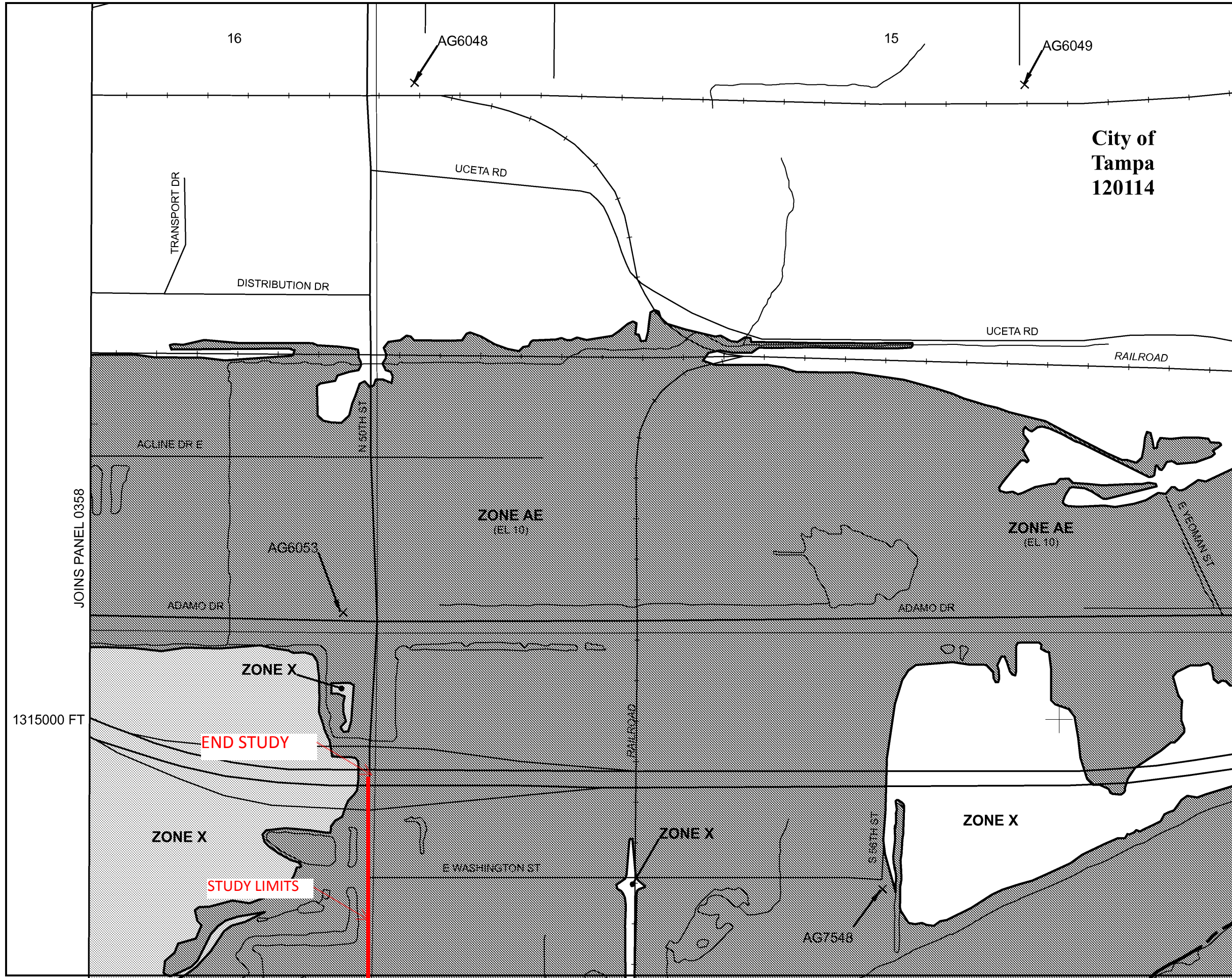
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 500'



City of Tampa 120114



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0359H

FIRM FLOOD INSURANCE RATE MAP

HILLSBOROUGH COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 359 OF 801

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HILLSBOROUGH COUNTY	120112	0359	H
TAMPA, CITY OF	120114	0359	H

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER 12057C0359H

EFFECTIVE DATE AUGUST 28, 2008

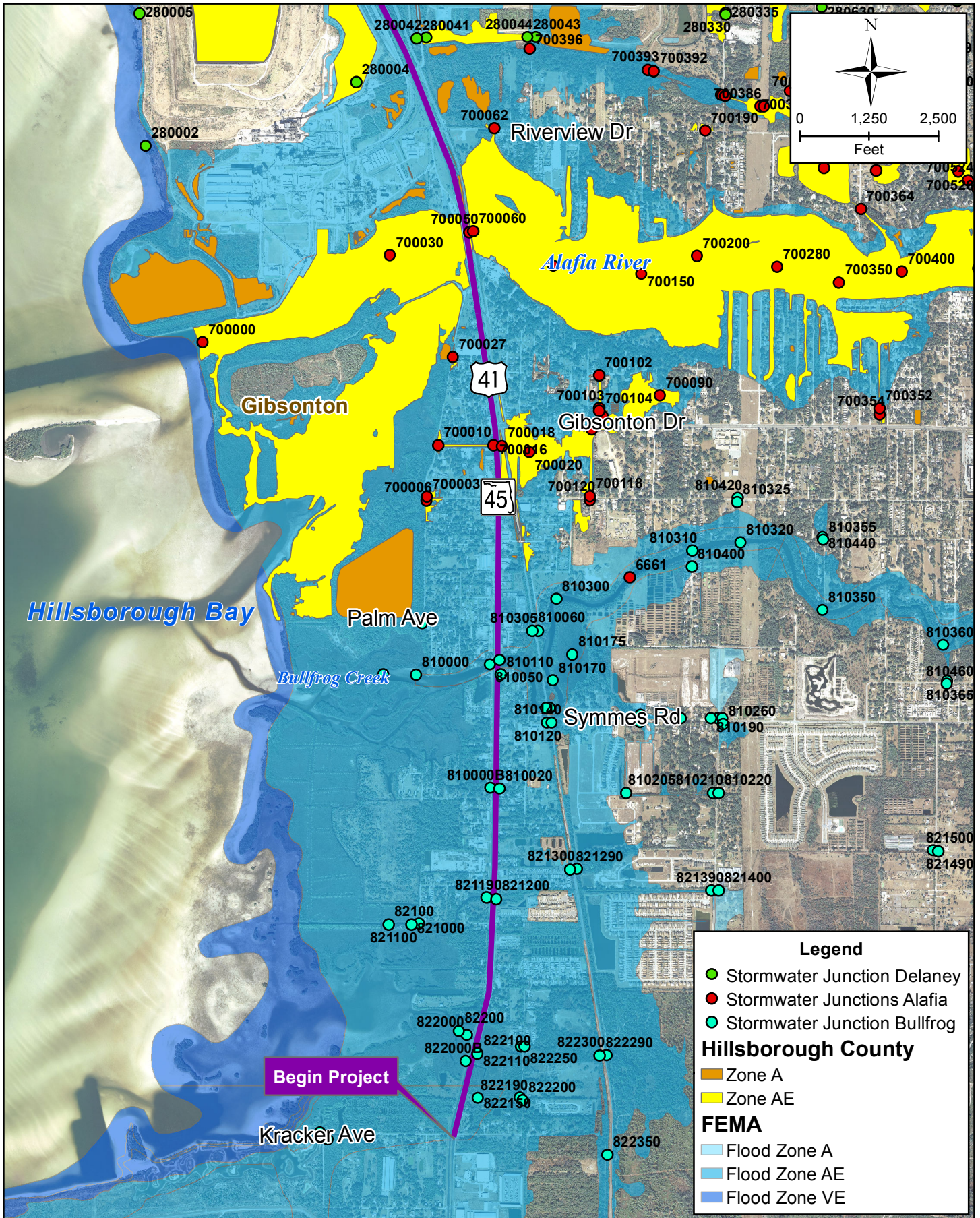
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

# APPENDIX B

## HILLSBOROUGH COUNTY RIVERINE FLOODPLAIN ELEVATIONS





**Legend**

- Stormwater Junction Delaney
- Stormwater Junctions Alafia
- Stormwater Junction Bullfrog

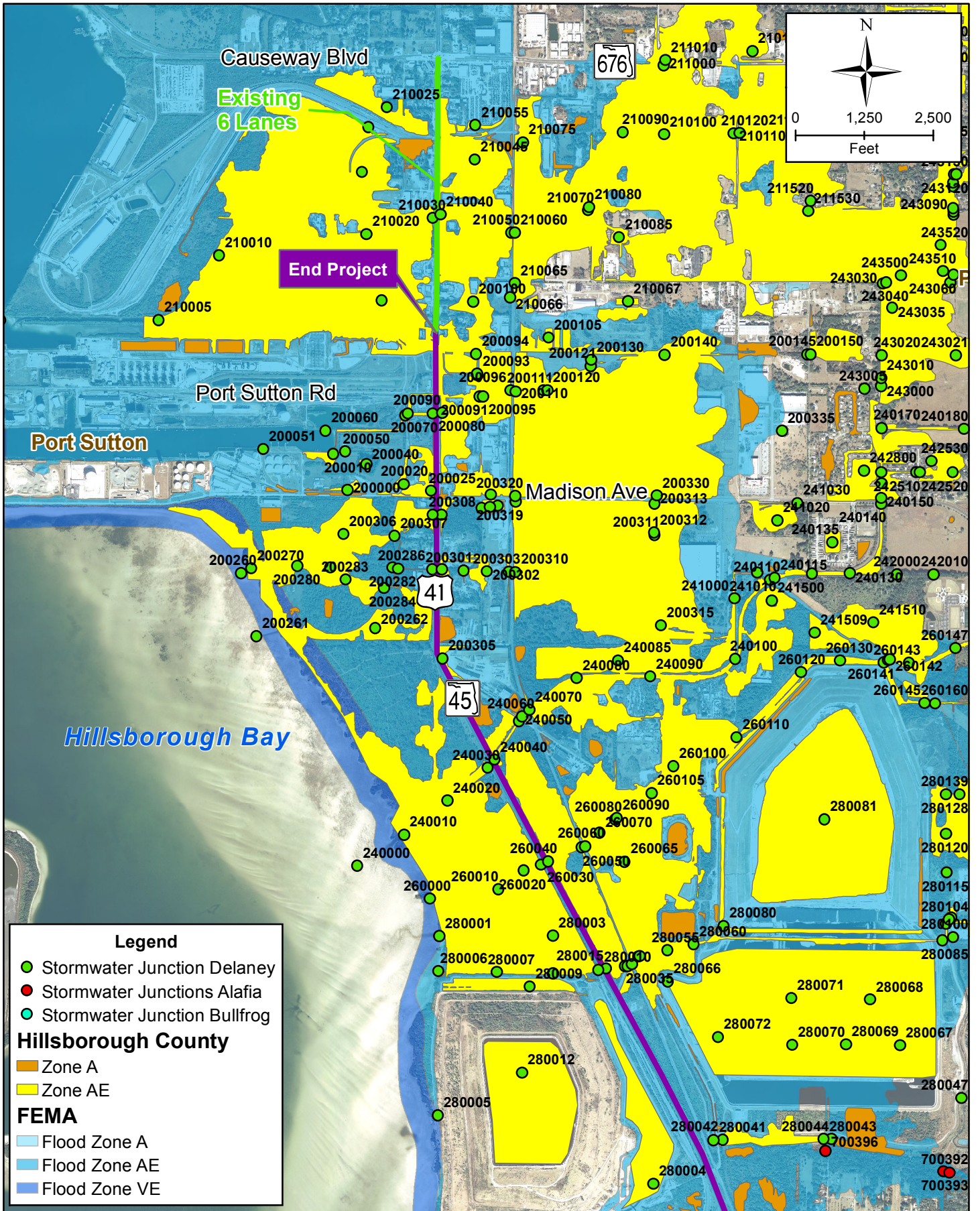
**Hillsborough County**

- Zone A
- Zone AE

**FEMA**

- Flood Zone A
- Flood Zone AE
- Flood Zone VE





**Legend**

- Stormwater Junction Delaney
- Stormwater Junctions Alafia
- Stormwater Junction Bullfrog

**Hillsborough County**

- Zone A
- Zone AE

**FEMA**

- Flood Zone A
- Flood Zone AE
- Flood Zone VE

### 6.3 EXISTING CONDITIONS MODEL SIMULATION RESULTS

The 2.33-, 5-, 10-, 25-, 50- and 100-year design rainfall storm events, each with a design duration of 24 hours, were input to the calibrated model for simulation of peak flood elevations in channels and at structures. Water surface profiles have been generated to show maximum water level elevation for these events. These profiles are presented for each major conveyance system in Exhibits 6-1a through 6-1s. These conditions represent the existing baseline condition (no action plan) flooding response for the Bullfrog Creek/Wolf Branch watershed. A summary of simulated peak stages at all model nodes is presented in Table 6.2 for each design storm simulation.

**Table 6.2  
DESIGN STORM MODEL OUTPUT SUMMARY**

Model Node ID	Existing Conditions Design Flood Elevations (Feet, NGVD)					
	2.33-year	5-year	10-year	25-year	50-year	100-year
Lower Bullfrog Creek						
810000	2.2	2.3	2.6	2.9	3.3	3.6
810020	4.1	4.3	4.6	4.9	5.3	5.5
810040	2.5	3.0	3.8	4.8	5.1	5.1
810050	2.9	3.4	4.1	4.6	5.5	6.1
810060	3.3	3.6	4.3	4.8	5.8	7.4
810100	2.9	3.5	4.2	4.7	5.8	6.5
810110	2.9	3.5	4.2	4.7	5.8	6.5
810115	3.6	4.2	5.1	5.7	6.7	7.4
810120	3.7	4.2	5.1	5.7	6.7	7.4
810130	3.8	4.5	5.5	6.3	7.8	7.5
810140	4.2	4.5	5.5	6.3	7.8	7.5
810170	4.0	4.8	5.8	6.6	8.0	8.0
810175	4.0	4.8	5.8	6.6	8.0	8.0
810180	4.0	4.8	5.8	6.6	8.0	8.0
810185	5.0	5.2	5.8	6.6	8.0	8.0
810190	8.7	8.9	9.3	9.5	10.0	10.2
810195	11.1	11.9	12.1	12.2	12.2	12.2
810200	5.0	5.5	6.1	6.7	8.0	8.2
810205	5.2	5.6	6.2	6.8	8.0	8.2
810210	6.9	7.2	7.4	7.6	8.0	8.4
810220	9.5	9.9	10.4	10.9	11.8	12.5
810240	11.4	12.5	13.3	13.6	13.6	13.6
810260	12.3	13.5	13.7	13.7	13.8	13.9
810300	4.4	5.2	6.3	7.1	8.5	8.6
810305	4.4	5.2	5.6	6.3	7.8	7.5
810310	5.2	6.1	7.3	8.2	9.7	10.0
810320	5.3	6.2	7.5	8.3	9.8	10.2
810325	7.7	7.8	7.9	8.3	9.8	10.2
810350	8.8	10.1	11.8	12.7	14.2	14.9
810355	10.2	10.3	11.8	12.7	14.2	14.9
810360	10.2	11.5	13.2	14.2	15.8	16.6
810365	12.6	12.8	13.2	14.2	15.8	16.6
810370	10.9	12.2	14.0	14.9	16.6	17.4
810380	11.0	12.3	14.1	15.1	16.8	17.7



**Table 6.2**  
**DESIGN STORM MODEL OUTPUT SUMMARY**

Model Node ID	Existing Conditions Design Flood Elevations (Feet, NGVD)					
	2.33-year	5-year	10-year	25-year	50-year	100-year
817695	73.7	74.6	75.6	76.3	77.3	78.8
817700	73.8	74.7	75.7	76.4	77.4	79.0
817740	73.9	74.7	75.7	76.4	77.4	79.0
817750	74.1	75.1	76.3	77.2	78.5	79.7
817800	80.1	80.4	80.7	80.9	81.2	79.8
Unnamed Southern Fork - Little Bullfrog Creek						
818000	57.8	58.3	58.9	59.3	60.0	60.4
818010	67.6	68.1	68.8	69.2	70.0	70.4
818020	77.8	78.3	79.1	79.5	80.4	80.8
818100	78.6	79.8	82.4	83.8	84.6	84.8
818120	88.0	89.2	91.0	92.4	95.2	96.6
818150	90.1	90.2	91.0	92.4	95.2	96.7
818200	80.7	81.3	81.9	82.5	83.3	83.7
818250	81.6	82.0	82.6	83.5	85.5	87.2
Unnamed North Prong - Upper Bullfrog Creek						
819000	48.0	49.4	51.2	52.3	55.0	55.1
819020	48.7	49.6	51.4	52.4	55.2	55.1
819050	52.7	54.2	55.0	55.4	55.9	56.2
819060	76.5	76.7	77.0	77.2	77.5	77.6
819080	78.2	78.5	78.9	79.1	79.5	79.7
819090	85.9	86.1	86.3	86.4	86.8	86.9
819095	86.5	87.3	88.7	90.0	90.5	90.6
819100	90.7	90.9	91.1	91.3	91.5	91.6
819200	89.3	89.5	89.7	89.9	90.1	90.1
Dug Creek - Coastal						
821000	2.1	2.1	2.1	2.1	2.1	2.4
821100	2.2	2.3	2.2	2.1	2.3	2.7
821190	3.3	3.8	4.5	5.0	5.3	5.4
821200	3.3	3.9	4.7	5.3	5.8	5.9
821290	4.1	4.7	5.4	5.9	6.4	6.7
821300	4.4	5.1	6.1	6.8	7.8	8.4
821390	9.8	10.2	10.7	11.1	11.5	11.7
821400	10.3	10.5	10.9	11.2	12.0	12.7
821490	20.0	20.3	20.6	20.9	21.3	21.5
821500	22.5	22.9	23.9	25.1	26.3	26.4
Kitchen Branch - Coastal						
822000	2.0	2.0	2.0	2.0	2.0	2.0
822050	2.1	2.3	2.8	3.3	4.5	4.7
822100	2.1	2.2	2.5	2.8	3.4	3.7
822110	2.4	2.6	2.9	3.3	3.8	4.1
822150	2.1	2.3	2.5	2.8	3.4	3.8
822190	2.1	2.3	2.5	2.8	3.4	3.8
822200	2.2	2.3	2.5	2.9	3.6	4.0
822250	2.5	2.7	3.1	3.6	4.3	4.6
822290	4.2	4.6	5.2	5.6	6.0	6.2
822300	4.3	4.8	5.6	6.2	7.1	7.7
822350	4.6	5.1	5.7	6.2	6.8	7.1

**TABLE 6.11-2**  
**ALAFIA RIVER WATERSHED MANAGEMENT PLAN UPDATE**  
**ALAFIA RIVER MAIN STEM SUBWATERSHED EXISTING CONDITIONS**  
**FLOOD ELEVATIONS SUMMARY**

MODEL JUNCTION	LOCATION DESCRIPTION	24-HOUR DURATION DESIGN STORM MAXIMUM FLOOD ELEVATION, ft NAVD 88					
		2.33-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR
<b>Alafia River from Hillsborough Bay to U.S. Highway 301</b>							
700000	Hillsborough Bay	1.09	1.09	1.09	1.09	1.09	1.09
700030		1.14	1.17	1.23	1.35	1.48	1.61
700050	U.S. Highway 41 Bridge (d/s); FEMA XS No 1	1.16	1.20	1.29	1.45	1.62	1.80
700060	U.S. Highway 41 Bridge (u/s); FEMA XS No 2B	1.16	1.21	1.30	1.46	1.64	1.82
700100	FEMA XS No 5 (A)	1.17	1.22	1.32	1.50	1.69	1.89
700150	FEMA XS No 6	1.19	1.26	1.38	1.60	1.82	2.05
700200	FEMA XS No 7 (B)	1.21	1.29	1.43	1.68	1.93	2.18
700280	FEMA XS No 8	1.23	1.31	1.47	1.74	2.01	2.28
700350	FEMA XS No 9	1.26	1.36	1.56	1.88	2.19	2.48
700400	FEMA XS No 10 (C)	1.36	1.52	1.80	2.25	2.66	3.04
700500	FEMA XS No 11	1.43	1.62	1.95	2.47	2.93	3.35
700550	FEMA XS No 12	1.46	1.66	2.02	2.56	3.04	3.48
700600	FEMA XS No 13 (D)	1.50	1.72	2.10	2.68	3.19	3.64
700700	I-75 Bridge (d/s)	1.51	1.74	2.13	2.72	3.23	3.69
700750	I-75 Bridge (u/s)	1.57	1.83	2.26	2.91	3.46	3.96
700900	FEMA XS No 14	1.68	1.99	2.49	3.22	3.84	4.39
701000	FEMA XS No 15 (E)	1.76	2.10	2.64	3.43	4.09	4.66
701020	FEMA XS No 16	1.84	2.22	2.80	3.64	4.34	4.94
701100	[S-20-T30-R20]	1.91	2.32	2.94	3.82	4.54	5.16
701180	FEMA XS No 17	1.98	2.41	3.06	3.98	4.74	5.38
701200	FEMA XS No 18	2.04	2.49	3.17	4.12	4.90	5.56
701250	U.S. Highway 301 Bridge (d/s); FEMA XS No 19	2.24	2.76	3.54	4.60	5.45	6.17
<b>Alafia River from U.S Highway 301 to Rice Creek</b>							
701350	U.S. Highway 301 Bridge (u/s); FEMA XS No 20B (F)	2.30	2.84	3.65	4.75	5.62	6.36
701370	FEMA XS No 21	2.34	2.91	3.74	4.87	5.76	6.51
701380	FEMA XS No 22	2.36	2.93	3.76	4.89	5.78	6.54
701390	FEMA XS No 23	2.40	2.98	3.82	4.96	5.86	6.62
701400	[S17-T30-R20]	2.44	3.03	3.88	5.04	5.95	6.71
701500	FEMA XS No 24 (G)	2.68	3.36	4.33	5.61	6.60	7.41
701600	Rice Creek	2.80	3.51	4.53	5.87	6.90	7.74
<b>Alafia River from Rice Creek to Buckhorn Creek</b>							
701700	FEMA XS No 25	2.83	3.56	4.59	5.94	6.98	7.83
701800	FEMA XS No 26 (H)	3.05	3.85	4.95	6.39	7.49	8.39
701900		3.25	4.11	5.26	6.75	7.88	8.81
701950	FEMA XS No 27	3.32	4.19	5.37	6.88	8.02	8.95
702000		3.46	4.38	5.59	7.14	8.32	9.27
702100	FEMA XS No 28	3.71	4.70	5.95	7.54	8.73	9.71
702200	FEMA XS No 29 (I)	3.81	4.82	6.08	7.71	8.94	9.95
702205		4.02	5.07	6.34	7.96	9.19	10.19
702250	FEMA XS No 30	4.19	5.27	6.54	8.17	9.40	10.41
702400	Buckhorn Creek; FEMA XS No 31 (J)	4.77	5.99	7.37	9.11	10.40	11.44
<b>Alafia River from Buckhorn Creek to Bell Creek</b>							
702450	FEMA XS No 32	5.23	6.59	8.07	9.91	11.28	12.39
702500	FEMA XS No 33 (K)	5.27	6.69	8.22	10.07	11.45	12.57
702600		5.34	6.77	8.29	10.16	11.54	12.66
702650	FEMA XS No 34	5.41	6.88	8.47	10.36	11.73	12.83
702700	FEMA XS No 35 (L)	5.49	6.98	8.60	10.58	12.02	13.18
702800		5.65	7.20	8.85	10.83	12.33	13.53
702880	FEMA XS No 36	5.71	7.28	8.92	10.92	12.44	13.64
702900		5.97	7.57	9.23	11.22	12.70	13.89
702950	FEMA XS No 37	6.43	8.15	9.77	11.71	13.17	14.34
703000		6.60	8.33	9.95	11.89	13.34	14.50
703050	FEMA XS No 38	6.81	8.60	10.24	12.19	13.64	14.79
703100	FEMA XS No 39 (M)	7.26	9.21	10.97	13.02	14.53	15.73
703200		7.33	9.32	11.13	13.23	14.78	16.01
703300	FEMA XS No 40 (N)	7.34	9.35	11.19	13.33	14.91	16.15
703400	FEMA XS No 41 (O)	7.62	9.77	11.68	13.83	15.40	16.64
703500	FEMA XS No 42	8.17	10.19	12.06	14.16	15.70	16.92
703550	FEMA XS No 43	8.28	10.30	12.15	14.26	15.79	17.01
703600	FEMA XS No 44 (P)	9.20	11.04	12.83	14.88	16.35	17.53
703700	Bell Creek	9.44	11.30	13.06	15.09	16.54	17.70
<b>Alafia River from Bell Creek to Bell Shoals Road Bridge</b>							
703790	FEMA XS No 45	9.59	11.44	13.19	15.21	16.66	17.82
703800	FEMA XS No 46	9.62	11.47	13.23	15.26	16.72	17.89
703850	FEMA XS No 47	9.92	11.84	13.62	15.63	17.08	18.24
703900	FEMA XS No 48	10.50	12.52	14.42	16.58	18.16	19.34

Table 6-4 Comparison of Peak WSEL for the 100-Year, 1-Day and 100-Year, 5-Day Events

Model Junction ID	Subwatershed	100-Year, 1-Day Peak WSEL (ft NAVD)	100-Year, 1-Day Time to Peak (Hr)	100-Year, 5-Day Peak WSEL (ft NAVD)	100-Year, 5-Day Time to Peak (Hr)	Z5D - Z1D (ft)
200000	Delaney Pop-off	6.86	14.40	6.80	62.90	(0.06)
200010	Delaney Pop-off	6.77	14.30	6.72	62.90	(0.05)
200020	Delaney Pop-off	7.60	24.80	7.82	64.40	0.22
200025	Delaney Pop-off	7.60	24.80	7.83	64.40	0.23
200040	Delaney Pop-off	11.52	25.40	11.67	62.30	0.15
200050	Delaney Pop-off	3.29	13.40	3.41	62.90	0.12
200051	Delaney Pop-off	1.60	0.00	1.60	0.00	0.00
200060	Delaney Pop-off	1.60	0.00	1.60	0.00	0.00
200065	Delaney Pop-off	3.39	19.80	3.50	68.20	0.11
200070	Delaney Pop-off	5.49	19.80	5.86	68.30	0.37
200080	Delaney Pop-off	5.53	19.60	5.90	68.30	0.37
200090	Delaney Pop-off	5.98	19.50	6.41	68.30	0.43
200091	Delaney Pop-off	6.09	19.50	6.50	68.20	0.41
200092	Delaney Pop-off	6.09	19.50	6.50	68.20	0.41
200093	Delaney Pop-off	6.09	19.70	6.50	69.00	0.41
200094	Delaney Pop-off	6.09	19.70	6.50	68.90	0.41
200095	Delaney Pop-off	7.53	17.50	8.01	66.90	0.48
200096	Delaney Pop-off	7.61	17.50	8.09	66.80	0.48
200100	Delaney Pop-off	6.10	20.10	6.51	69.20	0.41
200105	Delaney Pop-off	9.40	13.90	9.40	61.90	0.00
200110	Delaney Pop-off	7.70	18.00	8.20	67.40	0.50
200111	Delaney Pop-off	7.73	18.30	8.22	67.60	0.49
200120	Delaney Pop-off	7.82	18.60	8.31	67.90	0.49
200121	Delaney Pop-off	7.86	18.50	8.34	67.90	0.48
200130	Delaney Pop-off	8.30	13.90	8.57	67.50	0.27
200140	Delaney Pop-off	8.91	14.30	9.05	64.20	0.14
200145	Delaney Pop-off	11.12	15.00	11.07	63.80	(0.05)
200150	Delaney Pop-off	12.98	16.00	13.02	64.80	0.04
200260	Delaney Pop-off	1.60	0.00	1.60	0.00	0.00
200261	Delaney Pop-off	1.60	0.00	1.60	0.00	0.00
200262	Delaney Pop-off	2.03	13.10	1.81	61.30	(0.22)
200270	Delaney Pop-off	2.38	13.30	2.23	62.00	(0.15)
200280	Delaney Pop-off	2.80	13.40	2.68	62.20	(0.12)
200281	Delaney Pop-off	2.94	13.50	2.83	62.30	(0.11)
200282	Delaney Pop-off	2.94	13.50	2.84	62.20	(0.10)
200283	Delaney Pop-off	2.97	13.50	2.86	62.30	(0.11)
200284	Delaney Pop-off	2.97	13.50	2.86	62.30	(0.11)
200285	Delaney Pop-off	5.17	13.60	4.79	62.30	(0.38)

Table 6-4 Comparison of Peak WSEL for the 100-Year, 1-Day and 100-Year, 5-Day Events

Model Junction ID	Subwatershed	100-Year, 1-Day Peak WSEL (ft NAVD)	100-Year, 1-Day Time to Peak (Hr)	100-Year, 5-Day Peak WSEL (ft NAVD)	100-Year, 5-Day Time to Peak (Hr)	Z5D - Z1D (ft)
200286	Delaney Pop-off	3.01	13.50	2.90	62.20	(0.11)
200290	Delaney Pop-off	3.10	13.50	2.99	62.20	(0.11)
200300	Delaney Pop-off	5.82	13.60	5.35	62.20	(0.47)
200301	Delaney Pop-off	6.13	13.50	5.61	62.10	(0.52)
200302	Delaney Pop-off	6.23	13.40	5.71	62.10	(0.52)
200303	Delaney Pop-off	7.43	26.60	7.73	72.00	0.30
200305	Delaney Pop-off	7.43	12.80	7.14	61.10	(0.29)
200306	Delaney Pop-off	3.01	13.40	2.85	62.20	(0.16)
200307	Delaney Pop-off	3.04	13.50	2.87	62.10	(0.17)
200308	Delaney Pop-off	3.06	13.50	2.89	62.10	(0.17)
200310	Delaney Pop-off	7.47	26.60	7.81	72.00	0.34
200311	Delaney Pop-off	7.47	26.60	7.81	72.00	0.34
200312	Delaney Pop-off	7.53	26.10	7.87	72.00	0.34
200313	Delaney Pop-off	7.54	26.10	7.87	71.90	0.33
200315	Delaney Pop-off	7.47	26.70	7.80	72.00	0.33
200319	Delaney Pop-off	7.46	27.30	7.80	72.00	0.34
200320	Delaney Pop-off	6.96	64.00	7.04	72.00	0.08
200330	Delaney Pop-off	8.86	15.90	9.09	65.10	0.23
200335	Delaney Pop-off	8.94	15.30	9.15	64.60	0.21
200340	Delaney Pop-off	4.30	13.40	3.77	61.50	(0.53)
200345	Delaney Pop-off	5.45	15.30	5.44	64.30	(0.01)
200346	Delaney Pop-off	5.47	16.00	5.51	64.80	0.04
200347	Delaney Pop-off	5.49	16.10	5.52	64.90	0.03
200350	Delaney Pop-off	5.52	15.10	5.50	64.30	(0.02)
210000	Delaney Creek	1.60	0.00	1.60	0.00	0.00
210005	Delaney Creek	5.24	18.60	5.65	67.10	0.41
210010	Delaney Creek	5.49	18.50	5.89	67.10	0.40
210015	Delaney Creek	5.50	18.50	5.89	67.10	0.39
210020	Delaney Creek	5.61	18.30	6.01	66.90	0.40
210021	Delaney Creek	5.62	18.60	6.01	67.10	0.39
210022	Delaney Creek	5.61	19.20	6.01	67.10	0.40
210025	Delaney Creek	5.51	18.60	5.90	67.20	0.39
210030	Delaney Creek	5.97	17.20	6.32	66.10	0.35
210040	Delaney Creek	7.74	16.10	7.95	65.10	0.21
210045	Delaney Creek	7.76	16.60	7.98	65.50	0.22
210050	Delaney Creek	8.28	15.80	8.47	64.70	0.19
210055	Delaney Creek	7.77	16.70	7.99	65.60	0.22
210060	Delaney Creek	10.25	15.60	10.39	64.40	0.14



Table 6-4 Comparison of Peak WSEL for the 100-Year, 1-Day and 100-Year, 5-Day Events

Model Junction ID	Subwatershed	100-Year, 1-Day Peak WSEL (ft NAVD)	100-Year, 1-Day Time to Peak (Hr)	100-Year, 5-Day Peak WSEL (ft NAVD)	100-Year, 5-Day Time to Peak (Hr)	Z5D - Z1D (ft)
230160	Delaney Creek	33.26	45.30	35.89	72.00	2.63
230170	Delaney Creek	33.94	32.30	35.92	72.00	1.98
230175	Delaney Creek	35.67	23.30	37.04	63.60	1.37
230177	Delaney Creek	40.13	13.00	39.87	61.20	(0.26)
230178	Delaney Creek	37.87	14.30	38.18	63.80	0.31
230179	Delaney Creek	41.41	12.70	41.17	61.00	(0.24)
230180	Delaney Creek	35.69	23.20	37.20	63.50	1.51
230185	Delaney Creek	35.66	25.20	36.39	67.60	0.73
230186	Delaney Creek	35.70	23.20	37.25	63.40	1.55
230190	Delaney Creek	39.26	15.10	39.81	61.30	0.55
230195	Delaney Creek	45.97	13.50	46.00	61.60	0.03
230196	Delaney Creek	46.26	12.90	46.17	61.20	(0.09)
230197	Delaney Creek	52.89	13.10	52.59	61.30	(0.30)
230200	Delaney Creek	49.85	25.80	50.80	65.30	0.95
231000	Delaney Creek	33.52	13.80	33.55	62.80	0.03
231001	Delaney Creek	33.55	13.80	33.57	62.80	0.02
233000	Delaney Creek	43.73	24.80	44.15	63.80	0.42
233010	Delaney Creek	38.69	25.60	42.36	72.00	3.67
233015	Delaney Creek	38.69	25.60	42.36	72.00	3.67
234000	Delaney Creek	37.71	15.50	38.40	62.70	0.69
240000	Delaney Pop-off	1.60	0.00	1.60	0.00	0.00
240010	Delaney Pop-off	3.90	13.60	3.94	62.30	0.04
240020	Delaney Pop-off	4.25	14.00	4.45	63.50	0.20
240030	Delaney Pop-off	4.47	16.40	4.70	64.30	0.23
240040	Delaney Pop-off	4.90	16.50	5.22	64.50	0.32
240050	Delaney Pop-off	5.58	16.40	5.87	64.60	0.29
240060	Delaney Pop-off	6.72	16.40	7.08	64.70	0.36
240070	Delaney Pop-off	7.09	16.40	7.49	64.70	0.40
240080	Delaney Pop-off	7.16	16.30	7.55	64.70	0.39
240085	Delaney Pop-off	6.19	26.30	7.12	70.70	0.93
240090	Delaney Pop-off	7.40	16.10	7.78	64.50	0.38
240100	Delaney Pop-off	7.71	15.80	8.10	64.30	0.39
240110	Delaney Pop-off	9.01	14.40	9.34	63.30	0.33
240115	Delaney Pop-off	9.40	14.20	9.68	63.10	0.28
240120	Delaney Pop-off	10.02	14.00	10.27	62.70	0.25
240130	Delaney Pop-off	10.42	14.00	10.65	62.70	0.23
240135	Delaney Pop-off	10.51	14.00	10.71	62.60	0.20
240140	Delaney Pop-off	10.64	14.10	10.89	62.80	0.25

Table 6-4 Comparison of Peak WSEL for the 100-Year, 1-Day and 100-Year, 5-Day Events

Model Junction ID	Subwatershed	100-Year, 1-Day Peak WSEL (ft NAVD)	100-Year, 1-Day Time to Peak (Hr)	100-Year, 5-Day Peak WSEL (ft NAVD)	100-Year, 5-Day Time to Peak (Hr)	Z5D - Z1D (ft)
252000	Delaney Pop-off	28.93	18.10	29.27	67.60	0.34
252020	Delaney Pop-off	28.93	18.40	29.26	67.80	0.33
252025	Delaney Pop-off	29.20	12.90	29.27	67.90	0.07
252030	Delaney Pop-off	28.93	18.60	29.24	67.40	0.31
252040	Delaney Pop-off	29.01	15.00	29.24	67.30	0.23
252050	Delaney Pop-off	29.10	14.40	29.24	67.40	0.14
252051	Delaney Pop-off	28.61	25.40	29.15	72.00	0.54
252052	Delaney Pop-off	28.61	34.40	29.15	72.00	0.54
252053	Delaney Pop-off	28.61	32.90	29.15	72.00	0.54
252054	Delaney Pop-off	28.74	13.90	29.15	72.00	0.41
252055	Delaney Pop-off	29.74	25.10	30.26	72.00	0.52
252060	Delaney Pop-off	29.39	14.00	29.31	62.80	(0.08)
252065	Delaney Pop-off	29.96	12.80	30.26	72.00	0.30
252500	Delaney Pop-off	29.01	15.00	29.24	67.50	0.23
252505	Delaney Pop-off	69.10	14.00	60.00	63.20	(9.10)
252510	Delaney Pop-off	29.01	15.00	29.24	67.80	0.23
253000	Delaney Pop-off	28.89	19.70	29.27	67.80	0.38
253005	Delaney Pop-off	29.49	12.90	29.27	67.30	(0.22)
253010	Delaney Pop-off	28.88	19.70	29.26	67.40	0.38
253015	Delaney Pop-off	31.79	12.80	30.13	63.30	(1.66)
253020	Delaney Pop-off	28.88	19.50	29.26	67.40	0.38
253025	Delaney Pop-off	32.65	12.70	31.09	61.20	(1.56)
254000	Delaney Pop-off	29.51	17.40	29.98	65.80	0.47
254010	Delaney Pop-off	29.55	18.20	30.00	66.40	0.45
254020	Delaney Pop-off	29.55	18.10	30.00	66.40	0.45
254030	Delaney Pop-off	29.99	12.60	30.01	66.40	0.02
254040	Delaney Pop-off	30.77	12.50	30.01	66.20	(0.76)
254050	Delaney Pop-off	31.20	12.50	30.67	60.80	(0.53)
260000	North Archie Creek	1.60	0.00	1.60	0.00	0.00
260010	North Archie Creek	3.54	28.40	3.76	72.00	0.22
260020	North Archie Creek	3.83	28.40	4.08	72.00	0.25
260030	North Archie Creek	4.09	28.30	4.35	72.00	0.26
260040	North Archie Creek	4.45	27.70	4.83	72.00	0.38
260050	North Archie Creek	4.96	27.20	5.35	72.00	0.39
260060	North Archie Creek	5.92	26.60	6.75	72.00	0.83
260065	North Archie Creek	6.01	26.40	6.81	72.00	0.80
260070	North Archie Creek	6.56	27.00	7.31	72.00	0.75
260080	North Archie Creek	7.09	27.10	7.65	72.00	0.56

Table 6-4 Comparison of Peak WSEL for the 100-Year, 1-Day and 100-Year, 5-Day Events

Model Junction ID	Subwatershed	100-Year, 1-Day Peak WSEL (ft NAVD)	100-Year, 1-Day Time to Peak (Hr)	100-Year, 5-Day Peak WSEL (ft NAVD)	100-Year, 5-Day Time to Peak (Hr)	Z5D - Z1D (ft)
280003	Archie Creek	1.93	13.70	1.84	62.40	(0.09)
280004	Archie Creek	3.98	13.00	3.10	61.40	(0.88)
280005	Archie Creek	1.77	24.80	1.84	70.30	0.07
280006	Archie Creek	1.60	0.00	1.60	0.00	0.00
280007	Archie Creek	2.89	21.30	3.05	69.80	0.16
280008	Archie Creek	3.23	21.30	3.40	69.80	0.17
280009	Archie Creek	8.60	25.00	9.96	72.00	1.36
280010	Archie Creek	3.55	21.30	3.72	69.80	0.17
280012	Archie Creek	170.64	25.00	171.29	72.00	0.65
280015	Archie Creek	3.86	21.30	4.07	69.80	0.21
280020	Archie Creek	4.16	21.30	4.37	69.80	0.21
280030	Archie Creek	4.46	21.30	4.72	69.80	0.26
280035	Archie Creek	6.56	20.70	7.15	69.30	0.59
280040	Archie Creek	6.56	20.70	7.14	69.30	0.58
280041	Archie Creek	7.19	20.00	7.82	68.80	0.63
280042	Archie Creek	7.66	19.70	8.54	68.40	0.88
280043	Archie Creek	7.72	19.60	8.59	68.40	0.87
280044	Archie Creek	8.05	19.40	8.91	68.20	0.86
280047	Archie Creek	8.21	19.20	9.03	68.00	0.82
280050	Archie Creek	6.54	20.70	7.11	69.70	0.57
280055	Archie Creek	6.54	20.80	7.11	69.90	0.57
280060	Archie Creek	6.54	20.80	7.11	69.80	0.57
280066	Archie Creek	11.00	25.00	11.40	72.00	0.40
280067	Archie Creek	11.00	25.00	11.39	72.00	0.39
280068	Archie Creek	11.00	25.00	11.39	72.00	0.39
280069	Archie Creek	11.02	25.00	11.42	72.00	0.40
280070	Archie Creek	10.98	25.00	11.36	72.00	0.38
280071	Archie Creek	10.98	25.00	11.36	72.00	0.38
280072	Archie Creek	11.29	25.00	11.81	72.00	0.52
280080	Archie Creek	9.94	13.10	9.35	62.00	(0.59)
280081	Archie Creek	111.07	25.00	111.52	72.00	0.45
280085	Archie Creek	8.30	18.90	9.08	67.90	0.78
280086	Archie Creek	8.86	17.60	9.61	67.10	0.75
280088	Archie Creek	10.05	18.50	10.87	66.90	0.82
280089	Archie Creek	10.99	18.80	11.74	66.70	0.75
280100	Archie Creek	8.74	12.60	9.09	68.00	0.35
280104	Archie Creek	8.86	17.60	9.61	67.10	0.75
280105	Archie Creek	8.87	17.60	9.62	67.10	0.75