LOCATION HYDRAULICS TECHNICAL MEMORANDUM

State Road (SR) 50 (US 98/Cortez Boulevard)
Project Development and Environment Study

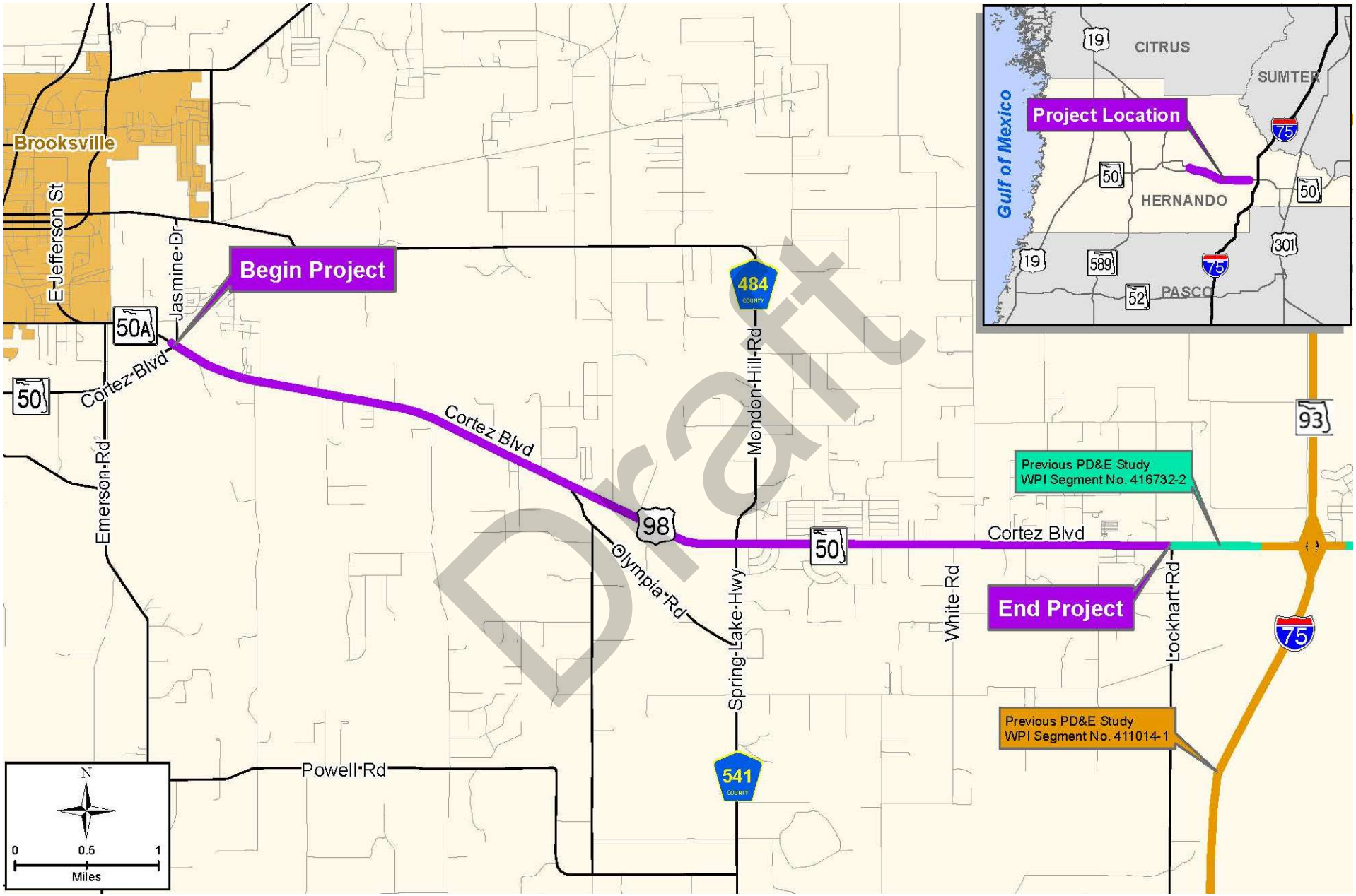
From Brooksville Bypass/SR 50A (Eastern Intersection)/
East Jefferson Street to west of Interstate 75
Hernando County
WPI Segment No. 430051-1
ETDM Project No. 13980

September 2015, Updated Figures October 2019

Draft

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) study to evaluate alternative improvements for SR 50 (US 98/Cortez Boulevard) from the Brooksville Bypass/SR 50A/East Jefferson Street to west of Interstate 75 (I-75) in Hernando County (**Figure 1)**. The length of the study is approximately 7.2 miles. The section along SR 50 to the east of Lockhart Road has been studied as a part of a separate FHWA approved PD&E study – SR 50 (Cortez Boulevard) from Lockhart Road to US 301 (SR 35/Treiman Boulevard), WPI Segment No.: 416732-2. Study objectives include: 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. A *Type 2 Categorical Exclusion* is being prepared as part of this study. The highway is expected to be improved from an existing, four-lane divided rural facility to a six-lane divided facility. Existing and proposed typical sections are attached as **Figures 2 & 3**, respectively. The proposed improvements will include construction of stormwater management and floodplain compensation facilities and various intersection improvements, in addition to multimodal facilities (pedestrian, bicycle and transit accommodations).

This *Location Hydraulics Memorandum (LHM)* has been prepared for the proposed project's 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 final phase of the project is completed. This LHM will be used as an engineering tool to identify potential floodplain encroachments as a result of the conceptual improvements.



State Road 50 PD&E Study

From the Brooksville Bypass to west of Interstate 75

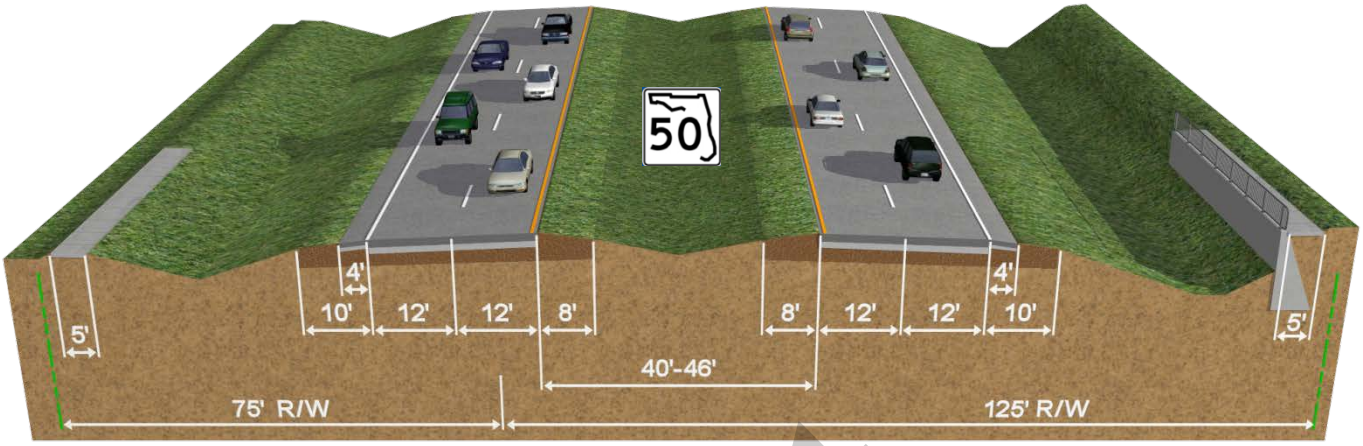
WPI Segment No. 430051 1 - Hernando County

Project Location and Study Area Map

Figure 1

West Portion of Study Area

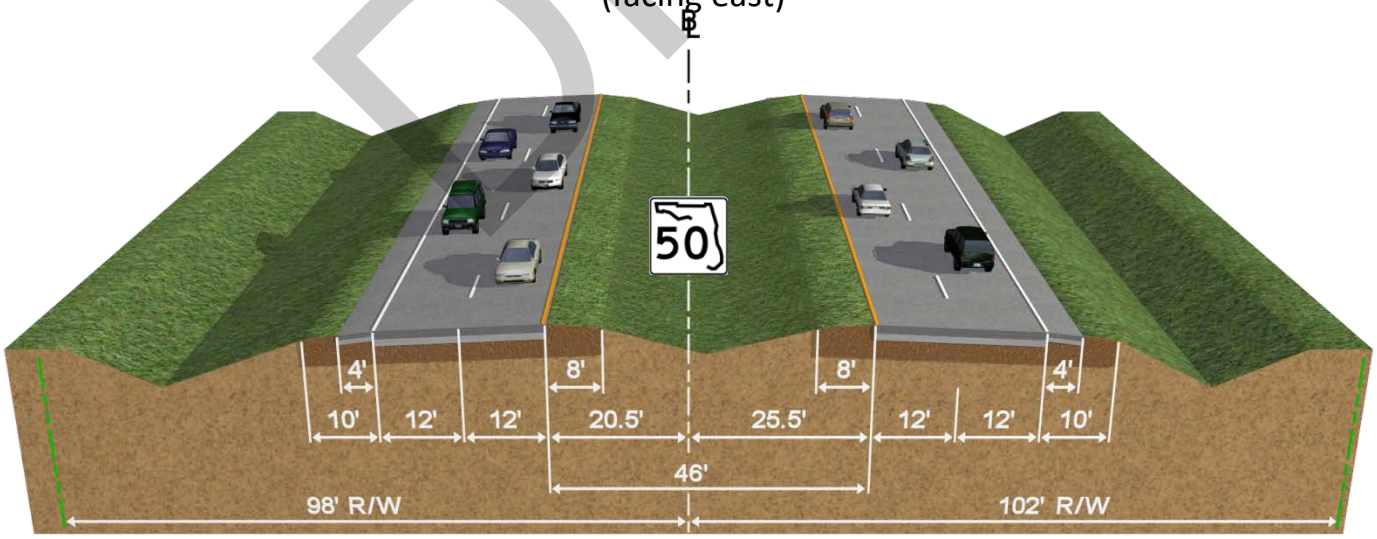
(facing east)



- From SR 50A/Brooksville Bypass/Cortez Blvd to Spring Lake Highway/Mondon Hill Road (4.2 miles)
- Posted Speed Varies: 45 mph at west end transitions to 60 mph throughout most of section

East Portion of Study Area

(facing east)



- From Spring Lake Highway/Mondon Hill Road to Lockhart Road (3.0 miles)
- Posted Speed Varies: 60 mph throughout most of section, transition to 55 mph just west of Lockhart Road

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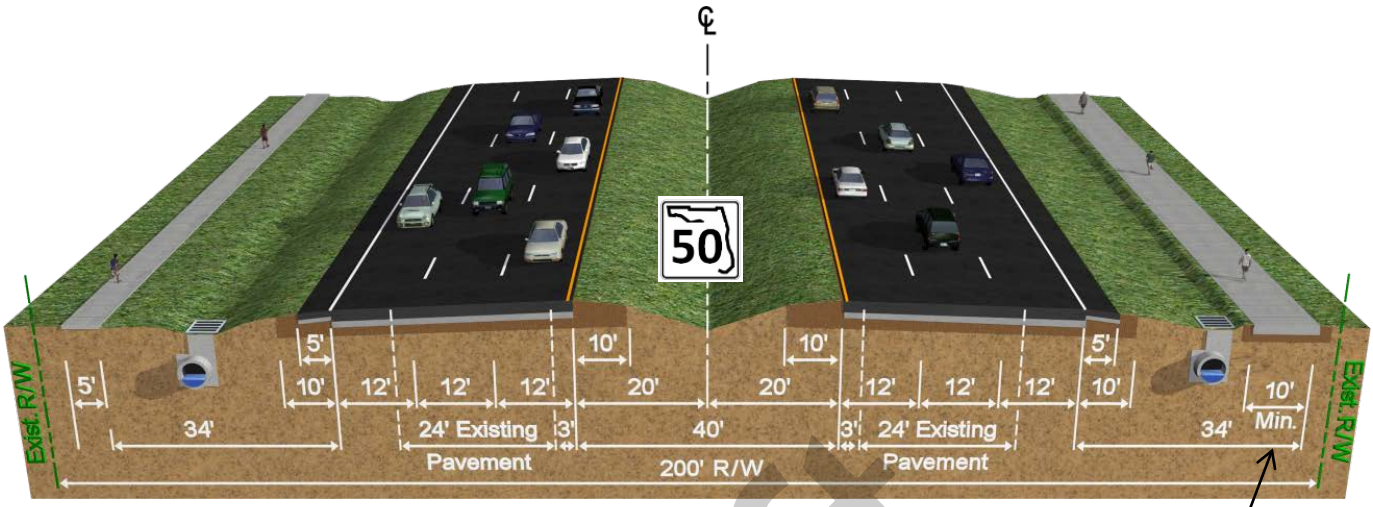
FDOT **State Road 50 PD&E Study** ***From the Brooksville Bypass to west of Interstate 75*** WPI Segment No. 430051-1 Hernando County	**Existing Roadway Typical Sections**	**Figure 2**

West Portion of Study Area
Rural Typical Section – facing east

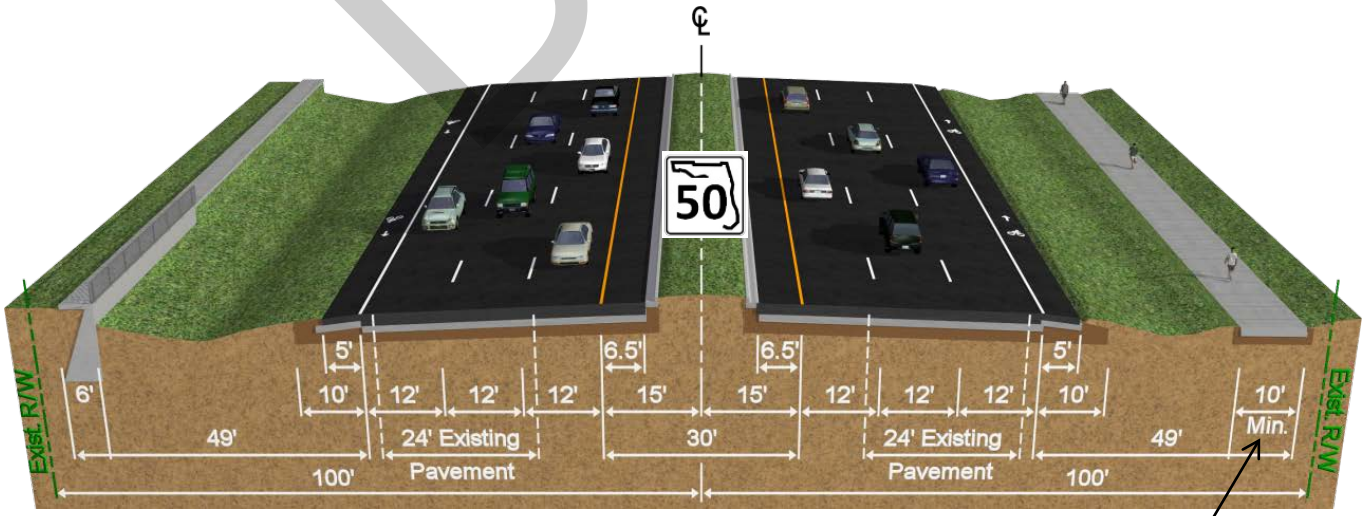
(from west limit of PD&E Study at SR 50/Brooksville Bypass to just east of Spring Lake Highway/Mondon Hill Road)



- Provides for 65 mph design speed
- Design variation of 6 ft for border width required for each side
- A 10 ft widened sidewalk is shown on the south side of SR 50 and will be constructed based on priorities of the Hernando/Citrus MPO. If a widened sidewalk is not constructed, a 5 ft sidewalk will be constructed instead.

East Portion of Study Area
6-Lane Suburban Typical Section – facing east

(from just east of Spring Lake Highway/Mondon Hill Road to east limit of PD&E study west of I-75 at Lockhart Road)



- Provides for 50 mph design speed
- A 10 ft widened sidewalk is shown on the south side of SR 50 and will be constructed based on priorities of the Hernando/Citrus MPO. If a widened sidewalk is not constructed, a 6 ft sidewalk will be constructed instead.

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FDOT **State Road 50 PD&E Study** *From the Brooksville Bypass to west of Interstate 75* WPI Segment No. 430051 1 - Hernando County	**Preferred Roadway Typical Sections**	**Figure 8-3**

The study limits of the SR 50 Corridor traverses 15 project basins within the Bystre Lake, Croom, and Eastern Hernando Withlacoochee River Watershed. There are 18 cross drains and 1 bridge culvert (Bridge No. 080036) within the study limits. See **Table 1** for basin locations and **Tables 2 & 3** and **Figure 4** for cross drain and bridge locations.

Table 1 Drainage Basin Data

Watersheds	Project Basin No.	Project Basin Boundaries	Total Onsite Acreage (ac)	Outfall Location
Bystre Lake Watershed	1	Sta 566+00 to Sta 598+25	14.81	Sta 567+56
	2	Sta 598+25 to Sta 650+00	23.76	Sta 634+30
	3	Sta 650+00 to Sta 669+00	8.72	Sta 659+30
	4	Sta 669+00 to Sta 680+00	5.05	Sta 673+83
	5	Sta 680+00 to Sta 707+00	12.40	Sta 697+50
	6	Sta 707+00 to Sta 731+00	11.02	Sta 722+30
	7	Sta 731+00 to Sta 750+00	8.72	Sta 743+70
	8	Sta 750+00 to Sta 769+00	8.72	Sta 756+30
	9	Sta 769+00 to Sta 787+00	8.26	Sta 777+70
	10	Sta 787+00 to Sta 813+00	11.94	Sta 794+80
Croom Watershed	11	Sta 813+00 to Sta 849+00	16.53	Sta 832+10
	12	Sta 849+00 to Sta 879+00	13.77	Sta 853+80
	13	Sta 879+00 to Sta 918+00	17.91	Sta 903+80
	14	Sta 918+00 to Sta 939+00	9.64	Sta 926+40
Eastern Hernando Withlacoochee River Watershed	15	Sta 939+00 to Sta 948+00	4.13	Sta 949+80
		Total	**175.39**	

Note: Onsite drainage areas were computed from basin length times 200' R/W width.

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Table 2 Existing Cross Drains

Cross Drain No.	Mile Post	Station	Description
1	10.287	567+56	24” CC
2	9.786	594+30	24” CC
3	9.022	634+30	76”X48” CC
4	8.296	673+83	24” CC
5	7.830	697+50	2-48” CC
6	7.460	721+50	18” CC
7	7.402	722+30	2-60”X38” CC
8	6.947	743+70	24” CC
9	6.708	756+30	10’X8’ CBC
10	6.352	777+70	36” CC
11	0.133	794+80	2-36” CC
12	0.697	824+20	36” CC
13	0.847	832+10	36” CC
14	1.257	853+80	24” CC
15	2.212	903+80	30” CC
16	2.422	915+90	18” CC
17	2.624	926+40	2-45” CC
18	2.684	929+50	2-30” CC

Table 3 Existing Bridge Culvert

Bridge No.	Mile Post	Station	Description
080036	8.542 to 8.552	659+30	53’ Bridge Culvert

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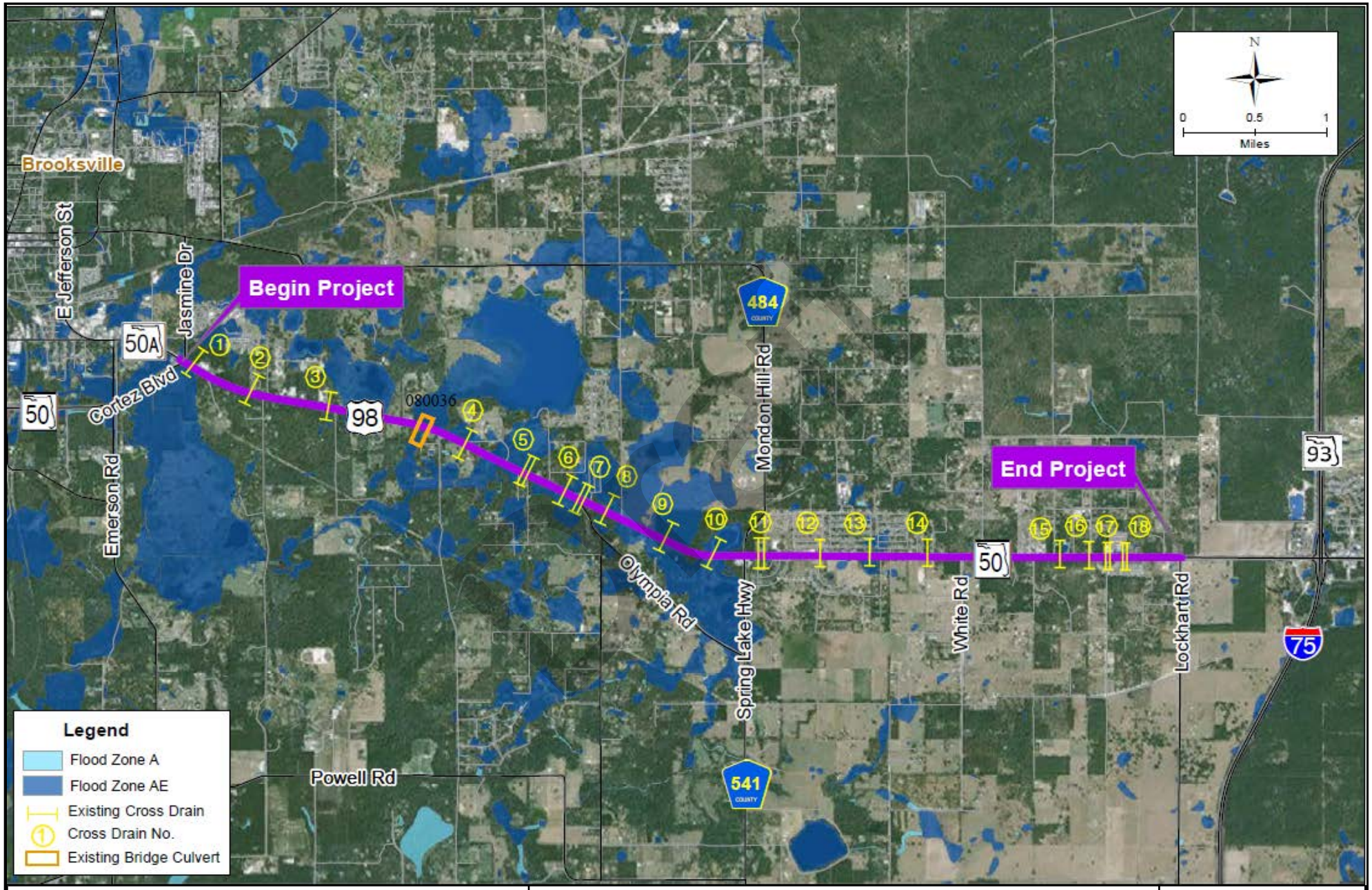

FDOT

State Road 50 PD&E Study

From the Brooksville Bypass to west of Interstate 75

WPI Segment No. 430051 1 - Hernando County

Cross Drain and Bridge Locations

Figure 4

1. *HISTORY OF FLOODING*

According to the District 7 Drainage Office there are three flood investigation sites (Investigation Nos. 0806192006827, 0806192006317, and 0806042010344) within the project limits. No history of SR 50 roadway flooding has been identified. District 7 Maintenance Office also noted some concerns listed below:

Maintenance related issues identified include, Section #08050, from MP 6.117 to 10.130:

- Erosion under, behind and over pedestrian sidewalk
- Slime, mildew growing on sidewalks shaded by trees
- Erosion around headwalls
- Sidewalk constructed too close to trees are cracking, being stressed by tree growth
- Clogged drains installed on gravity walls (clogged with eroded sand from slopes)
- Silt over sidewalks
- Undermined sidewalks

2. *LONGITUDINAL OR TRANSVERSE ENCROACHMENTS*

Detailed floodplain models have been developed for the project limits such that if the cup-for-cup compensation is not provided then it will be required to establish no-impact through modification of the floodplain modeling. Due to the complex conveyance and storage modeled to establish the floodplain zones, the traditional categorization of longitudinal vs. transverse encroachment is not identifiable.

3. *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.

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4. *EMERGENCY SERVICES AND EVACUATIONS*

SR 50 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.

5. *BASE FLOOD IMPACTS*

The FEMA FIRMs dated February 2, 2012: 12053C0211D, 12053C0212D, 12053C0214D, 12053C0218D and 12053C0219D indicate that portions of the study limits are within Flood Zones A and AE (Elevations vary throughout limits). FEMA Maps are provided in **Figures 5A-5H** at the end of this memo.

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

- Bystre Lake Watershed Floodplain Justification Report, dated March 2010
- Justification for Updates to the FEMA Floodplain as a Result of Watershed Management Program for the Croom Watershed, dated March 2010

Design Floodplain elevations for each project sub-basin are identified in **Table 4**. The elevations provided in the table are for the 100 yr-24 hr storm event in feet NAVD 88. The flood elevations utilized are per the current FEMA FIRMs and floodplain studies.

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 up to that, encompassed by the 100-year event, will be allowed, and that compensating storage shall be equivalently provided. Therefore, no significant changes in base flood elevations or limits will occur.

6. *FLOODPLAIN/FIRM*

The project limits have been evaluated to determine potential impacts to the base floodplain. **Table 4** identifies estimated floodplain elevations. Cup for cup compensation will be provided for any fill placed within the floodplain. Approximate required floodplain compensation site area requirements will be estimated and reported in the Draft *Pond Sizing Report* being prepared for the proposed project's PD&E study.

7. *REGULATORY FLOODWAY*

There are no regulatory floodways within the study limits.

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Table 4 Floodplain Summary

Watersheds	Project Sub-Basin No.	Project Sub Basin Boundaries	Model Node ID	Zone AE-Hernando County Design 100 yr Flood EL (ft – NAVD 88)
Bystre Lake Watershed	1	Sta 566+00 to Sta 598+25	NC0500	96.3
			NC0520	92.1
			NC0910	102.3
	2	Sta 598+25 to Sta 650+00	NC1400	87.8
			NC1405	85.1
	3	Sta 650+00 to Sta 669+00	NC1490/NA2040	78.2
			NC1345	77.5
	4	Sta 669+00 to Sta 680+00	NC1470/NC1480	78.2
	5	Sta 680+00 to Sta 707+00	NB0070	78.2
			NA1440/NA1480	77.4
	6	Sta 707+00 to Sta 731+00	NA1490	74.5
			NA1470	74.5
	7	Sta 731+00 to Sta 750+00	NA1770/NA1740	74.5
			NA1775/NA1790	74.5
	8	Sta 750+00 to Sta 769+00	NA1740	74.5
			NA1790/NA1880	74.5
	9	Sta 769+00 to Sta 787+00	NA1240	74.5
			NA1248	74.5
	10	Sta 787+00 to Sta 813+00	NA1220	67.3
Croom Watershed	11	Sta 813+00 to Sta 849+00	NK0510	58.1
			NK0430	63.6
			NK0500	57.9
	12	Sta 849+00 to Sta 879+00	NK0534	77.4
			NK0540	77.6
			NK0538	94.3
			NK0536	95.0
	13	Sta 879+00 to Sta 918+00	NL0293	86.8
			NL0297	84.5
			NL0300	79.1
			NL0257	80.4
	14	Sta 918+00 to Sta 939+00	NL0120	101.4
			NL0170	100.8
			NL0180	102.4
Eastern Hernando Withlacoochee River Watershed	15	Sta 939+00 to Sta 948+00	NF0478	105.0

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8. *NATURAL AND BENEFICIAL FLOODPLAIN VALUES*

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

9. *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. Any future development will be in accordance with designated land uses according to the Hernando County adopted comprehensive plan and land development regulations. Therefore, no significant changes in base flood elevations or limits will occur.

10. *RISK ASSESSMENT*

Based on the evaluation of anticipated improvements, the applicable floodplain statement according to the *FDOT PD&E Manual Part 2 Chapter 13* is Statement 3- PROJECTS INVOLVING MODIFICATION TO EXISTING DRAINAGE STRUCTURES:

> **"Modifications to existing drainage structures (extension or replacement of existing cross drains) included in this project will result in an insignificant change in their capacity to carry floodwater. These modifications will cause minimal increases in flood heights and flood limits which will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant change in flood risks or damage. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes as the result of modifications to the existing drainage structures. Therefore, it has been determined that this encroachment is not significant.**

The public hearing advertisement will include a statement that the project involves encroachments on base floodplains. The presentation at the public hearing will mention these involvements.

A *Bridge Hydraulics Report (BHR)* will be prepared for the bridge culvert within the study limits during the proposed project's future design phase. The future structure will be hydraulically equivalent to the existing bridge culvert.

A *Pond Sizing Report* was prepared for the proposed project's PD&E study 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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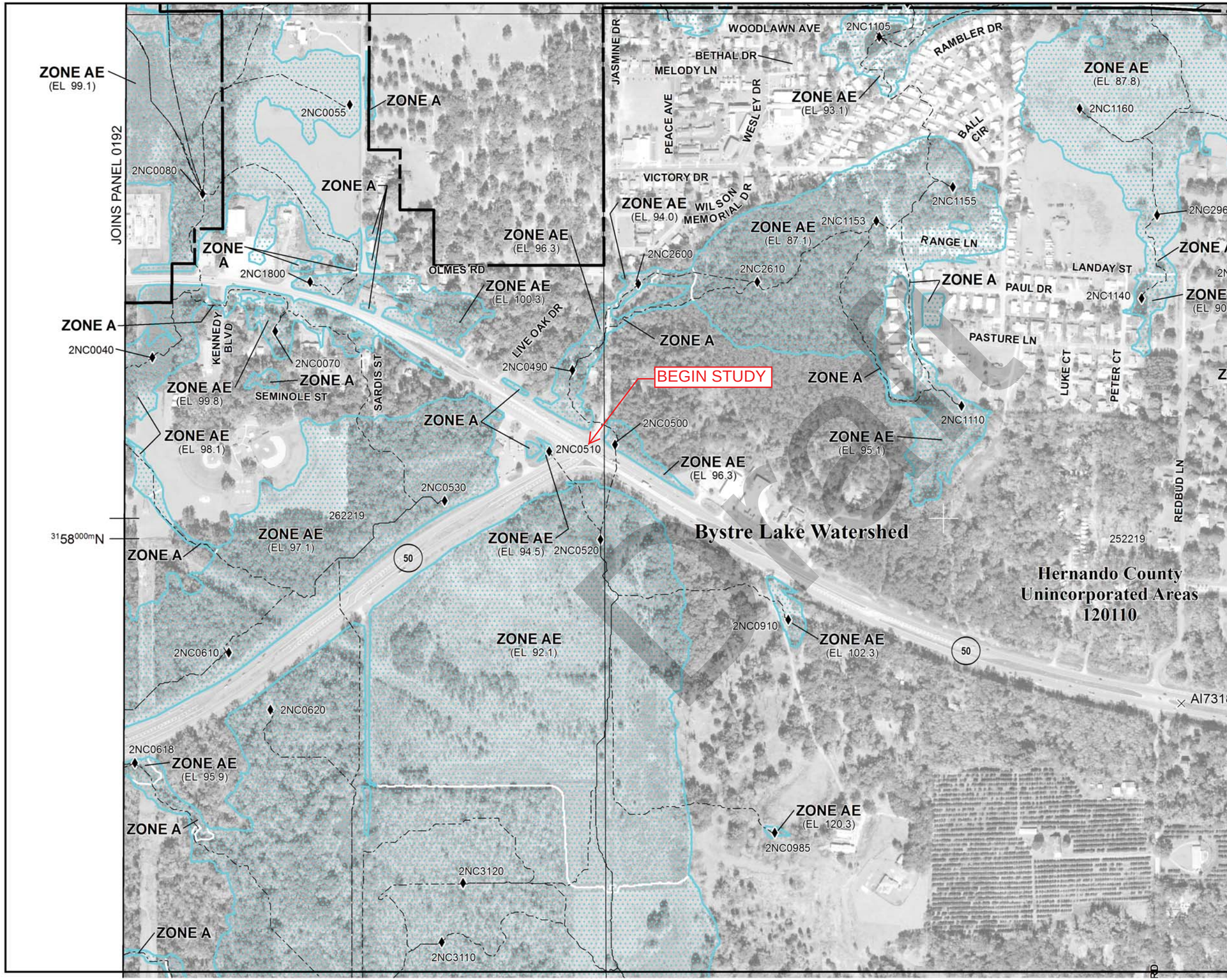

MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0211D

FIRM

FLOOD INSURANCE RATE MAP

HERNANDO COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 211 OF 410

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BROOKSVILLE, CITY OF	120333	0211	D
HERNANDO COUNTY	120110	0211	D

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
12053C0211D

EFFECTIVE DATE
FEBRUARY 2, 2012

Federal Emergency Management Agency

Figure 5A

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

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0211D

FIRM

FLOOD INSURANCE RATE MAP

HERNANDO COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 211 OF 410

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BROOKSVILLE, CITY OF	120333	0211	D
HERNANDO COUNTY	120110	0211	D

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Figure 5B

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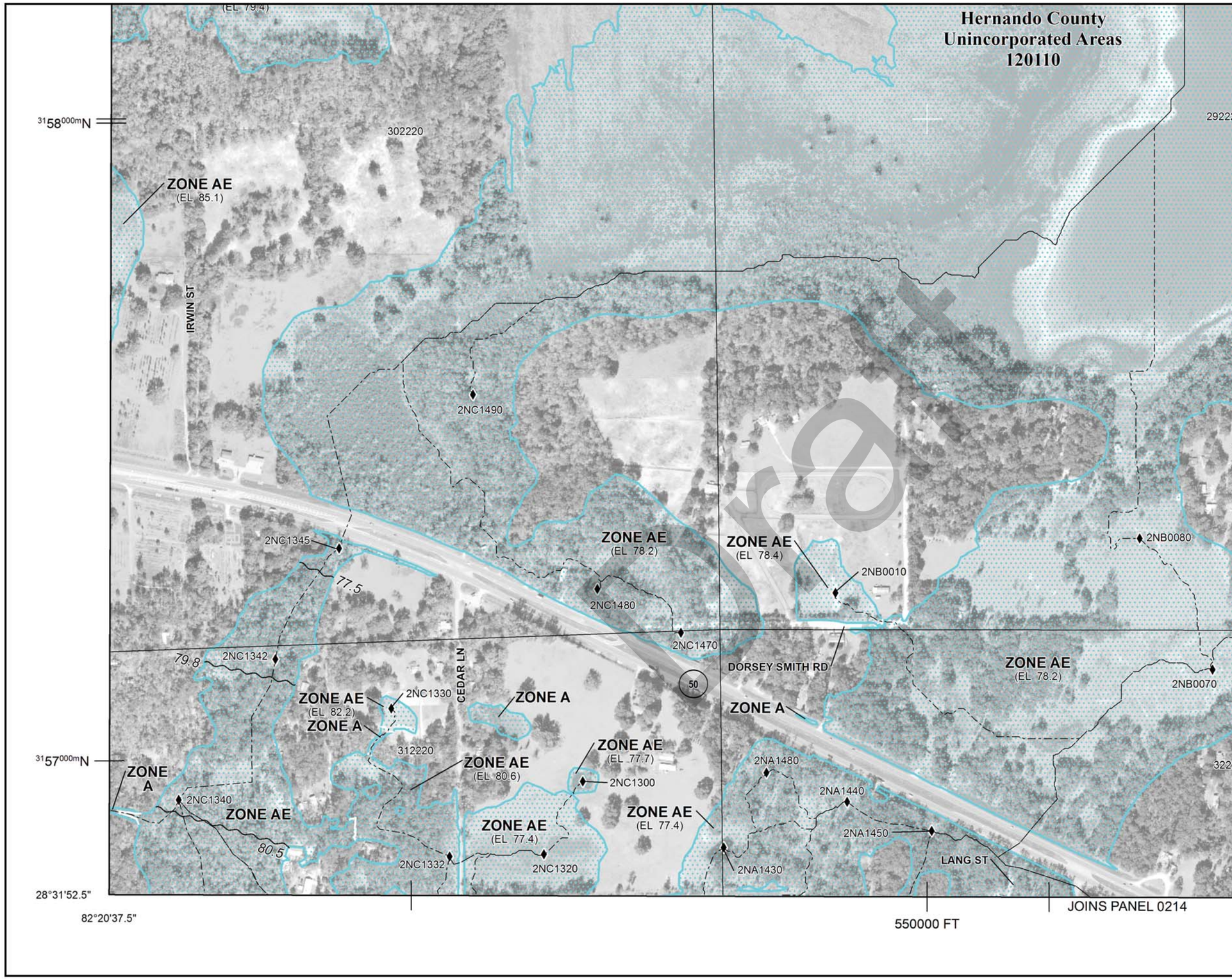

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0212D

FIRM

FLOOD INSURANCE RATE MAP

HERNANDO COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 212 OF 410

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COMMUNITY	NUMBER	PANEL	SUFFIX
BROOKSVILLE, CITY OF	120333	0212	D
HERNANDO COUNTY	120110	0212	D

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Figure 5C

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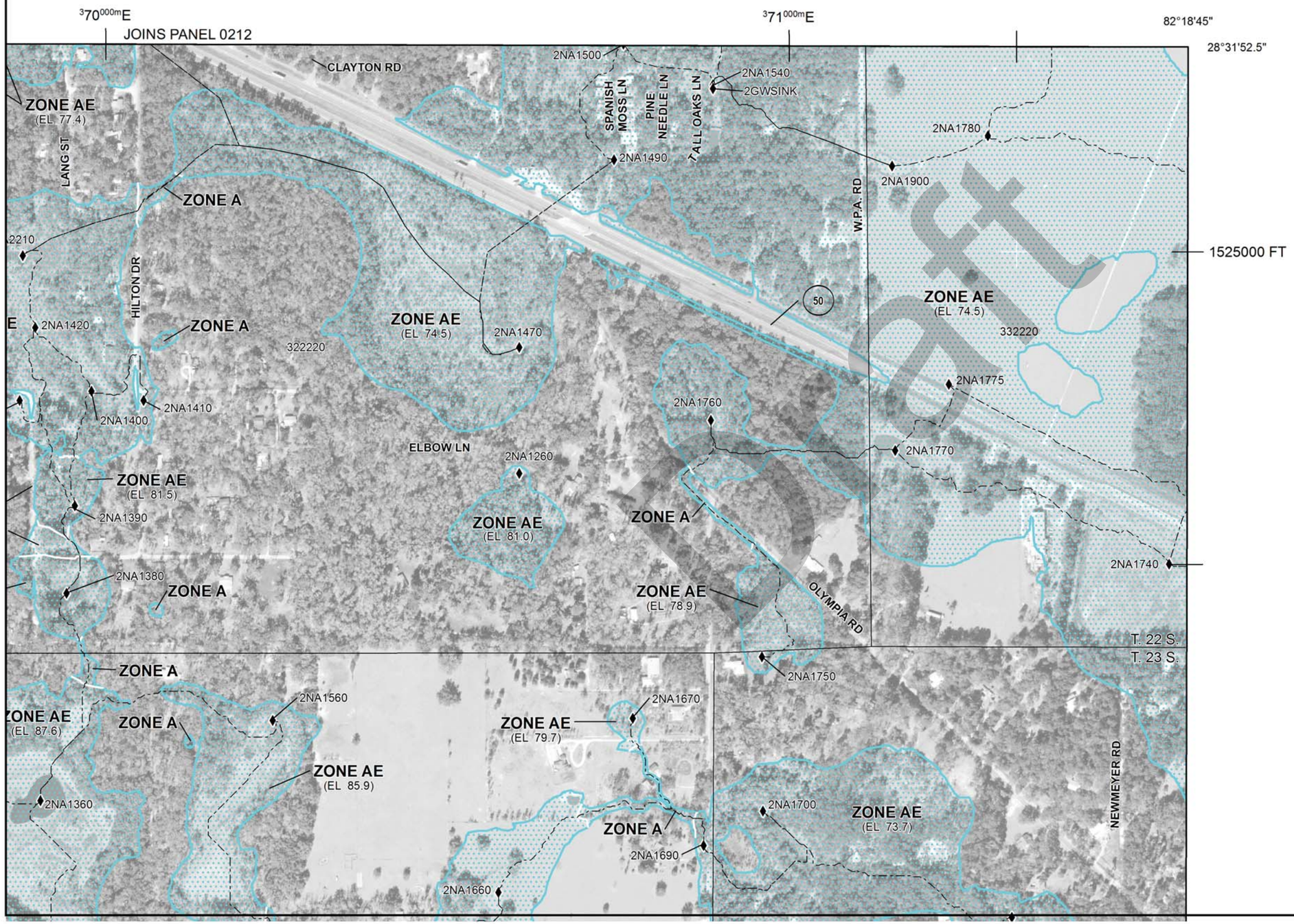

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0214D

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FLOOD INSURANCE RATE MAP

HERNANDO COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 214 OF 410

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HERNANDO COUNTY	120110	0214	D

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Figure 5D

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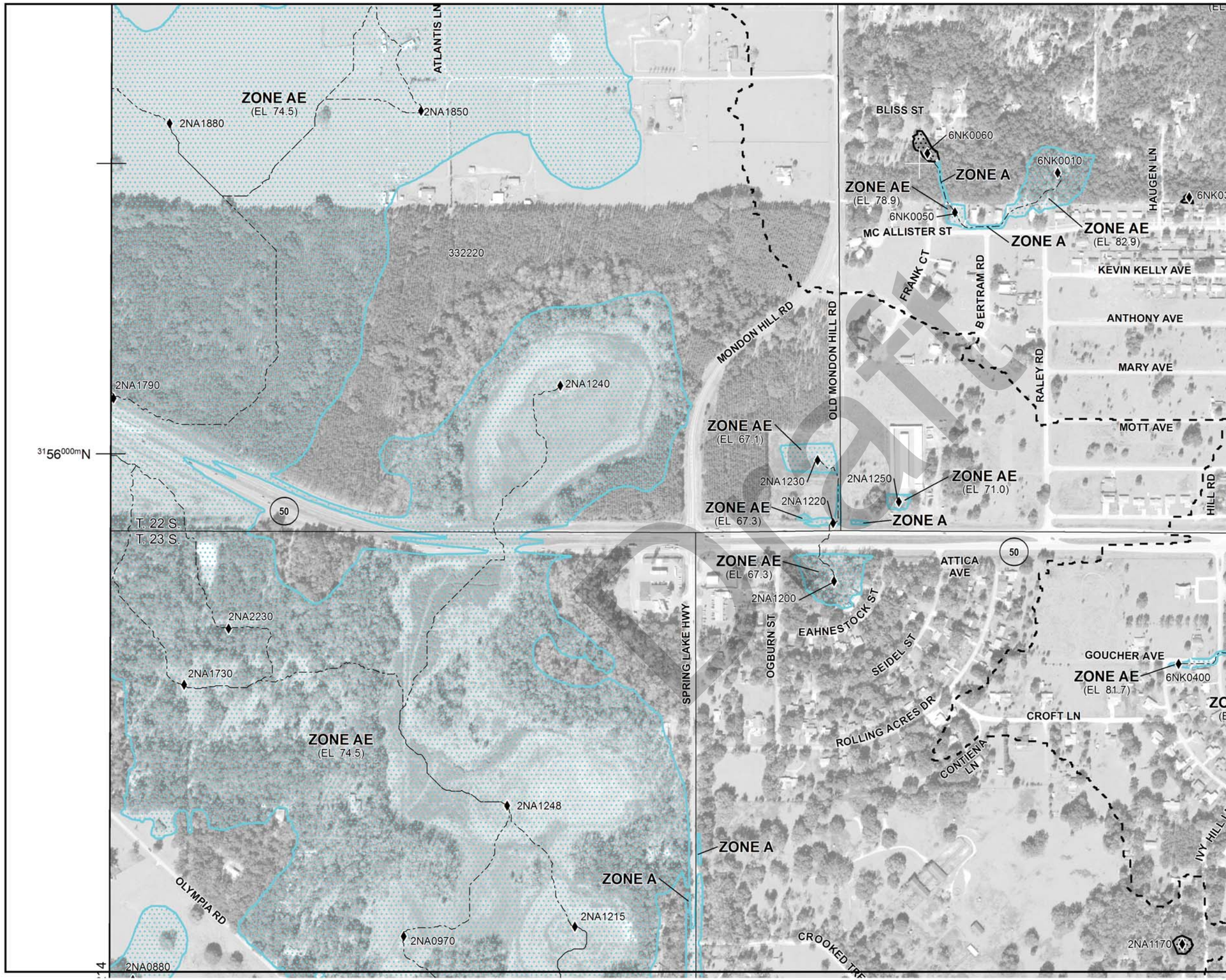

MAP SCALE 1" = 500'

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0218D

FIRM

FLOOD INSURANCE RATE MAP

HERNANDO COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 218 OF 410

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FEBRUARY 2, 2012

Federal Emergency Management Agency

Figure 5E

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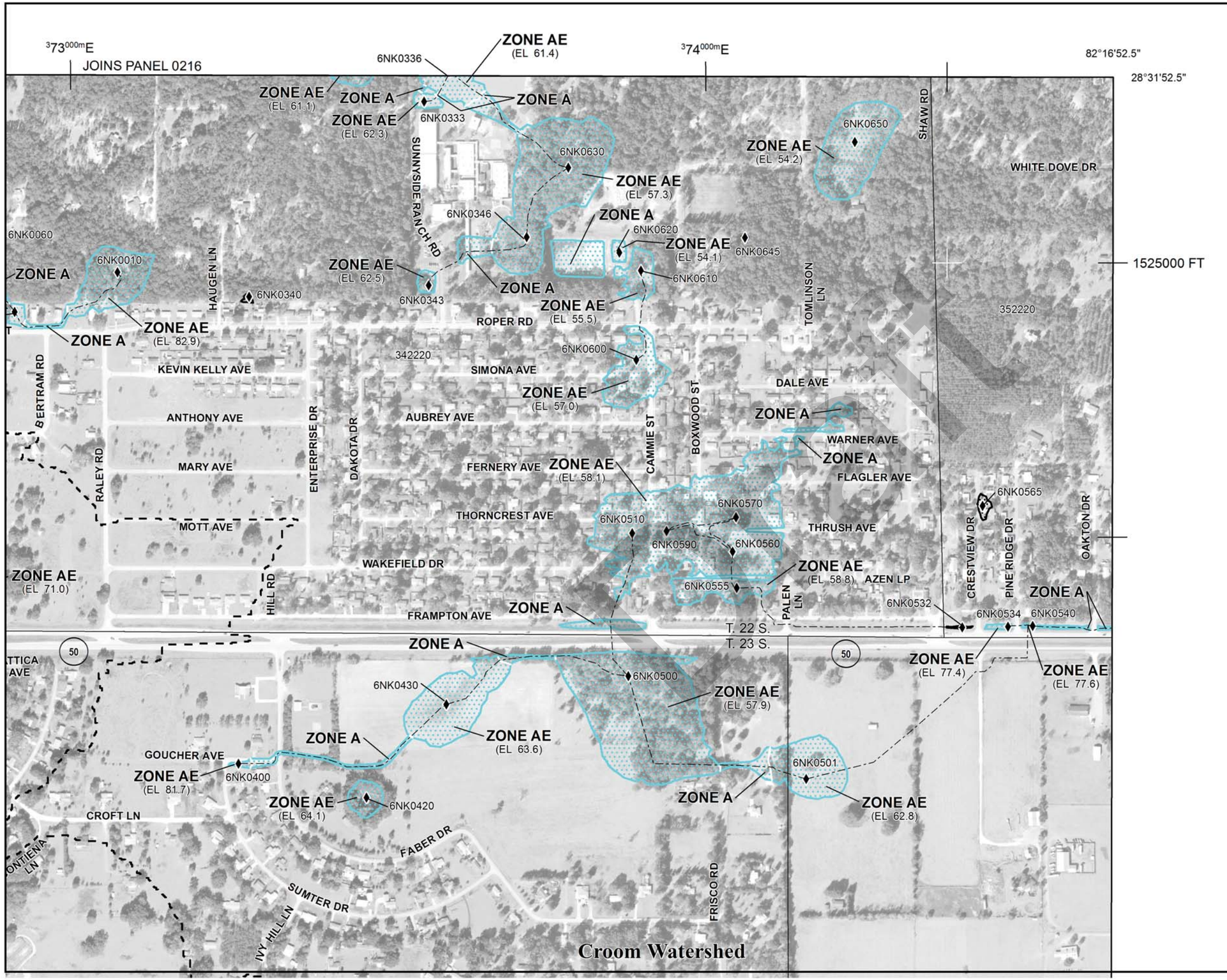

MAP SCALE 1" = 500'

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0218D

FIRM

FLOOD INSURANCE RATE MAP

HERNANDO COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 218 OF 410

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Figure 5F

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MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0219D

FIRM

FLOOD INSURANCE RATE MAP

HERNANDO COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 219 OF 410

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HERNANDO COUNTY	120110	0219	D

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EFFECTIVE DATE
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Federal Emergency Management Agency

Figure 5G

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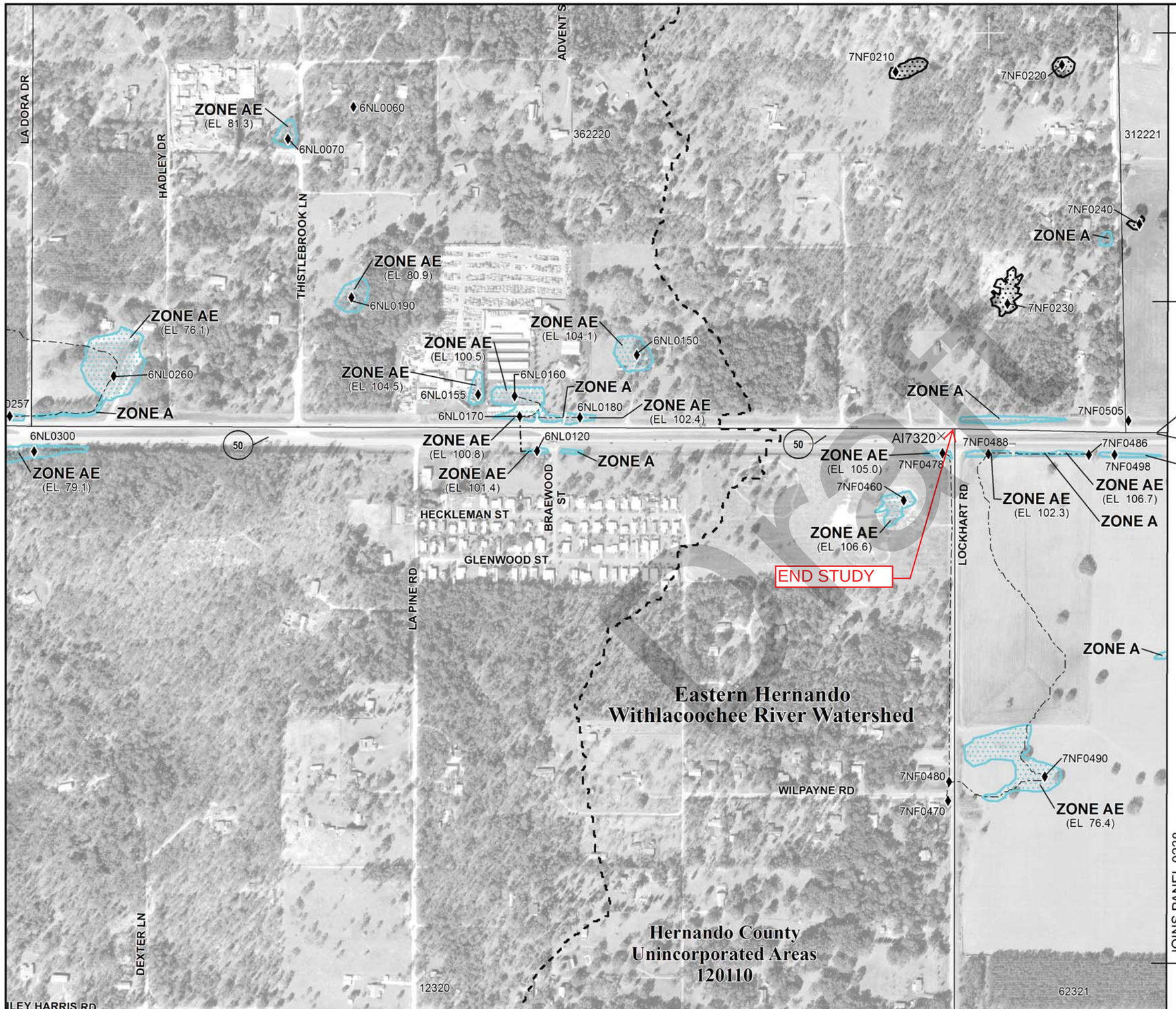

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0219D

FIRM

FLOOD INSURANCE RATE MAP

HERNANDO COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 219 OF 410

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

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HERNANDO COUNTY	120110	0219	D

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EFFECTIVE DATE
FEBRUARY 2, 2012

Federal Emergency Management Agency

Figure 5H

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