Final Pond Siting Report

S.R. 50 PD&E Study Reevaluation

From U.S. 19 (S.R. 55) to the east intersection of S.R. 50 / S.R. 50A [along the Brooksville Bypass]

Hernando County, Florida

WPI Segment No: 407951 1
FAP No: 300-1(7)

Florida Department of Transportation
District 7

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Submitted to:

Florida Department of Transportation - District 7
Tampa, Florida

Submitted by:

AYRES ASSOCIATES

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1.0 SUMMARY

This project involves the reevaluation of the previous PD&E study that was performed for the project, which is documentation of any changes that may have occurred since the previous study was completed. The previous PD&E study being reevaluated is S.R. 50 from U.S. 19 (S.R. 55) to the eastern intersection of S.R. 50/S.R. 50A [1]. This project involves widening S.R. 50 (Cortez Boulevard), from the existing 4-lane typical section to a 6-lane typical section, from U.S. 19 (S.R. 55) to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass]. The length of the project is approximately 13.7 miles. The widening of S.R. 50 from U.S. 19 to the west intersection of S.R. 50/S.R. 50A is proposed to be widened to the outside; whereas the remainder of the project, from the west intersection of S.R. 50/S.R. 50A to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass], is proposed to be widened to the inside. Figure 1-1, Project Location Map, illustrates the limits of the project area in relation to the local roadway network.

This *Pond Siting Report* (*PSR*) was prepared to find and assess suitable pond locations that are hydraulically functional and environmentally permittable. Project boundary information was determined as a result of information received from the permit application for S.R. 50 from the west intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass]. This application stated that the stormwater management facilities in this section had previously been sized to handle the ultimate 6-lane built-out condition. This information effectively reduced the pond siting required in this analysis to Basins A through L and the areas adjacent to the west intersection of S.R. 50/S.R. 50A. The initial design approach was to design two alternative ponds per sub-basin and one large pond per basin. This approach resulted in the siting and sizing of approximately 230 ponds for the sub-basin alternatives (Alternatives “A” and “B”) and 15 ponds for the basin alternatives. Following the siting and sizing of Alternatives “A” and “B”, it was determined that the right-of-way acquisition effort required in this implementation would be excessive and would be limited by the availability of vacant land and funding. The basin alternatives were thus selected as the preferred alternative, and this report has been limited to the documentation of these basin alternatives (Alternatives “A” and “B” will be retained within the project’s files). Note that exhibits showing all of the sub-basin alternatives are provided in a separate volume of this report (Appendix F).

1.1 References

1. Final Preliminary Engineering Report - S.R. 50 U.S. 19 to the eastern intersection of S.R. 50/S.R. 50A; Reynolds, Smith and Hills Architects-Engineers-Planners, Inc.; Florida; May 1988.

2.0 INTRODUCTION

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Reevaluation Study, which evaluates capacity improvement options along S.R. 50 (Cortez Boulevard) in Hernando County Florida. The proposed project involves widening S.R. 50 from the existing 4-lane typical section to a 6-lane typical section from U.S. 19 to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass], a distance of approximately 13.7 miles. The widening of the segment of S.R. 50 from U.S. 19 (S.R. 55) to the west intersection of S.R. 50/S.R. 50A is proposed to be widened to the outside; whereas the remainder of the project, from the west intersection of S.R. 50/S.R. 50A to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass], is proposed to be widened to the inside.

2.1 Purpose

This Pond Siting Report (PSR) has been prepared as part of the PD&E Reevaluation Study for a 13.7 mile segment of S.R. 50 in Hernando County, Florida. This effort will recommend potential pond locations that are hydraulically functional and environmentally permittable. These ponds will meet the requirements of the Southwest Florida Water Management District (SWFWMD) criteria based on best available information and conservative design assumptions. Although this study describes pond sizes and characteristics, it is important to note that this analysis is contingent upon further data acquisition in the form of ground elevation survey, soil borings, establishing site specific seasonal high water (SHW) elevations in agreement with the environmental agencies, parcel boundaries, and floodplain impacts.

The information provided in this document provided input for discussion and review during the public hearing. Pertinent public input during the hearing process and comments from review agencies was utilized to refine and determine the final recommended pond sites.

This report aided the FDOT and Federal Highway Administration (FHWA) in determining the recommended pond sites and served as a support document for subsequent engineering decisions as the project advances through design and construction.

2.2 Project Description

S.R. 50 is an east/west principal arterial facility. This Reevaluation Study examines the section of S.R. 50 from U.S. 19 (S.R. 55) to the east intersection of S.R. 50/S.R. 50A [along the Brookville Bypass], a distance of approximately 13.7 miles (see Figure 1-1). The majority of the project is located within an unincorporated area of Hernando County; however, portions extend through the City of Weeki Wachee and the City of Brooksville. The project is located in Section 36 of Township 22 South, Range 17 East; Sections 25 through 36 of Township 22 South, Range 18 East; Sections 20, and 25 through 30 of Township 22 South, Range 19 East; and Sections 1 and 2 of Township 23 South, Range 17 East.

Land use along the corridor is generally urbanized and suburban in nature with undeveloped tracts interspersed. The existing land use along S.R. 50 is predominantly commercial with areas of residential use as well as isolated areas of medical, institutional and recreational uses. The proposed project is consistent with future land use plans.

S.R. 50, which is part of the Florida Intrastate Highway System (FIHS), is typically a 4-lane divided roadway with 12-foot travel lanes, which was constructed according to the original Type II Categorical Exclusion approved in 1990. The existing posted speed limit along S.R. 50 varies between 45 mph and 55 mph.

The S.R. 50 project corridor is divided into four segments for analysis purposes based on existing land use, projected traffic volumes, and roadway characteristics (refer to Table 2-1).

Table 2-1: Project Segments

Segment	Limits	Length (Miles)
1	U.S. 19 (S.R. 55) to Mariner Boulevard (C.R. 587)	3.88
2	Mariner Boulevard (C.R. 587) to the Suncoast Parkway	2.02
3	Suncoast Parkway to the west S.R. 50/S.R. 50A intersection	4.00
4	West S.R. 50/S.R. 50A intersection to the east S.R. 50/S.R. 50A intersection [along the Brooksville Bypass]	3.84

2.3 Recommended Typical Sections

The recommended typical sections for the widening of S.R. 50 from U.S. 19 (S.R. 55) to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass] consists of five typical sections, which are illustrated in Figures 2-1 through 2-5. Additional right-of-way is required for the recommended typical sections to provide right-turn lanes at unsignalized and signalized intersections.

The proposed improvements for the portion of the project between U.S. 19 (S.R. 55) and west of the west intersection of S.R. 50/S.R. 50A is a 6-lane rural typical section (65 mph design speed) within the 200 feet of existing right-of-way. It also includes a 12-foot shared used path and 5-foot sidewalk on the south and north side of the roadway, respectively.

A 6-lane urban typical section (50 mph design speed) is recommended for the section of S.R. 50 that is immediately west and east of the west intersection of S.R. 50/S.R. 50A. This typical section includes a 5-foot sidewalk and a 4-foot bicycle lane on both the north and south side of the roadway, which requires a 126-foot right-of-way width. The placement of the bicycle lanes will be further evaluated during the design phase and a shared use path may be considered at that time.

The recommended typical section for the portion of S.R. 50 from east of the west intersection of S.R. 50/S.R. 50A to west of Candlelight Boulevard [along the Brooksville Bypass] is a 6-lane modified urban typical section with a 50 mph design speed within the existing right-of-way (170 feet to 205 feet). This typical section provides curb and gutter within the median while maintaining the existing open drainage system to the outside, and also provides a 5-foot sidewalk on both the north and south side of the roadway. The placement of the bicycle lanes will be further evaluated during the design phase and a shared use path may be considered at that time.

A 6-lane urban typical section is recommended for S.R. 50 [along the Brooksville Bypass] from west of Candlelight Boulevard to east of Ray Browning Road (50 mph design speed), which will provide curb and gutter in the median. This typical section will maintain the existing closed drainage system to the outside within the existing right-of-way (varies between 132 feet and 185 feet). The placement of the bicycle lanes will be further evaluated during the design phase and a shared use path may be considered at that time.

Similarly, a 6-lane modified urban typical section (50 mph design speed) is recommended for the remaining portion of the project from east of Ray Browning Road to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass] within the existing right-of-way (varies 180 feet to 240 feet). This typical section provides curb and gutter within the median while maintaining the existing open drainage system to the outside as well as 5-foot sidewalk along both sides of the roadway. The placement of the bicycle lanes will be further evaluated during the design phase and a shared use path may be considered at that time.

3.0 LAND USE

3.1 Existing Land Use

Generally, the existing land uses adjacent to the S.R. 50 corridor consist of commercial, residential, medical, institutional and recreational uses, which can be characterized as generally urbanized and suburban in nature with undeveloped tracts interspersed. The existing land use within the project corridor is depicted in Figure 3-1. S.R. 50 within the project corridor can be divided into two sections based on the existing roadway network as follows: U.S. 19 (S.R. 55) to the western intersection of S.R. 50/S.R. 50A and the western intersection of S.R. 50/S.R. 50A to the eastern intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass]. Below is a description of the existing land use within each section.

The existing land uses along S.R. 50 from U.S. 19 (S.R. 55) to the western intersection of S.R. 50/S.R. 50A are predominantly commercial with residential land uses located behind the commercial frontage as well as isolated areas of medical, institutional and recreational uses. Commercial uses include medium scale shopping centers, service stations, restaurants, motels, financial institutions, and miscellaneous retail establishments. Residential uses include both single-family residences/subdivisions and mobile home parks. The medical land uses within the Study corridor consist of medical offices/complexes and hospitals (Oak Hill Hospital and Springbrook Hospital). Institutional land uses include the Hernando County Public Library (West Side), Hernando County Fire & Rescue Station #12 and two churches. The Weeki Wachee tourist attraction, Sand Hill Scout Reservation and Suncoast Pedestrian Trail are recreational land uses within the Study corridor. Although vacant land exists throughout this section of the Study corridor, the majority of the vacant land occurs along the eastern bounds of this section.

The existing land uses along the remainder of the Study corridor, S.R. 50 from the western intersection of S.R. 50/S.R. 50A to the eastern intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass], is primarily commercial with isolated areas of residential and institutional uses as well as vacant land. Medium scale shopping centers, miscellaneous retail establishments, restaurants, and financial institutions are the types of commercial development within this area. The residential land uses are primarily single-family residences that border the commercial frontage. The institutional uses are comprised of the Hernando County Sheriff's Office, U.S. Post Office, Hernando County Utility Department and two churches. Similar to S.R. 50 west of the Brooksville Bypass, the vacant land along this portion of the Study corridor occurs throughout this section of roadway with the majority occurring at the eastern end.

3.2 Future Land Use

Hernando County has developed the Hernando County Comprehensive Plan Map to provide guidance for future land use planning. The designated land uses along the S.R. 50 project corridor indicate that future land uses will follow the established trends of the existing land uses in the Study area as shown in Figure 3-2. Future land use designations of existing vacant parcels will consist primarily of commercial development with residential development both behind the commercial development and adjacent to the S.R. 50 corridor.

Although there are no requests for a Development of Regional Impact (DRI) within the Study corridor, it should be noted that 11 parcels have applied for and been granted rezoning. Nine of these parcels are located immediately adjacent to S.R. 50 and the two remaining parcels are located in proximity to the roadway. In general, these developments are proposed on vacant land or require modification to existing buildings to provide additional services.

4.0 DESIGN INFORMATION

4.1 Soil Conditions

The soils within the limits of the Study corridor can be categorized according to the USDA SCS's *Soil Survey of Hernando County, Florida* [1]. The predominant soil map units located within the Study corridor and the corresponding characteristics are summarized in Table 4-1. Figure 4-1A through 4-1C illustrates the location of each of the soil map units. A brief description of the soils within the Study corridor follows; however, for a more detailed description of the soils refer to the *Preliminary Geotechnical Report* [2].

The majority of the Study corridor is underlain by select soils, such as American Association of State Highway and Transportation Officials (AASHTO) classified soils as A-3 and A-2-4. There are areas within the Study corridor that are underlain by shallow plastic soils (A-2-6, A-4, A-6 and A-7). These areas are in Section 30, R19E, T22S, on either side of the Suncoast Parkway that cross S.R. 50 for approximately 1,700 feet, as well as several areas on S.R. 50 [along the Brooksville Bypass] for approximately 7,000 feet.

The area within the Study corridor has groundwater levels greater than 6 feet below the existing grades. However, in the areas where plastic soils are present, a perched groundwater table can be expected immediately after storm events. Also, in areas with lower elevations, the groundwater levels can be expected to be near the existing ground surface.

The surficial geologic material within the Study area consists of sporadic relic dune sand and the residual elements of the Hawthorne Group, with parts of the project having undifferentiated sands and clays. Most of these surficial soils are relatively unconsolidated sands and sandy clays. The thin and somewhat absent Hawthorne soils may consist of fine to medium grained unconsolidated quartz sand, silt, clay and limestone.

In some areas, the Ocala limestone is present at or very close to ground surface. This limestone has experienced significant dissolution and the creation of an intricate cavernous system. Problems in the development of sinkholes are related to the size and depth of the limestone and these underground cavities. The upper surface of this limestone is highly irregular.

S.R. 50 crosses areas of West Central Florida that have a known history for the formation of sinkholes. The potential for sinkhole activity is based on the recorded documentation of the formation of sinkholes and the geology of the area.

TABLE 4-1
SUMMARY OF SOIL INFORMATION

HERNANDO COUNTY USDA SOIL SURVEY							
		Soil Classification			Seasonal High Water Table		
USDA Map Unit	Depth (Inches)	USCS	AASHTO	Permeability (Inch/Hour)	Depth (Feet)	Kind	Month
Astatula (8)	0 – 85	SP, SP-SM	A-3	>20.0	>6.0	----	----
Basinger (9)	0 – 80	SP, SP-SM	A-3, A-2-4	>20.0	0 – 1.0	Apparent	June – November
Blichton (11 & 12)	0 – 28 28 – 34 34 – 63 63 – 75	SP-SM, SM SC SC SC, CL, CH	A-2-4, A-3 A-2-4, A-2-6 A-6 A-6, A-7	6.0 – 20.0 2.0 – 6.0 0.6 – 2.0 0.2 – 0.6	0 – 1.0	Apparent	June – September
Candler (14 & 15)	0 – 48 48 – 80	SP, SP-SM SP-SM	A-3 A-3, A-2-4	>20.0 6.0 – 20.0	>6.0	----	----
Flemington (20 & 21)	0 – 5 5 – 36 36 – 66 66 – 81	SM SC, CH, CL CH, MH, CL CH, MH	A-2-4 A-7 A-7 A-7	2.0 – 20.0 <0.06 <0.06 <0.06	0 – 2.5	Perched	June – September
Floridana Variant (25)	0 – 8 8 – 22 22 – 42 42 – 59 59 – 80	SM SM SC SM SC, CL, CH	A-2-4 A-2-4 A-2-4, A-2-6, A-4, A-6 A-2-4, A-2-6, A-4 A-4, A-6, A-7	6.0 – 20.0 6.0 – 20.0 0.6 – 6.0 2.0 – 6.0 0.06 – 0.2	+2.0 – 1.0	Apparent	June – February
Kendrick (29)	0 – 28 28 – 34 34 – 63 63 – 80	SP-SM SC, SM-SC SC SC, SM-SC	A-3, A-2-4 A-2-6, A-2-4 A-2-6, A-6 A-2-6, A-2-4	6.0 – 20.0 0.6 – 2.0 0.6 – 2.0 0.6 – 2.0	>6.0	----	----
Micanopy (33 & 34)	0 – 18 18 – 25 25 – 62	SM, SP-SM SC CH	A-2-4 A-2-6, A-6, A-7 A-7	6.0 – 20.0 0.6 – 2.0 0.06 – 0.2	1.5 – 2.5	Perched	July – November
Myakka (35)	0 – 23 23 – 37 37 – 80	SP-SP-SM SM, SP-SM SP, SP-SM	A-3 A-3, A-2-4 A-3	6.0 – 20.0 0.6 – 6.0 6.0 – 20.0	0 – 1.0	Apparent	June – February
Nobleton (36)	0 – 33 33 – 37 37 – 60 60 – 80	SP-SM, SM SC SC, CL, CH, SC SM, SM-SC, SC	A-2-4 A-2-6, A-6 A-6, A-7 A-2-6, A-6 A-2-4, A-2-6, A-6	6.0 – 20.0 0.2 – 2.0 0.2 – 0.6 0.2 – 2.0 0.2 – 6.0	1.5 – 3.5	Perched	July – October
Paola (39)	0 – 26 26 – 99	SP SP	A-3 A-3	>20.0 >20.0	>6.0	----	----
Sparr (47)	0 – 61 61 – 64 64 – 80	SP-SM SM, SC-SM SC, SM-SC	A-3, A-2-4 A-2-4 A-2-4, A-2-6, A-4, A-6	6.0 – 20.0 0.6 – 2.0 0.6 – 2.0	1.5 – 3.5	Perched	July – October
Wacreshula (52)	0 – 8 8 – 24 24 – 31 31 – 38 38 – 80	SP-SM SP-SM SP-SM, SM SP-SM,SM SM, SM-SC, SC	A-3, A-2-4 A-3, A-2-4 A-3, A-2-4 A-3, A-2-4 A-2-4, A-2-6, A-4, A-6	6.0 – 20.0 6.0 – 20.0 0.6 – 6.0 6.0 – 20.0 0.6 – 6.0	0 – 1.0	Apparent	June – February

4.2 Design Information Sources

Since the project corridor is within SWFWMD jurisdiction, it will require a stormwater management system that meets the District's criteria. The stormwater management facilities' designs and layouts are based on the following design information sources:

- Aerial Photos; flight date April 19, 2002.
- FDOT District 7 Location Hydraulics Report of S.R. 50; prepared September 1989.
- FDOT District 7 Location Hydraulics Report of S.R. 50; prepared September 1988.
- FDOT Existing S.R. 50 roadway construction plans; prepared 1992.
- FDOT Existing S.R. 50 roadway construction plans; prepared 1998.
- USGS Quadrangle Maps; Weeki Wachee Springs and Brooksville, Florida; dated 1954.
- SWFWMD maps.
- US Soil Conservation Service, Soil Survey of Hernando County, Florida; dated 1977.
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) 120110 0140 B, 120110 0150 B, 120110 0175 B and 120110 0190 B dated April 17 1984; and 120333 0001 C dated September 18, 1986, for Hernando County, Florida.
- SWFWMD Environmental Resource Permit (ERP), Permit Information Manual; dated January 1997.
- SWFWMD Environmental Resource Permit (ERP), Permit Information Manual; dated November 1998.
- FDOT Drainage Manual.
- FDOT Stormwater Management Facility Handbook
- FDOT Straight Line Diagram (SLD) of Road Inventory.
- Interviews, correspondence and site investigations.

4.3 Design Assumptions

All of the design assumptions for the project were based upon the best available information. The design assumptions utilized for this project are as follows:

- Pond Site Configuration – The proposed pond site configuration was based upon a combination of resources to determine the best site and layout. These resources included aerial photographs to determine existing land use, SWFWMD Aerial Contour Maps to determine existing hydraulics, cultural resources (archaeological and historical) and ecological impacts (wetland, protected species and upland habitat).

- Pond Volume – The required pond volume was calculated by finding the difference in pavement areas for the existing and proposed condition. The amount of runoff was then calculated using a precipitation value of 20 inches for the 100 year, 10 day storm event

(closed basin criteria). In addition, the volume that is lost by filling in the existing roadside ditches for the build alternative is included in the volume requirements. During a February 19, 2003, meeting with SWFWMD staff, they advised deducting 30% of the runoff volume to account for the high amount of percolation within the project corridor, except for the area located east of Colorado Street where there are clayey soil conditions.

- Pond Area – The pond area was determined by converting the calculated pond volume, and included a 20-foot perimeter strip to allow for maintenance activities, 1:4 vertical to horizontal side slopes, and required depths dictated by subsurface soil conditions. Typically, a 3-foot pond depth was applied due to SWFWMD criteria in sinkhole prone areas.

- Treatment Method – It is anticipated that dry retention will be used in the design of the required stormwater management facilities for basins with a deep SHW table. A wet detention/retention facility may be warranted for basins that have shallow SHW table, such as the basins east of the S.R. 50/California Street intersection, (identified later in this report as basins J, K, L, and the pond east of the S.R. 50/Cobb Road Intersection). As previously discussed, shallow SHW is often caused by storm water perching on clayey soils.

4.4 Design Criteria

The FDOT Drainage Manual and current standards, including Chapter 14-86, were used to design the drainage systems for S.R. 50. According to SWFWMD and the Florida Department of Environmental Protection (EPC) Environmental Resource Permit (ERP) rules (Chapters 40D-4, 40D-40, and 40D-400), it is anticipated that stormwater treatment will be accomplished through the use of detention/retention ponds. According to specific criteria contained within the ERP rules and FDOT Chapter 14-86 pertaining to closed drainage basins, the storm water management facilities will be required to store the difference in the 100-year, 10-day event runoff volume between the pre-development and post-development conditions.

Per discussion with SWFWMD staff, a portion of this project falls within the Peck Sink Watershed and specific design criteria is required. It is also considered a closed basin, and upstream ponds typically have two orifices in their design, one to bleed down the 100-year event and a second, lower orifice to bleed down the treatment volume.

The applicable types of stormwater management facilities vary throughout the project and are generally dependent upon topographic constraints, SHW table depth, soil types and permeabilities encountered. Dry detention/retention and wet detention/retention type storm water management facilities are generally considered for use in providing water quality treatment, peak discharge attenuation and erosion and sediment control. It is anticipated that dry retention will be used in the design of the required stormwater management facilities for

basins with a deep SHW table. A wet detention/retention facility may be warranted for basins that have shallow SHW table due to soil types and groundwater conditions, which is typical in the eastern portion of this project. Floodplain compensating storage should also be provided per applicable ERP rules.

Coordination with the SWFWMD and FDOT was ongoing throughout the pond sizing and siting procedure. Several criteria were addressed, adjusted and added throughout this process, as specific project information was determined. Project boundary information was determined as a result of information received from the permit application for S.R. 50 from the west intersection of S.R. 50/ S.R. 50A [along the Brooksville Bypass] that stated that the stormwater management facilities in this section had previously been sized to handle the ultimate 6-lane built-out condition. This information effectively reduced the pond siting required in this analysis to Basins A through L and the areas adjacent to the west intersection of S.R. 50/S.R. 50A (Brooksville Bypass and Cobb Road), as described in section 5.1. Basin M was not analyzed in this process as a result of the 6-lane built-out condition. The drainage approach needed to be adjusted as a result of the conditions caused by the FDOT critical rainfall event, which is a 100-year 10-day event. The sub-basins for the S.R. 50 drainage area were considered to be submerged for design purposes as a result of this rainfall event. With the submerged sub-basins the ponds could then be located and sized so that berms were not required, otherwise causing additional floodplain impacts. Additionally, soil conditions indicate that ponds west of California Street needed to maintain a maximum depth of 3' due to the likely development of sinkholes that could occur with the construction of deeper ponds.

Following the setting of the design criteria, the design approach was determined based on meetings with FDOT. The determined approach was to design two alternative ponds per each sub-basin and one large pond per basin. This approach resulted in the siting and sizing of approximately 230 ponds for the sub-basin alternatives (Alternatives "A" and "B") and 15 ponds for the basin alternatives. Following the siting and sizing of Alternatives "A" and "B", it was determined that the right-of-way acquisition effort required in this implementation would be excessive and would be limited by the availability of vacant land and funding. The basin alternatives were thus selected as the preferred alternative, and this report has been limited to the documentation of these basin alternatives (Alternatives "A" and "B" will be retained within the project's files). Note that exhibits showing all of the sub-basin alternatives are provided in a separate volume of this report (Appendix F).

Coordination with the SWFWMD will also occur during the design phase of this project to address stormwater management issues. Federal agencies that may require permits for the proposed improvements include the Army Corps of Engineers (ACOE) and the Environmental Protection Agency (EPA). The ACOE requires permits for dredge and fill activities in waters of the United States. EPA requires a Notice of Intent (NOI) for construction under the State of Florida General Permit for the National Pollutant Discharge Elimination System (NPDES) for construction impacts greater than one acre. This NOI will require a site-specific pollution prevention plan that incorporates current FDOT standards.

4.5 Cultural and Environmental Assessment Factors

The project corridor was analyzed to assess cultural and environmental impacts. These reports are summarized and included in the S.R. 50 Preliminary Engineering Memorandum (PEM). The cultural and environmental factors are included in Table 8-1 of the PEM and are summarized below.

Evaluation of the pond sites resulted in the discovery and evaluation of one new archaeological site (8HE365) within proposed Pond A, and two archaeological occurrences (AOs) within Pond I-South and Pond J, respectively. The latter is probably associated with 8HE241C. Of these sites, the Colorado Site (8HE241) was determined to be the only site eligible for listing in the NRHP.

4.6 References

1. Soil Survey of Hernando County, Florida; United States Department of Agriculture Soil Conservation Service and the University of Florida Soil Science Department; Florida; July 1977.

2. Preliminary Geotechnical Report; Professional Service Industries, Inc.; Tampa, Florida; July 2003.

5.0 DRAINAGE BASINS

5.1 Basin Characteristics

The existing drainage patterns and basin boundaries were determined based on the existing FDOT construction plans, United States Geological Survey (USGS) quadrangle and SWFWMD maps.

The project has been delineated into thirteen basins, identified as A through M, which are illustrated in Figure 5-2. These basins contain numerous sub-basins that were utilized for the hydrologic evaluation. Within the immediate vicinity of S.R. 50, wetlands are very sparse and predominantly consist of isolated depressions. These depressions are evident in Figure 5-1, the Floodplains Map. The overland flow eventually is conveyed to these depressions. Most of the stormwater runoff travels from north to south through commercial, residential, woods and open land. Drainage along the project corridor is accomplished with a combination of roadside ditches, cross drains, and side drainpipes that are located under driveways and roadways. These basins along the corridor are considered to be closed basins and some are located within the Peck Sink Watershed near S.R. 50 and Cobb Road. The existing drainage systems within the project limits appear to function adequately, except for existing flooding problems along the Brooksville Bypass from the west intersection of S.R. 50/S.R. 50A to U.S. 41. These problems are a result of clayey soils being present with a perched water table. The City of Brooksville and the FDOT Maintenance Office have both indicated that there are also known flooding problems due to clayey soils and development in low areas near the S.R. 50 and Cobb Road intersection area.

There are five existing concrete box culverts (CBC) under S.R. 50 within the limits of the project: one double 4' by 6' CBC, one double 8' by 4' CBC, one single 10' by 5' CBC, one triple 8' by 7' CBC and one single 8' by 6' CBC. A Culvert Analysis Report will be prepared in the design phase of this project. With the proposed roadway widening, it is anticipated that the final design may call for some existing cross drains to be extended or replaced.

On-site and off-site sub-basin areas that affect the conveyance of runoff from the S.R. 50 right-of-way between U.S. 19 and U.S. 41 were determined for the purpose of estimating the proposed stormwater management facility needs for each sub-basin.

Based on interpretation of limited data and in concurrence with the previously approved FDOT Report, it is anticipated that dry detention will be used in the design of the required stormwater management facilities for basins A, B, C, D, E, F, G, H and I. A wet detention/retention facility may be warranted for basins J, K, L and M due to soils and groundwater conditions. These basins discharge into isolated/depressional areas (closed basins). Recovery is accomplished through percolation into the ground and evapo-transpiration.

Basin A extends approximately 2,390 feet and outfalls to the depressed area southeast of the U.S. 19 / S.R. 50 intersection. The soil type consists of Myakka

and Paola soils, hydrological soil group (HSG) “A/D” and “A”, respectively. The contributing drainage area is approximately 102.6 acres. The pond site for Basin A is located southeast of the U.S. 19/S.R. 50 intersection with a total area of 3.3 acres.

Basin B extends approximately 3,670 feet and has no positive outfall. The soil type consists of Paola soils, HSG “A”, and Lake fine sand, HSG “A”. The contributing drainage area is approximately 116.0 acres. The pond site for Basin B is located south of S.R. 50 with a total area of 6.4 acres.

Basin C extends approximately 2,900 feet and has no positive outfall. The soil type consists of Paola, Candler and Basinger soils, HSG “A” and “A/D”. The contributing drainage area is approximately 98.1 acres. The pond site for Basin C is located south of S.R. 50 with a total area of 4.6 acres.

Basin D extends approximately 7,640 feet and has no positive outfall. The soil type consists of Kendrick, Candler, Myakka and Basinger soils, HSG “A” and “A/D”. The contributing drainage area is approximately 248.7 acres. The pond site for Basin D is located south of S.R. 50 with a total area of 11.4 acres.

Basin E extends approximately 5,890 feet and has no positive outfall. The soil type consists of Kendrick, Candler, Myakka and Basinger soils, HSG “A” and “A/D”. The contributing drainage area is approximately 195.3 acres. The pond site alternative for Basin E is broken into two ponds, one north and one south of S.R. 50. The south pond contains a total area of 4.4 acres, while the north pond has a total area of 4.6 acres.

Basin F extends approximately 3,375 feet and has no positive outfall. The soil type consists of Candler soils, HSG “A”. The contributing drainage area is approximately 130.1 acres. The pond site alternative for Basin F is broken into two ponds, one north and one south of S.R. 50. The south pond contains a total area of 2.5 acres, while the north pond has a total area of 2.2 acres.

Basin G extends approximately 4,035 feet and has no positive outfall. The soil type consists of Candler soils, HSG “A”. The contributing drainage area is approximately 97.4 acres. The pond site for Basin G is sized to include the runoff from Basin H as well as the runoff from Basin G. This Basin Alternative is located south of S.R. 50 with a total area of 8.3 acres.

Basin H extends approximately 2,660 feet and has no positive outfall. The soil type consists of Candler soils, HSG “A”. The contributing drainage area is approximately 62.8 acres. The runoff from Basin H is included in the Basin Alternative for Basin G.

Basin I extends approximately 8,090 feet and has no positive outfall. The soil type consists of Candler, Arredondo, Sparr, Nobleton, Micanopy and Williston soils, HSG “A” and “C”. The contributing drainage area is approximately 275.1 acres. The pond site alternative for Basin I is broken into two ponds, one north and one south of S.R. 50. The south pond contains a total area of 5.3 acres, while the north pond has a total area of 4.5 acres.

Basin J extends approximately 2,860 feet and has no positive outfall. The soil type consists of Candler, Arredondo, Kendrick, Sparr soils HSG "A", Nobleton, Micanopy and Williston soils HSG "C", and Flemington soils HSG "D". The contributing drainage area is approximately 123.1 acres. The pond site for Basin J is located south of S.R. 50 with a total area of 2.3 acres.

Basin K extends approximately 2,950 feet and has no positive outfall. The soil type consists of Kendrick, Sparr soils HSG "A", Nobleton and Micanopy soils HSG "C", and Blichton soils HSG "D". The contributing drainage area is approximately 291.8 acres. The pond site for Basin K is located south of S.R. 50 with a total area of 1.7 acres.

Basin L extends approximately 9,670 feet and has no positive outfall. The soil type consists of Kendrick, Sparr soils HSG "A", Nobleton and Micanopy soils HSG "C", Flemington and Blichton soils HSG "D". The contributing drainage area is approximately 977.3 acres. The pond site for Basin L is located north of S.R. 50 with a total area of 2.8 acres.

Basin M extends approximately 3,600 feet and has no positive outfall. The soil type consists of Kendrick, Sparr soils HSG "A", Nobleton and Micanopy soils HSG "C", Flemington and Blichton soils HSG "D". The contributing drainage area is approximately 406.2 acres. The pond site for Basin M is north of S.R. 50 and east of Cobb Road. The total area for this basin alternative is 1.7 acres.

5.2 Floodplain Involvement and Classification

The National Flood Insurance Program (NFIP), through the Federal Emergency Management Agency (FEMA), has established the 100-year base floodplain limits for Hernando County. These base floodplain limits include the boundaries shown in the Flood Insurance Rate Maps (FIRM) referenced below for the S.R. 50 study area. The FIRMs for the study area include Community Panel Numbers 120110 0140 B, 120110 0150 B, 120110 0175 B and 120110 0190 B (dated April 17, 1984) and 120333 0001 C (dated September 18, 1986). Refer to Figure 5-1 for the FIRM floodplains.

The SWFWMD Environmental Resource Permit (ERP) Information Manual (Section 4.4, 10/96 version) states that no net encroachment into the floodplain, up to that encompassed by the 100-year event, which will adversely effect either conveyance, storage, water quality or adjacent lands will be allowed and the required compensating storage shall be equivalently provided. Floodplain-compensatory storage will be provided as required by the SWFWMD as portions of the proposed roadway widening will encroach upon the 100-year base floodplain.

According to the FEMA flood boundary and floodway maps, regulated floodways do not exist within the Study limits. Refer to the Floodplains Map (Figure 5-1) as mentioned in the previous section for areas of encroachment to the 100-year floodplain.

6.0 ALTERNATIVE POND SITES ANALYSIS

The alternative pond sites were identified for consideration based on field reconnaissance, ground and roadway elevations and existing land use. Each of the 13 designated basins was broken down into several sub-basins. Each of these sub-basins was then analyzed and an average of two pond sites were identified for each. Out of this analysis came the 15 basin alternatives previously mentioned in Section 4 and then described in section 5. Appendix C provides aerial photos showing the approximate locations of the Basin Alternative Sites.

6.1 Pond Siting Analysis

The pond siting analysis consisted of a preliminary review of all available records and a literature search with limited field review data to determine if any adverse environmental impact would result from the construction of stormwater facilities.

The selection of the pond locations and the preliminary estimates of their areas and volumes were based on the best available information and current data. The method used to determine the estimated pond volumes, and correlating design requirements detailed in section 4, began with the calculation of the difference of existing and proposed pavement areas within the proposed right-of-way lines. The volume of run-off in acre-feet for the design event was then calculated based on the difference in pavement area and the amount of precipitation. The volume contained in the attenuation ditch blocks that will be lost as a result of the proposed S.R. 50 widening was also included in the calculations. These volumes were added to the volumes for each sub-basin to get a total volume. The total volumes were then reduced by 30%, per recommendation from SWFWMD, to account for the high amount of percolation experienced in the area.

The pond areas were then calculated based on the required storage volumes using the FDOT *Stormwater Management Facility Handbook*[1] in a method that is outlined in chapter two and detailed in example 2.1 of the handbook. This equation was able to account for the 1 to 4-side slope as required, as well as the 3-foot maximum pond depth applied to the project west of California Street. These calculations and associated spreadsheet are provided in Appendix D. The equation and spreadsheet were also able to account for the varying depths per pond location east of California Street.

The SCS Soil Survey Maps for Hernando County were used to identify and verify the soil types found in the proposed alternative pond sites. The existing time of concentration for the pre-development condition and the onsite and offsite curve numbers associated with pre- and post-development conditions were calculated using SCS procedures described in TR-55 (SCS, 1986).

The analyses were performed for the pond sites using the existing data mentioned previously in Section 4.3. In addition, coordination with the SWFWMD staff was documented regarding additional design criteria and pond site locations/ recommendations, respectively. The alternative pond sites were

evaluated based upon the potential for impacts and physical characteristics. The following items were considered:

- Cultural resources (archaeological and historical)
- Ecological impacts (wetland, protected species and upland habitat)
- Petroleum and hazardous material contamination
- Hydraulics
- Hydrology

The proposed pond area for each basin was sized based on the onsite drainage area, more specifically, the difference in impervious area in the pre-development and the post-development conditions. The loss of ditch volume associated with filling in the existing roadside ditches for the build alternative is included in the volume requirements.

The design criteria used to compare the proposed pond sites were based on the following constraint:

- The DHW must be less than the lowest edge of pavement (EOP) elevation within the respective basin to insure positive flow to the selected stormwater pond.

The selected pond sites are reasonable worst-case scenarios, and during the design phase the effectiveness of treatment within the right-of-way will be evaluated and negotiated with SWFWMD. The summary of the alternative analyses as well as the right-of-way cost estimates and other relevant factors associated with the pond sites are shown in Table 8-1.

6.2 References

1. Stormwater Management Facility Handbook; State of Florida Department of Transportation, Office of Design, Drainage Section, Tallahassee, Florida; January 1999.

7.0 REGULATORY AGENCIES AND PERMITTING

The local agencies with jurisdiction over the proposed improvements are Hernando County and the City of Brooksville. Coordination with these agencies regarding floodplain and stormwater impacts, as well as proposed changes to the existing drainage system will occur during preliminary and final design stages.

Permits for the proposed improvements will be issued by State agencies including the SWFWMD, which requires an Environmental Resource Permit (ERP) for all dredge and fill activities conducted in areas either in or connected to Waters of the State, as outlined in *Chapter 17-4.48, Florida Administrative Code (FAC)*. An Environmental Resource Permit (ERP) for the construction or alteration of any surface water system according to *Chapter 40C-4 FAC* will also be required by the SWFWMD. The issuance of permits is intended to regulate new systems and their impact on water quantity, water quality, wetlands and other environmental features. Also, State Water Quality Standards, as stated in *Chapter 17-3* and *Section 17.4.242 FAC*, will need to be met by the discharges that will be regulated through these permits. Stormwater management issues will be addressed through coordination with the SWFWMD during preliminary and final design.

The United States Army Corps of Engineers (ACOE) and the Environmental Protection Agency (EPA) are Federal agencies that may require permits for the proposed improvements. The ACOE requires permits for dredge and fill activities in waters of the United States. EPA requires a Notice of Intent (NOI) for construction under the State of Florida General Permit for NPDES Stormwater Permit for construction impacts greater than one acre. A site-specific pollution prevention plan that incorporates current FDOT standards will be required by this NOI. Coordination with Federal agencies will occur during preliminary and/or final design of the proposed improvements.

8.0 SUMMARY AND RECOMMENDATIONS

Based on office and field investigations as well as design calculations, the recommended pond sites described previously within this report have been located for Basins A through L, along with a recommended pond site on the northeast corner of the west intersection of S.R. 50/S.R. 50A. The initial design approach was to design two alternative ponds per sub-basin and one large pond per basin. This approach resulted in the siting and sizing of approximately 230 ponds for the sub-basin alternatives (Alternatives "A" and "B") and 15 ponds for the basin alternatives. Following the siting and sizing of Alternatives "A" and "B", it was determined that the right-of-way acquisition effort required in this implementation would be excessive and would be limited by the availability of vacant land and funding. The basin alternatives were thus selected as the preferred alternative, which are summarized in Table 8-1. Stormwater treatment for basins A through I is anticipated to be achieved through dry retention due to the relatively deep SHW table and subsurface soil conditions. In addition, it is anticipated that Basins J (beginning at California Street and proceeding eastward) through L, and the basin on the northeast corner of the west intersection of S.R. 50/S.R. 50A, will be treated through wet detention due to the relatively shallow SHW table and subsurface soil conditions.

The pond volumes were calculated to account for the difference in the pre-construction condition compared to the proposed condition and to capture the amount of additional runoff that will be created. Areas were then calculated based on required depths and a 20-foot maintenance berm surrounding the pond perimeter.

FDOT and SWFWMD design criteria will be compared, with the more stringent of the requirements being used in the design phase. The permitting phase of project development will address the SWFWMD requirements.

Final Pond Siting Report

S.R. 50 PD&E Study Reevaluation

From U.S. 19 (S.R. 55) to the east intersection of S.R. 50 / S.R. 50A [along the Brooksville Bypass]

Hernando County, Florida

WPI Segment No: 407951 1
FAP No: 300-1(7)

Florida Department of Transportation
District 7

November 2003

FINAL POND SITING REPORT

Florida Department of Transportation
Project Development and Environment (PD&E) Study Reevaluation

S.R. 50 PD&E Study Reevaluation

From U.S. 19 (S.R. 55) to the east intersection of S.R. 50 / S.R. 50A [along the Brooksville Bypass]

Hernando County, Florida

WPI Segment No: 407951 1
FAP No: 300-1(7)

Submitted to:

Florida Department of Transportation - District 7
Tampa, Florida

Submitted by:

AYRES ASSOCIATES

November 2003

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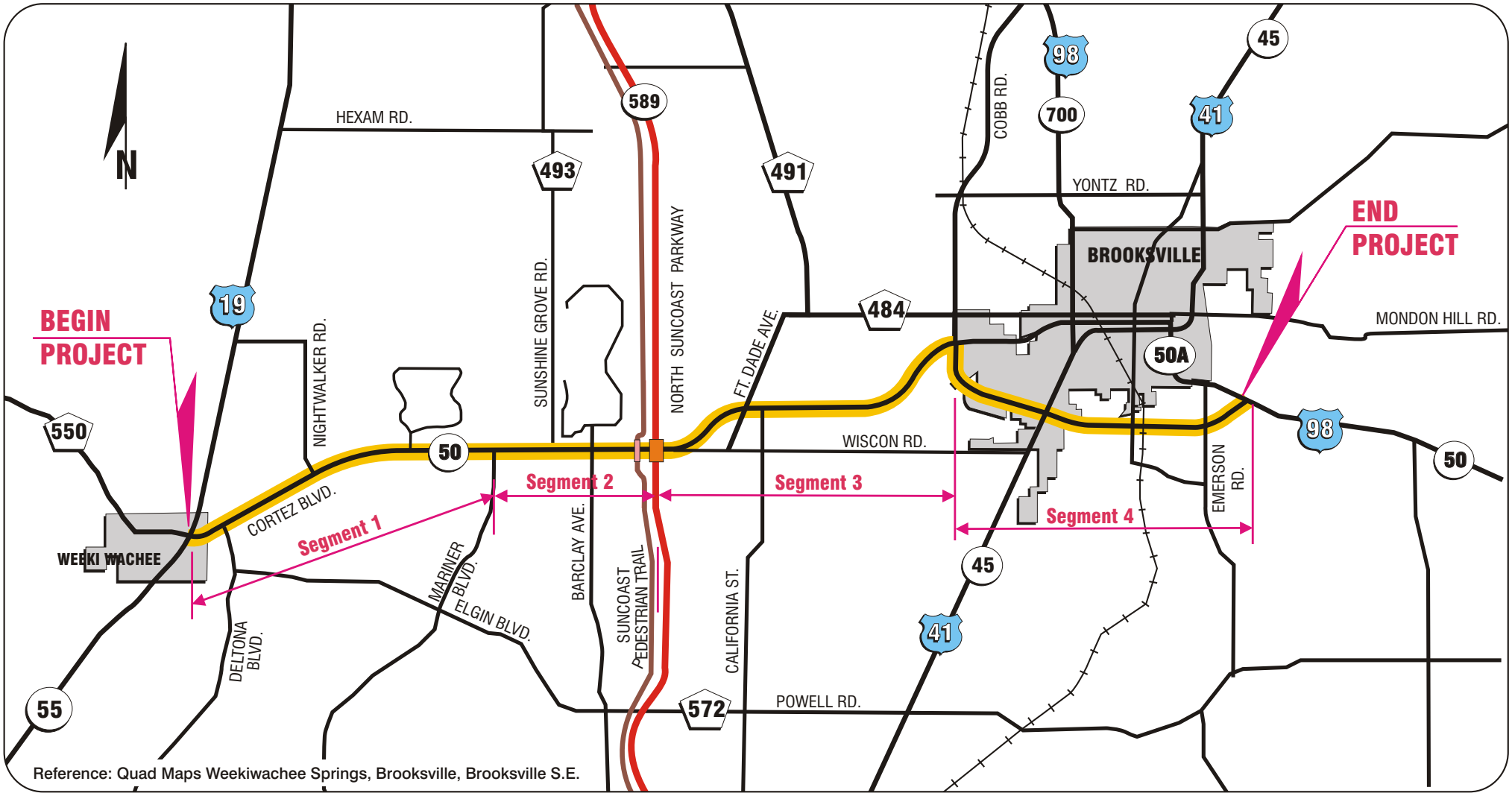
1.0 SUMMARY

This project involves the reevaluation of the previous PD&E study that was performed for the project, which is documentation of any changes that may have occurred since the previous study was completed. The previous PD&E study being reevaluated is S.R. 50 from U.S. 19 (S.R. 55) to the eastern intersection of S.R. 50/S.R. 50A [1]. This project involves widening S.R. 50 (Cortez Boulevard), from the existing 4-lane typical section to a 6-lane typical section, from U.S. 19 (S.R. 55) to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass]. The length of the project is approximately 13.7 miles. The widening of S.R. 50 from U.S. 19 to the west intersection of S.R. 50/S.R. 50A is proposed to be widened to the outside; whereas the remainder of the project, from the west intersection of S.R. 50/S.R. 50A to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass], is proposed to be widened to the inside. Figure 1-1, Project Location Map, illustrates the limits of the project area in relation to the local roadway network.

This *Pond Siting Report* (*PSR*) was prepared to find and assess suitable pond locations that are hydraulically functional and environmentally permittable. Project boundary information was determined as a result of information received from the permit application for S.R. 50 from the west intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass]. This application stated that the stormwater management facilities in this section had previously been sized to handle the ultimate 6-lane built-out condition. This information effectively reduced the pond siting required in this analysis to Basins A through L and the areas adjacent to the west intersection of S.R. 50/S.R. 50A. The initial design approach was to design two alternative ponds per sub-basin and one large pond per basin. This approach resulted in the siting and sizing of approximately 230 ponds for the sub-basin alternatives (Alternatives “A” and “B”) and 15 ponds for the basin alternatives. Following the siting and sizing of Alternatives “A” and “B”, it was determined that the right-of-way acquisition effort required in this implementation would be excessive and would be limited by the availability of vacant land and funding. The basin alternatives were thus selected as the preferred alternative, and this report has been limited to the documentation of these basin alternatives (Alternatives “A” and “B” will be retained within the project’s files). Note that exhibits showing all of the sub-basin alternatives are provided in a separate volume of this report (Appendix F).

GRAPHICS: JOBS/ PD&E / DIST 7 / SR 50 / REPORT / POND SITING / POND.CDR / FIG 1-1 / 05-19-03



LEGEND

- Project Study Limits
- Major Interchange
- Railroad

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

PROJECT LOCATION MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 1-1

1.1 References

1. Final Preliminary Engineering Report - S.R. 50 U.S. 19 to the eastern intersection of S.R. 50/S.R. 50A; Reynolds, Smith and Hills Architects-Engineers-Planners, Inc.; Florida; May 1988.

2.0 INTRODUCTION

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Reevaluation Study, which evaluates capacity improvement options along S.R. 50 (Cortez Boulevard) in Hernando County Florida. The proposed project involves widening S.R. 50 from the existing 4-lane typical section to a 6-lane typical section from U.S. 19 to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass], a distance of approximately 13.7 miles. The widening of the segment of S.R. 50 from U.S. 19 (S.R. 55) to the west intersection of S.R. 50/S.R. 50A is proposed to be widened to the outside; whereas the remainder of the project, from the west intersection of S.R. 50/S.R. 50A to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass], is proposed to be widened to the inside.

2.1 Purpose

This Pond Siting Report (PSR) has been prepared as part of the PD&E Reevaluation Study for a 13.7 mile segment of S.R. 50 in Hernando County, Florida. This effort will recommend potential pond locations that are hydraulically functional and environmentally permittable. These ponds will meet the requirements of the Southwest Florida Water Management District (SWFWMD) criteria based on best available information and conservative design assumptions. Although this study describes pond sizes and characteristics, it is important to note that this analysis is contingent upon further data acquisition in the form of ground elevation survey, soil borings, establishing site specific seasonal high water (SHW) elevations in agreement with the environmental agencies, parcel boundaries, and floodplain impacts.

The information provided in this document provided input for discussion and review during the public hearing. Pertinent public input during the hearing process and comments from review agencies was utilized to refine and determine the final recommended pond sites.

This report aided the FDOT and Federal Highway Administration (FHWA) in determining the recommended pond sites and served as a support document for subsequent engineering decisions as the project advances through design and construction.

2.2 Project Description

S.R. 50 is an east/west principal arterial facility. This Reevaluation Study examines the section of S.R. 50 from U.S. 19 (S.R. 55) to the east intersection of S.R. 50/S.R. 50A [along the Brookville Bypass], a distance of approximately 13.7 miles (see Figure 1-1). The majority of the project is located within an unincorporated area of Hernando County; however, portions extend through the City of Weeki Wachee and the City of Brooksville. The project is located in Section 36 of Township 22 South, Range 17 East; Sections 25 through 36 of Township 22 South, Range 18 East; Sections 20, and 25 through 30 of Township 22 South, Range 19 East; and Sections 1 and 2 of Township 23 South, Range 17 East.

Land use along the corridor is generally urbanized and suburban in nature with undeveloped tracts interspersed. The existing land use along S.R. 50 is predominantly commercial with areas of residential use as well as isolated areas of medical, institutional and recreational uses. The proposed project is consistent with future land use plans.

S.R. 50, which is part of the Florida Intrastate Highway System (FIHS), is typically a 4-lane divided roadway with 12-foot travel lanes, which was constructed according to the original Type II Categorical Exclusion approved in 1990. The existing posted speed limit along S.R. 50 varies between 45 mph and 55 mph.

The S.R. 50 project corridor is divided into four segments for analysis purposes based on existing land use, projected traffic volumes, and roadway characteristics (refer to Table 2-1).

Table 2-1: Project Segments

Segment	Limits	Length (Miles)
1	U.S. 19 (S.R. 55) to Mariner Boulevard (C.R. 587)	3.88
2	Mariner Boulevard (C.R. 587) to the Suncoast Parkway	2.02
3	Suncoast Parkway to the west S.R. 50/S.R. 50A intersection	4.00
4	West S.R. 50/S.R. 50A intersection to the east S.R. 50/S.R. 50A intersection [along the Brooksville Bypass]	3.84

2.3 Recommended Typical Sections

The recommended typical sections for the widening of S.R. 50 from U.S. 19 (S.R. 55) to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass] consists of five typical sections, which are illustrated in Figures 2-1 through 2-5. Additional right-of-way is required for the recommended typical sections to provide right-turn lanes at unsignalized and signalized intersections.

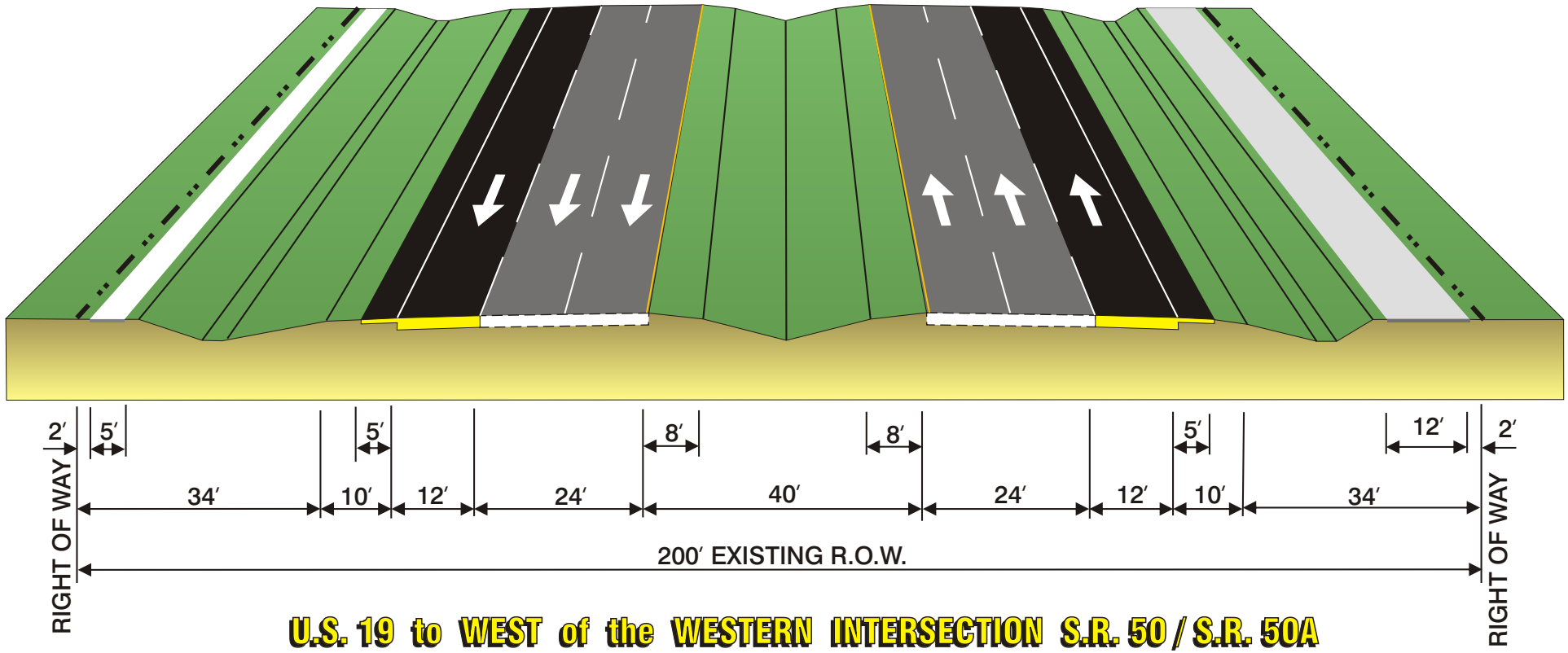
The proposed improvements for the portion of the project between U.S. 19 (S.R. 55) and west of the west intersection of S.R. 50/S.R. 50A is a 6-lane rural typical section (65 mph design speed) within the 200 feet of existing right-of-way. It also includes a 12-foot shared used path and 5-foot sidewalk on the south and north side of the roadway, respectively.

A 6-lane urban typical section (50 mph design speed) is recommended for the section of S.R. 50 that is immediately west and east of the west intersection of S.R. 50/S.R. 50A. This typical section includes a 5-foot sidewalk and a 4-foot bicycle lane on both the north and south side of the roadway, which requires a 126-foot right-of-way width. The placement of the bicycle lanes will be further evaluated during the design phase and a shared use path may be considered at that time.

The recommended typical section for the portion of S.R. 50 from east of the west intersection of S.R. 50/S.R. 50A to west of Candlelight Boulevard [along the Brooksville Bypass] is a 6-lane modified urban typical section with a 50 mph design speed within the existing right-of-way (170 feet to 205 feet). This typical section provides curb and gutter within the median while maintaining the existing open drainage system to the outside, and also provides a 5-foot sidewalk on both the north and south side of the roadway. The placement of the bicycle lanes will be further evaluated during the design phase and a shared use path may be considered at that time.

A 6-lane urban typical section is recommended for S.R. 50 [along the Brooksville Bypass] from west of Candlelight Boulevard to east of Ray Browning Road (50 mph design speed), which will provide curb and gutter in the median. This typical section will maintain the existing closed drainage system to the outside within the existing right-of-way (varies between 132 feet and 185 feet). The placement of the bicycle lanes will be further evaluated during the design phase and a shared use path may be considered at that time.

Similarly, a 6-lane modified urban typical section (50 mph design speed) is recommended for the remaining portion of the project from east of Ray Browning Road to the east intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass] within the existing right-of-way (varies 180 feet to 240 feet). This typical section provides curb and gutter within the median while maintaining the existing open drainage system to the outside as well as 5-foot sidewalk along both sides of the roadway. The placement of the bicycle lanes will be further evaluated during the design phase and a shared use path may be considered at that time.



U.S. 19 to WEST of the WESTERN INTERSECTION S.R. 50 / S.R. 50A

(Design Speed = 65 mph)

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

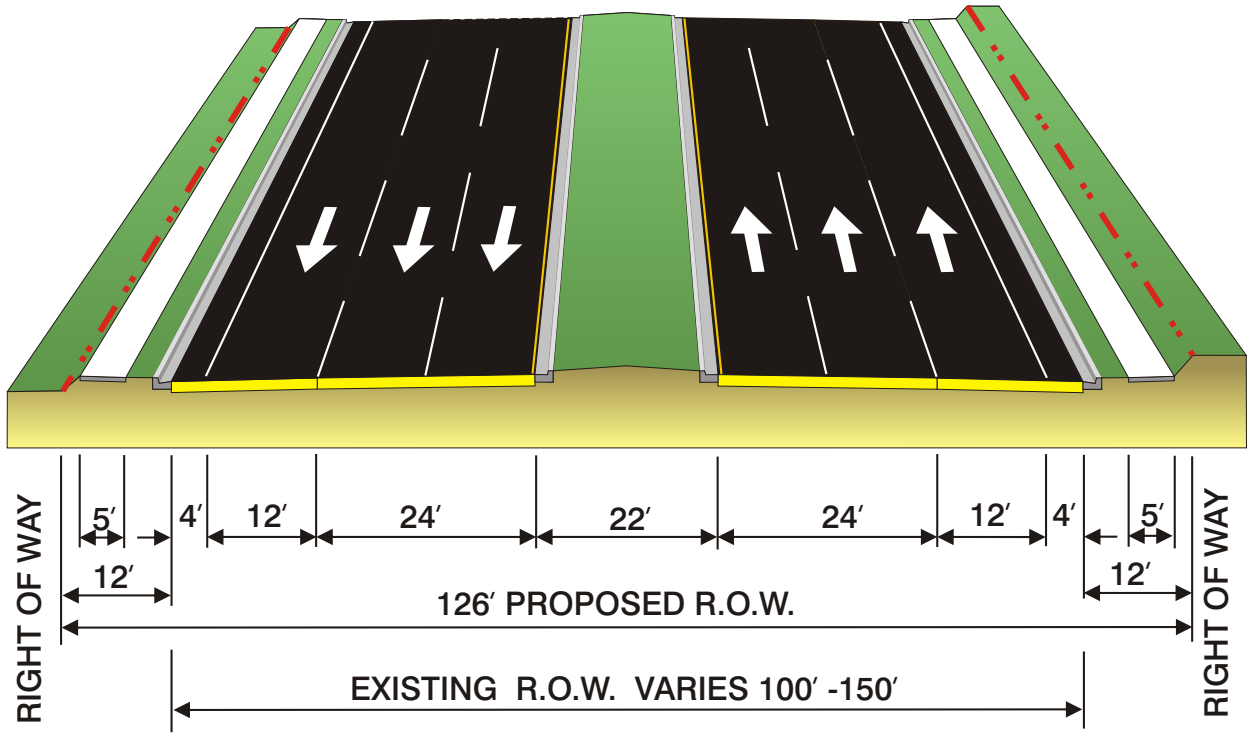
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

RECOMMENDED 6 - LANE RURAL ROADWAY TYPICAL SECTION

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 2-1



WEST of the WESTERN INTERSECTION S.R. 50 / 50A to EAST of the WESTERN INTERSECTION S.R. 50 / 50A [along the BROOKSVILLE BYPASS] (Design Speed = 50 mph)

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

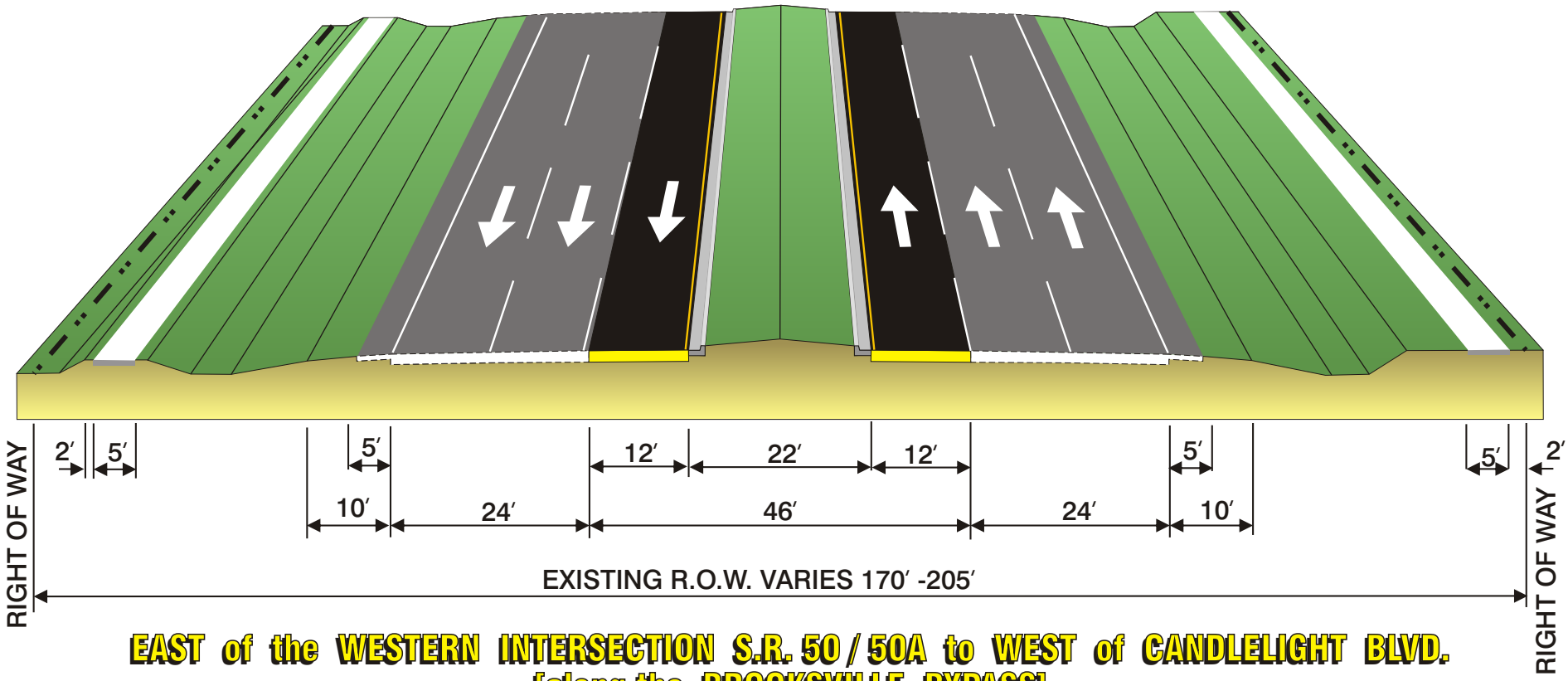
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of S.R. 50 / 50A [along the Brooksville Bypass] Hernando County, Florida

RECOMMENDED 6 - LANE URBAN ROADWAY TYPICAL SECTION

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 2-2



EAST of the WESTERN INTERSECTION S.R. 50 / 50A to WEST of CANDLELIGHT BLVD.
[along the BROOKSVILLE BYPASS]

(Design Speed = 50 mph)

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

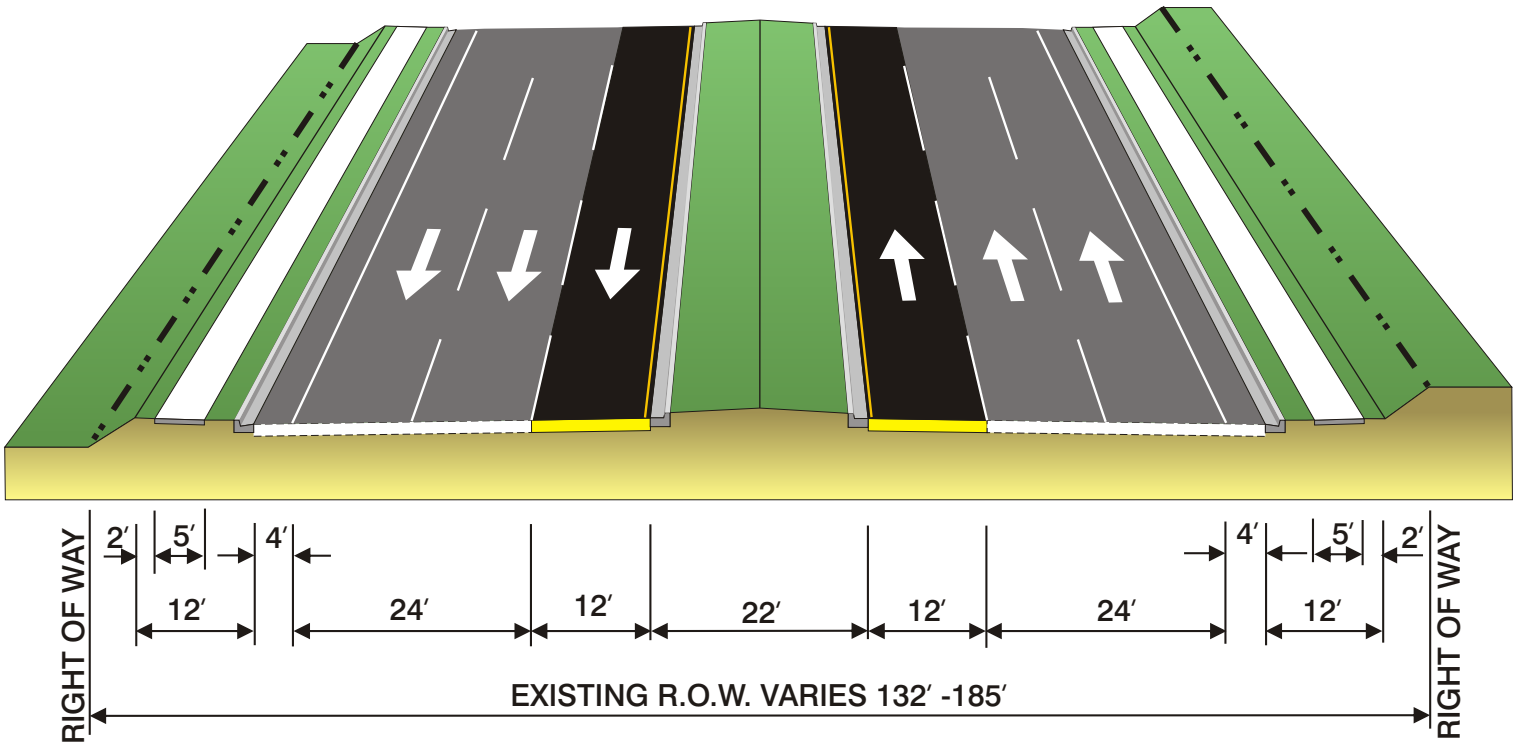
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

RECOMMENDED 6 - LANE MODIFIED URBAN ROADWAY TYPICAL SECTION

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 2-3



WEST of CANDLELIGHT BLVD. to EAST of RAY BROWNING RD.
[along the BROOKSVILLE BYPASS]

(Design Speed = 50 mph)

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

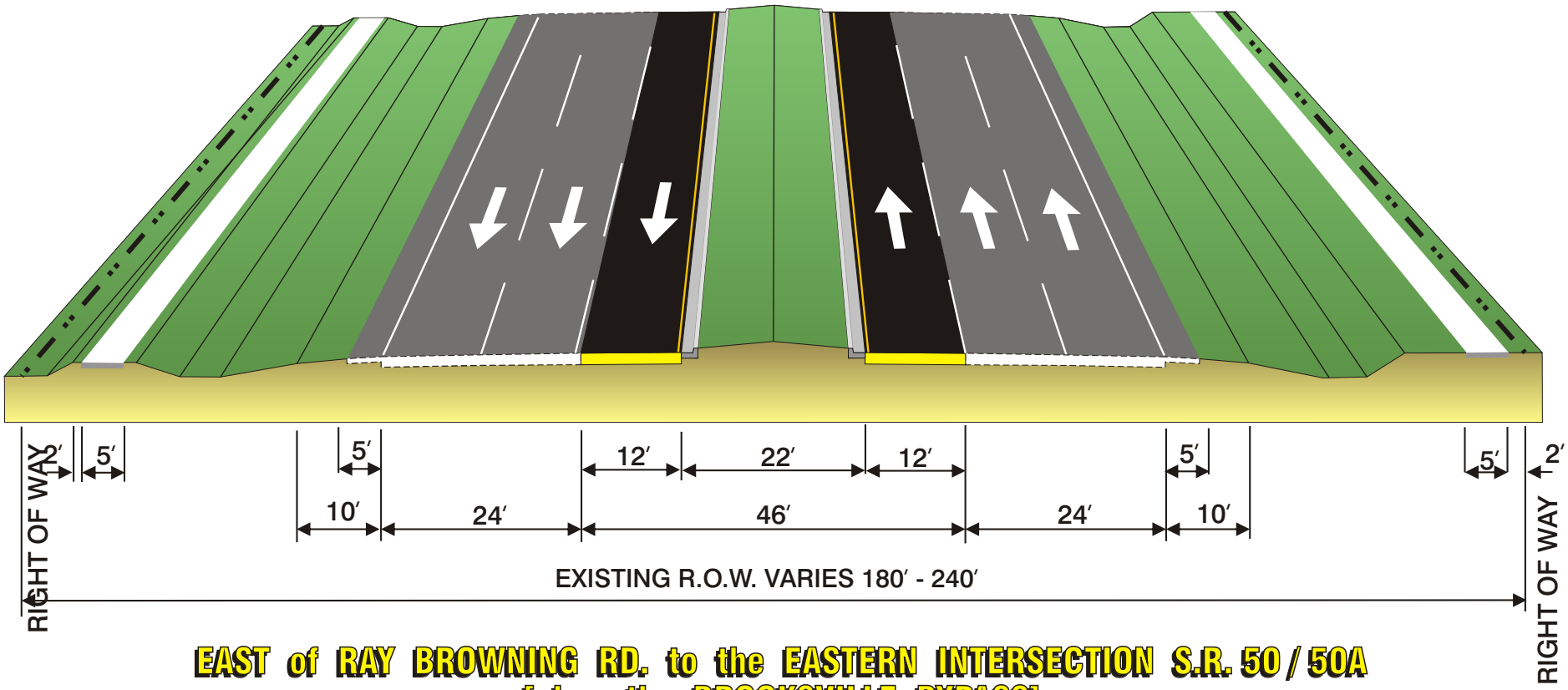
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

RECOMMENDED 6 - LANE URBAN ROADWAY TYPICAL SECTION

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 2-4



EAST of RAY BROWNING RD. to the EASTERN INTERSECTION S.R. 50 / 50A
[along the BROOKSVILLE BYPASS]

(Design Speed = 50 mph)

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

RECOMMENDED 6 - LANE MODIFIED URBAN ROADWAY TYPICAL SECTION

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 2-5

3.0 LAND USE

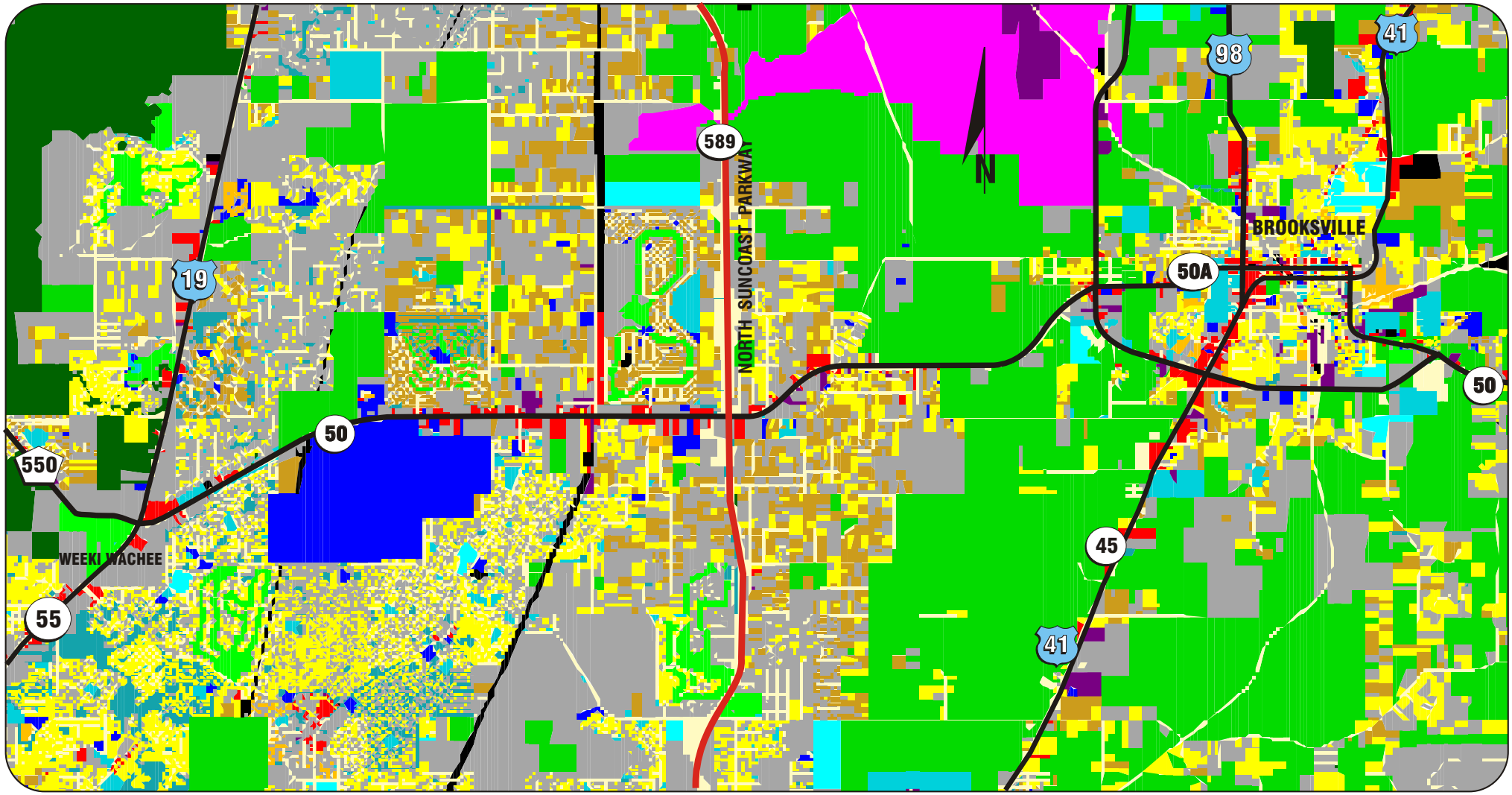
3.1 Existing Land Use

Generally, the existing land uses adjacent to the S.R. 50 corridor consist of commercial, residential, medical, institutional and recreational uses, which can be characterized as generally urbanized and suburban in nature with undeveloped tracts interspersed. The existing land use within the project corridor is depicted in Figure 3-1. S.R. 50 within the project corridor can be divided into two sections based on the existing roadway network as follows: U.S. 19 (S.R. 55) to the western intersection of S.R. 50/S.R. 50A and the western intersection of S.R. 50/S.R. 50A to the eastern intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass]. Below is a description of the existing land use within each section.

The existing land uses along S.R. 50 from U.S. 19 (S.R. 55) to the western intersection of S.R. 50/S.R. 50A are predominantly commercial with residential land uses located behind the commercial frontage as well as isolated areas of medical, institutional and recreational uses. Commercial uses include medium scale shopping centers, service stations, restaurants, motels, financial institutions, and miscellaneous retail establishments. Residential uses include both single-family residences/subdivisions and mobile home parks. The medical land uses within the Study corridor consist of medical offices/complexes and hospitals (Oak Hill Hospital and Springbrook Hospital). Institutional land uses include the Hernando County Public Library (West Side), Hernando County Fire & Rescue Station #12 and two churches. The Weeki Wachee tourist attraction, Sand Hill Scout Reservation and Suncoast Pedestrian Trail are recreational land uses within the Study corridor. Although vacant land exists throughout this section of the Study corridor, the majority of the vacant land occurs along the eastern bounds of this section.

The existing land uses along the remainder of the Study corridor, S.R. 50 from the western intersection of S.R. 50/S.R. 50A to the eastern intersection of S.R. 50/S.R. 50A [along the Brooksville Bypass], is primarily commercial with isolated areas of residential and institutional uses as well as vacant land. Medium scale shopping centers, miscellaneous retail establishments, restaurants, and financial institutions are the types of commercial development within this area. The residential land uses are primarily single-family residences that border the commercial frontage. The institutional uses are comprised of the Hernando County Sheriff's Office, U.S. Post Office, Hernando County Utility Department and two churches. Similar to S.R. 50 west of the Brooksville Bypass, the vacant land along this portion of the Study corridor occurs throughout this section of roadway with the majority occurring at the eastern end.

GRAPHICS: JOBS/ PD&E / DIST 7 / SR 50 / REPORTS /POND SITING / POND. CDR / FIG 3-1 / 04-25-03



LEGEND

- Agriculture
- Commercial
- Conservation
- Education
- Mining
- Mobile Home
- Private Institutional
- Publically Owned
- Recreational
- Right of Way
- Single Family
- Utilities
- Vacant
- Water / DRA
- Industrial
- Multi-Family

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

EXISTING LAND USE MAP

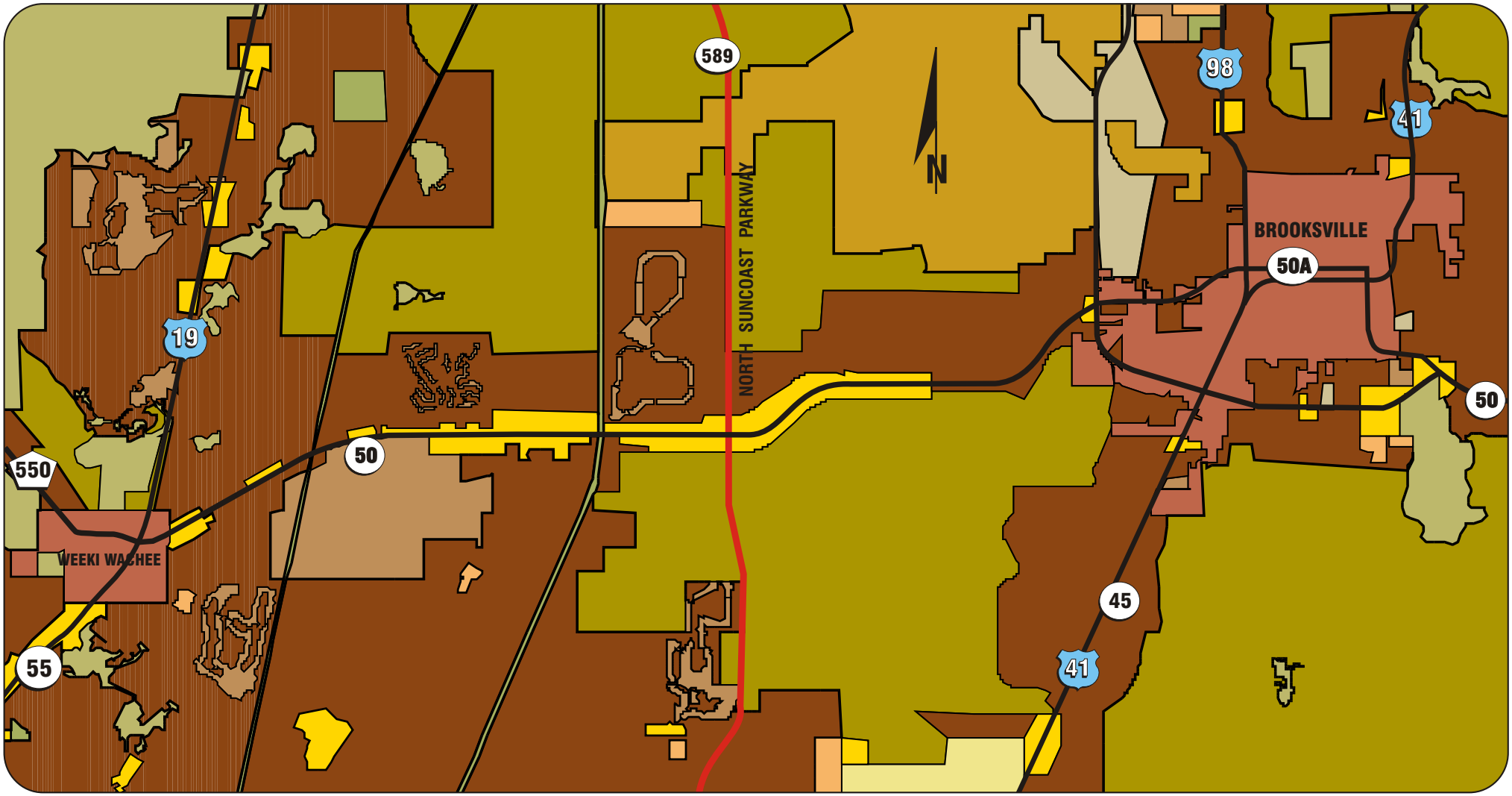
WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 3-1

3.2 Future Land Use

Hernando County has developed the Hernando County Comprehensive Plan Map to provide guidance for future land use planning. The designated land uses along the S.R. 50 project corridor indicate that future land uses will follow the established trends of the existing land uses in the Study area as shown in Figure 3-2. Future land use designations of existing vacant parcels will consist primarily of commercial development with residential development both behind the commercial development and adjacent to the S.R. 50 corridor.

Although there are no requests for a Development of Regional Impact (DRI) within the Study corridor, it should be noted that 11 parcels have applied for and been granted rezoning. Nine of these parcels are located immediately adjacent to S.R. 50 and the two remaining parcels are located in proximity to the roadway. In general, these developments are proposed on vacant land or require modification to existing buildings to provide additional services.



LEGEND

- City
- Commercial
- Conservation
- Education
- Industrial
- Mining
- Plan Development
- Public Facilities
- Recreation
- Residential
- Rural

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

FUTURE LAND USE MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 3-2

4.0 DESIGN INFORMATION

4.1 Soil Conditions

The soils within the limits of the Study corridor can be categorized according to the USDA SCS's *Soil Survey of Hernando County, Florida* [1]. The predominant soil map units located within the Study corridor and the corresponding characteristics are summarized in Table 4-1. Figure 4-1A through 4-1C illustrates the location of each of the soil map units. A brief description of the soils within the Study corridor follows; however, for a more detailed description of the soils refer to the *Preliminary Geotechnical Report* [2].

The majority of the Study corridor is underlain by select soils, such as American Association of State Highway and Transportation Officials (AASHTO) classified soils as A-3 and A-2-4. There are areas within the Study corridor that are underlain by shallow plastic soils (A-2-6, A-4, A-6 and A-7). These areas are in Section 30, R19E, T22S, on either side of the Suncoast Parkway that cross S.R. 50 for approximately 1,700 feet, as well as several areas on S.R. 50 [along the Brooksville Bypass] for approximately 7,000 feet.

The area within the Study corridor has groundwater levels greater than 6 feet below the existing grades. However, in the areas where plastic soils are present, a perched groundwater table can be expected immediately after storm events. Also, in areas with lower elevations, the groundwater levels can be expected to be near the existing ground surface.

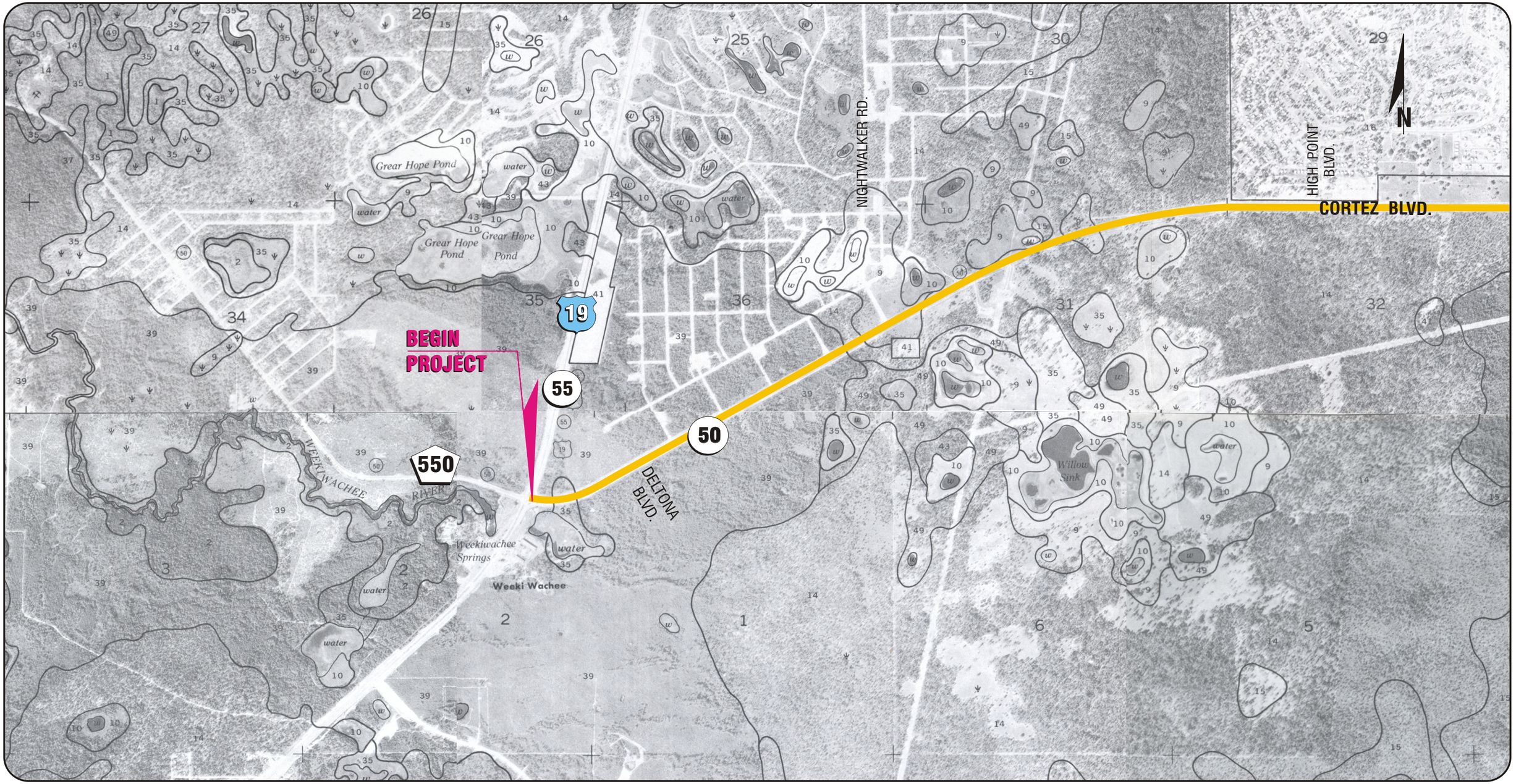
The surficial geologic material within the Study area consists of sporadic relic dune sand and the residual elements of the Hawthorne Group, with parts of the project having undifferentiated sands and clays. Most of these surficial soils are relatively unconsolidated sands and sandy clays. The thin and somewhat absent Hawthorne soils may consist of fine to medium grained unconsolidated quartz sand, silt, clay and limestone.

In some areas, the Ocala limestone is present at or very close to ground surface. This limestone has experienced significant dissolution and the creation of an intricate cavernous system. Problems in the development of sinkholes are related to the size and depth of the limestone and these underground cavities. The upper surface of this limestone is highly irregular.

S.R. 50 crosses areas of West Central Florida that have a known history for the formation of sinkholes. The potential for sinkhole activity is based on the recorded documentation of the formation of sinkholes and the geology of the area.

TABLE 4-1
SUMMARY OF SOIL INFORMATION

HERNANDO COUNTY USDA SOIL SURVEY							
		Soil Classification			Seasonal High Water Table		
USDA Map Unit	Depth (Inches)	USCS	AASHTO	Permeability (Inch/Hour)	Depth (Feet)	Kind	Month
Astatula (8)	0 – 85	SP, SP-SM	A-3	>20.0	>6.0	----	----
Basinger (9)	0 – 80	SP, SP-SM	A-3, A-2-4	>20.0	0 – 1.0	Apparent	June – November
Blichton (11 & 12)	0 – 28 28 – 34 34 – 63 63 – 75	SP-SM, SM SC SC SC, CL, CH	A-2-4, A-3 A-2-4, A-2-6 A-6 A-6, A-7	6.0 – 20.0 2.0 – 6.0 0.6 – 2.0 0.2 – 0.6	0 – 1.0	Apparent	June – September
Candler (14 & 15)	0 – 48 48 – 80	SP, SP-SM SP-SM	A-3 A-3, A-2-4	>20.0 6.0 – 20.0	>6.0	----	----
Flemington (20 & 21)	0 – 5 5 – 36 36 – 66 66 – 81	SM SC, CH, CL CH, MH, CL CH, MH	A-2-4 A-7 A-7 A-7	2.0 – 20.0 <0.06 <0.06 <0.06	0 – 2.5	Perched	June – September
Floridana Variant (25)	0 – 8 8 – 22 22 – 42 42 – 59 59 – 80	SM SM SC SM SC, CL, CH	A-2-4 A-2-4 A-2-4, A-2-6, A-4, A-6 A-2-4, A-2-6, A-4 A-4, A-6, A-7	6.0 – 20.0 6.0 – 20.0 0.6 – 6.0 2.0 – 6.0 0.06 – 0.2	+2.0 – 1.0	Apparent	June – February
Kendrick (29)	0 – 28 28 – 34 34 – 63 63 – 80	SP-SM SC, SM-SC SC SC, SM-SC	A-3, A-2-4 A-2-6, A-2-4 A-2-6, A-6 A-2-6, A-2-4	6.0 – 20.0 0.6 – 2.0 0.6 – 2.0 0.6 – 2.0	>6.0	----	----
Micanopy (33 & 34)	0 – 18 18 – 25 25 – 62	SM, SP-SM SC CH	A-2-4 A-2-6, A-6, A-7 A-7	6.0 – 20.0 0.6 – 2.0 0.06 – 0.2	1.5 – 2.5	Perched	July – November
Myakka (35)	0 – 23 23 – 37 37 – 80	SP-SP-SM SM, SP-SM SP, SP-SM	A-3 A-3, A-2-4 A-3	6.0 – 20.0 0.6 – 6.0 6.0 – 20.0	0 – 1.0	Apparent	June – February
Nobleton (36)	0 – 33 33 – 37 37 – 60 60 – 80	SP-SM, SM SC SC, CL, CH, SC SM, SM-SC, SC	A-2-4 A-2-6, A-6 A-6, A-7 A-2-6, A-6 A-2-4, A-2-6, A-6	6.0 – 20.0 0.2 – 2.0 0.2 – 0.6 0.2 – 2.0 0.2 – 6.0	1.5 – 3.5	Perched	July – October
Paola (39)	0 – 26 26 – 99	SP SP	A-3 A-3	>20.0 >20.0	>6.0	----	----
Sparr (47)	0 – 61 61 – 64 64 – 80	SP-SM SM, SC-SM SC, SM-SC	A-3, A-2-4 A-2-4 A-2-4, A-2-6, A-4, A-6	6.0 – 20.0 0.6 – 2.0 0.6 – 2.0	1.5 – 3.5	Perched	July – October
Wacreshula (52)	0 – 8 8 – 24 24 – 31 31 – 38 38 – 80	SP-SM SP-SM SP-SM, SM SP-SM,SM SM, SM-SC, SC	A-3, A-2-4 A-3, A-2-4 A-3, A-2-4 A-3, A-2-4 A-2-4, A-2-6, A-4, A-6	6.0 – 20.0 6.0 – 20.0 0.6 – 6.0 6.0 – 20.0 0.6 – 6.0	0 – 1.0	Apparent	June – February



GRAPHICS: JOBS/ PD&E / DIST 7 / SR 50 / REPORTS / POND SITING / POND SOILS 11X17.CDR / FIG_4-1-A / 06-30-03

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

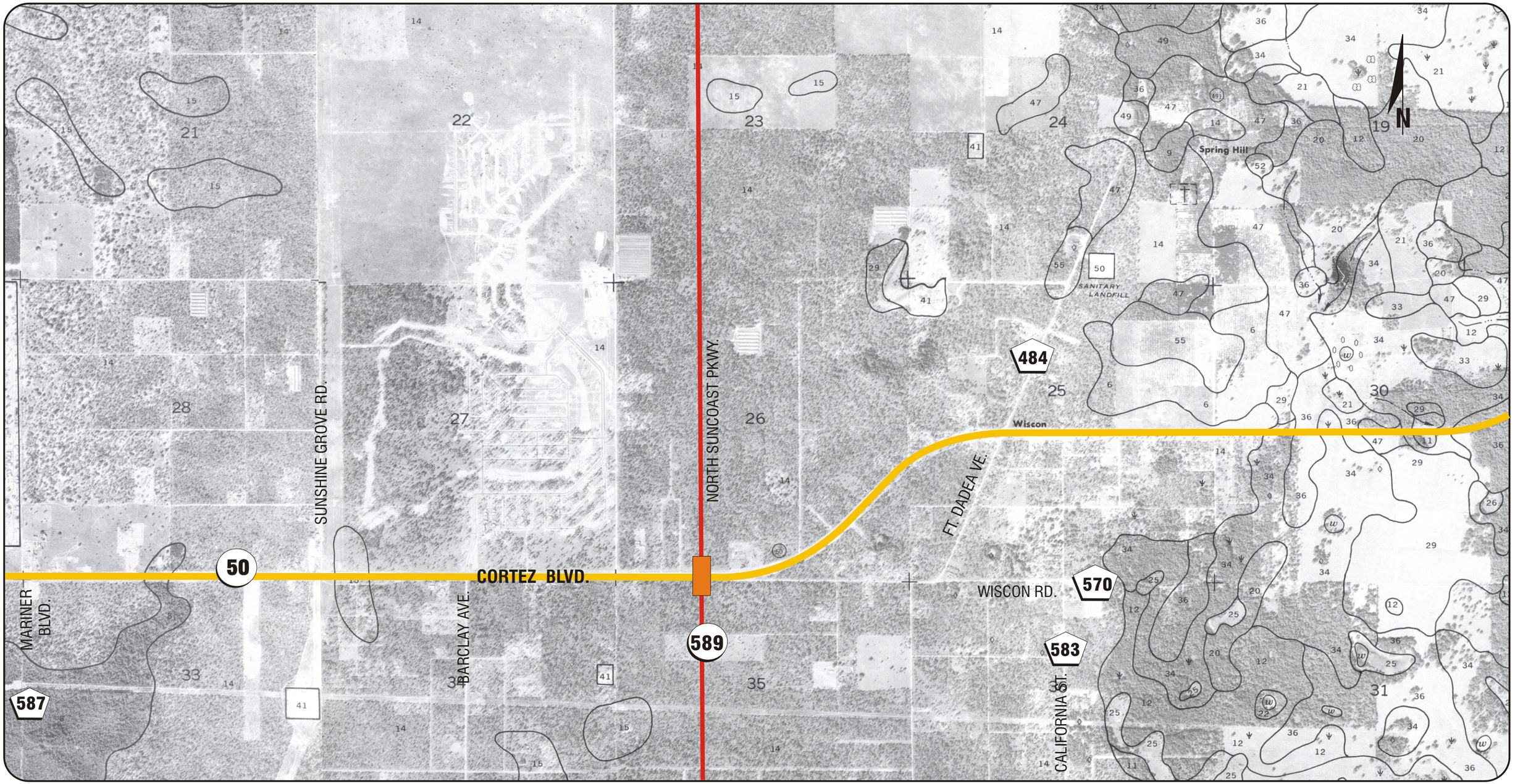
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

SOILS MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 4-1-A



GRAPHICS: JOBS/ PD&E / DIST 7 / SR 50 / REPORTS / POND SITING / POND SOILS 11X17.CDR / FIG_4-1-B / 06-30-03

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

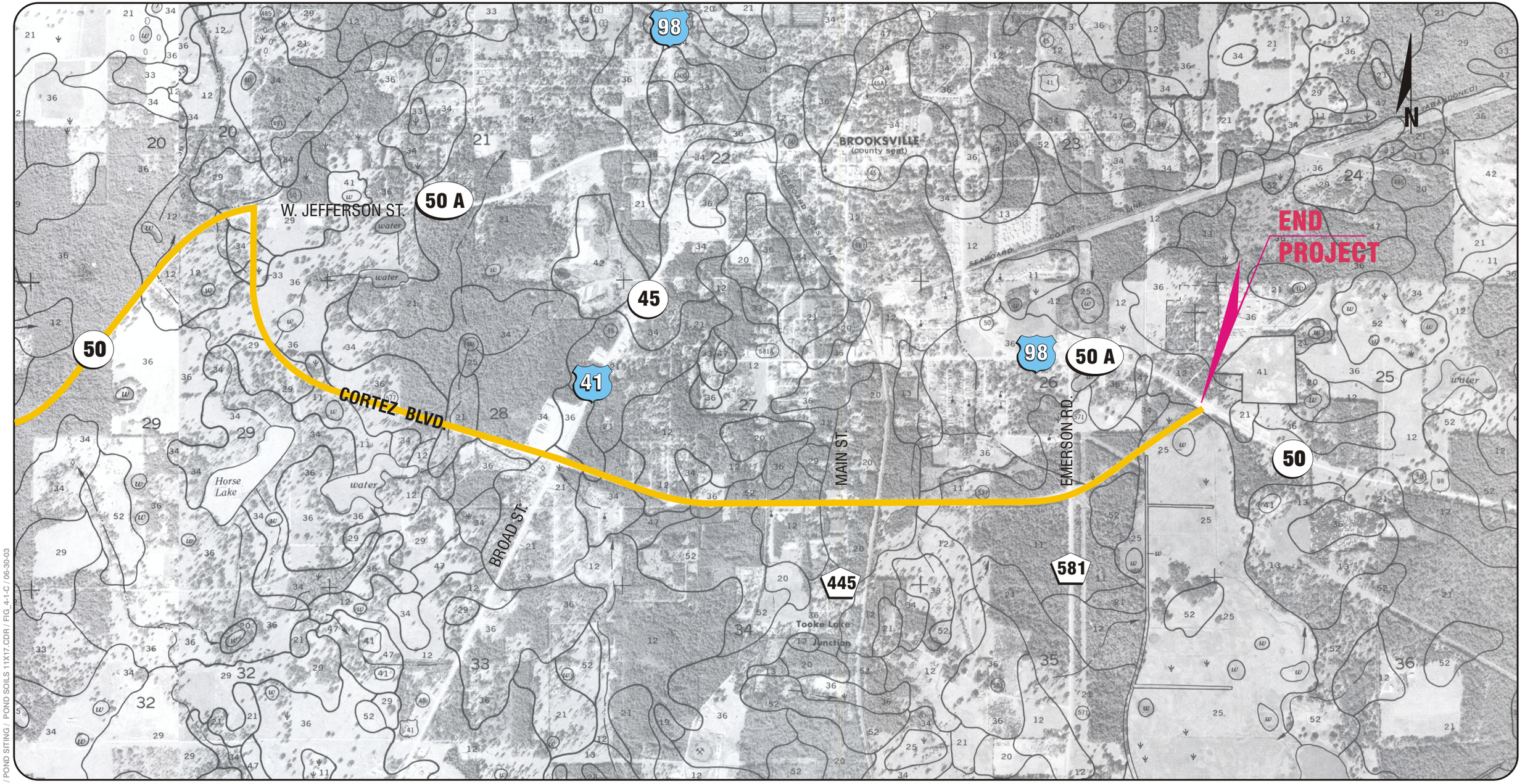
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

SOILS MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 4-1-B



GRAPHICS: JOBS/ PD&E/ DIST 7 / SR 50 / REPORTS / POND SITING / POND SOILS 11X17.CDR / FIG_4-1-C / 06-30-03

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

SOILS MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 4-1-C

4.2 Design Information Sources

Since the project corridor is within SWFWMD jurisdiction, it will require a stormwater management system that meets the District's criteria. The stormwater management facilities' designs and layouts are based on the following design information sources:

- Aerial Photos; flight date April 19, 2002.
- FDOT District 7 Location Hydraulics Report of S.R. 50; prepared September 1989.
- FDOT District 7 Location Hydraulics Report of S.R. 50; prepared September 1988.
- FDOT Existing S.R. 50 roadway construction plans; prepared 1992.
- FDOT Existing S.R. 50 roadway construction plans; prepared 1998.
- USGS Quadrangle Maps; Weeki Wachee Springs and Brooksville, Florida; dated 1954.
- SWFWMD maps.
- US Soil Conservation Service, Soil Survey of Hernando County, Florida; dated 1977.
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) 120110 0140 B, 120110 0150 B, 120110 0175 B and 120110 0190 B dated April 17 1984; and 120333 0001 C dated September 18, 1986, for Hernando County, Florida.
- SWFWMD Environmental Resource Permit (ERP), Permit Information Manual; dated January 1997.
- SWFWMD Environmental Resource Permit (ERP), Permit Information Manual; dated November 1998.
- FDOT Drainage Manual.
- FDOT Stormwater Management Facility Handbook
- FDOT Straight Line Diagram (SLD) of Road Inventory.
- Interviews, correspondence and site investigations.

4.3 Design Assumptions

All of the design assumptions for the project were based upon the best available information. The design assumptions utilized for this project are as follows:

- Pond Site Configuration – The proposed pond site configuration was based upon a combination of resources to determine the best site and layout. These resources included aerial photographs to determine existing land use, SWFWMD Aerial Contour Maps to determine existing hydraulics, cultural resources (archaeological and historical) and ecological impacts (wetland, protected species and upland habitat).

- Pond Volume – The required pond volume was calculated by finding the difference in pavement areas for the existing and proposed condition. The amount of runoff was then calculated using a precipitation value of 20 inches for the 100 year, 10 day storm event

(closed basin criteria). In addition, the volume that is lost by filling in the existing roadside ditches for the build alternative is included in the volume requirements. During a February 19, 2003, meeting with SWFWMD staff, they advised deducting 30% of the runoff volume to account for the high amount of percolation within the project corridor, except for the area located east of Colorado Street where there are clayey soil conditions.

- Pond Area – The pond area was determined by converting the calculated pond volume, and included a 20-foot perimeter strip to allow for maintenance activities, 1:4 vertical to horizontal side slopes, and required depths dictated by subsurface soil conditions. Typically, a 3-foot pond depth was applied due to SWFWMD criteria in sinkhole prone areas.

- Treatment Method – It is anticipated that dry retention will be used in the design of the required stormwater management facilities for basins with a deep SHW table. A wet detention/retention facility may be warranted for basins that have shallow SHW table, such as the basins east of the S.R. 50/California Street intersection, (identified later in this report as basins J, K, L, and the pond east of the S.R. 50/Cobb Road Intersection). As previously discussed, shallow SHW is often caused by storm water perching on clayey soils.

4.4 Design Criteria

The FDOT Drainage Manual and current standards, including Chapter 14-86, were used to design the drainage systems for S.R. 50. According to SWFWMD and the Florida Department of Environmental Protection (EPC) Environmental Resource Permit (ERP) rules (Chapters 40D-4, 40D-40, and 40D-400), it is anticipated that stormwater treatment will be accomplished through the use of detention/retention ponds. According to specific criteria contained within the ERP rules and FDOT Chapter 14-86 pertaining to closed drainage basins, the storm water management facilities will be required to store the difference in the 100-year, 10-day event runoff volume between the pre-development and post-development conditions.

Per discussion with SWFWMD staff, a portion of this project falls within the Peck Sink Watershed and specific design criteria is required. It is also considered a closed basin, and upstream ponds typically have two orifices in their design, one to bleed down the 100-year event and a second, lower orifice to bleed down the treatment volume.

The applicable types of stormwater management facilities vary throughout the project and are generally dependent upon topographic constraints, SHW table depth, soil types and permeabilities encountered. Dry detention/retention and wet detention/retention type storm water management facilities are generally considered for use in providing water quality treatment, peak discharge attenuation and erosion and sediment control. It is anticipated that dry retention will be used in the design of the required stormwater management facilities for

basins with a deep SHW table. A wet detention/retention facility may be warranted for basins that have shallow SHW table due to soil types and groundwater conditions, which is typical in the eastern portion of this project. Floodplain compensating storage should also be provided per applicable ERP rules.

Coordination with the SWFWMD and FDOT was ongoing throughout the pond sizing and siting procedure. Several criteria were addressed, adjusted and added throughout this process, as specific project information was determined. Project boundary information was determined as a result of information received from the permit application for S.R. 50 from the west intersection of S.R. 50/ S.R. 50A [along the Brooksville Bypass] that stated that the stormwater management facilities in this section had previously been sized to handle the ultimate 6-lane built-out condition. This information effectively reduced the pond siting required in this analysis to Basins A through L and the areas adjacent to the west intersection of S.R. 50/S.R. 50A (Brooksville Bypass and Cobb Road), as described in section 5.1. Basin M was not analyzed in this process as a result of the 6-lane built-out condition. The drainage approach needed to be adjusted as a result of the conditions caused by the FDOT critical rainfall event, which is a 100-year 10-day event. The sub-basins for the S.R. 50 drainage area were considered to be submerged for design purposes as a result of this rainfall event. With the submerged sub-basins the ponds could then be located and sized so that berms were not required, otherwise causing additional floodplain impacts. Additionally, soil conditions indicate that ponds west of California Street needed to maintain a maximum depth of 3' due to the likely development of sinkholes that could occur with the construction of deeper ponds.

Following the setting of the design criteria, the design approach was determined based on meetings with FDOT. The determined approach was to design two alternative ponds per each sub-basin and one large pond per basin. This approach resulted in the siting and sizing of approximately 230 ponds for the sub-basin alternatives (Alternatives "A" and "B") and 15 ponds for the basin alternatives. Following the siting and sizing of Alternatives "A" and "B", it was determined that the right-of-way acquisition effort required in this implementation would be excessive and would be limited by the availability of vacant land and funding. The basin alternatives were thus selected as the preferred alternative, and this report has been limited to the documentation of these basin alternatives (Alternatives "A" and "B" will be retained within the project's files). Note that exhibits showing all of the sub-basin alternatives are provided in a separate volume of this report (Appendix F).

Coordination with the SWFWMD will also occur during the design phase of this project to address stormwater management issues. Federal agencies that may require permits for the proposed improvements include the Army Corps of Engineers (ACOE) and the Environmental Protection Agency (EPA). The ACOE requires permits for dredge and fill activities in waters of the United States. EPA requires a Notice of Intent (NOI) for construction under the State of Florida General Permit for the National Pollutant Discharge Elimination System (NPDES) for construction impacts greater than one acre. This NOI will require a site-specific pollution prevention plan that incorporates current FDOT standards.

4.5 Cultural and Environmental Assessment Factors

The project corridor was analyzed to assess cultural and environmental impacts. These reports are summarized and included in the S.R. 50 Preliminary Engineering Memorandum (PEM). The cultural and environmental factors are included in Table 8-1 of the PEM and are summarized below.

Evaluation of the pond sites resulted in the discovery and evaluation of one new archaeological site (8HE365) within proposed Pond A, and two archaeological occurrences (AOs) within Pond I-South and Pond J, respectively. The latter is probably associated with 8HE241C. Of these sites, the Colorado Site (8HE241) was determined to be the only site eligible for listing in the NRHP.

4.6 References

1. Soil Survey of Hernando County, Florida; United States Department of Agriculture Soil Conservation Service and the University of Florida Soil Science Department; Florida; July 1977.

2. Preliminary Geotechnical Report; Professional Service Industries, Inc.; Tampa, Florida; July 2003.

5.0 DRAINAGE BASINS

5.1 Basin Characteristics

The existing drainage patterns and basin boundaries were determined based on the existing FDOT construction plans, United States Geological Survey (USGS) quadrangle and SWFWMD maps.

The project has been delineated into thirteen basins, identified as A through M, which are illustrated in Figure 5-2. These basins contain numerous sub-basins that were utilized for the hydrologic evaluation. Within the immediate vicinity of S.R. 50, wetlands are very sparse and predominantly consist of isolated depressions. These depressions are evident in Figure 5-1, the Floodplains Map. The overland flow eventually is conveyed to these depressions. Most of the stormwater runoff travels from north to south through commercial, residential, woods and open land. Drainage along the project corridor is accomplished with a combination of roadside ditches, cross drains, and side drainpipes that are located under driveways and roadways. These basins along the corridor are considered to be closed basins and some are located within the Peck Sink Watershed near S.R. 50 and Cobb Road. The existing drainage systems within the project limits appear to function adequately, except for existing flooding problems along the Brooksville Bypass from the west intersection of S.R. 50/S.R. 50A to U.S. 41. These problems are a result of clayey soils being present with a perched water table. The City of Brooksville and the FDOT Maintenance Office have both indicated that there are also known flooding problems due to clayey soils and development in low areas near the S.R. 50 and Cobb Road intersection area.

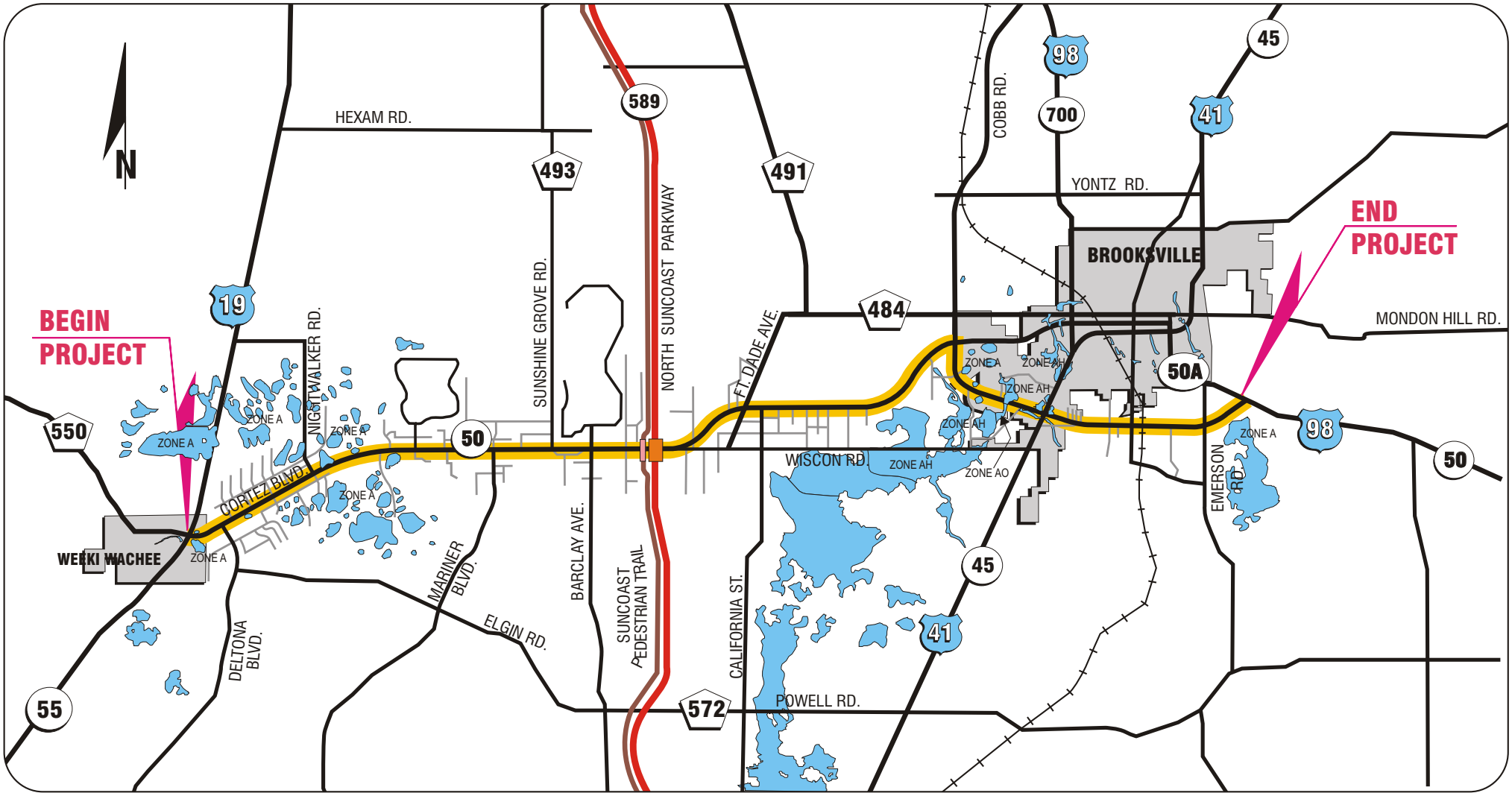
There are five existing concrete box culverts (CBC) under S.R. 50 within the limits of the project: one double 4' by 6' CBC, one double 8' by 4' CBC, one single 10' by 5' CBC, one triple 8' by 7' CBC and one single 8' by 6' CBC. A Culvert Analysis Report will be prepared in the design phase of this project. With the proposed roadway widening, it is anticipated that the final design may call for some existing cross drains to be extended or replaced.

On-site and off-site sub-basin areas that affect the conveyance of runoff from the S.R. 50 right-of-way between U.S. 19 and U.S. 41 were determined for the purpose of estimating the proposed stormwater management facility needs for each sub-basin.

Based on interpretation of limited data and in concurrence with the previously approved FDOT Report, it is anticipated that dry detention will be used in the design of the required stormwater management facilities for basins A, B, C, D, E, F, G, H and I. A wet detention/retention facility may be warranted for basins J, K, L and M due to soils and groundwater conditions. These basins discharge into isolated/depressional areas (closed basins). Recovery is accomplished through percolation into the ground and evapo-transpiration.

Basin A extends approximately 2,390 feet and outfalls to the depressed area southeast of the U.S. 19 / S.R. 50 intersection. The soil type consists of Myakka

GRAPHICS: JOBS/ PD&E / DIST 7 / SR 50 / REPORTS / POND SITING / POND.CDR / FIG 5-1 / 04-25-03



LEGEND

- Project Study Limits
- Major Interchange
- Railroad
- 100yr. Floodplains

Reference: FEMA Maps Panel Numbers 1201110 0140 B, 120413, 120110 0150 B, 120110 0175 B, 120333 0001 C and 120110 0190 B

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

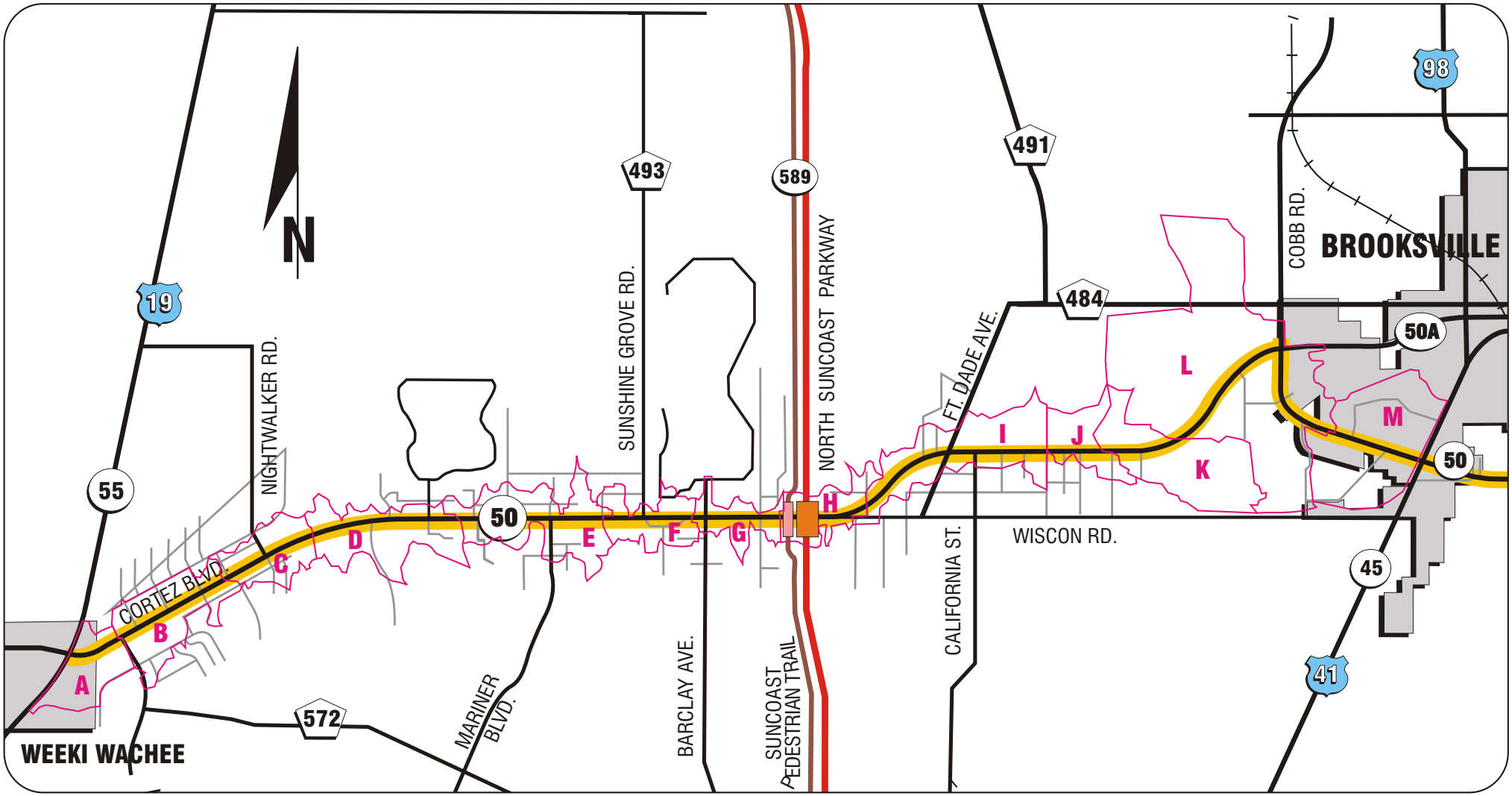
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

FLOODPLAINS MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 5-1



LEGEND

- Project Study Limits
- Major Interchange
- Railroad
- Drainage Basin Boundary

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

DRAINAGE BASIN MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 5-2

and Paola soils, hydrological soil group (HSG) “A/D” and “A”, respectively. The contributing drainage area is approximately 102.6 acres. The pond site for Basin A is located southeast of the U.S. 19/S.R. 50 intersection with a total area of 3.3 acres.

Basin B extends approximately 3,670 feet and has no positive outfall. The soil type consists of Paola soils, HSG “A”, and Lake fine sand, HSG “A”. The contributing drainage area is approximately 116.0 acres. The pond site for Basin B is located south of S.R. 50 with a total area of 6.4 acres.

Basin C extends approximately 2,900 feet and has no positive outfall. The soil type consists of Paola, Candler and Basinger soils, HSG “A” and “A/D”. The contributing drainage area is approximately 98.1 acres. The pond site for Basin C is located south of S.R. 50 with a total area of 4.6 acres.

Basin D extends approximately 7,640 feet and has no positive outfall. The soil type consists of Kendrick, Candler, Myakka and Basinger soils, HSG “A” and “A/D”. The contributing drainage area is approximately 248.7 acres. The pond site for Basin D is located south of S.R. 50 with a total area of 11.4 acres.

Basin E extends approximately 5,890 feet and has no positive outfall. The soil type consists of Kendrick, Candler, Myakka and Basinger soils, HSG “A” and “A/D”. The contributing drainage area is approximately 195.3 acres. The pond site alternative for Basin E is broken into two ponds, one north and one south of S.R. 50. The south pond contains a total area of 4.4 acres, while the north pond has a total area of 4.6 acres.

Basin F extends approximately 3,375 feet and has no positive outfall. The soil type consists of Candler soils, HSG “A”. The contributing drainage area is approximately 130.1 acres. The pond site alternative for Basin F is broken into two ponds, one north and one south of S.R. 50. The south pond contains a total area of 2.5 acres, while the north pond has a total area of 2.2 acres.

Basin G extends approximately 4,035 feet and has no positive outfall. The soil type consists of Candler soils, HSG “A”. The contributing drainage area is approximately 97.4 acres. The pond site for Basin G is sized to include the runoff from Basin H as well as the runoff from Basin G. This Basin Alternative is located south of S.R. 50 with a total area of 8.3 acres.

Basin H extends approximately 2,660 feet and has no positive outfall. The soil type consists of Candler soils, HSG “A”. The contributing drainage area is approximately 62.8 acres. The runoff from Basin H is included in the Basin Alternative for Basin G.

Basin I extends approximately 8,090 feet and has no positive outfall. The soil type consists of Candler, Arredondo, Sparr, Nobleton, Micanopy and Williston soils, HSG “A” and “C”. The contributing drainage area is approximately 275.1 acres. The pond site alternative for Basin I is broken into two ponds, one north and one south of S.R. 50. The south pond contains a total area of 5.3 acres, while the north pond has a total area of 4.5 acres.

Basin J extends approximately 2,860 feet and has no positive outfall. The soil type consists of Candler, Arredondo, Kendrick, Sparr soils HSG "A", Nobleton, Micanopy and Williston soils HSG "C", and Flemington soils HSG "D". The contributing drainage area is approximately 123.1 acres. The pond site for Basin J is located south of S.R. 50 with a total area of 2.3 acres.

Basin K extends approximately 2,950 feet and has no positive outfall. The soil type consists of Kendrick, Sparr soils HSG "A", Nobleton and Micanopy soils HSG "C", and Blichton soils HSG "D". The contributing drainage area is approximately 291.8 acres. The pond site for Basin K is located south of S.R. 50 with a total area of 1.7 acres.

Basin L extends approximately 9,670 feet and has no positive outfall. The soil type consists of Kendrick, Sparr soils HSG "A", Nobleton and Micanopy soils HSG "C", Flemington and Blichton soils HSG "D". The contributing drainage area is approximately 977.3 acres. The pond site for Basin L is located north of S.R. 50 with a total area of 2.8 acres.

Basin M extends approximately 3,600 feet and has no positive outfall. The soil type consists of Kendrick, Sparr soils HSG "A", Nobleton and Micanopy soils HSG "C", Flemington and Blichton soils HSG "D". The contributing drainage area is approximately 406.2 acres. The pond site for Basin M is north of S.R. 50 and east of Cobb Road. The total area for this basin alternative is 1.7 acres.

5.2 Floodplain Involvement and Classification

The National Flood Insurance Program (NFIP), through the Federal Emergency Management Agency (FEMA), has established the 100-year base floodplain limits for Hernando County. These base floodplain limits include the boundaries shown in the Flood Insurance Rate Maps (FIRM) referenced below for the S.R. 50 study area. The FIRMs for the study area include Community Panel Numbers 120110 0140 B, 120110 0150 B, 120110 0175 B and 120110 0190 B (dated April 17, 1984) and 120333 0001 C (dated September 18, 1986). Refer to Figure 5-1 for the FIRM floodplains.

The SWFWMD Environmental Resource Permit (ERP) Information Manual (Section 4.4, 10/96 version) states that no net encroachment into the floodplain, up to that encompassed by the 100-year event, which will adversely effect either conveyance, storage, water quality or adjacent lands will be allowed and the required compensating storage shall be equivalently provided. Floodplain-compensatory storage will be provided as required by the SWFWMD as portions of the proposed roadway widening will encroach upon the 100-year base floodplain.

According to the FEMA flood boundary and floodway maps, regulated floodways do not exist within the Study limits. Refer to the Floodplains Map (Figure 5-1) as mentioned in the previous section for areas of encroachment to the 100-year floodplain.

6.0 ALTERNATIVE POND SITES ANALYSIS

The alternative pond sites were identified for consideration based on field reconnaissance, ground and roadway elevations and existing land use. Each of the 13 designated basins was broken down into several sub-basins. Each of these sub-basins was then analyzed and an average of two pond sites were identified for each. Out of this analysis came the 15 basin alternatives previously mentioned in Section 4 and then described in section 5. Appendix C provides aerial photos showing the approximate locations of the Basin Alternative Sites.

6.1 Pond Siting Analysis

The pond siting analysis consisted of a preliminary review of all available records and a literature search with limited field review data to determine if any adverse environmental impact would result from the construction of stormwater facilities.

The selection of the pond locations and the preliminary estimates of their areas and volumes were based on the best available information and current data. The method used to determine the estimated pond volumes, and correlating design requirements detailed in section 4, began with the calculation of the difference of existing and proposed pavement areas within the proposed right-of-way lines. The volume of run-off in acre-feet for the design event was then calculated based on the difference in pavement area and the amount of precipitation. The volume contained in the attenuation ditch blocks that will be lost as a result of the proposed S.R. 50 widening was also included in the calculations. These volumes were added to the volumes for each sub-basin to get a total volume. The total volumes were then reduced by 30%, per recommendation from SWFWMD, to account for the high amount of percolation experienced in the area.

The pond areas were then calculated based on the required storage volumes using the FDOT *Stormwater Management Facility Handbook*[1] in a method that is outlined in chapter two and detailed in example 2.1 of the handbook. This equation was able to account for the 1 to 4-side slope as required, as well as the 3-foot maximum pond depth applied to the project west of California Street. These calculations and associated spreadsheet are provided in Appendix D. The equation and spreadsheet were also able to account for the varying depths per pond location east of California Street.

The SCS Soil Survey Maps for Hernando County were used to identify and verify the soil types found in the proposed alternative pond sites. The existing time of concentration for the pre-development condition and the onsite and offsite curve numbers associated with pre- and post-development conditions were calculated using SCS procedures described in TR-55 (SCS, 1986).

The analyses were performed for the pond sites using the existing data mentioned previously in Section 4.3. In addition, coordination with the SWFWMD staff was documented regarding additional design criteria and pond site locations/ recommendations, respectively. The alternative pond sites were

evaluated based upon the potential for impacts and physical characteristics. The following items were considered:

- Cultural resources (archaeological and historical)
- Ecological impacts (wetland, protected species and upland habitat)
- Petroleum and hazardous material contamination
- Hydraulics
- Hydrology

The proposed pond area for each basin was sized based on the onsite drainage area, more specifically, the difference in impervious area in the pre-development and the post-development conditions. The loss of ditch volume associated with filling in the existing roadside ditches for the build alternative is included in the volume requirements.

The design criteria used to compare the proposed pond sites were based on the following constraint:

- The DHW must be less than the lowest edge of pavement (EOP) elevation within the respective basin to insure positive flow to the selected stormwater pond.

The selected pond sites are reasonable worst-case scenarios, and during the design phase the effectiveness of treatment within the right-of-way will be evaluated and negotiated with SWFWMD. The summary of the alternative analyses as well as the right-of-way cost estimates and other relevant factors associated with the pond sites are shown in Table 8-1.

6.2 References

1. Stormwater Management Facility Handbook; State of Florida Department of Transportation, Office of Design, Drainage Section, Tallahassee, Florida; January 1999.

7.0 REGULATORY AGENCIES AND PERMITTING

The local agencies with jurisdiction over the proposed improvements are Hernando County and the City of Brooksville. Coordination with these agencies regarding floodplain and stormwater impacts, as well as proposed changes to the existing drainage system will occur during preliminary and final design stages.

Permits for the proposed improvements will be issued by State agencies including the SWFWMD, which requires an Environmental Resource Permit (ERP) for all dredge and fill activities conducted in areas either in or connected to Waters of the State, as outlined in *Chapter 17-4.48, Florida Administrative Code (FAC)*. An Environmental Resource Permit (ERP) for the construction or alteration of any surface water system according to *Chapter 40C-4 FAC* will also be required by the SWFWMD. The issuance of permits is intended to regulate new systems and their impact on water quantity, water quality, wetlands and other environmental features. Also, State Water Quality Standards, as stated in *Chapter 17-3* and *Section 17.4.242 FAC*, will need to be met by the discharges that will be regulated through these permits. Stormwater management issues will be addressed through coordination with the SWFWMD during preliminary and final design.

The United States Army Corps of Engineers (ACOE) and the Environmental Protection Agency (EPA) are Federal agencies that may require permits for the proposed improvements. The ACOE requires permits for dredge and fill activities in waters of the United States. EPA requires a Notice of Intent (NOI) for construction under the State of Florida General Permit for NPDES Stormwater Permit for construction impacts greater than one acre. A site-specific pollution prevention plan that incorporates current FDOT standards will be required by this NOI. Coordination with Federal agencies will occur during preliminary and/or final design of the proposed improvements.

8.0 SUMMARY AND RECOMMENDATIONS

Based on office and field investigations as well as design calculations, the recommended pond sites described previously within this report have been located for Basins A through L, along with a recommended pond site on the northeast corner of the west intersection of S.R. 50/S.R. 50A. The initial design approach was to design two alternative ponds per sub-basin and one large pond per basin. This approach resulted in the siting and sizing of approximately 230 ponds for the sub-basin alternatives (Alternatives "A" and "B") and 15 ponds for the basin alternatives. Following the siting and sizing of Alternatives "A" and "B", it was determined that the right-of-way acquisition effort required in this implementation would be excessive and would be limited by the availability of vacant land and funding. The basin alternatives were thus selected as the preferred alternative, which are summarized in Table 8-1. Stormwater treatment for basins A through I is anticipated to be achieved through dry retention due to the relatively deep SHW table and subsurface soil conditions. In addition, it is anticipated that Basins J (beginning at California Street and proceeding eastward) through L, and the basin on the northeast corner of the west intersection of S.R. 50/S.R. 50A, will be treated through wet detention due to the relatively shallow SHW table and subsurface soil conditions.

The pond volumes were calculated to account for the difference in the pre-construction condition compared to the proposed condition and to capture the amount of additional runoff that will be created. Areas were then calculated based on required depths and a 20-foot maintenance berm surrounding the pond perimeter.

FDOT and SWFWMD design criteria will be compared, with the more stringent of the requirements being used in the design phase. The permitting phase of project development will address the SWFWMD requirements.

Appendix F - Alternative Pond Locations

S.R. 50 PD&E Study Reevaluation

From U.S. 19 (S.R. 55) to the east intersection of S.R. 50 / S.R. 50A [along the Brooksville Bypass]

Hernando County, Florida

WPI No: 407951 1
FAP No: 300-1(7)

Florida Department of Transportation
District 7

November 2003

APPENDIX F -
ALTERNATIVE POND SITE LOCATIONS

Florida Department of Transportation
Project Development and Environment (PD&E) Reevaluation Study

S.R. 50 PD&E Study Reevaluation

From U.S. 19 (S.R. 55) to the east intersection of S.R. 50 / S.R. 50A [along the Brooksville Bypass]

Hernando County, Florida

WPI No: 407951 1
FAP No: 300-1(7)

Submitted to:

Florida Department of Transportation - District 7
Tampa, Florida

Submitted by:

AYRES ASSOCIATES

September 2003

Appendix A

Excerpts From the Hernando County Soil Survey

Appendix B

Correspondence

Appendix C

Proposed Pond Locations

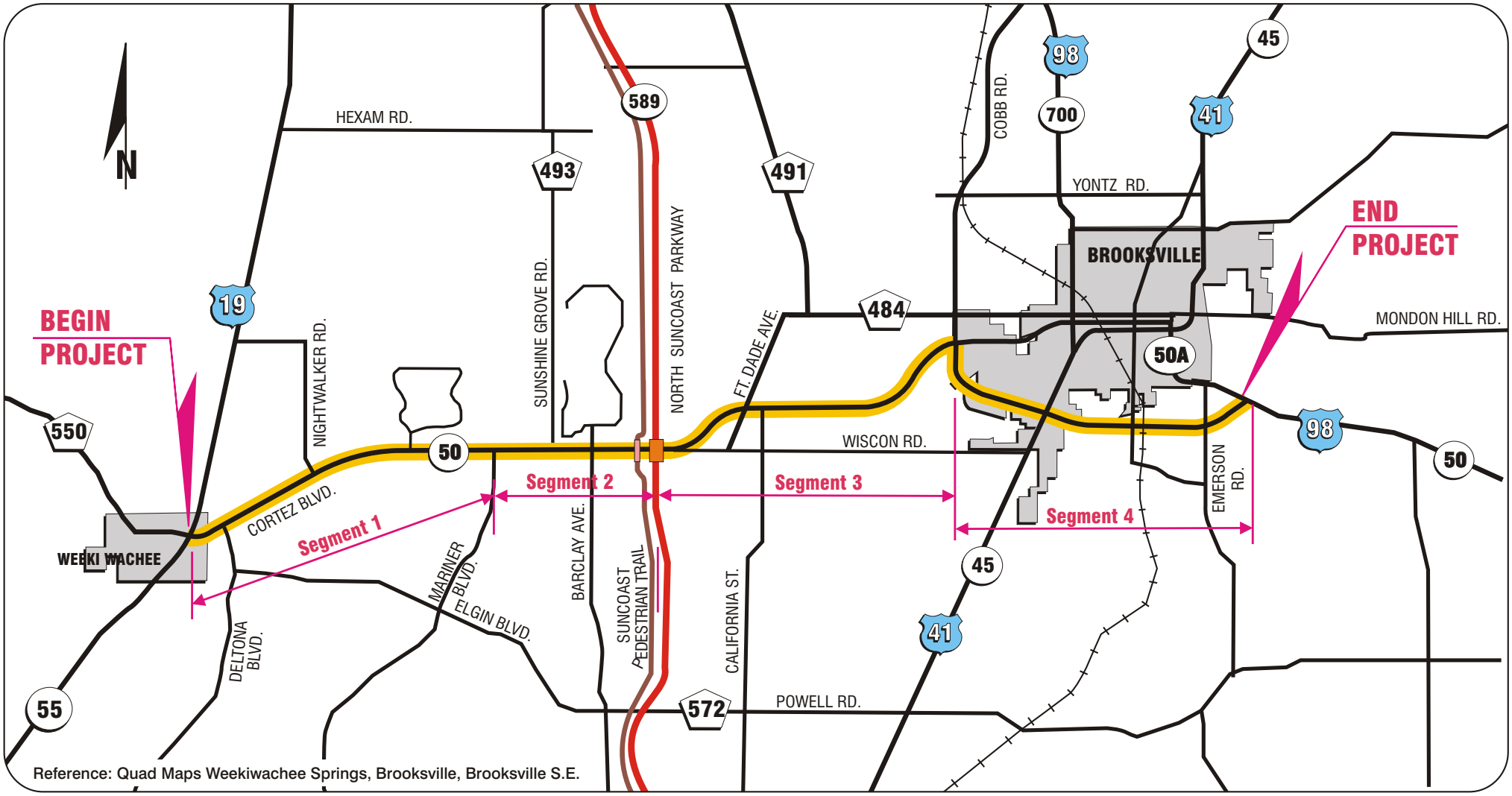
Appendix D

Pond Sizing Calculations

Appendix E

Tables, Nomographs & Design Aids

GRAPHICS: JOBS/ PD&E / DIST 7 / SR 50 / REPORT / POND SITING / POND.CDR / FIG 1-1 / 05-19-03



LEGEND

- Project Study Limits
- Major Interchange
- Railroad

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

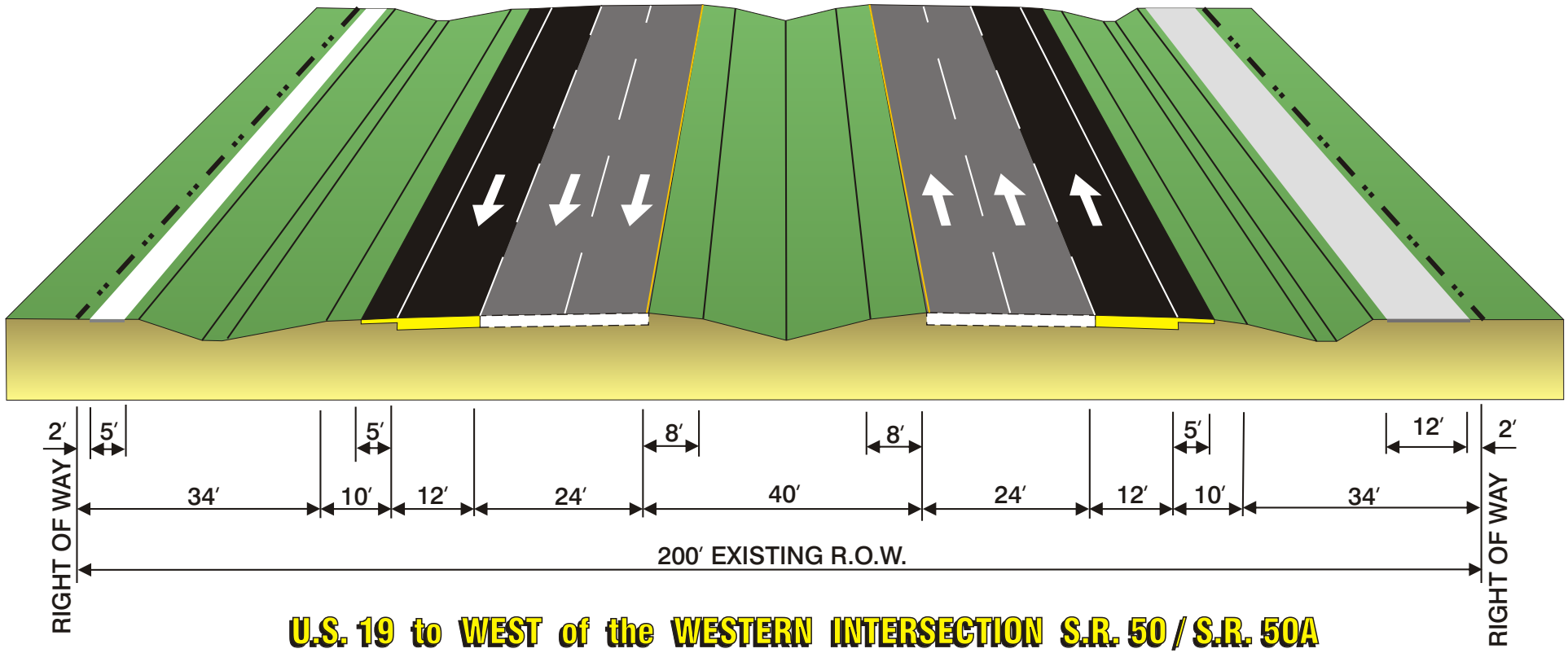
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

PROJECT LOCATION MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 1-1



U.S. 19 to WEST of the WESTERN INTERSECTION S.R. 50 / S.R. 50A

(Design Speed = 65 mph)

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

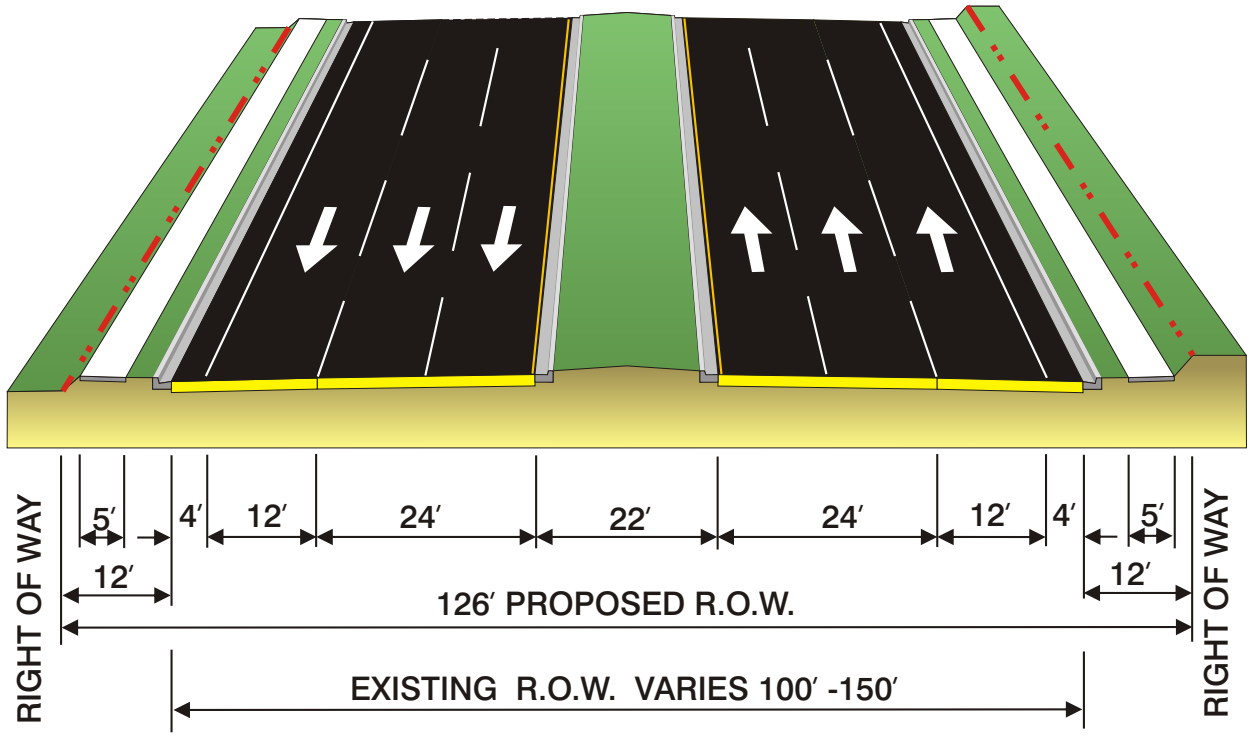
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

RECOMMENDED 6 - LANE RURAL ROADWAY TYPICAL SECTION

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 2-1



WEST of the WESTERN INTERSECTION S.R. 50 / 50A to EAST of the WESTERN INTERSECTION S.R. 50 / 50A [along the BROOKSVILLE BYPASS] (Design Speed = 50 mph)

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

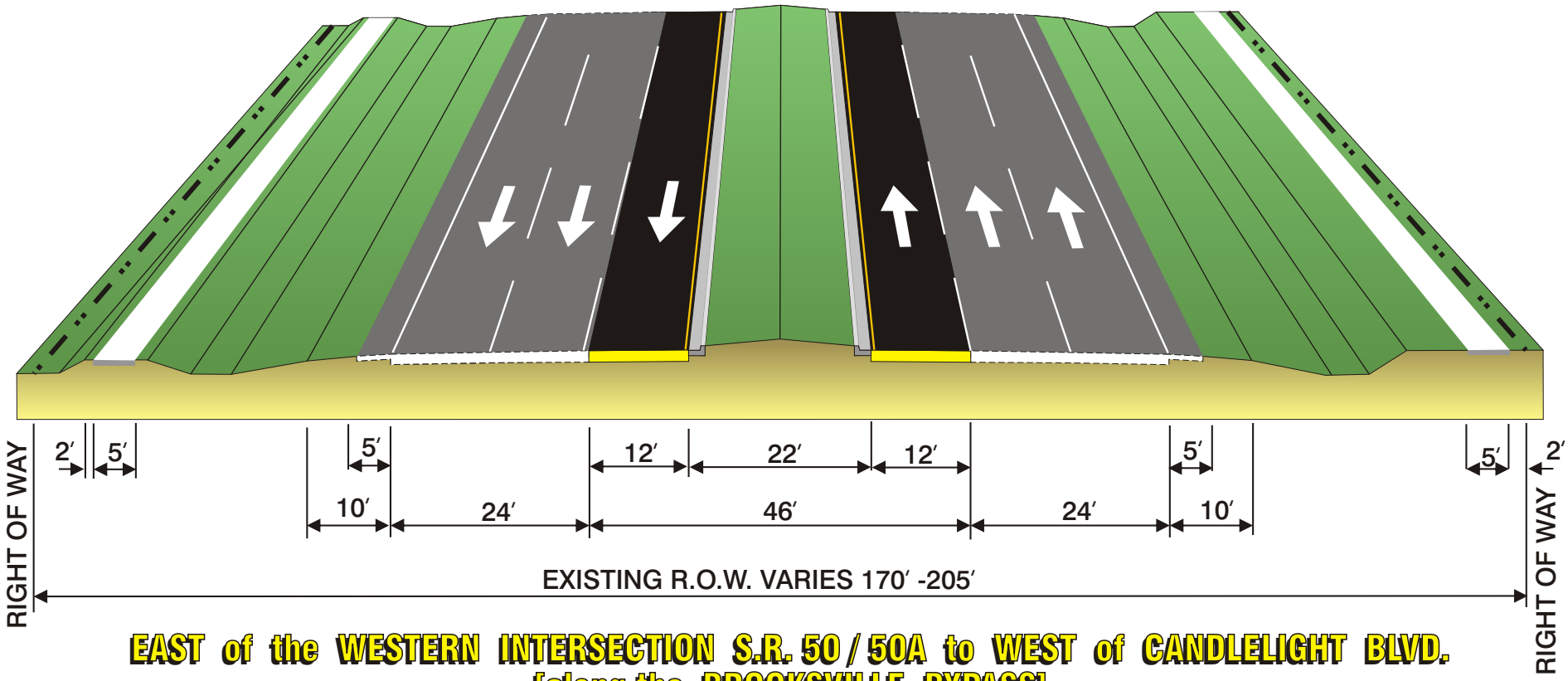
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of S.R. 50 / 50A [along the Brooksville Bypass] Hernando County, Florida

RECOMMENDED 6 - LANE URBAN ROADWAY TYPICAL SECTION

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 2-2



EAST of the WESTERN INTERSECTION S.R. 50 / 50A to WEST of CANDLELIGHT BLVD.
[along the BROOKSVILLE BYPASS]

(Design Speed = 50 mph)

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

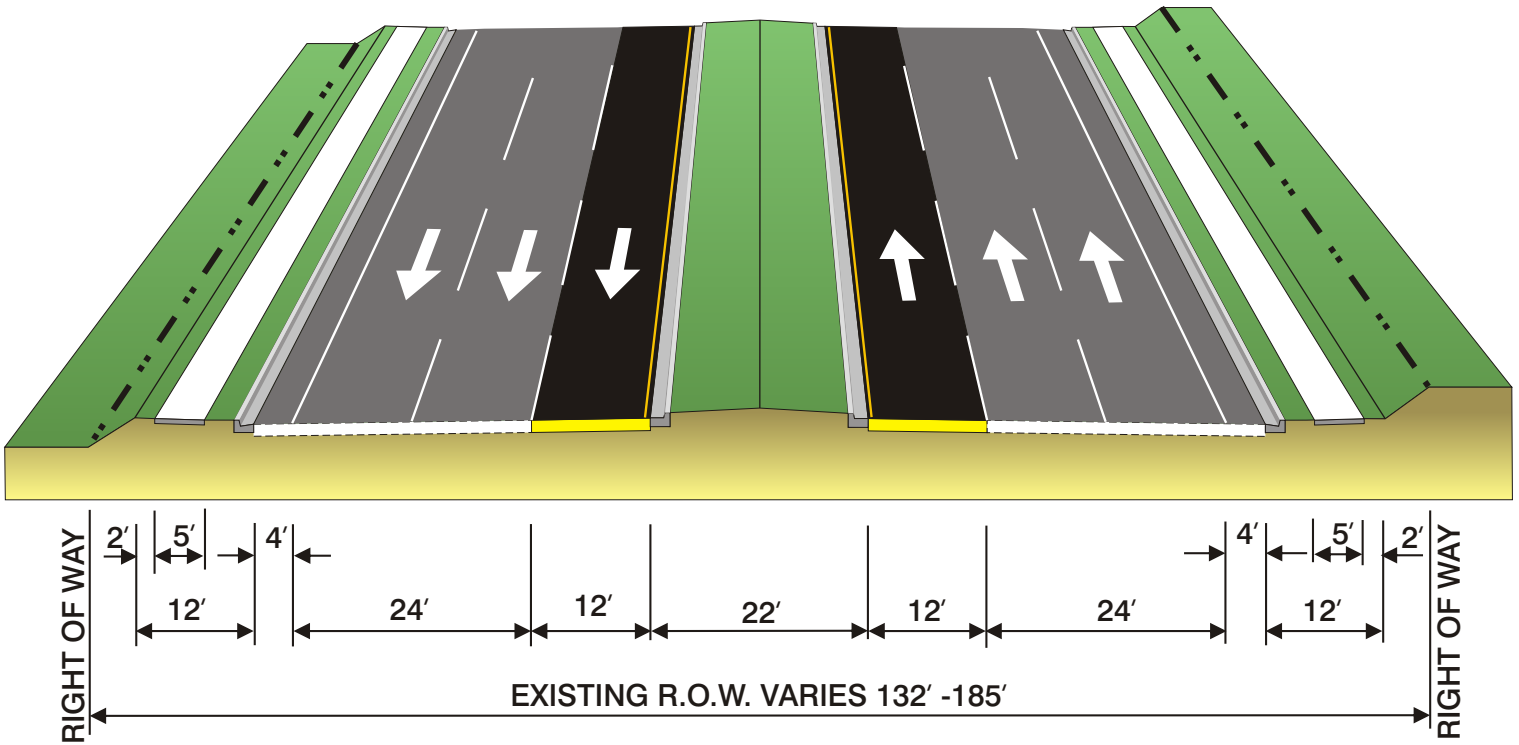
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

RECOMMENDED 6 - LANE MODIFIED URBAN ROADWAY TYPICAL SECTION

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 2-3



WEST of CANDLELIGHT BLVD. to EAST of RAY BROWNING RD.
[along the BROOKSVILLE BYPASS]

(Design Speed = 50 mph)

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

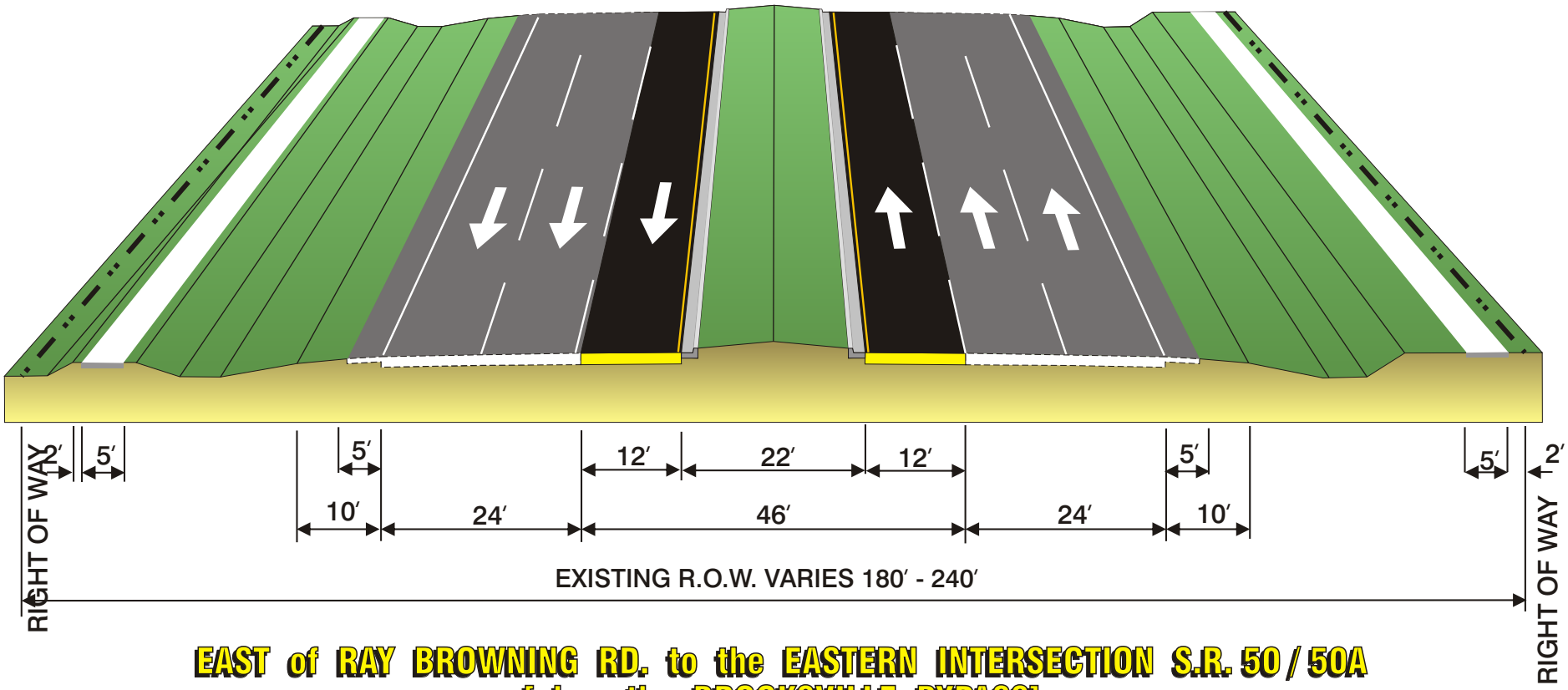
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

RECOMMENDED 6 - LANE URBAN ROADWAY TYPICAL SECTION

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 2-4



EAST of RAY BROWNING RD. to the EASTERN INTERSECTION S.R. 50 / 50A
[along the BROOKSVILLE BYPASS]

(Design Speed = 50 mph)

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

PD&E STUDY REEVALUATION

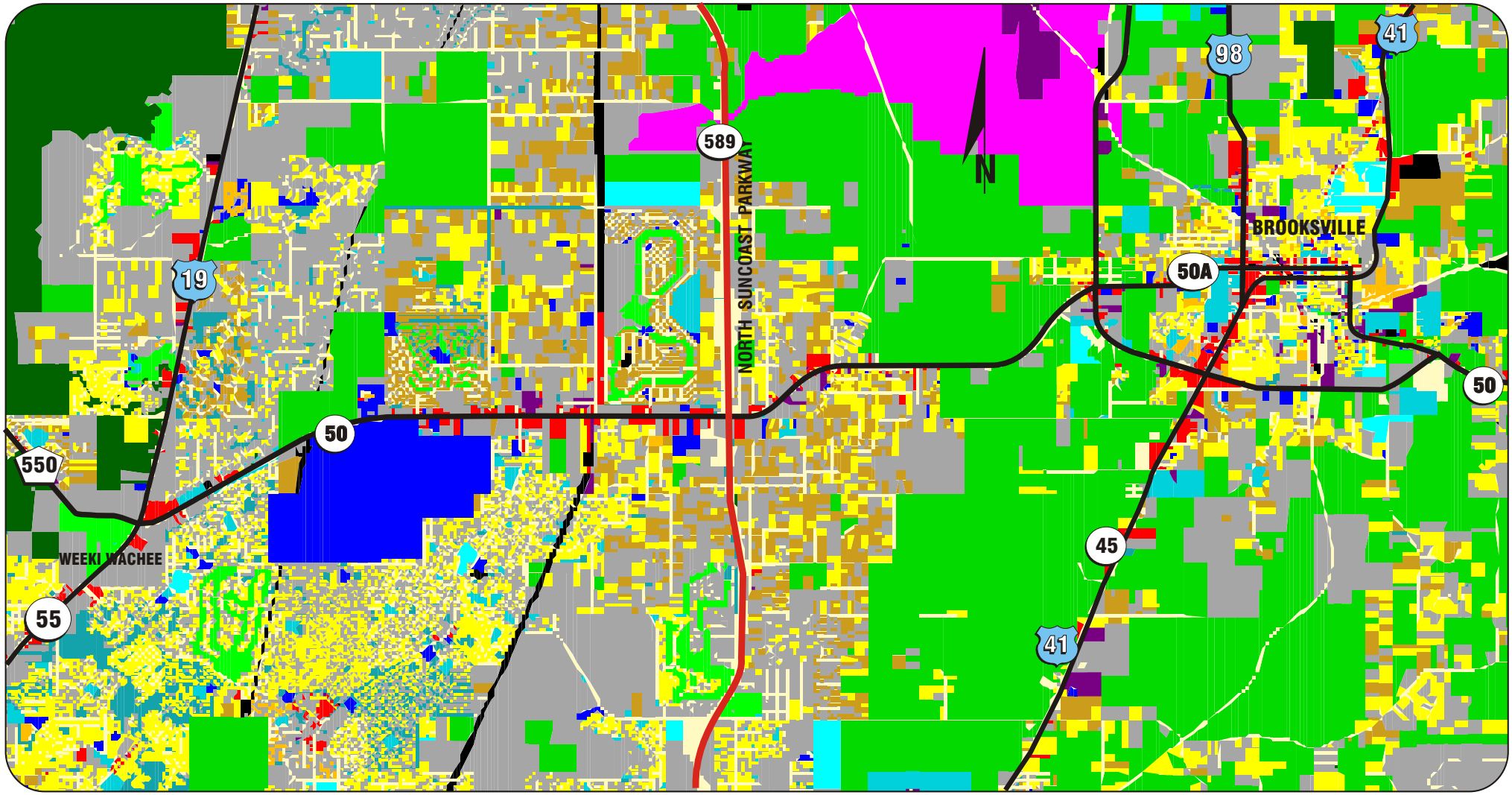
From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

RECOMMENDED 6 - LANE MODIFIED URBAN ROADWAY TYPICAL SECTION

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 2-5

GRAPHICS: JOBS/ PD&E / DIST 7 / SR 50 / REPORTS /POND SITING / POND. CDR / FIG 3-1 / 04-25-03



LEGEND

- Agriculture
- Commercial
- Conservation
- Education
- Mining
- Mobile Home
- Private Institutional
- Publically Owned
- Recreational
- Right of Way
- Single Family
- Utilities
- Vacant
- Water / DRA
- Industrial
- Multi-Family

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

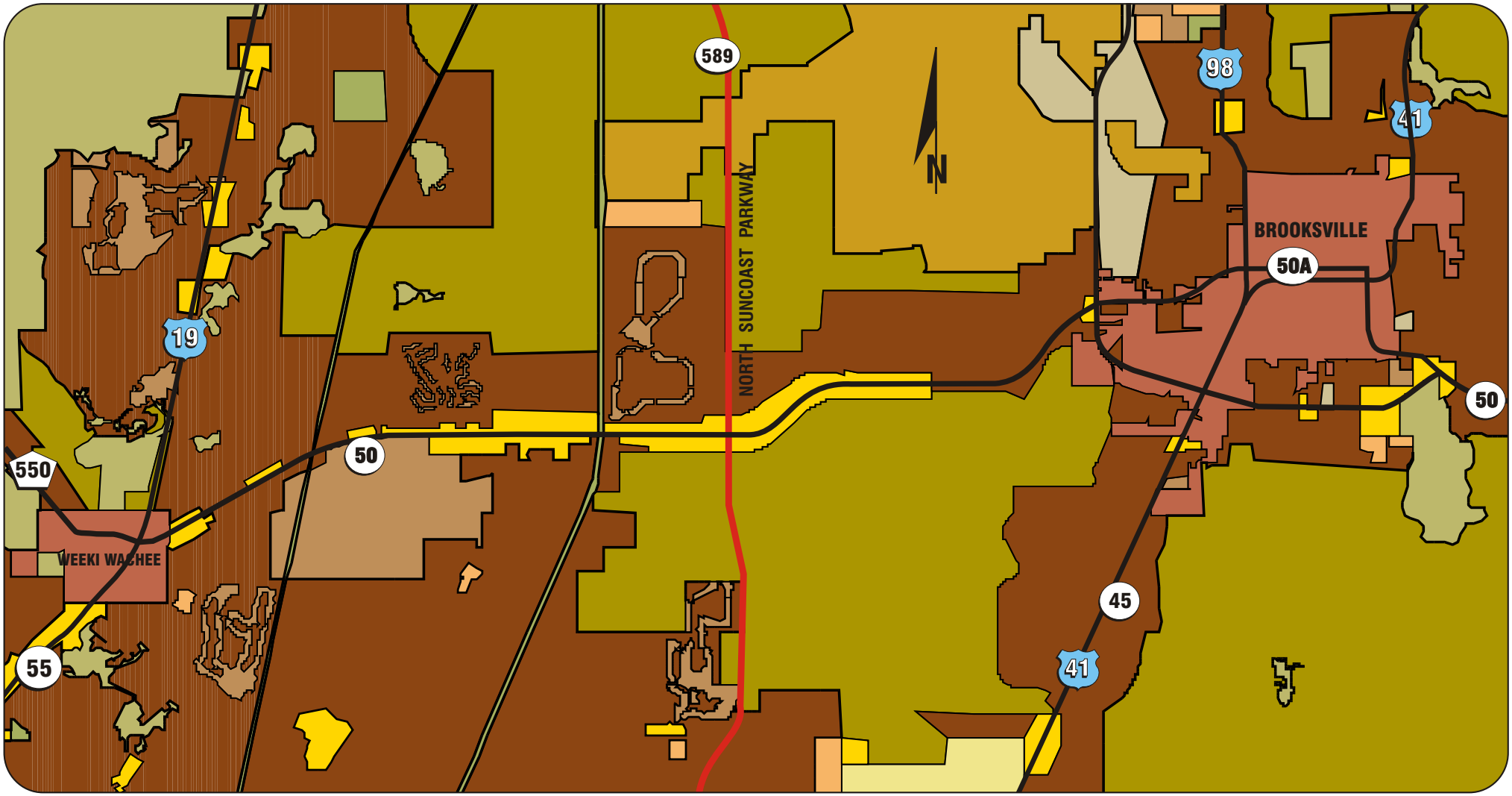
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

EXISTING LAND USE MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 3-1



LEGEND

- City
- Commercial
- Conservation
- Education
- Industrial
- Mining
- Plan Development
- Public Facilities
- Recreation
- Residential
- Rural

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

PD&E STUDY REEVALUATION

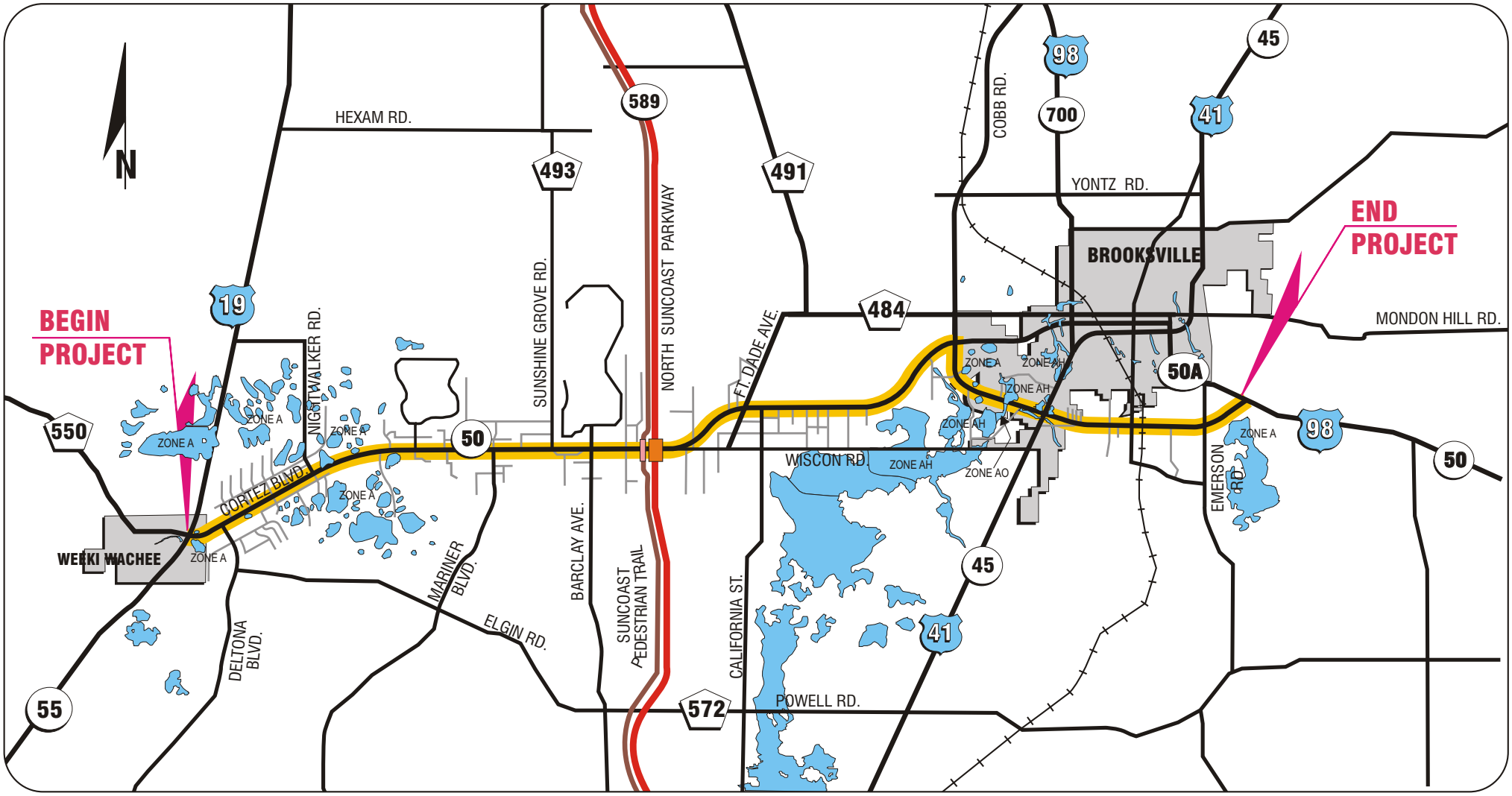
From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

FUTURE LAND USE MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 3-2

GRAPHICS: JOBS/ PD&E / DIST 7 / SR 50 / REPORTS / POND SITING / POND.CDR / FIG 5-1 / 04-25-03



LEGEND

- Project Study Limits
- Major Interchange
- Railroad
- 100yr. Floodplains

Reference: FEMA Maps Panel Numbers 1201110 0140 B, 120413, 120110 0150 B, 120110 0175 B, 120333 0001 C and 120110 0190 B

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

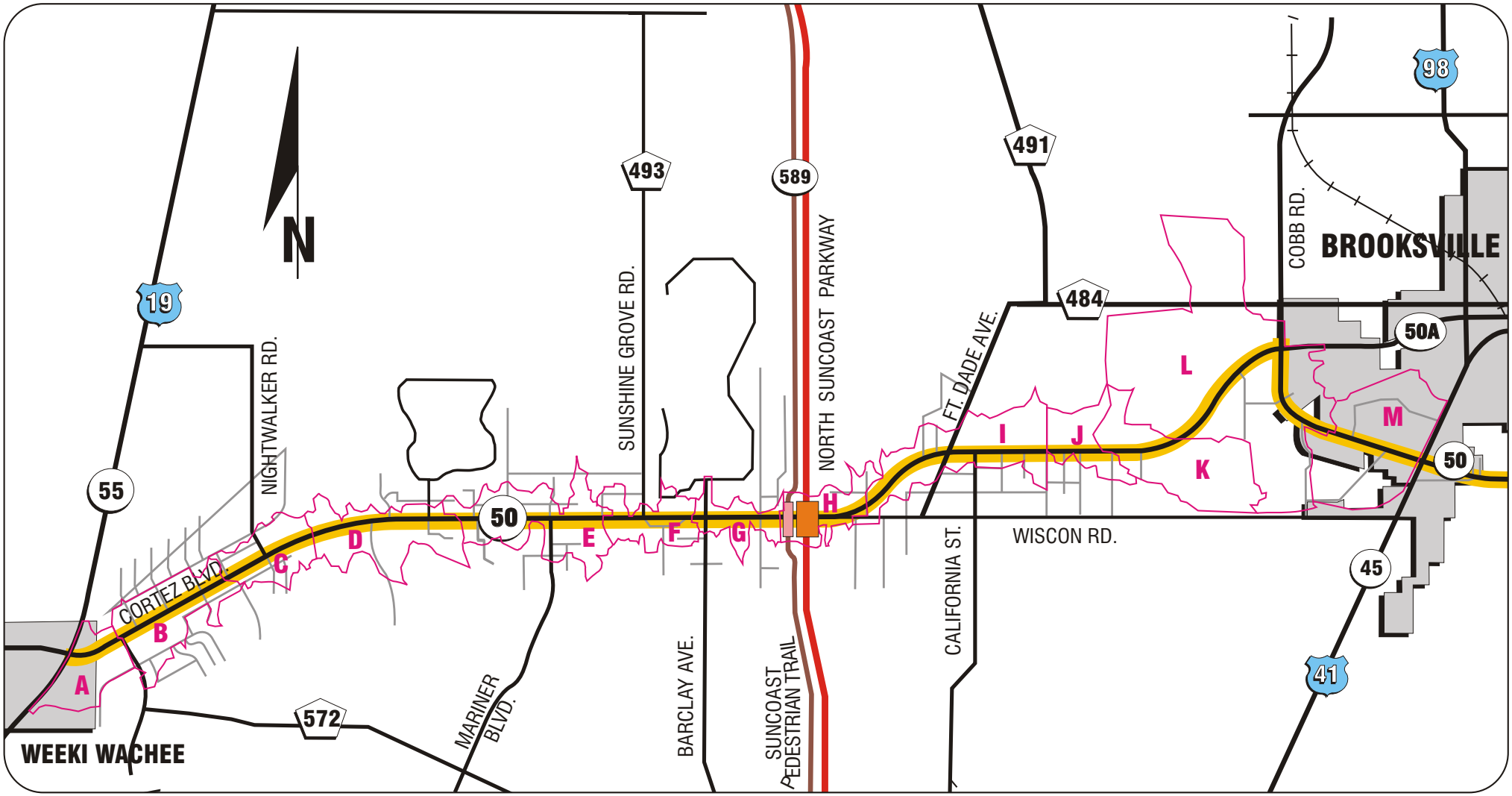
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

FLOODPLAINS MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 5-1



LEGEND

- Project Study Limits
- Major Interchange
- Railroad
- Drainage Basin Boundary

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

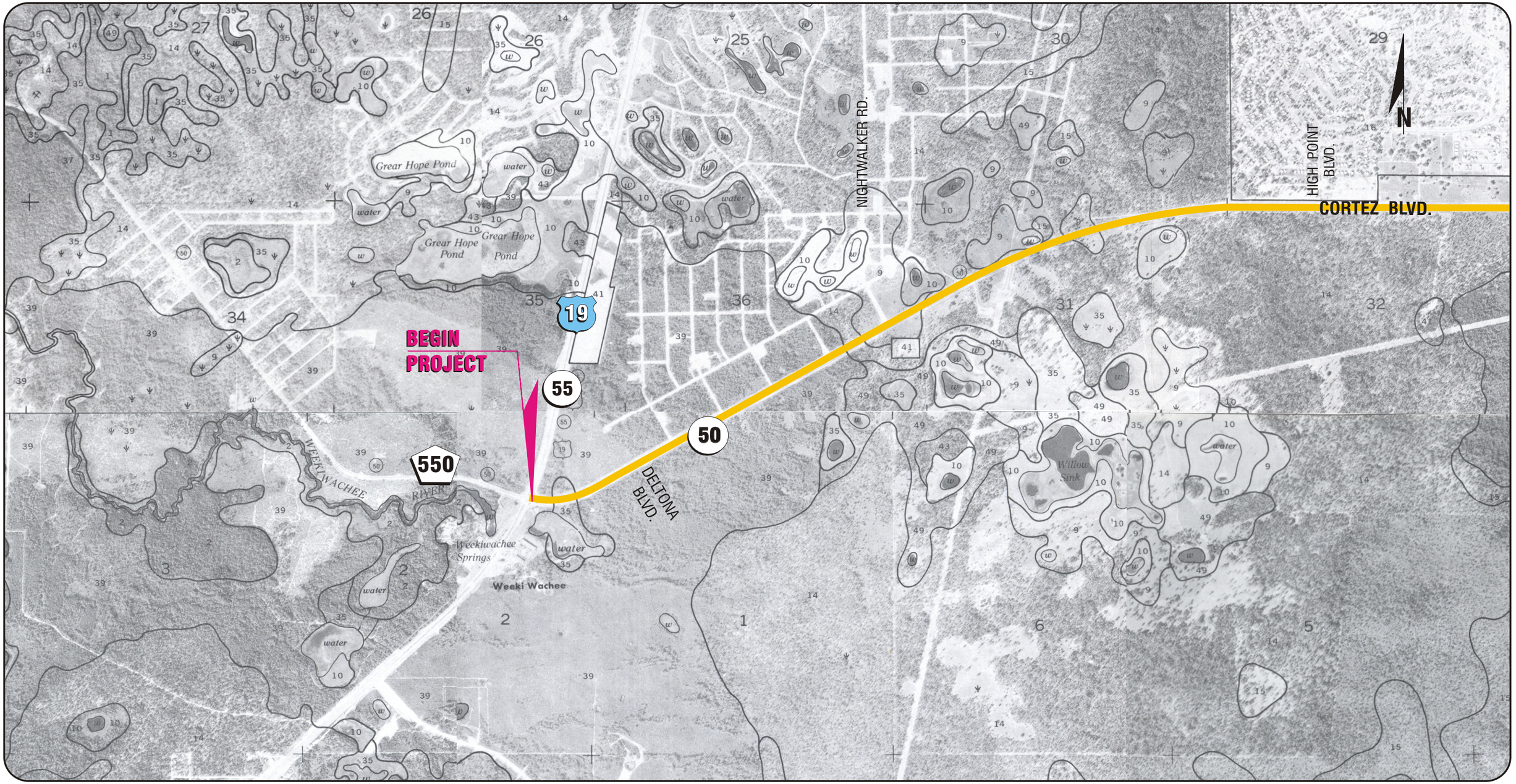
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

DRAINAGE BASIN MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 5-2



GRAPHICS: JOBS/ PD&E / DIST 7 / SR 50 / REPORTS / POND SITING / POND SOILS 11X17.CDR / FIG_4-1-A / 06-30-03

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

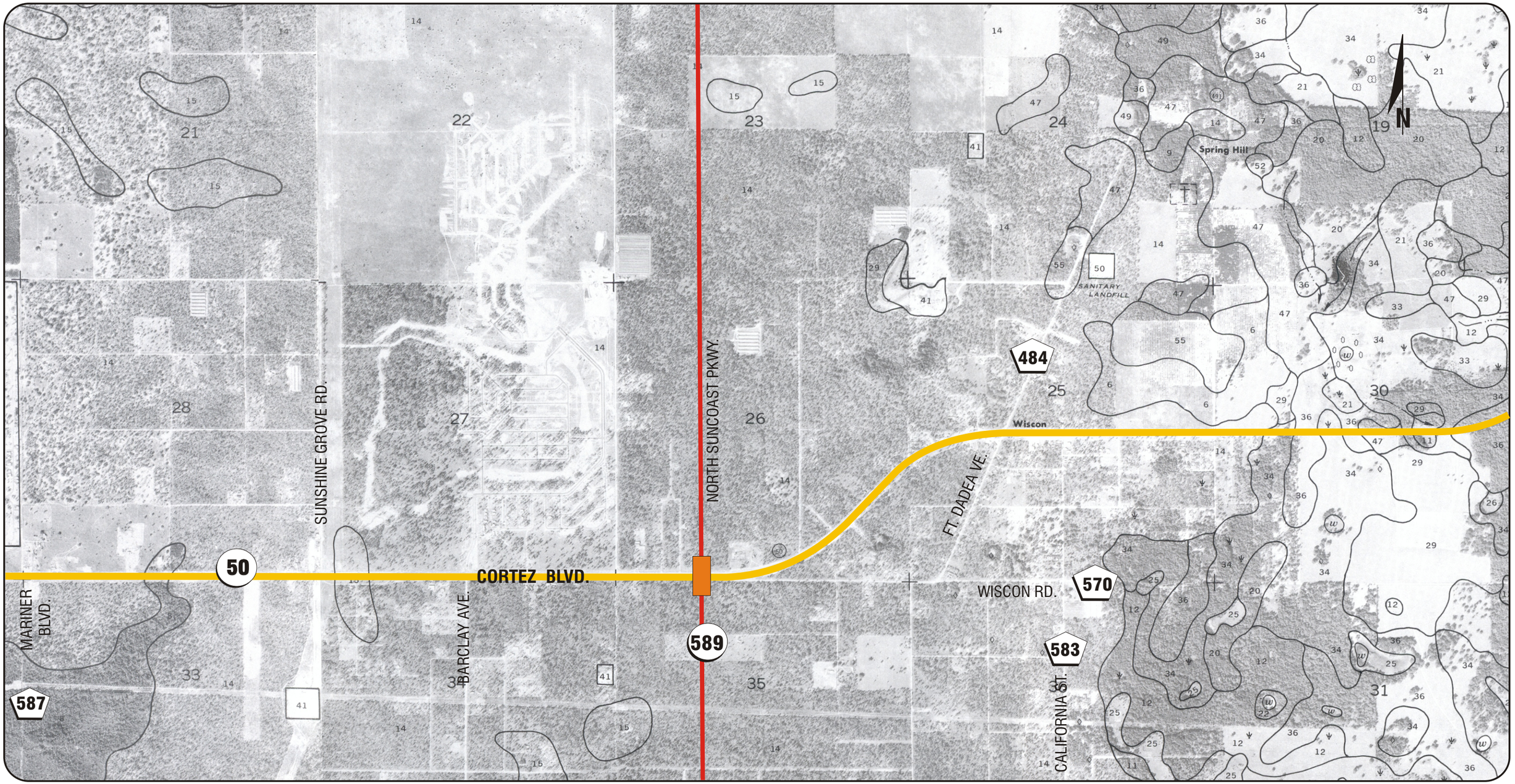
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

SOILS MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 4-1-A



GRAPHICS: JOBS/ PD&E / DIST 7 / SR 50 / REPORTS / POND SITING / POND SOILS 11X17.CDR / FIG_4-1-B / 06-30-03

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

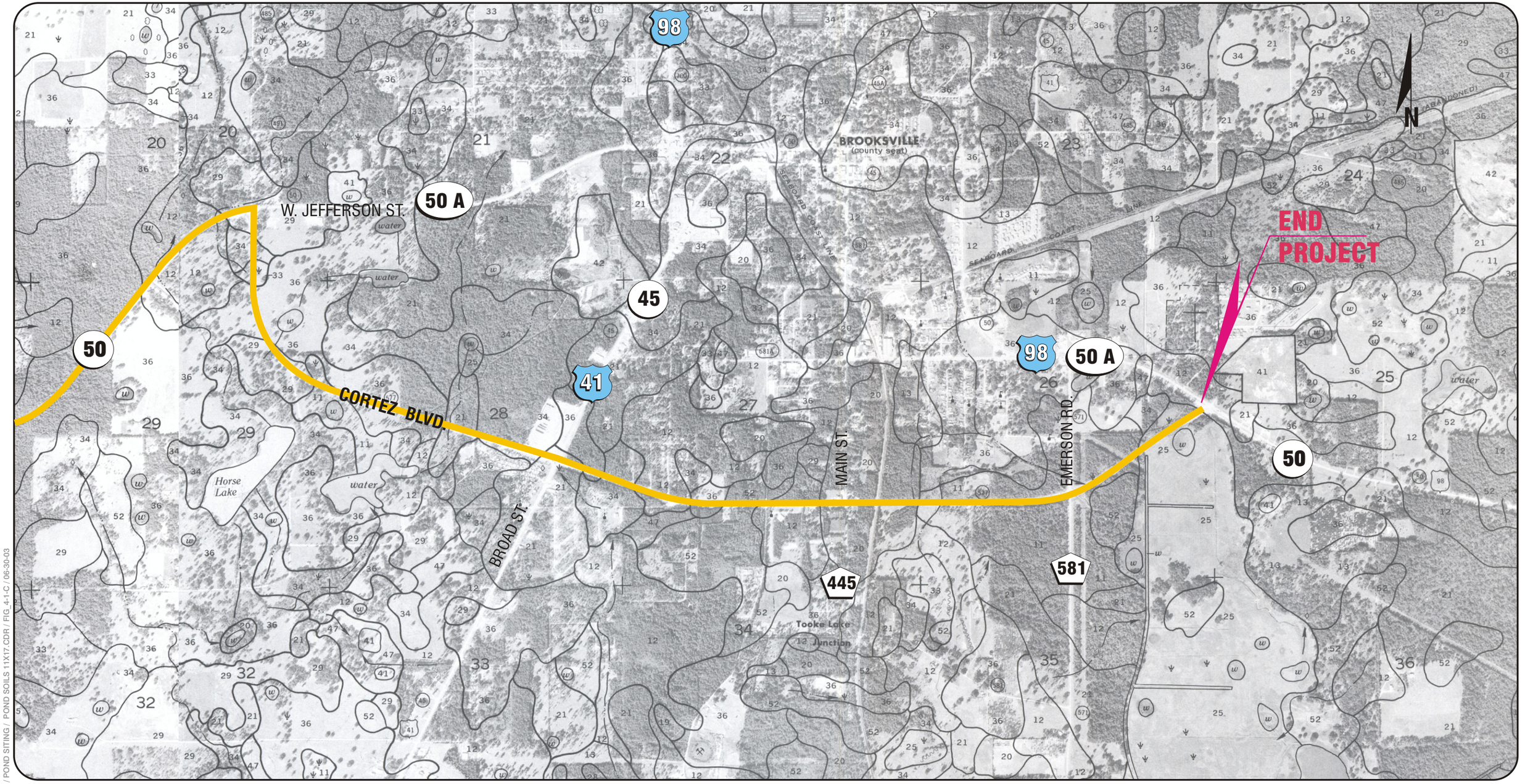
PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

SOILS MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 4-1-B



GRAPHICS: JOBS/ PD&E/ DIST 7 / SR 50 / REPORTS / POND SITING / POND SOILS 11X17.CDR / FIG_4-1-C / 06-30-03

FLORIDA DEPARTMENT OF TRANSPORTATION

S.R. 50 (CORTEZ BLVD.)

PD&E STUDY REEVALUATION

From U.S. 19 (S.R. 55) to the East Intersection of
S.R. 50 / 50A [along the Brooksville Bypass]
Hernando County, Florida

SOILS MAP

WPI SEG. NO: 407951 1
FAP NO: 300 - 1 (7)

FIGURE 4-1-C

Appendix A

Excerpts From the Hernando County Soil Survey

Appendix B

Correspondence

Appendix C

Proposed Pond Locations

Appendix D

Pond Sizing Calculations

Appendix E

Tables, Nomographs & Design Aids

Appendix F - Alternative Pond Locations

S.R. 50 PD&E Study Reevaluation

From U.S. 19 (S.R. 55) to the east intersection of S.R. 50 / S.R. 50A [along the Brooksville Bypass]

Hernando County, Florida

WPI No: 407951 1
FAP No: 300-1(7)

Florida Department of Transportation
District 7

November 2003

APPENDIX F -
ALTERNATIVE POND SITE LOCATIONS

Florida Department of Transportation
Project Development and Environment (PD&E) Reevaluation Study

S.R. 50 PD&E Study Reevaluation

From U.S. 19 (S.R. 55) to the east intersection of S.R. 50 / S.R. 50A [along the Brooksville Bypass]

Hernando County, Florida

WPI No: 407951 1
FAP No: 300-1(7)

Submitted to:

Florida Department of Transportation - District 7
Tampa, Florida

Submitted by:

AYRES ASSOCIATES

September 2003