

TRAIL & SIDEWALK FEASIBILITY STUDY – PHASE 2

Madeline Avenue, From County Road 4009 (S
Williamson Boulevard) to County Road 483 (Clyde
Morris Boulevard)

City of Port Orange
FINAL Report, January 2019

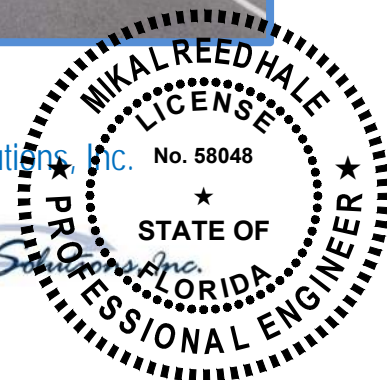


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INTRODUCTION

The purpose of this study is to evaluate the feasibility of constructing a trail on the north side of Madeline Avenue and a sidewalk on the south side of Madeline Avenue, from County Road 4009 (S Williamson Boulevard) to County Road 483 (Clyde Morris Boulevard) (approximately 1.2 miles), in the City of Port Orange. Madeline Avenue from station 100+00 to station 136+00 is under the jurisdiction of Volusia County. The study limits are shown in **Figure 1**. The primary focus of this project will be to provide pedestrian and bicyclist connectivity along Madeline Avenue from S Williamson Boulevard to Nova Road via connectivity to Phase 1; Phase 1 evaluates the feasibility of constructing a trail along Madeline Avenue, from Clyde Morris Boulevard to Nova Road (approximately 1.3 miles) and a sidewalk along the east side of Bruner Road from Stillwood Court to Madeline Avenue.

Currently, there is existing sidewalk along the south side of Madeline Avenue from S Williamson Boulevard to 575 feet east of Town Park Drive; there is also existing sidewalk along the north side of Madeline Avenue from 135 feet west of Sunset Cove Drive to Long Grove Lane; and there is existing sidewalk along both sides of Madeline Avenue from Long Grove Lane to Clyde Morris Boulevard. One of the reasons for the proposed trail and sidewalk improvements along Madeline Avenue is to enhance safety for pedestrians and bicyclists. Currently, no shared-use path is available and there is no continuous sidewalk present, therefore, if a pedestrian desired to walk along the study corridor, they would either have to walk on the outside paved shoulder (in locations where it exists) or walk on the embankment beyond the paved shoulders within the areas that do not have any sidewalk present. Additionally, bicyclists do not have continuous segments of outside paved shoulder or sidewalk to ride on. The project purpose and scope for this study are further explained in Section 2.

In addition to providing safer access for pedestrians and bicyclists, the proposed trail and sidewalk along Madeline Avenue would provide local residents with safer connectivity to public transportation, commercial properties, and other community amenities within the area.

Figure 1
Project Location Map



*Madeline Avenue Trail & Sidewalk Feasibility Study – Phase 2
Port Orange (Volusia County), Florida*

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PROJECT PURPOSE AND SCOPE

Madeline Avenue is an east-west local collector roadway within the City of Port Orange, extending from S Williamson Boulevard to Sauls Street. This section of Madeline Avenue is a two-lane predominantly undivided roadway with sections transitioning between urban and rural (curb and/or gutter to no curb and gutter) with a posted speed limit of 35 and 45 miles per hour. Currently, sidewalks are provided along the south side of Madeline Avenue from S Williamson Boulevard to 575 feet east of Town Park Drive, along the north side of Madeline Avenue from 135 feet west of Sunset Cove Drive to Long Grove Lane, and along both sides of Madeline Avenue from Long Grove Lane to Clyde Morris Boulevard. The proposed trail on the north side of Madeline Avenue and proposed sidewalk on the south side of Madeline Avenue from S Williamson Boulevard to Clyde Morris Boulevard will provide pedestrian and bicyclist connectivity along Madeline Avenue from S Williamson Boulevard to Nova Road via connectivity to Phase 1.

One of the reasons for the proposed trail and sidewalk improvements along Madeline Avenue is to enhance safety for pedestrians and bicyclists. Currently, no shared-use path is available and there is no continuous sidewalk present, therefore, if a pedestrian desired to walk along the study corridor, they would either have to walk on the outside paved shoulder or walk on the embankment beyond the paved shoulders within the areas that do not have any sidewalk present. Additionally, bicyclists do not have continuous segments of outside paved shoulder or sidewalk to ride on.

A field review was conducted for the purposes of data collection, corridor evaluation, development of concept plans, and cost estimates. Items were investigated to identify conditions that may provide input to the determination of improvements, with focus predominantly on the items that impact the proposed trail and sidewalk improvements. Color photographs were taken along the study corridor with emphasis on obtaining visual information which would be of value to the City of Port Orange (the City), Volusia County (the County), the Florida Department of Transportation (FDOT), and the River to Sea Transportation Organization (R2CTPO) during any subsequent project plans preparation activities. These include utility conflicts, right-of-way constraints, obstructions, unusual geometrics, deficient pavement markings. Typical sections and concept plans are provided in **Appendix A** and show existing roadway information and dimensions, including traffic control devices, driveways, sidewalks, signs, pavement markings, drainage inlets, buildings, utility and signal poles, lighting, and other fixed objects along with right-of-way lines. The Americans with Disabilities Act (ADA) requirements were used as requirements for the concept plans.

An ecological feasibility analysis was performed to identify potential impacts to wetlands and threatened and endangered species which would result from the proposed sidewalk improvements included in this study. The permitting requirements and estimated mitigation costs required as a result of any potential wetland or species impacts resulting from the proposed improvements are also summarized. A desktop study was conducted that includes background research in the history of the project corridor, as well as a records search for previously recorded cultural resources and professional archaeological surveys within or near this segment of Madeline Avenue.

Based on the data collection, site reviews, and project coordination meetings, concept plans (see **Appendix A**) were prepared showing the proposed trail and sidewalk improvements, drainage system modifications, driveway improvements, traffic signal adjustments, crosswalks, and tie-ins to existing sidewalks and curb.

Volusia County's Long Range Capital Improvement Plan were reviewed for any scheduled improvements along the Madeline Avenue study corridor. Based on Volusia County's Five-Year Capital Improvement Program, no improvements are currently planned on Madeline Avenue from S Williamson Boulevard to Clyde Morris Boulevard. Additionally, based on discussion at a coordination meeting with Volusia County and the City of Port Orange on October 15, 2018, there are no plans to widen or extend Madeline Avenue at this time.

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EXISTING CONDITIONS

The following section provides a general description of the characteristics observed within the project study limits in regards to the physical conditions, environmental conditions, drainage and utilities, and it also includes an assessment of the apparent right-of-way.

General Description

The study corridor is on Madeline Avenue (a collector roadway) from S Williamson Boulevard to Clyde Morris Boulevard, a length of approximately 1.2 miles. Along the study corridor, Madeline Avenue is a two-lane predominantly undivided roadway with sections transitioning between urban and rural (curb and/or gutter to no curb and gutter). Currently, there is sidewalk along the south side Madeline Avenue from S Williamson Boulevard to 575 feet east of Town Park Drive, along the north side of Madeline Avenue from 135 feet west of Sunset Cove Drive to Long Grove Lane, and along both sides of Madeline Avenue from Long Grove Lane to Clyde Morris Boulevard. The study area is predominantly residential, with some commercial and undeveloped areas. The residential and commercial developments along the study corridor are as follows:

- The Village of Town Park subdivision
- Sunset Cove subdivision
- The Groves subdivision
- The Groves apartments
- The Groves commercial plaza

Along the study corridor there are two signalized intersections at S Williamson Boulevard and Clyde Morris Boulevard. There are no pedestrian features at the Madeline Avenue/Williamson Boulevard intersection. At the Madeline Avenue/Clyde Morris Boulevard intersection, there are pedestrian features (crosswalks and pedestrian pushbuttons and signals) across all approaches of the intersection. The posted speed limit varies throughout the study corridor as follows:

- 45 mph from S Williamson Boulevard to 300 feet west of Sunset Cove Drive (station 130+40)
- 35 mph from 300 feet west of Sunset Cove Drive to Clyde Morris Boulevard (station 130+40 – 163+77)

The project team assessed existing land uses, roadway typical sections, utilities, lighting, existing sidewalk and drainage items. Madeline Avenue was measured to be approximately 100 feet wide. There are no railroad crossings within the study corridor. There is no continuous street lighting along the study corridor from S Williamson Boulevard to Sunset Cove Drive; there is existing sporadic street lighting approaching the S Williamson Boulevard intersection and a single street light in the vicinity of Town Park Drive on the south side of Madeline Avenue. From Sunset Cove Drive eastward, there is continuous street lighting along the south side of Madeline Avenue to approximately 400 feet east of Grove View Lane (station 142+40) where they then transition over to the north side of Madeline Avenue and continue

along the north side to approximately 120 feet east of Long Grove Lane (station 155+20). At station 155+20 the continuous street lighting then crosses back to the south side of the road and continues to Clyde Morris Boulevard.

Driveways

There are nine (9) driveways along the study corridor, including seven unpaved driveways and two paved driveways. In areas where curb is proposed, driveway improvements are required to maintain access to the properties. The two existing paved driveways do not meet ADA requirements and are recommended to be reconstructed (see photos below). **Table 1** below shows existing driveways proposed to be reconstructed with concrete driveway aprons (not including side streets), property locations and proposed improvements. The concept plans in **Appendix A** identifies the driveways that are recommended to receive ADA-compliant concrete improvements.

Table 1
Driveway Information
Madeline Avenue from S Williamson Boulevard to Clyde Morris Boulevard

Current Driveway Material	Station Location (Appendix A)	Parcel ID	Property Location	Proposed Driveway Material
Grass	114+70 (Rt.)	01-16-32-00-00-0012	Existing gated Access	Concrete Flared Driveway
Dirt	117+35 (Rt.)	01-16-32-00-00-0012	RA-2 Pond Maintenance	Concrete Flared Driveway
Dirt	123+20 (Lt.)	01-16-32-00-00-0010	RA-3 Pond Maintenance	Concrete Flared Driveway
Dirt	123+70 (Rt.)	01-16-32-00-00-0012	Borrow Pit Maintenance	Concrete Flared Driveway
Dirt	126+90 (Lt.)	01-16-32-00-00-0010	RA-3 Pond Maintenance	Concrete Flared Driveway
Dirt	131+10 (Rt.)	01-16-32-00-00-0012	Borrow Pit Maintenance	Concrete Flared Driveway
Paved	132+30 (Lt.)	01-16-32-00-00-0011	Canal Maintenance	Concrete Flared Driveway
Paved	136+10 (Lt.)	06-16-33-12-00-0002	Lift Station Maintenance	Concrete Flared Driveway
Grass	152+45 (Lt.)	06-16-33-08-00-0003	Utility Maintenance	Concrete Flared Driveway



Dirt driveways along the study corridor are recommended to receive new concrete driveways



Paved driveways that presently meet ADA requirements are recommended to remain

Right-of-Way

Madeline Avenue is maintained by Volusia County within the City of Port Orange. Apparent right-of-way lines were obtained from Volusia County's Geographic Information Services (GIS) website, and used to preliminarily assess the right-of-way width along the study corridor. However, several record engineering documents for Madeline Avenue were also consulted to more accurately depict the existing apparent right of way, as the GIS did not appear accurate in several locations. Record documents suggest that right-of-way is 100 feet wide through the entire study corridor. The apparent right-of-way is also shown on the concept plans exhibits and in the typical section (see **Appendix A**).

Utilities

A utility assessment was made along the study corridor during the field visit. There is no continuous street lighting along the study corridor from S Williamson Boulevard to Sunset Cove Drive; there is existing sporadic street lighting approaching the S Williamson Boulevard intersection and a single street light in the vicinity of Town Park Drive on the south side of Madeline Avenue. From Sunset Cove Drive eastward, there is continuous street lighting along the south side of Madeline Avenue to approximately 400 feet east of Grove View Lane (station 142+40) where they then transition over to the north side of Madeline Avenue and continue along the north side to approximately 120 feet east of Long Grove Lane (station 155+20). At station 155+20 the continuous street lighting then crosses back to the south side of the road and continues to Clyde Morris Boulevard. Overhead power lines are located on the south side of Madeline Avenue from S Williamson Boulevard to just east of Grove View Lane. From approximately 400 feet east of Grove View Lane (station 142+40) the overhead power lines cross over to the north side of Madeline Avenue and continue along the north side to approximately 120 feet east of Long Grove Lane (station 155+20), where it then crosses back to the south side of the road and continues to Clyde Morris Boulevard. A total of 40 overhead utility poles and 17 luminaires were noted during the field visit.

The clear zone distance from the edge of pavement to the utility poles was generally a minimum of 16 feet. However, at station 159+20 the existing utility pole and fire hydrant are within less than 8 feet from the edge of pavement. Sanitary sewer from the Town Park subdivision crosses Madeline Avenue to an existing manhole on the north side of Madeline Avenue (station 107+75). There is a lift station on the south side of Madeline Avenue after Town Park Drive (station 109+40) where a sanitary sewer runs along the south side of Madeline Avenue for approximately 200 feet, and a force main crosses Madeline Avenue and runs along the north corridor for approximately 2,280 feet. There is a lift station near Grove View Lane (station 136+20) where a sanitary sewer begins and runs in the center of Madeline Avenue to Long Grove Lane (station 153+80), and a force main runs along the north side of Madeline Avenue through the intersection of Clyde Morris Boulevard. Water mains run along the south side of Madeline Avenue from S Williamson Boulevard to Clyde Morris Boulevard. Reclaimed water runs along the north side of Madeline Avenue from S Williamson Boulevard to Town Park Drive and services the Town Park subdivision. A small segment of underground telephone is located within the intersection of Madeline Avenue and Clyde Morris Boulevard. Gas mains run along the east side of Clyde Morris Boulevard.



Utility poles along the south side of Madeline Avenue
(Facing East)

Floodway / Floodplain

A copy of FEMA FIRM Panel 12127C0368H is included in **Appendix B**, as last revised February 19, 2014. As depicted on this map, most all of the existing right of way throughout the study corridor lies within Special Flood Hazard Areas (SFHAs), including floodway areas in Zone AE (from approximately station 115+80 to station 133+40), areas beyond the floodway which are subject to inundation by the 1% annual chance flood, and areas beyond those which are subject to inundation by the 0.2% annual change flood. On the north side of Madeline Avenue, the Base Flood Elevation (BFE) for surrounding areas has been determined at elevation 28.00' NAVD88, while on the south side, BFE for surrounding areas was commonly determined at elevation 27.00' NAVD88. However, according to the profile contained in Table 18 of the Flood Insurance Study (effective date of February 19, 2014), which is typically considered to be more accurate, the study profile indicates peak stages within the B-19 canal were determined to be at elevation 27.5' NAVD88 at Cross-Section "P" on the north of Madeline Avenue, and at elevation 27.4' NAVD88 at Cross-Section "O" located approximately 1,000' south of Madeline Avenue.

Drainage and Permitting

Within the study corridor, the construction of Madeline Avenue was previously permitted by the St. Johns River Water Management District (SJRWMD) under two separate Environmental Resource Permits (ERP) series, with multiple subsequent modifications thereto. A brief summary of the stormwater management systems permitted within each is provided below.

The Groves PUD (ERP Series 22640)

Of the six permits issued within this ERP series, the first was issued September 10, 1985, authorizing construction of Madeline Avenue from just east of the B-19 canal to S Clyde Morris Boulevard. These permits authorized the construction of four wet detention ponds (RA-1, RA-2, RA-3, & RA-4) to treat and attenuate runoff from The Groves master planned development areas and address floodplain storage. These ponds are equalized with a series of box culverts

and/or pipes, and this interconnected system discharges northerly through a control structure located in the northeastern corner of RA-4, which regulates discharge into an east-west oriented canal that conveys the runoff westerly into the B-19 canal. As provided by the City of Port Orange, as-built plans for The Groves – Phase C (dated July 18, 1991) suggest that the portion of Madeline Avenue between Grove View Lane (near station 138+00) and Long Grove Lane (near station 154+00) was intended to be widened to a 4-lane facility in the future.

Madeline Avenue Extension (ERP No. 23171-1)

Legacy Permit #4-127-0343A-ERP was originally issued August 11, 1998 for the extension of Madeline Avenue as a 2-lane road from S Williamson Boulevard to just east the B-19 canal, with potential for expansion into a future 4-lane facility. The approved stormwater management system included three wet detention ponds west of the B-19 canal, and one wet detention pond east of the B-19 canal. West of the B-19 canal, wet detention pond RA-1 discharges northerly into an existing wetland system, while wet detention ponds RA-2 and RA-3 both discharge southerly into the expanded borrow pit. A control structure in the southeast corner of the borrow pit regulates discharge into the B-19 canal. East of the B-19 canal, wet detention pond RA-4 discharges easterly to the existing collection system within the road that was constructed within The Groves master planned development.

There is an abundance of record documents on file with SJRWMD for the above referenced permits that date back several years. Much of it is scattered or incomplete, and image quality is low. Very little narrative summarizing the permit history or basis of design was encountered within all of the records reviewed in preparation of this feasibility study, and at this time, it has not been determined whether or not the above referenced stormwater management facilities were designed to accommodate additional impervious area.

There are a total of six (6) existing cross-drain, equalizer, and/or outfall pipes that pass runoff underneath Madeline Avenue that are expected to remain in order to maintain existing drainage patterns. Below is a summary of these drainage conveyance elements:

- Station 108+60 – single-barrel 24-inch concrete pipe cross-drain
- Station 118+80 – triple-barrel 24-inch concrete pipe cross-drain
- Station 124+20 – single-barrel 24-inch concrete pipe (outfall from RA-3)
- Station 131+70 – single-barrel unknown size concrete arch span culvert (B-19 canal)
- Station 146+50 – single-barrel 4-ft by 6-ft concrete box culvert (equalizer RA-1 to RA-2)
- Station 155+70 – single barrel 30-inch concrete pipe (equalizer RA-3 to RA-4)

Field photos of some of the drainage structures are provided on the following page.



Soils

The proposed shared use path and sidewalk traverses through EauGallie fine sands, Immokalee sand, Myakka-Myakka fine sands, Myakka-St Johns complex, Pomona fine sand, Pomona-St Johns complex and Satellite sand. A soils map is included in **Appendix D**. This map was prepared through the Web Soil Survey (WSS) operated by USDA Natural Resources Conservation Services (NRCS).

Environmental

An ecological feasibility study was completed for the proposed trail and sidewalk project by Environmental Services, Inc. (ESI). The purpose of the investigation was to preliminarily assess the work corridor for the presence of jurisdictional wetlands in accordance with the current methodologies of the U.S. Army Corps of Engineers (ACOE) and the St. Johns River Water Management District (SJRWMD). In addition, the study corridor was investigated for the potential presence and/or use of the area by any species protected by the Florida Fish and Wildlife Conservation Commission (FWC) and/or the U.S. Fish and Wildlife Service (FWS). The study was initiated with a review of topographic maps, soil survey information, and color infrared aerial photographs of the study area, along with relevant technical publications and field guides. Upon completion of the in-house review, ESI staff inspected the study area on October 10 and November 6, 2018.

In August 1998, the Madeline Avenue Extension Permit (ERP No. 23171-1 [Legacy Permit #4-

127-0343A-ERP]) was issued by SJRWMD for the project area. The permit extended Madeline Avenue west to S Williamson Boulevard. Wetland extents associated with this permit were established by SJRWMD Formal Wetland Determination #16-127-0043 also issued August 1998. The permit allowed for approximately 1.7 acres of fill to construct the roadway extension. Mitigation was provided in the form of mitigation bank credits from Barberville Conservation Area Mitigation Bank. More recently, wetlands on the western end of the study corridor were formally delineated and approved by SJRWMD under the Parcel 2B project permitted to DSC of Newark Enterprises, Inc. A formal wetland determination was most recently issued in May 2017 locking in the extent of the surrounding wetlands for five years, which were delineated on the concept plans in **Appendix A**. Based on ESI's site review, the wetland extents bordering Madeline Avenue Phase 2 are consistent with the extents established as part of this formal wetland determination. The eastern portion of the study corridor is also bordered by previously permitted developments, including The Groves, a master planned single-family residential development originally permitted by SJRWMD in 1985. As noted above, stormwater management ponds associated with the development border both the northern and southern extent of the Madeline Avenue right-of-way.

ESI investigated the proposed project corridor for the presence of any state or federally jurisdictional wetlands or surface waters in accordance with the current methodologies of ACOE and SJRWMD. ESI initiated the investigation with a review of historic and infrared aerial photography, along with National Wetlands Inventory (NWI) data and soils maps. This review was supplemented with the historic permitting review. Based on this information, no direct evidence of any wetlands or surface waters were noted. On 10 October 2018, ESI staff performed a site review of the corridor to further investigate for the presence of any jurisdictional wetlands or surface waters within and directly adjacent to the study corridor. Results are reflected on the map in **Appendix C**.

ESI also initiated a wildlife study within the corridor with a literature search of the listed species known to occur in this portion of Volusia County, Florida. The literature consulted included lists supplied by the Florida Fish and Wildlife Conservation Commission (FWC), the U.S. Fish and Wildlife Service (FWS), and the Florida Natural Areas Inventory (FNAI) along with technical publications and field guides. Based on this information, and knowledge of the specific habitat requirements for the individual listed species, the probability of each species occurrence on the site was considered. Due to the nature of the proposed project, use of the area by a wide variety of protected species is not likely. Soils surrounding the Phase II portion of the Madeline Avenue sidewalk project do not appear to be sufficiently drained to support habitat for the gopher tortoise (*Gopherus polyphemus*). In their site review, ESI investigated the areas most likely to support the species and noted no burrows within or directly adjacent to the right-of-way. Marginal foraging habitat for wading birds such as the wood stork (*Mycteria americana*) occurs along the littoral fringes of the stormwater ponds adjacent to Madeline Avenue.

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TRAIL AND SIDEWALK CONCEPT PLAN

As previously conveyed, the purpose of this study was to evaluate the feasibility of providing trail and sidewalk on Madeline Avenue from Clyde Morris Boulevard to S Williamson Boulevard. This section discusses the sidewalk concept plan and explains drainage and utilities improvements, field photos are included. The sidewalks in this study are designed to the current FDOT standards with a minimum width of 6-feet. During design of the project, the FDOT standards may be reevaluated to determine if the sidewalk width may be reduced to 5-feet. It should be noted that the City currently has a requirement for fiberglass reinforcement in their concrete sidewalk construction details, but they are in the process of removing that requirement. This study incorporates the cost of fiberglass reinforcing; however, the City requirement should be examined during the design phase.

Shared-Use Path, Sidewalk, Driveways, Signing and Pedestrian Facilities

- Construct an 8-foot minimum shared-use path along the north side of Madeline Avenue and a 6-foot sidewalk on the south side of Madeline Avenue, from S Williamson Boulevard to Clyde Morris Boulevard. The sidewalks in this study are designed to the current FDOT standards with a minimum width of 6-feet (during design of the project, the FDOT standards may be reevaluated to determine if the sidewalk width may be reduced to 5-feet).
- Provide intersection/pedestrian crosswalk lighting at the S Williamson Boulevard and Clyde Morris Boulevard intersections with Madeline Avenue.
- Provide Accessible Pedestrian Signal (APS) improvements to assist pedestrians who are visually impaired.
- ADA compliant pedestrian ramps and intersection/pedestrian crosswalk lighting at the Clyde Morris Boulevard intersection with Madeline Avenue are accounted for in both Phase 1 and Phase 2, Madeline Avenue Feasibility studies. These improvements include:
 - Relocate the existing traffic signal cabinet.
 - Relocate the stop bar striping, and crosswalk striping.
 - Removal and replacement of traffic loops.
 - Required pedestrian push buttons and signals.
 - The removal and construction of an existing ditch bottom inlet and pipe.
- Modify signal timing/phasing to provide pedestrian phasing at the east leg of the S Williamson Boulevard/Madeline Avenue intersection.
- The following improvements are recommended for the north side of Madeline Avenue:
 - Construct a new ADA compliant sidewalk in the northeast corner of S Williamson Boulevard/Madeline Avenue intersection to connect to the new pedestrian crosswalk across the east leg of the intersection.
 - Construct a 10-foot shared-use path at station 100+40 which extends east to approximately 150 feet east of Town Park Drive (station 109+20).
 - Relocate the STOP sign assembly at the existing paved turn out near station 105+10.

- Continue the trail as a 10-to-12-foot shared-use path from station 109+20 to station 131+30 which is approximately 200 feet west of Sunset Cove Drive.
 - Construct new Type “F” Curb to connect to existing Type “F” Curb at station 109+20 and run approximately 2,160 feet east to connect to existing Type “F” Curb at station 130+80.
 - Relocate the Speed Limit 45mph sign at station 130+35 and curve warning sign (W01-02L) at station 133+20.
 - Construct a new concrete driveway at station 123+20 in place of the existing dirt driveway, as needed to provide an ADA compliant trail crossing and maintenance to the pond.
 - Construct a new concrete driveway at station 126+90 in place of the existing dirt driveway, as needed to provide an ADA compliant trail crossing and maintenance to the pond.
 - Remove and replace the existing concrete driveway at station 132+30, as needed to provide an ADA compliant trail crossing and maintenance access for the B-19 Canal.
 - Continue the trail as a 12-foot shared-use path from station 131+30 to approximately 200 feet west of Grove View Lane (station 136+40).
 - Remove and replace the existing concrete driveway at station 136+10, as needed to provide an ADA compliant trail crossing.
 - Continue the trail as an 8-foot shared-use path from station 136+40 to Long Grove Lane (station 154+00).
 - Continue the trail as a 12-foot shared-use path from station 154+00 to Clyde Morris Boulevard (station 163+40).
 - Relocate the Right Lane Ends sign at station 158+30.
- The following improvements are recommended for the south side of Madeline Avenue:
 - Remove and replace existing section of sidewalk in the southeast corner of S Williamson Boulevard/Madeline Avenue intersection and construct a new 6-foot sidewalk to provide an ADA compliant sidewalk to the new pedestrian crosswalk across the east leg of the intersection.
 - Construct a new 6-foot sidewalk to connect to the existing 5-foot sidewalk at station 113+40 and run approximately 2,160 feet east to connect to Clyde Morris Boulevard (station 163+40).
 - Construct new Type “F” Curb starting at station 113+40 and run approximately 1,790 feet east to connect to existing Type “F” Curb at station 131+30.
 - Relocate the curve warning sign (W01-02R) at station 115+00.
 - Construct a new concrete driveway at station 113+30 in place of the existing dirt driveway, as needed to provide an ADA compliant sidewalk crossing and access to the pasture through the existing gate.
 - Construct a new concrete driveway at station 117+30 in place of the existing dirt driveway, as needed to provide an ADA compliant sidewalk crossing and maintenance to the pond.
 - Construct a new concrete driveway at station 123+70 in place of the existing dirt driveway, as needed to provide an ADA compliant sidewalk crossing and maintenance to the pond.

- Relocate the Speed Limit 35mph sign at station 130+20.
- Construct a new concrete driveway at station 131+10 in place of the existing dirt driveway, as needed to provide an ADA compliant sidewalk crossing and maintenance access for the B-19 Canal.
- Mill and resurface a portion of Sunset Cove Drive (station 133+60) to replace existing crosswalk striping closer to Madeline Avenue.
- Relocate the STOP sign and Street Name sign assemblies at Sunset Cove Drive (station 133+60).
- Relocate the STOP sign and Street Name sign assemblies at Grove View Lane (station 138+50).
- Relocate the Speed Limit 35mph sign at station 140+20.
- Remove existing Drop Curb from station 151+60 to station 153+60 and replace it with Type "F" Curb.
- Remove the existing valley gutter at the shopping center driveway near station 159+40, construct new 3 foot concrete valley gutter and reconstruct existing asphalt right turn taper
- Complete excavation for floodplain compensating storage between sidewalk and existing right of way.



Floodway / Floodplain

Volumes of embankment required to construct the shared use path and sidewalk systems will need to be offset by similar volumes of excavated material to provide compensating storage. As shown on the typical sections within **Appendix A**, it is anticipated that small areas at the back side of the sidewalks can be excavated within the existing right of way to provide this compensating storage volume, while remaining directly connected to the existing floodplain. In existing conditions, flood waters stage over top of the roadway and are connected, such that compensating storage may be able to be provided at any location within the existing right of way to offset fill in other areas throughout the corridor.

Drainage and Permitting

The following drainage improvements are anticipated:

- Construct new Type 'F' curb & gutter at the back of existing shoulder pavement on both sides of the roadway from station 109+40 to station 131+00, with exception of where sidewalk already exists on the south side of the road to station 113+50
- Construct 19 new curb inlets within new Type "F" curb & gutter at sufficient spacing to address spread with minimum profile grade on the existing roadway, with associated culvert pipes required to connect the new structures to the existing conveyance system(s)
- Remove the existing catch basin at station 114+90 (LT)
- Modify the existing catch basin at station 114+90 (RT) to receive the new conveyance system piping and add a new manhole top
- Modify the existing catch basin at station 116+60 (RT) to receive the new conveyance system piping
- Remove the existing catch basin at station 125+90 (LT)
- Construct a new catch basin over existing outfall pipe at station 125+90 (LT) to receive new conveyance system piping

Typically multi-use recreational paths less than 14' in width, sidewalks less than 6' in width, and minor roadway safety construction projects qualify for exemption from ERP. However, as noted above, proposed improvements are within previously permitted project areas from multiple permits, and it has not been determined whether or not the existing stormwater management facilities were designed to accommodate additional impervious area. Furthermore, determination of coverage of project improvements in multiple existing permits is beyond the scope of this feasibility report. Detailed analysis is required during the design phase further determine the original design and whether or not excess capacity is available within the facilities. If proposed improvements result in conditions which exceed the thresholds permitted as minor modifications under FAC 62-330.315(2), then major modifications to the permits described above will be required, with substantial supporting calculations. However, given the vast size of the basins and storage facilities within, as compared to the nominal increase in impervious areas resulting from the trail facilities, no significant modifications to the storage facilities or their outfall structures are anticipated.

NOTE: Modification of previous permits will require authorization by the current ownership and maintenance authorities for the stormwater management facilities, including D.S.C. of Newark Enterprises, Inc. and the Association of the Groves

Homeowner's, Inc. In addition, new easements or other agreements may need to be negotiated with these private entities unless other evidence is found demonstrating that legal rights for maintenance and/or modification of the facilities were provided to the local agencies (City of Port Orange or Volusia County).

Utilities

The proposed shared use path and sidewalk improvements are expected to be fill-only, with very limited excavation expected to occur below existing grade. However, in the areas available for floodplain compensation, excavation may be required to a depth of up to two (2) feet. Conflicts requiring the relocation of existing underground utilities may occur in these areas as well as in the areas of proposed storm drainage improvements. Overhead utility poles are not expected to be impacted as a result of the proposed improvements, as there is sufficient right-of-way to adjust the sidewalk alignment around any potential conflict.

Fire Hydrant relocations are expected near intersections where the right-of-way becomes constrained, however there is evidence of existing public utility easements in these areas. Utility adjustments for this project are anticipated to include the adjustment of existing utility appurtenances to match finished grade, the relocation of utility risers. Based on limited field observations, at least five (5) utility appurtenances will need to be adjusted to finished grade as a result of the proposed improvements. The concept plans included in **Appendix A**, depict the utility adjustments needed to accommodate the proposed sidewalk improvements along Madeline Avenue.

Environmental

Should work occur within the maintained right-of-way of Madeline Avenue, ESI does not anticipate wetland impacts. However, if work occurs outside of the existing maintained right-of-way, there is potential for wetland impacts. The majority of wetlands adjacent to the project area are the littoral fringes of existing stormwater management ponds, as illustrated on the map in **Appendix C**. Forested wetlands also border Madeline Avenue approximately 1,700 feet east of the intersection of Madeline Avenue and S Williamson Boulevard. None of these wetlands are of high quality or unique communities. Avoidance of any wetland areas by constructing within the maintained right-of-way is the optimal alternative from a wetland permitting perspective. However, should mitigation be required, the City has a wetland mitigation bank and fees would not be required.

The work area is alongside an existing 2-lane highway surrounded by agricultural and residential uses, and will primarily occur within an existing mowed and maintained right-of-way. Based on ESI's review, it is not anticipated that the project will have any detrimental impact on any state or federally listed species if work be limited to within the existing maintained right-of-way. Impacts to wood storks will be considered as part of the federal wetland permitting process (if necessary), but it is unlikely the proposed project will be determined to adversely affect the species.

5

FINANCIAL FEASIBILITY

This section summarizes preliminary cost estimates for the design and construction of the proposed trail and sidewalk improvements along Madeline Avenue. This cost estimate is completed for the purposes of the feasibility study and to allow the River to Sea TPO and City of Port Orange to prioritize planned trail and sidewalk improvements. The overall improvement costs were estimated based on FDOT historical unit prices from the FDOT Basis of Estimates. To adjust for potential future increases in the project's cost estimates, an annual inflation factor was applied based on FDOT guidelines. FDOT provides annual inflation factors for roadway construction costs. A listing of the FDOT approved inflation factors through 2028 is available in **Appendix E**.

The total cost of the improvements, including engineering and CEI, is estimated at approximately \$2,653,590 and is provided in **Table 2** on the following pages. Using FDOT inflation factors, the four-year breakdown for cost estimates is provided below:

- Year 1 (2019) cost estimate adjusted for inflation – \$2,727,890
- Year 2 (2020) cost estimate adjusted for inflation – \$2,798,815
- Year 3 (2021) cost estimate adjusted for inflation – \$2,868,786
- Year 4 (2022) cost estimate adjusted for inflation – \$2,946,243

Table 2
Cost Estimate
Madeline Avenue from S Williamson Boulevard to Clyde Morris Boulevard

PAY ITEM NO.	PAY ITEM DESCRIPTION	UNIT	QUANTITY	2018 UNIT PRICE	AMOUNT
101-1	MOBILIZATION	LS	1	\$154,974.00	\$154,974.00
102-1	MAINTENANCE OF TRAFFIC	LS	1	\$172,193.00	\$172,193.00
104-10-3	SEDIMENT BARRIER	LF	12400	\$1.50	\$18,600.00
104-18	INLET PROTECTION SYSTEM	EA	35	\$111.00	\$3,885.00
110-1-1	CLEARING AND GROOMING	AC	9,963	\$11,620.00	\$115,770.00
110-4-10	REMOVAL OF EXISTING CONCRETE	SY	4452	\$20.00	\$89,040.00
120-1	REGULAR EXCAVATION	CY	2350	\$4.75	\$11,162.50
120-6	EMBANKMENT	CY	2350	\$8.50	\$19,975.00
160-4	TYPE B STABILIZATION	SY	914	\$4.50	\$4,113.00
285-706	OPTIONAL BASE, BASE GROUP 06	SY	914	\$18.50	\$16,909.00
327-70-1	MILLING EXIST ASPHALT PAVT, 1" AVG DEPTH	SY	10089	\$2.50	\$25,222.50
334-1-13	SUPER PAVE ASPHALTIC CONCRETE, TRAFFIC C	TN	112	\$89.00	\$10,057.00
337-7-82	ASPHALT CONCRETE FRICTION COURSE, TRAFFIC C, FC-9.5, PG 76-22	TN	605	\$140.00	\$84,700.00
425-1521	INLETS, DT BOT, TYPE C, <10'	EA	1	\$3,292.00	\$3,292.00
425-1-321	INLETS, CURB, TYPE P-3, <10'	EA	15	\$6,478.00	\$97,170.00
425-2-41	MANHOLES, P-7, <10'	EA	1	\$4,568.00	\$4,568.00
425-5	MANHOLE, ADJUST	EA	1	\$892.00	\$892.00
425-5-1	MANHOLE, ADJUST, UTILITIES	EA	1	\$1,405.00	\$1,405.00
425-6	VALVE BOX, ADJUST	EA	5	\$697.00	\$3,485.00
425-11	WOOLLY EXISTING DRAINAGE STRUCTURE	EA	7	\$2,879.00	\$19,803.00
430-173-118	PIPE CULVERT, OPTIONAL MATERIAL, ROUND, 18", GD	LF	318	\$95.00	\$30,210.00
430-173-124	PIPE CULVERT, OPTIONAL MATERIAL, ROUND, 24", GD	LF	1136	\$90.00	\$102,240.00
515-2-312	PEOT BICYCLE RAILING, ALUM, 42" TYPE 2	LF	110	\$110.00	\$12,100.00
520-1-10	CONCRETE CURB & GUTTER, TYPE F	LF	5722	\$21.00	\$120,162.00
520-3	VALLEY GUTTER-CONCRETE	LF	98	\$31.00	\$3,038.00
522-1	CONCRETE SIDEWALK, 4" THICK (WITH FIBER) (3000 PSI)	SY	21298	\$30.00	\$638,900.00
522-2	CONCRETE DRIVEWAY, 8" THICK	SY	429	\$60.00	\$25,740.00
527-2	DETECTABLE WARNING	SF	512	\$28.00	\$14,364.00
570-1-2	PERFORMANCE TURF, SOD	SY	36496	\$2.50	\$91,240.00
630-2-11	CONDUIT, F&I, OPEN TRENCH	LF	400	\$8.00	\$3,200.00
630-2-12	CONDUIT, F&I, DIRECTIONAL BORE	LF	400	\$20.00	\$8,000.00
632-7-1	SIGNAL CABLE-NEW OR RECO, F&I	PI	1	\$5,148.00	\$5,148.00
635-2-11	PULL & SPLICE BOX, F&I, 13" X 24"	EA	10	\$629.00	\$6,290.00
639-1-121	ELEC POWER SERV, F&I, UNDERGROUND, HETER FURNISHED BY POWER COMPANY	EA	2	\$4,815.00	\$9,630.00
639-2-1	ELEC SERV WIRE, F&I	LF	2400	\$9.50	\$22,800.00
639-3-11	ELEC SERV DISCON, F&I, POLE MNT	EA	2	\$806.00	\$1,612.00
641-2-11	PRESTRESSED CONCRETE POLE, F&I, TYPE P-11 PEDISTAL	EA	8	\$1,450.00	\$11,600.00
646-1-12	ALUMINUM SIGNAL POLE, F&I PEDESTRIAN DETECTOR POST	EA	2	\$981.00	\$1,962.00
653-1-11	PEDESTRIAN SIGNAL, F&I LED COUNTDOWN, 1 WAY	AS	2	\$681.00	\$1,362.00
653-1-12	PEDESTRIAN SIGNAL, F&I LED COUNTDOWN, 2 WAY	AS	4	\$1,186.00	\$4,744.00
660-1-60	LOOP DETECTOR INDUCTIVE, REMOVE	EA	6	\$28.00	\$168.00
660-2-106	LOOP ASSEMBLY, F&I, TYPE F	AS	6	\$849.00	\$5,094.00
665-1-12	PEDESTRIAN DETECTOR, F&I, ACCESSIBLE	EA	6	\$1,770.00	\$10,620.00
665-1-60	PEDESTRIAN DETECTOR, REMOVE	AS	6	\$55.00	\$330.00
670-3-110	TRAFFIC CONTROLLER, F&I, NEHA	EA	1	\$27,000.00	\$27,000.00
670-3-600	TRAFFIC CONTROLLER ASSEMBLY, REMOVE CONTROLLER WITH CABINET	AS	1	\$502.00	\$502.00
676-1-112	TRAFFIC SIGNAL CONTROL CABINET, F&I, NEHA S 2	EA	1	\$2,449.00	\$2,449.00
700-1-11	SINGLE POST SIGN, F&I, GROUND MOUNT, UP TO 125F	AS	9	\$363.00	\$3,267.00
700-1-60	SINGLE POST SIGN, REMOVE	AS	9	\$35.00	\$315.00
711-11-123	THERMOPLASTIC, STANDARD, WHITE, SOLID, 12"	LF	1527	\$2.50	\$3,816.47
711-11-125	THERMOPLASTIC, STANDARD, WHITE, SOLID, 24"	LF	100	\$4.50	\$448.82
711-16-101	THERMOPLASTIC, STD-OTH, WHITE, SOLID, 6"	GH	0.007	\$4,060.00	\$29.27
715-1-12	LIGHTING CONDUCTORS, F&I, INSULATED, NO. 8 - 6	LF	2400	\$2.00	\$4,800.00
715-4-12	LIGHT POLE COMPLETE, F&I STD POLE STD FOUNDATION, 35' MOUNTING HEIGHT	EA	5	\$6,076.00	\$30,380.00
715-7-11	LOAD CENTER, F&I, SECONDARY VOLTAGE	EA	2	\$10,466.00	\$20,932.00
715-500-1	POLE CABLE DISTRIBUTION SYSTEM, CONVENTIONAL	EA	5	\$346.00	\$1,730.00
-	LIGHT POLE BY POWER COMPANY	EA	3	\$2,000.00	\$6,000.00
1644800	FIRE HYDRANT, RELOCATE	EA	2	\$3,465.00	\$6,930.00
CONSTRUCTION COSTS SUBTOTAL					\$2,049,089.74
-	SURVEYING	LS	1	\$ 61,000.00	\$ 61,000.00
-	CULTURAL RESOURCES	LS	1	\$ 10,000.00	\$ 10,000.00
-	ENVIRONMENTAL (INCLUDES WETLAND DELINEATION & PROTECTED SPECIES ASSESSMENT)	LS	1	\$ 10,000.00	\$ 10,000.00
-	ENGINEERING	LS	1	\$205,000.00	\$ 205,000.00
-	STRUCTURAL	LS	1	\$ 37,500.00	\$ 37,500.00
-	SUP	LS	1	\$ 15,000.00	\$ 15,000.00
-	CEI	LS	1	\$ 266,000.00	\$ 266,000.00
SURVEY / DESIGN / CEI SUBTOTAL					\$604,500.00
TOTAL PROJECT COST					\$2,653,589.74
FDOT INFLATION-ADJUSTED ESTIMATE			INFLATION FACTOR	PDC MULTIPLIER	ADJ COST
2019 ESTIMATED PROJECT COST			2.8%	1.028	\$2,727,890.26
2020 ESTIMATED PROJECT COST			2.8%	1.055	\$2,798,815.40
2021 ESTIMATED PROJECT COST			2.5%	1.081	\$2,868,785.79
2022 ESTIMATED PROJECT COST			2.7%	1.110	\$2,946,243.00

* Ultimate costs for Environmental and Cultural Resources will be determined once results of Initial surveys are obtained

* No costs associated with obtaining harmonizing easements or permanent easements over offsite stormwater management facilities are included above.

* No costs have been included for wetland mitigation as the City has a wetland mitigation bank.

6

CONCLUSION

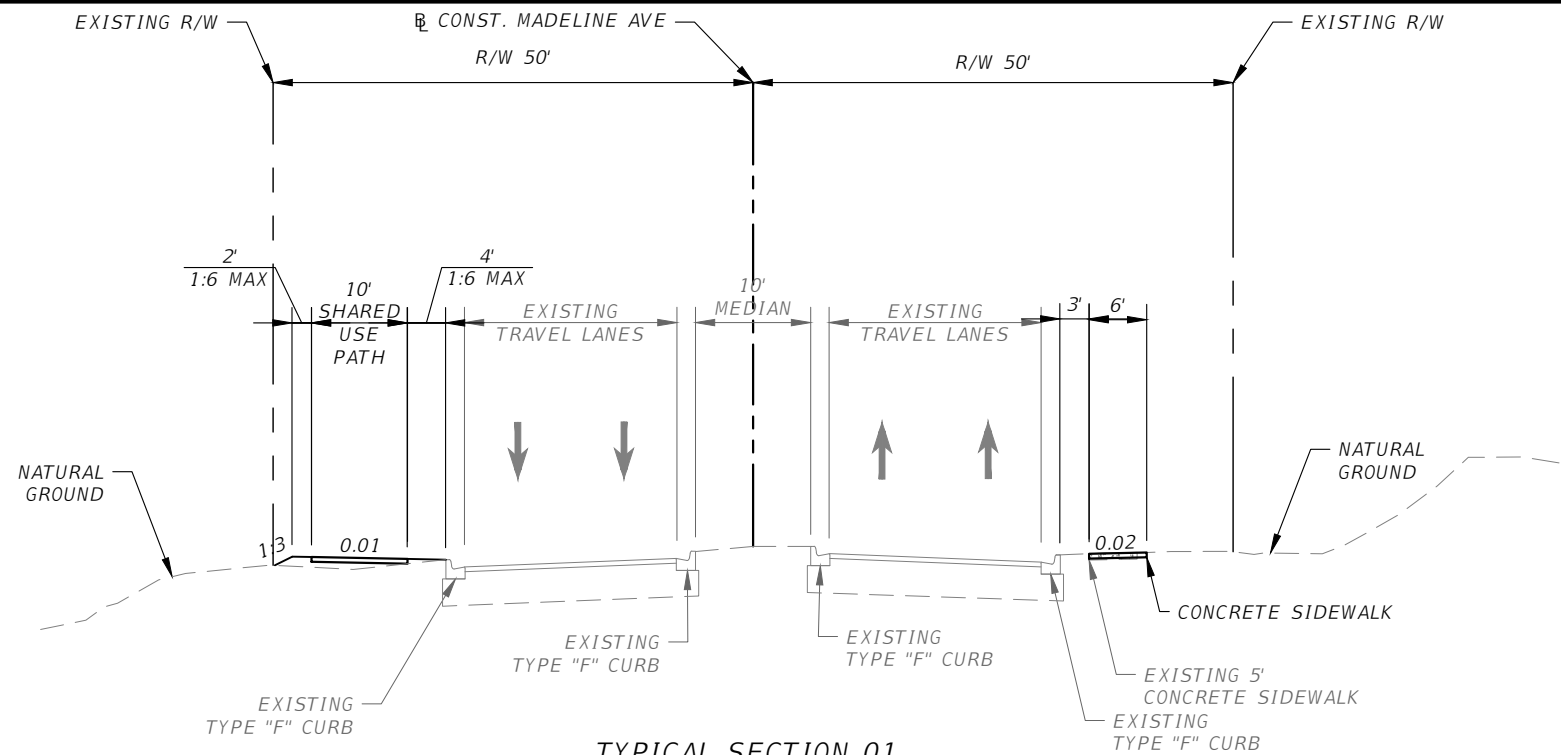
The purpose of this study was to evaluate the feasibility of constructing trail and sidewalk on the north side of Madeline Avenue, in the City of Port Orange, from Clyde Morris Boulevard to S Williamson Boulevard. In addition, key components of the study include drainage considerations of Madeline Avenue. The primary purpose of this project would be to provide pedestrian and bicyclist connectivity along Madeline Avenue from S Williamson Boulevard to Clyde Morris Boulevard. The following recommendations and conditions have been determined along the study corridor:

- It is recommended to construct an 8-foot minimum shared-use path along the north side of Madeline Avenue and a 6-foot sidewalk on the south side of Madeline Avenue, from S Williamson Boulevard to Clyde Morris Boulevard (during design of the project, the FDOT standards may be reevaluated to determine if the sidewalk width may be reduced to 5-feet) (see concept plans in **Appendix A**).
- Proposed sidewalk on the south side of Madeline Avenue will tie into existing sidewalk.
- Construct new concrete driveways in place of the existing dirt driveways as needed to provide an ADA compliant trail or sidewalk crossings and permanent maintenance access to ponds, lift stations, and other utilities.
- Mill and resurface or reconstruct existing paved sidestreets and/or driveways as needed to provide an ADA compliant trail or sidewalk crossing.
- Mill and resurface Madeline Avenue from station 112+40 to station 130+90 to repair the roadway after installation of a new drainage collection system, including curb & gutter, curb inlets and pipes.
- Some drainage facilities along the study corridor are recommended to be modified including replacement and adjustment of drainage facilities to finished grade.
- Complete excavation for floodplain compensating storage between the trail and/or sidewalk and the existing right of way.
- Remove existing sidewalk and construct a new ADA compliant sidewalk in the northeast corner and southeast corner of S Williamson Boulevard/Madeline Avenue intersection to connect to the new pedestrian crosswalk across the east leg of the intersection.
- Modify signal timing/phasing to provide pedestrian phasing at the east leg of the S Williamson Boulevard/Madeline Avenue intersection.
- Provide intersection/pedestrian crosswalk lighting at the S Williamson Boulevard and Clyde Morris Boulevard intersections with Madeline Avenue.
- The engineering and construction costs associated with these improvements are estimated at approximately \$2,653,590 in 2018.

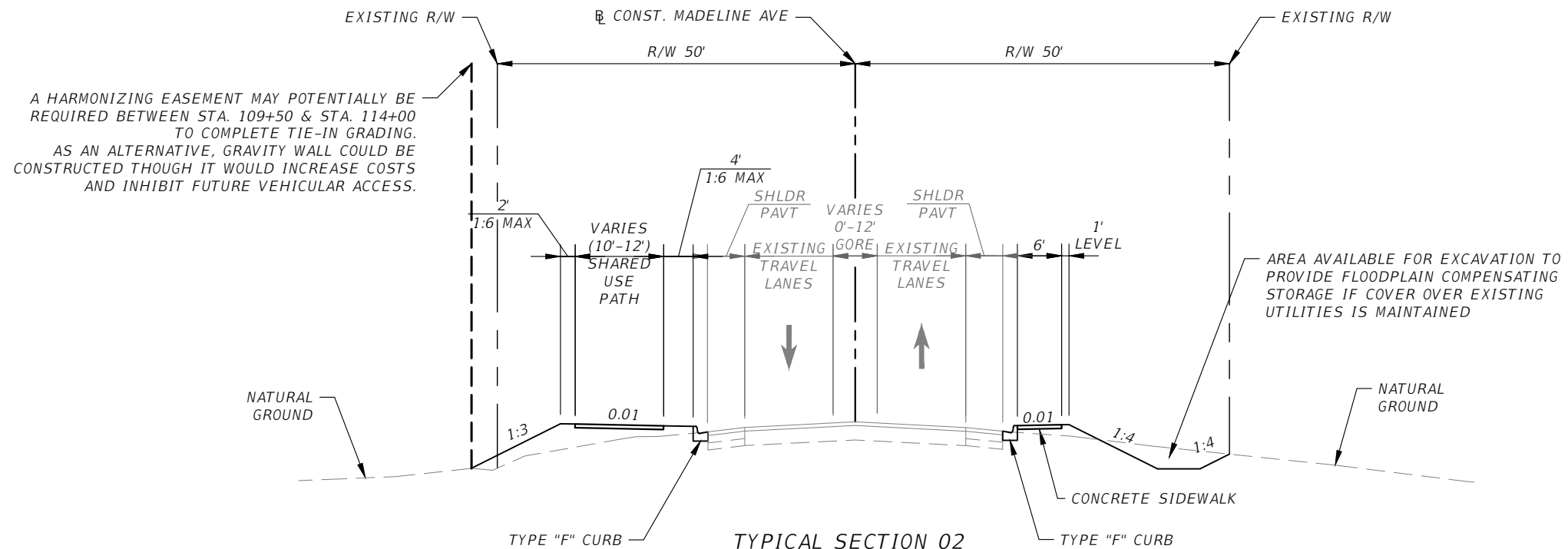
APPENDIX

APPENDIX A

TYPICAL SECTIONS AND CONCEPT PLANS

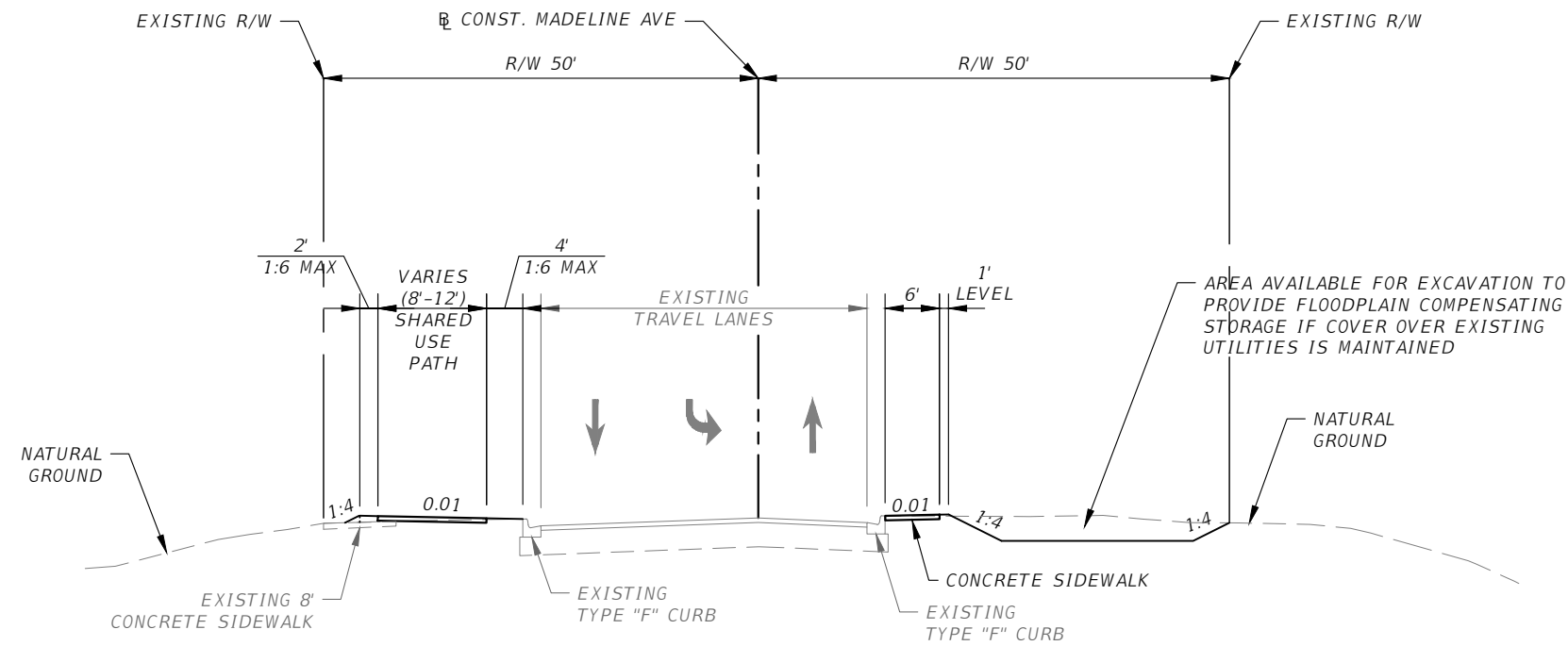


TYPICAL SECTION 01
MADELINE AVENUE
STA 100+40 TO STA 109+20

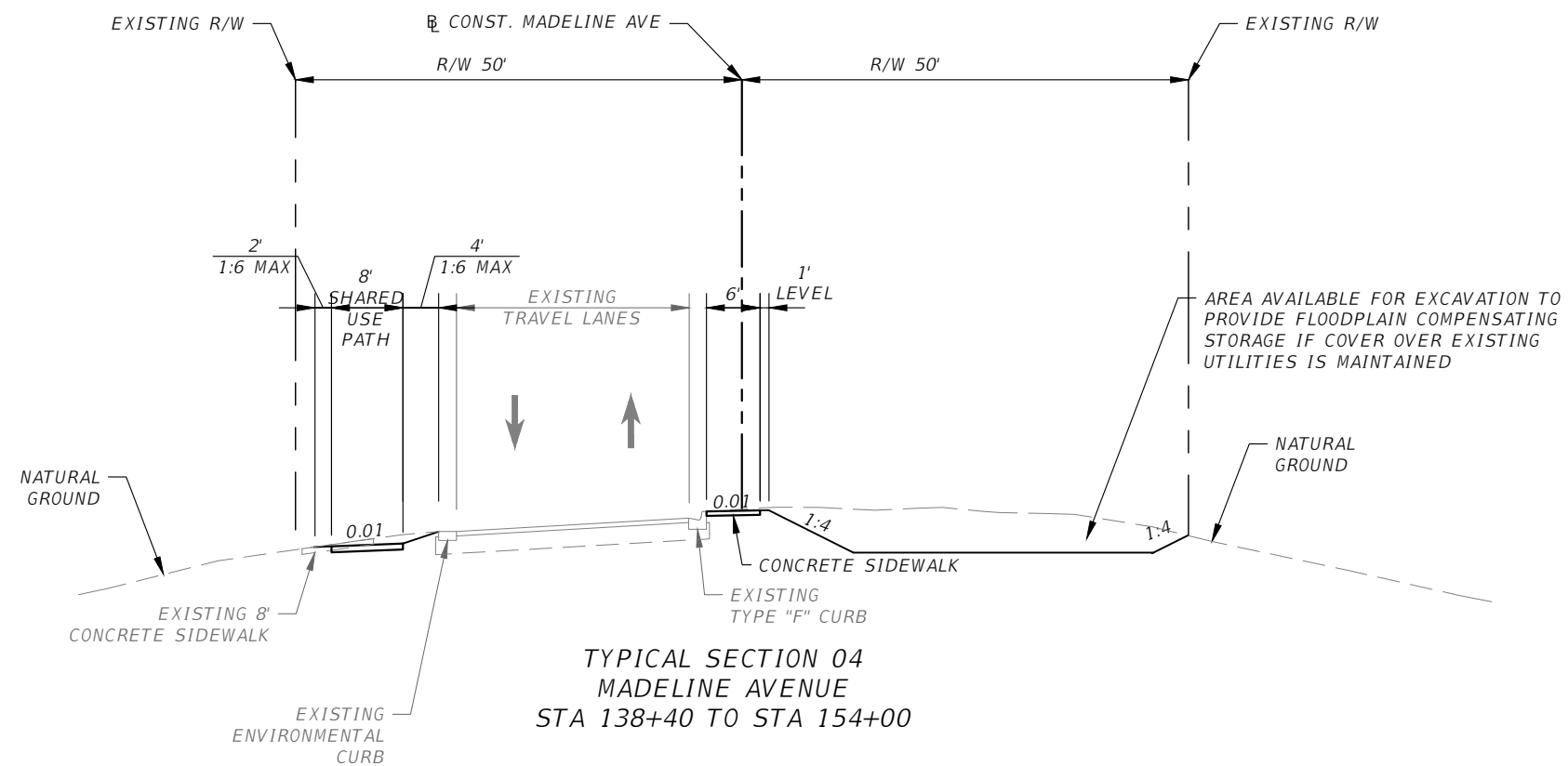


TYPICAL SECTION 02
MADELINE AVENUE
STA 109+20 TO STA 131+30

REVISIONS				MADELINE AVENUE TRAIL & SIDEWALK PHASE 2			TYPICAL SECTIONS PHASE 2	SHEET NO. 1
DATE	DESCRIPTION			ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
1/22/2019	REVISED PER CITY, FDOT AND R2CTPO COMMENTS			..	VOLUSIA	----		

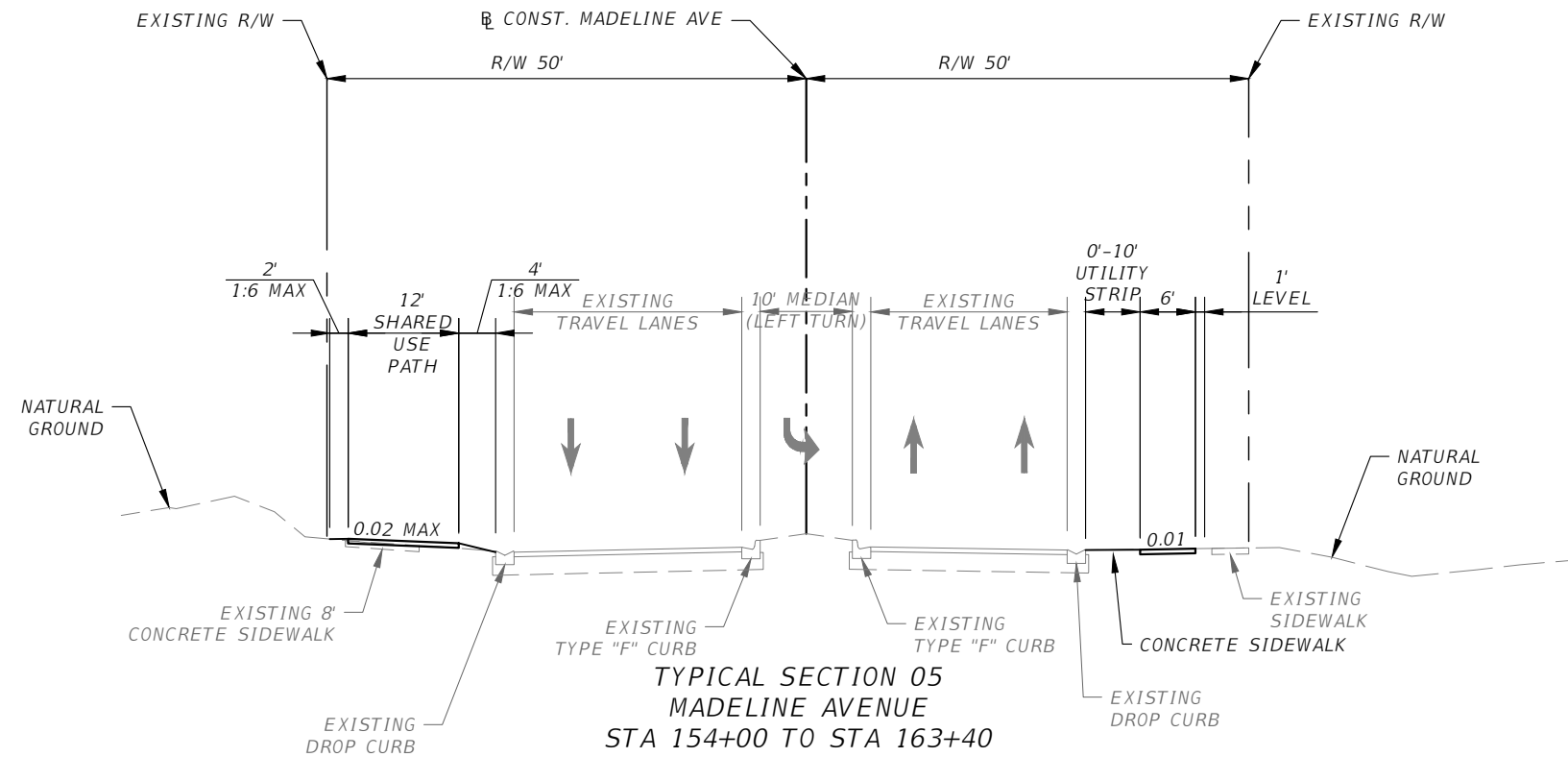


TYPICAL SECTION 03
MADELINE AVENUE
STA 131+30 TO STA 138+40



TYPICAL SECTION 04
MADELINE AVENUE
STA 138+40 TO STA 154+00

REVISIONS		 			MADELINE AVENUE TRAIL & SIDEWALK PHASE 2		TYPICAL SECTIONS PHASE 2	SHEET NO. 2
DATE	DESCRIPTION							
1/22/2019	REVISED PER CITY, FDOT AND R2CTPO COMMENTS	<small> TRAFFIC ENGINEERING DATA SOLUTIONS, INC. Phone 386.753.0558 80 Spring Vista Drive Fax 386.753.0778 DeBary, FL 32713 CERTIFICATE OF AUTHORIZATION NO. 27392 </small>			ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
					..	VOLUSIA	----	



REVISIONS		 			MADELINE AVENUE TRAIL & SIDEWALK PHASE 2		TYPICAL SECTIONS PHASE 2	SHEET NO. 3
DATE	DESCRIPTION							
1/22/2019	REVISED PER CITY, FDOT AND R2CTPO COMMENTS	TRAFFIC ENGINEERING DATA SOLUTIONS, INC. Phone 386.753.0558 80 Spring Vista Drive Fax 386.753.0778 DeBary, FL 32713 CERTIFICATE OF AUTHORIZATION NO. 27392			ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
					..	VOLUSTIA	----	

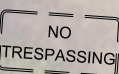
- FOR FURTHER INFORMATION, REFER TO FEMA MAP INCLUDED IN APPENDIX B FOR A DEPICTION OF THE FOLLOWING AREAS APPLICABLE TO THIS CORRIDOR
- FLOODWAY AREAS IN ZONE AE
 - CHANNEL OF A STREAM PLUS ANY ADJACENT FLOODPLAIN AREAS THAT MUST BE KEPT FREE OF ENCROACHMENT SO THAT THE 1% ANNUAL CHANCE FLOOD CAN BE CARRIED WITHOUT SUBSTANTIAL INCREASES IN FLOOD HEIGHTS
 - SFHA'S SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
 - ZONE AE - AREAS WITH BFE'S DETERMINED
 - OTHER FLOOD AREAS
 - ZONE X - AREAS OF 0.2% ANNUAL CHANCE FLOOD, AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD
 - OTHER AREAS
 - ZONE X - AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN

4015 S WILLIAMSON BLVD
PARCEL ID: 0116320000050
RAINBOW DEVELOPMENT GROUP LLC
(O.R.B. 6743, PG. 4980)

R01-01
(F&I, NEW)



(EXIST TO REMAIN)

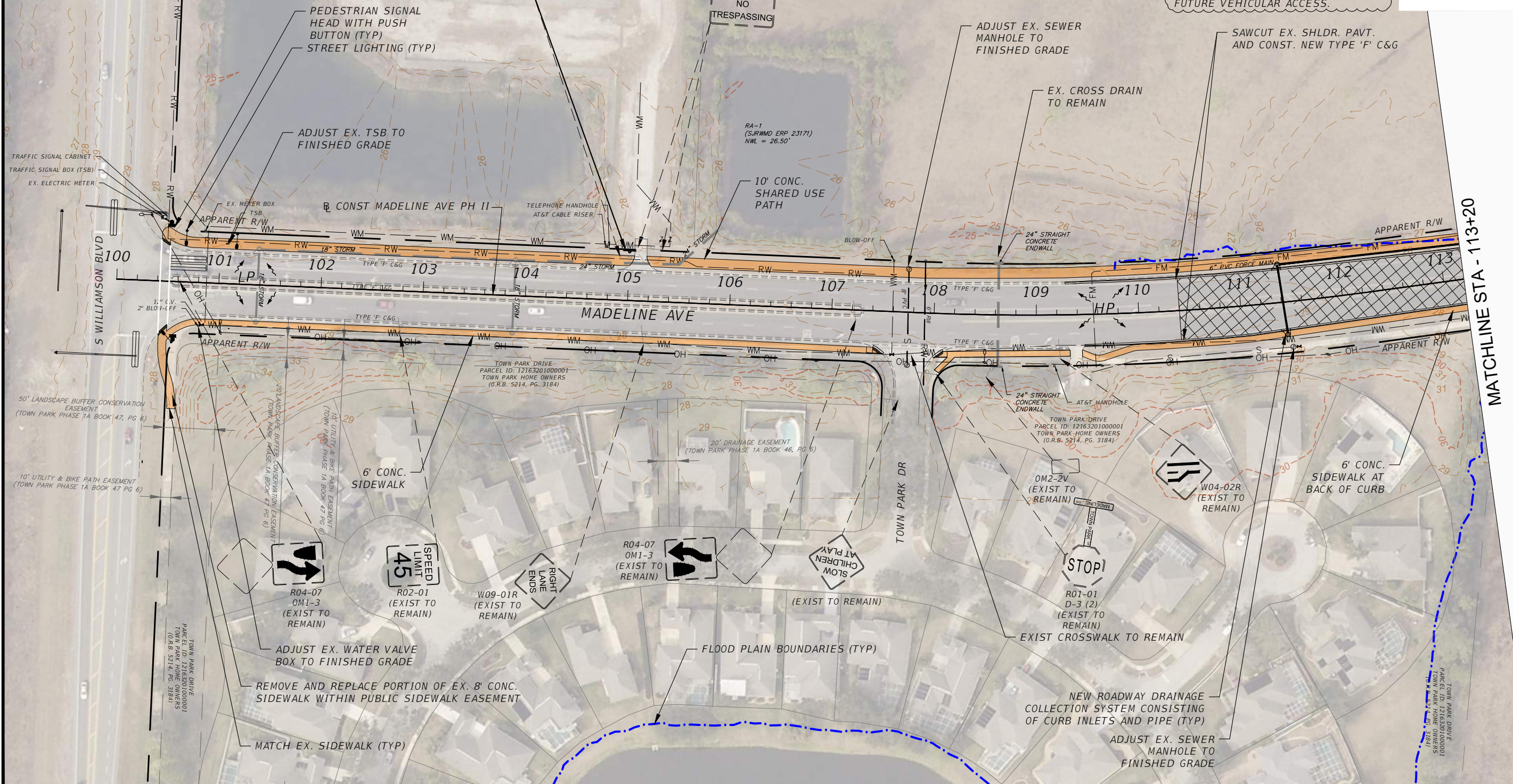
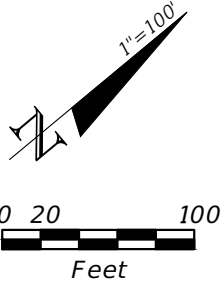


WETLAND F
10.79 ACRES

MADLINE AVENUE
PARCEL ID: 0116320000010
DSC OF NEWARK ENTERPRISES INC.
(O.R.B. 2692, PG. 1874)

NOTE:
DURING THE DESIGN PHASE THE CITY MAY SEEK TO REQUEST APPROVAL FROM FDOT FOR THE CONSTRUCTION OF A 5' SIDEWALK IN LIEU OF CONSTRUCTING A 6' SIDEWALK IN THE LOCATIONS SHOWN HEREON.

A HARMONIZING EASEMENT MAY POTENTIALLY BE REQUIRED BETWEEN STA. 109+50 & STA. 114+00 TO COMPLETE TIE-IN GRADING. AS AN ALTERNATIVE, GRAVITY WALL COULD BE CONSTRUCTED THOUGH IT WOULD INCREASE COSTS AND INHIBIT FUTURE VEHICULAR ACCESS.



REVISIONS		MADELINE AVENUE TRAIL & SIDEWALK PHASE 2			CONCEPT PLANS PHASE 2	SHEET NO. 4
DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
1/22/2019	REVISED PER CITY, FDOT AND R2CTPO COMMENTS	..	VOLUSIA	----		

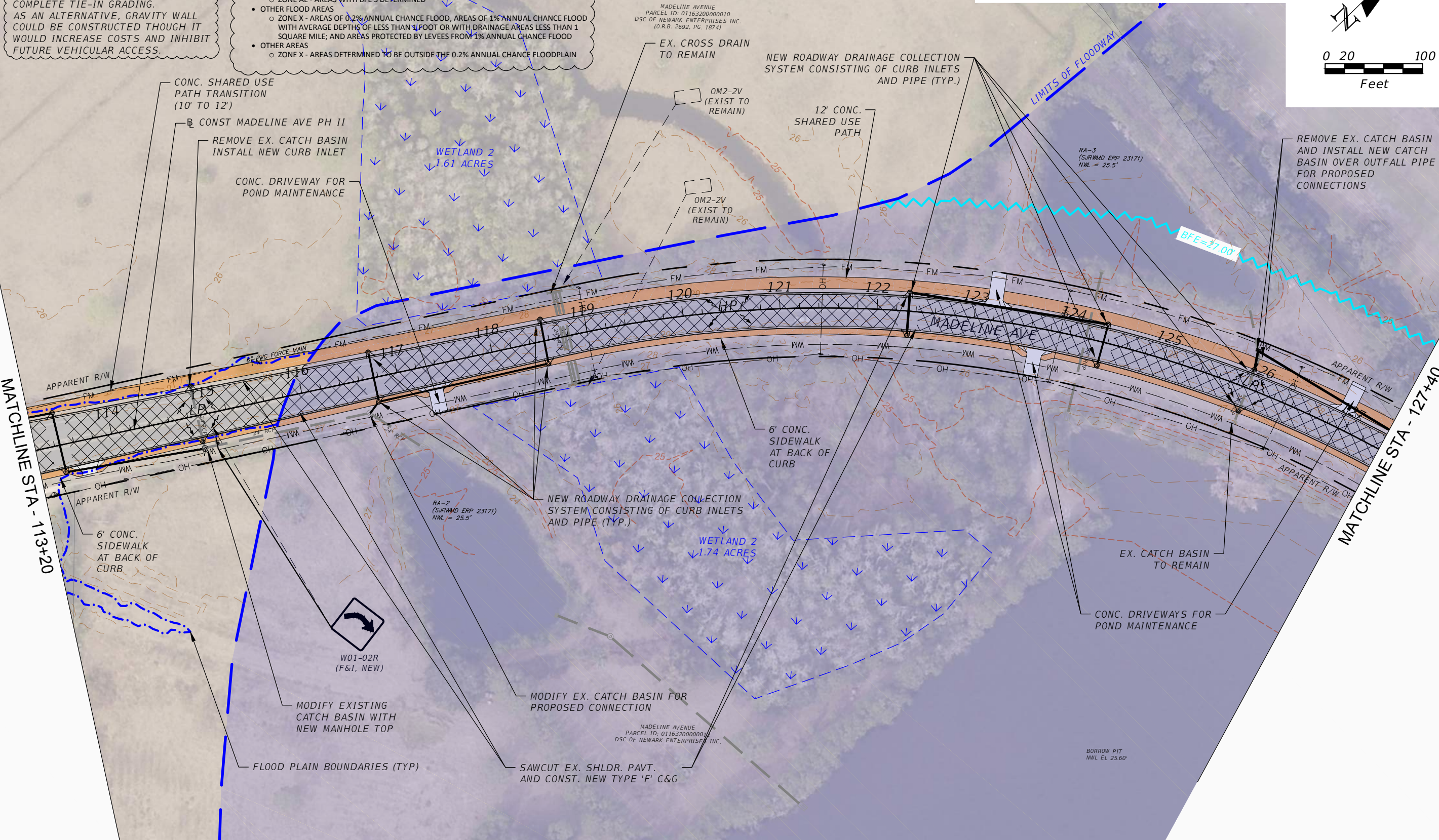
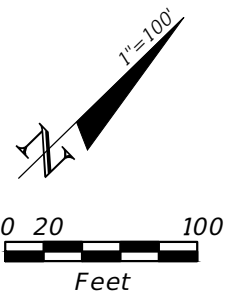


TEDS
TRAFFIC ENGINEERING DATA SOLUTIONS, INC.
Phone 386.753.0558 80 Spring Vista Drive
Fax 386.753.0778 DeBary, FL 32713
CERTIFICATE OF AUTHORIZATION NO. 27392

A HARMONIZING EASEMENT MAY POTENTIALLY BE REQUIRED BETWEEN STA. 109+50 & STA. 114+00 TO COMPLETE TIE-IN GRADING. AS AN ALTERNATIVE, GRAVITY WALL COULD BE CONSTRUCTED THOUGH IT WOULD INCREASE COSTS AND INHIBIT FUTURE VEHICULAR ACCESS.

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 - ZONE AE - AREAS WITH BFE'S DETERMINED
 - OTHER FLOOD AREAS
 - ZONE X - AREAS OF 0.2% ANNUAL CHANCE FLOOD, AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD
 - OTHER AREAS
 - ZONE X - AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN

NOTE:
DURING THE DESIGN PHASE THE CITY MAY SEEK TO REQUEST APPROVAL FROM FDOT FOR THE CONSTRUCTION OF A 5' SIDEWALK IN LIEU OF CONSTRUCTING A 6' SIDEWALK IN THE LOCATIONS SHOWN HEREON.



REVISIONS	
DATE	DESCRIPTION
1/22/2019	REVISED PER CITY, FDOT AND R2CTPO COMMENTS

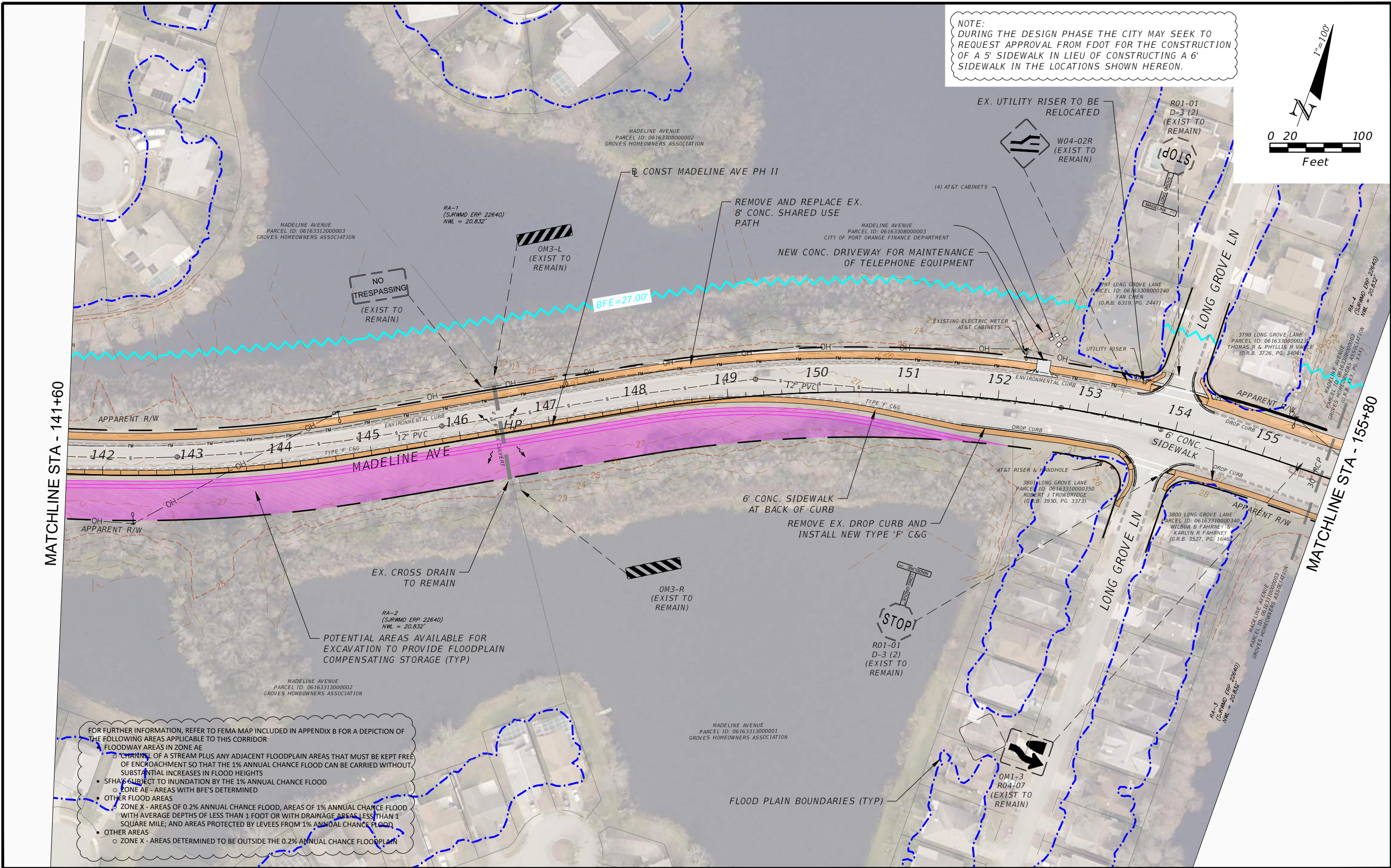


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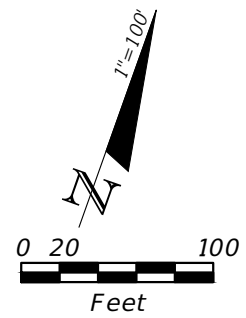
MADELINE AVENUE TRAIL & SIDEWALK PHASE 2		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
..	VOLUSIA	----

CONCEPT PLANS PHASE 2	

SHEET NO.
5



NOTE:
DURING THE DESIGN PHASE THE CITY MAY SEEK TO
REQUEST APPROVAL FROM FDOT FOR THE CONSTRUCTION
OF A 5' SIDEWALK IN LIEU OF CONSTRUCTING A 6'
SIDEWALK IN THE LOCATIONS SHOWN HEREON.



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REVISIONS	
DATE	DESCRIPTION
1/22/2019	REVISED PER CITY, FDOT AND R2CTPO COMMENTS



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CERTIFICATE OF AUTHORIZATION NO. 27392

MADLINE AVENUE TRAIL & SIDEWALK PHASE 2		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
..	VOLUSIA	----

CONCEPT PLANS PHASE 2	
SHEET NO.	
7	

RA-4
(SJRWMD ERP 22640)
NWL = 20.832'

FLOOD PLAIN BOUNDARIES (TYP)



Mike Thompson 1/31/2019 4:47:12 PM 2017 Projects\11076 (R2C - Bicycle Pedestrian Feasibility Study Continuing Services)\TWO #003 - Madeline Ave Trail & Sidewalk - PH 2 (Port Orange)\CAD\CONCEPT PLANS\CONCEPT PLANS PH 11.dwg

APPENDIX B

FEMA FIRM PANEL 12127C0368H

NOTES TO USERS

This map is for use in addressing the National Flood Insurance Program. It does not necessarily identify areas subject to flooding, particularly from local drainage sources that may exist. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **Base Flood Depths** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Floodway Data contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent modeled whole-flood elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only to landward of 0.0 North American Vertical Datum of 1988. Users should be aware that coastal flood elevations are also provided in the Summary of Floodway Data and/or Summary of Floodway Data. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane East datum (zone 18N). The **horizontal datum** used in the preparation of this map was the North American Vertical Datum of 1988 (NAVD 88). Differences in datum, whether projected or State Plane, are used in the preparation of FIRM for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the North American Vertical Datum of 1988 and the North American Vertical Datum of 1985, visit the National Geospatial Survey website at <http://www.ngs.noaa.gov> or contact the National Geospatial Survey at the following address:

NGS Information Services
NCEA, NCEC-12
National Geospatial Survey
SHEC-1, #6022
1515 East-West Highway
Silver Spring, Maryland, 20910-2082
(301) 713-3242

To obtain current elevation, description, and/or location information for **beach nourishment** shown on this map, please contact the Information Services Branch of the National Geospatial Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

Base Map information shown on this FIRM was provided in digital format by the Volusia County, Florida GIS Department at a scale of 1:12,000 or larger from photography dated 2005 or later.

Based on updated topographic information, this map reflects more detailed and up-to-date stream channel configurations and floodplain elevations than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map. Also, the relationship between floodway widths and stream channels may differ from what is shown on previous maps.

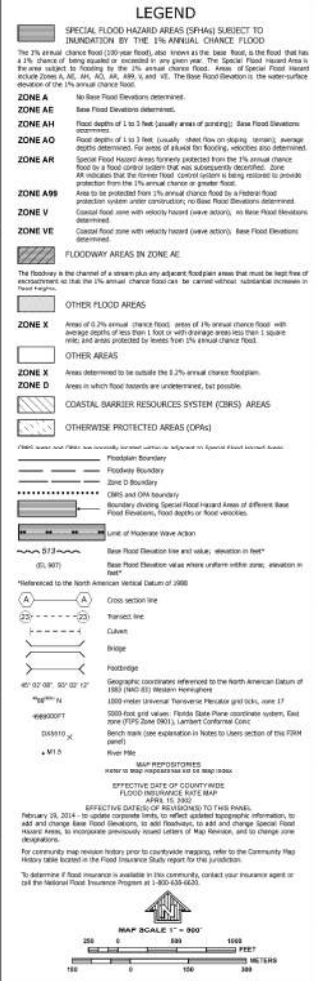
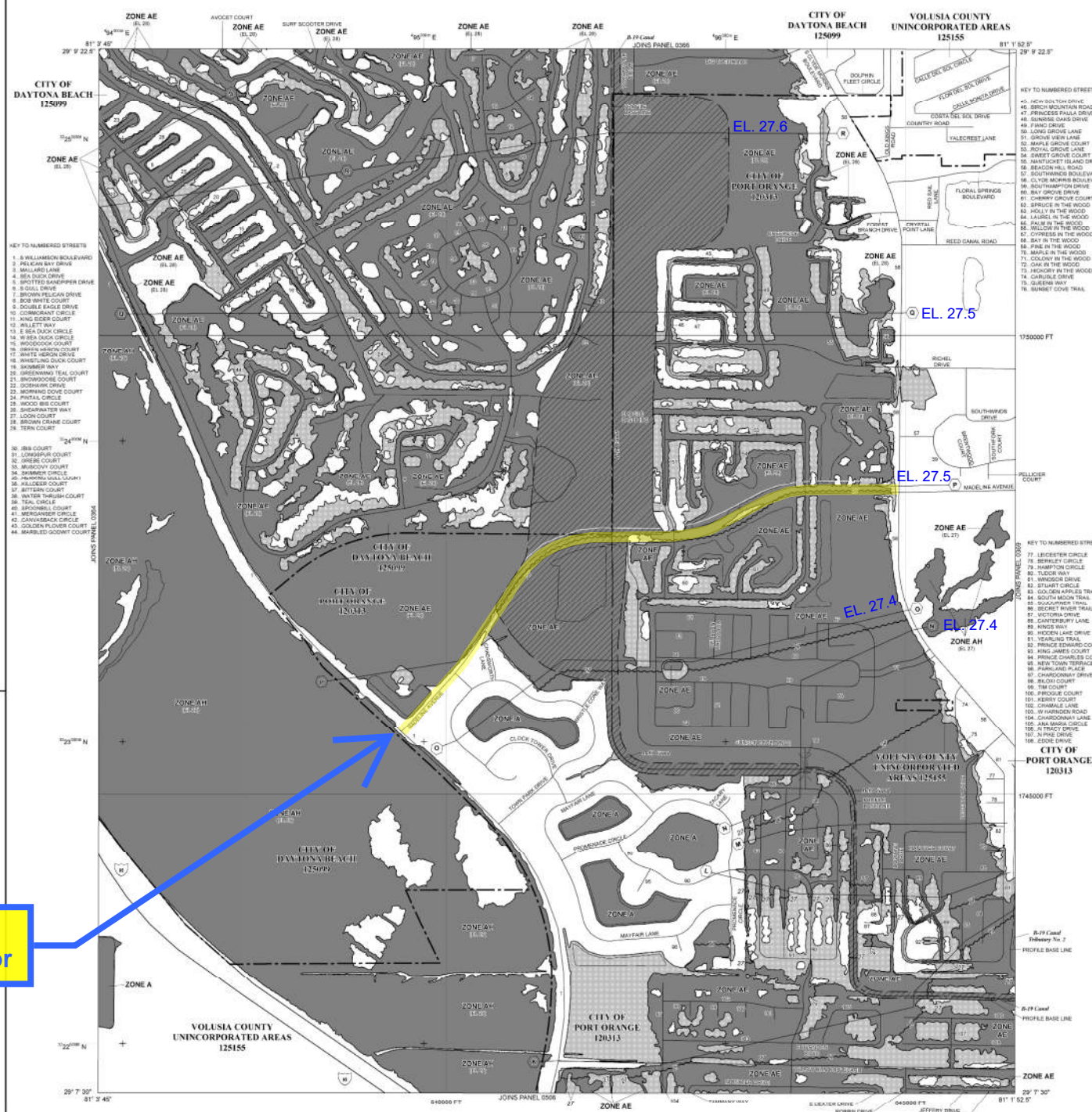
Corporate limits shown on this map are based on the best data available at the time of publication. Boundary changes due to annexations or dis-annexations may have occurred after this map was published; map users should contact appropriate community officials to verify current corporate limits locations.

Please refer to the **accompanying printed Map Index** for an overview map of the county showing the location of map sheets. Community map repository addresses and a listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels in which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of the FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-362-7627) or visit the FEMA Map Service Center website at <http://hazards.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Profile elevations
from the B-19 Canal
Flood Insurance
Study dated
February 19, 2014

Feasibility
Study Corridor



NFIP
PANEL 0368H

FIRM
FLOOD INSURANCE RATE MAP

VOLUSIA COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 368 OF 930
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY	NUMBER	PANEL	SUFFIX
DAYTONA BEACH, CITY OF	125099	368H	H
PORT ORANGE, CITY OF	126313	368H	H
VOLUSIA COUNTY	125155	368H	H

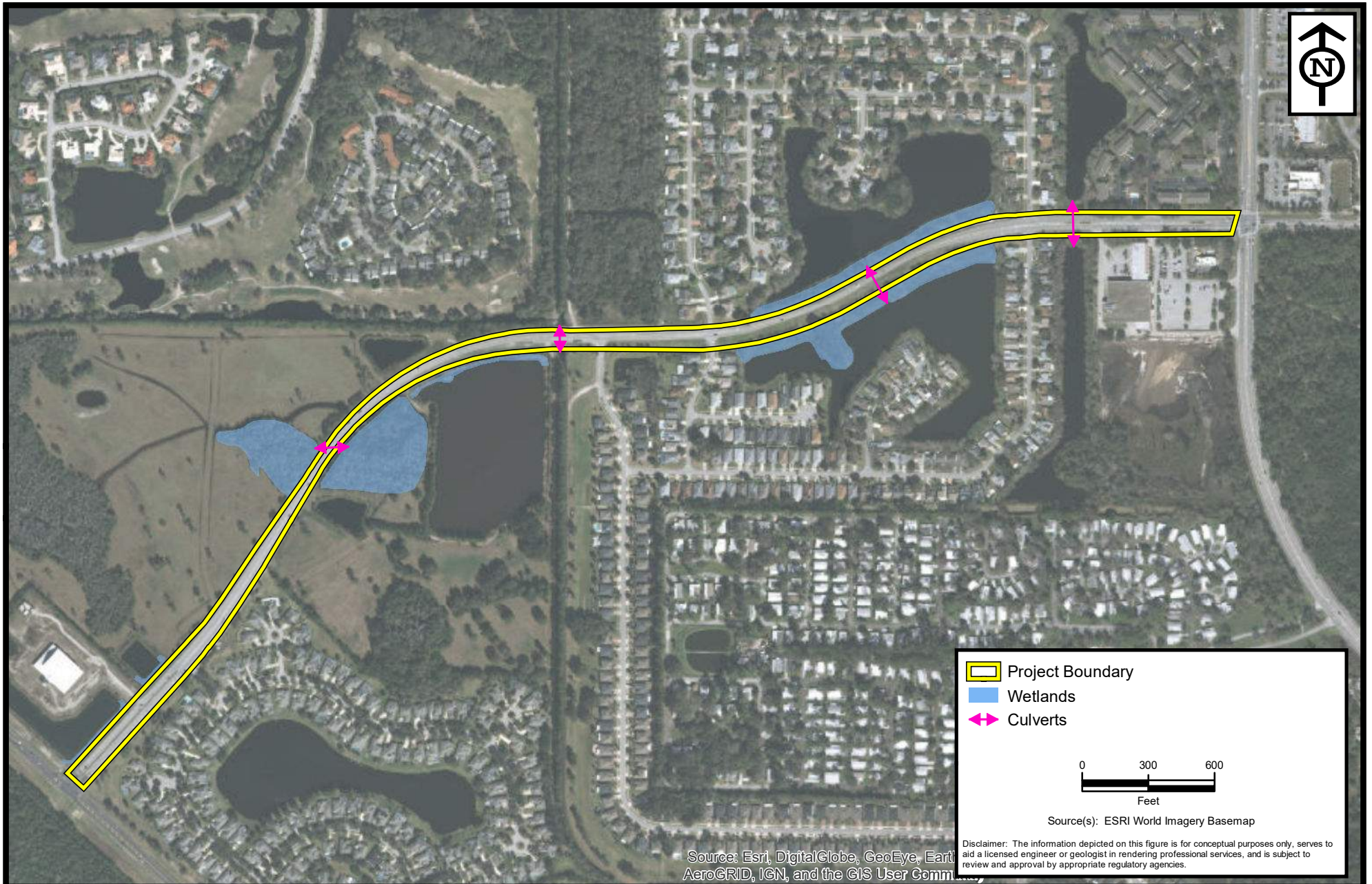
Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
1217C0368H
MAP REVISED
FEBRUARY 19, 2014

Federal Emergency Management Agency

APPENDIX C

WETLANDS



Project Boundary
 Wetlands
↔ Culverts

0 300 600
 Feet

Source(s): ESRI World Imagery Basemap

Disclaimer: The information depicted on this figure is for conceptual purposes only, serves to aid a licensed engineer or geologist in rendering professional services, and is subject to review and approval by appropriate regulatory agencies.



ENVIRONMENTAL SERVICES, INC.
 7220 Financial Way, Suite 100
 Jacksonville, Florida 32256
 (904) 470-2200
 (904) 470-2112 Fax
www.environmentalservicesinc.com

Feasibility Study
Madeline Avenue Sidewalks - Phase 2
 Volusia County, Florida

Project:	EJ18291.00
Date:	Nov. 2018
Drawn By:	AA
Checked By:	JRN
Approved By:	BAA
Figure:	2

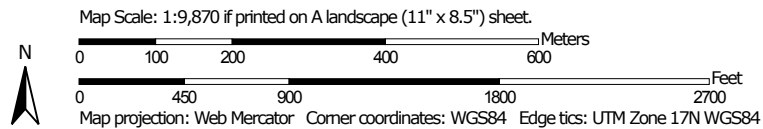
APPENDIX D

SOILS MAP

Hydrologic Soil Group—Volusia County, Florida (Madeline Ave Phase 2)



Soil Map may not be valid at this scale.



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

11/30/2018
Page 1 of 4

MAP LEGEND

Area of Interest (AOI)









Area of Interest (AOI)

Soils

Soil Rating Polygons





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points






-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Volusia County, Florida
Survey Area Data: Version 17, Sep 13, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 12, 2013—Dec 18, 2013

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
17	Daytona sand, 0 to 5 percent slopes	A	0.1	0.1%
20	EauGallie fine sand	A/D	1.0	1.7%
29	Immokalee sand	B/D	5.3	9.3%
32	Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes	A/D	12.8	22.3%
34	Myakka-St. Johns complex	A/D	32.7	56.9%
49	Pomona fine sand	A/D	0.8	1.4%
51	Pomona-St. Johns complex	A/D	4.7	8.3%
57	Satellite sand, 0 to 2 percent slopes	A	0.0	0.0%
Totals for Area of Interest			57.4	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX E

FDOT APPROVED INFLATION FACTORS



Inflation Factors

This “*Transportation Costs*” report is one of a series of reports issued by the Office of Policy Planning. It provides information on inflation factors and other indices that may be used to convert Present Day Costs (PDC) to Year Of Expenditure costs (YOE) or vice versa. This report is updated annually when the factors are posted within the FDOT Work Program Instructions.

Please note that the methodology for Inflationary adjustments relating to specific transportation projects should be addressed with the district office where the project will be located. For general use or non-specific areas, the guidelines provided herein may be used for inflationary adjustments.

Construction Cost Inflation Factors

The table on the next page includes the inflation factors and present day cost (PDC) multipliers that are applied to the Department’s Work Program for highway construction costs expressed in Fiscal Year 2017 dollars.

Other Transportation Cost Inflation Factors

Other indices may be used to adjust project costs for other transportation modes or non-construction components of costs. Examples are as follows:

The Consumer Price Index (CPI, also retail price index) is a weighted average of prices of a specified set of products and services purchased by wage earners in urban areas. As such, it provides one measure of inflation. The CPI is a fixed quantity price index and a reasonable cost-of-living index.

The Employment Cost Index (ECI) is based on the National Compensation Survey. It measures quarterly changes in compensation costs, which include wages, salaries, and other employer costs for civilian workers (nonfarm private industry and state and local government).

The monthly series, Producer Price Index for Other Non-residential Construction, is available from the Bureau of Labor Statistics (BLS). It is not exclusively a highway construction index, but it is the best available national estimate of changes in highway costs from month to month.



FLORIDA DEPARTMENT OF TRANSPORTATION

TRANSPORTATION COSTS REPORTS

Work Program Highway Construction Cost Inflation Factors

Fiscal Year	Inflation Factor	PDC Multiplier
2017	Base	1.000
2018	2.7%	1.027
2019	2.8%	1.056
2020	2.6%	1.083
2021	2.5%	1.110
2022	2.7%	1.140
2023	2.8%	1.172
2024	2.9%	1.206
2025	3.0%	1.242
2026	3.1%	1.281
2027	3.2%	1.322
2028	3.3%	1.365
2029	3.3%	1.410
2030	3.3%	1.457
2031	3.3%	1.505
2032	3.3%	1.555
2033	3.3%	1.606
2034	3.3%	1.659
2035	3.3%	1.714
2036	3.3%	1.770
2037	3.3%	1.829
Source: Office of Work Program and Budget, (Fiscal Year 2017 is July 1, 2016 to June 30, 2017)		

Advisory Inflation Factors For Previous Years

Another “*Transportation Costs*” report covers highway construction cost inflation for previous years. “*Advisory Inflation Factors For Previous Years (1987-2015)*” provides Present Day Cost (PDC) multipliers that enable project cost estimates from previous years to be updated to FY 2015. This report is updated about once a year. For the table and text providing this information, please go to <http://www.dot.state.fl.us/planning/policy/costs/RetroCostInflation.pdf>.

APPENDIX F

RECORDED PLATS AND LAND RECORDS

A PORTION OF SECTIONS 1 AND 12, TOWNSHIP 16 SOUTH, RANGE 32 EAST AND
A PORTION OF SECTION 7, TOWNSHIP 16 SOUTH, RANGE 33 EAST, SITUATED IN
THE CITY OF PORT ORANGE, VOLUSIA COUNTY, FLORIDA.

BEING A PORTION OF SECTIONS 1 AND 12, TOWNSHIP 16 SOUTH, RANGE 32 EAST AND A PORTION OF SECTION 7, TOWNSHIP 16 SOUTH, RANGE 33 EAST, PER PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA. BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

[illegible]

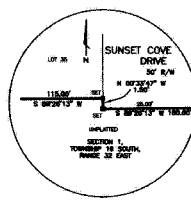
THE ABOVE DESCRIBED PARCEL CONTAINS 19.258 ACRES MORE OR LESS.

GENERAL NOTES:

- [illegible]

LINE TABLE		
LINE	LENGTH	BEARING
L1	180.00'	S 89°26'13" W
L2	1.50'	N 00°33'47" W
L3	115.00'	S 89°26'13" W
L4	104.00'	S 00°18'45" W

CURVE TABLE					
CURVE	DELTA	RADIUS	LENGTH	CHORD	CHORD BEARING
C1	80°02'21"	318.00'	499.00'	442.00'	S 45°07'31" E
C2	80°02'21"	318.00'	499.00'	442.00'	S 45°07'31" E



DETAIL "A"
SCALE 1" = 10'

DEDICATION:

[illegible]

IN WITNESS WHEREOF, MARIONDA HOMES, INC. OF FLORIDA, A FLORIDA CORPORATION, HAS CAUSED THESE PRESENTS TO BE EXECUTED IN ITS NAME AND IN ITS CORPORATE SEAL TO BE HEREUNTO AFFIXED BY ITS OFFICERS THEREUNTO DULY AUTHORIZED ON THIS 17 DAY OF April, 2006.

BY: 4213
PRINTED NAME: JOE HUEY
BY: Denise Nicolai
PRINTED NAME: Denise C. Nicolai

MARONDA HOMES, INC. OF FLORIDA
A FLORIDA CORPORATION
BY: MARCO FALCK
PRINTED NAME: MARCO FALCK

STATE OF FLORIDA, COUNTY OF VOLUNSA
THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS 17 DAY OF April
2008, by Mark D. Paley AS Vice Pres. OF MANHATTAN HOMES, INC. OF FLORIDA, A
CORPORATION, AND WHO ACKNOWLEDGED THAT HE HAS FULL AUTHORITY TO EXECUTE
THE FOREGOING PLAT ENTITLED "SUNSET COVE PHASE I" ON BEHALF OF THE CORPORATION.
THAT HE IS ☒ PERSONALLY KNOWN TO ME, OR ☐ WAS PRODUCED _____ AS
IDENTIFICATION _____

IN WITNESS WHEREOF, I HAVE HEREUNTO
SET MY HAND AND SEAL ON THE ABOVE DATE
Dennis Michael

NOTARY PUBLIC
STATE OF FLORIDA AT LARGE
MY COMMISSION EXPIRES: 8-28-06

JOINDER AND CONSENT TO MEDICATION

[illegible]

SIGNED, SEALED, IN THE PRESENCE OF
BY Mary C. [Signature]

PRINT NAME: MARK CHAPMAN NAME: ROGER L. FEE
TITLE: SENIOR VICE PRESIDENT
(CORPORATE SIGN)

STATE OF FLORIDA
COUNTY OF VOLUNIA

THE FOREGOING JOINDER AND CONSENT WAS ACKNOWLEDGED BEFORE ME THIS 14th DAY OF APRIL, 2006, BY PAUL L. FEE, AS SENIOR PRESIDENT OF BA AMERICA, N.A., A NATIONAL BANKING ASSOCIATION, ON BEHALF OF THE ASSOCIATES, WHO [] PERSONALLY KNOWN TO ME OR [] HAS PRODUCED _____ IDENTIFICATION

IN WITNESS WHEREOF, I HAVE HEREUNTO
SET MY HAND AND SEAL ON THE ABOVE DATE:
11/21/2012

NOTARY PUBLIC
STATE OF FLORIDA AT LARGE
MY COMMISSION EXPIRES:

CERTIFICATE OF SURVEYOR AND MAPPER

KNOW ALL MEN BY THESE PRESENTS, THAT THE UNDERSIGNED, BEING A LICENSED AND PROFESSIONAL SURVEYOR AND MAPPER, DO HEREBY CERTIFY THAT THE PLAT SHOWN AND DESCRIBED HEREON, ENTITLED SUNSET COVE-PHASE I, WAS PREPARED UNDER MY DIRECTION AND SUPERVISION, THAT THE PLAT COMPLIES WITH ALL OF THE SURVEY REQUIREMENTS OF CHAPTER 177, FLORIDA STATUTES, AND THAT ALL MONUMENTATION SHOWN HEREON OR REQUIRED FOR CHAPTER 177, FLORIDA STATUTES, HAS BEEN PROPERLY PLACED.

(SIGNATURE) William S Hart
DATE: April 13, 2006
(PRINT NAME) WILLIAM S HART, P.S.M. NO. 30

COMPANY NAME: UPGRADE INC.
 CERTIFICATE OF AUTHORIZATION NO. 3812
 ADDRESS: 285 KENILWORTH AVENUE
 ORLANDO BEACH, FLORIDA 32174

I HEREBY CERTIFY TO THE CITY, THAT I HAVE REVIEWED THE FOREGOING PLAT FOR COMPLIANCE WITH THE REQUIREMENTS OF CHAPTER 177, FLORIDA STATUTES, AND THAT I HAVE PROVIDED BOTH THE CITY AND THE SURVEYOR AND MAPPER OF RECORD A LIST OF VIOLATIONS, IF ANY, BELOW.

SUCH REQUIREMENTS. Steve T. Kruger
(SIGNATURE)
DATE: APRIL 28, 2006
(PRINT NAME) STEVEN T. KRUGER P.S.M. NO. 4722

PLANNING COMMISSION CERTIFICATE OF APPROVAL

THIS STATEMENT HEREBY CERTIFIES THAT THE PLAT ENTITLED SUNSET COVE - PHASE I
WAS APPROVED BY THE PORT ORANGE PLANNING COMMISSION ON 11-28-85
BY: James M. Tucker
CHAIRMAN OF THE PORT ORANGE PLANNING COMMISSION

CITY COUNCIL CERTIFICATE OF APPROVAL
THIS STATEMENT HEREBY CERTIFIES THAT THE PLAT ENTITLED SUBSET ONE, PHASE 1
WAS APPROVED BY THE PORT ORANGE CITY COUNCIL ON 1-27-02
BY: [Signature] ATTEST: [Signature]

CERTIFICATE OF CLERK

FILED FOR RECORD ON FILE NO. 000 AT 8:25 P.M. Deland, FL
2006-157596
 CLERK OF CIRCUIT COURT
 VOLUSIA COUNTY, FLORIDA

Upham, Inc.
Organization of Engineers, Surveyors & Landscape Architects
P.O. Box 1106 • 200 Kenilworth Avenue • Ormond Beach, Florida 32177
(386) 872-0515 • FAX (386) 873-8054 • LD 0003812 • LC 0003567
Visit us at: www.uphaminc.com

SHEET 1 OF 5

KEY/ VICINITY MAP

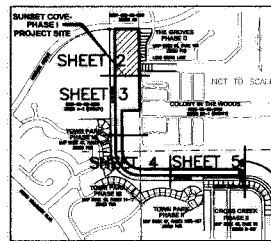
MAP BOOK **53** PAGE **64**

GENERAL NOTES:

- [illegible]

LINE TABLE		
LINE	LENGTH	BEARING
L1	180.00'	S 89°28'13" W
L2	1.50'	N 00°33'47" W
L3	115.00'	S 89°28'13" W
L4	104.89'	S 00°18'45" W
L5	15.00'	N 89°28'13" E
L6	44.87'	N 51°22'01" E
L7	82.38'	N 72°38'30" E
L8	9.72'	N 00°00'00" E
L9	24.93'	N 00°00'00" E
L10	83.12'	N 72°38'30" E
L11	8.11'	N 45°00'00" E

CURVE TABLE					
CURVE	DELTA	RADIUS	LENGTH	CHORD	CHORD BEARING
C1	80°07'24"	315.00	188.99	432.08	S 48°27'31" E
C2	92°04'42"	210.00	928.87	588.67	N 45°20'30" W
C3	95°38'58"	300.00	188.11	183.14	N 49°07'00" W
C4	95°35'45"	300.00	188.28	183.14	N 49°07'00" W
C5	88°49'48"	34.00	53.31	48.01	N 48°07'00" W
C6	87°42'00"	375.00	50.85	50.85	N 48°07'00" W
C7	112°11'58"	273.00	50.85	50.85	S 18°40'00" E
C8	102°38'30"	273.00	98.12	98.12	S 18°40'00" E
C9	102°38'30"	273.00	14.81	14.81	S 18°40'00" E
C10	113°01'24"	325.00	82.50	65.40	S 28°01'00" E
C11	171°11'06"	528.00	67.77	67.77	S 18°40'00" E
C12	102°38'30"	273.00	50.85	50.85	S 18°40'00" E
C13	81°08'00"	528.00	111.18	111.18	N 10°34'00" E
C14	86°49'00"	528.00	28.07	28.07	N 10°34'00" E
C15	28°06'36"	528.00	14.81	14.81	S 17°10'00" E
C16	102°42'34"	273.00	98.67	98.67	S 20°28'00" E
C17	87°42'00"	375.00	67.77	67.77	S 20°28'00" E
C18	125°08'12"	728.00	82.85	82.12	N 18°34'50" E
C19	08°31'48"	273.00	49.84	49.84	S 04°24'00" E
C20	08°31'48"	273.00	58.77	58.77	S 04°24'00" E
C21	08°31'48"	273.00	57.81	57.81	S 04°24'00" E
C22	43°53'30"	510.00	24.18	24.18	S 06°02'00" E
C23	43°53'30"	510.00	35.89	35.89	S 06°02'00" E
C24	43°53'30"	510.00	39.78	39.78	S 06°02'00" E
C25	83°00'00"	315.00	65.81	65.81	S 06°02'00" E
C26	08°31'40"	273.00	14.81	14.81	S 08°30'00" E
C27	08°31'40"	273.00	57.81	57.81	S 08°30'00" E



KEY MESSAGE

SECTION 1,
SHIP 16 SOUTH,
RANGE 32 EAST
UNPLATTED

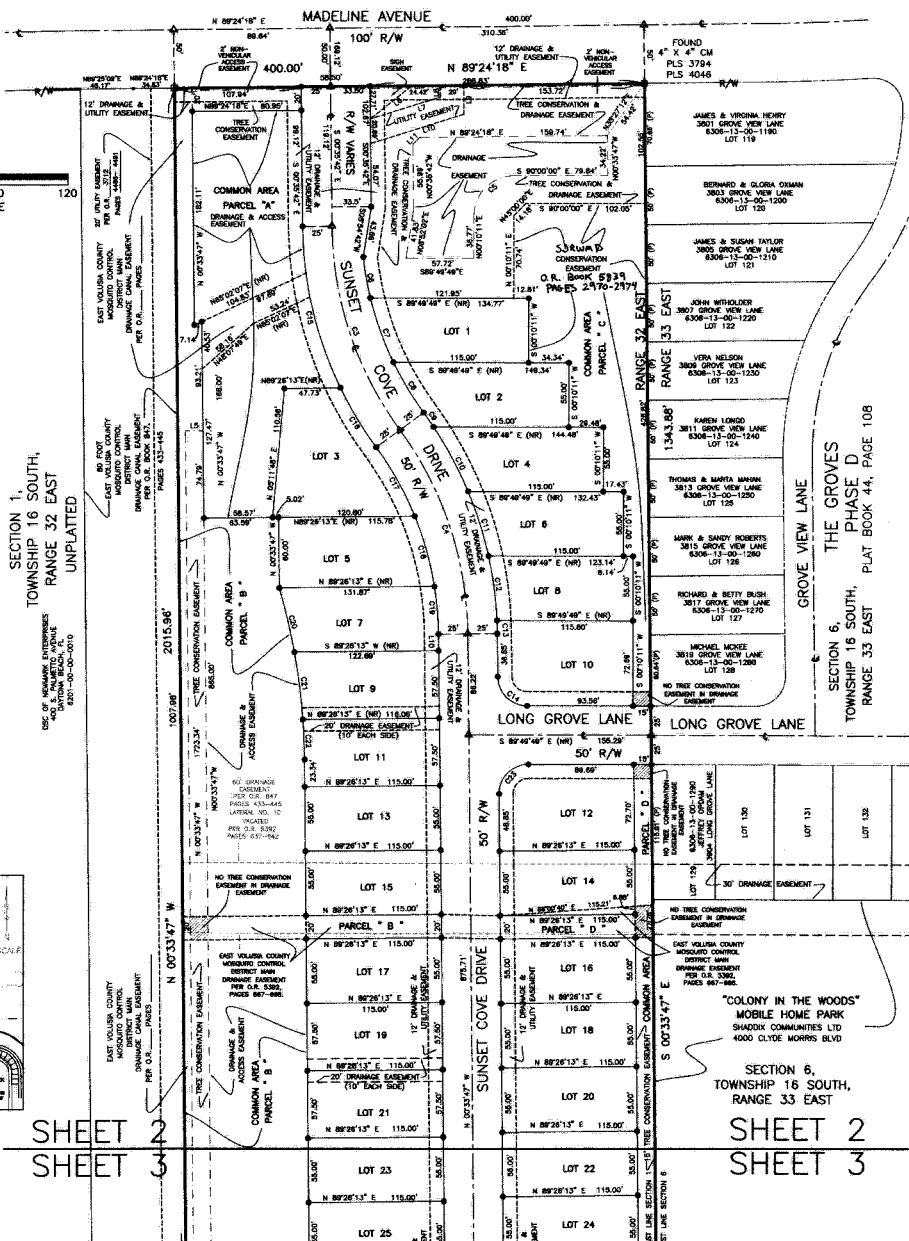
CO. OF NEWARK ENTERPRISES
400 S. PALMETTO AVENUE
DAYTONA BEACH, FL
3201-00-00-0010

LEGEND

- [illegible]



0 60 120
GRAPHIC SCALE



SECTION 6,
TOWNSHIP 16 SOUTH,
RANGE 33 EAST

SECTION 6,
TOWNSHIP 16 SOUTH,
RANGE 33 EAST

SHEET 2
SHEET 3

Upham, Inc.
Organization of Engineers, Surveyors & Landscape Architects
P.O. Box 1105 • 285 Kendworth Avenue • Ormond Beach, Florida 32174
(306) 672-8515 • FAX (306) 672-8564 • LB# 0003612 • LC# 0000307
Visit us at: www.uphaminc.com

SHEET 2 OF 5

THE GROVES PHASE A

SECTION 6, TOWNSHIP 16 SOUTH, RANGE 33 EAST, CITY OF PORT ORANGE, VOLUSIA COUNTY FLORIDA

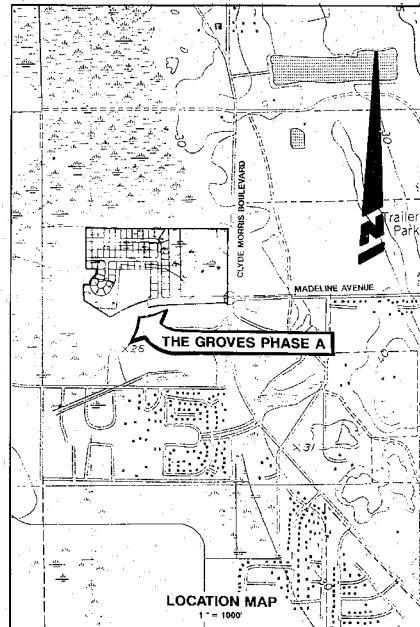
LEGAL DESCRIPTION

A PORTION OF SECTION 6, TOWNSHIP 16 SOUTH, RANGE 33 EAST, VOLUSIA COUNTY, FLORIDA, DESCRIBED AS FOLLOWS: FROM THE NORTHWEST CORNER OF SAID SECTION 6, RUN SOUTH 00 DEGREES 32 MINUTES 27 SECONDS EAST, ALONG THE WEST LINE OF SAID SECTION 6, THE BEARING BASE OF THIS DESCRIPTION, A DISTANCE OF 1650.28 FEET; THENCE DEPARTING SAID LINE, RUN SOUTH 89 DEGREES 28 MINUTES 50 SECONDS EAST, PARALLEL WITH THE NORTH LINE OF SAID SECTION 6, A DISTANCE OF 642.59 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE SOUTH 89 DEGREES 28 MINUTES 50 SECONDS EAST, A DISTANCE OF 1995.67 FEET TO THE WEST RIGHT-OF-WAY LINE OF CLYDE MORRIS BOULEVARD, A 100 FOOT RIGHT-OF-WAY; THENCE SOUTH 00 DEGREES 25 MINUTES 03 SECONDS WEST, ALONG SAID WEST RIGHT-OF-WAY LINE, RUN WESTERLY ALONG THE CUSP OF A CURVE, CONCAVE SOUTHWEST, HAVING A RADIUS OF 25.00 FEET; A CENTRAL ANGLE OF 91 DEGREES 15 MINUTES 06 SECONDS AND A CHORD BEARING OF NORTH 45 DEGREES 12 MINUTES 30 SECONDS WEST; THENCE DEPARTING SAID WEST RIGHT-OF-WAY LINE, RUN WESTERLY ALONG THE ARC OF SAID CURVE, A DISTANCE OF 39.82 FEET; THENCE SOUTH 89 DEGREES 09 MINUTES 57 SECONDS WEST, A DISTANCE OF 776.71 FEET TO THE POINT OF CURVATURE OF A CURVE, CONCAVE SOUTHEAST, HAVING A RADIUS OF 1400.00 FEET; A CENTRAL ANGLE OF 12 DEGREES 37 MINUTES 24 SECONDS AND A CHORD BEARING OF SOUTH 82 DEGREES 51 MINUTES 15 SECONDS WEST; THENCE RUN WESTERLY ALONG THE ARC OF SAID CURVE, A DISTANCE OF 308.44 FEET; THENCE NORTH 13 DEGREES 27 MINUTES 27 SECONDS WEST, A DISTANCE OF 100.00 FEET TO A POINT ON THE ARC OF A CURVE, CONCAVE SOUTHEAST, HAVING A RADIUS OF 1500.00 FEET; A CENTRAL ANGLE OF 16 DEGREES 09 MINUTES 36 SECONDS, AND A CHORD BEARING OF SOUTH 68 DEGREES 27 MINUTES 45 SECONDS WEST; THENCE RUN WESTERLY ALONG THE ARC OF SAID CURVE, A DISTANCE OF 423.08 FEET; THENCE SOUTH 60 DEGREES 22 MINUTES 57 SECONDS WEST, A DISTANCE OF 1512.22 FEET; THENCE NORTH 58 DEGREES 00 MINUTES 00 SECONDS WEST, A DISTANCE OF 440.79 FEET; THENCE NORTH 01 DEGREES 50 MINUTES 45 SECONDS WEST, A DISTANCE OF 200.00 FEET; THENCE NORTH 88 DEGREES 09 MINUTES 15 SECONDS EAST, A DISTANCE OF 100.00 FEET; TO A POINT ON THE ARC OF A CURVE, CONCAVE SOUTHEAST, HAVING A RADIUS OF 150.00 FEET, CENTRAL ANGLE OF 61 DEGREES 48 MINUTES 10 SECONDS AND A CHORD BEARING OF NORTH 29 DEGREES 03 MINUTES 16 SECONDS EAST; THENCE RUN NORTHERLY ALONG THE ARC OF SAID CURVE, A DISTANCE OF 161.80 FEET TO THE POINT OF REVERSE CURVATURE OF A CURVE, CONCAVE NORTHWEST, HAVING A RADIUS OF 50.00 FEET AND A CENTRAL ANGLE OF 59 DEGREES 28 MINUTES 11 SECONDS; THENCE RUN NORTHERLY ALONG THE ARC OF SAID CURVE, A DISTANCE OF 51.67 FEET; THENCE NORTH 00 DEGREES 31 MINUTES 10 SECONDS EAST, A DISTANCE OF 46.71 FEET; THENCE NORTH 89 DEGREES 28 MINUTES 50 SECONDS WEST, A DISTANCE OF 160.00 FEET; THENCE NORTH 00 DEGREES 31 MINUTES 10 SECONDS EAST, A DISTANCE OF 380.00 FEET; THENCE NORTH 02 DEGREES 09 MINUTES 14 SECONDS EAST, A DISTANCE OF 50.02 FEET; THENCE NORTH 00 DEGREES 31 MINUTES 10 SECONDS EAST, A DISTANCE OF 139.99 FEET TO THE POINT OF BEGINNING.

CONTAINING 48.82 ACRES.

NOTES:

- DENOTES PERMANENT REFERENCE MONUMENT
- ⊙ DENOTES PERMANENT CONTROL POINT
- BEARING STRUCTURE IS ASSUMED WITH THE BEARING ON THE WEST LINE OF SECTION 6, TOWNSHIP 16 SOUTH, RANGE 33 EAST, BEING S00°00'00"E.
- NOTICE: THERE MAY BE ADDITIONAL RESTRICTIONS THAT ARE NOT RECORDED ON THIS PLAT THAT MAY BE FOUND IN THE PUBLIC RECORDS OF THIS COUNTY.
- DRAINAGE AND UTILITY EASEMENTS, UNLESS SHOWN OTHERWISE:
 - 10 FOOT FRONT YARD
 - 10 FOOT REAR YARD
 - 7.5 FOOT SIDE YARD
- DIMENSIONS SHOWN ARE IN FEET AND DECIMALS THEREOF
- ELEVATIONS REFER TO N.G.V.D. PER USC & GS, BM 2525, HAVING A PUBLISHED ELEVATION OF 91.0 FEET.
- (R) DENOTES RADIAL LINE, (NR) DENOTES NON-RADIAL LINES.
- BUILDING SETBACK REQUIREMENTS
 - FRONT: 30'
 - SIDE (INTERIOR): 7.5'
 - SIDE (CORNER): 30'
 - REAR: 25'
 - 30' FROM MADELINE AVENUE
- THE DRAINAGE EASEMENTS SHOWN, TOGETHER WITH A DRAINAGE EASEMENT ACROSS PARCELS 4-2 AND 4-4, ARE HEREBY DEDICATED TO THE CITY OF PORT ORANGE AS ACCESSORIES TO THEIR MASTER DRAINAGE SYSTEM.
- THE SIGN EASEMENT, AND THE TRAFFIC ISLANDS WITHIN THE ROAD RIGHT-OF-WAYS ARE TO BE MAINTAINED BY THE GROVES HOMEOWNERS ASSOCIATION, AS PROVIDED BY THE DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS OF RECORD.
- THE F.P.B.L. EASEMENT SHOWN IS DEDICATED TO FLORIDA POWER AND LIGHT COMPANY.



LOCATION MAP
1" = 100'

<p>CERTIFICATE OF APPROVAL BY THE CITY COUNCIL</p> <p>THIS IS TO CERTIFY THAT ON <u>3-19-88</u> THE FOREGOING PLAT WAS APPROVED BY THE CITY COUNCIL OF PORT ORANGE, FLORIDA.</p> <p>MAYOR: <u>[Signature]</u></p> <p>ATTEST: <u>[Signature]</u></p> <p>CITY CLERK</p>	
<p>CERTIFICATE OF CLERK</p> <p>I HEREBY CERTIFY THAT I HAVE EXAMINED THE FOREGOING PLAT AND FIND IT COMPLIES IN FORM WITH THE REQUIREMENTS OF CHAPTER 177, FLORIDA STATUTES, AND WAS FILED FOR RECORD ON <u>3-22-88</u> AT <u>1:20 PM</u>.</p> <p>FILED: <u>[Signature]</u></p> <p>CLERK OF THE COUNTY COURT IN AND FOR VOLUSIA COUNTY, FLORIDA</p>	
<p>CERTIFICATE OF APPROVAL</p> <p>THIS IS TO CERTIFY THAT ON <u>3-27-88</u> THIS PLAT WAS APPROVED.</p> <p>BY: <u>[Signature]</u></p> <p>PORT ORANGE PLANNING COMMISSION</p>	
<p>CERTIFICATE OF APPROVAL BY THE PLANNING COMMISSION</p> <p>THE PORT ORANGE PLANNING COMMISSION HEREBY APPROVES THE FINAL PLAT FOR THE GROVES, PHASE A.</p> <p>DATE: <u>3-24-88</u></p> <p>BY: <u>[Signature]</u></p> <p>CHAIRMAN, PORT ORANGE PLANNING COMMISSION</p>	
<p>CERTIFICATE OF SURVEYOR</p> <p>KNOW ALL MEN BY THESE PRESENTS, THAT THE UNDERSIGNED, BEING A LICENSED AND REGISTERED LAND SURVEYOR, DO HEREBY CERTIFY THAT ON <u>3-2-88</u> THE SURVEY WAS COMPLETED OF THE LANDS AS SHOWN ON THE ATTACHED PLAT, THAT SAID PLAT IS A TRUE AND CORRECT REPRESENTATIVE OF THE LANDS THEREIN DESCRIBED AND ADJACENT PLATS, THAT THE SURVEY WAS MADE UNDER MY PERSONAL DIRECTION AND SUPERVISION, THAT THE SURVEY DATA COMPLY WITH ALL OF THE REQUIREMENTS OF CHAPTER 177, FLORIDA STATUTES, AND MEET THE MINIMUM TECHNICAL STANDARDS REQUIRED BY THE FLORIDA BOARD OF LAND SURVEYORS PURSUANT TO SECTION 473.07, FLORIDA STATUTES, AND THAT THE PLAT IS BEING FILED WITH THE CITY OF PORT ORANGE, FLORIDA.</p> <p>FILED: <u>[Signature]</u></p> <p>REGISTERED LAND SURVEYOR</p> <p>DATE: <u>MARCH 9, 1988</u></p>	

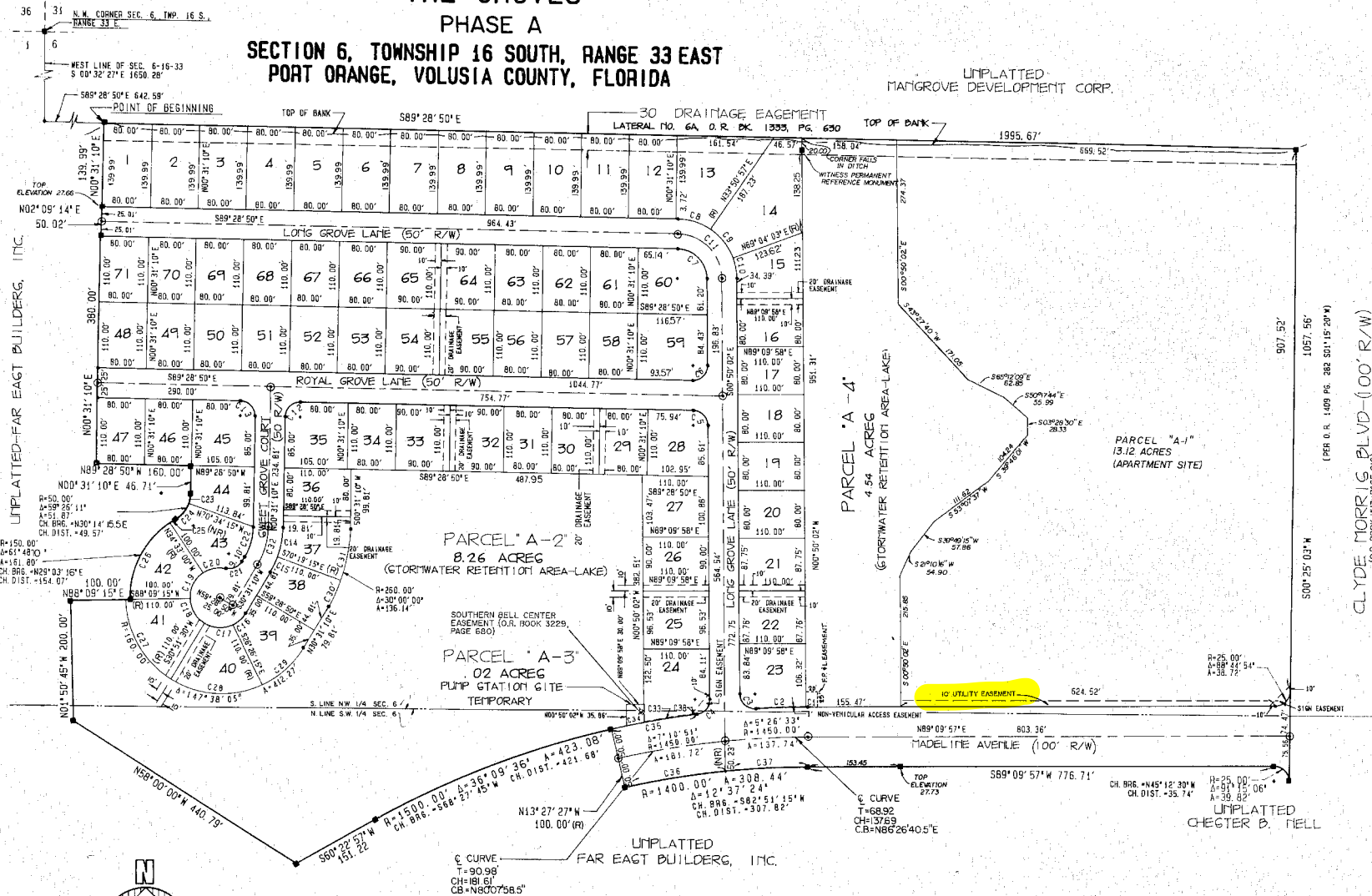
PLAT BOOK 42 PAGE 76

<p>DEDICATION</p> <p>KNOW ALL MEN BY THESE PRESENTS, THAT FAR EAST BUILDERS, INC., A FLORIDA CORPORATION, BEING THE OWNER IN FEE SIMPLE OF THE LANDS DESCRIBED IN THE ATTACHED PLAT, ENTITLED THE GROVES, PHASE A, LOCATED IN PORT ORANGE, VOLUSIA COUNTY, FLORIDA, DO HEREBY DEDICATE A LONG DRIVE LANE, WEST GROVE COURT, NORTON DRIVE, DEDICATED TO THE GROVES HOMEOWNERS ASSOCIATION.</p> <p>IN WITNESS WHEREOF, THE SAID CORPORATION HAS CAUSED THESE PRESENTS TO BE SIGNED IN ITS NAME, AND ITS CORPORATE SEAL TO BE HEREUNTO AFFIXED BY ITS OFFICERS THE UNDERSIGNED DULY AUTHORIZED ON THIS <u>27</u> DAY OF <u>March</u>, 1988.</p> <p>FAR EAST BUILDERS, INC.</p> <p>BY: <u>[Signature]</u> CORPORATE SEAL</p> <p>OFFICER</p> <p>ATTEST: <u>[Signature]</u></p> <p>SECRETARY</p> <p>SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF:</p> <p><u>[Signature]</u></p> <p><u>[Signature]</u></p> <p>STATE OF FLORIDA</p> <p>COUNTY OF VOLUSIA</p> <p>THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS <u>2nd</u> DAY OF <u>March</u>, 1988, BY DAVID L. JOBALIA, PRESIDENT AND ARNOLD D. JOBALIA, SECRETARY OF FAR EAST BUILDERS, INC. OF THE CORPORATION.</p> <p><u>[Signature]</u></p> <p>NOTARY PUBLIC STATE OF FLORIDA</p> <p>MY COMMISSION EXPIRES: <u>7-20-88</u></p>	
<p>DEDICATION</p> <p>KNOW ALL MEN BY THESE PRESENTS, THAT THINKING HERITAGE HOMES, INC., A FLORIDA CORPORATION, BEING THE OWNER IN FEE SIMPLE OF THE LANDS DESCRIBED IN THE ATTACHED PLAT, ENTITLED THE GROVES, PHASE A, LOCATED IN PORT ORANGE, VOLUSIA COUNTY, FLORIDA, DO HEREBY DEDICATE A LONG DRIVE LANE, WEST GROVE COURT, NORTON DRIVE, DEDICATED TO THE GROVES HOMEOWNERS ASSOCIATION.</p> <p>IN WITNESS WHEREOF, THE SAID CORPORATION HAS CAUSED THESE PRESENTS TO BE SIGNED IN ITS NAME, AND ITS CORPORATE SEAL TO BE HEREUNTO AFFIXED BY ITS OFFICERS THE UNDERSIGNED DULY AUTHORIZED ON THIS <u>27</u> DAY OF <u>March</u>, 1988.</p> <p>THINKING HERITAGE HOMES, INC.</p> <p>BY: <u>[Signature]</u> CORPORATE SEAL</p> <p>OFFICER</p> <p>ATTEST: <u>[Signature]</u></p> <p>SECRETARY</p> <p>SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF:</p> <p><u>[Signature]</u></p> <p><u>[Signature]</u></p> <p>STATE OF FLORIDA</p> <p>COUNTY OF VOLUSIA</p> <p>THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS <u>27</u> DAY OF <u>March</u>, 1988, BY STEPHEN HERSON, PRESIDENT AND BRENDA L. LUCAS, SECRETARY OF THINKING HERITAGE HOMES, INC. OF THE CORPORATION.</p> <p><u>[Signature]</u></p> <p>NOTARY PUBLIC STATE OF FLORIDA</p> <p>MY COMMISSION EXPIRES: <u>7-21-88</u></p>	
<p>JOINER AND CONSENT TO DEDICATION</p> <p>FIRST FLORIDA BANK, N.A., INCORPORATED UNDER THE LAWS OF THE STATE OF FLORIDA HEREBY CERTIFIES THAT IT IS THE HOLDER OF A MORTGAGE, LIEN, OR OTHER ENCUMBRANCE UPON THE PROPERTY SHOWN AND DESCRIBED IN THE ATTACHED PLAT, ENTITLED THE GROVES, PHASE A, LOCATED IN VOLUSIA COUNTY, FLORIDA, DO HEREBY JOIN IN AND CONSENT TO THE DEDICATION SHOWN ON THAT PLAT OF THE LANDS THEREIN AND DESCRIBED BY THE OWNERS THEREOF, AND AGREES THAT ITS MORTGAGE, LIEN, OR OTHER ENCUMBRANCE, WHICH IS RECORDED IN OFFICIAL RECORD BOOK 311, AT PAGE 187 OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA, SHALL BE SUBORDINATED TO THE SAID DEDICATION.</p> <p>IN WITNESS WHEREOF, FIRST FLORIDA BANK, N.A. HAS CAUSED THESE PRESENTS TO BE SIGNED IN ITS CORPORATE NAME, BY A VICE PRESIDENT, ITS CORPORATE SEAL TO BE HEREUNTO AFFIXED AND ATTESTED BY A VICE PRESIDENT THIS <u>20</u> DAY OF <u>March</u>, A.D. 19<u>88</u>.</p> <p>FIRST FLORIDA BANK, N.A.</p> <p>BY: <u>[Signature]</u> SEAL</p> <p>ATTEST: <u>[Signature]</u></p> <p>MARK D. BLAND, VICE PRESIDENT</p> <p>SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF:</p> <p><u>[Signature]</u></p> <p><u>[Signature]</u></p> <p>STATE OF FLORIDA</p> <p>COUNTY OF VOLUSIA</p> <p>THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS <u>2nd</u> DAY OF <u>March</u>, 1988, BY JOE P. EPTON, JR., VICE PRESIDENT OF FIRST FLORIDA BANK, N.A., A FLORIDA CORPORATION ON BEHALF OF THE CORPORATION.</p> <p><u>[Signature]</u></p> <p>NOTARY PUBLIC STATE OF FLORIDA</p> <p>MY COMMISSION EXPIRES: <u>7-20-90</u></p>	
<p>JOINER AND CONSENT TO DEDICATION</p> <p>FIRST FLORIDA BANK, N.A., INCORPORATED UNDER THE LAWS OF THE STATE OF FLORIDA HEREBY CERTIFIES THAT IT IS THE HOLDER OF A MORTGAGE, LIEN, OR OTHER ENCUMBRANCE UPON THE PROPERTY SHOWN AND DESCRIBED IN THE ATTACHED PLAT, ENTITLED THE GROVES, PHASE A, LOCATED IN VOLUSIA COUNTY, FLORIDA, DO HEREBY JOIN IN AND CONSENT TO THE DEDICATION SHOWN ON THAT PLAT OF THE LANDS THEREIN AND DESCRIBED BY THE OWNERS THEREOF, AND AGREES THAT ITS MORTGAGE, LIEN, OR OTHER ENCUMBRANCE, WHICH IS RECORDED IN OFFICIAL RECORD BOOK 311, AT PAGE 187 OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA, SHALL BE SUBORDINATED TO THE SAID DEDICATION.</p> <p>IN WITNESS WHEREOF, FIRST FLORIDA BANK, N.A. HAS CAUSED THESE PRESENTS TO BE SIGNED IN ITS CORPORATE NAME, BY A VICE PRESIDENT, ITS CORPORATE SEAL TO BE HEREUNTO AFFIXED AND ATTESTED BY A VICE PRESIDENT THIS <u>20</u> DAY OF <u>March</u>, A.D. 19<u>88</u>.</p> <p>FIRST FLORIDA BANK, N.A.</p> <p>BY: <u>[Signature]</u> SEAL</p> <p>ATTEST: <u>[Signature]</u></p> <p>JOE P. EPTON, JR., VICE PRESIDENT</p> <p>SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF:</p> <p><u>[Signature]</u></p> <p><u>[Signature]</u></p> <p>STATE OF FLORIDA</p> <p>COUNTY OF VOLUSIA</p> <p>THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS <u>2nd</u> DAY OF <u>March</u>, 1988, BY JOE P. EPTON, JR., VICE PRESIDENT OF FIRST FLORIDA BANK, N.A., A FLORIDA CORPORATION ON BEHALF OF THE CORPORATION.</p> <p><u>[Signature]</u></p> <p>NOTARY PUBLIC STATE OF FLORIDA</p> <p>MY COMMISSION EXPIRES: <u>7-20-90</u></p>	

THE GROVES PHASE A

SECTION 6, TOWNSHIP 16 SOUTH, RANGE 33 EAST
PORT ORANGE, VOLUSIA COUNTY, FLORIDA

UNPLATTED
MANGROVE DEVELOPMENT CORP.



CLYDE MORRIS BLVD (100' R/W)
(FOR INFO SEE PAGE 148)

(PER D.R. 1409 PG. 382 S.D. 15' 10" W)

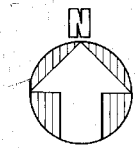
500' 25' 03" W

907.52'

1057.56'

PARCEL "A-1"
13.12 ACRES
(APARTMENT SITE)

UNPLATTED
CHESTER B. HELL



SCALE IN FEET
0 25 50 100 200
SCALE: 1" = 100'

NOTICE: THERE MAY BE ADDITIONAL RESTRICTIONS
THAT ARE NOT RECORDED ON THIS PLAT THAT
MAY BE FOUND IN THE PUBLIC
RECORDS OF THIS COUNTY.

- P. R. M. PERMANENT REFERENCE MONUMENT
- P. C. P. PERMANENT CONTROL POINT

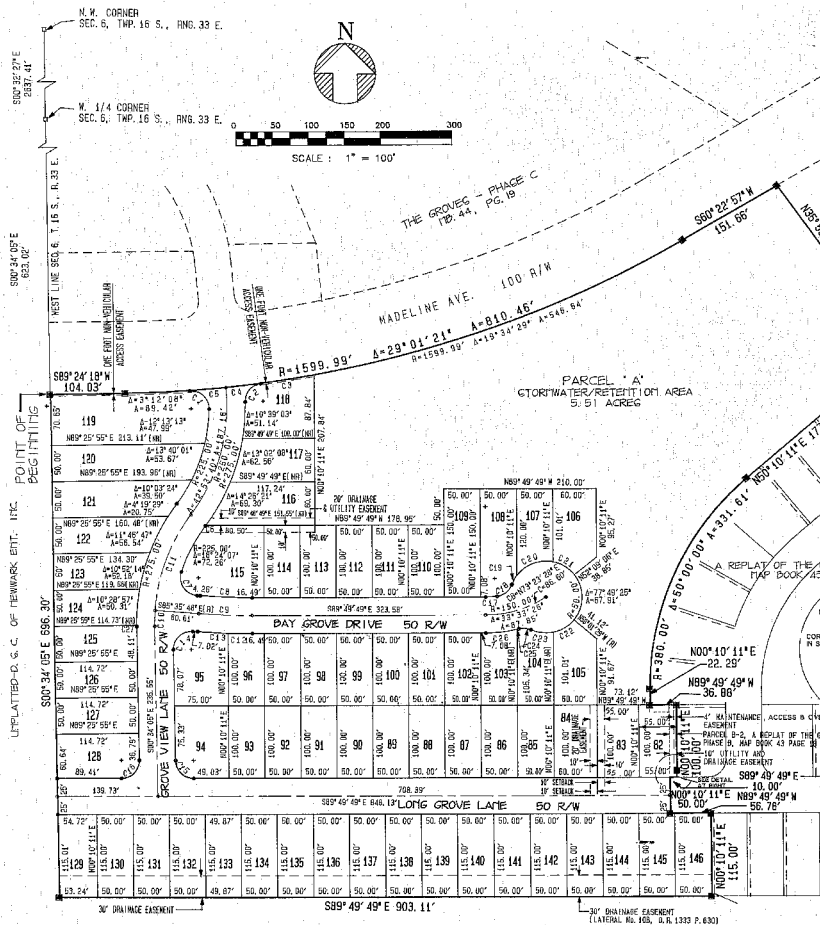
DRAINAGE AND UTILITY EASEMENTS, UNLESS
SHOWN OTHERWISE:
A. 10 FOOT FRONT YARD
B. 10 FOOT REAR YARD
C. 7.5 FOOT SIDE YARD

Curve	Radius	Delta	Length	Tangent	Chord/Brg
C1	1500.00'	0° 05' 48"	2.53'	1.27'	2.53' N89° 07' 02" E
C2	1500.00'	3° 11' 38"	8.61'	4.31'	8.61' N87° 58' 44" E
C3	25.00'	33° 11' 26"	40.71'	25.48'	35.36' N45° 31' 10" E
C4	25.00'	82° 55' 11"	36.11'	22.08'	33.11' S40° 28' 03" W
C5	25.00'	89° 38' 48"	36.68'	22.42'	34.84' N45° 09' 36" W
C6	25.00'	31° 21' 12"	39.86'	25.60'	35.77' S44° 50' 34" W
C7	50.00'	68° 38' 48"	77.36'	48.63'	69.87' N45° 09' 36" W
C8	100.00'	33° 15' 47"	151.22'	95.17'	97.35' S72° 48' 56" E
C9	100.00'	35° 13' 06"	61.47'	31.74'	60.50' S38° 34' 30" E
C10	100.00'	22° 05' 05"	30.00'	17.72'	34.90' S10° 02' 58" E
C11	75.00'	88° 38' 48"	115.04'	71.25'	104.81' S45° 09' 36" W
C12	25.00'	90° 00' 00"	39.27'	25.00'	35.36' N45° 31' 10" E
C13	25.00'	90° 00' 00"	39.27'	25.00'	35.36' S44° 28' 50" E
C14	150.00'	19° 05' 35"	50.18'	32.22'	46.93' S10° 05' 57" W
C15	150.00'	10° 50' 25"	28.38'	14.23'	28.44' S47° 02' 27" W
C16	50.00'	33° 02' 35"	28.84'	14.83'	27.39' N87° 41' 22" W
C17	50.00'	57° 17' 45"	50.00'	47.94'	47.94' N50° 29' 37" W
C18	50.00'	57° 17' 45"	50.00'	47.94'	47.94' N50° 29' 37" W

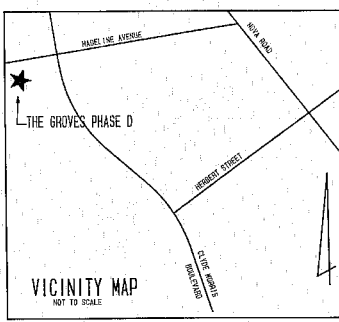
Curve	Radius	Delta	Length	Tangent	Chord/Brg
C19	50.00'	57° 17' 45"	50.00'	27.32'	47.94' N26° 48' 07" E
C20	50.00'	45° 35' 47"	39.79'	21.02'	38.75' N78° 14' 53" E
C21	25.00'	70° 31' 37"	30.77'	17.68'	28.81' N65° 45' 58" E
C22	100.00'	30° 00' 00"	52.36'	26.79'	51.76' S15° 31' 10" W
C23	50.00'	18° 54' 49"	16.50'	8.33'	16.43' S09° 58' 32" W
C24	50.00'	40° 35' 27"	35.37'	18.48'	34.63' S39° 41' 37" E
C25	150.00'	4° 30' 25"	11.80'	5.90'	11.79' N57° 42' 06" E
C26	150.00'	57° 17' 45"	150.00'	81.95'	143.83' N26° 48' 07" E
C27	150.00'	57° 17' 45"	150.00'	87.41'	153.42' N26° 48' 07" E
C28	150.00'	57° 17' 45"	150.00'	87.41'	153.42' N67° 42' 22" W
C29	150.00'	39° 02' 35"	92.27'	47.46'	91.00' S47° 02' 27" W
C30	50.00'	10° 50' 25"	48.19'	24.57'	48.19' S75° 05' 57" W
C31	250.00'	19° 05' 35"	86.94'	43.88'	86.94' S15° 05' 57" W
C32	125.00'	30° 00' 00"	65.43'	33.49'	64.70' S15° 31' 10" W
C33	1500.00'	3° 01' 21"	79.15'	39.98'	79.15' N80° 11' 35" E
C34	1500.00'	1° 19' 03"	30.57'	15.28'	30.57' N78° 08' 51" E
C35	1500.00'	5° 33' 35"	140.55'	72.83'	145.49' N78° 19' 12" E
C36	1400.00'	6° 58' 04"	170.69'	85.45'	170.58' N80° 00' 00" E
C37	1400.00'	5° 38' 18"	137.76'	68.93'	137.70' N86° 29' 49" E
C38	1500.00'	0° 22' 55"	10.90'	5.00'	10.90' N81° 54' 41" E

THE GROVES PHASE D

CITY OF PORT ORANGE, VOLUSIA COUNTY, FLORIDA
A PORTION OF SECTION 6, TOWNSHIP 16 SOUTH, RANGE 33 EAST, VOLUSIA COUNTY, FLORIDA, AND PARCEL B-2, A REPLAT OF THE GROVES PHASE B, AS RECORDED IN MAP BOOK 43 ON PAGE 18 OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA.



Curve	Radius	Delta	Length	Tangent	Chord/Beg
C1	25.00	89°47'49"	41.51	27.34	36.80
C2	25.00	89°47'49"	36.49	22.27	33.34
C3	1598.80	24°40'00"	31.73	14.58	10.45
C4	1598.80	14°43'43"	24.14	11.74	8.27
C5	1598.80	14°43'43"	24.14	11.74	8.27
C6	275.00	90°00'00"	81.31	31.81	81.31
C7	275.00	104°00'00"	72.84	36.04	72.84
C8	1000.00	114°00'00"	114.00	72.84	72.84
C9	1000.00	114°00'00"	114.00	72.84	72.84
C10	250.00	90°00'00"	39.27	15.71	15.71
C11	250.00	90°00'00"	39.27	15.71	15.71
C12	1000.00	114°00'00"	114.00	72.84	72.84
C13	1000.00	114°00'00"	114.00	72.84	72.84
C14	25.00	89°47'49"	41.51	27.34	36.80
C15	25.00	89°47'49"	36.49	22.27	33.34
C16	25.00	89°47'49"	36.49	22.27	33.34
C17	125.00	71°00'23"	15.65	7.83	15.64
C18	25.00	89°47'49"	41.51	27.34	36.80
C19	25.00	89°47'49"	36.49	22.27	33.34
C20	25.00	89°47'49"	36.49	22.27	33.34
C21	25.00	89°47'49"	36.49	22.27	33.34
C22	25.00	89°47'49"	36.49	22.27	33.34
C23	25.00	89°47'49"	36.49	22.27	33.34
C24	25.00	89°47'49"	36.49	22.27	33.34
C25	25.00	89°47'49"	36.49	22.27	33.34
C26	25.00	89°47'49"	36.49	22.27	33.34
C27	25.00	89°47'49"	36.49	22.27	33.34
C28	25.00	89°47'49"	36.49	22.27	33.34
C29	25.00	89°47'49"	36.49	22.27	33.34
C30	25.00	89°47'49"	36.49	22.27	33.34
C31	25.00	89°47'49"	36.49	22.27	33.34
C32	25.00	89°47'49"	36.49	22.27	33.34
C33	25.00	89°47'49"	36.49	22.27	33.34
C34	25.00	89°47'49"	36.49	22.27	33.34
C35	25.00	89°47'49"	36.49	22.27	33.34
C36	25.00	89°47'49"	36.49	22.27	33.34
C37	25.00	89°47'49"	36.49	22.27	33.34
C38	25.00	89°47'49"	36.49	22.27	33.34
C39	25.00	89°47'49"	36.49	22.27	33.34
C40	25.00	89°47'49"	36.49	22.27	33.34
C41	25.00	89°47'49"	36.49	22.27	33.34
C42	25.00	89°47'49"	36.49	22.27	33.34
C43	25.00	89°47'49"	36.49	22.27	33.34
C44	25.00	89°47'49"	36.49	22.27	33.34
C45	25.00	89°47'49"	36.49	22.27	33.34
C46	25.00	89°47'49"	36.49	22.27	33.34
C47	25.00	89°47'49"	36.49	22.27	33.34
C48	25.00	89°47'49"	36.49	22.27	33.34
C49	25.00	89°47'49"	36.49	22.27	33.34
C50	25.00	89°47'49"	36.49	22.27	33.34
C51	25.00	89°47'49"	36.49	22.27	33.34
C52	25.00	89°47'49"	36.49	22.27	33.34
C53	25.00	89°47'49"	36.49	22.27	33.34
C54	25.00	89°47'49"	36.49	22.27	33.34
C55	25.00	89°47'49"	36.49	22.27	33.34
C56	25.00	89°47'49"	36.49	22.27	33.34
C57	25.00	89°47'49"	36.49	22.27	33.34
C58	25.00	89°47'49"	36.49	22.27	33.34
C59	25.00	89°47'49"	36.49	22.27	33.34
C60	25.00	89°47'49"	36.49	22.27	33.34
C61	25.00	89°47'49"	36.49	22.27	33.34
C62	25.00	89°47'49"	36.49	22.27	33.34
C63	25.00	89°47'49"	36.49	22.27	33.34
C64	25.00	89°47'49"	36.49	22.27	33.34
C65	25.00	89°47'49"	36.49	22.27	33.34
C66	25.00	89°47'49"	36.49	22.27	33.34
C67	25.00	89°47'49"	36.49	22.27	33.34
C68	25.00	89°47'49"	36.49	22.27	33.34
C69	25.00	89°47'49"	36.49	22.27	33.34
C70	25.00	89°47'49"	36.49	22.27	33.34
C71	25.00	89°47'49"	36.49	22.27	33.34
C72	25.00	89°47'49"	36.49	22.27	33.34
C73	25.00	89°47'49"	36.49	22.27	33.34
C74	25.00	89°47'49"	36.49	22.27	33.34
C75	25.00	89°47'49"	36.49	22.27	33.34
C76	25.00	89°47'49"	36.49	22.27	33.34
C77	25.00	89°47'49"	36.49	22.27	33.34
C78	25.00	89°47'49"	36.49	22.27	33.34
C79	25.00	89°47'49"	36.49	22.27	33.34
C80	25.00	89°47'49"	36.49	22.27	33.34
C81	25.00	89°47'49"	36.49	22.27	33.34
C82	25.00	89°47'49"	36.49	22.27	33.34
C83	25.00	89°47'49"	36.49	22.27	33.34
C84	25.00	89°47'49"	36.49	22.27	33.34
C85	25.00	89°47'49"	36.49	22.27	33.34
C86	25.00	89°47'49"	36.49	22.27	33.34
C87	25.00	89°47'49"	36.49	22.27	33.34
C88	25.00	89°47'49"	36.49	22.27	33.34
C89	25.00	89°47'49"	36.49	22.27	33.34
C90	25.00	89°47'49"	36.49	22.27	33.34
C91	25.00	89°47'49"	36.49	22.27	33.34
C92	25.00	89°47'49"	36.49	22.27	33.34
C93	25.00	89°47'49"	36.49	22.27	33.34
C94	25.00	89°47'49"	36.49	22.27	33.34
C95	25.00	89°47'49"	36.49	22.27	33.34
C96	25.00	89°47'49"	36.49	22.27	33.34
C97	25.00	89°47'49"	36.49	22.27	33.34
C98	25.00	89°47'49"	36.49	22.27	33.34
C99	25.00	89°47'49"	36.49	22.27	33.34
C100	25.00	89°47'49"	36.49	22.27	33.34

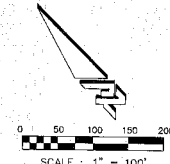
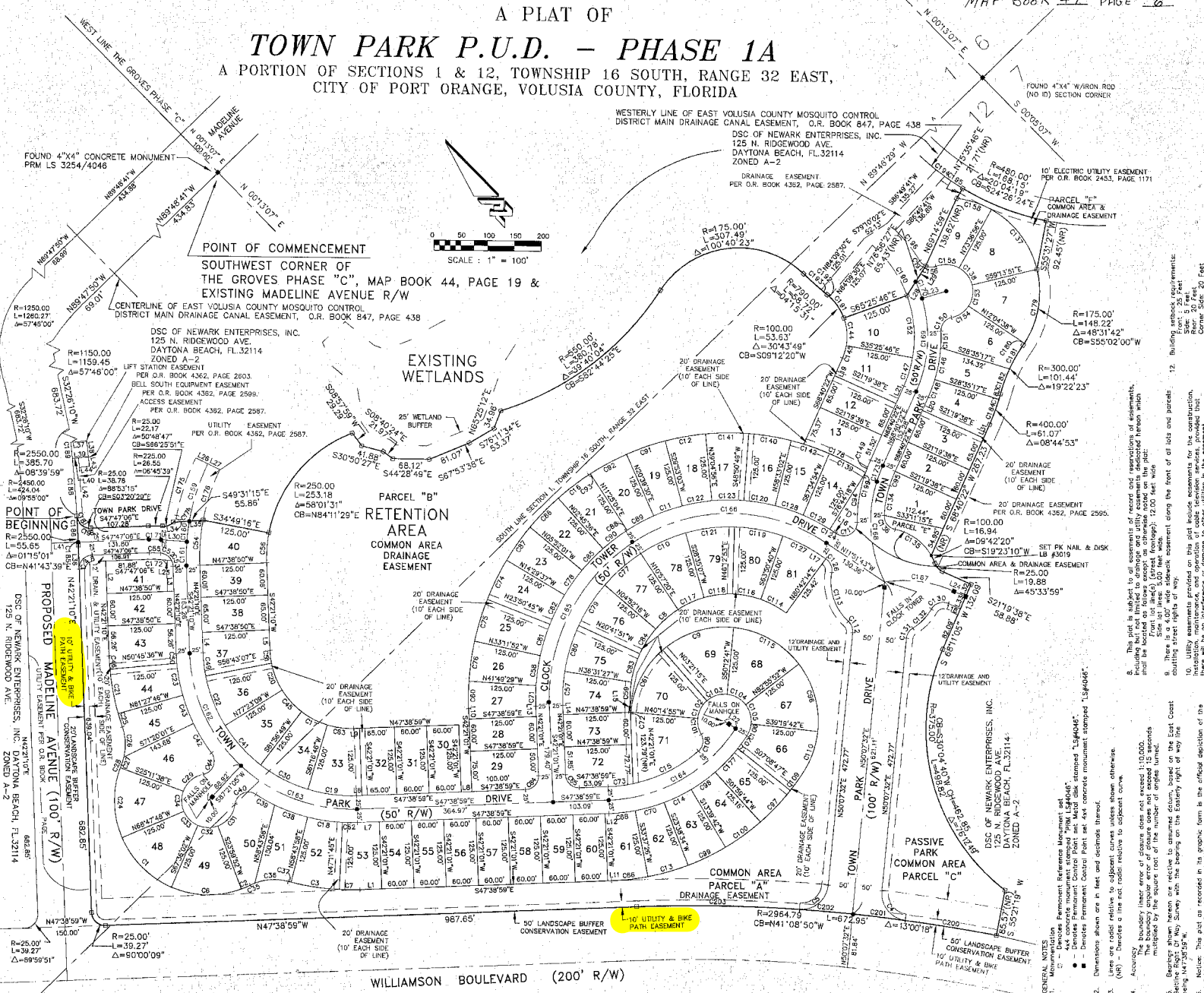


JONDER AND CONSENT TO DEDICATION
SOUTH TRUST BANK OF VOLUSIA COUNTY, INCORPORATED UNDER THE LAWS OF THE STATE OF FLORIDA HEREBY CERTIFIES THAT IT IS THE HOLDER OF A MORTGAGE, LEND, OR OTHER ENCUMBRANCE UPON THE PROPERTY SHOWN, AND CONSISTING IN THE ATTACHED PLAT, ENTITLED, "THE GROVES - PHASE D, LOCATED IN VOLUSIA COUNTY, FLORIDA, DOES HEREBY JOIN IN AND CONSENT TO THE DEDICATION, SHOWN ON THAT PLAT, OF THE LANDS THEREIN AND DESCRIBED BY THE CHARGES THEREON, AND AGREES THAT ITS MORTGAGE, LEND, OR OTHER ENCUMBRANCE, HEREIN IS SUBORDINATED TO THE DEDICATION.
IN WITNESS WHEREOF, SOUTH TRUST BANK OF VOLUSIA COUNTY HAS CAUSED THESE PRESENTS TO BE SIGNED IN ITS CORPORATE NAME BY A VICE PRESIDENT, ITS CORPORATE SEAL IS HEREIN AFFIXED AND ATTESTED BY A VICE PRESIDENT THIS 12th DAY OF JANUARY, 1993.
SOUTH TRUST BANK OF VOLUSIA COUNTY
BY: *Thomas D. Ingram*
THOMAS D. INGRAM, VICE PRESIDENT
ATTEST: *Thomas D. Ingram*
THOMAS D. INGRAM, VICE PRESIDENT
SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF:
Michael Cunningham
Thomas D. Ingram
STATE OF FLORIDA
COUNTY OF VOLUSIA
THIS IS TO CERTIFY THAT ON 12/19/93, BEFORE ME, AN OFFICER DULY AUTHORIZED TO TAKE ACKNOWLEDGMENTS IN THE STATE AND COUNTY AFORESAID, PERSONALLY APPEARED THOMAS D. INGRAM AND THOMAS D. INGRAM, VICE PRESIDENT AND EXECUTIVE VICE PRESIDENT, RESPECTIVELY, TO ME KNOWN TO BE THE PERSONS WHO, FOR AND ON BEHALF OF SOUTH TRUST BANK OF VOLUSIA COUNTY, EXECUTED THE FOREGOING JONDER AND CONSENT TO DEDICATION, AND SEVERALLY ACKNOWLEDGED THE EXECUTION FOR AND ON BEHALF OF SOUTH TRUST BANK OF VOLUSIA COUNTY THEY ARE PERSONALLY KNOWN TO ME AND HAVE NOT TAKEN AN OATH.
IN WITNESS WHEREOF, I HAVE HEREUNTO SET MY HAND AND SEAL ON THE ABOVE DATE.
NOTARY PUBLIC, STATE OF FLORIDA AT LARGE
COMMISSION EXPIRES: 12/19/93
DIPAK D. JORALIA - SECRETARY

DEDICATION
KNOW ALL MEN BY THESE PRESENTS, THAT FAR EAST BUILDERS, INC., A FLORIDA CORPORATION, BEING THE OWNER IN FEE SIMPLE OF THE LANDS DESCRIBED IN THE ATTACHED PLAT, ENTITLED "THE GROVES - PHASE D, LOCATED IN PORT ORANGE, VOLUSIA COUNTY, FLORIDA, DOES HEREBY DEDICATE BAY GROVE DRIVE, SHOVE DRIVE, MADLINE AVENUE AND GROVE DRIVE AND ALL UTILITY EASEMENTS TO THE CITY OF PORT ORANGE, PARCEL "A" IS HEREBY DEDICATED TO THE GROVER HOMEOWNERS ASSOCIATION. THE CITY OF PORT ORANGE IS HEREBY GIVEN A DRAINAGE EASEMENT OVER PARCEL "A". THE ONE-FOOT NON-VOLUNTARY ACCESS EASEMENT IS TO BE EXERCISED IN THE CITY OF PORT ORANGE. THE CITY OF PORT ORANGE IS HEREBY GIVEN A DRAINAGE EASEMENT OVER PARCEL "A". THE ONE-FOOT NON-VOLUNTARY ACCESS EASEMENT IS TO BE EXERCISED IN THE CITY OF PORT ORANGE. THE CITY OF PORT ORANGE IS HEREBY GIVEN A DRAINAGE EASEMENT OVER PARCEL "A". THE ONE-FOOT NON-VOLUNTARY ACCESS EASEMENT IS TO BE EXERCISED IN THE CITY OF PORT ORANGE.
BY: *Dipak D. Joralia*
DIPAK D. JORALIA - SECRETARY
ATTEST: *Aruna D. Joralia*
ARUNA D. JORALIA - SECRETARY
SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF:
Aruna D. Joralia
STATE OF FLORIDA
COUNTY OF VOLUSIA
THIS IS TO CERTIFY THAT ON 12/19/93, BEFORE ME, AN OFFICER DULY AUTHORIZED TO TAKE ACKNOWLEDGMENTS IN THE STATE AND COUNTY AFORESAID, PERSONALLY APPEARED DIPAK D. JORALIA AND ARUNA D. JORALIA, SECRETARY AND SECRETARY, RESPECTIVELY, TO ME KNOWN TO BE THE PERSONS WHO, FOR AND ON BEHALF OF FAR EAST BUILDERS, INC., EXECUTED THE FOREGOING DEDICATION, AND SEVERALLY ACKNOWLEDGED THE EXECUTION FOR AND ON BEHALF OF FAR EAST BUILDERS, INC. THEY ARE PERSONALLY KNOWN TO ME AND HAVE NOT TAKEN AN OATH.
IN WITNESS WHEREOF, I HAVE HEREUNTO SET MY HAND AND SEAL ON THE ABOVE DATE.
NOTARY PUBLIC, STATE OF FLORIDA AT LARGE
COMMISSION EXPIRES: 12/19/93
DIPAK D. JORALIA - SECRETARY
ARUNA D. JORALIA - SECRETARY
CERTIFICATE OF SURVEYOR
KNOW ALL MEN BY THESE PRESENTS, THAT THE UNDERSIGNED, BEING A LICENSED AND REGISTERED LAND SURVEYOR, DO HEREBY CERTIFY THAT ON THE 22nd DAY OF DECEMBER, 1992, THE SURVEY WAS COMPLETED OF THE LANDS AS SHOWN ON THE ATTACHED PLAT, ENTITLED "THE GROVES - PHASE D, LOCATED IN PORT ORANGE, VOLUSIA COUNTY, FLORIDA, DOES HEREBY DEDICATE BAY GROVE DRIVE, SHOVE DRIVE, MADLINE AVENUE AND GROVE DRIVE AND ALL UTILITY EASEMENTS TO THE CITY OF PORT ORANGE, PARCEL "A" IS HEREBY DEDICATED TO THE GROVER HOMEOWNERS ASSOCIATION. THE CITY OF PORT ORANGE IS HEREBY GIVEN A DRAINAGE EASEMENT OVER PARCEL "A". THE ONE-FOOT NON-VOLUNTARY ACCESS EASEMENT IS TO BE EXERCISED IN THE CITY OF PORT ORANGE. THE CITY OF PORT ORANGE IS HEREBY GIVEN A DRAINAGE EASEMENT OVER PARCEL "A". THE ONE-FOOT NON-VOLUNTARY ACCESS EASEMENT IS TO BE EXERCISED IN THE CITY OF PORT ORANGE.
DATE: 12/24/93
CERTIFICATE OF APPROVAL BY THE PLANNING COMMISSION
THE PORT ORANGE PLANNING COMMISSION HEREBY APPROVES THE FINAL PLAT FOR THE GROVES - PHASE D.
DATE: Jan. 26, 1993
BY: *Aruna D. Joralia*
ARUNA D. JORALIA, CHAIRMAN
CERTIFICATE OF APPROVAL BY THE CITY COUNCIL
THIS IS TO CERTIFY THAT ON 12/24/93, BEFORE ME, AN OFFICER DULY AUTHORIZED TO TAKE ACKNOWLEDGMENTS IN THE STATE AND COUNTY AFORESAID, PERSONALLY APPEARED ARUNA D. JORALIA, CHAIRMAN OF THE PORT ORANGE PLANNING COMMISSION, AND SEVERALLY ACKNOWLEDGED THE EXECUTION FOR AND ON BEHALF OF THE PORT ORANGE PLANNING COMMISSION.
DATE: 12/24/93
BY: *Aruna D. Joralia*
ARUNA D. JORALIA, CHAIRMAN
CERTIFICATE OF CLEK
KNOW ALL MEN BY THESE PRESENTS, THAT I, THE UNDERSIGNED, BEING A LICENSED AND REGISTERED LAND SURVEYOR, DO HEREBY CERTIFY THAT ON THE 22nd DAY OF DECEMBER, 1992, THE SURVEY WAS COMPLETED OF THE LANDS AS SHOWN ON THE ATTACHED PLAT, ENTITLED "THE GROVES - PHASE D, LOCATED IN PORT ORANGE, VOLUSIA COUNTY, FLORIDA, DOES HEREBY DEDICATE BAY GROVE DRIVE, SHOVE DRIVE, MADLINE AVENUE AND GROVE DRIVE AND ALL UTILITY EASEMENTS TO THE CITY OF PORT ORANGE, PARCEL "A" IS HEREBY DEDICATED TO THE GROVER HOMEOWNERS ASSOCIATION. THE CITY OF PORT ORANGE IS HEREBY GIVEN A DRAINAGE EASEMENT OVER PARCEL "A". THE ONE-FOOT NON-VOLUNTARY ACCESS EASEMENT IS TO BE EXERCISED IN THE CITY OF PORT ORANGE. THE CITY OF PORT ORANGE IS HEREBY GIVEN A DRAINAGE EASEMENT OVER PARCEL "A". THE ONE-FOOT NON-VOLUNTARY ACCESS EASEMENT IS TO BE EXERCISED IN THE CITY OF PORT ORANGE.
DATE: 12/24/93
BY: *Aruna D. Joralia*
ARUNA D. JORALIA, CHAIRMAN
GENERAL NOTES
1. THIS PLAT IS SUBJECT TO ALL EASEMENTS OF RECORD, RESERVATION OF EASEMENTS, INCLUDING BUT NOT LIMITED TO AN EASEMENT TEN FEET (10') IN WIDTH ALONG THE FRONT AND REAR OF ALL LOTS DEDICATED TO THE CITY OF PORT ORANGE FOR INSTALLATION AND MAINTENANCE OF UTILITIES AND DRAINAGE FACILITIES.
2. UTILITIES SHALL INCLUDE, BUT NOT BE LIMITED TO, SEWER, SANITARY, IRRIGATION, TELEPHONE, POTABLE WATER, ELECTRIC AND CABLE TV SYSTEMS.
3. SANITARY SEWER, WATER MAINS, POTABLE WATER AND RECLAIMED WATER SHALL BE OWNED AND MAINTAINED BY THE CITY OF PORT ORANGE.
4. DENOTES PERMANENT CONDUIT POINT POC
5. DENOTES PERMANENT REFERENCE MONUMENT FRM
6. BEARING STRUCTURE IS ASSUMED.
7. BUILDING SETBACK REQUIREMENTS:
FRONT: 20 FT.
SIDE INTERIOR LOTS - EXCEPT AS INDICATED: 15 FT.
SIDE R/W ON CORNER: 15 FT.
REAR: 15 FT.
ALONG MADLINE AVE.: 30 FT.
SIDE BOUNDARY (SIDE LOT LINE) LOT 101: 30 FT.
EAST BOUNDARY (SIDE LOT LINE) LOT 102: 10 FT.
8. THE LANDSCAPED ISLAND IN THE CUL-DE-SAC AND RETENTION POND IN PARCEL "A" TO BE MAINTAINED BY THE GROVER HOMEOWNERS ASSOCIATION.
9. NOTICE: THERE MAY BE ADDITIONAL RESTRICTIONS THAT ARE NOT RECORDED ON THIS PLAT THAT MAY BE FOUND IN THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA.
10. A FIVE FOOT (5') UTILITY EASEMENT IS PROVIDED TO THE CITY OF PORT ORANGE ALONG ALL SIDE LOT LINES, EXCEPT SHOWN OTHERWISE.
11. (H) DENOTES A RADIAL LINE. (HM) DENOTES A NON-RADIAL LINE.
12. ANY CONSTRUCTION WITHIN ANY EASEMENT MUST BE AUTHORIZED BY THE CITY OF PORT ORANGE, FLORIDA.
13. THE 4' MAINTENANCE ACCESS 5' OVERLAPPING EASEMENT ON LOT 42 IS FOR THE BENEFIT OF THE OWNER OF LOT 41, THE GROVES, PHASE D, RECORDED IN MAP BOOK 43, PAGE 19, OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA.

A PLAT OF TOWN PARK P.U.D. - PHASE 1A A PORTION OF SECTIONS 1 & 12, TOWNSHIP 16 SOUTH, RANGE 32 EAST, CITY OF PORT ORANGE, VOLUSIA COUNTY, FLORIDA

MAP BOOK 47 PAGE 6



- This plat is subject to all easements of record and specifications of easements, including but not limited to drainage and utility easements, and all other easements shown on this plat. The plat shall be subject to all easements of record and specifications of easements, including but not limited to drainage and utility easements, and all other easements shown on this plat.
- There is a 50-foot wide sidewalk easement along the front of all lots and parcels.
- Utility easements provided on this plat include easements for the installation, maintenance, and operation of cable television services, provided that there will be no interference or damage to other utilities in the easement.
- All other easements or encroachments to any conservation easements dedicated to the Town Park Homeowners Association, Inc. shall be subject to the same terms and conditions as the easements shown on this plat.
- Any proposed construction or other use within a conservation easement shall be subject to the approval of the Town Park Homeowners Association, Inc. and the City of Port Orange.
- Orange and any other authority having jurisdiction over the conservation easement.

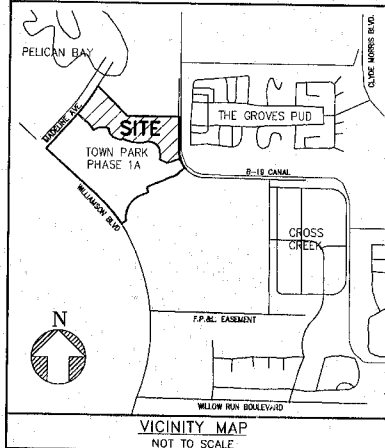
ABBREVIATIONS
 & = Central Angle
 R = Radius
 L = Length
 C/L = Chord
 CB = Chord Bearing
 D.B. = Official Records
 R/W = Right of Way
 DRAIN = Drainage

A PLAT OF
TOWN PARK P.U.D. - PHASE 1B
A PORTION OF SECTIONS 1 & 12, TOWNSHIP 16 SOUTH, RANGE 32 EAST,
CITY OF PORT ORANGE, VOLUSIA COUNTY, FLORIDA

LEGAL DESCRIPTION

A PORTION OF SECTIONS 1 AND 12, TOWNSHIP 16 SOUTH, RANGE 32 EAST, VOLUSIA COUNTY, FLORIDA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE SOUTHWEST CORNER OF THE GROVES PHASE "C", AS RECORDED IN MAP BOOK 44, PAGE 19 OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA, SAID CORNER ALSO BEING THE SOUTHWEST CORNER OF MAELINE AVENUE, A 100 FOOT RIGHT OF WAY FOR SAID GROVES PHASE "C", AND ALSO BEING A POINT ON THE SOUTHERLY RIGHT OF WAY LINE OF MAELINE AVENUE AS DESCRIBED IN DEED RECORDED IN OFFICIAL RECORDS BOOK 4216, PAGE 1152, SAID PUBLIC RECORDS; THENCE N89°48'41"W, 434.83 FEET TO THE CENTERLINE OF THE EAST VOLUSIA COUNTY MOSQUITO CONTROL DISTRICT MAIN DRAINAGE CANAL EASEMENT, AS RECORDED IN OFFICIAL RECORDS BOOK 847, PAGE 438, SAID PUBLIC RECORDS; THENCE N89°47'50"W, 69.01 FEET TO THE BEGINNING OF A CURVE TO THE LEFT, HAVING A RADIUS OF 1150.00 FEET AND A CENTRAL ANGLE OF 57°40'00"; THENCE SOUTHWESTERLY ALONG THE ARC OF SAID CURVE, 1150.45 FEET; THENCE S32°26'10"W, 549.45 FEET TO THE POINT OF BEGINNING; THENCE S32°26'10"W, 134.27 TO THE BEGINNING OF A CURVE TO THE RIGHT, HAVING A RADIUS OF 2550.00 FEET AND A CENTRAL ANGLE OF 08°39'59"; THENCE SOUTHWESTERLY ALONG THE ARC OF SAID CURVE, 365.70 FEET TO THE NORTHEAST CORNER OF TOWN PARK P.U.D., PHASE 1A, AS RECORDED IN PLAT BOOK 47, PAGES 5-7, SAID PUBLIC RECORDS, AND THE BEGINNING OF A CURVE TO THE LEFT HAVING A RADIUS OF 25.00 FEET, A CENTRAL ANGLE OF 88°33'15" AND A CHORD BEARING OF S03°20'29"E; THENCE ALONG THE BOUNDARY OF SAID TOWN PARK P.U.D., PHASE 1A, SOUTHEASTERLY ALONG THE ARC OF SAID CURVE A DISTANCE OF 38.78 FEET; THENCE S47°47'00"E, 107.28 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT HAVING A RADIUS OF 225.00 FEET AND A CENTRAL ANGLE OF 08°45'39"; THENCE EASTERLY ALONG THE ARC OF SAID CURVE, 26.56 FEET TO A POINT OF REVERSE CURVATURE HAVING A RADIUS OF 25.00 FEET, A CENTRAL ANGLE OF 50°48'47" AND A CHORD BEARING OF S88°25'51"E; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, 22.17 FEET; THENCE ALONG A LINE NON-TANGENT TO THE PRECEDING CURVE, S49°31'15"E, 55.86 FEET; THENCE S34°49'16"E, 125.00 FEET TO THE BEGINNING OF A NON-TANGENT CURVE TO THE RIGHT, HAVING A RADIUS OF 250.00 FEET, A CENTRAL ANGLE OF 50°41'31" AND A CHORD BEARING OF N84°11'29"E; THENCE NORTHEASTERLY ALONG THE ARC OF SAID CURVE, 253.18 FEET; THENCE S05°57'08"W, 29.29 FEET; THENCE S30°50'27"E, 41.88 FEET; THENCE S08°40'24"E, 21.97 FEET; THENCE S44°28'40"E, 68.12 FEET; THENCE S67°53'38"E, 81.07 FEET; THENCE S76°11'34"E, 53.37 FEET; THENCE N65°25'12"E, 34.96 FEET TO THE BEGINNING OF A NON-TANGENT CURVE TO THE LEFT, HAVING A RADIUS OF 550.00 FEET, A CENTRAL ANGLE OF 39°40'04" AND A CHORD BEARING OF S44°28'40"E; THENCE SOUTHWESTERLY ALONG THE ARC OF SAID CURVE, 380.78 FEET TO A POINT OF REVERSE CURVATURE, HAVING A RADIUS OF 790.00 FEET AND A CENTRAL ANGLE OF 100°40'23"; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, 307.49 FEET TO A POINT OF REVERSE CURVATURE, HAVING A RADIUS OF 790.00 FEET AND A CENTRAL ANGLE OF 04°18'31"; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, 58.72 FEET TO A POINT OF REVERSE CURVATURE, HAVING A RADIUS OF 100.00 FEET, A CENTRAL ANGLE OF 30°43'49" AND A CHORD BEARING OF S09°12'30"E; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, 53.83 FEET; THENCE ALONG A LINE NON-TANGENT TO THE PRECEDING CURVE, S89°25'46"E, 125.00 FEET; THENCE N76°56'27"E, 65.43 FEET; THENCE N89°14'59"E, 139.62 FEET; THENCE N75°35'46"E, 21.71 FEET TO THE WESTERLY LINE OF SAID EAST VOLUSIA COUNTY MOSQUITO CONTROL DISTRICT MAIN DRAINAGE CANAL EASEMENT AND THE BEGINNING OF A NON-TANGENT CURVE TO THE RIGHT, HAVING A RADIUS OF 480.00 FEET, A CENTRAL ANGLE OF 14°37'39" AND A CHORD BEARING OF N07°09'20"E; THENCE DEPART THE BOUNDARY OF SAID TOWN PARK P.U.D., PHASE 1A, ALONG SAID WESTERLY LINE, NORTHWESTERLY ALONG THE ARC OF SAID CURVE, 122.54 FEET; THENCE N07°12'27"E ALONG SAID WESTERLY LINE, 538.11 FEET; THENCE DEPART SAID WESTERLY LINE, N09°19'28"W, 827.82 FEET; THENCE N44°52'08"W, 663.77 FEET TO THE POINT OF BEGINNING, CONTAINING 18.12 ACRES, MORE OR LESS.



ABBREVIATIONS

D = DELTA
R = RADIUS
L = LENGTH
BK = BOOK
C = CHORD
CB = CHORD BEARING

D.R. = OFFICIAL RECORDS
PC = PAGE
Y = YEAR
R/W = RIGHT OF WAY

REVIEW BY SURVEYOR AND MAPPER FOR THE CITY

I hereby certify to the City that I have reviewed the foregoing plat for compliance with the requirements of Chapter 177, Florida Statutes, and that I have provided both the City and the Surveyor and Mapper, of a list of deviations, if any, from such requirements.

(Signature) N.J. Krumpholtz DATE 11/06/00
(Print name) N.J. Krumpholtz P.L.S. No. 2642

GENERAL NOTES

- 1. Monumentation**
 - - Denotes Permanent Reference Monument set
 - - Denotes Permanent Reference Monument found
 - - Denotes Permanent Control Point set
 - - Denotes point of curvature
- 2. Dimensions shown are in feet and decimals thereof.**
- 3. (R) - Denotes a line radial relative to adjacent curve.**
(N) - Denotes a line not radial relative to adjacent curve.
- 4. Accuracy**
 - The boundary linear error of closure does not exceed 1:10,000.
 - The boundary angular error of closure does not exceed 15 seconds
 - (N) - Denotes a line not radial relative to adjacent curve.
- 5. Bearings shown hereon are relative to assumed datum, based on the East Coast Datum, Volusia County Right of Way Survey, Project No. 4146-1-2, May 1992) with the bearing on the Eastern right of way line being N47°38'58"W.**
- 6. Notice:** This plat as recorded in its graphic form is the official depiction of the subdivided lands described hereon and will in no circumstances be supplanted in authority by any other graphic or digital form of the plat.
- 7. Utilities include but are not limited to sanitary sewer, potable water, reclaimed water, storm drainage, electric, telephone, cable television, security, and natural gas.**
- 8. This plat is subject to all easements of record and reservations of easements, including but not limited to drainage and utility easements dedicated hereon which shall be located as follows (except as otherwise noted on the plat):**
Front lot line(s) (street frontage): 12.00 feet wide
- 9. There is a 4.00' wide sidewalk easement along the front of all lots and all parcels abutting street rights of way.**
- 10. Utility easements provided on this plat include easements for the construction, installation, maintenance, and operation of cable television services, provided that there will be no interference or damage to any utilities in the easement.**
- 11. All other easements are subordinate to any conservation easements dedicated thereon. There shall be no removal or disturbance of any vegetation within such conservation easements. Any proposed construction or other use within a conservation easement must be reviewed and approved by the City of Port Orange and any other authority having jurisdiction over the conservation easement.**
- 12. Building setback requirements:**
Front: 25 Feet
Side: 5 Feet
Rear: 20 Feet
Corner Side: 20 Feet
- 13. The common areas granted to the Town Park Homeowners Association, Inc. by this plat shall be subject to easements as shown or described hereon or granted in accordance with the Town Park Homeowners Association, Inc.'s covenants and restrictions. The granting of such common areas is not intended to grant any right to the general public.**
- 14. The Town Park Homeowners Association, Inc. shall be responsible for the operation and maintenance of the drainage system serving the area within the boundaries of this plat, as depicted on the Stormwater Management Plan approved for this development by the City of Port Orange, Florida. Conservation areas within the common areas shall be maintained by the Town Park Homeowners Association, Inc.**
- 15. The Town Park Homeowners Association, Inc. shall be responsible for maintaining all trees, landscaping and irrigation in common areas and public rights of way.**
- 16. The articles of incorporation for the Town Park Homeowners Association, Inc. are recorded in Official Records Book 4362, Pages 2168 through 2375 of the Public Records of Volusia County, Florida. The declaration of covenants and restrictions for the Town Park P.U.D. are recorded in Official Records Book 4362, Pages 2546 through 2567 of the Public Records of Volusia County, Florida.**
- 17. NOTE:** All measurements refer to horizontal plane in accordance with the definition of the U.S. Survey foot or meter adopted by the National Institute of Standards and Technology. All measurements shall use the 39.37/12 = 3.280833333333333 equation for conversion from U.S. foot to meters.
- 18. Lot coverage regulations:**
Minimum open space: 40%
Maximum building coverage: 60%

PLANNING COMMISSION CERTIFICATE OF APPROVAL

This statement hereby certifies that the plat entitled TOWN PARK P.U.D. - PHASE 1B was approved by the Port Orange Planning Commission on 10/22/98

BY James M. Lasker
Chairman of the Port Orange Planning Commission

CITY COUNCIL CERTIFICATE OF APPROVAL

This statement hereby certifies that the plat entitled TOWN PARK P.U.D. - PHASE 1B was approved by the Port Orange City Council on 11/18/98

BY Anthony J. Lasker ATTEST: Anthony J. Lasker
Mayor of the City of Port Orange, Florida City Clerk of the City of Port Orange, Florida

CERTIFICATE OF CLERK

I hereby certify that I have examined the foregoing plat and find that it complies in form with all the requirements of Chapter 177, Florida Statutes, and was duly recorded on November 6, 2000 at 11:15 AM in the Public Records of Volusia County, Florida.

(Signature) Debra J. Lasker
Clerk of the Circuit Court of Volusia County, Florida

MAP BOOK 48 PAGE 1

DEDICATION:

KNOW ALL MEN BY THESE PRESENTS, that TOWN PARK DEVELOPMENT COMPANY, being the owner in fee simple of the lands shown and described hereon as the plat entitled TOWN PARK P.U.D. - PHASE 1B, located in the City of Port Orange, Volusia County, Florida, hereby dedicates the said lands and plat for the uses and purposes hereon expressed. All streets, roads, alleys, sidewalks, bike paths and other rights of way shown or described on the plat are, unless otherwise indicated, dedicated to the City of Port Orange, Florida. All potable water, reclaimed water, and sanitary sewer mains shown or described on the plat are, unless otherwise indicated, dedicated to the City of Port Orange, Florida. All drainage, utility, sidewalk, access and conservation easements shown or described on the plat are, unless otherwise indicated, dedicated to the City of Port Orange, Florida. All drainage easements shown or described on the plat are, unless otherwise indicated, granted to the TOWN PARK HOMEOWNERS ASSOCIATION, Inc. for the purposes described in the General Notes. All lots, parcels, and other areas shown or depicted hereon as common areas are hereby granted to the TOWN PARK HOMEOWNERS ASSOCIATION, INC. for the purposes depicted on the subdivision plans approved by the City of Port Orange, Florida.

IN WITNESS WHEREOF, TOWN PARK DEVELOPMENT COMPANY HAS CAUSED THESE PRESENTS TO BE SIGNED, SEALED AND ATTESTED TO BY THE PERSONS NAMED BELOW ON THIS 6th DAY OF November, 2000.

SIGNED AND SEALED IN THE PRESENCE OF:

PRINTED NAME: JAMES R. FISHER BY: TOWN PARK DEVELOPMENT COMPANY
(Signature)
PRINTED NAME: JOHN J. FISHER BY: TOWN PARK DEVELOPMENT COMPANY
(Signature)
PRINTED NAME: JAMES R. FISHER BY: TOWN PARK DEVELOPMENT COMPANY
(Signature)
PRINTED NAME: Michelle E. Winters BY: TOWN PARK DEVELOPMENT COMPANY
(Signature)

STATE OF FLORIDA, COUNTY OF VOLUSIA
THIS IS TO CERTIFY THAT ON November 6, 2000, BEFORE ME, AN OFFICER DULY AUTHORIZED TO TAKE ACKNOWLEDGMENTS IN THE STATE AND COUNTY AFORESAID, PERSONALLY JAMES R. FISHER, PRESIDENT AND JOHN J. FISHER, VICE-PRESIDENT AND Michelle E. Winters, SECRETARY OF TOWN PARK DEVELOPMENT COMPANY, A FLORIDA CORPORATION, EXECUTED THE FOREGOING DEDICATION AND SEVERALLY ACKNOWLEDGED THE EXECUTION THEREOF FOR AND ON BEHALF OF SAID CORPORATION.

THEY (SHE) ARE (ARE NOT) UNKNOWN TO ME OR HAVE PRODUCED NO IDENTIFICATION AND THEY (HAS) (HAVE) NOT TAKEN AN OATH.

IN WITNESS WHEREOF, I HAVE HEREUNTO SET MY HAND AND SEAL ON THE ABOVE DATE.

NOTARY PUBLIC
STATE OF FLORIDA AT LARGE
MY COMMISSION EXPIRES: 11/15/01
TITLE/NAME: James R. Fisher
COMMISSION NUMBER: 11111

JOINDER AND CONSENT TO DEDICATION:

COLONIAL BANK, AN ALABAMA BANKING CORPORATION, HEREBY CERTIFIES THAT IT IS THE HOLDER OF A MORTGAGE, LIEN, OR OTHER ENCUMBRANCE UPON THE PROPERTY SHOWN AND DESCRIBED HEREON AS THE PLAT ENTITLED "TOWN PARK P.U.D. - PHASE 1B" LOCATED IN THE CITY OF PORT ORANGE, VOLUSIA COUNTY, FLORIDA, AND HEREBY JOINS AND CONSENTS TO THE DEDICATION OF THE LANDS AND PLAT AND AGREES THAT ITS MORTGAGE, LIEN, OR OTHER ENCUMBRANCE WHICH IS RECORDED IN OFFICIAL RECORDS BOOK 4362, PAGE 2546 OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA, SHALL BE SUBORDINATE TO THE DEDICATION.

IN WITNESS WHEREOF, COLONIAL BANK HAS CAUSED THESE PRESENTS TO BE EXECUTED IN ITS CORPORATE NAME AND ITS CORPORATE SEAL TO BE AFFIXED BY ITS DULY AUTHORIZED OFFICERS THIS 6th DAY OF November, 2000.

SIGNED AND SEALED IN THE PRESENCE OF:

PRINTED NAME: DAVID M. McLEOD BY: Michael S. Lasker
(Signature)
PRINTED NAME: DAVID M. McLEOD BY: Michael S. Lasker
(Signature)
PRINTED NAME: DAVID M. McLEOD BY: Michael S. Lasker
(Signature)
PRINTED NAME: DAVID M. McLEOD BY: Michael S. Lasker
(Signature)

STATE OF FLORIDA, COUNTY OF VOLUSIA
THIS IS TO CERTIFY THAT ON November 6, 2000, BEFORE ME, AN OFFICER DULY AUTHORIZED TO TAKE ACKNOWLEDGMENTS IN THE STATE AND COUNTY AFORESAID, PERSONALLY DAVID M. McLEOD, PRESIDENT AND DAVID M. McLEOD, VICE-PRESIDENT AND DAVID M. McLEOD, SECRETARY OF COLONIAL BANK, AN ALABAMA BANKING CORPORATION, EXECUTED THE FOREGOING DEDICATION AND SEVERALLY ACKNOWLEDGED THE EXECUTION THEREOF FOR AND ON BEHALF OF SAID CORPORATION.

THEY (SHE) ARE (ARE NOT) UNKNOWN TO ME OR HAVE PRODUCED NO IDENTIFICATION AND THEY (HAS) (HAVE) NOT TAKEN AN OATH.

NOTARY PUBLIC
STATE OF FLORIDA AT LARGE
MY COMMISSION EXPIRES: 11/15/01
TITLE/NAME: James R. Fisher
COMMISSION NUMBER: 11111

CERTIFICATE OF SURVEYOR AND MAPPER

KNOW ALL MEN BY THESE PRESENTS, that the undersigned, being a licensed and registered Surveyor and Mapper, does hereby certify that the plat shown and described hereon, entitled TOWN PARK P.U.D. - PHASE 1B, was prepared under my direction and supervision, that the plat complies with all the survey requirements of Chapter 177, Florida Statutes, and that all measurement shown hereon as required per Chapter 177, Florida Statutes, has been properly placed.

DATE: November 6, 2000
TIME: 11:15 AM
PLACE: Port Orange, Florida

PREPARED BY: Sliger & Associates, Inc.

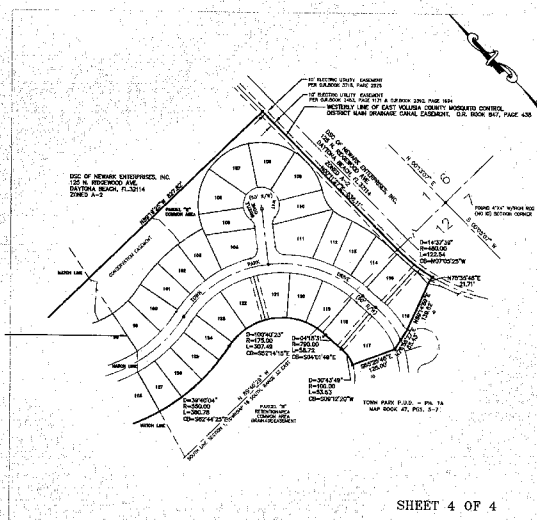
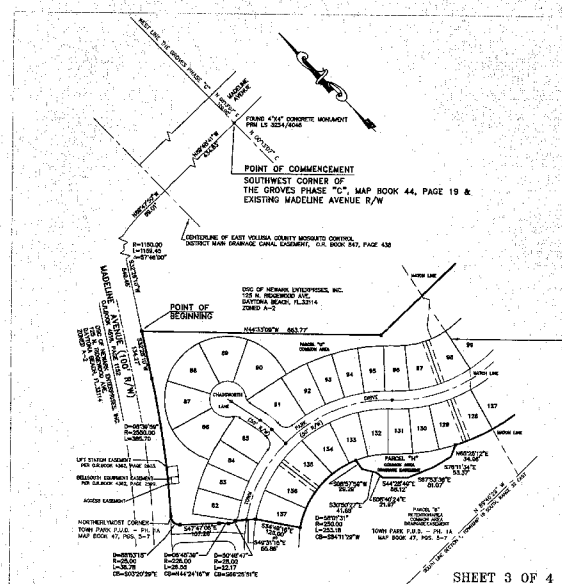
SLIGER & ASSOCIATES, INC.
PROFESSIONAL LAND SURVEYORS
1001 N. ORANGE AVENUE, SUITE 100
PORT ORANGE, FL 32127
(407) 321-1585

SHEET 1 OF 4

A PLAT OF
TOWN PARK P.U.D. - PHASE 1B
 A PORTION OF SECTIONS 1 & 12, TOWNSHIP 16 SOUTH, RANGE 32 EAST,
 CITY OF PORT ORANGE, VOLUSIA COUNTY, FLORIDA

MAP BOOK 18 PAGE 15

KEY MAP



GENERAL NOTES

1. Monumentation
 - - Denotes Permanent Reference Monument set
 - 4x4 concrete monument stamped "PRM LB3019"
 - - Denotes Permanent Reference Monument found
 - 4x4 concrete monument stamped "PRM LS3794/4046/4722"
 - Denotes Permanent Control Point set
 - Metal disk stamped "LB3019"
 - o - Denotes point of curvature
2. Dimensions shown are in feet and decimals thereof.
3. (R) - Denotes a line radial relative to adjacent curve.
(NR) - Denotes a line not radial relative to adjacent curve.
4. Accuracy
 - The boundary linear error of closure does not exceed 1:10,000.
 - The boundary angular error of closure does not exceed 15 seconds multiplied by the square root of the number of angles turned.
5. Bearings shown hereon are relative to assumed datum, based on the East Coast Datum, Volusia County Right Of Way Survey, Project No. 4145-1-2, May 1992 with the bearing on the Eastern right of way line being N47°28'05" W.
6. Notice: This plat as recorded in its graphic form is the official depiction of the subdivided lands described hereon and will in no circumstances be supplanted in authority by any other graphic or digital form of the plat. There may be additional restrictions that are not recorded on this plat that may be found in the Public Records of Volusia County, Florida.
7. Utilities include but are not limited to sanitary sewer, potable water, reclaimed water, storm drainage, electric, telephone, cable television, security, and natural gas.
8. This plat is subject to all easements of record and reservations of easements, including but not limited to drainage and utility easements dedicated hereon which shall be located as follows except as otherwise noted on the plat:
Front lot line(s) (street frontage): 12.00 feet wide
9. There is a 4.00' wide sidewalk easement along the front of all lots and all parcels abutting street rights of way.
10. Utility easements provided on this plat include easements for the construction, installation, maintenance, and operation of cable television services, provided that there will be no interference or damage to other utilities in the easement.
11. All other easements are subordinate to any conservation easements dedicated thereon. There shall be no removal or disturbance of any vegetation within such conservation easements. Any proposed construction or other use within a conservation easement must be reviewed and approved by the City of Port Orange and any other authority having jurisdiction over the conservation easement.
12. Building setback requirements:
 - Front: 25 Feet
 - Side: 5 Feet
 - Rear: 20 Feet
 - Corner Side: 20 Feet
13. The common areas granted to the Town Park Homeowners Association, Inc. by this plat shall be subject to easements as shown or described hereon or granted in accordance with the Town Park Homeowners Association, Inc.'s covenants and restrictions. The granting of such common areas is not intended to grant any right to the general public.
14. The Town Park Homeowners Association, Inc. shall be responsible for the operation and maintenance of the drainage system serving the area within the boundaries of this plat, as depicted on the Stormwater Management Plan approved for this Development by the City of Port Orange, Florida. Conservation areas within the common areas shall be maintained by the Town Park Homeowners Association, Inc.
15. The Town Park Homeowners Association, Inc. shall be responsible for maintaining all trees, landscaping and irrigation in common areas and public rights of way.
16. The articles of incorporation for the Town Park Homeowners Association, Inc. are recorded in Official Records Book 4362, Pages 2568 through 2575 of the Public Records of Volusia County, Florida. The declaration of covenants and restrictions for the Town Park P.U.D. are recorded in Official Records Book 4362, Pages 2548 through 2567 of the Public Records of Volusia County, Florida.
17. NOTE: All measurements refer to horizontal plane in accordance with the definition of the U.S. Survey foot or meter adopted by the National Institute of Standards and Technology. All measurements shall use the 39.37/12 = 3.280833333333333 equation for conversion from a U.S. foot to meters.

SHEET 2 OF 4

PREPARED BY:

SLIGER & ASSOCIATES, INC.
 PROFESSIONAL LAND SURVEYORS

LICENSED BUSINESS CORPORATION #3009

TAX MAPS UNIT

PORT ORANGE, FL 32127

(386) 321-1111



ABBREVIATIONS

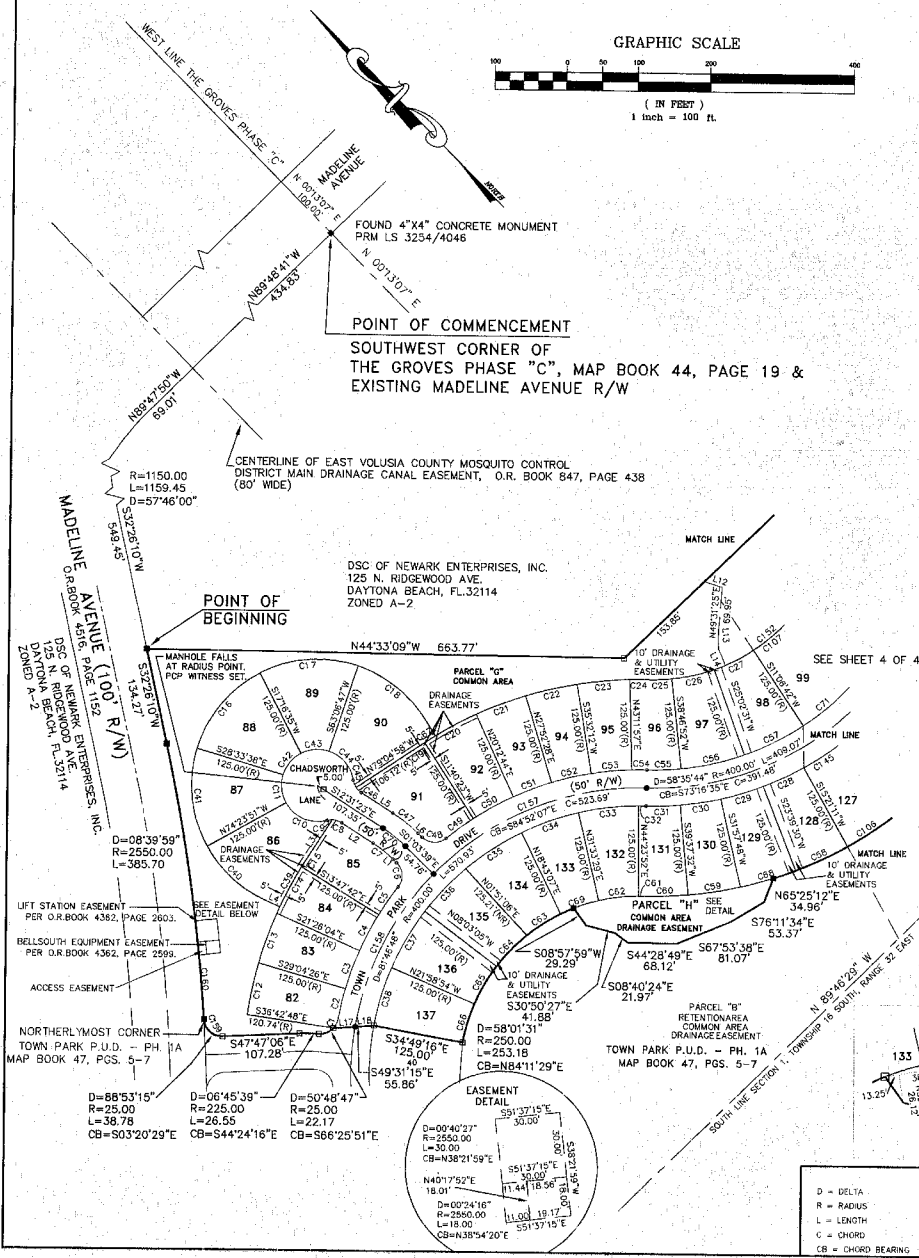
D = DELTA	D/R = OFFICIAL RECORDS
R = RADIUS	PG = PAGE
L = LENGTH	BN = BOOK
C = CHORD	R/W = RIGHT OF WAY
CB = CHORD BEARING	

A PLAT OF

TOWN PARK P.U.D. - PHASE 1B

A PORTION OF SECTIONS 1 & 12, TOWNSHIP 16 SOUTH, RANGE 32 EAST, CITY OF PORT ORANGE, VOLUSIA COUNTY, FLORIDA

MAP BOOK 48 PAGE 162



- GENERAL NOTES**
- Monumentation**
 - - Denotes Permanent Reference Monument set.
 - ▲ - Denotes Permanent Reference Monument found.
 - - Denotes Permanent Control Point set.
 - - Denotes point of curvature.
 - Dimensions shown are in feet and decimals thereof.
 - (R) - Denotes a line radial relative to adjacent curve.
 - (NR) - Denotes a line not radial relative to adjacent curve.
 - Accuracy**
 - The boundary linear error of closure does not exceed 1:10,000.
 - The boundary angular error of closure does not exceed 15 seconds multiplied by the square root of the number of angles turned.
 - Bearings shown hereon are relative to assumed datum, based on the East Coast Beltline, Volusia County Right of Way Survey, Project No. 4146-1-2, May 1992) with the bearing on the Eastern right of way line being N47°38'59\"/>

LINE	LINE TABLE	BEARING
1	1.24	N01°33'12\"/>

CURVE TABLE					
CURVE	LENGTH	RADIUS	CHORD	DIRECTION	DELTA
C1	15.47	25.00	14.22	N71°38'00"	333.02
C2	14.86	425.00	14.63	S82°00'00"	300.00
C3	56.67	425.00	56.67	S64°44'00"	37°38'2"
C4	56.67	425.00	56.63	T23°23'07"	07°38'22"
C5	47.14	25.00	33.83	N80°00'00"	96°17'
C6	49.49	25.00	33.33	N40°44'00"	83°37'4"
C7	35.01	175.00	34.65	N06°37'41"	11°27'44"
C8	3.81	25.00	3.82	N80°25'45"	31°39'02"
C9	7.22	25.00	7.23	N80°00'00"	16°01'
C10	50.60	50.00	38.78	S22°33'15"	76°15'55"
C11	40.67	50.00	31.94	S38°16'15"	45°50'11"
C12	73.33	50.00	50.00	S50°00'00"	90°00'00"
C13	73.33	50.00	73.28	S64°44'00"	07°38'22"
C14	73.33	50.00	73.28	T23°23'07"	07°38'22"
C15	12.01	25.00	12.01	S50°00'00"	10°18'19"
C16	140.00	175.00	136.21	S45°29'28"	33°00'00"
C17	140.00	175.00	136.30	N49°48'19"	35°00'13"
C18	123.27	175.00	120.74	N80°42'27"	40°31'36"
C19	7.28	25.00	7.29	S80°00'00"	16°01'
C20	81.97	550.00	81.98	N74°03'26"	08°32'11"
C21	73.55	550.00	73.50	N80°00'00"	07°39'44"
C22	73.55	550.00	73.50	N80°24'24"	07°39'44"
C23	73.55	550.00	73.50	N50°00'00"	07°39'44"
C24	31.08	550.00	31.09	N45°23'23"	02°49'21"
C25	27.98	550.00	27.97	S47°36'55"	07°24'36"
C26	58.95	550.00	58.95	S80°00'00"	13°42'47"
C27	60.78	250.00	60.63	S71°56'24"	13°55'40"
C28	61.60	425.00	61.55	S70°29'30"	08°18'18"
C29	61.67	425.00	61.67	S64°44'00"	08°18'16"
C30	56.84	425.00	56.79	S54°17'07"	07°39'44"
C31	47.44	425.00	47.42	S47°03'25"	06°23'45"
C32	83.63	375.00	83.63	N44°17'25"	01°37'25"
C33	83.63	375.00	83.63	S44°17'25"	01°37'25"
C34	84.03	375.00	83.86	N64°41'49"	1°25'23"
C35	82.83	375.00	82.60	N87°22'24"	1°41'02"
C36	84.36	375.00	84.36	S87°22'24"	1°25'01"
C37	91.17	375.00	91.21	S64°44'00"	07°39'44"
C38	84.03	375.00	83.86	S61°35'55"	1°25'23"
C39	78.69	550.00	78.53	S73°31'26"	07°24'37"
C40	110.00	550.00	110.00	S80°00'00"	07°39'44"
C41	140.00	550.00	136.30	S84°18'18"	35°00'13"
C42	50.00	50.00	50.00	S80°00'00"	45°50'11"
C43	50.67	50.00	50.62	N04°23'15"	52°53'13"
C44	54.59	25.00	39.27	S23°13'31"	24°44'58"
C45	10.43	25.00	10.35	S08°48'07"	23°26'25"
C46	42.45	25.00	42.45	S45°00'00"	90°00'00"
C47	16.29	25.00	16.33	S42°56'15"	83°37'4"
C48	47.14	425.00	47.11	N61°30'07"	06°21'11"
C49	56.84	425.00	56.84	S64°44'00"	07°39'44"
C50	56.84	425.00	56.79	S54°17'07"	07°39'44"
C51	56.84	425.00	56.78	S47°03'25"	06°23'45"
C52	47.44	425.00	47.44	S47°03'25"	06°23'45"
C53	37.9	375.00	37.94	S47°35'55"	07°14'26"
C54	89.92	375.00	89.71	S45°09'19"	13°44'21"
C55	91.17	375.00	91.17	S45°09'19"	13°44'21"
C56	73.75	550.00	73.65	S47°03'25"	07°39'44"
C57	73.55	550.00	73.50	S54°17'07"	07°39'44"
C58	73.55	550.00	73.51	S52°00'00"	06°23'45"
C59	68.02	550.00	68.01	S52°00'00"	12°26'2"
C60	56.84	425.00	56.81	N7°42'06"	12°26'26"
C61	56.84	425.00	56.84	S74°03'25"	13°55'40"
C62	56.84	425.00	56.83	S74°03'25"	13°55'40"
C63	56.82	50.00	55.91	S01°55'55"	12°26'23"
C64	56.82	50.00	54.52	T27°48'19"	02°23'17"
C65	78.50	50.00	78.50	S80°00'00"	07°39'44"
C66	56.82	50.00	55.91	N64°41'49"	1°25'23"
C67	40.67	200.00	39.64	N60°47'31"	11°27'44"
C68	20.59	25.00	20.59	S80°00'00"	80°33'15"
C160	88.77	2550.00	88.77	N40°00'00"	07°39'44"

PLAT SHEET 3 OF 4

PREPARED BY

SLIGER & ASSOCIATES, INC.

PROFESSIONAL LAND SURVEYORS

1100 N. W. 11th Ave., Suite 100
Fort Lauderdale, FL 33304
(954) 571-1100

- ABBREVIATIONS**
- OR - OFFICIAL RECORDS
 - PG - PAGE
 - BK - BOOK
 - R/W - RIGHT OF WAY

APPENDIX G

**RESPONSE TO COMMENTS
TECHNICAL MEMORANDUM**



Ref: 11076, TWO 3

TECHNICAL MEMORANDUM

To: Mr. Stephan Harris, Transportation Planner–Project Manager
From: Mr. Chris Walsh, P.E., Mr. Mikal Hale, P.E.
Subject: Madeline Ave Trail & Sidewalk - PH 2 – Response to Comments
Date: January 31, 2019

We have received comments on the Madeline Ave Trail & Sidewalk - PH 2. Comments and their respective responses are provided below. Should you have any questions, please contact Chris Walsh at (386) 753-0558.

Comments from the City of Port Orange – Planning Division:

(Tim Burman, Principal Planner (386) 506-5675/tburman@port-orange.org):

1. The original Feasibility Study application called for a minimum 5' sidewalk along the south side of Madeline Avenue and the draft Feasibility Study calls for a 6' sidewalk (Sheet 5, 6, 7, and 8). City request it is indicated in the Feasibility Study that the sidewalk along the south side of Madeline Avenue be between 5' and 6' wide or minimum of 5' to give flexibility on the sidewalk width during design. City may opt to build a 5' wide sidewalk to reduce construction and future maintenance cost.

Response: Per discussion on the January 16, 2019 phone conference, the study will remain showing a 6' sidewalk per current FDOT design guidelines, despite the fact that in the design phase, the City may revisit this subject to see if FDOT would approve the construction of a 5' sidewalk instead. A note to this effect has been added to Section 4 Trail and Sidewalk Concept Plan.

2. The original Feasibility Study application was for a minimum 8' sidewalk/multi-purpose trail along the north side of Madeline Avenue and the draft Feasibility Study calls for sidewalk/multi-purpose trail width between 8' to 12' (Sheet 5, 6, 7, and 8). City request it is indicated in the Feasibility Study that the sidewalk/multi-purpose trail along the north side of Madeline Avenue be a minimum of 8' wide to give flexibility on the width during design. City may opt to build an 8' wide sidewalk/multi-purpose trail to reduce construction and future maintenance cost.

Response: Per FDM 224.4, shared use paths have a preferred width of 12-feet, a minimum width of 10-feet and may contain short segments of 8-feet in constrained conditions. Per discussion on the January 16, 2019 phone conference, the study will remain showing 10' and 12' shared use path where feasible per current FDOT design guidelines, as requested by Stephen Harris at the July 18, 2019 scoping meeting.

Comments from the City of Port Orange – Engineering Division:

(Larry A. Roberts, Engineer (386) 506-5665 lroberts@port-orange.org; Lisa Epstein, Engineering Specialist (386) 506-5662 lepstein@port-orange.org; Valerie Duhl, Engineering Intern (386) 506-5664 vduhl@port-orange.org):

1. Change verb tense from of Section 2, paragraph 3, sentence 2 future to past to match rest of paragraph.

Response: Section 2, paragraph 3, sentence 2 has been revised to past tense to match the rest of the paragraph.

2. Spell out River to Sea Transportation Planning Organization with first use of acronym in Section 2, paragraph 3.

Response: River to Sea Transportation Planning Organization has been spelt out prior to the first use of the R2CTPO acronym.

3. In the Existing Conditions Driveways section, clarify whether the existing paved driveways meet ADA requirements as the referenced photo states some driveways meet ADA requirements and will remain.

Response: Please see the revised Driveways section clarifying that two (2) of the existing four (4) paved driveways do not meet ADA requirements and are recommended to be reconstructed.

4. Clarify details within Driveway Information Table 1:
 - a. Change Column 1 description from "Driveway Type" to "Current Driveway Material".
 - b. Change Column 4 description from "Property Address" to "Property Location" and add better description for locations because the locations are not readily apparent based on the addresses provided.

Response: Please see revised Table 1 where Columns 1 and 4 have been revised as requested and a description has been added to the Property Location column.

5. In the existing Conditions Floodway/Floodplain, confirm and conform the base flood elevation on the north side of the road. There is a 27.47 feet line along the north right-of-way on the FIRM Panel and the Concept Plans show BFE=27.00' on the north side of the road on sheets 5-8.

Response: Please see revised Floodway / Floodplain report which has been adjusted to now also reference the profile elevations from within the flood insurance stud completed for the B-19 Canal, in lieu of just reporting the BFE elevations for surrounding areas.

6. In the Section 3 Drainage and Permitting section, delete the note highlighted in red as this is covered in note in Section 4 Drainage and Permitting.

Response: As requested, the red highlighted note in section 3 Drainage and Permitting has been removed.

7. Reverse Section 4 photo captions and photos.

Response: Section 4 photo captions have been reversed.

8. In Section 4 Drainage and Permitting paragraph 2, indicate that determination of coverage of project improvements in multiple existing permits is beyond the scope of this feasibility report.

Response: The requested statement has been added to paragraph 2.

9. In Section 4 Environmental, note please note the City has a wetland mitigation bank so those fees would not be required. Also conform the estimated environmental costs between this paragraph and Table 2 Cost Estimate.

Response: A note has been added demonstrating that the City has a mitigation bank and that fees would not be required. The environmental costs have been reevaluated to account for the City's wetland mitigation bank.

10. Label blue dot/dash line on Concept Plans.

Response: Due to the extents of various flood plain boundaries only the floodway limits and BFE lines were depicted on the concept plans. However, please see revised concept plans where the blue dot/dash line has been labeled on the plans as the floodplain boundary per the FIRM map with a note added to each plan directing the reader to refer to Appendix B for a depiction of the various areas.

11. The study states floodplain compensation areas are shown in Appendix A and they are shown in sections but not plans. The proposed locations should also be shown on the plans since the available area is less than the limits of the section. The study also states that floodplain compensation area is available on the backside of both the shared path and sidewalk but the sections show available space only beyond sidewalks, not the shared path. Conform the study analysis and the sections and plans.

Response: Please see revised concept plans where the potential areas available for excavation to provide proposed floodplain compensation storage have been added, as delineated in magenta. The study has been revised to state that floodplain compensation is only available behind the sidewalks.

12. Adjust street light labeling in plans:

- a. Label proposed street light symbol on first sheet used
- b. Replace "Pedestrian Lighting (typ)" with "Street Lighting (typ)"

Response: Pedestrian lighting (typ) has been replaced with Street lighting (typ) on sheets 4 and 8.

13. Photometric analysis and design of the intersection lighting (stop bar to stop bar in both directions) will be required by the design engineer.

Response: Information Acknowledged. The lighting design analysis (photometric analysis) is a standard analysis required as part of the lighting design efforts (thus, this fee is reflected in the engineering costs).

Comments from the City of Port Orange – Public Works:

(Alex Popovic, Engineering Intern (386) 506-5572/apopovic@port-orange.org; Kristine Martin, Engineering Inspector (386) 506-5597/kmartin@port-orange.org; Mick Neals, Solid Waste Manager (386) 506-5571/mneals@port-orange.org):

1. **Advisory:** Confirm the need for new sidewalk in areas with existing sidewalk.

Response: As discussed at the July 18, 2018 scoping meeting, this study does not evaluate the condition of the existing sidewalk. Instead, all sidewalk within the corridor will be removed and replaced.

Comments from the City of Port Orange – Utilities / Right-of-Way:

(Linda Johnson, Right-of-Way Agent (386) 506-5755/ljohnson@port-orange.org, Elizabeth O'Reilly, Kimley-Horn 407-427-1655 / elizabeth.oreilly@kimley-horn.com):

1. Page 5, Section 3, Existing Conditions. Of the seven developments listed, two are unfamiliar to this reviewer as existing of-record in Volusia County: Portside Subdivision, and Bayside Subdivision. Please provide more identifying information or delete from the study as inapplicable.

Response: Portside subdivision and Bayside subdivisions are neighborhoods within the Groves subdivision on the north and south side of Madeline Ave. respectively. All references to these neighborhoods have been removed from the study as they are incorporated in the Groves Subdivision as a whole.

2. **Advisory:** Pages 9 and 15, Notes concerning storage nodes or drainage collection/conveyance systems located on private properties. This reviewer would welcome a round-table discussion on this issue if warranted.

Response: As noted in Larry Robert's Comment #6 above, the red highlighted note is section 3 Drainage and Permitting has been removed. Further discussion may be warranted between now and when this project enters into the design phase.

3. **Advisory:** Concept Plans Phase 2. Station 100 to 136 of this Madeline Avenue project is under Volusia County jurisdiction, as is any proposed work within the intersection of Clyde Morris Boulevard.

Response: Information acknowledged. Discussion has been added to the feasibility study addressing Volusia County's jurisdiction limits.

4. In locations where fire hydrants will be relocated out of the right-of-way (Phase II only) the report describes "evidence of public utility easements." Please clarify if these are Port Orange exclusive utility easements, and if not, do the easements contain any restrictions, limitations, etc. that the city should be aware of.

Response: Please refer to new Appendix F where copies of the record plats for subdivisions abutting the Madeline Avenue right of way have now been provided. Both of the fire hydrants near station 159+00 (RT) and station 162+80 (RT) are being relocated outside the existing right of way into the 20' Public Utility Easement, as dedicated in the plat of The Groves Planned Commercial Development – Phase 1 (PB 45, PG 143). Note #7 on this plat states that "Sanitary sewer, reclaimed water lines and potable water mains located within public utility easements shall be owned and maintained by the City of Port Orange." Note #9 suggests that this 20' public utility easement is subordinate to the 30' Conservation Easement dedicated by same plat, and that all installation of utilities, construction of drainage facilities or other use within the conservation easements shall be approved by the City of Port Orange. Additionally, it provides for there to be no removal or disturbance of any vegetation within any conservation easement unless specifically authorized by the City of Port Orange. So while this easement was not necessarily exclusively dedicated to the City, the City does have significant control over the 20' public utility easement which is located entirely within the 30' conservation easement.

Comments from FDOT

(Eric Brule, PE (386) 943-5567/Eric.Brule@dot.state.fl.us)

1. Typical Sections Sheets 1,2 - The typicals show floodplain compensation behind the sidewalk with a note stating if cover over existing utilities is maintained. Is there any concern about floodplain compensation if the utilities do not allow for these swales?

Response: The proposed swales will likely be only 1 – 2 feet in depth at maximum. Per email correspondence with Elizabeth O'Reilly on January 25th, 2019, the City Utilities Department is satisfied that there is sufficient cover over the 12" water main in both Phase 1 and Phase 2 of Madeline Avenue and that no modifications to the feasibility study is warranted.

2. Sheet 4 Concepts - sidewalk outside apparent ROW: Recommend including documentation of the Public Sidewalk Easement in the SE quadrant within the study, as Page 7 references several record engineering documents.

Response: Please see revised Sheet 4 which now more clearly depicts the existing 10' Utility & Bike Path Easement that was dedicated to the City in the Plat of Town Park Phase 1A (MB 47, PGS 5-7), a copy of which has now been included in Appendix F.

3. Sheet 6 Concepts - driveway at Sta. 131+15 RT: Are there any concerns with washout/erosion at the bottom of the proposed driveway? The elevation change is noticeable between the back of curb and ROW at the unpaved canal maintenance road.

Response: Based on sampling existing ground surface created with County LIDAR data, the driveway slope is not expected to exceed the 10% maximums permitted for commercial driveway in FDM 214. In addition, this area is near the existing high point in the profile of Madeline Avenue and the curb & gutter system will direct all runoff from the roadway to the proposed collection system, as opposed to down the driveway. Accordingly, no issues with washout / erosion are anticipated at the bottom of the proposed driveway.

4. Sheet 8 Concepts – ramp width at driveway taper Sta. 159+00 RT: Leader mentions reducing down to 4-ft but can the taper remain and/or avoid ROW while providing an ADA compliant curb ramp?

Response: Based on the existing conditions model assembled through tracing of aerial photos and records plans, our analysis suggests that the taper can remain in place while accommodating a 4' ramp, which is ADA compliant, and in compliance with FDOT Index #522-002.

5. General: what is the reason for removing and constructing the same width sidewalk within certain limits? (e.g. Sta.137+00 to 154+00 LT (replace) versus Sta.101+60 to 113+00 RT (remain)) The 7-18-18 meeting minutes mentioned existing sidewalks not being evaluated for ADA compliance. I'm not sure FHWA will want to participate in replacing in kind without explanation.

Response: Please see revised Typical Section 1 and the concept plans where the existing 5' concrete sidewalk on the south side from station 101+60 (RT) to station 113+00 (RT) is now proposed to be removed, and replaced with a new 6' concrete sidewalk in accordance with FDM 222.2.1.1 and FDOT Index #522-002, as discussed on the recent phone conference of January 16, 2018 with R2CTPO and the City. The existing 8' concrete trail from station 137+00 to station 154+00 is cracked in several places, and as illustrated in Typical Section 4, there are several places where the cross-slope of the existing trail is likely not in compliance with ADA, which is why it was shown to be removed and replaced. The study does not contain any assessment or narrative summary of existing sidewalk conditions based on the discussion that took place at the July 18, 2018 scoping meeting.

Comments from R2CTPO

(Stephan Harris (386) 226-0422 ext 20428 sharris@r2ctpo.org)

1. Page 2; Project Location Map – Include a scale on Figure 1.

Response: A scale has been included on the Project Location Map

2. Page 6; Driveways – Clarify if you are referring to concrete driveway aprons.

Response: The Driveways section has been revised to specify concrete driveway aprons.

3. Page 8; Utility Poles image – Indicate facing direction.

Response: Facing direction has been added to the utility image.

4. Page 10; Curb and storm image – Facing east.

Response: The Facing direction has been added to the storm drainage image.

5. Page 12; Shared-Use Path, Sidewalk, Driveways, Signing and Pedestrian Facilities – Include APS equipment.

Response: Accessible Pedestrian Signal equipment has been included in the Shared-Use Path, Sidewalk, Driveways, Signing and Pedestrian Facilities section.

6. Page 14; Images – Indicate facing direction in both of these photos.

Response: Facing direction has been added to both of these images.

7. Page 17; Financial Feasibility – Since Year 4 (2022) is listed in Table 2, include it here as well.

Response: Year four (4) has been added to the Financial Feasibility list.

8. Page 18; Table 2 Cost Estimate – Include Accessible Pedestrian Signal (APS) equipment in this Cost Estimate.

Response: Accessible Pedestrian Signal equipment has been included in the revised cost estimate.

9. Page 18; Table 2 – Why does Pay Item 632-7-1 have a quantity of 0?

Response: Pay Item 632-7-1 has been revised to reflect the needed signal cable to construct the intersection improvements.

10. Page 18; Table 2 – Remove Pay Item 653-1-12.

Response: Pay Item 653-1-12 is now required for the intersection improvements at Clyde Morris.

11. Page 18; Table 2 – This survey estimate (\$55,000) seems excessive. Please verify.

Response: The project corridor is $\pm 6,200$ LF in length and the existing R/W is 100 feet wide, which is roughly ± 14.2 acres. Significant detailed topography on the pavement surface will be required to prepare a DTM for design of the roadway drainage collection system, as well as the areas hosting floodplain compensating storage. Under all circumstances, and based on our several past experiences in completing similar design project, we feel the previously estimated fee is in order for this project. It is noted that no separate budget allocated for Subsurface Utility Exploration (SUE) services was provided for in the study. However, based on the increasing level of detail required during the design phase of LAP projects, we have now added a new \$15,000.00 line item within the cost estimate to account for these services.

12. Page 19; Conclusion, bullet 2 – Indicate the location of this tie-in on the concept plan.

Response: Please see revised concept plan Sheets 4 and 8 where we have now specified the location points where proposed sidewalk/trails will tie-into existing sidewalks/trails.