Final

Naranja Road Sidewalk Feasibility Study DeBary, Florida

July 2009

Prepared for:
Volusia County MPO

Volusia County MPO

Transportation Planning

Kimley-Horn and Associates, Inc.

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Prepared by:
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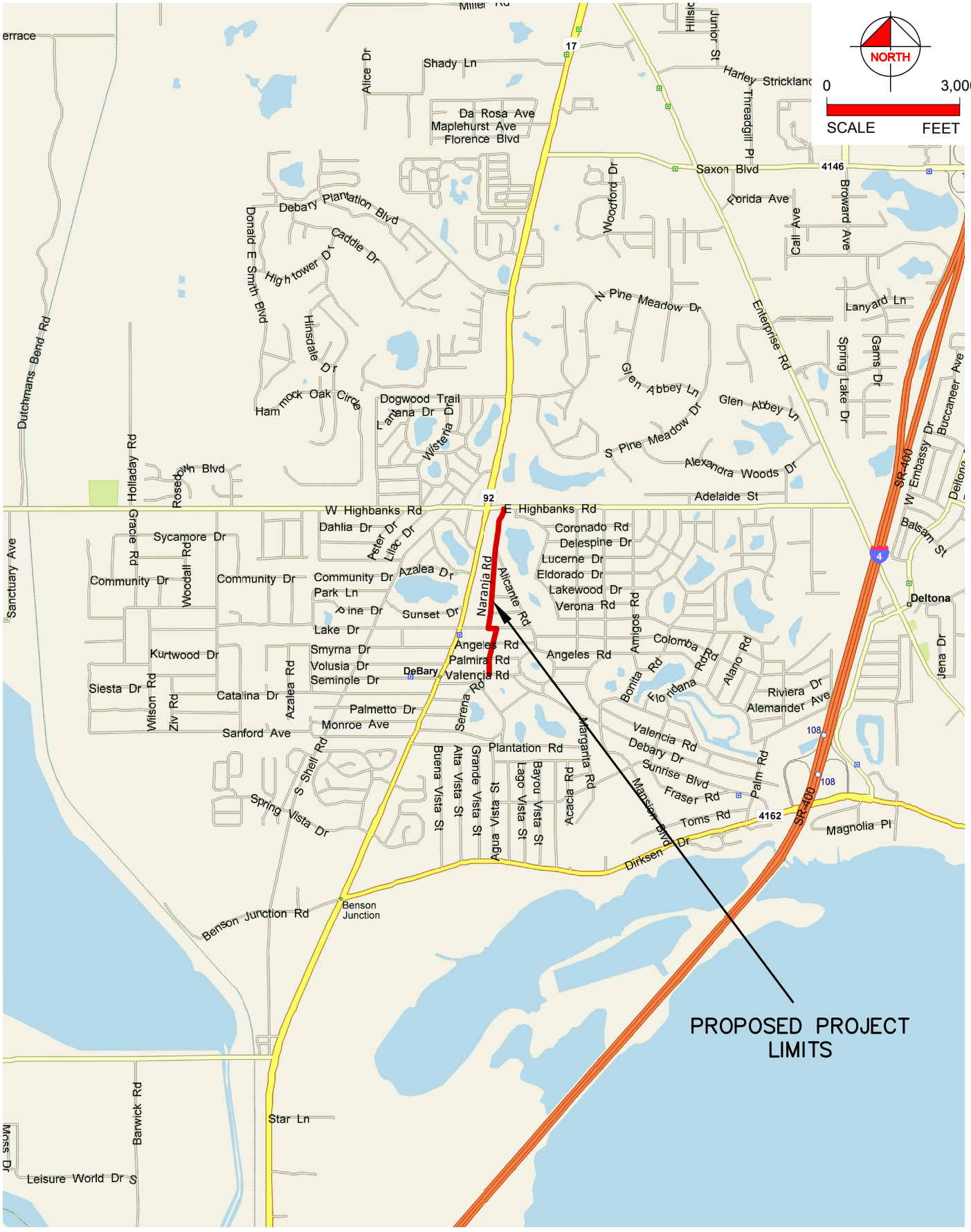
INTRODUCTION

The Volusia County Metropolitan Planning Organization (VCMPO) recognizes the importance of developing a cohesive transportation network that provides safe, efficient and accessible pedestrian and bicycle facilities. One way to accomplish this goal is to expand the integrated bicycle and pedestrian transportation system by conducting feasibility studies of prioritized projects.

The City of DeBary wants to construct a five-foot wide pedestrian sidewalk along Naranja Road in an effort to provide a safe and defined area for the school-age children walking to/from the sidewalk along East Highbanks Road which serves the DeBary Elementary School. The Naranja Road Sidewalk is a VCMPO prioritized XU Bicycle/Pedestrian project as requested by the City of DeBary. Additionally, this sidewalk improvement was identified in Volusia County MPO's *Bicycle and Pedestrian Safety Review Study Implementation Report* for DeBary Elementary School, dated March 2007 as prepared by Hoke Design, Inc.

The intent of this study was to determine the feasibility of constructing a sidewalk along the east side of Naranja Road from Valencia Road to East Highbanks Road, a distance of approximately 3,800 feet in length (see **Figures 1** and **2**). The project is located in the heart of the City of DeBary in an area consisting of low density single family residences with some commercial/office uses on the western side of the corridor. The proposed sidewalk will provide north-south connectivity between the east-west sidewalks on Valencia Road, Angeles Road, Colomba Road, and East Highbanks Road thus closing a gap in the sidewalk network in proximity to many community assets and residential areas. The study focuses on identifying the various obstacles, constraints, and opportunities along the corridor in an effort to identify the conceptual alignment of a cost-effective path which fits within the existing right-of-way.

SOURCE: MICROSOFT STREETS AND TRIPS, 2008



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LOCATION MAP

NARANJA ROAD SIDEWALK FEASIBILITY STUDY
DeBARY, FLORIDA

SCALE: AS SHOWN	PROJECT NO: 149127004	06/02/09	FIGURE 1

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PROJECT OVERVIEW

NARANJA ROAD SIDEWALK FEASIBILITY STUDY
DeBARY, FLORIDA

SCALE: AS SHOWN	PROJECT NO: 149127004	06/02/09	FIGURE 2

STUDY PURPOSE

The Naranja Road corridor traverses the western portion of the Plantation Estates subdivision in the heart of DeBary. Currently, there are only three north-south oriented sidewalks within the neighborhood; two of which are located along busy U.S. 17/92 and the other is over a ½-mile to the east along Amigos Road. Pedestrian access to DeBary Elementary is provided by east-west oriented sidewalks along Highbanks Road. Students living in the Plantation Estates subdivision who walk to DeBary Elementary must currently travel via one of the three north-south sidewalks traversing the Plantation Estates subdivision or, as in most cases, walk along one of the north-south roadways without a sidewalk to access the Highbanks Road sidewalks. Clearly this presents a safety issue which the City and the VCMPO are very eager to resolve.

The proposed sidewalk will also provide pedestrian connectivity between the Plantation Estates subdivision and City Hall, the DeBary Post Office, and numerous service-oriented businesses and offices located along U.S. 17/92.

In addition, the City's desire to enhance pedestrian facilities is supported by the following goals, objectives and policies of the City's Comprehensive Plan:

> ***Transportation Element***
>
> *Goal: To facilitate the development of a cost-effective, coordinated, multi-modal transportation system for the movement of people and goods so as to benefit the social, economic, and physical development of the City.*
>
> *Objective 6.1: The City will carry out a program of activities to facilitate the provision of a cost-effective, safe, convenient, and energy efficient multi-modal transportation system.*
>
> *Policy 6.101 b: The Future Transportation Map (2015) is hereby incorporated as a part of this Plan, and depicts the character and extent of transportation facilities to be provided by the target year (2015). The Map specifically shows the general or approximate location and character of: Bicycle and pedestrian facilities deemed necessary to support the City's transportation goals.*
>
> *Policy 6.107 e: Not later than 1997, the City will adopt land development regulations to implement the following standards for construction or modification of transportation facilities: Provisions will be made to facilitate pedestrian circulation and use of bicycles and transit. Such*

provisions will include a comprehensive system of sidewalks, separate secure bicycle parking areas, transit bus shelters and bus pullouts, and (where appropriate) design of the on-site circulation to facilitate through movement by bus traffic.

There are also provisions in the City's Land Development Code which require the construction of sidewalks:

Sec. 4-90. Sidewalks.

(a) *Pedestrian access.* Neighborhood and community commercial facilities shall have an efficient and direct pedestrian way connection to the residential areas the facilities are intended to serve. The design of local commercial facilities shall allow pedestrians direct access from adjacent neighborhood areas, with due consideration to the elimination of points of conflict between pedestrians and vehicles.

(b) *Sidewalks.*

(1) *General.* Paved sidewalks, a minimum of five feet in width, shall be installed on both sides of all local streets within a new development, except in a subdivision classified single-family or duplex where the minimum lot sizes are one acre or larger, in which case sidewalks shall not be required; provided, however, said sidewalks shall be installed on both sides of all streets within a new development that intersect with an arterial. Alternative path systems within a new development may be approved by the Development Review Committee instead of sidewalks. Specifications for materials and design of sidewalks or alternative path systems shall be approved by the City Development Engineer. Maintenance and replacement of the sidewalks or alternative path systems within a development will be the responsibility of the abutting property owner.

(2) *Sidewalks along arterials.* Paved sidewalks a minimum of five feet in width shall be installed along any abutting side of all existing and proposed arterials which border or transverse a new development and along both sides of all arterials which are required to be constructed within a new development; provided, however, that if the development is within two miles of an existing or proposed school site, then a sidewalk will be required on one side of the roadway. Except when the Development Review Committee waives the sidewalk requirement on one or both sides of the street for one or more of the following reasons:

a. A single-family or duplex subdivision with a density of less than three units per acre will require a sidewalk on only one side of the arterial; provided, however, that within one mile of existing or planned schools, commercial centers or community centers, sidewalks shall be installed along both sides of the arterial.

b. A single-family or duplex subdivision with a density one unit or less per acre shall not require a sidewalk on either side of the arterial; provided, however, that within one mile of existing or planned schools, commercial centers or community centers, sidewalks shall be installed along both sides of the arterial.

(3) *Location.* Sidewalks shall be located in the rights-of-way or adjacent easements of said streets within and abutting the development. Sidewalks shall typically be located one foot from the abutting easement or right-of-way line. Sufficient distance from obstacles such as fire hydrants, drainage inlets, manholes, utility structures and trees shall be maintained for the safety of the sidewalk users. No sidewalk shall be located within the appropriate recovery area of the traveled way of said street. Where the sidewalk is curved, there shall be no unsafe curves or sudden elevation changes in the sidewalk which would present a hazard to the users.

(4) *Pedestrian barriers.* The Development Review Committee may require fences, hedges, berms, other landscaping, or other barriers in order to discourage pedestrians from crossing hazardous streets at unsafe points or at numerous points. When possible, developments shall be designed so as to promote pedestrian streets crossings only at traffic control signals, crosswalks or intersections.

(5) *Payment to the sidewalk trust fund.* See section 4-26(1).

Safety is of paramount concern for the consideration of this project. The crash history on Naranja Road between Valencia Road and East Highbanks Road was evaluated by obtaining a summary of information compiled by the Volusia County Traffic Engineering Department. The data obtained was from February 1, 2004 to December 31, 2008. Based on the data provided by the County, during this time period there were a total of three crashes reported along the study corridor; none of which involved pedestrians or bicyclists.

STUDY METHODOLOGY

To help determine the available right-of-way along the study corridor, the original plats of the Plantation Estates subdivision, dated 1947, were obtained from the Volusia County Clerk's website. The plats show a 50-foot right-of-way for the length of the corridor as well as a 16.5-foot easement for telephone lines along the eastern side of the right-of-way of Naranja Road from Colomba Road to East Highbanks Road. It should be noted that the 16.5-foot telephone easement is not like a typical easement due to the fact that the easement does not appear to cut through the adjacent lots; rather, it appears to be a dedicated right-of-way for telephone or other various utilities. GIS data detailing the parcel lines of properties along the corridor were obtained from Volusia County. The GIS data appears to indicate approximately 66 feet of right-of-way along the corridor which is generally consistent with the original plat of the subdivision from Colomba Road to East Highbanks Road (50-foot right-of-way + 16.5-foot telephone easement = 65.5 feet of right-of-way). However, the GIS data obtained from the County does not appear to line up properly with the existing positioning of the roadway, thus the GIS data is provided for informational purposes only. Additionally, the site plan of the recently completed DeBary City Hall was obtained to assist in determining the right-of-way constraints along the study corridor, however the site plan only indicates the position of the roadway with respect to the western right-of-way line from Colomba Road to 1st Street and does not show the eastern right-of-way line or adjacent 16.5-foot easement. The City of DeBary was contacted in an attempt to gather further right-of-way information, however, the City indicated that further information above and beyond what was already collected was not readily available. Therefore, the feasibility determinations within this study have been made based on the available data and engineering judgment per direction from the VCMPO. It is recommended that a right-of-way survey be conducted prior to the design and construction of the sidewalk to identify any further constraints which may not be covered within this study.

The study recommendations are based on design criteria for pedestrian facilities contained in the FDOT Pedestrian Facilities Planning and Design Handbook, the 2009 FDOT Plans Preparation Manual (PPM), the 2007 Manual on Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Greenbook). A feasible layout for the project has been identified in accordance with these reference manuals. However, opportunities and encumbrances currently exist that could change conceptual design elements and probable costs.

GENERAL DESIGN PRINCIPLES

Sidewalks, according to the Florida Pedestrian Planning and Design Handbook, are defined as "the portion of a highway designed for preferential or exclusive use by pedestrians." The number one goal in designing sidewalks shall be the elimination of vehicle-pedestrian conflicts. Though it is not possible to eliminate all vehicle-pedestrian conflicts within the typical roadway corridor, steps should be taken to minimize the effects of all vehicle-pedestrian conflicts through proper design. Sidewalks in Florida should be designed in accordance with the criteria set forth in the PPM and the Florida Greenbook. Some important design requirements to consider involve the proper horizontal separation/barriers from the traveled way and accessibility/safety.

Horizontal Separation

To properly account for horizontal separation between the roadway and sidewalk, the design must, at a minimum, meet Florida Greenbook requirements. The Florida Greenbook states that sidewalks shall be separated from the travel lane of a rural (non-curbed) roadway based on the following criteria listed in order of desirability:

- Outside of the highway right-of-way in a separately dedicated corridor
- At or near the right-of-way line
- Outside of the designed roadside clear zone.
- Outside of the minimum required roadside clear zone
- As far from the edge of the driving lane as possible.

When adequate horizontal separation cannot be achieved, longitudinal barriers should be considered. Longitudinal barriers can be either guardrails or other rigid barriers which are designed to deflect errant vehicles away from the pedestrian facility.

Accessibility/Safety

The Florida Greenbook states that curb ramps meeting the requirements of ADA Accessibility Guidelines and the Florida Accessibility Code for Building Construction shall be constructed at crosswalks at all intersections where curbs and sidewalks are constructed in order to give persons with disabilities safe access. In general, proper design of pedestrian crossings shall consider the following:

- Crossings should be placed at locations with ample sight distances
- At crossings, the roadway should be free from changes in alignment or cross section
- The entire length of the crosswalk shall be visible to drivers at a sufficient distance to allow a stopping maneuver
- STOP bars shall be provided adjacent to all signalized crosswalks to inform drivers of the proper location to stop. The STOP bar should be well separated from the crosswalk, but should not be closer than 4 feet.
- All crosswalks shall be easily identified and clearly delineated, in accordance with Manual on Uniform Traffic Control Devices (MUTCD) (Rule 14-15.010)

Additionally, signs and markings should be utilized whenever possible to provide the pedestrian clear direction. The signs and markings should conform to the standards set forth in the MUTCD.

Finally, illumination of the roadway should also provide sufficient lighting for the pedestrian facility. This is particularly important at pedestrian crossings or other areas of potential vehicle-pedestrian conflict.

CORRIDOR OPPORTUNITIES AND CONSTRAINTS

As mentioned earlier, the right-of-way information used as the basis for this study will need to be verified through formal right-of-way mapping. Based on indicators such as utility placement, fence locations, and driveway paving, it is anticipated that the construction of the sidewalk along the eastern side of Naranja Road is feasible from a constructability standpoint. However, it should be noted that there are several opportunities and constraints within the proposed sidewalk route as indicated in the following figures that impact the sidewalk's constructability:

Figure 3

In **Figure 3**, the proposed sidewalk will connect on the east side of Naranja Road to the existing sidewalk along the north side of Valencia Road (see **Photo 1**). As evident in **Photo 1**, the existing sidewalk ramps at the intersection of Valencia Road and Naranja Road are not currently ADA compliant as they do not have a detectable warning surface. These sidewalk ramps should be retrofitted/reconstructed to comply with ADA regulations. **Photos 2** through **6** depict the existing conditions of the corridor from Valencia Road to Angeles Road. **Photo 4** illustrates a situation where detailed right-of-way information is required to delineate the right-of-way from the adjacent privately-owned parcels. Typically fences are placed and paved driveways are ended very close to the right-of-way line and thus are generally good indicators of the line's location. However as shown in **Photo 4**, the placement of the fence and the terminus of the paved driveway are not consistent. **Photo 6** shows another connection point to the existing sidewalk system of the neighborhood. Like the sidewalk along Valencia Road, the sidewalk ramps along the south side of Angeles Road are not currently ADA compliant as they are lacking detectable warning surfaces.

Figure 4

In **Figure 4** the proposed sidewalk continues north from Angeles Road to Colomba Road, makes a jog to the west along Colomba Road, and then follows Naranja Road to just north of 2nd Street. **Photos 7** through **16** show the various opportunities and constraints along this segment of Naranja Road that will impact the constructability of the sidewalk. The property located in the northeast quadrant of the Naranja Road/Angeles Road intersection has an irrigation system that appears to extend within the right-of-way. Modifications to this system will need to be addressed during design and construction. **Photo 8** shows an instance where an electrical service pole conflicts with the proposed path of the sidewalk. The service pole should be relocated to the right-of-way line to provide sufficient room for the proposed sidewalk. As shown in **Photos 9** and **10**, the proposed sidewalk will encounter yet another possible connection point with the existing sidewalk along the south side of Colomba Road. Much like the other connection points, the existing sidewalk ramps will need to be brought up to ADA compliancy. It is proposed to utilize a

short section of the sidewalk along Colomba Road to compensate for the jog in Naranja Road thus crossings should be constructed across Naranja Road, immediately south of Colomba Road, at the location shown in **Photo 9** and across Colomba Road at the location shown in **Photo 10**. All crosswalks shall be marked in accordance with the latest edition of the MUTCD. Additionally, because STOP signs are not located on Colomba Road at the western Naranja Road intersection, advanced warning signs are recommended to alert motorists of the crosswalk across Colomba Road. **Photos 11** through **13** show the three drainage structures which were recently constructed as part of the City Hall construction project. It is recommended to route the sidewalk up against the right-of-way line behind the structures if practicable. **Photos 11** through **16** also provide evidence of the 16.5-foot easement based on the location of the utilities, tree lines, and different sod types.

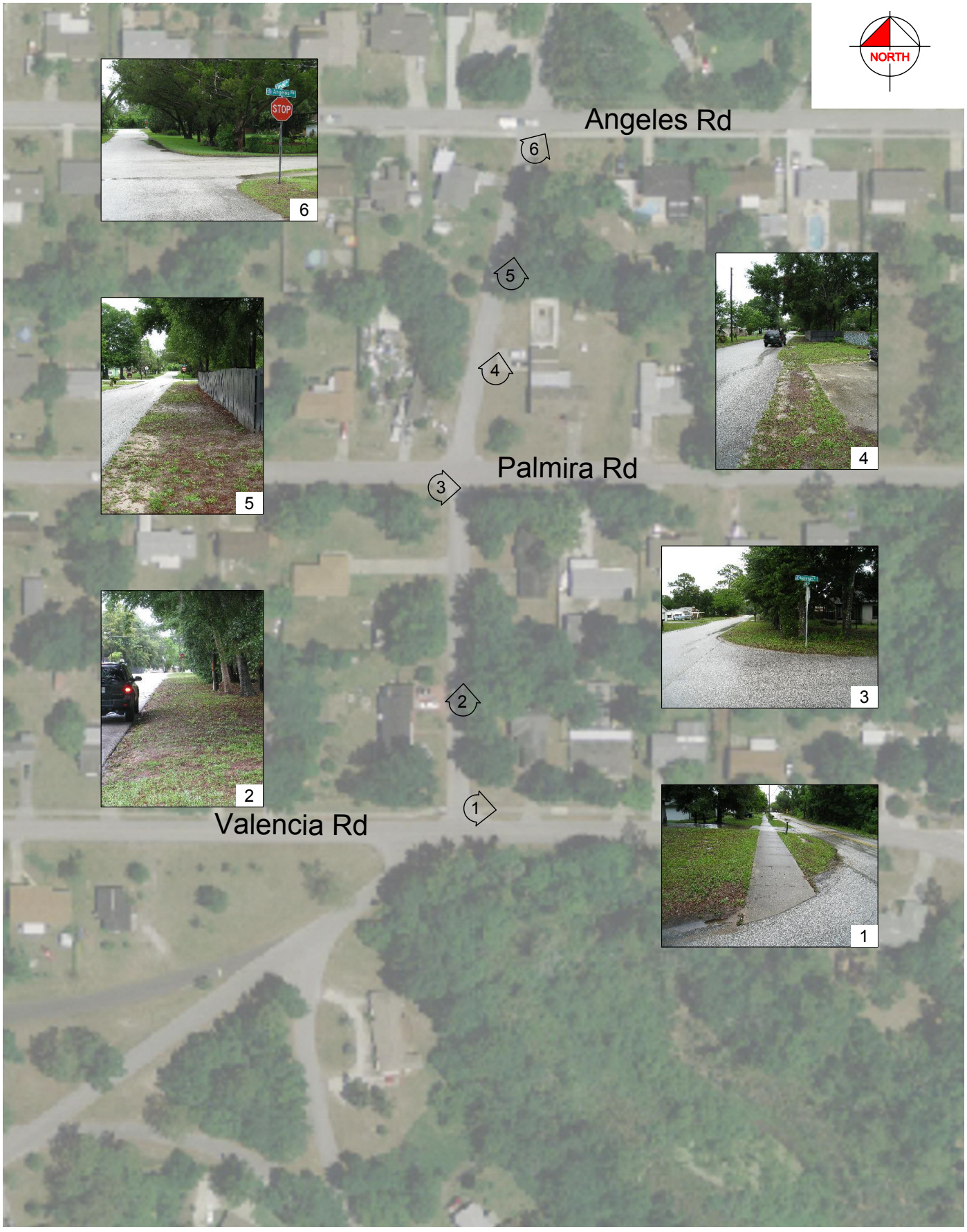
Figure 5

Continuing northward, **Photos 17** through **24** show several opportunities and constraints which will govern the placement of the proposed sidewalk. **Photos 21**, **22**, and **24** indicate the location of mailboxes along the corridor that the sidewalk should be routed behind to provide access for the U.S. Postal Service. Also evident in several of the pictures is the presence of trees and shrubs that should be trimmed and/or removed to clear a path for the sidewalk. In particular, **Photos 21** and **23** show large pines that will need to be removed from the proposed path of the sidewalk. **Photo 19** depicts the intersection of Alicante Road with Naranja Road. To continue the sidewalk along the eastern side of Naranja Road, an ADA compliant crosswalk will need to be provided across Alicante Road. During final design of the crosswalk, consideration should be given to sight distance when relocating the STOP sign on Alicante Road.

Figure 6

Photos 25 through **31** reveal the most challenging portion of the proposed sidewalk corridor. The challenges are due to more intensive presence of obstacles within the right-of-way which impact the proposed path of the sidewalk and the existing drainage system of Naranja Road. It is important to note that the FDOT drainage pond on the western side of Naranja Road severely impacts the feasibility of a future sidewalk along the west side of Naranja Road (see **Photo 26**). One constraint that is not easily noticeable is the longitudinal grade of Naranja Road and how it impacts the longitudinal grade of the proposed sidewalk. The design team should make every effort to design the sidewalk's longitudinal grade in accordance with ADA guidelines. **Photo 25** indicates a tree and power pole which will need to be removed/relocated to construct the proposed sidewalk. **Photos 28** and **29** reveal some landscaping which appears to be located within the right-of-way. This landscaping should be removed from the path of the proposed sidewalk. The proposed sidewalk should connect to the existing sidewalk along the south side

of East Highbanks Road. The existing sidewalk ramps on the East Highbanks Road sidewalk should be brought up to ADA compliance and a crosswalk should be provided across Naranja Road to provide adequate connectivity to the existing sidewalk network.



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STUDY AREA ISSUES

NARANJA ROAD SIDEWALK FEASIBILITY STUDY
DeBARY, FLORIDA

SCALE: N.T.S.	PROJECT NO: 149127004	06/02/09	FIGURE 3

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STUDY AREA ISSUES

NARANJA ROAD SIDEWALK FEASIBILITY STUDY
DeBARY, FLORIDA

SCALE: N.T.S.	PROJECT NO: 149127004	06/02/09	FIGURE 4

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STUDY AREA ISSUES

NARANJA ROAD SIDEWALK FEASIBILITY STUDY
DeBARY, FLORIDA

SCALE: N.T.S.	PROJECT NO: 149127004	06/02/09	FIGURE 5

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STUDY AREA ISSUES

NARANJA ROAD SIDEWALK FEASIBILITY STUDY
DeBARY, FLORIDA

SCALE: N.T.S.	PROJECT NO: 149127004	06/02/09	FIGURE 6

DESIGN CONSIDERATIONS

Figures 7 through **9** depict a conceptual layout of the proposed sidewalk as well as some guidance relative to the design of the proposed facility. It should be noted that the conceptual design is based on the available data as provided by the City of DeBary and collected by KHA. As indicated in **Figures 7** through **9**, there are several recommendations pertinent to the design of the proposed sidewalk. **Figures 10** and **11** collectively show four typical sections of the proposed sidewalk along Naranja Road. Below is a generalized summary of the fundamental design principles indicated in **Figures 7** through **11**:

- Construct sidewalk such that it is ADA compliant.
- Retrofit all existing sidewalk ramps with detectable warning surfaces at crosswalk locations. Reconstruct if necessary to meet ADA guidelines.
- Provide concrete driveway aprons between Naranja Road and the proposed sidewalk at all asphalt and gravel driveways. Additionally, new driveway aprons shall be constructed in all areas with curbing.
- Provide high-visibility crosswalk markings at all roadway crossings. All crosswalks should be six-feet wide at a minimum.
- Provide ADA compliant sidewalk ramps at all new crosswalk locations.
- Relocate existing utilities within the proposed path of the sidewalk to a practicable location.
- Remove trees within the proposed path of the sidewalk if unavoidable.
- From Valencia Road to Alicante Road, the proposed sidewalk should generally be four-inches thick, five-feet wide, and should be located at least one-foot from the right-of-way line where practicable. From Alicante Road to East Highbanks Road, the proposed sidewalk width should be increased to six feet and placed immediately behind the curb.
- At driveway crossings and areas subject to vehicular crossing, it is recommended to increase the thickness of the sidewalk to six inches to discourage breakage caused by the excessive weight of vehicles.
- The longitudinal grade of the sidewalk should be less than five percent if practicable. In the event that the longitudinal grade exceeds five percent, then the sidewalk should be designed in accordance with chapter four of the ADA guidelines (28 CFR part 36).
- It is anticipated that curb and gutter will need to be constructed along the east side of Naranja Road near the northern limits of the corridor. Proper drainage inlets, pipe, and outfalls should be designed accordingly at all curbed locations. Additionally, easements may need to be obtained through private lots to discharge storm water runoff into Gem Lake.

- It is anticipated that the proposed sidewalk project may qualify as exempt from a St. John's River Water Management District permit as the proposed swales and curbing indicated in **Figures 10** and **11** are expected to provide a better drainage situation than existing.

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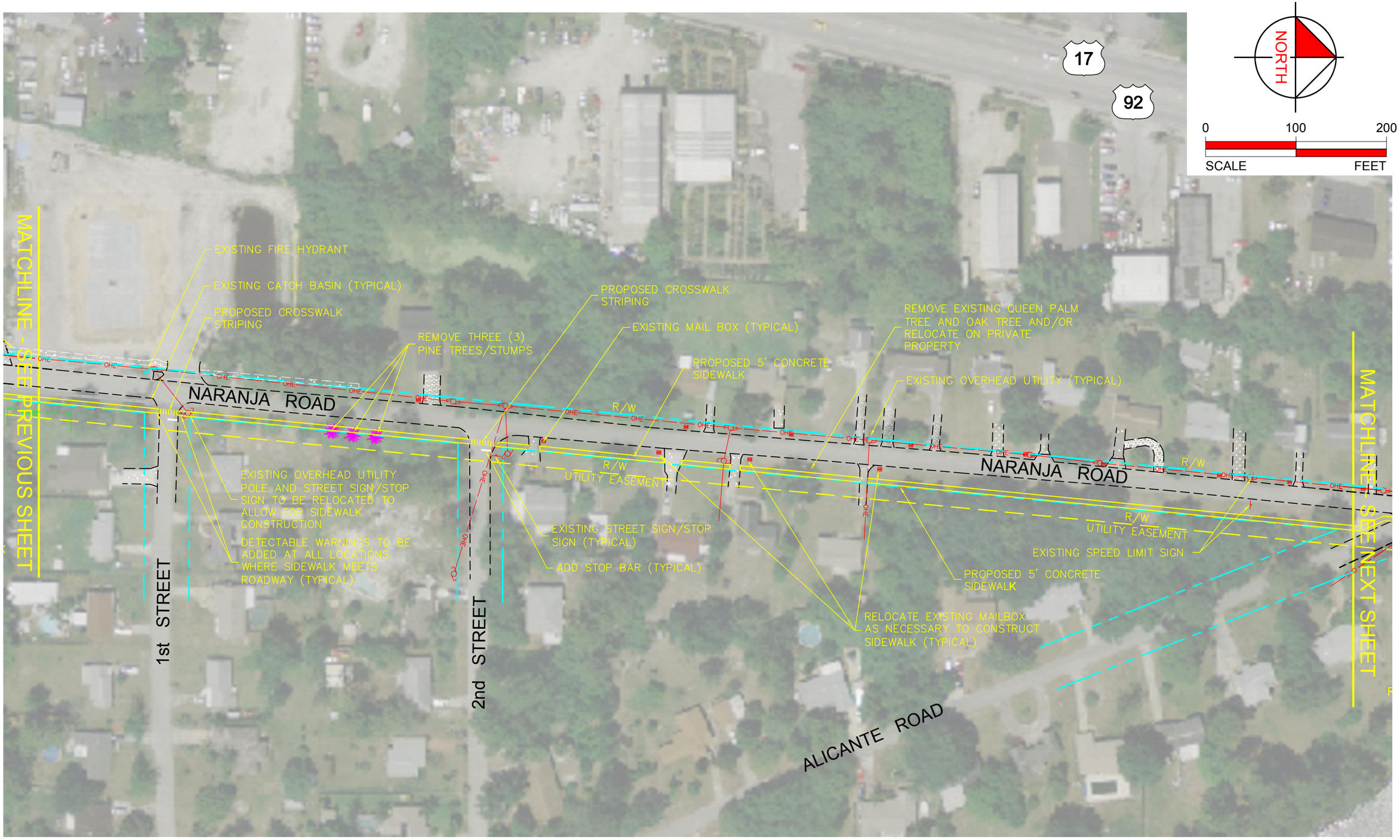
PROJECT CORRIDOR CONCEPT PLANS

NARANJA ROAD SIDEWALK FEASIBILITY STUDY
DeBARY, FLORIDA

SCALE: AS SHOWN	PROJECT NO: 149127004	06/02/09	FIGURE 7



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PROJECT CORRIDOR CONCEPT PLANS

NARANJA ROAD SIDEWALK FEASIBILITY STUDY
DeBARY, FLORIDA

SCALE: N.T.S.	PROJECT NO: 149127004	06/02/09	FIGURE 8

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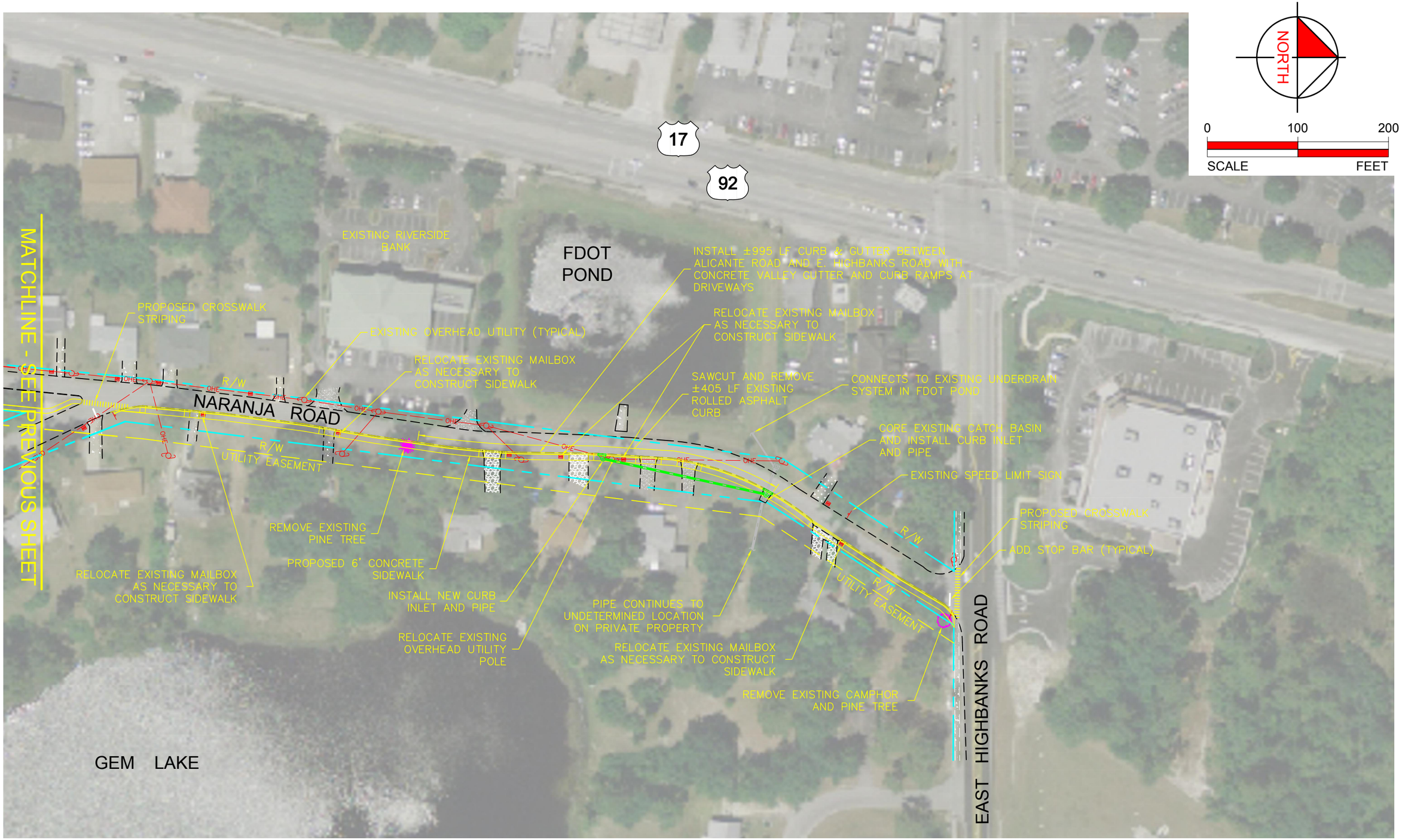

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DeBARY, FLORIDA

SCALE: N.T.S.	PROJECT NO: 149127004	06/02/09	FIGURE 9

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Drawing name: K:\PTO_TPTO\149127004 – Naranja Road Sidewalk\CADD\TYPICAL SECTIONS.dwg TYPICAL SECTION 1 Jun 25, 2009 4:09pm by: brent.lenzen

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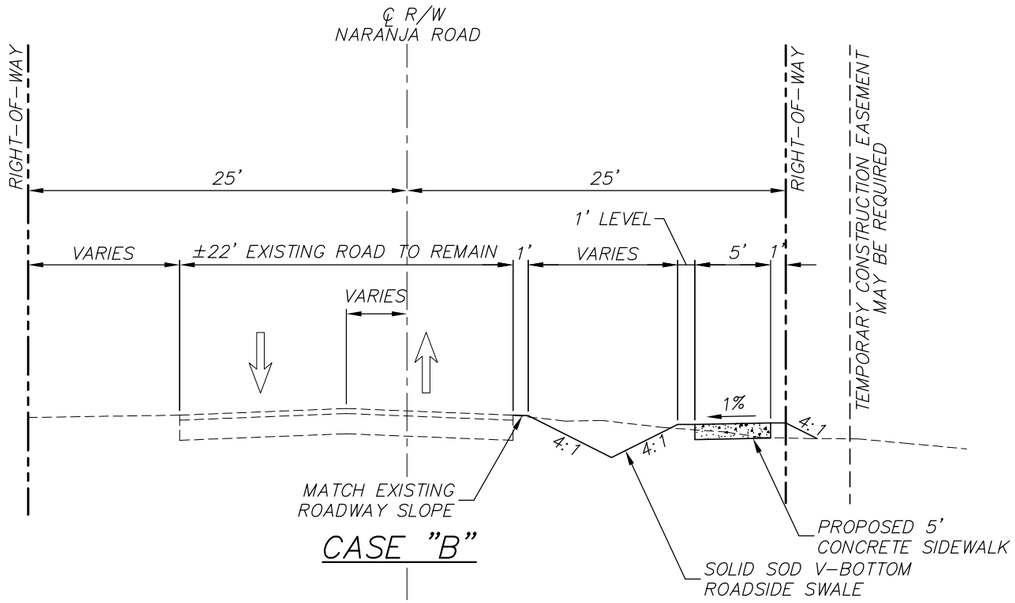
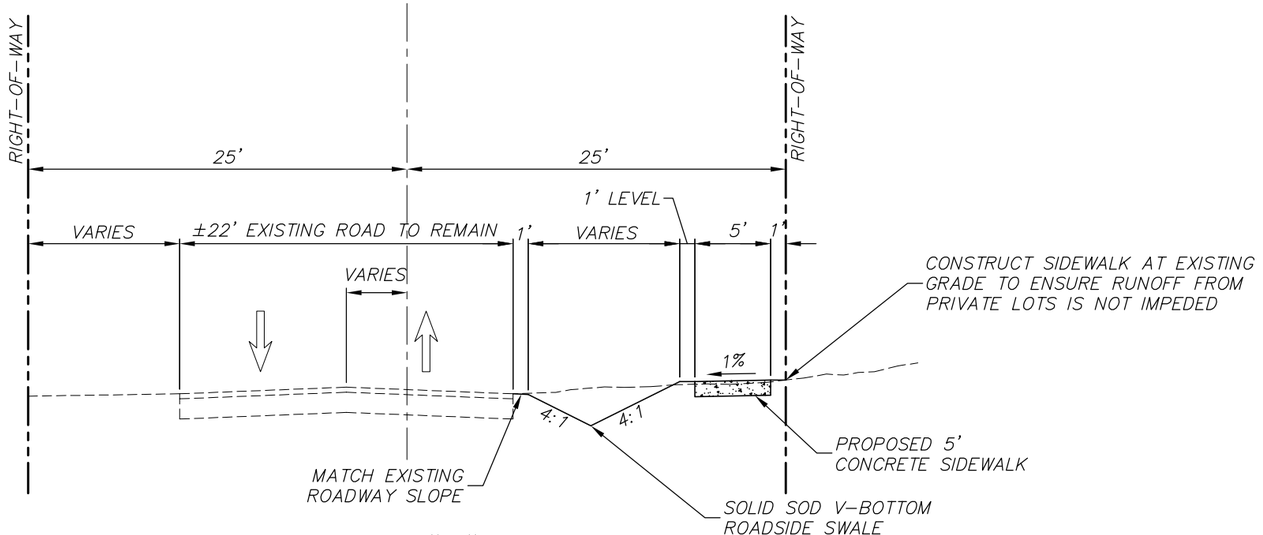


CASE "B"



CASE "A"

TYPICAL SECTION 1

N.T.S.

NARANJA ROAD

(VALENCIA ROAD TO COLOMBA ROAD)

Kimley-Horn and Associates, Inc.

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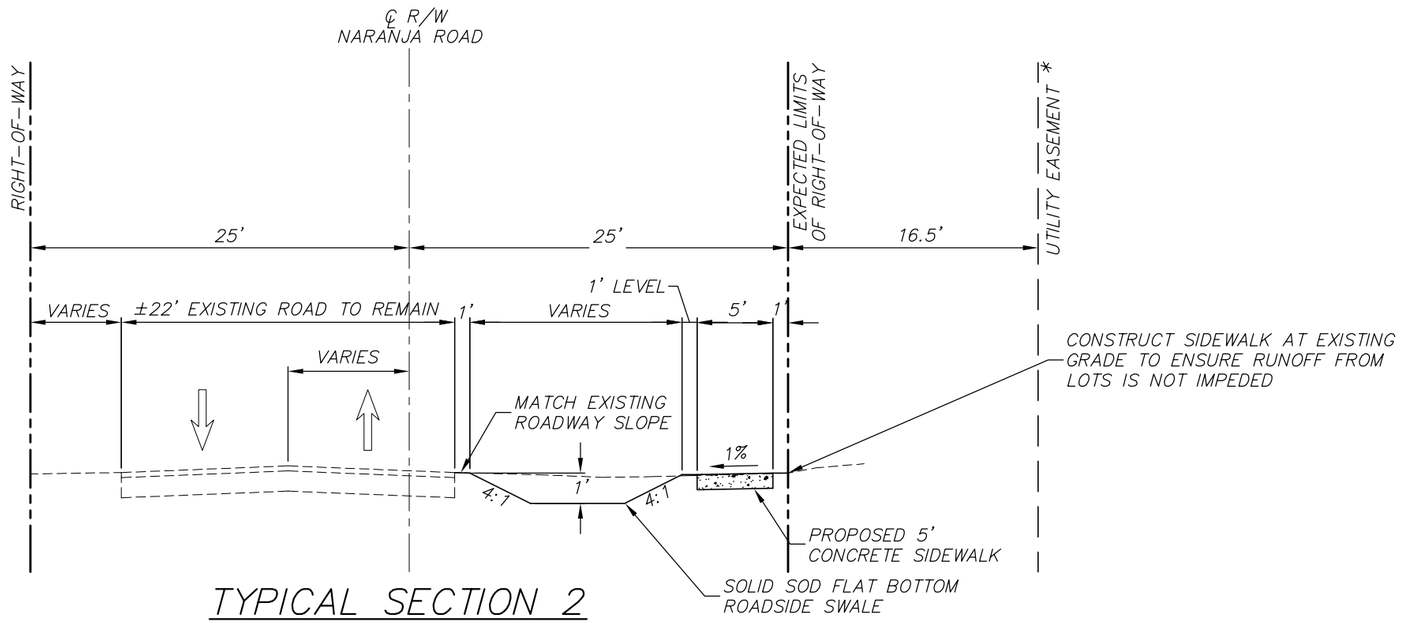
Volusia County MPO

Transportation Planning

PROJECT CORRIDOR TYPICAL SECTIONS

NARANJA ROAD SIDEWALK FEASIBILITY STUDY
DeBARY, FLORIDA

SCALE: N.T.S.	PROJECT NO: 149127004	06/02/09	FIGURE 10

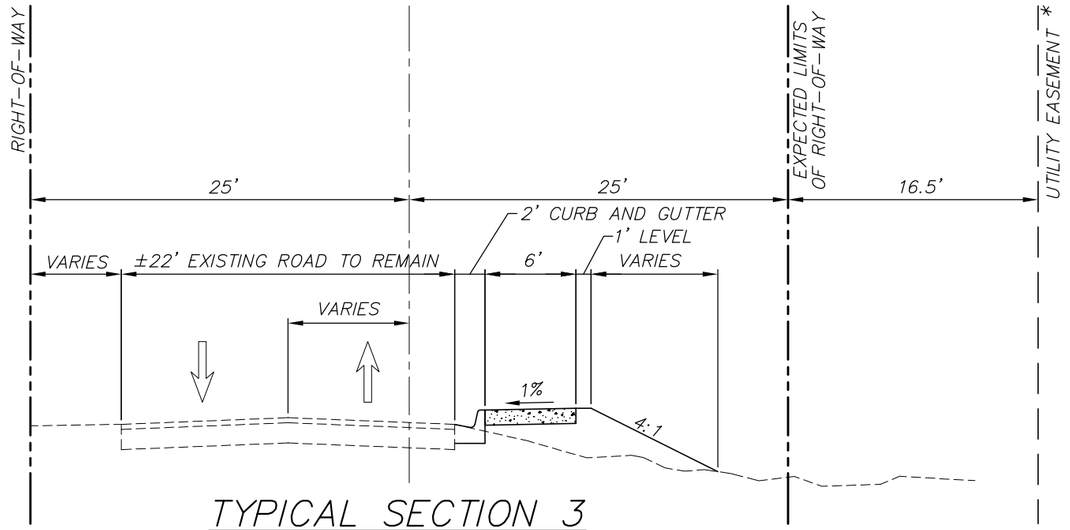


TYPICAL SECTION 2

N.T.S.

NARANJA ROAD

(COLOMBA ROAD TO ALICANTE ROAD)



TYPICAL SECTION 3

N.T.S.

NARANJA ROAD

(ALICANTE ROAD TO E. HIGHBANKS ROAD)

*—KIMLEY-HORN AND ASSOCIATES, INC. MADE SEVERAL ATTEMPTS TO RESEARCH EXISTING LIMITS OF RIGHT OF WAY FOR NARANJA ROAD. HOWEVER, PER OUR 6/2/09 CORRESPONDENCE WITH SHALENE ESTES, AND OUR 6/9/09 CORRESPONDENCE WITH JIM STROUPE, THE CITY DOES NOT POSSESS ANY RIGHT OF WAY MAPS OR RECORD PLANS FOR THIS ROAD. THE LATEST G.I.S. SHAPE FILES AVAILABLE FROM VOLUSIA COUNTY WERE OBTAINED FOR LOCATION OF PRIVATE LOT LINES AND RIGHTS OF WAY, BUT AN OVERLAY ONTO AN AERIAL PHOTOGRAPH IN STATE PLANE COORDINATES REVEALS THAT THIS DATA SOURCE IS NOT ACCURATE IN THIS PROJECT VICINITY. WE WERE ABLE TO OBTAIN COPIES OF THE FOLLOWING RECORDED PLAT SHEETS WHICH DEPICT THE RIGHT OF WAY IN QUESTION....

- PLANTATION ESTATES – UNIT No.1 (MB 11, PGS 174–175)
- REPLAT OF PLANTATION ESTATES – UNIT No.1 (MB 11, PGS 177–178)
- PLANTATION ESTATES – UNIT No.2 (MB 11, PG 183)

THOUGH THESE RATHER OLD DOCUMENTS DO DEPICT RIGHT OF WAY LINES, AND DIMENSIONS IN SOME CASES, THEIR SCALE IS NO LONGER IN TACT. THERE ARE SOME VAGUE NOTES/DIMENSIONS ON THESE DOCUMENTS WHICH SUGGEST A 16.5' UTILITY EASEMENT WAS GRANTED ALONG THE EASTERN SIDE OF NARANJA ROAD RIGHT OF WAY, FROM COLOMBA ROAD TO EAST HIGH BANKS ROAD. THERE IS ALSO EVIDENCE THAT EXISTING UTILITIES HAVE BEEN INSTALLED WITHIN THIS SAME AREA. KIMLEY-HORN AND ASSOCIATES, INC. RECOMMENDS ABSTRACTING THESE AREAS FURTHER, MAPPING THE RIGHT OF WAY, AND PERFORMING A TOPOGRAPHIC SURVEY BEFORE PROCEEDING TO THE DESIGN PHASE.

Drawing name: K:\PTO_TPTO\149127004 – Naranja Road Sidewalk\CADD\TYPICAL SECTIONS.dwg TYPICAL SECTION 2 Jun 25, 2009 4:09pm by: brent.lenzen

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PROJECT CORRIDOR TYPICAL SECTIONS

NARANJA ROAD SIDEWALK FEASIBILITY STUDY
DeBARY, FLORIDA

SCALE: N.T.S.	PROJECT NO: 149127004	06/02/09	FIGURE 11

FINANCIAL FEASIBILITY

Table 1 provides an Engineer's Opinion of Probable Cost (OPC) to construct the proposed sidewalk. FDOT's 2009 Basis of Estimates Handbook was used to obtain the pay item number, item description, and unit of measure for each of the line items contained in the OPC. FDOT's Statewide Item Average Unit Cost report for the year 2008 was used to identify the unit cost for each item. The following definitions were utilized to determine cost basis for the estimated work:

- *Clearing and Grubbing* – This item is included to account for the miscellaneous clearing that is necessary to build the sidewalk.

- *Regular Excavation* – This item represents the cost of miscellaneous excavation for the drainage swales and sidewalk.

- *Turnout Construction* – This item is included to account for the construction of a driveway apron between the sidewalk and the roadway.

- *Inlet Curb, Type P*-4 – This item is installed in the curb-line as indicated in **Figure 9** to collect storm water runoff.

- *Pipe Culv, Opt Matl, Round, 0-24"S/CD* – This item indicates the type of pipe to connect the proposed drainage structures. Although it is unclear at this point what size pipe is needed, it is likely that the size will be less than 24 inches in diameter.

- *Curb & Gutter Conc (Type F)* – This item is included to account for the costs of placing curb along the northern end of Naranja Road.

- *Sidewalk Conc (4" Thick)* –This item is included to account for the cost of placing the majority of the sidewalk along the proposed route. The ADA compliant sidewalk ramps are also included in this cost.

- *Detectable Warning on Walk Surf, Retro* – This item accounts for retrofitting existing sidewalk ramps with detectable warning surfaces.

- *Performance Turf, Sod* – This item is included to sod all areas disturbed by construction of the proposed sidewalk.

- *Single Post Sign, F&I, Less than 12 SF* – This item is included for the pedestrian crosswalk signage.

- *Single Post Sign, Relocate* – This item accounts for the relocation of signage along the corridor.

- *Thermoplastic, Std, White, Solid, 12"* - This item is included to mark the crosswalks. The proposed crosswalks utilize 12" wide by 6' long longitudinal lines with 24"gaps. This type of crosswalk is recommended because of its enhanced visibility.

- *Thermoplastic, Std, White, Solid, 18"* – This item is included to mark the STOP bars at all of the intersections along the corridor.

- *Misc. Utility Pole Relocate* – This item is not included in the FDOT unit costs database, however it was included to account for the three projected utility pole relocations along the study corridor.

As shown in **Table 1**, the projected total estimated cost for design and construction of the sidewalk along the east side of Naranja Road during the year 2009 is **$264,244.19**.

Table 1 - Engineer's Opinion of Probable Costs

To Design and Construct a Five-foot Wide Sidewalk along the East Side of Naranja Road

DeBary, FL

THIS OPC IS NOT BASED ON DESIGN AND UTILIZES THE 2008 FDOT STATEWIDE ITEM AVERAGE UNIT COSTS

ACTUAL CONSTRUCTION COSTS WILL VARY

Item Number	Description	Estimated Quantity	Unit of Measure	2008 Unit Price	Inflation Factor	Extended Cost by Year				
						2009	2010	2011	2012	2013
0101-1	Mobilization	1	LS	10%	5%	$ 15,165.53	$ 15,923.81	$ 16,720.00	$ 17,556.00	$ 18,433.80
0102-1	Maintenance of Traffic	1	LS	5%	5%	$ 7,221.68	$ 7,582.76	$ 7,961.90	$ 8,360.00	$ 8,778.00
0110-1-1	Clearing and Grubbing	0.80	AC	$ 9,316.48	5%	$ 7,825.84	$ 8,217.14	$ 8,627.99	$ 9,059.39	$ 9,512.36
0120-1	Regular Excavation	650	CY	$ 4.13	5%	$ 2,818.73	$ 2,959.66	$ 3,107.64	$ 3,263.03	$ 3,426.18
0286-1	Turnout Construction	170	SY	$ 17.02	5%	$ 3,038.07	$ 3,189.97	$ 3,349.47	$ 3,516.95	$ 3,692.79
0425-1341	Inlet, Curb, Type P-4, <10'	1	EA	$ 4,048.98	5%	$ 4,251.43	$ 4,464.00	$ 4,687.20	$ 4,921.56	$ 5,167.64
0425-1345	Inlet, Curb, Type P-4, Partial	1	EA	$ 3,038.88	5%	$ 3,190.82	$ 3,350.37	$ 3,517.88	$ 3,693.78	$ 3,878.47
0430-175-101	Pipe Culv, Opt Matl, Round, 0-24"S/CD	200	LF	$ 55.70	5%	$ 11,697.00	$ 12,281.85	$ 12,895.94	$ 13,540.74	$ 14,217.78
0520-1-10	Curb & Gutter Conc (Type F)	995	LF	$ 16.95	5%	$ 17,708.51	$ 18,593.94	$ 19,523.64	$ 20,499.82	$ 21,524.81
0522-1-0	Sidewalk Conc (4" Thick)	2000	SY	$ 35.67	5%	$ 74,907.00	$ 78,652.35	$ 82,584.97	$ 86,714.22	$ 91,049.93
0527-1	Detectable Warning on Walk Surf, Retro	9	EA	$ 495.31	5%	$ 4,680.68	$ 4,914.71	$ 5,160.45	$ 5,418.47	$ 5,689.40
0570-1-2	Performance Turf, Sod	1880	SY	$ 2.10	5%	$ 4,145.40	$ 4,352.67	$ 4,570.30	$ 4,798.82	$ 5,038.76
0700-20-11	Single Post Sign, F&I, Less than 12 SF	6	EA	$ 291.28	5%	$ 1,835.06	$ 1,926.82	$ 2,023.16	$ 2,124.32	$ 2,230.53
0700-20-40	Single Post Sign, Relocate	6	EA	$ 167.21	5%	$ 1,053.42	$ 1,106.09	$ 1,161.40	$ 1,219.47	$ 1,280.44
0711-11123	Thermoplastic, Std, White, Solid, 12"	640	LF	$ 1.86	5%	$ 1,249.92	$ 1,312.42	$ 1,378.04	$ 1,446.94	$ 1,519.29
0711-11124	Thermoplastic, Std, White, Solid, 18"	130	LF	$ 2.65	5%	$ 361.73	$ 379.81	$ 398.80	$ 418.74	$ 439.68
	Misc. Utility Pole Relocate	3	EA	$ 1,800.00	5%	$ 5,670.00	$ 5,953.50	$ 6,251.18	$ 6,563.73	$ 6,891.92
					SUBTOTAL	$ 166,820.83	$ 175,161.87	$ 183,919.96	$ 193,115.96	$ 202,771.76
0999-25	Initial Contingency*		LS	20%		$ 33,364.17	$ 35,032.37	$ 36,783.99	$ 38,623.19	$ 40,554.35
					TOTAL CONSTRUCTION COST	$ 200,184.99	$ 210,194.24	$ 220,703.95	$ 231,739.15	$ 243,326.11
	Design		LS	20%		$ 40,037.00	$ 42,038.85	$ 44,140.79	$ 46,347.83	$ 48,665.22
	CEI		LS	12%		$ 24,022.20	$ 25,223.31	$ 26,484.47	$ 27,808.70	$ 29,199.13
					TOTAL COST	$ 264,244.19	$ 277,456.40	$ 291,329.22	$ 305,895.68	$ 321,190.46

*An initial contingency of 20% was applied to account any unforseen costs that will arise during design and construction.

THIS OPC DOES NOT INCLUDE THE COSTS FOR ANY RIGHT-OF-WAY OR EASEMENT ACQUISITIONS.

THIS OPC DOES NOT INCLUDE THE COSTS ASSOCIATED WITH OBTAINING PERMITS.

THIS OPC DOES NOT INCLUDE THE COSTS FOR LANDSCAPING.

THE COSTS FOR YEARS 2009 THROUGH 2012 WERE GENERATED USING A 5% INFLATION RATE.

THE ENGINEER HAS NO CONTROL OVER THE COST OF LABOR, MATERIALS, EQUIPMENT, OR OVER THE CONTRACTOR'S METHODS OF DETERMINING PRICES OR OVER COMPETITIVE BIDDING OR MARKET CONDITIONS. OPINIONS OF PROBABLE COSTS PROVIDED HEREIN ARE BASED ON THE INFORMATION KNOWN TO ENGINEER AT THIS TIME AND REPRESENT ONLY THE ENGINEER'S JUDGMENT AS A DESIGN PROFESSIONAL FAMILIAR WITH THE CONSTRUCTION INDUSTRY. THE ENGINEER CANNOT AND DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL CONSTRUCTION COSTS WILL NOT VARY FROM ITS OPINIONS OF PROBABLE COSTS.

DATA COLLECTION REFERENCES

Data collection consisted of referencing readily available information including:

- City of DeBary
- Volusia County MPO, http://www.volusiacountympo.com/
- The Volusia County MPO Bicycle/Pedestrian Plan, January 25, 2005
- Volusia County, http://www.volusia.org/
- Florida Department of Transportation (FDOT), http://www.dot.state.fl.us/Safety/ped_bike/brochures/ped_bike_brochures.htm
- http://www.dot.state.fl.us/
- Florida Pedestrian Planning and Design Handbook, FDOT, 2000
- Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways, May 2007
- FDOT Plans Preparation Manuel (PPM), January 2009
- FDOT 2009 Basis of Estimates Handbook
- ADA Standards for Accessible Design, Code of Federal Regulations, 28 CFR Part 36, July 1994