PRELIMINARY ENGINEERING REPORT

St. Johns River to Sea Loop Trail Gap PD&E Study

Volusia County, Florida

Financial Project ID Number: 439874-1-22-01

July 2020

PROFESSIONAL ENGINEER CERTIFICATION

PRELIMINARY ENGINEERING REPORT

Project: St. Johns River to Sea Loop Trail Gap PD&E Study

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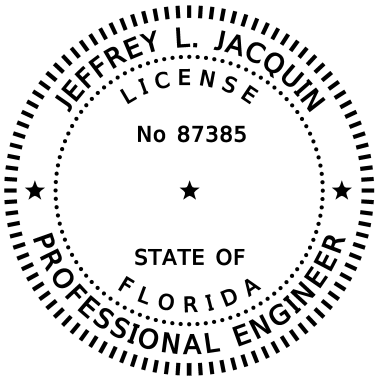
This preliminary engineering report contains engineering information that fulfills the purpose and need for the St. Johns River to Sea Loop Trail Gap Project Development & Environment Study from Lake Beresford Park to Grand Avenue in Volusia County, Florida. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

I hereby certify that I am a registered professional engineer in the State of Florida practicing with AIM Engineering & Surveying, Inc., and that I have prepared or approved the evaluation, findings, opinions, conclusions or technical advice for this project.



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AIM ENGINEERING & SURVEYING, INC.
3802 CORPOREX PARK DRIVE STE. 225
TAMPA, FLORIDA 33619
TELEPHONE (888) 627-4144
CERTIFICATE OF AUTHORIZATION NO. 3114
JEFFREY L. JACQUIN, P.E. 87385

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1.0 PROJECT SUMMARY

1.1 Project Description

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) study to construct a multi-use trail from Lake Beresford Park to Grand Avenue in Volusia County. The purpose of this PD&E study is to evaluate engineering and environmental data and to document information that will aid Volusia County and FDOT in determining the type, preliminary design, and location of the proposed improvements. The project study area is shown in **Figure 1-1** and totals approximately 3.6 square miles in size.

Figure 1-1 Project Location Map

1.2 Purpose & Need

The purpose of the project is to evaluate a potential 12-foot-wide paved multi-use trail from Lake Beresford Park to Grand Avenue in unincorporated Volusia County. This improvement is necessary to provide connectivity between two existing sections of the County's Spring-to-Spring Trail, a subsection of the St. Johns River to Sea Loop Trail, a system of paved recreational trails that, when completed, will total over 260 miles in length within five counties in eastern Central Florida.

SAFETY: Address Lack of Pedestrian and Bicycle Facilities

There are limited existing bicycle and pedestrian facilities within the study area. Constructing a paved multi-use trail from Lake Beresford Park to Grand Avenue will provide a safe means of travel for bicycle and pedestrian traffic and will improve roadway safety.

SYSTEM LINKAGE: Improve Trail Network Connectivity

Paved multi-use trails have been constructed both north and south of the project limits; however, there are no continuous existing bicycle or pedestrian facilities in-place to provide connectivity between these trail segments. Providing a paved multi-use trail between these two existing trail segments will improve overall trail network connectivity by joining disconnected trail segments into a single continuous facility from Blue Springs State Park to DeLeon Springs State Park.

RECREATION: Provide Additional Opportunities

Volusia County has an active cycling and recreational community that is supported by the River to Sea Transportation Planning Organization (R2CTPO) Bicycle/Pedestrian Advisory Committee and the St. Johns River to Sea Loop Alliance, among others. These groups advocate for regional trail systems that will provide recreational opportunities to the residents of the many communities they represent. If constructed, a multi-use trail will provide needed recreational infrastructure as well as direct access to the state parks located north and south of the project area.

1.3 Commitments

The Department is committed to the following measures to minimize impacts to the human and natural environment:

- The US Fish and Wildlife Service (USFWS) Standard Protection Measures for the Eastern Indigo Snake will be implemented to assure that the Eastern indigo snake will not be adversely impacted by the project.

1.4 Summary of Alternatives Analysis

Initial study corridors were identified through coordination with agency stakeholders and evaluation of the existing roadway network, which included surveying the initial corridor segments to define the existing rights-of-way. The right-of-way survey indicated that roadway right-of-way had not been established through many of the initial corridor segments and that trail construction through these segments would not be viable. The elimination of these unviable segments resulted in a single corridor alternative along S. Beresford Road, from Lake Beresford Park to Grand Avenue, east of the FDOT and CSX railroad corridor. Using the right-of-way survey information, another corridor alternative was developed along Lakeview Drive, west of the railroad corridor, and the study area was expanded to encompass this new alternative. The two alternative corridors were designated as Alternative 1 (West) and Alternative 2 (East), as shown in **Figure 1-2**, and advanced for further engineering and environmental analysis. The findings of the analyses were summarized in an evaluation matrix and presented to the public at an Alternatives Public Meeting in December 2018. Based on input received from the public and agency stakeholders, Alternative 2 was selected for further build consideration.

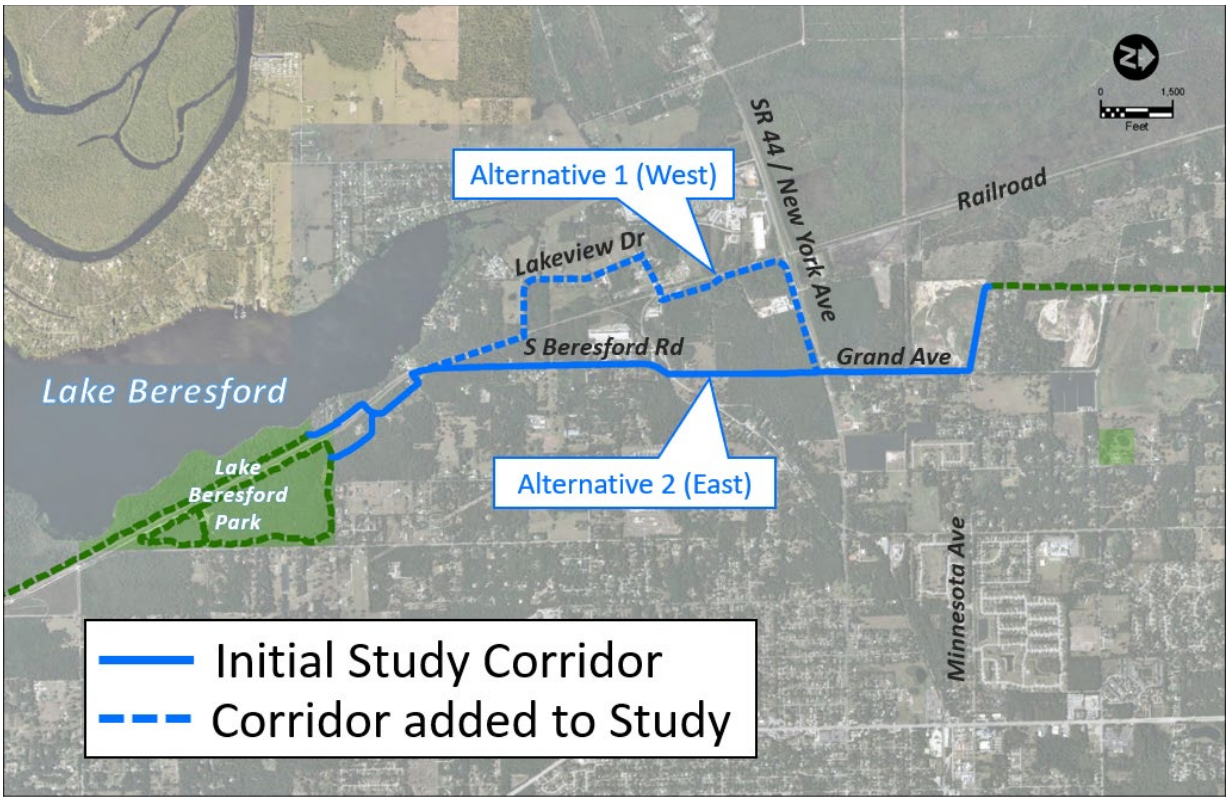


Figure 1-2 Final Study Corridors

1.5 Description of Preferred Alternative

The Preferred Alternative for the proposed trail was selected based on engineering and environmental factors, and comments received from the public. The Preferred Alternative results in the development of a 12-foot-wide multi-use trail with two-foot-wide unpaved shoulders, separated from the existing roadways by a minimum distance of 5 feet. Stormwater runoff will be collected in shallow trailside swales, where necessary. The Preferred Alternative meets the safety, system linkage, and recreation goals of the Purpose and Need statement by providing a continuous bicycle and pedestrian facility through the project area. Following the Alternatives Public Meeting, the Preferred Alternative was updated to provide three alignment options along S. Beresford Road that will be further evaluated during the Design Phase of the project. The Preferred Alternative typical section is shown in **Figure 1-3** and the overall project trail route is depicted in **Figure 1-4**. The approved typical section package is included in **Appendix A** and concept plans for the Preferred Alternative can be found in **Appendix B**.

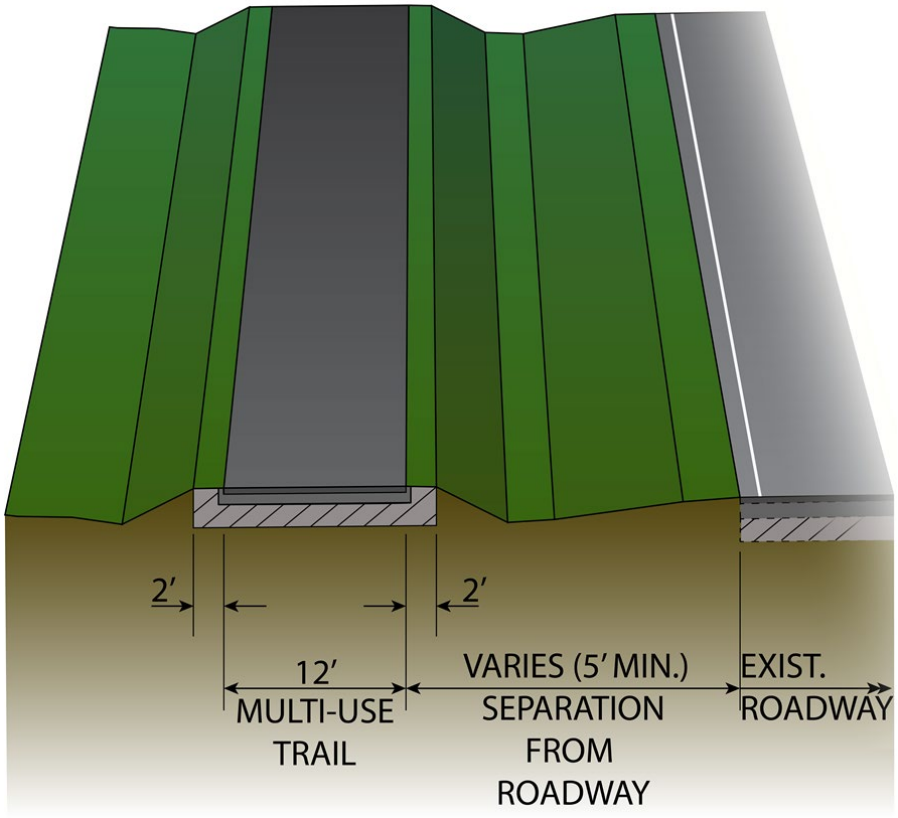


Figure 1-3 Preferred Typical Section

Figure 1-4 Preferred Alternative

The evaluation matrix includes environmental effects, right-of-way needs, and project costs. The evaluation matrix is shown in **Table 1-1**. It quantifies considerations such as potential business and residential relocations, impacts to environmental resources, and the acres of right-of-way needed for roadway improvements and stormwater facilities. The potential for construction of the proposed trail to impact archaeological/historical sites and threatened and endangered species were qualified in the matrix. Cost estimates were prepared for trail construction and are shown in the matrix. The construction costs were estimated using the FDOT Long Range Estimate (LRE) system and are provided in **Appendix C**.

Table 1-1 Evaluation Matrix

Evaluation Criteria	No-Build Alternative	Preferred Alternative		
		S. Beresford Rd. Option 1	S. Beresford Rd. Option 2	S. Beresford Rd. Option 3
Centerline Length of Alternative (miles)	0	3.069	3.059	3.061
Property Impacts				
Number of individual parcels impacted	0	16	17	17
Number of business relocations	0	0	0	0
Number of residential relocations	0	0	0	0
Environmental Effects				
Archaeological/Historical sites - potential for impact (low/medium/high)	none	medium	medium	medium
Public parks, recreation areas, or wildlife refuges (acres)	0	0.09	0.09	0.09
Wetland (acres)	0	0	0	0
Threatened and endangered species - potential for impact (low/medium/high)	none	low	low	low
Contamination sites (ratio - high/medium)	0/0	0/3	0/3	0/3
Provides existing trail connectivity (yes/no)	no	yes	yes	yes
Right of Way Needs				
Right of way acquisition for trail (acres)	0	4.89	4.68	5.42
Estimated Total Project Costs (2020 Cost)				
Design	$0	$2,100,000	$2,100,000	$2,100,000
Right-of-Way Cost	$0	$1,365,200	$1,513,200	$1,352,200
Trail Construction Cost	$0	$2,803,388	$2,797,739	$2,800,309
Roadway Construction Cost	$0	$1,397,732	$1,605,076	$1,037,812
Maintenance of Traffic (10%)	$0	$420,112	$440,281	$383,812
Mobilization (10%)	$0	$462,123	$484,310	$422,193
Project Unknowns and Initial Contingency	$0	$307,543	$322,308	$282,206
Construction Engineering & Inspection (15% of Construction Costs)	$0	$630,168	$660,422	$575,718
Preliminary Estimate of Total Project Cost	**$0**	**$9,486,266**	**$9,923,336**	**$8,954,251**

Notes:
1) Right-of-way cost estimates were prepared by FDOT in April 2020.
2) Construction costs were derived using the FDOT Long Range Estimates system in February 2020.

1.6 List of Technical Documents

A list of the technical documents prepared for the study in shown in **Table 1-2**.

Table 1-2 Technical Documents

Document	Completion Date
Public Involvement	
Public Involvement Plan	August 2017
Public Involvement Summary Memorandum	July 2020
Engineering	
ROW / Survey Maps	December 2017
Typical Section Package	July 2020
Concept Plans	April 2020
Preliminary Engineering Report	July 2020
Drainage Analysis Technical Memorandum	January 2020
Geotechnical Engineering Report	January 2020
Environmental	
Cultural Resource Assessment Survey	April 2019
Cultural Resource Assessment Survey Addendum	June 2019
Contamination Screening Evaluation Report	January 2020
Natural Resources Evaluation	January 2020

2.0 EXISTING CONDITIONS

Existing conditions information described in the following section of this report was derived from property records, right-of-way survey, FDOT Straight Line Diagrams of Road Inventory, Volusia County information, and field reviews.

2.1 Roadway

Existing roadways within the project area are typically two-lane undivided facilities without paved shoulders, bicycle lanes, or sidewalks.

2.2 Right-of-Way

Existing railroad and roadway right-of-way information was obtained from right-of-way survey. The right-of-way survey indicated that roadway right-of-way has not been defined along the frontage of many parcels within the study area. **Table 2-1** summarizes the typical existing right-of-way widths for facilities within the project area.

Table 2-1 Existing Right-of-Way

Facility	From	To	Width
FDOT Railroad	Lake Beresford Park Trail Access	SR 44 (New York Avenue)	100 ft
CSX Railroad	SR 44 (New York Avenue)	North of Project Area	100 ft
Alexander Drive	Lake Beresford Park	Beresford Road W	60 ft
Monroe Drive	Lake Beresford Park	Beresford Road W	50 ft
Lake Boulevard	Monroe Drive	Alexander Drive	70 ft
Beresford Road W	S Ridgewood Avenue	S Beresford Road	60 ft
S Beresford Road	Beresford Road W	Beresford Avenue W	50 ft
S Beresford Road	Beresford Avenue W	Old New York Avenue	40 ft
Old New York Avenue	Lakeview Drive	Euclid Avenue W	66 ft
Grand Avenue	Old New York Avenue	Euclid Avenue W	40 ft
Grand Avenue	Euclid Avenue W	SR 44 (New York Avenue)	50 ft
SR 44 (New York Avenue)	West of Project Area	East of Project Area	200 ft
Grand Avenue	SR 44 (New York Avenue)	North of Project Area	Undefined

2.3 Roadway Classification & Context Classification

Roadways within the project area are under Volusia County jurisdiction and are typically two-lane rural collector facilities within low-density and medium-density residential neighborhoods.

2.4 Adjacent Land Use

The existing land use within the project area is largely made up of low-density and medium-density residential areas, as well as agricultural and forested upland areas. The project area's existing land use, derived from the 2014 St. Johns River Water Management District land use classification dataset, is depicted in **Figure 2-1**.

2.5 Posted Speeds

The posted speed limits within the project area vary from 25 to 35 mph on the local streets and is 45 mph on SR 44.

2.6 Vertical and Horizontal Alignment

The project area is made up of flat-to-gently sloping terrain. Roadway profiles are generally flat, and the project area roadway network is arranged in a grid formation.

2.7 Pedestrian Accommodations

There are no existing sidewalks within the project area, except for the 8-ft sidewalks at the roundabout at the intersection of SR 44 and Grand Avenue.

2.8 Bicycle Facilities

There are no existing bicycle lanes or paved shoulders for bicycle use within the project area, except for the paved shoulders along SR 44 that transition to marked bike lanes at the roundabout at Grand Avenue.

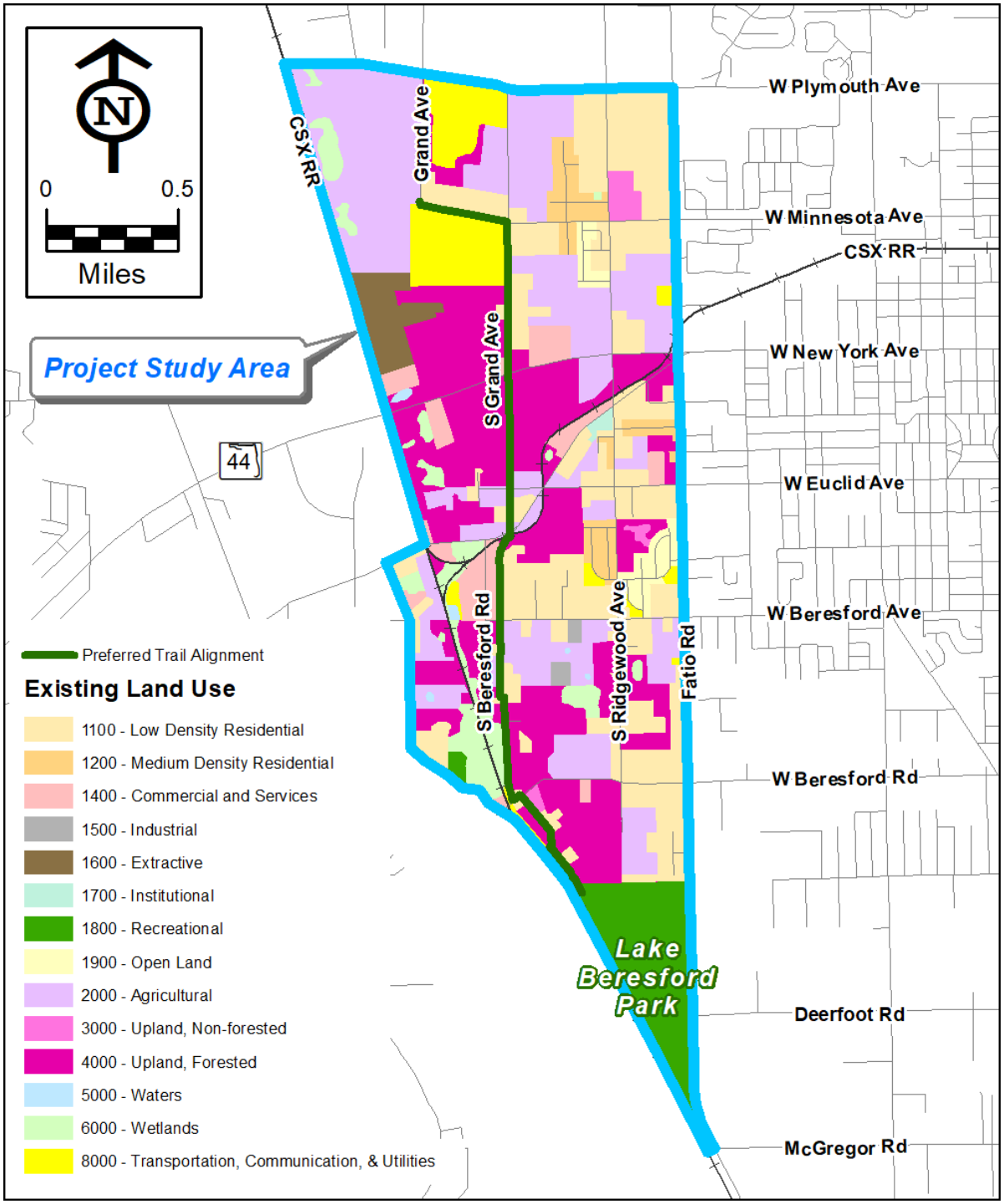


Figure 2-1 Existing Land Use

2.9 Transit Facilities

There is no transit service currently available within the project area.

2.10 Intersection Layout and Traffic Control

SR 44 at Grand Avenue is the only major intersection within the project limits. This intersection is controlled by a modern roundabout that includes wide sidewalks and bike lanes. There are many other stop-controlled minor intersections within the project area.

2.11 Railroad Crossings

An active north-south railroad line runs along the western boundary of the project area with existing at-grade crossings at Alexander Drive and Old New York Avenue. Additionally, a spur line connects to the main railroad line just south of Old New York Avenue and meanders northeasterly through the project area with at-grade crossings at West Avenue, S Beresford Road, Old New York Avenue, and SR 44.

2.12 Crash Data and Safety Analysis

Crash data was analyzed within the project study area for the years 2014 to 2018. A total of 194 crashes occurred within the study area during the five-year period, as shown on **Figure 2-2**. Of the 194 total crashes, three crashes involved bicycles and two crashes involved pedestrians. All five of the crashes involving bicycles and pedestrians included an injury. The bicycle and pedestrian crashes occurred at the following locations:

- Bicycle crash at Euclid Avenue & Fairfield Avenue, one injury reported.
- Bicycle crash at SR 44 & Grand Avenue, one injury reported.
- Bicycle crash at Old New York Avenue & Euclid Avenue, one injury reported.
- Pedestrian crash at SR 44 & Ridgewood Avenue, one injury reported.
- Pedestrian crash at Old New York Avenue & Euclid Avenue, one injury reported.

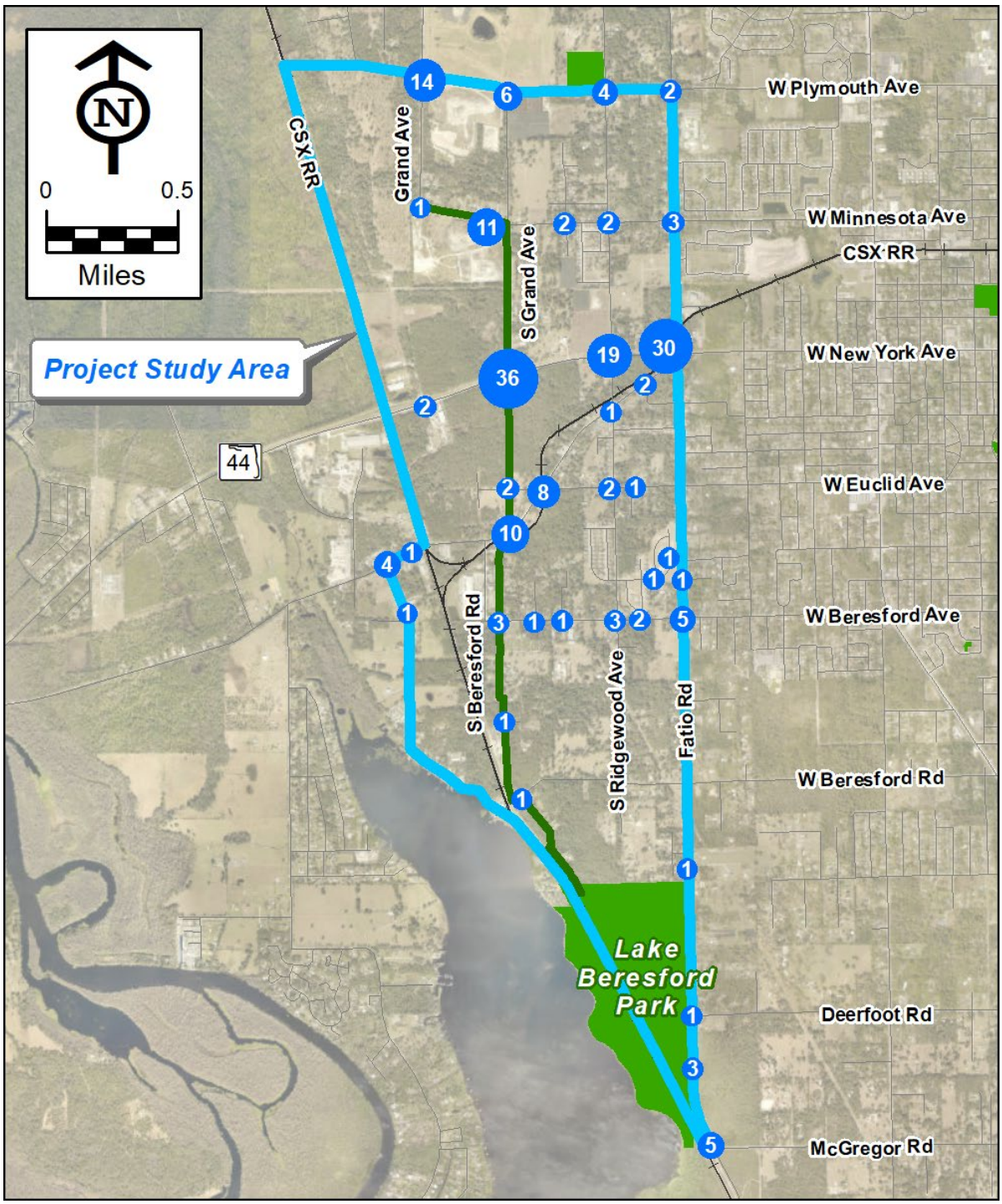


Figure 2-2 2014 – 2018 Crash Locations

2.13 Drainage

The project is located in WBID 2921D, Lake Woodruff Outlet and WBID 2893U1, Lake Beresford Drain and does not fall within any impaired water bodies or within the 100-year FEMA floodplain. The study area also falls within the jurisdiction of the St. Johns River Water Management District (SJRWMD). There are several existing permits within and adjacent to the alignments reviewed; however, none were found for the roadways being evaluated for the multi-use trail corridor.

The study area consists of several road systems, mostly owned and operated by Volusia County. Typical sections for these roadways vary as does the existing right of way width, and the existing roadways do not have a substantial drainage conveyance ditch. Roadway drainage is mostly through overland flow along the side slopes of the roadway and percolates into the highly permeable soils adjacent to the roadway. In general, runoff drains from the east to the west to Lake Beresford and Lake Woodruff, and ultimately to the St. Johns River.

2.14 Soils and Geotechnical Data

The "Soil Survey of Volusia County, Florida," published by the United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS), was reviewed for general near-surface soil information within the general project vicinity. This information indicates that there are nine soil groups within the vicinity of the proposed project, as summarized in **Table 2-2**.

Table 2-2 NRCS Soil Survey Results

Soil Series	Depth (inches)	AASHTO Classification	USDA Seasonal High Groundwater Table
			Depth (feet)
1 - Apopka fine sand, 0 to 5 percent slopes	0 to 80	A-3, A-2-4, A-2-6, A-4, A-6	> 6
4 - Astatula fine sand, 0 to 8 percent slopes	0 to 95	A-3	> 6
17 - Daytona sand, 0 to 5 percent slopes	0 to 80	A-3, A-2-4	3.5 to 5
22 - Electra fine sand, 0 to 5 percent slopes	0 to 70	A-3, A-2-4, A-2-6, A-4, A-6	2 to 3.5
37 - Orsino fine sand, 0 to 5 percent slopes	0 to 80	A-3	3.5 to 5
47 - Pits	-	-	-
48 - Placid fine sand, frequently ponded, 0 to 1 percent slopes	0 to 75	A-3, A-2-4	+2 to 1
49 - Pomona fine sand	0 to 60	A-3, A-2-4, A-2, A-4, A-6	0 to 1
63 - Tavares fine sand, 0 to 5 percent slopes	0 to 80	A-3	3.5 to 6

2.15 Utilities

The Utility Agency/Owners (UAOs) within the study area were determined using a Sunshine 811 Design Ticket, and are summarized in **Table 2-3**. Additional utilities information can be found in the *Utility Assessment Package*, prepared under separate cover.

Table 2-3 Existing Utilities

UAO	Contact	Email/Phone #	Facilities
City of Deland	Jim Ailes	ailesj@deland.org (386)-626-7250	Reclaimed Water, Water, Sewer
Charter Communications	Kevin Galbreath	(813)-684-6100	CATV
Duke Energy	Stephanie Olmo	(407)-905-3376	Electric
Lake Beresford Water Assoc. Inc.	John Stanberry	stanberry68@gmail.com (386)-717-3198	Water
MCI	Dean Boyers	(469)-886-4238	Fiber, Communication Lines
AT&T	Dino Farruggio	(561)-997-0240	Telephone

2.16 Lighting

The only street lighting within the project area is at the roundabout at the SR 44 intersection with Grand Avenue.

2.17 Aesthetics Features

The project area includes forested uplands, agricultural uses, and historical residences. Additionally, eight live oak trees along South Beresford Road were found to qualify for historic status under Volusia County guidelines. A historic tree is any live oak or bald cypress tree with a trunk diameter in excess of 36 inches when measured at chest height. The eight trees have diameters ranging from 40 inches to 74 inches, and range in distance from five feet to 12.5 feet from the existing edge of roadway pavement.

2.18 Bridges and Structures

There are no bridges or bridge culverts within the project limits.

3.0 PROJECT DESIGN CONTROLS & CRITERIA

The design criteria used for the proposed trail concepts are listed in **Table 3-1** and adhere to the *2019 FDOT Design Manual* (FDM). This criteria was used to develop and evaluate the build alternatives described in **Section 4.4.**

Table 3-1 Design Criteria

Multi-Use Path Design Criteria			
Design Element		**Criteria**	**Source**
Design Speed	Desirable Maximum (Downhill)	18 mph 30 mph	FDM 224.9
Paved Width	Maximum Desirable Minimum Constraints	14 ft 12 ft 10 ft 8 ft	FDM 224.4
Horizontal Clearance to Obstacles	Desirable Minimum	4 ft 2 ft	FDM 224.7
Minimum Separation from Roadway (distance to edge of paved shoulder)	Minimum	5 ft	FDM 224.12
Minimum Separation from Roadway (distance to back of curb and gutter)	Minimum	4 ft	FDM 224.12
Vertical Clearance for Multi-Use Path Bridges over Roadway	Desirable Minimum	17.5 ft 17 ft	FDM Table 260.6.1
Vertical Clearance for Multi-Use Path Bridges over Railroad	Minimum	23.5 ft	FDM Table 260.6.1
Vertical Clearance	Desirable (SUN Trail) Minimum	12 ft 8 ft	FDM 224.8
Shoulder Width	Minimum	2 ft	FDM 224.7
Horizontal Curve Radius	Minimum	74 ft	FDM Table 224.10.1
Profile Grade	Desirable Maximum	< 5% 11%	FDM Table 224.6.1
Pavement Cross Slope	Desirable Maximum	0.015 0.02	FDM 224.5
Stopping Sight Distance	Minimum	134 ft	FDM Table 224.10.2
Trail Side Slopes (outside of Shoulder)	Desirable Minimum	1:6 1:4	FDM 224.7

4.0 ALTERNATIVES ANALYSIS

4.1 Previous Planning Studies

The Regional Trails Corridor Assessment Final Report was completed in May 2017 by the R2CTPO. This study was undertaken to assess gaps within the regional trail network through completion of a Regional Tails Connectivity Assessment (RTCA). During the study, the R2CTPO worked with local residents, advocacy groups, governmental agencies, and municipalities to:

- Provide a comprehensive understanding of the overall status of regional trails;
- Identify gaps in the system and begin planning a strategy to close those gaps;
- Prepare for the addition of needed segments to the update of the Florida Department of Environmental Protection's Office of Greenways and Trails opportunities map;
- Identify trail segments that may be ready for funding and identify potential funding and partnering opportunities.

The RTCA study assessed 195.0 miles of trails and identified 27.9 miles of trail gaps. Engineering concept designs and cost estimates were developed for 20.7 miles of those trail gap segments to assist the R2CTPO with finding the appropriate approach to closing those gaps. Nine trails were identified in the RTCA and a gap in the Spring to Spring Trail was analyzed from Lake Beresford Park to Grand Avenue in DeLand. Two alignments were proposed and reviewed as part of the RTCA study to connect this gap. Through coordination with Volusia County staff, the most feasible alternative was identified as a direct alignment along South Beresford Road to Alexander Drive connecting to existing trails at Lake Beresford Park. A concept design and cost estimate were developed and included in the Regional Trails Corridor Assessment Final Report.

4.2 No-Build (No-Action) Alternative

The No-Build Alternative assumes that a multi-use path will not be constructed within the project area and that the existing trails to the north and south of the project area will remain unconnected. The following are the advantages and limitations associated with the No-Build Alternative:

Advantages of the No-Build Alternative

- No additional right-of-way needed
- No design, right-of-way or construction costs
- No delays to motorists or inconveniences to property owners during construction
- No construction impacts to the adjacent natural, physical and social environment

Disadvantages of the No-Build Alternative

- Does not meet Purpose and Need of project
- No standalone bicycle/pedestrian facility constructed within the project area
- No increase in safety for bicyclists and pedestrians within the project area
- Incompatibility with the River to Sea Loop Trail masterplan

The No-Build Alternative will remain a viable alternative throughout this PD&E study.

4.3 Future Conditions

Volusia County has assigned future land uses within the project area that include *Urban Low Intensity*, *Activity Center*, and *Rural* designations. These land uses are consistent with the existing land uses of the area and are compatible with the proposed River to Sea Loop trail.

4.4 Build Alternatives

Initial study corridors were first identified within the study area through discussions with agency stakeholders and evaluation of the existing roadway network. The initial study corridors are shown in **Figure 4-1**.

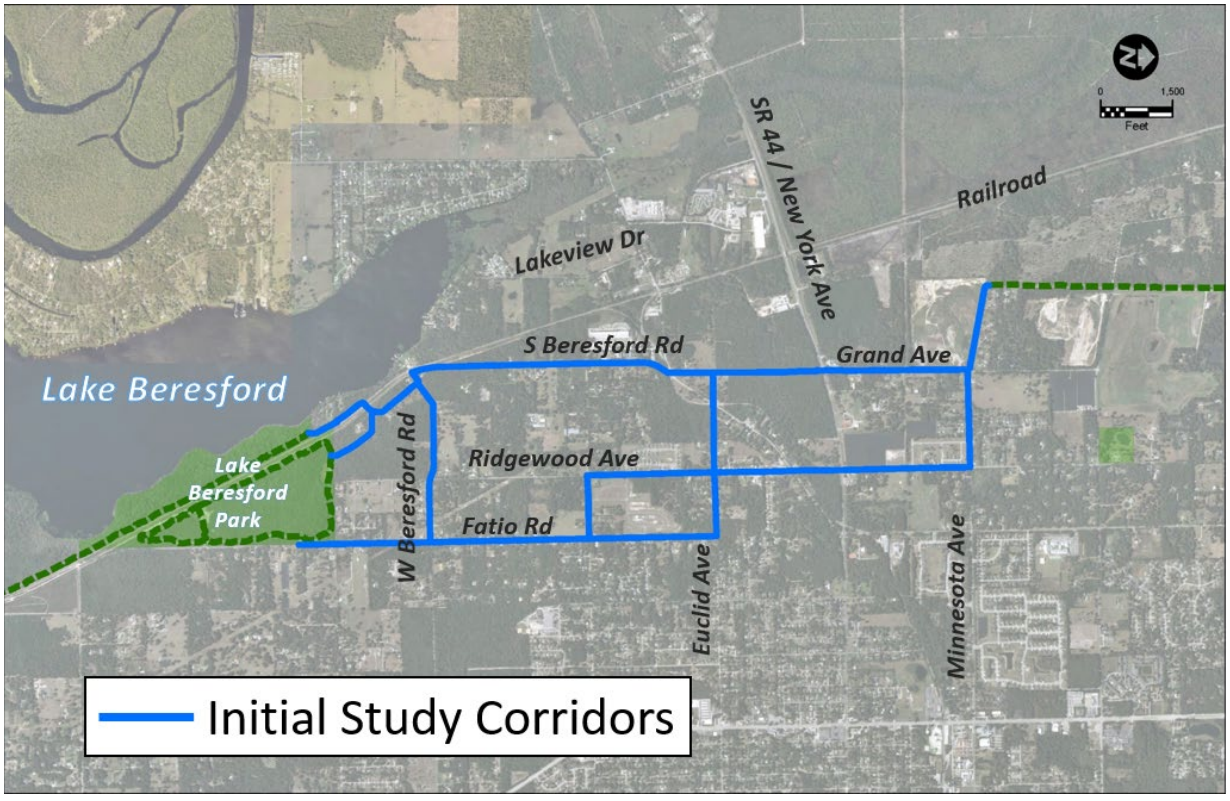


Figure 4-1 Initial Study Corridors

An extensive survey was then conducted to establish the existing roadway right-of-way along the corridors. The results of the right-of-way survey indicated that roadway right-of-way was not established along many sections of several of the initial corridor segments and trail construction through these segments would not be viable. The corridor segments along W. Beresford Road, Fatio Road, Ridgewood Avenue, and Euclid Avenue were therefore eliminated from further study, as depicted in **Figure 4-2**.

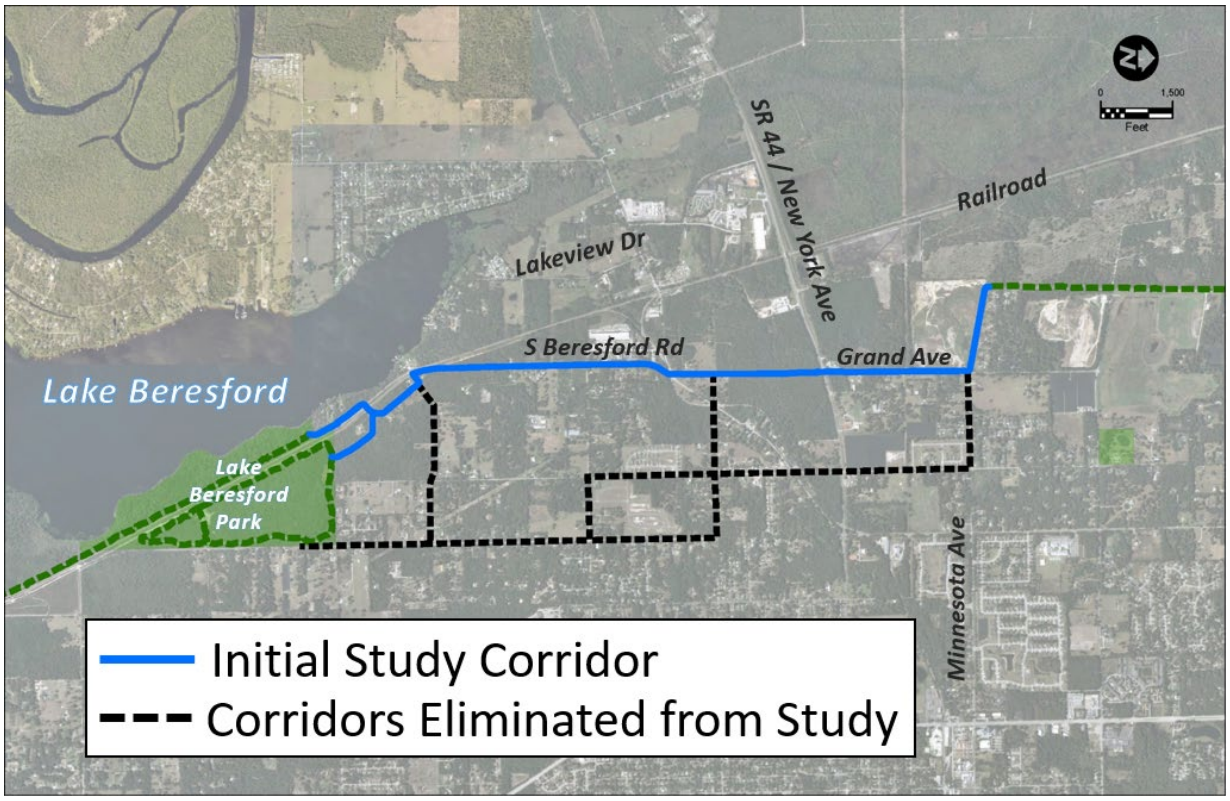


Figure 4-2 Eliminated Study Corridors

An additional potential study corridor was then identified that aligned further west than the initial corridors and would require two crossings of the FDOT-owned railroad corridor bounding the western side of the study area. This corridor was added to the project for further analysis and the two resulting corridors were identified as Alternative 1 (West) and Alternative 2 (East), as shown in **Figure 4-3**.

Both corridor alternatives considered two potential connections to the southern trail network: one connection to the trail from Blue Springs on the west side of the railroad tracks, and another connection to the trail system within Lake Beresford Park. The alternatives shared the same alignment heading north along Alexander Drive until the intersection of W. Beresford Road and S. Beresford Road. From that intersection, Alternative 1 would continue northward along the

eastern side of the railroad right-of-way to a proposed trail overpass that would carry the trail westward over the railroad tracks to Lakeview Drive. The alignment would then follow Lakeview Drive northward to Old New York Avenue, where it would then continue eastward, crossing the railroad tracks at-grade, to the DeLand transit station. Alternative 1 would then head northward along the railroad right-of-way until SR 44, where it would turn east and continue to the roundabout at the SR 44 and Grand Avenue intersection. Alternatives 1 and 2 would then follow a contiguous alignment northward along Grand Avenue to Minnesota Avenue, turning west and continuing to the existing DeLeon Springs trailhead at Grand Avenue. Alternative 2 differed from Alternative 1 in that it would continue northward along S. Beresford Road to the roundabout at the intersection of SR 44 and Grand Avenue.

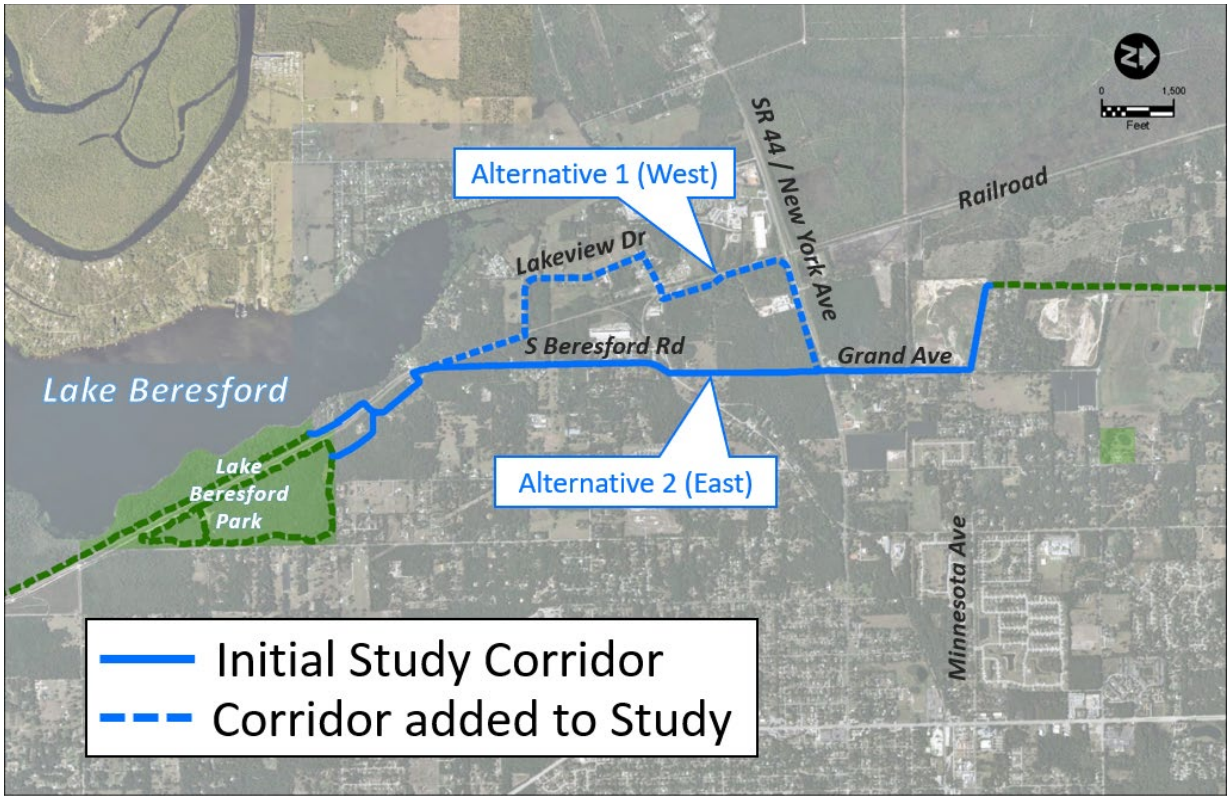


Figure 4-3 Final Study Corridors

Both Alternative 1 and Alternative 2 addressed the Purpose and Need of the project by providing a safe means of recreational transportation for bicyclists and pedestrians that is largely separated from interaction with motorized vehicles. The two alternatives were found to be viable and created a continuous long-distance trail system by closing the gap between the Blue Springs and DeLeon Springs trail systems. The alternatives were advanced for further engineering and environmental analysis and were presented to the public at an Alternatives Public Meeting.

4.5 Comparative Alternatives Evaluation

Each build alternative was evaluated based on environmental effects, residential and business impacts, right-of-way needs, and project costs. The matrix shown in **Table 4-1** was displayed at the Alternatives Public Meeting on December 5, 2018, to share the results of the alternatives evaluation process.

Table 4-1 Evaluation Matrix

Evaluation Criteria	No-Build Alternative	Alternative 1 (West)	Alternative 2 (East)
Centerline Length of Alternative (miles)	0	3.85	3.15
Property Impacts			
Number of individual parcels impacted	0	19	4
Number of business relocations	0	0	0
Number of residential relocations	0	0	0
Environmental Effects			
Archaeological/Historical sites - potential for impact (low/medium/high)	none	medium	medium
Public parks, recreation areas, or wildlife refuges (acres)	0	0.15	0.15
Wetland (acres)	0	1.01	0.52
Floodplains (acres)	0	0	0
Threatened and endangered species - potential for impact (low/medium/high)	none	low	low
Contamination sites (ratio - high/medium)	0/0	0/1	0/1
Provides existing trail connectivity (yes/no)	no	yes	yes
Right of Way Needs			
Right of way acquisition for trail (acres)	0	7.4	4.2
Project Cost			
Preliminary Estimate of Total Project Cost*	$0	$12.9 M	$12.1 M

*Project costs do not include potential right-of-way acquisition

4.6 Selection of the Preferred Alternative

Based on the consideration of the impacts shown in the evaluation matrix, the input received at the Alternatives Public Meeting, and through stakeholder coordination, Alternative 2 was selected for further build alternative consideration. Details of the Preferred Alternative are further discussed in **Section 6.0**.

5.0 PROJECT COORDINATION & PUBLIC INVOLVEMENT

A comprehensive *Public Involvement Program (PIP)* (August 2017) was prepared and initiated at the start of the study. This report outlines the strategies used to address public involvement and outreach over the course of the study. Below is a summary of public involvement activities associated with this project.

5.1 Agency Coordination

Numerous agencies were identified that would have an interest in the St. Johns River to Sea Loop Trail Gap PD&E Study. The project's *PIP* identified representatives of local, regional, state and federal agencies for coordination as needed.

Additional correspondence was coordinated with the City of DeLand, Volusia County, the R2CTPO, the River of Lakes Heritage Corridor Byway Organization, and the St. Johns River-to-Sea Loop Alliance to ensure they were given the opportunity to provide input. Small group meetings and presentations were provided to several of these organizations and agencies. Presentations and meetings provided project-related information on the multi-use trail alternatives and allowed for follow-up on the status of action items. Two presentations were provided to the St. Johns River to Sea Loop Alliance, one on August 8, 2017, and another on December 11, 2017. A presentation was also given to the R2CTPO on November 28, 2018. Meetings were held with Volusia County on October 17, 2017, November 28, 2018, March 20, 2019, May 29, 2019, and August 28, 2019.

5.2 Public Involvement

5.2.1. *Informational Public Meeting*

An informational public meeting was held from 5:30 PM to 7:30 PM on Tuesday November 14, 2017, at Volusia County's Thomas C. Kelly Administration Center, 123 W. Indiana Avenue in DeLand. Attendees included 44 citizens, four FDOT staff, and four consultant staff. Information about the project was on display and members of the study team were available to answer questions and receive input. As attendees entered the meeting, they were asked to sign in and were given an informational handout and a public comment form. There was no formal presentation.

Fourteen comment forms were received at the meeting and none were received during the 10-day comment period following the meeting, ending Tuesday, November 28, 2017. One comment was in favor of a trail addition. Eight comments suggested trail routes, with four comments in

favor of following the CSX railroad line, two comments suggesting that the trail be located near amenities like restaurants, one comment suggesting that the trail go through the swamp to Lakeview Drive, and one comment suggesting that the trail follow Plymouth Avenue to the CSX railroad line. Two comments were related to available property in the study area, including the open area on Ridgewood Avenue and Grand Avenue, north of SR 44, and the for-sale parcels in the Ridgewood Avenue area north of SR 44. Two comments recommended increased safety measures, one comment suggested benches along the trail, one comment suggested a pedestrian bridge at Lake Beresford Park, and one comment suggested changing the study name to "DeLand Gap." Eight comments were also received about where to avoid placing the trail, including Fatio Road, Hazen Road, Lakeview Drive, near Citrus Grove Elementary School and south of W. Beresford Road, South Ridgewood Avenue, and on either side of Alexander Drive.

5.2.2. Alternatives Public Meeting

An Alternatives Public Meeting was held from 5:00 PM to 7:00 PM on Wednesday, December 5, 2018, at the Sanborn Activity and Event Center, 815 S. Alabama Ave in DeLand. Attendees included 58 citizens, 15 FDOT staff, and six consultant staff. The meeting was held in an open house format. The purpose of the meeting was to present the multi-use trail options being evaluated. Project displays and related information were available for review, and members of the project team were available to discuss the project and answer questions. There was no formal presentation, but a continuous loop presentation was shown during the duration of the meeting. Attendees were asked to sign in as they entered and were given a project handout and comment form. Twenty-three comment forms were received at the workshop. Ten comment forms, emails, and/or letters were received during the 10-day comment period following the meeting, ending December 19, 2018. Of these, 15 comments supported the project and preferred Alternative 2 over Alternative 1 (locations of these Alternatives are shown on **Figure 4-3)**. Of those, four comments expressed concerns that included the number of times the trail would cross the railroad, disturbance of the existing green space on either side of the road, and siting the trail on Alexander Drive west of the railroad. Only three comments supported Alternative 1, and only two comments were against the project. Other comments received were related to intersections, SR 44, trail connections, the project schedule, or meeting requests.

5.2.3. Alexander Drive Property Owner Meeting

A property owner meeting was held from 5:00 PM to 7:00 PM on January 22, 2019, at the Sanborn Activity and Event Center, 815 S. Alabama Ave, DeLand. Attendees included ten citizens, three FDOT staff, and four consultants. The meeting format included a short presentation and a

question-and-answer (Q&A) session. The same materials for the Alternatives Public Meeting were presented at this meeting. Speaker request cards were handed out to those citizens who wished to speak or ask questions of the project team. Six speaker request cards were turned in and each person was given the opportunity to speak for three minutes using a microphone. Many topics for discussion were raised, with concerns over the impact trail users may have on property owners' peace and safety being a common topic. Four commenters stated opposition to building the trail on the west side of the railroad tracks.

5.2.4. S. Beresford Drive Property Owner Meeting

A S. Beresford Drive property owner meeting was held from 5:00 PM to 7:00 PM on August 15, 2019, at the Sanborn Activity and Event Center, 815 S. Alabama Ave, DeLand. Attendees included sixteen citizens, seven FDOT staff, four Volusia County staff, and four consultant staff. The meeting format included a short presentation and a Q&A session. The same materials for the Alternatives Public Meeting were presented at this meeting along with roll plots depicting three alternative alignment options being proposed along S. Beresford Road, as described in **Section 6.1.2** and depicted in the concept plans included in **Appendix B**. As attendees entered the meeting, they were asked to sign in and were given a project handout and a neighborhood map. Members of the study team were available to answer questions and discuss the project. Speaker request cards were handed out to those citizens who wished to speak or ask questions of the project team. Seven speaker request cards were received, and each person was given the opportunity to speak for three minutes using a microphone. Again, property owners' peace and safety were common concerns among commenters. Another common concern was over the historic trees that would potentially be affected by alignment Option 2. Two commenters preferred the no-build alternative, and the other five commenters preferred Alternative 1 that was presented at the Alternatives Public Meeting in December 2018 and is depicted in **Figure 4-3**.

6.0 DESIGN FEATURES OF THE PREFERRED ALTERNATIVE

Based on the evaluation of the alternatives described in **Section 4.0**, Alternative 2 is the Preferred Alternative. Concept plans illustrating the Preferred Alternative can be found in **Appendix B**.

6.1 Engineering Details of the Preferred Alternative

6.1.1 Typical Sections

The Preferred Alternative typical section consists of a 12-foot-wide paved multi-use trail with two-foot-wide unpaved shoulders. The trail will slope to the inside at a grade of 1.5% and stormwater runoff will be collected in a one-foot-deep swale with 1:4 front and back slopes and a 4-foot-wide flat bottom, to be constructed between the trail and the adjacent roadways. The trail-side shoulders of the existing roadways will be reconstructed to provide a six-foot unpaved shoulder with a 6% slope and, where roadway reconstruction is required, the proposed roadways will consist of two 10-foot travel lanes with six-foot unpaved shoulders. Examples of these typical section scenarios are shown in **Figure 6-1** and **Figure 6-2**. The approved typical section package is included in **Appendix A**.

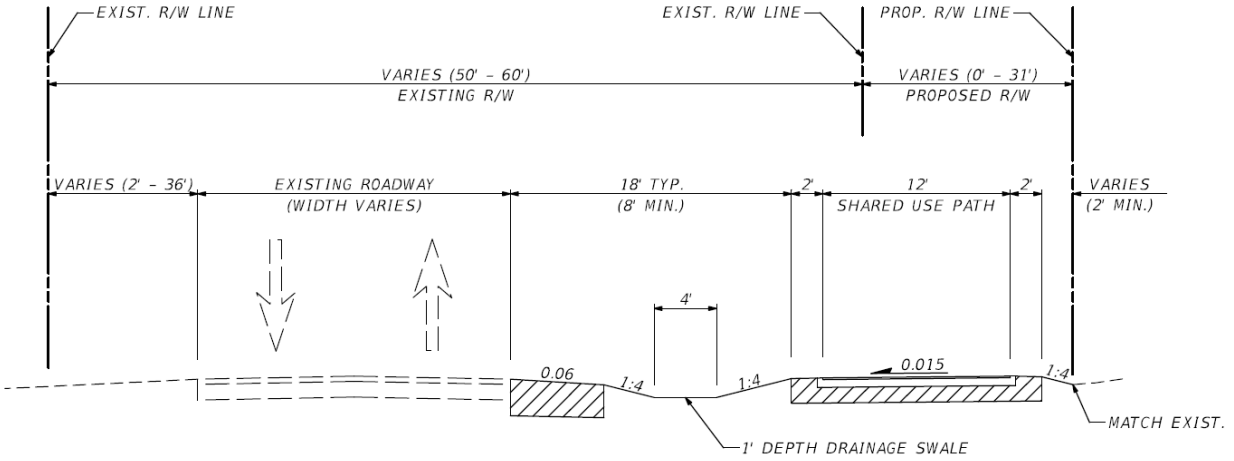


Figure 6-1 Typical Section with Existing Roadway

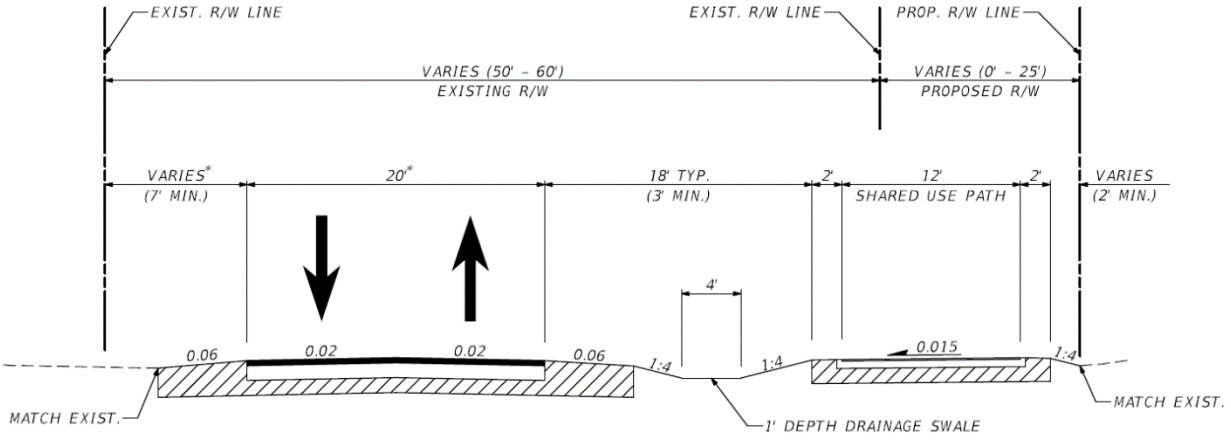


Figure 6-2 Typical Section with Proposed Roadway

6.1.2 Right-of-Way and Relocations

The proposed trail will be constructed either left or right of the adjacent roadways, as depicted in the concept plans in **Appendix B**. The trail's alignment was selected to minimize right-of-way impacts by making use of the available areas between the existing roadways and the limits of the existing rights-of-way, where possible. Where proposed right-of-way was unavoidable due to the constrained existing right-of-way width, the alignment was typically sited to impact the fewest number of parcels.

Following the Alternatives Public Meeting, the Preferred Alternative was updated to provide three alignment options along S. Beresford Road that will be further evaluated during the Design Phase of the project. Option 1 proposes the trail be constructed along the western side of S. Beresford Road from W. Beresford Road to W. Beresford Avenue and will require roadway reconstruction along a portion of S. Beresford Road. Option 2 proposes the trail be constructed along the eastern side of S. Beresford Road from W. Beresford Road to W. Beresford Avenue and will also require roadway reconstruction along a portion of S. Beresford Road. Option 3 does not require roadway reconstruction and proposes the trail be constructed along the eastern side of S. Beresford Road from W. Beresford Road to approximately 1,600 feet south of W. Beresford Avenue, where it will cross over to the western side of S. Beresford Road via a midblock crossing, and then continue northward along the western side of S. Beresford Road. The three S. Beresford Road options all require right-of-way acquisition; however, the options all also avoid impacts to the eight historic live oak trees sited along the eastern side of S. Beresford Road.

The Preferred Alternative does not require any residential or business relocations. The number of parcels impacted, required acquisition area, and associated cost varies depending on which

alignment option is selected along S. Beresford Road from W. Beresford Road to W. Beresford Avenue. The impacts summarized in **Table 6-1** represent the total right-of-way impacts along the entire proposed trail, from Lake Beresford Park to the existing trail at Grand Avenue. The existing and proposed rights-of-way are depicted on the concept plans included in **Appendix B**.

Table 6-1 Right-of-Way Impacts

Project Phase	Preferred Alternative Costs		
	S. Beresford Rd. Option 1	S. Beresford Rd. Option 2	S. Beresford Rd. Option 3
Number of Parcels Impacted	14	15	16
Right-of-Way Acquisition Area	4.89 acres	4.68 acres	5.42 acres
Right-of-Way Cost	$1,365,200	$1,513,200	$1,352,200

6.1.3 Horizontal and Vertical Geometry

The horizontal curves of the trail's alignment generally fall into one of three categories: tight bends at intersecting roadways, with radiuses varying from 20 feet to 100 feet; driveway crossings and obstacle avoidance, with radiuses varying from 92 feet to 506 feet; and offsets from the adjacent roadway curves, with radiuses varying from 464 feet to 7,953 feet. The trail's horizontal curve radiuses are labeled on the concept plans included in **Appendix B**. Existing National Geodetic Vertical Datum (NGVD) ground elevations along the trail alignment range from +10 feet to +60 feet NGVD and the project area generally consists of flat-to-gently sloping terrain. The vertical alignment of the trail will typically mimic the vertical alignment of the adjacent roadways and will be constructed in compliance with grade criteria set by the Americans with Disabilities Act of 1990. Detailed vertical geometry will be determined during the final design phase of the project.

6.1.4 Utilities

The Preferred Alternative is not expected to significantly impact existing utilities and mitigation measures will be taken during the design phase of the project to minimize possible impacts to the existing utilities. If impacts are unavoidable, design alternatives will be reviewed to allow for the relocation of impacted facilities in a manner that minimizes costs to the UAO and disruption to their customers.

Since relocations of facilities located in easements would likely be eligible for reimbursement, all measures will be taken to avoid impacting the existing utility facilities identified in easements. Though relocation of other facilities within the existing right-of-way are anticipated, all efforts will be made during final design to minimize impacts to Florida Power and Light's transmission line.

6.1.5 Drainage and Stormwater Management Facilities

The existing roadway does not have a formal drainage system and there is no known history of flooding within the proposed construction limits. It is expected that final design of the Preferred Alternative will allow for stormwater runoff to drain over the trail or through small cross-drain pipes, as needed, to maintain the existing flow patterns. Where feasible, swales will be constructed between the proposed trail and adjacent roadways, as described in **Section 6.1.1**., and will be designed in consideration of the combined runoff from the trail and roadway and for conveyance to historic discharge points. A *Drainage Technical Memorandum* was prepared for the Preferred Alternative and is included in **Appendix D**.

6.1.6 Design Variations and Design Exceptions

No design variations or exceptions are anticipated for this project.

6.1.7 Cost Estimates

The project costs estimated for the Preferred Alternative are summarized in **Table 6-2**. Construction costs were prepared using the FDOT's LRE program are included in **Appendix C**.

Table 6-2 Project Cost Estimate

Project Phase	Preferred Alternative Costs		
	S. Beresford Rd. Option 1	S. Beresford Rd. Option 2	S. Beresford Rd. Option 3
Design	$2,100,000	$2,100,000	$2,100,000
Right-of-Way Cost	$1,365,200	$1,513,200	$1,352,200
Trail Construction Cost	$2,803,388	$2,797,739	$2,800,309
Roadway Construction Cost	$1,397,732	$1,605,076	$1,037,812
Maintenance of Traffic (10%)	$420,112	$440,281	$383,812
Mobilization (10%)	$462,123	$484,310	$422,193
Project Unknowns and Initial Contingency	$307,543	$322,308	$282,206
Construction Engineering & Inspection (15% of Construction Costs)	$630,168	$660,422	$575,718
Preliminary Estimate of Total Project Cost	**$9,486,266**	**$9,923,336**	**$8,954,251**

6.2 Summary of Environmental Impacts of the Preferred Alternative

6.2.1 Future Land Use

Volusia County has assigned future land uses along the Preferred Alternative route that include *Urban Low Intensity*, *Activity Center*, and *Rural* designations. These land uses are consistent with the existing land uses of the area and are compatible with the proposed multi-use trail.

6.2.2 Cultural Resources

A *Cultural Resource Assessment Survey (CRAS)* (April 2019) and a *CRAS Addendum* (June 2019) were prepared under separate cover. The reports included background research and field survey findings, including a review of the Florida Master Site File and the National Register of Historic Places (NRHP). No archaeological sites were recorded within the project's Area of Potential Effect (APE).

The architectural survey resulted in the identification and evaluation of 12 historic resources within the APE, including six previously recorded resources and six newly recorded resources. The previously recorded historic resources include one linear resource and five structures. The newly recorded historic resources include one linear resource and five structures. The five previously recorded and five newly recorded structures are recommended ineligible for the NRHP, due to a lack of significant historic associations and architectural distinction. The segment of the previously recorded Jacksonville, Tampa, & Key West Railroad (8VO07641) within the APE is eligible for the NRHP for significant associations with transportation and community planning and development in Volusia County and the Florida interior, and for its association with Henry B. Plant and Henry M. Flagler. The newly recorded linear resource, the Jacksonville, Tampa, & Key West Railroad Spur (8VO10189), is eligible for the NRHP for significant associations with transportation and community planning and development.

The two eligible resources cross the APE in different locations: 8VO07641 travels roughly north/south through the western edge of the south end of the APE, while 8VO10189 travels east/west through the center of the APE. The proposed trail will be approximately 12 feet wide and will be constructed well outside of the 8VO07641 railroad right-of-way. At its closest point, the trail will be approximately 40 feet northeast of the railroad. The trail is not of a particular viewshed concern, as the trail will be at-grade, along a current roadway, and will not diminish integrity of setting to a point where 8VO07641 is not able to showcase its significance. The proposed trail will introduce a new at-grade crossing at 8VO10189 along the west side of South Beresford Road and South Grand Avenue. After construction, railroad traffic will continue as before. Prior to construction, extensive coordination will occur with the operator to ensure minimal interruption. Ultimately, the trail will not impede railroad traffic and will not significantly

alter fabric associated with the railroad. Although the introduction of a trail will diminish integrity of setting slightly, the introduction of the trail occurs where an existing road already crosses, minimizing any major loss of setting. No other aspects of integrity will be diminished as the purpose, function, and overall design of the railroad will remain, allowing it to evoke the same feeling and association. Therefore, it is expected that the Preferred Alternative will have no adverse effect on cultural resources listed or eligible for listing in the NRHP. No other architectural or archaeological work is recommended.

The *CRAS* and *CRAS Addendum* were submitted to the State Historic Preservation Officer, who provided concurrence on June 10, 2019, and October 31, 2019, respectively, as provided in **Appendix E**.

6.2.3 Wetlands

A *Natural Resources Evaluation (NRE)* (January 2020) was prepared under separate cover for this project. The purpose of this evaluation was to assure the protection, preservation, and enhancement of wetlands to the fullest extent practicable.

Through field data and in-house reviews, a total of two wetland and surface water habitat types were identified within the project study area. Wetland and surface water habitats include mixed wetland hardwoods and freshwater marshes. Five wetlands are within 300 feet of the Preferred Alternative trail alignment; however, no wetlands are directly within the Preferred Alternative footprint and there are no anticipated wetland or surface water impacts.

6.2.4 Protected Species and Habitat

An *NRE* (January 2020) was prepared under separate cover to document and evaluate the effects of the Preferred Alternative on protected species within the project corridor. The evaluation included reviews of literature and databases maintained by the U.S. Fish and Wildlife Service, the Florida Fish and Wildlife Conservation Commission, and the Florida Natural Areas Inventory. Project biologists conducted field evaluations of the project area, adjacent habitats, and species surveys on May 31, 2019, to identify the potential occurrence of protected species and/or presence of federal-designated critical habitat.

Based on evaluation of collected data and field reviews, the federal- and state-listed species discussed in **Table 6-3** and **Table 6-4** were observed or were determined to have the potential to occur within or adjacent to the project area. An effect determination was made for each of these species based on an analysis of the potential impacts of the proposed project on each species. Other protected species with the potential to occur in the project area are the bald eagle, osprey, and Florida black bear.

Table 6-3 Summary of Species Effects, Federal

Determination	Federally Listed Species
No effect	Okeechobee Gourd (*Cucurbita okeechobeensis*)
	American Alligator (*Alligator mississippiensis*)
	Wood Stork (*Mycteria americana*)
	Red-cockaded Woodpecker (*Picoides borealis*)
	West Indian Manatee (*Trichechus manatus*)
May affect, but is not likely to adversely affect	Rugel's Pawpaw (*Deeringothamnus rugelii*)
	Striped Newt (*Notophthalmus perstriatus*)
	Eastern Indigo Snake (*Drymarchon couperi*)
	Florida Scrub-jay (*Aphelocoma coerulescens*)

Table 6-4 Summary of Species Effects, State

Determination	State Listed Species
No effect anticipated	Many-flowered Grass-pink (*Calopogon multiflorus*)
	Sand Butterfly Pea (*Centrosema arenicola*)
	Large-flowered Rosemary (*Conradina grandiflora*)
	Hartwrightia (*Hartwrightia floridana*)
	Star Anise (*Illicium parviflorum*)
	Nodding Pinweed (*Lechea cernua*)
	Florida Spiny-pod (*Matelea floridana*)
	Celestial Lily (*Nemastylis floridana*)
	Florida Beargrass (*Nolina atopocarpa*)
	Giant Orchid (*Pteroglossaspis ecristata*)
	Ocala Vetch (*Vicia ocalensis*)
	Bluenose Shiner (*Pteronotropis welaka*)
No adverse effect anticipated	Gopher Tortoise (*Gopherus polyphemus*)
	Florida Pine Snake (*Pituophis melanoleucus mugitus*)
	Florida Burrowing Owl (*Athene cunicularia floridana*)
	Florida Sandhill Crane (*Grus canadensis pratensis*)

6.2.5 Essential Fish Habitat

There is no essential fish habitat within the project study area.

6.2.6 Contamination

Level I contamination evaluations were conducted for the study and a *Contamination Screening Evaluation Report (CSER)* (January 2020) was prepared under separate cover. Based on a document and site review, 13 sites along the corridor were evaluated. Three of the sites were found to have a risk rating of "Medium" and the remaining 10 sites were found to have a risk rating of "Low/No."

For the sites ranked "Low/No," no further action is required at this time. These sites/facilities have the potential to impact the proposed project but based on select variables these have been determined to have low risk to the project at this time. Variables that may change the risk ranking include a facility's non-compliance to environmental regulations, new discharges to the soil or groundwater, and modifications to current permits. Should any of these variables change, assessment of these facilities shall be conducted.

For those locations with a risk ranking of "Medium," the FDOT Project Manager and the District Contamination Impact Coordinator will coordinate on further actions that must be taken to best address the contamination issue. This may include determining if the Florida Department of Environmental Protection/FDOT Memorandum of Understanding applies to any sites, conducting Level II activities, or recommending Level III or remedial activities, notes on the plans, design modifications, and/or special provisions prior to or during construction.

6.3 Preferred Alternative Evaluation Matrix

The Preferred Alternative has been evaluated for its effect on the social and cultural makeup of the surrounding area, for impacts to the environment, and for its ability to meet the purpose and need of this project. An evaluation matrix showing the impacts and costs associated with the Preferred Alternative, as well as the No-Build Alternative, is shown in **Table 6-5**.

Table 6-5 Preferred Alternative Evaluation Matrix

Evaluation Criteria	No-Build Alternative	Preferred Alternative		
		S. Beresford Rd. Option 1	S. Beresford Rd. Option 2	S. Beresford Rd. Option 3
Centerline Length of Alternative (miles)	0	3.069	3.059	3.061
Property Impacts				
Number of individual parcels impacted	0	16	17	17
Number of business relocations	0	0	0	0
Number of residential relocations	0	0	0	0
Environmental Effects				
Archaeological/Historical sites - potential for impact (low/medium/high)	none	medium	medium	medium
Public parks, recreation areas, or wildlife refuges (acres)	0	0.09	0.09	0.09
Wetland (acres)	0	0	0	0
Threatened and endangered species - potential for impact (low/medium/high)	none	low	low	low
Contamination sites (ratio - high/medium)	0/0	0/3	0/3	0/3
Provides existing trail connectivity (yes/no)	no	yes	yes	yes
Right of Way Needs				
Right of way acquisition for trail (acres)	0	4.89	4.68	5.42
Estimated Total Project Costs (2020 Cost)				
Design	$0	$2,100,000	$2,100,000	$2,100,000
Right-of-Way Cost	$0	$1,365,200	$1,513,200	$1,352,200
Trail Construction Cost	$0	$2,803,388	$2,797,739	$2,800,309
Roadway Construction Cost	$0	$1,397,732	$1,605,076	$1,037,812
Maintenance of Traffic (10%)	$0	$420,112	$440,281	$383,812
Mobilization (10%)	$0	$462,123	$484,310	$422,193
Project Unknowns and Initial Contingency	$0	$307,543	$322,308	$282,206
Construction Engineering & Inspection (15% of Construction Costs)	$0	$630,168	$660,422	$575,718
Preliminary Estimate of Total Project Cost	**$0**	**$9,486,266**	**$9,923,336**	**$8,954,251**

Notes:
1) Right-of-way cost estimates were prepared by FDOT in April 2020.
2) Construction costs were derived using the FDOT Long Range Estimates system in February 2020.

APPENDIX A

Approved Typical Section Package

STATE OF FLORIDA

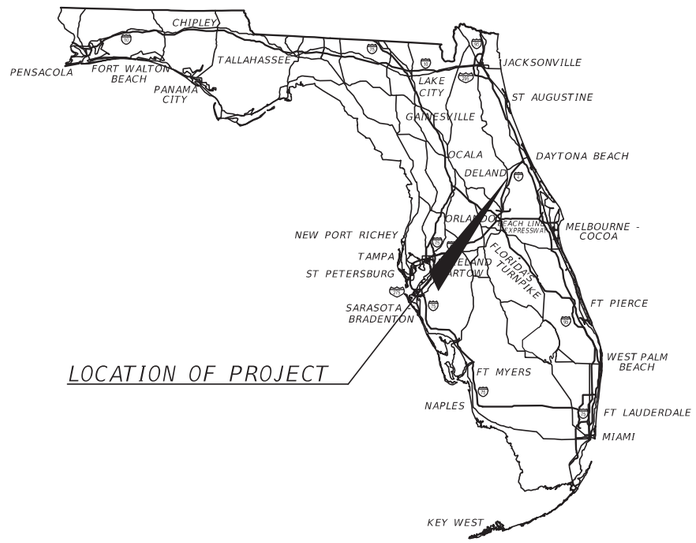
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION PACKAGE

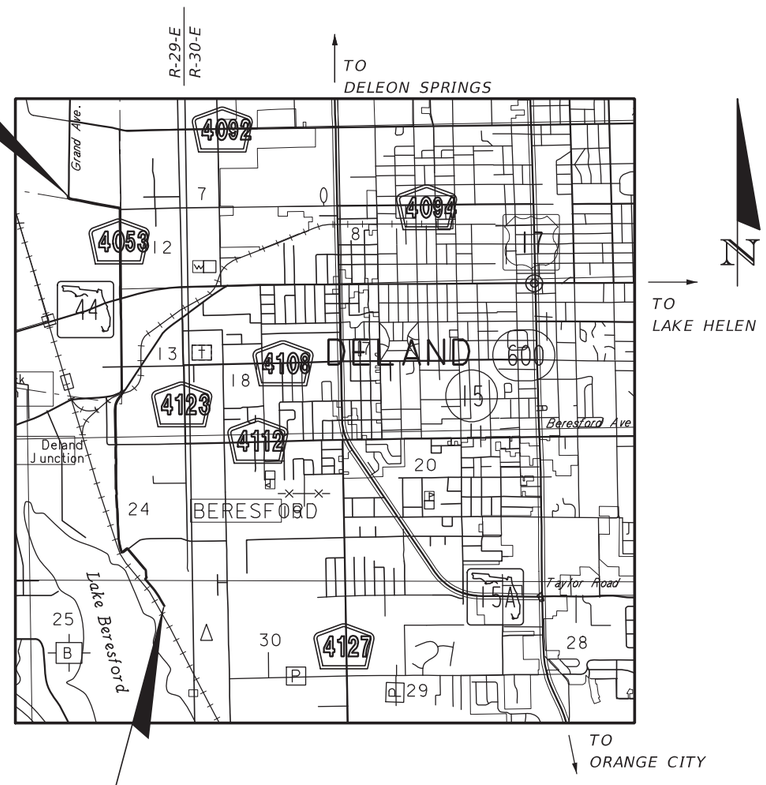
FINANCIAL PROJECT ID 439874-1-22-01

VOLUSIA COUNTY

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY
FROM LAKE BERESFORD PARK TO GRAND AVENUE



END PROJECT
GRAND AVE.



BEGIN PROJECT
LAKE BERESFORD PARK

INDEX OF ROADWAY PLANS

JEFFREY L. JACQUIN
LICENSE
No 87385
STATE OF FLORIDA
PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY

Digitally signed by Jeffrey Jacquin
Date: 2020.07.02 11:56:47 -04'00'

ON THE DATE ADJACENT TO THE SEAL

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

AIM ENGINEERING & SURVEYING, INC.
3802 CORPOREX PARK DRIVE STE. 225
TAMPA, FLORIDA 33619
TELEPHONE (888) 627-4144
CERTIFICATE OF AUTHORIZATION NO. 3114
JEFFREY L. JACQUIN, P.E. 87385

FDOT PROJECT MANAGER:

DAVID A. GRAEBER, P.E.

SHEET NO.
1

TYPICAL SECTION CONCURRENCE:

Mario J Bizzio

Digitally signed by Mario J Bizzio
Date: 2020.07.14 09:05:52 -04'00'

FDOT DISTRICT DESIGN ENGINEER

FDOT DISTRICT STRUCTURES DESIGN ENGINEER

CONTEXT CLASSIFICATION CONCURRENCE:

Loreen Bobo

Digitally signed by: loreen.bobo@dot.state.fl.us
DN: CN = loreen.bobo@dot.state.fl.us
Date: 2020.07.14 09:23:06 -05'00'

FDOT DISTRICT INTERMODAL SYSTEMS DEVELOPMENT MANAGER

DESIGN SPEED AND POSTED SPEED CONCURRENCE:

James S Stroz

Digitally signed by James S Stroz
Date: 2020.07.14 08:47:01 -04'00'

FDOT DISTRICT TRAFFIC OPERATIONS ENGINEER

Mario J Bizzio

Digitally signed by Mario J Bizzio
Date: 2020.07.14 09:06:09 -04'00'

FDOT DISTRICT DESIGN ENGINEER

AGENCY CONCURRENCE:

VOLUSIA COUNTY ENGINEERING AND CONSTRUCTION DIRECTOR

FINANCIAL PROJECT ID	SHEET NO.
439874-1-22-01	2

6/3/2020 4:35:16 PM

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
(X)	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
( )	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	(X)	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

( )	NATIONAL HIGHWAY SYSTEM
( )	STRATEGIC INTERMODAL SYSTEM
( )	STATE HIGHWAY SYSTEM
(X)	OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

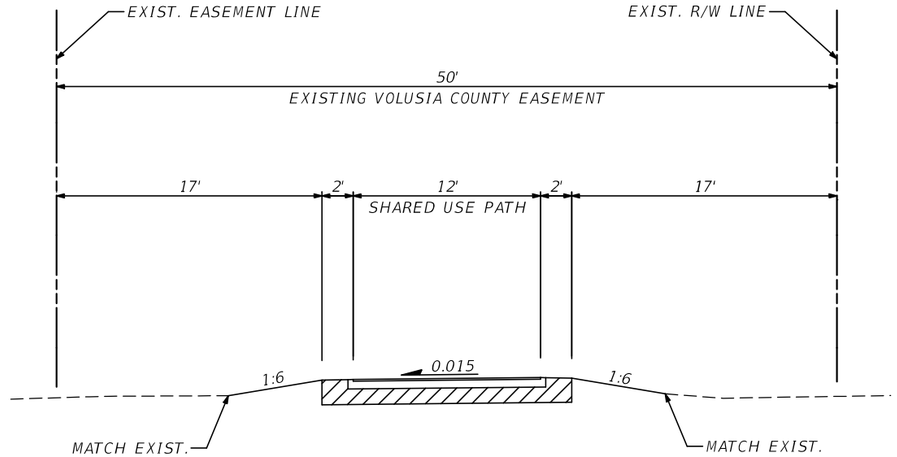
( )	1 - FREEWAY
( )	2 - RESTRICTIVE w/Service Roads
( )	3 - RESTRICTIVE w/660 ft. Connection Spacing
( )	4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( )	5 - RESTRICTIVE w/440 ft. Connection Spacing
( )	6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( )	7 - BOTH MEDIAN TYPES

CRITERIA

(X)	NEW CONSTRUCTION / RECONSTRUCTION
( )	RESURFACING (LA FACILITIES)
( )	RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 1



VOLUSIA COUNTY EASEMENT

STA. 10+00.00 TO STA. 21+33.99

SHARED USE PATH
DESIGN SPEED = 18 MPH

FINANCIAL PROJECT ID	SHEET NO.
439874-1-22-01	3

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
(X)	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
( )	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	(X)	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
( ) STATE HIGHWAY SYSTEM
(X) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

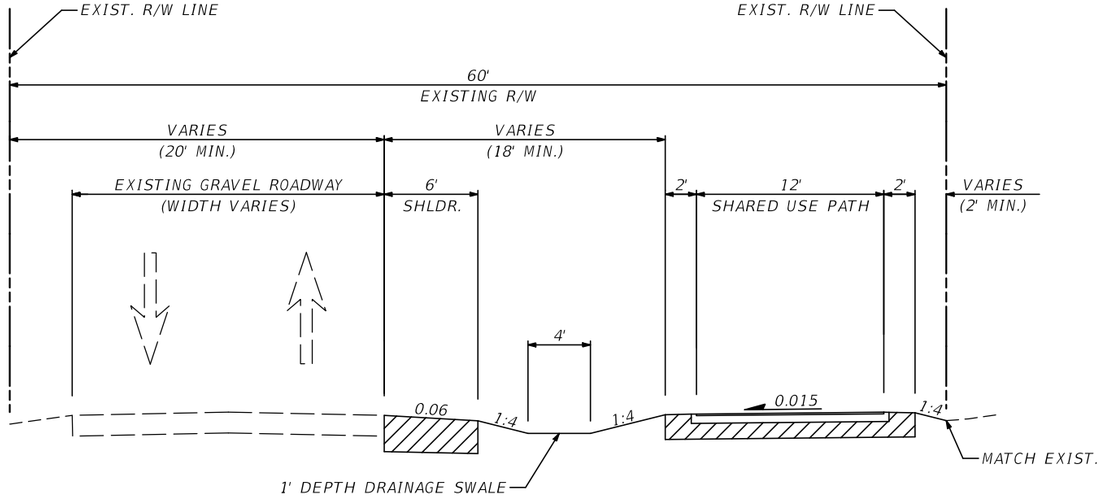
( ) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 2



ALEXANDER DRIVE
DESIGN SPEED/POSTED SPEED LIMIT: 25 MPH

STA. 21+33.99 TO STA. 33+59.60

SHARED USE PATH
DESIGN SPEED = 18 MPH

FINANCIAL PROJECT ID	SHEET NO.
439874-1-22-01	4

6/3/2020 4:35:17 PM

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PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
(X)	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
( )	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	(X)	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
( ) STATE HIGHWAY SYSTEM
(X) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

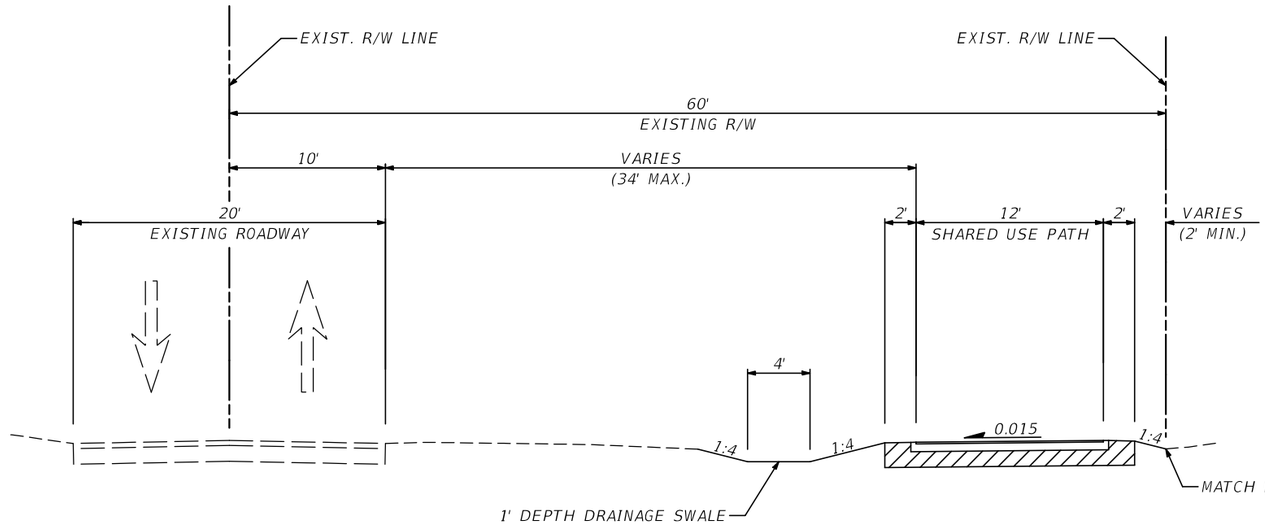
( ) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 3



W BERESFORD ROAD
DESIGN SPEED/POSTED SPEED LIMIT: 30 MPH

STA. 33+59.60 TO STA. 35+63.73

SHARED USE PATH
DESIGN SPEED = 18 MPH

FINANCIAL PROJECT ID	SHEET NO.
439874-1-22-01	5

6/3/2020 4:35:18 PM

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PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
(X)	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
( )	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	(X)	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

( )	NATIONAL HIGHWAY SYSTEM
( )	STRATEGIC INTERMODAL SYSTEM
( )	STATE HIGHWAY SYSTEM
(X)	OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

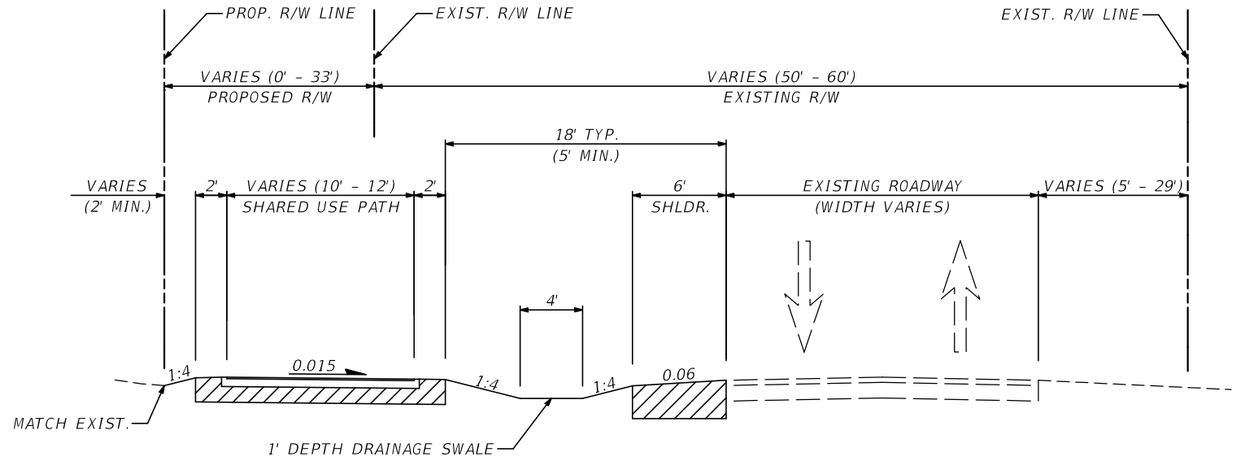
( )	1 - FREEWAY
( )	2 - RESTRICTIVE w/Service Roads
( )	3 - RESTRICTIVE w/660 ft. Connection Spacing
( )	4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( )	5 - RESTRICTIVE w/440 ft. Connection Spacing
( )	6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( )	7 - BOTH MEDIAN TYPES

CRITERIA

(X)	NEW CONSTRUCTION / RECONSTRUCTION
( )	RESURFACING (LA FACILITIES)
( )	RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 4



S BERESFORD ROAD
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

ALIGNMENT OPTION 1:
STA. 35+63.73 TO STA. 47+49.98
STA. 58+53.83 TO STA. 73+00.00

ALIGNMENT OPTION 3:
STA. 56+82.52 TO STA. 73+00.00

STA 73+00.00 TO STA. 91+69.87

SHARED USE PATH
DESIGN SPEED = 18 MPH

FINANCIAL PROJECT ID	SHEET NO.
439874-1-22-01	6

6/3/2020 4:35:19 PM

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
(X)	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
( )	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	(X)	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

( )	NATIONAL HIGHWAY SYSTEM
( )	STRATEGIC INTERMODAL SYSTEM
( )	STATE HIGHWAY SYSTEM
(X)	OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

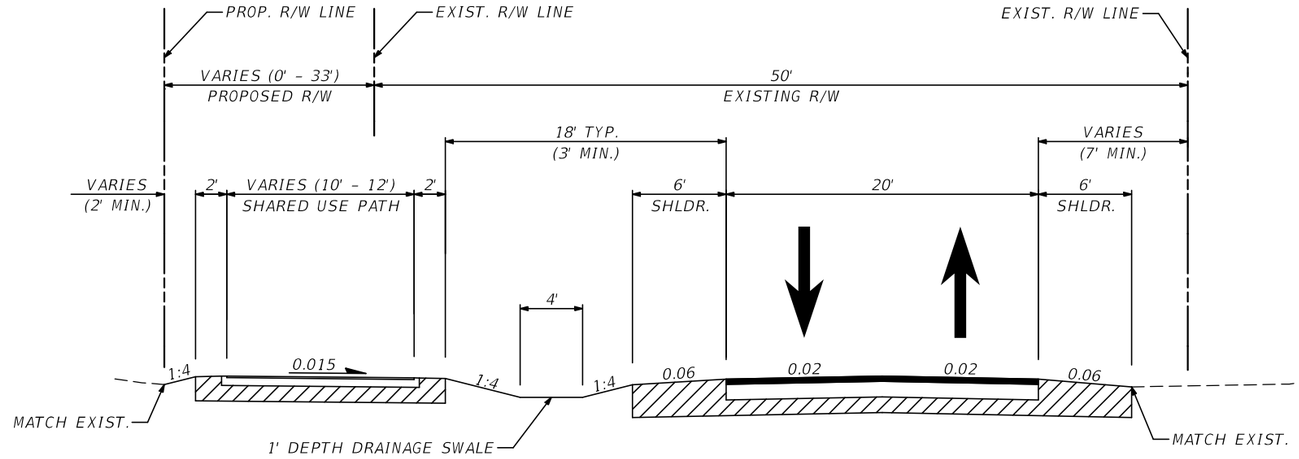
( )	1 - FREEWAY
( )	2 - RESTRICTIVE w/Service Roads
( )	3 - RESTRICTIVE w/660 ft. Connection Spacing
( )	4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( )	5 - RESTRICTIVE w/440 ft. Connection Spacing
( )	6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( )	7 - BOTH MEDIAN TYPES

CRITERIA

(X)	NEW CONSTRUCTION / RECONSTRUCTION
( )	RESURFACING (LA FACILITIES)
( )	RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 5



S BERESFORD ROAD
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

ALIGNMENT OPTION 1:
STA. 47+49.98 TO STA. 58+53.83

SHARED USE PATH
DESIGN SPEED = 18 MPH

FINANCIAL PROJECT ID	SHEET NO.
439874-1-22-01	7

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PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C3C : SUBURBAN COMM.
(X) C2 : RURAL
( ) C4 : URBAN GENERAL
( ) C2T : RURAL TOWN
( ) C5 : URBAN CENTER
( ) C3R : SUBURBAN RES.
( ) C6 : URBAN CORE
( ) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
( ) MAJOR COLLECTOR
( ) FREEWAY/EXPWY.
(X) MINOR COLLECTOR
( ) PRINCIPAL ARTERIAL
( ) LOCAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
( ) STATE HIGHWAY SYSTEM
(X) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

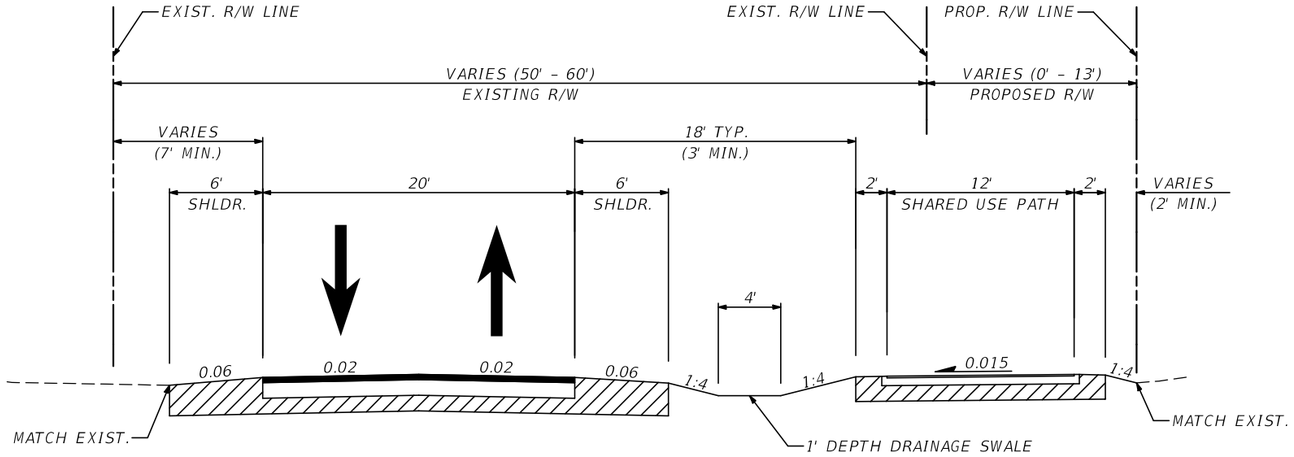
( ) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 6



S BERESFORD ROAD
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

ALIGNMENT OPTION 2:
STA. 35+63.73 TO STA. 52+93.20

SHARED USE PATH
DESIGN SPEED = 18 MPH

FINANCIAL PROJECT ID	SHEET NO.
439874-1-22-01	8

6/3/2020 4:35:21 PM

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
(X)	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
( )	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	(X)	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
( ) STATE HIGHWAY SYSTEM
(X) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

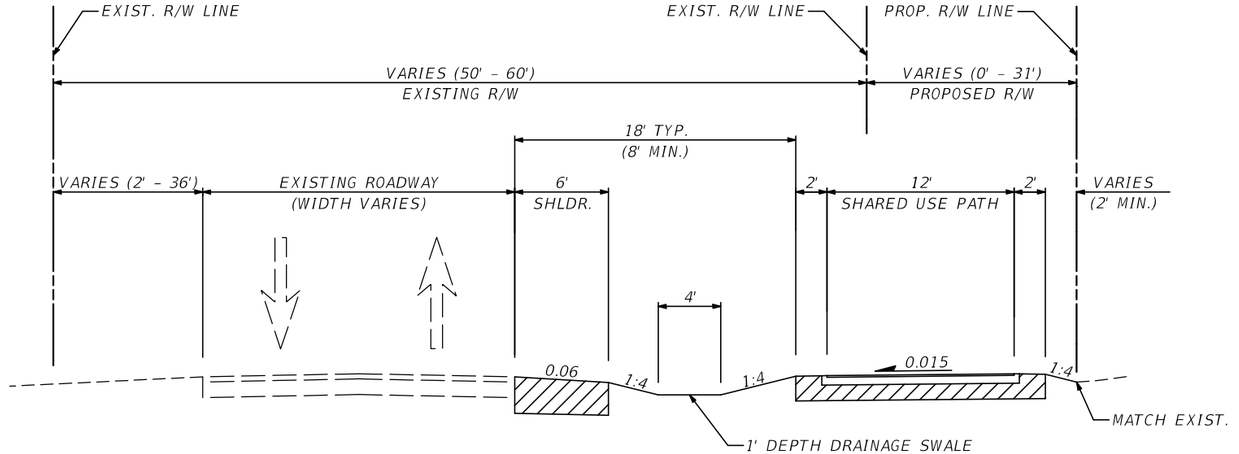
( ) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 7



S BERESFORD ROAD
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

ALIGNMENT OPTION 2:
STA. 52+93.20 TO STA. 73+00.00

ALIGNMENT OPTION 3:
STA. 35+63.73 TO STA. 56+82.52

SHARED USE PATH
DESIGN SPEED = 18 MPH

FINANCIAL PROJECT ID	SHEET NO.
439874-1-22-01	9

6/3/2020 4:35:22 PM

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
(X)	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
( )	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	(X)	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

- ( ) NATIONAL HIGHWAY SYSTEM
- ( ) STRATEGIC INTERMODAL SYSTEM
- ( ) STATE HIGHWAY SYSTEM
- (X) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

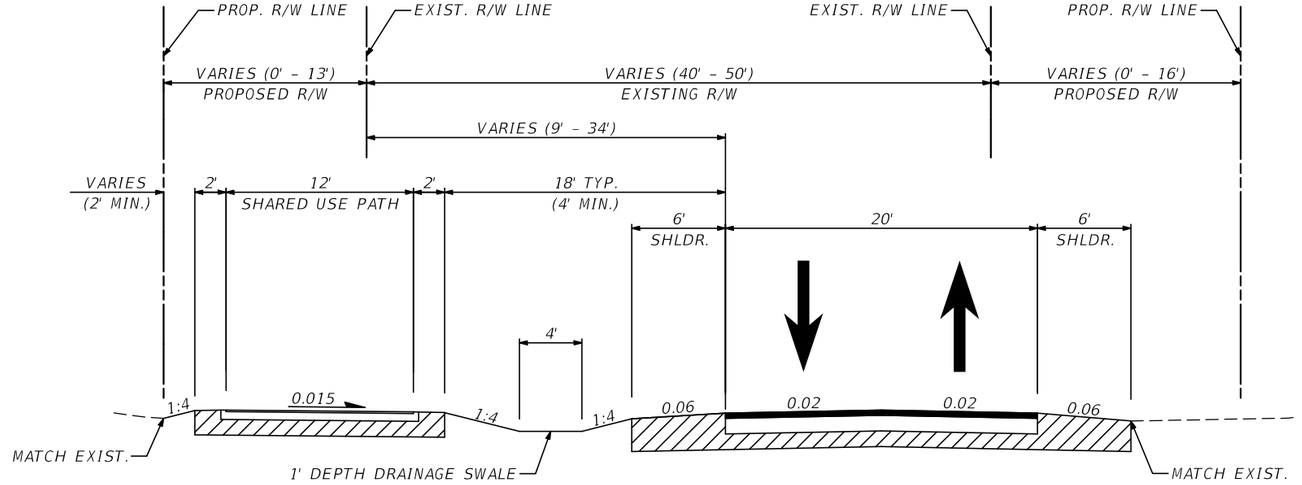
- ( ) 1 - FREEWAY
- ( ) 2 - RESTRICTIVE w/Service Roads
- ( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
- ( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
- ( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
- ( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
- ( ) 7 - BOTH MEDIAN TYPES

CRITERIA

- (X) NEW CONSTRUCTION / RECONSTRUCTION
- ( ) RESURFACING (LA FACILITIES)
- ( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 8



GRAND AVENUE
DESIGN SPEED/POSTED SPEED LIMIT: 30 MPH

STA. 91+69.87 TO STA. 123+10.41

SHARED USE PATH
DESIGN SPEED = 18 MPH

FINANCIAL PROJECT ID	SHEET NO.
439874-1-22-01	10

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PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
(X) C3R : SUBURBAN RES.
( ) N/A : L.A. FACILITY
( ) C3C : SUBURBAN COMM.
( ) C4 : URBAN GENERAL
( ) C5 : URBAN CENTER
( ) C6 : URBAN CORE

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
( ) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL
( ) MAJOR COLLECTOR
(X) MINOR COLLECTOR
( ) LOCAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
( ) STATE HIGHWAY SYSTEM
(X) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

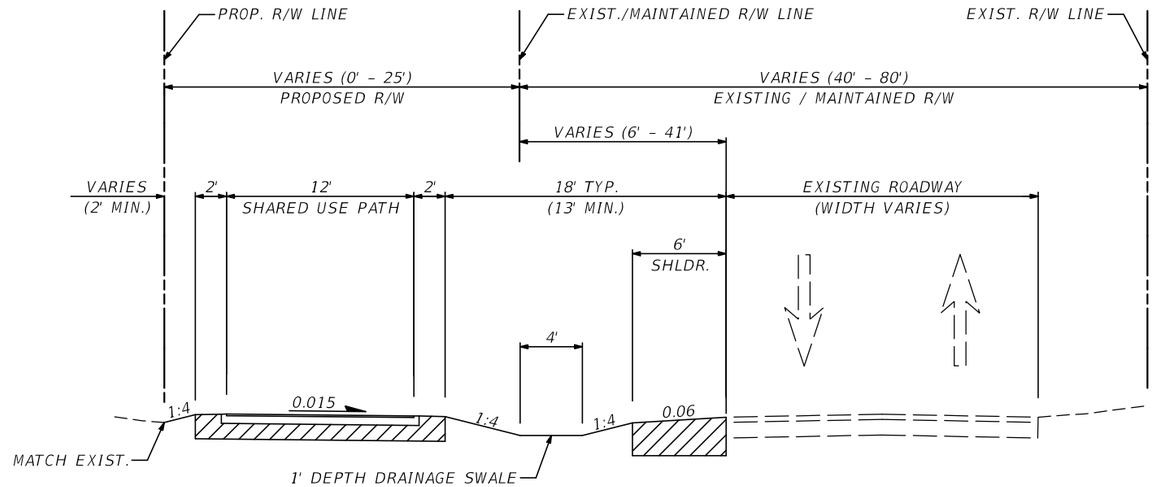
( ) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 9



GRAND AVENUE
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

STA. 123+10.41 TO STA. 134+27.09

SHARED USE PATH
DESIGN SPEED = 18 MPH

FINANCIAL PROJECT ID	SHEET NO.
439874-1-22-01	11

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
( )	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
(X)	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	(X)	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

( )	NATIONAL HIGHWAY SYSTEM
( )	STRATEGIC INTERMODAL SYSTEM
( )	STATE HIGHWAY SYSTEM
(X)	OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

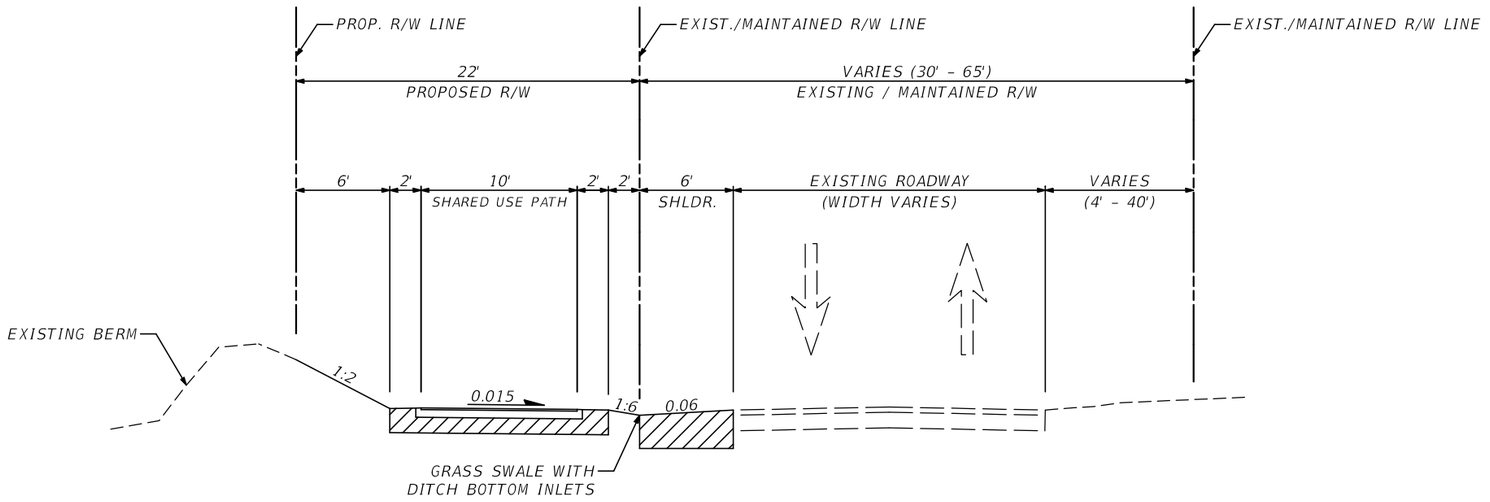
( )	1 - FREEWAY
( )	2 - RESTRICTIVE w/Service Roads
( )	3 - RESTRICTIVE w/660 ft. Connection Spacing
( )	4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( )	5 - RESTRICTIVE w/440 ft. Connection Spacing
( )	6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( )	7 - BOTH MEDIAN TYPES

CRITERIA

(X)	NEW CONSTRUCTION / RECONSTRUCTION
( )	RESURFACING (LA FACILITIES)
( )	RRR (ARTERIALS & COLLECTORS)

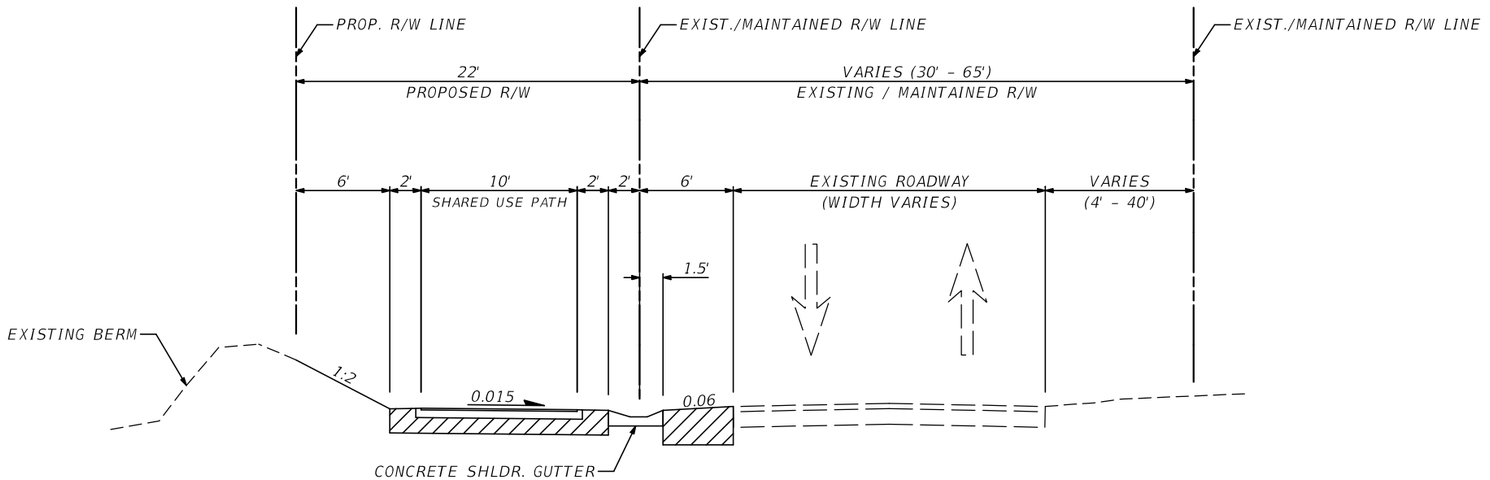
POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

TYPICAL SECTION No. 10



GRAND AVENUE / W MINNESOTA AVENUE (DRAINAGE OPTION 2)
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

STA. 134+27.09 TO STA. 172+23.95



GRAND AVENUE / W MINNESOTA AVENUE (DRAINAGE OPTION 1)
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

STA. 134+27.09 TO STA. 172+23.95

SHARED USE PATH
DESIGN SPEED = 18 MPH

FINANCIAL PROJECT ID	SHEET NO.
439874-1-22-01	12

6/3/2020 4:35:24 PM

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APPENDIX B

Preferred Alternative Concept Plans

STATE OF FLORIDA

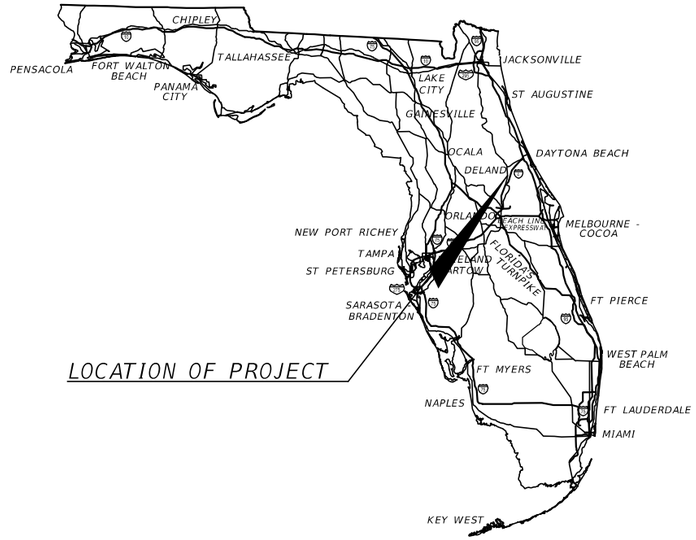
DEPARTMENT OF TRANSPORTATION

PRELIMINARY CONCEPT PLANS

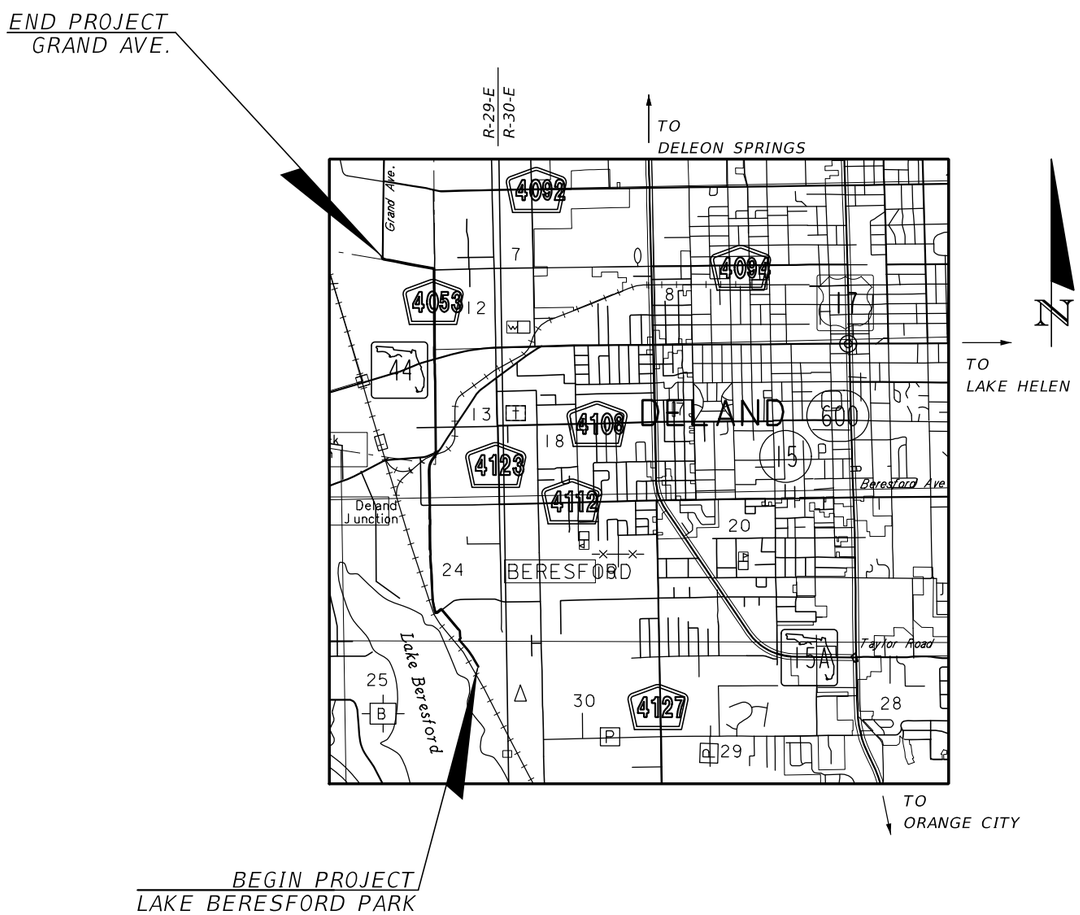
FINANCIAL PROJECT ID 439874-1-22-01

VOLUSIA COUNTY

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY
FROM LAKE BERESFORD PARK TO GRAND AVENUE



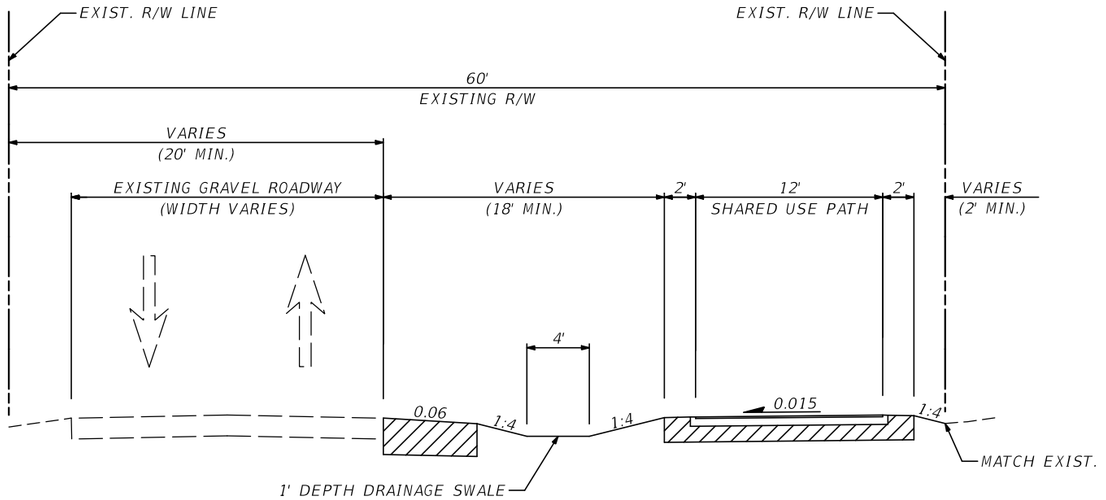
INDEX OF ROADWAY PLANS



FDOT PROJECT MANAGER:

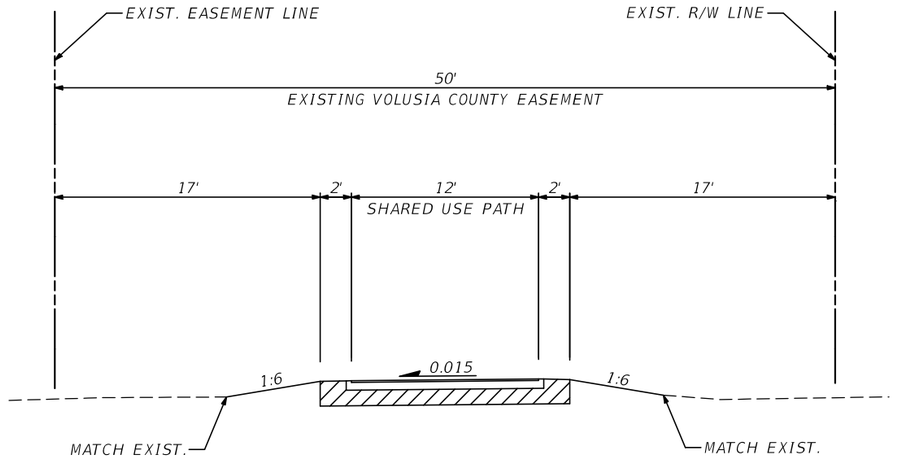
DAVID A. GRAEBER, P.E.

SHEET NO.
1



ALEXANDER DRIVE
DESIGN SPEED/POSTED SPEED LIMIT: 25 MPH

STA. 21+33.99 TO STA. 33+59.60



VOLUSIA COUNTY EASEMENT
DESIGN SPEED/POSTED SPEED LIMIT: N/A

STA. 10+00.00 TO STA. 21+33.99

SHARED USE PATH
DESIGN SPEED = 18 MPH

AIM ENGINEERING & SURVEYING
3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

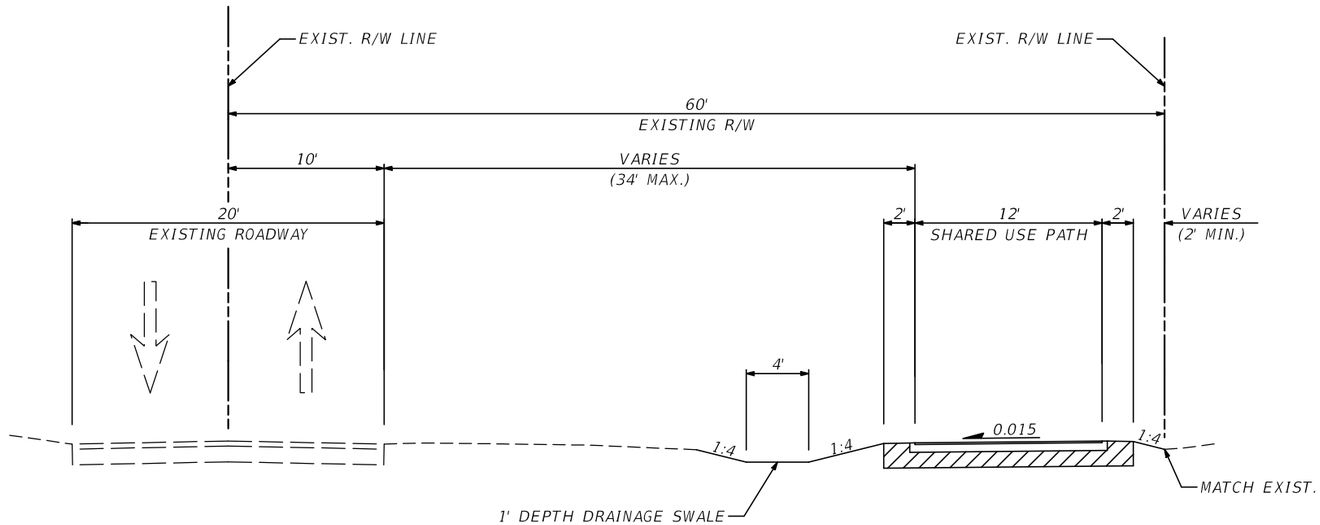
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

TYPICAL SECTIONS

SHEET NO. 2



W BERESFORD ROAD
DESIGN SPEED/POSTED SPEED LIMIT: 30 MPH

STA. 33+59.60 TO STA. 35+63.73

SHARED USE PATH
DESIGN SPEED = 18 MPH

AIM ENGINEERING & SURVEYING
3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

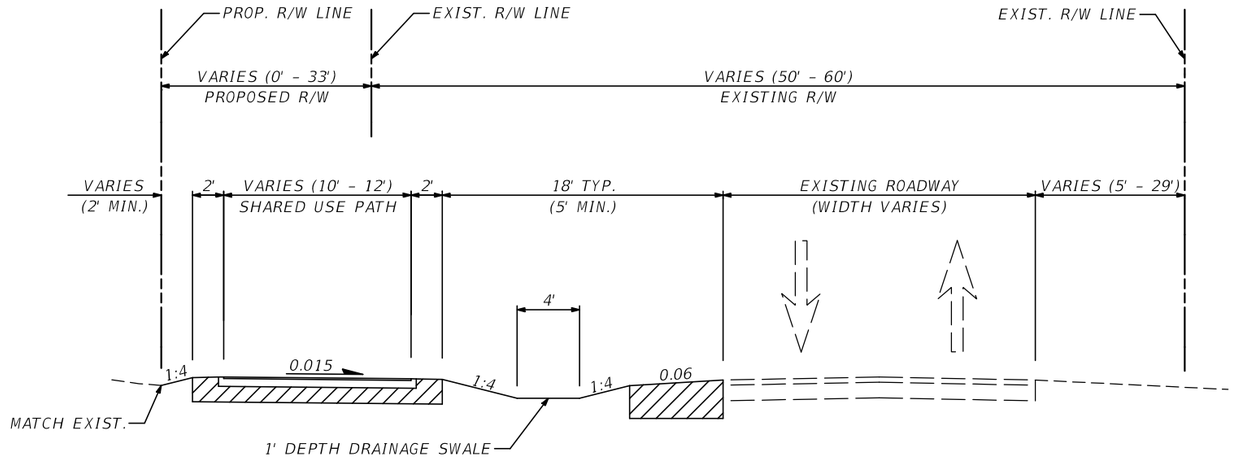
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

TYPICAL SECTIONS

SHEET NO. 3



S BERESFORD ROAD
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

ALIGNMENT OPTION 1:
STA. 35+63.73 TO STA. 47+49.98
STA. 58+53.83 TO STA. 73+00.00

ALIGNMENT OPTION 3:
STA. 56+82.52 TO STA. 73+00.00

STA 73+00.00 TO STA. 91+69.87

SHARED USE PATH
DESIGN SPEED = 18 MPH

AIM ENGINEERING & SURVEYING
3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

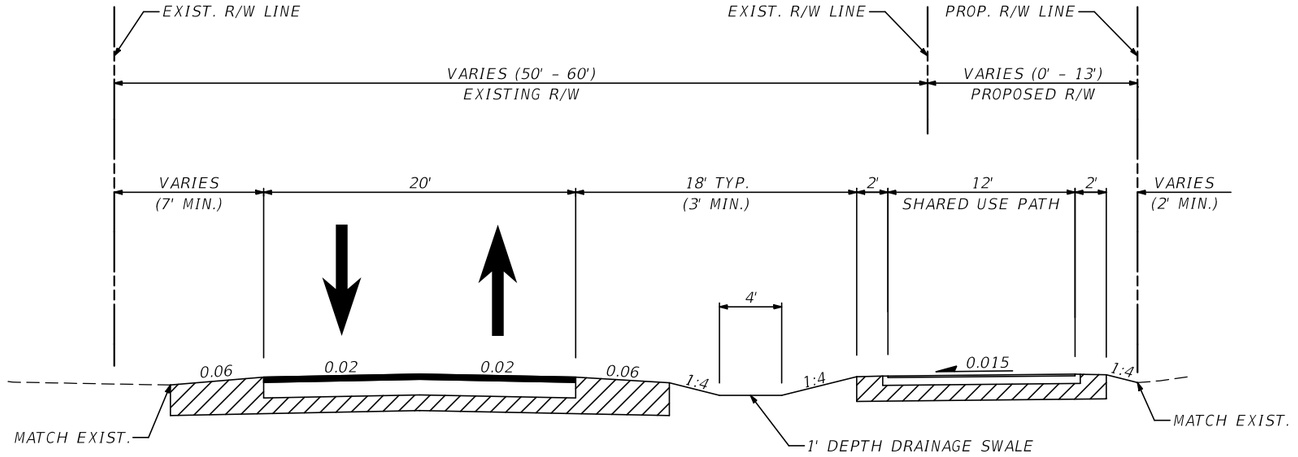
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

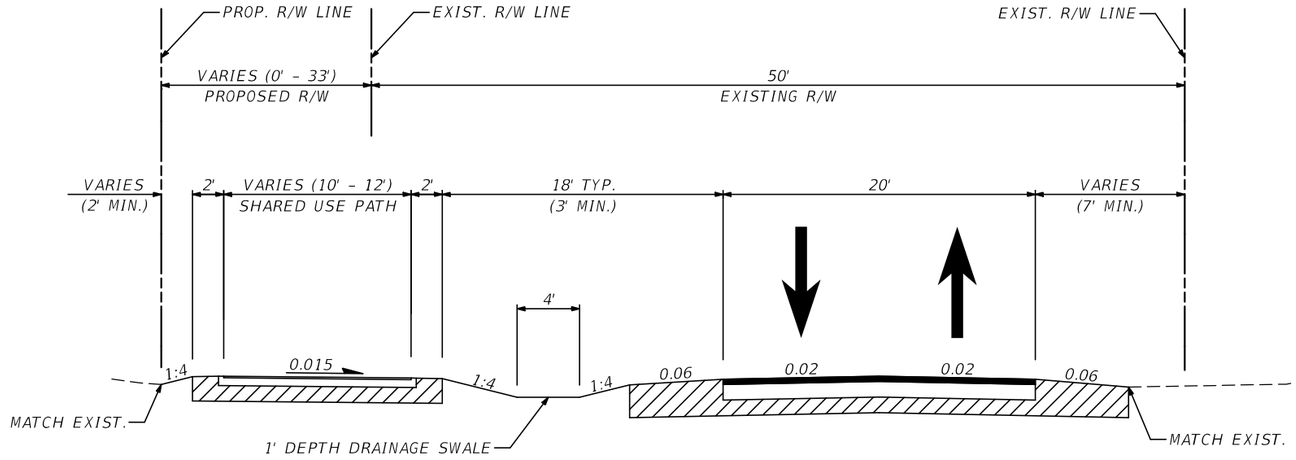
TYPICAL SECTIONS

SHEET NO. 4



S BERESFORD ROAD
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

ALIGNMENT OPTION 2:
STA. 35+63.73 TO STA. 52+93.20



S BERESFORD ROAD
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

ALIGNMENT OPTION 1:
STA. 47+49.98 TO STA. 58+53.83

SHARED USE PATH
DESIGN SPEED = 18 MPH

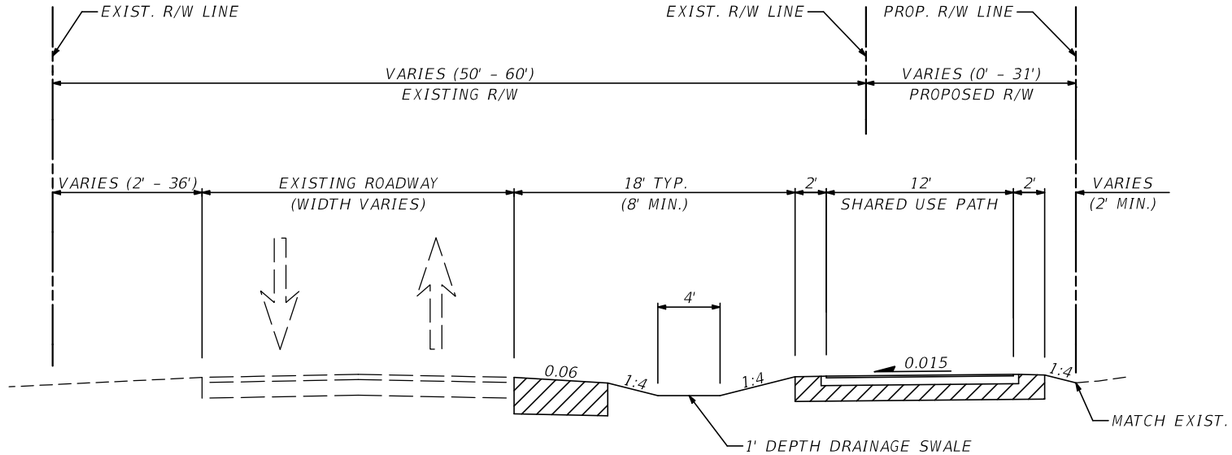
AIM ENGINEERING & SURVEYING
3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

TYPICAL SECTIONS

SHEET NO. 5



S BERESFORD ROAD
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

ALIGNMENT OPTION 2:
STA. 52+93.20 TO STA. 73+00.00

ALIGNMENT OPTION 3:
STA. 35+63.73 TO STA. 56+82.52

SHARED USE PATH
DESIGN SPEED = 18 MPH

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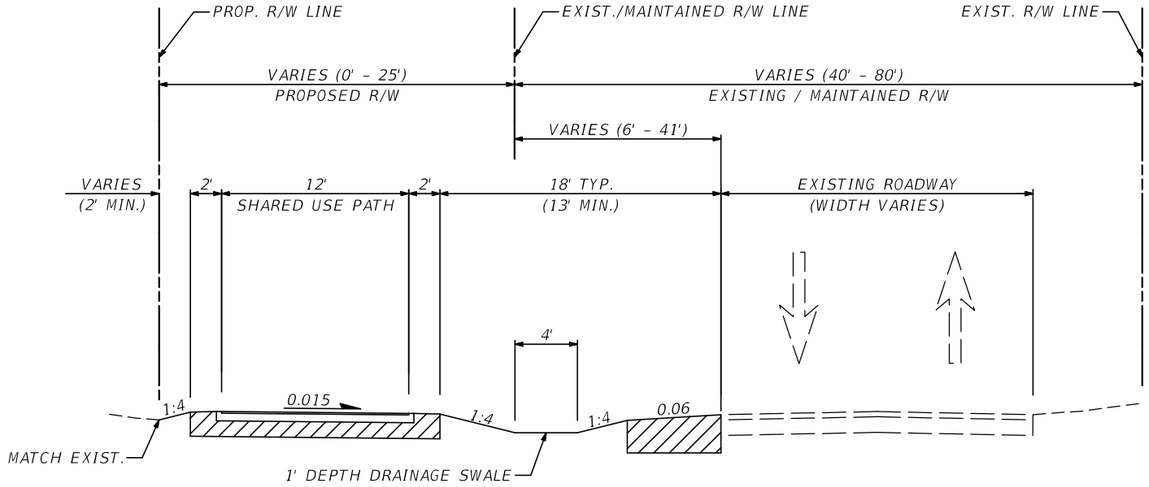
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

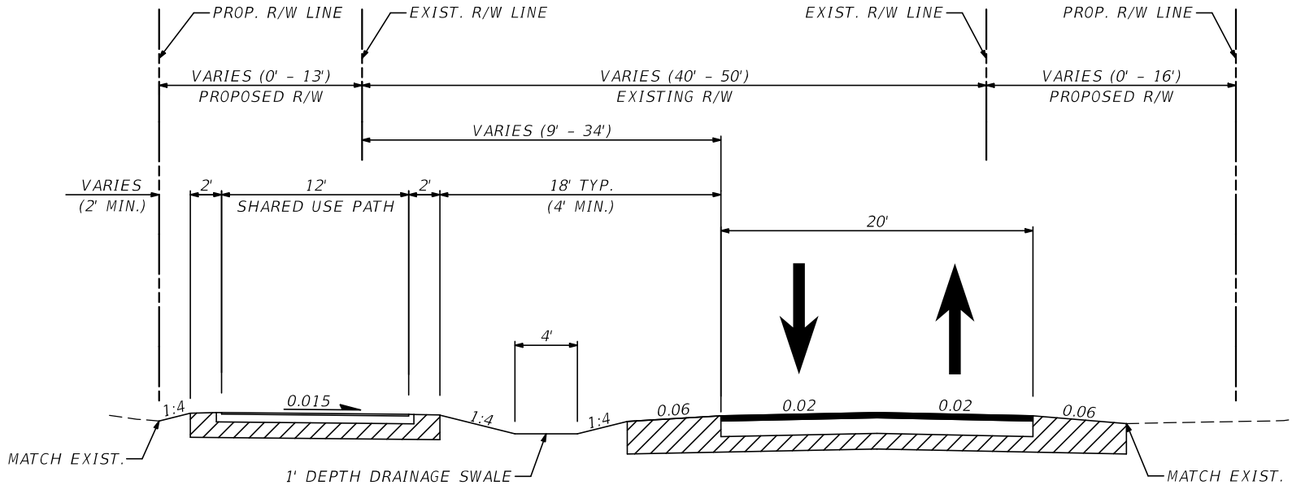
TYPICAL SECTIONS

SHEET NO. 6



GRAND AVENUE
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

STA. 123+10.41 TO STA. 134+27.09



SHARED USE PATH
DESIGN SPEED = 18 MPH

GRAND AVENUE
DESIGN SPEED/POSTED SPEED LIMIT: 30 MPH

STA. 91+69.87 TO STA. 123+10.41

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SUITE 225
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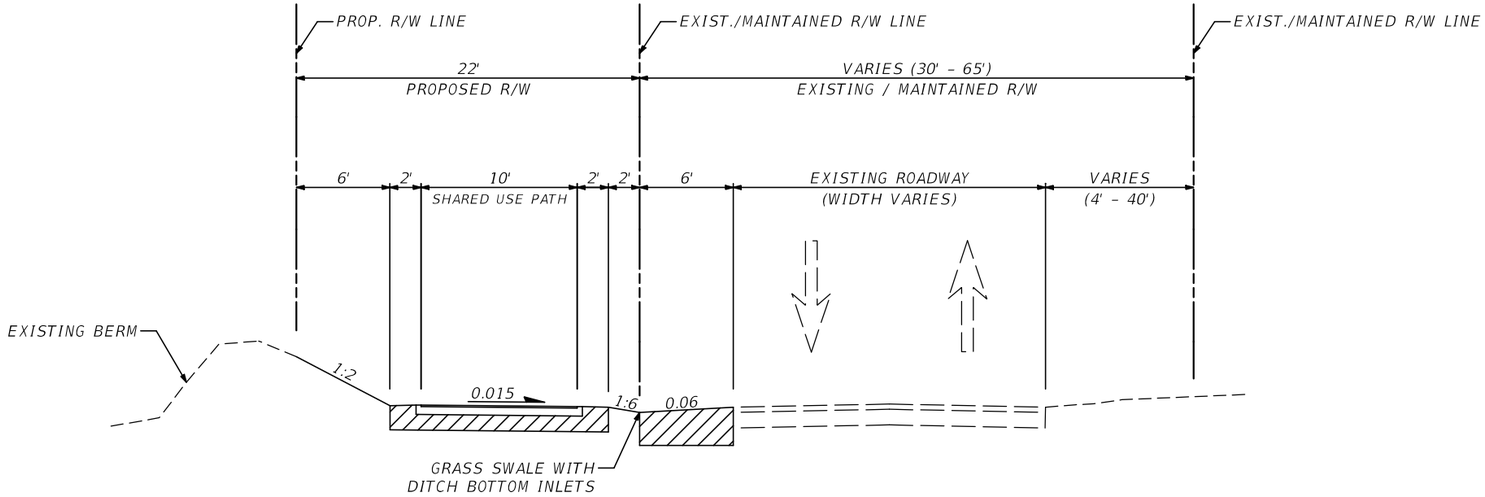
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

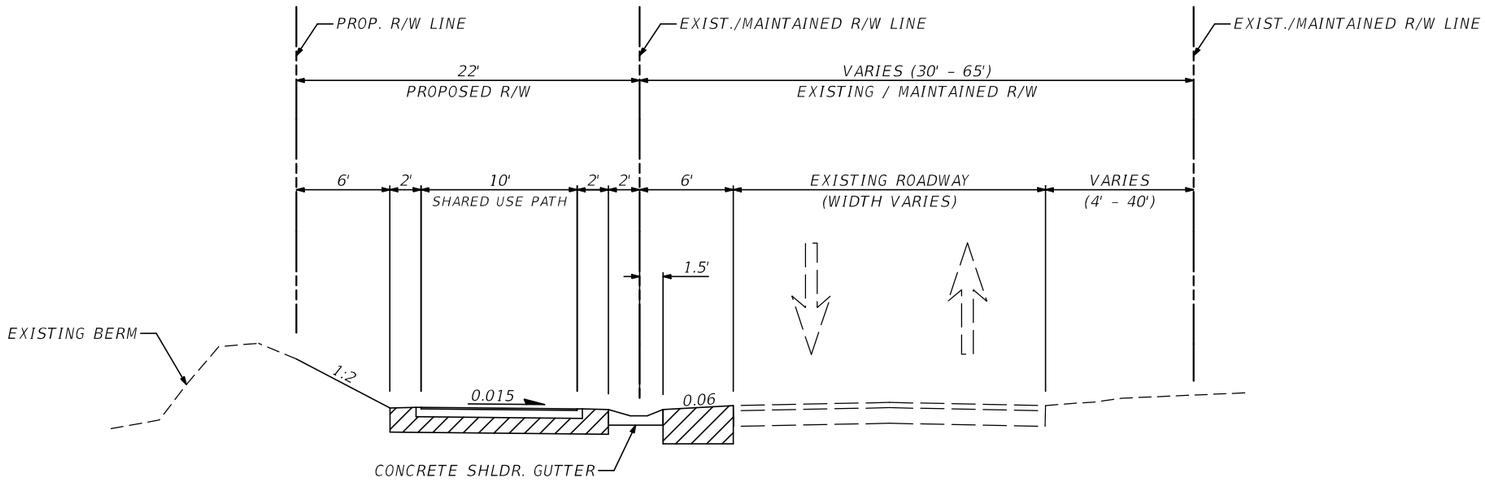
TYPICAL SECTIONS

SHEET NO. 7



GRAND AVENUE / W MINNESOTA AVENUE (DRAINAGE OPTION 2)
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

STA. 134+27.09 TO STA. 172+23.95



GRAND AVENUE / W MINNESOTA AVENUE (DRAINAGE OPTION 1)
DESIGN SPEED/POSTED SPEED LIMIT: 35 MPH

STA. 134+27.09 TO STA. 172+23.95

SHARED USE PATH
DESIGN SPEED = 18 MPH

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SUITE 225
TAMPA, FL 33619

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

TYPICAL SECTIONS

SHEET NO. 8

PRELIMINARY

AERIAL FLIGHT DATE: 2015

PROPERTY LINE
EXISTING R/W LINE
MAINTAINED R/W LINE
EXISTING EASEMENT LINE
PROPOSED R/W LINE
PROPOSED TRAIL
PROPOSED ROADWAY RECONSTRUCTION
HISTORIC TREE

AIM ENGINEERING & SURVEYING
3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

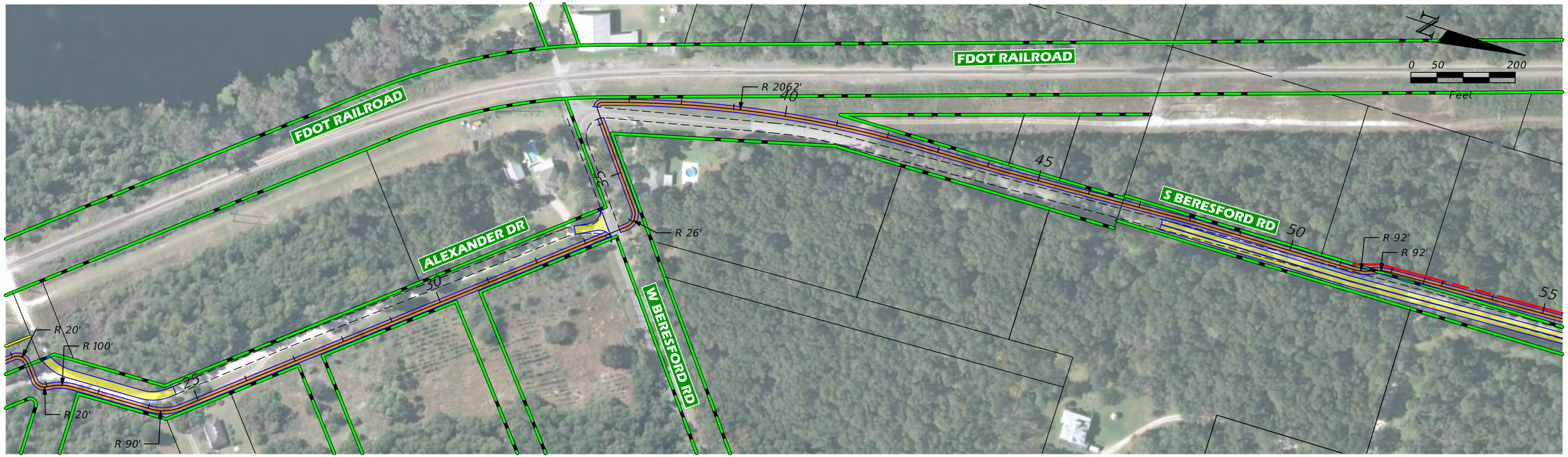
ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

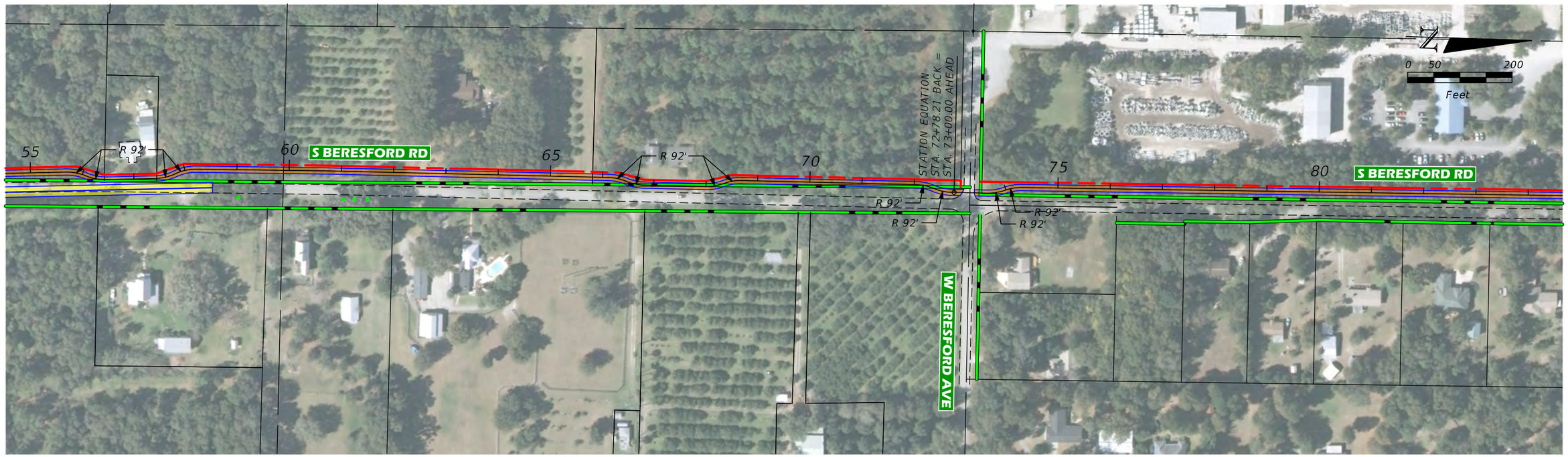
PRELIMINARY CONCEPT PLANS

SHEET NO. 9

PRELIMINARY

AERIAL FLIGHT DATE: 2015





S. BERESFORD ROAD OPTION 1: TRAIL ON WEST SIDE OF ROADWAY

PROPERTY LINE
EXISTING R/W LINE
MAINTAINED R/W LINE
EXISTING EASEMENT LINE
PROPOSED R/W LINE
PROPOSED TRAIL
PROPOSED ROADWAY RECONSTRUCTION
HISTORIC TREE

AIM ENGINEERING & SURVEYING
3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

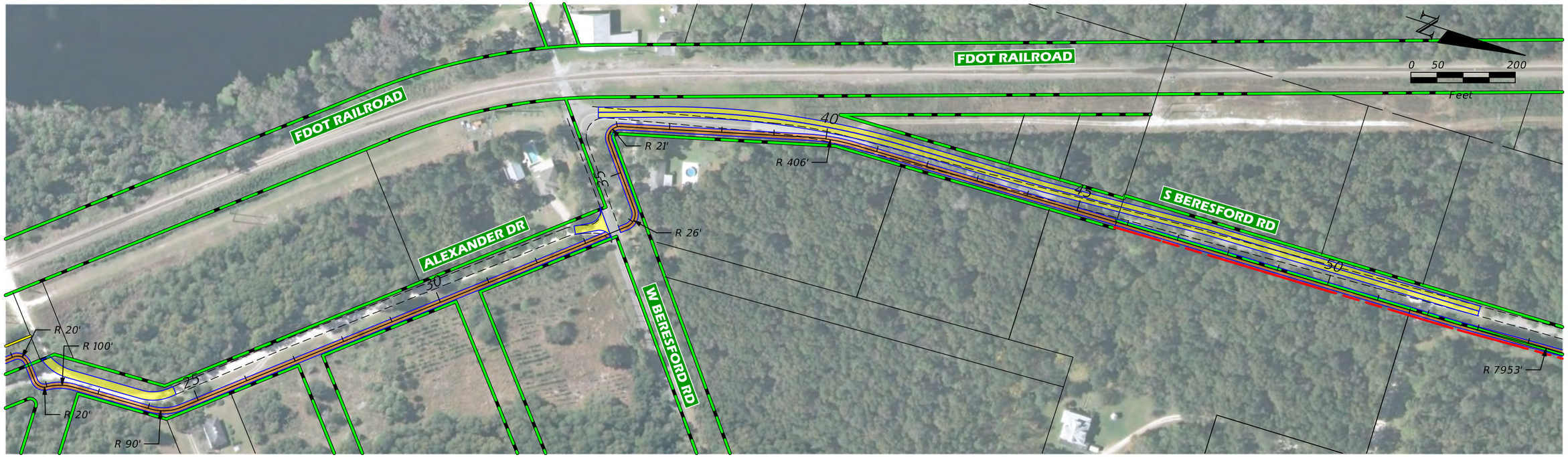
ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

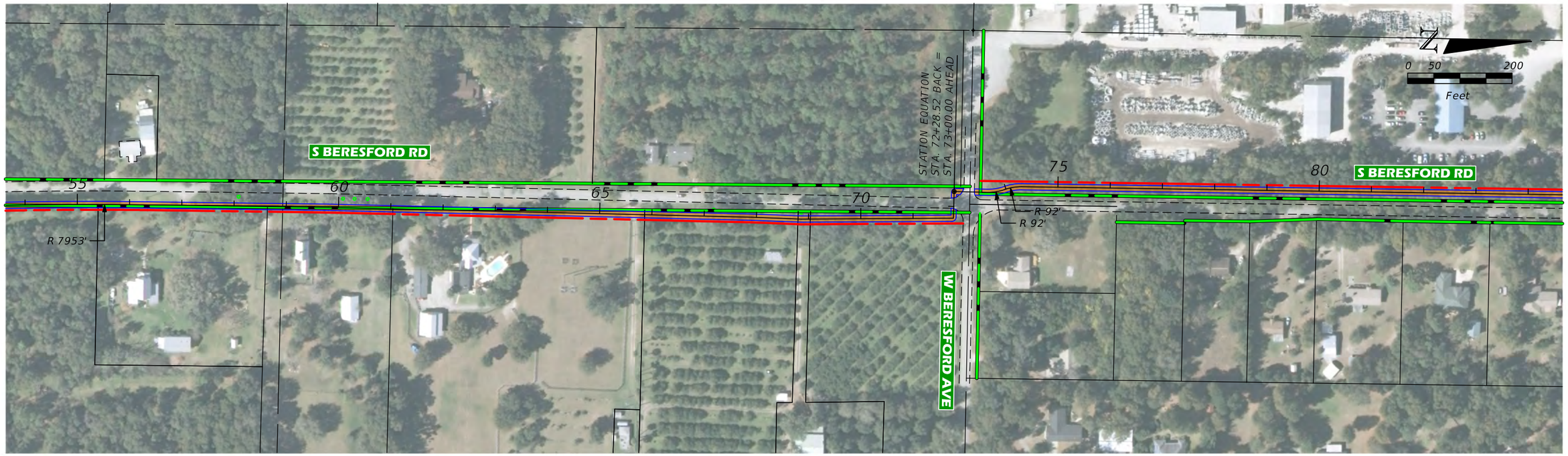
PRELIMINARY CONCEPT PLANS

SHEET NO. 10A

PRELIMINARY

AERIAL FLIGHT DATE: 2015





S. BERESFORD ROAD OPTION 2: TRAIL ON EAST SIDE OF ROADWAY

PROPERTY LINE
EXISTING R/W LINE
MAINTAINED R/W LINE
EXISTING EASEMENT LINE
PROPOSED R/W LINE
PROPOSED TRAIL
PROPOSED ROADWAY RECONSTRUCTION
HISTORIC TREE

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3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

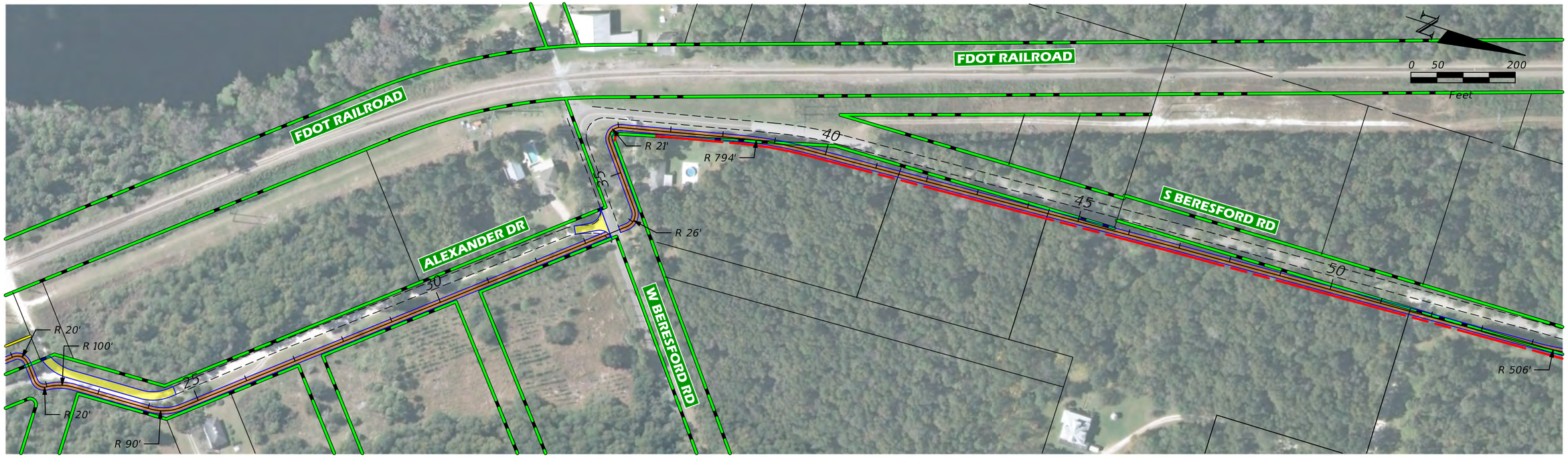
ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

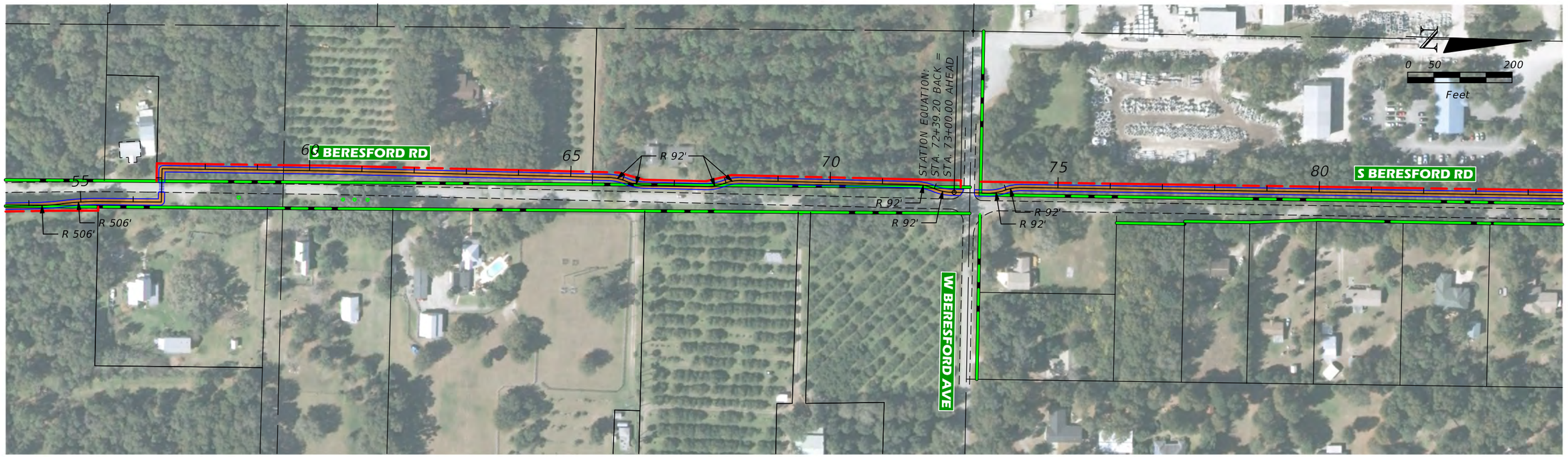
PRELIMINARY CONCEPT PLANS

SHEET NO. 10B

PRELIMINARY

AERIAL FLIGHT DATE: 2015





S. BERESFORD ROAD OPTION 3: MIDBLOCK CROSSING

PROPERTY LINE
EXISTING R/W LINE
MAINTAINED R/W LINE
EXISTING EASEMENT LINE
PROPOSED R/W LINE
PROPOSED TRAIL
PROPOSED ROADWAY RECONSTRUCTION
HISTORIC TREE

AIM ENGINEERING & SURVEYING
3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

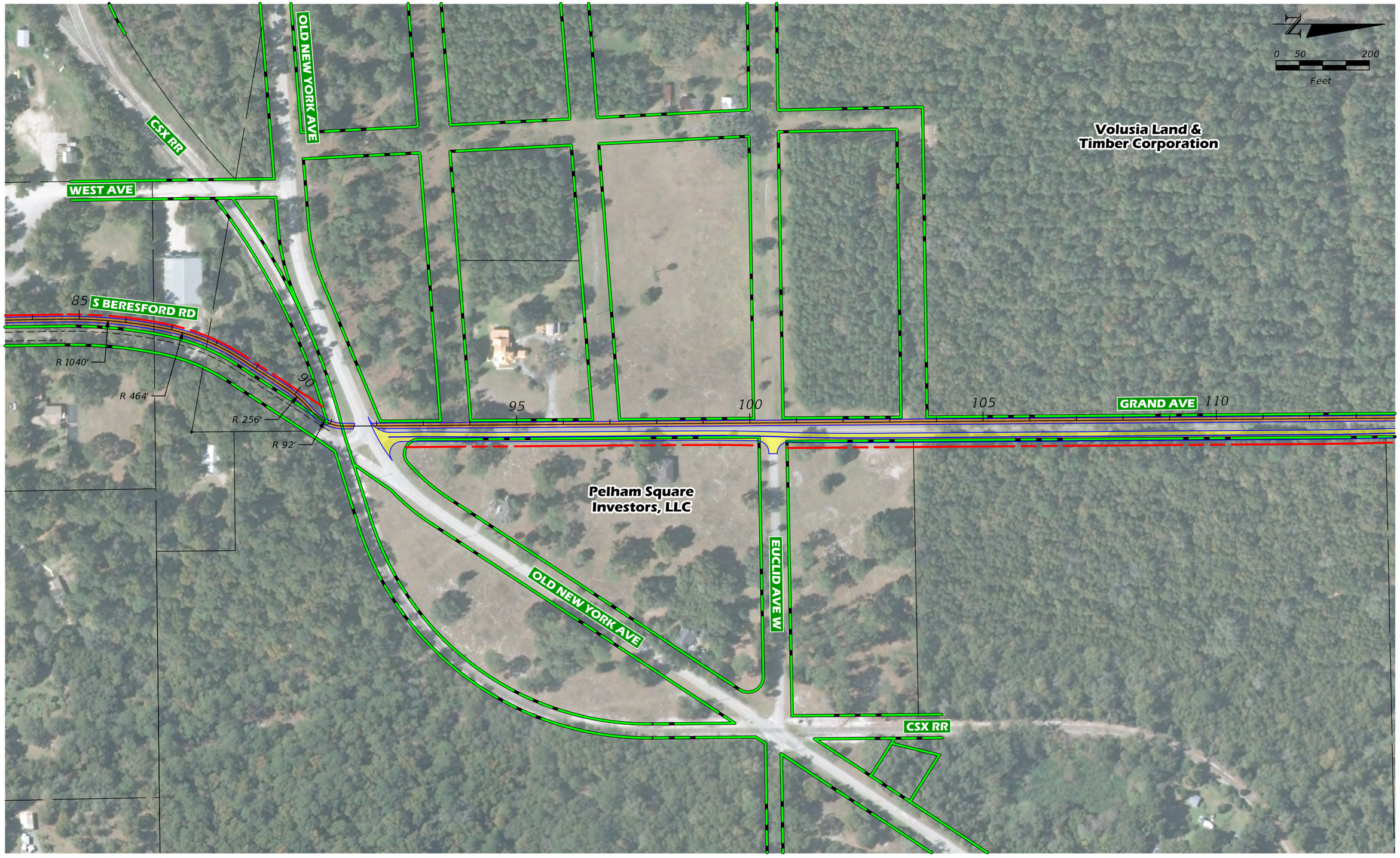
ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

PRELIMINARY CONCEPT PLANS

SHEET NO. 10C

PRELIMINARY

AERIAL FLIGHT DATE: 2015



PROPERTY LINE
EXISTING R/W LINE
MAINTAINED R/W LINE
EXISTING EASEMENT LINE
PROPOSED R/W LINE
PROPOSED TRAIL
PROPOSED ROADWAY RECONSTRUCTION
HISTORIC TREE

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3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

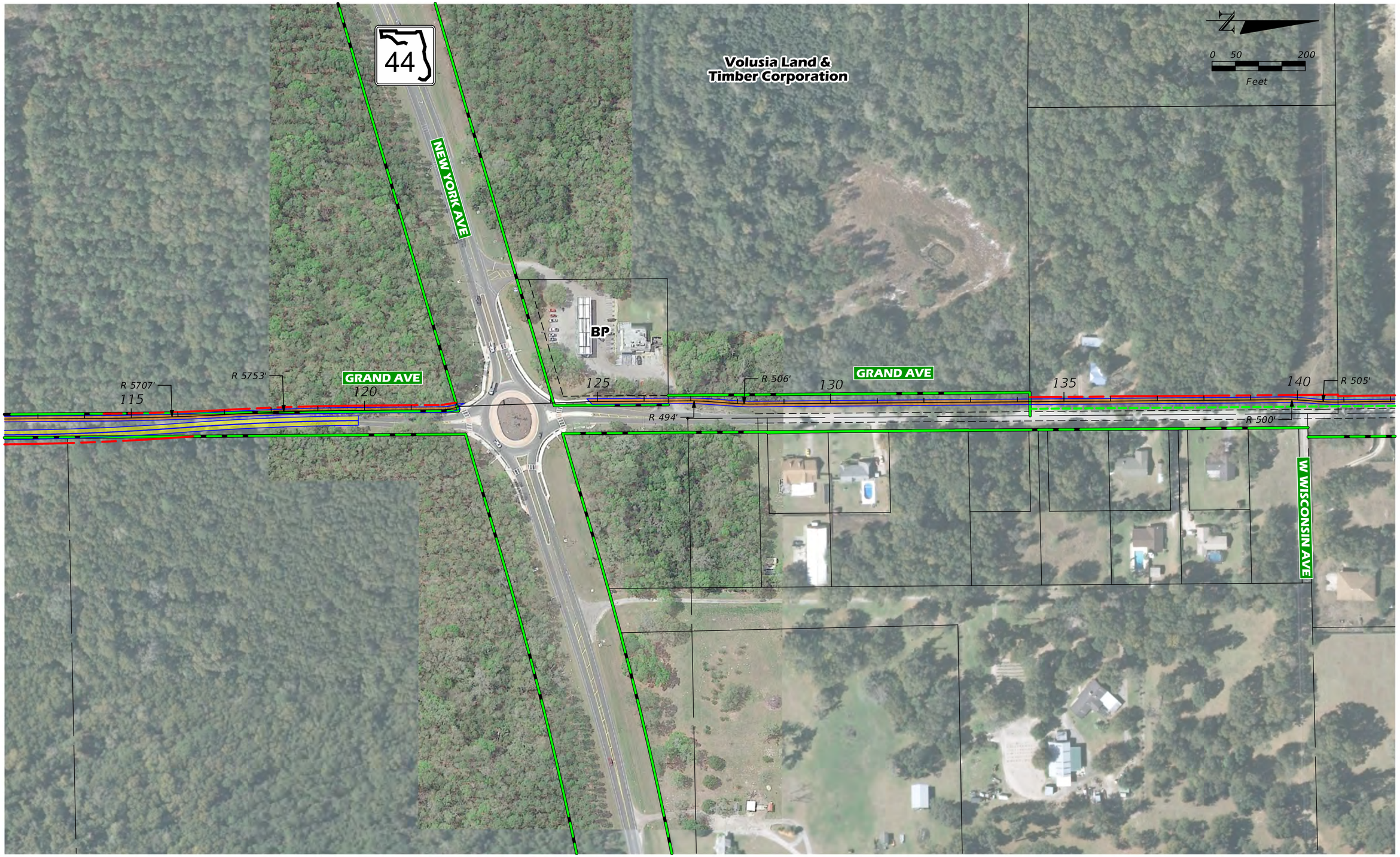
ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

PRELIMINARY CONCEPT PLANS

SHEET NO. 11

PRELIMINARY

AERIAL FLIGHT DATE: 2015



PROPERTY LINE
EXISTING R/W LINE
MAINTAINED R/W LINE
EXISTING EASEMENT LINE
PROPOSED R/W LINE
PROPOSED TRAIL
PROPOSED ROADWAY RECONSTRUCTION
HISTORIC TREE

AIM ENGINEERING & SURVEYING
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SUITE 225
TAMPA, FL 33619

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

PRELIMINARY CONCEPT PLANS

SHEET NO. 12

PRELIMINARY

AERIAL FLIGHT DATE: 2015

PROPERTY LINE
EXISTING R/W LINE
MAINTAINED R/W LINE
EXISTING EASEMENT LINE
PROPOSED R/W LINE
PROPOSED TRAIL
PROPOSED ROADWAY RECONSTRUCTION
HISTORIC TREE

AIM ENGINEERING & SURVEYING
3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

PRELIMINARY CONCEPT PLANS

SHEET NO. 13

APPENDIX C

Long Range Estimates

Date: 2/25/2020 4:07:24 PM

FDOT Long Range Estimating System - Production

R3: Project Details by Sequence Report

Project: SJR2C_-T-RA-IL **Letting Date:** 01/2099

Description: ***UNOFFICIAL COST ESTIMATE*** FPID 439874-1-22-01 St Johns River to Sea Loop Trail Gap PD&E Study Volusia County

District: 05 **County:** 79 VOLUSIA **Market Area:** 06 **Units:** English

Contract Class: **Lump Sum Project:** N **Design/Build:** N **Project Length:** 3.400 MI

Project Manager:

Version 5 Project Grand Total **$5,390,898.42**

Description: Update: 2020-02-25 Preferred Alternative - S. Beresford Road Option 1 (Trail on West Side of Road)

Sequence: 1 MIS - Miscellaneous Construction **Net Length:** 3.069 MI 16,202 LF

Description: 12-ft shared use path

Special Conditions: Includes path, railroad crossing, and drainage items

EARTHWORK COMPONENT

User Input Data

Description	Value
Standard Clearing and Grubbing Limits L/R	0.00 / 0.00
Incidental Clearing and Grubbing Area	0.00

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	13.39 AC	$20,128.02	$269,514.19
	Comment: 3.069mi * 5280ft * 36ft / 43560sf = 13.39ac			
120-1	REGULAR EXCAVATION	14,019.74 CY	$19.32	$270,861.38
	Comment: Pavement Design = 1.5in SP + 4in OBG + 12in Stab= 1.46ft; Excavation Width = 2ft + 12ft + 2ft = 16ft; Pavement Length = 3.069mi * 5280ft = 16204.32ft; 1.46ft * 16ft * 16204.32ft / 27cf = 14019.74cy			
120-6	EMBANKMENT	3,504.94 CY	$24.98	$87,553.40
	Comment: Assume 25% of Excavation; 14019.74cy * 25% = 3504.94cy			
	Earthwork Component Total			$627,928.97

ROADWAY COMPONENT

EX-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
1	RAILROAD CROSSING	1.00 LS	$350,000.00	$350,000.00
	Comment: Per Original Trail Estimate			

Peripherals Subcomponent

Description	Value
Off Road Bike Path(s)	0

Off Road Bike Path Width L/R	6.00 / 6.00
Bike Path Structural Spread Rate	165
Noise Barrier Wall Length	0.00
Noise Barrier Wall Begin Height	0.00
Noise Barrier Wall End Height	0.00

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	28,803.93	SY	$10.84	$312,234.60
285-701	OPTIONAL BASE,BASE GROUP 01	21,602.94	SY	$15.64	$337,869.98
334-1-11	SUPERPAVE ASPHALTIC CONC, TRAFFIC A	1,782.24	TN	$155.45	$277,049.21
	Roadway Component Total				$1,277,153.79

SHOULDER COMPONENT

User Input Data

Description	Value

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	9,869.55	SY	$10.84	$106,985.92
	Comment: 6-ft shoulder along existing and proposed roadways, trail side only. ((3.069mi * 5280ft) - 1400ft) * 6ft / 9sf = 9869.55sy				
400-1-11	CONC CLASS I, RETAINING WALLS	137.50	CY	$1,111.71	$152,860.12
	Comment: 625 linear feet of 3-ft high gravity wall (0.22cy/linear ft)				
415-1-3	REINF STEEL- RETAINING WALL	3,125.00	LB	$1.13	$3,531.25
	Comment: 625 linear feet of 3-ft high gravity wall (5lbs/linear ft)				
520-6	SHOULDER GUTTER- CONCRETE	3,123.95	LF	$25.92	$80,972.78
	Comment: Sta. 141+00.00 to Sta. 172+23.95 = 3123.95ft				
570-1-2	PERFORMANCE TURF, SOD	43,211.52	SY	$3.23	$139,573.21
	Comment: 3.069mi * 5280ft * (36ft - 12ft)/ 9sf = 43211.52sy				
	Shoulder Component Total				$483,923.29

DRAINAGE COMPONENT

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
425-1-521	INLETS, DT BOT, TYPE C, <10'	18.00	EA	$3,297.31	$59,351.58
430-175-118	PIPE CULV, OPT MATL, ROUND, 18"S/CD	2,368.00	LF	$80.12	$189,724.16
430-175-124	PIPE CULV, OPT MATL, ROUND, 24"S/CD	1,568.00	LF	$82.06	$128,670.08
430-982-125	MITERED END SECT, OPTIONAL RD, 18" CD	18.00	EA	$1,149.86	$20,697.48
430-982-129	MITERED END SECT, OPTIONAL RD, 24" CD	2.00	EA	$1,358.46	$2,716.92

	Drainage Component Total	$401,160.22

SIGNING COMPONENT

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	35.00	AS	$377.77	$13,221.95

	Signing Component Total	$13,221.95

Sequence 1 Total	$2,803,388.22

Sequence: 2 NUR - New Construction, Undivided, Rural **Net Length:** 0.802 MI
4,234 LF

Description: Roadway reconstruction

EARTHWORK COMPONENT

User Input Data

Description	Value
Standard Clearing and Grubbing Limits L/R	10.00 / 16.00
Incidental Clearing and Grubbing Area	0.00
Alignment Number	1
Distance	0.802
Top of Structural Course For Begin Section	103.00
Top of Structural Course For End Section	103.00
Horizontal Elevation For Begin Section	100.00
Horizontal Elevation For End Section	100.00
Front Slope L/R	6 to 1 / 6 to 1
Outside Shoulder Cross Slope L/R	6.00 % / 6.00 %
Roadway Cross Slope L/R	2.00 % / 2.00 %

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	2.53 AC	$20,128.02	$50,923.89
120-6	EMBANKMENT	14,595.12 CY	$24.98	$364,586.10
	Earthwork Component Total			$415,509.99

ROADWAY COMPONENT

User Input Data

Description	Value
Number of Lanes	2
Roadway Pavement Width L/R	10.00 / 10.00
Structural Spread Rate	275
Friction Course Spread Rate	165

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	12,230.12 SY	$10.84	$132,574.50
285-709	OPTIONAL BASE,BASE GROUP 09	9,718.24 SY	$36.25	$352,286.20
334-1-13	SUPERPAVE ASPHALTIC CONC, TRAFFIC C	1,293.57 TN	$129.76	$167,853.64
337-7-83	ASPH CONC FC,TRAFFIC C,FC-12.5,PG 76-22	776.14 TN	$126.62	$98,274.85

Pavement Marking Subcomponent

Description	Value
Include Thermo/Tape/Other	N
Pavement Type	Asphalt
Solid Stripe No. of Paint Applications	2
Solid Stripe No. of Stripes	2
Skip Stripe No. of Paint Applications	2
Skip Stripe No. of Stripes	1

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
706-3	RETRO-REFLECTIVE/RAISED PAVEMENT MARKERS	108.00	EA	$5.23	$564.84
710-11-101	PAINTED PAVT MARK,STD,WHITE,SOLID,6"	3.21	GM	$1,256.11	$4,032.11
710-11-231	PAINTED PAVT MARK,STD,YELLOW,SKIP,6"	1.60	GM	$712.56	$1,140.10
	Roadway Component Total				$756,726.24

SHOULDER COMPONENT

User Input Data

Description	Value
Total Outside Shoulder Width L/R	0.00 / 6.00
Total Outside Shoulder Perf. Turf Width L/R	0.00 / 6.00
Paved Outside Shoulder Width L/R	0.00 / 0.00
Structural Spread Rate	110
Friction Course Spread Rate	165
Total Width (T) / 8" Overlap (O)	T
Rumble Strips ï¿½No. of Sides	0

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
570-1-1	PERFORMANCE TURF	2,822.34	SY	$2.93	$8,269.46

Erosion Control

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
104-10-3	SEDIMENT BARRIER	11,007.11	LF	$1.82	$20,032.94
104-11	FLOATING TURBIDITY BARRIER	200.45	LF	$11.62	$2,329.23
104-12	STAKED TURBIDITY BARRIER-NYL REINF PVC	200.45	LF	$7.61	$1,525.42
104-15	SOIL TRACKING PREVENTION DEVICE	1.00	EA	$2,482.27	$2,482.27
107-1	LITTER REMOVAL	9.72	AC	$42.66	$414.66
107-2	MOWING	9.72	AC	$65.88	$640.35
	Shoulder Component Total				$35,694.33

DRAINAGE COMPONENT

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
400-2-2	CONC CLASS II, ENDWALLS	14.43	CY	$1,850.81	$26,707.19
430-174-124	PIPE CULV, OPT MATL, ROUND,24"SD	648.00	LF	$99.03	$64,171.44
430-175-136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	136.00	LF	$164.02	$22,306.72
430-984-129	MITERED END SECT, OPTIONAL RD, 24" SD	33.00	EA	$1,247.42	$41,164.86
570-1-1	PERFORMANCE TURF	564.47	SY	$2.93	$1,653.90
	Drainage Component Total				$156,004.11

SIGNING COMPONENT

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	2.00 AS	$377.77	$755.54
700-1-12	SINGLE POST SIGN, F&I GM, 12-20 SF	17.00 AS	$1,379.21	$23,446.57
700-2-14	MULTI- POST SIGN, F&I GM, 31-50 SF	2.00 AS	$4,797.59	$9,595.18
	Signing Component Total			$33,797.29

Sequence 2 Total $1,397,731.96

Date: 2/25/2020 4:07:25 PM

FDOT Long Range Estimating System - Production

R3: Project Details by Sequence Report

Project: SJR2C_-T-RA-IL **Letting Date:** 01/2099

Description: ***UNOFFICIAL COST ESTIMATE*** FPID 439874-1-22-01 St Johns River to Sea Loop Trail Gap PD&E Study Volusia County

District: 05 **County:** 79 VOLUSIA **Market Area:** 06 **Units:** English

Contract Class: **Lump Sum Project:** N **Design/Build:** N **Project Length:** 3.400 MI

Project Manager:

Version 5 Project Grand Total **$5,390,898.42**

Description: Update: 2020-02-25 Preferred Alternative - S. Beresford Road Option 1 (Trail on West Side of Road)

Project Sequences Subtotal			**$4,201,120.18**
102-1	Maintenance of Traffic	10.00 %	$420,112.02
101-1	Mobilization	10.00 %	$462,123.22
Project Sequences Total			**$5,083,355.42**
Project Unknowns		5.00 %	$254,167.77
Design/Build		0.00 %	$0.00

Non-Bid Components:

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)		LS	$53,375.23	$53,375.23
Project Non-Bid Subtotal					**$53,375.23**
Version 5 Project Grand Total					**$5,390,898.42**

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FDOT Long Range Estimating System - Production

R3: Project Details by Sequence Report

Project: SJR2C_-T-RA-IL **Letting Date:** 01/2099

Description: ***UNOFFICIAL COST ESTIMATE*** FPID 439874-1-22-01 St Johns River to Sea Loop Trail Gap PD&E Study Volusia County

District: 05 **County:** 79 VOLUSIA **Market Area:** 06 **Units:** English

Contract Class: **Lump Sum Project:** N **Design/Build:** N **Project Length:** 3.400 MI

Project Manager:

Version 6 Project Grand Total **$5,649,713.71**

Description: Update: 2020-02-25 Preferred Alternative - S. Beresford Road Option 2 (Trail on East Side of Road)

Sequence: 1 MIS - Miscellaneous Construction **Net Length:** 3.059 MI 16,153 LF

Description: 12-ft shared use path

Special Conditions: Includes path, railroad crossing, and drainage items

EARTHWORK COMPONENT

User Input Data

Description	Value
Standard Clearing and Grubbing Limits L/R	0.00 / 0.00
Incidental Clearing and Grubbing Area	0.00

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	13.35 AC	$20,128.02	$268,709.07
	Comment: 3.059mi * 5280ft * 36ft / 43560sf = 13.35ac			
120-1	REGULAR EXCAVATION	13,974.06 CY	$19.32	$269,978.84
	Comment: Pavement Design = 1.5in SP + 4in OBG + 12in Stab= 1.46ft; Excavation Width = 2ft + 12ft + 2ft = 16ft; Pavement Length = 3.059mi * 5280ft = 16151.52ft; 1.46ft * 16ft * 16151.52ft / 27cf = 13974.06cy			
120-6	EMBANKMENT	3,493.52 CY	$24.98	$87,268.13
	Comment: Assume 25% of Excavation; 13974.06cy * 25% = 3493.52cy			
	Earthwork Component Total			$625,956.04

ROADWAY COMPONENT

EX-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
1	RAILROAD CROSSING	1.00 LS	$350,000.00	$350,000.00
	Comment: Per Original Trail Estimate			

Peripherals Subcomponent

Description	Value
Off Road Bike Path(s)	0

Off Road Bike Path Width L/R	6.00 / 6.00
Bike Path Structural Spread Rate	165
Noise Barrier Wall Length	0.00
Noise Barrier Wall Begin Height	0.00
Noise Barrier Wall End Height	0.00

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	28,715.69	SY	$10.84	$311,278.08
285-701	OPTIONAL BASE,BASE GROUP 01	21,536.77	SY	$15.64	$336,835.08
334-1-11	SUPERPAVE ASPHALTIC CONC, TRAFFIC A	1,776.78	TN	$155.45	$276,200.45
	Roadway Component Total				$1,274,313.61

SHOULDER COMPONENT

User Input Data

Description	Value

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	9,834.34	SY	$10.84	$106,604.25
	Comment: 6-ft shoulder along existing and proposed roadways, trail side only. ((3.059mi * 5280ft) - 1400ft) * 6ft / 9sf = 9834.34sy				
400-1-11	CONC CLASS I, RETAINING WALLS	137.50	CY	$1,111.71	$152,860.12
	Comment: 625 linear feet of 3-ft high gravity wall (0.22cy/linear ft)				
415-1-3	REINF STEEL- RETAINING WALL	3,125.00	LB	$1.13	$3,531.25
	Comment: 625 linear feet of 3-ft high gravity wall (5lbs/linear ft)				
520-6	SHOULDER GUTTER- CONCRETE	3,123.95	LF	$25.92	$80,972.78
	Comment: Sta. 141+00.00 to Sta. 172+23.95 = 3123.95ft				
570-1-2	PERFORMANCE TURF, SOD	43,070.72	SY	$3.23	$139,118.43
	Comment: 3.059mi * 5280ft * (36ft - 12ft)/ 9sf = 43070.72sy				
	Shoulder Component Total				$483,086.84

DRAINAGE COMPONENT

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
425-1-521	INLETS, DT BOT, TYPE C, <10'	18.00	EA	$3,297.31	$59,351.58
430-175-118	PIPE CULV, OPT MATL, ROUND, 18"S/CD	2,368.00	LF	$80.12	$189,724.16
430-175-124	PIPE CULV, OPT MATL, ROUND, 24"S/CD	1,568.00	LF	$82.06	$128,670.08
430-982-125	MITERED END SECT, OPTIONAL RD, 18" CD	18.00	EA	$1,149.86	$20,697.48
430-982-129	MITERED END SECT, OPTIONAL RD, 24" CD	2.00	EA	$1,358.46	$2,716.92

	Drainage Component Total	$401,160.22

SIGNING COMPONENT

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	35.00	AS	$377.77	$13,221.95

	Signing Component Total	$13,221.95

Sequence 1 Total	$2,797,738.66

Sequence: 2 NUR - New Construction, Undivided, Rural **Net Length:** 0.923 MI
4,872 LF

Description: Roadway reconstruction

EARTHWORK COMPONENT

User Input Data

Description	Value
Standard Clearing and Grubbing Limits L/R	10.00 / 16.00
Incidental Clearing and Grubbing Area	0.00
Alignment Number	1
Distance	0.923
Top of Structural Course For Begin Section	103.00
Top of Structural Course For End Section	103.00
Horizontal Elevation For Begin Section	100.00
Horizontal Elevation For End Section	100.00
Front Slope L/R	6 to 1 / 6 to 1
Outside Shoulder Cross Slope L/R	6.00 % / 6.00 %
Roadway Cross Slope L/R	2.00 % / 2.00 %

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	2.91	AC	$20,128.02	$58,572.54
120-6	EMBANKMENT	16,797.12	CY	$24.98	$419,592.06
	Earthwork Component Total				$478,164.60

ROADWAY COMPONENT

User Input Data

Description	Value
Number of Lanes	2
Roadway Pavement Width L/R	10.00 / 10.00
Structural Spread Rate	275
Friction Course Spread Rate	165

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	14,075.78	SY	$10.84	$152,581.46
285-709	OPTIONAL BASE,BASE GROUP 09	11,184.83	SY	$36.25	$405,450.09
334-1-13	SUPERPAVE ASPHALTIC CONC, TRAFFIC C	1,488.78	TN	$129.76	$193,184.09
337-7-83	ASPH CONC FC,TRAFFIC C,FC-12.5,PG 76-22	893.27	TN	$126.62	$113,105.85

Pavement Marking Subcomponent

Description	Value
Include Thermo/Tape/Other	N
Pavement Type	Asphalt
Solid Stripe No. of Paint Applications	2
Solid Stripe No. of Stripes	2
Skip Stripe No. of Paint Applications	2
Skip Stripe No. of Stripes	1

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
706-3	RETRO-REFLECTIVE/RAISED PAVEMENT MARKERS	125.00	EA	$5.23	$653.75
710-11-101	PAINTED PAVT MARK,STD,WHITE,SOLID,6"	3.69	GM	$1,256.11	$4,635.05
710-11-231	PAINTED PAVT MARK,STD,YELLOW,SKIP,6"	1.85	GM	$712.56	$1,318.24
	Roadway Component Total				$870,928.52

SHOULDER COMPONENT

User Input Data

Description	Value
Total Outside Shoulder Width L/R	0.00 / 6.00
Total Outside Shoulder Perf. Turf Width L/R	0.00 / 6.00
Paved Outside Shoulder Width L/R	0.00 / 0.00
Structural Spread Rate	110
Friction Course Spread Rate	165
Total Width (T) / 8" Overlap (O)	T
Rumble Strips ï¿½No. of Sides	0

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
570-1-1	PERFORMANCE TURF	3,248.26	SY	$2.93	$9,517.40

Erosion Control

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
104-10-3	SEDIMENT BARRIER	12,668.20	LF	$1.82	$23,056.12
104-11	FLOATING TURBIDITY BARRIER	230.70	LF	$11.62	$2,680.73
104-12	STAKED TURBIDITY BARRIER-NYL REINF PVC	230.70	LF	$7.61	$1,755.63
104-15	SOIL TRACKING PREVENTION DEVICE	1.00	EA	$2,482.27	$2,482.27
107-1	LITTER REMOVAL	11.18	AC	$42.66	$476.94
107-2	MOWING	11.18	AC	$65.88	$736.54
	Shoulder Component Total				$40,705.63

DRAINAGE COMPONENT

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
400-2-2	CONC CLASS II, ENDWALLS	16.61	CY	$1,850.81	$30,741.95
430-174-124	PIPE CULV, OPT MATL, ROUND,24"SD	744.00	LF	$99.03	$73,678.32
430-175-136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	160.00	LF	$164.02	$26,243.20
430-984-129	MITERED END SECT, OPTIONAL RD, 24" SD	37.00	EA	$1,247.42	$46,154.54
570-1-1	PERFORMANCE TURF	649.65	SY	$2.93	$1,903.47
	Drainage Component Total				$178,721.48

SIGNING COMPONENT

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	2.00 AS	$377.77	$755.54
700-1-12	SINGLE POST SIGN, F&I GM, 12-20 SF	19.00 AS	$1,379.21	$26,204.99
700-2-14	MULTI- POST SIGN, F&I GM, 31-50 SF	2.00 AS	$4,797.59	$9,595.18
	Signing Component Total			$36,555.71

Sequence 2 Total $1,605,075.94

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FDOT Long Range Estimating System - Production

R3: Project Details by Sequence Report

Project: SJR2C_-T-RA-IL **Letting Date:** 01/2099

Description: ***UNOFFICIAL COST ESTIMATE*** FPID 439874-1-22-01 St Johns River to Sea Loop Trail Gap PD&E Study Volusia County

District: 05 **County:** 79 VOLUSIA **Market Area:** 06 **Units:** English

Contract Class: **Lump Sum Project:** N **Design/Build:** N **Project Length:** 3.400 MI

Project Manager:

Version 6 Project Grand Total **$5,649,713.71**

Description: Update: 2020-02-25 Preferred Alternative - S. Beresford Road Option 2 (Trail on East Side of Road)

Project Sequences Subtotal			**$4,402,814.60**
102-1	Maintenance of Traffic	10.00 %	$440,281.46
101-1	Mobilization	10.00 %	$484,309.61
Project Sequences Total			**$5,327,405.67**
Project Unknowns		5.00 %	$266,370.28
Design/Build		0.00 %	$0.00

Non-Bid Components:

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)		LS	$55,937.76	$55,937.76
Project Non-Bid Subtotal					**$55,937.76**
Version 6 Project Grand Total					**$5,649,713.71**

Date: 2/25/2020 4:11:37 PM

FDOT Long Range Estimating System - Production

R3: Project Details by Sequence Report

Project: SJR2C_-T-RA-IL **Letting Date:** 01/2099

Description: ***UNOFFICIAL COST ESTIMATE*** FPID 439874-1-22-01 St Johns River to Sea Loop Trail Gap PD&E Study Volusia County

District: 05 **County:** 79 VOLUSIA **Market Area:** 06 **Units:** English
Contract Class: **Lump Sum Project:** N **Design/Build:** N **Project Length:** 3.400 MI

Project Manager:

Version 7 Project Grand Total **$4,926,333.07**
Description: Update: 2020-02-25 Preferred Alternative - S. Beresford Road Option 3 (Midblock Crossing)

Sequence: 1 MIS - Miscellaneous Construction **Net Length:** 3.061 MI
16,163 LF

Description: 12-ft shared use path
Special Conditions: Includes path, railroad crossing, and drainage items

EARTHWORK COMPONENT

User Input Data

Description	Value
Standard Clearing and Grubbing Limits L/R	0.00 / 0.00
Incidental Clearing and Grubbing Area	0.00

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	13.36 AC	$20,128.02	$268,910.35
	Comment: 3.061mi * 5280ft * 36ft / 43560sf = 13.36ac			
120-1	REGULAR EXCAVATION	13,983.19 CY	$19.32	$270,155.23
	Comment: Pavement Design = 1.5in SP + 4in OBG + 12in Stab= 1.46ft; Excavation Width = 2ft + 12ft + 2ft = 16ft; Pavement Length = 3.061mi * 5280ft = 16162.08ft; 1.46ft * 16ft * 16162.08ft / 27cf = 13983.19cy			
120-6	EMBANKMENT	3,495.80 CY	$24.98	$87,325.08
	Comment: Assume 25% of Excavation; 13983.19cy * 25% = 3495.80cy			
	Earthwork Component Total			$626,390.66

ROADWAY COMPONENT

EX-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
1	RAILROAD CROSSING	1.00 LS	$350,000.00	$350,000.00
	Comment: Per Original Trail Estimate			

Peripherals Subcomponent

Description	Value
Off Road Bike Path(s)	0
Off Road Bike Path Width L/R	6.00 / 6.00

Bike Path Structural Spread Rate	165
Noise Barrier Wall Length	0.00
Noise Barrier Wall Begin Height	0.00
Noise Barrier Wall End Height	0.00

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	28,734.46	SY	$10.84	$311,481.55
285-701	OPTIONAL BASE,BASE GROUP 01	21,550.85	SY	$15.64	$337,055.29
334-1-11	SUPERPAVE ASPHALTIC CONC, TRAFFIC A	1,777.94	TN	$155.45	$276,380.77
	Roadway Component Total				$1,274,917.61

SHOULDER COMPONENT

User Input Data

Description	Value

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	9,841.39	SY	$10.84	$106,680.67
	Comment: 6-ft shoulder along existing and proposed roadways, trail side only. ((3.061mi * 5280ft) - 1400ft) * 6ft / 9sf = 9841.39sy				
400-1-11	CONC CLASS I, RETAINING WALLS	137.50	CY	$1,111.71	$152,860.12
	Comment: 625 linear feet of 3-ft high gravity wall (0.22cy/linear ft)				
415-1-3	REINF STEEL- RETAINING WALL	3,125.00	LB	$1.13	$3,531.25
	Comment: 625 linear feet of 3-ft high gravity wall (5lbs/linear ft)				
520-6	SHOULDER GUTTER- CONCRETE	3,123.95	LF	$25.92	$80,972.78
	Comment: Sta. 141+00.00 to Sta. 172+23.95 = 3123.95ft				
570-1-2	PERFORMANCE TURF, SOD	43,521.28	SY	$3.23	$140,573.73
	Comment: 3.061mi * 5280ft * (36ft - 12ft)/ 9sf = 43521.28sy				
	Shoulder Component Total				$484,618.56

DRAINAGE COMPONENT

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
425-1-521	INLETS, DT BOT, TYPE C, <10'	18.00	EA	$3,297.31	$59,351.58
430-175-118	PIPE CULV, OPT MATL, ROUND, 18"S/CD	2,368.00	LF	$80.12	$189,724.16
430-175-124	PIPE CULV, OPT MATL, ROUND, 24"S/CD	1,568.00	LF	$82.06	$128,670.08
430-982-125	MITERED END SECT, OPTIONAL RD, 18" CD	18.00	EA	$1,149.86	$20,697.48
430-982-129	MITERED END SECT, OPTIONAL RD, 24" CD	2.00	EA	$1,358.46	$2,716.92
	Drainage Component Total				$401,160.22

SIGNING COMPONENT

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	35.00 AS	$377.77	$13,221.95
	Signing Component Total			$13,221.95

Sequence 1 Total $2,800,309.00

Sequence: 2 NUR - New Construction, Undivided, Rural **Net Length:** 0.594 MI
3,136 LF

Description: Roadway reconstruction

EARTHWORK COMPONENT

User Input Data

Description	Value
Standard Clearing and Grubbing Limits L/R	10.00 / 16.00
Incidental Clearing and Grubbing Area	0.00
Alignment Number	1
Distance	0.594
Top of Structural Course For Begin Section	103.00
Top of Structural Course For End Section	103.00
Horizontal Elevation For Begin Section	100.00
Horizontal Elevation For End Section	100.00
Front Slope L/R	6 to 1 / 6 to 1
Outside Shoulder Cross Slope L/R	6.00 % / 6.00 %
Roadway Cross Slope L/R	2.00 % / 2.00 %

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	1.87 AC	$20,128.02	$37,639.40
120-6	EMBANKMENT	10,809.85 CY	$24.98	$270,030.05
	Earthwork Component Total			$307,669.45

ROADWAY COMPONENT

User Input Data

Description	Value
Number of Lanes	2
Roadway Pavement Width L/R	10.00 / 10.00
Structural Spread Rate	275
Friction Course Spread Rate	165

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	9,060.48 SY	$10.84	$98,215.60
285-709	OPTIONAL BASE,BASE GROUP 09	7,199.60 SY	$36.25	$260,985.50
334-1-13	SUPERPAVE ASPHALTIC CONC, TRAFFIC C	958.32 TN	$129.76	$124,351.60
337-7-83	ASPH CONC FC,TRAFFIC C,FC-12.5,PG 76-22	574.99 TN	$126.62	$72,805.23

Pavement Marking Subcomponent

Description	Value
Include Thermo/Tape/Other	N
Pavement Type	Asphalt
Solid Stripe No. of Paint Applications	2
Solid Stripe No. of Stripes	2
Skip Stripe No. of Paint Applications	2
Skip Stripe No. of Stripes	1

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
706-3	RETRO-REFLECTIVE/RAISED PAVEMENT MARKERS	80.00	EA	$5.23	$418.40
710-11-101	PAINTED PAVT MARK,STD,WHITE,SOLID,6"	2.38	GM	$1,256.11	$2,989.54
710-11-231	PAINTED PAVT MARK,STD,YELLOW,SKIP,6"	1.19	GM	$712.56	$847.95
	Roadway Component Total				$560,613.82

SHOULDER COMPONENT

User Input Data

Description	Value
Total Outside Shoulder Width L/R	0.00 / 6.00
Total Outside Shoulder Perf. Turf Width L/R	0.00 / 6.00
Paved Outside Shoulder Width L/R	0.00 / 0.00
Structural Spread Rate	110
Friction Course Spread Rate	165
Total Width (T) / 8" Overlap (O)	T
Rumble Strips ï¿½No. of Sides	0

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
570-1-1	PERFORMANCE TURF	2,090.88	SY	$2.93	$6,126.28

Erosion Control

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
104-10-3	SEDIMENT BARRIER	8,154.43	LF	$1.82	$14,841.06
104-11	FLOATING TURBIDITY BARRIER	148.50	LF	$11.62	$1,725.57
104-12	STAKED TURBIDITY BARRIER-NYL REINF PVC	148.50	LF	$7.61	$1,130.08
104-15	SOIL TRACKING PREVENTION DEVICE	1.00	EA	$2,482.27	$2,482.27
107-1	LITTER REMOVAL	7.20	AC	$42.66	$307.15
107-2	MOWING	7.20	AC	$65.88	$474.34
	Shoulder Component Total				$27,086.76

DRAINAGE COMPONENT

Pay Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
400-2-2	CONC CLASS II, ENDWALLS	10.69	CY	$1,850.81	$19,785.16
430-174-124	PIPE CULV, OPT MATL, ROUND,24"SD	480.00	LF	$99.03	$47,534.40
430-175-136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	104.00	LF	$164.02	$17,058.08
430-984-129	MITERED END SECT, OPTIONAL RD, 24" SD	24.00	EA	$1,247.42	$29,938.08
570-1-1	PERFORMANCE TURF	418.18	SY	$2.93	$1,225.27
	Drainage Component Total				$115,540.99

SIGNING COMPONENT

Pay Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	2.00 AS	$377.77	$755.54
700-1-12	SINGLE POST SIGN, F&I GM, 12-20 SF	12.00 AS	$1,379.21	$16,550.52
700-2-14	MULTI- POST SIGN, F&I GM, 31-50 SF	2.00 AS	$4,797.59	$9,595.18
	Signing Component Total			$26,901.24

Sequence 2 Total $1,037,812.26

Date: 2/25/2020 4:11:38 PM

FDOT Long Range Estimating System - Production

R3: Project Details by Sequence Report

Project: SJR2C_-T-RA-IL **Letting Date:** 01/2099

Description: ***UNOFFICIAL COST ESTIMATE*** FPID 439874-1-22-01 St Johns River to Sea Loop Trail Gap PD&E Study Volusia County

District: 05 **County:** 79 VOLUSIA **Market Area:** 06 **Units:** English

Contract Class: **Lump Sum Project:** N **Design/Build:** N **Project Length:** 3.400 MI

Project Manager:

Version 7 Project Grand Total **$4,926,333.07**

Description: Update: 2020-02-25 Preferred Alternative - S. Beresford Road Option 3 (Midblock Crossing)

Project Sequences Subtotal			**$3,838,121.26**
102-1	Maintenance of Traffic	10.00 %	$383,812.13
101-1	Mobilization	10.00 %	$422,193.34
Project Sequences Total			**$4,644,126.73**
Project Unknowns		5.00 %	$232,206.34
Design/Build		0.00 %	$0.00

Non-Bid Components:

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)		LS	$50,000.00	$50,000.00
Project Non-Bid Subtotal					**$50,000.00**
Version 7 Project Grand Total					**$4,926,333.07**

APPENDIX D

Drainage Technical Memorandum

MEMORANDUM

AIM Engineering & Surveying, Inc.

Tampa Office
3802 Corporex Park Drive
Suite 225
Tampa, Florida 33619

813-627-4144
888-627-4144
Fax: 813-664-1899

Successfully providing our clients and the community with quality planning, engineering and surveying services since 1980.

Date: January 16, 2020

To: Bob Finck

From: Marty L. Morlan, PE

Subject: 439874-1-22-01, St. Johns River to Sea Loop Trail Gap PD&E Study
Overview of Existing and Proposed Drainage Conditions
Additional Analysis/Review

Introduction

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) study to construct a multi-use trail from Lake Beresford Park to Grand Avenue in Volusia County. The purpose of this PD&E study is to evaluate engineering and environmental data and to document information that will aid Volusia County and FDOT District Five in determining the type, preliminary design and location of the proposed improvements. The project study area is shown in the figure below and totals approximately 3.6 square miles in size.

The project is located in WBID 2921D, Lake Woodruff Outlet and WBID 2893U1, Lake Beresford Drain and does not fall within any impaired water bodies or within the 100-year FEMA floodplain. The study area also falls within the jurisdiction of the St. Johns River Water Management District (SJRWMD). There are several existing permits within and adjacent to the alignments reviewed; however, none were found for the roadways being evaluated for the multi-use trail corridor.

Based on the evaluation of the alternatives, the Eastern Alignment Alternative is the Preferred Alternative and includes several typical sections, most of which include the addition of a 12' asphalt multi-use trail with 2' flat sod areas on both sides. Draft concept plans and typical sections (of which the drainage analysis is based on) are attached.

Existing Conditions
The study area consists of several road systems, mostly owned and operated by Volusia County. Typical sections of these roadways vary as does the existing right of way width. The intent of the project is to fit the trail within the existing right of way, where possible. For the Preferred Alternative alignment, the existing roadways do not have a substantial drainage conveyance ditch. Roadway drainage is mostly through overland flow along the side slopes of the roadway and percolates into the highly permeable soils adjacent to the roadway. In general, runoff drains from the east to the west to Lake Beresford and Lake Woodruff, and ultimately to the St. Johns River.

Field Review and Corridor Segmentation
An additional field review of the project corridor to further identify existing drainage patterns and features was performed on December 18, 2019. As a result of this field review, and a detailed review of the topographic GIS contours, the corridor has been divided into 10 segments. These segments represent the limits of high/low points along the Preferred trail corridor with each having their own outfalls. The segments are identified in the table below with their approximate limits which will need to be verified during final design based upon field survey.

Segment #	Adjacent Roadway	From	To
1	None	Lake Beresford Park	Alexander Drive
2	Alexander Drive	Railroad Access	Beresford Rd W
3	Beresford Rd W	Alexander Drive	S Beresford Rd
4	S Beresford Rd	Beresford Rd W	400 Feet S of Beresford Ave W
5	S Beresford Rd	400 Feet S of Beresford Ave W	Old New York Ave
6	Grand Ave	Old New York Ave	1300 Feet N of Old New York Ave
7	Grand Ave	1300 Feet N of Old New York Ave	New York Ave (SR 44)
8	Grand Ave	New York Ave (SR 44)	Wisconsin Ave
9	Grand Ave	Wisconsin Ave	Minnesota Ave
10	Minnesota Ave	Grand Ave	Grand Ave

Design Criteria
The intent of the multi-use trail project is to provide a safe passageway for pedestrians and bicyclists while minimizing impacts to utilities and adjacent properties. Based upon our preliminary analysis, the proposed improvements will not result in any significant adverse impacts to the drainage system. The design criteria for the trail is in accordance with the FDOT Florida Design Manual. Tie downs within the right of way are required so as to not block offsite runoff.

The project will adhere to SJRWMD criteria. The proposed project meets 62-330.051(10) for exemptions of construction for recreational trails for pedestrians and bicyclists. Therefore, formal treatment and attenuation calculations and compensation are not required. During final design, verification of the requirements will be required that the proposed improvements do not result in adverse drainage conditions along the roadway and adjacent properties.

Proposed Conditions
A 12-ft multi-use trail is proposed within the study area. A standalone stormwater management system and associated facilities are not anticipated to be required. The existing roadway does not have a formal drainage

system and there is no known history of flooding within the proposed construction limits. The project corridor is composed of gently sloping grades and highly permeable soils. It is expected that final design will allow for runoff to drain over the trail or through small cross drain pipes as needed to maintain the existing flow patterns. Small swales can be incorporated as feasible throughout the project limits. Swales placed between the proposed trail and parallel roadways will need some consideration of the combined runoff from the trail/roadway to be conveyed to historic discharge points. Since there are no defined existing swales along the roadways in current conditions, a determination of the final design criteria for the proposed conditions could impact the location, sizing and right-of-way requirements for the proposed conveyance features. The calculations and typical sections in this memorandum provide for a 10-year storm event for the combined runoff and do not impact any permitted facilities. The following are drainage recommendations and considerations for each segment of the corridor:

Segment 1 – **Lake Beresford Park to Alexander Drive** - The proposed trail will connect to the existing trail section within Lake Beresford Park and will run adjacent to the railroad within an existing easement. There is no defined existing drainage swale or feature along this segment which could be impacted. The overland flow is from east towards the west. There is an existing residence along the east side that is separated from the proposed trail corridor by a 60 ft existing right-of-way which provides driveway access. The recommended drainage design should consider the provision of incorporating small cross drains at low points along the trail to not obstruct the offsite flows should the trail design be elevated above existing grade. A small v-swale design (if required) could be considered in the design and placed along the east side of the trail within the easement.

Segment 2 – **Railroad Access to Beresford Rd W** -The proposed trail would be located along the east side of the existing gravel roadway. There is significant topographic relief to the east which has a residential property (see photo right) that has an existing dirt driveway which parallels Alexander Drive due to the 3-4 feet elevation difference between the east right-of-way and the roadway. It is recommended that consideration be given to reconstruct a portion of Alexander Drive both horizontally and vertically to allow a perpendicular driveway design to access Alexander Drive and to provide enough room/separation to allow the design of a drainage ditch/swale between the trail and the roadway. The ditch/swale design should also provide a drainage inlet and cross drain to convey the approximate 5 acres of drainage area from the east to the historic outfall low area on the west side of Alexander Drive. Another drainage consideration is the existing residence on the southwest corner of Alexander Drive/Beresford Rd W where the driveway slopes away from the roadway towards the residence garage (see photo left). The proposed ditch/swale located between the roadway and the trail at this driveway location should collect the roadway/trail runoff and convey it to the south and into a proposed cross drain

south of the residential property.

Segment 3 - **Alexander Drive to S Beresford Rd** - In this short segment of proposed trail, there is significant longitudinal grade (approximately 3-4%) along the existing roadway to convey the runoff from the roadway and proposed trail within the right-of-way along the roadway edge. To alleviate any potential erosion impacts along the northern shoulder, the recommended drainage design should consider the addition of a curb and gutter with a flume at the low point be placed adjacent to the roadway. There is an existing drainage outfall inlet located within the pavement (see photo left) on the corner at Beresford Rd W/S Beresford Rd. The inlet should be evaluated to determine if relocation or an additional inlet be added to improve drainage conditions. The use of a type F curb and gutter around the roadway return would provide a safer separation for trail users. This type of curb would also aid in keeping vehicles on the pavement through the return.

Segment 4 – **Beresford Rd W to 400 Feet S of Beresford Ave W**. This segment is the longest segment (approx. 3,200 ft.) from the low point to the high point along the corridor and has the largest offsite drainage (over 26 acres) flow from east towards the west and into S Beresford Rd right-of-way. A few large residential farms exist along the east side at a much higher elevation than the roadway. The offsite drainage flows during major storm events may overtop the existing roadway given there is no appreciable conveyance system along both sides of the roadway (see photo right looking North). There are two farms along the west side where the topography is lower than the roadway. Concept Plan S. Beresford Road Alternative 1 would place the trail along the west side. The recommended drainage design for this would include providing a trapezoidal swale (minimum 1 foot deep, 1:4 side slopes and a minimum 4 foot bottom width which would meet FDOT requirements for roadside recovery) located between the roadway and the trail to provide for the combined roadway and trail runoff. Some consideration for the provision/addition of a swale/ditch to handle the offsite drainage along the east side should be evaluated during final design. For the other Concept Plan S. Beresford Road alternatives (2 and portion of 3), which would place the trail along the east side, a similar trapezoidal swale would be placed on the east side between the roadway and the trail. The historic drainage outfall from this segment would require a drainage inlet (or mitered end section) and pipe to the railroad ditch.

Segment 5 - **400 Feet S of Beresford Ave W to Old New York Ave** – The existing roadway appears to run along a topographic ridge so the drainage runoff is limited to the roadway right-of-way. Similar to segment 4, there is no defined drainage conveyance feature along the roadsides. There are some larger residences/farms along the east side which are lower topographically than the roadway. In all three of the Concept Plan S. Beresford Road alternatives, the proposed trail would be placed along the west side and requires additional

right-of-way. The recommended drainage design would provide a trapezoidal swale (same geometry as segment 4) between the proposed trail and the existing roadway. At the northern end, a side drain culvert will be necessary to convey the drainage under the trail to the railroad ditch adjacent to Old New York Ave.

Segment 6 - **Old New York Ave to 1300 Feet N of Old New York Ave** – The existing low point in the pavement at Old New York Ave/Grand Ave intersection appears to be the location where surface runoff, from the intersection and from Grand Ave to the north, collects and then flows south (overtopping Old New York Ave) into the railroad ditch outfall. Along Grand Ave, there is no existing drainage conveyance system. The recommended drainage design should include an inlet and cross drain at the intersection to improve the drainage conditions (see photo left which shows the low point on NW corner). The recommended drainage conveyance swale would place a trapezoidal section (same as segment 4) between the proposed trail and the roadway.

Segment 7 - **1300 Feet N of Old New York Ave to New York Ave (SR 44)** – This segment appears to have an offsite drainage area (approximately 19 acres) along the west side of Grand Ave which flows towards the northeast and into the right-of-way. The historic outfall is into the New York Ave (SR 44) roadside swale drainage system. There are no driveways along this segment. Since the proposed trail would be located along the west side, the recommended drainage design would place a trapezoidal swale (same geometry as segments 4-6) in between the trail and the roadway. The offsite drainage should be accommodated for by allowing the flow to overtop the trail and into the trapezoidal ditch. A mitered end section and side drain culvert will be necessary to connect into the historic outfall at SR 44 (see photo above for the existing swale along the SW corner of SR 44/Grand Ave).

Segment 8 - **New York Ave (SR 44) to Wisconsin Ave** – This segment appears to drain to an existing isolated wetland located just west of Grand Ave and north of the BP gas station property. There is an offsite drainage area on the east side of Grand Ave which flows towards the west. It is assumed that there is a cross drain pipe near the roadway low point (approximately 400 feet north of SR 44) under Grand Ave (see photo to left) to connect this offsite drainage into the wetland system on the west. Since the proposed trail is to be located along the west side, the recommended drainage design would place a trapezoidal swale (same geometry as segments 4-7) between the trail and the roadway. It will be necessary to provide an inlet structure at the

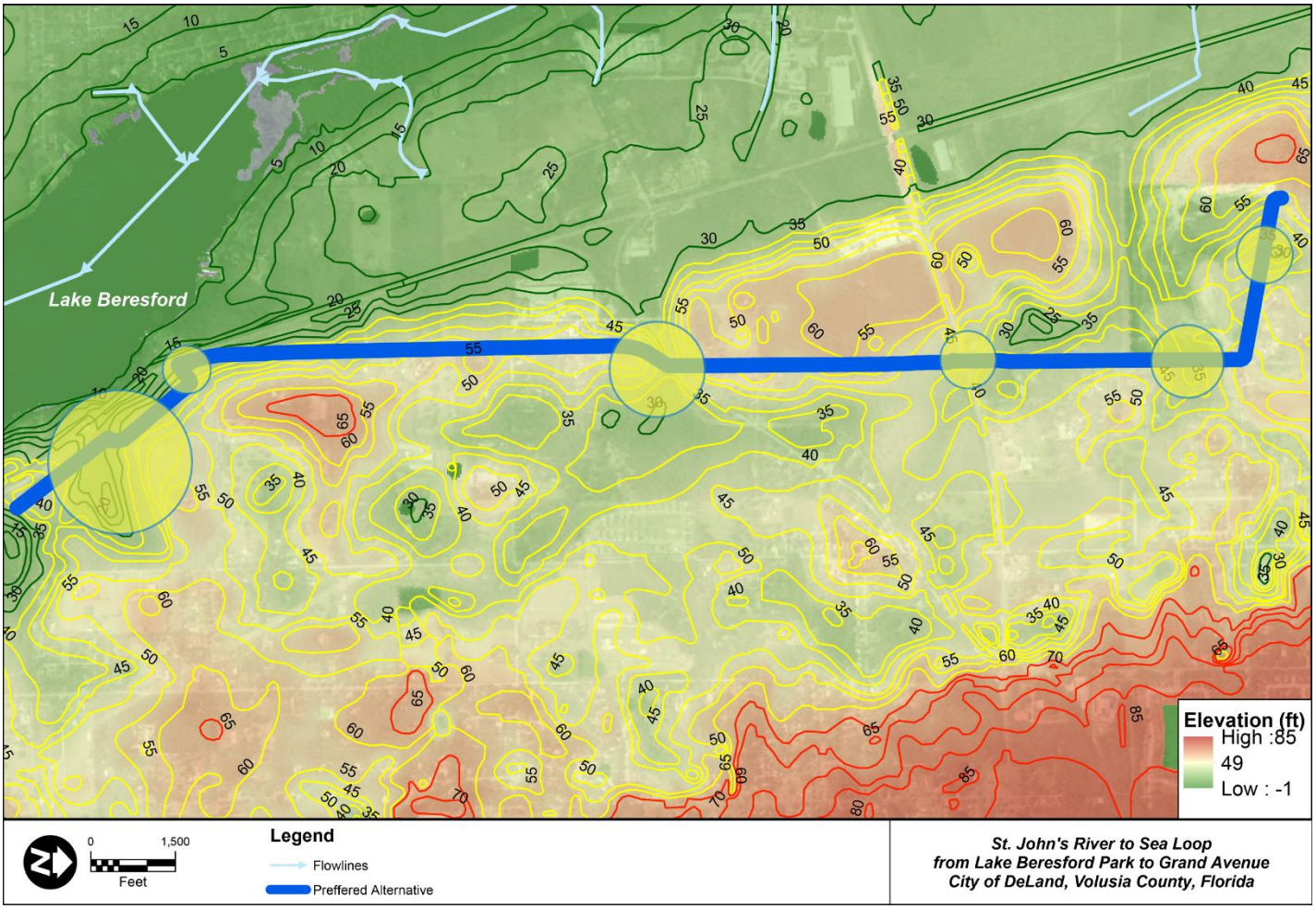
low point of the swale and provide either a new pipe to cross under the trail or connect to the existing cross drain. This would then outfall into the wetland system to the west.

Segment 9 and 10 - **Wisconsin Ave to Minnesota Ave and from Grand Ave to Grand Ave** – These two segments are located adjacent to the large debris disposal property owned by HTS Environmental Services, Inc. There is an existing embankment berm (approximately 3-4 feet high) located along the west side of Grand Ave and along the south side of Minnesota Ave just outside of the roadway shoulder area (see photo at right looking north along Grand Ave). The existing roadway runoff appears to be only the right-of-way area along the left side. The right side appears to drain to a low point depression outside of the roadway on private property located midway along each of the segments. The recommended drainage design is to utilize a concrete shoulder gutter placed at the outside of the shoulder area directly adjacent to the trail. This will provide for the conveyance of the trail/roadway drainage along the west side and will keep the impacts reduced to the existing embankment berm. It will be necessary to provide an inlet with cross-drain pipe at the low point to connect the drainage from the left side with the historic discharge locations on the right side.

Calculations

A review of the anticipated additional runoff based on the proposed 12' asphalt trail and adjacent roadway was estimated. Based on a ten-year storm event, per FDOT Drainage Manual Section 2.2, the potential flow from the impervious surfaces and roadway shoulder/swale was estimated. Using a trapezoidal swale (1:4 side slopes with 4 ft. wide bottom for roadside recovery) results in a swale depth of less than one foot (except for Segment 4 Concept Plan S. Beresford Road Alt. 2 and 3 with provision for offsite area – this requires a 1.13 foot depth) and a top width that varies from 9 feet to 12 feet. The swale would provide conveyance and could provide some retention if ditch blocks were introduced (not anticipated to be required since the project would likely be exempt from permitting). Similar calculations were done for an option for a v-shaped swale located between the trail and roadway (using 1:6 side slopes which meet roadside recovery requirements) and outside of the trail (using 1:4 side slopes). These swale shapes by calculations could result in slightly narrower ditch top widths (from 7 to 14 foot widths); however, these v-swales would likely require the use of additional back-side berms if located in fill sections or would require wider swale sections for driveway culverts/mitered end sections resulting in similar or greater widths than the trapezoidal design. The design of such a swale would be done at the final design stage of the project after the necessary additional data collection, including topographic survey, geotechnical investigation and determination of the appropriate and available locations for consideration, has been completed.

The flow patterns were analyzed based on the GIS contours. The low areas were reviewed more in-depth to verify potential for positive drainage outfall and to make sure the selected alternative would not incur a fatal flaw. These areas are identified with yellow circles in the following graphic.

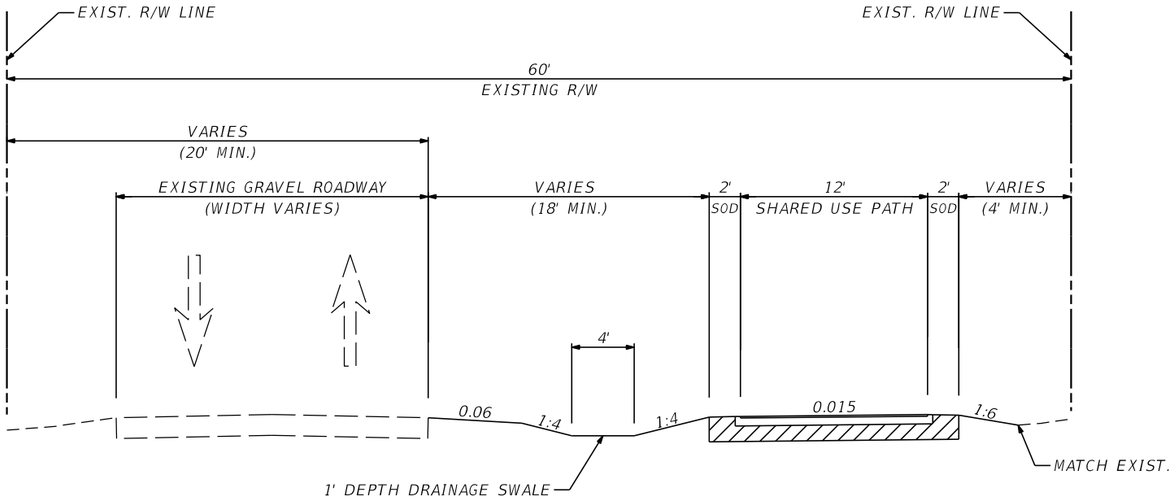


Final drainage analysis and drainage calculations will need to be assessed during final design following the topographic data collection to make sure there are no adverse impacts to on-site or off-site flow patterns. The final ditch/swale sizing will also be accomplished during development of the cross sections and trail profiles during final design.

APPENDIX

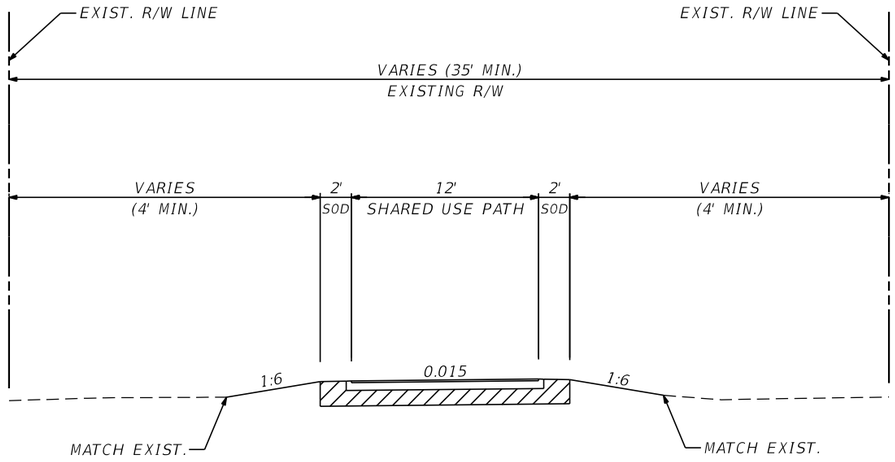
PRELIMINARY DRAINAGE ANALYSIS

CALCULATIONS AND MAP



TYPICAL SECTION 2
FROM ALEXANDER DRIVE TO S BERESFORD ROAD
POSTED SPEED LIMIT: 25 MPH

Preliminary
01/16/2020 3:30:00 PM



TYPICAL SECTION 1
FROM LAKE BERESFORD PARK TO ALEXANDER DRIVE
POSTED SPEED LIMIT: N/A

AIM ENGINEERING & SURVEYING
3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

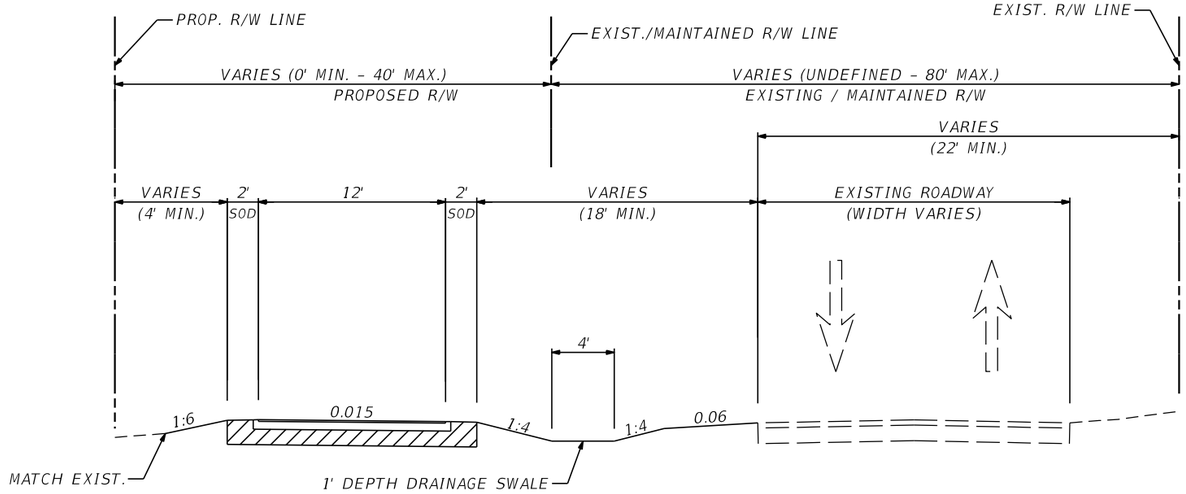
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

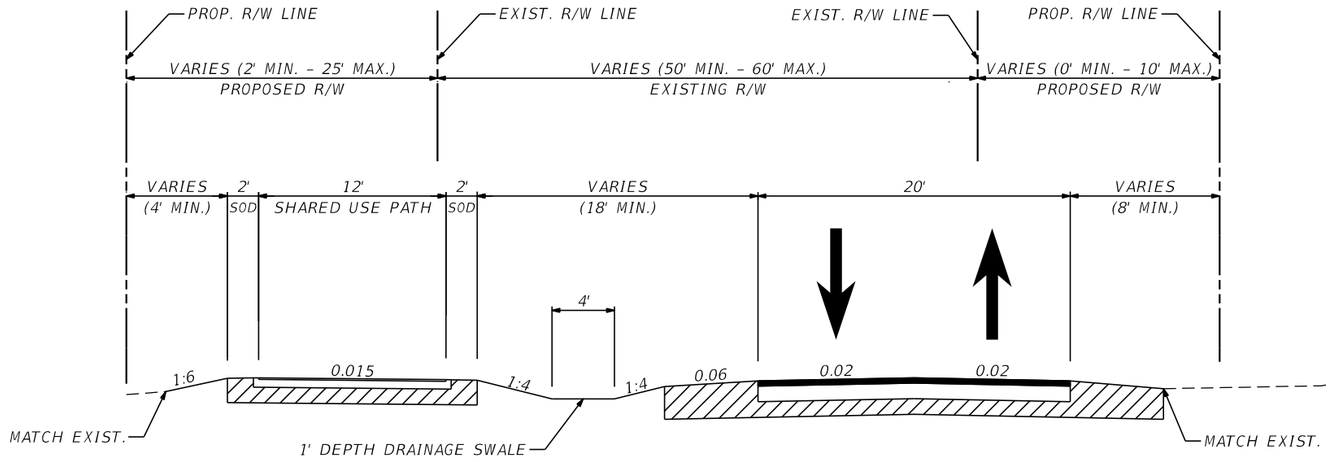
TYPICAL SECTIONS

SHEET NO. 2



TYPICAL SECTION 4
FROM BERESFORD AVENUE W TO OLD NEW YORK AVENUE
AND
FROM NEW YORK AVENUE (SR 44) TO W WISCONSIN AVENUE
POSTED SPEED LIMIT: 35 MPH

Preliminary
01/16/2020 3:30:21 PM



TYPICAL SECTION 3
FROM BERESFORD ROAD W TO BERESFORD AVENUE W
AND
FROM OLD NEW YORK AVENUE TO NEW YORK AVENUE (SR 44)
POSTED SPEED LIMIT: 30-35 MPH

AIM ENGINEERING & SURVEYING
3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

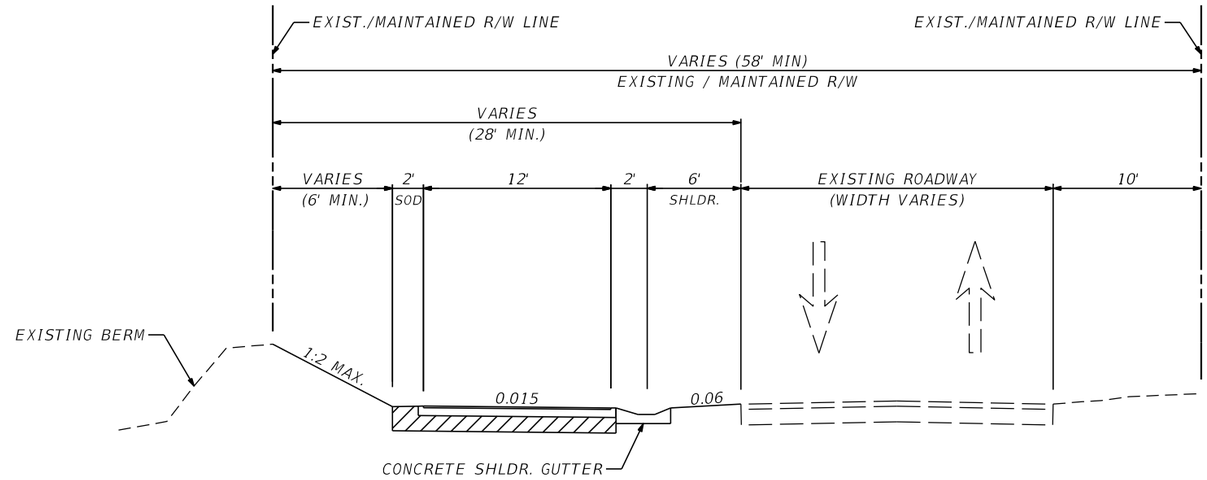
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

TYPICAL SECTIONS

SHEET NO. 3



TYPICAL SECTION 5
FROM W WISCONSIN AVENUE TO GRAND AVENUE
POSTED SPEED LIMIT: 35 MPH

Preliminary
01/16/2020 3:30:41 PM

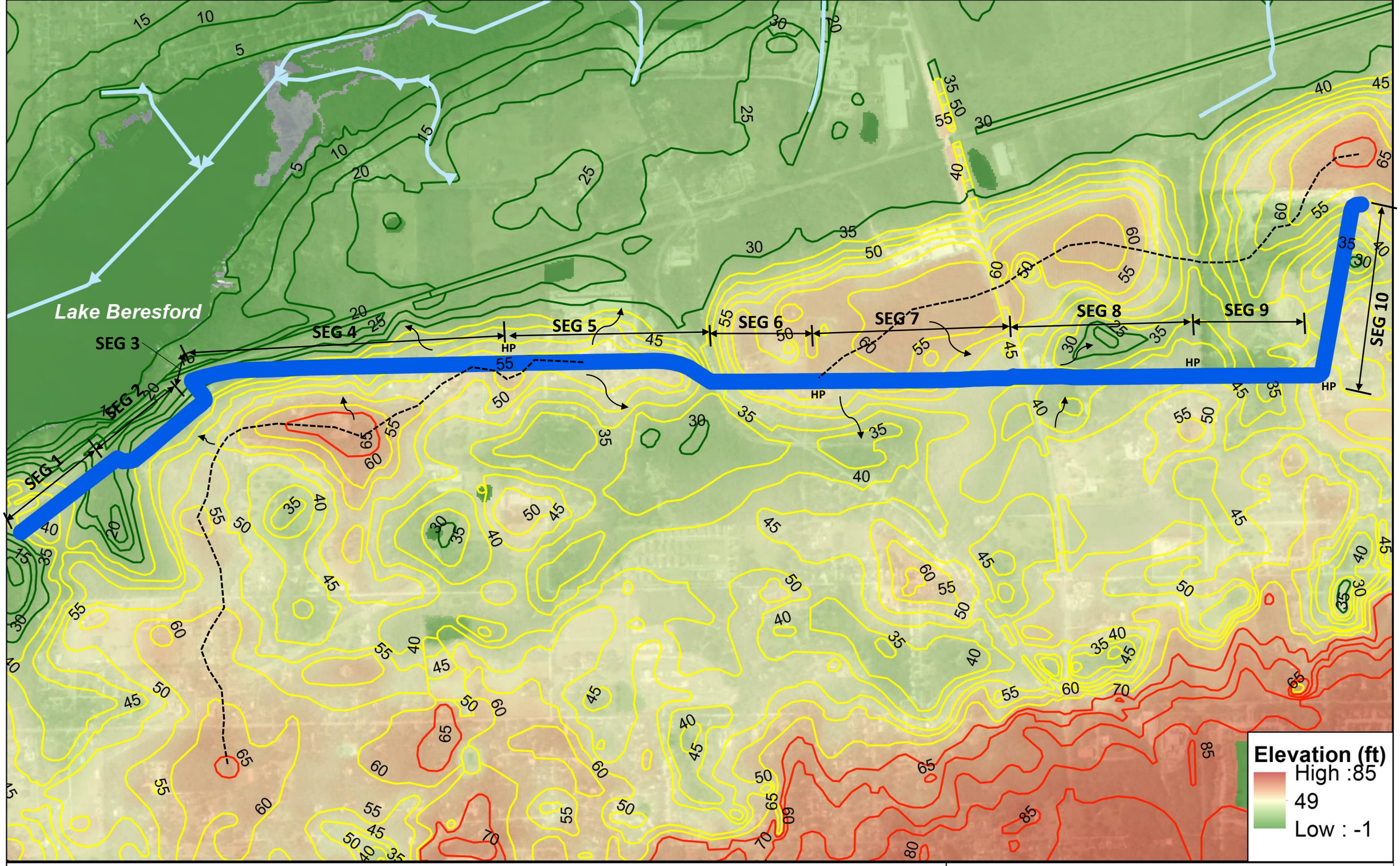
AIM ENGINEERING & SURVEYING
3802 CORPOREX PARK DRIVE
SUITE 225
TAMPA, FL 33619

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
N/A	VOLUSIA	439874-1-22-01

ST. JOHNS RIVER TO SEA LOOP TRAIL GAP PD&E STUDY

TYPICAL SECTIONS

SHEET NO. 4



0 1,500
Feet

Legend

Flowlines

Preffered Alternative

PRELIMINARY DRAINAGE MAP

Drainage Divide (Ridge Line)

Surface Runoff Flow Direction

St. John's River to Sea Loop
from Lake Beresford Park to Grand Avenue
City of DeLand, Volusia County, Florida

FLORIDA DEPARTMENT OF TRANSPORTATION

HYDRAULIC WORKSHEET FOR ROADSIDE DITCHES

Road: **SJR2C Sea Loop Trail PD&E**

Project No.: **43987412201**

Path & Name: T:\PROJECTS\D5 PD&E Continuing Services\SJR to Sea Loop Trail 439874-1\01 Engineering\Drainage\[Ditch Worksheet.xls]Channel Sections

	Segment	Limits	Length (ft)	SIDE	% Slope	Drainage Area (Ac.)	"C"	Tc (min.)	I (in/hr)	Q (cfs)	F.S.		B.W. (ft)	B.S.		"n"	Input normal depth "d" (ft)	Ditch Flow Area A (ft^2)	Ditch Wetted Perimeter P (ft)	Hydraulic Radius R (ft)	Calculated Ditch Flow Q (cfs)	Ditch Velocity (ft/s)	Ditch Lining	Design Storm	Ditch/Swale Top Width (ft)	Remarks
TRAPEZOIDAL SWALE BETWEEN TRAIL & ROAD	2	Alexander Dr	1200	Rt	0.1%	4.86	0.20	36	4.25	4.1	4	:1	4	4	:1	0.06	0.94	7.2944	11.75144	0.620724	4.2	0.6	Sod	10	12	Roadside Ditch (between gravel rd and prop 12 ft trail)
	4 - Alt 1	Beresford Rd W to HP approx 3000 ft N	3000	Lt	1.0%	3.10	0.65	39	4.07	8.2	4	:1	4	4	:1	0.06	0.75	5.25	10.18466	0.515481	8.4	1.6	Sod	10	10	Roadside Ditch (between roadway and prop. 12ft trail)
	4 - Alt 2 & 3	Beresford Rd W to HP approx 3000 ft N	3000	Rt	1.0%	26.50	0.2	48	3.63	19.2	4	:1	4	4	:1	0.06	1.13	9.6276	13.31822	0.722889	19.2	2.0	Sod	10	14	Roadside Ditch (between roadway and prop. 12ft trail)
	5	3000 ft N of Beresford Rd W to Old New York Ave	2300	Lt or Rt	0.8%	2.32	0.6	26	4.99	7.0	4	:1	4	4	:1	0.06	0.73	5.0516	10.01973	0.504165	7.1	1.4	Sod	10	10	Roadside Ditch (between roadway and prop. 12ft trail)
	6	Old NY Ave to 1400 ft N	1400	Lt	1.0%	1.51	0.6	12	6.73	6.1	4	:1	4	4	:1	0.06	0.64	4.1984	9.277575	0.452532	6.1	1.5	Sod	10	10	Roadside Ditch (between roadway and prop. 12ft trail)
	7	1400 ft N of Old NY Ave to NY Ave (SR44)	1900	Lt	0.9%	19.00	0.2	83	2.59	9.8	4	:1	4	4	:1	0.06	0.84	6.1824	10.92682	0.565801	9.9	1.6	Sod	10	11	Roadside Ditch (between roadway and prop. 12ft trail)
	8	NY Ave (SR 44) to W Wisconsin Ave	1700	Lt	0.8%	1.83	0.6	19	5.72	6.3	4	:1	4	4	:1	0.06	0.70	4.76	9.772348	0.487089	6.5	1.4	Sod	10	10	Roadside Ditch (between roadway and prop. 12ft trail)
	9	W Wisconsin Ave to Minnesota Ave	1300	Lt	1.3%	1.40	0.6	10	7.09	6.0	4	:1	4	4	:1	0.06	0.60	3.84	8.947727	0.429159	6.2	1.6	Sod	10	9	Roadside Ditch (between roadway and prop. 12ft trail)
	10	Minnesota Ave to Grand Ave	1900	Lt	1.2%	2.05	0.6	16	6.11	7.5	4	:1	4	4	:1	0.06	0.68	4.5696	9.607424	0.475632	7.6	1.7	Sod	10	10	Roadside Ditch (between roadway and prop. 12ft trail)
V-SHAPE SWALE OUTSIDE OF TRAIL	2	Alexander Dr	1200	Rt	0.1%	1.05	0.63	13	6.56	4.4	4	:1	0	4	:1	0.06	1.36	7.3984	11.21485	0.659697	4.4	0.6	Sod	10	11	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway)
	4	Beresford Rd W to HP approx 3000 ft N	3000	Lt	1.0%	2.62	0.63	33	4.45	7.4	4	:1	0	4	:1	0.06	1.08	4.6656	8.905908	0.523877	7.5	1.6	Sod	10	9	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway)
	5	3000 ft N of Beresford Rd W to Old New York Ave	2300	Lt or Rt	0.8%	2.01	0.63	26	4.99	6.4	4	:1	0	4	:1	0.06	1.06	4.4944	8.740984	0.514176	6.4	1.4	Sod	10	9	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway)
	6	Old NY Ave to 1400 ft N	1400	Lt	1.0%	1.22	0.63	15	6.25	4.8	4	:1	0	4	:1	0.06	0.92	3.3856	7.586514	0.446266	4.9	1.4	Sod	10	8	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway)
	7	1400 ft N of Old NY Ave to NY Ave (SR44)	1900	Lt	0.9%	1.66	0.63	21	5.49	5.8	4	:1	0	4	:1	0.06	1.00	4	8.246211	0.485071	5.8	1.5	Sod	10	8	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway)
	8	NY Ave (SR 44) to W Wisconsin Ave	1700	Lt	0.8%	1.48	0.63	18	5.84	5.5	4	:1	0	4	:1	0.06	1.00	4	8.246211	0.485071	5.5	1.4	Sod	10	8	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway)
	9	W Wisconsin Ave to Minnesota Ave	1300	Lt	1.3%	1.13	0.63	14	6.40	4.6	4	:1	0	4	:1	0.06	0.86	2.9584	7.091742	0.417161	4.7	1.6	Sod	10	7	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway)
	10	Minnesota Ave to Grand Ave	1900	Lt	1.2%	1.66	0.63	21	5.49	5.8	4	:1	0	4	:1	0.06	0.95	3.61	7.833901	0.460818	5.8	1.6	Sod	10	8	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway)
ALE BETWEEN TRAIL & ROAD	2	Alexander Dr	1200	Rt	0.1%	1.05	0.63	13	6.56	4.4	6	:1	0	6	:1	0.06	1.16	8.0736	14.11201	0.572108	4.4	0.5	Sod	10	14	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway) 1:6 Max sideslopes
	4	Beresford Rd W to HP approx 3000 ft N	3000	Lt	1.0%	2.62	0.63	33	4.45	7.4	6	:1	0	6	:1	0.06	0.92	5.0784	11.19228	0.453741	7.4	1.5	Sod	10	12	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway) 1:6 Max sideslopes
	5	3000 ft N of Beresford Rd W to Old New York Ave	2300	Lt or Rt	0.8%	2.01	0.63	26	4.99	6.4	6	:1	0	6	:1	0.06	0.91	4.9686	11.07063	0.448809	6.5	1.3	Sod	10	11	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway) 1:6 Max sideslopes
	6	Old NY Ave to 1400 ft N	1400	Lt	1.0%	1.22	0.63	15	6.25	4.8	6	:1	0	6	:1	0.06	0.79	3.7446	9.610765	0.389626	4.9	1.3	Sod	10	10	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway) 1:6 Max sideslopes
	7	1400 ft N of Old NY Ave to NY Ave (SR44)	1900	Lt	0.9%	1.66	0.63	21	5.49	5.8	6	:1	0	6	:1	0.06	0.86	4.4376	10.46235	0.424149	5.9	1.3	Sod	10	11	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway) 1:6 Max sideslopes

FLORIDA DEPARTMENT OF TRANSPORTATION

HYDRAULIC WORKSHEET FOR ROADSIDE DITCHES

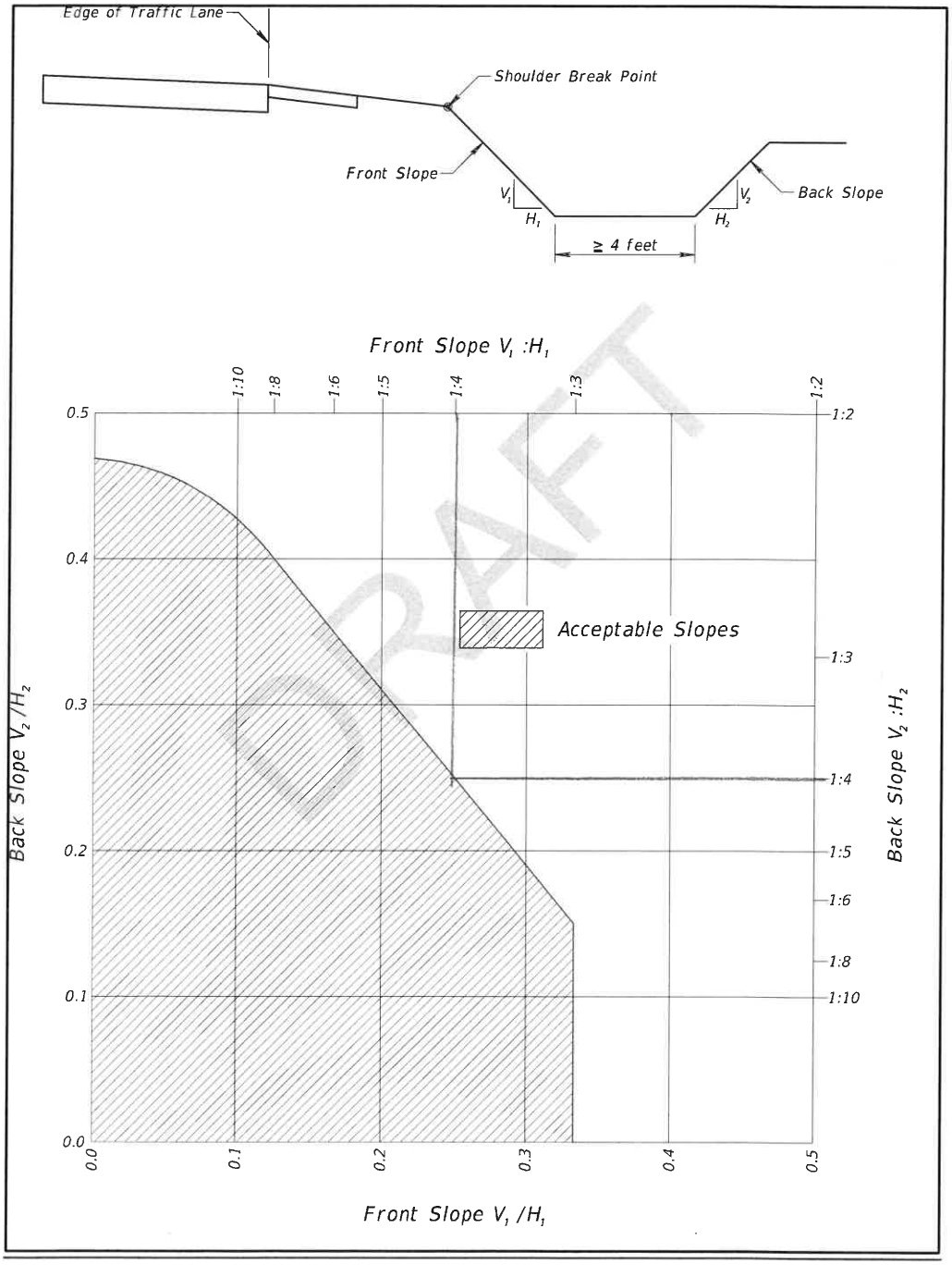
Road: **SJR2C Sea Loop Trail PD&E**

Project No.: **43987412201**

Path & Name: T:\PROJECTS\D5 PD&E Continuing Services\SJR to Sea Loop Trail 439874-1\01 Engineering\Drainage\[Ditch Worksheet.xls]Channel Sections

												Input												
																		Calculated						
	Segment	Limits	Length (ft)	SIDE	% Slope	Drainage Area (Ac.)	"C"	Tc (min.)	I (in/hr)	Q (cfs)	F.S.		B.W. (ft)	B.S.		"n"	normal depth "d" (ft)	Ditch Flow Area A (ft^2)	Ditch Wetted Perimeter P (ft)	Hydraulic Radius R (ft)	Ditch Flow Q (cfs)	Ditch Velocity (ft/s)	Ditch Lining	Design Storm	Ditch/Swale Top Width (ft)	Remarks
V-SHAPE SW	8	NY Ave (SR 44) to W Wisconsin Ave	1700	Lt	0.8%	1.48	0.63	18	5.84	**5.5**	6	:1	0	6	:1	0.06	**0.86**	4.4376	10.46235	0.424149	**5.5**	**1.3**	Sod	10	11	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway) 1:6 Max sideslopes
	9	W Wisconsin Ave to Minnesota Ave	1300	Lt	1.3%	1.13	0.63	14	6.40	**4.6**	6	:1	0	6	:1	0.06	**0.73**	3.1974	8.880833	0.360034	**4.6**	**1.4**	Sod	10	9	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway) 1:6 Max sideslopes
	10	Minnesota Ave to Grand Ave	1900	Lt	1.2%	1.66	0.63	21	5.49	**5.8**	6	:1	0	6	:1	0.06	**0.81**	3.9366	9.854075	0.39949	**5.8**	**1.5**	Sod	10	10	Alternative - Roadside Swale (sized for Trail runoff+1/2roadway) 1:6 Max sideslopes

Figure 4 – 5 Roadside Ditches – Bottom Width ≥ 4 Feet



Source: Figure 3 – 6, 2011 AASHTO Roadside Design Guide.

Project:	SJR2C Sea Loop Trail	By:	MLM	Date:	12/30/2019
Location:	Volusia	Checked:		Date:	

Time of Concentration (Tc) or Travel Time (Tt)

BASIN NAME: **Seg 2** **EX. & PROP.**

Present Developed **Tc** Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segment.

Sheet flow (Applicable to Tc only)

	Seqment ID	AB	BC	
1. Surface description		Grass, D	Cultivated1	
2. Manning's roughness coefficient, n (table 3-1)		0.24	0.06	
3. Flow length, L (total L<= 300 ft)	ft	300	1	
4. Two-Year 24-hour rainfall, P	in	4.5	4.5	
5. Land slope, S	ft/ft	0.0167	1.0000	
6. Tt = [(0.007)(nL)^0.8] / [(P^0.5)(s^0.4)]	Compute Tt…….hr	0.520	0.000	0.520

Shallow Concentrated Flow

	Seqment ID	CD	DE	
7. Surface description (paved or unpaved)		UNPAVED	Paved	
8. Flow length, L	ft	669	1	
9. Watercourse slope, s	ft/ft	0.0224	18.8000	
10. Average velocity, V	ft/s	2.416	88.141	
11. Tt = L / 3600 V	Compute Tt…….hr	0.077	0.000	0.077

Channel Flow

	Seqment ID	EF	FG	
12. Cross sectional flow area, a	ft2	6	28	
13. Wetted perimeter, p_w	ft	12.17	23.49	
14. Hydraulic radius, r = a / p_w	ft	0.49	1.19	
15. Channel slope , s	ft/ft	28.000	3.500	
16. Manning's roughness coefficient, n		0.03	0.1	
17. V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	164.06	31.34	
18. Flow length, L	ft	1	1	
19. Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Pipe Flow

	Seqment ID	GH	HI	
20. Pipe diameter, D	in	1	1	
21. Pipe slop[e, s	ft/ft	17.000	1.000	
22. Manning's roughness coefficient, n		0.012	0.012	
23. V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	38.76	9.40	
24. Flow length, L	ft	1	1	
25. Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Total Time of Concentration

26. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, 19 and 25)	Hr	0.597
	Min	35.81

USE TC = 36

Project:	SJR2C Sea Loop Trail	By:	MLM	Date:	12/30/2019
Location:	Volusia	Checked:		Date:	

Time of Concentration (Tc) or Travel Time (Tt)

BASIN NAME: **Seg 4 (Lt)**

Present Developed **Tc** Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segment.

Sheet flow (Applicable to Tc only)

		Seqment ID	AB	BC	
1.	Surface description		Grass, D	Cultivated1	
2.	Manning's roughness coefficient, n (table 3-1)		0.24	0.06	
3.	Flow length, L (total L<= 300 ft)	ft	10	1	
4.	Two-Year 24-hour rainfall, P	in	4.5	4.5	
5.	Land slope, S	ft/ft	0.5000	1.0000	
6.	Tt = [(0.007)(nL)^0.8] / [(P^0.5)(s^0.4)]	Compute Tt…….hr	0.009	0.000	0.009

Shallow Concentrated Flow

		Seqment ID	CD	DE	
7.	Surface description (paved or unpaved)		Unpaved	Paved	
8.	Flow length, L	ft	3000	1	
9.	Watercourse slope, s	ft/ft	0.0067	18.8000	
10.	Average velocity, V	ft/s	1.317	88.141	
11.	Tt = L / 3600 V	Compute Tt…….hr	0.633	0.000	0.633

Channel Flow

		Seqment ID	EF	FG	
12.	Cross sectional flow area, a	ft2	6	28	
13.	Wetted perimeter, p_w	ft	12.17	23.49	
14.	Hydraulic radius, r = a / p_w	ft	0.49	1.19	
15.	Channel slope , s	ft/ft	28.000	3.500	
16.	Manning's roughness coefficient, n		0.03	0.1	
17.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	164.06	31.34	
18.	Flow length, L	ft	1	1	
19.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Pipe Flow

		Seqment ID	GH	HI	
20.	Pipe diameter, D	in	1	1	
21.	Pipe slop[e, s	ft	17.000	1.000	
22.	Manning's roughness coefficient, n		0.012	0.012	
23.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	38.76	9.40	
24.	Flow length, L	ft	1	1	
25.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Total Time of Concentration

26. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, 19 and 25)	Hr	0.642
	Min	38.50

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Project:	SJR2C Sea Loop Trail	By:	MLM	Date:	12/30/2019
Location:	Volusia	Checked:		Date:	

Time of Concentration (Tc) or Travel Time (Tt)

BASIN NAME: **Seg 4 (Rt)**

Present Developed **Tc** Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segment.

Sheet flow (Applicable to Tc only)

		Seqment ID	AB	BC	
1.	Surface description		Grass, D	Cultivated1	
2.	Manning's roughness coefficient, n (table 3-1)		0.24	0.06	
3.	Flow length, L (total L<= 300 ft)	ft	300	1	
4.	Two-Year 24-hour rainfall, P	in	4.5	4.5	
5.	Land slope, S	ft/ft	0.0167	1.0000	
6.	Tt = [(0.007)(nL)^0.8] / [(P^0.5)(s^0.4)]	Compute Tt…….hr	0.520	0.000	0.520

Shallow Concentrated Flow

		Seqment ID	CD	DE	
7.	Surface description (paved or unpaved)		Unpaved	Paved	
8.	Flow length, L	ft	1400	1	
9.	Watercourse slope, s	ft/ft	0.0071	18.8000	
10.	Average velocity, V	ft/s	1.364	88.141	
11.	Tt = L / 3600 V	Compute Tt…….hr	0.285	0.000	0.285

Channel Flow

		Seqment ID	EF	FG	
12.	Cross sectional flow area, a	ft2	6	28	
13.	Wetted perimeter, p_w	ft	12.17	23.49	
14.	Hydraulic radius, r = a / p_w	ft	0.49	1.19	
15.	Channel slope , s	ft/ft	28.000	3.500	
16.	Manning's roughness coefficient, n		0.03	0.1	
17.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	164.06	31.34	
18.	Flow length, L	ft	1	1	
19.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Pipe Flow

		Seqment ID	GH	HI	
20.	Pipe diameter, D	in	1	1	
21.	Pipe slop[e, s	ft	17.000	1.000	
22.	Manning's roughness coefficient, n		0.012	0.012	
23.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	38.76	9.40	
24.	Flow length, L	ft	1	1	
25.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Total Time of Concentration

26. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, 19 and 25)	Hr	0.805
	Min	48.31

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Project:	SJR2C Sea Loop Trail	By:	MLM	Date:	12/30/2019
Location:	Volusia	Checked:		Date:	

Time of Concentration (Tc) or Travel Time (Tt)

BASIN NAME: **Segment 5**

Present Developed **Tc** Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segment.

Sheet flow (Applicable to Tc only)

		Seqment ID	AB	BC	
1.	Surface description		Grass, D	Cultivated1	
2.	Manning's roughness coefficient, n (table 3-1)		0.24	0.06	
3.	Flow length, L (total L<= 300 ft)	ft	1	1	
4.	Two-Year 24-hour rainfall, P	in	4.5	4.5	
5.	Land slope, S	ft/ft	5.0000	1.0000	
6.	Tt = [(0.007)(nL)^0.8] / [(P^0.5)(s^0.4)]	Compute Tt…….hr	0.001	0.000	0.001

Shallow Concentrated Flow

		Seqment ID	CD	DE	
7.	Surface description (paved or unpaved)		Unpaved	Paved	
8.	Flow length, L	ft	2300	1	
9.	Watercourse slope, s	ft/ft	0.0087	18.8000	
10.	Average velocity, V	ft/s	1.505	88.141	
11.	Tt = L / 3600 V	Compute Tt…….hr	0.425	0.000	0.425

Channel Flow

		Seqment ID	EF	FG	
12.	Cross sectional flow area, a	ft2	6	28	
13.	Wetted perimeter, p_w	ft	12.17	23.49	
14.	Hydraulic radius, r = a / p_w	ft	0.49	1.19	
15.	Channel slope , s	ft/ft	28.000	3.500	
16.	Manning's roughness coefficient, n		0.03	0.1	
17.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	164.06	31.34	
18.	Flow length, L	ft	1	1	
19.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Pipe Flow

		Seqment ID	GH	HI	
20.	Pipe diameter, D	in	1	1	
21.	Pipe slop[e, s	ft	17.000	1.000	
22.	Manning's roughness coefficient, n		0.012	0.012	
23.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	38.76	9.40	
24.	Flow length, L	ft	1	1	
25.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Total Time of Concentration

26. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, 19 and 25)	Hr	0.426
	Min	25.54

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Project: SJR2C Sea Loop Trail By: MLM Date: 12/30/2019
Location: Volusia Checked: Date:

Time of Concentration (Tc) or Travel Time (Tt)

BASIN NAME: **Segment 6**

Present Developed **Tc** Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segment.

Sheet flow (Applicable to Tc only)

		Seqment ID	AB	BC	
1.	Surface description		Grass, D	Cultivated1	
2.	Manning's roughness coefficient, n (table 3-1)		0.24	0.06	
3.	Flow length, L (total L<= 300 ft)	ft	1	1	
4.	Two-Year 24-hour rainfall, P	in	4.5	4.5	
5.	Land slope, S	ft/ft	5.0000	1.0000	
6.	Tt = [(0.007)(nL)^0.8] / [(P^0.5)(s^0.4)]	Compute Tt…….hr	0.001	0.000	0.001

Shallow Concentrated Flow

		Seqment ID	CD	DE	
7.	Surface description (paved or unpaved)		Unpaved	Paved	
8.	Flow length, L	ft	1	1	
9.	Watercourse slope, s	ft/ft	15.0000	18.8000	
10.	Average velocity, V	ft/s	62.489	88.141	
11.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Channel Flow

		Seqment ID	EF	FG	
12.	Cross sectional flow area, a	ft2	9	28	
13.	Wetted perimeter, p_w	ft	13.25	23.49	
14.	Hydraulic radius, r = a / p_w	ft	0.68	1.19	
15.	Channel slope , s	ft/ft	0.011	3.500	
16.	Manning's roughness coefficient, n		0.06	0.1	
17.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	1.99	31.34	
18.	Flow length, L	ft	1400	1	
19.	Tt = L / 3600 V	Compute Tt…….hr	0.196	0.000	0.196

Pipe Flow

		Seqment ID	GH	HI	
20.	Pipe diameter, D	in	1	1	
21.	Pipe slop[e, s	ft	17.000	1.000	
22.	Manning's roughness coefficient, n		0.012	0.012	
23.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	38.76	9.40	
24.	Flow length, L	ft	1	1	
25.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Total Time of Concentration

26. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, 19 and 25)	Hr	0.197
	Min	11.80
	USE TC =	**12**

Project:	SJR2C Sea Loop Trail	By:	MLM	Date:	12/30/2019
Location:	Volusia	Checked:		Date:	

Time of Concentration (Tc) or Travel Time (Tt)

BASIN NAME: **Segment 7**

Present Developed **Tc** Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segment.

Sheet flow (Applicable to Tc only)

		Seqment ID	AB	BC	
1.	Surface description		Woods, L	Cultivated1	
2.	Manning's roughness coefficient, n (table 3-1)		0.4	0.06	
3.	Flow length, L (total L<= 300 ft)	ft	300	1	
4.	Two-Year 24-hour rainfall, P	in	4.5	4.5	
5.	Land slope, S	ft/ft	0.0067	1.0000	
6.	Tt = [(0.007)(nL)^0.8] / [(P^0.5)(s^0.4)]	Compute Tt…….hr	1.128	0.000	1.128

Shallow Concentrated Flow

		Seqment ID	CD	DE	
7.	Surface description (paved or unpaved)		Unpaved	Paved	
8.	Flow length, L	ft	150	1	
9.	Watercourse slope, s	ft/ft	0.0067	18.8000	
10.	Average velocity, V	ft/s	1.317	88.141	
11.	Tt = L / 3600 V	Compute Tt…….hr	0.032	0.000	0.032

Channel Flow

		Seqment ID	EF	FG	
12.	Cross sectional flow area, a	ft2	9	28	
13.	Wetted perimeter, p_w	ft	13.25	23.49	
14.	Hydraulic radius, r = a / p_w	ft	0.68	1.19	
15.	Channel slope , s	ft/ft	0.009	3.500	
16.	Manning's roughness coefficient, n		0.06	0.1	
17.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….ft/s	1.78	31.34	
18.	Flow length, L	ft	1400	1	
19.	Tt = L / 3600 V	Compute Tt…….hr	0.219	0.000	0.219

Pipe Flow

		Seqment ID	GH	HI	
20.	Pipe diameter, D	in	1	1	
21.	Pipe slop[e, s	ft	17.000	1.000	
22.	Manning's roughness coefficient, n		0.012	0.012	
23.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	38.76	9.40	
24.	Flow length, L	ft	1	1	
25.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Total Time of Concentration

26.	Watershed or subarea Tc or Tt (add Tt in steps 6, 11, 19 and 25)	Hr	1.379
		Min	82.73

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Project:	SJR2C Sea Loop Trail	By:	MLM	Date:	12/30/2019
Location:	Volusia	Checked:		Date:	

Time of Concentration (Tc) or Travel Time (Tt)

BASIN NAME: **Segment 8**

Present Developed **Tc** Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segment.

Sheet flow (Applicable to Tc only)

		Seqment ID	AB	BC	
1.	Surface description		Woods, L	Cultivated1	
2.	Manning's roughness coefficient, n (table 3-1)		0.4	0.06	
3.	Flow length, L (total L<= 300 ft)	ft	1	1	
4.	Two-Year 24-hour rainfall, P	in	4.5	4.5	
5.	Land slope, S	ft/ft	2.0000	1.0000	
6.	Tt = [(0.007)(nL)^0.8] / [(P^0.5)(s^0.4)]	Compute Tt…….hr	0.001	0.000	0.002

Shallow Concentrated Flow

		Seqment ID	CD	DE	
7.	Surface description (paved or unpaved)		Unpaved	Paved	
8.	Flow length, L	ft	1	1	
9.	Watercourse slope, s	ft/ft	1.0000	18.8000	
10.	Average velocity, V	ft/s	16.135	88.141	
11.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Channel Flow

		Seqment ID	EF	FG	
12.	Cross sectional flow area, a	ft2	3.5	28	
13.	Wetted perimeter, p_w	ft	9.12	23.49	
14.	Hydraulic radius, r = a / p_w	ft	0.38	1.19	
15.	Channel slope , s	ft/ft	0.008	3.500	
16.	Manning's roughness coefficient, n		0.06	0.1	
17.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….ft/s	1.15	31.34	
18.	Flow length, L	ft	1300	1	
19.	Tt = L / 3600 V	Compute Tt…….hr	0.314	0.000	0.314

Pipe Flow

		Seqment ID	GH	HI	
20.	Pipe diameter, D	in	1	1	
21.	Pipe slop[e, s	ft	17.000	1.000	
22.	Manning's roughness coefficient, n		0.012	0.012	
23.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	38.76	9.40	
24.	Flow length, L	ft	1	1	
25.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Total Time of Concentration

26.	Watershed or subarea Tc or Tt (add Tt in steps 6, 11, 19 and 25)	Hr	0.316
		Min	18.94

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Project:	SJR2C Sea Loop Trail	By:	MLM	Date:	12/30/2019
Location:	Volusia	Checked:		Date:	

Time of Concentration (Tc) or Travel Time (Tt)

BASIN NAME: **Segment 8**

Present Developed **Tc** Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segment.

Sheet flow (Applicable to Tc only)

		Seqment ID	AB	BC	
1.	Surface description		Woods, L	Cultivated1	
2.	Manning's roughness coefficient, n (table 3-1)		0.4	0.06	
3.	Flow length, L (total L<= 300 ft)	ft	1	1	
4.	Two-Year 24-hour rainfall, P	in	4.5	4.5	
5.	Land slope, S	ft/ft	2.0000	1.0000	
6.	Tt = [(0.007)(nL)^0.8] / [(P^0.5)(s^0.4)]	Compute Tt…….hr	0.001	0.000	0.002

Shallow Concentrated Flow

		Seqment ID	CD	DE	
7.	Surface description (paved or unpaved)		Unpaved	Paved	
8.	Flow length, L	ft	1	1	
9.	Watercourse slope, s	ft/ft	1.0000	18.8000	
10.	Average velocity, V	ft/s	16.135	88.141	
11.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Channel Flow

		Seqment ID	EF	FG	
12.	Cross sectional flow area, a	ft2	3.5	28	
13.	Wetted perimeter, p_w	ft	9.12	23.49	
14.	Hydraulic radius, r = a / p_w	ft	0.38	1.19	
15.	Channel slope , s	ft/ft	0.013	3.500	
16.	Manning's roughness coefficient, n		0.06	0.1	
17.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….ft/s	1.51	31.34	
18.	Flow length, L	ft	750	1	
19.	Tt = L / 3600 V	Compute Tt…….hr	0.138	0.000	0.138

Pipe Flow

		Seqment ID	GH	HI	
20.	Pipe diameter, D	in	1	1	
21.	Pipe slop[e, s	ft	17.000	1.000	
22.	Manning's roughness coefficient, n		0.012	0.012	
23.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	38.76	9.40	
24.	Flow length, L	ft	1	1	
25.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Total Time of Concentration

26. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, 19 and 25)	Hr	0.139
	Min	8.35
	TC =	8

Project:	SJR2C Sea Loop Trail	By:	MLM	Date:	12/30/2019
Location:	Volusia	Checked:		Date:	

Time of Concentration (Tc) or Travel Time (Tt)

BASIN NAME: **Segment 8**

Present Developed **Tc** Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segment.

Sheet flow (Applicable to Tc only)

		Seqment ID	AB	BC	
1.	Surface description		Woods, L	Grass, S	
2.	Manning's roughness coefficient, n (table 3-1)		0.4	0.15	
3.	Flow length, L (total L<= 300 ft)	ft	1	1	
4.	Two-Year 24-hour rainfall, P	in	4.5	4.5	
5.	Land slope, S	ft/ft	2.0000	1.0000	
6.	Tt = [(0.007)(nL)^0.8] / [(P^0.5)(s^0.4)]	Compute Tt…….hr	0.001	0.001	0.002

Shallow Concentrated Flow

		Seqment ID	CD	DE	
7.	Surface description (paved or unpaved)		Unpaved	Paved	
8.	Flow length, L	ft	1	1	
9.	Watercourse slope, s	ft/ft	1.0000	1.0000	
10.	Average velocity, V	ft/s	16.135	20.328	
11.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Channel Flow

		Seqment ID	EF	FG	
12.	Cross sectional flow area, a	ft2	3.5	28	
13.	Wetted perimeter, p_w	ft	9.12	23.49	
14.	Hydraulic radius, r = a / p_w	ft	0.38	1.19	
15.	Channel slope , s	ft/ft	0.012	3.500	
16.	Manning's roughness coefficient, n		0.06	0.1	
17.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….ft/s	1.41	31.34	
18.	Flow length, L	ft	1300	1	
19.	Tt = L / 3600 V	Compute Tt…….hr	0.256	0.000	0.256

Pipe Flow

		Seqment ID	GH	HI	
20.	Pipe diameter, D	in	1	1	
21.	Pipe slop[e, s	ft	17.000	1.000	
22.	Manning's roughness coefficient, n		0.012	0.012	
23.	V = [1.49 $r^{2/3}$ $s^{1/2}$] / n	Compute V…….hr	38.76	9.40	
24.	Flow length, L	ft	1	1	
25.	Tt = L / 3600 V	Compute Tt…….hr	0.000	0.000	0.000

Total Time of Concentration

26. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, 19 and 25)	Hr	0.258
	Min	15.50
	TC =	**16**

APPENDIX E

Agency Coordination

FDOT

Florida Department of Transportation

RON DESANTIS
GOVERNOR

719 S. Woodland Blvd.
DeLand, FL 32720

KEVIN J. THIBAULT, P.E.
SECRETARY

May 7, 2019

Timothy A. Parsons, Ph.D.,
Director and State Historic Preservation Officer
Florida Division of Historical Resources
Florida Department of State
R.A. Gray Building
500 South Bronough Street
Tallahassee, Florida 32399-0250

Attn: Dr. Adrianne Daggett, Transportation Compliance Review Program

RE: Cultural Resource Assessment Survey
St. Johns River to Sea Loop Trail Gap PD&E Study
Lake Beresford Park to Grand Avenue, Volusia County
Financial Management No.: 439874-1-22-01

Dear Dr. Parsons,

Enclosed please find one copy of the report titled *Cultural Resource Assessment Survey for the St. Johns River to Sea (SJR2C) Loop Trail Gap Project Development and Environment (PD&E) Study from Lake Beresford Park to Grand Avenue in DeLand, Volusia County, Florida.* This report presents the findings of a CRAS conducted in support of a proposed multi-use trail in Deland, Volusia County, Florida. The FDOT District 5 is proposing to construct an approximately 3.7-meter (12 foot)-wide multi-use trail that will close the gap of 5.1 kilometers (3.15 miles) between existing trails within Lake Beresford Park to the south and the junction of Grand Avenue and Minnesota Avenue to the north. Areas of roadway will be reconstructed as part of the trail project, but this work will be limited to the existing roadway footprint.

The project Area of Potential Effect (APE) was defined to include the proposed trail construction footprint (trail footprint plus buffer for a total width of 20 feet) and roadway reconstruction footprint from Lake Beresford Park to Grand Avenue. Additionally, this APE was expanded to include the existing right-of-way on the opposite side of the road from the trail at the request of the project manager. This APE was then extended to the back or side property lines of parcels located on the same side of the road where the trail is proposed or a distance of no more than 100 meters (330 feet). In areas where the trail is not being constructed adjacent to a roadway, the APE was extended in both directions to adjacent parcel boundaries or a maximum distance of 100 meters (330 feet). The archaeological survey was conducted within the right-of-way. The historic structure survey was conducted within the entire DeLand Segment of the SJR2C Loop Trail APE.

This CRAS was conducted in accordance with Chapter 267 of the Florida Statutes and Rule Chapter 1A-46, Florida Administrative Code and Section 267.12, Florida Statutes, Chapter 1A-32. All work was performed in accordance with Part 2, Chapter 8 of FDOT's PD&E Manual (revised June 2017), FDOT's Cultural Resource Manual, and the standards stipulated in the Florida Division of Historical Resources' (FDHR) *Cultural Resource Management Standards & Operations Manual, Module Three: Guidelines for Use by Historic Preservation Professionals*. The Principal Investigator for this project meets the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* (48 FR 44716-42).

The archaeological survey consisted of thorough pedestrian survey and the excavation of 32 subsurface tests within the trail construction area. Disturbances from buried utilities, wells, and pavement were documented and prevented excavation of additional shovel tests. No artifacts were recovered, and no archaeological sites or occurrences were identified. No further archaeological survey is recommended in support of the proposed DeLand Segment of the SJR2C Loop Trail project.

The architectural survey resulted in the identification and evaluation of 12 historic resources within the APE, including six previously recorded resources and six newly recorded resources. The previously recorded historic resources include one linear resource and five structures. The newly recorded historic resources include one linear resource and five structures.

Within the APE, none of the previously recorded resources were determined eligible for the National Register of Historic Places (NRHP) by the State Historic Preservation Officer (SHPO). Segments of the Jacksonville, Tampa, & Key West Railroad (8VO07641) outside of the APE were previously determined eligible for the NRHP by SHPO.

Based on the results of the current survey, the newly recorded linear resource, the Jacksonville, Tampa, & Key West RR Spur (8VO10189), is eligible for the NRHP under Criterion A for significant associations with transportation and community planning and development. Further, the segment of the previously recorded Jacksonville, Tampa, & Key West Railroad (8VO07641) within the APE is eligible for the NRHP under Criterion A for significant associations with transportation and community planning and development in Volusia County and the Florida interior, and under Criterion B for its association with Henry B. Plant and Henry M. Flagler. The five previously recorded and five newly recorded structures are recommended ineligible for the NRHP, due to a lack of significant historic associations and architectural distinction.

The two eligible resources cross the APE in different locations: 8VO07641 travels roughly north/south through the western edge of the south end of the APE, while 8VO10189 travels east/west through the center of the APE. The proposed trail will be approximately 12 feet wide and will be constructed well outside of the 8VO07641 railroad right-of-way. At its closest point, the trail will be approximately 40.07 feet (12.21 meters) northeast of the railroad. The trail is not of a particular viewshed concern, as the trail will be at-grade, along a current roadway, and will not diminish integrity of setting to a point where 8VO07641 is not able to showcase its significance. The proposed trail will introduce a new at-grade crossing at 8VO10189 along the west side of South Beresford Road and South Grand Avenue. Ultimately, the trail will not

impede railroad traffic and will not significantly alter fabric associated with the railroad. Although the introduction of a trail will diminish integrity of setting slightly, the introduction of the trail occurs where an existing road already crosses, minimizing any major loss of setting. No other aspects of integrity will be diminished as the purpose, function, and overall design of the railroad will remain, allowing it to evoke the same feeling and association.

Therefore, it is the opinion of SEARCH that the proposed project will not pose any adverse effect to either 8VO07641 or 8VO10189. No further architectural work is recommended.

Based on the results of this study, it is the opinion of the District that the proposed undertaking will have no adverse effect on NRHP-listed or -eligible historic properties. No further work is recommended.

I respectfully request your concurrence with the findings of the enclosed report. If you have any questions or need further assistance, please contact Catherine Owen, District Cultural Resource Coordinator, at (386) 943-5383 or me at (386) 943-5411.

Sincerely,

for William G. Walsh
Environmental Manager
FDOT, District Five

The Florida State Historic Preservation Officer:

✓ finds the attached report complete and sufficient and ✓ concurs/ ___ does not concur with the findings and recommendations contained in this cover letter and the enclosed report.

___ does not find the attached report complete and sufficient and requires additional information in order to provide an opinion on the potential effects of the proposed project on historic resources.

/s/ _____ 6/10/2019
For: Timothy A. Parsons, Ph.D. **Date**
Director, Division of Historical Resources
& State Historic Preservation Officer

2019-2708
DHR No.

Concur w/ finding of no effect, but not on determinations of elig. No further work needed, due to scope of work.

FDOT

Florida Department of Transportation

RON DESANTIS
GOVERNOR

719 S. Woodland Blvd.
DeLand, FL 32720

KEVIN J. THIBAULT, P.E.
SECRETARY

October 22, 2019

Timothy A. Parsons, Ph.D.,
Director and State Historic Preservation Officer
Florida Division of Historical Resources
Florida Department of State
R.A. Gray Building
500 South Bronough Street
Tallahassee, Florida 32399-0250

Attn: Dr. Adrianne Daggett, Transportation Compliance Review Program

RE: Cultural Resource Assessment Survey Addendum
St. Johns River to Sea (SJR2C) Loop Trail Gap PD&E Study
Volusia County, Florida
Financial Management No.: 439874-1-22-01

Dear Dr. Parsons,

Enclosed please find one copy of the report titled *Cultural Resource Assessment Survey Addendum for the St. Johns River to Sea Loop Trail Adjustment at Alexander Drive, DeLand, Volusia County, Florida.* This report presents the findings of a cultural resource assessment survey (CRAS) conducted in support of the realignment of the proposed multi-use trail in DeLand, Volusia County, Florida. The Florida Department of Transportation (FDOT), District 5, is proposing to realign the St. Johns River to Sea (SJR2C) Loop Trail from the southern end of Alexander Drive southeast to the terminus of the proposed trail footprint, for a distance of approximately 1,230 feet (375 meters). Volusia County was able to acquire additional right-of-way in the vicinity of Alexander Drive to allow for an adjustment of the trail alignment to satisfy the wishes of local residents in the area.

The project Area of Potential Effects (APE) was defined to include the Trail Adjustment Footprint and was extended to the back or side property lines of parcels adjacent to the trail footprint, or a distance of no more than 328.1 feet (100 meters). As the exact alignment of the approximately 12-foot (3.7-meter) wide multi-use trail has not been established, the currently proposed centerline was buffered to give the DeLand Segment of the SJR2C Loop Trail Adjustment Footprint a total width of 70 feet (21.3 meters) to allow for minor adjustments within the trail corridor. The archaeological survey was conducted within the Trail Adjustment Footprint. The historic structure survey was conducted within the entire DeLand Segment of the SJR2C Loop Trail APE.

This CRAS was conducted in accordance with Chapter 267 of the Florida Statutes and Rule Chapter 1A-46, Florida Administrative Code and Section 267.12, Florida Statutes, Chapter 1A-32. All work was performed in accordance with Part 2, Chapter 8 of FDOT's PD&E Manual (revised June 2017), FDOT's Cultural Resource Manual, and the standards stipulated in the Florida Division of Historical Resources' (FDHR) *Cultural Resource Management Standards & Operations Manual, Module Three: Guidelines for Use by Historic Preservation Professionals*. The Principal Investigator for this project meets the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* (48 FR 44716-42).

The archaeological survey consisted of thorough pedestrian survey and the excavation of 14 subsurface tests within the trail construction area. Clay and compacted soil impasse conditions disrupting four shovel tests were documented. No artifacts were recovered, and no archaeological sites or occurrences were identified. No further archaeological survey is recommended in support of the proposed DeLand Segment of the SJR2C Loop Trail project.

The architectural survey resulted in the identification and evaluation of one historic resource within the DeLand Segment of the SJR2C Loop Trail Adjustment APE. The resource is a newly recorded segment of the previously recorded Jacksonville, Tampa, & Key West Railroad (8VO07641) linear resource.

Within the APE, Resource 8VO07641 has not been previously recorded. Segments of the Jacksonville, Tampa, & Key West Railroad (8VO07641) outside of the APE were determined eligible for the National Register of Historic Places (NRHP) by State Historic Preservation Officer (SHPO) in December 2011, July 2015, August 2016, March 2018, and December 2018.

Based on the results of the current survey, the segment of the previously recorded Jacksonville, Tampa, & Key West Railroad (8VO07641) within the APE is eligible for the NRHP under Criterion A for significant associations with transportation and community planning and development in Volusia County and the Florida interior, and under Criterion B for its association with Henry B. Plant and Henry M. Flagler.

Resource 8VO07641 travels roughly north/south through the western edge of the APE. The proposed trail will be approximately 12 feet (3.7 meters) wide and will be constructed well outside of the 8VO07641 railroad right-of-way. The centerline of the proposed trail will be approximately 160 feet (48.7 meters) east of the railroad. The trail is not of a particular viewshed concern, as the trail will be at-grade along a current roadway, and will not diminish integrity of setting to a point where 8VO07641 is not able to showcase its significance.

Therefore, it is the opinion of SEARCH that the proposed project will pose no effect to 8VO07641. No further architectural work is recommended.

Based on the results of this study, it is the opinion of the District that the proposed undertaking will have no adverse effect on NRHP-listed or -eligible historic properties. No further work is recommended.

I respectfully request your concurrence with the findings of the enclosed report.

If you have any questions or need further assistance, please contact Catherine Owen, District Cultural Resource Coordinator, at (386) 943-5383 or me at (386) 943-5411.

Sincerely,

William G. Walsh
Environmental Manager
FDOT, District Five

The Florida Division of Historical Resources finds the attached Cultural Resource Assessment Report complete and sufficient and ☑ concurs / ☐ does not concur with the determinations of historic significance provided in this cover letter and ☐ does ☐ does not find applicable the determinations of effects provided in this cover letter for SHPO/FDHR Project File Number 2019·2708
FDHR Comments:
For Timothy A. Parsons, PhD, Director, Deputy SHPO Florida Division of Historical Resources 10/31/2019 Date

From: Graeber, David
To: Bob Finck
Subject: FPID 439874-1 - SJR2C Loop Gap PD&E Study – Beresford to Grand - NRE Consultation
Date: Thursday, November 21, 2019 3:32:02 PM
Attachments: image001.jpg

Bob,

The Department will determine USFWS involvement after reviewing the NRE. However, it is very, very, very unlikely it would be necessary.

David A. Graeber, PE
Project Manager
Aspireon Consulting Group, FDOT In-House Consultant
719 South Woodland Boulevard
DeLand, Florida 32720
386-943-5182 – Office
407-506-4134 - Cell
david.graeber@dot.state.fl.us

FDOT_Logo_color_blue