

Technical Memorandum - Viable Alternatives Development and Screening



January 2015

Technical Memorandum | Viable Alternatives Development and Screening



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- Appendix A Purpose and Need; Goals and Objectives
- Appendix B US 441 Travel Forecasting and Results Report
- Appendix C Future Transportation and Station Impacts Technical Memorandum
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Technical Memorandum | Viable Alternatives Development and Screening

Introduction

1.1 Introduction and Background

The Florida Department of Transportation, working in partnership with the Cities of Orlando, Apopka, Tavares, Eustis and Mount Dora in addition to Orange and Lake Counties, conducted a transit study for the US 441 Corridor. This study builds upon both current local transportation and land use initiatives and long-term growth management policies to evaluate options for providing premium transit service between major activity centers in Orange and Lake Counties within the US 441 Corridor. This study also evaluated options for improved connectivity with SunRail, Central Florida's commuter rail system.

Figure 1-1 shows the Study Area, which extends approximately 33 miles from downtown Orlando northwest along US 441 through Apopka and into Lake County, terminating in the City of Eustis. Portions of the Cities of Orlando, Apopka, Tavares, Mount Dora and Eustis are included within the Study Area boundary.

1.2 Purpose of this Report

This technical memorandum presents the Viable Alternatives, the Viable Alternatives screening process, the results from the Viable Alternatives screening, and the Recommended Alternative.

The Viable Alternatives are comprised of reasonable transit solutions that could address the three major needs identified in the Purpose and Need Statement:

Future Traffic Congestion

- By 2035, it is projected that approximately 59 percent of the US 441 roadway corridor will operate over capacity and another 26 percent of the corridor will operate near capacity.
- There are no adopted plans to widen the corridor after existing widening projects are completed.



Regional Connectivity

• Currently, a transit trip between downtown Orlando and the Golden Triangle area (Mount Dora, Eustis, and Tavares) requires two transfers and takes a minimum of 1 hour and 45 minutes to complete, equating to an average speed of 11 miles per hour.

Land Use, Economic Development, and Community Redevelopment

- Improved transit service is needed to implement the Study Area communities' vision to accommodate population and employment growth.
- Transit improvements in the Study Area are needed to support redevelopment efforts, encourage economic growth, and reinforce communities' desired compact land use patterns.

As noted in the project Purpose and Need Report:

"An improved transportation system has the potential to enhance the livability and economic health of the Study Area by providing better access to employment opportunities and basic services; by supporting the economic vitality of existing communities; by providing a range of transportation options for all ages, incomes and abilities; and by reducing household transportation costs. Public transportation improvements are needed within the US 441 Study Area to provide mobility alternatives to address future traffic congestion; improve regional transit connectivity for residents and employees; and support land use, economic development, and community redevelopment goals. There is a need to address projected deficiencies in roadway capacity, existing transit service and existing transit infrastructure with improvements that better serve the transit-dependent population, and provide improved connectivity between existing and proposed employment centers and other modal transportation systems, including SunRail. Transit improvements are also needed to implement the adopted transit-oriented land use visions of the Study Area communities."

Building upon the Purpose and Need Statement, five project goals were developed and documented in the Goals and Objectives. These goals are as follows:

- 1. Improve mobility and transportation access;
- 2. Enhance the livability and economic competitiveness of the Study Area through an improved transportation system;
- 3. Develop the most efficient transportation system, which maximizes limited resources for the greatest public benefit;
- 4. Develop a transit system consistent with adopted local and regional plans and policies; and
- 5. Preserve and enhance the environment, natural and cultural resources, and open space.

Each of the three Build Viable Alternatives has been developed to support the five project goals. The project Purpose and Need Report and Goals and Objectives are included in Appendix A. \\FL-ORL\projects\61817.00 US441 Corridor AA\GIS\Project\Existing Conditions\Study Area Map Corridor.mxd





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1.3 The Alternatives Evaluation Process and the Development of the Viable Alternatives

The US 441 Corridor Study alternatives evaluation process was comprised of three levels of screening. At each level, evaluation criteria were established that is used to implement the screening.

The three-level process included:

- 1. A modal technology assessment that identified the appropriate modes to develop the **Initial Alternatives**;
- 2. An evaluation of the Initial Alternatives to select the Viable Alternatives; and
- 3. Ultimately an evaluation of the Viable Alternatives to aid in the selection of a **Recommended Alternative**.

Each evaluation phase was linked and resulted in a gradual reduction in the number of alternatives. The evaluation process was developed and conducted transparently and collaboratively so that stakeholders had the opportunity to contribute to the process. This process resulted in defensible screening results, widespread support of the alternatives, and an efficient progression to the next level of alternative development and evaluation. Proper documentation of the process was critical so that eliminated alternatives did not re-emerge at later phases of project development.

Figure 1-2 shows the three levels of screening used in the evaluation of the alternatives.



Figure 1-2: Screening Process



As shown in Figure 1-2, the three technologies (commuter rail, express bus, and bus rapid transit) that were advanced from the Tier One Modal Screening were used to develop the Initial Build Alternatives, shown in Table 1-1 below.

Alternative and Mode(s)	Premium Transit Route Alignments	
Alternative 0-1	No Current or New Premium Transit Alignments	
No Build		
Alternative 1-1	Commuter Rail: Downtown Orlando to Apopka (FCEN rail line)	
Commuter Rail and		
Express Bus	Express Bus: Apopka to Lake County (US 441)	
Alternative 1-2	Commuter Rail: Downtown Orlando to SR 429 (FCEN rail line)	
Commuter Rail and		
Express Bus	Express Bus: SR 429 to Lake County (US 441)	
Alternative 1-3	Commuter Rail: Downtown Orlando to Zellwood (FCEN rail line)	
Commuter Rail and		
Express Bus	Express Bus: Zellwood to Lake County (US 441)	
Alternative 1-4	Downtown Orlando to Tavares/Eustis (FCEN rail line)	
Commuter Rail		
Alternative 1-5	Downtown Orlando to Mount Dora and Eustis (FCEN rail line)	
Commuter Rail		
Alternative 2-1	Downtown Orlando to Tavares/Eustis (US 441)	
Express Bus		
Alternative 2-2	Downtown Orlando to Tavares/Eustis (US 441 with Queue Jumps)	
Express Bus		
Alternative 2-3	Downtown Orlando to Tavares/Eustis (US 441 with Exclusive Lanes)	
Bus Rapid Transit		
Alternative 2-4	Downtown Orlando to Tavares/Eustis (US 441, SR 414, SR 429, SR 46)	
Express Bus		
Alternative 2-5	Downtown Orlando to Tavares (US 441, FCEN Right-of-Way)	
Bus Rapid Transit		

Table 1-1: Summary of the Initial Alternatives

The ten Initial Alternatives were then evaluated based on a set of criteria that addressed each of the five project goals. Based on this evaluation, three Build Alternatives were advanced as Viable Build Alternatives. The No Build Alternative was automatically advanced as a Viable Alternative. The criteria used and the results from the Initial Alternatives screening can be found in the *Initial Alternatives Development and Screening Technical Memorandum*. The four Viable Alternatives are:

- Viable Alternative 0-1: No Build
- Viable Alternative 1-2: Commuter rail service from downtown Orlando to State Road (SR) 429 and express bus service from SR 429 to Tavares/Eustis
- Viable Alternative 1-5: Commuter rail service from downtown Orlando to Eustis and Mount Dora
- Viable Alternative 2-4: Express bus service from downtown Orlando to Tavares/Eustis

After the four Viable Alternatives were identified through the screening process, they were then further refined with input and guidance from stakeholders (see next chapter for more information).





2

Definition of the Viable Alternatives

2.1 Introduction

Following identification of the four Viable Alternatives, input was sought from the Project Advisory Group (PAG) as the Viable Alternatives were refined. The PAG met on a monthly basis throughout the project and thereby throughout the refinement of the Viable Alternatives and provided feedback on key items.



These items included:

- Station locations
- Station access considerations (bike/pedestrian/auto/transit)
- Transit service plans
- Consideration of a downtown Orlando rail connection
- Land use and consistency with local and regional plans
- Environmental analyses
- Capital cost
- Ridership

Minutes from these meetings are available upon request and will be included in the **US 441** *Corridor Study Final Report*.

This chapter summarizes the key elements of the four Viable Alternatives.



2.2 Viable Alternative 0-1: No Build

The No Build Alternative for the US 441 Corridor Study project reflects the continuation of existing traffic and transit operations within the Study Area. It was assumed that LYNX and LakeXpress will continue to maintain existing transit service along the corridor. The No Build Alternative includes programmed transportation infrastructure and service improvements in the MetroPlan Orlando 2030 Long Range Transportation Plan and the Lake~Sumter Metropolitan Planning Organization 2035 Long Range Transportation Plan.

While the improvements included in the No Build Alternative expand the capacity of the transportation system, increase roadway connectivity, or improve transit service, this alternative does not adequately meet the Purpose and Need of this project. A list of projects that were included in the No Build Alternative is shown in Table 2-1. The location of these projects is shown in Figure 2-1.

Project Name	Description	Project Type	Purpose of Project	Anticipated Year of Completion
US 441/John Young Parkway	Construction of flyover and connection of John Young Parkway to Forest City Road	Roadway	Increase Capacity	2014
Forest City Road	Widen from four to six lanes from Edgewater Drive to Maitland Boulevard	Roadway	Increase Capacity	2019
All American Boulevard	Realignment to connect Clarcona- Ocoee Road to Kennedy Boulevard	Roadway	Increase Connectivity	2018
Wekiva Parkway	Construction of new four lane toll road	Roadway	Increase Capacity	2019
State Road (SR) 46	Widening existing roadway from two to six lanes	Roadway	Increase Capacity	2019
Interstate 4	Construction of four new managed lanes	Roadway	Increase Capacity	2020
US 441	Widen from four to six lanes from SR 44 to SR 46	Roadway	Increase Capacity	Unknown
Grapefruit East-West LYMMO Line	New east-west transit line from Parramore to Thornton Park that expands the existing LYMMO system in downtown Orlando	Transit	Increased Coverage	2014
Lime Parramore LYMMO Line	New transit line in the Parramore neighborhood that expands the existing LYMMO system in downtown Orlando	Transit	Increased Coverage	2014
North-South LYMMO Line	Extension of existing LYMMO line further north and south in downtown Orlando	Transit	Increased Coverage	Unknown

Table 2-1: Viable Alternative 0-1 Projects





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2.3 Viable Alternative 1-2: Commuter Rail from Downtown Orlando to SR 429, Express Bus from SR 429 to Lake County

Viable Alternative 1-2 is approximately 33 miles in length. It would introduce commuter rail service from the existing Orlando Health/Amtrak SunRail Station, continue north to serve the existing Church Street SunRail Station, and then provide service along the Florida Central Railroad (FCEN) corridor from downtown Orlando to SR 429 (approximately 18 miles). Express Bus service would be provided along US 441 from SR 429 to Tavares/Eustis (approximately 15 miles). This alternative would provide a same-platform transfer to SunRail at Church Street Station and Orlando Health/Amtrak Station.

Figure 2-2 shows the proposed alignment of this alternative and the locations of the potential stations.

2.3.1 Stations

Table 2-2 presents the stations and associated amenities for each station. Since the Orlando Health/Amtrak and Church Street Stations are existing SunRail stations, no modifications were proposed as part of this project.

Certain stations have park and ride service which were determined based on park and ride demand from the ridership projections. For planning purposes, parking was sized based on three prototypes: small (25 spaces), medium (50 spaces), and large (100 spaces). The actual number of spaces will vary depending on the configuration of the lot and the size of the parcel identified.

Each station would have feeder bus service. Accommodations for bus drop-off for feeder bus and express bus service are also noted in Table 2-2. For stations with on-site bus drop-off, a portion of the station was designated for a bus turnaround loop, complete with bus bays and passenger shelters. For stations with on-street bus drop-off, it was envisioned that bus platforms would be constructed adjacent to the street.



Table 2-2: Viable Alternative 1-2 Stations

Station	Transit Mode(s)	Prototype Park and Ride Size	Kiss and Ride?	On-Site Bus Drop-Off (Express Bus/Feeder Bus)
Orlando Health/Amtrak	Commuter Rail	N/A	N/A	N/A
Church Street	Commuter Rail	N/A	N/A	N/A
Robinson Street	Commuter Rail	None	Kiss and Ride Combined with On-Site Bus Drop-O to Site Constraints	
Amelia Street	Commuter Rail	None	Yes	No (On-Street)
Princeton	Commuter Rail	50 Spaces	Yes	Yes
Lockhart/Rosemont	Commuter Rail	100 Spaces	Yes	No (On-Street)
Apopka	Commuter Rail	100 Spaces	Yes	Yes (Using Existing LYNX SuperStop)
SR 429	Commuter Rail/ Express Bus	100 Spaces	Yes	Yes
Zellwood	Express Bus	25 Spaces	Yes	No (On-Street)
Mount Dora	Express Bus	25 Spaces	Yes	Yes
Tavares/Eustis	Express Bus	100 Spaces	Yes	Yes

Commuter rail stations were envisioned to provide the same level of amenities as existing SunRail stations. Each commuter rail station would have a single train platform and feature the following:

- A 300 foot long platform with a mini high
- Two ticket vending machine and three ticket validators
- Canopy covering and seating
- Security cameras, emergency phones, and platform announcement devices

Express bus stations were envisioned to be appropriate for premium transit service with amenities similar to SunRail stations. Each express bus station would feature:

- A 100 foot platform
- Canopy covering and seating
- Security cameras, emergency phones, and platform announcement devices



2.3.2 Service/Operations Plan

Commuter rail and express bus service was proposed from 6 AM to 10 PM, Monday through Friday. During the AM Peak (6 AM to 9 AM) and the PM Peak (4 PM to 7 PM), service will be every 30 minutes. At all other times, service would operate every 2 hours.



A feeder bus plan was also developed that would allow riders to access a commuter rail or express bus station without needing to drive or be dropped off at the station. The feeder bus plan identified which future (year 2035) bus routes (for both LYNX and LakeXpress) would need to be rerouted in order to serve the proposed commuter rail and express bus stations. In addition, the feeder bus plan identified which routes would need increased frequency in order to match the proposed 30 minute peak service proposed for commuter rail and express bus service in the AM and PM peak. The feeder bus service was anticipated to run generally from 5:30 AM to 10:30 PM on weekdays.

The operations plans for the three Viable Build Alternatives is described in Appendix D: Operations Plan.

2.3.3 Major Capital Cost Components

The following were the major capital cost components for this alternative:

- Infrastructure
 - FCEN mainline track upgrade 17.8 miles
 - Upgrade FCEN passing sidings 2.4 miles (see Figure 2-3 for the locations of these improvements)
 - o Railway signal system
 - Grade crossing improvements 58
 - Commuter rail light maintenance facility
 - New commuter rail stations (includes the SR 429 Station) 6
 - New express bus stations (excludes the SR 429 Station) 3
- Right-of-Way
 - Acres of property acquisition for stations 19.5
 - Acres of property acquisition for rail light maintenance facility 6.7
- Vehicles
 - Trainsets (one Tier 4 locomotive, one coach, and one cab car) 5
 - Express Buses 6
 - o Feeder Buses 14
- Professional Services

2.3.4 Major Operating and Maintenance (O&M) Cost Components

The following were the major O&M cost components for this alternative:

- Daily commuter rail passenger car hours 63.5
- Daily express bus hours 21.0
- Number of LYNX/LakeXpress feeder bus routes that require increased frequency: 8



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2.4 Viable Alternative 1-5: Commuter Rail from Downtown Orlando to Lake County

This alternative is approximately 39 miles in length. It would introduce Commuter Rail service from the existing Orlando Health/Amtrak SunRail Station, continue north to serve the existing Church Street SunRail Station, and then provide service along the Florida Central Railroad (FCEN) corridor from downtown Orlando to Eustis and Mount Dora. This alternative would provide a same-platform transfer to the existing SunRail at Church Street Station and Orlando Health/Amtrak Station.

Figure 2-4 shows the proposed alignment of this alternative and the locations of the potential stations.

2.4.1 Stations

Table 2-3 presents the stations and associated amenities for each station. Since the Orlando Health/Amtrak and Church Street Stations are existing SunRail stations, no modifications were proposed as part of this project.

Certain stations have park and ride service which were determined based on park and ride demand from the ridership projections. For planning purposes, parking was sized based on three prototypes: small (25 spaces), medium (50 spaces), and large (100 spaces). The actual number of spaces will vary depending on the configuration of the lot and the size of the parcel identified.

Each station would have feeder bus service. Accommodations for bus drop-off for feeder bus service is also noted in Table 2-3. For stations with on-site bus drop-off, a portion of the station was designated for a bus turnaround loop, complete with bus bays and passenger shelters. For stations with on-street bus drop-off, it was envisioned that bus platforms would be constructed adjacent to the street.



Table 2-3: Viable Alternative 1-5 Stations

Station	Transit Mode	Prototype Park and Ride Size	Kiss and Ride?	On-Site Bus Drop-Off (Feeder Bus)
Orlando Health/Amtrak	Commuter Rail	N/A	N/A	N/A
Church Street	Commuter Rail	N/A	N/A	N/A
Robinson Street	Commuter Rail	None	Kiss and Ride Combined with On-Site Bus Drop-Off to Site Constraints	
Amelia Street	Commuter Rail	None	Yes	No (On-Street)
Princeton	Commuter Rail	50 Spaces	Yes	Yes
Lockhart/Rosemont	Commuter Rail	100 Spaces	Yes	No (On-Street)
Apopka	Commuter Rail	100 Spaces	Yes	Yes (Using Existing LYNX SuperStop)
SR 429	Commuter Rail	100 Spaces	Yes	Yes
Zellwood	Commuter Rail	100 Spaces	Yes	No (On-Street)
Tavares	Commuter Rail	50 Spaces	No (Utilize On- Street Parking Area)	No (On-Street)
Eustis	Commuter Rail	50 Spaces	Yes	No (On-Street)
Mount Dora	Commuter Rail	25 Spaces	Yes	No (On-Street)

Commuter rail stations were envisioned to provide the same level of amenities as existing SunRail stations. Each commuter rail station would have a single train platform and feature the following:

- A 300 foot long platform with a mini high
- Two ticket vending machine and three ticket validators
- Canopy covering and seating
- Security cameras, emergency phones, and platform announcement devices

2.4.2 Service/Operations Plan

Commuter rail service was proposed from 6 AM to 10 PM, Monday through Friday. During the AM Peak (6 AM to 9 AM) and the PM Peak (4 PM to 7 PM), service would be every 30 minutes. At all other times, service will operate every 2 hours.

A feeder bus plan was also developed that would allow riders to access a commuter rail station without needing to drive or be dropped off at the station. The feeder bus plan identified which future (year 2035) bus routes (for both LYNX and LakeXpress) would need to be rerouted in order to serve the proposed commuter rail stations. In addition, the feeder bus plan identified which routes would need increased frequency in order to match the proposed 30 minute peak service proposed for commuter rail service in the AM and PM peak. The feeder bus service was anticipated to run generally from 5:30 AM to 10:30 PM on weekdays.

The operations plans for the three Viable Build Alternatives is described in Appendix D: Operations Plan.



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2.4.3 Major Capital Cost Components

The following are the major capital cost components for this alternative:

- Infrastructure
 - FCEN mainline track upgrade 37.3 miles
 - FCEN Mount Dora branch track upgrade 2.7 miles
 - Upgrade passing sidings 2.4 miles (see Figure 2-5 for the locations of these improvements)
 - Construct new/lengthen existing FCEN passing sidings 1.7 miles (see Figure 2-5 for the locations of these improvements)
 - o Signal system
 - Grade crossing improvements 111
 - o Commuter rail light maintenance facility
 - New commuter rail stations 10
- Right-of-Way
 - Acres of property acquisition for stations 17.9
 - Acres of property acquisition for rail light maintenance facility 6.7
- Vehicles
 - Trainsets (one Tier 4 locomotive, one coach car, one cab car) 7
 - Trainsets (one Tier 4 locomotive, one cab car) 1
 - o Feeder Buses 14
- Professional Services

2.4.4 Major Operating and Maintenance (O&M) Cost Components

The following are the major O&M cost components for this alternative:

- Daily commuter rail passenger car hours 96.9
- Number of LYNX/LakeXpress feeder bus routes that require increased frequency: 8



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2.5 Viable Alternative 2-4: Express Bus from Downtown Orlando to Lake County

This alternative is approximately 34 miles in length and would introduce Express Bus service along US 441, State Road (SR) 414, SR 429, and SR 46 from downtown Orlando to Tavares/Eustis.

Figure 2-6 shows the proposed alignment of this alternative and the locations of the potential stations.

2.5.1 Stations

Table 2-4 presents the stations and associated amenities for each station. Since LYNX Central Station is an existing transit terminal, no modifications were proposed as part of this project.



Certain stations have park and ride service which

were determined based on park and ride demand from the ridership projections. For planning purposes, parking was sized based on three prototypes: small (25 spaces), medium (50 spaces), and large (100 spaces). The actual number of spaces will vary depending on the configuration of the lot and the size of the parcel identified.

Each station would have feeder bus service. Accommodations for bus drop-off for feeder bus and express bus service are also noted in Table 2-4. For stations with on-site bus drop-off, a portion of the station was designated for a bus turnaround loop, complete with bus bays and passenger shelters. For stations with on-street bus drop-off, it was envisioned that bus platforms would be constructed adjacent to the street.

Express bus stations were envisioned to be appropriate for premium transit service with amenities similar to SunRail stations. Each express bus station would feature:

- A 100 foot platform
- Canopy covering and seating
- Security cameras, emergency phones, and platform announcement devices



Station	Transit Mode	Prototype Park and Ride Size	Kiss and Ride?	On-Site Bus Drop-Off (Express Bus/Feeder Bus)
LYNX Central Station	Express Bus	None	N/A	Yes (Existing LYNX Bus Terminal)
Amelia Street	Express Bus	None	Yes	No (On-Street)
Princeton	Express Bus	50 Spaces	Yes	No (On-Street)
Rosemont	Express Bus	100 Spaces	Yes	No (Using Existing LYNX SuperStop On-Street)
SR 429	Express Bus	100 Spaces	Yes	Yes
Mount Dora	Express Bus	50 Spaces	Yes	No (On-Street)
Tavares/Eustis	Express Bus	100 Spaces	Yes	No (On-Street)

Table 2-4: Viable Alternative 2-4 Stations

2.5.2 Service/Operations Plan

Express bus service is being proposed from 6 AM to 10 PM, Monday through Friday. During the AM Peak (6 AM to 9 AM) and the PM Peak (4 PM to 7 PM), service will be every 30 minutes. At all other times, service will operate every 2 hours.

A feeder bus plan was also developed that would allow riders to access an express bus station without needing to drive or be dropped off at the station. The feeder bus plan identified which future (year 2035) bus routes (for both LYNX and LakeXpress) would need to be rerouted in order to serve the proposed express bus stations. In addition, the feeder bus plan identified which routes would need increased frequency in order to match the proposed 30 minute peak service proposed for express bus service in the AM and PM peak. The feeder bus service was anticipated to run generally from 5:30 AM to 10:30 PM on weekdays.

The operations plans for the three Viable Build Alternatives is described in Appendix D: Operations Plan.

2.5.3 Major Capital Cost Components

The following were the major capital cost components for this alternative:

- Infrastructure
 - New express bus stations 6
- Right-of-Way
 - Acres of property acquisition for stations 16.3
- Vehicles
 - o Express Buses 10
 - Feeder Buses 12
- Professional Services

2.5.4 Major Operating and Maintenance (O&M) Cost Components

The following are the major O&M cost components for this alternative:

- Daily express bus hours 41.9
- Number of LYNX/LakeXpress feeder bus routes that require increased frequency: 7

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3

Ridership Projections

3.1 Introduction

This chapter summarizes the results of the ridership projections that were developed to evaluate the alternatives. These ridership projections were used in the alternatives screening process which is discussed in greater detail in Chapters 4 and 5. This chapter serves as an executive summary for the ridership report that is included as Appendix B of this report.



3.2 Ridership Results

Table 3-1 highlights the range of daily boardings forecasted for each of the Viable Build Alternatives. As seen in the table, Viable Alternative 1-5 forecasted the highest ridership for the corridor, however Viable Alternative 1-2 generated over half the ridership of Viable Alternative 1-5 with less than half the commuter rail alignment (18 miles for Viable Alternative 1-2 versus 39 miles for Viable Alternative 1-5).

Table 3-1: Viable Build Alternatives 2035 Boardings

Viable Alternative	Year 2035 Daily Boardings
Alt. 1-2: Commuter Rail to SR 429,	1,300 +/- 10%
Express Bus to Lake County	
Alt. 1-5: Commuter Rail to Lake County	2,000 +/- 10%
Alt. 2-4: Express Bus to Lake County	900 +/- 10%



The Viable Build Alternative ridership values were forecasted by understanding the base year and anticipated future travel in the US 441 corridor. Adjustments were made to the Central Florida Regional Planning Model (CFRPM) parameters based on survey data and national standards to best represent the Study Area's travel patterns.

As shown in Table 3-2, the addition of commuter rail and/or express bus service in the Study Area does not impact ridership on the LakeXpress bus routes. However, there was a noticeable reduction in ridership for LYNX Links 106 and 406. Depending on the Viable Build Alternative examined, Link 106 was anticipated to experience between a 23 to 26 percent reduction in ridership compared to the No Build Alternative while Link 406 was anticipated to experience between a 10 to 20 percent reduction in ridership when compared to the No Build Alternative.

Table 3-2: Boardings on Key Transit Routes Along US 441 Corridor

Route Name	No Build	Viable Alt 1-2 (Commuter Rail and Bus)	Viable Alt 1-5 (Commuter Rail)	Viable Alt 2-4 (Express Bus)
LYNX Link 106 US 441 North	3,500	2,600	2,600	2,700
LYNX Link 406 Apopka/Plymouth/Zellwood	500	400	450	450
LakeXpress Route 4 Umatilla/Zellwood	200	200	200	200
LakeXpress Route 3 Mount Dora Circ.	400	400	400	400
Premium Transit		1,300	2,000	900

It was important to understand the markets that generate the 2,000 trips for the full commuter rail alternative (Viable Alternative 1-5). The summary of markets for the commuter rail forecast is listed below:

- 70% of the trips occur in the peak periods;
- 75% of the trips are Home Based Work (HBW) trips;
- Park and Ride trips account for 40% of the access to commuter rail;
- Walk trips account for 30% of the access to commuter rail;
- 62% of rail egress was by walk and 30% by bus;
- 23% of riders use the system for only one-station trips;
- Transit dependent riders (Zero Car Households) account for 20% of the trips;
- Only 8% of the trips use SunRail in the corridor; and
- 65% of the trips occur between the Apopka to downtown Orlando portion of the system.

The relative attractiveness of each station can be seen by the magnitude of trips that are projected to occur at the station. Figure 3-1 shows the total trips forecasted by station for the commuter rail alternative (Viable Alternative 1-5). The absolute value of each station is shown in Table 3-3.









Commuter Rail Stations	Trips
Orlando Health/Amtrak	70
Church Street	280
Robinson Street	200
Princeton	140
Lockhart/Rosemont	320
Apopka	260
SR 429	130
Zellwood	70
Tavares	230
Mount Dora	130
Eustis	120
Total	1,950

Table 3-3: Trips by Station for Viable Alternative 1-5

Note: Total does not match value presented in Table 3-1 due to rounding

Table 3-4 shows the trips by station for the Viable Alternative 1-2. Most trips occur on the commuter rail portion of the alternative and the values by station are similar to values for the commuter rail only alternative (Viable Alternative 1-5). Only 10 percent of the trips use the express bus portion of the alternative.

Table 3-4: Tr	ips by Station	n for Viable	Alternative 1-2
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Stations	Trips
Orlando Health/Amtrak (Commuter Rail)	60
Church Street (Commuter Rail)	230
Robinson Street (commuter Rail)	150
Princeton (Commuter Rail)	130
Lockhart/Rosemont (Commuter Rail)	280
Apopka (Commuter Rail)	210
SR 429 (Commuter Rail)	140
SR 429 (Express Bus)	60
Zellwood (Express Bus)	10
Mount Dora (Express Bus)	30
Tavares/Eustis (Express Bus)	40
Total	1,340

Note: Total does not match value presented in Table 3-1 due to rounding


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Table 3-5 shows that the trips for Viable Alternative 2-4 are less than the other alternatives but similar trends exist for key stop locations. LYNX Central Station has the largest proportion of trips in this alternative due to the connection with other key regional routes at this location. The middle of the corridor stations at Rosemont and SR 429 have a large proportion of trips just as was seen in the other alternatives.

Express Bus Stations Trips LYNX Central Station 300 Amelia Street 50 Princeton 60 Rosemont 180 SR 429 140 Mount Dora 80 Tavares/Eustis 110 Total 920

Table 3-5: Trips by Station for Viable Alternative 2-4

Note: Total does not match value presented in Table 3-1 due to rounding



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4

Evaluation Methodology

4.1 Introduction

This chapter details the methodology used in the Viable Alternatives screening process and presents the criteria that were used in evaluating each of the Viable Alternatives.

4.2 Viable Alternatives Screening Methodology

The Viable Alternatives screening incorporated a comprehensive level of quantitative criteria with some qualitative criteria, tied to the Goals and Objectives, including cost, ridership, travel time, and potential environmental impacts. The screening included a rating (Low, Medium, or High) for each criterion, identified in Table 4-1, which was applied to each Viable Build Alternative. The thresholds for the rating of Low, Medium, and High for each criterion were relative to each other, rather than other projects in the region, and are shown in Tables 4-2 through 4-6.

The overall ratings for the Viable Build Alternatives contribute to the identification of which alternative should be selected as the Recommended Alternative. An alternative that ranked highest in the Viable Build Alternatives screening did not necessarily advance as the Recommended Alternative.

Selection of the Recommended Alternative will ultimately be at the direction of project decision-makers: FDOT and the Project Advisory Group. Based on the results of the Viable Alternatives screening as well as other factors such as financial feasibility of the project and the ability to fund the operations and maintenance, FDOT and the Project Advisory Group will then select the Recommended Alternative. If a build alternative is selected, MetroPlan Orlando and Lake~Sumter MPO will then be responsible for adopting the Recommended Alternative as the Locally Preferred Alternative and into the fiscally constrained Long Range Transportation Plan (LRTP), following completion of further National Environmental Policy Act (NEPA) and preliminary engineering studies.



Table 4-1: Viable Alternatives Screening Criteria

PROJECT GOAL	VIABLE ALTERNATIVES CRITERIA	EVALUATION
		TYPE
Goal 1: Improve mobility	1-1: Order of magnitude peak period in vehicle travel time from	Data
and transportation access	downtown Orlando (+/- LYNX Central Station) to Tavares or	
	Tavares/Eustis Station	
	1-2: Number of required transfers for end-to-end corridor trips	Data
	1-3: Percentage of alignment in dedicated right-of-way (ROW)	Data
	1-4: Ability to attract choice riders to transit service (reliability)	Qualitative
	1-5: Year 2035 daily transit trips on project	Data
	1-6: Number of daily transit trips taken by zero car household individuals (Year 2035)	Data
	1-7: Number of vehicles removed daily from roadways due to transit ridership (Year 2035)	Data
	1-8: Number of direct platform transfer opportunities to SunRail	Data
	1-9: Direct connection to LYNX Central Station	Data
Goal 2: Enhance the	2-1: Number of Study Area major employment centers served	Data
livability and economic	2-2: Number of Study Area residential centers served	Data
Study Area through an	2-3: Number of existing affordable housing units served within	Data
improved transportation	1/2 mile of all stations (Year 2013)	
system	2-4: Ability to maintain existing freight rail operations and industrial activity	Qualitative
	2-5: Number of acres of vacant land within 1/2 mile of all stations	Data
	2-6: Year 2035 population within 1/2 mile radius of all stations	Data
	2-7: Year 2035 employment within 1/2 mile radius of all stations	Data
Goal 3: Develop the most	3-1: Right-of-way needed (acres)	Data
efficient transportation	3-2: Order of magnitude capital cost (2013 dollars)	Data
system, which maximizes limited resources for the greatest public benefit	3-3: Order of magnitude annual operating and maintenance (O&M) cost (2013 dollars)	Data
	3-4: Requires a permanent easement or purchase from FCEN	Qualitative
	3-5a: Annual O&M Cost per annual transit trip (2013 dollars)	Data
	3-5b: Annual O&M Cost per annual transit passenger mile (2013 dollars)	Data
	3-6: Competitiveness for FTA New Starts Funding	Qualitative



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Table 4-1, Continued

Goal 4: Develop a transit system consistent with adopted local and regional plans and policies	4-1: Consistency of station locations with adopted local government land use plans	Data
	4-2: Number of station locations with adopted master plans supportive of TOD	Data
	4-2: Consistency with metropolitan planning organization long range transportation plans	Data
	4-3: Builds upon previous/current LYNX and LakeXpress planning efforts	Data
Goal 5: Preserve and	5-1: Minimizes widening of US 441	Qualitative
enhance the	5-2: Reduction in Vehicle Miles of Travel in Study Area	Data
environment, natural and cultural resources and open space	5-3: Impact to low income and minority populations (environmental justice)	Qualitative
	5-4: Potential impact on the natural environment	Qualitative
	5-5: Potential impact on the social/cultural environment	Qualitative
	5-6: Potential impact on the physical environment	Qualitative



	Criteria								
Thresholds	 1-1: Order of magnitude peak period in vehicle travel time from downtown Orlando (+/- LYNX Central Station) to Tavares or Tavares/Eustis Station (Year 2035) 	1-2: Number of required transfers for end-to-end corridor trips	1-3: Percentage of alignment in dedicated right-of-way (ROW)	1-4: Ability to attract choice riders to transit service (reliability)	1-5: Year 2035 daily transit trips on project*	1-6: Number of daily transit trips taken by zero car household individuals (Year 2035)	1-7: Number of vehicles removed daily from roadways due to transit ridership (Year 2035)	1-8: Number of direct platform transfer opportunities to SunRail	1-9: Direct connection to LYNX Central Station
High	The average transit travel time is less than or equal to the 2035 average auto travel time via SR 429 and SR 414 This equates to a travel time of 56.5 minutes or less	No transfers required	More than 75 percent of the transit alignment is in dedicated right-of-way	Transit service is highly attractive to choice riders Transit service is being exclusively provided by commuter rail	More than 15,000 daily transit trips	More than 20 percent of transit trips are taken by zero car household individuals	More than 1,500 vehicles removed daily	Two or more direct platform transfer opportunities to SunRail	There is a direct connection to LYNX Central Station
Medium	The average transit travel time is 101 to 120 percent of the 2035 average auto travel time via SR 429 and SR 414 This equates to a travel time between 56.6 and 67.8 minutes	One transfer required	50-75 percent of the transit alignment is in dedicated right-of-way	Transit service is moderately attractive to choice riders Transit service is being partially provided by commuter rail	5,000 to 15,000 daily transit trips	10 to 20 percent of transit trips are taken by zero car household individuals	1,000 to 1,500 vehicles removed daily	One direct platform transfer opportunity to SunRail	N/A
Low	The average transit travel time is more than 120 percent of the 2035 average auto travel time via SR 429 and SR 414 This equates to a travel time of more than 67.8 minutes	Two or more transfers required	Less than 50 percent of the transit alignment is in dedicated right-of-way	Transit service is not very attractive to choice riders Transit service is being provided by buses using general purpose lanes	Less than 5,000 daily transit trips	Less than 10 percent of transit trips are taken by zero car household individuals	Less than 1,000 vehicles removed daily	No direct platform transfer opportunities to SunRail	No direct connection to LYNX Central Station

Note*: This is a Federal Transit Administration New Starts Criteria

Goal 1: Improve Mobility and Transportation Access



Goal 2: Enhance the Livability and	Economic Competitiveness	of the Study Area thro
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	Criteria										
Thresholds	2-1: Number of Study Area major employment centers served*	2-2: Number of Study Area residential centers served	2-3: Number of existing affordable housing units served within 1/2 mile of all stations (Year 2013)**	2-4: Ability to maintain existing freight rail operations and industrial activity	2-5: Year 2035 population within 1/2 mile radius of all stations	2-6: Year 2035 employment within 1/2 mile radius of all stations					
High	Serves three or four of the four major employment centers (Downtown Orlando, Downtown Apopka, East Lake/Mount Dora Employment Center, Downtown Tavares)	Serves all four residential centers (Downtown Orlando, Rosemont, Apopka, and the Golden Triangle Area)	1,500 or more units served within a 1/2 mile radius of all stations	No negative impact to freight rail operations	20,000 or more people within a 1/2 mile radius of all stations	100,000 or more jobs within a 1/2 mile radius of all stations					
Medium	Serves two of the four major employment centers (Downtown Orlando, Downtown Apopka, East Lake/Mount Dora Employment Center, Downtown Tavares)	Serves three of the four residential centers (Downtown Orlando, Rosemont, Apopka, and the Golden Triangle Area)	1,000 to 1,499 units served within a 1/2 mile radius of all stations	Some negative impact to freight rail operations These impacts are tolerable by Florida Central Railroad (FCEN) but are not ideal	15,000 to 19,999 people within a 1/2 mile radius of all stations	50,000 to 99,999 jobs within a 1/2 mile radius of all stations					
Low	Serves one or none of the four major employment centers (Downtown Orlando, Downtown Apopka, East Lake/Mount Dora Employment Center, Downtown Tavares)	Serves two or fewer of the four residential centers (Downtown Orlando, Rosemont, Apopka, and the Golden Triangle Area)	Less than 1,000 units served within a 1/2 mile radius of all stations	Major negative impact to freight rail operations These impacts present significant operational challenges to FCEN	Less than 15,000 people within a 1/2 mile radius of all stations	Less than 50,000 jobs within a 1/2 mile radius of all stations					

Note*: Major employment centers defined by Lake~Sumter Metropolitan Planning Organization and MetroPlan Orlando Note**: Affordable housing units were identified from properties that received federal, state, or local government assistance. This data was compiled by the University of Florida in 2013.

ough an Improved Transportation System



Goal 3: Develop the Most Efficient Transportation System, Which Maximizes Limited Resources for the Greatest Public Benefit

	Criteria									
Thresholds	3-1: Right-of-way needed (acres)	3-2: Order of magnitude capital cost (2013 dollars)	3-3: Order of magnitude annual operating and maintenance(O&M) cost - 2013 dollars	3-4: Requires permanent easement or purchase from FCEN	3-5a: Annual O&M cost per annual transit trips (2013 dollars)	3-5b: Annual O&M cost per annual transit passenger miles (2013 dollars)	3-6: Competitiveness for FTA New Starts funding			
High	Requires acquisition of less than 15 acres of land	Capital cost is less than \$100 million	Annual O&M cost is less than \$1.5 million	No permanent easement or purchase from FCEN is required	Annual cost of less than \$2.50 per trip	5.00 transit passenger miles or more per dollar	High average score of ridership and cost effectiveness (Criteria 1-5 and 3-5a)			
Medium	Requires acquisition of 15 to 20 acres of land	Capital cost is \$100 to 300 million	Annual O&M cost is \$1.5 to \$2.5 million	N/A	Annual cost of \$2.50 to \$5 per transit trip	2.50 to 4.99 transit passenger miles per dollar	Medium average score of ridership and cost effectiveness (Criteria 1-5 and 3-5a)			
Low	Requires acquisition of more than 20 acres of land	Capital cost is greater than \$300 million	Annual O&M cost is more than \$2.5 million	Yes, a permanent easement or purchase from FCEN is required	Annual cost of more than \$5 per transit trip	0 to 2.49 transit passenger miles per dollar	Low average score of ridership and cost effectiveness (Criteria 1-5 and 3-5a)			



US 441 Corridor Study Table 4-5: Viable Alternatives Evaluation Criteria - Goal 4

Goal 4: Develop a Transit System Consistent With Adopted Local and Regional Plans and Policies

Thresholds	Criteria								
	4-1: Consistency of station locations with adopted local government land use plans	4-2: Number of station locations with adopted master plans supportive of TOD	4-3: Consistency with metropolitan planning organization long range transportation plans (Lake~Sumter MPO and MetroPlan Orlando)	4-4: Builds upon previous/current LYNX and LakeXpress planning efforts*					
High	More than 70 percent of all station locations have adopted land use plans which support compact TOD	More than 70 percent of all station locations have adopted master plans which support compact TOD	Alignment and mode is consistent with both the MetroPlan Orlando and Lake~Sumter MPO transportation plans	Alignment and mode consistent with LYNX planning efforts*					
Medium	50 to 70 percent of all station locations have adopted land use plans which support compact TOD	50 to 70 percent of all station locations have adopted master plans which support compact TOD	Alignment or mode is consistent for the MetroPlan Orlando and Lake~Sumter MPO transportation plans	Alignment or mode consistent with LYNX planning efforts*					
Low	Less than 50 percent of all station locations have adopted land use plans which support compact TOD	Less than 50 percent of all station locations have adopted master plans which support compact TOD	Neither mode nor alignment is consistent with both the MetroPlan Orlando and Lake~Sumter MPO transportation plans	Neither mode nor alignment consistent with LYNX planning efforts*					

Note*: The LakeXpress Transit Development Plan does not specify a mode or alignment for transit service. It was assumed that all build alternatives would be consistent with the LakeXpress plan.



US 441 Corridor Study Table 4-6: Viable Alternatives Evaluation Criteria - Goal 5

Goal 5: Preserve and Enhance the Environment, Natural and Cultural Resources, and Open Space

	Criteria										
Thresholds	5-1: Minimizes widening of US 441	5-2: Reduction in Vehicle Miles of Travel in Study Area	5-3: Impact to low income and minority populations	5-4: Potential impact on the natural environment	5-5: Potential impact on the social/cultural environment	5-6: Potential impact on the physical environment					
High	Requires no widening	More than 10 percent reduction in VMT	Potential stations and alignment are expected to have minimal impact on low income and minority populations	Potential stations and alignment are expected to have minimal impact on the natural environment	Potential stations and alignment are expected to have minimal impact on the social/cultural environment	Potential stations and alignment are expected to have minimal impact on the physical environment					
Medium	Requires widening of 5 miles or less	5 to 10 percent reduction in VMT	Potential stations and alignment are expected to have a minimal to moderate impact on low income and minority populations	Potential stations and alignment are expected to have a minimal to moderate impact on the natural environment	Potential stations and alignment are expected to have a minimal to moderate impact on the social/cultural environment	Potential stations and alignment are expected to have a minimal to moderate impact on the physical environment					
Low	Requires widening greater than 5 miles	Less than 5 percent reduction in VMT	Potential stations and alignment are expected to have a significant impact on low income and minority populations	Potential stations and alignment are expected to have a significant impact on the natural environment	Potential stations and alignment are expected to have a significant impact on the social/cultural environment	Potential stations and alignment are expected to have a significant impact on the physical environment					



5

Viable Alternatives Screening Results

5.1 Introduction

The goal of the Viable Alternatives screening was to quantitatively and qualitatively evaluate the Viable Alternatives and aid in the selection of the alternative that best met the project's Purpose and Need (the Recommended Alternative). As mentioned previously, an alternative that ranked highest in the Viable Alternatives screening does not necessarily advance as the Recommended Alternative as FDOT and the Project Advisory Group took into account the totality of the goals and objectives, including cost effectiveness and financial feasibility, prior to selecting a Recommended Alternative.

For the Viable Alternatives screening, the three build alternatives (Viable Alternative 1-2, 1-5, and 2-4) and the one no build alternative (Viable Alternative 0-1) were evaluated against the criteria shown previously in Table 4-1.

5.2 Screening Results

Tables 5-1, 5-2, and 5-3 present the results of the screening. Based upon the data collected, each Viable Alternative was given a rating of Low, Medium, or High for each criterion. The rating for each goal was calculated as the average of all the criteria scores for that particular goal. The overall rating for the alternative was calculated as the average of the five goal scores.

The data used to populate the matrix came from the following documents:

- US 441 Travel Forecasting and Results Report Appendix B
- Future Transportation and Station Impacts Technical Memorandum Appendix C
- Operations Plan Technical Memorandum Appendix D
- Railroad-Highway Grade Crossing Analysis Technical Memorandum Appendix E
- Cost Methodology and Results Technical Memorandum Appendix F
- Future Land Use Technical Memorandum Appendix G
- Environmental Evaluation Technical Memorandum Appendix H



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US 441 Corridor Study Table 5-1: Viable Alternatives Evaluation Data Matrix

Alt 1-2 Alt 1-5 Alt 2-4 Alt 0-1 Commuter Rail to SR 429, Express Bus to Lake Туре **Express Bus via Limited Access Roads Evaluation Criteria Commuter Rail to Eustis and Mount Dora** No Build County Goal 1: Improve Mobility and Transportation Access **Transit:** 138-143 min (Computed Average: 140.5 min) 1-1: Order of magnitude peak period in vehicle travel time from 75-80 min 53-58 min 67-72 min **Auto:** 57-62 min via US 441 (Computed Average: downtown Orlando (+/- LYNX Central Station) to Tavares or Data 59.5 min) Tavares/Eustis Station (Year 2035) Computed Average: 55.5 min Computed Average: 69.5 min Computed Average: 77.5 min Auto: 54-59 min via US 441/SR 46/SR 429/SR 414/US 441 (Computed Average: 56.5 min) 1-2: Number of required transfers for end-to-end corridor trips N/A Data 0 0 1 39 of 39 miles in dedicated ROW 0 of 34 miles in dedicated ROW 18 of 33 miles in dedicated ROW 1-3: Percentage of alignment in dedicated right-of-way (ROW) N/A Data (0% of alignment) (100% of alignment) (Approx. 55% of alignment) Transit service is moderately attractive to choice Transit service is highly attractive to choice Transit service is not very attractive to choice 1-4: Ability to attract choice riders to transit service (reliability) Qual N/A riders riders riders 2,000 +/- 10% 900 +/- 10% N/A 1-5: Year 2035 daily transit trips on project 1,300 +/- 10% Data 305 157 481 1-6: Number of daily transit trips taken by zero car household N/A Data individuals (Year 2035) (Approx. 23% of all transit trips) (Approx. 24% of all transit trips) (Approx. 17% of all transit trips) 1-7: Number of vehicles removed daily from roadways due to 750 +/- 10% 1,080 +/- 10% 1,670 +/- 10% N/A Data transit ridership (Year 2035) 1-8: Number of direct platform transfer opportunities to SunRail N/A Data 2 0 2 No (1/4 mile walk) 1-9: Direct connection to LYNX Central Station No (1/4 mile walk) N/A Yes Data

Goal 2: Enhance the Livability and Economic Competitiveness of the Study Area through an Improved Transportation System

	1				
		2 of 4	3 of 4	2 of 4	
2-1: Number of Study Area major employment centers served	Data	(Downtown Orlando and Downtown Apopka)	(Downtown Orlando, Downtown Apopka, Downtown Tavares)	(Downtown Orlando and East Lake/ Mount Dora Employment Center)	N/A
2-2: Number of Study Area residential centers served	Data	4 of 4	4 of 4	4 of 4	N/A
2-3: Number of existing affordable housing units served within 1/2 mile of all stations (Year 2013)	Data	1,500	1,400	1,000	N/A
2-4: Ability to maintain existing freight rail operations and industrial activity	Qual	No negative impact to freight rail operations	No negative impact to freight rail operations	No negative impact to freight rail operations	No negative impact to freight rail operations
2-5: Year 2035 population within 1/2 mile radius of all stations	Data	18,800	21,300	12,400	N/A
2-6: Year 2035 employment within 1/2 mile radius of all stations	Data	108,700	116,300	32,100	N/A
Goal 3: Develop the Most Efficient Transportation System, Which N	Лахітіze	s Limited Resources for the Greatest Public Benef	it		
3-1: Right-of-way needed (acres)	Data	19.5 acres (station related) + 6.7 acres (maintenance facility) = 26.2 acres total	17.9 acres (station related) + 6.7 acres (maintenance facility) = 24.6 acres total	16.3 acres (all station related)	N/A
3-2: Order of magnitude capital cost (2013 dollars)	Data	\$245-255 M	\$365-375 M	\$55-60 M	N/A
3-3: Order of magnitude annual operating and maintenance (O&M) cost - 2013 dollars (Premium Transit/Feeder Bus)	Data	\$3.2 M (\$1.2 M/\$2.0 M)	\$3.6 M (\$1.7 M/\$1.9 M)	\$2.3 M (\$0.6 M/\$1.7 M)	N/A
3-4: Requires permanent easement or purchase from FCEN	Qual	Yes	Yes	No	No
3-5a: Annual O&M cost per annual transit trips (2013 dollars)	Data	\$9.38	\$6.89	\$9.93	N/A
3-5b: Annual O&M cost per annual transit passenger miles (2013 dollars)	Data	2.19 transit passenger miles per dollar	3.68 passenger miles per dollar	2.53 passenger miles per dollar	N/A
3-6: Competitiveness for FTA New Starts funding	Qual	Low	Low	Not eligible	N/A
Goal 4: Develop a Transit System Consistent With Adopted Local a	nd Regioi	nal Plans and Policies			
4-1: Consistency of station locations with adopted local government land use plans	Data	7 of 11 stations	10 of 12 stations	5 of 7 stations	N/A
4-2: Number of station locations with adopted master plans supportive of TOD	Data	3 of 11 stations	6 of 12 stations	1 of 7 stations	N/A
4-3: Consistency with metropolitan planning organization long		(Approx. 27% of all stations)	(50% of all stations)	(Approx. 14% of all stations)	Not consistent with both plans as no new transit
range transportation plans (Lake~Sumter MPO and MetroPlan Orlando)	Data	Alignment and mode consistent with both plans	Alignment and mode consistent with both plans	Alignment consistent with both plans	service being provided
4-4: Builds upon previous/current LYNX and LakeXpress planning efforts	Data	Alignment consistent with LYNX plan (1)	Alignment consistent with LYNX plan (1)	Alignment and mode consistent with LYNX plan (1)	Not consistent with LYNX plan as no new transit service being provided
Goal 5: Preserve and Enhance the Environment, Natural and Cultur	al Resou	rces, and Open Space			
5-1: Minimizes widening of US 441	Qual		No longer a o	differentiator	
5-2: Reduction in Vehicle Miles of Travel in Study Area	Data	Less than 1% Reduction in VMT	Less than 1% Reduction in VMT	Less than 1% Reduction in VMT	N/A
5-3: Impact to low income and minority populations	Qual	Minimal (2)	Minimal (2)	Minimal (2)	Moderate (3)
5-4: Potential impact on the natural environment (4)	Qual	Minimal (5)	Minimal (5)	Minimal (5)	Minimal (5)
5-5: Potential impact on the social/cultural environment (6)	Qual	Minimal (7)	Minimal (7)	Minimal (7)	Minimal (7)
5-6: Potential impact on the physical environment (8)	Qual	Moderate (9)	Moderate (9)	Moderate (9)	Minimal (10)

Note:

1) The LakeXpress Transit Development Plan does not specify a mode or alignment for transit service. It was assumed that all build alternatives would be consistent with the LakeXpress plan.

2) Minimal impact was assigned because there would be enhanced transit service that has the potential to enhance access to employment opportunities for this segment of the population.

There were no direct impacts (residential relocations) for this segment of the population.

3) A moderate environmental justice impact was assigned because there would not be enhanced transit service when compared to the build alternatives.

4) The natural environment includes wetlands, wildlife habitat, water quality, floodplains and public lands (parks and recreation areas).

5) A minimal rating was assigned where direct impacts were assumed to be minor (ie: less than 10 acres of impact; no direct impact, etc.).

6) Social/cultural environment includes land use and community services.

7) A minimal rating was assigned where direct impacts were assumed to have no significant effect on existing or proposed land uses and/or community facilities.

8) Physical environment includes air quality, noise sensitive sites and potential contamination sites.

9) A moderate rating was assigned where direct impacts were assumed to require additional field verification, quantification and analysis of impacts, and agency coordination.

10) A minimal rating was assigned to indicate no direct impact on the existing physical environment.

Rating of High
Rating of Medium
Rating of Low

Note: Medium-High and Medium-Low ratings were only used in the "goal" evaluations.



US 441 Corridor Study Table 5-2: Viable Alternatives Evaluation Ratings Matrix

		Alt 1-2	Alt 1-5	Alt 2-4	Alt 0-1
Evaluation Criteria	Туре	Commuter Rail to SR 429, Express Bus to Lake County	Commuter Rail to Eustis and Mount Dora	Express Bus via Limited Access Roads	No Build
Goal 1: Improve Mobility and Transportation Access					
1-1: Order of magnitude peak period in vehicle travel time from downtown Orlando (+/- LYNX Central Station) to Tavares or Tavares/Eustis Station (Year 2035)	Data	Low	High	Low	N/A
1-2: Number of required transfers for end-to-end corridor trips	Data	Medium	High	High	N/A
1-3: Percentage of alignment in dedicated right-of-way (ROW)	Data	Medium	High	Low	N/A
1-4: Ability to attract choice riders to transit service (reliability)	Qual	Medium	High	Low	N/A
1-5: Year 2035 daily transit trips on project	Data	Low	Low	Low	N/A
1-6: Number of daily transit trips taken by zero car household individuals (Year 2035)	Data	High	High	Medium	N/A
1-7: Number of vehicles removed daily from roadways due to transit ridership (Year 2035)	Data	Medium	High	Low	N/A
1-8: Number of direct platform transfer opportunities to SunRail	Data	High	High	Low	N/A
1-9: Direct connection to LYNX Central Station	Data	Low	Low	High	N/A
Goal 1 Overall		Medium-Low	High	Medium-Low	
Goal 2: Enhance the Livability and Economic Competitiveness of the	e Study A	rea through an Improved Transportation System			
2-1: Number of Study Area major employment centers served	Data	Medium	High	Medium	N/A
2-2: Number of Study Area residential centers served	Data	High	High	High	N/A
2-3: Number of existing affordable housing units served within 1/2 mile of all stations (Year 2013)	Data	High	Medium	Medium	N/A
2-4: Ability to maintain existing freight rail operations and industrial activity	Qual	High	High	High	High
2-5: Year 2035 population within 1/2 mile radius of all stations	Data	Medium	High	Low	N/A
2-6: Year 2035 employment within 1/2 mile radius of all stations	Data	High	High	Low	N/A
Goal 2 Overall		High	High	Medium	
Goal 3: Develop the Most Efficient Transportation System, Which N	laximizes	s Limited Resources for the Greatest Public Benefi	t	N 4 a alticum	N1 / A
3-1: Right-of-Way needed (acres)	Data	LOW	LOW	Iviedium	N/A
3-2. Order of magnitude capital cost (2013 dollars) 3-3: Order of magnitude annual operating and maintenance (O&M)	Dala	Ivieulum	LOW		IN/A
cost - 2013 dollars (Premium Transit/Feeder Bus)	Data	Low	Low	Medium	N/A
3-4: Requires permanent easement or purchase from FCEN	Qual	Low	Low	High	High
3-5a: Annual O&M cost per annual transit trips (2013 dollars)	Data	Low	Low	Low	N/A
dollars)	Data	Low	Medium	Medium	N/A
3-6: Competitiveness for FTA New Starts funding	Qual	Low	Low	N/A	N/A
Goal 3 Overall		Low	Low	Medium-High	
Goal 4: Develop a Transit System Consistent With Adopted Local ar	d Region	al Plans and Policies			
4-1: Consistency of station locations with adopted local government land use plans	Data	Medium	High	High	N/A
4-2: Number of station locations with adopted master plans supportive of TOD	Data	Low	Medium	Low	N/A
4-3: Consistency with metropolitan planning organization long range transportation plans (Lake~Sumter MPO and MetroPlan Orlando)	Data	High	High	Medium	Low
4-4: Builds upon previous/current LYNX and LakeXpress planning efforts	Data	Medium	Medium	High	Low
Goal 4 Overall		Medium	High	Medium-High	

Goal 5: Preserve and Enhance the Environment, Natural Resources, and Open Space

5-1: Minimizes widening of US 441	Qual	No longer a differentiator				
5-2: Reduction in Vehicle Miles of Travel in Study Area	Data	Low	Low Low			
5-3: Impact to low income and minority populations	Qual	High	High	High	Medium	
5-4: Potential impact on the natural environment	Qual	High	High	High	High	
5-5: Potential impact on the social/cultural environment	Qual	High	High	High	High	
5-6: Potential impact on the physical environment	Qual	Medium	Medium	Medium	High	
Goal 5 Overall		Medium-High	Medium-High	Medium-High		

LEGEND:

Rating of High
Rating of Medium-High
Rating of Medium
Rating of Medium-Low
Rating of Low

Note: Medium-High and Medium-Low ratings were only used in the "goal" evaluations.





	Alt 1-2	Alt 1-5	Alt 2-4
	Commuter Rail to SR 429, Express Bus to Lake County	Commuter Rail to Eustis and Mount Dora	Express Bus via Limited Access Roadways
Goal 1: Improve Mobility and Transportation Access	Medium-Low	High	Medium-Low
Goal 2: Enhance the Livability and Economic Competitiveness of the Study Area through an Improved Transportation System	High	High	Medium
Goal 3: Develop the Most Efficient Transportation System, Which Maximizes Limited Resources for the Greatest Public Benefit	Low	Low	Medium-High
Goal 4: Develop a Transit System Consistent With Adopted Local and Regional Plans and Policies	Medium	High	Medium-High
Goal 5: Preserve and Enhance the Environment, Natural Resources and Open Space	Medium-High	Medium-High	Medium-High





5.3 Analysis of Screening Results

Each of the three Build Viable Alternatives were developed and then refined to be consistent with the overall purpose and need as well as the goal and objectives. The primary differentiators between the Viable Build Alternatives were the estimated transit travel time, anticipated ridership, and expected capital costs.

Of the three Viable Build Alternatives, Viable Alternative 1-5 would have the lowest transit travel time, making it most competitive with auto travel and thereby potentially most attractive to choice riders. Consequently, it also would have the highest projected ridership out of the three Viable Build Alternatives. However, it also would have the highest capital cost. As a result, Viable Alternative 1-5 scored the highest of the three Build Viable Alternatives with an overall Medium-High rating.

Both Viable Alternatives 1-2 (Commuter Rail and Express Bus) and 2-4 (Express Bus) would have travel times greater than Viable Alternative 1-5 and correspondingly, lower ridership. The main differentiator between Viable Alternatives 1-2 and 2-4 was that Viable Alternative 2-4 had a capital cost approximately 20 percent of that for Viable Alternative 1-2 (\$55-60 million for Viable Alternative 2-4 versus \$245-255 million for Viable Alternative 1-2) and ridership that was approximately 69 percent of that for Viable Alternative 1-2 (900 +/- 10% for Viable Alternative 2-4 versus 1,300 +/- 10% for Viable Alternative 1-2).

Each of the three Viable Build Alternatives were successful in fulfilling the purpose and need/goals and objectives to varying degrees with the exception of the cost-effectiveness elements. With regards to their comparative ratings, Viable Alternative 1-2 scored an overall Medium rating. In general, this was due to:

- Travel time was relatively close to Viable Alternative 2-4 but Viable Alternative 1-2 has a higher capital cost
- The incremental increase in ridership from Viable Alternative 2-4 to Viable Alternative 1-2 does not justify the larger incremental increase in capital costs

Viable Alternative 2-4 also scored an overall Medium rating. In general, this was due to:

- Low travel time reliability since no portion of the alignment is in dedicated right-ofway (resulting also in being less attractive to choice riders)
- Less people and jobs served within a 1/2 mile of all stations due to the routing chosen

Viable Alternative 1-5 scored an overall Medium-High rating. In general, this was due to:

- Competitive travel time with the auto
- Stronger consistency with local/regional plans and policies

The overriding challenge with the analysis of the commuter rail alternatives was that while Viable Alternative 1-2 has a ranking of Medium and Viable Alternative 1-5 has a ranking of Medium-High relative to the project goals, neither of these Viable Alternatives have Technical Memorandum | Viable Alternatives Development and Screening



sufficient projected ridership to rate highly against the Federal Transit Administration's New Starts funding Mobility and Cost-effectiveness criteria due to low transit ridership, high capital cost, and low cost effectiveness. This would result in a low likelihood that the project would attract federal capital funds for construction. Without a significant amount of federal funding (approximately 50%), the state and local funding partners have indicated they would not support moving an alternative forward beyond this study.

The project's low projected ridership for each of the Viable Build Alternatives may be attributed to the following principal factors:

- 1. There is not sufficient current or future (year 2035) population or employment to generate home based work trips that require end-to-end corridor travel best served by transit.
- 2. The transit travel times of the Build Viable Alternatives are not substantially better than the auto travel times on the less than severely congested roadways. Without reduced or competitive transit travel times, there is little incentive to encourage choice riders to migrate from single occupancy vehicles to premium transit.

This was the case despite the fact that each of the communities has adopted land use plans and vision plans that support community development patterns and densities that will encourage transit usage.

Similarly, Viable Alternative 2-4 (Express Bus), while not eligible for FTA New Starts Funding (but may be eligible other FTA funding programs), was also not strong in terms of ridership and the capital and operations and maintenance (O&M) costs. While the projected daily ridership of 900 +/- 10% was reasonable for an express bus route, the high capital cost of \$55-60 million was likely too high given the modest projected ridership.



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6 Selection of Recommended Alternative and Short Term Transit Improvements

6.1 Selection of a Recommended Alternative

As stated in Section 5.3, the two commuter rail alternatives (Viable Alternative 1-2 and 1-5) have high capital and operations & maintenance (O&M) costs which have been deemed by the PAG as not financially feasible without Federal participation. As stated previously, none of the Viable Build Alternatives is likely to attract FTA funding based on current FTA guidelines. Based upon this, these two alternatives were eliminated from further consideration.

Between the two remaining Viable Alternatives (No Build and Viable Alternative 2-4), Viable Alternative 2-4 properly addresses the study's overarching goal of providing an end-to-end premium transit option. However, PAG members were reluctant to recommend Viable Alternative 2-4 due to the low likelihood of securing FTA funding, thereby requiring a greater local financial commitment which the PAG deemed not appropriate due to the low ridership projections.

As such, the project team recommended the No Build Alternative.

While each of the Viable Build Alternatives met the study's purpose and need, none of the Alternatives generated sufficient ridership based upon the currently identified 2035 socioeconomic projections and resultant population and employment densities nor travel and transit demand to support a cost-effective capital program solution that would need to be met locally, due to the low likelihood of federal funding.

This recommendation was developed in collaboration with the Project Advisory Group (PAG) on November 20, 2014 and was accepted as the Recommended Alternative.

It is important to remember that Long Range Transportation Plans (LRTPs) are updated every 5 years. As such, if the Study Area experiences a dramatic change (population, employment,



congestion, or otherwise), it is possible to revisit this corridor as part of the continuing systems planning updates of the LRTPs at which time modifications to the Recommended Alternative can be made.

The Recommended Alternative was presented to the Lake~Sumter MPO Governing Board on October 28, 2015, and to the MetroPlan Orlando Board on November 4, 2015. Since the Recommended Alternative was a No Build Alternative, no action was taken by either Board, concluding the Corridor Study.

6.2 Short Term Transit Improvements Identified for the Corridor

While the project team and stakeholders determined that none of the three Viable Alternatives were financially viable given the low ridership and high capital costs, many stakeholders felt that improved regional transit connectivity could still be achieved in the US 441 corridor, one of the major needs identified as part of the project.

In order to address this need, the PAG elected to use the project's remaining budget to identify short-term, low capital cost improvements that could enhance transit and connectivity within the corridor. A subsequent report, titled "Local and Express Bus Operational Analysis", documents the work that was performed to accomplish the following tasks:

- 1. Analyze four routes to determine the best one for an express bus from Apopka to downtown Orlando
- 2. Analyze four local bus options to determine how to improve the local bus connectivity between LYNX and LakeXpress

The report identifies estimated capital costs, operations and maintenance costs, and express and local bus options that LYNX and LakeXpress helped develop. LYNX will consider the express and local bus improvements for implementation during its 2016 Transit Development Plan update. LakeXpress will consider the local bus option for implementation during its 2016 Comprehensive Operational Analysis.



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Appendix A: Purpose and Need & Goals and Objectives

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Purpose and Need Summary



October 2013



Purpose and Need

1 Project Description

The Florida Department of Transportation (FDOT) is conducting a Corridor Study in collaboration with MetroPlan Orlando, Lake~Sumter Metropolitan Planning Organization (MPO), Orange County, Lake County, CSX Transportation, Florida Central Railroad (FCEN), LYNX, LakeXpress, and the cities of Orlando, Apopka, Eustis, Tavares, and Mount Dora.

Figure 1-1 shows the Study Area. The Study Area is bound by downtown Orlando to the south and by the cities of Eustis, Tavares, and Mount Dora to the north, spanning a distance of approximately 33 miles. The Study Area includes three major activity centers: downtown Orlando, the City of Apopka, and the Golden Triangle (consisting of the Cities of Eustis, Tavares, and Mount Dora). Also within the Study Area are the unincorporated rural communities of Tangerine and Zellwood. Beyond the Study Area approximately 20 miles to the northwest is The Villages, a retirement community of approximately 100,000 residents. The Study Area contains residential and employment centers, in addition to some tourism.

The year 2010 population for the Study Area is 354,000 based on Census data; by the year 2035, the population is expected to grow to 573,000 based on adopted Central Florida Regional Planning Model (CFRPM) forecasts. The Study Area has a poverty rate of 15.3%, higher than that for Orange and Lake Counties (7.5% and 5.7%, respectively). Similarly, the Study Area has a higher percentage of zero-vehicle households (8.1%) in comparison to Orange and Lake Counties (6.0% for Orange County and 4.2% for Lake County). According to the 2010 Census, minorities comprise 37 % of the Study Area population, a lower percentage than Orange County (54%) but higher than Lake County (25%).

Current employment within the Study Area is estimated at 201,000 (based year 2012 ESRI Business Analyst data); by the year 2035, employment is expected to grow to 379,000 based on adopted CFRPM forecasts. Downtown Orlando is the primary employment center for both the Study Area and for the Orlando metropolitan region. Major employment uses outside of downtown Orlando include two hospitals (Florida Hospital Apopka and Florida Hospital Waterman) and the government offices for Apopka, Mount Dora, Eustis, Tavares and Lake County. The Study Area also contains several industrial parks located near the FCEN rail corridor and some agricultural employment between Apopka and Mount Dora.

The two primary transportation corridors in the Study Area are US 441 and the Florida Central Railroad. US 441 is a regionally significant corridor, as it is the only major roadway that connects downtown Orlando to the City of Apopka and the Golden Triangle area. The FCEN rail line, mainly



serving freight traffic, connects these communities as well and runs parallel to US 441 for most of the Study Area. The FCEN rail line has statewide significance as a Strategic Intermodal System (SIS) Rail Corridor. In downtown Orlando, the rail line connects with the Central Florida Rail Corridor (CFRC), which will host SunRail commuter rail service beginning in 2014.

Also included in the Study Area are SR 50 within Orlando (connecting US 441 to downtown Orlando) and SR 19 within Lake County (connecting US 441 to downtown Eustis). The limits of SR 50 within the Study Area are from US 441 east to Garland Avenue, approximately 250 feet east of Interstate 4. The limits of SR 19 within the Study Area are from US 441 north to CR 44.

2 Study Area Needs

There are three primary issues that define the need for transit improvements within the Study Area: future traffic congestion, regional connectivity, and land use/economic development.

2.1 Future Traffic Congestion

Currently, the majority of the roadway segments within the corridor operate at or below capacity. By 2035, however, it is projected that approximately 59 percent of the corridor will operate over capacity and another 26 percent of the corridor will operate near capacity. These over-capacity segments on US 441 are from downtown Orlando to Zellwood and from Eustis to Tavares. Portions of SR 19 in Lake County and SR 50 in Orange County that are included in the Study Area are also expected to operate over capacity in 2035. Table 1 summarizes the Year 2035 Level of Service conditions for the Study Area roadway segments.

FDOT has funded the final design for the widening of US 441 from four to six lanes from SR 46 to SR 44 in Lake County; this project will continue the widening previously completed for the Lake County segments from SR 44 through Eustis and Tavares to Leesburg (west of the Study Area). Beyond this improvement, there are no adopted long-term plans to widen the corridor further. The Lake~Sumter MPO Long Range Transportation Plan identifies US 441 as a multimodal corridor, with an emphasis on long term transit improvements as an alternative to providing roadway capacity. The Lake~Sumter MPO has also adopted a Corridor Constraint Policy that limits US 441 to a maximum of six lanes. The comprehensive plans for the five cities and two counties in the Study Area do not identify further widening of US 441; however, transit investments could provide the additional capacity.

2.2 Regional Connectivity

Transit service in the Study Area is provided by LYNX within Orange County and Lake Xpress within Lake County. There is a connection point between the two systems in Zellwood, in northwest Orange County. Other transit transfer points within the Study Area are LYNX Superstops in the Rosemont neighborhood of Orlando and downtown Apopka, as well as LYNX Central Station in downtown Orlando. Table 2 summarizes the existing transit service in the Study Area. Transit service frequency varies along the corridor, from 15 minute peak-period headways in Orlando to two-hour headways in Lake County. Similarly, transit ridership varies greatly, with daily ridership for routes ranging from 100 to over 2,000 riders per day. Within the Study Area, regional transit mobility is currently limited due to both the number of required transfers between transit routes and inconsistent service levels. Currently, a transit trip between downtown Orlando and the Golden Triangle area requires two transfers and takes a minimum of 1 hour and 45 minutes to



complete, equating to an average speed of 11 miles per hour. These travel times are not competitive with the automobile, even after accounting for future congestion.

As described above, the Study Area contains a higher percentage of transit dependent households than Orange and Lake Counties overall. Transit investments to enhance service provide an opportunity to improve mobility for this population group through increased access to employment centers and services. Improved transit service with an enhanced connection to SunRail, which will serve as the north-south transit spine for the Central Florida region, could also give Study Area residents better access to select regional employment centers.

2.3 Land Use, Economic Development, and Community Redevelopment

Improved transit service will assist in implementing the Study Area communities' vision for population and employment growth. The Cities of Orlando, Apopka, Eustis, Mount Dora and Tavares all have adopted comprehensive plans identifying higher density or mixed-use development in their downtown areas. Orange and Lake Counties also have adopted policies supporting transit-oriented development. These land use plans are implemented through adopted transit-supportive land use and zoning regulations. Each community has one or more Community Redevelopment Agencies (CRAs), providing a potential funding mechanism for redevelopment and economic development within the Study Area's activity centers. Several sites adjacent to the FCEN rail corridor are designated as future industrial employment centers.

While adopted land use policies and regulations reflect the Study Area communities' commitment to transit-oriented development, transit investments and improved transit service are also needed to fulfill this vision. Currently, Orange County and the City of Orlando fund a portion of the annual operating costs for LYNX service. In 2013, the Cities of Tavares, Eustis, Mount Dora, Apopka, and Orlando as well as Orange and Lake Counties contributed local matching funds for upgrades to the Florida Central rail line. Transit improvements in the Study Area will help to support redevelopment efforts, encourage economic growth, and reinforce communities' desired compact land use patterns.

3 Purpose and Need Statement

An improved transportation system has the potential to enhance the livability and economic health of the Study Area by providing better access to employment opportunities and basic services; by supporting the economic vitality of existing communities; by providing a range of transportation options for all ages, incomes and abilities; and by reducing household transportation costs. Public transportation improvements are needed within the US 441 Study Area to provide mobility alternatives to address future traffic congestion; improve regional transit connectivity for residents and employees; and support land use, economic development, and community redevelopment goals. There is a need to address projected deficiencies in roadway capacity, existing transit service and existing transit infrastructure with improvements that better serve the transit-dependent population, and provide improved connectivity between existing and proposed employment centers and other modal transportation systems, including SunRail. Transit improvements are also needed to implement the adopted transit-oriented land use visions of the Study Area communities. \\FL-ORL\projects\61817.00 US441 Corridor AA\GIS\Project\Existing Conditions\Study Area Map Corridor.mxd



Table 1: Year 2035 Level of Service Summary

US 441 Segment Limits	Year 2035 # of Lanes	Acceptable LOS Standard	Year 2035 LOS
SR 50 to Lee Road / John Young		_	_
Parkway	4	E	F
SR 423 / Lee Road / John Young			
Parkway to Piedmont Wekiva Rd	4	E	F
Piedmont Wekiva Road to SR 436	4	E	D
SR 436 to SR 429 / Western Beltway	4	E	F
SR 429 / Western Beltway to Sadler			
Road	4	E	F
Sadler Road to SR 46	4	D	С
SR 46 to SR 19 / Bay Street	6	D	С
SR 19 / Bay Street to SR 19 / Orange			
Avenue / N Duncan Drive	6	D	F

Source: 2012 FDOT LOS_ALL Update, Lake~Sumter LRTP, MetroPlan Orlando LRTP

Table 2: Primary Study Area Transit Routes

Route	Route Description	Span of Service	Service Frequency	FY 2012 Annual Ridership
LYNX Link 17	N US 441 / Apopka	4:45 AM to 1:35 AM	30/15/60 Min	778,227
		Monday – Friday		
		4:45 AM to 10:35 PM	30/60 Min	
		Saturday		
		4:45 AM to 8:35 PM	60 Min	
		Sunday & Holiday		
LYNX Link 44	Hiawassee Road / Zellwood	5:22 AM to 9:10 PM	60 Min	209,747
		Monday - Saturday		
Lake Xpress	Umatilla to Zellwood	7:11 AM to 7:11 PM	120 Min	35,925
Route 4		Monday – Friday		

Source: LYNX Service Planning April 2013 Bid and September 2012 Ridership By Route Report www.ridelakexpress.com and Trips by Route file June 24, 2013

Note: The routes shown are those that operate along US 441. In addition to these routes, several east-west LYNX routes intersect with the US 441 corridor in Orange County.



Goals and Objectives

Goal 1: Improve Mobility and Transportation Access

Objective 1: Improve connectivity between transit systems and increase opportunities for future local and regional transit services.

Objective 2: Reduce transit travel time for longer distance trips.

Objective 3: Provide safe, multi-modal access to the transit system.

Goal 2: Enhance the Livability and Economic Competitiveness of the Study Area through an Improved Transportation System

Objective 1: Enhance economic competitiveness by providing reliable and timely transit access to employment centers.

Objective 2: Develop transportation infrastructure that does not preclude existing/future freight operations and industrial employment within the Study Area.

Objective 3: Provide transportation options that promote affordable housing and reduced household transportation costs.

Objective 4: Provide transportation options that serve travelers of all ages, incomes, and abilities.

Goal 3: Develop the Most Efficient Transportation System, which Maximizes Limited Resources for the Greatest Public Benefit

Objective 1: Maximize use (capacity) of existing transportation corridors and infrastructure. Advance the most cost-effective transit network.

Objective 2: Maximize the potential for a variety of project funding sources, including federal, state, and local government agencies and private sector entities.

Objective 3: Develop transportation options that use known and proven transportation technologies suitable to the Study Area.

Objective 4: Provide a transportation improvement that can be implemented in a phased manner.



Goal 4: Develop a Transit System Consistent with Adopted Local and Regional Plans and Policies

Objective 1: Support and implement transit improvements consistent with the MetroPlan 2030 Long Range Transportation Plan (LRTP), the Lake~Sumter Metropolitan Planning Organization 2035 LRTP, LYNX Vision 2030, and the transportation components of the Comprehensive Plans adopted by Orange and Lake Counties, and the Cities of Orlando, Apopka, Mount Dora, Eustis, and Tavares.

Objective 2: Implement transit improvements consistent with the adopted land use plans and policies of Orange and Lake Counties, and the Cities of Orlando, Apopka, Mount Dora, Eustis, and Tavares.

Goal 5: Preserve and Enhance the Environment, Natural and Cultural Resources, and Open Space

Objective 1: Minimize potential adverse impact on residences, businesses, and the built environment.

Objective 2: Minimize potential adverse impacts on the natural environment and preserve the character of existing rural communities.



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Appendix B: Technical Memorandum – US 441 Travel Forecasting and Results

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US 441 TRAVEL FORECASTING AND RESULTS REPORT



Prepared for the Florida Department of Transportation –District 5

Ву

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December 22, 2014



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1. INTRODUCTION

The Florida Department of Transportation (FDOT) conducted a major transit study in partnership with the Cities of Orlando, Apopka, Tavares, Eustis and Mount Dora in addition to Orange and Lake Counties and the Lake-Sumter MPO for the US 441 Corridor. The US 441 Corridor Study, shown in Figure 1, considered a range of transit improvements by maximizing the major transportation assets present within the corridor including US 441 and the adjacent Florida Central Railroad (FCEN) corridor.

The US 441 Corridor Study Existing Conditions Report states the study should address the following key objectives:

- Evaluate various options for improving transit service in the US 441 Corridor between the Cities of Tavares, Mt. Dora and Eustis in Lake County, through northwest Orange County and the City of Apopka and terminating in downtown Orlando;
- Conduct the necessary evaluations that will result in a Locally Preferred/Recommended Alternative to be adopted by MetroPlan Orlando and the Lake Sumter MPO; and
- Satisfy the Federal Transit Administration (FTA) New Starts or Small Starts Criteria to obtain approval from the FTA, so the chosen transit alternative can quickly proceed into the next phase of transit project development and be eligible for Federal funding.

In order to meet the proposed objectives of the project, ridership forecasts were one of the critical components needed to assist in the evaluations for each of the Viable Build Alternatives. This document provides the supporting technical documentation from the travel forecasting results to support the analysis for the US 441 corridor. The report includes limited discussion of the existing conditions and instead focuses on results for the No Build Alternative, and the Build Viable Alternatives for the design year 2035. Estimates are for average weekday travel. Total transit ridership refers to the total number of trips by local bus, express bus or commuter rail in the entire modeled region unless specified further.

Portions of this document were condensed into a summary chapter of the Viable Alternatives Development and Screening Technical Memo¹.

¹ Viable Alternatives Development and Screening Technical Memorandum, VHB, October 2014.







Figure 1: US441 Corridor Boundary





2. TRAVEL DEMAND MODEL ANALYSIS TOOL

In order to maintain a level of consistency between projects in the region, it was decided that the US 441 Corridor Study would utilize the Central Florida Regional Planning Model (CFRPM) Version 5.6. The CFRPM v5.6 is a time-of-day model that underwent significant revision to better meet FTA New Starts standards for mode choice analysis. The model contains a 2010 base year and 2035 horizon year. The model results were used to identify the major travel patterns in the area using both person and transit trips.

The base year model was reviewed regionally and along the corridor to understand the existing US 441 corridor travel patterns. The details of the model review are outlined in *US 441 Forecasting Travel Demand Model and Corridor Review Technical Memorandum*².

In order to properly forecast ridership using CFRPM v5.6 and to better reflect anticipated patterns, additional adjustments to model parameters were made using nationally accepted values, survey data and experience on similar commuter rail projects. These adjustments are discussed in later sections of the document

The development of a district system along the corridor plays a key role in helping to tell the story of the markets and in developing the ridership forecasts. A district system is a grouping of transit analysis zones into a larger geographical area in order to separate out movements in different portions of a corridor or region. These districts will be used throughout the remainder of this document to explain the travel markets and the results of the alternatives. Districts 1 through 9 are considered to be in The Project corridor.

Figure 2 shows the districts adjacent to and surrounding the US 441 study corridor, including name and number.



Figure 2: US 441 District System

² US 441 Forecasting Travel Demand Model and Corridor Review Technical Memorandum, Task 1 and 2 Technical Documentation, Parsons Brinckerhoff, January 2014





2.1 Base Year Corridor Conditions

A detailed review of the base year model conditions compared with observed data was done as a part of the Project³ This section highlights the key results from that analysis.

As a part of the study, the roadway facilities and transit routes were reviewed and updated to match existing conditions in the region. The review of the highway network consisted of using the historical 2010 images from Google Earth, the Orlando Urban Area Transportation Study (OUATS) model base year 2009 network data and the CFRPM v6 base year 2010 network. All of these items were used to verify the attributes of number of lanes, posted speed, and locations of centroid connectors in the CFRPM v5.6 2010 model.

Transit routes were updated using the 2010 LYNX schedule book to include the proper headways, stop locations and connectivity with both the highway network as well as other transit routes. Visual plots of the transit network were developed to ensure that routes follow the correct roadways and that stop nodes were logical. The team reviewed observed transit speeds and times on network links as well as travel times and headways from route schedules. Based on that review, several changes were made in order to better represent the 2010 highway network conditions in the corridor including updating attributes like number of lanes, posted speed and providing the proper connection to other roadways along the corridor.

The key to a successful transit analysis is to understand the existing and future travel markets in the region. Reviewing the data sets available in the region and the model outputs made it possible to evaluate what the existing transit markets were in the US 441 corridor. Markets are the grouping of riders(users) into key segments of demand for the transit system along the corridor. For example, people using transit for work is a market because the largest demand on the system would be in the morning as patrons go to work on local buses. If there is no demand from a typical type of users of transit, like PNR, this could be considered a non-existent market, but still referred to as a market. FTA refers to typical transit markets in discussions and similar terminology is used in this report.

To assure that the model was able to accurately reflect travel patterns in the entire region, the on-board survey was assigned to the network. Unlinked transit boardings were summarized from the assignment of the survey data and compared with observed survey boardings. Table 1 summarizes the observed boardings and assigned boardings by transit systems in the model region. Onboard assignment boardings are slightly lower than the observed boardings for LYNX, VOTRAN and LakeXpress Transit systems. These differences are the result of un-assignable trips. It is not uncommon to have ten to 15 percent of trips un-assignable from the on-board survey, due to things like illogical geo-codes of responses, poor responses from respondents because of the phrasing of survey questions. Transfer rates are also comparable between the two versions – observed transfer rate being 31% and the assigned observed transfer rate being 35%. Table 1 highlights that regionally the travel model is accurately reflecting base transit conditions.

Boarding Comp	arison	P	eak Boardin	igs	Off	-peak Board	lings	D	aily Boardin	igs
Transit System	Mode Code	Observed	Assigned Observed	Difference (Asgn-Obs)	Observed	Assigned Observed	Difference (Asgn-Obs)	Observed	Assigned Observed	Difference (Asgn-Obs)
LYNX	21	28,618	27,417	(1,201)	53,074	50,170	(2,904)	81,692	77,587	(4,105)
VOTRAN	31	4,873	4,594	(279)	6,200	6,210	10	11,073	10,804	(269)
LAKE	51	155	179	23	624	518	(107)	780	696	(83)
SUN TRAN	51	0	0	0	0	0	0	-	-	0
SPACE COAST	41	0	0	0	0	0	0	-	-	0
TOTAL		33,646	32,190	(1,457)	59,898	56,897	(3,001)	93,545	89,087	(4,458)
Total Linked Tri	ps	25,613			45,684			71,296		
Assignable Trips	5		23,527			42,477			66,004	
Transfer Rate		31%	37%		31%	34%		31%	35%	

Table 1: On-Board Survey Assignment Transit Trip Summary

*It should be noted that two more transit systems, Sun Tran and Space Coast, are listed in the table with no data since neither system had a recent onboard survey.



³ Ibid



Table 2 shows that there are a total of 5,061 transit trips in the corridor. It also shows that 44 percent of the trips are Home Based Work (HBW) trips and 45 percent are Home Based Other (HBO) trips. Based on this table, two key markets in the corridor are work trips and trips from home to other destinations in the corridor.

Table 2. Observed Transit Trips III Corridor										
Trip Purpose	Transit Trips	Percentage of Trips								
HBW peak	1,006	19.9%								
HBW offpeak	1,195	23.6%								
HBO peak	620	12.2%								
HBO offpeak	1,653	32.7%								
NHB peak	288	5.7%								
NHB offpeak	299	5.9%								
Total	5,061	100%								

Table 2: Observed Transit Trins In Corridor

Understanding markets by access mode and auto ownership level as well as by trip purpose is important. Using the work market as the data in this analysis, Table 3 shows us that the vast majority of transit trips (92.6 percent) in the corridor today are walk access, while park and ride (PNR) and kiss and ride (KNR) trips are minimal. Therefore the current access market is walk. This table also shows that there is an existing large zero car household market in the corridor but that there is also potential for "choice riders", people with vehicles, in the corridor.

Access mode	Trips	Percent of Trips	Auto Ownership	Trips	Percent of Trips						
Walk	2,039	92.6%	0 Car	1,028	46.7%						
PNR	58	2.63%	1 Car	929	42.2%						
KNR	104	4.7%	2+Car	244	11.1%						

Table 3: Observed HBW Transit Trips by Access and Segmentation

After reviewing the data it is obvious that the markets in the 441 Study Corridor are:

- Substantial Work Market •
- Large Home Based Other Market
- 0 Car Household Market (captive riders) but just as many 1 Car households
- Walk to Transit is the overwhelming access mode •

The Project has a very small PNR/KNR market. The lack of drive access in the base year makes it difficult for the travel demand model to accurately predict typical drive access for commuter rail in the future. This is typical in a lot of regions where park and ride is not an existing strong market. Past experiences across the country were used in the forecasts in order to predict the change in park and ride characteristics for the corridor. These are discussed in the model adjustments section of the document.





3. FUTURE NETWORK DEVELOPMENT

3.1 ALTERNATIVES DEFINITION

The US 441 Corridor Study Viable Build Alternatives are comprised of viable transit solutions that could address the needs identified in the Purpose and Need Statement. Each of the Alternatives was developed to support the five project goals that have been developed and documented in the Goals and Objectives for the Study. Brief descriptions of the No Build and Viable Build alternatives are outlined in this section.

The No Build alternative includes the planned and programmed highway transportation improvements that have been included in the cost feasible components of the Long-Range Transportation Plans (LRTP) for MetroPlan Orlando and the Lake Sumter Metropolitan Planning Organization (MPO). The local transit service assumed for the alternative consists of fixed route, circulator, pulse, shuttle, and express bus service that is able to service trips throughout the region but primary improvements were focused on the Viable Alternatives for the study corridor.

These key roadway projects are included:

- Widening of US 441 from SR 44 to SR 46
- Wekiva Parkway
- Flyover at US 441 and John Young Parkway
- All American Boulevard realignment

The coding of the No Build and Build Viable Alternatives are based upon the report *Modeling Assumptions for the Three Viable Build Alternatives Technical Memorandum*⁴ and include the following key transit projects in all alternatives:

- SunRail Phases 1 through 3;
- LYMMO (Orange, Grapefruit and Lime);
- I-Ride Service (Main, Universal, North, and Green);
- And the Orlando International Airport (OIA) Light Rail (LRT) Connector.

The three Viable Build Alternatives coded and described are:

- Alternative 1-5 (Alt1-5): commuter rail from downtown Orlando to Lake County (Eustis and Mt Dora both included).
- Alternative 1-2(Alt 1-2): commuter rail from downtown Orlando to SR 429 with connecting express bus from SR 429 to Lake County
- Alternative 2-4(Alt2-4): express from downtown Orlando to Lake County using limited access facilities to improve travel times

Figure 3 through Figure 5 show the route alignments and station locations of the alternatives. This report uses the alternative abbreviations noted above to summarize results in tables and figures.

⁴ Technical Memorandum: Modeling Assumptions for the Three Viable Build Alternatives, Parsons Brinckerhoff, April 2014







Figure 3: Alternative 1-5 Route Alignment and Stations







Figure 4: Alternative 1-2 Route Alignment and Stations







Figure 5: Alternative 2-4 Route Alignment and Stations





3.2 TRANSIT NETWORKS

For the future Viable Build Alternatives described previously, the local bus connections and headways were reviewed and revised as shown in Table 4 through Table 6. The "X" shown in the tables designate the physical location where the bus route was assured connection to the Viable Build Alternative being evaluated. These locations allow riders to transfer directly and easily from bus to the Viable Build Alternatives.

Table 4: Local Bus Connection Summary for Alternative 1-2

CORRIDOR BUS ROUTES		HEAD	WAY			-			STATION	·				
Alternative 1-2: Commuter Rail/Express Bus	Long Name	Peak	Off- Peak	Amtrak - Orlando	Amelia Street	Princeton	Rosemont/ John Young Pkwy	Apopka	SR 429	Zellwood	Tavares	Tavares/ Eustis	Eustis	Mt Dora
LY101	Link 101 West SR 436	15	30					Х						
LY105	Link 105 West Colonial Dr	15	30		х									
LY106 (keep at base 2010 year headways - competes)	Link 106 US 441 North	30	30	x	x	x	х	х		x				
LY203 MT DORA (competes)	LYNX 203 Mt Dora - CBD	0	0	Х	х	Х	х	Х	Х	Х	Х	Х	Х	Х
LY305 JYPN	North John Young Parkway	30	30					Х						
LY309 HIAW	Hiawassee Road	60	60					Х						
LY310 SSTAR	Silver Star IB	30	30			Х								
LY311 SS-UNI	Silver Star - Universal	60	120			Х								
LY314 CLAR	Clarcona Ocoee	30	30				х							
LY318 APOPKA	Apopka-Vineland Rd	60	60					Х						
LY320 KEN	Kennedy	30	30				х							
LY323 434	Route 434	30	30					Х						
LY404	Link 404 Pine Hills/North Lane	30	30				х							
LY405	Link 405 Apopka-Park Ave	30	30					Х						
LY406	Apopka Plymouth Zellwood	60	60					Х		Х				
LY407	Link 407 West Altamonte	30	30					Х						
LY412	Link 412 Edgewater Dr	30	30				х							
LX1 VILL WB	LakeXpress #1 Westbound	60	60								Х	Х	Х	Х
LX3 MTD	LakeXpress #3 Mount Dora C	60	60										Х	Х
LX4 UMA SB	LakeXpress #4 Southbound	120	120								х	х	х	х
LakeXpress Golden Triangle Circulat	New Service	30	60								х	х	х	х

Table 5: Local Bus Connection Summary for Alternative 1-5

CORRIDOR BUS ROUTES		HEAD	WAY						STATION					
Alternative 1-5: Commuter Rail	Long Name	Peak	Off- Peak	Amtrak - Orlando	Amelia Street	Princeton	Rosemont/ John Young Pkwy	Apopka	SR 429	Zellwood	Tavares	Tavares/ Eustis	Eustis	Mt Dora
LY101	Link 101 West SR 436	15	30					Х						
LY105	Link 104 West Colonial Dr	15	30		Х									
LY106 (keep at base 2010 year headways - competes)	Link 106 US 441 North	30	30	x	x	x	х	x		x				
LY203 MT DORA (competes)	LYNX 203 Mt Dora - CBD	0	0	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
LY305 JYPN	North John Young Parkway	30	30					Х						
LY309 HIAW	Hiawassee Road	60	60					Х						
LY310 SSTAR	Silver Star IB	30	30			Х								
LY311 SS-UNI	Silver Star - Universal	60	120			Х								
LY314 CLAR	Clarcona Ocoee	30	30				х							
LY318 APOPKA	Apopka-Vineland Rd	60	60					Х						
LY320 KEN	Kennedy	30	30				х							
LY323 434	Route 434	30	30					Х						
LY404	Link 404 Pine Hills/North L	30	30				х							
LY405	Link 405 Apopka-Park Ave	30	30					Х						
LY406	Link 406 Apopka Plymouth	60	60					Х		Х				
LY407	Link 407 West Altamonte	30	30					Х						
LY412	Link 412 Edgewater Dr	30	30				х							
LX1 VILL WB	LakeXpress #1 Westbound	60	60								Х	Х	Х	Х
LX3 MTD	LakeXpress #3 Mount Dora	60	60										х	Х
LX4 UMA SB	LakeXpress #4 Southbound	120	120								Х	Х	х	Х
LakeXpress Golden Triangle Circula	t New Service	30	60								Х	х	Х	Х





CORRIDOR BUS ROUTES		HEAD	WAY						STATION					
Alternative 2-4: Express Bus	Long Name	Peak	Off-Peak	Amtrak - Orlando	Amelia Street	Princeton	Rosemont/ John Young Pkwy	Apopka	SR 429	Zellwood	Tavares	Tavares/ Eustis	Eustis	Mt Dora
LY101	Link 101 West SR 436	15	30					Х						
LY105	Link 104 West Colonial Dr	15	30		Х									
LY106 (keep at base 2010 year headways - competes)	Link 106 US 441 North	30	30	х	x	x	x	x		x				
LY203 MT DORA (competes)	LYNX 203 Mt Dora - CBD	0	0	Х	Х	Х	х	Х	Х	Х	Х	Х	Х	Х
LY305 JYPN	North John Young Parkway	30	30					Х						
LY309 HIAW	Hiawassee Road	60	60					Х						
LY310 SSTAR	Silver Star IB	30	30			Х								
LY311 SS-UNI	Silver Star - Universal	60	120			Х								
LY314 CLAR	Clarcona Ocoee	30	30				х							
LY318 APOPKA	Apopka-Vineland Rd	60	60					Х						
LY320 KEN	Kennedy	30	30				х							
LY323 434	Route 434	30	30					Х						
LY404	Link 404 Pine Hills/North Lane	30	30				х							
LY405	Link 405 Apopka-Park Ave	30	30					Х						
LY406	Link 406 Apopka Plymouth Zel	60	60					Х		Х				
LY407	Link 407 West Altamonte	30	30					Х						
LY412	Link 412 Edgewater Dr	30	30				х							
LX1 VILL WB	LakeXpress #1 Westbound	60	60								Х	Х	Х	Х
LX3 MTD	LakeXpress #3 Mount Dora C	60	60										х	Х
LX4 UMA SB	LakeXpress #4 Southbound	120	120								Х	Х	Х	Х
LakeXpress Golden Triangle Circulat	New Service	30	60								х	х	х	х

Table 6: Local Bus Connection Summary for Alternative 2-4

3.3 HIGHWAY NETWORK VERIFICATION

For the 2035 no build, the regionally-adopted highway network file including all changes to facility types, number of lanes, and capacity was reviewed and revised based on the Transportation Improvement Programs (TIP) and FDOT Work Program. The TIPs are documents produced by each MPO on an annual basis, that typically include the next 3-5 years of "committed projects". The various TIPs and FDOT work program documents used were:

- **MetroPlan (Orange/Seminole):** http://www.metroplanorlando.com/plans/transportation-improvement-program/ (accessed in 6/30/2014)
- Lake-Sumter MPO (Lake): http://www.lakesumtermpo.com/documents/tip.aspx (accessed in 6/30/2014)
- **FDOT Work Program:** http://www2.dot.state.fl.us/fmsupportapps/workprogram/WorkProgram.aspx (accessed in 6/30/2014)

The future highway network projects were reviewed to make sure that they were correctly coded for connectivity and reasonableness along the Project study area. Remaining portions of the region were assumed to be accurate. Based on the review, it was found that three roadway segments need to be revised in the 2035 No Build roadway network to reflect the transportation improvement plan and those are shown in Table 7.

Roadway	From	То	Work Description	Model Before Fix
SR 408	Chickasaw Trail	SR 417/GreeneWay	Widen to 8 Lanes	4 Lanes
SR 414/Maitland Blvd.	1-4	Maitland Ave.	Widen to 6 Lanes	4 Lanes
SR 423/John Young	SR 50	Shader Rd.	Widen to 6 Lanes	4 Lanes

Table 7: Inconsistent Roadway Segments between the 2035 No Build Roadway Network and TIPs





4. NO BUILD ALTERNATIVE FORECAST

The No Build Alternative is a combination of existing plus committed roadway and transit projects that reflect improvements to the transit system in the entire region with particular focus on the routes that impact the US 441 project corridor. The No Build Alternative is evaluated based on 2035 socio-economic data and highway and transit networks in the CFRPM v5.6 model. This alternative constitutes the 2035 base network upon which all build alternatives were developed and coded.

The growth of the HBW and HBO total person trips, the two major markets, in The Project corridor provide insight into the travel behavior changes that could affect the transit ridership. As shown in Table 8, the HBW market is anticipated to grow by 28 percent, while the HBO market is expected to increase by 31 percent. Table 9 and Table 10 show, by district, the anticipated growth of the HBW and HBO markets between the 2035 No Build Alternative and the 2010 Base Year. Appendix A shows the detailed results of the total person trip changes by purpose and district for the corridor.

Table 8: Change in Person Trips by Purpose in Study AreaPurpose20102035Growth

Purpose	2010	2035	Growth
HBW	319,572	408,280	28%
НВО	902,572	1,181,141	31%
NHB	586,614	772,368	32%
Total	1,808,759	2,361,790	31%

Table 9: HBW Difference (2035 No Build-2010 Base)

					•			· ·		
	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	1,619	1,805	447	370	37	53	(6)	6	6	4,337
2: North Orlando	(131)	13,864	329	3,176	128	34	(4)	32	20	17,448
3: NW Orlando	2,564	5,946	7,057	2,191	518	1,005	28	82	38	19,429
4: Forest City	(491)	3,131	91	4,467	109	(67)	(6)	65	32	7,330
5: Apopka	(510)	1,246	143	1,323	458	(401)	(381)	239	(16)	2,101
6: Paradise Heights	(204)	2,005	989	1,359	693	966	260	173	66	6,308
7: Tavares	131	914	375	787	697	706	9,864	1,246	1,234	15,953
8: Mt Dora	289	454	111	169	168	(65)	156	965	542	2,788
9: Eustis	47	892	420	746	821	364	1,213	2,111	6,400	13,013
Total	3,313	30,257	9,961	14,588	3,628	2,595	11,124	4,920	8,321	88,708

Table 10: HBO Difference (2035 No Build-2010 Base)

	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	10,677	5,458	3,174	680	46	468	4	5	4	20,516
2: North Orlando	2,106	40,853	3,954	5,739	116	517	(3)	19	2	53,303
3: NW Orlando	3,724	4,543	36,437	1,234	675	12,054	0	30	14	58,711
4: Forest City	(608)	2,287	2,572	15,613	601	812	(33)	(8)	(10)	21,225
5: Apopka	(51)	962	925	2,758	3,443	5,250	(1,615)	(2,302)	(766)	8,604
6: Paradise Heights	(1,063)	(375)	(1,081)	833	1,012	20,328	183	(58)	(53)	19,726
7: Tavares	415	881	475	841	1,471	4,054	32,883	3,302	2,619	46,941
8: Mt Dora	37	351	230	511	2,135	1,201	1,317	4,852	1,817	12,451
9: Eustis	315	700	375	669	1,726	931	3,789	8,702	19,885	37,092
Total	15,552	55,660	47,061	28,877	11,225	45,615	36,525	14,542	23,512	278,569





The No Build Alternative improved transit service along the Project by the addition of approximately 15 routes in key districts along the corridor. This additional transit service resulted in an increase of approximately 21,000 transit trips, or 110 percent increase, between 2010 existing and 2035 No Build for the nine districts along the corridor. Table 11 shows the change in total transit trips in the corridor districts. In comparison, the entire nine county modeled region experienced a 97 percent growth in transit trips.

The increase in corridor transit trips is primarily in/around downtown Orlando, referenced as Districts 1 through 3 in Table 11. This can be attributed to the addition of SunRail to the system, the growth in zero-car households near the Orlando CBD and the changes in downtown local bus service.

Table 11: Total	Transit	rips – i	vo Bulla	to Base	District	to Distr	ict Sumi	maries (All Acces	ss iviodes
	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	2,830	1,773	450	130	8	54	0	(0)	0	5,245
2: North Orlando	1,303	4,845	272	421	10	38	0	(0)	0	6,889
3: NW Orlando	907	1,021	1,957	381	46	714	(0)	(0)	(0)	5,026
4: Forest City	249	437	128	366	(31)	39	0	(0)	(0)	1,188
5: Apopka	17	64	38	23	32	99	(0)	(3)	(1)	270
6: Paradise										
Heights	132	158	305	131	86	1,560	(0)	(0)	(0)	2,371
7: Tavares	(0)	0	(0)	(0)	(0)	(0)	151	18	41	209
8: Mt Dora	(0)	(0)	(0)	(0)	(1)	(1)	2	59	24	82
9: Eustis	(0)	(0)	(0)	(0)	(0)	(0)	45	48	52	144
Total	5,436	8,299	3,150	1,452	150	2,502	197	122	115	21,423

5)

It is important to note that the increase in transit trips in the corridor are from shorter-distance trips, meaning trips remain in the same district or only go from their home district to the next neighboring district. For example, from District 3 (NW Orlando) to District 2 North Orlando there are 1,021 trips, illustrating that many of the trips are therefore short distance trips.

Table 11 also highlights that the trip patterns from Lake County, Districts 7 through 9, are generally not to and from Orlando.

Along the corridor there are key transit routes that provide service directly along or parallel to US 441, thus they would serve as competition to any Viable Build Alternatives. Understanding the 2035 No Build Alternative boardings for these routes are valuable because bus usually serves a different travel market than commuter rail. This will also allow evaluations of the effect of the Viable Build Alternatives on existing service. Table 12 shows the boardings for the four key routes along The Project for the No Build Alternative.

Table 12. Daily boardings on Key	cornaor noutes
Transit Route	Daily Boardings
LYNX Link 106	3,500
US 441 North	
LYNX Link 406	500
Apopka/Plymouth/Zellwood	
Lake Xpress Route 4	200
Umatilla/Zellwood	
Lake Xpress Route 3	400
Mount Dora Circ.	

Table 12: Daily Boardings on Key Corridor Routes





Table 13 displays the summary of boardings by system and route for the No Build alternative.

System				R	Route Boardings				
Name	Route	Route Name	Mode	Peak	Off Peak	Total			
BUS Syst	ems								
LYNX		LYNX Bus System (excl. LYMMO)	21, 23	61,084	105,372	166,456			
LYNX	LYMMO	LYMMO Orange NB	23	3,399	6,532	9,931			
LYNX	LYMMO	LYMMO East-West Grapefruit	23	698	1,277	1,975			
LYNX	LYMMO	LYMMO Parramore Lime	23	205	418	623			
LYNX		All LYNX		65,386	113,599	178,984			
VT		VOTRAN	31, 34	8,570	14,591	23,160			
LAKE		LAKE	51	847	1,668	2,514			
ST		SUN TRAN	51	615	1,123	1,738			
SC		SPACE COAST	41	3,094	6,693	9,787			
		Total Bus		78,510	137,673	216,183			
RAIL Syst	tems								
CR	Sun Rail	Central Florida Commuter Rail	25	7,409	6,946	14,355			
CR	US441	US441	0	-	-	-			
LRT	OIA	LRT OIA	24	3,128	3,727	6,855			
		Total Rail		10,537	10,673	21,210			
		Total Bus and Rail		89,047	148,346	237,393			
		Transfer Rate				48%			

Table 13: No Build Transit Boarding Summary





5. VIABLE BUILD ALTERNATIVES FORECASTS

The forecasts developed for the Viable Build Alternatives involved changes to model parameters, the analysis of other commuter rail surveys from across the country, evaluations of the change in the KNR and PNR markets and optimizing of station locations. The results of the forecasts as well as the approach and changes made to get acceptable ridership forecasts are included in this chapter. The first section of the chapter highlights the final ridership values but more details are included in the later portions of the chapter and in the appendices.

5.1 SUMMARY RIDERSHIP FORECASTS

Section 6.2 describes the model adjustments made to produce reasonable forecasts for the Viable Build Alternatives. As a result of those changes the full length commuter rail alternative forecast is approximately 2,000 boardings per day in 2035. Table 14 shows the range of boardings projected for each of the three Viable Build Alternatives.

Viable Alternative	Year 2035 Daily Boardings
Alternative 1-5 Commuter Rail to Lake Co.	2,000 +/- 10%
Alternative 1-2 Commuter Rail to SR 429 Express Bus to Lake Co.	1,300 +/- 10%
Alternative 2-4 Express Bus to Lake Co.	1,000+/- 10%

Table 14: Build Viable Alternatives 2035 Boardings

As shown in Table 15, the effect on the future bus routes along the corridor is minimal and indicates that additional choice riders are using the commuter rail alternative. The boardings remain consistent across alternatives and indicate that the type of premium transit introduced in the corridor does not affect the ridership on other transit routes in the corridor.

Table 15: Boardings on Key Transit Routes Along US 441 Corridor

	<u> </u>			
Route Name	No Build	Viable Alt 1-2	Viable Alt 1-5	Viable Alt 2-4
		(Commuter Rail	(Commuter	(Express Bus)
		and Bus)	Rail)	
LYNX Link 106	3,500	2,600	2,600	2,700
US 441 North				
LYNX Link 406	500	400	450	450
Apopka/Plymouth/Zellwood				
Lake Xpress Route 4	200	200	200	200
Umatilla/Zellwood				
Lake Xpress Route 3	400	400	400	400
Mount Dora Circ.				
Premium Transit		1,300	2,200	1,000





The relative attractiveness of each station can be seen by the magnitude of trips⁵ that occur at the station. The absolute value of trips at each station for commuter rail alternative (Alt 1-5) is shown in Table 16. Figure 6 shows graphically the total trips forecasted by station for Alternative 1-5.

n	ie to: mps by station to	Alternative
Ī	Commuter Rail Stations	Trips
Ī	1: Orlando Amtrak	70
ſ	2: Church Street	280
ſ	3: Robinson Street	200
Ī	4: Princeton	140
ſ	5: Rosemont	320
	6: Apopka	260
Ī	7: SR 429	130
ſ	8: Zellwood	70
	9: Tavares	230
Ī	10: Mount Dora	130
ĺ	11: Eustis	120
	Total	1950

Table 16: Trips by Station for Alternative 1-5

⁵ *Trips are different than boardings and therefore totals for each alternative may not appear consistent throughout the document.







Figure 6: Transit Trips by Station for Viable Alternative 1-5





Table 17 shows the trips by station for the Viable Build Alternative 1-2. Most trips occur on the commuter rail portion of the alternative and the values by station, on the commuter rail section, are similar to values for the commuter rail only alternative (Alt 1-5). Only 10 percent of the trips use the express bus portion of the alternative.

Station Name	Trips
1: Orlando Amtrak	60
2: Church Street	230
3: Robinson Street	150
4: Princeton	130
5: Rosemont	280
6: Apopka	210
7: SR 429	140
*6: SR 429	60
*7: Zellwood	10
*9: Mt Dora	30
*10: Taveres/Eustis	40
Total	1,340

Table 17: Trips by Station for Alternative 1-2

*Express Bus Station

Table 18 shows the trips for Alternative 2-4 are less than the other alternatives but similar trends exist for key stop locations. LYNX Central station has the largest proportion of trips in this alternative due to the connection with other key regional routes at this location. The middle of the corridor stations at Rosemont and SR 429 have a large proportion of trips similar to the other alternatives.

Station Name	Trips
1: LYNX Central	300
2: Amelia Street	50
3: Princeton	60
4: Rosemont	180
5: SR 429	140
8: Mt Dora	80
10: Taveres/Eustis	110
Total	920

Table 18: Trips by Station for Alternative 2-4





5.2 MODELING PARAMETERS FOR VIABLE BUILD ALTERNATIVES

As a part of the forecasting for The Project, the existing forecasts⁶ developed for SunRail were used as a guide to understand the model parameters assumed and results obtained. Additional improvements to parameters and modeling assumptions were made for The Project and are discussed in this section.

5.2.1 TRAVEL TIME ASSUMPTIONS

The Viable Build Alternatives pivot off of the No Build Alternative by coding the transit stops, service frequency, segment distance and travel times as well as specific technology type for each Viable Build Alternative. The service frequency, or headways, coded for the alternatives are 30 minutes for peak service and 120 minutes for off-peak service, the same as the existing SunRail service. The peak periods in the CFRPM v5.6 consists of a three hour AM and three hour PM period with the remaining hours classified as off-peak.

To calculate the end to end travel times each Viable Build Alternative assumes a dwell time of 30 seconds for commuter rail stations and 150 seconds for bus alternatives in addition to the acceleration and deceleration between stations. The travel time values hard coded in the travel model, as well as the model free flow travel time of autos from downtown Orlando to Lake County, are shown in Table 19. Table 20 gives more detailed link segment distances and travel times by time of day along the Viable Alternative Route. It is important to note that travel times by direction along the same segment can change based on congestion.

Alternative	Route Travel Time(min)	Approximate Free Flow Auto Time Along Route
Alt 1-5	69	~60
Alt 1-2	62	~52
Alt 2-4	51	~42

Table 19: 2035 Modeled Travel Times

Route	Dist	Highway Time in Minutes							
	(Mi)	Free Flow	AM*	Midday*	PM*	Night*			
Alternative 1-5 : Commuter Rail Only									
Orlando Amtrak to Eustis (NB)	39.94	60.4	69.2	68.5	84.0	60.7			
Eustis to Orlando Amtrak (SB)	39.99	60.3	80.6	68.1	74.8	60.5			
Alternative 1-2 : CR & Express Bus									
Orlando Amtrak to SR429 (NB) - ComRail	21.91	33.2	38.9	36.9	43.6	33.3			
SR429 to Orlando Amtrak (SB) - ComRail	21.61	32.9	42.1	36.5	40.4	32.9			
SR429 to Mt Dora (NB) - ExpBus	14.72	18.9	20.3	20.2	24.1	19.0			
Mt Dora to SR429 (SB) - ExpBus	14.72	18.9	22.9	20.1	21.8	18.9			
Orlando Amtrak to Mt Dora (NB)-Full	36.63	52.1	59.2	57.1	67.7	52.3			
Mt Dora to Orlando Amtrak (SB) -Full	36.34	51.8	65.0	56.7	62.2	51.9			
Alternative 2-4 : Express Bus Only									
LYNX Central to Mt Dora (NB)	34.83	41.9	47.7	46.6	58.9	42.1			
Mt Dora to LYNX Central (SB)	34.43	41.5	56.2	45.7	50.3	41.6			

Table 20: Model Distance and Travel Times by Period

*congested travel times

⁶ Discussion Points v3 081313.pdf,AECOM slides, August 2013.





5.2.2 UN-INCLUDED ATTRIBUTES

The Federal Transit Administration (FTA), in their 2007 Proposed Guidance on New Start / Small Starts Policies and Procedures, proposed new guidelines for calculating and reporting user benefits associated with characteristics of a transit line not included in a travel demand model. Modeled attributes include travel time, frequency and wait time, and fares and parking costs. Service attributes not part of travel demand models include *"its visibility, reliability, span of service hours, comfort, protection from the weather, the chances of finding a seat, and passenger amenities."* These non-included attributes, based on perceived rider perceptions, are theoretically part of the mode-specific constant for existing transit modes being modeled. New modes are required by the FTA to use a mode-specific constant of 0, but are now allowed to take credit for any non-included attributes by using a post-processing procedure that applies user benefits (time savings) to certain riders of the proposed transit line. Those user benefits are determined by the type and nature of the attributes of the new mode.

FTA credits projects that introduce a transit mode⁷ to an urban area with additional transportation benefits, the magnitude of which will depend on the characteristics of the proposed project and the number of transit trips predicted to use the project. The additional benefits will occur in three forms: (1) a relatively large positive constant for trips using the project via park & ride access and no dependence on local buses; (2) a smaller positive constant for all other trips on the project; and (3) a less onerous weight applied to the time spent riding on the new facility compared to the weight applied to time on all other modes. The large constant will not be applied to walk trips to the proposed project because of the inability of current travel models to distinguish the walk-to-guideway-only market from all other walk-to-transit markets, a limitation that would produce a gross over-estimation of the size of that market.

The determination of the values of the constants and travel-time weight are based on three types of project characteristics that are not recognized in current methods for ridership forecasting:

1. <u>Guideway-like Characteristics</u>

- **Reliability of vehicle arrival** (up to four minutes for trips using park & ride access with no dependence on local bus, and up to two minutes for all other trips using the proposed project): depending on the extent that the vehicle right-of-way is grade-separated and the extent of traffic signal priority or preemption along portions of the alignment that are controlled by traffic signals;
- Branding/visibility/learnability (two minutes, one minute): depending on the extent that stations, vehicles, and right-of-way are distinctive, and the system is easy to use;
- Schedule-free service (two minutes, zero minutes): depending on the extent to which service headways are less than 10 minutes in the peak period and less than 15 minutes during the off-peak;

2. Span of Good Service

Hours of frequent service (three minutes, zero minutes): depending on the extent to which weekday service extends beyond the peak period with headways that are less than 30 minutes;

3. Passenger Amenities

Stations/stops (three minutes, two minutes): depending on the extent to which these have passenger amenities that relate to safety and security features, protection from the weather, retail activities, comfort, and other features valued by users;

Dynamic schedule information (one minute, one minute): depending on the provision of real time information on vehicle arrivals at stations; and

⁷ Although SunRail is in operation currently, there is no data to support the calibration of a mode specific constant to help account for non-included attributes so the FTA credit for a new transit mode is valid for this forecast.





Vehicle amenities (discount on the weight applied to time spent on the transit vehicle of up to 20 percent): depending factors such as comfort, and the probability of getting a seat of the proposed service.

There are maximum possible credits for each characteristic, however the specific values assigned for each project will depend on specific characteristics of the project. For example, a project running at grade through intersections without traffic signal priority or pre-emption would have a significantly lower value for reliability compared to a project in a tunnel, on an aerial structure, or on other dedicated right-of-way for which travel is uninterrupted by cross traffic.

To derive the non-included benefits for a specific project, each of the attributes described previously are assessed for the degree to which they are incorporated in the design of the proposed project. A premium only service, incorporating exclusive guideway, next train information, and clear signage and branding, can derive the maximum benefit, while areas of mixed traffic operations and fixed schedules will derive less benefit.

The non-included attributes for the US 441 Viable Build Alternatives were based on the FTA guidance and the operating characteristics of commuter rail in the region. Together the non-included attributes for The Project analysis produce 13 minutes of travel time savings for riders who use commuter rail only and 6 minutes for riders who use both commuter rail and bus for their trip. Also, Commuter Rail In-Vehicle Time(IVT) gets a discount of 20%. These are reasonable assumptions based on past FTA acceptable parameters.

5.2.3 PNR AND KNR ASSUMPTIONS

All stations except Downtown and Parramore assume that PNR access is allowed. Every station allows KNR access. Although PNR access is allowed at some stations, there is a maximum auto travel shed distance assumed for each station. The values are based on national experience and survey analysis that indicates that people will drive longer distances to access end of line stations. The allowable PNR shed distance decreases as you move from the end of the line in Lake County to downtown Orlando. Figure 7 shows the assumed travel sheds for Alternative 1-5, with distance increasing the farther from downtown the station is located. Other alternatives follow the same PNR distance pattern.

PNR capacity at the station lots were unconstrained so that the maximum demand can be determined for each location and no parking cost was assumed at the station lots.

Recall in Section 2.1 that existing PNR and KNR mode of access shares were minimal in the corridor. Since an improved service like commuter rail will exist in the corridor in the future and because no local data on PNR access percentages for commuter rail exist, adjustments to the CFRPM v5.6 were made for PNR and KNR.

The CFRPM V5.6 mode choice model KNR related constants for local bus were highly negative in the base condition. In order to replicate the base year conditions where minimal KNR existed, negative values were needed. No commuter rail or premium modes existed in the base year calibration so the local bus KNR constants were borrowed and applied to premium mode KNR constants in the future. As a result, the KNR to commuter rail build project trips were less than 1%. In order to determine if this value was typical of commuter rail systems across the country, a summary was developed using several commuter rail onboard surveys across the nation. That analysis determined that KNR trips to commuter rail systems are generally around 10-14 percent.





Figure 7: PNR Station Travel Shed Distance





Hence premium mode KNR constants were adjusted so that The Project KNR trips were reasonable when compared with other commuter rail onboard surveys. Table 21 shows the KNR mode choice model constants before and after adjustments for all purposes.

	Before (origi	nal versio	n)		After (revised version)					
MODE	Constant	HBW0	HBW1	HBW2	MODE	Constant	HBW0	HBW1	HBW2	
	HBW	Peak			HBW Peak					
KNR	-2									
KNR_LOC	0	-2	-2.25	-4	Change		1.50	1.50	1.50	
KNR_PREM	0	-2	-2.25	-4	KNR_PREM	0	-0.5	-0.75	-2.5	
	HBW Of	f Peak				HBW Of	f Peak			
KNR	-2								-	
KNR_LOC	0	-1.75	-2	-4	Change		1.70	1.70	1.70	
KNR_PREM	0	-1.75	-2	-4	KNR_PREM	0	-0.05	-0.3	-2.3	
	HBO F	Peak				HBO I	Peak			
KNR	-3								-	
KNR_LOC	0	-1.5	-4	-5	Change		1.40	1.40	1.40	
KNR_PREM	0	-1.5	-4	-5	KNR_PREM	0	-0.1	-2.6	-3.6	
	HBO Of	f Peak			HBO Off Peak					
KNR	-3								-	
KNR_LOC	0	-1.75	-3.75	-5	Change		1.60	1.60	1.60	
KNR_PREM	0	-1.75	-3.75	-5	KNR_PREM	0	-0.15	-2.15	-3.4	
	NHB F	Peak				NHB	Peak			
KNR	-3									
KNR_LOC	0		-2.9		Change			0.80		
KNR_PREM	0		-2.9		KNR_PREM	0		-2.1		
NHB Off Peak					NHB Of	f Peak				
KNR	-3									
KNR_LOC	0		-3.5		Change			1.30		
KNR_PREM	0		-3.5		KNR_PREM	0	-2.2			

Table 21: Mode Choice KNR Constant Adjustments





5.2.4 DRIVE ACCESS RATIO

PNR trips to Viable Build Alternative 1-5 were 55% of the total ridership. In order to assure that the high proportion of PNR access was reasonable, analysis was done to compare to national averages for similar systems. Figure 8 shows the production and attraction modes for the three primary modes for the systems analyzed. About half of all Commuter Rail Transit(CRT) riders surveyed accessed the system by car (including carpool, drive alone, and taxi). At the same time, a substantial percentage accessed on the production end by walking. About 15 percent accessed by either Bus or Rail, which includes all non-CRT public transit modes.

Access on the attraction end (or egress) is predominantly by walking or another transit mode.



Figure 8: Nationwide Commuter Rail System Summary by Mode of Access and Egress

Although the total PNR access percentage of 55 percent was reasonable, an additional analysis was performed to assure that people are not making illogical trips using PNR at stations. Instances of this occurrence could be:

- 1- Someone drives from their home to a rail station that is very close to their destination and parks and then rides rail for one stop or a very short distance,
- 2- Someone drives west to a PNR station then rides the rail system east to get to their destination.

For the first issue, in reality someone is going to just drive all the way to their destination instead of riding rail for a very short time. In the second instance, this is called backtracking and makes no logical sense. People are not likely to drive way out of their way in the opposite direction of their intended destination.





To limit both of these instances a drive access ratio is computed for all drive access paths as:

Drive Access Ratio (DAR) = Drive Access Distance / Total Distance

Where:

Drive Access Distance= the distance from the trip origin to the rail station used

Total Distance = the distance from the trip origin to the final destination

Closer to 1 = same distance you would drive to get to destination. A DAR value of more than 1 means that the drive access distance is more than the total distance would be for the origin/destination pair and it is unlikely to occur in the real world. It is assumed that most travelers would not drive more than half the way to their destination to then take commuter rail, therefore a value of .5 is assumed to be a reasonable DAR.

Figure 9 represents PNR to commuter rail trips showing a plot for percent of drive access trips versus DAR. Figure 10 shows a plot of cumulative percent values versus DAR. The figures highlight that nearly 8 percent of the trips have a DAR value of 1 or more and 19 percent of the PNR trips have a DAR value of 0.5 and more. In the figure, Mixed Mode refers to a trip that involves using a Premium mode plus local bus paths while the Fixed-Guideway Only (FGO) refers to Premium modes only paths with no local bus involved.



Figure 9: US 441 Drive Access Ratio Percentages







Figure 10: US 441 Cumulative Trips by Drive Access Ratio

To overcome the issues described earlier in this section, a DAR function was developed and applied for drive access to US441 project trips only⁸. Figure 11 shows the DAR function for The Project. It is important to recognize the function discourages travelers against drive access trips with a DAR value of 0.5 or more. As expected, the DAR had a small negative impact on project drive access trips.



Figure 11: US 441 DAR Function

⁸ DAR not applied for other projects in the region like Sun Rail and OIA





5.2.5 MOUNT DORA PULSE

The Viable Alternative 1-5 has a rail spur connection between the Tavares and Mount Dora stations (See Figure 3). This one link connection was originally coded as a separate commuter rail line spur and hence required a rail transfer. Since transfer time is usually assumed to be half the headway (in this case the rail headways are 30 minutes in the peak and 120 min in the off peak for the Project), this additional connector link increased the transfer wait time dramatically. It was determined that this connection service will be a shuttle connector that is assumed to coordinate perfectly with the main line schedules and the transfer time will be minim two minutes. Subsequently a two minute pulse service was implemented in the model to make the connections more realistic.

5.3 MODEL ADJUSTMENT IMPACT RESULTS AND UNCERTAINTY

5.3.1 ADJUSTMENT TESTING RESULTS

As discussed previously in this section, several adjustments were made to the model in order to improve the reliability of the forecasts for the US 441 Corridor Study. Each of those adjustments affected the range of results for the forecast of ridership for the Viable Alternative 1-5. The analysis results in Chapter 6 include all of the changes discussed in Section 0. However, it is beneficial to understand the impacts to the forecast due to each model adjustment that was implemented. Therefore each adjustment was tested in a stepwise process in order to evaluate the magnitude of change.

The model adjustments resulted in both positive changes, increasing the upper bounds, and negative changes, lowering bounds of the forecasts.

Increases to the forecast were from:

- Changing KNR Constants to be less negative;
- Increasing the Un-included Attribute Values;
- Adding in the Mt Dora Transfer as a Pulse System.

The decrease to the forecast was from:

• Trip Length Adjustments using the DAR model adjustment

Table 22 shows the results of the stepwise evaluations, pivoting off of the original forecast estimate of 1,883 riders for Viable Alternative 1-5. Combining each adjustment does not necessarily result in an additive change in ridership as noted in the chart. When combined together riders adjust their travel accordingly and the system balances the adjustments to arrive at the optimal forecast ridership of approximately 2,200 boardings.

Commuter Rail	Ridership Total	Change from Base
Original Forecast	1,883	NA
Test DAR coefficient/variable	1,726	(157)
Adjust KNR constants to match surveys Analyzed	2,078	195
Adjust CR un-included attributes (from 10 to 13 min and 6 min)	2,002	119
Mt Dora CR connection adjustment	2,168	285

Table 22: Stepwise Results of Model Adjustments





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5.3.2 UNCERTAINTY TEST

Typically extensive uncertainty testing is performed on the forecast for the LPA. However, this study was focused on evaluating the results for all the Viable Build Alternatives and therefore only one significant uncertainty test was performed. In this test, headways for the Viable Build Alternative 1-5 were decreased to be 15 minutes in the peak and 30 minutes in the off-peak. These tested headways match the anticipated 2030 SunRail service frequencies and therefore allow consistent comparisons and conclusions to be drawn between the two systems. When the headways were adjusted the daily ridership increases to 4,000 for the US 441 Corridor Project.

The improved US 441 ridership value with the headway change would equate to the existing opening year Sunrail ridership values and is only 27 percent of the future ridership projected for Sunrail with all phases in operation. Table 23 shows the original forecast before any model changes (T11 in the table) and the results of the improved headways (T13 in the table) as well as the difference between the model runs. Local bus and LYMMO ridership also reduces slightly when commuter rail headways along the US 441 corridor improve.

System			Rout	te Boardings (Г13)	Rou	Difference (T13 - T11)					
Name	Route	Route Name	Mode	Peak	Off Peak	Total	Peak	Off Peak	Total	Peak	Off Peak	Total
BUS Syst	ems											
LYNX		LYNX Bus System (excl. LYMMO)	21, 23	61,357	106,858	168,215	61,349	107,037	168,386	8	(180)	(172)
LYNX	LYMMO	LYMMO Orange NB	23	3,418	6,597	10,015	3,422	6,611	10,033	(4)	(15)	(18)
LYNX	LYMMO	LYMMO East-West Grapefruit	23	726	1,315	2,041	716	1,292	2,008	10	23	34
LYNX	LYMMO	LYMMO Parramore Lime	23	193	400	593	194	414	608	(1)	(14)	(15)
LYNX		All LYNX		65,695	115,169	180,864	65,682	115,354	181,036	13	(185)	(172)
VT		VOTRAN	31, 34	8,589	14,641	23,229	8,584	14,632	23,216	4	9	13
LAKE		LAKE	51	861	1,653	2,514	849	1,654	2,503	13	(2)	11
ST		SUN TRAN	51	617	1,124	1,742	617	1,124	1,742	0	0	0
SC		SPACE COAST	41	3,105	6,711	9,816	3,105	6,711	9,816	0	0	0
		Total Bus		78,867	139,297	218,164	78,837	139,476	218,312	30	(178)	(148)
RAIL Syst	ems											
CR	Sun Rail	Central Florida Commuter Rail	25	7,362	7,017	14,379	7,361	7,043	14,404	1	(25)	(24)
CR	US441	US 441 Commuter Rail	35	1,961	2,037	3,998	1,374	509	1,883	587	1,528	2,115
LRT	OIA	LRT OIA	24	3,130	3,755	6,885	3,126	3,751	6,877	4	4	8
		Total Rail		12,453	12,809	25,262	11,861	11,303	23,163	592	1,507	2,099
		Total Bus and Rail		91,319	152,107	243,426	90,697	150,778	241,475	622	1,329	1,951

Table 23: Transit Boardings for Headway Uncertainty Test





6. ADDITIONAL SUMMARIES

In this section there are two terms that need to be understood when looking at some of the commuter rail summaries. When the term "Mixed Mode" is used it refers to a trip that uses the US441 commuter rail and either bus or Sunrail to make the trip and "FG Only" refers to a trip that only used the US 441 Commuter Rail mode.

6.1 VIABLE ALTERNATIVE 1-5 SUMMARIES

It is important to understand the markets that generate the boardings and trips for the commuter rail alternative. The results in Table 24 and Table 25 show that the summary of markets for the commuter rail forecast are:

- 69% of the trips occur in the peak periods;
- 67% of the trips are for Home Based Work (HBW);
- PNR trips account for 40% of the access to commuter rail;
- Walk trips account for 50% of the access to commuter rail;

Time	Access	HBW			НВО			NHB			Special Purposes			Total All Purposes		
			FG			FG			FG			FG			FG	
Period	Mode	Mixed	Only	Total	Mixed	Only	Total	Mixed	Only	Total	Mixed	Only	Total	Mixed	Only	Total
Peak	WLK	171	158	329	92	113	204	20	48	67	6	4	11	288	323	611
	PNR	209	352	561	0	1	1	1	3	4	8	19	27	219	374	592
	KNR	1	105	106	0	16	16	-	5	5	0	15	16	2	141	142
	Total	381	614	995	92	129	221	21	55	76	15	38	53	509	837	1,346
Off Peak	WLK	81	45	126	107	94	201	12	12	23	4	4	7	204	153	357
	PNR	59	104	163	1	4	5	0	3	3	8	9	18	69	120	188
	KNR	0	29	30	0	22	22	-	2	2	1	10	11	1	63	64
	Total	140	178	318	109	119	227	12	16	28	13	23	36	274	336	610
Daily	WLK	252	203	454	199	206	405	31	59	90	10	8	18	492	476	968
	PNR	268	456	724	2	4	6	1	5	7	16	28	44	287	493	781
	KNR	2	134	136	0	37	37	-	7	7	1	26	27	3	203	206
	Total	521	792	1,314	201	248	449	32	71	104	28	62	89	782	1,173	1,955

Table 24: Total Trips by Purpose and Access Mode for Alternative 1-5





Time	Access	HBW	HBW FG		НВО		NHB			Special I	Purpose	5	Total All Purposes			
			FG			FG			FG			FG			FG	
Period	Mode	Mixed	Only	Total	Mixed	Only	Total	Mixed	Only	Total	Mixed	Only	Total	Mixed	Only	Total
Peak	WLK	9%	8%	17%	5%	6%	10%	1%	2%	3%	0%	0%	1%	15%	17%	31%
	PNR	11%	18%	29%	0%	0%	0%	0%	0%	0%	0%	1%	1%	11%	19%	30%
	KNR	0%	5%	5%	0%	1%	1%	0%	0%	0%	0%	1%	1%	0%	7%	7%
	Total	19%	31%	51%	5%	7%	11%	1%	3%	4%	1%	2%	3%	26%	43%	69%
Off Peak	WLK	4%	2%	6%	5%	5%	10%	1%	1%	1%	0%	0%	0%	10%	8%	18%
	PNR	3%	5%	8%	0%	0%	0%	0%	0%	0%	0%	0%	1%	4%	6%	10%
	KNR	0%	1%	2%	0%	1%	1%	0%	0%	0%	0%	1%	1%	0%	3%	3%
	Total	7%	9%	16%	6%	6%	12%	1%	1%	1%	1%	1%	2%	14%	17%	31%
Daily	WLK	13%	10%	23%	10%	11%	21%	2%	3%	5%	1%	0%	1%	25%	24%	50%
	PNR	14%	23%	37%	0%	0%	0%	0%	0%	0%	1%	1%	2%	15%	25%	40%
	KNR	0%	7%	7%	0%	2%	2%	0%	0%	0%	0%	1%	1%	0%	10%	11%
	Total	27%	41%	67%	10%	13%	23%	2%	4%	5%	1%	3%	5%	40%	60%	100%

Table 25: Percentage of Trips by Purpose and Access Mode for Alternative 1-5

Table 26 highlights that there 16 percent of access trips and 30 percent of egress on commuter rail are by bus. The vast majority of egress trips are walk, while only 8 percent of all trips interface with Sunrail on the egress.

			Fixed Gui	deway	, , ,	
Access/Egress	Mixed I	Mode	Onl	y .	Total [Daily
Туре	Boardings	Percent	Boardings	Percent	Boardings	Percent
Access Mode to US	5441 Rail					
Walk	172	20%	472	37%	644	30%
PNR	344	39%	520	41%	864	40%
KNR	6	1%	237	19%	243	11%
Bus	334	38%	11	1%	345	16%
Sun Rail	26	3%	27	2%	54	2%
Total	882	100%	1,268	100%	2,150	100%
Egress Mode from	US441 Rail					
Walk	201	23%	1,127	89%	1,328	62%
Bus	596	68%	47	4%	643	30%
Sun Rail	85	10%	95	7%	180	8%
Total	883	100%	1,268	100%	2,151	100%

Table 26: Access and Egress Boarding Summary (ALT1-5)





Station to station trip summaries assist in determining the highest usage stations and point out significant travel patterns for the alternative. Table 27 shows that 23 percent of the trips on commuter rail use the system for one-station trips (highlighted in blue). The Apopka to downtown portion of the system contains 65 percent of the trips on commuter rail.

Station	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	7	8	2	0	0	0	0	-	17
2: Church Street	-	-	-	19	36	12	3	0	6	2	2	79
3: Robinson Street	-	-	-	10	28	5	2	0	3	1	1	50
4: Princeton	25	58	23	-	29	7	3	0	1	0	0	146
5: Rosemont	44	138	86	40	0	32	7	0	2	1	1	351
6: Apopka	25	109	79	21	69	0	13	2	4	2	2	326
7: SR 429	10	53	46	9	28	32	0	2	2	1	1	184
8: Zellwood	4	29	34	5	17	20	10	0	3	2	1	126
9: Tavares	6	60	49	12	41	46	14	3	0	73	35	338
10: Mount Dora	1	12	13	3	11	14	6	2	71	0	26	159
11: Eustis	3	27	27	6	21	25	8	2	34	20	3	175
Total	118	486	357	131	288	195	67	11	125	101	72	1,952

Table 27: Station to Station Trip Summary (Alt1-5)

Transit dependent riders are important for FTA project calculations. Table 28 contains the transit dependent riders for Viable Alternative 1-5 and it shows the transit dependent riders use the system equally for both HBW and HBO trips. that Of the 1,952 trips on Alternative 1-5, only 433 trips, or 22 percent of the trips on the commuter rail are from zero-car households.

Alternative	HBW	НВО	Total								
Commuter Rail (Alt 1-5)	227	206	433								

Table 28: Transit Dependent Riders

Appendix B contains additional summaries for the commuter rail alternative.





6.2 VIABLE ALTERNATIVE 2-4 AND 1-2 SUMMARIES

As shown in Table 29, Viable Alternative 2-4 has 76 percent of the trips occurring in the peak and most of those are PNR access. Table 30 has the station to station boardings and alightings in which most of the productions occurring in the middle of the corridor on the Rosemont and SR 429 stations. More than half of the alightings are going to Lynx central station.

Time	Access	HBW			НВО			NHB			Special Purpose Trips			Total Trips		
Period	Mode	Mixed	FG Only	Total	Mixed	FG Only	Total	Mixed	FG Only	Total	Mixed	FG Only	Total	Mixed	FG Only	Total
Peak	WLK	91	44	135	48	49	97	8	10	19	3	3	5	150	106	256
	PNR	270	71	340	0	0	1	2	3	5	8	3	11	280	76	357
	KNR	4	0	4	0	0	0	-	-	-	1	0	1	5	1	6
	Total	365	115	480	48	50	98	11	13	24	12	5	17	435	183	618
Off Peak	WLK	12	4	15	18	18	36	1	0	1	6	2	8	36	24	60
	PNR	79	19	97	2	2	3	0	0	0	14	4	18	95	24	119
	KNR	0	0	0	0	-	0	-	-	-	9	0	9	9	0	10
	Total	91	22	113	19	19	39	1	0	1	30	5	35	140	48	188
Daily	WLK	103	48	150	65	67	132	9	11	20	9	4	13	186	130	316
	PNR	348	89	438	2	2	4	3	3	5	22	6	28	375	100	475
	KNR	4	1	5	0	0	0	-	-	-	10	0	10	15	1	15
	Total	455	138	593	68	69	136	11	13	25	41	11	52	576	231	806

Table 29: Total Trips by Purpose and Access Mode for Alternative 2-4

Table 30: Station To Station Boardings and Alightings (ALT 2-4)

Station	1	2	3	4	5	6	7	Total
1: LYNX Central	-	3	19	26	5	1	5	59
2: Amelia Street	21	-	5	9	1	0	0	36
3: Princeton	16	3	-	3	1	0	1	23
4: Rosemont	134	16	17	-	6	0	1	174
5: SR 429	150	12	13	47	-	1	1	225
6: Mt Dora	74	6	7	22	6	-	4	120
7: Taveres/Eustis	88	7	15	50	6	4	0	170
Total	482	47	76	158	24	6	13	806

P and A format





The patterns for Viable Alternative 1-2 are similar to the full commuter rail alternative with over 75 percent of the trips occurring in the peak. Access is split evenly between walk and PNR.

Time	Access	HBW			НВО			NHB			Special Purpose Trips			Total All Purposes		
Period	Mode	Mixed	FG Only	Total	Mixed	FG Only	Total	Mixed	FG Only	Total	Mixed	FG Only	Total	Mixed	FG Only	Total
Peak	WLK															
	DND	99	131	230	46	64	110	12	38	50	4	3	7	161	237	398
	PINK	139	272	411	0	0	0	1	2	3	7	12	19	147	287	433
	KNR				-	-	-	_	-	-						
		0	88	88	0	7	7	-	3	3	0	11	12	0	110	110
	Total	238	491	729	46	71	117	13	44	57	11	27	38	308	633	941
Off	WLK		-		-					_						_
Peak		7	29	36	15	40	54	1	8	8	1	2	4	24	78	102
	PNR	28	68	96	1	1	2	0	2	2	5	5	10	34	75	109
	KNR	20	00	50	1	-	2	U	2	2	5	5	10	54	/5	105
		0	23	23	-	10	10	-	1	1	-	7	7	0	40	40
	Total															
Dell		35	119	154	15	50	65	1	10	11	6	14	20	57	193	250
Dally	VVLK	106	160	266	60	104	164	13	46	59	5	5	11	184	315	499
	PNR										-	-				
		167	340	507	1	1	2	1	4	5	12	17	29	180	362	542
	KNR	0	110	111	0	17	17		4	4	0	10	10	0	150	150
	Total	0	110	111	U	1/	1/	-	4	4	U	10	19	0	120	120
	TOTAL	273	610	883	61	122	183	14	54	68	17	41	58	365	827	1,192

Table 31: Total Trips by Purpose and Access Mode for Alternative 1-2

Alternative 1-2 has about 75 percent of the total riders that the full commuter rail alternative contains. The Rosemont, Apopka and SR 429 stations are the highest producing stations with Church Street and Robinson Street stations attracting most of the alightings. Since this alternative combines commuter rail and express bus, Table 32 and Table 33 must be viewed together to understand the station flows.

Table 32: Station To Station Boardings and Alightings (ALT 1-2)-Commuter Rail Portion

	1	2	3	4	5	6	7	Total
1: Orlando Amtrak	-	-	-	7	8	2	0	17
2: Church Street	-	-	-	19	36	12	5	71
3: Robinson Street	-	-	-	10	28	5	3	46
4: Princeton	25	58	23	-	29	7	3	145
5: Rosemont	44	138	86	40	0	32	8	347
6: Apopka	25	109	79	21	69	0	14	317
7: SR 429	13	75	68	12	39	38	-	245
Total	108	379	256	109	209	96	33	1,190





	1	2	3	4	Total
1: SR 429	-	1	3	4	7
2: Zellwood	6	-	2	1	10
3: Mt Dora	30	1	0	7	39
4:					
Taveres/Eustis	38	1	6	0	46
Total	75	3	11	12	101

Table 33: Station To Station Boardings and Alightings (ALT 1-2)-Express Bus Portion





APPENDIX A: TOTAL TRIP CHANGES



Appendix A: Person Trips By Purpose in the US 441 Study Corridor

HBW TOTAL DAILY PERSON TRIPS

2010 Base

	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	6,039	2,637	1,177	516	42	234	11	3	-	10,661
2: North Orlando	11,298	32,929	6,007	9,744	617	1,062	69	31	15	61,773
3: NW Orlando	9,192	10,488	15,654	5,996	1,131	5,314	106	65	36	47,982
4: Forest City	6,518	18,832	5,046	26,167	2,454	2,130	163	115	47	61,472
5: Apopka	3,306	5,780	2,811	7,806	8,440	4,561	1,251	1,148	504	35,606
6: Paradise Heights	6,626	6,062	6,351	4,600	2,067	13,129	390	147	92	39,463
7: Tavares	521	593	683	872	997	1,598	17,242	2,030	2,130	26,667
8: Mt Dora	294	796	374	906	1,003	699	2,634	4,599	2,186	13,490
9: Eustis	312	357	182	661	848	641	5,344	3,788	10,326	22,458
Total	44,107	78,474	38,286	57,268	17,597	29,367	27,210	11,926	15,336	319,572

2035 No Build

	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	7,658	4,442	1,625	886	79	288	5	9	6	14,998
2: North Orlando	11,167	46,793	6,336	12,921	745	1,096	65	63	36	79,221
3: NW Orlando	11,757	16,433	22,711	8,187	1,649	6,319	134	148	74	67,412
4: Forest City	6,027	21,963	5,137	30,634	2,562	2,063	157	180	79	68,803
5: Apopka	2,796	7,026	2 <i>,</i> 953	9,129	8,898	4,160	870	1,387	488	37,707
6: Paradise Heights	6,421	8,067	7,341	5,960	2,760	14,095	650	320	157	45,771
7: Tavares	652	1,507	1,058	1,659	1,693	2,304	27,106	3,276	3,364	42,620
8: Mt Dora	583	1,250	485	1,074	1,170	633	2,790	5,564	2,728	16,278
9: Eustis	359	1,249	602	1,407	1,669	1,004	6,557	5,898	16,726	35,471
Total	47,421	108,731	48,248	71,856	21,226	31,963	38,334	16,846	23,657	408,280

HBW Difference (2035 No Build-2010 Base)

	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	1,619	1,805	447	370	37	53	(6)	6	6	4,337
2: North Orlando	(131)	13,864	329	3,176	128	34	(4)	32	20	17,448
3: NW Orlando	2,564	5,946	7,057	2,191	518	1,005	28	82	38	19,429
4: Forest City	(491)	3,131	91	4,467	109	(67)	(6)	65	32	7,330
5: Apopka	(510)	1,246	143	1,323	458	(401)	(381)	239	(16)	2,101
6: Paradise Heights	(204)	2,005	989	1,359	693	966	260	173	66	6,308
7: Tavares	131	914	375	787	697	706	9,864	1,246	1,234	15,953
8: Mt Dora	289	454	111	169	168	(65)	156	965	542	2,788
9: Eustis	47	892	420	746	821	364	1,213	2,111	6,400	13,013
Total	3,313	30,257	9,961	14,588	3,628	2,595	11,124	4,920	8,321	88,708

Appendix A
HBO TOTAL DAILY PERSON TRIPS

2010 Base	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	21,550	9,296	3,855	926	52	269	2	3	-	35,953
2: North Orlando	14,220	121,487	10,140	19,401	576	861	27	21	11	166,744
3: NW Orlando	10,516	18,943	67,483	11,748	1,807	13,047	74	84	22	123,724
4: Forest City	3,991	38,899	7,555	121,873	5,899	3,459	130	182	63	182,051
5: Apopka	1,136	6,477	3,403	17,858	52,075	10,570	3,188	7,491	2,001	104,199
6: Paradise Heights	4,288	8,749	15,540	9,860	6,228	66,596	859	394	157	112,671
7: Tavares	272	469	231	402	1,190	946	53,916	9,765	7,603	74,794
8: Mt Dora	66	139	58	293	2,307	455	8,190	18,564	8,896	38,968
9: Eustis	201	292	115	208	761	198	15,734	13,358	32,602	63,469
Total	56,240	204,751	108,380	182,569	70,895	96,400	82,120	49,862	51,355	902,572
2035 No Build	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	32,227	14,754	7,029	1,606	98	737	6	8	4	56,469
2: North Orlando	16,326	162,341	14,094	25,140	692	1,378	24	40	13	220,047
3: NW Orlando	14,240	23,486	103,920	12,982	2,482	25,101	74	114	36	182,435
4: Forest City	3,383	41,186	10,127	137,486	6,500	4,271	97	174	53	203,277
5: Apopka	1,085	7,439	4,328	20,616	55,518	15,820	1,573	5,189	1,235	112,803
6: Paradise Heights	3,225	8,374	14,459	10,693	7,240	86,924	1,042	336	104	132,397
7: Tavares	687	1,350	706	1,243	2,661	5,000	86,799	13,067	10,222	121,735
8: Mt Dora	103	490	288	804	4,442	1,656	9,507	23,415	10,713	51,418
9: Eustis	516	992	490	877	2,487	1,129	19,523	22,060	52,487	100,561

HBO Difference (2035 No Build-2010 Base)

	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	10,677	5,458	3,174	680	46	468	4	5	4	20,516
2: North Orlando	2,106	40,853	3,954	5,739	116	517	(3)	19	2	53,303
3: NW Orlando	3,724	4,543	36,437	1,234	675	12,054	0	30	14	58,711
4: Forest City	(608)	2,287	2,572	15,613	601	812	(33)	(8)	(10)	21,225
5: Apopka	(51)	962	925	2,758	3,443	5,250	(1,615)	(2,302)	(766)	8,604
6: Paradise Heights	(1,063)	(375)	(1,081)	833	1,012	20,328	183	(58)	(53)	19,726
7: Tavares	415	881	475	841	1,471	4,054	32,883	3,302	2,619	46,941
8: Mt Dora	37	351	230	511	2,135	1,201	1,317	4,852	1,817	12,451
9: Eustis	315	700	375	669	1,726	931	3,789	8,702	19,885	37,092
Total	15,552	55,660	47,061	28,877	11,225	45,615	36,525	14,542	23,512	278,569

Appendix A

NHB TOTAL DAILY PERSON TRIPS

2010 Base	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	40,861	17,073	9,951	4,376	618	2,525	67	42	22	75,535
2: North Orlando	16,995	89,165	12,679	27,532	2,418	3,229	161	152	73	152,404
3: NW Orlando	10,164	12,686	31,351	6,938	1,754	7,533	125	114	53	70,718
4: Forest City	4,450	27,627	7,061	65,503	6,608	4,218	259	298	142	116,166
5: Apopka	669	2,499	1,847	6,794	15,424	4,617	998	1,475	606	34,929
6: Paradise Heights	2,733	3,323	7,658	4,168	4,271	37,638	529	387	183	60,890
7: Tavares	54	133	113	216	1,353	591	21,736	5,258	5,379	34,833
8: Mt Dora	34	137	85	247	2,257	528	5,091	7,376	4,398	20,153
9: Eustis	16	56	38	129	814	208	5,568	4,563	9,594	20,986
Total	75,976	152,699	70,783	115,903	35,517	61,087	34,534	19,665	20,450	586,614

2035 No Build

	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	51,393	21,894	12,590	4,901	689	2,730	88	85	44	94,414
2: North Orlando	21,868	135,543	17,126	35,501	3,083	4,003	250	331	159	217,864
3: NW Orlando	12,968	17,021	44,527	8,660	2,254	9,517	201	227	114	95,489
4: Forest City	5,153	35,783	8,918	79,682	7,559	5,080	353	498	231	143,257
5: Apopka	809	3,324	2,526	8,003	17,650	6,002	1,153	2,299	981	42,747
6: Paradise Heights	3,037	4,254	10,003	5,141	5,673	40,976	866	652	279	70,881
7: Tavares	80	245	199	344	1,550	1,060	31,454	6,575	6,974	48,481
8: Mt Dora	95	302	204	486	3,499	929	6,165	10,208	6,195	28,083
9: Eustis	41	175	112	226	1,380	338	6,991	6,598	15,291	31,152
Total	95,444	218,541	96,205	142,944	43,337	70,635	47,521	27,473	30,268	772,368

NHB Difference (2035 No Build-2010 Base)

	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	10,532	4,821	2,639	525	71	205	21	43	22	18,879
2: North Orlando	4,873	46,378	4,447	7,969	665	774	89	179	86	65,460
3: NW Orlando	2,804	4,335	13,176	1,722	500	1,984	76	113	61	24,771
4: Forest City	703	8,156	1,857	14,179	951	862	94	200	89	27,091
5: Apopka	140	825	679	1,209	2,226	1,385	155	824	375	7,818
6: Paradise Heights	304	931	2,345	973	1,402	3,338	337	265	96	9,991
7: Tavares	26	112	86	128	197	469	9,718	1,317	1,595	13,648
8: Mt Dora	61	165	119	239	1,242	401	1,074	2,832	1,797	7,930
9: Eustis	25	119	74	97	566	130	1,423	2,035	5,697	10,166
Total	19,468	65,842	25,422	27,041	7,820	9,548	12,987	7,808	9,818	185,754

Appendix A

Total Daily Trips (All Purposes)

2010 Base	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	68,450	29,006	14,983	5,818	712	3,028	80	48	22	122,149
2: North Orlando	42,513	243,581	28,826	56,677	3,611	5,152	257	204	99	380,921
3: NW Orlando	29,872	42,116	114,488	24,682	4,692	25,894	305	263	111	242,424
4: Forest City	14,959	85,358	19,662	213,543	14,961	9,807	552	595	252	359,690
5: Apopka	5,111	14,756	8,061	32,458	75,938	19,748	5,437	10,114	3,111	174,734
6: Paradise Heights	13,647	18,134	29,549	18,628	12,566	117,362	1,778	928	432	213,024
7: Tavares	847	1,195	1,027	1,490	3,540	3,135	92,893	17,053	15,112	136,293
8: Mt Dora	394	1,072	517	1,446	5,567	1,682	15,915	30,539	15,480	72,611
9: Eustis	529	705	335	998	2,423	1,046	26,646	21,709	52,522	106,913
Total	176,323	435,925	217,449	355,740	124,009	186,855	143,864	81,453	87,141	1,808,759
2035 No Build	1	2	3	4	5	6	7	8	9	Total
	-	-	•	-	•	•	-	•	5	TULAI
1: Orlando CBD	91,279	41,090	21,244	7,393	866	3,755	99	102	54	165,881
1: Orlando CBD 2: North Orlando	91,279 49,361	41,090 344,676	21,244 37,556	7,393 73,562	866 4,520	3,755 6,477	99 339	102 434	54 208	165,881 517,133
1: Orlando CBD 2: North Orlando 3: NW Orlando	91,279 49,361 38,965	41,090 344,676 56,940	21,244 37,556 171,158	7,393 73,562 29,829	866 4,520 6,385	3,755 6,477 40,937	99 339 409	102 434 489	54 208 224	165,881 517,133 345,336
1: Orlando CBD 2: North Orlando 3: NW Orlando 4: Forest City	91,279 49,361 38,965 14,563	41,090 344,676 56,940 98,932	21,244 37,556 171,158 24,182	7,393 73,562 29,829 247,802	866 4,520 6,385 16,621	3,755 6,477 40,937 11,414	99 339 409 607	102 434 489 852	5 54 208 224 363	165,881 517,133 345,336 415,336
1: Orlando CBD 2: North Orlando 3: NW Orlando 4: Forest City 5: Apopka	91,279 49,361 38,965 14,563 4,690	41,090 344,676 56,940 98,932 17,789	21,244 37,556 171,158 24,182 9,807	7,393 73,562 29,829 247,802 37,748	866 4,520 6,385 16,621 82,065	3,755 6,477 40,937 11,414 25,982	99 339 409 607 3,596	102 434 489 852 8,875	54 208 224 363 2,704	165,881 517,133 345,336 415,336 193,257
 1: Orlando CBD 2: North Orlando 3: NW Orlando 4: Forest City 5: Apopka 6: Paradise Heights 	91,279 49,361 38,965 14,563 4,690 12,683	41,090 344,676 56,940 98,932 17,789 20,695	21,244 37,556 171,158 24,182 9,807 31,803	7,393 73,562 29,829 247,802 37,748 21,793	866 4,520 6,385 16,621 82,065 15,673	3,755 6,477 40,937 11,414 25,982 141,995	99 339 409 607 3,596 2,558	102 434 489 852 8,875 1,308	5 54 208 224 363 2,704 540	165,881 517,133 345,336 415,336 193,257 249,048
 1: Orlando CBD 2: North Orlando 3: NW Orlando 4: Forest City 5: Apopka 6: Paradise Heights 7: Tavares 	91,279 49,361 38,965 14,563 4,690 12,683 1,419	41,090 344,676 56,940 98,932 17,789 20,695 3,102	21,244 37,556 171,158 24,182 9,807 31,803 1,963	7,393 73,562 29,829 247,802 37,748 21,793 3,246	866 4,520 6,385 16,621 82,065 15,673 5,904	3,755 6,477 40,937 11,414 25,982 141,995 8,364	99 339 409 607 3,596 2,558 145,358	102 434 489 852 8,875 1,308 22,918	54 208 224 363 2,704 540 20,560	165,881 517,133 345,336 415,336 193,257 249,048 212,836
1: Orlando CBD 2: North Orlando 3: NW Orlando 4: Forest City 5: Apopka 6: Paradise Heights 7: Tavares 8: Mt Dora	91,279 49,361 38,965 14,563 4,690 12,683 1,419 781	41,090 344,676 56,940 98,932 17,789 20,695 3,102 2,042	21,244 37,556 171,158 24,182 9,807 31,803 1,963 977	7,393 73,562 29,829 247,802 37,748 21,793 3,246 2,364	866 4,520 6,385 16,621 82,065 15,673 5,904 9,111	3,755 6,477 40,937 11,414 25,982 141,995 8,364 3,218	99 339 409 607 3,596 2,558 145,358 18,462	102 434 489 852 8,875 1,308 22,918 39,188	54 208 224 363 2,704 540 20,560 19,636	165,881 517,133 345,336 415,336 193,257 249,048 212,836 95,780
 1: Orlando CBD 2: North Orlando 3: NW Orlando 4: Forest City 5: Apopka 6: Paradise Heights 7: Tavares 8: Mt Dora 9: Eustis 	91,279 49,361 38,965 14,563 4,690 12,683 1,419 781 916	41,090 344,676 56,940 98,932 17,789 20,695 3,102 2,042 2,416	21,244 37,556 171,158 24,182 9,807 31,803 1,963 977 1,204	7,393 73,562 29,829 247,802 37,748 21,793 3,246 2,364 2,510	866 4,520 6,385 16,621 82,065 15,673 5,904 9,111 5,536	3,755 6,477 40,937 11,414 25,982 141,995 8,364 3,218 2,471	99 339 409 607 3,596 2,558 145,358 18,462 33,071	102 434 489 852 8,875 1,308 22,918 39,188 34,556	54 208 224 363 2,704 540 20,560 19,636 84,503	165,881 517,133 345,336 415,336 193,257 249,048 212,836 95,780 167,183

Total Difference (2035 No Build-2010 Base)

	1	2	3	4	5	6	7	8	9	Total
1: Orlando CBD	22,828	12,084	6,260	1,575	154	726	19	54	32	43,732
2: North Orlando	6,848	101,095	8,730	16,884	908	1,325	82	230	108	136,211
3: NW Orlando	9,092	14,824	56,670	5,147	1,693	15,043	104	225	113	102,912
4: Forest City	(396)	13,574	4,520	34,258	1,661	1,607	55	257	111	55,646
5: Apopka	(421)	3,033	1,747	5,290	6,127	6,234	(1,841)	(1,239)	(407)	18,522
6: Paradise Heights	(963)	2,561	2,253	3,165	3,107	24,633	780	380	109	36,025
7: Tavares	572	1,907	936	1,756	2,365	5,229	52,465	5,865	5,448	76,542
8: Mt Dora	387	970	460	919	3,545	1,537	2,547	8,649	4,156	23,169
9: Eustis	387	1,711	869	1,512	3,113	1,425	6,425	12,848	31,981	60,271
Total	38,334	151,759	82,445	70,506	22,673	57,758	60,636	27,270	41,651	553,031

Appendix A



APPENDIX B: ADDITIONAL STATION TO STATION SUMMARIES



US 441 Commuter Rail Trips Alt 1-5 T20												
		All Pu	rposes	Daily		All Ad	cess					
Mixed Mode	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	-	1	1	-	-	0	0	-	2
2: Church Street	-	-	-	-	9	8	2	0	5	2	2	27
3: Robinson Street	-	-	-	-	14	4	2	0	3	1	1	24
4: Princeton	0	4	4	-	6	4	1	0	0	0	0	19
5: Rosemont	3	18	30	5	0	14	2	0	1	1	0	74
6: Apopka	5	31	41	8	28	-	3	1	1	1	1	121
7: SR 429	2	17	28	3	14	14	-	0	0	1	0	80
8: Zellwood	1	11	23	2	11	13	2	-	0	0	-	62
9: Tavares	4	53	46	10	34	38	8	1	0	40	15	248
10: Mount Dora	0	8	11	2	9	11	1	0	4	0	0	48
11: Eustis	1	17	22	3	13	17	1	-	1	1	-	75
Total	17	159	205	33	138	124	22	3	15	45	19	780
Fixed Guideway Only	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	7	7	1	0	0	0	0	-	16
2: Church Street	-	-	-	19	27	4	1	0	1	0	0	52
3: Robinson Street	-	-	-	10	14	2	0	0	0	-	0	27
4: Princeton	25	53	19	-	23	4	2	0	0	0	0	127
5: Rosemont	41	120	56	35	0	18	6	0	1	0	0	277
6: Apopka	20	79	37	13	41	0	10	1	2	1	1	205
7: SR 429	8	36	18	5	15	18	0	2	2	1	1	104
8: Zellwood	3	19	11	2	6	8	9	0	3	1	1	64
9: Tavares	2	8	3	2	7	8	6	1	0	33	21	90
10: Mount Dora	0	3	2	1	2	2	5	1	68	0	25	110
11: Eustis	2	10	5	3	8	8	7	2	33	19	3	100
Total	101	328	151	98	151	71	45	8	110	56	53	1,171
TOTAL	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	7	8	2	0	0	0	0	-	17
2: Church Street	-	-	-	19	36	12	3	0	6	2	2	79
3: Robinson Street	-	-	-	10	28	5	2	0	3	1	1	50
4: Princeton	25	58	23	-	29	7	3	0	1	0	0	146
5: Rosemont	44	138	86	40	0	32	7	0	2	1	1	351
6: Apopka	25	109	79	21	69	0	13	2	4	2	2	326
7: SR 429	10	53	46	9	28	32	0	2	2	1	1	184
8: Zellwood	4	29	34	5	17	20	10	0	3	2	1	126
9: Tavares	6	60	49	12	41	46	14	3	0	73	35	338
10: Mount Dora	1	12	13	3	11	14	6	2	71	0	26	159
11: Eustis	3	27	27	6	21	25	8	2	34	20	3	175
Total	118	486	357	131	288	195	67	11	125	101	72	1,952

Mixed Mode All Purposes Peak All Access												
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	-	1	1	-	-	-	0	-	1
2: Church Street	-	-	-	-	8	7	2	0	4	1	1	25
3: Robinson Street	-		-		10	3	2	0	2	1	1	19
4: Princeton	0	4	4		5	4	1	0	0	0	0	17
5: Rosemont	3	15	22	3	0	11	2	0	0	0	0	58
6: Apopka	5	28	36	7	24		3	1	1	1	1	107
7: SR 429	2	14	21	2	9	11		0	0	0	0	61
8: Zellwood	1	7	17	2	7	9	1	-	0	0	-	43
9: Tavares	2	25	19	4	13	17	2	0	0	8	3	94
10: Mount Dora	0	5	7	1	5	6	1	0	3	0	0	28
11: Eustis	1	14	15	2	8	13	1	-	1	1	-	56
Total	14	112	141	21	90	82	14	2	12	13	7	508
Fixed Guideway Only	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak		-		6	5	1	0	0		0		11
2: Church Street				15	20	3	1_	0	1	0	0	40
3: Robinson Street	-			9	10	1	0	0	0			20
4: Princeton	21	45	17		18	3	1	0	0		0	105
5: Rosemont	32	100	43	27	0_	13	3	0	0	0	0	219
6: Apopka	13	60	27_	9	27	0	7_	0_	1_	0	1	146
7: SR 429	6	27	12	3	9	11	0	1	1	0	0	71
8: Zellwood	_2	13	8	2	4	4	5	0	2	1	1	42
9: Tavares	1	4	2	1	6	5	4	1	0	20	14	58
10: Mount Dora	0	2	1_	0	1_	1	2	1	36	0	13	57
11: Eustis	2	7	3	2	6	6	5	1	22	11	2	67
Total	78	258	112	75	106	48	27	4	64	33	31	836
Total	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak				6	6	1	0	0		0		13
2: Church Street				15	28	10	3	0	5	2	2	65
3: Robinson Street	-			9	20	5	2	0	2	1	1	38
4: Princeton	21	49	20		23	6_	1_	0	0_	0		122
5: Rosemont	35	114	65	31	0	24	5	0	1	1	0	277
6: Apopka	18	88	63	16	51	0	10	1	2	1	1	252
7: <u>SR 429</u>	7	41	33	6	19	_ 22	0_	1	1	1	1	132
8: Zellwood	3	20	25	3	11	13	6	0	2	<u> </u>	1	85
9: Tavares	3	29	20	5	18	23	6	1	0	28	17	152
10: Mount Dora	0	7	8	2	6	7	2	1	39	0	13	85
11: Eustis	3	21	18	4	14	19	6	1	23	12	2	123
Total	91	370	253	95	196	130	42	6	76	46	38	1,343

US 441 Commuter Rail Trips ALT 1-5

US 441 Commuter Rail Trips ALT 1-5 T20												
Mixed Mode		All Purp	oses	Off Pea	k	All Acce	ess					
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	_	-		-	-	0	-	-	0	-	-	0
2: Church Street	-	-	-	-	1	0	0	0	1	0	0	3
3: Robinson Street	<u></u>	- 1	-		4	0		-	0	0	0	5
4: Princeton	0	0			1	0		0	0	0		2
5: Rosemont	0	3	7	1		3		0	0	0	0	16
6: Apopka	0	3	5	1	4		0	0	0	0	0	14
7: SR 429	0	3	8	1	4	3	-	0	0	0		20
8: Zellwood	0	3	6	1	4	4	1	-	0	-	-	19
9: Tavares	2	27	27	6	21	21	6	1	0	31	11	154
10: Mount Dora	0	3	4	1	4	6	1	-	1	-	-	21
11: Eustis	0	3	6	1	5	4	0		0	0		20
Total	4	47	64	13	48	42	8	1	3	33	12	273
Fixed Guideway Only												
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	2	2	0	0	0	0	-	-	5
2: Church Street				4	7	1	0	0	0		0	12
3: Robinson Street		-		1	5	1	0	0	0		0	7
4: Princeton	4	8	3		5	1	1	0	0	0	0	22
5: Rosemont	9	20	13	8	0	5	3	0	0	0	0	58
6: Apopka	6	19	11	4	14		3	1	1	0	1	59
7: SR 429	2	9	6	2	5	6	0	1	1	0	0	33
8: Zellwood	1	5	3	1	2	3	4		1	1	1	22
9: Tavares	1	4	2	1	2	2	2	1		13	7	33
10: Mount Dora	0	2		0	1	1	3	1	32	0	12	53
	0	3	2	1	2	2	2	0	11	8	1	33
Total	23	70	39	23	45	22	18	4	47	23	22	335
Total												
lota	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	2	2	1	0	0	0	-	-	5
2: Church Street			-	4	8	1	0	0	1	0	0	15
3: Robinson Street		-		1	9	1	0	0	1	0	0	12
4: Princeton	4	8	3		6	1	1	0	0	0	0	24
5: Rosemont	9	23	20	9	0	8	3	0	1	0	0	74
6: Apopka	7	21	16		18		3	1	1	1	1	74
7: SR 429	2	13	13	3	9	9	0	1	1	1	0	52
8: Zellwood	1	9	9	2	6	7	4		1	1	1	41
9: Tavares	2	31	29	7	23	23	8	2		44	18	187
10: Mount Dora	0	5	5	2	5	7	4	1	33	0	12	73
11: Eustis		6	9	2	7	6	2	0	11	8	1	52
Total	27	116	103	36	93	64	26	5	49	55	34	608

US 441 Commuter Rail Trips ALT1-5 T20												
Mixed Mode		All Purp	ooses	Daily		WLK						
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	-	1	1	-	-	0	0	-	2
2: Church Street		-			9	7	2	0	5	2	2	26
3: Robinson Street		-			14	4	2	0	3	1	1	24
4: Princeton		0			3	2	1	0	0	0	0	6
5: Rosemont	2	8	11	1	0	7	2	0	1	1	0	33
6: Apopka	4	20	17	5	17		3	1	1	1	1	70
7: SR 429	1	7	7	1	5	3		0	0	1	0	25
8: Zellwood	0	5	6	1	4	6	1	-	0	0	-	24
9: Tavares	4	46	34	8	26	29	8	1	0	39	15	210
10: Mount Dora	0	8	11	2	9	11	1	0	4	0	0	48
11: Eustis	0	6	4	1	4	5	0		1	1		22
Total	12	101	89	19	92	76	20	3	15	45	19	491
Fixed Guideway Only												
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	5	5	1	0	0	0	0	-	11
2: Church Street				17	21	2	1	0	0	0	0	42
3: Robinson Street	-	-	-	8	12	1	0	0	0		0	22
4: Princeton	8	16	6	[·	7	1	1	0	0	0	0	38
5: Rosemont	19	50	21	13	-	6	2	0	0	0	0	112
6: Apopka	8	29	11	6	18		4	1	1	1	1	80
7: SR 429	1	3	1	1	2	2		1	0	0	0	12
8: Zellwood	0	2	1	0	1	2	3	-	1	1	0	12
9: Tavares	0	1	0	0	1	1	1	1	-	19	9	34
10: Mount Dora	0	3	1	1	2	2	4	1	46	-	24	83
11: Eustis	0	1	1	1	1	1	1	0	10	12		29
Total	37	105	42	52	72	18	18	4	60	33	35	476
Total												
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	5	6	1	0	0	0	0	-	13
2: Church Street				17	30	9	3	0	5	2	2	69
3: Robinson Street				8	26	5	2	0	3	1	1	45
4: Princeton	8	16	6		10	2	1	0	0	0	0	44
5: Rosemont	21	58	32	13	00	14	4	0	1	1	1	145
6: Apopka	12	49	28	11	35		8	1	3	2	2	150
7: SR 429	2	10	8	2	8	5	-	1	1	1	0	37
8: Zellwood	1	7	7	2	6	8	4		1	1	0	36
9: Tavares	4	47	34	8	28	30	9	2	0	58	24	245
10: Mount Dora	1	11	13	3	11	13	5	1	50	0	24	132
11: Eustis	0	7	5	1	5	6	2	0	11	13	-	51
Total	48	206	132	71	164	94	38	7	75	78	53	966

US 441 Commut	1 Commuter Rail Trips ALT1-5 T20											
Mixed Mode		All Purp	ooses	Daily		PNR						
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	-	-	-	-	-	-		-	-
2: Church Street	-	-	-	-	-	1	-	-	0	0	-	1
3: Robinson Street	L <u>-</u> _											-
4: Princeton	0	4	4		3	2	_	-		_		13
5: Rosemont	1	10	19	4	-	7	-	-	-	-	-	40
6: Apopka	1	10	24	3	12		0					50
7: SR 429	1	10	22	2	8	11			0	0		55
8: Zellwood	1	6	17	1	6	6	0	-	0	0		38
9: Tavares	0	6	12	2	7	9	1			0		36
10: Mount Dora	-	-	-	-	-	-	-	-	0	-	-	0
11: Eustis	1	11	17	2	9	12	1		0			53
Total	5	56	116	14	44	48	2	-	0	0	-	287
Fixed Guideway Only												
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	-	-	-	-	-	-	-	-	-
2: Church Street				0	3	1	0		0		0	5
3: Robinson Street												-
4: Princeton	15	33	12	T	13	2	1	0	0		0	76
5: Rosemont	16	50	25	15	0	8	2	0	0	0	0	118
6: Apopka	8	34	17	5	14		4	0	1	0	0	82
7: SR 429	5	25	12	3	8	9		1	1	0	0	63
8: Zellwood	2	14	8	2	4	4	4	-	2	0	1	41
9: Tavares	2	6	3	1	5	5	4	1	0	8	8	42
10: Mount Dora		-				-	-	-	13			13
11: Eustis	2	7	4	2	6	6	4	1	17	3	1	53
Total	49	167	81	27	53	36	20	3	34	11	11	493
Total												
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	-	-	-	-	-	-	-	-	-
2: Church Street		-		0	3	2	0	-	0	0	0	6
3: Robinson Street		-		-	-	-	-	-	-	-	-	-
4: Princeton	15	37	16	-	15	4	1	0	0		0	88
5: Rosemont	17	60	44	19	0	15	2	0	0	0	0	158
6: Apopka	9	44	42	8	26	_	4	0	1	0	0	133
7: SR 429	6	35	34	5	16	20	-	1	1	0	0	118
8: Zellwood	3	19	26	3	10	11	5	-	2	0	1	79
9: Tavares	2	11	15	3	12	14	4	1	0	8	8	78
10: Mount Dora									13		['	13
11: Eustis	2	19	21	4	14	18	5	1	17	3	1	106
Total	54	224	197	41	97	85	22	3	34	11	11	779

US 441 Commuter Rail Trips					ALT 1	L-5				T20		
Mixed Mode		All Purp	oses	Daily		KNR						
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	-	-	-	-	-	-	-	-	-
2: Church Street			-		0				0			0
3: Robinson Street	L <u>-</u> _		-					-	-			-
4: Princeton	□ <u>-</u> -					-	-	-	-		「 <u>−</u> −	-
5: Rosemont	□ <u>-</u> □			0			_	-	-		└ <u>-</u> -	0
6: Apopka	-	0	-	0	0		0					0
7: SR 429		0	0	0	0	0						0
8: Zellwood	-	0		-	0	0	-		-	-	-	0
9: Tavares	0	1	0	-	1	0			-	0	0	2
10: Mount Dora	-	-	-	-	-	-	-	-	-	-	-	-
11: Eustis		0	0		0							0
Total	0	1	0	0	1	0	0	-	0	0	0	3
Fixed Guideway Only												
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	2	2	0	0	-	0	-	-	4
2: Church Street		-		1	3	1	0	-	0	0	0	5
3: Robinson Street			-	2	2	0	0	0	0	-	0	5
4: Princeton	2	4	2		4	1	0	0	0		0	13
5: Rosemont	6	19	10	8	0	3	1	0	0		0	47
6: Apopka	4	17	9	3	8	0	2	0	0	0	0	43
7: SR 429	2	9	4	2	4	7	0	1	0	0	0	29
8: Zellwood	1	3	1	0	1	1	2	0	1	1	0	11
9: Tavares	0	1	0	0	1	1	1	0	-	6	4	14
10: Mount Dora	0	1	1	0	0	0	1	0	9	0	2	14
11: Eustis	0	2	1	0	1	1	1	0	6	4	2	18
Total	15	55	28	18	26	16	8	2	16	11	8	203
Total												
	1	2	3	4	5	6	7	8	9	10	11	Total
1: Orlando Amtrak	-	-	-	2	2	0	0	-	0	-	-	4
2: Church Street		-	-	1	3	1	0	-	0	0	0	5
3: Robinson Street				2	2	0	0	0	0	[]	0	5
4: Princeton	2	4	2		4	1	0	0	0		0	13
5: Rosemont	6	19	10	8	0	3	1	0	0	-	0	47
6: Apopka	4	17	9	3	8	0	2	0	0	0	0	43
7: SR 429	2	9	4	2	4	7	0	1	0	0	0	29
8: Zellwood	1	3	1	0	1	2	2	0	1	1	0	11
9: Tavares	0	2	1	0	2	1	1	0	_	6	4	16
10: Mount Dora	0	1	1	0	0	0	1	0	9	0	2	14
11: Eustis	0	2	1	0	1	1	1	0	6	4	2	18
Total	15	56	28	18	27	16	8	2	16	11	8	206

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US 441 Commuter Rail Trips ALT1-5

Station Boardings by Access Mode

Mixed Mode		All Purpos	ses	Daily				
			Access	ss Mode				
Station Name	Walk Only	Bus	Rail	PNR	KNR	Total		
1: Orlando Amtrak	2	-	-	-	-	2		
2: Church Street	4	5	26	□ - □	Γ -	35		
3: Robinson Street	1	26				27		
4: Princeton	1	6		23		30		
5: Rosemont	24	11		47	0	83		
6: Apopka	28	45	└ ─ - ─	59	0	133		
7: SR 429	15	11		62	1	90		
8: Zellwood	18	8		44	1	71		
9: Tavares	16	210		45	1	271		
10: Mount Dora	43	7		0	1	51		
11: Eustis	20	4		64	1	89		
Total	172	334	26	344	6	882		
Fixed Guideway Only			Access	Mode				
Station Name	Walk Only	Bus	Rail	PNR	KNR	Total		
1: Orlando Amtrak	12	0	-	-	6	18		
2: Church Street	32	4	27	F =	3	67		
3: Robinson Street	16	6		F =	8	30		
4: Princeton	40			82	16	137		
5: Rosemont	115			122	54	291		
6: Apopka	82			86	50	219		
7: SR 429	13		「	67	32	112		
8: Zellwood	12			44	13	69		
9: Tavares	35			48	17	100		
10: Mount Dora	85			13	16	114		
11: Eustis	30	-	-	59	22	111		
Total	472	11	27	520	237	1,268		
Total	1	2	3	4	5	6		
1: Orlando Amtrak	13	0			6	20		
2: Church Street	36	9	54		3	102		
3: Robinson Street	17	33		L	8	57		
4: Princeton	41	6		105	16	168		
5: Rosemont	139	11		170	54	373		
6: Apopka	110	45	-	145	51	351		
7: SR 429	28	11		129	33	202		
8: Zellwood	30	8		87	14	139		
9: Tavares	52	210		92	18	372		
10: Mount Dora	128	7		14	16	165		
11: Eustis	50	4		122	24	200		
Total	644	345	54	864	243	2,150		



Technical Memorandum | Viable Alternatives Development and Screening

Appendix C: Technical Memorandum – Future Transportation and Station Impacts

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1 Introduction

1.1 Introduction and Background

The purpose of this technical memorandum is to identify the future year 2035 roadway operating conditions and station access impacts based on the No Build Alternative 1-0 and Viable Alternatives 1-2, 1-5 and 2-4. The alternatives are summarized below:

- No Build Alternative 0-1 Future traffic conditions with the addition of planned and programmed improvements for the Corridor Study Area;
- Viable Alternative 1-2 Commuter rail service from downtown Orlando to State Road (SR) 429 and express bus service from SR 429 to Tavares/Eustis;
- Viable Alternative 1-5 Commuter rail service from downtown Orlando to Eustis and Mount Dora; and
- Viable Alternative 2-4 Express bus service from downtown Orlando to Tavares/Eustis

For discussion and analysis purposes, the Corridor Study Area has been divided into four sections.

- Section 1 Downtown Orlando to John Young Parkway
- Section 2 John Young Parkway to State Road (SR) 429
- Section 3 SR 429 to Orange/Lake County Line
- Section 4 Orange/Lake County Line to Eustis and Tavares

Within this technical memorandum, analysis will be provided to compare the Viable Alternatives to the No Build Alternative through an assessment of the resulting volume to capacity ratio (v/c) and the impact on at-grade crossings. To assess the impact of the proposed station locations, vehicular access requirements will be identified as well as considerations for bicycle and pedestrian connectivity within a $\frac{1}{2}$ mile radius.

The Central Florida Regional Planning Model (CFRPM) was used for both traffic projections and transit projections. At the time of the analysis, the latest approved/validated version that was available for developing traffic projections was Version 5.0 (v5.0). Likewise, the latest approved/validated version for transit projections was Version 5.6 (v5.6). It should be noted that



the v5.6 model mode choice was updated to more accurately reflect FTA procedures, however, the highway network was not officially validated for traffic projections.

Year 2035 traffic conditions were provided for each Viable Alternative, described in subsequent sections of this report. To derive these results, the following methodology was utilized to apply the transit projections from v5.6 to the background traffic projections from v5.0:

- Background no-build traffic projections were obtained from v5.0 for the YR 2035 and converted into peak hour trips;
- Transit projections were obtained from v5.6 for the YR 2035 based on the estimated impact of each alternative;
- Transit projections were converted into peak hour vehicle trips using average peak hour percentages and vehicle occupancy rates;
- The vehicle trips obtained from the transit estimates were subtracted from the YR 2035 background traffic volumes to provide the corresponding traffic forecasts per alternative.



2

No Build Alternative 0-1

2.1 Introduction and Background

This chapter presents traffic forecasts and a summary of traffic operating conditions for the future year 2035 along the Corridor Study Area.

Based on the year 2035 Central Florida Regional Planning Model Version 5.0 (CFRPM), 82,500 trips per day are anticipated to interact between the regional centers within the study corridor. The trip interaction breakdowns between the regional centers are:

- Between Orlando and Apopka 61,400 daily trips;
- Between Apopka and Mount Dora/Eustis/Tavares 17,500 daily trips; and
- Between Mount Dora/Eustis/Tavares and Orlando 6,600 daily trips.

The No Build Alternative includes programmed transportation infrastructure and cost feasible improvements identified in the MetroPlan Orlando 2030 Long Range Transportation Plan and the Lake~Sumter Metropolitan Planning Organization 2035 Long Range Transportation Plan. It should be noted that this analysis also reflects the anticipated travel patterns with the addition of the Wekiva Parkway. The new 25-mile long expressway, which is anticipated to be fully constructed by the year 2021, provides some congestion relief for Section 3 and 4 of the Corridor Study Area by providing a parallel route between Apopka and Mount Dora. The north/south parallel portion of the Wekiva Parkway will connect to SR 46 in Lake County by the year 2019, while the remaining portion will continue east to its connection at SR 417. Upon completion, the Wekiva Parkway will connect the beltway around northwest metropolitan Orlando. A complete list of the improvements included in the No Build Alternative is provided in Table 2-1.



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Project Name	Description	Project Type	Purpose of Project	Anticipated Year of Completion
US 441/John Young Parkway	Construction of flyover and connection of John Young Parkway to Forest City Road	Roadway	Increase Capacity	2014
Forest City Road	Widen from four to six lanes from Edgewater Drive to Maitland Boulevard	Roadway	Increase Capacity	2019
All American Boulevard	Realignment to connect Clarcona- Ocoee Road to Kennedy Boulevard	Roadway	Increase Connectivity	2018
Wekiva Parkway	Construction of new four lane toll road	Roadway	Increase Capacity	2019
State Road (SR) 46	Widening existing roadway from two to six lanes	Roadway	Increase Capacity	2019
Interstate 4	Construction of four new managed lanes	Roadway	Increase Capacity	2020
US 441	Widen from four to six lanes from SR 44 to SR 46	Roadway	Increase Capacity	Unknown

Table 2-1: Projects included in the No Build Alternative

Source: MetroPlan Orlando 2030 LRTP, Lake~Sumter LRTP

2.2 **Corridor Study Area Transportation Impacts**

The year 2035 No Build arterial Level of Service (LOS) analysis was performed by comparing the year 2035 traffic volumes against generalized service volumes obtained from the 2013 FDOT Quality/Level of Service Handbook. For the purpose of this analysis, year 2035 AADT volumes were obtained from the 2014 FDOT D5 LOS ALL Spreadsheet, which is based upon the historical trends growth rate and the CFRPM. This "hybrid" method of forecasting combines the two forecasting tools by utilizing a weighted growth rate which favors the trends analysis for short term forecasts and the adopted regional traffic model for long term forecasts. Utilizing these anticipated daily traffic volumes, peak hour traffic volumes were formulated using the generalized K and D factors provided in the 2013 FDOT Quality/Level of Service Handbook. Transit projects generally have the most impact during peak hour conditions; therefore, No Build peak hour conditions will be used as background traffic conditions to assess the Viable Alternatives in the following Chapters.

The year 2035 peak hour volume to capacity (v/c) conditions for the Corridor Study Area is summarized in Table 2-2. As seen in Table 2-2, even with the addition of programmed and cost feasible improvements, many US 441 roadway segments within the Corridor Study Area are projected to operate over capacity by the future year 2035. The majority of Section 1 and Section 3 is expected to operate over capacity. Additionally, the majority of the corridor within Section 1 is both policy and physically constrained and is also projected to operate at LOS F for long-term conditions.

Figure 2-1 depicts the roadway segments anticipated to operate over capacity by the future year 2035. Detailed analyses of the year 2035 No Build roadway operating conditions can be found in Appendix A of this memorandum.



Table 2-2: No Build Alternative 0-1 Volume to Capacity (Year 2035)

Section 1 - Downtown Orlando to John Young Parkway									
Roadway	Limits	Cost Feasible # of Lanes	FDOT LOS Standard	Peak Period	Pk Hour Maximum Service Volume	Pk Hr / Pk Dir Volume	v/c		
US 441	Amelia Street to SR 50	4	D	PM	1,630	1,971	1.21		
Amelia Street	US 441 to Garland Avenue	4	D	PM	1,630	101	0.06		
SR 50	US 441 to Westmoreland Drive	4	D	PM	2,100	2,550	1.21		
SR 50	Westmoreland Drive to SR 527	4	D	PM	2,100	2,424	1.15		
US 441	SR 50 to Country Club Drive	4	D	PM	2,000	2,162	1.08		
US 441	Country Club Drive to Country Club Villa	4	D	PM	2,000	2,197	1.10		
US 441	Country Club Villa to Princeton Street	4	D	PM	2,000	2,208	1.10		
US 441	Princeton Street to SR 423	4	D	PM	2,100	2,001	0.95		

Section 2 - John Young Parkway to SR 429									
Roadway	Limits	Cost Feasible # of Lanes	FDOT LOS Standard	Peak Period	Pk Hour Maximum Service Volume	Pk Hr / Pk Dir Volume	v/c		
US 441	SR 423 to Overland Road	4	D	PM	2,100	2,026	0.96		
US 441	Overland Road to SR 414	4	D	AM	2,100	2,117	1.01		
US 441	SR 414 to Orange / Seminole County Line	4	D	AM	2,100	1,875	0.89		
US 441	Orange / Seminole Line to Hiawassee Road	4	D	AM	2,100	1,875	0.88		
US 441	Hiawassee Road to Leg to EB 436	4	D	PM	2,100	1,845	0.74		
US 441	Leg to EB 436 to SR 436	2	D	PM	2,400	1,773	1.62		
US 441	SR 436 to Edgewood Drive	4	D	PM	1,630	2,646	1.42		
US 441	Edgewood Drive to CR 435A	4	D	PM	1,712	2,429	1.26		
US 441	CR 435A to CR 437A	4	D	PM	1,630	2,061	0.98		
US 441	CR 437A to SR 429	4	D	PM	2,100	2,061	0.96		



Table 2-2, Continued

Section 3 - SR 429 to Lake County Line									
Roadway	Limits	Cost Feasible # of Lanes	FDOT LOS Standard	Peak Period	Pk Hour Maximum Service Volume	Pk Hr / Pk Dir Volume	v/c		
US 441	SR 429 to Errol Parkway	4	D	PM	2,100	2,303	1.10		
US 441	Errol Parkway to CR 437	4	D	AM	2,100	2,339	1.11		
US 441	CR 437 to Junction Road	4	D	PM	2,100	2,641	1.26		
US 441	Junction Road to Jones Avenue	4	D	PM	2,000	2,641	1.32		
US 441	Jones Avenue to Sadler Road	4	D	PM	2,100	2,313	1.10		
US 441	Sadler Road to 0.134 mi N of Wadsworth Road	4	D	PM	3,240	2,292	0.71		
US 441	Wadsworth Road to Lake / Orange County Line	4	С	PM	2,450	1,881	0.77		

	Section 4 - Lake County Line to Tavares / Eustis										
Roadway	Limits	Cost Feasible # of Lanes	FDOT LOS Standard	Peak Period	Pk Hour Maximum Service Volume	Pk Hr / Pk Dir Volume	V/C				
US 441	Lake / Orange County Line to Limit Avenue	4	D	PM	2,100	1,966	0.94				
US 441	Limit Avenue to SR 44B	6	D	PM	3,171	2,742	0.86				
US 441	SR 44B to SR 19 / Bay Street	6	D	PM	3,171	2,757	0.87				
SR 19/Bay Street	Lake Saunders Drive to Golf Links Avenue	4	D	PM	2,100	1,532	0.73				
SR 19/Bay Street	Golf Links Avenue to Stevens Avenue	4	D	PM	2,100	1,477	0.70				
SR 19 NB/Grove Street	Stevens Avenue to SR 19	2	D	PM	1,956	1,962	1.01				
SR 19 SB/Bay Street	SR 19 to Stevens Avenue	2	D	PM	2,400	1,890	0.79				
SR 19	CR 452 to CR 44	4	D	PM	2,100	1,275	0.61				
US 441	SR 19 / Bay Street to SR 19 / Orange Avenue	6	D	PM	3,171	3,241	1.02				
SR 19/N Duncan Drive	US 441 to CR 500A / Old US 441	4	D	PM	1,712	1,704	1.00				

Source: 2014 FDOT LOS_ALL Update, 2013 FDOT Quality/Level of Service Handbook

Notes: Red shaded text indicates segment anticipated to operate over capacity







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3

Viable Alternative 1-2

3.1 Introduction

This alternative consists of commuter rail from Orlando to SR 429 and express bus from SR 429 to Lake County. Based on the preliminary estimates, Viable Alternative 1-2 is anticipated to have a daily ridership of 1,200 passengers (± 10 percent) per day. Within this Chapter, the transportation impacts of Viable Alternative 1-2 was evaluated for the Corridor Study Area and the proposed station locations. The existing bicycle and pedestrian network within the vicinity of the proposed stations was identified, as well as potential improvements to increase connectivity to the proposed stations.

3.2 Corridor Study Area Transportation Impacts

Roadway Usage

Roadway usage was evaluated for the Corridor Study Area during the AM and PM peak hours for the year 2035 traffic conditions. A simple assumption was made that the peak hour transit trips on the build alternative were diverted from the highway vehicle trips. To estimate the number of vehicle trips that would be removed from the highway segment as a result of the shift to the build transit alternative, the ridership estimates were converted to equivalent vehicle trips. The transit person trips produced by the travel demand model were produced for the peak and off-peak periods. The peak period results were for the combined AM and PM peak periods, each three hours long. For purposes of this analysis, it was assumed that the traffic split is 50% AM and 50% PM peak periods. Furthermore, the number of trips that occurred during the peak hour of the peak period was estimated at 50% in the AM peak and 40% in the PM peak. The peak hour person trips were then converted to vehicle trips by using an average auto occupancy rate of 1.2 persons/vehicle, consistent with the CFRPM assumptions.

In comparison to the No Build Alternative, the introduction of commuter rail and express bus services would result in a small to negligible reduction of volume to capacity ratio on the existing



roadways. This reduction was most significant in the AM and PM peak hours of travel. The anticipated reduction in traffic within the Corridor Study Area ranges from as high as 5.1 percent in Section 4 – Lake County Line to Tavares / Eustis to as low as 0.4 percent in Section 1 – Downtown Orlando to John Young Parkway. Detailed person trip and vehicle trip estimates can be found in Appendix B of this memorandum.

Figure 3-1 depicts the roadway segments anticipated to operate over capacity by the year 2035 with the addition of Viable Alternative 1-2. Detailed analyses of the year 2035 roadway operating conditions can be found in Appendix A of this memorandum.

Table 3-1: Alternative 1-2 Volume to Capacity Comparison (Year 2035)

Section 1 - Downtown Orlando to John Young Parkway										
Roadway	Limits	Peak Period	No Build V/C	Alt 1-2 V/C	V/C Reduction %					
US 441	Amelia Street to SR 50	PM	1.21	1.20	0.41%					
Amelia Street	US 441 to Garland Avenue	PM	0.06	0.06	0.00%					
SR 50	US 441 to Westmoreland Drive	PM	1.21	1.21	0.31%					
SR 50	Westmoreland Drive to SR 527	PM	1.15	1.15	0.33%					
US 441	SR 50 to Country Club Drive	PM	1.08	1.08	0.37%					
US 441	Country Club Drive to Country Club Villa	PM	1.10	1.09	0.36%					
US 441	Country Club Villa to Princeton Street	PM	1.10	1.10	0.36%					
US 441	Princeton Street to SR 423	PM	0.95	0.95	0.40%					

Section 2 - John Young Parkway to SR 429					
Roadway	Limits	Peak Period	No Build V/C	Alt 1-2 V/C	V/C Reduction %
US 441	SR 423 to Overland Road	PM	0.96	0.96	0.39%
US 441	Overland Road to SR 414	AM	1.01	1.01	0.52%
US 441	SR 414 to Orange / Seminole County Line	AM	0.89	0.89	0.59%
US 441	Orange / Seminole Line to Hiawassee Road	AM	0.89	0.89	0.59%
US 441	Hiawassee Road to Leg to EB 436	PM	0.88	0.87	0.43%
US 441	Leg to EB 436 to SR 436	PM	0.74	0.74	0.45%
US 441	SR 436 to Edgewood Drive	PM	1.62	1.62	0.30%
US 441	Edgewood Drive to CR 435A	PM	1.42	1.41	0.33%
US 441	CR 435A to CR 437A	PM	1.26	1.26	0.39%
US 441	CR 437A to SR 429	PM	0.98	0.98	0.39%



Table 3-1, Continued

Section 3 - SR 429 to Lake County Line					
Roadway	Limits	Peak Period	No Build V/C	Alt 1-2 V/C	V/C Reduction %
US 441	SR 429 to Errol Parkway	PM	1.10	1.08	1.91%
US 441	Errol Parkway to CR 437	AM	1.11	1.08	2.74%
US 441	CR 437 to Junction Road	PM	1.26	1.24	1.67%
US 441	Junction Road to Jones Avenue	PM	1.32	1.30	1.67%
US 441	Jones Avenue to Sadler Road	PM	1.10	1.08	1.90%
US 441	Sadler Road to 0.134 mi N of Wadsworth Road	PM	0.71	0.69	1.92%
US 441	Wadsworth Road to Lake / Orange County Line	PM	0.77	0.75	2.34%

Section 4 - Lake County Line to Tavares / Eustis

Roadway	Limits	Peak Period	No Build V/C	Alt 1-2 V/C	V/C Reduction %
US 441	Lake / Orange County Line to Limit Avenue	PM	0.94	0.91	3.31%
US 441	Limit Avenue to SR 44B	PM	0.86	0.84	2.37%
US 441	SR 44B to SR 19 / Bay Street	PM	0.87	0.85	2.36%
SR 19/Bay Street	Lake Saunders Drive to Golf Links Avenue	PM	0.73	0.70	4.24%
SR 19/Bay Street	Golf Links Avenue to Stevens Avenue	PM	0.70	0.67	4.40%
SR 19 NB/Grove Street	Stevens Avenue to SR 19	PM	1.01	0.97	3.31%
SR 19 SB/Bay Street	SR 19 to Stevens Avenue	PM	0.79	0.76	3.44%
SR 19	CR 452 to CR 44	PM	0.61	0.58	5.10%
US 441	SR 19 / Bay Street to SR 19 / Orange Avenue	PM	1.02	1.01	2.01%
SR 19/N Duncan Drive	US 441 to CR 500A / Old US 441	PM	1.00	0.96	3.81%

Source: 2014 FDOT LOS_ALL Update, 2013 FDOT Quality/Level of Service Handbook

Notes: Red shaded text indicates segment anticipated to operate over capacity

Transit Trip reduction not applied to Amelia Street





At-Grade Crossings

Within the commuter rail section of Viable Alternative 1-2 from Orlando to SR 429, there are four Florida Central Railroad (FCEN) at-grade crossings that impact mainline traffic. The at-grade crossings are identified below in Table 3-2. It should be noted that two at-grade crossings are located on corridor segments which are anticipated to operate over capacity. While the impact was expected to be minimal, the additional delay at these locations could be reduced by implementing mitigation measures such as signal optimization at grade crossings, and where necessary, shifting platforms further away from the crossing.

Table 3-2: At-Grade Crossings

Crossing		Segment
ID	Location	Over Capacity
622355U	Amelia Street (approximately 630 feet east of US 441)	No
622356B	SR 50 (approximately 50 feet east of US 441)	Yes
622359W	SR 500/US 441 (approximately 600 feet south of SR 438)	Yes
622365A	US 441 (approximately 270 feet north of Princeton Street)	No







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3.3 Vehicular and Bicycle/Pedestrian Access to Proposed Station Locations

Viable Alternative 1-2 consists of seven rail stations, three express bus stations and one shared rail/express bus station. It should be noted that two of the rail stations would be utilizing existing SunRail stations. The anticipated vehicular access improvements were identified for each station based on the existing driveway connections, traffic control devices, and proposed size and function of the parking lot. Detailed station access impact calculations, including anticipated boardings and alightings can be found in Appendix C of this memorandum.

Bicycle and pedestrian connectivity also plays a major function in assisting any community to access a rail or bus station. The combination of a strategic station location, adequate parking, safe access, dependable service, and good/safe pedestrian and bike facilities would encourage system users to rely on commuter rail and express bus as their daily form of commute. The bicycle/pedestrian evaluation was conducted by inventorying sidewalks and bike lanes surrounding each station for each alternative, utilizing the latest Geographic Information System (GIS) shapefiles obtained from the appropriate local agencies. When necessary, the latest aerial imageries were utilized to ensure accurate and up-to-date information.

The existing conditions and a summary of recommendations for vehicular and bicycle/pedestrian access is provided below for each of the proposed stations:

Robinson Street Station (Rail)

The Robinson Street Station was proposed to be located at the northwest corner of the intersection of Robinson Street and Hughey Avenue in downtown Orlando. Currently, the parcel is undeveloped, however, there is a paved vehicular/bus access to Robinson Street. Park and ride facilities will not be available at this station.

Vehicular Access: Vehicular and bus access at the proposed location would be provided through the existing unsignalized connections to Robinson Street. These current connections would provide adequate access to the proposed station. Bus routing to stations are documented in Appendix D: Operations Plan.

Bicycle/Pedestrian Access: This station is located in downtown Orlando, within a few blocks of the LYNX Central Station (LYNX bus and SunRail access). As such, the existing pedestrian network is well established. Currently, Gertrude's Walk runs along the west side of the SunRail tracks, running from Washington Street to Church Street. With the City of Orlando's plan to extend Gertrude's Walk north of Washington Street, there is a potential for a bike lane extension on Robinson Avenue from the station to the trail to complete the bike connection. To enhance pedestrian connectivity, pedestrian facilities along Hughey Avenue to and from LYNX Central Station would be recommended as part of this project.

Figure 3-2 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.







Figure 3-2: Robinson Street Station





Amelia Street Station (Rail)

The proposed location for the Amelia Street Station in Orlando is the northeast corner of the intersection of Amelia Street and Hames Avenue. If developed, this station would replace the existing Hodges Carl Light Manufacturing business, which has an existing parking lot with vehicular access via Hames Avenue. Park and ride facilities would not be available at this station.

Vehicular Access: Vehicular access at the proposed location would be provided through the existing unsignalized connection to Hames Avenue. Bus service would be provided via passenger pick-up and drop-off on Amelia Street.

Bicycle/Pedestrian Access: Currently, the sidewalk network is well established within the vicinity of the proposed station location. While bike lane gaps exist along US 441, the major connections to the Parramore Neighborhood, LYMMO Lime Line, and Creative Village are sufficiently provided via Amelia Street. To aid these connections, it was recommended that a pedestrian crossing be added at the intersection of Amelia Street and Homes Avenue.

Figure 3-3 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.

Princeton Station (Rail)

The Princeton station in the College Park section of Orlando is proposed to be located at the northeast corner of the intersection of Princeton Street at US 441. Currently, the parcel is occupied by existing Amazon Hose and Rubber Warehouse. A medium size park and ride parking lot will be provided at this station, featuring 50 parking spaces.

Vehicular Access: Vehicular and bus access at the proposed location would be provided through the existing unsignalized connections to both Princeton Street and US 441. The project related trips is anticipated to be 17 AM peak hour trips (16 inbound and 1 outbound) and 14 PM peak hour trips (1 inbound and 13 outbound). Based on the anticipated project traffic volumes, no further improvements are necessary.

Bicycle/Pedestrian Access: Existing sidewalks and bike lanes are present for the major connections to the College Park neighborhood and potential LYMMO connection to Florida Hospital Orlando. Potential improvements within the vicinity of the station exist for sidewalks within the large industrial area located northwest of the station, and for bike lanes along US 441.

Figure 3-4 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.









Figure 3-4: Princeton Station





Lockhart/Rosemont Station (Rail)

The Lockhart/Rosemont Station in Orange County is proposed to be located south of Edgewater Drive between Clarcona-Ocoee Road and All American Boulevard. Currently, this parcel is occupied by Ferrell Gas, which has a driveway connection to Edgewater Drive. A large size park and ride lot will be provided at this station, featuring 100 parking spaces.

Vehicular Access: Vehicular access at the proposed location would be provided through the existing unsignalized connection to Edgewater Drive. Bus service would be provided via passenger on-street pick-up and drop-off.

The project related trips is anticipated to be 33 AM peak hour trips (30 inbound and 3 outbound) and 26 PM peak hour trips (2 Inbound and 24 outbound). Based on the anticipated project traffic volumes and the current geometry at the connection to Edgewater Drive, no access improvements are necessary to accommodate the project related traffic.

Bicycle/Pedestrian Access: Existing sidewalks are provided along Clarcona-Ocoee Road, All American Boulevard, and Edgewater Drive. However, the sidewalks are in poor condition and result in an undesirable pedestrian environment. Therefore, sidewalk repair and rehabilitation would enhance connectivity and encourage pedestrian traffic to and from surrounding neighborhoods.

Figure 3-5 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.



Figure 3-5: Lockhart/Rosemont Station






Apopka Station (Rail)

The Apopka Station is proposed to be located at the existing LYNX SuperStop (east of the intersection of Central Avenue and M.A. Board Street). Park and ride spaces are proposed to be located on vacant parcels on the west side of Central Avenue, directly across from the SuperStop. A large size park and ride lot will be provided at this station, featuring 100 parking spaces.

Vehicular Access: Bus access at the proposed location would be provided through the existing LYNX Apopka SuperStop. The empty lot across from the SuperStop has been identified to provide both park and ride service and kiss and ride drop-off for the station. The project related trips is anticipated to be 27 AM peak hour trips (25 inbound and 2 outbound) and 22 PM peak hour trips (2 Inbound and 20 outbound). A driveway connection on Central Avenue will be necessary to access the proposed parking lot.

Bicycle/Pedestrian Access: Existing sidewalks are provided along Central Avenue and 7th Street. The West Orange Trail also stretches in the north/south direction east of Park Avenue (approximately ¼ of a mile to the east of the station). Potential improvements to increase connectivity are to add sidewalks along M.A. Board Street and increase the sidewalk width along Central Avenue. Adding a pedestrian crossing signal on Central Avenue will provide better pedestrian crossing conditions between the park and ride lot and the LYNX SuperStop. Enhancing bicycle facilities along Central Avenue and 7th street will provide better connectivity to the existing West Orange Trail and the existing bike lanes along US 441.

Figure 3-6 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.

SR 429 Station (Bus and Rail)

The SR 429 Station is proposed to be located in the southwest corner of the intersection of US 441 and Kitt Avenue/Connector Road. The station is expected to operate on the existing parking lot, which has an existing connection to US 441. A large size park and ride lot will be provided at the commuter rail station, featuring 100 parking spaces. An additional medium size park and ride lot will be provided at the bus station, featuring 50 parking spaces.

Vehicular Access: Vehicular and bus access at the proposed location would be provided through the existing signalized connection of US 441 and Connector Road. The project related trips for the commuter rail station is anticipated to be 30 AM peak hour trips (29 inbound and 1 outbound) and 24 PM peak hour trips (1 Inbound and 23 outbound). For the bus station, the project related trips for the commuter rail were anticipated to be 14 AM peak hour trips (12 inbound and 2 outbound) and 10 PM peak hour trips (1 Inbound and 9 outbound). Based on anticipated project trips, the current configuration of US 441 and Kitt Avenue/Connector Road would sufficiently accommodate the anticipated project traffic without any improvements.

Bicycle/Pedestrian Access: Existing sidewalks are provided along Connector Road and within the residential neighborhood north of the station, however, sidewalks are needed along US 441 to connect to the station and to the residential neighborhood. Pedestrian signal heads were recommended for installation at the existing signal of US 441 and Connector Road.

Figure 3-7 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.



Figure 3-6: Apopka Station







Figure 3-7: SR 429 Station





Zellwood Station (Bus)

The Zellwood Station is proposed to be located at the northwest corner of the intersection of US 441 and Jones Avenue. Currently, the proposed parcel is vacant. A small size park and ride lot will be provided at this station, featuring 25 parking spaces.

Vehicular Access: Vehicular access at the proposed location would be provided through the existing unsignalized connection to Jones Avenue. Buses were expected to stop along US 441 for passenger pick-up and drop-off. The project related trips were anticipated to be 3 AM peak hour trips (2 inbound and 1 outbound) and 3 PM peak hour trips (1 Inbound and 2 outbound). Based on the anticipated project traffic volumes, no access improvements were necessary to accommodate project related traffic.

Bicycle/Pedestrian Access: Existing sidewalks are provided along US 441 and Jones Avenue east of US 441. There would be potential to increase the connectivity to the warehouses on Jones Avenue by adding sidewalks west of the station.

Figure 3-8 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.











Mount Dora Station (Bus)

The Mount Dora Station (Alternative 1-2) is proposed to be located at the southeast corner of the intersection of US 441 and Stoneybrook Hills Parkway. The station will be located within the existing Publix Plaza, but no business relocations are anticipated. A small size park and ride lot will be provided at this station, featuring 25 parking spaces.

Vehicular Access: Vehicular and bus access at the proposed station would be provided through the existing unsignalized connection to Stoneybrook Hills Parkway. Therefore all traffic to and from the proposed station will be routed through the signalized intersection at US 441 and Stoneybrook Hills Parkway. The project related trips were anticipated to be 7 AM peak hour trips (6 inbound and 1 outbound) and 6 PM peak hour trips (1 Inbound and 5 outbound). The existing connections to the proposed station would adequately serve the project related traffic without any additional improvements.

Bicycle/Pedestrian Access: Existing sidewalks are provided along the north side of Stoneybrook Hills Parkway. However, to provide direct access to the residential development located east of the station, pedestrian facilities should be added along the south side of Stoneybrook Hills Parkway. While there are currently no sidewalks along US 441, there is little demand for pedestrian facilities due to the lack of development.

Figure 3-9 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.





Figure 3-9: Mount Dora Station





Tavares/Eustis Station (Bus)

The Tavares/Eustis Station is proposed to be located at the northwest corner of the intersection of US 441 and Mt. Homer Road. Currently the proposed station parcel is vacant, and is located across from the Waterman Hospital, along Huffstetler Drive. A large size park and ride lot will be provided at this station, featuring 100 parking spaces.

Vehicular Access: Two access points were anticipated for the proposed station location. The western access point, which would line up with the Waterman Hospital driveway, would serve as the bus access for the station. The second access point to the north is anticipated as a stop controlled connection which will line up with Ann Rou Road. Traffic to and from US 441 will be routed through the existing signalized intersection of US 441 and Huffstetler Drive. The project related trips were anticipated to be 9 AM peak hour trips (8 inbound and 1 outbound) and 7 PM peak hour trips (1 Inbound and 6 outbound). Driveway connections to the vehicle and bus access points will be necessary along Huffstetler Drive.

Bicycle/Pedestrian Access: Existing pedestrian and bicycle facilities are provided within the area surrounding the station, which serve the Waterman Hospital west of the station and the residential neighborhood south of the station. To facilitate safe pedestrian access between the hospital and the station, the addition of a pedestrian crossing or a signal (if warranted) at the shared access should be provided.

Figure 3-10 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.



Figure 3-10: Tavares/Eustis Station





4

Viable Alternative 1-5

4.1 Introduction

This alternative will consist of commuter rail from Orlando to Lake County. Based on the preliminary estimates, Alternative 1-5 is anticipated to have a daily ridership of 2,000 trips (\pm 10 percent) per day. Within this chapter, the transportation impacts of Viable Alternative 1-5 will be evaluated for the Corridor Study Area and the proposed station locations. The existing bicycle and pedestrian network within the vicinity of the proposed stations will also be identified, as well as potential improvements to increase connectivity to the proposed stations.

4.2 Corridor Study Area Transportation Impacts

Roadway Usage

Roadway usage was evaluated for the Corridor Study Area during the peak time of day for the year 2035 traffic conditions using the methodology outlined in Chapter 3 of this report. In comparison to the No Build Alternative, the introduction of commuter rail service would result in a small to negligible reduction of volume to capacity ratio on the existing roadways. This reduction was most significant in the AM and PM peak hours of travel. As a result of Viable Alternative 1-5, the anticipated reduction in traffic within the Corridor Study Area ranged from as high as 6.0 percent on Section 4 - Lake County Line to Tavares / Eustis to as low as 1.0 percent on Section 1 - Downtown Orlando to John Young Parkway. Detailed person trip and vehicle trip estimates can be found in Appendix B of this memorandum.

A comparison of the year 2035 peak hour v/c for the No Build Alternative and Viable Alternative 1-5 is provided below in Table 4-1. It should be noted that based on the ridership estimates, Viable Alternative 1-5 was anticipated to reduce the v/c throughout the Corridor Study Area and alleviate the capacity deficiency on three segments.

Figure 4-1 depicts the roadway segments anticipated to operate over capacity by the year 2035 with the addition of Viable Alternative 1-5. Detailed analyses of the year 2035 roadway operating conditions can be found in Appendix A of this memorandum.



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Section 1 - Downtown Orlando to John Young Parkway										
Roadway	Limits	Peak Period	No Build V/C	Alt 1-5 V/C	V/C Reduction %					
US 441	Amelia Street to SR 50	PM	1.21	1.19	1.27%					
Amelia Street	US 441 to Garland Avenue	PM	0.06	0.06	0.00%					
SR 50	US 441 to Westmoreland Drive	PM	1.21	1.20	0.98%					
SR 50	Westmoreland Drive to SR 527	PM	1.15	1.14	1.03%					
US 441	SR 50 to Country Club Drive	PM	1.08	1.07	1.16%					
US 441	Country Club Drive to Country Club Villa	PM	1.10	1.09	1.14%					
US 441	Country Club Villa to Princeton Street	PM	1.10	1.09	1.13%					
US 441	Princeton Street to SR 423	PM	0.95	0.94	1.25%					

Table 4-1: Viable Alternative 1-5 Volume to Capacity Comparison (Year 2035)

Section 2 - John Young Parkway to SR 429										
Roadway	Limits	Peak Period	No Build V/C	Alt 1-5 V/C	V/C Reduction %					
US 441	SR 423 to Overland Road	PM	0.96	0.95	1.73%					
US 441	Overland Road to SR 414	AM	1.01	0.98	2.36%					
US 441	SR 414 to Orange / Seminole County Line	AM	0.89	0.87	2.67%					
US 441	Orange / Seminole Line to Hiawassee Road	AM	0.89	0.87	2.67%					
US 441	Hiawassee Road to Leg to EB 436	PM	0.88	0.86	1.90%					
US 441	Leg to EB 436 to SR 436	PM	0.74	0.72	1.97%					
US 441	SR 436 to Edgewood Drive	PM	1.62	1.60	1.32%					
US 441	Edgewood Drive to CR 435A	PM	1.42	1.40	1.44%					
US 441	CR 435A to CR 437A	PM	1.26	1.24	1.70%					
US 441	CR 437A to SR 429	PM	0.98	0.96	1.70%					

Section 3 - SR 429 to Lake County Line										
Roadway	Limits	Peak Period	No Build V/C	Alt 1-5 V/C	V/C Reduction %					
US 441	SR 429 to Errol Parkway	PM	1.10	1.07	2.65%					



Table 4-1, Continued

US 441	Errol Parkway to CR 437	AM	1.11	1.07	3.81%
US 441	CR 437 to Junction Road	PM	1.26	1.23	2.31%
US 441	Junction Road to Jones Avenue	PM	1.32	1.29	2.31%
US 441	Jones Avenue to Sadler Road	PM	1.10	1.07	2.64%
US 441	Sadler Road to 0.134 mi N of Wadsworth Road	PM	0.71	0.69	2.66%
US 441	Wadsworth Road to Lake / Orange County Line	PM	0.77	0.74	3.24%

Section 4 - Lake County Line to Tavares / Eustis										
Roadway	Limits	Peak Period	No Build V/C	Alt 1-5 V/C	V/C Reduction %					
US 441	Lake / Orange County Line to Limit Avenue	PM	0.94	0.90	3.92%					
US 441	Limit Avenue to SR 44B	PM	0.86	0.84	2.81%					
US 441	SR 44B to SR 19 / Bay Street	PM	0.87	0.85	2.79%					
SR 19/Bay Street	Lake Saunders Drive to Golf Links Avenue	PM	0.73	0.69	5.03%					
SR 19/Bay Street	Golf Links Avenue to Stevens Avenue	PM	0.70	0.67	5.21%					
SR 19 NB/Grove Street	Stevens Avenue to SR 19	PM	1.01	0.96	3.92%					
SR 19 SB/Bay Street	SR 19 to Stevens Avenue	PM	0.79	0.76	4.07%					
SR 19	CR 452 to CR 44	PM	0.61	0.57	6.04%					
US 441	SR 19 / Bay Street to SR 19 / Orange Avenue	PM	1.02	1.00	2.38%					
SR 19/N Duncan Drive	US 441 to CR 500A / Old US 441	PM	1.00	0.95	4.52%					

Source: 2014 FDOT LOS_ALL Update, 2013 FDOT Quality/Level of Service Handbook

Notes: Red shaded text indicates segment anticipated to operate over capacity Transit Trip reduction not applied to Amelia Street





At-Grade Crossings

Within Alternative 1-5, commuter rail from Orlando to Lake County, there are five Florida Central Railroad (FCEN) at-grade crossings that impact mainline traffic. The at-grade crossings are identified below in Table 4-2. It should be noted that three at-grade crossings are located on corridor segments which are anticipated to operate over capacity. While the impact was expected to be minimal, the additional delay at these locations could be reduced by implementing mitigation measures such as signal optimization at grade crossings, and where necessary, shifting platforms further away from the crossing.

Table 4-2: At-Grade Crossings

Crossing ID	Location	Segment Over Capacity
622355U	Amelia Street (approximately 630 feet east of US 441)	No
622356B	SR 50 (approximately 50 feet east of US 441)	Yes
622359W	SR 500/US 441 (approximately 600 feet south of SR 438/Princeton St)	Yes
622365A	US 441 (approximately 270 feet north of Princeton Street)	No
622005C	US 441 (approximately 120 feet east of Mt Homer Road)	Yes







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4.3 Vehicular and Bicycle/Pedestrian Access to Proposed Station Locations

There are nine commuter rail stations and one express bus station within Viable Alternative 1-5. Similar to the summary provided for Viable Alternative 1-2, the existing and proposed vehicular access, bicycle, and pedestrian facilities were identified for each station.

Amelia Street Station (Rail) Please refer to Viable Alternative 1-2.

Robinson Street Station (Rail) *Please refer to Viable Alternative 1-2.*

Princeton Station (Rail) *Please refer to Viable Alternative 1-2.*

Lockhart/Rosemont Station (Rail) Please refer to Viable Alternative 1-2.

Apopka Station (Rail) Please refer to Viable Alternative 1-2.

SR 429 Station (Rail) *Please refer to Viable Alternative 1-2.*

Zellwood Station (Rail)

The Zellwood Rail Station is located at the same location as the Zellwood Bus Station. Please refer to Viable *Alternative 1-2.*

Mount Dora (Rail)

The Mount Dora station was proposed to be located on the south side of Old US Highway 441 between Eudora Road and Poinsettia Drive in the existing Mount Dora Shopping Plaza. A small size park and ride lot will be provided at this station, featuring 25 parking spaces.

Vehicular Access: Vehicular access would be provided via existing signalized intersection at Old US 441 and the Southern Technical College entrance. Bus service would be provided via passenger pickup and drop-off on Old US 441. The project related trips were anticipated to be 4 AM peak hour trips (3 inbound and 1 outbound) and 4 PM peak hour trips (1 inbound and 3 outbound). Based on the anticipated project traffic volumes, no further improvements would be necessary to accommodate the project related traffic.

Bicycle/Pedestrian Access: Currently, there are no pedestrian and bicycle facilities along Old US Highway 441 in the vicinity of the station, however, the Tav-Dora multiuse trail is planned for future conditions. The Tav-Dora multiuse trail will run parallel to Old US Highway 441, just east of the station.

Figure 4-2 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.







Figure 4-2: Mount Dora Rail Station (Alt 1-5)





Tavares Station (Rail)

The Tavares Station was proposed to be located at the northeast corner of the intersection of Main Street and Disston Avenue. The station location is an existing City of Tavares Water Plant and Offices, therefore, a relocation of the existing facilities would be required to accommodate a station and support facilities. A medium size park and ride lot will be provided at this station, featuring 50 parking spaces.

Vehicular Access: Vehicular and bus access at the proposed location would be provided through the existing unsignalized connection to Disston Avenue, however minor improvements may be necessary to accommodate bus access. The project related trips were anticipated to be 18 AM peak hour trips (16 inbound and 2 outbound) and 15 PM peak hour trips (13 Inbound and 2 outbound). Based on the anticipated project traffic volumes, no further improvements are necessary.

Bicycle/Pedestrian Access: The Tavares Station is located within a residential area, which is currently supported by good condition pedestrian facilities. There are two planned multiuse trails to the east of the station (Tav-Dora multiuse trail and Tav-Lee trail). The construction of these two trails will enhance pedestrian and bicycle connectivity to from and to the station. For the purposes of supporting the safe movement of the increased pedestrian traffic, traffic calming improvements are also recommended along Main Street.

Figure 4-3 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.





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Eustis Station (Rail)

The Eustis Station is proposed to be located at the west side of Bay Street between Clifford Avenue and McDonald Avenue. The parcel has a vacant building and is owned by the City of Eustis. A small size park and ride lot would be provided at this station, featuring 25 parking spaces.

Vehicular Access: Vehicular access at the proposed location would be provided through the existing unsignalized connections to both Clifford Avenue and McDonald Avenue, however improvements may be necessary to comply with current access management criteria. Bus service would be provided via passenger pick-up and drop-off on Bay Street. The project related trips were anticipated to be 20 AM peak hour trips (19 inbound and 1 outbound) and 17 PM peak hour trips (16 Inbound and 1 outbound). Based on the anticipated project traffic volumes, no further improvements are necessary.

Bicycle/Pedestrian Access: The station is located within downtown Eustis, which is currently medium density residential and commercial. The existing pedestrian facilities are in good condition, and there are plans to add bike lanes as indicated in the City of Eustis Downtown Master Plan. To enhance the safety of pedestrian network, crosswalks were recommended on the east-west connecter roads between the one-way pairs.

Figure 4-4 illustrates the pedestrian and bicycle connectivity within the vicinity of the proposed station and the anticipated vehicle access considerations.



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5

Viable Alternative 2-4

5.1 Introduction

This alternative would consist of express bus from Orlando to Lake County. Based on the preliminary estimates, Alternative 2-4 is anticipated to have a daily ridership of 800 passengers (\pm 10 percent) per day. Within this Chapter, the transportation impacts of Viable Alternative 2-4 will be evaluated for the Corridor Study Area and the proposed station locations. The existing bicycle and pedestrian network within the vicinity of the proposed stations will also be identified, as well as potential improvements to increase connectivity to the proposed stations.

5.2 Corridor Study Area Transportation Impacts

Roadway Usage

Roadway usage was evaluated for the Corridor Study Area during the peak time of day for the year 2035 traffic conditions using the methodology outlined in Chapter 3 of this report. In comparison to the No Build Alternative, the introduction of express bus service will result in a small to negligible reduction of volume to capacity ratio on the existing roadways. This reduction is most significant in the AM and PM peak hours of travel. As a result of Viable Alternative 2-4, the anticipated reduction in traffic within the Corridor Study Area ranged from as high as 3.5 percent on Section 4 – Lake County Line to Tavares / Eustis to as low as 0.6 percent on Section 1 – Downtown Orlando to John Young Parkway. Detailed person trip and vehicle trip estimates can be found in Appendix B of this memorandum.

A comparison of the year 2035 peak hour v/c for the No Build Alternative and Viable Alternative 2-4 is provided below in Table 5-1. It should be noted that based on the ridership estimates, Viable Alternative 2-4 was anticipated to reduce the v/c throughout the Corridor Study Area and alleviate the capacity deficiency on three segments.



Figure 5-1 depicts the roadway segments anticipated to operate over capacity by the year 2035 with the addition of Viable Alternative 2-4. Detailed analyses of the year 2035 roadway operating conditions can be found in Appendix A of this memorandum.

At-Grade Crossings

Alternative 2-4 would consist of express bus from Orlando to Lake County, therefore, there were no impacts to at-grade crossings.

Table 5-1: Alternative 2-4 Volume to Capacity Comparison (Year 2035) Section 1 Deventourn Orlanda to John Young Parkway

Section 1 - Downtown Orlando to John Young Parkway										
Roadway	Limits	Peak Period	No Build V/C	Alt 2-4 V/C	V/C Reduction %					
US 441	Amelia Street to SR 50	PM	1.21	1.20	0.76%					
Amelia Street	US 441 to Garland Avenue	PM	0.06	0.06	0.00%					
SR 50	US 441 to Westmoreland Drive	PM	1.21	1.21	0.59%					
SR 50	Westmoreland Drive to SR 527	PM	1.15	1.15	0.62%					
US 441	SR 50 to Country Club Drive	PM	1.08	1.07	0.69%					
US 441	Country Club Drive to Country Club Villa	PM	1.10	1.09	0.68%					
US 441	Country Club Villa to Princeton Street	PM	1.10	1.10	0.68%					
US 441	Princeton Street to SR 423	PM	0.95	0.95	0.75%					

Section 2 - John Young Parkway to SR 429

		Peak	No Build	Alt 2-4	V/C Reduction
Roadway	Limits	Period	V/C	V/C	%
US 441	SR 423 to Overland Road	PM	0.96	0.96	0.99%
US 441	Overland Road to SR 414	AM	1.01	0.99	1.42%
	SR 414 to Orange / Seminole				
03 441	County Line	AM	0.89	0.88	1.60%
	Orange / Seminole Line to				
03 441	Hiawassee Road	AM	0.89	0.88	1.60%
	Hiawassee Road to Leg to EB				
03 441	436	PM	0.88	0.87	1.08%
US 441	Leg to EB 436 to SR 436	PM	0.74	0.73	1.13%
US 441	SR 436 to Edgewood Drive	PM	1.62	1.61	0.76%
US 441	Edgewood Drive to CR 435A	PM	1.42	1.41	0.82%
US 441	CR 435A to CR 437A	PM	1.26	1.25	0.97%
US 441	CR 437A to SR 429	PM	0.98	0.97	0.97%



Table 5-1, Continued

Section 3 - SR 429 to Lake County Line							
Roadway	Limits	Peak Period	No Build V/C	Alt 2-4 V/C	V/C Reduction %		
US 441	SR 429 to Errol Parkway	PM	1.10	1.07	2.00%		
US 441	Errol Parkway to CR 437	AM	1.11	1.08	2.86%		
US 441	CR 437 to Junction Road	PM	1.26	1.24	1.74%		
US 441	Junction Road to Jones Avenue	PM	1.32	1.30	1.74%		
US 441	Jones Avenue to Sadler Road	PM	1.10	1.08	1.99%		
	Sadler Road to 0.134 mi N of						
05 441	Wadsworth Road	PM	0.71	0.69	2.01%		
	Wadsworth Road to Lake / Orange						
US 441	County Line	PM	0.77	0.75	2.45%		

Section 4 - Lake County Line to Tavares / Eustis									
Roadway	Limits	Peak Period	No Build V/C	Alt 2-4 V/C	V/C Reduction %				
US 441	Lake / Orange County Line to Limit Avenue	PM	0.94	0.92	2.24%				
US 441	Limit Avenue to SR 44B	PM	0.86	0.85	1.60%				
US 441	SR 44B to SR 19 / Bay Street	PM	0.87	0.86	1.60%				
SR 19/Bay Street	Lake Saunders Drive to Golf Links Avenue	PM	0.73	0.71	2.87%				
SR 19/Bay Street	Golf Links Avenue to Stevens Avenue	PM	0.70	0.68	2.98%				
SR 19 NB/Grove Street	Stevens Avenue to SR 19	PM	1.01	0.98	2.24%				
SR 19 SB/Bay Street	SR 19 to Stevens Avenue	PM	0.79	0.77	2.33%				
SR 19	CR 452 to CR 44	PM	0.61	0.59	3.45%				
US 441	SR 19 / Bay Street to SR 19 / Orange Avenue	PM	1.02	1.01	1.36%				
SR 19/N Duncan Drive	US 441 to CR 500A / Old US 441	PM	1.00	0.97	2.58%				

Source: 2014 FDOT LOS_ALL Update, 2013 FDOT Quality/Level of Service Handbook

Notes: Red shaded text indicates segment anticipated to operate over capacity

Transit Trip reduction not applied to Amelia Street





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5.3 Vehicular and Bicycle/Pedestrian Access to Proposed Station Locations

There would be seven express bus stations within Viable Alternative 2-4. LYNX Central Station will be utilized as one of the bus stations, which will require no further improvements at this particular station. Similar to the summary provided for Viable Alternative 1-2, the existing and proposed vehicular access, bicycle, and pedestrian facilities are identified for each station.

Amelia Station (Bus)

The Amelia Bus Station is located at the same location as the Amelia Rail Station. Please refer to Viable Alternative 1-2.

Vehicular Access: For vehicular and bus access please refer to Viable Alternative 1-2. It should be noted that on-site vehicle and bus circulation would not be provided at this station. Express bus service would be provided via on street pick-up & drop-off at the corner of US 441 and Amelia Street.

Princeton Station (Bus)

The Princeton Bus Station is located at the northeast corner of the intersection of Princeton Street and US 441, one block west of the Princeton Rail Station. Please refer to Viable Alternative 1-2.

Vehicular Access: For vehicular and bus access please refer to Viable Alternative 1-2.

Rosemont Station (Bus)

The Rosemont Station was proposed to operate via existing Rosemont SuperStop bus station, which is located on the west side of US 441 between All American Boulevard and Cinderlane Parkway. The station is located within a residential neighborhood, which has good existing pedestrian and bicycle facilities. The existing conditions and future needs for this station is similar to the Lockhart/Rosemont Rail station. Please refer to Viable Alternative 1-2. A large size park and ride lot will be provided at this station, featuring 100 parking spaces. The park and ride lot will be located at the southwest corner of US 441 and Winter Rose Drive.

Vehicular Access: Please refer to Viable Alternative 1-2 for access conditions for this station. The project related trips were anticipated to be 20 AM peak hour trips (19 inbound and 1 outbound) and 17 PM peak hour trips (16 Inbound and 1 outbound). Based on the anticipated project traffic volumes, no further improvements were necessary.

SR 429 Station (Bus)

Please refer to Viable Alternative 1-2.

Zellwood Station (Bus)

Please refer to Viable Alternative 1-2.

Mount Dora Station 2-4 (Bus)

The Mount Dora Station (Viable Alternative 2-4) is proposed to be located at the northwest corner of the intersection of SR 46 and Round Lake Road. Currently, the proposed parcel is vacant and



there are a small number of developments surrounding the station. A small size park and ride lot will be provided at this station, featuring 25 parking spaces.

Vehicular Access: Vehicular and bus access at the proposed location would be provided through the existing unsignalized connection to SR 46. Buses would enter the station to pickup and drop-off passengers. The project related trips were anticipated to be 19 AM peak hour trips (16 inbound and 3 outbound) and 15 PM peak hour trips (2 Inbound and 13 outbound). Based on the anticipated project traffic volumes and existing driveway connection, no improvements were necessary to accommodate the project related traffic.

Bicycle/Pedestrian Access: Due to the insignificant number of existing developments, there are poor existing pedestrian and bicycle facilities. Improvements for these facilities would be needed for the future conditions. It is expected that bicycle and pedestrian facilities improvements would be associated with the development of the Wekiva Parkway project.

Tavares/Eustis Station (Bus)

Please refer to Viable Alternative 1-2.



Appendix A: Corridor Study Area Analysis Tables

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Section 1 - Downtown Orlando to John Young Parkway

Roadway	Limits	Cost Feasible # of Lanes	FDOT LOS Standard	Maximum Service Volume	2035 AADT	LOS	v/c
US 441	Amelia Street to SR 50	4	D	32,400	39,100	F	1.21
Amelia Street	US 441 to Garland Avenue	4	D	32,400	2,000	С	0.06
SR 50	US 441 to Westmoreland Drive	4	D	41,790	50,600	F	1.21
SR 50	Westmoreland Drive to SR 527	4	D	41,790	48,100	F	1.15
US 441	SR 50 to Country Club Drive	4	D	39,800	42,900	F	1.08
US 441	Country Club Drive to Country Club Villa	4	D	39,800	43,600	F	1.10
US 441	Country Club Villa to Princeton Street	4	D	39,800	43,800	F	1.10
US 441	Princeton Street to SR 423	4	D	41,790	39,700	С	0.95

	Section 2 - John Young Parkway to SR 429											
Roadway	Limits	Cost Feasible # of Lanes	FDOT LOS Standard	Maximum Service Volume	2035 AADT	LOS	v/c					
US 441	SR 423 to Overland Road	4	D	41,790	40,200	D	0.96					
US 441	Overland Road to SR 414	4	D	41,790	42,000	F	1.01					
US 441	SR 414 to Orange / Seminole County Line	4	D	41,790	37,200	С	0.89					
US 441	Orange / Seminole Line to Hiawassee Road	4	D	41,790	37,200	С	0.89					
US 441	Hiawassee Road to Leg to EB 436	4	D	41,790	36,600	С	0.88					
US 441	Leg to EB 436 to SR 436	2	D	23,880	19,700	С	0.82					
US 441	SR 436 to Edgewood Drive	4	D	32,400	52,500	F	1.62					
US 441	Edgewood Drive to CR 435A	4	D	34,020	48,200	F	1.42					
US 441	CR 435A to CR 437A	4	D	32,400	40,900	F	1.26					
US 441	CR 437A to SR 429	4	D	41,790	40,900	D	0.98					

	Section 3 - SR 429 to L	ake County Line					
Roadway	Limits	Cost Feasible # of Lanes	FDOT LOS Standard	Maximum Service Volume	2035 AADT	LOS	v/c
US 441	SR 429 to Errol Parkway	4	D	41,790	45,700	F	1.09
US 441	Errol Parkway to CR 437	4	D	41,790	46,400	F	1.11
US 441	CR 437 to Junction Road	4	D	41,790	52,400	F	1.25
US 441	Junction Road to Jones Avenue	4	D	39,800	52,400	F	1.32
US 441	Jones Avenue to Sadler Road	4	D	41,790	45,900	F	1.10
US 441	Sadler Road to 0.134 mi N of Wadsworth Road	4	D	65,600	46,300	С	0.71
US 441	Wadsworth Road to Lake / Orange County Line	4	С	49,600	38,000	С	0.77

Section 4 - Lake County Line to Tavares / Eustis

		Cost Feasible # of	FDOT LOS	Maximum Service			
Roadway	Limits	Lanes	Standard	Volume	2035 AADT	LOS	v/c
US 441	Lake / Orange County Line to Limit Avenue	4	D	41,790	39,000	С	0.93
US 441	Limit Avenue to SR 44B	6	D	62,900	54,400	С	0.86
US 441	SR 44B to SR 19 / Bay Street	6	D	62,900	54,700	С	0.87
SR 19/Bay Street	Lake Saunders Drive to Golf Links Avenue	4	D	41,790	30,400	С	0.73
SR 19/Bay Street	Golf Links Avenue to Stevens Avenue	4	D	41,790	29,300	С	0.70
SR 19 NB/Grove Street	Stevens Avenue to SR 19	2	D	19,440	21,800	F	1.12
SR 19 SB/Bay Street	SR 19 to Stevens Avenue	2	D	23,880	21,000	С	0.88
SR 19	CR 452 to CR 44	4	D	41,790	25,300	С	0.61
US 441	SR 19 / Bay Street to SR 19 / Orange Avenue	6	D	62,900	64,300	F	1.02
SR 19/N Duncan Drive	US 441 to CR 500A / Old US 441	4	D	34,020	33,800	D	0.99

Source: 2014 FDOT LOS_ALL Update, 2013 FDOT Quality/Level of Service Handbook

Notes: Red shaded text indicates segment anticipated to operate over capacity

Corridor Study Area Analysis No Build Alternative Year 2035 Peak Hour Conditions

	Section 1 - Dov	vntown Orlando to Joh	n Young Parl	way				
Roadway	Limits	Cost Feasible # of Lanes	FDOT LOS Standard	Peak Period	Pk Hour Maximum Service Volume	Pk Hr / Pk Dir Volume	LOS	v/c
US 441	Amelia Street to SR 50	4	D	PM	1,630	1,971	F	1.21
Amelia Street	US 441 to Garland Avenue	4	D	PM	1,630	101	С	0.06
SR 50	US 441 to Westmoreland Drive	4	D	PM	2,100	2,550	F	1.21
SR 50	Westmoreland Drive to SR 527	4	D	PM	2,100	2,424	F	1.15
US 441	SR 50 to Country Club Drive	4	D	PM	2,000	2,162	F	1.08
US 441	Country Club Drive to Country Club Villa	4	D	PM	2,000	2,197	F	1.10
US 441	Country Club Villa to Princeton Street	4	D	PM	2,000	2,208	F	1.10
US 441	Princeton Street to SR 423	4	D	PM	2,100	2,001	С	0.95

	Section 2 -	John Young Parkway	y to SR 429					
Roadway	Limits	Cost Feasible # of Lanes	FDOT LOS Standard	Peak Period	Pk Hour Maximum Service Volume	Pk Hr / Pk Dir Volume	LOS	v/c
US 441	SR 423 to Overland Road	4	D	PM	2,100	2,026	D	0.96
US 441	Overland Road to SR 414	4	D	AM	2,100	2,117	F	1.01
US 441	SR 414 to Orange / Seminole County Line	4	D	AM	2,100	1,875	С	0.89
US 441	Orange / Seminole Line to Hiawassee Road	4	D	AM	2,100	1,875	С	0.89
US 441	Hiawassee Road to Leg to EB 436	4	D	PM	2,100	1,845	С	0.88
US 441	Leg to EB 436 to SR 436	2	D	PM	2,400	1,773	С	0.74
US 441	SR 436 to Edgewood Drive	4	D	PM	1,630	2,646	F	1.62
US 441	Edgewood Drive to CR 435A	4	D	PM	1,712	2,429	F	1.42
US 441	CR 435A to CR 437A	4	D	PM	1,630	2,061	F	1.26
US 441	CR 437A to SR 429	4	D	PM	2,100	2,061	D	0.98

	Section 3 -	SR 429 to Lake Cou	unty Line					
Roadway	Limits	Cost Feasible # of Lanes	FDOT LOS Standard	Peak Period	Pk Hour Maximum Service Volume	Pk Hr / Pk Dir Volume	LOS	v/c
US 441	SR 429 to Errol Parkway	4	D	PM	2,100	2,303	F	1.10
US 441	Errol Parkway to CR 437	4	D	AM	2,100	2,339	F	1.11
US 441	CR 437 to Junction Road	4	D	PM	2,100	2,641	F	1.26
US 441	Junction Road to Jones Avenue	4	D	PM	2,000	2,641	F	1.32
US 441	Jones Avenue to Sadler Road	4	D	PM	2,100	2,313	F	1.10
US 441	Sadler Road to 0.134 mi N of Wadsworth Road	4	D	PM	3,240	2,292	С	0.71
US 441	Wadsworth Road to Lake / Orange County Line	4	С	PM	2,450	1,881	С	0.77

	Section 4 - La	ke County Line to Ta	vares / Eusti	5				
Roadway	Limits	Cost Feasible # of Lanes	FDOT LOS Standard	Peak Period	Pk Hour Maximum Service Volume	Pk Hr / Pk Dir Volume	LOS	v/c
US 441	Lake / Orange County Line to Limit Avenue	4	D	PM	2,100	1,966	С	0.94
US 441	Limit Avenue to SR 44B	6	D	PM	3,171	2,742	С	0.86
US 441	SR 44B to SR 19 / Bay Street	6	D	PM	3,171	2,757	С	0.87
SR 19/Bay Street	Lake Saunders Drive to Golf Links Avenue	4	D	PM	2,100	1,532	С	0.73
SR 19/Bay Street	Golf Links Avenue to Stevens Avenue	4	D	PM	2,100	1,477	С	0.70
SR 19 NB/Grove Street	Stevens Avenue to SR 19	2	D	PM	1,956	1,962	E	1.01
SR 19 SB/Bay Street	SR 19 to Stevens Avenue	2	D	PM	2,400	1,890	С	0.79
SR 19	CR 452 to CR 44	4	D	PM	2,100	1,275	С	0.61
US 441	SR 19 / Bay Street to SR 19 / Orange Avenue	6	D	PM	3,171	3,241	F	1.02
SR 19/N Duncan Drive	US 441 to CR 500A / Old US 441	4	D	PM	1,712	1,704	D	1.00

Source: 2014 FDOT LOS_ALL Update, 2013 FDOT Quality/Level of Service Handbook

Notes: Red shaded text indicates segment anticipated to operate over capacity

Corridor Study Area Analysis Viable Alternative 1-2 Commuter Rail & Express Bus Year 2035 Peak Hour Conditions

				Castian 1	Damatan a	anda ta Jahu '	Varia Davi									
		Cost Feasible	Maximum Service	FDOT LOS	- Downtown Orl	Pk Hour Maximum Service	2035	way		No Build Pk Hr / Pk Dr	No Build	Transit Trip	Alt 1-2 Pk Hr / Pk Dr		Alt 1-2	V/C Reduction
Roadway	Limits	# of Lanes	Volume ²	Standard	Peak Period	Volume	AADT	K Factor	D Factor	Volume	v/c	Reduction	Volume	LOS	v/c	%
US 441	Amelia Street to SR 50	4	32,400	D	PM	1,630	39,100	0.09	0.56	1,971	1.21	8	1,963	F	1.20	0.41%
Amelia Street	US 441 to Garland Avenue	4	32,400	D	PM	1,630	2,000	0.09	0.56	101	0.06	0	101	С	0.06	0.00%
SR 50	US 441 to Westmoreland Drive	4	41,790	D	PM	2,100	50,600	0.09	0.56	2,550	1.21	8	2,542	F	1.21	0.31%
SR 50	Westmoreland Drive to SR 527	4	41,790	D	PM	2,100	48,100	0.09	0.56	2,424	1.15	8	2,416	F	1.15	0.33%
US 441	SR 50 to Country Club Drive	4	39,800	D	PM	2,000	42,900	0.09	0.56	2,162	1.08	8	2,154	F	1.08	0.37%
US 441	Country Club Drive to Country Club Villa	4	39,800	D	PM	2,000	43,600	0.09	0.56	2,197	1.10	8	2,189	F	1.09	0.36%
US 441	Country Club Villa to Princeton Street	4	39,800	D	PM	2,000	43,800	0.09	0.56	2,208	1.10	8	2,200	F	1.10	0.36%
US 441	Princeton Street to SR 423	4	41,790	D	PM	2,100	39,700	0.09	0.56	2,001	0.95	8	1,993	С	0.95	0.40%

				Se	ction 2 - John Yo	ung Parkway t	o SR 429									
Roadway	Limits	Cost Feasible # of Lanes	Maximum Service Volume ²	FDOT LOS Standard	Peak Period	Pk Hour Maximum Service Volume	2035 AADT	K Factor	D Factor	No Build Pk Hr / Pk Dr Volume	No Build V/C	Transit Trip Reduction	Alt 1-2 Pk Hr / Pk Dr Volume	LOS	Alt 1-2 V/C	V/C Reduction %
US 441	SR 423 to Overland Road	4	41,790	D	PM	2,100	40,200	0.09	0.56	2,026	0.96	8	2,018	D	0.96	0.39%
US 441	Overland Road to SR 414	4	41,790	D	AM	2,100	42,000	0.09	0.56	2,117	1.01	11	2,106	F	1.01	0.52%
US 441	SR 414 to Orange / Seminole County Line	4	41,790	D	AM	2,100	37,200	0.09	0.56	1,875	0.89	11	1,864	С	0.89	0.59%
US 441	Orange / Seminole Line to Hiawassee Road	4	41,790	D	AM	2,100	37,200	0.09	0.56	1,875	0.89	11	1,864	С	0.89	0.59%
US 441	Hiawassee Road to Leg to EB 436	4	41,790	D	PM	2,100	36,600	0.09	0.56	1,845	0.88	8	1,837	С	0.87	0.43%
US 441	Leg to EB 436 to SR 436	2	23,880	D	PM	2,400	19,700	0.09	1.00	1,773	0.74	8	1,765	С	0.74	0.45%
US 441	SR 436 to Edgewood Drive	4	32,400	D	PM	1,630	52,500	0.09	0.56	2,646	1.62	8	2,638	F	1.62	0.30%
US 441	Edgewood Drive to CR 435A	4	34,020	D	PM	1,712	48,200	0.09	0.56	2,429	1.42	8	2,421	F	1.41	0.33%
US 441	CR 435A to CR 437A	4	32,400	D	PM	1,630	40,900	0.09	0.56	2,061	1.26	8	2,053	F	1.26	0.39%
US 441	CR 437A to SR 429	4	41,790	D	PM	2,100	40,900	0.09	0.56	2,061	0.98	8	2,053	D	0.98	0.39%

				S	ection 3 - SR 429	to Lake Coun	ty Line									
			Maximum	FDOT		Maximum				No Build	No	Transit	Alt 1-2		Alt	v/c
		Cost Feasible	Service	LOS		Service	2035			Pk Hr / Pk Dr	Build	Trip	Pk Hr / Pk Dr		1-2	Reduction
Roadway	Limits	# of Lanes	Volume ²	Standard	Peak Period	Volume	AADT	K Factor	D Factor	Volume	v/c	Reduction	Volume	LOS	v/c	%
US 441	SR 429 to Errol Parkway	4	41,790	D	PM	2,100	45,700	0.09	0.56	2,303	1.10	44	2,259	F	1.08	1.91%
US 441	Errol Parkway to CR 437	4	41,790	D	AM	2,100	46,400	0.09	0.56	2,339	1.11	64	2,275	F	1.08	2.74%
US 441	CR 437 to Junction Road	4	41,790	D	PM	2,100	52,400	0.09	0.56	2,641	1.26	44	2,597	F	1.24	1.67%
US 441	Junction Road to Jones Avenue	4	39,800	D	PM	2,000	52,400	0.09	0.56	2,641	1.32	44	2,597	F	1.30	1.67%
US 441	Jones Avenue to Sadler Road	4	41,790	D	PM	2,100	45,900	0.09	0.56	2,313	1.10	44	2,269	F	1.08	1.90%
US 441	Sadler Road to 0.134 mi N of Wadsworth Road	4	65,600	D	PM	3,240	46,300	0.09	0.55	2,292	0.71	44	2,248	С	0.69	1.92%
US 441	Wadsworth Road to Lake / Orange County Line	4	49,600	C	PM	2,450	38,000	0.09	0.55	1,881	0.77	44	1,837	С	0.75	2.34%

				Section	on 4 - Lake Coun	ty Line to Tava	ares / Eustis	5								
			Maximum	FDOT		Maximum				No Build	No	Transit	Alt 1-2		Alt	v/c
		Cost Feasible	Service	LOS		Service	2035			Pk Hr / Pk Dr	Build	Trip	Pk Hr / Pk Dr		1-2	Reduction
Roadway	Limits	# of Lanes	Volume ²	Standard	Peak Period	Volume	AADT	K Factor	D Factor	Volume	v/c	Reduction	Volume	LOS	v/c	%
US 441	Lake / Orange County Line to Limit Avenue	4	41,790	D	PM	2,100	39,000	0.09	0.56	1,966	0.94	65	1,901	С	0.91	3.31%
US 441	Limit Avenue to SR 44B	6	62,900	D	PM	3,171	54,400	0.09	0.56	2,742	0.86	65	2,677	С	0.84	2.37%
US 441	SR 44B to SR 19 / Bay Street	6	62,900	D	PM	3,171	54,700	0.09	0.56	2,757	0.87	65	2,692	С	0.85	2.36%
SR 19/Bay Street	Lake Saunders Drive to Golf Links Avenue	4	41,790	D	PM	2,100	30,400	0.09	0.56	1,532	0.73	65	1,467	С	0.70	4.24%
SR 19/Bay Street	Golf Links Avenue to Stevens Avenue	4	41,790	D	PM	2,100	29,300	0.09	0.56	1,477	0.70	65	1,412	С	0.67	4.40%
SR 19 NB/Grove Street	Stevens Avenue to SR 19	2	19,440	D	PM	1,956	21,800	0.09	1.00	1,962	1.01	65	1,897	E	0.97	3.31%
SR 19 SB/Bay Street	SR 19 to Stevens Avenue	2	23,880	D	PM	2,400	21,000	0.09	1.00	1,890	0.79	65	1,825	С	0.76	3.44%
SR 19	CR 452 to CR 44	4	41,790	D	PM	2,100	25,300	0.09	0.56	1,275	0.61	65	1,210	С	0.58	5.10%
US 441	SR 19 / Bay Street to SR 19 / Orange Avenue	6	62,900	D	PM	3,171	64,300	0.09	0.56	3,241	1.02	65	3,176	F	1.01	2.01%
SR 19/N Duncan Drive	US 441 to CR 500A / Old US 441	4	34,020	D	PM	1,712	33,800	0.09	0.56	1,704	1.00	65	1,639	D	0.96	3.81%

Source: 2014 FDOT LOS_ALL Update, 2013 FDOT Quality/Level of Service Handbook

Notes: Red shaded text indicates segment anticipated to operate over capacity

Transit Trip reduction not applied to Amelia Street

Corridor Study Area Analysis Viable Alternative 1-5 Commuter Rail Year 2035 Peak Hour Conditions

				Section 1 -	Downtown Orla	ndo to John Yo	oung Parkv	vay								
			Maximum	FDOT		Pk Hour				No Build Pk Hr /	No	Transit	Alt 1-5		Alt	V/C
		Cost Feasible	Service	LOS		Maximum	2035			Pk Dr	Build	Trip	Pk Hr / Pk Dr		1-5	Reduction
Roadway	Limits	# of Lanes	Volume ²	Standard	Peak Period	Service	AADT	K Factor	D Factor	Volume	v/c	Reduction	Volume	LOS	v/c	%
US 441	Amelia Street to SR 50	4	32,400	D	PM	1,630	39,100	0.09	0.56	1,971	1.21	25	1,946	F	1.19	1.27%
Amelia Street	US 441 to Garland Avenue	4	32,400	D	PM	1,630	2,000	0.09	0.56	101	0.06	0	101	С	0.06	0.00%
SR 50	US 441 to Westmoreland Drive	4	41,790	D	PM	2,100	50,600	0.09	0.56	2,550	1.21	25	2,525	F	1.20	0.98%
SR 50	Westmoreland Drive to SR 527	4	41,790	D	PM	2,100	48,100	0.09	0.56	2,424	1.15	25	2,399	F	1.14	1.03%
US 441	SR 50 to Country Club Drive	4	39,800	D	PM	2,000	42,900	0.09	0.56	2,162	1.08	25	2,137	F	1.07	1.16%
US 441	Country Club Drive to Country Club Villa	4	39,800	D	PM	2,000	43,600	0.09	0.56	2,197	1.10	25	2,172	F	1.09	1.14%
US 441	Country Club Villa to Princeton Street	4	39,800	D	PM	2,000	43,800	0.09	0.56	2,208	1.10	25	2,183	F	1.09	1.13%
US 441	Princeton Street to SR 423	4	41,790	D	PM	2,100	39,700	0.09	0.56	2,001	0.95	25	1,976	С	0.94	1.25%

				Sect	ion 2 - John You	ng Parkway to	SR 429									
Roadway	Limits	Cost Feasible # of Lanes	Maximum Service Volume ²	FDOT LOS Standard	Peak Period	Maximum Service Volume	2035 AADT	K Factor	D Factor	No Build Pk Hr / Pk Dr Volume	No Build V/C	Transit Trip Reduction	Alt 1-5 Pk Hr / Pk Dr Volume	LOS	Alt 1-5 V/C	V/C Reduction %
US 441	SR 423 to Overland Road	4	41,790	D	PM	2,100	40,200	0.09	0.56	2,026	0.96	35	1,991	D	0.95	1.73%
US 441	Overland Road to SR 414	4	41,790	D	AM	2,100	42,000	0.09	0.56	2,117	1.01	50	2,067	F	0.98	2.36%
US 441	SR 414 to Orange / Seminole County Line	4	41,790	D	AM	2,100	37,200	0.09	0.56	1,875	0.89	50	1,825	С	0.87	2.67%
US 441	Orange / Seminole Line to Hiawassee Road	4	41,790	D	AM	2,100	37,200	0.09	0.56	1,875	0.89	50	1,825	С	0.87	2.67%
US 441	Hiawassee Road to Leg to EB 436	4	41,790	D	PM	2,100	36,600	0.09	0.56	1,845	0.88	35	1,810	С	0.86	1.90%
US 441	Leg to EB 436 to SR 436	2	23,880	D	PM	2,400	19,700	0.09	1.00	1,773	0.74	35	1,738	С	0.72	1.97%
US 441	SR 436 to Edgewood Drive	4	32,400	D	PM	1,630	52,500	0.09	0.56	2,646	1.62	35	2,611	F	1.60	1.32%
US 441	Edgewood Drive to CR 435A	4	34,020	D	PM	1,712	48,200	0.09	0.56	2,429	1.42	35	2,394	F	1.40	1.44%
US 441	CR 435A to CR 437A	4	32,400	D	PM	1,630	40,900	0.09	0.56	2,061	1.26	35	2,026	F	1.24	1.70%
US 441	CR 437A to SR 429	4	41,790	D	PM	2,100	40,900	0.09	0.56	2,061	0.98	35	2,026	D	0.96	1.70%

	Section 3 - SR 429 to Lake County Line															
Roadway	Limits	Cost Feasible # of Lanes	Maximum Service Volume ²	FDOT LOS Standard	Peak Period	Maximum Service Volume	2035 AADT	K Factor	D Factor	No Build Pk Hr / Pk Dr Volume	No Build V/C	Transit Trip Reduction	Alt 1-5 Pk Hr / Pk Dr Volume	LOS	Alt 1-5 V/C	V/C Reduction %
US 441	SR 429 to Errol Parkway	4	41,790	D	PM	2,100	45,700	0.09	0.56	2,303	1.10	61	2,242	F	1.07	2.65%
US 441	Errol Parkway to CR 437	4	41,790	D	AM	2,100	46,400	0.09	0.56	2,339	1.11	89	2,250	F	1.07	3.81%
US 441	CR 437 to Junction Road	4	41,790	D	PM	2,100	52,400	0.09	0.56	2,641	1.26	61	2,580	F	1.23	2.31%
US 441	Junction Road to Jones Avenue	4	39,800	D	PM	2,000	52,400	0.09	0.56	2,641	1.32	61	2,580	F	1.29	2.31%
US 441	Jones Avenue to Sadler Road	4	41,790	D	PM	2,100	45,900	0.09	0.56	2,313	1.10	61	2,252	F	1.07	2.64%
US 441	Sadler Road to 0.134 mi N of Wadsworth Road	4	65,600	D	PM	3,240	46,300	0.09	0.55	2,292	0.71	61	2,231	С	0.69	2.66%
US 441	Wadsworth Road to Lake / Orange County Line	4	49,600	С	PM	2,450	38,000	0.09	0.55	1,881	0.77	61	1,820	С	0.74	3.24%

				Section	n 4 - Lake County	/ Line to Tavar	es / Eustis									
Roadway	Limits	Cost Feasible # of Lanes	Maximum Service Volume ²	FDOT LOS Standard	Peak Period	Pk Hour Maximum Service Volume	2035 AADT	K Factor	D Factor	No Build Pk Hr / Pk Dr Volume	No Build V/C	Transit Trip Reduction	Alt 1-5 Pk Hr / Pk Dr Volume	LOS	Alt 1-5 V/C	V/C Reduction %
US 441	Lake / Orange County Line to Limit Avenue	4	41,790	D	PM	2,100	39,000	0.09	0.56	1,966	0.94	77	1,889	С	0.90	3.92%
US 441	Limit Avenue to SR 44B	6	62,900	D	PM	3,171	54,400	0.09	0.56	2,742	0.86	77	2,665	С	0.84	2.81%
US 441	SR 44B to SR 19 / Bay Street	6	62,900	D	PM	3,171	54,700	0.09	0.56	2,757	0.87	77	2,680	С	0.85	2.79%
SR 19/Bay Street	Lake Saunders Drive to Golf Links Avenue	4	41,790	D	PM	2,100	30,400	0.09	0.56	1,532	0.73	77	1,455	С	0.69	5.03%
SR 19/Bay Street	Golf Links Avenue to Stevens Avenue	4	41,790	D	PM	2,100	29,300	0.09	0.56	1,477	0.70	77	1,400	С	0.67	5.21%
SR 19 NB/Grove Street	Stevens Avenue to SR 19	2	19,440	D	PM	1,956	21,800	0.09	1.00	1,962	1.01	77	1,885	E	0.96	3.92%
SR 19 SB/Bay Street	SR 19 to Stevens Avenue	2	23,880	D	PM	2,400	21,000	0.09	1.00	1,890	0.79	77	1,813	С	0.76	4.07%
SR 19	CR 452 to CR 44	4	41,790	D	PM	2,100	25,300	0.09	0.56	1,275	0.61	77	1,198	С	0.57	6.04%
US 441	SR 19 / Bay Street to SR 19 / Orange Avenue	6	62,900	D	PM	3,171	64,300	0.09	0.56	3,241	1.02	77	3,164	F	1.00	2.38%
SR 19/N Duncan Drive	US 441 to CR 500A / Old US 441	4	34,020	D	PM	1,712	33,800	0.09	0.56	1,704	1.00	77	1,627	D	0.95	4.52%
Source: 2014 EDOT LOS ALL Undate 2	2013 EDOT Quality/Level of Service Handbook															

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Notes: Red shaded text indicates segment anticipated to operate over capacity

Transit Trip reduction not applied to Amelia Street

Viable Alternative 2-4 Express Bus Year 2035 Peak Hour Conditions

	Section 1 - Downtown Orlando to John Young Parkway															
			waximum	FDOT		Pk Hour				No Build	No	Transit	Alt 2-4		Alt	V/C
		Cost Feasible	Service	LOS		Maximum	2035			Pk Hr / Pk Dr	Build	Trip	Pk Hr / Pk Dr		2-4	Reduction
Roadway	Limits	# of Lanes	Volume ²	Standard	Peak Period	Service	AADT	K Factor	D Factor	Volume	v/c	Reduction	Volume	LOS	v/c	%
US 441	Amelia Street to SR 50	4	32,400	D	PM	1,630	39,100	0.09	0.56	1,971	1.21	15	1,956	F	1.20	0.76%
Amelia Street	US 441 to Garland Avenue	4	32,400	D	PM	1,630	2,000	0.09	0.56	101	0.06	0	101	С	0.06	0.00%
SR 50	US 441 to Westmoreland Drive	4	41,790	D	PM	2,100	50,600	0.09	0.56	2,550	1.21	15	2,535	F	1.21	0.59%
SR 50	Westmoreland Drive to SR 527	4	41,790	D	PM	2,100	48,100	0.09	0.56	2,424	1.15	15	2,409	F	1.15	0.62%
US 441	SR 50 to Country Club Drive	4	39,800	D	PM	2,000	42,900	0.09	0.56	2,162	1.08	15	2,147	F	1.07	0.69%
US 441	Country Club Drive to Country Club Villa	4	39,800	D	PM	2,000	43,600	0.09	0.56	2,197	1.10	15	2,182	F	1.09	0.68%
US 441	Country Club Villa to Princeton Street	4	39,800	D	PM	2,000	43,800	0.09	0.56	2,208	1.10	15	2,193	F	1.10	0.68%
US 441	Princeton Street to SR 423	4	41,790	D	PM	2,100	39,700	0.09	0.56	2,001	0.95	15	1,986	С	0.95	0.75%

	Section 2 - John Young Parkway to SR 429															
Roadway	Limits	Cost Feasible # of Lanes	Maximum Service Volume ²	FDOT LOS Standard	Peak Period	Maximum Service Volume	2035 AADT	K Factor	D Factor	Pk Hr / Pk Dr Volume	No Build V/C	Transit Trip Reduction	Alt 2-4 Pk Hr / Pk Dr Volume	LOS	Alt 2-4 V/C	V/C Reduction %
US 441	SR 423 to Overland Road	4	41,790	D	PM	2,100	40,200	0.09	0.56	2,026	0.96	20	2,006	D	0.96	0.99%
US 441	Overland Road to SR 414	4	41,790	D	AM	2,100	42,000	0.09	0.56	2,117	1.01	30	2,087	D	0.99	1.42%
US 441	SR 414 to Orange / Seminole County Line	4	41,790	D	AM	2,100	37,200	0.09	0.56	1,875	0.89	30	1,845	С	0.88	1.60%
US 441	Orange / Seminole Line to Hiawassee Road	4	41,790	D	AM	2,100	37,200	0.09	0.56	1,875	0.89	30	1,845	С	0.88	1.60%
US 441	Hiawassee Road to Leg to EB 436	4	41,790	D	PM	2,100	36,600	0.09	0.56	1,845	0.88	20	1,825	С	0.87	1.08%
US 441	Leg to EB 436 to SR 436	2	23,880	D	PM	2,400	19,700	0.09	1.00	1,773	0.74	20	1,753	С	0.73	1.13%
US 441	SR 436 to Edgewood Drive	4	32,400	D	PM	1,630	52,500	0.09	0.56	2,646	1.62	20	2,626	F	1.61	0.76%
US 441	Edgewood Drive to CR 435A	4	34,020	D	PM	1,712	48,200	0.09	0.56	2,429	1.42	20	2,409	F	1.41	0.82%
US 441	CR 435A to CR 437A	4	32,400	D	PM	1,630	40,900	0.09	0.56	2,061	1.26	20	2,041	F	1.25	0.97%
US 441	CR 437A to SR 429	4	41,790	D	PM	2,100	40,900	0.09	0.56	2,061	0.98	20	2,041	D	0.97	0.97%

	Section 3 - SR 429 to Lake County Line															
			Maximum	FDOT		Maximum					No	Transit	Alt 2-4		Alt	V/C
		Cost Feasible	Service	LOS		Service	2035			Pk Hr / Pk Dr	Build	Trip	Pk Hr / Pk Dr		2-4	Reduction
Roadway	Limits	# of Lanes	Volume ²	Standard	Peak Period	Volume	AADT	K Factor	D Factor	Volume	v/c	Reduction	Volume	LOS	v/c	%
US 441	SR 429 to Errol Parkway	4	41,790	D	PM	2,100	45,700	0.09	0.56	2,303	1.10	46	2,257	F	1.07	2.00%
US 441	Errol Parkway to CR 437	4	41,790	D	AM	2,100	46,400	0.09	0.56	2,339	1.11	67	2,272	F	1.08	2.86%
US 441	CR 437 to Junction Road	4	41,790	D	PM	2,100	52,400	0.09	0.56	2,641	1.26	46	2,595	F	1.24	1.74%
US 441	Junction Road to Jones Avenue	4	39,800	D	PM	2,000	52,400	0.09	0.56	2,641	1.32	46	2,595	F	1.30	1.74%
US 441	Jones Avenue to Sadler Road	4	41,790	D	PM	2,100	45,900	0.09	0.56	2,313	1.10	46	2,267	F	1.08	1.99%
US 441	Sadler Road to 0.134 mi N of Wadsworth Road	4	65,600	D	PM	3,240	46,300	0.09	0.55	2,292	0.71	46	2,246	С	0.69	2.01%
US 441	Wadsworth Road to Lake / Orange County Line	4	49,600	С	PM	2,450	38,000	0.09	0.55	1,881	0.77	46	1,835	С	0.75	2.45%

				Sect	ion 4 - Lake Cou	nty Line to Ta	vares / Eust	tis								
Roadway	Limits	Cost Feasible # of Lanes	Maximum Service Volume ²	FDOT LOS Standard	Peak Period	Maximum Service Volume	2035 AADT	K Factor	D Factor	Pk Hr / Pk Dr Volume	No Build V/C	Transit Trip Reduction	Alt 2-4 Pk Hr / Pk Dr Volume	LOS	Alt 2-4 V/C	V/C Reduction %
US 441	Lake / Orange County Line to Limit Avenue	4	41,790	D	PM	2,100	39,000	0.09	0.56	1,966	0.94	44	1,922	С	0.92	2.24%
US 441	Limit Avenue to SR 44B	6	62,900	D	PM	3,171	54,400	0.09	0.56	2,742	0.86	44	2,698	С	0.85	1.60%
US 441	SR 44B to SR 19 / Bay Street	6	62,900	D	PM	3,171	54,700	0.09	0.56	2,757	0.87	44	2,713	С	0.86	1.60%
SR 19/Bay Street	Lake Saunders Drive to Golf Links Avenue	4	41,790	D	PM	2,100	30,400	0.09	0.56	1,532	0.73	44	1,488	С	0.71	2.87%
SR 19/Bay Street	Golf Links Avenue to Stevens Avenue	4	41,790	D	PM	2,100	29,300	0.09	0.56	1,477	0.70	44	1,433	С	0.68	2.98%
SR 19 NB/Grove Street	Stevens Avenue to SR 19	2	19,440	D	PM	1,956	21,800	0.09	1.00	1,962	1.01	44	1,918	D	0.98	2.24%
SR 19 SB/Bay Street	SR 19 to Stevens Avenue	2	23,880	D	PM	2,400	21,000	0.09	1.00	1,890	0.79	44	1,846	С	0.77	2.33%
SR 19	CR 452 to CR 44	4	41,790	D	PM	2,100	25,300	0.09	0.56	1,275	0.61	44	1,231	С	0.59	3.45%
US 441	SR 19 / Bay Street to SR 19 / Orange Avenue	6	62,900	D	PM	3,171	64,300	0.09	0.56	3,241	1.02	44	3,197	F	1.01	1.36%
SR 19/N Duncan Drive	US 441 to CR 500A / Old US 441	4	34,020	D	PM	1,712	33,800	0.09	0.56	1,704	1.00	44	1,660	D	0.97	2.58%

Source: 2014 FDOT LOS_ALL Update, 2013 FC Source: 2014 FDOT LOS_ALL Update, 2013 FDOT Quality/Level of Service Handbook

Notes: Red shaded text indicates segment ant Notes: Red shaded text indicates segment anticipated to operate over capacity

Transit Trip reduction not applied to Amelia S Transit Trip reduction not applied to Amelia Street


Appendix B: Corridor Segment Analysis of Build Transit Trips by Alternative

Corridor Segment Analysis of Build Transit Trips by Alternative

Trips in Vehicle Trips columns represents the amount of vehicles that would be removed from the highway network in the AM and PM Peak hours by direction

Alt 1-5 Commuter Rail (1)

				Persor		Vehicle Trips						
Segment	OP	РК (2)	AM Peak Inbound	AM Peak Outbound	PM Peak Inbound	PM Peak Outbound	AM Peak Inbound	AM Peak Outbound	PM Peak Inbound	PM Peak Outbound		
End to Zellwood	211	250	44	19	20	30	37	16	17	25		
Zellwood to 429	252	334	59	26	27	41	50	22	23	35		
429 to Rosemont	304	604	106	46	49	73	89	39	41	61		
Rosemont to Downtown	297	760	133	57	61	92	111	48	51	77		

Alt 2-4 Express Bus (1)

				Persor	n Trips		Vehicle Trips						
Cogmont	OD.	DK (2)	AM Peak	AM Peak	PM Peak	PM Peak	AM Peak	AM Peak	PM Peak	PM Peak			
Segment	UP	PK (2)	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound			
End to Zellwood*	93	150	27	12	12	18	23	10	10	15			
Zellwood to 429**	136	196	35	15	16	24	30	13	14	20			
429 to Rosemont	240	455	80	35	37	55	67	30	31	46			
Rosemont to Downtown	150	430	76	33	35	52	64	28	30	44			

*Express Bus doesn't stop at Zellwood so this segment is really Eustis/Tavares to Mount Dora **Similarly, this segment is really Mount Dora to 429

Alt 1-2 Commuter Rail & Express Bus (1)

				Persor	n Trips		Vehicle Trips						
Segment	ОР	PK (2)	AM Peak	AM Peak	PM Peak	PM Peak	AM Peak	AM Peak	PM Peak	PM Peak			
			IIIboullu	Outbound	mbound	Outbound	IIIbouliu	Outbound	IIIboullu	Outbound			
End to Zellwood	29	68	12	6	6	9	10	5	5	8			
Zellwood to 429	29	72	13	6	6	9	11	5	5	8			
429 to Rosemont	132	430	76	33	35	52	64	28	30	44			
Rosemont to Downtown	165	636	112	48	51	77	94	40	43	65			

Percent of Peak in Peak Hour

	AM	50%
	PM	40%
Directional Split		
	AM In	0.7
	AM Out	0.3
	PM In	0.4
	PM Out	0.6
Auto Occupancy		1.2

Notes:

1. Base numbers come from model results

2. Peak period of model is total of both AM & PM periods. Peak periods are 3 hours long



Appendix C: Station Access Traffic Impacts

Station Impacts Viable Alternative 1-2

Alternative 1-2									AM and PM Peak Hour Vehicle Trips											
				Total Number of	Number of Trips	Percent of Trips	Park and Ride	Proposed												
			Total Boarding &	Trips (See Note	Using Park and	using Park and	Demand (See	Parking Size	PnR AM In	PnR AM	PnR PM In	PnR PM	KnR AM In	KnR AM	KnR PM	KnR PM	Total AM	Total AM	Total PM	Total PM
CommuterRail Stations	Production	Attraction	Alightings	1)	Ride (See Note 2)	Ride	Note 1)	(See Note 5)	(11)	Out (12)	(13)	Out (14)	(15)	Out (15)	In (15)	Out (15)	In	Out	IN	Out
1: Orlando Health/Amtrak	17	108	125	62		0%	0	(D											
2: Church Street	71	379	450	225		0%	0	(D											
3: Robinson Street	46	256	302	151		0%	0	(0											
4: Amelia Street																				
5: Princeton	145	109	254	127	88	64%	44	50	15	-	-	12	1	1	1	1	16	1	1	13
6: Lockhart/Rosemont	347	209	557	278	157	49%	79	100	27	-	-	22	3	3	2	2	30	3	2	24
7: Apopka	317	96	414	207	131	. 51%	66	100	23	-	-	18	2	2	2	2	25	2	2	20
8: SR 429	245	33	278	139	159	93%	59	100	27	-	-	22	1	1	1	1	29	1	1	23
																			•	

Express Bus	Production	Attraction	Total Boardings & Alightings	Total Number of Trips (See Note 1)	Number of Trips Using Park and Ride (60%) (See Note 3)	Park and Ride Demand (See Note 4)	Proposed Parking Size (See Note 5)
8: SR 429 Alt 12	12	102	114	57	17	28	50
9: Zellwood Alt 12	12	4	15	8	2	4	25
10: Mt Dora Alt 12	51	14	65	33	10	16	25
11: Tavares/Eustis	63	18	81	40	12	20	100
Total			2,655	1,327			

10	-	-	8	2	2	1	1	12	2	1	9
1	-	-	1	1	1	1	1	2	1	1	2
5	-	-	4	1	1	1	1	6	1	1	5
7	-	-	5	1	1	1	1	8	1	1	6

Assumptions

1. Assumes that each rider completed a round-trip from the station. Total number of people using each station was calculated by dividing total station ridership by 2.

2. The number of Park and Ride users was generated from the regional travel demand model.

3. 60% average provided by FDOT ridership consultant. Individual station PNR data not available yet

4. Assumes 97% of Express Bus trips use PnR lots. Total number of people using each station was calculated by dividing stations with PnR lots ridership by 2.

5. For cost estimation purposes, three parking lot sizes for commuter rail stations were identified: small (25 spaces), medium (50 spaces), and large (100 spaces).

 Peak Period % (6)
 AM Period % (7)
 PM Period % (8)
 AM Peak Hr % (9)
 PM Peak Hr % (10)

 69%
 35%
 35%
 17%
 14%

6. Commuter rail/Express Bus trips during the AM and PM Peak Periods as a percent of total daily trips (provided by PB as part of the ridership forecast)

7. Percent of commuter rail/express bus trips in AM peak period (3 hours). Assumes 50% AM and 50% PM

8. Percent of commuter rail/express bus trips in PM Peak period (3 hours). Assumes 50% AM and 50% PM

9. Percent of commuter rail/express bus trips in the AM Peak Hour - assumes Peak Hour represents 50% of AM Peak Period

10. Percent of commuter rail/express bus trips in the PM Peak Hour - assumes Peak Hour represents 40% of PM Peak Period

11. Assumes 100% of AM commuter rail/express bus PnR trips are in-bound to the station 12. Assumes 0% of AM commuter rail/express bus PnR trips are out-bound from station

13. Assumes 0% of PM commuter rail/express bus PnR trips are in-bound to station

14. Assumes 100% of PM commuter rail/express PnR trips are out-bound from station

15. Assumes 11% of daily trips are KnR and same factors as PnR to Peak Hour

Station Impacts Viable Alternative 1-5

Alternative 1-5									AM and PM Peak Hour Vehicle Trips											
CommuterRail Stations	Production	Attraction	Total Boardings & Alightings	Total Number of Trips (See Note 1)	Number of Trips Using Park and Ride (See Note 2)	Percent of Trips Using Park and Ride	Park and Ride Demand (See Note 1)	Proposed Parking Size (See Note 3)	PnR AM In (9)	PnR AM Out (10)	PnR PM In (11)	PnR PM Out (12)	KnR AM In (13)	KnR AM Out (13)	KnR PM In (13)	KnR PM Out (13)	Total AM In	Total AM Out	Total PM IN	Total PM Out
1: Orlando Health/Amtrak	17	118	135	68	0	0%	0													
2: Church Street	79	486	565	283	0	0%	0													
3: Robinson Street	50	357	407	204	0	0%	0						2	2	2	2	2	2	2	2
4: Amelia Street													0	0	0	0	0	0	0	0
5: Princeton	146	131	277	139	88	64%	44	50) 15	0	12	0	1	1	1	1	17	1	13	1
6: Lockhart/Rosemont	351	288	639	320	158	49%	79	100) 27	0	22	0	3	3	2	2	30	3	24	2
7: Apopka	326	195	521	261	133	51%	66	100	23	0	18	0	2	2	2	2	25	2	20	2
8: SR 429	184	67	251	126	118	93%	59	100	20	0	16	0	1	1	1	1	22	1	17	1
9: Zellwood	126	11	137	69	79	115%	40	100) 14	0	11	0	1	1	1	1	14	1	11	1
10: Tavares	338	125	463	232	78	34%	39	50) 13	0	11	0	2	2	2	2	16	2	13	2
11: Mount Dora	159	101	260	130	13	10%	7	25	5 2	0	2	0	1	1	1	1	3	1	3	1
12: Eustis	175	72	247	124	106	86%	53	50	18	0	15	0	1	1	1	1	19	1	16	1
Total	1951	1951	3902	1956	773		387													
					55%															

Assumptions

1. Assumes that each rider completed a round-trip from the station. Total number of people using each station was calculated by dividing total station ridership by 2.

2. The number of Park and Ride users was generated from the regional travel demand model.

3. For cost estimation purposes, three size parking lots for commuter rail stations were identified: small (25 spaces), medium (50 spaces), and large (100 spaces).

Peak Period % (4) AM Period % (5) PM Period % (6) AM Peak Hr % (7) PM Peak Hr % (8) 69% 35% 35% 17% 14%

Assumptions for AM/PM Peak Hour.

4. Commuter rail trips during the AM and PM Peak Periods as a percent of total daily trips (provided by PB as part of the ridership forecast)

5. Percent of commuter rail trips in AM peak period (3 hours). Assumes 50% AM and 50% PM

6. Percent of commuter rail trips in PM Peak period (3 hours). Assumes 50% AM and 50% PM

7. Percent of commuter rail trips in the AM Peak Hour - assumes Peak Hour represents 50% of AM Peak Period

8. Percent of commuter rail trips in the PM Peak Hour - assumes Peak Hour represents 40% of PM Peak Period

9. Assumes 100% of AM commuter rail PnR trips are in-bound to the station

10. Assumes 0% of AM commuter rail PnR trips are out-bound from station

11. Assumes 0% of PM commuter rail PnR trips are in-bound to station

12. Assumes 100% of PM commuter rail PnR trips are out-bound from station

13. Assumes 11% of daily trips are KnR and same factors as PnR to Peak Hour with 50% in and 50% out

Station Impacts Viable Alte

Viable Alternative 2-4

Alternative 2-4								AM and PM Peak Hour Vehicle Trips											
5			Total Boardings &	Total Number of	Number of Trips Using Park and Ride (60%)	Park and Ride Demand (See	Proposed Parking Size	PnR AM	PnR AM	PnR PM	PnR PM	KnR AM	KnR AM	KnR PM	KnR PM	Total AM	Total AM	Total PM	1 Total PM
Express Bus	Production	Attraction	Alightings	trips (see Note 1)	(See Note 2)	Note 3)	(See Note 4)	IN (11)	Out (12)	in (13)	Out (14)	IN (15)	Out (15)	in (15)	Out (15)	IN	Out	IIN	Out
1: LYNX Central	74	535	609	304	0	0	0 0)											1
2: Amelia Street	37	53	90	45	0	0	0)											
3: Princeton	25	87	112	56	17	27	50	10			8	1	1	1	1	11	1	1	1 9
4: Rosemont	184	184	369	184	55	89	100	31			25	2	2	3	3	33	2	3	3 28
5: SR 429 Alt 2-4	256	28	284	142	43	69	100	24			19	4	4	3	3	28	4	3	3 22
6: Mt Dora Alt 2-4	141	9	150	75	23	36	50	13			11	3	3	2	2	16	3	2	2 13
7: Tavares/Eustis	203	22	226	113	34	55	100	19			16	2	2	2	2	21	2	2	2 18
			1,840	920			0)											

Assumptions

1. Assumes that each rider completed a round-trip from the station. Total number of people using each station was calculated by dividing total station ridership by 2.

2. 60% average for all stations provided by FDOT ridership consultant. Individual station PNR data not available yet

3. Assumes 97% of Express Bus trips use PnR lots. Total number of people using each station was calculated by dividing stations with PnR lots ridership by 2.

4. For cost estimation purposes, three parking lot sizes for commuter rail stations were identified: small (25 spaces), medium (50 spaces), and large (100 spaces)



6. Commuter rail/Express Bus trips during the AM and PM Peak Periods as a percent of total daily trips (provided by PB as part of the ridership forecast

7. Percent of commuter rail/express bus trips in AM peak period (3 hours). Assumes 50% AM and 50% PM

8. Percent of commuter rail/express bus trips in PM Peak period (3 hours). Assumes 50% AM and 50% PM

9. Percent of commuter rail/express bus trips in the AM Peak Hour - assumes Peak Hour represents 50% of AM Peak Perioc

10. Percent of commuter rail/express bus trips in the PM Peak Hour - assumes Peak Hour represents 40% of PM Peak Perioc

11. Assumes 100% of AM commuter rail/express bus PnR trips are in-bound to the statior

12. Assumes 0% of AM commuter rail/express bus PnR trips are out-bound from station

13. Assumes 0% of PM commuter rail/express bus PnR trips are in-bound to station

14. Assumes 100% of PM commuter rail/express PnR trips are out-bound from station

15. Assumes 11% of daily trips are KnR and same factors as PnR to Peak Hour





Appendix D: Technical Memorandum – Operations Plan



Technical Memorandum – Operations Plan



January 2015



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Appendix A: Technical Memorandum - Rail Infrastructure to Support Operations Plan





1.1 Introduction

This technical memorandum summarizes the operations plan assumed for the No-Build and Viable Build Alternatives in the US 441 Corridor Study.

The Viable Build Alternatives are comprised of reasonable transit solutions that could address the needs identified in the Purpose and Need Statement. Each of the Alternatives has been developed to support the five project goals that have been developed and documented in the Goals and Objectives for the Study:

- 1. Improve mobility and transportation access;
- 2. Enhance the livability and economic competitiveness of the Study Area through an improved transportation system;
- 3. Develop the most efficient transportation system, which maximizes limited resources for the greatest public benefit;
- 4. Develop a transit system consistent with adopted local and regional plans and policies; and
- 5. Preserve and enhance the environment, natural and cultural resources, and open space.





2

No-Build Alternative

2.1 The No-Build Alternative

The No-Build Alternative consists of planned and programmed transportation improvements that have been included in the cost feasible components of the Long-Range Transportation Plans (LRTP) for MetroPlan Orlando and the Lake~Sumter Metropolitan Planning Organization (MPO). For the purposes of this technical memorandum, the focus of the analysis is on the transit components of these MPO plans. The LRTP projects have been coded into the Central Florida Regional Planning Model (CFRPM 5.6) which was used to forecast transit associated with this study. A number of other transit projects have been identified by both regions in their Transit Development Plans (TDPs) and their Needs Plans; however, the No-Build Alternative developed for comparison purposes should be cost feasible and consistent with adopted LRTPs from a federal planning perspective.

The key transit corridors serving the Study Area in operation in 2014 are illustrated on Figure 2-1. Table 2-1 summarizes the No-Build Alternative service characteristics for 2014.

The balance of the network is comprised of fixed route, circulator, pulse, shuttle, and express bus service. In order to serve as the future year No-Build Alternative, three components of the 2035 regional transit network needed to be removed or adjusted because they serve the same travel markets as the Viable Build Alternatives: the Orange Blossom/Commuter Rail Northwest, and LYNX bus routes Link 106, and Link 203. Link 106 headways were adjusted to 30-minutes in the peak period and Link 203 was adjusted to 60-minute headways, to allow a direct comparison with required service frequencies with their future feeder by route counterparts. The Orange Blossom/ Commuter Rail Northwest service was eliminated since it is one of the Viable Build Alternatives.



Table 2-1: Summary of the No-Build Alternative

2014 LOCAL BUS SERVICE - US 441 NO-BUILD ALTERNATIVE

CO	RRIDOR BUS ROUTES		2014	STATION			
No-Build Alternative	Long Name	Mode	Operator	Distance (miles)	Peak Weekday Headway (minutes)	Off-Peak Weekday Headway (minutes)	
LY9 NOA RS OB	LYNX-9 Winter Park/Rosemont Outbound	21	1	12.25	60	60	
LY17 441APO OB	LYNX-17 North US441 Outbound (Competes)	21	1	13.29	30	30	
LY23 WP/SV NB	Winter Park/Springs Village NB	21	1	14.57	60	60	
LY41 436CT SB	LYNX-41 SR436 Crosstown Southbound	21	1	30.33	30	30	
LY44 CL ZW	LYNX-44 Clarcona Zellwood	21	1	17.24	60	60	
LY48 CD PPP OB	LYNX-48 West Colonial (AKA Link 105)	21	1	8.18	30	30	
LY49 PHR OB	LYNX-49 W CLNL DR Pine Hills Rd Outbound	21	1	10.41	30	30	
LY405 Apopka	Apopka Circulator N (replace with PUL per COA)	21	1	5.46	90	90	
LYMMO	LYMMO Orange Circulator	23	4	2.1	5	5	
LYMMO	LYMMO Grapefruit Circulator	23	4	1.7	5	5	
LYMMO	LYMMO Lime Circulator	23	4	2.5	5	5	



Table 2-1: Summary of the No-Build Alternative (Cont.)

2035 LOCAL BUS SERVICE - US 441 NO-BUILD ALTERNATIVE

COR	RIDOR BUS ROUTES			2035		
No-Build Alternative	Long Name	Mode	Operator	Distance (miles)	Peak Weekday Headway (minutes)	Off-Peak Weekday Headway (minutes)
LY101	Link 101 West SR 436	21	1	11.15	30	60
LY105	Link 105 West Colonial Dr	21	1	9.19	15	30
LY106	Link 106 US 441 North	21	1	13.49	15	30
LY203 MT DORA	LYNX 203 Mt Dora - CBD	21	1	31.41	0	0
LY305 JYPN	North John Young Parkway	21	1	15.87	30	30
LY309 HIAW	Hiawassee Road	21	1	14.97	60	60
LY310 SSTAR	Silver Star IB	21	1	11.56	30	30
LY311 SS-UNI	Silver Star - Universal	21	1	13.31	60	120
LY314 CLAR	Clarcona Ocoee	21	1	9.53	30	30
LY318 APOPKA	Apopka-Vineland Rd	21	1	10.33	60	60
LY320 KEN	Kennedy	21	1	12.48	30	30
LY323 434	Route 434	21	1	25.28	30	30
LY324 SR50W	SR 50 West	21	1	14.45	60	60
LY403	Link 403 Pine Hills/Balboa Dr	21	1	8.4	30	30
LY404	Link 404 Pine Hills/North Lane	21	1	7.73	30	30
LY405	Link 405 Apopka-Park Ave	21	1	5.7	60	60
LY406	Link 406 Apopka Plymouth Zellwood	21	1	7.7	60	60
LY407	Link 407 West Altamonte	21	1	4.49	30	30
LY412	Link 412 Edgewater Dr	21	1	7.54	30	30
LY801 LYMMO	LYMMO Orig+Ext NB	23	4	4.68	5	5
LY802 LYMEW	LYMMO East-West - Grapefruit	23	4	2.83	5	5
LYMMO	LYMMO Lime Circulator	23	4	2.5	5	5
OBlossom CRNW	OBlossom Commuter Rail NW	25	6	33.35	0	0





Figure 2-1: No-Build Transit Network Key Corridors

No-Build Alternative Study Area Bus Routes



3

Development of the Viable Build Alternatives

3.1 Introduction

Two of the three technologies that advanced past the modal screening (Commuter Rail and Express Bus) were used to develop the Viable Build Alternatives.

Each of the Alternatives was developed based on the issues and opportunities identified in the Purpose and Need Report, utilizing different modes (or combination thereof), alignments, and stations. A brief summary of the issues is presented in Section 3.2.

In total, three Viable Build Alternatives were developed. A No-Build Alternative was also developed and was included in all analyses as a basis of comparison with the Viable Build Alternatives.

3.2 Issues and Needs

Based on the Purpose and Need, three major needs for this project were identified. They are summarized as follows:

Future Traffic Congestion

- By 2035, it is projected that approximately 59 percent of the corridor will operate over capacity and another 26 percent of the corridor will operate near capacity.
- There are no adopted plans to widen the corridor after existing widening projects are completed.
- Transit investments could provide additional capacity without additional widening.

Regional Connectivity

• Currently, a transit trip between downtown Orlando and the Golden Triangle area (Mount Dora, Eustis, and Tavares) requires two transfers and takes a minimum of 1



hour and 45 minutes to complete, equating to an average speed of 11 miles per hour.

• Transit investments provide an opportunity to improve mobility through increased access to employment centers and services.

Land Use, Economic Development, and Community Redevelopment

- Improved transit service will assist in implementing the Study Area communities' vision for population and employment growth.
- Transit improvements in the Study Area will help to support redevelopment efforts, encourage economic growth, and reinforce communities' desired compact land use patterns.

3.3 Viable Build Alternatives

Two of the three technologies that advanced past the modal screening (Commuter Rail and Express Bus) were used to develop the Viable Build Alternatives which included potential alignments and stations. A No-Build Alternative was developed and will be included in the evaluation process as a basis of comparison with the Viable Build Alternatives.

A consistent analysis year is required for the comparative assessment of the alternatives. Consistent with FTA's requirement that forecasts are based upon the current, regionally adopted Long Range Transportation Plan (LRTP), the year 2035 was defined as the analysis year for the study. This year is consistent with the horizon year for the CFRPM, which is the adopted regional transportation model for the Lake~Sumter MPO. The CFRPM includes the entire Study Area within Orange and Lake Counties. The MetroPlan Orlando MPO recently adopted its 2040 LRTP, which included an updated Orlando Urban Area Transportation Study (OUATS) model for the Orange County portion of the Study Area.

The Viable Build Alternatives were developed using various combinations of the following elements:

- **Mode/Technology** Two of the three technologies that advanced from the modal screening Commuter Rail and Express Bus.
- Alignment Commuter rail service if implemented would run along the Florida Central (FCEN) rail line to connect downtown Orlando with the cities of Apopka, Tavares, Mount Dora and Eustis. Express bus service, if implemented, would primarily run along US 441. The express bus only alternative proposed the use of SR 414 and SR 429 for service.

The Viable Build Alternatives are summarized in Table 3-1. Figures 3-1, 3-2, and 3-3 show the alignment, mode, and stations served for the three Viable Build Alternatives.



Table 3-1: Summary of the Viable Build Alternatives

Alternative and Mode(s)	Transit Route Alignments
Alternative 1-2	Commuter Rail: Downtown Orlando to SR 429
Commuter Rail and	(FCEN rail line)
Express Bus	
	Express Bus: SR 429 to Lake County (US 441)
Alternative 1-5	Downtown Orlando to Mount Dora and Eustis
Commuter Rail	(FCEN rail line)
Alternative 2-4	Downtown Orlando to Tavares/Eustis (US 441,
Express Bus	SR 414, SR 429, US 441)

3.4 Existing Service Characteristics

The existing and planned bus service patterns were also examined including the latest Transit Development Plans for LakeXpress and LYNX as well as the LYNX Comprehensive Operations Analysis and the LYNX/MetroPlan Orlando 2030 Transit Vision Plan. LakeXpress currently operates four routes. Route 1 operates east-to-west along US 441. Route 2 operates in Fruitland Park just west of the Study Area. Route 3 circulates through Mount Dora, Eustis, and Tavares. Route 4 extends from Umatilla at the north down to Zellwood to provide a connection to the LYNX system. There is also a planned Golden Triangle Circulator (Tavares, Eustis, and Mount Dora) as well as new service along SR 50 (near Clermont outside of the Study Area). All of the routes in the LakeXpress system operate at 60-minute headways with the exception of Route 4 which operates at 120-minute headways. The Lake~Sumter MPO is working with its partners to develop a financial plan to fund increased headways along these routes within the next ten years.

LYNX operates several key routes in the Study Area. Service is focused around four key stop locations: LYNX Central Station; Rosemont SuperStop; Apopka SuperStop; and Zellwood Station. LYNX Central Station is located in downtown Orlando and is the key transfer opportunity for other destinations in the region. However, there are select services that serve key employment centers from the SuperStops, including Walt Disney World properties, for example. The system is structured as a hub and spoke network based upon providing the highest quality bus service along the 22 premium transit corridors identified in the 2030 Transit Vision Plan. US 441 from Apopka to downtown Orlando is identified as Corridor #11 in the 2030 Transit Vision Plan.

Accordingly, existing and future bus service in the Study Area is focused along the US 441 corridor with the most frequent service operating between LYNX Central Station and the Apopka SuperStop. This LYNX Link 106 (previously Link 17) service operates at 15-minute or better headways in the peak period and 30 minutes in the off-peak period with late service operating at 60-minute headways. From LYNX Central Station, numerous Links may be accessed.



Existing service Links 9, 23, 106, 302, and 443 provide connections from the Rosemont SuperStop to Apopka, Walt Disney World, downtown Orlando, Florida Hospital Winter Park, Pine Hills, Springs Village Shopping Center, and Valencia College Winter Park. Peak-hour connections are provided to the Winter Park SunRail Station via Links 9 and 23. Long-term connections to Maitland Boulevard via planned LYNX bus service should be considered at the Rosemont or Apopka SuperStop. These services all operate at 55 to 65-minute headways except for the select service to Walt Disney World and the Link 106 (15-minute peak).

The Apopka SuperStop is also served by Link 106 as well as Links 44, 405, 436N, and 445. These routes provide connections to the Altamonte Springs SunRail Station, downtown Orlando, Fern Park SuperStop, West Oaks Mall, and Zellwood Station. Link 405 is an Apopka circulator service. These services operate at 30 to 60-minute headways except for the select service to West Oaks Mall and the Link 106 (15-minute peak). Connections are provided to the Altamonte SunRail Station via Link 436N. Long-term connections to Maitland Boulevard via planned LYNX bus service should be considered at the Rosemont or Apopka SuperStop. The Zellwood Station is served by LYNX Link 44 which has 60-minute headways and LakeXpress Route 4 with 120-minute headways. IFL-ORL/projects/61817.00 US441 Comidor AA/GIS/Project/Existing Conditions/Study Area Map Comidor mxd



VFL-ORL/projects/61817.00 US441 Comdor AA/GIS/Project/Existing Conditions/Study Area Map Comdor mxd



VFL-ORL/projects/61817.00 US441 Comdor AA/GIS/Project/Existing Conditions/Study Area Map Comdor mxd







3.5 Build Service Assumptions

For modeling purposes, the basic service characteristics for the three Viable Build Alternatives were developed. A variety of factors were considered including the initial analysis of markets prepared in April 2014 as part of ridership projection efforts. There are several new service stop/station locations proposed along the study corridor including Robinson Street; Amelia Street; Princeton; Lockhart/Rosemont; Apopka SuperStop; SR 429 at US 441; Zellwood; Mount Dora; Waterman Hospital (serving Tavares and Eustis); Downtown Tavares; and Mount Dora. For each of the three Viable Build Alternatives, 30-minute peak hour headways have been proposed with 120-minute off-peak headways. Consistent with the existing SunRail service, no Saturday and Sunday service will be provided in the initial phase. These service characteristics are also consistent with express service catering to home-based work trips. The analysis of markets indicates that the region and the Study Area are both reflecting approximately 40 percent of the trips as being home-based work trips.

The service pattern of the Viable Build Alternatives are summarized in Table 3-2 and illustrated in Figures 3-1, 3-2, and 3-3. Also shown is the park-n-ride space provision associated with each station based on the travel demand forecasting undertaken and ridership projections developed.

CORRIDOR							STATIC	DN						
ALTERNATIVE Central Station	Orlando Health/ Amtrak	Church Street	Robinson Street	Amelia Street	Prince- ton	Lockhart/ Rosemont	Apopka	SR 429	Zell- wood	Mt. Dora	Tavares/ Eustis	Tavares	Eustis	
Viable														
Alternative 1-2:		х	х	х	х	х	х	х	х	х	х	х		
Commuter		(0)	(0)	(0)	(0)	(50)	(100)	(100)	(100)	(25)	(25)	(100)		
Rail/Express Bus														
Viable		v		v	N/	N/	N.	N.		N/	~		v	v
Alternative 1-5:		(0)	(0)	x (0)	(0)	x (50)	(100)	(100)	x (100)	(100)	(25)		(50)	(50)
Commuter Rail		(-)	(-)	(-)	(-)	()	()	()	()	()	()		()	()
Viable	v				N/	N/					~	v		
Alternative 2-4:	(0)				(0)	(50)	(100)		x (100)		(50)	(100)		
Express Bus	(3)				(5)	(20)	(_00)		(=00)		(20)	(=50)		

Table 3-2: Service Patterns for the Viable Build Alternatives

X = Station served

(0) = No. of parking spaces

As illustrated in Table 3-3, the transit travel times have been predicted based upon the future year (2035) congested travel speeds applied to key roadway segments for the three Viable Build Alternatives. Depending upon the mode composition of the alternative, time was added for transfer between commuter rail and express bus, dwell time at bus stops, travel time savings for queue jump or transit signal priority treatments (10 seconds for



selected US 441 intersections traversed), and rail travel time was treated separately but is shown in the table. It was anticipated that the transfer between commuter rail and express bus modes for Alternative 1-2 would take 10 minutes, building in adequate time for the bus layover (though passenger transfer time could be less). The dwell time per station was assumed to be 150 seconds or 2.5 minutes per station for the express bus alternatives. Alternative 1-2 has two intermediate stations whereas alternative 2-4 has five intermediate stations with an overall station dwell time of 12.5 minutes. A 10-percent savings for transit priority treatments was calculated for the express bus service in Alternatives 1-2 and 2-4. Commuter rail travel times range from 31 to 55 minutes depending upon the length of the rail alignment. For comparative purposes, the No-Build Alternative would have a total travel time of 143 minutes which is double the travel time of the other alternatives.

The express bus service was assumed to include regular 40-foot standard coach. Likewise, commuter rail service would include on-board access to Wi-Fi service and wide, comfortable seating. These amenities would allow passengers to get small work tasks completed during the ride, making it more attractive to choice riders than local bus service.

Tables 3-4 and 3-5 identify the specific service characteristics of commuter rail service in Alternatives 1-2 and 1-5, including annual operating hours, which was used in estimating the operating costs for new rail service, as documented in the *Cost Methodology and Results Report.* Likewise, Table 3-6 identifies the specific service characteristics for the new express bus service in Alternatives 1-2 and 2-4.

Information on the rail infrastructure necessary to support the commuter rail operations plan is included in Appendix A.

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		Section	2035 Cong.							
		Length (mi)	Speed (mph)					1.2	1.5	2.4
Roadway	Limits	(111.)	(See note 1)		2035 Auto via US 441	2035 Auto via SR 429 and SR 414	2035 No- Build	Commuter Rail to SR 429, Express Bus from SR 429 to Lake County	Commuter Rail to Eustis and Mount Dora	Express Bus via Limited Access Roads
Amelia Street	Lynx Central Station to Hughey Avenue	0.07	21							
Amelia Street	Hughey Avenue to Parramore Avenue	0.37	23							
Amelia Street	Westmoreland Drive to US 441	0.25	20							
	Length and Average Speed (Lynx Central Station to Amelia Street Station)	0.9	24		2.3	2.3				2.3
US 441	Amelia St to SR 50	0.28	26							
US 441	SR 50 to Country Club Drive	0.50	23							
US 441	Country Club Drive to Country Club Villa / Glen Eagles Way	0.49	23							
US 441	Country Club Villa / Glen Eagles Way to Princeton Street	0.38	21		43	43				43
US 441	Princeton Street to Lee Road / John Young Parkway	2.04	23							
US 441	Lee Road / John Young Parkway to Rosemont Station	0.58	26							
	Length and Average Speed (Princeton Station to Rosemont Station)	2.6	25		6.4	6.4				6.4
US 441	Rosemont Station to Overland Road	1.78	26							
US 441	Overland Road to Maitland Boulevard / SR 414	1.01	34							
US 441	Maitland Boulevard / SR 414 to End Section	0.49	39							
US 441	Orange County Line / Beg. Sec. to Orange County Line / End Sec.	0.35	41							
US 441	Beg. Section to Hiawassee Road / Pledmont Wekiva Road	1.02	36							
US 441	I awassee Koad / Predmont werkiva Koad to beg to be 456	0.24	42							
	Length and Average Speed (Rosemont Station to Apopka Station)	6.7	37		11.0					
US 441	SR 436 to Edgewood Drive / Midland Avenue	0.33	19							
US 441	Edgewood Drive / Midland Avenue to CR 435A / Park Avenue	0.33	21							
US 441	CR 435A / Park Avenue to CR 437A / Central Avenue	0.13	26							
US 441	CR 437A / Central Avenue to SR 429 / Western Beltway	1.21	32							
	Length and Average Speed (Apopka Station to SR 429 Station)	2.0	25		4.9					
US 441	Rosemont Station to Overland Road	1.78	26							
58 414	US 441 to N. Hipwassee Rd	1.01	34							
SR 414	N. Hiawassee Rd to SR 429	3.70	31							
SR 429	SR 414 to SR 429 Station	3.90	65							
	Length and Average Speed (Rosemont Station to SR 429 Station)	11.8	39			18.4				18.4
SR 429	SR 429 Station to Orange / Lake County Line	6.46	65							
SR 429	Orange / Lake County Line to SR 46	1.46	65							
SR 46	SR 429 to Mount Dora Station-Alt 2-4	0.79	39			0.2				0.2
58.46	Length and Average speed (Sk 429 station to Mount Dora station-Ait 2-4)	1.67	56			5.3				3.3
US 441	US 441 to Limit Avenue / Wolfbranch Road	1.02	30							
US 441	Limit Avenue / Wolfbranch Road to SR 44B / Donnelly Street	1.16	29							
US 441	SR 44B / Donnelly Street to SR 19	2.59	32							
US 441	SR 19 to Mayo Dr	1.49	26							
	Length and Average Speed (Mount Dora Station-Alt 2-4 to Tavares/Eustis Station)	8.1	32			15.4				15.4
US 441	SR 429 / Western Beltway to Errol Parkway	0.55	19							
US 441	Errol Parkway to CR 437 / Orange Avenue	1.49	38							
US 441	LR 437 / Orange Avenue to Junction Road / Orlando Orban Boundary	1.40	43							
03441	Length and Average Speed (SR 429 Station to Zellwood Station)	6.0	33		10.9			10.9		
US 441	Jones Avenue to Sadler Road	1.55	54							
US 441	Sadler Road to 0.134 mi N of Wadsworth Road	1.70	54							
US 441	0.134 mi N of Wadsworth Road to Lake County Line	0.92	56							
US 441	Orange County Line to Mt. Dora Station	0.75	30							
100.000	Length and Average Speed (Zellwood Station to Mount Dora Station)	4.9	49	1	6.1			6.1	_	
US 441	Mr. Dora Station to Limit Avenue / Wolfbranch Road	1.32	30							
US 441	SR 44B / Donnelly Street to SR 19	2.59	32							
US 441										
	SR 19 to Mayo Dr	1.49	26							
	SR 19 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station)	1.49 6.6	26 29		13.5			13.5		
	SR 19 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station)	1.49 6.6	26 29		13.5			13.5	0.0	56.1
	SR 19 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station) Total Length and Average Speed	1.49 6.6 37.24	26 29		13.5			13.5 30.5	0.0	56.1
	SR 19 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station) Total Length and Average Speed	1.49 6.6 37.24	26 29 35	Transfer time between Commuter Rail and Express Bus	13.5			13.5 30.5 10.0	0.0	56.1
TOTAL TRAV minu	SR 19 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station) Total Length and Average Speed //EL TIME (in 59 56 140 76 55 140 76 55	1.49 6.6 37.24	26 29 35	Transfer time between Commuter Rail and Express Bus Dwell Time for intermediate bus stops (assumes 150 seconds per station for express bus)	13.5			13.5 30.5 10.0 5.0	0.0	56.1 0.0 12.5
TOTAL TRAV	SIX 13 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station) Total Length and Average Speed //EL TIME (in 59 56 140 76 55 140 76 55	69	26 29 35	Transfer time between Commuter Rail and Express Bus Dwell Time for intermediate bus stops (assumes 150 seconds per station for express bus) Rail Travel Time (see note	13.5			13.5 30.5 10.0 5.0	0.0	56.1 0.0 12.5
TOTAL TRAV minu	SK 13 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station) Total Length and Average Speed /EL TIME (in 59 56 140 76 55 utes)	1.49 6.6 37.24	26 29 35	Transfer time between Commuter Rail and Express Bus Dwell Time for intermediate bus stops (assumes 150 seconds per station for express bus) Rail Travel Time (see note 2)	13.5			13.5 30.5 10.0 5.0 31	0.0	56.1 0.0 12.5
TOTAL TRAV minu	SIX 13 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station) Total Length and Average Speed (EL TIME (in 59 56 140 76 55)	1.49 6.6 37.24 69	26 29 35	Transfer time between Commuter Rail and Express Bus Dwell Time for intermediate bus stops (assumes 150 seconds per station for express bus) Rail Travel Time (see note 2) TOTAL TRAVEL TIME (in	59	56	140	13.5 30.5 10.0 5.0 31 76	0.0 0.0 55 55	56.1 0.0 12.5 69
TOTAL TRAV	Sit 19 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station) Total Length and Average Speed //EL TIME (in 59 56 140 76 55 //EL TIME (in 59 56 140 76 55	1.49 5.6 37.24 69	26 29 35	Transfer time between Commuter Rail and Express Bus Dwell Time for intermediate bus stops (assumes 150 seconds per station for express bus) Rail Travel Time (see note 2) TOTAL TRAVEL TIME (in minutes)	59	56	140	13.5 30.5 10.0 5.0 31 76	0.0 0.0 55 55	56.1 0.0 12.5 69
TOTAL TRAV minu	SK 13 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station) Total Length and Average Speed //EL TIME (in 59 56 140 76 55	1.49 5.6 37.24 69	26 29 35	Transfer time between Commuter Rail and Express Bus Dwell Time for intermediate bus stops (assumes 105 asconds per station for express bus) Rail Travel Time (see note 2) TOTAL TRAVEL TIME (in minutes)	13.5	56	140	13.5 30.5 10.0 5.0 31 76	0.0 0.0 55 55	56.1 0.0 12.5 69
TOTAL TRAV minu	SR 19 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station) Total Length and Average Speed //EL TIME (in 59 56 140 76 55 utes) 59 56 140 76 55	1.49 6.6 37.24 69	35	Transfer time between Commuter Rail and Express Bus Dwell Time for intermediate bus stops (assumes 150 seconds per station for express bus) Rail Travel Time (see note 2) TOTAL TRAVEL TIME (in minutes)	59	56	140	13.5 30.5 10.0 5.0 31 76	0.0 0.0 55 55	56.1 0.0 12.5 69
TOTAL TRAV minu ASSUMPTIONS/SOU	SN 13 to Mayo Dr Length and Average Speed (Mount Dora Station to Tavares/Eustis Station) Total Length and Average Speed //EL TIME (in 59 56 140 76 55 //EL TIME (in 59 56 140 76 55 //EL TIME (in 59 56 140 76 55 ///////////////////////////////////	1.49 6.6 37.24	26 29 35	Transfer time between Commuter Rail and Express Bus Dwell Time for intermediate bus stops (assumes 150 seconds per station for express bus) Rail Travel Time (see note minutes)	13.5	56	140	13.5 30.5 10.0 5.0 31 76	0.0 0.0 55 55	56.1 0.0 12.5 69

Table 3-3: Estimated 2035 Transit Travel Times for the Viable Build Alternatives



Rail Service	Mor Start Time	ning End Time	After Start Time	noon End Time	Daily Train Hours	# of Trains Needed	Passenger Cars per Train	Single Weekday Passenger Car Hours	Annual Weekday Passenger Car Hours
Train 1	5:37	9:09	12:37	18:39	9:34	1	2	19.13	4782.5
Train 2	6:07	11:59	15:37	19:09	9:24	1	2	18.8	4700
Train 3	6:37	8:12	16:07	22:09	7:37	1	2	15.23	3807.5
Train 4	7:07	8:42	16:34	20:09	5:10	1	2	10.33	2582.5
Total						4	8	63.5	15872.5

Table 3-4: US 441 Rail Service Characteristics – Viable Alternative 1-2

Table 3-5: US 441 Rail Service Characteristics – Viable Alternative 1-5

Eustis-Orlando Health/Amtrak Mainline

	М	orning	After	rnoon		# of	Passenger	Single Weekday	Annual Weekday
Rail Service	Start Time	End Time	Start Time	End Time	Daily Train Hours	Trains Needed	Cars per Train	Passenger Car Hours	Passenger Car Hours
Train 1	5:05	7:53	14:33	20:10	8:25	1	2	16.83	4207.5
Train 2	5:35	8:23	15:05	20:40	8:23	1	2	16.77	4192.5
Train 3	6:05	8:43	12:05	18:40	9:13	1	2	18.43	4607.5
Train 4	6:35	12:30	16:32	22:40	12:03	1	2	24.1	6025
Train 5	7:05	9:40	17:02	19:40	5:13	1	2	10.43	2607.5
Train 6	7:35	10:10	15:35	18:10	5:10	1	2	10.33	2582.5
Total						6	12	96.9	24222.5

Mount Dora-Tavares Shuttle

Line

	M	orning	Aftei	noon	Daily	# of	Passenger	Single Weekday	Annual Weekday
Rail	Start		Start		Vehicle	Trains	Cars per	Passenger	Passenger
Service	Time	End Time	Time	End Time	Hours	Needed	Train	Car Hours	Car Hours
Train 1	4:47			22:59	18:12	1	1	18.2	4550
Total						1	1	18.2	4550





Express Bus	Round No. of Buses US Trip Needed Single Weekday		Round No. of Buses Trip Needed		No. of Annual Weekday	
Alternative	Time (Min.)	Peak	Off- Peak	Bus Hrs.	Bus Hrs.	
Alternative 1-2	74	6	2	21.0	5250	
Alternative 2-4	148	10	3	41.9	10902.7	

Table 3-6: US 441 Express Bus Service Characteristics

Weekday Peak - 6-9 AM, 4-7 PM

Weekday Off-Peak - 9 AM-4 PM, 7-10 PM


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Feeder Bus Service

4.1 Introduction

This section details the feeder bus service routes that will serve the Viable Alternative station locations.

4.2 Feeder Bus Evaluation

System Considerations

An analysis of future feeder bus service was conducted for the Study Area by first understanding the existing and planned route and system structure. In accordance with the LYNX Comprehensive Operations Analysis (COA) recommendations, a new Pine Hills SuperStop location is being implemented which would impact the alignments of Links 9, 44, 49, and 443. In addition, the COA includes a recommendation to modify Link 41 by increasing the hours of operation, splitting the route, and improving headways. Likewise, Link 405 would have 30-minute weekday peak headways. A long-term LYNX recommendation would be to implement SunRail connector service along SR 414 from Maitland extending west over I-4 to Forest City Road and SR 434; but it would not extend over to US 441. The LakeXpress TDP includes a recommendation to implement a new Golden Triangle Circulator service that would connect the proposed commuter rail stop locations to key activity centers in Eustis, Tavares, and Mount Dora offering weekday service at 30-minute headways.

The LakeXpress system provides cross-county service utilizing Route 1 which operates on US 441. Routes 2 and 3 operate as circulator services in the east and west sides of the service area. There is also Route 4 which currently operates between Umatilla and Zellwood with stops along US 441 near Mount Dora. The Route 4 service connects to the LYNX system which provides residents with access to the Orlando International Airport as well as specialty human services such as the



Veteran's Administration Hospital. A new Golden Triangle service has been proposed as well as a new service along SR 50 in the Clermont area (outside of the Study Area).

For the LYNX system, the transit network is planned as a series of hubs and spokes. SuperStops serve as hub locations and premium service is focused along key corridors identified by the region through its 2030 Transit Vision Plan. In the US 441 Study Area, US 441 would have the highest level of investment with Link 106 offering weekday service at 15-minute headways in the peak hour and peak direction. The model files for the CFRPM include Link 106 operating from downtown Orlando to Apopka SuperStop at 30-minute weekday peak headways in the 2010 base year and 10-minute weekday peak headways in the year 2035. Likewise, a new service, Link 203 would extend from downtown Orlando to Tavares in 2035 and operate at 30-minute weekday peak headways. These two services would compete with the proposed Viable Build Alternatives.

Because these services are competing, the feeder bus network for modeling purposes used the base year weekday headway for Link 106 of 30-minutes in the peak period and did not include the new Link 203 service since it is the equivalent of Viable Alternative 2-4.

Span of Service and Service Frequency

Related to the span of service for the feeder bus operation, it was assumed that service would start 30 minutes prior to the first commuter rail train or express bus run in the morning, and end 30 minutes after the last commuter train or express bus run (5:30 AM to 10:30 PM). Weekday peak service would generally operate from 6:00 to 9:00 AM and 4:00 to 7:00 PM, with weekday off-peak service generally operating every 120 minutes from 9:00 AM to 4:00 PM and 7:00 to 10:30 PM.

Tables 4-1 through 4-3 summarize the feeder bus network recommendation for year 2035 conditions, including future headways. The identified headways are those either planned or improved to meet commuter rail and express bus service of 30 minutes during the weekday period, and 120 minutes during the weekday off-peak period.

Final Stop Locations

The US 441 Corridor Study evaluation process examined a number of proposed stop locations for the analysis. These stop locations are shown in Table 3-2. Figures 4-1a through 4-3b show the identified feeder bus routings to the different stations.

The stations were evaluated for general feasibility to advance to the Viable Alternatives phase. This evaluation was consistent with the desire to advance only the most feasible alternatives with the best potential to meet the Study Area needs and satisfy the project Goals and Objectives.



2035 LOCAL BUS CONNECTIONS - US 441 VIA																			
CORRIDOR BUS ROUTES	LONG NAME	ROUTE LENGTH	BUILD HEADWAY		CHANGE I FROM	IN HEADWAY NO-BUILD	OPERATING SPEED	# OF ADDITIONAL						STATION					
Viable Build Alternative 1-2: Commuter Rail/Express Bus			Peak	Off-Peak	Peak	Off-Peak		VEHICLES NEEDED	Orlando- Amtrak	Church Street	Robinson Street	Amelia Street	Princeton Street	Lockhart/ Rosemont	Apopka	SR 429	Zellwood	Mt Dora	Tavares/ Eustis
LY101	Link 101 West SR 436	11.15	30	60	0	0	15								Х				
LY105	Link 104 West Colonial Dr	9.72	15	30	0	0	15				Х	Х							
LY106 (keep at base 2010 year headways competes)	Link 106 US 441 North	13.49	30	30	0	0	15		x	х	x	х	х	х	х	х			
LY305 JYPN	North John Young Parkway	15.87	30	30	0	0	15								Х				
LY309 HIAW	Hiawassee Road	14.97	30	60	30	0	15	2							Х				
LY310 SSTAR	Silver Star IB	11.56	30	30	0	0	15						Х						
LY311 SS-UNI	Silver Star - Universal	13.31	30	120	30	0	15	2					Х						
LY314 CLAR	Clarcona Ocoee	9.53	30	30	0	0	15							х					
LY318 АРОРКА	Apopka-Vineland Rd	10.67	30	60	30	0	15	1							Х				
LY320 KEN	Kennedy	12.48	30	30	0	0	15							Х					
LY323 434	Route 434	23.33	30	30	0	0	15								Х				
LY404	Link 404 Pine Hills/North Lane	9.41	30	30	0	0	15							Х					
LY405	Link 405 Apopka-Park Ave	5.70	30	30	0	0	15								Х				
LY406	Link 406 Apopka Plymouth Zellwood	7.70	30	60	30	0	15	1							Х	Х			
LY407	Link 407 West Altamonte	4.49	30	30	0	0	15								Х				
LY412	Link 412 Edgewater Dr	7.54	30	30	0	0	15							Х					
LY801	LYMMO Orange Line+Ext NB	4.68	5	10	0	0	15	0	Х										
LY802	LYMMO Grapefruit Line	3.75	10	15	0	0	15			Х									
LY803	LYMMO Lime Line	2.50	10	15	0	0	15			Х	Х								
LX1 VILL WB	LakeXpress #1 Westbound	30.63	30	60	30	0	15	2										Х	Х
LX1 VILL EB	LakeXpress #1 Eastbound	31.02	30	60	30	0	15	2										Х	Х
LX3 MTD	LakeXpress #3 Mount Dora C	11.57	30	60	30	0	15	2										Х	
LX4 UMA SB	LakeXpress #4 Southbound	19.41	30	120	90	0	15	2										Х	Х
LakeXpress Golden Triangle Circulator	31.92	30	60	0	0	15	5										Х	Х	
	Total	1	1	1	1	Î	1	19											
Weekday Peak - 5:30-9:30 AM, 3:30-7 :30 P	M	8.00																	
Weekday Off-Peak - 9:30 AM-3:30 PM, 7:30	-10:30 PM	9.00																	

Table 4-1: Viable Alternative 1-2 Feeder Bus Network



2035 LOCAL BUS CONNECTIONS - US 441 VIA	ABLE BUILD ALTERNATIVES																			
CORRIDOR BUS ROUTES		ROUTE	BUILD I	HEADWAY	CHANGE FROM	IN HEADWAY NO-BUILD	OPERATING	# OF ADDITIONAL		l				STA						
Viable Build Alternative 1-5: Commuter Rail	LONG NAME	LENGTH	Peak	Off-Peak	Peak	Off-Peak	SPEED	VEHICLES NEEDED	Orlando- Amtrak	Church Street	Robinson Street	Amelia Street	Princeton Street	Lockhart/ Rosemont	Apopka	SR 429	Zellwood	Tavares	Eustis	Mount Dora
LY101	Link 101 West SR 436	11.15	30	60	0	0	15								Х					
LY105	Link 104 West Colonial Dr	9.72	15	30	0	0	15				Х	Х								
LY106 (keep at base 2010 year headways - competes)	Link 106 US 441 North	13.49	30	30	0	0	15		х	х	x	х	х	x	х	x				
LY305 JYPN	North John Young Parkway	23.06	30	30	0	0	15								Х					
LY309 HIAW	Hiawassee Road	14.97	30	60	30	0	15	2							Х					
LY310 SSTAR	Silver Star IB	11.56	30	30	0	0	15						Х							
LY311 SS-UNI	Silver Star - Universal	13.31	30	120	30	0	15	2					Х							
LY314 CLAR	Clarcona Ocoee	9.53	30	30	0	0	15							Х						
LY318 APOPKA	Apopka-Vineland Rd	10.67	30	60	30	0	15	1							Х					
LY320 KEN	Kennedy	12.48	30	30	0	0	15							Х						
LY323 434	Route 434	25.28	30	30	0	0	15								Х					
LY404	Link 404 Pine Hills/North Lane	9.41	30	30	0	0	15							Х						
LY405	Link 405 Apopka-Park Ave	5.70	30	30	0	0	15								Х					
LY406	Link 406 Apopka Plymouth Zellwood	7.70	30	60	30	0	15	1							Х	Х				
LY407	Link 407 West Altamonte	8.29	30	30	0	0	15								Х					
LY412	Link 412 Edgewater Dr	7.54	30	30	0	0	15							Х						
LY801	LYMMO Orange Line+Ext NB	4.68	5	10	0	0	15		Х											
LY802	LYMMO Grapefruit Line	3.75	10	15	0	0	15			Х										
LY803	LYMMO Lime Line	2.50	10	15	0	0	15			Х	Х									
LX1 VILL WB	LakeXpress #1 Westbound	30.63	30	60	30	0	15	2										Х	Х	X
LX1 VILL EB	LakeXpress #1 Eastbound	31.02	30	60	30	0	15	2										Х	Х	Х
LX3 MTD	LakeXpress #3 Mount Dora C	11.57	30	60	30	0	15	2												Х
LX4 UMA SB	LakeXpress #4 Southbound	19.41	30	120	90	0	15	2										Х	Х	Х
LakeXpress Golden Triangle Circulator	New Service	31.92	30	60	0	0	15	5										Х	Х	Х
	Total	1	1	1	í	1		19												
Weekday Peak - 5:30-9:30 AM, 3:30-7 :30 P																				
Weekday Off-Peak - 9:30 AM-3:30 PM, 7:30	0-10:30 PM																			

Table 4-2: Viable Alternative 1-5 Feeder Bus Network

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2035 LOCAL BUS CONNECTIONS - US 441 V	ABLE BUILD ALTERNATIVES																		
CORRIDOR BUS ROUTES	LONG NAME	ROUTE	BUILD I	HEADWAY	CHANGE IN FROM N	N HEADWAY IO-BUILD	BUS OPS	OPERATING	INCREME	NTAL ANNU COST/HF	JAL BUS OPS	# OF ADDITIONAL				STATION			
Viable Build Alternative 2-4: Express Bus		LENGTH	Peak	Off-Peak	Peak	Off-Peak	COST/HR	SPEED	Weekday	Weekend/ Holiday	Annual Total	VEHICLES NEEDED	LYNX Central	Amelia Street	Princeton Street	Rosemont	SR 429	Tavares/ Eustis	Mount Dora
LY101	Link 101 West SR 436	11.15	30	60	0	0	\$111.94	15											
LY105	Link 104 West Colonial Dr	9.72	15	30	0	0	\$111.94	15					Х	Х					
LY106 (keep at base 2010 year headways - competes)	Link 106 US 441 North	13.49	30	30	0	0	\$111.94	15					х	x	x	x	х		
LY203 MT DORA (competes)	LYNX 203 Mt Dora - CBD	31.41	0	0	0	0	\$111.94	15											
LY305 JYPN	North John Young Parkway	15.87	30	30	0	0	\$111.94	15											
LY309 HIAW	Hiawassee Road	14.97	30	60	30	0	\$111.94	15	\$1,787	\$0	\$446,860	2							
LY310 SSTAR	SilverStarIB	11.56	30	30	0	0	\$111.94	15							Х				
LY311 SS-UNI	Silver Star - Universal	13.31	30	120	30	0	\$111.94	15	\$1,589	\$0	\$397,308	2			х				
LY314 CLAR	Clarcona Ocoee	9.53	30	30	0	0	\$111.94	15								Х			
LY318 АРОРКА	Apopka-Vineland Rd	10.67	30	60	30	0	\$111.94	15	\$1,274	\$0	\$318,503	1							
LY320 KEN	Kennedy	12.48	30	30	0	0	\$111.94	15								Х			
LY323 434	Route 434	25.28	30	30	0	0	\$111.94	15											
LY404	Link 404 Pine Hills/North Lane	9.41	30	30	0	0	\$111.94	15								Х			
LY405	Link 405 Apopka-Park Ave	5.70	30	30	0	0	\$111.94	15											
LY406	Link 406 Apopka Plymouth Zellwood	7.70	30	60	30	0	\$111.94	15	\$919	\$0	\$229,848	1					Х		
LY407	Link 407 West Altamonte	4.49	30	30	0	0	\$111.94	15											
LY412	Link 412 Edgewater Dr	7.54	30	30	0	0	\$111.94	15								Х			
LY801	LYMMO Orange Line+Ext NB & SB	4.68	5	10	0	0	\$111.94	15					Х						
LY802	LYMMO Grapefruit Line	2.83	10	15	0	0	\$111.94	15											
LY803	LYMMO Lime Line	2.50	10	15	0	0	\$111.94	15					Х						
LX1 VILL WB	LakeXpress #1 Westbound	29.79	30	60	30	0	\$149.03	15	\$2,383	\$0	\$595,734	2						Х	Х
LX3 MTD	LakeXpress #3 Mount Dora C	11.57	30	60	30	0	\$149.03	15	\$1,839	\$0	\$459,821	2							Х
LX4 UMA SB	LakeXpress #4 Southbound	19.41	30	120	90	0	\$149.03	15	\$2,314	\$0	\$578,552	2						Х	Х
LakeXpress Golden Triangle Circulator	New Service	31.92	30	60	0	0	\$149.03	15	\$7,929	\$4,757	\$2,220,018	5						Х	Х
	otal	1						\$20,035	\$4,757	\$5,246,643	17								
Weekdav Peak - 5:30-9:30 AM. 3:30-7 :30 PM																			
Weekday Off-Peak - 9:30 AM-3:30 PM, 7:	30-10:30 PM																		

Table 4-3: Viable Alternative 2-4 Feeder Bus Network







































































Technical Memorandum Operations Plan



Technical Memorandum | Operations Plan

Appendix A: Technical Memorandum – Rail Infrastructure to Support Operations Plan

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Technical Memorandum – Rail Infrastructure to Support Operations Plan



January 2015

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1 Introduction

1.1 Introduction

The purpose of this memorandum is to further define two commuter rail Viable Alternatives for the US 441 Corridor Study. The following sections provide a summary of the methodology and assumptions, an operating plan for the rail alternatives, and infrastructure improvement needs for these alternatives to assist in developing capital cost estimates and refining the Viable Alternatives for the US 441 Corridor Study.

1.2 Methodology and Assumptions

This memorandum documents the infrastructure needs, preliminary schedule, running time, and other characteristics required to operate commuter rail service on the FCEN corridor with a connection onto the SunRail corridor (assuming 2035 service levels of 15 minute peak and 1 hour off-peak service).

- Travel times were developed using the Rail Traffic Controller (RTC) Train Performance Calculator (TPC) from the outermost station on the FCEN line (SR 429 Station for Viable Alternative 1-2; Eustis Station for Viable Alternative 1-5) to the Orlando Health/Amtrak Station on the SunRail corridor. The TPC runs assumed the following:
- A maximum operating speed of 59 MPH (Class 3 for passenger trains)
- Consist size for trains operating on the FCEN mainline would be one locomotive, one coach, and one cab car; Mount Dora shuttle would be one locomotive and one cab car
- TPC runs were used to estimate travel times between proposed stations along the FCEN corridor and the Church Street Station; travel time between Church Street Station and the Orlando Heath/Amtrak Station was assumed to match the existing SunRail schedule (3 minutes)
- US 441 rail service was developed using the existing SunRail service frequencies (30 minute peak and 2 hour off-peak service). Future considerations to the increased SunRail frequency and the infrastructure needed to accommodate US 441 service under that scenario were discussed in more detail in later sections.
- The US 441 rail schedule was developed to be synchronized with the existing SunRail schedule.



- Assumed the short turn shuttle service between Mount Dora and Tavares Station would operate independently of the US 441 mainline service from Eustis Station to Orlando Health/Amtrak Station.
- Commuter rail vehicles would be stored/dispatched generally in the vicinity of FCEN's current facility near SR 429/US 441
- Existing passing sidings were used where available. New or extended sidings were proposed where it would make operations more efficient without needing to hold a train for too long or too far away. Passing sidings are commonly used along single track corridors as pockets for trains moving in one direction to wait for a train traveling in the other direction to pass. This passing operation allows commuter rail services to operate in both directions along single-track territory without needing to construct double track along the entire corridor.



2

Rail Corridor Improvements

2.1 Introduction

As part of the Alternatives Analysis screening, five alternatives included commuter rail service. Out of the five Initial Alternatives which included commuter rail, two advanced as Viable Alternatives. They were:

- Viable Alternative 1-2: Commuter Rail from Orlando Health/Amtrak to SR 429 with Express Bus from SR 429 to Lake County
- Viable Alternative 1-5: Commuter Rail from Orlando Health/Amtrak to Mount Dora, Eustis, and Tavares

2.2 Downtown Orlando Rail Connection

As part of the refinement of the commuter rail components for these two Viable Alternatives, a connection to SunRail was identified. A June 12, 2014 workshop identified that the most appropriate way to connect the Florida Central (FCEN) Rail Line to the Central Florida Rail Corridor (CFRC) given current conditions was by using the existing southbound wye track. US 441 rail service would serve the proposed Robinson Street Station (near Hughey Avenue/Robinson Street) and then proceed south to service both the existing Church Street and Orlando Health/Amtrak SunRail Stations.

After trains service the Orlando Health/Amtrak SunRail Station, they would continue south to a new #15 crossover (south of Grant Street) on the CFRC to access the freight track to turn the train. After a train has been turned, the train would proceed north, utilize an existing #15 crossover (SB to NB) north of Grant Street, and then proceed to service both the Orlando Health/Amtrak and Church Street SunRail Stations. As the train departs the Church Street SunRail Station, it would utilize a new #15 crossover (NB to SB) to access the FCEN Rail Line from the CFRC. Once on the FCEN Rail Line, trains would service the Robinson Street Station and all other stations along the route.



This connection would require the following corridor upgrades:

- Upgrade of the existing wye and addition of a new #15 turnout
- Construction of a #15 crossover (SB to freight) between Grant Street and Michigan Street to enable the freight track to be used as a turnback track
- Assumption: Reasonable lease terms for use of the freight track
- Construction of a 475 foot #15 crossover (NB to SB) between Central Boulevard and Washington Street to enable outbound trains to access the FCEN branch
- Modification to signal system to accommodate new track configurations

Transfers to LYNX Central Station could be made in several ways:

- Disembarking at the Robinson Street Station and transferring to the LYMMO Lime Line
- Disembarking at the Robinson Street Station and walking to LYNX Central Station (approximately ¼ mile); the identified walking route will be improved to be a themed hardscaped/landscaped well-lit walkway
- Disembarking at the Church Street SunRail Station and transferring to the LYMMO Orange Line

2.2.1 Future Peak Service Considerations

The Transportation and Maintenance Operations Plan (TMOP) prepared for SunRail, the Central Florida Rail Corridor, and the Florida Department of Transportation identified in the 8/13/12 revision a 2030 Full Build SunRail Schedule that expands SunRail service from 30-minute peak-period headways to 15 minutes. In order to accommodate US 441 rail service on the CFRC corridor under SunRail's 2030 Full Build scenario, additional infrastructure would be required. As shown in Figure 2-1, the preliminary evaluation identified the following infrastructure needs to accommodate both the future SunRail service expansion and the proposed US 441 rail service:

- Double track wye and diamond crossing to allow northbound and southbound US 441 trains to simultaneously access/egress the CFRC corridor in the slots available between peak-period SunRail trains;
- Private property acquisitions and potential business relocation;
- Second platform at Robinson Station to accommodate both the northbound and southbound US 441 service; and,
- Grade crossing upgrades at Robinson Street and Garland Avenue.

Should SunRail pursue the 2030 Full Build expansion and US 441 rail alternatives advance beyond this Alternatives Analysis phase, a full simulation would be needed to identify the operational efficiency of the combined commuter rail services at this critical junction. While operationally feasible with the additional infrastructure, impacts to on-time performance may demonstrate delays that would need to be considered in future phases of the project.



LEGEND

Existing Station – – – – – Property Line



Passenger Track



US 441 CORRIDOR STUDY

Figure 2-1: Potential Double Track Wye Configuration



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2.3 Viable Alternative 1-2 Infrastructure Requirements

This alternative would provide commuter rail service along the existing FCEN rail corridor from Orlando Heath/Amtrak to SR 429; express bus service would connect SR 429 to Lake County. This alternative consists of eight commuter rail stations (two existing SunRail stations and six proposed new stations):

- Orlando Heath/Amtrak (existing SunRail station)
- Church Street (existing SunRail station)
- Robinson Street
- Amelia Street
- Princeton
- Lockhart/Rosemont
- Apopka
- SR 429

In addition, this alternative included three proposed express bus stations at SR 429, Mount Dora and Tavares/Eustis.

As part of this alternative, the following improvements were identified (see track chart and "Improvements to Existing Sidings for Viable Alternative 1-2" figure in Appendix A for more information):

- Upgrade FCEN track between the SunRail corridor and SR 429 Station from Class 2 to Class 4
- Upgrade existing sidings from Class 1 to Class 4 and replace existing turnouts
- Construct 850 feet of new Class 4 mainline track through the FCEN rail yard to avoid speed restriction with existing mainline track
- Improve grade crossings for safety (e.g., install active warning devices, clear vegetation)
- Install a signal system with Positive Train Control

It was assumed that midday layovers would be provided at existing railroad facilities (e.g., passing sidings, pocket tracks, yards). As the rail alternatives were developed in future phases of this project, layover and maintenance details would need to be further defined and evaluated for available capacity to accommodate US 441 service.

Based on these improvements, travel time from Orlando Heath/Amtrak to SR 429 would be approximately 38 minutes.

This alternative would provide approximately 30-minute headways for the peak period service and 2 hour off-peak headways (service that closely matches the existing, year 2014, SunRail schedule). To run this service, this alternative would require four train-sets plus one spare. A draft schedule is shown in Table 2-1. The proposed equipment cycle to operate the draft schedule is shown in Figure 2-2.



Northbound																
Train Number	2	4	6*	8*	10	12	14	16	18	20	22	24	26	28	30	32
Orlando Health/Amtrak	6:42	7:12	7:32	8:02	8:32	9:02	11:22	14:02	16:32	17:02	17:32	18:02	18:32	19:02	19:32	21:32
Church St.	6:45	7:15	7:35	8:05	8:35	9:05	11:25	14:05	16:35	17:05	17:35	18:05	18:35	19:05	19:35	21:35
Robinson St.	6:52	7:22	7:42	8:12	8:39	9:09	11:29	14:09	16:39	17:09	17:39	18:09	18:39	19:09	19:39	21:39
Amelia St.	6:55	7:25	7:45	8:15	8:42	9:12	11:32	14:12	16:42	17:12	17:42	18:12	18:42	19:12	19:42	21:42
Princeton	7:00	7:30	7:50	8:20	8:47	9:17	11:37	14:17	16:47	17:17	17:47	18:17	18:47	19:17	19:47	21:47
Lockhart/Rosemont	7:06	7:36	7:56	8:26	8:53	9:23	11:43	14:23	16:53	17:23	17:53	18:23	18:53	19:23	19:53	21:53
Apopka	7:17	7:47	8:07	8:37	9:04	9:34	11:54	14:34	17:04	17:34	18:04	18:34	19:04	19:34	20:04	22:04
SR 429	7:22	7:52	8:12	8:42	9:09	9:39	11:59	14:39	17:09	17:39	18:09	18:39	19:09	19:39	20:09	22:09

	Southbound															
Train Number	1	3	5	7	9	11	13	15	17	19	21	23*	25*	27*	29*	31
SR 429	5:37	6:07	6:37	7:07	7:37	8:07	10:07	12:37	15:07	15:37	16:07	16:34	17:04	17:34	18:04	20:07
Apopka	5:42	6:12	6:42	7:12	7:42	8:12	10:12	12:42	15:12	15:42	16:12	16:39	17:09	17:39	18:09	20:12
Lockhart/Rosemont	5:53	6:23	6:53	7:23	7:53	8:23	10:23	12:53	15:23	15:53	16:23	16:50	17:20	17:50	18:20	20:23
Princeton	5:59	6:29	6:59	7:29	7:59	8:29	10:29	12:59	15:29	15:59	16:29	16:59	17:29	17:59	18:29	20:29
Amelia St.	6:05	6:35	7:05	7:35	8:05	8:35	10:35	13:05	15:35	16:05	16:35	17:05	17:35	18:05	18:35	20:35
Robinson St.	6:08	6:38	7:08	7:38	8:08	8:38	10:38	13:08	15:38	16:08	16:38	17:08	17:38	18:08	18:38	20:38
Church St.	6:12	6:42	7:12	7:42	8:12	8:42	10:42	13:12	15:42	16:12	16:42	17:12	17:42	18:12	18:42	20:42
Orlando Health/Amtrak	6:15	6:45	7:15	7:45	8:15	8:45	10:45	13:15	15:45	16:15	16:45	17:15	17:45	18:15	18:45	20:45

* Represent trips with elongated travel times to avoid meet pass taking place at Lockhart/Rosemont Station

• This schedule produced is based off of a high level analysis that will need to be verified via full simulation

• Dwell times – 60 seconds

· Consist size – 1F40 Loco + 2 Coaches

• Travel Times estimated from RTC PTC Runs – for both Northbound and Southbound trips





2.4 Viable Alternative 1-5 Infrastructure Requirements

This alternative would provide commuter rail service along the existing FCEN rail corridor from Orlando Health/Amtrak to Eustis and Mount Dora. This alternative consists of 12 commuter rail stations (two existing SunRail stations and ten proposed new stations):

- Orlando Heath/Amtrak (existing SunRail station)
- Church Street (existing SunRail station)
- Robinson Street
- Amelia Street
- Princeton
- Lockhart/Rosemont
- Apopka
- SR 429
- Zellwood
- Tavares
- Mount Dora
- Eustis

There would be no express bus service with this alternative. A one-seat ride would be provided from downtown Orlando to Eustis, with a shuttle-train providing a connection between Tavares and Mount Dora.

As part of this alternative, the following improvements were identified (see track chart and "New and Improved Sidings for Viable Alternative 1-5" figure in Appendix B for more information):

- Upgrade FCEN track between the SunRail corridor and Eustis Station from Class 2 to Class 4
- Upgrade FCEN track between Tavares Station to Mount Dora Station from Class 1 to Class 4
- Upgrade existing sidings from Class 1 to Class 4 and replace existing turnouts
- Construct 850 feet of new Class 4 mainline track through the FCEN rail yard to avoid speed restriction with existing mainline track
- Construction of a new 1,900 foot siding south of Tavares Station
- Extend an existing 600 foot siding north of Zellwood Station to 6,000 feet
- Construction of a new 1,400 foot siding north of SR 429 Station
- Improve grade crossings for safety (e.g., install active warning devices, clear vegetation)
- Install a signal system with Positive Train Control

It was assumed that midday layovers would be provided at existing railroad facilities (e.g., passing sidings, pocket tracks, yards). As the rail alternatives are developed in future phases of this project, layover and maintenance details will need to be further defined and evaluated for available capacity to accommodate US 441 service.

Based on these improvements, travel time from Orlando Health/Amtrak to Eustis would be approximately 70 minutes and approximately 11-12 minutes on the shuttle train from Tavares to Mount Dora. There would be a 13-14 minute wait to transfer to/from the shuttle train.

This alternative would provide approximately 30-minute headways for the peak period service and 2 hour off-peak headways (service that closely matches the existing, year 2014, SunRail





schedule). To run the service, this alternative is estimated to require six trainsets plus one spare for the mainline and one trainset for the Mount Dora shuttle train. There is opportunity to consolidate trainsets with non-revenue moves through the operating plan, which would require fewer total vehicles. This would be explored further should the rail alternatives advance beyond this phase. A draft schedule is shown in Table 2-2. The proposed equipment cycle to operate the draft schedule is shown in Figure 2-3.



Northbound																
Train Number	2	4	6*	8*	10	12	14	16	18	20	22	24	26	28	30	32
Orlando Health/Amtrak	6:42	7:12	7:32	8:02	8:32	9:02	11:22	14:02	16:32	17:02	17:32	18:02	18:32	19:02	19:32	21:32
Church St.	6:45	7:15	7:35	8:05	8:35	9:05	11:25	14:05	16:35	17:05	17:35	18:05	18:35	19:05	19:35	21:35
Robinson St.	6:52	7:22	7:42	8:12	8:39	9:09	11:29	14:09	16:39	17:09	17:39	18:09	18:39	19:09	19:39	21:39
Amelia St.	6:55	7:25	7:45	8:15	8:42	9:12	11:32	14:12	16:42	17:12	17:42	18:12	18:42	19:12	19:42	21:42
Princeton	7:00	7:30	7:50	8:20	8:47	9:17	11:37	14:17	16:47	17:17	17:47	18:17	18:47	19:17	19:47	21:47
Lockhart/Rosemont	7:06	7:36	7:56	8:26	8:53	9:23	11:43	14:23	16:53	17:23	17:53	18:23	18:53	19:23	19:53	21:53
Apopka	7:17	7:47	8:07	8:37	9:04	9:34	11:54	14:34	17:04	17:34	18:04	18:34	19:04	19:34	20:04	22:04
SR 429	7:22	7:52	8:12	8:42	9:09	9:39	11:59	14:39	17:09	17:39	18:09	18:39	19:09	19:39	20:09	22:09
Zellwood	7:30	8:00	8:20	8:50	9:17	9:47	12:07	14:47	17:17	17:47	18:17	18:47	19:17	19:47	20:17	22:17
Tavares	7:46	8:16	8:36	9:06	9:33	10:03	12:23	15:03	17:33	18:03	18:33	19:03	19:33	20:03	20:33	22:33
Eustis	7:53	8:23	8:43	9:13	9:40	10:10	12:30	15:10	17:40	18:10	18:40	19:10	19:40	20:10	20:40	22:40
															-	
Tavares	8:01	8:31	8:51	9:21	9:48	10:18	12:38	15:18	17:48	18:18	18:48	19:18	19:48	20:18	20:48	22:48
Mount Dora	8:12	8:42	9:02	9:32	9:59	10:29	12:49	15:29	17:59	18:29	18:59	19:29	19:59	20:29	20:59	22:59

	Southbound															
Train Number	1	3	5	7	9	11	13	15	17	19	21	23*	25*	27*	29*	31
Mount Dora	4:47	5:17	5:47	6:17	6:47	7:17	9:17	11:47	14:17	14:47	15:17	15:44	16:14	16:44	17:14	19:17
Tavares	4:59	5:29	5:59	6:29	6:59	7:29	9:29	11:59	14:29	14:59	15:29	15:56	16:26	16:56	17:26	19:29
Eustis	5:05	5:35	6:05	6:35	7:05	7:35	9:35	12:05	14:35	15:05	15:35	16:02	16:32	17:02	17:32	19:35
Tavares	5:14	5:44	6:14	6:44	7:14	7:44	9:44	12:14	14:44	15:14	15:44	16:11	16:41	17:11	17:41	19:44
Zellwood	5:29	5:59	6:29	6:59	7:29	7:59	9:59	12:29	14:59	15:29	15:59	16:26	16:56	17:26	17:56	19:59
SR 429	5:37	6:07	6:37	7:07	7:37	8:07	10:07	12:37	15:07	15:37	16:07	16:34	17:04	17:34	18:04	20:07
Apopka	5:42	6:12	6:42	7:12	7:42	8:12	10:12	12:42	15:12	15:42	16:12	16:39	17:09	17:39	18:09	20:12
Lockhart/Rosemont	5:53	6:23	6:53	7:23	7:53	8:23	10:23	12:53	15:23	15:53	16:23	16:50	17:20	17:50	18:20	20:23
Princeton	5:59	6:29	6:59	7:29	7:59	8:29	10:29	12:59	15:29	15:59	16:29	16:59	17:29	17:59	18:29	20:29
Amelia St.	6:05	6:35	7:05	7:35	8:05	8:35	10:35	13:05	15:35	16:05	16:35	17:05	17:35	18:05	18:35	20:35
Robinson St.	6:08	6:38	7:08	7:38	8:08	8:38	10:38	13:08	15:38	16:08	16:38	17:08	17:38	18:08	18:38	20:38
Church St.	6:12	6:42	7:12	7:42	8:12	8:42	10:42	13:12	15:42	16:12	16:42	17:12	17:42	18:12	18:42	20:42
Orlando Health/Amtrak	6:15	6:45	7:15	7:45	8:15	8:45	10:45	13:15	15:45	16:15	16:45	17:15	17:45	18:15	18:45	20:45

* Represent trips with elongated travel times to avoid meet pass taking place at Lockhart/Rosemont Station

· This schedule produced is based off of a high level analysis that will need to be verified via full simulation

Dwell times – 60 seconds

Consist size – 1F40 Loco + 2 Coaches

· Travel Times estimated from RTC PTC Runs – for both Northbound and Southbound trips

US 441 Corridor Study Figure 2-3: Alternative 1-5 Equipment Cycle

				Overnight			
	Consist	Α	В	С	D	E	F
	4:00AM						
_	5:00AM	1					
	6:00AM		3	5			
	7:00AM	2	4		7	9	
	3:00AM			6	8		11
	3:00AM					10	12
	2:00AM				13		
	1.00AM						
	::00PM 11			15	14		
	00PM 12						
	00PM 1:			16			
	00PM 2:	17					
	0PM 3:(19				21
	0PM 4:0	~~~	18	23	25		
	PM 5:0	29		22		27	20
	PM 6:00		~~~		24	26	
	PM 7:00	28	30		31		
_	M 8:00						
	100:6 Md				32		
	M 10:001						
	M 11:00F						
	A 12:00A						
	VY000:1 Consist	A	В	с	D	E	F
	20110130	2	5	Overnight	5	-	



2.4.1 Mount Dora to Tavares Service

Current considerations for the Mount Dora spur operation includes a transfer at the Tavares Station. Passengers traveling to and from Mount Dora would have a two-seat ride with 11-12 minutes of travel time and a potential 13-14 minute wait.

In order to accommodate a Mount Dora shuttle service that provides a more seamless crossplatform transfer (with almost no wait time), a new center-island platform and modifications to the existing track would be needed as shown in Figure 2-2. Based on the low incremental increase in ridership (increase from 73 to 130 trips per day), the added capital expense for a cross-platform transfer was not justified.







US 441 CORRIDOR STUDY



Figure 2-2: Modifications to Tavares Station to Accommodate Cross-Platform Transfer



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2.5 Signal System Infrastructure

The railway signal system work for the rail corridor in the entire Study Area included the design, fabrication, installation, testing, commissioning and cutover of a new wayside Traffic Control System signal system and installation of new wayside equipment along the 42 miles of the track including 15 new control points, modifications to the existing SunRail system between LYNX Central Station and Orlando Health/Amtrak.

The work included improvements at grade crossings consisting of constant warning train detection, with traffic and pedestrian gates (where required), flashers, cantilevered flashers (where necessary) and warning bells.

The wayside signal system will include all new wayside signals, microprocessor-based control points, coded track and electric locks compatible with the SunRail system currently installed on Phase 1. The wayside signal system shall be a Traffic Control System consisting of bi-directional signaling. Operating speeds as great as 59 mph passenger train operation and a maximum 39 mph freight train operation may be realized depending upon track geometry and infrastructure.

The line would be predominately single track with passing sidings distributed throughout the main line to allow for meets and passes between passenger trains.

Similar to SunRail Phase 1, the proposed signal system would consist of intermediate signals operating on electronic-coded track circuits and solid-state microprocessor-based systems for new control points.

It was assumed that this new service will be operated and controlled by an operator from the FCEN storage and maintenance facility or the new commuter rail storage and light maintenance facility. There would also be a communication line that would connect to the SunRail Operations Control Center. The proposed control points would use a fiber optic backbone for normal communications and an ATCS radio for redundant communication between the control points and control center. Communication between the ATCS base stations and the control center would be via the new fiber optic network. The wayside signal system would provide electric lock devices (where necessary) for all hand throw switches on main track to ensure proper alignment of hand throw switches to be opened by train crews.

The majority of the new interlockings would be at the end of sidings to allow for passing of passenger trains operating in the opposite direction (see track chart). Each interlocking would include all material supplied and installed (i.e., switch components, automatic signals, control houses, track circuits connections, electric locks, signals, express cable, installation and testing). Track turnouts and crossovers would be shown under special track work.

2.6 Communications Systems

Communications between the control center and wayside/station equipment would be accomplished by a newly installed fiber optic communications system using three different methods:


- Via a combination of fiber optic cables directly connected to the control points for:
 - o Train dispatching and routing
 - o Operation of controlled signals
 - Other dynamic alarms and indications (SCADA functions) that are required at Control Points.
- Via a combination of fiber optic cables and VHF radio for:
 - o Cab "road" radio
 - Maintenance (portable) radio (defect detectors will not communicate with the control center but will transmit directly to the "road" and portable radios)
- Via fiber optic cables for the station amenities, SCADA functions, and Wi-Fi:
 - o Closed Circuit TV
 - o Variable Message Signs
 - o Ticket Vending Machines including credit card authorization
 - o Passenger Assistance Telephones
 - o Emergency Call Boxes
 - o Public Address Speakers
 - o Train Approach Notification Message/Light

The fiber optic communications system would consist of a fiber optic cable installed in the 44 mile length of the 441 commuter rail line interconnected with the SunRail fiber at West Jefferson in Orlando installed during SunRail Phase 1 construction. The new fiber optic cable would be connected to each new control point, wayside signal locations, stations and radio sites.

A total of 24 lateral tie-in locations (included in the fiber optic cable estimate) for information transmittal to and from the control center as listed above.

The fiber optic cable would be installed in a duct along the ROW and may be installed with outside utility company's cables if installed within the railroad ROW. Where no outside utilities exist, the fiber optic cable would be installed separately in a fiber optic duct.

2.7 Positive Train Control

The Rail Safety Improvement Act of 2008 (RSIA) requires all passenger trains to be outfitted with Positive Train Control (PTC) by the end of 2015. PTC will automatically stop or slow a train to avoid certain accidents if a driver is unable or fails to. The RSIA requires that the railroads develop PTC technology, and there are different methods to comply. Although great progress has been made, the technology still needs further development, and it is not expected that there will be full compliance by the date set by the RSIA. This project, like all others in the country, will need to implement PTC measures.





3

Commuter Rail Maintenance Facility

3.1 Introduction

For the US 441 Corridor Study, the need for a light maintenance facility for the commuter rail service associated with Viable Alternatives 1-2 (Commuter Rail/Express Bus) and 1-5 (Commuter Rail Only) was identified. The facility would be large enough to store up to eight train sets (3 vehicles each), with maintenance limited to fueling, washing, and minor maintenance. Heavy vehicle maintenance for the US 441 line was assumed to occur at the SunRail/Amtrak maintenance facility in Sanford.

The evaluation included identifying alternate sites for a light maintenance facility, developing a concept layout for what appeared to be a preferred site, and development of capital cost and right-of-way acquisition cost estimates for the facility. The purpose of this effort was to be able to prepare an order of magnitude cost estimate for such a facility. It was not intended to identify a recommended location nor definitive facility layout.

3.2 Site Evaluation

With Alternative 1-2 having commuter rail service terminate just west of SR 429, and with the Florida Central Railroad (FCEN) having its maintenance facility just east of SR 429, alternate sites for a commuter rail facility were concentrated in the vicinity of the SR 429 interchange. Figure 1 identifies three sites initially identified following discussions with FCEN staff, review of GIS data and sites visits as potential locations. Site #1 would develop the property south of the existing FCEN maintenance facility on a former block company site. Site #2 would develop a facility in an east-west direction along the FCEN track west of the abandoned ACCO parking lot, where the SR 429 commuter rail station would be located. Site #3 would develop a facility in a north-south configuration east of the existing BWI development, where trains would be required to turn 90 degrees off of the rail corridor to access the site.



Table 3-1 identifies the pros and cons of each site. Site #1 would have the disadvantage of not being at the end of the commuter rail line in Alternative 1-2, as well as some existing building constraints to provide the proper length of storage track. Site #3 would have the disadvantage of more land being required for the facility with its particular orientation, and would come close to a church along Hogshead Road southeast of the site. Site #2 would require the relocation of Hermit Smith Road just south of US 441 to not have this road encroach into the facility rail maintenance facility footprint, as well as the need to acquire and relocate three single-family residential properties. Site #2 would have the advantage of having the proper length to most efficiently accommodate the identified storage track need.

Table 3-1: Comparison of Alternate Maintenance Facility Sites

CRITERION	SITE #1	SITE #2	SITE #3
Right-of-Way Required	6.5 acres	7 acres (incl. Hermit Smith Rd. relocation)	7 acres
Relocations Required	None	3 single-family residential homes	None
Adequate Storage Length	No	Yes	Yes
Train Deadhead Miles	Diversion to west side of SR 429 with Alt. 1-2	Directly at end of Alt. 1-2	Directly at end of Alt. 1-2
Impact on Local Roads	ct on Local Roads None Relocation of Hermit Smith Rd		None
Impact on Adjacent Development	None	None	Noise/light levels on adjacent church
Environmental Impact	No fatal flaws apparent	Forest area west of ACCO lot would need to be removed	No fatal flaws apparent



Commuter Rail Station

Place of Worship

f.

Parks

Wetlands

100 - Year Floodplain

Park Boundaries

114

Maintenance Facility

Site 1

Site 2

Site 3













3.3 Refined Site

Given its operational advantages over the other two sites, Site #2 was chosen for the development of a concept plan for a light maintenance facility. The identification of a site for a concept was primarily developed to identify an order of magnitude cost estimate. More detailed analysis will be required if a commuter rail alternative is progressed as the Recommended Alternative. The concept plan is shown in Figure 2.

There are a couple of options to accommodating the Hermit Smith Road closure. In either case, Hermit Smith Road would need to be cul-de-sacced just south of the railroad. The first option would be to extend Hogshead Road to the northeast to connect with the ACCO access road on the east side of the old parking lot (as shown in Figure 3-2). The second option would be to realign Hermit Smith Road north of Hogshead Road to the east to connect with the ACCO access road, again east of the parking lot.

The capital cost for a new light maintenance facility on Site #2 is shown in Table 3-2. The total cost was estimated at about \$10.4 million, in 2013 dollars. This includes \$6.2 million for construction and \$4.2 million for right-of-way acquisition. About 6.5 acres of land would be required, as well as another 0.5 acres to accommodate east the Hogshead Road extension or Hermit Smith Road relocation to the ACCO access road.



Table 3-2: US 441 Rail Maintenance Facility Quantities – Site #2

FACILITY COMPONENT	UNIT	QUANTITY		
Light Maintenance Facility				
Transportation Building	SF	1,972		
Office Furnishings	LS	1		
Wash Pad	SF	7,150		
_Equipment	LS	1		
Yard Air, Water, Electrical	LS	1		
Parking, Walkways, Access Roads	SY	6,532		
Security Fence w/ Remote Control Gates	LF	3,200		
Site Security, Communications, Building Systems	LS	1		
VSLMF Yard and Roadway Lighting	SF	283,140		
Storage or Maintenance of Way Building				
Train Crew Trailer with 15 Parking Spaces	LS	1		
Yard and Yard Track				
Storage Tracks	TF	5,294		
Embedded Track	TF	412		
#10 Turnouts	EA	2		
#8 Turnouts	EA	6		
Excavation, Grading. Yard Drainage, Environmental	LS	1		





Figure 3-2: Conceptual Site Plan Limited Service Facility

Rail Maintenance and Storage Facility









Technical Memorandum | Viable Alternatives Development and Screening

Appendix E: Technical Memorandum – Railroad-Highway Grade Crossing Analysis



Technical Memorandum – Railroad-Highway Grade Crossing Analysis



January 2015



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1 Introduction

1.1 Introduction and Background

The Florida Department of Transportation, working in partnership with the Cities of Orlando, Apopka, Tavares, Eustis and Mount Dora in addition to Orange and Lake Counties, conducted a transit study for the US 441 Corridor. This study builds upon both current local transportation and land use initiatives and long-term growth management policies to evaluate options for providing premium transit service between major activity centers in Orange and Lake Counties within the US 441 Corridor. This study also evaluated options for improved connectivity with SunRail, Central Florida's commuter rail system.

The FCEN rail line is operated by Florida Central Railroad and is owned by parent company Pinsly Railroad. The FCEN line is a 68-mile rail corridor that consists of one main line and three branch lines. The main line, about 40 miles long, begins in downtown Orlando (connecting to the Central Florida Rail Corridor {CFRC}) and travels northwest, running roughly parallel to US 441 until Zellwood where it then goes northwest to the community of Tavares. In Tavares, the main line then continues north to Umatilla.

This Technical Memorandum summarizes the evaluation methodology, existing conditions, and preliminary recommendations to enhance safety and operations at railroad-highway grade crossings along the segments of the existing Florida Central Railroad (FCEN) rail line where commuter rail would operate for Viable Alternatives 1-2 and 1-5 shown in Figures 1-1 and 1-2. The Viable Alternative 1-2 and 1-5 alignments are summarized in Table 1-2.



Alternative and Mode(s)	Transit Route Alignments	
Viable Alternative 1-2	Commuter Rail: Downtown Orlando	
Commuter Rail and	to SR 429 (FCEN rail line)	
Express Bus		
	Express Bus: SR 429 to Lake County (US 441)	
Viable Alternative 1-5	Downtown Orlando to Mount Dora and Eustis	
Commuter Rail	(FCEN rail line)	

Table 1-2: Summary of the Viable Alternatives 1-2 and 1-5

The procedures for evaluating railroad-highway grade crossings are based upon physical and operational characteristics of individual crossings. Implementation of a new commuter rail service requires performing a rail crossing assessment to ensure all grade crossings meet current design and safety standards. This evaluation methodology for railroad-highway grade crossing analysis for the US 441 Commuter Rail Viable Build Alternatives consists of obtaining existing conditions data, field visits, and evaluation of each grade crossing to provide preliminary recommendations. The methodology described in this memorandum is consistent with those used for Phase 1 of SunRail.

Recommendations for improvements to the railroad-highway grade crossings are based on state and federal policies and guidelines and current industry practices. The specific recommendations for each railroad-highway grade crossing using the methodology presented in this technical memorandum should not be considered final and approved. Further evaluation and a more rigorous analysis of existing conditions and proposed commuter rail and freight operations is required to refine improvement recommendations for future project development phases.

This technical memorandum is divided into three major sections. The first section (Chapter 2) of this memorandum documents the existing conditions which summarizes the physical and operating conditions of grade crossings along the corridor. The second section (Chapter 3) describes the methodology used in developing the recommended improvements. The third section (Chapter 4) summarizes recommended improvements.

IFL-ORL/projects/61817.00 US441 Comidor AA/GIS/Project/Existing Conditions/Study Area Map Comidor mxd



VFL-ORL/projects/61817.00 US441 Comdor AA/GIS/Project/Existing Conditions/Study Area Map Comdor mxd





2

Existing Conditions

2.1 Introduction and Background

Railroad-highway grade crossings involve the intersection of two transportation modes, one public and the other private in most cases. Safe and efficient operations require cooperation of federal, state and local agencies and organizations. The U.S. Department of Transportation (U.S. DOT) seeks to ensure that a viable and safe national transportation system is maintained to transport people and goods while making efficient use of national resources.

The Railroad-Highway Grade Crossing Handbook is disseminated under the sponsorship of the U.S.DOT and provides a reference on prevalent and best practices as well as adopted standards relative to railroad-highway grade crossings. According to this handbook, crossings are divided into two categories: 1) public crossings are those on highways under the jurisdiction of and maintained by a public authority and open to the traveling public and 2) private crossings on roadways privately owned and utilized only by the landowner or licensee.

There are 59 existing, open railroad-highway at grade crossings along Viable Alternative 1-2 and 116 open crossings along Viable Alternative 1-5 in the US 441 corridor. The breakdown by type is detailed in Table 2-1. Figure 2-1 shows the location of the railroad-highway at-grade crossings.

	Number of Railroad-Highway Grade Crossings		
Type of Crossing	Viable Alternative 1-2	Viable Alternative 1-5	
Public Roadway	48	83	
Private Roadway	9	30	
Pedestrian	2	3	
Total	59	116	

Table 2-1: Existing Open Railroad-Highway Grade Crossings



2.2 Physical and Operating Conditions

The FDOT Highway-Rail Grade Crossing Inventory (RCHI) contains data collected through diagnostic field reviews, crossing status changes, and rail crossing inventory activities. Data updates are transmitted to the Federal Railroad Administration (FRA) based on the requirements from the Rail Safety Improvement Act of 2008 (49 USC 20101; Section 204. National Crossing Inventory).

The FDOT Highway-Rail Grade Crossing Inventory forms for existing, open, at grade crossings in the Viable Build Alternatives 1-2 and 1-5 corridors were obtained with the help of the FDOT District 5 Rail Coordinator. The most recent data available was for year 2013. A field review was performed to confirm existing conditions data and to determine other physical and operating characteristics including:

- Condition and visibility of warning devices, including advance warning signs and pavement markings
- Alignment, grade and sight distance of crossing
- Crossing surface conditions
- Roadway geometrics that may be diverting driver attention
- Physical characteristics of the crossing including auxiliary lanes, lighting, and driveways
- Type of roadway and roadway operational characteristics including traffic volume, vehicular speed, and type of use

Warning Devices

The purpose of traffic control at railroad-highway grade crossings is to permit safe and efficient operation of rail and highway traffic over such crossings. The warning devices are classified as follows:

- Passive Devices: Provide static messages of warning; their purpose is to identify and direct attention to the location of a crossing to permit drivers and pedestrians to take appropriate action.
- Active Devices: Provide advance notice of the approach of a train; they are activated by the passage of a train over a detection circuit in the track. Active devices include automatic gates, flashing-light signals, traffic control signals, and active advance warning devices.

All of the evaluated pedestrian crossings and public/private roadway crossings have passive warning devices. Several crossings showed that the warning devices were in poor condition and may need to be replaced or upgraded. Pavement markings were present at the majority of the crossings, but not all the crossings were in full conformance with the *Manual of Uniform Traffic Control Devices* (MUTCD) guidelines. Active or automatic warning devices were present at the majority of the public at-grade roadway crossings.





Figure 2-1: Railroad-Highway Grade Crossings









Roadway

The ideal crossing geometry is a 90-degree intersection of track and highway with slightascending grades on both highway approaches to reduce the flow of surface water toward the crossing. If there is insufficient clearing sight distance, and the driver is unable to make a determination to proceed safely, the clearing sight distance needs to be improved or flashing light signals with gates, closure, or grade separation should be considered. The majority of the crossings were observed to be at or close to a perpendicular configuration with respect to the track alignments; however, there are crossings that are skewed to the track and present potential sight distance issues. The majority of the crossings also had a moderate to flat roadway approach profiles. Modifications to the roadway geometry were noted at non redundant grade crossing locations with potential sight distance issues. Railroad-highway grade crossings that have poor geometric configurations, sight distance issues, and redundant roadway network were identified for further evaluation to investigate closure.

Vegetation should be removed or cut back periodically to keep the sight distance area free of obstructions. Roadside vegetation and illumination were noted if they presented sight distance issues at the crossings.

Signalized highway intersections in close proximity (200 feet or less) to a grade crossing should be preempted to operate in a special control mode when trains are approaching. At grade crossings located near signalized intersections with high traffic volumes where clear storage distance is 120 feet or less, pre-signals can be located to stop vehicular traffic before the railroad crossing only after an engineering study determines that the queue extends into the track area. Pre-signals display a red signal during the track clearing portion of a signal preemption sequence to prohibit additional vehicles from crossing the railroad track. A qualitative analysis was initially performed to determine locations where the clear storage distance is 200 feet or less to confirmed existing preemption at the signalized intersection. Grade crossings with a clear storage distance of 120 feet or less and high Average Annual Daily Traffic Volumes (AADT) were identified and further engineering analysis is recommended to evaluate the need for pre-signals. At grade crossings near intersections that are not signalized and with a clear storage distance of 120 feet or less, queue prevention strategies such as a displaced stop bar or the installation of gates is recommended and will require engineering evaluation.

A qualitative evaluation of the condition of existing pavement markings on grade crossing approaches was performed to identify locations where such markings are absent, unreadable, or not in compliance with MUTCD guidelines.

Pedestrian Accommodations

Sidewalks were observed along many or the crossing roadways along the corridor. However, some sidewalks did not cross the tracks; they truncate before and after the track forcing pedestrians to travel onto grass, gravel, ballast or on the roadway shoulder. Only eight crossings have pedestrian gates. In some locations, the roadway gates covered the area where pedestrians would walk but no pedestrian gates were provided on the far side of the crossing.



Crossing Surface

Many railroad-highway grade crossings were observed to have newly installed crossing surfaces; however, many other locations showed evidence of wear and deterioration. The following crossing surfaces were found at the crossings evaluated:

- Asphalt
- Rubber rail seal and concrete
- Pre-cast concrete panels
- Metal

Railroad Operations

The track segment between downtown Orlando and Apopka is designated as Class 2. North of Apopka to Tavares, the track is older and designated as Class 1 with slower operating speeds. The Florida Central Railroad track upgrade project is in the process of bringing this segment to Class 2. The segment from Tavares to Mount Dora is also designated as Class 1 but will not be improved as part of the FCEN's track upgrades.

Most of the activity along the FCEN rail line is freight-related. Freight destined for/coming from the FCEN line is typically interchanged with CSX trains at the CSX Taft Yard. Excursion trains also run on weekends from Tavares.

2.3 Safety Index

The *Federal-Aid Policy Guide* (FAPG) requires that potential danger to large numbers of people at crossings used on regular basis by passenger trains, school buses, transit buses, pedestrians, bicyclists, or by trains/motor vehicles carrying hazardous materials be one of the considerations in establishing a priority improvement schedule. Each year, the FDOT Central Rail Office enters rail crossing incidents into the RHCI for the preceding year and calculates the safety index for each crossing. The Safety Index report is used by the FDOT Rail Coordinator to develop the priority schedule for improvements which is translated into the ranking given to each grade crossing in the FDOT Railroad-Highway Crossing Inventory Forms. It was used to assign a relative priority ranking for the grade crossings analyzed.

The accident prediction model used in the RCHI was developed by Florida State University for FDOT and incorporates factors such as AADT, number of lanes, maximum speed of train, posted vehicle speed limit, and sight distance. The safety index formula is a simple method of rating each crossing from zero to 90; the formula is derived from the accident prediction model. A safety index of 70 is considered safe (according to the accident prediction model) and no further improvements are necessary for current rail operations. A safety index of 60 would be considered marginal. The safety index is calculated as follows:

 $R = X (1 - \sqrt{Y})$

where:



- R = safety index
- Y = adjusted accident prediction value
- X = 90 when less than 10 school buses per day traverse the crossing
- = 85 when 10 or more school buses per day and active control devices exist without gates
- = 80 when 10 or more school buses per day and passive control devices exist

2.4 Priority Schedule

FDOT District Rail Coordinators run a safety index report each year and make revisions to the priority improvement schedule by eliminating or adding crossings based on:

- Crossings scheduled for improvement, abandonment, or closure
- Crossings with signals that have age related problems
- Crossings with safety issues not reflected in the safety index
- Crossings that are part of a corridor review
- Crossings with passive devices that have had an accident/incident (injury or death to an individual or damage to equipment or a roadbed) within the last year
- Crossings where rail traffic carries hazardous materials, passengers, or have plans to increase rail traffic
- Crossings identified as unsafe or with near misses

According to the input received from the FDOT District 5 Rail Coordinator, when creating the priority schedule, the lower the ranking given, the greater the need for improvements at that particular location. The ranking assigned by the FDOT District 5 Rail Coordinator to each grade crossing is found in the Railroad-Highway Crossing Inventory Forms and was used to assign a relative priority ranking for the grade crossings analyzed. The relative priority ranking was calculated as the ratio of the most recent priority ranking to the 2013 statewide rank of 5357. Obtaining this ratio was essential to prioritize grade crossings in the corridor that have been already determined to require safety improvements by the FDOT District 5 Rail Coordinator.





3

Railroad-Highway Crossing Analysis Methodology

3.1 Introduction

This chapter details the methodology used for the railroad-highway crossing assessment for the US 441 Commuter Rail Viable Build Alternatives. The methodology described in this document is consistent with the Phase 1 SunRail analysis procedures for railroad-highway grade crossing assessment and follow state and federal policies and guidelines.

The procedures for evaluating railroad-highway grade crossings are based upon physical and operational characteristics of individual crossings. Implementation of a new commuter rail service requires performing a rail crossing assessment to ensure the crossings meet current design and safety standards. The railroad-highway crossing assessment consists of evaluating each of the existing grade crossings over the length of the corridor. The analysis was performed through a multidisciplinary approach consisting of a review of traffic characteristics, highway and track geometry, crossing surface, adjacent traffic signals, and overall rail operations. The railroad-highway grade crossing analysis methodology process is shown in Figure 3-1.





Figure 3-1: Railroad-Highway Grade Crossing Evaluation Process



3.2 Phase 1 SunRail Analysis Methodology

The methodology described in this technical memorandum was developed following the methodology used for the Phase 1 SunRail railroad-highway grade crossing analysis. The project stakeholders involved in the review of this methodology were FDOT, FTA, counties and local communities.

The Phase 1 SunRail railroad-highway grade crossing assessment consisted of obtaining the existing conditions data through records research, field visits and an evaluation of each railroad-highway grade crossing to provide a preliminary list of recommendations. The specific analysis methodology for Phase 1 SunRail is outlined as follows:

- 1. Obtain U.S. DOT Crossing Inventory Forms
- 2. Obtain 10 year accident data available on the FRA's website



- 3. Obtain the most recent annual daily traffic volumes
- 4. Research upcoming roadway, traffic signal, and railroad-highway grade crossing improvement projects
- 5. Field review of each railroad-highway grade crossing
- 6. Team meeting to evaluate findings from data research and field reviews and initiate discussions of recommended improvements
- 7. Coordinate meeting with local jurisdictions and FDOT to provide overview of the analysis

3.3 Insights from State and Federal Handbooks

Railroad-highway grade crossings involve the intersection of two transportation modes, one public (highway) and the other private (railroad) in most cases; safe and efficient operations require cooperation of federal, state and local agencies and organizations. Agencies within U.S. DOT that actively participate in crossing safety programs are noted in Table 3-1.

Agency	Involvement
Federal Highway Administration (FHWA)	 Administers federally-funded programs for crossing improvements Establishes standards for traffic control devices and systems at crossings (Manual of Uniform Traffic Control Devices - MUTCD)
Federal Railroad Administration (FRA)	 Maintains the national Railroad Accident/Incident Reporting System Custodian of the National Railroad-Highway Crossing Inventory

Table 3-1: U.S. DOT Agencies Participating in Crossing Safety Programs

The *Railroad-Highway Grade Crossing Handbook* provides general information on grade crossings; characteristics of the crossing environment and users, and the physical and operational improvements that can be made to enhance safety and operations of both highway and rail traffic over crossing intersections. This handbook draws on a number of different sources including the MUTCD and provides guidelines for the identification and selection of active control devices.

Jurisdiction over railroad-highway grade crossings resides primarily with the State of Florida. State highway and transportation agencies are responsible for administering crossings and programs for improvement projects and maintenance. State and local law enforcement agencies are responsible for the enforcement of traffic laws at crossings. Local government bodies are responsible for ordinances governing traffic laws and operational matters relating to crossings.





3.4 Florida Central Railroad Upgrade Project

The Florida Central Railroad (FCEN) rail improvement project was a Strategic Intermodal System (SIS) Rail Rehabilitation project that included the upgrade of a 57-mile stretch of FCEN track between Orlando and Umatilla. The rail project consisted of upgrading the track bed, replacing damaged railroad ties and clips, re-attaching the existing rails to the new sub-structure, along with improved grade crossings.

The project was completed in September 2014. The entire FCEN corridor has been designated as Class 2 track. FRA's track safety standards set the maximum speed for each class of track. For Class 2 track, the maximum speed for freight operations is 25 MPH and 30 MPH for passenger rail operations.

The US 441 Commuter Rail Viable Alternative alignments completely fall in the limits of the Florida Central Railroad Upgrade Project. Since the upgrade project improved grade surfaces at crossings, the grade surface improvements noted as part of the recommendations in this technical memorandum are for grade crossings located in segments where additional track would be installed.



3.5 Needs Criteria

The railroad-highway grade crossing assessment was performed following state and federal policies and guidelines and current industry practices.

Warning Devices

- Passive Devices: According to the *Railroad-Highway Grade Crossing Handbook,* Federal law requires that, at minimum, each state shall provide signs at all crossings.
- Active Devices: Required for public crossings with presence of passenger trains, school buses, transit buses or trucks carrying hazardous materials. Other considerations are: multiple mainline railroad tracks, history of collisions, roadways with a prevailing speed exceeding 25 mph, and roadways with traffic volumes exceeding 2,000 Annual Average Daily Traffic (AADT) in urban areas or 500 AADT in rural areas.

Crossing Closure

Eliminating redundant and unneeded crossings requires balancing public necessity, convenience and safety. The crossing closure decision should be based on economics; comparing the cost of retaining the crossing against the cost of providing alternate access and any adverse travel costs incurred by users. It is important to assess the effects of diverted traffic on the surrounding street system.

Preemption of Traffic Signals

A railroad crossing with active devices should be interconnected with any adjacent traffic signal control equipment, and the normal operation for the traffic signals controlling the intersection should be preempted to operate in a special control mode when trains are approaching at locations where a signalized highway intersection exists in close proximity to a railroad crossing. At grade crossings where the roadway corridor extending downstream from the crossing is heavily congested, it may be necessary to implement queue prevention strategies.

Pedestrian and Bicyclist Considerations

Non-motorist crossing safety should be considered at all railroad-highway grade crossings, particularly at or near commuter stations and at non-motorist facilities, such as bicycle/walking trails, pedestrian only facilities, and pedestrian malls. Pedestrian gates should be considered if flash-light signals with a crossbuck sign and audible device would not provide sufficient notice of an approaching train and/or commuter rail speeds exceeds 35 mph.





Sight Improvements

Sight improvements can contribute greatly to the safety of grade crossings. Vegetation is often desired along railroad right-of-way to serve as an environmental barrier to noise; however, vegetation should be removed or cut back periodically to keep sight distance area free of obstructions. The ideal crossing geometry is a 90-degree intersection of track and highway with slight-ascending grades on both highway approaches to reduce the flow of surface water toward the crossing.

Crossing Surface

Providing a reasonably smooth crossing surface would limit a driver's attention to be devoted primarily to choosing the smoothest path over the crossing rather than determining if the train is approaching.

Roundabouts

Provision of traffic control devices consistent with treatments at other railroad-highway grade crossings should be considered. If traffic queues are determined to impact the grade crossing, the following actions can be taken to keep the grade crossing clear of traffic prior to the arrival of rail traffic:

- Elimination of the roundabout
- Geometric design revisions
- Grade crossing regulatory devices
- Highway traffic signals
- Traffic metering devices
- Activated signs

Private Crossings

Private crossings should be evaluated on a case by case basis. Improvements consistent with public railroad-highway grade crossings should be considered for private roadways with moderate to high volume traffic (e.g., a shopping center driveway) and locations with high pedestrian activity. For private roadways with low traffic volume, a combination of passive devices and/or gate with a lock may be appropriate.

Table 3-3 summarizes the criteria identified in the *Railroad-Highway Grade Crossing Handbook* for minimum requirements related to level of protection at railroad-highway grade crossings for the implementation of a new commuter rail service.



Table 3-3: Level of Crossing Protection Criteria

Туре	Device	Description	Criteria	Exemptions
Crossing Closure	Crossing Closure	Eliminating redundant and unneeded crossings to reduce grade crossing accidents	 Surrounding street system should be examined to assess the effects of diverted traffic More than four crossings per mile with fewer than 2,000 vehicles per day and more than 2 trains per day 	
Passive	Crossbuck	Shall be reflectorized white with the black lettering	 As a minimum, one crossbuck sign shall be used on each approach to every highway-rail grade crossing 	
	Stop Sign	Road user must come to a full and complete stop not less than 15 feet short of the nearest rail	 Maximum train speed equals or exceeds 30 mph Rail line is used by passenger trains 	
	Pavement Markings	All grade crossing pavement markings shall be reflectorized white	 Identical markings shall be placed in each approach lane on all paved approaches where signals and automatic gates are located, and all other crossings where the statutory highway speed is 40 mph or greater 	 Pavement markings should not be required at grade crossings where the posted highway speed is less than 40 mph
Active	Flashing-Light Signals	Consists of two red lights in a horizontal line flashing alternately at approaching highway traffic	 Grade crossings shall be equipped with flashing-light signals where train speeds exceed 35 mph 	 Traffic control signals shall not be used instead of flashing-light signals to control road users at a mainline highway-rail grade crossing
	Automatic Gates	Consists of a drive mechanism and a fully reflectorized red-and white-striped gate arm with lights	 Grade crossings should be equipped with automatic gates and flashing- light signals where train speeds exceed 35 mph Presence of passenger trains 	• Traffic control signals or flashing- lights without automatic gates may be used where crossing is at a location other than an intersection and where train speeds do not exceed 25 mph and the roadway is a low-volume street with prevailing speeds do not exceed 25 mph
	Pedestrian Gates	A pedestrian gate is similar to an automatic gate except the arm is shorter	 Pedestrian gates should be considered if flash-light signals with a crossbuck sign and audible device would not provide sufficient notice of an approaching train Commuter rail speeds exceeding 35 mph 	
	Preemption/ Interconnection	Preemption serves to ensure that the actions of separate traffic control devices complement rather than conflict with each other	 When a highway-rail grade is equipped with a flashing-light signal system and is located within 200 ft of an intersection controlled by a traffic control signal, the traffic control signal should be provided with preemption 	
Illumination	Street Lighting	Illumination at a crossing may be effective in reducing nighttime collisions	 Nighttime train operations. Restricted sight or stopping distance in rural areas Low ambient light levels 	
Removing Obstructions	Clear Vegetation	Clearing sight distance	 Vegetation should be removed or cut back periodically at grade crossings 	







4

Recommended Improvements

4.1 Overview

The railroad-highway crossing assessment consisted of evaluating each of the existing railroad-highway grade crossings over the length of the corridors for the Viable Build Alternatives 1-2 and 1-5. The analysis was performed using the existing conditions data found in the most recent Railroad-Highway Crossing Inventory Forms provided by the FDOT District 5 Rail Coordinator along with data recorded during field visits. The existing conditions data is shown in Table 4-1.

The initial findings were used to develop a list of recommendations regarding grade crossing improvements through a team review of existing data, field inspections, and team discussions on appropriate improvements based on various policies and guidelines identified in the following reference documents:

- Railroad-Highway Grade Crossing Handbook (Revised Second Edition August 2007) Federal Highway Administration
- Manual on Uniform Traffic Control Devices (MUTCD 2009)

The specific recommendations for each railroad-highway grade crossing using the methodology presented in this technical memorandum should not be considered final and approved. Further evaluation of existing conditions and proposed commuter rail and freight operations are required to refine improvement recommendations. The plans, maintenance records and general condition of electronic controls will be required to better determine if existing equipment is re-usable with the implementation of commuter rail service.

Capital costs identified for public and private railroad-highway grade crossing improvements are provided in the separate **Cost Methodology and Results Technical Memorandum**.




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Table 4-1: Railroad-Highway Grade Crossings Existing Conditions Summary

Viable Alternative	Crossing ID	Mile Post	Cross Street	Type	County	Exist # of Tracks	Sidewalks	AADT	Storage Length	Signalized Intersection	No of Lanes	Crossbuck	Crossbuck Sign	Stop Sign	Post Mounted Flashing Lights	Roadway Gate	Ped Gate	Cantilevered Flashing Over Traffic	Stoplines	Xing Symbols	Crossing Pavement Surface	Rank 2013*
	622188X	790.12	WEST WASHINGTON S	Public	ORANGE	2	yes	1300	200	yes	3	\checkmark			✓	✓	✓	✓	✓	✓	Rubber	1321
	622187R	790.06	WEST JEFFERSON ST	Public	ORANGE	3	yes	4820	250	yes	2	✓			✓	✓		✓			Rubber	575
	622344G	814.6	ROBINSON ST W / SR 526	Public	ORANGE	1	yes	15500	108	yes	4		✓		✓			✓	✓	~	Rubber	771
	622345N	814.58	GARLAND AVE N	Public	ORANGE	1	yes	7800	N/A	N/A	3	\checkmark			✓	✓		✓	~	✓	Rubber	2671
	622347C	814.51	HUGHEY AVE S	Public	ORANGE	1	yes	8600	103	yes	3	\checkmark			✓	~		✓	~	~	Rubber	2148
	622348J	814.08	PARRAMORE ST / CR 5107	Public	ORANGE	1	yes	2500	91	yes	2	\checkmark			\checkmark	~			\checkmark	✓	Rubber	1631
	914119X	813.99	PEDESTRIAN XING	Public	ORANGE	1	no	N/A	N/A	N/A	1	\checkmark			\checkmark						Rubber	3783
	914118R	813.93	PEDESTRIAN XING	Public	ORANGE	1	no	N/A	N/A	N/A	1	✓			✓						Rubber	3782
	622353F	813.87	WESTMORELAND DR / CR 5109	Public	ORANGE	1	yes	2100	N/A	N/A	2	\checkmark			~	\checkmark			\checkmark	~	Rubber	2130
	622354M	813.72	LIVINGSTON ST / CR 5088	Public	ORANGE	1	yes	650	570	no	2	\checkmark			✓	~			✓	✓	Rubber	3416
	622355U	813.48	AMELIA ST / CR 5084	Public	ORANGE	2	yes	1600	560	no	4		х		✓	~	✓	✓	✓	~	Rubber	969
	622356B	813.29	W COLONIAL / SR 50 / US 17	Public	ORANGE	1	yes	29500	N/A	N/A	4	✓			~	✓		~	~	~	Concrete	653
Ч	622357H	812.71	COUNTRY CLUB DR	Public	ORANGE	1	yes	3588	N/A	N/A	2	\checkmark			✓	✓	✓		~	✓	Rubber	3210
1	622358P	812.5	GOLFVIEW ST	Public	ORANGE	1	no	6055	N/A	N/A	2	\checkmark	✓		✓	~			✓	~	Rubber	3098
∞	622363L	811.85	PRINCETON ST / SR 438	Public	ORANGE	1	yes	13500	400	yes	4		✓		✓	~	~	✓	~	~	Concrete and Rubber	674
S 1-2	622364T	811.4	SILVER STAR RD E / CR 424A	Public	ORANGE	2	yes	7800	190	yes	4		~			~		~	~	~	Rubber	481
ve	622377U	811.19	PRIVATE RD	Private	ORANGE	1	no	N/A	N/A	N/A	2	\checkmark			✓						Asphalt	4912
ati	622378B	811.18	PRIVATE RD	Private	ORANGE	1	no	N/A	N/A	N/A	1	\checkmark		✓							Unconsolidated	4913
LD	622379H	811.07	PRIVATE	Private	ORANGE	1	no	N/A	N/A	N/A	1	\checkmark		✓							Unconsolidated	4914
te	622381J	810.9	PRIVATE	Private	ORANGE	1	no	N/A	N/A	N/A	2	\checkmark		✓							Unconsolidated	4915
A	622382R	810.86	L.VAGABOND CIR	Private	ORANGE	1	no	N/A	N/A	N/A	2	\checkmark		✓							Unconsolidated	4916
	914117J	810.75	FAIRVIEW VISTA PT	Private	ORANGE	1	no	N/A	N/A	N/A	2	\checkmark			✓						Asphalt and Timber	4109
	622383X	810.75	AQUATIC DR	Private	ORANGE	1	no	N/A	N/A	N/A	2	\checkmark									Unconsolidated	4917
	622384E	810.6	PRIVATE	Private	ORANGE	1	no	N/A	N/A	N/A	2	\checkmark			✓	✓					Unconsolidated	4918
	622385L	810.57	PVT MINI STORAGE	Private	ORANGE	1	no	N/A	N/A	N/A	2	\checkmark									Unconsolidated	4919
	622386T	810.5	PRIVATE	Private	ORANGE	1	no	N/A	N/A	N/A	2	\checkmark									Unconsolidated	4920
	622387A	810.4	PRIVATE	Private	ORANGE	1	no	N/A	N/A	N/A	2		\checkmark		✓	✓					Asphalt	4921
	622389N	810.3	PRIVATE	Private	ORANGE	1	no	N/A	N/A	N/A	1	\checkmark									Unconsolidated	4910
	622392W	810.02	BARRETTS MARINA P	Private	ORANGE	1	no	N/A	N/A	N/A	2	✓		✓							Unconsolidated	4922
	622390H	810.22	PRIVATE	Private	ORANGE	1	no	N/A	N/A	N/A	1	\checkmark									Unconsolidated	4911
	622393D	809.89	LEE RD / SR 423	Public	ORANGE	1	yes	32500	N/A	N/A	4	\checkmark			✓	\checkmark		✓	\checkmark	\checkmark	Concrete and Rubber	608
	626494D	808.87	ALL AMERICAN BLVD	Public	ORANGE	3	yes	9043	1400	no	2	\checkmark			✓	\checkmark			✓	✓	Concrete and Rubber	2207
	622396Y	808.61	EDGEWATER DR S / CR 424	Public	ORANGE	1	yes	22000	116	yes	4		~		~	✓		~	✓	~	Asphalt and Timber	520
	622397F	809.35	MAGNOLIA HOMES RD	Public	ORANGE	1	yes	6600	650	yes	2		\checkmark		✓	\checkmark	✓		\checkmark	\checkmark	Concrete	1566

* FDOT District 5 Rail Coordinator, when creating the priority schedule, assigns a ranking to each grade crossing. The lower the ranking given, the greater the need for improvements





Table 4-1: Railroad-Highway Grade Crossings Existing Conditions Summary (Cont.)

Viable Alternative	Crossing ID	Mile Post	Cross Street	Type	County	Exist # of Tracks	Sidewalks	AADT	Storage Length	Signalized Intersection	No of Lanes	Crossbuck	Crossbuck Sign	Stop Sign	Post Mounted Flashing Lights	Roadway Gate	Ped Gate	Cantilevered Flashing Over Traffic	Stoplines	Xing Symbols	Crossing Pavement Surface	Rank 2013*
	622398M	807.7	EDGEWATER DR N / CR 424	Public	ORANGE	1	no	22000	N/A	N/A	2	~			~	~			✓	~	Rubber	1509
	622399U	807.6	MOTT AVE	Public	ORANGE	1	yes	2600	165	yes	2	✓			✓	✓			✓	✓	Rubber	3231
	622400L	807.3	ROSE AVE / CR 4273	Public	ORANGE	1	yes	4500	N/A	N/A	2		✓		✓	~	~		\checkmark	✓	Rubber	2163
	622402A	806.87	BEGGS RD	Public	ORANGE	1	yes	3900	580	no	2	✓			✓	\checkmark			\checkmark	\checkmark	Rubber	1235
	625278G	805.36	VULCAN RD	Private	ORANGE	1	yes	N/A	N/A	N/A		✓		\checkmark							Rubber	4593
	625276T	804.38	LAKEVILLE RD	Public	ORANGE	1	yes	4100	N/A	N/A	2	\checkmark			✓	\checkmark			✓	✓	Rubber	1889
	625275L	803.32	SHEELER RD	Public	ORANGE	1	yes	5100	450	yes	2		✓		✓	✓			\checkmark	✓	Rubber	2128
ц С	625274E	802.95	13TH ST	Public	ORANGE	1	yes	1706	N/A	N/A	2	√			✓	\checkmark	✓		\checkmark	✓	Concrete	2529
~	625273X	802.41	HIGHLAND ST	Public	ORANGE	1	no	270	580	no	2	\checkmark									Unconsolidated	2432
2	625272R	802.3	ROBINSON AVE	Public	ORANGE	1	yes	1613	224	no	2		✓		✓	✓			✓	✓	Unconsolidated	2851
- -	914124U	802.23	WEST ORANGE TRAIL	Public	ORANGE	1	no	N/A	N/A	N/A	1	✓	,		✓	✓			✓	√	Asphalt and Timber	3784
S	625271J	802.22	EIGHTH ST	Public	ORANGE	1	yes	6873	470	no	2		√		✓ ✓				✓	✓ ✓	Rubber	2834
.≚	625269H	802.08	PARK AVE CR 435	Public	ORANGE	1	yes	10718	400	no	2		√		✓ ✓	√	~		✓	√	Concrete and Rubber	1283
lat	625268B	801.95	CENTRAL AVE / CR 4275	Public	ORANGE	1	yes	12900	290	yes	2		✓ ✓		✓ ✓	✓ ✓		1	✓	✓ ✓	Rubber	2140
L	6252670	801.77		Public	ORANGE	1	yes	2348	180	no	2		✓ ✓		√	√		~	✓	✓	Rubber	3158
lte	625266IVI	801.7		Public		1	no	2325	220	no	2		v		v	~			•	•	Rubber	3205
< <	625265F	801.45		Public		1	no	2086	370	no	2		~		∨				✓	v	Rubber	3043
	6252641	801.29		Public		1	no	2000	495	no	2	•			∨	•			•	v	Rubber	2041
	6252055 625261D	800.22		Public		1	110	1745	210	yes	2	•			•	•			v	v	Concrete and Pubber	2222
	625254T	700.25		Public		1	110	3000	160	no	2	• •			• •	•			1	1	Concrete and Rubber	2161
	625252F	798.65		Private		2	no	N/Δ	100 N/Δ	Ν/Δ	2				•	•			·	•	Asphalt	/5/0
	6252521	798.85	MID FLA FRFFZFR	Public	ORANGE	1	no	N/A	N/A	N/A	1	✓									Rubber	3773
	625251X	798.58	ORANGE AVE / CR 437	Public	ORANGE	1	no	8983	130	ves	2	· •			✓	✓			✓	~	Rubber	2402
	625250R	798.29	PRIVATE (Kitt Ave)	Private	ORANGE	2	no	N/A	45	ves	2	✓			✓						Rubber	4541
	625249W	798.03	HERMIT SMITH RD	Public	ORANGE	1	no	2333	53	no	2	√			✓	\checkmark			✓	✓	Asphalt	2905
	625248P	797.87	FUDGE RD	Private	ORANGE	1	no	1119	65	no	2	~									Asphalt	4543
	625247H	797.69	TRAILER PARK DR	Private	ORANGE	1	no	N/A	N/A	N/A	2	✓		✓							Asphalt and Timber	4542
	625245U	797.3	AIRPORT DR	Public	ORANGE	1	no	N/A	N/A	N/A	2	✓			✓			✓			Asphalt	4553
È	625244M	796.05	WESLEY RD	Public	ORANGE	1	no	127	50	no	2	✓	✓								Asphalt	3100
ō	625243F	795.66	PVT	Private	ORANGE	1	no	N/A	N/A	N/A	2	✓		✓							Timber	4547
Ņ	625242Y	795.24	PVT	Private	ORANGE	2	no	N/A	N/A	N/A	2	✓									Unconsolidated	4546
÷	625241S	795.06	UNION ST	Public	ORANGE	2	no	127	50	no	2	✓									Asphalt	4545
<pre></pre>	625240K	794.97	PONCAN RD	Public	ORANGE	2	no	772	40	no	2	✓								✓	Rubber	2677
ati	625238J	794.62	JONES AVE / CR 4232	Public	ORANGE	1	no	6767	60	yes	2	\checkmark			\checkmark	~			\checkmark	\checkmark	Metal	2909
ů	625237C	793.39	LAUGHLIN RD	Public	ORANGE	1	no	1802	130	no	2	~			✓				✓	~	Asphalt	3080
Te l	625233A	790.81	CR 448A / CR 448A	Public	LAKE	1	no	10	N/A	N/A	2		\checkmark		✓	~			✓	✓	Concrete	3093
AH	625227W	790.14	OAK SHADOW LN	Private	LAKE	1	no	N/A	N/A	N/A	1	✓									Unconsolidated	4549
	627997A	790.05	PRIVATE	Private	LAKE	2	NO	N/A	N/A	N/A	1	✓									Asphalt and Timber	4332
	625226P	789.24	CR 448	Public	LAKE	1	no	6100	540	no	2	✓			✓	\checkmark			\checkmark	✓	Rubber	1303
	625225H	788.74	SHIRLEY SHORES DR / CR 4463	Public	LAKE	1	no	2141	N/A	N/A	1		~		~	~			~	~	Concrete	2443

* FDOT District 5 Rail Coordinator, when creating the priority schedule, assigns a ranking to each grade crossing. The lower the ranking given, the greater the need for improvements



Viable Alternative	Crossing ID	Mile Post	Cross Street	Type	County	Exist # of Tracks	Sidewalks	AADT	Storage Length	Signalized Intersection	No of Lanes	Crossbuck	Crossbuck Sign	Stop Sign	Post Mounted Flashing Lights	Roadway Gate	Ped Gate	Cantilevered Flashing Over Traffic	Stoplines	Xing Symbols	Crossing Pavement Surface	Rank 2013*
	625223U	787.88	PVT	Private	LAKE	2	no	N/A	N/A	N/A	1	✓									Asphalt and Timber	4552
	625198N	786.78	BEECHNUT RD	Private	LAKE	1	no	N/A	N/A	N/A	1	~									Unconsolidated	4553
	625197G	785.47	S DORA BLVD	Public	LAKE	1	no	304	N/A	N/A	2	~							\checkmark	✓	Rubber	2889
	625195T	784.6	LAKE DORA CIRCLE	Public	LAKE	1	no	486	190	no	2		\checkmark		✓	\checkmark			\checkmark	✓	Rubber	3441
	625194L	784.34	COUNTY DR	Public	LAKE	1	no	918	420	no	2		\checkmark		✓	\checkmark			\checkmark	✓	Rubber	3221
	625193E	783.88	MANSFIELD RD	Public	LAKE	1	yes	1650	N/A	N/A	2										Asphalt	795
	625189P	0.17	SINCLAIR AVE	Public	LAKE	1	no	377	N/A	N/A	2	\checkmark									Asphalt	3172
	622002G		PRIVATE	Private	LAKE	1	no	N/A	N/A	N/A												2893
	625190J	23.9	S. NEW HAMPSHIRE AVE	Public	LAKE	1	no	N/A	N/A	N/A	1										Asphalt	3514
	621833N	822.2	ROCKINGHAM AVE	Public	LAKE	1	no	636	N/A	N/A	2	✓	✓						\checkmark	✓	Asphalt	2756
	621832G	822.15	ST. CLAIR-ABRAMS	Public	LAKE	1	yes	13	N/A	N/A	2	✓							\checkmark	✓	Asphalt	3011
	621998L	822.05	DISSTON AVE	Public	LAKE	2	yes	1450	N/A	N/A	2	\checkmark							\checkmark	✓	Rubber	2188
	622001A	821.98	LAKE DORA DR	Public	LAKE	2	yes	1450	724	no	2	\checkmark							\checkmark	✓	Rubber	2189
	622003N	821.8	E ALFRED ST / CR 500A	Public	LAKE	1	yes	12000	770	no	2	\checkmark			\checkmark				\checkmark	✓	Concrete	1052
	622004V	820.85	MT HOMER RD	Public	LAKE	1	no	233	200	no	2	\checkmark							\checkmark	✓	Asphalt	2977
<u>></u>	622005C	820.15	SR 500 / SR 19 /US 441	Public	LAKE	1	yes	44500	770	no	6	\checkmark			✓	\checkmark			\checkmark	✓	Concrete	654
L	622006J	819.8	HUFFSTETLER DR	Public	LAKE	1	yes	750	750	no	2	\checkmark			✓	\checkmark			\checkmark	✓	Concrete and Rubber	1918
0	622007R	819.5	MT HOMER RD	Public	LAKE	1	no	4600	88	no	2	✓			\checkmark						Asphalt	1958
ц Ц	622008X	818.75	CLAY BLVD	Public	LAKE	1	no	1520	160	no	2	✓				\checkmark			√	✓	Asphalt	2352
() ()	622009E	818.6	ATWATER AVE / CR 4423	Public	LAKE	1	no	1040	30	no	2	✓							✓	✓	Asphalt	2747
ž	622010Y	818.3	STEVENS AVE	Public	LAKE	1	no	484	170	no	2	✓		 ✓ 					✓		Asphalt	2582
ati	622011F	818.07	WOODWARD AVE	Public	LAKE	1	no	1100	540	no	2	✓		✓					✓		Asphalt	1056
Ĩ	622012M	817.95	WARD ST	Public	LAKE	1	no	864	270	no	2	✓		✓					\checkmark	~	Asphalt	2896
ē	622013U	817.85	LEMON ST	Private	LAKE	1	no	N/A	N/A	N/A	2	✓									Asphalt	4909
Ĭ	622014B	817.77	LAKESHORE DR	Public	LAKE	1	no	5037	210	no	2	✓			\checkmark	\checkmark			✓	✓	Rubber	3219
-	622015H	817.62	ORANGE AVE	Public	LAKE	1	no	11438	107	yes	2	✓		✓					✓		Rubber	1990
	622016P	817.6	MAGNOLIA AVE	Public	LAKE	1	yes	187	84	no	2	✓		✓					✓		Rubber	3190
	622017W	817.55	MACDONALD AVE	Public	LAKE	1	no	499	73	no	2	✓		✓					✓		Rubber	2957
	622018D	817.5	CLIFFORD AVE	Public	LAKE	1	yes	510	60	yes	2	√		✓					<u>√</u>		Rubber	3060
	621831A	797.25	LAKE DORA DR / CR 4358	Public	LAKE	1	no	1450	N/A	N/A	2	√							✓	✓ ✓	Rubber	2646
	6218301	/9/.0/	DORA AVE / CR 4423	Public	LAKE	1	no	4700	N/A	N/A	1	√		✓					~	~	Rubber	2868
	621829Y	797		Private		1	no	1450	N/A	N/A	1	✓									Asphalt	4941
	6218285	796.9		Public		1	no	1450	N/A	N/A	2	✓							v	~	Asphalt	1207
	621826D	796.7		Public		1	no	1450	N/A	N/A	2	✓		~					~		Asphalt	2647
	021825W	796.65		Private		1	no	N/A	N/A	N/A	1	•									Asphalt	3750
	621823H	795.5		Public	LAKE	1	no	/1/	43	no	2	√				~			~	~	Asphalt	2866
	621822B	/95.4		Private		1	no	N/A	N/A	N/A	2	√		✓	/						Unconsolidated	4940
	6218210	1.85		PUDIIC		1	no	1682	30	yes	2	•			✓	✓			✓	~	Rubber	2686
	02182UIVI	794.99		Private		1	no	N/A	N/A	N/A	2	v			/						Asphait	4947
	6218191	52.3		PUDIIC		1	no	2035	40	no	2	•			√	√			•		Asphalt	2/36
	021010L	52.3	GULDEN ISLE DK	PUDIIC	LAKE	1	110	12/3	20	110	2	✓			✓	✓			v	✓	Asphalt	2164

Table 4-1: Railroad-Highway Grade Crossings Existing Conditions Summary (Cont.)

* FDOT District 5 Rail Coordinator, when creating the priority schedule, assigns a ranking to each grade crossing. The lower the ranking given, the greater the need for improvements





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Technical Memorandum | Railroad-Highway Grade Crossing Analysis



4.2 Recommended Improvements to Apply to Grade Crossings

Thirteen (13) evaluation categories have been identified to determine specific recommended improvements at railroad-highway grade crossings. The quantities designated below are for the entire rail line within the Study Area.

- 1. <u>Relocate Automatic Warning Devices:</u> Relocation may be required due to additional track installation. Three grade crossings were determined to be located in rail segments where additional tracking would be installed.
- 2. <u>Upgrade Automatic Warning Devices:</u> Fourteen grade crossings were identified for installation of new automatic crossing warning equipment based on equipment age data found in the Rail Crossing Inventory Forms.
- 3. <u>Install New Automatic Warning Devices:</u> It is estimated that approximately 47% of the existing railroad-highway grade crossings would require installation of new automatic crossing warning equipment.
- 4. <u>Install Gate and Lock:</u> For private roadways with low traffic volume, a combination of passive devices and a gate with a lock is recommended. Nine grade crossings with these characteristics were identified based on data from the Rail Crossing Inventory Forms and field review.
- 5. <u>Install New Crossing Surface:</u> Based on field review, it was estimated that approximately 33% of the grade crossings would require a new crossing surface to provide a reasonably smooth crossing surface. The improvements were assumed to be completed with the Florida Central Railroad Upgrade Project.
- 6. <u>Install Railroad Warning Signs and Pavement Markings:</u> Installing warning signs and pavement markings where absent at paved approaches where signals and automatic gates are located and/or grade crossings where existing signs and pavement markings do not comply with the MUTCD guidelines. Approximately 37% of the grade crossings were identified for improvements in this category.
- 7. <u>Modify Roadway Grading/Geometry:</u> Approach profile grading and roadway alignment modifications to improve access and/or sight-distance were identified for four grade crossings.
- 8. <u>Install Pedestrian Gates/Flashers:</u> Recommended for all sidewalk approaches to railroad-highway grade crossings and locations close to stations or high pedestrian activity centers. Approximately 29% of the grade crossings would require improvements for pedestrian protection.



- 9. <u>Construct Sidewalk Connections</u>: Construct new sidewalk across railroad right-ofway to connect existing sidewalk that terminates on either side of the crossing at 15 grade crossings.
- 10. Install/Maintain Traffic Signal Preemption, Pre-signal, Queue Prevention Strategy: This relates to railroad-highway grade crossings equipped with a flashing-light signal system and located within 200 feet of an intersection controlled by a traffic control signal. Most of the grade crossings evaluated that are located within 200 feet of a signalized intersection already have traffic signal pre-emption installed. Grade crossings located near signalized intersections where the clear storage distance is 120 feet or less and the traffic volumes are high were identified for potential need of presignals if an engineering study determines that the queue extends into the track area. For grade crossings close to a non-signalized intersection where the clear storage area is 120 feet or less, queue prevention strategies such as a displaced stop bar or the installation of gates will require engineering evaluation. 17% of the grade crossings were identified for potential need of signal pre-emption, pre-signal, or queue prevention strategy.
- 11. <u>Install Street Lighting:</u> Over 68% of the grade crossings were observed to have low ambient light levels in rural areas. New and/or brighter street lighting is recommended to improve safety at these locations.
- 12. <u>Clear Vegetation</u>: Vegetation should be removed or cut back periodically to keep sight distance area free of obstructions. Vegetation for about 36% of the grade crossings were observed to have vegetation that obstructed sight distance.
- 13. <u>Investigate Crossing Closure</u>: Based on the field inspection observations, 18 railroadhighway grade crossings have poor geometric configurations, sight distance issues, and/or redundant roadway network were identified and further evaluation is recommended to investigate closure.

Table 4-2 summarizes the magnitude of recommended improvements for the open railroadhighway grade crossings for each viable alternative based on the site specific requirements. Site improvements that include installation of new street lighting and clear vegetation were identified for the majority of grade crossings; installation of new automatic warning devices and railroad warning signs and pavement markings were also identified for a great number of crossings that currently have in place passive warning devices only. Figure 4-1 summarizes the type of improvements needed by alternative.



Table 4-2: Railroad-Highway Grade Crossing Improvements											
Railroad-Highway Grade Crossing Improvements	Viable Alternative 1-2	Viable Alternative 1-5									
Total Number of Grade Crossings	59	116									
Grade Crossings Not Needing Improvements	1	5									
Grade Crossings Needing Improvements	58	111									
Relocate Automatic Warning Devices	2	3									
Upgrade Automatic Warning Devices	12	14									
Install New Automatic Warning Devices	16	55									
Install Gate & Lock	3	9									
Install New Crossing Surface	8	38									
Install RR Warning Signs & Pavement Markings	17	43									
Modify Roadway Grading/Geometry	4	4									
Install Pedestrian Gates/Flashers	24	34									
Construct Sidewalk Connections	9	15									
Traffic Signal Preemption, Pre-signal, Queue											
Prevention Strategy	5	20									
Install Street Lighting	34	76									
Clear Vegetation	20	42									
Investigate Crossing Closure	7	18									





Figure 4-1: Railroad-Highway Grade Crossing Improvements for Viable Alternatives 1-2 and 1-5

Table 4-3 shows the specific improvements identified for each of the railroad-highway grade crossings evaluated for Viable Alternatives 1-2 and 1-5.

The relative priority ranking was calculating as the ratio of the most recent priority ranking found in the Railroad-Highway Crossing Inventory Forms to the 2013 statewide rank of 5357. In general, priority is given to the crossings with the lowest rankings. Obtaining this ratio is essential to prioritize grade crossings in the corridor that have been already determined to require safety improvements by FDOT District 5 Rail Coordinator. The cells have been color coded as follows: green for values in the upper 50%, yellow for values between 25% to 50%, and red for values in the lowest 25%. The values in red identified locations with the most need for improvements relative to the statewide ranking for 2013.

As further evaluation is performed during design phases, the number of full upgrades may be refined with the goal of enhancing safety with cost effective improvements.



Modify Roadway Grading Geometry Install RR Warning Signs & Pavement Markings Lock Pedestrian Viable Alternativ Install New Crossing surface # of Tracks ≙ Street # of Tracks Post ø County Investigate Crossing Closu Crossing Type **Warning dev** locate itomatic arning dev Gate New grade tomatic arning de Mile oss nstall nstall Install rop. WEST WASHINGTON S ORANGE 622188X 790.12 Public 2 2 \checkmark \checkmark \checkmark \checkmark \checkmark 622187R 790.06 WEST JEFFERSON ST Public ORANGE 3 3 \checkmark \checkmark \checkmark \checkmark 622344G 814.6 ROBINSON ST W / SR 526 Public ORANGE 1 \checkmark 1 622345N 814.58 GARLAND AVE N Public ORANGE 1 1 622347C 814.51 HUGHEY AVE S Public ORANGE 1 1 622348J 814.08 PARRAMORE ST / CR 5107 Public ORANGE 1 \checkmark 1 ~ 914119X 813.99 PEDESTRIAN XING Public ORANGE 1 1 914118R 813.93 PEDESTRIAN XING Public ORANGE 1 1 \checkmark WESTMORELAND DR / CR 622353F 813.87 Public \checkmark ORANGE 1 1 5109 622354M 813.72 LIVINGSTON ST / CR 5088 Public ORANGE 1 \checkmark \checkmark 1 622355U 813.48 AMELIA ST / CR 5084 Public ORANGE 2 2 622356B W COLONIAL / SR 50 / US 17 813.29 Public ORANGE 1 1 622357H 812.71 COUNTRY CLUB DR Public ORANGE 1 1 ORANGE 622358P 812.5 GOLFVIEW ST Public 1 1 1-5 PRINCETON ST / SR 438 622363L 811.85 ORANGE Public 1 1 622364T 811.4 SILVER STAR RD E / CR 424A Public ORANGE 2 2 ø 622377U 811.19 PRIVATE RD Private ORANGE 1 1 ~ \checkmark 1-2 ~ ~ 622378B 811.18 PRIVATE RD Private ORANGE 1 1 622379H 811.07 PRIVATE Private ORANGE 1 1 \checkmark \checkmark \checkmark \checkmark Alternatives 622381J 810.9 PRIVATE Private ORANGE 1 1 \checkmark \checkmark 622382R 810.86 L.VAGABOND CIR Private ORANGE 1 \checkmark \checkmark 1 914117J 810.75 FAIRVIEW VISTA PT Private ORANGE 1 \checkmark 1 622383X 810.75 AQUATIC DR Private ORANGE 1 1 ✓ ✓ ~ 622384E 810.6 PRIVATE ORANGE 1 1 Private ~ 622385L 810.57 **PVT MINI STORAGE** ORANGE \checkmark Private 1 1 622386T PRIVATE ORANGE \checkmark 810.5 Private \checkmark 1 1 622387A 810.4 PRIVATE ORANGE \checkmark Private 1 1 622389N 810.3 PRIVATE ORANGE ~ \checkmark Private 1 1 √ ✓ 622392W BARRETTS MARINA P ORANGE 810.02 Private 1 1 622390H 810.22 PRIVATE Private ORANGE 1 1 \checkmark \checkmark \checkmark 622393D 809.89 LEE RD / SR 423 Public ORANGE \checkmark 1 1 626494D 808.87 ORANGE \checkmark ALL AMERICAN BLVD Public 3 3 622396Y EDGEWATER DR S / CR 424 808.61 Public ORANGE 1 1 809.35 MAGNOLIA HOMES RD Public 622397F ORANGE 1 1 622398M 807.7 EDGEWATER DR N / CR 424 Public ORANGE 1 1 622399U 807.6 MOTT AVE Public ORANGE 1 1 \checkmark 622400L 807.3 ROSE AVE / CR 4273 Public ORANGE 1 1 622402A 806.87 BEGGS RD Public ORANGE 1 1 \checkmark \checkmark 625278G 805.36 **VULCAN RD** Private ORANGE 1 1 ~ 625276T 804.38 LAKEVILLE RD ORANGE Public 1 1

Table 4-3: Recommended Improvements for Railroad-Highway Grade Crossings

* Calculated as the ratio of the most recent priority ranking found in the Railroad-Highway Crossing Inventory Forms to the 2013 statewide rank of 5357. Priority is given to the crossings with the lowest rankings Green denotes values in the upper 50%, yellow for values between 25% to 50%, and red for values in the lowest 25%. The values in red identified locations with the most need for improvements relative to the statewide ranking for 2013.

Gates/Flashers	Construct Sidewalk Connections	Install Preemption, Pre-signal , Queue Prevention Strategy	Install Street Lighting	Clear Vegetation	Relative Priority Ranking*
					0.25
 			✓		0.11
/		✓			0.14
/	✓		,		0.50
/		✓	~		0.40
		\checkmark			0.30
/					0.71
 					0.71
~					0.40
\checkmark	✓		✓	✓	0.64
\checkmark			✓		0.18
\checkmark					0.12
			✓		0.60
			✓		0.58
	✓		✓		0.13
 			✓		0.09
			✓	✓	0.92
			✓	✓	0.92
			\checkmark	\checkmark	0.92
			\checkmark		0.92
			\checkmark		0.92
			\checkmark		0.77
			\checkmark		0.92
					0.92
			\checkmark		0.92
			\checkmark		0.92
			✓		0.92
			✓	✓	0.92
					0.92
			✓		0.92
\checkmark				✓	0.11
 	✓				0.41
 		✓		✓	0.10
				✓	0.29
 	✓		✓		0.28
 	✓				0.60
				✓	0.40
 	✓		✓	✓	0.23
			✓		0.86
				\checkmark	0.35



Viable Alternative	Crossing ID	Mile Post	Cross Street	Туре	County	Exist # of Tracks	Prop. # of Tracks	Investigate Crossing Closure	Relocate Automatic Warning devices	Upgrade Automatic Warning devices	Install New Automatic Warning devices	Install Gate & Lock	Install New Crossing surface	Install RR Warning Signs & Pavement Markings	Modify Roadway Grading Geometry	Install Pedestrian Gates/ Flashers	Construct Sidewalk Connections	InstallPreem ption, Pre- signal , Queue Prevention Strategy	Install Street Lighting	Clear Vegetation	Relative Priority Ranking *
	625275L	803.32	SHEELER RD	Public	ORANGE	1	1									✓			✓	✓	0.40
	625274E	802.95	13TH ST	Public	ORANGE	1	1									✓				\checkmark	0.47
	625273X	802.41	HIGHLAND ST	Public	ORANGE	1	1				✓			\checkmark					✓	\checkmark	0.45
	625272R	802.3	ROBINSON AVE	Public	ORANGE	1	1												✓	\checkmark	0.53
Ч	914124U	802.23	WEST ORANGE TRAIL (PED)	Public	ORANGE	1	1						✓							\checkmark	0.71
۲ ٦	625271J	802.22	EIGHTH ST	Public	ORANGE	1	1			✓						\checkmark					0.53
80	625269H	802.08	PARK AVE CR 435	Public	ORANGE	1	1												✓	\checkmark	0.24
-7	625268B	801.95	CENTRAL AVE / CR 4275	Public	ORANGE	1	1			\checkmark						\checkmark					0.40
с Т	625267U	801.77	MARVIN ZANDERS	Public	ORANGE	1	1									\checkmark	✓		✓		0.59
ě	625266M	801.7	W 4TH ST	Public	ORANGE	1	1														0.60
tiv	625265F	801.45	HAWTHORNE AVE	Public	ORANGE	1	1			\checkmark									✓	\checkmark	0.57
na	625264Y	801.29	MARSHALL LAKE RD	Public	ORANGE	1	1												✓	\checkmark	0.49
er	625263S	801.14	BRADSHAW RD / CR 4277	Public	ORANGE	1	1			\checkmark									✓	\checkmark	0.57
١t	625261D	800.23	LAKE DOE BLVD	Public	ORANGE	1	1							\checkmark					✓		0.62
4	625254T	799.35	BOY SCOUT BLVD	Public	ORANGE	1	2		~				\checkmark						✓		0.59
	625252E	798.65	MID FLA	Private	ORANGE	2	2	✓			~	✓									0.85
	625253L	798.85	MID FLA FREEZER	Public	ORANGE	1	2	\checkmark			~		\checkmark								0.70
	625251X	798.58	ORANGE AVE / CR 437	Public	ORANGE	1	2		~				\checkmark			_					0.45
	625250R	798.29	PRIVATE (KITT AVE)	Private	ORANGE	2	2			\checkmark				√		\checkmark	\checkmark	\checkmark	\checkmark		0.85
	625249W	798.03	HERMIT SMITH RD	Public	ORANGE	1	1											✓		\checkmark	0.54
	625248P	797.87	FUDGE RD	Private	ORANGE	1	1	~			~	 ✓ 	\checkmark					✓	✓		0.85
	625247H	797.69	TRAILER PARK DR	Private	ORANGE	1	1				\checkmark			\checkmark					✓		0.85
	625245U	797.3	AIRPORT DR	Public	ORANGE	1	1							\checkmark							0.85
	625244M	796.05	WESLEY RD	Public	ORANGE	1	1				\checkmark		\checkmark	\checkmark				\checkmark			0.58
	625243F	795.66	PRIVATE	Private	ORANGE	1	1	✓			\checkmark	✓	✓								0.85
l l	625242Y	795.24	PRIVATE	Private	ORANGE	2	2				\checkmark		✓	\checkmark					✓		0.85
Ō	625241S	795.06	UNION ST	Public	ORANGE	2	2				\checkmark		✓	\checkmark				\checkmark	✓		0.85
Ч	625240K	794.97	PONCAN RD	Public	ORANGE	2	2				✓			✓				✓	✓	✓	0.50
-	625238J	794.62	JONES AVE / CR 4232	Public	ORANGE	1	1											✓	✓	\checkmark	0.54
ve Ve	625237C	793.39	LAUGHLIN RD	Public	ORANGE	1	1				✓								✓	\checkmark	0.57
ati	625233A	790.81	CR 448A / CR 448A	Public	LAKE	1	2		✓										✓	\checkmark	0.58
ů,	625227W	790.14	OAK SHADOW LN	Private	LAKE	1	1	✓			✓	✓	√						✓	\checkmark	0.85
ter	627997A	790.05	PRIVATE	Private	LAKE	2	2	✓			✓	✓	\checkmark						✓	\checkmark	0.81
Alt	625226P	789.24	CR 448	Public	LAKE	1	1			\checkmark									✓		0.24
	625225H	788.74	SHIRLEY SHORES DR / CR 4463	Public	LAKE	1	1			\checkmark									✓		0.46
	625223U	787.88	PRIVATE	Private	LAKE	2	2				✓	✓	\checkmark								0.85
	625198N	786.78	BEECHNUT RD	Private	LAKE	1	1				✓		\checkmark	\checkmark					✓		0.85
	625197G	785.47	S DORA BLVD	Public	LAKE	1	1				\checkmark			\checkmark					✓		0.54
	625195T	784.6	LAKE DORA CIRCLE	Public	LAKE	1	1												✓	\checkmark	0.64
	625194L	784.34	COUNTY DR	Public	LAKE	1	1												✓	\checkmark	0.60

Table 4-3 (Cont.): Recommended Improvements for Railroad-Highway Grade Crossings

* Calculated as the ratio of the most recent priority ranking found in the Railroad-Highway Crossing Inventory Forms to the 2013 statewide rank of 5357. Priority is given to the crossings with the lowest rankings

Green denotes values in the upper 50%, yellow for values between 25% to 50%, and red for values in the lowest 25%. The values in red identified locations with the most need for improvements relative to the statewide ranking for 2013.



Table 4-3 (Cont.): Recommended Improvements for Railroad-Highway Grade Crossings

Viable Alternative	Crossing ID	Mile Post	Cross Street	Type	County	Exist # of Tracks	Prop. # of Tracks	Investigate Crossing Closure	Relocate Automatic Warning devices	Upgrade Automatic Warning devices	Install New Automatic Warning devices	Install Gate & Lock	Install New Crossing surface	Install RR Warning Signs & Pavement Markings	Modify Roadway Grading Geometry	Install Pedestrian Gates/Flashers	Construct Sidewalk Connections	Install Preemption, Pre-signal , Queue Prevention Strategy	Install Street Lighting	Clear Vegetation	Relative Priority Ranking (2013/Statewide Ranking - 5357)
	625193E	783.88	MANSFIELD RD	Public	LAKE	1	1				\checkmark		✓	\checkmark		✓			✓	\checkmark	0.15
	625189P	0.17	SINCLAIR AVE	Public	LAKE	1	1				\checkmark		✓	\checkmark		✓	✓		✓	\checkmark	0.59
	622002G	Unknown	PRIVATE	Private	LAKE	1	1	✓			\checkmark		✓	\checkmark					✓		0.54
	625190J	23.9	S. NEW HAMPSHIRE AVE	Public	LAKE	1	1				✓		✓	✓					✓		0.57
	621833N	822.2	ROCKINGHAM AVE	Public	LAKE	1	1				✓		✓	✓		✓	✓		✓		0.51
	621832G	822.15	ST. CLAIR-ABRAMS	Public	LAKE	1	1	✓													0.56
	621998L	822.05	DISSTON AVE	Public	LAKE	2	2				✓					✓	✓			✓	0.41
	622001A	821.98	LAKE DORA DR	Public	LAKE	2	2				✓			\checkmark		✓					0.41
	622003N	821.8	E ALFRED ST / CR 500A	Public	LAKE	1	1														0.20
	622004V	820.85	MT HOMER RD	Public	LAKE	1	1				✓		✓						✓		0.56
	622005C	820.15	SR 500 / SR 19 /US 441	Public	LAKE	1	1									✓					0.12
	622006J	819.8	HUFFSTETLER DR	Public	LAKE	1	1									✓	✓		✓	\checkmark	0.36
	622007R	819.5	MT HOMER RD	Public	LAKE	1	1				✓		✓						✓	✓	0.37
<u>></u>	622008X	818.75	CLAY BLVD	Public	LAKE	1	1				✓		✓						✓		0.44
lu	622009E	818.6	ATWATER AVE / CR 4423	Public	LAKE	1	1				✓		✓					\checkmark	✓		0.51
0	622010Y	818.3	STEVENS AVE	Public	LAKE	1	1				✓		✓						✓	✓	0.48
	622011F	818.07	WOODWARD AVE	Public	LAKE	1	1				✓		✓	\checkmark					✓		0.20
e e	622012M	817.95	WARD ST	Public	LAKE	1	1				✓		✓	✓							0.54
ti	622013U	817.85	LEMON ST	Private	LAKE	1	1				✓		✓	✓					✓	\checkmark	0.92
Jaj	622014B	817.77	LAKESHORE DR	Public	LAKE	1	1														0.60
L L	622015H	817.62	ORANGE AVE	Public	LAKE	1	1				✓			✓				✓	✓		0.37
١te	622016P	817.6	MAGNOLIA AVE	Public	LAKE	1	1				✓			✓		✓	✓	\checkmark	✓		0.60
4	622017W	817.55	MACDONALD AVE	Public	LAKE	1	1	✓			✓			✓				✓	✓		0.55
	622018D	817.5	CLIFFORD AVE	Public	LAKE	1	1				✓			✓		✓	✓	✓	✓		0.57
	621831A	797.25	LAKE DORA DR / CR 4358	Public	LAKE	1	1				\checkmark								✓	\checkmark	0.49
	621830T	797.07	DORA AVE / CR 4423	Public	LAKE	1	1				✓									~	0.54
	621829Y	797	PRIVATE	Private	LAKE	1	1	✓			\checkmark	✓	✓							\checkmark	0.92
	621828S	796.9	DONNA ST	Public	LAKE	1	1				✓			✓					✓	\checkmark	0.23
	621826D	796.7	MEDINA ST	Public	LAKE	1	1				✓		~	✓					✓		0.49
	621825W	796.65	PED XING	Private	LAKE	1	1	✓					~			✓			✓		0.70
	621823H	795.5	FAIRVIEW AVE	Public	LAKE	1	1						✓					\checkmark			0.54
	621822B	795.4	SALVAGE YD D	Private	LAKE	1	1	✓			✓		✓	✓					✓		0.92
	621821U	1.85	NORTH BAY RD / SR 4439	Public	LAKE	1	1							✓				\checkmark	✓		0.50
	621820M	794.99	SALVAGE YD D	Private	LAKE	1	1	✓			✓		✓	✓					✓		0.92
	621819T	52.3	BOYD DR	Public	LAKE	1	1						✓					\checkmark	✓	\checkmark	0.51
	621818L	52.3	GOLDEN ISLE DR	Public	LAKE	1	1						✓					\checkmark	✓	\checkmark	0.40

* Calculated as the ratio of the most recent priority ranking found in the Railroad-Highway Crossing Inventory Forms to the 2013 statewide rank of 5357. Priority is given to the crossings with the lowest rankings

Green denotes values in the upper 50%, yellow for values between 25% to 50%, and red for values in the lowest 25%. The values in red identified locations with the most need for improvements relative to the statewide ranking for 2013.



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Technical Memorandum | Railroad-Highway Grade Crossing Analysis



Technical Memorandum | Viable Alternatives Development and Screening

Appendix F: Technical Memorandum – Cost Methodology and Results

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Technical Memorandum – Cost Methodology and Results



January 2015



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-Introduction

1.1 Introduction

The Florida Department of Transportation, working in partnership with the Cities of Orlando, Apopka, Tavares, Eustis and Mount Dora in addition to Orange and Lake Counties, conducted a transit study for the US 441 Corridor. This study builds upon both current local transportation and land use initiatives and long-term growth management policies to evaluate options for providing premium transit service between major activity centers in Orange and Lake Counties within the US 441 Corridor. This study also evaluated options for improved connectivity with SunRail, Central Florida's commuter rail system.

Figure 1-1 shows the Study Area, which extends approximately 33 miles from downtown Orlando northwest along US 441 through Apopka and into Lake County, terminating in the City of Eustis. Portions of the Cities of Orlando, Apopka, Tavares, Mount Dora and Eustis are included within the Study Area boundary.

The methodology and results for the development of capital and operating and maintenance (O&M) cost estimates prepared for this study are included in this report. This Cost Methodology and Results Technical Memorandum will address the three Viable Build Alternatives which were identified from the initial alternatives evaluation:

- 1. Viable Alternative 1-2: Commuter Rail from Downtown Orlando to SR 429/ Express Bus from SR 429 to Lake County;
- 2. Viable Alternative 1-5: Commuter Rail from Downtown Orlando to Lake County; and
- 3. Viable Alternative 2-4: Express Bus Service from Downtown Orlando to Lake County using limited access roads.

Figures 1-2 through 1-4 show the alignment and stations for each of the Viable Alternatives.

The identified methods for preparing the capital and O&M cost estimates for the US 441 Corridor Study are focused on providing order of magnitude cost estimates to facilitate the comparative evaluation of the viable alternatives and are generally consistent with the Federal Transit Administration (FTA), SunRail, and LYNX and LakeXpress procedures for computing commuter rail and bus costs.



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Figure 1-1: Study Area Map



IFL-ORL/projects/61817.00 US441 Comidor AA/GIS/Project/Existing Conditions/Study Area Map Comidor mxd



VFL-ORL/projects/61817.00 US441 Comdor AA/GIS/Project/Existing Conditions/Study Area Map Comdor mxd



VFL-ORL/projects/61817.00 US441 Comdor AA/GIS/Project/Existing Conditions/Study Area Map Comdor mxd





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2

Operating Requirements

2.1 Introduction

This Operating Requirements section documents the proposed commuter rail, express bus and feeder bus service levels for the three US 441 Viable Build Alternatives. The costs associated with these service levels were developed for the current year (2013) and a future year (2035) and include all administration, operations, and maintenance costs necessary for daily operations of a premium transit service.

2.2 Service Levels

For cost estimating purposes, the basic service characteristics including operating hours, peak period service frequency, and off-peak period service frequency for the Viable Build Alternatives have been developed. For the Viable Build Alternatives, service characteristics were developed taking into consideration the current SunRail service patterns and operating hours so that the regional system would be consistent. For each of the three Viable Build Alternatives, on weekdays, 30-minute peak hour headways have been proposed with 120-minute off-peak headways. Consistent with the SunRail service, no Saturday and Sunday service will be provided in the initial phase. These service characteristics are also consistent with express service catering to home-based work trips. The ridership analysis conducted for the US 441 study indicated that the majority of commuter rail and/or express bus trips are home-based work.

The assumed operating hours for the three alternatives will generally be from 6:00 a.m. until 10:00 p.m. weekdays for both commuter rail and express bus operations, for both the current year (2013) and 2035 O&M cost calculations. These services would not be operated on weekends in the initial phase of service. Feeder bus service would operate between 5:30 a.m. and 10:30 p.m. (30-minutes before and end of commuter rail/express bus service). The peak operating schedule for feeder bus would closely match the SunRail schedule, with half-hour service roughly operating from 6:00 a.m. until 9:00 a.m. in the morning peak and 4:00 p.m. until 7:00 p.m. in the evening peak.



2.3 Stations

The stations assumed to be served for each of the Viable Build Alternatives are identified in Table 2-1.

0000000							STATIC)N						
ALTERNATIVE	LYNX Central Station	Orlando Health/ Amtrak	Church Street	Robinson Street	Amelia Street	Prince- ton	Lockhart/ Rosemont	Apopka	SR 429	Zell- wood	Mt. Dora	Tavares/ Eustis	Tavares	Eustis
Viable														
Alternative 1-2:		х	х	х	х	х	х	х	х	х	х	х		
Commuter		(0)	(0)	(0)	(0)	(50)	(100)	(100)	(100)	(25)	(25)	(100)		
Rail/Express Bus														
Viable		v	v	v	v	X	V	V	v	X	V		V	X
Alternative 1-5:		X (0)	(0)	X (0)	(0)	(50)	x (100)	x (100)	X (100)	x (100)	x (25)		x (50)	x (50)
Commuter Rail		(-)	(-)	(-)	(-)	()	()	()	()	()	()		()	()
Viable	v				v	X	v		v		V	v		
Alternative 2-4:	X (0)				(0)	(50)	X (100)		X (100)		X (50)	x (100)		
Express Bus	(3)				(3)	(20)	(=30)		(=50)		(20)	(_30)		

Table 2-1: Stations to be Served by the Viable Build Alternatives

X = Station served

(0) = No. of parking spaces

As illustrated above, Viable Alternative 1-2 would have eleven stations, Viable Alternative 1-5 would have twelve stations, and Viable Alternative 2-4 would have seven stations. Based on the ridership study, three different sizes of park and ride facilities (25, 50 and 100-spaces) were assumed to be provided at different stations.

2.4 Service Amenities

The express bus service was assumed to utilize standard 40-foot coaches. Commuter rail service would include on-board Wi-Fi service. These amenities have the potential to assist in attracting choice riders.

Capital Costs

3.1 Methodology

In accordance with the FTA recommended cost estimating methodology procedures, capital costs were estimated in nine major component categories. There are five FTA Standard Capital Cost (SCC) construction categories which include: guideway elements (i.e., track or dedicated lanes), stations, support facilities, site work, and systems. The other four SCC categories are right-of-way, vehicles, professional services, and contingencies. All costs were estimated in 2013 dollars initially using assumed unit costs based on past planned or implemented projects. Specific contingencies were applied to all construction items and to vehicles, and an added "unallocated" contingency applied to all cost items.

The construction costs for each of the three Viable Build Alternatives was estimated by multiplying the anticipated capital unit cost (i.e., cost per linear foot, cost per cubic yard, lump sum) within each cost category by the number of units specific to each alternative. After each of the line items within the nine categories were estimated, the total from the categories were be aggregated to provide a cost estimate for each of the three alternatives. The basis for the unit costs for the commuter rail improvements were derived from the *SunRail Phase 2 South Explanation of Estimate Report* (September 2014), which were developed in year 2013 dollars. For express bus improvements, vehicle costs were derived based on recent LYNX bus purchases, with roadway costs for station access derived from the *SunRail Phase 2 South Explanation of Estimate Report* (September 2014).

The five FTA SCC major infrastructure construction category cost elements were estimated in the following manner:

- Track Track costs were based on identifying the mainline condition of track of class 2 to be upgraded to class 4. Siding tracks were assumed to be upgraded from class 1 to class 4 or completely new construction if not existing. These determinations were based upon conditions of the track at the completion of the FCEN freight rail improvement project.
- Signals and control systems



- Stations Station design consistent with recent SunRail station amenities. Specific
 decisions on parking capacity, kiss and ride, and bus drop-off were made on an
 individual station basis.
- Station access The accommodation of bicycle, pedestrian, transit, and auto (park and ride, kiss and ride) access was identified for each station in coordination with the project advisory group.
- Light maintenance facility A brief feasibility study for site availability identified three potential locations in the area of US 441/SR 429. A representative site was used to estimate right-of-way acquisition and infrastructure costs. The light maintenance facility will generally consist of storage for eight trains, fueling, washing, and minor maintenance.

Right-of-way and any relocation costs for the station locations were provided by FDOT. The project team identified a preferred site at each station location, along with up to three alternate parcels, which were transmitted to FDOT for costing. The costs identified by FDOT for the primary site were used for the capital cost estimate as part of the evaluation. The other parcel data were used to understand the overall cost ramifications for the general area.

Vehicle costs were determined using the appropriate vehicle technology (express bus or commuter rail) based on peer project cost estimates prepared for LYNX and SunRail. The projected number of vehicles was estimated based on an operating plan developed for each viable build alternative, reflective of assumed service frequency and hours of operation and predicted operating speeds. The number of vehicles required to provide premium transit service headways was calculated taking predicted operating factors into consideration. The number of vehicles by technology for each alternative was multiplied by the estimated vehicle cost. Express bus vehicles were assumed to be standard 40-foot coaches with automatic vehicle location (AVL) and automatic passenger counter (APC) equipment, and onboard fare collection (unit costs from LYNX). Commuter rail vehicle costs were estimated by train sets to include the locomotive, one cab car, and one coach with the exception of the Mount Dora shuttle train which will consist of one locomotive and one cab car; and positive train control (PTC) equipment and installation.

Engineering, management and administration costs include anticipated future allowances for preliminary engineering (4 percent), final design (10 percent), project management (3 percent), construction management (5 percent), surveys (3 percent), testing and inspection (1 percent) and pre-revenue service costs (1 percent). These allowances are applied to the total civil construction costs. Audits, legal fees, and permits are assumed to be included under each civil construction and vehicle category. Mobilization is assumed to be part of each civil construction category.

"Allocated" contingencies were applied to the capital costs. Allocated contingencies ranging from 5 percent for vehicles to 35 percent for all civil construction items were assumed at this initial level of design. This contingency factor typically covers items that were not identified during the conceptual design and provides an allowance for unforeseeable expenses that the project may incur. Based on the level of detail from the SunRail guidance documents, the FCEN rail improvement project activities documentation, as well as the close coordination with the project advisory group stakeholders, an "unallocated" contingency was not applied



as it was felt that the level of initial cost estimation was more detailed than what would typically be developed at this stage of project analysis.

3.2 Results

The US 441 Corridor Study capital cost estimates were prepared at a "conceptual engineering" level, reflective of general site layouts and typical sections for civil construction items. Table 3.1 is a summary table that presents the initial capital cost estimates, in year 2013 dollars. The more detailed FTA SCC definitions and worksheets for the capital cost estimates for each viable alternative are provided in Appendix A.

Table 3-1: 2013 Viable Build Alternative Capital Cost Estimates

Cost Category	Viable Alternative 1-2 (Commuter Rail/Express Bus)	Viable Alternative 1-5 (Commuter Rail)	Viable Alternative 2-4 (Express Bus)
1.0 Guideway	\$12,163,000	\$25,765,000	\$0
2.0 Stations	\$6,915,000	\$9,538,000	\$1,669,000
3.0 Support Facilities	\$5,083,000	\$5,756,000	\$0
4.0 Sitework	\$18,676,000	\$20,922,000	\$10,888,000
5.0 Systems	\$55,281,000	\$97,112,000	\$1,345,000
CONSTRUCTION SUB-TOTAL	\$98,116,000	\$159,093,000	\$13,902,000
6.0 Right-of-Way	\$29,497,000	\$28,748,000	\$19,315,000
7.0 Vehicles	\$76,581,000	\$108,993,000	\$14,175,000
8.0 Professional Services	\$28,061,000	\$45,501,000	\$3,976,000
9.0 Unallocated Contingency	\$20,375,000	\$29,858,000	\$4,579,000
TOTAL PROJECT COSTS (APPROX.)	\$245 – 255 M	\$365 – 375 M	\$55 – 60 M

Note: All costs reflect 2013 dollars with contingency.

Capital costs will vary by alternative due to alignment length, the number of stations, the number and type of vehicles needed, the degree of maintenance facilities needed (related to the rail alternatives), the amount of right-of-way required, and other factors. In general, the commuter rail alternatives will be more costly than the express bus alternatives since commuter rail requires significant track, signalization and grade crossing improvements,



whereas the express bus alternatives would operate at-grade in mixed traffic using existing roadways.

The cost estimates revealed that Viable Alternative 1-5 (Commuter Rail) would have the highest cost, \$355 to \$365 million. Most of the cost (almost 60%) would be associated with a new train control system and vehicles. Viable Alternative 1-2, with less commuter rail provision, would have a cost between \$240 to \$250 million, again with the train control system and vehicles comprising the largest percentage of the cost. Alternative 2-4 (Express Bus) would have the lowest cost at between \$50 to \$55 million, 15 percent of the Viable Alternative 1-5 cost and 20 percent of the Alternative 1-2 cost.



4

Operations & Maintenance (O&M) Costs

4.1 Overview

Operations & Maintenance (O&M) cost estimates for the US 441 viable alternatives were derived by use of actual commuter rail and bus O&M costs experienced in the region. For commuter rail, the actual SunRail Phase 1 O&M costs experienced to date has been applied on a unit cost basis. For the new express service in the US 441 corridor, and the assumed local feeder bus service to be provided by LYNX, actual LYNX bus O&M cost per revenue hour have been applied. For the local feeder bus service assumed to be provided by LakeXpress, the actual LakeXpress bus O&M cost per revenue hour was applied. O&M cost estimates were developed for both years 2013 and 2035, on a weekly basis assuming 250 applicable days a year. A 3% per year growth factor (reflective of inflation and applied to the Phase 2 South SunRail O&M costs) was applied to escalate 2013 to 2035 dollars.

The unit O&M costs include the following components:

- Operator Salaries & Wages
- Other Salaries & Wages
- Fringe Benefits
- Services
- Fuel & Lubricants
- Tires & Tubes
- Other Materials & Supplies
- Yards and Facilities Maintenance
- Utilities
- Casualty & Liability
- Taxes
- Expense Transfers



4.2 Bus Methodology

Basic Calculations

O&M cost estimates were developed based on the assumed operating plan for each of the Viable Build Alternatives. Operating statistics were projected based on general operating assumptions for each alternative and included calculation of peak vehicles and annual vehicle-hours which were used as inputs along with LYNX, LakeXpress and SunRail Phase 1 unit operating costs. Total fleet vehicle requirements were calculated for use in the capital cost estimates as well.

Cost Estimating Assumptions

There are two transit operators in the US 441 Corridor Study Area. The Lake County Board of County Commissioners provides fixed route and paratransit transit services to the residents of Lake County. Fixed route service is delivered through a contract provider and locally operated as "LakeXpress". LakeXpress includes four routes that serve the US 441 corridor in Lake County. In addition, Link 204 is operated by LYNX between Downtown Orlando and Clermont as an express service that is paid for jointly by Lake County and Orange County.

The Central Florida Regional Transportation Authority (d.b.a. LYNX) is responsible for providing fixed route and paratransit public transit services in the City of Orlando and Orange, Osceola, and Seminole counties. FDOT and LYNX have executed an interlocal agreement whereby LYNX will provide feeder bus services for SunRail. After the initial seven year start-up, LYNX will provide feeder bus services for the Central Florida Commuter Rail Commission. It is possible that a similar arrangement may be established for the US 441 Corridor project, if it advances into project development. A separate agreement could be arranged with Lake County for feeder bus service improvements in its service area along the US 441 corridor. This will be addressed further in the US 441 Financial Feasibility Analysis.

Each year, LYNX and Lake County develop a cost model that calculates the current year cost for bus operations and calculates the fully allocated cost per bus-hour of service. The fully allocated cost excludes offsetting revenues derived from federal and state grants, advertising, and other revenues. The LYNX model is used to allocate costs among its various jurisdictions for service provided in those jurisdictions. In its FY 2013 model, LYNX calculated its fully allocated O&M cost to be \$58.42 per hour of service. Lake County identified a \$77.78 cost per bus hour of service from its model. Applying a 3% per year growth factor to these costs, would result in per hour costs of \$111.94 and \$149.03 for LYNX and Lake County bus service respectively in year 2035. The costs are considered applicable for both US 441 express bus service and local feeder bus service.

To identify the feeder bus cost estimates, the incremental service frequency addition to match the commuter rail and express bus service levels (30 minutes in the weekday peak period and 120 minutes during the weekday off-peak period) compared to the no-build scenario service levels was applied. In many cases the no-build service levels for certain local bus routes were already greater than the commuter rail/express bus service levels, and hence no added local bus service frequency was required in those cases.

In estimating US 441 O&M costs, the LYNX unit costs were applied to the new express bus service in the corridor and to the incremental feeder bus service to be operated by LYNX to match the



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commuter rail and express bus service frequency. The LakeXpress unit costs were applied to the incremental LakeXpress feeder bus service to be provided.

4.3 Commuter Rail Methodology

Basic Calculations

For commuter rail, the Phase 2 South SunRaill O&M costs were applied for the base year for US 441 commuter rail, as documented in the *Phase 2 South – Operations & Maintenance Cost Methodology and Results Report* (August 2014). This cost is \$1,494.00 per revenue passenger car-hour. This number was derived by dividing the total O&M cost for the Current Year/No-Build scenario (reflecting existing SunRail operations) by the actual revenue passenger car-hours for that scenario. This per hour cost includes the different commuter rail operating components and was felt most appropriate to apply for the US 441 commuter rail cost estimates. Applying a 3% per year growth factor (a factor identified in the Phase 2 South report), this cost would be estimated at \$2,862.66 per revenue passenger car-hour in 2035.

As with the bus costs, the unit costs were applied to the estimated number of revenue passenger car-hours for commuter rail in the US 441 corridor based on the assumed service levels identified for commuter rail (30 minute frequency during weekday peak periods, and 120 minutes during off-peak periods, for both 2013 and 2035).

Cost Estimating Assumptions

The evaluation of commuter rail service O&M cost in the FCEN corridor was assumed to be directly related to the SunRail system. Thus the actual O&M unit costs experienced by SunRail to date have been applied. Analysis conducted as part of the US 441 corridor study revealed that to turnaround a US 441 corridor train at the south end, service would need to extend to the Orlando Health/Amtrak station.

4.4 Results

Table 4-1 presents the estimated O&M cost estimate for the three viable build alternatives for years 2013 and 2035. This includes the O&M costs for both the new line-haul commuter rail and/or express bus service in the US 441 corridor, as well as associated feeder bus service. Appendix B includes the more detailed service hour estimates by mode, including number of vehicles required (which were integrated into the capital cost estimates).

The O&M cost summary revealed that Viable Alternative 2-4 would have the lowest annual O&M costs, about \$3.3 million in 2013 dollars increasing to \$6.4 million in 2035. Viable Alternative 1-5



(commuter rail) would have the highest annual O&M cost, ranging from about \$46.1 million in 2013 dollars increasing to about \$88.3 million in 2035. The alternative 1-2 O&M cost would range from \$27.1 million in 2013 to \$51.9 million in 2035. Thus, the commuter rail operating costs would be almost 5 to 8 times as high as the cost of the express bus alternative (Viable Alternative 2-4) in 2013, and 8 to 13 times as high by 2035. Feeder bus would comprise a large share of the total Viable Alternative 2-4 O&M cost (82%), but only 7 and 11% for alternatives 1-5 and 1-2, respectively.

Mode	Year	Viable Alternative 1-2 (Commuter Rail/Express Bus)	Viable Alternative 1-5 (Commuter Rail)	Viable Alternative 2-4 (Express Bus)
Commuter Rail	2013	\$23,717,000	\$42,990,000	\$0
	2035	\$45,445,000	\$82,373,000	\$0
Express Bus	2013	\$306,000	\$0	\$587,000
	2035	\$612,000	\$0	\$1,173,000
Feeder Bus	2013	\$3,066,000	\$3,066,000	\$2,738,000
	2035	\$5,876,000	\$5,876,000	\$5,247,000
TOTAL PROJECT O&M COSTS (APPROX.)	2013	\$27,089,000	\$46,056,000	\$3,325,000
	2035	\$51,933,000	\$88,249,000	\$6,420,000

Table 4-1: US 441 O&M Cost Estimates (2013 and 2035)



5 Summary

5.1 Summary

This technical memorandum presents the assumptions and methods proposed for estimating the capital and O&M costs for express bus and commuter rail operations for the three Viable Build Alternatives in the US 441 Corridor Study. The proposed approach is consistent with FTA requirements and professionally accepted methods. As detailed above, the SunRail cost estimates and LYNX and LakeXpress O&M cost model are appropriate for the US 441 Corridor Study for the following reasons: (1) the models are based on current actual costs or bid costs for both LYNX bus and SunRail commuter rail operations, respectively; and (2) O&M cost results are consistent with those developed for the SunRail Phase 2 South project.


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Technical Memorandum | Cost Methodology and Results

APPENDIX A-1

STANDARD COST CATEGORIES

Appendix A-1



Standard Cost Categories List (page 1)					
Stand	ard Cost Categories for Major Capital Projects				
(Rev. 2, J	un. 24, 2005)				
10 GUID	EWAY & TRACK ELEMENTS (route miles)				
10.01	Guideway: At-grade exclusive right-of-way				
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)				
10.03	Guideway: At-grade in mixed traffic				
10.04	Guideway: Aerial structure				
10.05	Guideway: Built-up fill				
10.06	Guideway: Underground cut & cover				
10.07	Guideway: Underground tunnel				
10.08	Guideway: Retained cut or fill				
10.09	Track: Direct fixation				
10.10	Track: Embedded				
10.11	Track: Ballasted				
10.12	Track: Special (switches, turnouts)				
10.13	Track: Vibration and noise dampening				
20 STAT	IONS, STOPS, TERMINALS, INTERMODAL (number)				
20.01	At-grade station, stop, shelter, mall, terminal, platform				
20.02	Aerial station, stop, shelter, mall, terminal, platform				
20.03	Underground station, stop, shelter, mall, terminal, platform				
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.				
20.05	Joint development				
20.06	Automobile parking multi-story structure				
20.07	Elevators, escalators				
30 SUPF	ORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS				
30.01	Administration Building: Office, sales, storage, revenue counting				
30.02	Light Maintenance Facility				
30.03	Heavy Maintenance Facility				
30.04	Storage or Maintenance of Way Building				
30.05	Yard and Yard Track				
40 SITE	NORK & SPECIAL CONDITIONS				
40.01	Demolition, Clearing, Earthwork				
40.02	Site Utilities, Utility Relocation				
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments				
40.04	Environmental mitigation, e.g. wetlands, historic/archeologic, parks				
40.05	Site structures including retaining walls, sound walls				
40.06	Pedestrian / bike access and accommodation, landscaping				
40.07	Automobile, bus, van accessways including roads, parking lots				
40.08	Temporary Facilities and other indirect costs during construction				



Standard Cost Categories List (page 2)

50 SYSTEMS
50.01 Train control and signals
50.02 Traffic signals and crossing protection
50.03 Traction power supply: substations
50.04 Traction power distribution: catenary and third rail
50.05 Communications
50.06 Fare collection system and equipment
50.07 Central Control
60 ROW, LAND, EXISTING IMPROVEMENTS
60.01 Purchase or lease of real estate
60.02 Relocation of existing households and businesses
70 VEHICLES (number)
70.01 Light Rail
70.02 Heavy Rail
70.03 Commuter Rail
70.04 Bus
70.05 Other
70.06 Non-revenue vehicles
70.07 Spare parts
80 PROFESSIONAL SERVICES
80.01 Preliminary Engineering
80.02 Final Design
80.03 Project Management for Design and Construction
80.04 Construction Administration & Management
80.05 Insurance
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.
80.07 Surveys, Testing, Investigation, Inspection
80.08 Agency Force Account Work
90 UNALLOCATED CONTINGENCY
100 FINANCE CHARGES



Standard Cost Categories Definitions

Sta	andard Cost Categories for Major Capital Projects (Rev. 2, Jun. 24, 2005)	Definitions PLEASE NOTE! The SCC cost breakdown is based on a traditional Design Bid Build model. If your project is Design Build, to the best of your ability, separate construction costs from design, administration, testing, etc. Put construction in 10 through 50. Put design, administration, testing, etc. in 80.
10 GUI miles)	DEWAY & TRACK ELEMENTS (route	Include guideway and track costs for all transit modes (rail, bus, monorail, cable car, etc.) The unit of measure is route miles of guideway, regardless of width. As associated with the guideway, include costs for rough grading, excavation, and concrete base for guideway where applicable. Include all construction materials and labor regardless of who is performing the work.
10.01	Guideway: At-grade exclusive right-of-way	
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)	In your written description of the scope and in supporting graphic diagrams, indicate whether busway or rail track is single, double, triple, relocated, etc. For guideway and track elements associated with yards, see 30 Support Facilities below.
10.03	Guideway: At-grade in mixed traffic	
10.04	Guideway: Aerial structure	Include foundation excavation; guideway structures including caissons, columns, bridges, viaducts, crossovers, fly-overs.
10.05	Guideway: Built-up fill	Include construction of earthen berms.
10.06	Guideway: Underground cut & cover	Include excavation, retaining walls, backfill, underground guideway structure and finishes.
10.07	Guideway: Underground tunnel	Include tunneling by means of a tunnel boring machine, drill blasting, mining, and immersed tube tunneling; tunnel structure and finishes.
10.08	Guideway: Retained cut or fill	Include excavation, retaining walls, backfill, underground guideway structure and finishes.
10.09	Track: Direct fixation	Include rails, connectors.
10.10	Track: Embedded	Include rails, ties; ballast where applicable
10.11	Track: Ballasted	Include rails, ties and ballast.
10.12	Track: Special (switches, turnouts)	Include transitional curves.
10.13	Track: Vibration and noise dampening	Include upcharge for vib/noise dampening to any track condition above.



Sta	ndard Cost Categories for Major Capital Projects (Rev. 2, Jun. 24, 2005)	Definitions PLEASE NOTE! The SCC cost breakdown is based or a traditional Design Bid Build model. If your project is Design Build, to the best of your ability, separate construction costs from design, administration, testing, etc. Put construction in 10 through 50. Put design, administration, testing, etc. in 80.						
20 STA INTERI	TIONS, STOPS, TERMINALS, MODAL (number)	As associated with stations, include costs for rough grading, excavation, ventilation structures and equipment, station power and lighting, public address/customer information system, safety systems such as fire detection and prevention, security surveillance, access control, and life safety systems; finishes and equipment. Include all construction materials and labor regardless of who is performing the work.						
		Place all guideway and track associated with stations in 10 Guideway & Track Elements above.						
20.01	At-grade station, stop, shelter, mall, terminal, platform							
20.02	Aerial station, stop, shelter, mall, terminal, platform	Include station structures including caissons, columns, platforms, superstructures, etc.						
20.03	Underground station, stop, shelter, mall, terminal, platform	Include retaining walls, backfill, structure.						
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.							
20.05	Joint development	Per the FTA Circular 5010.1C Grant Management Guidelines, "Joint development is any income-producing activity with a transit nexus related to a real estate asset in which FTA has an interestJoint development projects are commercial, residential, industrial, or mixed- use developments that are induced by or enhance the effectiveness of transit projects" See circular for additional information. Path: www.fta.dot.gov Home / Government & Legal / Guidance / Circulars / 5000 - Grants Management - General / Table of Contents, Appendix: Joint Development Projects						
20.06	Automobile parking multi-story structure	Include retaining walls, backfill, structure.						
20.07	Elevators, escalators							



Sta	Indard Cost Categories for Major Capital Projects (Rev. 2, Jun. 24, 2005)	Definitions PLEASE NOTE! The SCC cost breakdown is based on a traditional Design Bid Build model. If your project is Design Build, to the best of your ability, separate construction costs from design, administration, testing, etc. Put construction in 10 through 50. Put design, administration, testing, etc. in 80.
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS		As associated with support facilities, include costs for rough grading, excavation, ventilation structures and equipment, facility power and lighting, safety systems such as fire detection and prevention, security surveillance, access control, and life safety systems; finishes and equipment. Include fueling stations, alternative fueling stations. Include all construction materials and labor regardless of who is performing the work. Where a support facility shares structure with a station, its cost may be included with station cost. Identify this with a note. Except for guideway and track associated with a yard, include all guideway and track costs associated with support facilities in <i>10 Guideway & Track Elements</i> above.
30.01	Administration Building: Office, sales, storage, revenue counting	
30.02	Light Maintenance Facility	Include service, inspection, and storage facilities and equipment.
30.03	Heavy Maintenance Facility	Include heavy maintenance and overhaul facilities and equipment.
30.04	Storage or Maintenance of Way Building	
30.05	Yard and Yard Track	Include yard construction, guideway and track associated with yard.
40 SITI	EWORK & SPECIAL CONDITIONS	Include all construction materials and labor regardless of who is performing the work.
40.01	Demolition, Clearing, Earthwork	Include project-wide clearing, demolition and fine grading.
40.02	Site Utilities, Utility Relocation	Include all site utilities - storm, sewer, water, gas, electric.
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	Include underground storage tanks, fuel tanks and other hazardous materials and treatments not listed.
40.04	Environmental mitigation, e.g. wetlands, historic/archeologic, parks	Include other environmental mitigation not listed.
40.05	Site structures including retaining walls, sound walls	
40.06	Pedestrian / bike access and accommodation, landscaping	Include sidewalks, paths, plazas, landscape, site and station furniture, site lighting, signage, public artwork, bike facilities, permanent fencing.



Sta	ndard Cost Categories for Major Capital Projects (Rev. 2, Jun. 24, 2005)	Definitions PLEASE NOTE! The SCC cost breakdown is based on a traditional Design Bid Build model. If your project is Design Build, to the best of your ability, separate construction costs from design, administration, testing, etc. Put construction in 10 through 50. Put design, administration, testing, etc. in 80.
40.07	Automobile, bus, van accessways including roads, parking lots	
40.08	Temporary Facilities and other indirect costs during construction	As a general rule and to the extent possible, appropriately allocate indirect costs among the construction costs in Categories 10 through 50. Where that is not possible, include in 40.08 Temporary Facilities costs for mobilization, demobilization, phasing; time and temporary construction associated with weather (heat, rain, freezing, etc.); temporary power and facilities; temporary construction, easements, and barriers for storm water pollution prevention, temporary access and to mitigate construction impacts; project and construction supervision; contractor's general liability and other insurance related to construction such as builder's risk; general conditions, overhead, profit.
50 SYS	STEMS	Include all construction materials and labor regardless of who is performing the work.
50.01	Train control and signals	
50.02	Traffic signals and crossing protection	
50.03		
	Traction power supply: substations	
50.04	Traction power supply: substations Traction power distribution: catenary and third rail	
50.04 50.05	Traction power supply: substations Traction power distribution: catenary and third rail Communications	Include intelligent transportation systems for stations and vehicles.
50.04 50.05 50.06	Traction power supply:substationsTraction power distribution:catenary and third railCommunicationsFare collection system and equipment	Include intelligent transportation systems for stations and vehicles. Include fare sales and swipe machines, fare counting equipment.
50.04 50.05 50.06 50.07	Traction power supply: substationsTraction power distribution: catenary and third railCommunicationsFare collection system and equipmentCentral Control	Include intelligent transportation systems for stations and vehicles. Include fare sales and swipe machines, fare counting equipment.
50.04 50.05 50.06 50.07 Constr	Traction power supply: substationsTraction power distribution: catenary and third railCommunicationsFare collection system and equipmentCentral Controluction Subtotal (Sum Categories 10 - 50)	Include intelligent transportation systems for stations and vehicles. Include fare sales and swipe machines, fare counting equipment.



Sta	Indard Cost Categories for Major Capital Projects (Rev. 2, Jun. 24, 2005)	Definitions PLEASE NOTE! The SCC cost breakdown is based on a traditional Design Bid Build model. If your project is Design Build, to the best of your ability, separate construction costs from design, administration, testing, etc. Put construction in 10 through 50. Put design, administration, testing, etc. in 80.					
60.01	Purchase or lease of real estate	Include donated, leased or purchased land. Include existing buildings and other structures on land. Include permanent surface and subsurface easements, costs for trackage rights.					
60.02	Relocation of existing households and businesses	Include professional services associated with relocat component of the project. Include costs related to exercise of eminent domain.					
70 VEHICLES (number)		Include design and manufacturing costs associated with vehicles. Include warranty costs.					
70.01	Light Rail	Include streetcar.					
70.02	Heavy Rail						
70.03	Commuter Rail	Include Self-Propelled Electric, Trailer, Locomotive Diesel, Locomotive Electric, Used Cars, Used Locomotive, Self-Propelled Diesel.					
70.04	Bus	Include STD 40 ft bus, STD 35 ft bus, 30 ft bus, <30 ft bus, School, Articulated, Commuter/Suburban, Intercity, Trolley STD, Trolley Articulated, Double Decker, Used, Used School Bus, Dual Mode.					
70.05	Other	Include Vans, Sedan/Station Wagon, Cable Car, People Mover, Monorail, Car/Inclined Railway, Ferry Boat, Transferred Vehicle					
70.06	Non-revenue vehicles						
70.07	Spare parts						



Sta	Indard Cost Categories for Major Capital Projects (Rev. 2, Jun. 24, 2005)	Definitions PLEASE NOTE! The SCC cost breakdown is based on a traditional Design Bid Build model. If your project is Design Build, to the best of your ability, separate construction costs from design, administration, testing, etc. Put construction in 10 through 50. Put design, administration, testing, etc. in 80.
80 PROFESSIONAL SERVICES		Include all professional, technical and management services (and related professional liability insurance costs) during the preliminary engineering, final design, and construction phases of the project. This includes environmental work, design, engineering and architectural services; specialty services such as safety or security analyses; value engineering, risk assessment, cost estimating, scheduling, Before and After studies, ridership modeling and analyses, auditing, legal services, administration and management, etc. by agency staff or outside consultants. As required, use back-up worksheets to track detailed costs within each of the line items. (Note that costs for alternatives analysis and NEPA work done before FTA approval to enter preliminary engineering (PE), even when funded with New Starts funds, are not included in an FFGA and therefore, should not be included in the Standard Cost Category worksheets. For example, on one and the same grant, costs incurred prior to FTA approval to enter PE should be omitted from these worksheets whereas costs incurred after FTA approval to enter PE should be included.)
80.01	Preliminary Engineering	
80.02	Final Design	
80.03	Project Management for Design and Construction	
80.04	Construction Administration & Management	
80.05	Insurance	
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	
80.07	Surveys, Testing, Investigation, Inspection	
80.08	Agency Force Account Work	Include access and protection work and other construction work in Categories 10 through 50 above. Include here only agency's testing, inspection, start up and training.



Standard Cost Categories for Major Capital Projects (Rev. 2, Jun. 24, 2005)	Definitions PLEASE NOTE! The SCC cost breakdown is based on a traditional Design Bid Build model. If your project is Design Build, to the best of your ability, separate construction costs from design, administration, testing, etc. Put construction in 10 through 50. Put design, administration, testing, etc. in 80.
90 UNALLOCATED CONTINGENCY	Includes unallocated contingency, project reserves. Document allocated contingencies for individual line items on the Allocated Contingency worksheet.
Subtotal (Sum Categories 10 - 90)	
100 FINANCE CHARGES	Include finance charges expected to be paid by the project sponsor/grantee prior to either the completion of the project or the fulfillment of the New Starts funding commitment, whichever occurs later in time. Finance charges incurred after this date should not be included in Total Project Cost on the Main Worksheet or in the FFGA Baseline Cost Estimate. (See FFGA Circular FTA C5200.1A Chapter III for additional information.) Derive finance charges from the New Starts project's financial plan, based on an analysis of the sources and uses of funds. The amount and type of debt financing required and revenues available determine the finance charges. By year, compute finance charges in year-of- expenditure (YOE) dollars. On the Inflation Calculation to YOE worksheet enter the finance charges for the appropriate years. The Inflation worksheet automatically calculates the amounts in base year dollars.
Total Project Cost (Sum Categories 10 - 100)	

Technical Memorandum | Cost Methodology and Results



APPENDIX A-2

US 441 ALTERNATIVE 1-2 CAPITAL COST BREAKDOWN

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-2 CAPITAL COST ESTIMATE (Revised 1-20-15) Main Worksheet Alternative 1-2 Build Summary (\$2013) Commuter Rail & Express Bus - 30 Minute/120 Minute Headway

FTA CATEGORY No.	DESCRIPTION	2013 BASE YEAR COST W/O CONTINGENCY	2013 ALLO UNALLOCATED	2013 ESTIMATE WITH CONTINGENCY	
10	GUIDEWAY AND TRACK ELEMENTS	\$9,730,125	\$2,432,531	25%	\$12,162,656
20	STATIONS, STOPS, TERMINALS, INTERMODALS	\$5,531,768	\$1,382,942	25%	\$6,914,710
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN BLDGS	\$4,066,115	\$1,016,529	25%	\$5,082,644
40	SITEWORK & SPECIAL CONDITIONS	\$14,940,443	\$3,735,111	25%	\$18,675,553
50	SYSTEMS	\$44,224,529	\$11,056,132	25%	\$55,280,661
	CONSTRUCTION SUBTOTAL (10-50)	\$78,492,979	\$19,623,245	25%	\$98,116,224
60	RIGHT-OF-WAY, LAND, EXISTING IMPROVEMENTS	\$26,815,727	\$2,681,573	10%	\$29,497,300
70	VEHICLES	\$72,934,740	\$3,646,737	5%	\$76,581,477
80	PROFESSIONAL SERVICES	\$25,510,218	\$2,551,022		\$28,061,240
	SUBTOTAL (SUM CATEGORIES 10-80)	\$203,753,665	\$28,502,576		\$232,256,241
90	UNALLOCATED CONTINGENCY (% of Base Cost)		\$20,375,366	10%	\$20,375,366
	SUBTOTAL (SUM CATEGORIES 10-90)	\$203,753,665	\$48,877,943		\$252,631,608
100	FINANCE CHARGES				\$0
	TOTAL	\$203,753,665	\$48,877,943		\$252,631,608

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-2 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 10 - GUIDEWAY & TRACK ELEMENTS

Line Descent vi at Gale in Sulling ment and	SCC No.	ITEM	UNIT	APPROX. QUANTITY	2	2013 UNIT COST	BA C	ASE YEAR COST W/O CONTINGENCY	TOTAL B COS CONTI	ASE YEAR T W/O NGENCY	ALL CONT	OCATED TINGENCY	BAS Al CO	SE YEAR \$ W/ LLOCATED	В/ TO	ASE YEAR)TAL COST
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Image: Note of the second state of		Class 3 to Class 4 Track Upgrade	Mi	0.0	\$	145,000	\$					25%	\$	-		
SUB-TOTAL Source \$ 7,376,575 \$ 9,220,715 10.12 TRACK: SPECIAL (SWITCHES, TURNOUTS) Image: Construct of the set installation EA 0 \$ 154,500 \$ - Image: Construct of the set installation EA 0 \$ 154,500 \$ - Image: Construct of the set installation EA 0 \$ 154,500 \$ - Image: Construct of the set installation EA 7 \$ 133,900 \$ 937,300 Image: Construct of the set installation EA 7 \$ 133,900 \$ 937,300 Image: Construct of the set installation EA 7 \$ 133,900 \$ 937,300 Image: Construct of the set installation EA 7 \$ 133,900 \$ 937,300 Image: Construct of the set installation EA 0 \$ 309,000 \$ 1mage: Construct of the set installation EA 0 \$ 206,000 Image: Construct of the set installation EA 0 \$ 226,000 S Image: Construct of the set installation EA 0 \$ 226,000 S Image: Construct of the set installation EA 0 \$ 226,000 S Image: Construct of the set installation Image: Construct of the set installatin Image: Conset installation																
10.12 TRACK: SPECIAL (SWITCHES, TURNOUTS) Image: Switch Ties & Installation EA 0 \$ 154,500 \$ - 25% \$ - - #10 Turnouts - Materials, Switch Ties & Installation EA 7 \$ 133,900 \$ 937,300 25% \$ 1,171,625 #10 Turnouts - Materials, Switch Ties & Installation EA 7 \$ 133,900 \$ 937,300 25% \$ 1,171,625 #10 Turnouts - Materials, Switch Ties & Installation EA 6 \$ 113,300 \$ 679,800 25% \$ 490,750 #20 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ 669,500 #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 226,600 \$ - 25% \$ 669,500 #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 226,500 \$ - 25% \$ - - Upgrade Existing Crossover EA 0 \$ 226,500 \$ - 25% \$ 251,063 - - - - - - - - - - - - - - - - - <td></td> <td>SUB-TOTAL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>\$</td> <td>7,376,575</td> <td></td> <td></td> <td></td> <td></td> <td>\$</td> <td>9,220,719</td>		SUB-TOTAL							\$	7,376,575					\$	9,220,719
#20 Turnouts - Materials, Switch Ties & Installation EA 0 \$ 154,500 \$ - 25% \$ 1,171,625 #15 Turnouts - Materials, Switch Ties & Installation EA 7 \$ 133,900 \$ 937,300 25% \$ 1,171,625 #10 Turnouts - Materials, Switch Ties & Installation EA 6 \$ 113,300 \$ 679,800 25% \$ 849,750 #20 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ 849,750 #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ 849,750 #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ 669,500 #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 226,600 \$ - 25% \$ 669,500 #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 226,600 \$ - 25% \$ 669,500 #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 226,600 \$ - 25% \$ - Upgrade Existing Crossover EA 0 \$ 207,500	10.12	TRACK: SPECIAL (SWITCHES, TURNOUTS)			+		+									
#15 Turnouts - Materials, Switch Ties & Installation EA 7 \$ 133,900 \$ 937,300 25% \$ 1,171,625 #10 Turnouts - Materials, Switch Ties & Installation EA 6 \$ 113,300 \$ 679,800 25% \$ 849,750 #20 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ 849,750 #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ 849,750 #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 326,800 \$ - 25% \$ - Upgrade Existing Crossover EA 0 \$ 226,800 \$ - 25% \$ -		#20 Turnouts - Materials, Switch Ties & Installation	EA	0	\$	154,500	\$	-				25%	\$	-		
mitor functions - meterizity, switch Ties & installation EA 0 \$ 113,300 \$ 079,800 25% \$ 849,700 #20 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ - #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ - #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 226,600 \$ - 25% \$ - Upgrade Existing Crossover EA 0 \$ 227,500 \$ - 25% \$ - Remove Existing Turnouts EA 0 \$ 227,500 \$ - 25% \$ - Image: Sub-TOTAL EA 13 \$ 15,450 \$ 200,850 25% \$ 25% \$ 25% \$ 25% \$ 25% \$ 25% \$ 25% \$ 25% \$ 25% \$ 25% \$ 25% \$ 25%		#15 Turnouts - Materials, Switch Ties & Installation	EA	7	\$	133,900	\$	937,300				25%	\$ ¢	1,171,625		
#15 Crossovers - Materials, Switch Ties & Installation EA 2 \$ 267,800 \$ 535,600 25% \$ 669,500 #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 226,600 \$ - 25% \$ 669,500 Upgrade Existing Crossover EA 0 \$ 226,600 \$ - 25% \$ - - Remove Existing Turnouts EA 0 \$ 227,500 \$ - 25% \$ - - SUB-TOTAL EA 13 \$ 15,450 \$ 200,850 225% \$ 251,063 10.13 TRACK: VIBRATION & NOISE DAMPENING NA - - - - SUB-TOTAL Sub-TOTAL - - - - - - TOTAL S Sub-TOTAL - - - - - - - 10.13 TRACK: VIBRATION & NOISE DAMPENING NA -		#20 Crossovers - Materials, Switch Ties & Installation #20 Crossovers - Materials, Switch Ties & Installation	EA	0	ې \$	309.000	ф \$	679,800				25%	э \$	049,750		
#10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 226,600 \$ - 25% \$ - - Upgrade Existing Crossover EA 0 \$ 257,500 \$ - 25% \$ - - Remove Existing Turnouts EA 13 \$ 15,450 \$ 200,850 225% \$ 251,063 SUB-TOTAL EA 13 \$ 15,450 \$ 200,850 25% \$ 251,063 Image: Sub-TOTAL Image: Sub-TOTAL <td></td> <td>#15 Crossovers - Materials, Switch Ties & Installation</td> <td>EA</td> <td>2</td> <td>\$</td> <td>267,800</td> <td>\$</td> <td>535,600</td> <td></td> <td></td> <td></td> <td>25%</td> <td>\$</td> <td>669,500</td> <td></td> <td></td>		#15 Crossovers - Materials, Switch Ties & Installation	EA	2	\$	267,800	\$	535,600				25%	\$	669,500		
Upgrade Existing Urossover EA 0 \$ 257,500 \$ - 25% \$ - Remove Existing Turnouts EA 13 \$ 15,450 \$ 200,850 25% \$ 251,063 SUB-TOTAL EA 13 \$ 15,450 \$ 200,850 25% \$ 251,063 TRACK: VIBRATION & NOISE DAMPENING NA Image: Constraint of the second seco		#10 Crossovers - Materials, Switch Ties & Installation	EA	0	\$	226,600	\$	-				25%	\$	-		
Interview Difference Difference <td></td> <td>Upgrade Existing Crossover Remove Existing Turnouts</td> <td>EA FA</td> <td>0</td> <td>\$</td> <td>257,500</td> <td>\$</td> <td>- 200 850</td> <td></td> <td></td> <td></td> <td>25%</td> <td>\$</td> <td>- 251 063</td> <td></td> <td></td>		Upgrade Existing Crossover Remove Existing Turnouts	EA FA	0	\$	257,500	\$	- 200 850				25%	\$	- 251 063		
SUB-TOTAL \$ 2,353,550 \$ 2,941,938 10.13 TRACK: VIBRATION & NOISE DAMPENING NA Image: Constraint of the second				15	Ψ	10,400	, ų	200,030				2370	Ψ	201,000		
10.13 TRACK: VIBRATION & NOISE DAMPENING NA Image: Constraint of the second sec		SUB-TOTAL							\$	2,353,550					\$	2,941,938
	10.13		NA				+									
SUB-TOTAL TOTALS \$ 9,730,125 \$ 2,432,531 TOTAL \$ 12,162,555	10.15		N/A		1		+									
TOTALS \$ 9730 125 \$ 2,432 531 TOTAL \$ 12 163 656		SUB-TOTAL														
							1	TOTALS	¢	9 730 125	\$	2 432 531		τοται	\$	12 162 656

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-2 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC - 20 STATIONS, STOPS, TERMINALS, INTERMODAL

SCC No.	ITEM	UNIT	APPROX. QUANTITY	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
20.01	AT-GRADE STATION, STOP, SHELTER, MALL, TERMINAL, PLATFORM								
	Platform Complete-Rail (Includes Mini-High, Ramps, Signage, and Canopies)	EA	6	\$ 763,003	\$ 4,578,018		25%	\$ 5,722,523	
	Platform Complete-Express Bus	EA	5	\$ 190,750	\$ 953,750		25%	\$ 1,192,188	
	SUB-TOTAL					\$ 5,531,768			\$ 6,914,710
20.02	AFRIAL STATION STOP SHELTER MALL TERMINAL PLATFORM	ΝΔ							
20.02		INA							
	SUB-TOTAL								
20.03	UNDERGROUND STATION, STOP, SHELTER, MALL, TERMINAL, PLATFORM	NA							
	SUB-TOTAL								
20.04	OTHER STATIONS LANDINGS TERMINALS: INTERMODAL FERRY TROLLEY FTC	NΔ							
20.04									
	SUB-TOTAL								
20.05	JOINT DEVELOPMENT	NA							
	SUB-TOTAL								
20.06	AUTOMOBILE PARKING MULTI-STORY STRUCTURE	NΔ							
20.00									
	SUB-TOTAL								
20.07	ELEVATORS, ESCALATORS	NA							
	SUB-TOTAL								
					TOTALS	\$ 5,531.768	\$ 1,382.942	TOTAL	\$ 6,914,710

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-2 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 30 - SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS

SCC No.	ITEM	UNIT	APPROX. QUANTITY	20	13 UNIT COST	BASE	E YEAR COST W/O NTINGENCY	тот С	TAL BASE YEAR COST W/O ONTINGENCY	ALLOCATED CONTINGENCY	BASE ALLO CONT	YEAR \$ W/ DCATED INGENCY	BA TO	SE YEAR
30.01	ADMINISTRATION BUILDING	NA												
	SUB-TOTAL													
30.02		05	1 070	•	400	•	407.000			050	•	0.40 500		
	I ransportation Building	SF	1,972	\$	100	\$	197,200			25%	\$	246,500		
	Office Furnishings	LS	1	\$	50,000	\$	50,000			25%	\$	62,500		
	Canonied	SE	0	\$	100	\$	-			25%	\$	_		
	Concrete Pit and Slab	CY	0	\$	450	\$	-			25%	\$ \$	-		
	Wash Pad	SF	7 150	\$	40	\$	286 000			25%	Ψ \$	357 500		
	Equipment	LS	1	\$	123 600	\$	123 600			25%	\$	154 500		
	Wayside Power	EA	0	\$	100.000	\$	-			25%	\$	-		
	Yard Air, Water, Electrical	LS	1	\$	240.000	\$	240.000			25%	\$	300.000		
	Parking, Walkways, Access Roads	SY	5,109	\$	39	\$	199,251			25%	\$	249,064		
	Security Fence w/ Remote Control Gates	LF	3,200	\$	43	\$	137,600			25%	\$	172,000		
	Site Security, Communications, Buidling Systems													
		LS	1	\$	202,875	\$	202,875			25%	\$	253,594		
	VSLMF Yard and Roadway Lighting	SF	270,340	\$	1	\$	302,781			25%	\$	378,476		
	SUB-TOTAL							\$	1,739,307				\$	2,174,134
30.03	HEAVY MAINTENANCE FACILITY	NA												
	SUB-TOTAL													
30.04	STORAGE OR MAINTENANCE OF WAY BUILDING			_										
	1 Train Crew Trailer w/ 15 Parking Spaces	LS	1	\$	70,000	\$	70,000			25%	\$	87,500		
								¢	70.000				¢	97 500
	30B-101AL							φ	70,000				Ŷ	07,500
20.05														
30.05	TARD AND TARD TRACK													
	Entrances	TF	4 574	\$	170	\$	777 580			25%	\$	971 975		
	Embedded Track	TF	316	\$	483	\$	152 628			25%	\$	190 785		
	#10 Turnouts	EA	2	\$	113.300	\$	226.600			25%	\$	283.250		
	#8 Turnouts	EA	4	\$	150,000	\$	600,000			25%	\$	750,000		
	Excavation, Grading, Yard Drainage,				,		,)		
	Environmental	LS	1	\$	500,000	\$	500,000			25%	\$	625,000		
	Fueling Track/Facility - Single Track, Fuel by													
	Tankers	SF	0	\$	36	\$	-			25%	\$	-		
	SUB-TOTAL							\$	2,256,808				\$	2,821,010
							TOTALS	\$	4,066,115	\$ 1,016,529		TOTAL	\$	5,082,644

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-2 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 40 - SITEWORK & SPECIAL CONDITIONS

SCC No.	ІТЕМ	UNIT	APPROX. QUANTITY	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COS
40.01	DEMOLITION, CLEARING, EARTHWORK								
	Light Maintenance Facility	°E	0.275	¢ 20	¢ 195 500		259/	¢ 001.075	
	Demonitori Remove Raving and Curbing, Includes Asphalt Disposal	SV	9,275	\$ <u>20</u> \$ 16	\$ 12,800		25%	\$ 16,000	
	Clear & Grub Rough Grade	AC	6.50	\$ 7,900	\$ 51,350		25%	\$ 64,188	
	Rail and Bus Stations								
	Demolition	SF	94,525	\$ 20	\$ 1,890,500		25%	\$ 2,363,125	
	Remove Paving and Curbing, Includes Asphalt Disposal	SY	17,840	\$ 16	\$ 285,440		25%	\$ 356,800	
	Clear & Grub Rough Grade	AC	14.79	\$ 7,900	۵ II0,841		20%	\$ 146,051	-
	SUB-TOTAL					\$ 2.542.431			\$ 3.178.0
40.02	SITE UTILITIES, UTILITY RELOCATION								
	Station Utilities (Rail and Bus)								
	Vehicle Area Utilities - General, Illumination - High Pressure Sodium, 25' HPS shoebox, Light Pole, Cable & Homerun to Contractor (Per Park and Ride Lot)	EA	7	\$ 158,554	\$ 1,109,878		25%	\$ 1,387,348	
	Station Elements - Plumbing	Parking Space	500	\$ 1/1	\$ 85,500		25%	\$ 106,875	
	Onsite Stormwater Retention and Drainage-Bus Drop-Of Only	EA	1	\$ 35,000	\$ 35,000		25%	\$ 43,750 \$ 38,750	
	Onsite Stormwater Retention and Drainage-Priss and Rule Only Onsite Stormwater Retention and Drainage-Priss and Rule Only	FA	2	\$ 50,250	\$ 100,500		25%	\$ 125.625	
	Onsite Stormwater Retention and Drainage-50 Space Park and Ride Lot (Includes Stormwater for Kiss and Ride and Bus Drop-Off)	EA	1	\$ 67,000	\$ 67,000		25%	\$ 83,750	
	Onsite Stormwater Retention and Drainage-100 Space Park and Ride Lot (Includes Stormwater for Kiss and Ride and Bus Drop-Off)	EA	4	\$ 100,500	\$ 402,000		25%	\$ 502,500	
	Power Distribution for All Lighting and General Use	ST	9	\$ 92,486	\$ 832,374		25%	\$ 1,040,468	
	Emergency Power Distribution Connection	ST	9	\$ 10,000	\$ 90,000		25%	\$ 112,500	
						¢ 0.750.050			¢ 2444 P
	305-101AL					\$ 2,755,252			ə 3,441,3
40.03	HAZ. MAT'L. CONTAM'D SOIL REMOVAL/MITIGATION. GROUND WATER TRTMT	NA							
	SUB-TOTAL								
40.04	ENVIRONMENTAL MITIGATION	NA							
	305-101AL								
40.05	SITE STRUCTURES INCLUDING RETAINING WALLS. SOUND WALLS	NA							
	SUB-TOTAL								
40.06	PEDESTRIAN/BIKE ACCESS AND ACCOMMODATION, LANDSCAPING								
	Off Site Station Improvements (Sidewalke)	ev.	44 792	¢ 54	¢ 2/18/228		25%	\$ 3,022,785	
	Off-Site Station Improvements (Crosswalks) Off-Site Station Improvements (Crosswalks)	LE	96	\$ 34	\$ 2,410,220		25%	\$ 3,022,703	
		2.	00	Ŷ Ű	¢ 020		2070	¢ 100	
	Rail and Bus Stations								
	Landscaping and Irrigation -25 Space Park and Ride Lot	EA	2	\$ 48,294	\$ 96,588		25%	\$ 120,735	
	Landscaping and Irrigation -50 Space Park and Ride Lot	EA	1	\$ 96,587	\$ 96,587		25%	\$ 120,734	
	Landscaping and Irrigation -100 Space Park and Ride Lot	EA	4	\$ 193,173	\$ 772,692		25%	\$ 965,865	
	SUB-TOTAL					\$ 3 384 415			\$ 4 230 5
						• •,•••,•••			• •,200,0
40.07	AUTOMOBILE, BUS, VAN ACCESSWAYS INCL ROADS, PARKING LOTS								
	Vehicle Circulation						0501		
L	Access Roadway (specifically for SR 429 station)	SY	1,467	\$ 50	\$ 73,350		25%	\$ 91,688	
	oigingig - ∠o opdob Park and Nide Lot Singane - 60 Soare Park and Ride Lot	EA EA	1	9 31,392 \$ 62,792	9 02,/84 \$ 62,792		∠0% 25%	φ /δ,480 \$ 79,470	
	Signage - So Space Park and Ride Lot	EA	4	\$ 125.565	\$ 502.260		25%	\$ 627.825	
<u> </u>	New Traffic Signal	EA	1	\$ 300,000	\$ 300,000		25%	\$ 375,000	
	Maintenance of Traffic	ST	9	\$ 20,000	\$ 180,000		25%	\$ 225,000	
	Surface Parking and Walks	54					05%		
	25 Space Park and Ride Lot	EA	2	\$ 207,000	\$ 414,000		25%	\$ 517,500	
-	30 Space Park and Nide L0 100 Space Park and Pick L0	ΕA	4	\$ 552,000	\$ 2,208,000		25%	\$ 2,760,000	
	Kiss and Ride Area	EA	8	\$ 86.200	\$ 689.600		25%	\$ 862.000	
	On-Site Bus Circulation Area								
	Busway with Bus Pad	EA	5	\$ 239,000	\$ 1,195,000		25%	\$ 1,493,750	
L				l			l		
	UT-Site BUS UrOP-UT AFRA On-Sitere Flux Pad	FΔ	6	\$ 16.500	\$ 99,000		25%	\$ 123.750	
	UPUNUU DUA F dU	LA	U	φ 10,000	φ 99,000		2J70	ψ 123,750	
	Pavement Markings	ST	9	\$ 21,952	\$ 197,568		25%	\$ 246,960	
	SUB-TOTAL					\$ 6,260,345			\$ 7,825,4
40.00				l					
40.08	TEMPORART FACILITIES AND OTHER INDIRECT COSTS DURING CONSTRUCTION	NA							
	SUB_TOTAL								
					TOTALS	> 14,940,443	\$ 3,735,111	TOTAL	\$ 18,675,5

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-2 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 50 - SYSTEMS

SCC No.	ITEM	UNIT	APPROX. QUANTITY	201	3 UNIT COST	B	ASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
50.01	TRAIN CONTROL AND SIGNALS (Supply, Fabricate, Install, Test)										
	FCEN Interlockings	EA	9	\$	2,200,000	\$	19,800,000		25%	\$ 24,750,000	
	FCEN/CFRC Interlocking	EA	1	\$	3,000,000	\$	3,000,000		25%	\$ 3,750,000	
	CFRC LYNX-Church Interlocking Modifications	EA	1	\$	3,000,000	\$	3,000,000		25%	\$ 3,750,000	
	PTC System	Mi	20.0	\$	400,000	\$	8,000,000		25%	\$ 10,000,000	
								\$ 33,800,000			\$ 42,250,000
50.02	TRAFFIC SIGNALS AND CROSSING PROTECTION										
	Grade Crossing Improvements for Public Crossings	LS	1	\$	2,182,156	\$	2,182,156		25%	\$ 2,727,695	
	Grade Crossing Improvements for Private Crossings	LS	1	\$	2,251,121	\$	2,251,121		25%	\$ 2,813,901	
	SUB-TOTAL							\$ 4,433,277			\$ 5,541,596
50.03	TRACTION POWER SUPPLY: SUBSTATIONS	NA									
	SUB-TOTAL										
50.04	TRACTION POWER DISTRIBUTION: OVERHEAD CONTACT SYSTEM	NA									
	SUB-TOTAL										
50.05	COMMUNICATIONS (STATIONS)										
	Fiber	Mi	20.0	\$	118,431	\$	2,368,620		25%	\$ 2,960,775	
	CCTV on Platform (Rail and Express Bus)	EA	11	\$	83,267	\$	915,937		25%	\$ 1,144,921.25	
	Station Circuit/Amenities Equipment	EA	11	\$	58,498	\$	643,478		25%	\$ 804,348	
	Radio	EA	11	\$	11,911	\$	131,021		25%	\$ 163,776	
											* - - - - - - - - - -
	SUB-IUIAL							\$ 4,059,056			\$ 5,073,820
50.06	FARE COLLECTION SYSTEM AND EQUIPMENT					+					
00.00	Fare Collection System and Equipment (Rail)										
	Ticket Vending Machines (2 per platform)	EA	12	\$	66.950	\$	803.400		25%	\$ 1.004.250	
	Ticket Validators (2 per platform)	EA	12	\$	10,733	\$	128,796		25%	\$ 160,995	
				Ť		Ť	0,. 00				
	Fare Collection System and Equipment (Express Bus)					1					
	Ticket Vending Machines (2 per platform)	EA	0	\$	66.950	\$	-		25%	\$-	
	Ticket Validators (2 per platform)	EA	0	\$	10,733	\$	-		25%	\$ -	
					,						
	SUB-TOTAL							\$ 932,196			\$ 1,165,245
50.07	OPERATIONS CONTROL CENTER					1					
	Operations Control Center (Rail)	LS	1	\$	1,000,000	\$	1,000,000		25%	\$ 1,250,000	
						1					
	SUB-TOTAL							\$ 1,000,000			\$ 1,250,000
							TOTALS	\$ 44,224,529	\$ 11,056,132	TOTAL	\$ 55,280,661

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-2 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC - 60 ROW, LAND, EXISTING IMPROVEMENTS

SCC No.	ITEM	UNIT	APPROX. QUANTITY	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
		′	1						
60.01	PURCHASE OR LEASE OF REAL ESTATE	'	<u> </u>						
	Station Parcel Acquisition - Includes Business Damages and Relocation Expenses	LS	1	\$ 23,048,700	\$ 23,048,700		10%	\$ 25,353,570	
	Light Maintenance Facility Parcel Acquisition	LS	1	\$ 3,767,027	\$ 3,767,027		10%	\$ 4,143,730	
			1						
	SUB-TOTAL					\$ 26,815,727			\$ 29,497,300
		<u> </u>	1						
60.02	RELOCATION OF EXISTING HOUSEHOLDS AND BUSINESSES - Open	NA	1						
	RELOCATION OF EXISTING HOUSEHOLDS AND BUSINESSES - Closed	NA	1						
!		′	í <u> </u>						
	SUB-TOTAL								
					TOTALS	\$ 26.815.727	\$ 2 681 573	TOTAL	\$ 29,497,300

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-2 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 70 - VEHICLES

	ITEM		UNIT	APPROX. QUANTITY	2013	3 UNIT COST	B (CO	ASE YEAR COST W/O NTINGENCY	T(Y CO	DTAL BASE EAR COST W/O NTINGENCY	ALLOCA CONTING	ATED Gency	BA W/ A COI	SE YEAR ALLOCATI NTINGEN(
70.01	LIGHT RAIL													
		SUB-TOTAL							-					
70.02														
70.02														
		SUB-TOTAL												
70.03	COMMUTER RAIL													
	Locomotives		EA	5	\$	7,000,000	\$	35,000,000			5%)	\$	36,750,00
	Cab Cars		EA	5	\$	2,694,492	\$	13,472,460			5%)	\$	14,146,08
	Coaches		EA	5	\$	2,392,456	\$	11,962,280			5%)	\$	12,560,39
		SUB-TOTAL							\$	60,434,740				
70.04	BUS													
	LYNX 40-foot Hybrid Bus for Express Bus Service		EA	6	\$	500,000	\$	3,000,000			5%)	\$	3,150,00
	LYNX 40-root Hybrid Bus for Feeder Bus Service		EA	19	\$	500,000	\$	9,500,000			5%)	\$	9,975,00
									¢	12 500 000				
		SUB-IUTAL							Ð	12,500,000				
70.05	OTHER													
10.00														
		SUB-TOTAL												
70.06	NON-REVENUE VEHICLES													
		SUB-TOTAL												
70.07	SPARE PARTS - RAIL VEHICLES													
					-				-					
									•					
		SUB-TOTAL							\$	-				



US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-2 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 80 - PROFESSIONAL SERVICES

SCC No.	ITEM	UNIT	APPROX. QUANTITY	% COST OF CONSTRUCTION SECTIONS 10-50	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE TOTAL	EYEAR L COST
		('									
80.01	PRELIMINARY ENGINEERING	2013 Estimate with Contingency	\$ 98,116,224	4%		\$ 3,924,649		10%	\$ 4,317,114		
80.02	FINAL DESIGN (Railway Infrastructure & Stations)	2013 Estimate with Contingency	\$ 98,116,224	10%		\$ 9,811,622		10%	\$ 10,792,785		
80.03	PROJECT MANAGEMENT FOR DESIGN AND CONSTRUCTION	2013 Estimate with Contingency	\$ 98,116,224	3%		\$ 2,943,487		10%	\$ 3,237,835		
80.04	CONSTRUCTION ADMINISTRATION AND MANAGEMENT	2013 Estimate with Contingency	\$ 98,116,224	5%		\$ 4,905,811		10%	\$ 5,396,392		
80.05	INSURANCE (Liability Insurance Included in Engineering Firm O/H)	2013 Estimate with Contingency	\$ 98,116,224	0%		\$ -		0%	\$ -		
80.06	LEGAL, PERMITS, REVIEW FEES	2013 Estimate with Contingency	\$ 98,116,224	0%		\$ -		0%	\$-		
80.07	SURVEYS, TESTING, INVESTIGATION, INSPECTION	2013 Estimate with Contingency	\$ 98,116,224	3%		\$ 2,943,487		10%	\$ 3,237,835		
80.08	START-UP (wayside signal system testing included in Systems)	2013 Estimate with Contingency	\$ 98,116,224	1%		\$ 981,162		10%	\$ 1,079,278		
		· · · · · · · · · · · · · · · · · · ·									
		[]					\$ 25,510,218			\$ 28	3,061,240
						TOTALS	\$ 25,510,218	\$ 2,551,022	TOTAL	\$ 28	3,061,240



APPENDIX A-3

US 441 ALTERNATIVE 1-5 CAPITAL COST BREAKDOWN

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-5 CAPITAL COST ESTIMATE (Revised 1-20-15) Main Worksheet Alternative 1-5 Build Summary (\$2013)

Commuter Rail - 30 Minute/120 Minute Headway

FTA CATEGORY No.	DESCRIPTION	2013 BASE YEAR COST W/O CONTINGENCY	2013 ALLO UNALLOCATED (CATED & CONTINGENCY	2013 ESTIMATE WITH CONTINGENCY
10	GUIDEWAY AND TRACK ELEMENTS	\$20,611,663	\$5,152,916	25%	\$25,764,579
20	STATIONS, STOPS, TERMINALS, INTERMODALS	\$7,630,030	\$1,907,508	25%	\$9,537,538
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN BLDGS	\$4,604,716	\$1,151,179	25%	\$5,755,895
40	SITEWORK & SPECIAL CONDITIONS	\$16,737,989	\$4,184,497	25%	\$20,922,487
50	SYSTEMS	\$77,689,893	\$19,422,473	25%	\$97,112,366
	CONSTRUCTION SUBTOTAL (10-50)	\$127,274,292	\$31,818,573	25%	\$159,092,864
60	RIGHT-OF-WAY, LAND, EXISTING IMPROVEMENTS	\$26,134,527	\$2,613,453	10%	\$28,747,980
70	VEHICLES	\$103,803,128	\$5,190,156	5%	\$108,993,284
80	PROFESSIONAL SERVICES	\$41,364,145	\$4,136,414		\$45,500,559
	SUBTOTAL (SUM CATEGORIES 10-80)	\$298,576,091	\$43,758,596		\$342,334,688
90	UNALLOCATED CONTINGENCY (% of Base Cost)		\$29,857,609	10%	\$29,857,609
	SUBTOTAL (SUM CATEGORIES 10-90)	\$298,576,091	\$73,616,206		\$372,192,297
100	FINANCE CHARGES				\$0
	TOTAL	\$298,576,091	\$73,616,206		\$372,192,297

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-5 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 10 - GUIDEWAY & TRACK ELEMENTS

SCC No.	ІТЕМ	UNIT	APPROX. QUANTITY	2	2013 UNIT COST	BASE YE W CONTIN	EAR COST //O NGENCY	TOTAL CO CONT	BASE YEAR ST W/O 'INGENCY	ALLOCATED CONTINGENCY	BA A CO	SE YEAR \$ W/ ALLOCATED ONTINGENCY	B. TC	ASE YEAR)TAL COST
40.04						-								
10.01	Avg. Cost per Track Foot for Subgrade and Sub-Ballast for New Track -													-
	Relatively Flat Grade	LF	8,700	\$	57	\$	495,900			25%	\$	619,875		
	SUB-TOTAL							¢	495 900				\$	619 875
								Ť	400,000				Ŷ	010,070
10.02	GUIDEWAY: AT-GRADE SEMI-EXCLUSIVE	NA												
	SUB-TOTAL													
10.03	GUIDEWAY: AT-GRADE IN MIXED TRAFFIC	NA												
	300-101AL												-	
10.04	GUIDEWAY: AERIAL STRUCTURES	NA												
	SUB-TOTAL													
10.05	GUIDEWAY: BUILT-UP FILL	NA												
	SUB-TOTAL													
10.06		NΔ									-			
10.00	CODEMAL ONDERGROUP COT & COTER	10/1												
	SUB-TOTAL													
40.07		NIA												
10.07	GUIDEWAT: UNDERGROUND TUNNEL	NA												
	SUB-TOTAL													
10.08	GUIDEWAY: RETAINED CUT OR FILL	NA												
	SUB-TOTAL													
10.09	TRACK: DIRECT FIXATION	NA												
	SUB-TOTAL													
10.10	TRACK: EMBEDDED													
	New Track Across Road	TF	72	\$	483	\$	34,788			25%	\$	43,485		
													•	
	SUB-TOTAL							\$	34,788				\$	43,485
10.11	TRACK: BALLASTED													
	New Mainline/Siding Track	TF	9,550	\$	170	\$	1,623,500			25%	\$	2,029,375		
	Realign Track	TF	775	\$	93	\$	72,075			25%	\$	90,094		
	Class 1 to Class 4 Track Upgrade	Mi	5.1	\$ ¢	1,500,000	\$	7,650,000			25%	\$	9,562,500		
	Class 2 to Class 4 Track Opgrade	Mi	0.0	\$	145.000	ş S	-			25%	ş	3,323,000		
				Ŀ							Ĺ			
	SUB-TOTAL							\$	16,805,575				\$	21,006,969
10.12														
10.12	#20 Turnouts - Materials, Switch Ties & Installation	EA	0	\$	154,500	\$	-			25%	\$			
	#15 Turnouts - Materials, Switch Ties & Installation	EA	11	\$	133,900	\$	1,472,900			25%	\$	1,841,125		
	#10 Turnouts - Materials, Switch Ties & Installation	EA	9	\$	113,300	\$	1,019,700			25%	\$	1,274,625	<u> </u>	
<u> </u>	#20 Crossovers - Materials, Switch Ties & Installation #15 Crossovers - Materials, Switch Ties & Installation	EA	2	\$ \$	267.800	э \$	535.600			∠ວ% 25%	ې \$	- 669.500		
	#10 Crossovers - Materials, Switch Ties & Installation	EA	0	\$	226,600	\$	-			25%	\$	-		
	Upgrade Existing Crossover	EA	0	\$	257,500	\$	-			25%	\$			
<u> </u>	Remove Existing Turnouts	EA	16	\$	15,450	\$	247,200	<u> </u>		25%	\$	309,000	<u> </u>	
	SUB-TOTAL							\$	3,275,400				\$	4,094,250
10.13	TRACK: VIBRATION & NOISE DAMPENING	NA		-						ļ	<u> </u>			
	SUB-TOTAL													
						TOT	TALS	\$	20,611,663	\$ 5,152,916		TOTAL	\$	25,764,579

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-5 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC - 20 STATIONS, STOPS, TERMINALS, INTERMODAL

SCC No.	ITEM	UNIT	APPROX. QUANTITY	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
20.01	AT-GRADE STATION, STOP, SHELTER, MALL, TERMINAL, PLATFORM								
	Platform Complete-Rail (Includes Mini-High, Ramps, Signage, and Canopies)	EA	10	\$ 763,003	\$ 7,630,030		25%	\$ 9,537,538	
	Platform Complete-Express Bus	EA	0	\$ 190,750	\$-		25%	\$ -	
	SUB-TOTAL					\$ 7,630,030			\$ 9,537,538
20.02		NIA							
20.02	AERIAL STATION, STOP, SHELLER, MALL, LERMINAL, PLATFORM	INA							
	SUB-TOTAL								
20.03	UNDERGROUND STATION, STOP, SHELTER, MALL, TERMINAL, PLATFORM	NA							
	SUB-TOTAL								
20.04		NIA							
20.04	OTHER STATIONS, LANDINGS, TERMINALS: INTERMODAL, FERRY, TROLLEY, ETC.	NA							
	SUB-TOTAL								
20.05	JOINT DEVELOPMENT	NA							
	SUB-TOTAL								
20.06	AUTOMOBILE PARKING MULTI-STORY STRUCTURE	NA							
	SUBJOTAL								
20.07	ELEVATORS, ESCALATORS	NA							
	SUB-TOTAL								
					TOTALS	\$ 7,630,030	\$ 1,907,508	TOTAL	\$ 9,537,538

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-5 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 30 - SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS

SCC No.	ITEM	UNIT	APPROX. QUANTITY	20	13 UNIT COST	BASE CON	YEAR COST W/O TINGENCY	тот С	TAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE ALI CON	YEAR \$ W/ OCATED TINGENCY	B/ TO	ASE YEAR TAL COST
30.01	ADMINISTRATION BUILDING	NA												
	SUB-TOTAL													
30.02		05	1.070	•	400	•	107.000			05%	^	0.40 500		
	I ransportation Building	SF	1,972	\$ ¢	100	\$	197,200			25%	\$ ¢	246,500		
	Office Furnishings	LS	1	\$	50,000	\$	50,000			25%	\$	62,500		
	Canonied	SE	0	\$	100	\$	_			25%	\$	_		
	Concrete Pit and Slab	CY	0	φ \$	450	\$	-			25%	\$ \$	-		
	Wash Pad	SF	7 150	\$	40	\$	286 000			25%	\$	357 500		
	Equipment	IS	1	\$	123 600	\$	123 600			25%	\$	154 500		
	Wayside Power	EA	0	\$	100.000	\$	-			25%	\$	-		
	Yard Air, Water, Electrical	LS	1	\$	240.000	\$	240.000			25%	\$	300.000		
	Parking, Walkways, Access Roads	SY	6,532	\$	39	\$	254,748			25%	\$	318,435		
	Security Fence w/ Remote Control Gates	LF	3,200	\$	43	\$	137,600			25%	\$	172,000		
	Site Security, Communications, Buidling Systems													
		LS	1	\$	202,875	\$	202,875			25%	\$	253,594		
	VSLMF Yard and Roadway Lighting	SF	283,140	\$	1	\$	317,117			25%	\$	396,396		
	SUB-TOTAL							\$	1,809,140					\$2,261,425
30.03	HEAVY MAINTENANCE FACILITY	NA												
	SUB-TOTAL													
30.04	STORAGE OR MAINTENANCE OF WAY BUILDING			-										
	1 Train Crew Trailer w/ 15 Parking Spaces	LS	1	\$	70,000	\$	70,000			25%	\$	87,500		
								¢	70.000				¢	97 500
	SUB-TOTAL			-				Þ	70,000				Þ	87,500
20.05														
30.05	TARD AND TARD TRACK													
	Entrances	TF	5 294	\$	170	\$	899 980			25%	\$	1 124 975		
	Embedded Track	TF	412	\$	483	\$	198 996			25%	\$	248 745		
	#10 Turnouts	EA	2	\$	113.300	\$	226.600			25%	\$	283,250		
	#8 Turnouts	EA	6	\$	150.000	\$	900.000			25%	\$	1.125.000		
	Excavation, Grading, Yard Drainage,						,					, .,		
	Environmental	LS	1	\$	500,000	\$	500,000			25%	\$	625,000		
	Fueling Track/Facility - Single Track, Fuel by													
	Tankers	SF	0	\$	36	\$	-			25%	\$	-		
	SUB-TOTAL							\$	2,725,576				\$	3,406,970
						Т	OTALS	\$	4,604,716	\$ 1,151,179		TOTAL	\$	5,755,895

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-5 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 40 - SITEWORK & SPECIAL CONDITIONS

SCC No.	ITEM	UNIT	APPROX. QUANTITY	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
40.01	DEMOLITION, CLEARING, EARTHWORK								
	Light Mainteance Facility	°E	0.275	¢ 20	¢ 195 500		250/	¢ 021.075	
	Demolition Romavio Ravias and Curbias Includes Asshalt Disposal	SF SV	9,275	\$ 20 \$ 16	\$ 165,500		25%	\$ 231,875	
	Clear & Grub Rouch Crade	AC	6.50	\$ 7.900	\$ 51,350		25%	\$ 64,188	
				÷ .,	+			+ • •,•••	
	Rail and Bus Stations								
	Demolition	SF	133,244	\$ 20	\$ 2,664,880		25%	\$ 3,331,100	
	Remove Paving and Curbing, Includes Asphalt Disposal	SY	27,607	\$ 16	\$ 441,712		25%	\$ 552,140	
	Clear & Grub Rough Grade	AC	13.65	\$ 7,900	\$ 107,843		25%	\$ 134,804	
	SUB-TOTAL					\$ 3,464,085			\$ 4.330.106
						• 0,101,000			• 1,000,100
40.02	SITE UTILITIES, UTILITY RELOCATION								
	Station Utilities (Rail and Bus)								
	Vehicle Area Utilities - General, Illumination - High Pressure Sodium, 25' HPS shoebox, Light Pole, Cable & Homerun to Contractor (Per Park and Ride Lot)	EA	8	\$ 158,554	\$ 1,268,432		25%	\$ 1,585,540	
	Station Elements - Plumbing	Parking Space	575	\$ 171	\$ 98,325		25%	\$ 122,906	
	Onsite Stormwater Retention and Drainage-Bus Drop-Off Only	EA	1	\$ 35,000	\$ 35,000		25%	\$ 43,750	
	Onsite Stormwater Retention and Drainage-Kiss and Kide Unit Onsite Stormwater Retention and Drainage-Kiss and Kide Unit	EA	1	\$ 50,250	\$ 50,250		25%	\$ 36,750 \$ 62,813	
	Onsite Stormwater Retention and Drainage-50 Space Park and Ride Lot (includes Stormwater for Kiss and Ride and Bus Drop-Off) Onsite Stormwater Retention and Drainage-50 Space Park and Ride Lot (includes Stormwater for Kiss and Ride and Bus Drop-Off)	FA	3	\$ 67,000	\$ 201,000		25%	\$ 251,250	
	Onsite Stormwater Retention and Drainage-100 Space Park and Ride Lot (Includes Stormwater for Kiss and Ride and Bus Drop-Off)	EA	4	\$ 100,500	\$ 402.000		25%	\$ 502,500	
	Power Distribution for All Lighting and General Use	ST	10	\$ 92,486	\$ 924,860		25%	\$ 1,156,075	
	Emergency Power Distribution Connection	ST	10	\$ 10,000	\$ 100,000		25%	\$ 125,000	
-	SUB-TOTAL					\$ 3,110,867			\$ 3,888,584
40.02	HAZ MATIL CONTAMID SOIL REMOVALIMITICATION COULIND WATER TRTMT	NA							
40.03	HAZ. MAT L, CONTAM D SOIL REMOVALIMITIGATION, GROUND WATER TRIMT	INA							
	SUB-TOTAL								
40.04	ENVIRONMENTAL MITIGATION	NA							
	SUB-TOTAL								
40.05		NIA							
40.05	STE STRUCTURES INCLUDING RETAINING WALLS, SOUND WALLS	NA							
	SUB-TOTAL								
40.06	PEDESTRIAN/BIKE ACCESS AND ACCOMMODATION, LANDSCAPING								
	Off-Site Station Improvements (Sidewalks)	SY	45,671	\$ 54	\$ 2,466,234		25%	\$ 3,082,793	
	Off-Site Station Improvements (Crosswalks)	LF	326	\$ 3	\$ 1,086		25%	\$ 1,357	
	Pail and Rue Stations								
	Rail and bus stations Landscaping and Irrigation-25 Space Park and Ride Lot	FA	1	\$ 48,294	\$ 48,294		25%	\$ 60.368	
	Landscaping and Irrigation-50 Space Park and Ride Lot	EA	3	\$ 96,587	\$ 289,761		25%	\$ 362,201	
	Landscaping and Irrigation-100 Space Park and Ride Lot	EA	4	\$ 193,173	\$ 772,692		25%	\$ 965,865	
	SUB-TOTAL					\$ 3,578,067			\$ 4,472,583
40.07									
40.07	AUTOMOBILE, BUS, VAN ACCESSWATS INCL RUADS, PARKING LUTS								
	Vehicle Circulation								
<u> </u>	Access Roadway (specifically for SR 429 station)	SY	1,467	\$ 50	\$ 73,350		25%	\$ 91,688	
	Signage-25 Space Park and Ride Lot	EA	1	\$ 31,392	\$ 31,392		25%	\$ 39,240	
	Signage-50 Space Park and Ride Lot	EA	3	\$ 62,783	\$ 188,349		25%	\$ 235,436	
	Signage-100 Space Park and Ride Lot New Tentific Signal	EA	4	\$ 125,565	\$ 502,260		25%	\$ 627,825	
	rew ranic oglial Maintanance of Traffic	EA ST	10	⇒ 300,000 \$ 20,000	φ <u>300,000</u> \$ 200,000		25% 25%	φ 3/5,000 \$ 250,000	
	municipane or fidine	31	10	ψ 20,000	φ 200,000		∠J70	φ 200,000	
	Surface Parking and Walks								
	25 Space Park and Ride Lot	EA	1	\$ 207,000	\$ 207,000		25%	\$ 258,750	
	50 Space Park and Ride Lot	EA	3	\$ 276,000	\$ 828,000	-	25%	\$ 1,035,000	
	100 Space Park and Ride Lot	EA	4	\$ 552,000	\$ 2,208,000		25%	\$ 2,760,000	
	Kiss and kide Area	ΕA	8	» 86,200	689,600 689,600		25%	> 862,000	
	On-Site Bus Circulation Area			1					-
	Buswav with Bus Pad	EA	4	\$ 239.000	\$ 956.000		25%	\$ 1.195.000	
								,,	
	Off-Site Bus Drop-Off Area								
	On-Street Bus Pad	EA	11	\$ 16,500	\$ 181,500		25%	\$ 226,875	
		07	4.0				05%		
L	Pavement Markings	ST	10	\$ 21,952	\$ 219,520		25%	\$ 274,400	
						\$ 6 594 074			\$ 8 224 244
	505-101AL					¥ 0,304,9/1			ψ 0,231,214
40.08	TEMPORARY FACILITIES AND OTHER INDIRECT COSTS DURING CONSTRUCTION	NA							
	SUB-TOTAL								
					TOTALS	\$ 16.737.989	\$ 4,184,497	TOTAL	\$ 20.922.487
							,		,•,.01

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-5 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 50 - SYSTEMS

SCC No.	ITEM	UNIT	APPROX. QUANTITY	201	3 UNIT COST	B	ASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE ALL CONT	YEAR \$ W/ OCATED [INGENCY	BASE	YEAR TOTAL COST
50.01	TRAIN CONTROL AND SIGNALS (Supply, Fabricate, Install, Test)												
	FCEN Interlockings	EA	16	\$	2,200,000	\$	35,200,000		25%	\$	44,000,000		
	FCEN/CFRC Interlocking	EA	1	\$	3,000,000	\$	3,000,000		25%	\$	3,750,000		
	CFRC LYNX-Church Interlocking Modifications	EA	1	\$	3,000,000	\$	3,000,000		25%	\$	3,750,000		
	PTC System	Mi	40.0	\$	400,000	\$	16,000,000		25%	\$	20,000,000		
								\$ 57,200,000				\$	71,500,000
50.02	TRAFFIC SIGNALS AND CROSSING PROTECTION												
	Grade Crossing Improvements for Public Crossings	LS	1	\$	7,881,690	\$	7,881,690		25%	\$	9,852,113		
	Grade Crossing Improvements for Private Crossings	LS	1	\$	3,780,543	\$	3,780,543		25%	\$	4,725,679		
												•	
	SUB-TOTAL							\$ 11,662,233				\$	14,577,791
50.03	TRACTION POWER SUPPLY: SUBSTATIONS	NA											
	SUB-101AL												
						-							
50.04	TRACTION POWER DISTRIBUTION: OVERHEAD CONTACT SYSTEM	NA				-							
	SUB-IUIAL					-							
50.05													
50.05	Eibor	M	40.0	¢	110 / 21	¢	4 727 240		259/	¢	5 021 550		
	CCTV on Platform (Pail and Express Rus)		40.0	ф Ф	83 267	¢ ¢	4,737,240		25%	ф ф	1 040 929		
	Station Circuit/Amenities Equipment		10	φ Φ	58 408	¢ ¢	594 090		25%	9	721 225		
	Radio	EA	10	φ φ	11 011	¢ 2	110 110		25%	ф Ф	1/8 888		
	Itadio	LA	10	φ	11,911	φ	119,110		2376	φ	140,000		
	SUB-TOTAL							\$ 6 274 000				\$	7 842 500
						1		¢ 0,214,000				Ŷ	1,042,000
50.06	FARE COLLECTION SYSTEM AND FOUIPMENT					-							
00.00	Fare Collection System and Equipment (Rail)												
	Ticket Vending Machines (2 per platform)	EA	20	\$	66.950	\$	1.339.000		25%	\$	1.673.750		
	Ticket Validators (2 per platform)	EA	20	\$	10.733	\$	214.660		25%	\$	268.325		
					-,		,				,		
	Fare Collection System and Equipment (Express Bus)												
	Ticket Vending Machines (2 per platform)	EA	0	\$	66,950	\$	-		25%	\$	-		-
	Ticket Validators (2 per platform)	EA	0	\$	10,733	\$	-		25%	\$	-		
	SUB-TOTAL							\$ 1,553,660				\$	1,942,075
50.07	OPERATIONS CONTROL CENTER		_										
	Operations Control Center (Rail)	LS	1	\$	1,000,000	\$	1,000,000		25%	\$	1,250,000		
	SUB-TOTAL							\$ 1,000,000				\$	1,250,000
							TOTALS	\$ 77 680 803	\$ 10 102 173	т	ΟΤΑΙ	\$	97 112 366
						L	101/LO	ψ 11,009,693	ψ 19,422,473			φ	57,112,300

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-5 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC - 60 ROW, LAND, EXISTING IMPROVEMENTS

SCC No.	ITEM	UNIT	APPROX. QUANTITY	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
60.01	PURCHASE OR LEASE OF REAL ESTATE								
	Station Parcel Acquisition - Includes Business Damages and Relocation Expenses	LS	1	\$ 22,367,500	\$ 22,367,500		10%	\$ 24,604,250	
	Light Maintenance Facility Parcel Acquisition	LS	1	\$ 3,767,027	\$ 3,767,027		10%	\$ 4,143,730	
	SUB-TOTAL	-				\$ 26,134,527			\$ 28,747,980
,									
60.02	RELOCATION OF EXISTING HOUSEHOLDS AND BUSINESSES - Open	NA							
	RELOCATION OF EXISTING HOUSEHOLDS AND BUSINESSES - Closed	NA							
	SUB-TOTAL	-							
					TOTALS	\$ 26.134.527	\$ 2.613.453	TOTAL	\$ 28.747.980

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-5 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 70 - VEHICLES

SCC No.	ITEM		UNIT	APPROX. QUANTITY	2013	3 UNIT COST	BAS CO CONT	SE YEAR OST W/O TINGENCY	TO YI COI	DTAL BASE EAR COST W/O NTINGENCY	AI CO	LOCATED	BA W/ / CO	ISE YEAR ALLOCATE NTINGENC
70.01	LIGHT RAIL													
		SUB-TOTAL												
70.00													-	
70.02														
		OOD-TOTAL												
70.03	COMMUTER RAIL													
	Locomotives		EA	8	\$	7,000,000	\$ 5	56,000,000				5%	\$	58,800,00
	Cab Cars		EA	8	\$	2,694,492	\$ 2	21,555,936				5%	\$	22,633,73
	Coaches		EA	7	\$	2,392,456	\$ 1	16,747,192				5%	\$	17,584,55
		SUB-TOTAL							\$	94,303,128				
70.04	BUS													
	LYNX 40-foot Hybrid Bus for Express Bus Service		EA	0	\$	500,000	\$	-				5%	\$	-
	LYNX 40-foot Hybrid Bus for Feeder Bus Service		EA	19	\$	500,000	\$	9,500,000				5%	\$	9,975,00
									•					
		SUB-IOTAL							\$	9,500,000				
70.05														
70.05														
		SUB-TOTAL												
70.06	NON-REVENUE VEHICLES													
	S S S S S S S S S S S S S S S S S S S	SUB-TOTAL												
70.07	SPARE PARTS - RAIL VEHICLES													
		SUB-TOTAL							\$	-				
							т	OTALS	\$	103 803 128	\$	5 190 156		τοτα



US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 1-5 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 80 - PROFESSIONAL SERVICES

SCC No.	ITEM	UNIT	APPROX. QUANTITY	% COST OF CONSTRUCTION SECTIONS 10-50	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTA YEAR (CONT	AL BASE COST W/O INGENCY	ALLOCATED CONTINGENCY	BASE ALL CONT	YEAR \$ W/ OCATED FINGENCY	В/ ТО	ASE YEAR
		· · · · · · · · · · · · · · · · · · ·	·	['									
80.01	PRELIMINARY ENGINEERING	2013 Estimate with Contingency	\$ 159,092,864	4%		\$ 6,363,715			10%	\$	7,000,086		!
80.02	FINAL DESIGN (Railway Infrastructure & Stations)	2013 Estimate with Contingency	\$ 159,092,864	10%		\$ 15,909,286			10%	\$	17,500,215		
80.03	PROJECT MANAGEMENT FOR DESIGN AND CONSTRUCTION	2013 Estimate with Contingency	\$ 159,092,864	3%		\$ 4,772,786			10%	\$	5,250,065		
80.04	CONSTRUCTION ADMINISTRATION AND MANAGEMENT	2013 Estimate with Contingency	\$ 159,092,864	5%		\$ 7,954,643			10%	\$	8,750,108		
80.05	INSURANCE (Liability Insurance Included in Engineering Firm O/H)	2013 Estimate with Contingency	\$ 159,092,864	0%		\$ -			0%	\$	-		
80.06	LEGAL, PERMITS, REVIEW FEES	2013 Estimate with Contingency	\$ 159,092,864	0%		\$ -			0%	\$	-		
80.07	SURVEYS, TESTING, INVESTIGATION, INSPECTION	2013 Estimate with Contingency	\$ 159,092,864	3%		\$ 4,772,786			10%	\$	5,250,065		
80.08	START-UP (wayside signal system testing included in Systems)	2013 Estimate with Contingency	\$ 159,092,864	1%		\$ 1,590,929			10%	\$	1,750,022		
		()		[]			\$4	41,364,145				\$	45,500,559
						TOTALS	\$ 4	41,364,145	\$ 4,136,414		TOTAL	\$	45,500,559



APPENDIX A-4

US 441 ALTERNATIVE 2-4 CAPITAL COST BREAKDOWN

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 2-4 CAPITAL COST ESTIMATE (Revised 1-20-15) Main Worksheet Alternative 2-4 Build Summary (\$2013)

Express Bus - 30 Minute/120 Minute Headway

FTA CATEGORY No.	DESCRIPTION	2013 BASE YEAR COST W/O CONTINGENCY	2013 ALLO UNALLOCATED	CATED & CONTINGENCY	2013 ESTIMATE WITH CONTINGENCY
10	GUIDEWAY AND TRACK ELEMENTS	\$0	\$0	25%	\$0
20	STATIONS, STOPS, TERMINALS, INTERMODALS	\$1,335,250	\$333,813	25%	\$1,669,063
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN BLDGS	\$0	\$0	25%	\$0
40	SITEWORK & SPECIAL CONDITIONS	\$8,710,585	\$2,177,646	25%	\$10,888,231
50	SYSTEMS	\$1,075,732	\$268,933	25%	\$1,344,665
	CONSTRUCTION SUBTOTAL (10-50)	\$11,121,567	\$2,780,392	25%	\$13,901,959
60	RIGHT-OF-WAY, LAND, EXISTING IMPROVEMENTS	\$17,558,700	\$1,755,870	10%	\$19,314,570
70	VEHICLES	\$13,500,000	\$675,000	5%	\$14,175,000
80	PROFESSIONAL SERVICES	\$3,614,509	\$361,451		\$3,975,960
	SUBTOTAL (SUM CATEGORIES 10-80)	\$45,794,776	\$5,572,713		\$51,367,489
90	UNALLOCATED CONTINGENCY (% of Base Cost)		\$4,579,478	10%	\$4,579,478
	SUBTOTAL (SUM CATEGORIES 10-90)	\$45,794,776	\$10,152,190		\$55,946,966
100	FINANCE CHARGES				\$0
	TOTAL	\$45,794,776	\$10,152,190		\$55,946,966

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 2-4 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 10 - GUIDEWAY & TRACK ELEMENTS

19.11 DODE MAY AT CAUGE SCULUPY BOOT OWAY Image: Science Scie	SCC No.	ІТЕМ	UNIT	APPROX. QUANTITY	:	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
1000 Model conserve and low balacity theor may into a part of a pa	10.01										
Normal Problem PD PD <thpd< th=""> PD PD</thpd<>	10.01	Avg. Cost per Track Foot for Subgrade and Sub-Ballast for New Track -									
SUB TOTA IM <		Relatively Flat Grade	LF	0	\$	57	\$ -		25%	\$-	
BORDERAY: AT GRADE SER EXCLUSIVE N I <		SUB-TOTAL						٤			۹.
THEME SUBJERIAY: AT GRADE SEME ACCUSIVE N. Image: Subject Accusive and Subject Accus Accus Accus Accus Accus Accus Accus Acc		305-101AL						Ψ -			4
Image: sector of the	10.02	GUIDEWAY: AT-GRADE SEMI-EXCLUSIVE	NA								
Image: Construct of the second seco											
19.05 GUDENAY AT-GADE IN MAKE TRAFTIC NA Image: Constraint of the second se		SUB-TOTAL									
Image: Substrate Substr	10.03	GUIDEWAY: AT-GRADE IN MIXED TRAFFIC	NA								
Bits FORL Image: Second Line of the second sec											
1944 JUDEWAY-AERAL STRUCTURES NA Image: Construct of the second seco		SUB-TOTAL									
SUB_TOTAL Image: Sub_Total	10.04	GUIDEWAY: AERIAL STRUCTURES	NA								
Image: Substrate Image: Substrate<											
10.86 GUDEWAY: BULT UP FLL IA		SUB-TOTAL									
MX MX<	10.05		NA								
SUB_TOTAL MA	10.05	GODEWAT. BOILT-OF TILE	INA.								
10.66 QUIDEWAY: UNDERGROUND CUT & COVER NA Image: Constraint of the second		SUB-TOTAL									
NUME NUME KA Image Imag	46.00										
SUB-TOTAL NA	10.06	GUIDEWAT: UNDERGROUND CUT & COVER	NA		+						
International control of the second control		SUB-TOTAL									
10.07 GUDEWAY: UNDERGROUND TUNNEL NA Image: Sub-TOTAL Ima											
SUB-TOTAL NA	10.07	GUIDEWAY: UNDERGROUND TUNNEL	NA								
19.00 QUDEWAY: RETAINED CUT OR FILL NA Image: Cut or File NA Image: Cut or File NA 19.00 GUDEWAY: RETAINED CUT OR FILL NA Image: Cut or File Image: Cut or File </td <td></td> <td>SUB-TOTAL</td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		SUB-TOTAL			_						
10.88 GUIDEWAY: RETAINED CUT OF FILL NA NA </td <td></td>											
SUB-TOTAL NA	10.08	GUIDEWAY: RETAINED CUT OR FILL	NA								
SUB-IDIAL NA											
10.00 TRACK: DIRECT FIXATION NA Image: Substrate of the substrate of		SUB-TOTAL									
Index Index <th< td=""><td>10.09</td><td></td><td>NA</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	10.09		NA								
SUB-TOTAL Mathematical Subscription	10.03		INA.								
10.10 TRACK: EMBEDDED TF 0 \$ 483 \$ 25% \$		SUB-TOTAL									
10.10 IRACK: EMEDUBU Image: constraint of the second							-				
Number of the set of	10.10	New Track Across Road	TF	0	\$	483	s -		25%	s -	
Image: state of the s				Ū	Ŷ	100	Ŷ		2070	Ŷ	
10.11 TRACK: BALLASTED		SUB-TOTAL						\$-			\$.
Intervention Teck D \$ 10 \$ 25% \$ - New Manine/Siding Track TF 0 \$ 170 \$ - 25% \$ - Class 1 Tock Upgrade Mi 0.0 \$ 150,000 \$ - 25% \$ - Class 2 to Class 4 Track Upgrade Mi 0.0 \$ 200,000 \$ - 25% \$ - Class 2 to Class 4 Track Upgrade Mi 0.0 \$ 160,000 \$ - 25% \$ - - Class 2 to Class 4 Track Upgrade Mi 0.0 \$ 160,000 \$ - 25% \$ - </td <td>40.44</td> <td></td>	40.44										
Realign Track TF 0 \$ 93 \$ 25% \$. Class 1 to Class 4 Track Upgrade Mi 0.0 \$ 1,500,000 \$. 25% \$. Class 1 to Class 4 Track Upgrade Mi 0.0 \$ 145,000 \$. 25% \$. Class 3 to Class 4 Track Upgrade Mi 0.0 \$ 145,000 \$. 25% \$. Class 3 to Class 4 Track Upgrade Mi 0.0 \$ 145,000 \$. 25% \$. 10.12 TRACK: SPECIAL (SWITCHES, TURNOUTS) S . . S .	10.11	New Mainline/Siding Track	TF	0	\$	170	s -		25%	s -	
Class 1 rack Upgrade Mi 0.0 \$ 1,500,000 \$ 25% \$. Class 2 to Class 4 Track Upgrade Mi 0.0 \$ 200,000 \$. 25% \$. Class 3 to Class 4 Track Upgrade Mi 0.0 \$ 145,000 \$. 25% \$. Class 3 to Class 4 Track Upgrade Mi 0.0 \$ 145,000 \$.		Realign Track	TF	0	\$	93	\$ -		25%	\$ -	
Class 2 to Class 4 Track Upgrade Mi 0.0 \$ 200,000 \$ - 25% \$ - Class 3 to Class 4 Track Upgrade Mi 0.0 \$ 145,000 \$ - 26% \$ - 26% \$ - Class 3 to Class 4 Track Upgrade Mi 0.0 \$ 145,000 \$ - 26% \$ - - 26% \$ - Class 3 to Class 4 Track Upgrade SuB-TOTAL - - - 26% \$ - -		Class 1 to Class 4 Track Upgrade	Mi	0.0	\$	1,500,000	\$ -		25%	\$ -	
Class 3 to Class 4 track Upgrade Mi 0.0 \$ 145,000 \$ - 25% \$ - Class 3 to Class 4 track Upgrade Mi 0.0 \$ 145,000 \$ - 25% \$ - Class 3 to Class 4 track Upgrade Substrate Substrate \$ - S - 25% \$ - Class 3 Mi Class 3 to Class 4 track Upgrade Substrate \$ - \$ - 25% \$ - Class 3 Mi Class 3 to Class 4 track Upgrade Substrate Substrate \$ 140 Class 3 Substrate \$ 140 Class 3 Substrate Substrat Substrate Subst		Class 2 to Class 4 Track Upgrade	Mi	0.0	\$	200,000	\$-		25%	\$-	
SUB-TOTAL Sub-TOTAL S		Class 3 to Class 4 Track Upgrade	Mi	0.0	\$	145,000	\$ -		25%	\$-	
10.12 TRACK: SPECIAL (SWITCHES, TURNOUTS) EA 0 \$ 1 <td></td> <td>SUB-TOTAL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>\$-</td> <td></td> <td></td> <td>\$</td>		SUB-TOTAL						\$-			\$
10.12 TRACK: SPECIAL (SWITCHES, TURNOUTS) Image: Switch Ties & Installation EA 0 \$ 154,500 \$ - 25% \$ - #20 Turnouts - Materials, Switch Ties & Installation EA 0 \$ 133,900 \$ - 25% \$ - #15 Turnouts - Materials, Switch Ties & Installation EA 0 \$ 133,900 \$ - 25% \$ - #10 Turnouts - Materials, Switch Ties & Installation EA 0 \$ 133,000 \$ - 25% \$ - #20 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ - #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 267,800 \$ - 25% \$ - #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 226,600 \$ - 25% \$ - Upgrade Existing Crossover EA 0 \$ 267,500 \$ - 25% \$ - Remove Existing Turnouts EA 0 \$ 15,450 \$											
#20 1 umouts - Materials, Switch Ties & Installation EA 0 \$ 154,500 \$ - 25% \$ - #15 Tumouts - Materials, Switch Ties & Installation EA 0 \$ 133,900 \$ - 25% \$ - #10 Tumouts - Materials, Switch Ties & Installation EA 0 \$ 133,900 \$ - 25% \$ - #20 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ - #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ - #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 267,800 \$ - 25% \$ - #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 267,800 \$ - 25% \$ - Upgrade Existing Crossover EA 0 \$ 257,500 \$ - 25% \$ - - Remove Existing Turnouts EA 0 \$ 257,500 \$ - 25% \$ - - Image: Sub-TOTAL EA 0 \$ 257,500 \$ - 25% \$ - - Image: S	10.12	TRACK: SPECIAL (SWITCHES, TURNOUTS)									
ministration EA 0 3 133,00 3 - 20% 3 - #10 Turnouts - Materials, Switch Ties & Installation EA 0 \$ 113,300 \$ - 25% \$ - #20 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ - #15 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 267,800 \$ - 25% \$ - #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 267,800 \$ - 25% \$ - Upgrade Existing Crossover EA 0 \$ 267,500 \$ - 25% \$ - Remove Existing Turnouts EA 0 \$ 257,500 \$ - 25% \$ - Installation EA 0 \$ 15,450 \$ - 25% \$ - - Upgrade Existing Turnouts EA 0 \$ 15,450 \$ - <td></td> <td>#20 Turnouts - Materials, Switch Ties & Installation #15 Turnouts - Materials, Switch Ties & Installation</td> <td>EA</td> <td>0</td> <td>\$ ¢</td> <td>154,500</td> <td>\$ - ¢</td> <td></td> <td>25%</td> <td>\$ - \$</td> <td> </td>		#20 Turnouts - Materials, Switch Ties & Installation #15 Turnouts - Materials, Switch Ties & Installation	EA	0	\$ ¢	154,500	\$ - ¢		25%	\$ - \$	
#20 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 309,000 \$ - 25% \$ - #15 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 267,800 \$ - 25% \$ - #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 226,600 \$ - 25% \$ - Upgrade Existing Crossover EA 0 \$ 226,600 \$ - 25% \$ - Remove Existing Turnouts EA 0 \$ 257,500 \$ - 25% \$ - SUB-TOTAL EA 0 \$ 257,500 \$ - 25% \$ - - Remove Existing Turnouts EA 0 \$ 15,450 \$ - 25% \$ - - 10.13 TRACK: VIBRATION & NOISE DAMPENING NA Image: Construct Constru		#10 Turnouts - Materials, Switch Ties & Installation #10 Turnouts - Materials, Switch Ties & Installation	EA	0	э \$	113,300	\$ -		25%	\$ -	
#15 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 267,800 \$ - 25% \$ - - #10 Crossovers - Materials, Switch Ties & Installation EA 0 \$ 226,600 \$ - 25% \$ - - Upgrade Existing Crossover EA 0 \$ 226,600 \$ - 25% \$ - - Remove Existing Crossover EA 0 \$ 257,500 \$ - 25% \$ - - Remove Existing Turnouts EA 0 \$ 257,500 \$ - 25% \$ - - Image: Construct Struct Stru		#20 Crossovers - Materials, Switch Ties & Installation	EA	0	\$	309,000	\$-		25%	\$-	
Image: Big System Lies & Installation EA U \$ 226,600 \$ - 25% \$ - - Upgrade Existing Crossover EA 0 \$ 257,500 \$ - 25% \$ - - Remove Existing Turnouts EA 0 \$ 257,500 \$ - 25% \$ - - Remove Existing Turnouts EA 0 \$ 15,450 \$ - 25% \$ - - Image: Construct Structure St		#15 Crossovers - Materials, Switch Ties & Installation	EA	0	\$	267,800	\$ -		25%	\$-	
Remove Existing Turnouts EA 0 \$ 15,450 \$ 20% \$ Remove Existing Turnouts EA 0 \$ 15,450 \$ 25% \$ SUB-TOTAL EA 0 \$ 15,450 \$ 6 6 10.13 TRACK: VIBRATION & NOISE DAMPENING NA 6 6 6 SUB-TOTAL SuB-TOTAL 6 6 6 6		#10 Crossovers - Materials, Switch Lies & Installation	EA FA	0	\$	226,600	> - \$ -		25% 25%	ծ - Տ -	
Image: second		Remove Existing Turnouts	EA	0	\$	15,450	\$ -		25%	\$ -	
SUB-TOTAL \$ - \$ - In 13 TRACK: VIBRATION & NOISE DAMPENING NA Image: Constraint of the second sec											
10.13 TRACK: VIBRATION & NOISE DAMPENING NA Image: Constraint of the second sec		SUB-TOTAL						ş -			\$-
	10.13	TRACK: VIBRATION & NOISE DAMPENING	NA		-						1
					L						<u> </u>
TOTALS & TOTAL &		SUB-TOTAL									
							TOTALS	e	¢	τοται	¢

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 2-4 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC - 20 STATIONS, STOPS, TERMINALS, INTERMODAL

SCC No.	ІТЕМ	UNIT	APPROX. QUANTITY	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
20.01	AT-GRADE STATION, STOP, SHELTER, MALL, TERMINAL, PLATFORM								
	Platform Complete-Rail (Includes Mini-High, Ramps, Signage, and Canopies)	EA	0	\$ 763,003	\$-		25%	\$-	
	Platform Complete-Express Bus	EA	7	\$ 190,750	\$ 1,335,250		25%	\$ 1,669,063	
	SUB-TOTAL					\$ 1,335,250			\$ 1,669,063
20.02	AERIAL STATION STOR SHELTER MALL TERMINAL REATEORM	ΝΑ							
20.02	ALKIAL STATION, STOP, SHELTER, MALL, TERMINAL, FEATLORM	11/5							
	SUB-TOTAL								
20.03	UNDERGROUND STATION, STOP, SHELTER, MALL, TERMINAL, PLATFORM	NA							
	SUB-TOTAL								
20.04		ΝΙΔ							
20.04	OTHER STATIONS, LANDINGS, TERMINALS. INTERMODAL, FERRY, TROLLET, ETC.	IN/A							
	SUB-TOTAL								
20.05	JOINT DEVELOPMENT	NA							
	SUB-TOTAL								
20.06		NIA							
20.06		INA							
	SUB-TOTAL								
20.07	ELEVATORS, ESCALATORS	NA							
	SUB-TOTAL								
					TOTALS	\$ 1,335,250	\$ 333,813	TOTAL	\$ 1,669,063

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 2-4 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 30 - SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS

SCC No.	ITEM	UNIT	APPROX. QUANTITY	2013 U COS	INIT ST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
30.01	ADMINISTRATION BUILDING	NA								
	SUB-TOTAL									
30.02		05			100	•		05%	^	
	I ransportation Building	SF	0	\$ ¢ = = = =	100	\$ -		25%	\$ -	
	Office Furnishings	LS	0	\$ 50	J,000	۶ -		25%	۶ -	
	Canonied	SE	0	\$	100	s -		25%	s -	
	Concrete Pit and Slab	CY	0	\$	450	\$ -		25%	\$ -	
	Wash Pad	SF	0	\$	100	\$-		25%	\$ -	
	Equipment	LS	0	\$ 123	3.600	\$-		25%	÷ \$-	
	Wayside Power	EA	0	\$ 100	0,000	\$-		25%	\$-	
	Yard Air, Water, Electrical	LS	0	\$ 200	0,000	\$ -		25%	\$ -	
	Parking, Walkways, Access Roads	SY	0	\$	39	\$ -		25%	\$ -	
	Security Fence w/ Remote Control Gates	LF	0	\$	43	\$-		25%	\$-	
	Site Security, Communications, Buidling Systems		0	¢ 000	0.075	¢		25%	¢	
	VSI ME Vard and Readway Lighting	L3	0	\$ 202 ¢	2,875	ֆ - ¢		25%	ъ -	
		ЪГ	0	¢	I	р -		23%	ъ -	
	SUB-TOTAL						\$			\$
	000-101AL			1			Ψ -			Ψ
30.03	HEAVY MAINTENANCE FACILITY	NA								
00.00		117.1								
	SUB-TOTAL									
30.04	STORAGE OR MAINTENANCE OF WAY BUILDING									
	1 Train Crew Trailer w/ 15 Parking Spaces	LS	0	\$ 70	0,000	\$-		25%	\$-	
	SUB-TOTAL						\$-			\$-
30.05	YARD AND YARD TRACK									
	New Track Structure - Storage Tracks and Yard									
	Entrances	TF	0	\$	170	\$-		25%	\$-	
	Embedded Track	TF	0	\$	412	\$ -		25%	\$ -	
	#10 Turnouts	EA	0	\$ 113	3,300	\$-		25%	\$-	
	#8 Turnouts	EA	0	\$ 150	J,000	\$ -		25%	\$-	
	Excavation, Grading, Yard Drainage, Environmental	LS	0	\$ <u>5</u> 00	0,000	\$		25%	\$ -	
	Fueling Track/Facility - Single Track, Fuel by									
	Tankers	SF	0	\$	36	\$-		25%	\$-	
							•			
	SUB-TOTAL						\$-			\$-
						TOTALS	\$-	\$-	TOTAL	\$-
US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 2-4 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 40 - SITEWORK & SPECIAL CONDITIONS

SCC No.	ITEM	UNIT	APPROX. QUANTITY	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
40.04								لــــــا	
40.01	DEMOLITION, CLEARING, EARTHWORK								
	Light manner i achty Demolition	SF	0	\$ 20	s -		25%	s -	
	Remove Paving and Curbing, Includes Asphalt Disposal	SY	0	\$ 16	\$ -		25%	\$ -	
	Clear & Grub Rough Grade	AC	0.00	\$ 7,900	\$ -		25%	\$ -	
	Rail and Bus Stations								
	Demolition	SF	27,351	\$ 20	\$ 547,020		25%	\$ 683,775	
	Remove Paving and Curbing, includes Asphait Disposal	SY	21,891	\$ 16	\$ 350,256		25%	\$ 437,820	
	cieal a Grup Rough Grade	70	11.20	φ 1,500	φ 00,400		2370	φ 110,000	
	SUB-TOTAL					\$ 985,756			\$ 1,232,195
						+,			+ .,===,===
40.02	SITE UTILITIES, UTILITY RELOCATION								
	Station Utilities (Rail and Bus)								
	Vehicle Area Utilities - General, Illumination - High Pressure Sodium, 25' HPS shoebox, Light Pole, Cable & Homerun to Contractor (Per Park and Ride Lot)	EA	5	\$ 158,554	\$ 792,770		25%	\$ 990,963	
	Station Elements - Plumbing	Parking Space	400	\$ 171	\$ 68,400		25%	\$ 85,500	
	Onsite Stormwater Retention and Drainage-Bus Drop-Off Only	EA	0	\$ 35,000	\$ -		25%	<u>\$</u>	
	Unsite Stormwater Retention and Drainage-Riss and Ride Univ	EA	0	\$ 31,000	\$ -		25%	\$ -	
	Onsite Stormwater Retention and Drainage-zo Space Park and Ride Lot (includes Stormwater for Kiss and Ride and Bus Drop-Off) Onsite Stormwater Retention and Drainage-zo Space Park and Ride Lot (includes Stormwater for Kiss and Ride and Bus Drop-Off)	EA EA	2	\$ 50,250 \$ 67,000	φ \$ 134.000		25%	φ \$ 167.500	
	Onsite Stormwater Retention and Drainage-50 Space Park and Ride Lid (Includes Stormwater for Kiss and Ride and Bis Dron-Off)	FA	3	\$ 100,500	\$ 301,500		25%	\$ 376.875	
	Power Distribution for All Lighting and General Use	ST	6	\$ 92,486	\$ 554,916		25%	\$ 693,645	
	Emergency Power Distribution Connection	ST	6	\$ 10,000	\$ 60,000		25%	\$ 75,000	
	SUB-TOTAL					\$ 1,911,586			\$ 2,389,483
40.03	HAZ. MAT'L, CONTAM'D SOIL REMOVAL/MITIGATION, GROUND WATER TRTMT	NA						ļ!	
	SUB-IVIAL								
40.04		ΝΔ						J	
40.04		107							
	SUB-TOTAL								
40.05	SITE STRUCTURES INCLUDING RETAINING WALLS, SOUND WALLS	NA							
	SUB-TOTAL SUB-TOTAL								
40.06								لـــــــــــــــــــــــــــــــــــــ	
40.00	PEDESTRIANDIRE ACCESS AND ACCOMMODATION, LANDSCAPING								
	Off-Site Station Improvements (Sidewalks)	SY	28,960	\$ 54	\$ 1,563,840		25%	\$ 1,954,800	
	Off-Site Station Improvements (Crosswalks)	LF	24	\$ 3	\$ 80		25%	\$ 100	
	Rail and Bus Stations								
	Landscaping and Irrigation-25 Space Park and Ride Lot	EA	0	\$ 48,294	\$ -		25%	\$ -	
	Landscaping and Irrigation-50 Space Park and Ride Lot	EA	2	\$ 96,587	\$ 193,174		25%	\$ 241,468	
	Landscaping and irrigation-100 Space Park and Ride Lot	EA	3	\$ 193,173	\$ 579,519		25%	\$ 724,399	
	SUB-TOTAL					\$ 1 563 920			\$ 1 954 900
						• .,			• 1,001,000
40.07	AUTOMOBILE, BUS, VAN ACCESSWAYS INCL ROADS, PARKING LOTS								
	Vehicle Circulation								
	Access Roadway (specifically for SR 429 station)	SY	1,467	\$ 50	\$ 73,350		25%	\$ 91,688	
	Signage-25 Space Park and Ride Lot	EA	0	\$ 31,392	<u>\$</u>		25%	<u>\$</u> -	
	Signage-SU Space Park and Ride Lot	EA	2	\$ 62,783	\$ 125,566		25%	\$ 156,958	
	oliginatie= ruo space raix anu Klūte Lūt New Traffic Sinnal	EA FA	0		φ 3/0,695 \$-		25%	9 470,869 \$ -	
	Maintenance of Traffic	ST	6	\$ 20.000	\$ 120.000		25%	\$ 150.000	
			-	,	•			+,	
	Surface Parking and Walks								
	25 Space Park and Ride Lot	EA	0	\$ 207,000	\$ -		25%	\$ -	
	50 Space Park and Ride Lot	EA	2	\$ 276,000	\$ 552,000		25%	\$ 690,000	
	100 Space Park and Ride Lot	EA	3	\$ 552,000	\$ 1,656,000		25%	\$ 2,070,000	
		EA	Ð	φ 86,200	φ 431,000		23%	φ 538,/50	
	On-Site Bus Circulation Area								
	Busway with Bus Pad	EA	3	\$ 239.000	\$ 717.000		25%	\$ 896.250	
					,250				
	Off-Site Bus Drop-Off Area								
	On-Street Bus Pad	EA	4	\$ 16,500	\$ 66,000		25%	\$ 82,500	
	Pavement Markings	ST	6	\$ 21,952	\$ 131,712		25%	\$ 164,640	
						\$ 1 240 222			¢ 5 311 CEA
-	SUB-TOTAL					φ 4,249,323			φ <u>0,011,054</u>
40.08	TEMPORARY FACILITIES AND OTHER INDIRECT COSTS DURING CONSTRUCTION	NA							
40.00		1003							
	SUB-TOTAL								
					TOTALS	\$ 9.740.50F	C 2 177 640	TOTAL	\$ 10 000 004
					IUIALS	¢ 0,/10,585	φ 2,177,046	IUTAL	φ 10,000,∠31

1/30/2015

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 2-4 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 50 - SYSTEMS

SCC No.	ITEM	UNIT	APPROX. QUANTITY	20	13 UNIT COST	B	ASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TO COST	ΓAL
50.01	TRAIN CONTROL AND SIGNALS (Supply, Fabricate, Install, Test)											
	FCEN Interlockings	EA	0	\$	2,200,000	\$	-		25%	\$-		
	FCEN/CFRC Interlocking	EA	0	\$	3,000,000	\$	-		25%	\$-		
	CFRC LYNX-Church Interlocking Modifications	EA	0	\$	3,000,000	\$	-		25%	\$-		
	PTC System	Mi	0.0	\$	400,000	\$	-		25%	\$		
								\$-			\$	-
50.02	TRAFFIC SIGNALS AND CROSSING PROTECTION											
	Grade Crossing Improvements for Public Crossings	LS	0	\$	-	\$	-		25%	\$-		
	Grade Crossing Improvements for Private Crossings	LS	0	\$	-	\$	-		25%	\$-		
	SUB-TOTAL							\$-			\$	-
50.03	TRACTION POWER SUPPLY: SUBSTATIONS	NA										
	SUB-TOTAL											
50.04	TRACTION POWER DISTRIBUTION: OVERHEAD CONTACT SYSTEM	NA										
	SUB-101AL					_						
						-						
50.05		N.4:	0.0	•	110 101	^			05%	¢		
	Fiber	IVII	0.0	\$	118,431	\$	-		25%	\$ - • 7 00 500		
	CCTV OIL Plationii (Rail and Expless Bus)	EA	7	¢	63,207	\$	582,869		25%	\$ 728,580		
	Station Circuit/Amenities Equipment	EA	7	¢	20,490	\$	409,486		25%	\$ 511,858		
	Raulo	EA	1	¢	11,911	¢	63,377		20%			
								¢ 1 075 732			¢ 1344	1 665
	300-101AL					-		φ 1,075,752			φ 1,544	,000
50.06												
30.00	Fare Collection System and Equipment (Rail)											
	Ticket Vending Machines (2 per platform)	FΔ	0	\$	66 950	\$	-		25%	\$		
	Ticket Validators (2 per platform)	ΕΔ	0	φ \$	10 733	\$	-		25%	\$		
		27		Ψ	10,100	Ŷ			2070	Ŷ		
	Fare Collection System and Equipment (Express Bus)					\vdash						
	Ticket Vending Machines (2 per platform)	FA	0	\$	66 950	\$	-		25%	\$ -		
	Ticket Validators (2 per platform)	EA	0	\$	10,733	\$	_		25%	\$ -		
			-	Ŧ		Ť				•		
	SUB-TOTAL							\$-			\$	-
						1						
50.07	OPERATIONS CONTROL CENTER					1						
	Operations Control Center (Rail)	LS	0	\$	1,000,000	\$	-		25%	\$-		
						T						
	SUB-TOTAL							\$-			\$	-
						1						
							TOTALS	\$ 1,075,732	\$ 268,933	TOTAL	\$ 1,344	1,665

1/30/2015

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 2-4 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC - 60 ROW, LAND, EXISTING IMPROVEMENTS

SCC No.	ITEM	UNIT	APPROX. QUANTITY	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
		′						· · · · · · · · · · · · · · · · · · ·	
60.01	PURCHASE OR LEASE OF REAL ESTATE	'	<u> </u>					<u> </u>	
	Station Parcel Acquisition - Includes Business Damages and Relocation Expenses	LS	1	\$ 17,558,700	\$ 17,558,700		10%	\$ 19,314,570	
	Light Maintenance Facility Parcel Acquisition	LS	0	\$ 2,500,000	\$-		10%	\$ -	
	1	′						[]	
	SUB-TOTAL	-				\$ 17,558,700			\$ 19,314,570
60.02	RELOCATION OF EXISTING HOUSEHOLDS AND BUSINESSES - Open	NA							
	RELOCATION OF EXISTING HOUSEHOLDS AND BUSINESSES - Closed	NA							
	SUB-TOTAL								
					TOTALS	\$ 17.558.700	\$ 1.755.870	TOTAL	\$ 19.314.570

US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 2-4 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 70 - VEHICLES

SCC No.	ITEM		UNIT	APPROX. QUANTITY	2013	3 UNIT COST	B/ C COI	ASE YEAR OST W/O NTINGENCY	тс Ү СО	DTAL BASE EAR COST W/O NTINGENCY	ALL CON	OCATED	BAS W/ A CON	SE YEAR LLOCATI
70.01	LIGHT RAIL												<u> </u>	
													 	
		SUB-TOTAL												
70.00													──	
70.02														
		SUB-TOTAL												
		00B-101AL												
70.03	COMMUTER RAIL												+	
	Locomotives		EA	0	\$	7,000,000	\$	-				5%	\$	-
	Cab Cars		EA	0	\$	2,694,492	\$	-				5%	\$	-
	Coaches		EA	0	\$	2,392,456	\$	-				5%	\$	-
		SUB-TOTAL							\$	-				
70.04	BUS													
	LYNX 40-foot Hybrid Bus for Express Bus Service		EA	10	\$	500,000	\$	5,000,000				5%	\$	5,250,00
	LYNX 40-foot Hybrid Bus for Feeder Bus Service		EA	17	\$	500,000	\$	8,500,000				5%	\$	8,925,0
										10 500 000			 	
		SUB-TOTAL							\$	13,500,000				
70.05	OTHER												┼───	
70.05														
		SUB-TOTAL												
													—	
70.06	NON-REVENUE VEHICLES													
		SUB-TOTAL												
70.07	SPARE PARTS - RAIL VEHICLES													
		SUB-TOTAL							\$	-				
								TOTALS	\$	13.500.000	\$	675.000		тоти



US 441 CORRIDOR STUDY TRANSIT PROJECT ALTERNATIVE 2-4 CAPITAL COST ESTIMATE (Revised 1-20-15) SCC 80 - PROFESSIONAL SERVICES

SCC No.	ITEM	UNIT	APPROX. QUANTITY	% COST OF CONSTRUCTION SECTIONS 10-50	2013 UNIT COST	BASE YEAR COST W/O CONTINGENCY	TOTAL BASE YEAR COST W/O CONTINGENCY	ALLOCATED CONTINGENCY	BASE YEAR \$ W/ ALLOCATED CONTINGENCY	BASE YEAR TOTAL COST
		· · · · · · · · · · · · · · · · · · ·								
80.01	PRELIMINARY ENGINEERING	2013 Estimate with Contingency	\$ 13,901,959	4%		\$ 556,078.35		10%	\$ 611,686	
80.02	FINAL DESIGN (Railway Infrastructure & Stations)	2013 Estimate with Contingency	\$ 13,901,959	10%		\$ 1,390,196		10%	\$ 1,529,215	
80.03	PROJECT MANAGEMENT FOR DESIGN AND CONSTRUCTION	2013 Estimate with Contingency	\$ 13,901,959	3%		\$ 417,059		10%	\$ 458,765	
80.04	CONSTRUCTION ADMINISTRATION AND MANAGEMENT	2013 Estimate with Contingency	\$ 13,901,959	5%		\$ 695,098		10%	\$ 764,608	
80.05	INSURANCE (Liability Insurance Included in Engineering Firm O/H)	2013 Estimate with Contingency	\$ 13,901,959	0%		\$ -		0%	\$-	
80.06	LEGAL, PERMITS, REVIEW FEES	2013 Estimate with Contingency	\$ 13,901,959	0%		\$ -		0%	\$-	
80.07	SURVEYS, TESTING, INVESTIGATION, INSPECTION	2013 Estimate with Contingency	\$ 13,901,959	3%		\$ 417,058.76		10%	\$ 458,765	
80.08	START-UP (wayside signal system testing included in Systems)	2013 Estimate with Contingency	\$ 13,901,959	1%		\$ 139,020		10%	\$ 152,922	
		'								
		· · · · · · · · · · · · · · · · · · ·					\$ 3,614,509			\$ 3,975,960
						TOTALS	\$ 3,614,509	\$ 361,451	TOTAL	\$ 3,975,960



APPENDIX B-1

US 441 RAIL SERVICE OPERATING COST ESTIMATE

ALTERNATIVE 1-2

AND

ALTERNATIVE 1-5





US 441 Rail Service Operating Co	st Estimate A	Alternative 1	-2									
Rail Service	Mori	ning	Afteri	noor	Daily Vehicle	# of Trains	Passenger Cars per	Passenger Car Hours	2013 Weekday Onerating Cost	2035 Weekday Onerating Cost	2013 Weekday Operating Cost	2035 Weekday Operating Cost
	Start Time	End Time	Start Time	End Time	Hours		Train	(numerical)	Operating cost		Annualized	Annualized
Train 1	5:37	60:6	12:37	18:39	9:34	1	2	19.13	\$28,585	\$54,772	\$7,146,300	\$13,693,050
Train 2	6:07	11:59	15:37	19:09	9:24	1	2	18.80	\$28,087	\$53,818	\$7,021,800	\$13,454,495
Train 3	6:37	8:12	16:07	22:09	7:37	1	2	15.23	\$22, 759	\$43,608	\$5,689,650	\$10,901,958
Train 4	7:07	8:42	16:34	20:09	5:10	1	2	10.33	\$15,438	\$29,581	\$3,859,500	\$7,395,201
Total						4	8	63.50	\$94,869	\$181,779	\$23,717,250	\$45,444,704
	2013	2035										
Operating Cost per Revenue Hour	\$1,494.00	\$2,862.66										

FDOT



Retric Orientol Mentify/Intrex Mentifier Monite Afternon Baly Vehicle Passenge	US 441 Rail Service Operating Co.	st Estimate	Alternative	e 1-5									
Exercise Chance hearby/Americk Molinie Morning Atternoon Baily vehicle Passenger													
Fail Service ImplicationMorning ImplicationAtternonDaily Vehicle ImplicationAtternon ImplicationDaily Vehicle ImplicationAtternon ImplicationDaily Vehicle ImplicationAtternon ImplicationDaily Vehicle ImplicationAtternon ImplicationDaily Vehicle ImplicationAtternon ImplicationDaily Vehicle ImplicationAtternon ImplicationDaily Vehicle ImplicationAtternon ImplicationDaily Vehicle ImplicationAtternon ImplicationDaily Vehicle ImplicationDaily V	Eustis-Orlando Health/Amtrak Main	aline											
Image: constraint from the sertitime Sertitime End Time End Time End Time End Time Tenin Tenin <t< th=""><th>Rail Service</th><th>Morn</th><th>ing</th><th>After</th><th>uoou.</th><th>Daily Vehicle</th><th># of Trains</th><th>Passenger Cars per</th><th>Passenger Car Hours</th><th>2013 Weekday</th><th>2035 Weekday Operating</th><th>2013 Weekday Operating Cost</th><th>2035 Weekday Operating Cost</th></t<>	Rail Service	Morn	ing	After	uoou.	Daily Vehicle	# of Trains	Passenger Cars per	Passenger Car Hours	2013 Weekday	2035 Weekday Operating	2013 Weekday Operating Cost	2035 Weekday Operating Cost
Trienit 1 535 8/33 14/33 20:10 8/35 8/333 8/33 8/333		Start Time	End Time	Start Time	End Time	Hours	Needed	Train	(numerical)	Operating Cost	Cost	Annualized	Annualized
Trianita 533 813 1505 823 1570 833 1570 833 <th< th=""><th>Train 1</th><th>5:05</th><th>7:53</th><th>14:33</th><th>20:10</th><th>8:25</th><th>1</th><th>2</th><th>16.83</th><th>\$25,149</th><th>\$48,188</th><th>\$6,287,250</th><th>\$12,047,021</th></th<>	Train 1	5:05	7:53	14:33	20:10	8:25	1	2	16.83	\$25,149	\$48,188	\$6,287,250	\$12,047,021
Triani 1 2 1 2 1 2 1 2 <td>Train 2</td> <td>5:35</td> <td>8:23</td> <td>15:05</td> <td>20:40</td> <td>8:23</td> <td>1</td> <td>2</td> <td>16.77</td> <td>\$25,049</td> <td>\$47,997</td> <td>\$6, 262, 350</td> <td>\$11,999,310</td>	Train 2	5:35	8:23	15:05	20:40	8:23	1	2	16.77	\$25,049	\$47,997	\$6, 262, 350	\$11,999,310
Tielled 653 12:30 15:33 12:340 55:05 <t< td=""><td>Train 3</td><td>6:05</td><td>8:43</td><td>12:05</td><td>18:40</td><td>9:13</td><td>1</td><td>2</td><td>18.43</td><td>\$27,539</td><td>\$52,768</td><td>\$6,884,850</td><td>\$13, 192, 085</td></t<>	Train 3	6:05	8:43	12:05	18:40	9:13	1	2	18.43	\$27,539	\$52,768	\$6,884,850	\$13, 192, 085
	Train 4	6:35	12:30	16:32	22:40	12:03	1	2	24.10	\$36,005	\$68,990	\$9,001,350	\$17,247,517
Traine(T33 10:10 15:35 18:10 5:10 10:33 5:54:38 5:5:438 5:2:4:248 <td>Train 5</td> <td>7:05</td> <td>9:40</td> <td>17:02</td> <td>19:40</td> <td>5:13</td> <td>1</td> <td>2</td> <td>10.43</td> <td>\$15,587</td> <td>\$29,867</td> <td>\$3,896,850</td> <td>\$7,466,768</td>	Train 5	7:05	9:40	17:02	19:40	5:13	1	2	10.43	\$15,587	\$29,867	\$3,896,850	\$7,466,768
	Train 6	7:35	10:10	15:35	18:10	5:10	1	2	10.33	\$15,438	\$29,581	\$3,859,500	\$7,395,201
Mountborare Shuttle LineImage: Second S	Total						9	12	96.90	\$144,769	\$277,392	\$36,192,150	\$69,347,902
MountDora-Tournes Nuttle LineMoint DiracMoint DiracDaily VehicleMoint DiracDaily VehicleDaily VehicleDai													
Rail ServiceMorning Bart TimeAfternoonDaily Vehicle k of TrainsPassengerPassengerPassengerPassenger2013 weekday2033 weekdayTrain 1 3.47 3.47 3.47 3.47 3.47 3.47 $3.2.59$ 3.61 $3.2.59$ 3.61 $3.2.51$ $3.2.71$ $3.2.51$ $3.2.72$ $3.2.71$ $3.2.72$	Mount Dora-Tavares Shuttle Line												
Train 1 4.47	Rail Service	Morn Start Time	ing Fnd Time	After Start Time	noon Fnd Time	Daily Vehicle Hours	# of Trains Needed	Passenger Care per	Passenger Car Hourse	2013 Weekday Operating Cost	2035 Weekday Operating	2013 Weekday Operating Cost	2035 Weekday
Total E1 1 </td <td>Train 1</td> <td>4.47</td> <td></td> <td>2011</td> <td>27-59</td> <td>18:12</td> <td>1 1</td> <td></td> <td>18.20</td> <td>577 191</td> <td>S52 100</td> <td>Sc 797 700</td> <td>\$13 075 096</td>	Train 1	4.47		2011	27-59	18:12	1 1		18.20	577 191	S52 100	Sc 797 700	\$13 075 096
Total Cost Mainline + Shuttle Line Internation Internation <th< td=""><td>Total</td><td>t t</td><td></td><td></td><td>66.32</td><td>19</td><td></td><td>- 1</td><td>18.20</td><td>\$27,191</td><td>\$52,100</td><td>\$6 797 700</td><td>\$13.025,090</td></th<>	Total	t t			66.32	19		- 1	18.20	\$27,191	\$52,100	\$6 797 700	\$13.025,090
						ł	1						
2013 Weakday Weakday Weakday Weakday Weakday Weakday Derating Cost Cost2033 Meakday Perating Cost Cost2033 Destring Cost Annualized2033 Destring Cost Distring Cost2033 Destring Cost Distring Cost2033 Destring Cost2033 Distring Cost Stated Sized	Total Cost Mainline + Shuttle Line												
Train 1 552,340 510,288 513,084,950 555,07117 0	Rail Service	2013 Weekday Operating Cost	2035 Weekday Operating Cost	2013 Weekday Operating Cost Annualized	2035 Weekday Operating Cost Annualized								
Train 2 S25,049 \$47,997 \$6,26,350 \$11,999,310 O <tho< th=""> <tho< th=""> O</tho<></tho<>	Train 1	\$52,340	\$100,288	\$13,084,950	\$25,072,117								
Train 3 S27,539 S27,768 S6,88,850 513,192,085 S13,192,085 S13,124,513 S13,124	Train 2	\$25,049	\$47,997	\$6,262,350	\$11,999,310								
Train 4 536,005 588,990 530,01,350 517,247,517 0	Train 3	\$27,539	\$52,768	\$6,884,850	\$13,192,085								
Train 5 \$15,587 \$29,867 \$3,896,850 \$7,466,768 0 0 Train 6 \$15,438 \$29,581 \$3,839,500 \$7,395,201 0	Train 4	\$36,005	\$68,990	\$9,001,350	\$17,247,517								
Train 6 \$15,438 \$29,581 \$3,835,500 \$7,395,201 \$20 \$2	Train 5	\$15,587	\$29,867	\$3,896,850	\$7,466,768								
Total \$171,959 \$329,492 \$42,889,850 \$82,372,988 0	Train 6	\$15,438	\$29,581	\$3,859,500	\$7,395,201								
2013 2035 2035 2035 2037 <th< td=""><td>Total</td><td>\$171,959</td><td>\$329,492</td><td>\$42,989,850</td><td>\$82,372,998</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Total	\$171,959	\$329,492	\$42,989,850	\$82,372,998								
2013 2035 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>													
Operating Cost per Passenger Car Hour \$1,494.00 \$22,862.66		2013	2035										
	Operating Cost per Passenger Car Hour	\$1,494.00	\$2,862.66										



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APPENDIX B-2

US 441 EXPRESS BUS OPERATING COST ESTIMATE



US 441 EXPRESS BUS SERVICE COST

Express Bus	Round Trip	No. (of Buses Rec w/20% Spar	quired es)	No. of	No. of Annual Bus Hrs.	2013 Bus Ops	2035 Bus Ops	2013 Annual Bus Ops Cost	2035 Annual Bus Ops Cost
Alternative	Time (Min.)	Peak	Off-Peak	Weekend Day	Bus Hrs.	Weekdays	Cost/Hr. (LYNX)	FY13 Inflated)	Weekdays	Weekdays
Alternative 1-2	74	6	2	2	21.0	5451.3	\$58.42	\$98.44	\$318,467	\$536,629
Alternative 2-4	148	10	3	3	41.9	10902.7	\$58.42	\$98.44	\$636,934	\$1,073,259

Weekday Peak - 6-9 AM, 4-7 PM Weekday Off-Peak - 9 AM-4 PM, 7-10 PM



APPENDIX B-3

US 441 LOCAL BUS OPERATING COST ESTIMATE



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2035 LOCAL BUS CONNECTIONS – US 441 VIABLE ALTERNATIVE 1-2 (FY2013 RATE)

2013 LOCAL BUS CONNECTIONS - US 441 VI	ABLE BUILD ALTERNATIVES																						
CORRIDOR BUS	ROUTES	ROUTE	BUILD	HEADWAY	CHANGE FROM	IN HEADWAY NO-BUILD	BUS OPS COST/HR	OPERATING SPEED	INCREMENTA OPS C	AL ANNUAL BUS	# of additional						STA	TION					
Viable Build Alternative 1-2: Commuter Rail/Express Bus	Long Name		Peak	Off-Peak	Peak	Off-Peak	•	_	Weekday	Annual Total	Vehicles Needed	Orlando- Amtrak	Church Street	LYNX Central	Robinson Street	Amelia Street	Princeton Street	Lockhart/ Rosemont	Apopka	SR 429	Zellwood	Mt Dora	Tavares/ Eustis
LY101	Link 101 West SR 436	11.15	30	60	0	0	\$58.42	15											х				1
LY105	Link 104 West Colonial Dr	9.72	15	30	0	0	\$58.42	15							Х	Х							
LY106 (keep at base 2010 year headways competes)	Link 106 US 441 North	13.49	30	30	0	0	\$58.42	15				x	x		x	x	x	x	х	x			
LY305 JYPN	North John Young Parkway	15.87	30	30	0	0	\$58.42	15											х				
LY309 HIAW	Hiawassee Road	14.97	30	60	30	0	\$58.42	15	\$933	\$233,213	2								х				
LY310 SSTAR	Silver Star IB	11.56	30	30	0	0	\$58.42	15									Х						
LY311 SS-UNI	Silver Star - Universal	13.31	30	120	30	0	\$58.42	15	\$829	\$207,352	2						Х						
LY314 CLAR	Clarcona Ocoee	9.53	30	30	0	0	\$58.42	15										Х					
LY318 APOPKA	Apopka-Vineland Rd	10.67	30	60	30	0	\$58.42	15	\$665	\$166,224	1								х				
LY320 KEN	Kennedy	12.48	30	30	0	0	\$58.42	15										х					
LY323 434	Route 434	23.33	30	30	0	0	\$58.42	15											х				
LY404	Link 404 Pine Hills/North Lane	9.41	30	30	0	0	\$58.42	15										х					
LY405	Link 405 Apopka-Park Ave	5.70	30	30	0	0	\$58.42	15											х				
LY406	Link 406 Apopka Plymouth Zellwo	7.70	30	60	30	0	\$58.42	15	\$480	\$119,956	1								х	Х			
LY407	Link 407 West Altamonte	4.49	30	30	0	0	\$58.42	15											Х				
LY412	Link 412 Edgewater Dr	7.54	30	30	0	0	\$58.42	15										Х					
LY801	LYMMO Orange Line+Ext NB	4.68	5	10	0	0	\$58.42	15			0	х											
LY802	LYMMO Grapefruit Line	3.75	10	15	0	0	\$58.42	15					х										
LY803	LYMMO Lime Line	2.50	10	15	0	0	\$58.42	15					Х		Х								
LX1 VILL WB	LakeXpress #1 Westbound	30.63	30	60	30	0	\$77.78	15	\$1,279	\$319,676	2											Х	Х
LX1 VILL EB	LakeXpress #1 Eastbound	31.02	30	60	30	0	\$77.78	15	\$1,279	\$319,676	2											Х	Х
LX3 MTD	LakeXpress #3 Mount Dora C	11.57	30	60	30	0	\$77.78	15	\$960	\$239,977	2											Х	
LX4 UMA SB	LakeXpress #4 Southbound	19.41	30	120	90	0	\$77.78	15	\$1,208	\$301,942	2											Х	Х
LakeXpress Golden Triangle Circulator	New Service	31.92	30	60	0	0	\$77.78	15	\$4,138	\$1,158,611	5											Х	Х
Total									\$11,770	\$3,066,626	19												
Weekday Peak - 5:30.0:30 AM 3:30-7:30 P	NA	8.00																					
Weekday Off Dock 0:20 AM 2:20 PM 7:20	10-20 DM	0.00																					
Weekuay UII-Peak - 9:50 Alvi-5:30 PIVI, 7:30	10.30 FIVI	9.00									1		1		1	1							





2035 LOCAL BUS CONNECTIONS – US 441 VIABLE ALTERNATIVE 1-2 (FY2013 RATE INFLATED BY 3% FOR 22 YEARS TO 2035)

2035 LOCAL BUS CONNECTIONS - US 441 VIA	ABLE BUILD ALTERNATIVES																						
CORRIDOR BUS ROUTES	LONG NAME	ROUTE LENGTH	BUILD H	HEADWAY	CHANGE I FROM	N HEADWAY NO-BUILD	BUS OPS COST/HR	OPERATING SPEED	INCREME	NTAL ANNUA COST/HR	AL BUS OPS	# OF ADDITIONAL						STA	TION				
Viable Build Alternative 1-2: Commuter Rail/Express Bus			Peak	Off-Peak	Peak	Off-Peak			Weekday	Weekend/ Holiday	Annual Total	VEHICLES NEEDED	Orlando- Amtrak	Church Street	LYNX Central	Robinson Street	Amelia Street	Princeton Street	Lockhart/ Rosemont	Apopka	SR 429	Zellwood Mt Dora	Tavares/ Eustis
LY101	Link 101 West SR 436	11.15	30	60	0	0	\$111.94	15												Х			
LY105	Link 104 West Colonial Dr	9.72	15	30	0	0	\$111.94	15								Х	Х						
LY106 (keep at base 2010 year headways competes)	Link 106 US 441 North	13.49	30	30	0	0	\$111.94	15					x	x		x	х	x	x	x	x		
LY305 JYPN	North John Young Parkway	15.87	30	30	0	0	\$111.94	15												Х			
LY309 HIAW	Hiawassee Road	14.97	30	60	30	0	\$111.94	15	\$1,787	\$0	\$446,860	2								Х			
LY310 SSTAR	Silver Star IB	11.56	30	30	0	0	\$111.94	15										Х					
LY311 SS-UNI	Silver Star - Universal	13.31	30	120	30	0	\$111.94	15	\$1,589	\$0	\$397,308	2						Х					
LY314 CLAR	Clarcona Ocoee	9.53	30	30	0	0	\$111.94	15											х				
LY318 APOPKA	Apopka-Vineland Rd	10.67	30	60	30	0	\$111.94	15	\$1,274	\$0	\$318,503	1								Х			
LY320 KEN	Kennedy	12.48	30	30	0	0	\$111.94	15											х				
LY323 434	Route 434	23.33	30	30	0	0	\$111.94	15												Х			
LY404	Link 404 Pine Hills/North Lane	9.41	30	30	0	0	\$111.94	15											Х				
LY405	Link 405 Apopka-Park Ave	5.70	30	30	0	0	\$111.94	15												Х			
LY406	Link 406 Apopka Plymouth Zellwood	7.70	30	60	30	0	\$111.94	15	\$919	\$0	\$229,848	1								Х	Х		
LY407	Link 407 West Altamonte	4.49	30	30	0	0	\$111.94	15												Х			
LY412	Link 412 Edgewater Dr	7.54	30	30	0	0	\$111.94	15											Х				
LY801	LYMMO Orange Line+Ext NB	4.68	5	10	0	0	\$111.94	15				0	Х										
LY802	LYMMO Grapefruit Line	3.75	10	15	0	0	\$111.94	15						Х									
LY803	LYMMO Lime Line	2.50	10	15	0	0	\$111.94	15						Х		Х							
LX1 VILL WB	LakeXpress #1 Westbound	30.63	30	60	30	0	\$149.03	15	\$2,450	\$0	\$612,532	2										Х	Х
LX1 VILL EB	LakeXpress #1 Eastbound	31.02	30	60	30	0	\$149.03	15	\$2,450	\$0	\$612,532	2										Х	Х
LX3 MTD	LakeXpress #3 Mount Dora C	11.57	30	60	30	0	\$149.03	15	\$1,839	\$0	\$459,821	2										Х	
LX4 UMA SB	LakeXpress #4 Southbound	19.41	30	120	90	0	\$149.03	15	\$2,314	\$0	\$578,552	2										Х	Х
LakeXpress Golden Triangle Circulator	New Service	31.92	30	60	0	0	\$149.03	15	\$7,929	\$4,757	\$2,220,018	5										Х	Х
	To	tal	1	-	1	1	1	1	\$22,552	\$4,757	\$5,875,973	19											
Weekday Peak - 5:30-9:30 AM, 3:30-7 :30 P Weekday Off-Peak - 9:30 AM-3:30 PM, 7:30	M D-10:30 PM	8.00 9.00																					





2013 LOCAL BUS CONNECTIONS - US 441 VIABLE BUILD ALTERNATIVES CHANGE IN HEADWAY INCREMENTAL ANNUAL CORRIDOR BUS ROUTES BUILD HEADWAY ROUTE FROM NO-BUILD BUS OPS OPERATING BUS OPS COST/HR of addition LENGTH COST/HR SPEED Vehicles Orlando-Church Robinson Amelia Princeton Viable Build Alternative 1-5: Commuter Rail Long Name Off-Peak Off-Peak Peak Peak Weekday Annual Total Needed Amtrak Street Street Street Street LY101 LY105 Link 101 West SR 436 11.15 30 60 0 0 \$58.42 15 Link 104 West Colonial Dr 9.72 30 \$58.42 15 0 0 15 х х LY106 (keep at base 2010 year headways Link 106 US 441 North 13.49 30 30 0 0 \$58.42 15 competes) LY305 JYPN North John Young Parkway 23.06 30 30 0 0 \$58.42 15 LY309 HIAW Hiawassee Road 14.97 \$233,213 30 60 30 \$58.42 15 \$933 0 2 LY310 SSTAR Silver Star IB 11.56 30 30 0 0 \$58.42 15 \$0 х Silver Star - Universal 30 \$58.42 15 \$207,352 LY311 SS-UNI 13.31 30 120 0 \$829 2 Х LY314 CLAR Clarcona Ocoee 9.53 30 30 0 0 \$58.42 15 \$0 Apopka-Vineland Rd 10.67 LY318 APOPKA 30 60 30 0 \$58.42 15 \$665 \$166,224 LY320 KEN Kennedy 12.48 30 30 0 0 \$58.42 15 25.28 30 0 \$58.42 15 LY323 434 Route 434 30 0 LY404 Link 404 Pine Hills/North Lane 9.41 30 30 0 0 \$58.42 15 LY405 Link 405 Apopka-Park Ave 5.70 30 30 0 \$58.42 15 0 LY406 30 \$480 \$119,956 Link 406 Apopka Plymouth Zellwood 7.70 30 60 0 \$58.42 15 1 LY407 Link 407 West Altamonte 8.29 30 30 0 0 \$58.42 15 LY412 Link 412 Edgewater Dr 7.54 30 30 0 0 \$58.42 15 LY801 LYMMO Orange Line+Ext NB 4.68 10 \$58.42 0 0 15 х 5 LY802 LYMMO Grapefruit Line 3.75 10 15 0 0 \$58.42 15 х LY803 LYMMO Lime Line 2.50 10 15 0 0 \$58.42 15 Х Х LX1 VILL WB LakeXpress #1 Westbound 30.63 30 60 30 0 \$77.78 15 \$1,279 \$319,676 2 LX1 VILL EB LakeXpress #1 Eastbound 31.02 30 60 30 \$77.78 \$1,279 \$319,676 0 15 2 \$77.78 LX3 MTD 60 30 LakeXpress #3 Mount Dora C 11.57 30 0 15 \$960 \$239,977 2 LX4 UMA SB LakeXpress #4 Southbound 19.41 30 120 90 0 \$77.78 15 \$1,208 \$301,942 2 LakeXpress Golden Triangle Circulator New Service 31.92 30 60 0 0 \$77.78 15 \$4.138 \$1,158,611 5 Total \$11,770 \$3,066,626 19 Weekday Peak - 5:30-9:30 AM, 3:30-7 :30 PM Weekday Off-Peak - 9:30 AM-3:30 PM, 7:30-10:30 PM

2035 LOCAL BUS CONNECTIONS - US 441 VIABLE ALTERNATIVE 1-5 (FY2013 RATE)

STATI	ON					
Lockhart/ Rosemont	Apopka	SR 429	Zellwood	Tavares	Eustis	Mt Dora
	Х					
х	х	x				
	Х					
	Х					
Х						
	Х					
X						
Y	X					
Χ	v					
	×	v				
	X	X				
x	~					
				Х	Х	х
				Х	Х	х
						х
				Х	Х	х
				Х	Х	Х
		ļ	ļ			





2035 LOCAL BUS CONNECTIONS – US 441 VIABLE ALTERNATIVE 1-5 (FY2013 RATE INFLATED BY 3% FOR 22 YEARS TO 2035)

2035 LOCAL BUS CONNECTIONS - US 441 VIA	ABLE BUILD ALTERNATIVES																							
CORRIDOR BUS ROUTES		ROUTE	BUILD H	HEADWAY	CHANGE I FROM	N HEADWAY NO-BUILD	BUS OPS	OPERATING	INCREME	NTAL ANNU COST/HR	IAL BUS OPS	# OF ADDITIONAL						STA	TION					
Viable Build Alternative 1-5: Commuter Rail		LENGTH	Peak	Off-Peak	Peak	Off-Peak	COST/HR	SPEED	Weekday	Weekend/ Holiday	Annual Total	VEHICLES NEEDED	Orlando- Amtrak	Church Street	Robinson Street	Amelia Street	Princeton Street	Lockhart/ Rosemont	Apopka	SR 429	Zellwood	Tavares	Eustis	Mt Dora
LY101	Link 101 West SR 436	11.15	30	60	0	0	\$111.94	15											Х					
LY105	Link 104 West Colonial Dr	9.72	15	30	0	0	\$111.94	15							Х	Х								
LY106 (keep at base 2010 year headways - competes)	Link 106 US 441 North	13.49	30	30	0	0	\$111.94	15					x	x	x	х	х	x	х	x				
LY305 JYPN	North John Young Parkway	23.06	30	30	0	0	\$111.94	15											Х					1
LY309 HIAW	Hiawassee Road	14.97	30	60	30	0	\$111.94	15	\$1,787	\$0	\$446,860	2							Х					1
LY310 SSTAR	Silver Star IB	11.56	30	30	0	0	\$111.94	15			\$0						Х							
LY311 SS-UNI	Silver Star - Universal	13.31	30	120	30	0	\$111.94	15	\$1,589	\$0	\$397,308	2					Х							
LY314 CLAR	Clarcona Ocoee	9.53	30	30	0	0	\$111.94	15			\$0							х						
LY318 APOPKA	Apopka-Vineland Rd	10.67	30	60	30	0	\$111.94	15	\$1,274	\$0	\$318,503	1							Х					
LY320 KEN	Kennedy	12.48	30	30	0	0	\$111.94	15										х						
LY323 434	Route 434	25.28	30	30	0	0	\$111.94	15											Х					1
LY404	Link 404 Pine Hills/North Lane	9.41	30	30	0	0	\$111.94	15										х						
LY405	Link 405 Apopka-Park Ave	5.70	30	30	0	0	\$111.94	15											Х					1
LY406	Link 406 Apopka Plymouth Zellwood	7.70	30	60	30	0	\$111.94	15	\$919	\$0	\$229,848	1							Х	Х				1
LY407	Link 407 West Altamonte	8.29	30	30	0	0	\$111.94	15											Х					1
LY412	Link 412 Edgewater Dr	7.54	30	30	0	0	\$111.94	15										х						
LY801	LYMMO Orange Line+Ext NB	4.68	5	10	0	0	\$111.94	15					Х											
LY802	LYMMO Grapefruit Line	3.75	10	15	0	0	\$111.94	15						Х										
LY803	LYMMO Lime Line	2.50	10	15	0	0	\$111.94	15						Х	Х									
LX1 VILL WB	LakeXpress #1 Westbound	30.63	30	60	30	0	\$149.03	15	\$2,450	\$0	\$612,532	2										Х	Х	Х
LX1 VILL EB	LakeXpress #1 Eastbound	31.02	30	60	30	0	\$149.03	15	\$2,450	\$0	\$612,532	2										Х	Х	Х
LX3 MTD	LakeXpress #3 Mount Dora C	11.57	30	60	30	0	\$149.03	15	\$1,839	\$0	\$459,821	2												Х
LX4 UMA SB	LakeXpress #4 Southbound	19.41	30	120	90	0	\$149.03	15	\$2,314	\$0	\$578,552	2										Х	Х	Х
LakeXpress Golden Triangle Circulator	New Service	31.92	30	60	0	0	\$149.03	15	\$7,929	\$4,757	\$2,220,018	5										Х	Х	Х
	T	otal		1		1	1	1	\$22,552	\$4,757	\$5,875,973	19												
Weekday Peak - 5:30-9:30 AM, 3:30-7 :30 P	Μ																							
Weekday Off-Peak - 9:30 AM-3:30 PM, 7:30	0-10:30 PM																							1





2035 LOCAL BUS CONNECTIONS – US 441 VIABLE ALTERNATIVE 2-4 (FY2013 RATE)

2013 LOCAL BUS CONNECTIONS - US 441	/IABLE BUILD ALTERNATIVES																	
CORRIDOR E	SUS ROUTES		BUUD		CHANGE II FROM N	N HEADWAY	BUS OPS	OPERATING			# of				STATION		<u> </u>	
Viable Build Alternative 2-4: Express Bus	Long Name		Peak	Off-Peak	Peak	Off-Peak	COST/HR	SPEED	Weekday	Annual Total	Vehicles Needed	LYNX Central	Amelia Street	Princeton Street	Rosemont	SR 429	Tavares /Eustis	Mount Dora
LY101	Link 101 West SR 436	11.15	30	60	0	0	\$58.42	15									r i	
LY105	Link 104 West Colonial Dr	9.72	15	30	0	0	\$58.42	15				Х	Х					
LY106 (keep at base 2010 year headways - competes)	Link 106 US 441 North	13.49	30	30	0	0	\$58.42	15				х	х	х	х	х		
LY203 MT DORA (competes)	LYNX 203 Mt Dora - CBD	31.41	0	0	0	0	\$58.42	15										
LY305 JYPN	North John Young Parkway	15.87	30	30	0	0	\$58.42	15										
LY309 HIAW	Hiawassee Road	14.97	30	60	30	0	\$58.42	15	\$933	\$233,213	2							
LY310 SSTAR	Silver Star IB	11.56	30	30	0	0	\$58.42	15						х				
LY311 SS-UNI	Silver Star - Universal	13.31	30	120	30	0	\$58.42	15	\$829	\$207,352	2			х				
LY314 CLAR	Clarcona Ocoee	9.53	30	30	0	0	\$58.42	15							Х			
LY318 АРОРКА	Apopka-Vineland Rd	10.67	30	60	30	0	\$58.42	15	\$665	\$166,224	1							
LY320 KEN	Kennedy	12.48	30	30	0	0	\$58.42	15							Х			
LY323 434	Route 434	25.28	30	30	0	0	\$58.42	15										
LY404	Link 404 Pine Hills/North Lane	9.41	30	30	0	0	\$58.42	15							Х			
LY405	Link 405 Apopka-Park Ave	5.70	30	30	0	0	\$58.42	15										
LY406	Link 406 Apopka Plymouth Zellwood	7.70	30	60	30	0	\$58.42	15	\$480	\$119,956	1					Х		
LY407	Link 407 West Altamonte	4.49	30	30	0	0	\$58.42	15										
LY412	Link 412 Edgewater Dr	7.54	30	30	0	0	\$58.42	15							Х			
LY801	LYMMO Orange Line+Ext NB & SB	4.68	5	10	0	0	\$58.42	15				Х						
LY802	LYMMO Grapefruit Line	2.83	10	15	0	0	\$58.42	15										
LY803	LYMMO Lime Line	2.50	10	15	0	0	\$58.42	15				Х						
LX1 VILL WB	LakeXpress #1 Westbound	29.79	30	60	30	0	\$77.78	15	\$1,244	\$310,909	2						х	Х
LX3 MTD	LakeXpress #3 Mount Dora C	11.57	30	60	30	0	\$77.78	15	\$960	\$239,977	2							Х
LX4 UMA SB	LakeXpress #4 Southbound	19.41	30	120	90	0	\$77.78	15	\$1,208	\$301,942	2						Х	Х
LakeXpress Golden Triangle Circulator	New Service	31.92	30	60	0	0	\$77.78	15	\$4,138	\$1,158,611	5						Х	Х
Total									\$10,456	\$2,738,184	17							
Weekday Peak - 5:30-9:30 AM, 3:30-7 :30	PM																	
Weekday Off-Peak - 9:30 AM-3:30 PM, 7:	30-10:30 PM																	





2035 LOCAL BUS CONNECTIONS – US 441 VIABLE ALTERNATIVE 2-4 (FY2013 RATE INFLATED BY 3% FOR 22 YEARS TO 2035)

2035 LOCAL BUS CONNECTIONS - US 441	VIABLE BUILD ALTERNATIVES																		
CORRIDOR BUS ROUTES	LONG NAME	ROUTE	BUILD	HEADWAY	CHANGE IN FROM N	I HEADWAY IO-BUILD	BUS OPS	OPERATING	INCREME	NTAL ANNU COST/HR	AL BUS OPS	# OF ADDITIONAL				STATION			
Viable Build Alternative 2-4: Express Bus		LENGTH	Peak	Off-Peak	Peak	Off-Peak	COST/HR	SPEED	Weekday	Weekend/ Holiday	Annual Total	VEHICLES NEEDED	LYNX Central	Amelia Street	Princeton Street	Rosemont	SR 429	Tavares/ Eustis	Mount Dora
LY101	Link 101 West SR 436	11.15	30	60	0	0	\$111.94	15											
LY105	Link 104 West Colonial Dr	9.72	15	30	0	0	\$111.94	15					Х	Х					
LY106 (keep at base 2010 year headways - competes)	Link 106 US 441 North	13.49	30	30	0	0	\$111.94	15					х	х	х	x	х		
LY203 MT DORA (competes)	LYNX 203 Mt Dora - CBD	31.41	0	0	0	0	\$111.94	15											
LY305 JYPN	North John Young Parkway	15.87	30	30	0	0	\$111.94	15											
LY309 HIAW	Hiawassee Road	14.97	30	60	30	0	\$111.94	15	\$1,787	\$0	\$446,860	2							
LY310 SSTAR	Silver Star IB	11.56	30	30	0	0	\$111.94	15							Х				
LY311 SS-UNI	Silver Star - Universal	13.31	30	120	30	0	\$111.94	15	\$1,589	\$0	\$397,308	2			х				
LY314 CLAR	Clarcona Ocoee	9.53	30	30	0	0	\$111.94	15								Х			
LY318 АРОРКА	Apopka-Vineland Rd	10.67	30	60	30	0	\$111.94	15	\$1,274	\$0	\$318,503	1							
LY320 KEN	Kennedy	12.48	30	30	0	0	\$111.94	15								Х			
LY323 434	Route 434	25.28	30	30	0	0	\$111.94	15											
LY404	Link 404 Pine Hills/North Lane	9.41	30	30	0	0	\$111.94	15								х			
LY405	Link 405 Apopka-Park Ave	5.70	30	30	0	0	\$111.94	15											
LY406	Link 406 Apopka Plymouth Zellwood	7.70	30	60	30	0	\$111.94	15	\$919	\$0	\$229,848	1					Х		
LY407	Link 407 West Altamonte	4.49	30	30	0	0	\$111.94	15											
LY412	Link 412 Edgewater Dr	7.54	30	30	0	0	\$111.94	15								Х			
LY801	LYMMO Orange Line+Ext NB & SB	4.68	5	10	0	0	\$111.94	15					Х						
LY802	LYMMO Grapefruit Line	2.83	10	15	0	0	\$111.94	15											
LY803	LYMMO Lime Line	2.50	10	15	0	0	\$111.94	15					Х						
LX1 VILL WB	LakeXpress #1 Westbound	29.79	30	60	30	0	\$149.03	15	\$2,383	\$0	\$595,734	2						Х	Х
LX3 MTD	LakeXpress #3 Mount Dora C	11.57	30	60	30	0	\$149.03	15	\$1,839	\$0	\$459,821	2							Х
LX4 UMA SB	LakeXpress #4 Southbound	19.41	30	120	90	0	\$149.03	15	\$2,314	\$0	\$578,552	2						Х	Х
LakeXpress Golden Triangle Circulator	New Service	31.92	30	60	0	0	\$149.03	15	\$7,929	\$4,757	\$2,220,018	5						Х	Х
	Т	otal							\$20,035	\$4,757	\$5,246,643	17							
Weekday Peak - 5:30-9:30 AM, 3:30-7 :30) PM																		
Weekday Off-Peak - 9:30 AM-3:30 PM, 7:	:30-10:30 PM																		



Technical Memorandum | Viable Alternatives Development and Screening

Appendix G: Technical Memorandum – Future Land Use

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1 Introduction

1.1 Introduction and Background

This document is intended to describe the adopted future land use factors that are supportive of transit service at each of the three Viable Build Alternatives (Alternatives 1-2, 1-5 and 2-4). The No-Build Alternative (Alternative 0-1) was not evaluated because no new transit stations would be created.

Adopted Future Land Uses are a component of the Local Government Comprehensive Plan, which is a growth management document required of all local governments in Florida. The Comprehensive Plan describes the type of use(s) permitted (residential, office, retail, industrial, etc.) under each land use category, as well as the maximum density and maximum intensity of development allowed under the land use category. Maximum density refers to dwelling units per acre, and maximum intensity refers to the Floor Area Ratio (FAR), which is a measure of how much building coverage is permitted on a site.

The adopted Future Land Uses categories within a one-half mile radius around the potential stations were evaluated using Table 12: Quantitative Element Rating Guide of the FTA *Guidelines for Land Use and Economic Development Effects for New Starts and Small Starts Projects (August 2013)* guidebook to determine if the existing adopted local plans are supportive of transit use:

FTA Rating	Corridor Policies and Station	Commercial Floor Area Ratio
	Area Zoning (Residential	(FAR) (non-Central Business District)
	DU/acre)	
High	>25	>2.5
Medium-High	15-25	1.75-2.5
Medium	10-15	1.0-1.75
Low-Medium	5-10	0.5-1.0
Low	< 5	<0.5



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2

Viable Alternative 1-2

2.1 Introduction

This chapter provides a description of the adopted future land uses within a one-half mile radius around each station included in Viable Alternative 1-2.

The following potential stations are included in this alternative:

- Orlando Health/Amtrak Station (existing Commuter Rail)
- Church Street Station (existing Commuter Rail)
- Robinson Street Station (Commuter Rail)
- Amelia Street Station (Commuter Rail)
- Princeton Station (Commuter Rail)
- Lockhart/Rosemont Station (Commuter Rail)
- Apopka Station (Commuter Rail)
- SR 429 Station (Commuter Rail and Express Bus)
- Zellwood Transit Station (Express Bus)
- Mount Dora Station (Express Bus)
- Tavares/Eustis Station (Express Bus)

It is important to note that Orlando Health/Amtrak and Church Street stations were not analyzed for future land use as they are existing commuter rail stations.

2.2 Robinson Street Station

The Robinson Street Station would be located at the northwest corner of Robinson Street and Hughey Avenue in Orlando's Parramore community. The station parcel is owned by FDOT and is approximately a ¼ mile walk to LYNX Central Station. In addition to being a 5-10 minute walk from LYNX Central Station, the Station would serve the planned Creative Village mixed use development, including the anticipated University of Central Florida (UCF) downtown campus, as well as existing institutional uses (Florida A&M Law School, Federal Courthouse, Florida Department of Children and Families building, Orange County Vocational Technology building).



The adopted Future Land Uses near the Robinson Street Station include Downtown Activity Center (DT-AC), which permits up to 200 residential units per acre and 4.0 FAR and Urban Activity Center (UR-AC), which permits up to 100 residential units per acre and 1.0 FAR. These mixed use classifications are amongst the most dense and intense future land uses adopted by the City of Orlando, and are highly supportive of transit use. The average density and commercial intensity of the entire half mile radius both rank as High and Low-Medium, respectively.



Figure 2-1: Robinson Street Station Future Land Use Map



Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Orlando	Downtown Activity Center (DT-AC)	188.00	200	4.0
	Urban Activity Center (UR-AC)	138.17	100	1.0
	Public-Recreation- Institutional	57.88	n/a	n/a
	Residential - Medium	46.31	30	0.3
	Residential - Low	23.65	12	0.3
	Industrial	22.16	40	0.7
	Mixed Use Corridor – Medium (MUC-MED)	13.14	30	0.5
	Residential - High	8.58	200	0.35
	Office - Low	3.73	21	0.4
	Office - Medium	0.93	40	0.7

Table 2-1-1: Robinson Street Station Future Land Uses

Table 2-1-2: Robinson Street Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
502.55	58.3	0.93	High / Low- Medium

2.3 Amelia Street Station

The Amelia Street Station would be located along the Florida Central Railroad (FCEN) rail corridor near the intersection of Amelia Street and the FCEN railroad in the City of Orlando. This station is located at the northern quadrant of Parramore, a community with a large transit-dependent population. The City is currently developing the Parramore Comprehensive Neighborhood Plan which anticipates a Transit Oriented Development (TOD) at this location. The adopted Future Land Use category immediately adjacent to the proposed station is highly supportive of transit use; however, the average density and commercial intensity of the entire half mile radius rank Medium-High and Low, respectively.





Table 2-2-1: Amelia Street Station Future Land Uses

Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Orlando	Residential - Low	190.22	12	0.3
	Industrial	81.35	40	0.7
	Mixed Use Corridor – Medium (MUC-MED)	74.37	30	0.5
	Residential - Medium	53.53	30	0.3
	Office - Low	29.79	21	0.4
	Office - Medium	7.87	40	0.7
	Urban Activity Center (UR-AC)	0.90	100	1.0



Table 2-2-2: Amelia Street Station Analysis Results

	Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
438.03 11.5 0.15 Medium /	438.03	11.5	0.15	Medium / Lov

2.4 Princeton Station

The Princeton Station would be located along the FCEN rail corridor near the intersection of US 441 and Princeton Street in the City of Orlando, near the College Park neighborhood. This station is also located near the Silver Star Industrial Park, a major employment center. Existing land uses near the station are predominantly retail, office, and industrial.

The adopted Future Land Use immediately adjacent to the Princeton Station is Urban Activity Center (UR-AC), which permits up to 100 residential units per acre and 1.0 FAR. This mixed use classification is among the most dense and intense future land uses adopted by the City of Orlando, and is highly supportive of transit use. The average density and commercial intensity of the entire half mile radius both rank as High and Low, respectively.





Figure 2-3: Princeton Station Future Land Use Map

Table 2-3-1: Princeton Station Future Land Uses

Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Orlando	Urban Activity Center (UR-AC)	218.35	100	1.0
	Residential - Low	179.46	12	0.3
	Industrial	87.01	40	0.7
	Public-Recreation- Institutional	10.59	n/a	n/a
	Neighborhood			
	Activity Center (NEIGH-AC)	2.20	30	0.3
	Office - Medium	1.89	40	0.7



Table 2-3-2: Princeton Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
499.51	26.2	0.35	High / Low

2.5 Lockhart/Rosemont Station

The Lockhart/Rosemont Station would be located along the FCEN rail corridor near the intersection of Clarcona-Ocoee Road and Edgewater Drive. It is located near the existing LYNX Rosemont SuperStop (near the intersection of US 441 and Cinderlane Parkway). The adopted future land uses immediately adjacent to the proposed station are highly supportive of transit use. However, the average density and commercial intensity of the entire half mile radius both rank as Low-Medium.



Figure 2-4: Lockhart/Rosemont Station Future Land Use Map



Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Orlando	Industrial (IND)	178.64	40	0.7
	Community Activity Center (COMM-AC)	84.81	40	0.7
	Mixed Use Corridor – Medium (MUC-MED)	25.39	30	0.5
	Residential – Medium (MDR)	9.44	30	0.5
	Residential – Low (LDR)	0.74	12	0.3
Orange County	Industrial (IND)	85.97	n/a	0.75
	Commercial (C)	43.75	n/a	3.0
	Low Density Residential (LDR)	40.42	4	n/a
	Medium Density Residential (MDR)	24.74	20	n/a
	Low-Medium Density Residential (LMDR)	11.22	10	n/a
	Institutional (INST)	7.71	n/a	2.0
	Office (O)	2.63	n/a	3.0
	Planned Development – Commercial (PD-C)	1.60	n/a	3.0

Table 2-4-1: Lockhart/Rosemont Station Future Land Uses

Table 2-4-2: Lockhart/Rosemont Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
517.05	6.1	0.74	Low-Medium / Low-Medium

2.6 Apopka Station

The Apopka Station would be located along the FCEN rail corridor near the existing LYNX Apopka SuperStop (south of the intersection of US 441 and Central Avenue). This station is located near





downtown Apopka and serves the South Apopka Neighborhood, which has a high transit dependent population. The City of Apopka has designed this area as the Central Business District Overlay, which provides a bonus of up to 2.0 FAR. Multi-family residential of up to 15 units per acre is permitted if the project is part of a mixed use Planned Unit Development. A Comprehensive Plan Amendment to increase residential density within the Central Business District and Commercial land use category would strengthen support for transit at this location.



Figure 2-5: Apopka Station Future Land Use Map
Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Apopka	Commercial (COMM)	152.10	n/a	0.25
	Residential – Low (RL)	73.48	5	n/a
	Industrial (IND)	39.79	n/a	0.6
	Residential – Medium (RM)	24.72	10	n/a
	Office (OFF)	21.15	n/a	0.3
	Mixed Use (MU)	7.08	15	2.0
	Institutional (INST_PU)	6.45	n/a	0.5
	Preservation (PR)	5.14	n/a	0.2
	Residential – High (RH)	1.38	15	n/a
Orange County	Low Density Residential (RL)	30.70	4	n/a
	Low-Medium Density Residential (RM)	12.18	10	n/a

Table 2-5-1: Apopka Station Future Land Uses

Table 2-5-2: Apopka Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
374.19	2.5	0.21	Low / Low

2.7 SR 429 Station

The SR 429 Station would be located along the FCEN rail corridor near the interchange of SR 429 and US 441 in northwest Apopka. This station would provide regional connectivity through direct access to SR 429, a limited access roadway. It is anticipated that this location would have a commuter park and ride lot. Increasing residential density at this location is not recommended because it could encourage leapfrog sprawl outside of established urban areas.







Figure 2-6: SR 429 Station Future Land Use Map



Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Apopka	Industrial (IND)	180.90	n/a	0.6
	Mixed Use (MU)	37.21	15	2.0
	Commercial (COMM)	12.90	n/a	0.25
	Annexation (ANNEX)	11.89	n/a	n/a
	Residential – Very Low Suburban (RVLS)	5.23	2	n/a
	Residential – Low Suburban (RLS)	4.41	3.5	n/a
	Agriculture (AG)	3.89	1/5	n/a
	Residential – Low (RL)	3.88	5	n/a
	Institutional (INST_PU)	2.27	n/a	0.5
Orange County	Rural (R)	215.92	1/10	n/a
	Industrial (IND)	22.78	n/a	0.75
	Planned Development – Commercial (PD-C)	1.93	n/a	3.0
	Low Density Residential (RL)	30.70	4	n/a

Table 2-6-1: SR 429 Station Future Land Uses

Table 2-6-2: SR 429 Station Analysis Results

Total Acreage De	Average Residential nsity (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
503.56	0.7	0.34	Low / Low

2.8 Zellwood Transit Station

The Zellwood Transit Station is located adjacent to existing Zellwood and Zellwood Station Rural Settlement Areas in unincorporated Orange County. There are opportunities for eco-tourism associated with Lake Apopka, as well as a new employment center. Increasing residential density at this location is not recommended because it could encourage leapfrog sprawl outside of established urban areas.







Figure 2-7: Zellwood Transit Station Future Land Use Map

Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
Orange County	Rural (R)	129.57	1/10	n/a
	Industrial (I)	120.10	n/a	0.75
	Low Density Residential (LD)	65.58	4	n/a
	Rural Settlement 1/5 (RS 1/5)	35.71	1/5	n/a
	Commercial (C)	23.99	n/a	3.0
	Institutional (IN)	9.68	n/a	2.0
	Rural Settlement 1/1 (RS 1/1)	7.88	1	n/a
	Rural Settlement Low Density (RSLD)	3.43	2	n/a
	Office (O)	2.87	n/a	3.0
	Planned Development (PD)	1.33	1	n/a
	Low Medium Density Residential (LM)	1.19	10	n/a

Table 2-7-1: Zellwood Transit Station Future Land Uses

Table 2-7-2: Zellwood Transit Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
401.34	0.8	0.47	Low / Low

2.9 Mount Dora Station (Alternative 1-2)

The Mount Dora Station would be located near the Publix shopping center located near the intersection of US 441 and Stoneybrook Hills Parkway in northwest Orange County. This location is predominantly rural in nature, with little existing development around the shopping center. Increasing residential density at this location is not recommended because it could encourage leapfrog sprawl outside of established urban areas.





Figure 2-8: Mount Dora Station (Alt. 1-2) Future Land Use Map



Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Mount Dora	Recreation (REC)	20.97	n/a	n/a
	Industrial (IND)	9.45	n/a	0.65
	Commercial (C)	3.02	n/a	0.65
	Office (OFF)	1.56	n/a	0.65
Lake County	Regional Office (OFF- REG)	71.63	1/10,000 sf of commercial	3.0
	Urban Low Density (LD)	2.14	4	0.35
Orange County	Rural (R)	123.02	1/10	n/a
	Rural Settlement 1/1 (RS 1/1)	90.77	1	n/a
	Low Density Residential (LD)	67.83	4	n/a
	Institutional (IN)	27.36	n/a	2.0
	Commercial (C)	26.87	n/a	3.0
	Low Medium Density Residential (LM)	22.39	10	n/a

Table 2-8-1: Mount Dora Station (Alt. 1-2) Future Land Uses

Table 2-8-2: Mount Dora Station (Alt. 1-2) Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
467.01	3.3	0.77	Low / Low-Medium

2.10 Tavares/Eustis Station

The Tavares/Eustis Station would be located near the Florida Hospital-Waterman, which is a major employer in the area. The station, located near the intersection of US 441 and Mayo Drive/Huffstetler Drive is anticipated to have a commuter park and ride lot. A Comprehensive Plan Amendment to allow for dense residential density within the Commercial land use category would strengthen support for transit at this location.







Figure 2-9: Tavares/Eustis Station Future Land Use Map



Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Eustis	Mixed Commercial/ Industrial (MU)	62.14	n/a	0.25
	Mixed Commercial/ Residential (MU)	6.11	12	0.25
City of Tavares	Commercial (COM)	192.39	n/a	0.35
	Medium Density (MED)	88.88	12	n/a
	Low Density (LOW)	77.15	5.6	n/a
	High Density (HD)	20.27	25	n/a
	Industrial (IND)	1.72	n/a	0.5
Lake County	Regional Office (RO)	1.11	1/10,000 sf of commercial	3.0
	Urban Medium Density (MED)	2.31	7	0.5

Table 2-9-1: Tavares/Eustis Station Future Land Uses

Table 2-9-2: Tavares/Eustis Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
452.08	4.7	0.20	Low / Low



3

Viable Alternative 1-5

3.1 Introduction

This chapter provides a description of the adopted future land uses within a one-half mile radius around each station included in Viable Alternative 1-5.

The following potential stations are included in this alternative:

- Orlando Health/Amtrak Station (existing Commuter Rail)
- Church Street Station (existing Commuter Rail)
- Robinson Street Station (Commuter Rail)*
- Amelia Street Station (Commuter Rail)*
- Princeton Station (Commuter Rail)*
- Lockhart/Rosemont Station (Commuter Rail)*
- Apopka Station (Commuter Rail)*
- SR 429 Station (Commuter Rail)*
- Zellwood Transit Station (Commuter Rail)*
- Tavares Station (Commuter Rail)
- Mount Dora Station (Commuter Rail)
- Eustis Station (Commuter Rail)

*Note: These stations are the same as those in Viable Alternative 1-2. Please refer to the corresponding station description in Chapter 2.

It is important to note that Orlando Health/Amtrak and Church Street stations were not analyzed for future land use as they are existing commuter rail stations.

3.2 Tavares Station

The Tavares Station would be located near Wooton Park near downtown Tavares. This station is located in the Lake County seat and serves both Lake County Government and City of Tavares Government. This station is within walking distance of existing retail and restaurants and is



located within an existing transit oriented development area. The City has adopted a Downtown Master Plan that envisions a dense mixed use Waterfront Entertainment District adjacent to the proposed station location. The adopted Commercial Downtown Future Land Use near the proposed station is supportive of transit use. However, the average density and commercial intensity of the entire half mile radius rank Low-Medium and Low, respectively.



Figure 3-1: Tavares Station Future Land Use Map



Table 3-1-1: Tavares Station Future Land Uses

Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Tavares	Mixed Use Commercial (MUC)	76.74	25	0.30
	Medium Density (MED)	60.68	12	n/a
	Commercial Downtown (CD)	52.70	25	0.75
	Public Facility/Institutional (PUB)	48.23	n/a	0.5
	Low Density (LOW)	21.02	5.6	n/a
	Industrial (IND)	12.55	n/a	0.5
	High Density (HIGH)	8.62	25	n/a
	Mixed Use Neighborhood (MUN)	8.12	12	0.15
	Commercial (COM)	7.30	n/a	0.35
	Mobile Home (MH)	3.18	8.7	n/a

Table 3-1-2: Tavares Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
299.14	9.2	0.22	Low-Medium / Low



3.3 Mount Dora Station (Alternative 1-5)

The Mount Dora Station would be located along the FCEN rail corridor near the intersection of Old US Highway 441 and Eudora Road, approximately 2 miles west of downtown Mount Dora. This location is identified as a compact and dense intermodal hub in the "Golden Triangle District" in the Mount Dora Citywide Vision Plan. The adopted Future Land Uses immediately adjacent to the proposed station are highly supportive of transit use. However, the average density and commercial intensity of the entire half mile radius both rank as Low-Medium.



Figure 3-2: Mount Dora Station (Alt. 1-5) Future Land Use Map



Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Mount Dora	Public Lands (PL)	36.54	n/a	0.7
	Mixed Use Traditional (MU-1)	35.69	35	3.0
	Residential – High (HD)	27.91	12	n/a
	Commercial (COMM)	17.28	n/a	0.65
	Office (OFF)	6.77	n/a	0.65
	Residential – Medium (MD)	4.82	6	n/a
Lake County	Urban Medium Density (MD)	160.36	7	0.5
	Urban High Density (HD)	139.59	12	2

Table 3-2-1: Mount Dora Station (Alt. 1-5) Future Land Uses

Table 3-2-2: Mount Dora Station (Alt. 1-5) Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
428.95	5.6	0.64	Low - Medium / Low - Medium

3.4 Eustis Station

The Eustis Station would be located along the FCEN rail corridor near Ferran Park in downtown Eustis. This station would be within walking distance of retail and restaurants that are in downtown Eustis. It is anticipated that park and ride service would be available through either construction of a new parking facility or use of an existing one. The adopted Central Business District Future Land Use near the proposed station is highly supportive of transit use. However, the average density and commercial intensity of the entire half mile radius rank Low-Medium and Low, respectively.







Table 3-3-1: Eustis Station Future Land Uses

Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Eustis	Suburban Residential (SR)	90.33	5	n/a
	Residential/Office Transition (RT)	87.85	12	1.0
	Central Business District (CBD)	63.33	40	2.0
	Public/Institutional (PI)	37.69	n/a	0.25
	Urban Residential (UR)	25.57	12	n/a
	General Commercial (GC)	25.32	n/a	0.25
	General Industrial (GI)	15.23	n/a	0.25
	Mobile Home/RV (MH/RV)	12.46	n/a	0.25
	Mixed Commercial/ Residential (MCR)	5.95	12	0.25
	Conservation (CON)	1.14	n/a	0.2

Table 3-3-2: Eustis Station Analysis Results

Total Acreage	Residential	Average	FTA Rating
	Density (Dwelling	Commercial	(Residential /
	Units/Acre)	Intensity (FAR)	Commercial)
364.87	7.4	0.35	Low - Medium / Low



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4

Viable Alternative 2-4

4.1 Introduction

This chapter provides a description of the adopted future land uses within a one-half mile radius around each station included in the Viable Alternative 2-4.

The following potential stations are included in this alternative:

- Existing LYNX Central Station (Express Bus)
- Amelia Street (Express Bus)
- Princeton Station (Express Bus)
- Rosemont Station (Express Bus)
- SR 429 Station (Express Bus)
- Mount Dora Station (Express Bus)
- Tavares/Eustis Station (Express Bus)

It is important to note that LYNX Central Station was not analyzed for future land use as it is an existing commuter rail station.

4.2 Amelia Street Station

The Amelia Street Station would be located at the intersection of US 441 and Amelia Street in the City of Orlando. This station would be located at the northern quadrant of Parramore, a community with a large transit-dependent population. Existing land uses near the station are a mix of retail, office, residential, and industrial. The adopted Mixed Use Corridor-Medium Future Land Use category immediately adjacent to the proposed station is highly supportive of transit use; however, the average density and commercial intensity of the entire half mile radius rank Medium and Low, respectively.





Figure 4-1: Amelia Street Station Future Land Use Map



Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Orlando	Residential - Low	190.22	12	0.3
	Industrial	81.35	40	0.7
	Mixed Use Corridor – Medium (MUC-MED)	74.37	30	0.5
	Residential - Medium	53.53	30	0.3
	Office - Low	29.79	21	0.4
	Office - Medium	7.87	40	0.7
	Urban Activity Center (UR-AC)	0.90	100	1.0

Table 4-1-1: Amelia Street Station Future Land Uses

Table 4-1-2: Amelia Street Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
438.03	11.5	0.15	Medium / Low

4.3 Princeton Station

The Princeton Station would be located near the intersection of US 441 and Princeton Street in the City of Orlando, near the College Park neighborhood. This station is also located near the Silver Star Industrial Park, a major employment center. Existing land uses near the station are predominantly retail/office and industrial. The adopted Urban Activity Center Future Land Use category is highly supportive of transit use and ranks high for residential, but low for commercial intensity.





Figure 4-2: Princeton Station Future Land Use Map

Table 4-2-1: Princeton Station Future Land Use

Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Orlando	Urban Activity Center (UR-AC)	263.56	100	1.0
	Industrial	115.07	40	0.7
	Residential - Low	105.22	12	0.3
	Public-Recreation- Institutional	10.59	n/a	n/a
	Office - Medium	4.70	40	0.7
	Neighborhood Activity Center (NEIGH-AC)	2.20	30	0.3
	Residential - Medium	1.21	30	0.3



Table 4-1-2: Princeton Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
502.56	28.9	0.43	High / Low

4.4 Rosemont Station

The Rosemont Station would be located near the existing LYNX Rosemont SuperStop (near the intersection of US 441 and Cinderlane Parkway). The SuperStop currently serves as the transfer point for five LYNX links and features two bus turn out bays, each with the capacity to accommodate three buses. This station would be located in the Rosemont neighborhood, which has a high transit-dependent population. The adopted Future Land Use category immediately adjacent to the proposed station is highly supportive of transit use; however, the average density and commercial intensity of the entire half mile radius rank Medium and Low, respectively.



Figure 4-3: Rosemont Station Future Land Use Map



Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Orlando	Industrial (IND)	178.64	40	0.7
	Residential – Medium (MDR)	130.33	30	0.5
	Community Activity Center (COMM-AC)	86.83	40	0.7
	Residential – Low (LDR)	70.70	12	0.3
	Mixed Use Corridor – Medium (MUC-MED)	24.96	30	0.5
	Public-Recreation- Institutional	9.53	n/a	n/a
	Office - Medium	5.42	40	0.7
Orange County	Commercial (C)	19.95	n/a	3.0
	Low Density Residential (LDR)	11.95	4	n/a
	Planned Development – Commercial (PD-C)	1.60	n/a	3.0
	Office	0.60	n/a	3.0

Table 4-3-1: Rosemont Station Future Land Uses

Table 4-3-2: Rosemont Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
540.52	12.7	0.43	Medium / Low

4.5 SR 429 Station

The SR 429 Station would be located near the interchange of SR 429 and US 441 in northwest Apopka. This station would provide regional connectivity through direct access to SR 429, a limited access roadway. It is anticipated that this location would have a commuter park and ride lot. Increasing residential density at this location is not recommended because it could encourage leapfrog sprawl outside of established urban areas.







Figure 4-4: SR 429 Station Future Land Use Map



Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Apopka	Industrial (IND)	180.90	n/a	0.6
	Mixed Use (MU)	37.21	15	2.0
	Commercial (COMM)	12.90	n/a	0.25
	Annexation (ANNEX)	11.89	n/a	n/a
	Residential – Very Low Suburban (RVLS)	5.23	2	n/a
	Residential – Low Suburban (RLS)	4.41	3.5	n/a
	Agriculture (AG)	3.89	1/5	n/a
	Residential – Low (RL)	3.88	5	n/a
	Institutional (INST_PU)	2.27	n/a	0.5
Orange County	Rural (R)	215.92	1/10	n/a
	Industrial (IND)	22.78	n/a	0.75
	Planned Development – Commercial (PD-C)	1.93	n/a	3.0
	Low Density Residential (RL)	30.70	4	n/a

Table 4-4-1: SR 429 Station Future Land Uses

Table 4-4-2: SR 429 Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
503.56	0.7	0.34	Low / Low

4.6 Mount Dora Station (Alternative 2-4)

The Mount Dora Station would be located in unincorporated Lake County, near the future interchange of SR 429 (Wekiva Parkway) and SR 46 in Lake County. The City of Mount Dora plans to annex this property for high-intensity employment and residential uses in this area after the Wekiva Parkway is constructed. The planned mixed use Kelly Park Crossings Development of Regional Impact (DRI) is adjacent to the site. It is anticipated that this location would have a park and ride lot for Wekiva Parkway commuters.





Figure 4-5: Mount Dora Station (Alt. 2-4) Future Land Use Map

Table 4-5-1: Mount Dora Station (Alt. 2-4) Future Land Uses

Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Mount Dora	Residential – Low (RL)	41.28	2.5	n/a
Lake County	Regional Office (OFF-REG)	433.04	1/10,000 sf of commercial	3.0
	Public Service (PL)	28.18	n/a	1.0



Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
433.03	11.5	2.64	Medium / High

Table 4-5-2: Mount Dora Station (Alt. 2-4) Analysis Results

4.7 Tavares/Eustis Station

The Tavares/Eustis Station would be located near the Florida Hospital-Waterman, which is a major employer in the area. The station, located near the intersection of US 441 and Mayo Drive/Huffstetler Drive is anticipated to have a commuter park and ride lot. A Comprehensive Plan Amendment to allow for dense residential density within the Commercial land use category would strengthen support for transit at this location.

Figure 4-6: Tavares/Eustis Station Future Land Use Map





Municipality	Future Land Use	Acreage	Maximum Residential Density (Dwelling Units/Acre)	Maximum Commercial Intensity (FAR)
City of Eustis	Mixed Commercial/ Industrial (MU)	84.00	n/a	0.25
	General Commercial (COM)	10.50	n/a	0.25
	Mixed Commercial/ Residential (MU)	6.99	12	0.25
	Public/Institutional (PI)	5.91	n/a	0.25
City of Tavares	Commercial (COM)	148.35	n/a	0.35
	Medium Density (MED)	107.22	12	n/a
	Low Density (LOW)	24.49	5.6	n/a
	High Density (HIGH)	18.10	25	n/a
Lake County	Regional Office (RO)	14.42	1/10,000 sf of commercial	3.0
	Urban Low Density (LDR)	13.01	4	0.35

Table 4-6-1: Tavares/Eustis Station Future Land Uses

Table 4-6-2: Tavares/Eustis Station Analysis Results

Total Acreage	Average Residential Density (Dwelling Units/Acre)	Average Commercial Intensity (FAR)	FTA Rating (Residential / Commercial)
433.03	4.9	0.37	Low / Low



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5 Results

5.1 Future Land Use Analysis Results

The results of the future land use analysis demonstrate that most of the communities within the Corridor Study Area have taken steps to adopt appropriate future land use classifications within the immediate vicinity of the proposed stations. These comprehensive plans, downtown master plans and other local neighborhood revitalization plans encourage compact community development patterns and densities that would support transit usage. However, when the entire one-half mile radius is evaluated, the majority of proposed stations (for all three Viable Build Alternatives) would not rank above Low-Medium using the FTA criteria described in the Introduction.

The Cities of Apopka, Eustis, Mount Dora, and Eustis could evaluate their comprehensive plans to increase the maximum permissible residential density within the one-half mile radii of the proposed stations that are located within the central business districts. This could occur during the Evaluation and Appraisal Report (EAR) process, allowing the community to analyze its ability to maintain adopted Level of Service (LOS) standards for public facilities, such as potable water, wastewater, roadways, and public schools, in conjunction with increased future residential density and commercial intensity. It is not recommended that residential density for proposed stations be increased, due to the potential for urban sprawl.

Viable Alternative 1-2 and Viable Alternative 1-5 have alignments that traverse the urban central business districts of the corridor study cities. Therefore, these Alternatives have the potential to serve more population than Viable Alternative 2-4, which serves several rural station locations without ample existing development.



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Technical Memorandum | Viable Alternatives Development and Screening

Appendix H: Technical Memorandum – Environmental Evaluation

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Technical Memorandum – Preliminary Environmental Evaluation



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Confidence Future

Introduction

1.1 Introduction

The purpose of this technical memorandum is to present the results of the preliminary environmental evaluation conducted for the US 441 Corridor Study. This document identifies potential impact or involvement with existing social, natural, cultural, and physical environmental conditions associated with the Viable Alternatives within the Study Area. The evaluation of potential environmental impact or involvement is based on literature research and desktop screening using Geographical Information Systems (GIS) data downloaded from the Florida Geographic Data Library (FGDL). The Florida Department of Transportation's (FDOTs) Project Development and Environment (PD&E) Manual, as well as federal and state regulations, provide the basis for this evaluation.

Existing environmental conditions were identified and documented in the US 441 Corridor Study Existing Conditions Report, dated August 2013. Under the FDOT Efficient Transportation Decision Making (ETDM) process, a Planning Screen was published in 2010 by FDOT on behalf of the Lake~Sumter Metropolitan Planning Organization (Lake~Sumter MPO) to document potential environmental issues associated with a commuter transit alternative along the Florida Central Railroad (FCEN) alignment from Orlando to Eustis and Mount Dora. The results of the US 441 Corridor Study Existing Conditions Report and ETDM Planning Screen were reviewed during this preliminary environmental evaluation. For reference, Chapter 5, Environmental Conditions, of the US 441 Corridor Study Existing Conditions Report is provided as Appendix A. The Orange Blossom Express Rail Project ETDM Planning Screen is provided as Appendix B. Environmental conditions identified and evaluated within the US 441 Corridor Study area include:

- Social features: land use, community facilities, and community cohesion;
- Natural resources: wetlands, threatened and endangered species, water quality, floodplains, and public lands (parks and recreation areas);
- Cultural resources: previously recorded historic and/or archaeological sites; and,



- - Physical environment: air quality, noise, vibration, and potential contamination sites.

The purpose of the preliminary environmental evaluation was to identify potential fatal flaws and/or significant impacts associated with environmentally sensitive areas. The results of this analysis has been used to evaluate potential transit alternatives developed for the study and will be used to further define the scope of services for any environmental impact assessments in subsequent project development phases. As a stand-alone document, this technical memorandum is divided as follows: Chapter 2, Project Description and Background; Chapter 3, Purpose and Need/Goals and Objectives; Chapter 4, Development of Alternatives; and, Chapter 5, Preliminary Environmental Evaluation. Once identified, the final Recommended Alternative will be included in this document. An updated ETDM Programming Screen prior to, or in conjunction with, the next phase of project development should be conducted on the Recommended Alternative to assist with scoping the environmental work effort in future project development.





2

Project Description and Background

2.1 Project Description and Background

The US 441 Corridor Study was conducted by FDOT in partnership with the Cities of Orlando, Apopka, Tavares, Eustis, and Mount Dora in addition to Orange and Lake Counties. The study builds upon current initiatives and long term policies to evaluate options for providing enhanced transit service between major activity centers in Orange and Lake Counties. Options for improved connectivity with SunRail, Central Florida's commuter rail system, were also evaluated. The US 441 Corridor Study considered a range of transit improvements by maximizing the major transportation assets present within the Study Area: US 441 and the adjacent Florida Central Railroad (FCEN) corridor.

The Study Area extends approximately 33 miles from Downtown Orlando northwest along US 441 and the FCEN corridor through Apopka and into Lake County, terminating in the City of Eustis. Portions of the Cities of Orlando, Apopka, Tavares, Mount Dora, and Eustis are included in the Study Area boundary. The Study Area contains areas of dense residential development in the City of Orlando and portions of Orange County; and traverses light industrial areas and sections of densely developed land uses in the downtown areas of Apopka, Eustis, Mount Dora, and Tavares. The Study Area includes major north-south arterial roadways serving Orange County, Lake County, and the cities of Apopka, Eustis, Mount Dora, and Tavares. The Study Area also includes portions of the following roadway facilities: SR 408, SR 50, Princeton Street, SR 423, SR 438, SR 414, SR 436, SR 429, SR 19, and SR 46. Figure 2-1 shows the US 441 Corridor Study Area.

The Study Area was defined by identifying a buffer area along US 441 and the adjacent short line rail corridor, the Florida Central Railroad (FCEN). The Study Area includes a one-mile buffer on either side of the FCEN corridor and a two mile buffer on either side of US 441. This larger buffer around US 441 recognizes that the transit improvement options could require alternative routes. At the northern and southern termini, the Study Area boundaries were refined to reflect the more urban character and areas where potential impacts could be anticipated.

US 441 is an important regional connector for commuters traveling between job centers in Lake County's "Golden Triangle" area (comprised of the City of Eustis, the City of Mount Dora, and the





City of Tavares), the City of Apopka, and downtown Orlando. The two facilities in the Study Area hold statewide and national importance. The FCEN rail line has statewide significance as a Strategic Intermodal System (SIS) Rail Corridor. US 441 has national significance being designated as a US Route.

The US 441 Corridor Study was conducted with guidance from Moving Ahead for Progress in the 21st Century (MAP-21) and the Federal Transit Administration's (FTA) New Starts process, which is the federal government's primary financial resource for supporting locally planned, implemented, and operated major transit capital investments. The MAP-21 guidance includes six (6) evaluation principles: mobility improvement; environmental benefit; congestion relief; economic development effect; cost effectiveness; and, land use. The results of the US 441 Corridor Study will be the identification of a Recommended Alternative which can then be evaluated as part of the FTA Project Development phase during which a more detailed environmental assessment would be performed in accordance with the National Environmental Policy Act (NEPA). This technical memorandum provides the basis upon which future evaluations can be performed regarding environmental benefits dependent upon the Recommended Alternative.







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3

Purpose and Need/Goals and Objectives

3.1 Purpose and Need

There are three primary issues that define the need for transit improvements within the Study Area: future traffic congestion, regional connectivity, and land use/economic development.

Future Traffic Congestion

Currently, the majority of the roadway segments within the corridor operate at or below capacity. By 2035, however, it is projected that approximately 59 percent of the corridor will operate over capacity and another 26 percent of the corridor will operate near capacity. These over-capacity segments on US 441 are from downtown Orlando to Zellwood and from Eustis to Tavares. Portions of SR 19 in Lake County and SR 50 in Orange County that are included in the Study Area are also expected to operate over capacity in 2035. Table 3-1 summarizes the Year 2035 Level of Service conditions for the Study Area roadway segments.

Table 3-1: Year 2035 Level of Service Summary

US 441 Segment Limits	Year 2035 # of Lanes	Acceptable LOS Standard	Year 2035 LOS
SR 50 to Lee Road / John Young Parkway	4	E	F
SR 423 / Lee Road / John Young Parkway to			
Piedmont Wekiva Rd	4	E	F
Piedmont Wekiva Road to SR 436	4	E	D
SR 436 to SR 429 / Western Beltway	4	E	F
SR 429 / Western Beltway to Sadler Road	4	E	F
Sadler Road to SR 46	4	D	С
SR 46 to SR 19 / Bay Street	6	D	С
SR 19 / Bay Street to SR 19 / Orange Avenue / N Duncan			
Drive	6	D	F

Source: 2012 FDOT LOS_ALL Update, Lake~ Sumter LRTP, MetroPlan Orlando LRTP



FDOT has funded the final design for the widening of US 441 from four to six lanes from SR 46 to SR 44 in Lake County; this project will continue the widening previously completed for the Lake County segments from SR 44 through Eustis and Tavares to Leesburg (west of the Study Area). Beyond this improvement, there are no adopted long-term plans to widen the corridor further. The Lake~Sumter MPO Long Range Transportation Plan identifies US 441 as a multimodal corridor, with an emphasis on long term transit improvements as an alternative to providing roadway capacity. The Lake~Sumter MPO has also adopted a Corridor Constraint Policy that limits US 441 to a maximum of six lanes. The comprehensive plans for the five cities and two counties in the Study Area do not identify further widening of US 441; however, transit investments could provide the additional capacity.

Regional Connectivity

Transit service in the Study Area is provided by LYNX within Orange County and Lake Xpress within Lake County. There is a connection point between the two systems in Zellwood, in northwest Orange County. Other transit transfer points within the Study Area are LYNX SuperStops in the Rosemont neighborhood of Orlando and downtown Apopka, as well as LYNX Central Station in downtown Orlando. Table 3-2 summarizes the existing transit service in the Study Area. Transit service frequency varies along the corridor, from 15 minute peak-period headways in Orlando to two-hour headways in Lake County. Similarly, transit ridership varies greatly, with daily ridership for routes ranging from 100 to over 2,000 riders per day. Within the Study Area, regional transit mobility is currently limited due to both the number of required transfers between transit routes and inconsistent service levels. Currently, a transit trip between downtown Orlando and the Golden Triangle area requires two transfers and takes a minimum of 1 hour and 45 minutes to complete, equating to an average speed of 11 miles per hour. These travel times are not competitive with the automobile (57-62 min via US 441), even after accounting for future congestion.

Route	Route Description	Span of Service	Service Frequency	FY 2012 Annual Ridership
LYNX Link 17	N US 441 / Apopka	4:45 AM to 1:35 AM	30/15/60 Min	778,227
		4:45 AM to 10:35 PM	30/60 Min	
		4:45 AM to 8:35 PM Sunday & Holiday	60 Min	
LYNX Link 44	Hiawassee Road / Zellwood	5:22 AM to 9:10 PM Monday - Saturday	60 Min	209,747
Lake Xpress Route 4	Umatilla to Zellwood	7:11 AM to 7:11 PM Monday – Friday	120 Min	35,925

Table 3-2: Primary Study Area Transit Routes

Source: LYNX Service Planning April 2013 Bid and September 2012 Ridership By Route Report www.ridelakexpress.com and Trips by Route file June 24, 2013

Note: The routes shown are those that operate along US 441. In addition to these routes, several east-west LYNX routes intersect with the US 441 corridor in Orange County.



The Study Area contains a higher percentage of transit dependent households than Orange and Lake Counties overall. Transit investments to enhance service provide an opportunity to improve mobility for this population group through increased access to employment centers and services. Improved transit service with an enhanced connection to SunRail, which serves as the north-south transit spine for the Central Florida region, could also give Study Area residents better access to select regional employment centers.

Land Use, Economic Development, and Community Redevelopment

Improved transit service will assist in implementing the Study Area communities' vision for population and employment growth. The Cities of Orlando, Apopka, Eustis, Mount Dora and Tavares all have adopted comprehensive plans identifying higher density or mixed-use development in their downtown areas. Orange and Lake Counties also have adopted policies supporting transit-oriented development. These land use plans are implemented through adopted transit-supportive land use and zoning regulations. Each community has one or more Community Redevelopment Agencies (CRAs), providing a potential funding mechanism for redevelopment and economic development within the Study Area's activity centers. Several sites adjacent to the FCEN rail corridor are designated as future industrial employment centers.

While adopted land use policies and regulations reflect the Study Area communities' commitment to transit-oriented development, transit investments and improved transit service are also needed to fulfill this vision. Currently, Orange County and the City of Orlando fund a portion of the annual operating costs for LYNX service. In 2013, the Cities of Tavares, Eustis, Mount Dora, Apopka, and Orlando as well as Orange and Lake Counties contributed local matching funds for upgrades to the Florida Central rail line. Transit improvements in the Study Area will help to support redevelopment efforts, encourage economic growth, and reinforce the communities' desired compact land use patterns.

Based upon the issues described above regarding the need for enhanced transit service within the Study Area, the following Purpose and Need Statement was developed:

"An improved transportation system has the potential to enhance the livability and economic health of the Study Area by providing better access to employment opportunities and basic services; by supporting the economic vitality of existing communities; by providing a range of transportation options for all ages, incomes and abilities; and by reducing household transportation costs. Public transportation improvements are needed within the US 441 Study Area to provide mobility alternatives to address future traffic congestion; improve regional transit connectivity for residents and employees; and support land use, economic development, and community redevelopment goals. There is a need to address projected deficiencies in roadway capacity, existing transit service and existing transit infrastructure with improvements that better serve the transit-dependent population, and provide improved connectivity between existing and proposed employment centers and other modal transportation systems, including SunRail. Transit improvements are also needed to implement the adopted transit-oriented land use visions of the Study Area communities."





3.2 **Goals and Objectives**

Building upon the Purpose and Need Statement, five project goals were developed and documented in the Goals and Objectives Statement. These goals were as follows:

- 1. Improve mobility and transportation access;
- 2. Enhance the livability and economic competitiveness of the Study Area through an improved transportation system;
- 3. Develop the most efficient transportation system, which maximizes limited resources for the greatest public benefit;
- 4. Develop a transit system consistent with adopted local and regional plans and policies; and
- 5. Preserve and enhance the environment, natural and cultural resources, and open space.

There were two specific objectives initially associated with Goal 5:

Objective 1: Minimize potential adverse impact on residences, businesses, and the built environment.

Objective 2: Minimize potential adverse impacts on the natural environment and preserve the character of existing rural communities.

Qualitative evaluation measures to address the objectives associated with Goal 5 were developed as follows:

- Minimizes widening of US 441 •
- Ability to preserve character of existing rural communities
- Minimizes potential to impact sensitive environmental areas •

These goals, objectives, and evaluation measures were utilized during the development of alternatives and preliminary environmental assessment for the US 441 Corridor Study.



4

Development of Alternatives

4.1 Development of Initial Alternatives

The process used to develop alternatives for the US 441 Corridor Study is documented in the Initial Alternatives Development and Screening Technical Memorandum, dated June 2014. That technical memorandum presents the formulation and screening of ten Initial Alternatives and identifies the three Initial Alternatives that were advanced to the list of Viable Alternatives. The Initial Alternatives were comprised of reasonable transit solutions that could address the needs identified in the Purpose and Need Statement and documented in the Goals and Objectives. Each of the Initial Alternatives was developed to support the project goals.

A No Build Alternative was also developed and is included in all analyses as a basis of comparison with the Build alternatives. These alternatives, along with all relevant data to be analyzed as part the Initial Alternatives screening are summarized in a set of fact sheets which are included in Appendix B of the *Initial Alternatives Development and Screening Technical Memorandum*. The Initial Alternatives developed for the US 441 Corridor are summarized below in Table 4-1.

The Initial Alternatives screening incorporated qualitative criteria with some quantitative criteria, tied to the Goals and Objectives, including a range of costs, travel time, and potential environmental impacts. The screening included a rating (Low, Medium, or High) for each criterion, which was applied to each Initial Alternative. The evaluation criteria and thresholds used to address Goal 5 are shown in Table 4-2.

In addition to the evaluation criteria for Goal 5, the overall ratings for the Initial Alternatives were evaluated to identify four alternatives (including the No Build Alternative) to advance to the Viable Alternatives phase. This evaluation was consistent with the desire to advance only the most feasible alternatives with the best potential to meet the Study Area needs and satisfy the project Goals and Objectives.

As part of the Initial Alternatives screening, Initial Alternative 2-5 was not evaluated. It was deemed infeasible to implement this alternative due to the need to purchase the FCEN right-of-way. (FCEN indicated that it would not be able to maintain freight operations along the line if



Initial Alternative 2-5 were implemented, thereby requiring acquisition of the corridor.) During the December 19, 2013 Project Advisory Group (PAG) meeting, the PAG approved the decision to eliminate this alternative from consideration.

Table 4-1: Summary of the Initial Alternatives

Alternative and Mode(s)	Premium Transit Route Alignments
Alternative 0-1	No Current or New Premium Transit Alignments
No Build	
Alternative 1-1	Commuter Rail: Downtown Orlando to Apopka
Commuter Rail and	(FCEN rail line)
Express Bus	
	Express Bus: Apopka to Lake County (US 441)
Alternative 1-2	Commuter Rail: Downtown Orlando to SR 429
Commuter Rail and	(FCEN rail line)
Express Bus	
	Express Bus: SR 429 to Lake County (US 441)
Alternative 1-3	Commuter Rail: Downtown Orlando to Zellwood
Commuter Rail and	(FCEN rail line)
Express Bus	
	Express Bus: Zellwood to Lake County (US 441)
Alternative 1-4	Downtown Orlando to Tavares/Eustis (FCEN rail
Commuter Rail	line)
Alternative 1-5	Downtown Orlando to Mount Dora and Eustis
Commuter Rail	(FCEN rail line)
Alternative 2-1	Downtown Orlando to Tavares/Eustis (US 441)
Express Bus	
Alternative 2-2	Downtown Orlando to Tavares/Eustis (US 441 with
Express Bus	Queue Jumps)
Alternative 2-3	Downtown Orlando to Tavares/Eustis (US 441 with
Bus Rapid Transit	Exclusive Lanes)
Alternative 2-4	Downtown Orlando to Tavares/Eustis (US 441, SR
Express Bus	414, SR 429, SR 46)
Alternative 2-5	Downtown Orlando to Tavares (US 441, FCEN
Bus Rapid Transit	Right-of-Way)

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Table 4-2: Initial Alternatives Evaluation Criteria - Goal 5

	Criteria				
Thresholds	5-1: Minimizes widening of US 441	5-2: Ability to preserve character of existing rural communities	5-3: Minimize potential to impact sensitive environmental areas		
High	Requires no widening	No potential stations are located in rural communities and no roadway widening is being proposed through rural communities. The rural character of these communities is preserved.	Potential stations and alignment are expected to have minimal impact on sensitive environmental areas.		
Medium	Requires widening of 5 miles or less	Roadway widening (either on US 441 or on FCEN railroad tracks) -OR- a potential station is being proposed in rural communities. Development can induce modest growth that would be in conflict with the rural character of these communities.	Potential stations and alignment are expected to have a moderate impact on sensitive environmental areas.		
Low	Requires widening greater than 5 miles	Roadway widening (either on US 441 or on FCEN railroad tracks) -AND- a potential station is being proposed in rural communities. Development can induce significant growth that would be in conflict with the rural character of these communities.	Potential stations and alignment are expected to have a significant impact on sensitive environmental areas.		

Note: Sensitive environmental areas include public lands, wild and scenic rivers, navigable water crossings, critical wildlife habitats, and sites listed (or eligible for listing) on the National Register for Historic Places.





The remaining Initial Alternatives were classified into three categories: Commuter Rail Only Alternatives, Bus Only Alternatives, and Commuter Rail/Express Bus Alternatives, as follows:

- Commuter Rail Only Initial Alternatives 1-4 and 1-5
- Bus Only Initial Alternatives 2-1 through 2-4
- Commuter Rail / Express Bus Initial Alternatives 1-1 through 1-3

The Commuter Rail Only Alternatives (Initial Alternatives 1-4 and 1-5) had several strengths when compared to the alternatives that utilized buses for all or a portion of the alignment. They included: competitive travel times with the auto, high travel time reliability, and a strong potential to attract choice riders and support compact development. The two major weaknesses, however, were higher capital, and operating and maintenance costs.

For the Bus Only Alternatives (Initial Alternatives 2-1 to 2-4), the primary strength was the lower capital, operating, and maintenance costs. However, the primary trade-offs with these alternatives were longer travel times, lower travel time reliability, and less potential to attract choice riders and support compact development.

The Commuter Rail/Express Bus Alternatives (Initial Alternatives 1-1 to 1-3) reflected aspects of both the Commuter Rail Only and Bus Only Alternatives. Capital, operating, and maintenance costs were significantly higher than the Bus Only Alternatives but lower than the Commuter Rail Only Alternatives. However, the Commuter Rail/Express Bus Alternatives had the longest end-to-end travel time, due to the transfer required between commuter rail and express bus. This resulted in modest travel time reliability, a modest potential to attract choice riders, and some potential to support compact development.

Tables 4-2 and 4-3 indicate that multiple alternatives achieved the same overall Medium-High rating, including ratings for Goal 5 where most of the ratings were High. As such, input was sought from the Project Advisory Group (PAG) to determine which alternatives advanced. At the January 16, 2014 and February 20, 2014 PAG meetings, the alternatives were discussed and ultimately selected.

During the meetings, careful consideration was given in selecting four Viable Alternatives, consisting of three Build and one No Build. The priority issues identified by the PAG were 1) regional mobility; 2) land use and economic development benefits; 3) cost efficiency; and 4) the ability to implement in phases. It was decided by the PAG that the three Viable Build Alternatives should consist of alternatives from each of the three categories (Commuter Rail Only, Bus Only, Commuter Rail/Express Bus). This was decided because it would allow for a wide range of comparisons regarding potential costs and transportation benefits, which in turn would allow for a better understanding of the cost-effectiveness of each of these modal combinations.

Among the Commuter Rail Alternatives, **Initial Alternative 1-5 was selected** because it serves more major employment centers than Initial Alternative 1-4, maximizing the ridership within the Study Area. Furthermore, Initial Alternative 1-5 serves more downtown areas than Initial Alternative 1-4, resulting in greater potential land use and economic development benefits, which is consistent with the land use plans and goals of Eustis, Tavares, and Mount Dora.



Table 4-3: Initial Alternatives Evaluation Ratings Matrix with Data

	Alt 1-1	Alt 1-2	Alt 1-3	Alt 1-4	Alt 1-5	Alt 2-1	Alt 2-2	Alt 2-3	Alt 2-4
Evaluation Criteria	Commuter Rail to Apopka, Express Bus to Lake County	Commuter Rail to SR 429, Express Bus to Lake County	Commuter Rail to Zellwood, Express Bus to Lake County	Commuter Rail to Tavares/Eustis	Commuter Rail to Eustis and Mount Dora	Express Bus via US 441 in Mixed Traffic	Express Bus via US 441 with Queue Jumps	BRT via US 441 with Exclusive Lanes	Express Bus via Limited Access Roads
Goal 5: Preserve and Enh	nance the Environment,	Natural and Cultural R	esources, and Open Spac	ce					
5-1: Minimizes widening of US 441	(High) No widening	(High) No widening	(Medium) About 5 miles of widening to construct queue jump lanes (1)	(Low) About 11.3 miles of widening to accommodate an exclusive bus lane (2)	(High) No widening				
5-2: Ability to preserve character of existing rural communities	(High) No impact	(High) No impact	(Medium) Station being proposed in Zellwood	(High) No impact	(High) No impact	(High) No impact	(High) Minimal impact (assume no impact)	(Medium) Constructs exclusive bus lanes along US 441	(High) No impact
5-3: Minimize potential to impact sensitive environmental areas (3)	(High) Minimal impact to sensitive environmental areas	(High) Minimal impact to sensitive environmental areas	(High) Minimal impact to sensitive environmental areas	(High) Minimal impact to sensitive environmental areas	(High) Minimal impact to sensitive environmental areas	(High) Minimal impact to sensitive environmental areas			
Goal 5 Overall	High	High	High	High	High	High	High	Medium	High
Overall (Average of overall score for each of the 5 goals)	Medium-High	Medium-High	Medium-High	High	High	Medium-High	Medium-High	Medium-High	Medium-High

1) Queue jump lanes were assumed to be provided in both directions at 22 intersections. Each queue jump was assumed to be 600 feet long.

2) Construction of the exclusive bus lane was proposed only in areas where right-of-way was available.

3) Sensitive environmental areas include public lands, wild and scenic rivers, navigable water crossings, critical wildlife habitats, and sites listed (or eligible for listing) on the National Register for Historic Places.

Legend

Rating of High	
Rating of Medium-High	
Rating of Medium	
Rating of Low	



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Among the Express Bus Alternatives, **Initial Alternative 2-4 was selected**. This alternative was selected because it was a low cost alternative that still had a competitive travel time with the auto. In comparison to this alternative, Initial Alternative 2-1 had a longer travel time despite having a similar capital cost. Initial Alternative 2-2 and Initial Alternative 2-3 had a high capital cost yet did not provide significantly lower travel times than Initial Alternative 2-4 and were not recommended.

Among the Commuter Rail/Express Bus Alternatives, **Initial Alternative 1-2 was selected**. This alternative was selected because it was the lowest cost alternative that provided regional connectivity (via SR 429 and the future Wekiva Parkway) and allowed for capturing the park-and-ride market. In addition, this alternative could be the first phase of a Commuter Rail system that eventually extends into Lake County. In comparison to this alternative, Initial Alternative 1-1 did not provide regional connectivity since it terminated in downtown Apopka. Initial Alternative 1-3 also provided regional connectivity but had a higher cost due to Commuter Rail service being provided further north, to Zellwood.

In summary, the following initial alternatives were recommended to be advanced to the list of Viable Alternatives:

- Alternative 1-2 (Commuter Rail to SR 429, Express Bus to Lake County)
- Alternative 1-5 (Commuter Rail to Eustis and Mount Dora)
- Alternative 2-4 (Express Bus via Limited Access Roads)

Alternative 0-1 (No Build) was also advanced to the list of Viable Alternatives.

Based on input from the PAG during the January and February meetings, the alternatives were refined as follows during the Viable Alternatives process:

- The project team explored the addition of queue jumps along US 441 for Alternatives 1-2 and 2-4. Queue jumps were evaluated but determined to be infeasible.
- The project team added a station in Zellwood for Alternatives 1-2 and 1-5 to address the economic development goals of Orange County for the area.
- The project team incorporated connecting bus service from the SR 429 Station to the existing LYNX SuperStop in downtown Apopka as a refinement to Alternative 2-4.

4.2 Description of Viable Build Alternatives

The Viable Build Alternatives for the US 441 Corridor Study project vary based on alignment, transit mode(s) of service, and infrastructure plans. A description of each Viable Build Alternative is provided below. Refer to Appendix D for station location maps.





4.2.1 Viable Alternative 1-2

This alternative will introduce Commuter Rail service from downtown Orlando to State Road (SR) 429 and Express Bus service from SR 429 to Tavares/Eustis. The following potential stations are included in this alternative:

- Orlando Health/Amtrak Station (existing Commuter Rail)
- Church Street Station (existing Commuter Rail)
- Robinson Street Station (Commuter Rail)
- Amelia Street Station (Commuter Rail)
- Princeton Station (Commuter Rail)
- Rosemont Station (Commuter Rail)
- Apopka Station (Commuter Rail)
- SR 429 Station (Commuter Rail and Express Bus)
- Zellwood Station (Express Bus)
- Mount Dora Station (Express Bus)
- Tavares/Eustis Station (Express Bus)

Robinson Street Station (Commuter Rail)

The Robinson Street Station would be located at the northwestern corner of Robinson Street and Hughey Avenue in Orlando's Parramore community.

Amelia Street Station (Commuter Rail)

The Amelia Street Station would be located along the FCEN rail corridor in the northeast corner of the intersection of Amelia Street and the Hames Avenue in the City of Orlando.

Princeton Station (Commuter Rail)

The Princeton Station would be located along the FCEN rail corridor near the intersection of US 441 and Princeton Street in the City of Orlando, near the College Park neighborhood.

Lockhart/Rosemont Station (Commuter Rail)

The Lockhart/Rosemont Station would be located along the FCEN rail corridor, south of Edgewater Drive between Clarcona-Ocoee Road and All American Boulevard, near the existing LYNX Rosemont SuperStop (near the intersection of US 441 and Cinderlane Parkway).

Apopka Station (Commuter Rail)

The Apopka Station would be located along the FCEN rail corridor at the existing LYNX Apopka SuperStop (east of the intersection of Central Avenue and M.A. Board Street).

SR 429 Station (Commuter Rail and Express Bus)

The SR 429 Station would be located along the FCEN rail corridor near the interchange of SR 429 and US 441 in northwest Apopka. It is proposed to be located in the southwest corner of the intersection of US 441 and Kitt Avenue/Connector Road.

Zellwood Station (Express Bus)

The Zellwood Transit Station is located adjacent to existing Zellwood and Zellwood Station Rural Settlement Areas in unincorporated Orange County. It is proposed to be located at the northwest corner of the intersection of US 441 and Jones Avenue.





Mount Dora Station (Express Bus)

The Mount Dora Station would be located at the southeast corner of the intersection of US 441 and Stoneybrook Hills Parkway in northwest Orange County. The station is proposed to be located within the existing Public Plaza.

Tavares/Eustis Station (Express Bus)

The Tavares/Eustis Station would be located near the Florida Hospital-Waterman, a major employer. The station, located at the northwest corner of the intersection of US 441 and Mayo Drive/Huffstetler Drive.

4.2.2 Viable Alternative 1-5

This alternative will introduce Commuter Rail service from downtown Orlando to Eustis and Mount Dora. The following potential stations are included in this alternative:

- Orlando Health/Amtrak Station (existing Commuter Rail)
- Church Street Station(existing Commuter Rail)
- Robinson Street Station (Commuter Rail)
- Amelia Street Station (Commuter Rail)
- Princeton Station (Commuter Rail)
- Rosemont Station (Commuter Rail)
- Apopka Station (Commuter Rail)
- SR 429 Station (Commuter Rail)
- Zellwood Station (Commuter Rail)
- Tavares Station (Commuter Rail)
- Mount Dora Station (Commuter Rail)
- Eustis Station (Commuter Rail)

Robinson Street Station (Commuter Rail)

The Robinson Street Station would be located at the northwestern corner of Robinson Street and Hughey Avenue in Orlando's Parramore community.

Amelia Street Station (Commuter Rail)

The Amelia Street Station would be located along the FCEN rail corridor in the northeast corner of the intersection of Amelia Street and the Hames Avenue in the City of Orlando.

Princeton Station (Commuter Rail)

The Princeton Station would be located along the FCEN rail corridor near the intersection of US 441 and Princeton Street in the City of Orlando, near the College Park neighborhood.

Lockhart/Rosemont Station (Commuter Rail)

The Lockhart/Rosemont Station would be located along the FCEN rail corridor, south of Edgewater Drive between Clarcona-Ocoee Road and All American Boulevard, near the existing LYNX Rosemont SuperStop (near the intersection of US 441 and Cinderlane Parkway).





Apopka Station (Commuter Rail)

The Apopka Station would be located along the FCEN rail corridor at the existing LYNX Apopka SuperStop (east of the intersection of Central Avenue and M.A. Board Street).

SR 429 Station (Commuter Rail)

The SR 429 Station would be located along the FCEN rail corridor near the interchange of SR 429 and US 441 in northwest Apopka. It is proposed to be located in the southwest corner of the intersection of US 441 and Kitt Avenue/Connector Road.

Zellwood Station (Commuter Rail)

The Zellwood Transit Station is located adjacent to existing Rural Settlement Areas in unincorporated Orange County. It is proposed to be located at the northwest corner of the intersection of US 441 and Jones Avenue.

Tavares Station (Commuter Rail)

The Tavares Station would be located near Wooton Park near downtown Tavares. It is proposed to be located at the northeast corner of the intersection of Maine Street and Disston Avenue.

Mount Dora Station (Commuter Rail)

The Mount Dora Station would be located along the FCEN rail corridor, on the south side of Old US Highway 441 between Eudora Road and Poinsettia Drive in the existing Mount Dora Shopping Plaza, approximately 2 miles west of downtown Mount Dora.

Eustis Station (Commuter Rail)

The Eustis Station would be located along the FCEN rail corridor near Ferran Park in downtown Eustis, on the west side of Bay Street between Clifford Avenue and McDonald Avenue.

4.2.3 Viable Alternative 2-4

This alternative will introduce Express Bus service from downtown Orlando to Tavares/Eustis. The following potential stations are included in this alternative:

- Existing LYNX Central Station (Express Bus)
- Amelia Street Station (Express Bus)
- Princeton Station (Express Bus)
- Rosemont Station (Express Bus)
- SR 429 Station (Express Bus)
- Mount Dora Station (Express Bus)
- Tavares/Eustis Station (Express Bus)

Amelia Street Station (Express Bus)

The Amelia Street Station would be located along the FCEN rail corridor in the northeast corner of the intersection of Amelia Street and the Hames Avenue in the City of Orlando.

Rosemont Station (Express Bus)

The Rosemont station is proposed to operate via the existing Rosemont SuperStop bus station, which is located at the west side of US 441 between All American Boulevard and Cinderlane Parkway.





SR 429 Station (Express Bus)

The SR 429 Station would be located along the FCEN rail corridor near the interchange of SR 429 and US 441 in northwest Apopka. It is proposed to be located in the southwest corner of the intersection of US 441 and Kitt Avenue/Connector Road.

Mount Dora Station (Express Bus)

The Mount Dora Station would be located in unincorporated Lake County, near the future interchange of SR 429 (Wekiva Parkway) and SR 46 in Lake County.

Tavares/Eustis Station (Express Bus)

The Tavares/Eustis Station would be located near the Florida Hospital-Waterman, a major employer. The station, located near the intersection of US 441 and Mayo Drive/Huffstetler Drive is anticipated to have a park and ride lot.

Maps of the Viable Build Alternatives are located in Figures 4-1, 4-2, and 4-3.





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5

Preliminary Environmental Evaluation

5.1 Introduction

The preliminary environmental evaluation for the US 441 Corridor Study was conducted using a three-step process as described below. Qualitative assessments of potential environmental impact or involvement for the US 441 Corridor Study were based on literature research, desktop reviews of existing data, and limited field investigations. More detailed environmental impact assessments will be performed during subsequent project development phases.

Step 1 of the preliminary environmental evaluation involved GIS-based data collection and analysis of existing conditions related to social, natural, cultural, and physical environmental features within the Study Area. The results of Step 1 were documented in the US 441 Corridor Study Existing Conditions Report, dated August 2013. Appendix A of this technical memorandum includes Chapter 5, Environmental Conditions, of the Existing Conditions Report.

Step 2 involved an assessment of the Initial Alternatives. The focus of the preliminary environmental evaluation at this stage was to identify potential fatal flaws or areas of critical concern within environmentally sensitive areas resulting from implementation of enhanced transit service within the Study Area. A qualitative assessment of each Initial Alternative was provided in terms of how well the alternative satisfied project goals and objectives with an emphasis on Goal 5: preserve and enhance the environment, natural and cultural resources, and open space. The results of the environmental evaluation for the Initial Alternatives are summarized in Chapter 4 of this technical memorandum and in the *Initial Alternatives Development and Screening Technical Memorandum* dated June 2014. No environmental fatal flaws were identified and all alternatives were deemed to have a medium to high probability of satisfying Goal 5.

Step 3 was focused on evaluating potential environmental impact or involvement associated with the Viable Alternatives including the No Build Alternative, Viable Build Alternatives and proposed station area locations. Proposed enhanced transit service for the Viable Build Alternatives would be located within existing rights-of-way either along the existing FCEN railroad corridor and/or along existing roadway corridors. The primary focus of the preliminary environmental evaluation in this step was focused on the station area locations. The remainder of this section presents the results of the preliminary environmental evaluation for the Viable Alternatives.



5.2 Environmental Characteristics and Evaluation Criteria

Environmental characteristics identified and evaluated within the US 441 Corridor Study area include:

- Social features such as land use, community facilities, and community cohesion;
- Natural resources such as wetlands, threatened and endangered species, water quality, floodplains, and public lands (parks and recreation areas);
- Cultural resources such as previously recorded historic and/or archaeological sites; and,
- Physical environmental conditions such as air quality, noise, vibration, and potential contamination sites.

Evaluation criteria were developed to provide a qualitative assessment of potential environmental impact for the Viable Alternatives including station area locations. The qualitative assessment started by simply identifying whether or not a particular environmental condition was present within or in close proximity to each alternative ("yes" or "no"). Evaluation criteria for the qualitative assessment were developed to assign an order of magnitude assessment (i.e., "minimal", "moderate", and "enhanced") for each topical category addressing social, natural, cultural, and physical environmental features. Table 5-1 provides a description of the evaluation criteria used in this order of magnitude assessment.



Criteria	Description	Rating System
Physical		
Air Quality	Limited research was conducted to identify air quality issues and whether the county has been designated as being in attainment under the Clean Air Act. A determination was made on whether the transit investment would improve air quality in the area. A qualitative analysis was also completed to understand the potential impact on total vehicle miles traveled.	 ★ "Enhanced" represents an enhanced degree of effect on air quality and the county is designated attainment • "Minimal represents a none to minimal degree of effect for air quality and/or the county is designated as nonattainment ◆ "Moderate" represents substantial degree of effect due to degradation of air quality and/or the county is designated as nonattainment
Coastal	The project is not located in a coastal area and will not impact any coastal or marine resources.	• "Minimal represents no involvement with coastal or marine resources



Table 5-1:	Evaluation Criteria and Rating System
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Criteria	Description	Rating System	I
		↑ "Enhanced"	represents an enhanced degree of effect on noise due to no involvement or no anticipated impacts to noise sensitive land uses or sites
Noise	A geospatial analysis was performed to identify noise sensitive land uses and to identify noise sensitive sites.	● "Minimal	represents a minimal to moderate degree of effect on noise due to the minor anticipated impacts and/or the predicted need for a noise analysis to determine the level of impacts to noise sensitive land uses or sites
			represents a substantial degree of effect on noise due to major anticipated impacts to noise sensitive land uses or sites and/or the predicted need for a noise analysis to determine the level of impacts to noise sensitive land uses or sites
	Field reviews and a limited desktop analysis of USEPA and	↑ "Enhanced"	represents no risk to the proposed transit improvements from potential contamination due to no involvement
Contamination	FDEP databases was conducted to identify potentially contaminated sites and known contaminated sites.	• "Minimal"	represents minimal risk to the proposed transit improvements from potential contamination due to negligible presence of potentially contaminated sites
			represents a substantial risk to the proposed transit improvements from potential contamination due to major presence of potentially contaminated sites
Natural			
		↑ "Enhanced"	represents no impacts to wetlands (0 acres of impact)
Wetlands and Other Surface Waters	A GIS review of the National Wetland Inventory (NWI) dataset was conducted to identify wetlands and	• "Minimal	represents minor impacts to wetlands (0-10 acres of impact)
	determine potential impacts.	♥ "Moderate"	represents major impacts to wetlands (>10 acres of impact)

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Criteria	Description	Rating System	ı
Floodplains	A GIS analysis of Federal Emergency Management Agency (FEMA) digital Flood Insurance Rate Map (FIRM) maps was conducted to determine potential impacts on floodplains.	↑ "Enhanced"	represents no impacts on floodplains (0 acres of impact)
		• "Minimal"	represents minor floodplain impacts (0-10 acres of impact)
			represents major floodplain impacts (>10 acres of impact)
	GIS was used to identify potential impaired waters and OFWs within the project area. Florida Department of	↑ "Enhanced"	represents no impact on impaired waters or OFWs
Water Quality (Impaired Waters and Outstanding Florida Waters (OFW))	Environmental Protection's (FDEP) Watershed Assessment Section's database lists water bodies that fail to attain designated use and/or meet minimum criteria for surface waters established in the Surface Water Quality Standards (62-302, Florida Administrative Code) and Impaired Waters Rule (IWR, 62-303, Florida	• "Minimal"	represents the project is within a watershed of impaired waters
			represents the project will impact an OFW
	Administrative Code). FDEP's OFW dataset contains OFW boundaries per Section 62-302.700, Florida		
	Administrative Code. An OFW is water designated worthy		
	of special protection because of its natural attributes.		



Criteria	Description	Rating System			
Threatened and Endangered Species	A GIS analysis was conducted to evaluate the potential impact to wildlife and habitat areas. The US Fish and Wildlife Service (USFWS) Wood stork rookery database and USFWS Research Institute Water Bird Locator were reviewed to determine if the project is located within the 15-mile Central Florida Region core foraging area of a Wood stork rookery. Florida Fish and Wildlife Conservation Commission's (FFWCC) eagle's nest databases were reviewed to determine the location of potentially active nests. USEWS databases for Florida	↑ "Enhanced	represents no involvement with protected wildlife and their habitat		
		• "Minimal"	represents involvement with either protected species habitat or an agency consultation area		
			represents involvement with both protected species habitat and an agency consultation area		
	protected species consultation areas were also reviewed.				
Parklands and Section 4(f)	A GIS analysis was conducted to identify parklands, recreation areas, state parks, national forests, city parks, and Florida managed lands.	↑ "Enhanced	represents no involvement with these resources		
		• "Minimal"	represents minor involvement (no direct impact) with these resources		
			represents major involvement (direct impact) with these resources		
Cultural					
Historic Resources	Site observations and a GIS review of the current State Historic Preservation Office (SHPO) databases were	↑ "Enhanced"	represents no involvement with historic sites		
	conducted to identify potential historic resources	• "Minimal	represents minor involvement with historic sites		
	including buildings, sites, districts, and other resources.		represents major involvement with historic sites		
Social					
Community Services	A desktop analysis of GIS data was used to identify the	↑ "Enhanced"	represents no involvement with community services		
	community service facilities within the project area. Community service buildings include hospitals, government buildings places of worship day care	• "Minimal	represents minor involvement with community services		
	centers, community centers, and social service buildings.	♥ "Moderate"	represents major involvement with community services		





Criteria	Description	Rating System
	Municipal land use plans, community redevelopment plans, proposed planned developments (such as developments of regional impact (DRI) and planned unit developments (PUDs) from the Florida Department of	★ "Enhanced" represents surrounding land use is or is planned to be densely developed and supportive of transit infrastructure investments
Land Use	Economic Opportunity, and site observations were used to evaluate the impact of the proposed project on land use patterns.	• "Minimal" represents surrounding land use is partially developed with the potential for more infill development
		♥ "Moderate" represents surrounding land use pattern is low intensity or sparsely developed and not supportive of transit investments



The following is a summary of the preliminary environmental evaluation using the evaluation criteria presented in Table 5-1. Additional GIS-based data for environmental conditions associated with each of the Viable Build Alternatives is provided in Appendix C. This data was generated using a 250-foot wide buffer from the centerline of each Viable Build Alternative (500 feet total) to further document environmental features in close proximity to the proposed improvement. Direct impacts at proposed station area locations, where applicable, were also evaluated as part of this preliminary environmental evaluation. Please refer to Appendix D, Proposed Station Area Maps.

5.3 Social Environment

Potential impacts to surrounding land uses and community facilities were evaluated as part of the social environment. The Viable Alternatives were assessed in terms of impacts to existing land uses (for proposed station locations), consistency with local adopted land use plans, community cohesion and potential Environmental Justice (Executive Order 12898) concerns.

<u>Land Use-</u>Direct impacts will occur in areas where new transit stations require right-of-way acquisition and development; however, these improvements will be developed in accordance with locally adopted land use plans, land development regulations and transit-oriented development (TOD) policies, where applicable. As a result, this criterion was rated as "enhanced" \uparrow for being supportive of local land use plans for the Viable Build Alternatives and "minimal" • for the No Build Alternative.

Viable Alternative 1-2 has a high consistency with adopted local land use plans with five of the seven potential stations (approximately 71 percent) being consistent in terms of land use types and intensities that support transit. The two potential stations that are not consistent are the SR 429 Station and the Mount Dora Station. This alternative will provide moderate permanent transit station infrastructure to support compact development. Alternatives with only Commuter Rail service were assumed to have stronger permanence. This alternative is also consistent (in both mode and alignment) with both the MetroPlan Orlando and the Lake~Sumter Metropolitan Planning Organization long range transportation plans and is mostly consistent in alignment with LYNX and LakeXpress planning efforts.

Viable Alternative 1-5 has a high consistency with adopted local land use plans with seven of the eight potential stations (approximately 88 percent) being consistent in terms of land use types and intensities that support transit. The potential station that is not consistent is the SR 429 Station. This alternative will provide significant permanent transit station infrastructure to support compact development. Alternatives with bus service were assumed to have less permanence. This alternative is consistent (in both mode and alignment) with both the MetroPlan Orlando and the Lake~Sumter Metropolitan Planning Organization long range transportation plans and is mostly consistent in alignment with LYNX and LakeXpress planning efforts.

Viable Alternative 2-4 has a high consistency with adopted local land use plans with six of the seven potential stations (approximately 86 percent) being consistent in terms of land use types and intensities that support transit. The potential station that is not consistent is the SR 429 Station. This alternative will provide minimal permanent transit station infrastructure to support compact development. Alternatives with Commuter Rail service were assumed to have stronger permanence. This alternative is consistent in alignment with both the MetroPlan Orlando and the Lake~Sumter



Metropolitan Planning Organization long range transportation plans and is consistent in mode and alignment with LYNX and LakeXpress planning efforts.

<u>Community Services</u>-There is a variety of community services adjacent to the US 441 and FCEN corridors, particularly in the downtown areas. None of the Viable Alternatives are expected to directly impact any of these resources or interfere with existing community services. In fact, the Viable Build Alternatives would provide better access to community services such as hospitals, schools, government buildings, and community centers. As a result, this criterion was rated as "enhanced" ↑ for no direct involvement with community services with any of the Viable Build Alternatives and "enhanced" ↑ for community cohesion. Stations utilizing existing rail right-of-way tracks will cause minimum disruption to the cohesion and circulation pattern in the surrounding neighborhoods and proposed stations and parking facilities to be developed on vacant sites will not adversely impact community cohesion.

<u>Environmental Justice</u>-Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations", was signed by President Clinton in 1994 to focus federal attention on the environmental and human health conditions of minority and low-income populations. The goal of Environmental Justice is to achieve environmental protection for all communities. Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

The Viable Build Alternatives would provide enhanced transit service and generally provide an affordable transportation alternative or choice for low income and minority populations within the Study Area. These alternatives would also provide enhanced access to employment areas and/or opportunities serving this segment of the population. There are no direct impacts (residential relocations) in areas of environmental justice concern. The ETDM screening conducted in 2010 for a rail alternative only assigned summary degrees of effect ranging from none to minimal and enhanced for all community related attributes. At this level of study, Environmental Justice does not appear to be an issue since enhanced transit service within the corridor could be presented as a positive benefit; therefore, all of the Viable Build Alternatives would have a rating of "enhanced" ↑. Throughout the US 441 Corridor Study, several opportunities for public comment were provided through several public engagement activities including public open houses, meetings, electronic surveys, and attendance at community events.

The No Build Alternative would not provide the same level of enhanced transit service as the Viable Build Alternatives. As a result, transportation alternatives and choices and access to community services and employment opportunities would be more limited; therefore, the No Build Alternative would have a rating of "minimal" •.

5.4 Natural Environment

<u>Wetlands</u>-Wetland systems located within 250 feet from the centerline of each Viable Build Alternative range from approximately 77 to 152 acres; however, direct impacts resulting from the


development of the Viable Build Alternatives are very minimal (less than 5 acres total) and may only be anticipated in the vicinity of the Mount Dora Station for Alternative 1-2 and Eustis Station for Alternative 1-5. As a result, this criterion was rated as "minimal" • for the Viable Build Alternatives and "no involvement" for the No Build Alternative.

<u>Floodplains</u>-Existing 100-year floodplain systems located within 250 feet from the centerline of each Viable Build Alternative range from approximately 51 to 156 acres; however, no direct impacts are anticipated. As a result, this criterion was rated as "minimal" • for the Viable Build Alternatives and "no involvement" for the No Build Alternative.

<u>Water quality</u>-Minimal impacts to water quality are anticipated in conjunction with all Viable Build Alternatives since no Outstanding Florida Waters are located within the 500-foot buffer. Impaired water bodies as defined by the Florida Department of Environmental Protection (FDEP) were documented within the 500-foot buffer for all Viable Build Alternatives. While the GIS data indicated a range of approximately 253 to 430 acres of impaired water bodies within the buffer, most of this area is associated with the Wolf Branch Watershed in Orange and Lake Counties. Direct impacts to these systems are anticipated to be minimal. Best management practices during the design of stormwater management for any of the Viable Build Alternatives will ensure that water quality impacts are minimized or avoided. As a result, this criterion was rated as "minimal" • for the Viable Build Alternatives and "no involvement" for the No Build Alternative.

Threatened and Endangered Species-Direct impacts to threatened and endangered species are anticipated to be "minimal" ● for the Viable Build Alternatives and No Build Alternative; however, the Study Area is located within the following consultation areas: Wood Stork, Red Cockaded Woodpecker, Scrub Jay and the Lake Wales Ridge Plant Association. There is one eagles' nest and Wood Stork Rookery in close proximity to the Study Area. As a result, this criterion was rated as "moderate" ♥ for the Viable Build Alternatives and "no involvement" for the No Build Alternative. Coordination with the US Fish and Wildlife Service and Florida Fish and Wildlife Commission will be required to avoid and/or minimize potential impacts to threatened and endangered species habitat during subsequent project development phases.

Public Lands (Parks and Recreation Areas)-Section 4(f) of the US Transportation Act of 1966 provides special protection for public lands including parks and recreation areas, wildlife refuges and conservation areas on federally-funded actions. While there are several local parks, recreational facilities and conservation areas within the Study Area, none of these resources will be directly affected by the Viable Build Alternatives. Further coordination with federal lead agencies such as the Federal Transit Administration (FTA) and Federal Highway Administration (FHWA) will be required during subsequent project development phases to further document this condition and to avoid and/or minimize potential impacts to Section 4(f) resources. As a result, this criterion was rated as "minimal" • for the Viable Build Alternatives and "no involvement" for the No Build Alternative.

5.5 Cultural Environment

<u>Historic and/or Archaeological Sites</u>-A review of the Florida Department of State, Division of Historic Resources GIS data base and related GIS layers was conducted to identify previously recorded historic and/or archaeological sites within the Study Area. Much of the Study Area has been previously surveyed for cultural resources and portions of the existing transportation facilities within the region have been evaluated by the State Historic Preservation Officer (SHPO). There are several designated



historic districts within the downtown areas of Orlando, Apopka, Mount Dora, Tavares and Eustis. The existing rail corridor is also potentially historic. Potential impacts to existing cultural resources may occur through implementation of any of the Viable Build Alternatives; however, further coordination with the SHPO and SHPO concurrence will be required during subsequent project development phases. To mitigate potential aesthetic concerns within these downtown areas related to historic districts, the design of station platforms and canopies can be architecturally compatible with the design of nearby historic resources. As a result, this criterion was rated as "minimal" • for the Viable Build Alternatives.

5.6 Physical Environment

<u>Air Quality</u>-Orange and Lake Counties are designated as being in attainment for all of the National Ambient Air Quality standards under the criteria provided in the Clean Air Act. Therefore, the Clean Air Act conformity requirements do not apply to the project. Further detailed analysis of anticipated ridership may be needed in subsequent project development phases to quantify reductions in Greenhouse gas emissions resulting for reductions in vehicle miles travelled (VMT). Air quality improvements, however, can be expected with the Viable Build Alternatives due to reduced VMT. As a result, this criterion was rated as "enhanced" ↑ for the Viable Build Alternatives and "minimal" • for the No Build Alternative.

<u>Noise</u>-The basic goals of noise and vibration criteria, as they apply to transit projects, are to minimize the adverse noise and vibration impacts on the community and to provide feasible and reasonable noise and vibration control where necessary and appropriate,

Several types of criteria are used to assess the impacts of noise and vibration from transportation projects. These include FHWA highway traffic noise abatement criteria and FTA transit noise guidelines. Both the FHWA and FTA criteria are based on land use category. For this study, the proposed transit alignments do not include any modification or expansions to existing roadways and therefore impact assessment can be evaluated based solely using FTA transit guidelines. The FTA guidelines for land use categories and noise metrics used in impact assessment are presented in Table 5-2.

There are numerous potential noise sensitive sites located within the buffer (250-foot wide from the centerlines) for all Viable Build Alternatives. The proposed transit operational improvements are not expected to noticeably alter ambient noise levels or create vibration impacts; however, an assessment of noise impacts from rail and transit facilities shall be completed consistent with Part 2, Chapter 17 of the PD&E Manual and using the Federal Railroad Administration (FRA) guidance "Railroad Noise Emissions Compliance Regulations" and FTA guidance "Transit Noise and Vibration Impact Assessment." As a result, this criterion was rated as "moderate" ♥ for the Viable Build Alternatives and "minimal" ● for the No Build Alternative.

<u>Contamination</u>–There are several contaminated sites located within the Study Area and GIS buffer areas for all Viable Build Alternatives (see Appendix C). Several proposed stations involving right-of-way acquisition include developed sites that may contain potential contamination. A Level I



Contamination Screening Evaluation Report (CSER) would be required during subsequent project development phases for any of the Viable Build Alternatives to assess the potential risk of involvement with these sites. As a result, this criterion was rated as "moderate" ♥ for the Viable Build Alternatives and "minimal" • for the No Build Alternative.

Table 5-2: FTA Guidelines Land Use Categories and Metrics for Transit Noise

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor L _{eq} (h)*	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land used as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Outdoor L _{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor L _{eq} (h)*	Institutional land uses with primary daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material.

L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.
 Source: FTA Transit Noise and Vibration Impact Assessment (May 2006)

5.7 Other Environmental Factors and Class of Action Determination

Other environmental factors to consider in implementing any of the Viable Build Alternatives include benefits such as reductions in energy consumption (measured in terms of reduced vehicle miles travelled and potential reductions in CO₂ emissions), aesthetic enhancements at proposed station locations and potential short-term impacts during construction.

Based on the Year 2035 ridership forecasts for each of the Viable Build Alternatives, minor reductions in vehicular traffic on existing roadways within the Study Area, particularly along US 441, are anticipated. These reductions would result in less vehicle-miles travelled along US 441 resulting in minor reductions in CO_2 emissions.

For any of the Viable Build Alternatives, there would be opportunities to provide aesthetics enhancements through transit-oriented development and land-use planning. These opportunities could also enhance local community identity particularly through designated historic districts located throughout the Study Area.

The Viable Build Alternatives considered would require varying degrees of construction with respect to developing site features associated with proposed station locations (parking areas, shelters, platform areas, stormwater management areas, etc.). Standard specifications and best management



practices would be developed during the engineering design phase to minimize and/or avoid potential short-term impacts to air quality, water quality, noise and vibration during construction. For any of the Viable Build Alternatives, the level of environmental analysis, review and documentation necessary to satisfy the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended, known as Class of Action (COA), would be determined as part of FTA's Project Development phase. Scoping is an important part of the COA Determination and involves coordination with the lead agency responsible for implementing the NEPA process. In this case the lead agency would be FTA. The results of the US 441 Corridor Study, including this preliminary environmental evaluation, can be used as a basis for scoping the subsequent project development phase and developing the Class of Action Determination for any of the Viable Build Alternatives.

5.8 Summary

There are no significant issues or fatal flaws associated with any of the Viable Alternatives evaluated for the US 441 Corridor Study. While there are minor direct impacts to the social, natural, cultural, and physical environments, these can be further addressed and mitigated in subsequent project development phases.

Table 5-3 provides a summary of the preliminary environmental evaluation presented in this section and includes an overall order of magnitude assessment by alternative.



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Table 5-3: Summary of Preliminary Environmental Evaluations

		Alt 1-2	Alt 1-5	Alt 2-4	Alt 0-1
Evaluation Criteria		Commuter Rail to SR 429, Express Bus to Lake County	Commuter Rail to Eustis and Mount Dora	Express Bus via Limited Access Roads	No Build Alternative
Socia	l Environment				
1.	Land Use	Enhanced 个	Enhanced 个	Enhanced 个	Minimal
2.	Community Services	Enhanced 个	Enhanced 个	Enhanced 个	Minimal
3.	Environmental Justice	Enhanced 个	Enhanced 个	Enhanced 个	Minimal
Natu	ral Environment				
1.	Wetlands	Minimal●	Minimal●	Minimal●	No Involvement
2.	Floodplains	Minimal●	Minimal●	Minimal●	No Involvement
3.	Water Quality	Minimal●	Minimal●	Minimal●	No Involvement
4.	Threatened and Endangered Species	Moderate 🗸	Moderate 🗸	Moderate 🗸	No Involvement
5. (Pa	Public Lands arks and Recreations)	Minimal●	Minimal●	Minimal●	No Involvement
Cultu	ral Environment				
1.	Historic/Archaeological Sites	Minimal●	Minimal●	Minimal●	No Involvement
Physical Environment					
1.	Air Quality	Enhanced $m{\uparrow}$	Enhanced 个	Enhanced $m{\uparrow}$	Minimal
2.	Noise	Moderate 🗸	Moderate 🗸	Moderate 🗸	Minimal
3.	Contamination	Moderate 🗸	Moderate 🗸	Moderate	Minimal
	Overall Minimal-Moderate Minimal-Moderate Minimal-Moderate				Minimal

Technical Memorandum | Preliminary Environmental Evaluation



APPENDIX A

US 441 EXISTING CONDITIONS REPORT CHAPTER 5: ENVIRONMENTAL CONDITIONS



5

Environmental Conditions

5.1 Introduction and Background

This environmental conditions chapter is an overview of the various cultural, recreational and environmentally sensitive resources within the US 441 Corridor Study Area. The Florida Department of Transportation's (FDOTs) Project Development and Environment (PD&E) Manual, as well as federal and state regulations, provides the basis for identifying these resources.

The environmental conditions were identified and reviewed using Geographical Information Systems (GIS). For the environmental conditions analysis, the Study Area is divided into three analysis areas, as described below and illustrated on Figure 1-3. The analysis presented here documents environmental and cultural conditions for the three areas: (1) directly adjacent to the corridors; (2) proximate to US 441 and the FCEN rail line; and (3) within the US 441 Study Area. The analysis buffers reflected in the tables and text on the following pages are defined as follows:

- Abutting: 100 feet from the center of the existing FCEN railroad, in each direction, for a total width of 200 feet; 200 feet from the center of the existing US 411 facility, in each direction, for a total width of 400 feet.
- One Mile: one mile from the center of each facility for a total width of two miles.
- Study Area: As shown on the following maps and described above.

Base line data reported in this chapter provides the basis upon which more detailed environmental assessments will be conducted in subsequent project development phases.

The remainder of this chapter summarizes the following topics:

- Cultural resources
- Parklands and recreational resources
- Air quality
- Noise
- Waters of the US
- Water quality
- 100-year floodplain



- Contaminated sites
- Endangered and protected species habitat

5.2 Cultural Resources

Cultural resources are defined by the National Historic Preservation Act (NHPA) of 1966 and governed by federal and state regulations. Section 106 of the NHPA provides a general process for cultural resource assessments and requires that historic and archaeological resources be considered in project planning for federally funded or permitted projects. Cultural resources or "historic properties" include any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the *National Register of Historic Places (NRHP)."* The NRHP places high importance on its listed resources giving them higher priority for preservation. A formal Cultural Resources Assessment Survey (CRAS) will be performed during subsequent project development phases to identify additional cultural resources.

Desktop reviews of the *NRHP* and the digital database of the Florida Master Site File (FMSF) were conducted to determine the presence of archaeological and/or historic resources within the US 441 Study Area. As a result of this review, any archaeological sites or historic resources that are listed, determined eligible, or considered potentially eligible for listing in the NRHP have been mapped and tabulated. Table 5-1, Figure 5-1 and Figure 5-2 summarize the resources found through this desktop review.

Cultural Resources	Abutting Buffer	One-Mile Buffer	Study Area
SHPO Structures	344	4,461	4,554
SHPO Bridges	3	5	5
SHPO Resource Groups	14	30	30
SHPO Cemeteries	0	4 (15.69 acres)	4 (15.69 acres)
National Register (Site, District, Building)	12	36	37
Archaeological Sites	4	15	31
SHPO Surveys	71	121	134

Table 5-1: Summary of Cultural Resources

*All area and length calculations account for the entire polygon/line, not only what lies within the buffers.

Source: Florida Master Site File (FMSF) from the Florida Department of State, Bureau of Historic Preservation (2013).



The Florida Division of Historical Resources created the GIS data evaluated by the State Historic Preservation Office (SHPO) including structures, bridges, cemeteries, and resource groups (historic districts, designed historic landscapes, linear resources/sites, and building complexes). This analysis reviewed the SHPO evaluation and included sites or areas that are eligible or potentially eligible for listing in the NRHP, as well as areas that have not been evaluated or have insufficient information. The SHPO survey areas shown in Figure 5-1 are areas that have been reviewed by SHPO but may or may not have eligible or potentially eligible NRHP sites.

No cemeteries are present within the abutting buffer or the Study Area. Numerous SHPO surveys have been completed in the Study Area, particularly in the developed areas.

There are 12 abutting sites, districts, or buildings listed on the NHRP. These NRHP listed sites include:

- Old Orlando Railroad Depot
- Dr P Phillips House
- First Church of Christ Scientist
- Tinker Building
- Old Mount Dora ACL Railroad Station
- Apopka Seaboard Air Line Railway Depot
- Lakeside Inn
- Lake Eola Heights Historic District
- Ryan & Company Lumber Yard
- Eustis Commercial Historic District
- Mount Dora Historic District
- Lake Adair-Lake Concord Historic District

Within the abutting buffer there are:

- 344 SHPO structures (27 structures are eligible for NRHP),
- 14 SHPO resource groups (9 resource groups are eligible for NRHP),
- Three bridges (Tremain Street Bridge is eligible for NRHP), and
- Four historic and prehistoric archaeological sites (Tavares Mound, Small Mound near Tavares, Lake Concord building remains, and FUMCO homestead site).



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Source: Florida Master Site File (FMSF) from the Florida Department of State, Bureau of Historic Preservation (2013).



5.3 Parklands and Recreational Areas

Section 4(f) of the US Transportation Act of 1966 provides protection of public parks, wildlife management areas, and other public lands. Public lands are considered parks, recreational areas, or wildlife and waterfowl refuges when the land has been designated by federal, state, or local officials having jurisdiction over the land. In addition, Section 6(f) of the Land and Water Conservation Act of 1972 provides protection of public lands that were purchased with funds from this program. Potential Section 4(f) properties are protected when federal funds are used to advance transportation improvements while Section 6(f) properties are protected regardless of funding source. A formal determination of the applicability of Section 4(f) as well Section 6(f) will be made during subsequent project development phases. Table 5-2, Figure 5-3, and Figure 5-4 summarize the parklands and recreational areas documented within the Study Area.

Parklands and Recreation Areas	Abutting Buffer	One-Mile Buffer	Study Area
Areas of Critical Concern	0	0	0
Conservation Lands	0	5 (12,370 acres)	6 (12,375 acres)
Existing Trails	4 (22 miles)	12 (39 miles)	14 (51 acres)
Florida Managed Areas	0	5 (20, 540 acres)	8 (20, 753 acres)
Florida Forever Lands	0	0	0
Golf Courses	2 (303 acres)	10 (1,608 acres)	11 (1,661 acres)
Greenways Project	0	0	0
Hiking Trail Opportunities	0	0	0
Parks	5	115	126
Park Boundaries	26 (708 acres)	146 (2,763 acres)	169 (2,621 acres)
Public Pinelands	0	4 (20,373 acres)	6 (20,686 acres)
Scenic Byways	0	0	0
State Park Management Zones	0	0	0
State Parks	0	0	0

Table 5-2: Summary of Parklands and Recreational Areas

*All area and length calculations account for the entire polygon/line, not only what lies within the buffers.

Sources: Florida Natural Areas Inventory (FNAI), 2013; Florida Department of Community Affairs (DCA), 2012; Florida Department of Revenue, 2012; Florida Department of Transportation (FDOT) District 5 DTS GeoPlan Center, 2007; University of Florida GeoPlan Center, 2012.

The GIS review identified the above parklands and recreational areas within the abutting buffer: four existing trails (Palm Island Park Trail in Mount Dora near the CSX railway, City of Eustis Trail also located near the CSX railway, and two segments of West Orange Trail in Apopka), two golf courses (Country Club of Mount Dora and Country Club of Orlando), and five parks (Florida



Department of Agriculture Forestry Site, City Commons Plaza, Wall Street Plaza, Spring Lake Park, and Wooten Park). Also included are 16 park boundaries:

- City Ball Fields Park
- City Commons Plaza
- Country Club Of
 Orlando
- Eustis Farran Park
- Eustis School/Park
- Expo Center
- Florida Department of Agriculture Forestry Site

- Lake Dot Park
- Lake Eola Park
- Lake Fairview Park
- Mayor William Beardall Senior Center
- Southern Gateway
- Spring Lake Park
- State of Florida
- Wall Street Plaza
- Wooton Park

The Lake Apopka Restoration Conservation lands are located south of the FCEN rail corridor in Orange and Lake Counties and are managed by the St. John's River Water Management District (SJRWMD).

Approximately eight of Florida's Managed Areas are located within the Study Area and they include:

- Wolf Branch Sink
 Preserve South of SR
 46 in Mt. Dora
- Hidden Waters Preserve
- Holiday Highlands Sanctuary – Located near US 441/SR 46
- Lake Lotus Park North of Maitland Boulevard

- Trimble Park Southeast corner of Lake Dora
- Trout Lake Nature Center North of the City of Eustis
- Cuyler Lanier Sanctuary South of Lake Dora
- Lake Apopka Restoration Area North of Lake Apopka

These are lands that the Florida Natural Areas Inventory (FNAI) has identified as having natural resource value and that are being managed at least partially for conservation purposes. As determined by the SJRWMD land use/land cover data sets and FNAI public lands boundary data set, public pine lands identified as conducive to prescribed burning have been identified within the Study Area. These public pine lands are located in the Hidden Waters Preserve, Lake Apopka Restoration Area, and the Wolf Branch Sink Preserve.

The Study Area does not contain existing Florida Scenic Highways and Byways, planned greenway projects, state parks and state park management zones, prioritized hiking trail opportunities, Florida Forever Lands, or Areas of Critical Concern. These terms are explained as follows:

- Florida Scenic Highways and Byways are designated by the FDOT Environmental Management Office (EMO) to promote a heightened awareness of the state's exceptional resources and unique history through educational and visual experiences.
- Planned greenway projects contain cultural and historic features recommended by the Bureau of Archaeological Research, Division of Historical Resources, Florida Department

of State, and edited by the GeoPlan Center, DEP Office of Greenways and Trails, and Public Comment (Regional Greenways Task Force).

- State Park Management Zones are divisions of land within Florida State Parks based on factors such as the natural community types, physical boundaries, land use and geography that are used to reference management activities.
- Prioritized hiking trail opportunities are pathways and essential associated lands required for proper functioning of the Florida National Scenic Trails network.
- Florida Forever Lands are areas that have been proposed for acquisition or have been acquired because of outstanding natural resources, opportunity for natural resource-based recreation, or historical and archaeological resources.
- Areas of Critical Concern are areas designated by a program that protects resources and public facilities of major statewide significance. Areas of Critical Concern are further described in Title XXVIII, Chapter 380.05 (2) (a) and (b), *Florida Statues*.

There are a number of local trails in the planning and construction phases within the Study Area; these include:

- Gertrude's Walk/Orlando Urban Trail
- Pine Hills Trail
- Lake Apopka Loop
- Lake Orange Loop
- Lake-Wekiva Trail
- Tav-Dora Trail
- Tav-Lee Trail
- North Lake Trail
- Sugar Loaf Mountain Trail

These trails are discussed in Chapter 2 of this report.



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Sources: Florida Natural Areas Inventory (FNAI), 2013; Florida Department of Community Affairs (DCA), 2012; Florida Department of Revenue, 2012; Florida Department of Transportation (FDOT) District 5 DTS GeoPlan Center, 2007; University of Florida GeoPlan Center, 2012.



5.4 Air Quality

The Clean Air Act of 1972 defines the Environmental Protection Agency's (EPA) responsibilities for protecting and improving the nation's air quality. This federal law gives EPA the authority to establish national air quality standards to protect public health and to regulate hazardous air pollutants.

The Central Florida region is currently meeting air quality standards and has "attainment status," although the region is close to non-attainment. Current conditions, however, for air quality vary across the three counties which are part of the MetroPlan Orlando MPO region (Seminole, Orange, and Osceola counties). According to MetroPlan Orlando, Orange County is in attainment, but comes close to exceeding the threshold. MetroPlan Orlando, in conjunction with the University of Central Florida, has developed a Fifth Annual Report and Contingency Plan for Air Emissions Reduction in Central Florida (February 2011). Lake County is currently in attainment, but could be designated non-attainment with the new EPA standards. Air quality is monitored daily through specified stations in each county.

The purpose of an air quality analysis as it relates to this type of study is to evaluate the air quality effects that would be caused by the proposed improvements and to determine whether project-related vehicle emissions would improve or contribute to exceeding the National Ambient Air Quality Standard (NAAQS) for carbon monoxide (CO). Air quality standards (or NAAQS) and criteria have been established for seven air pollutants. These standards, summarized in Table 5-3, have been adopted as the ambient air quality standards for the State of Florida. These primary standards have been established to protect public health. The secondary standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.



Dellutent	Assessation - Devia d	National Standards		
Pollutant	Averaging Period	Primary	Secondary	
Carbon Manavida	1 Hour ¹	35 ppm (40 mg/m ³)	None	
	8 Hour ¹	9 ppm (10 mg/m³)	None	
Lead	Quarterly Average	1.5 μ/m³	Same as Primary	
Nitrogen Dioxide	Annual Arithmetic Mean	0.053 ppm (100 μ/m³)	Same as Primary	
Ozone	1 Hour ⁶	0.12 ppm (235 μ/m³)	Same as Primary	
	8 Hour⁵	0.08 ppm (157 μ/m³)	Same as Primary	
Darticulata Mattar	24 Hour ¹	150 μ/m³		
(PM ₁₀)	Annual Arithmetic Mean ²	50 μ/m³	Same as Primary	
Deutieulete Metter	24 Hour ⁴	65 μ/m³		
$(PM_{2.5})$	Annual Arithmetic Mean ³	15 μ/m³	Same as Primary	
Sulfur Oxides	Annual Arithmetic Mean	0.03 ppm (80 µ/m³)		
	24 Hour ¹	0.14 ppm (365 μ/m³)		

Table 5-3: National Ambient Air Quality Standards

Source: US EPA, "National Ambient Air Quality Standards" (49 CFR 50)

Abbreviations: ppm=parts per million; ug/m3=microgram per cubic meter of air; mg/m3=milligram per cubic meter General Notes:

1: Not to be exceeded more than once per year.

2: To attain this standard, the expected annual arithmetic mean PM10 concentration at each monitor within an area must not exceed 50 ug/m3.

3: To attain this standard, the 3-year average of the annual arithmetic mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15ug/m3.

4: To attain this standard, the 3-year average of the 98th percentile of 24-hourconcentrations at each populationoriented monitor within an area must not exceed 65 ug/m3.

5: To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measure at each monitor within an area over each year must not exceed 0.08 ppm.

6: (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is <=1. (b) The 1-hour standard is applicable to all areas notwithstanding the promulgation of 8-hour ozone standards under Sec. 50.10. On June 2, 2003, (68 FR 32802) EPA proposed several options for when the 1-hour standard would no longer apply to an area.



5.5 Noise

Noise levels are measured in decibels. Since the human ear does not respond equally to all frequencies, measured sound levels are adjusted or weighted to correspond to the frequency response of human hearing and the human perception of volume. The weighted sound level is expressed in single number units called A-weighted decibels (dBA) and is measured with a calibrated noise meter. To measure noise accurately, it is common practice to average noise produced by different activities over a period of time to obtain a single number. This single number is defined as equivalent continuous noise level, or L_{eq} . Another noise measure, the day-night noise level (L_{dn}), takes into account the increased sensitivity of people to noise during sleeping hours. Both L_{eq} and L_{dn} are used by the Federal Transit Administration (FTA) in evaluating transit noise impacts. For transit operations, L_{eq} and L_{dn} are appropriate because these levels are sensitive to the frequency and duration of noise events.

Table 5-4 presents the guidelines established by FTA for noise impacts. The criteria included in Table 5-4 do not typically apply to commercial or industrial land uses because these types are generally representative of higher noise levels. The criteria do not apply to business uses which depend on quiet activity as an important part of normal everyday operations (i.e., concert halls, recording studios, theaters, etc.).

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor L _{eq} (h)*	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Outdoor L _{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor L _{eq} (h)*	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls fall into this category. Places for meditation or study associated with cemeteries, monuments, museums, certain historic sites, parks, and recreational facilities are also included.

Table 5-4: Land Use Categories and Metrics for Noise Criteria

 $*L_{eq}$ for the noisiest hour of transit-related activity during hours of noise sensitivity.

Source: FTA Guidance Manual – Transit Noise and Vibration Impact Assessment (April 1995)



Potentially noise sensitive land uses have been identified for the US 441 Corridor using a GIS desktop review. Summary information regarding these land uses is presented in this chapter. This includes lands where serenity and quiet are significant, serve as a public need, and where the preservation of these qualities is essential if the area is to continue to serve its intended purpose. Table 5-5, Figure 5-5 and Figure 5-6 show potential noise sensitive sites within the Study Area.

Noise Sensitive Sites	Abutting Buffer	One-Mile Buffer	Study Area
Cemeteries	0	15 (137 acres)	16 (147 acres)
Civic Centers	7	28	30
Community Centers	13	47	52
Cultural Centers	5	23	23
Day Care Centers	5	87	136
Golf Courses	2 (303 acres)	10 (1,608 acres)	11 (1,661 acres)
Government Buildings	7	45	49
Health Clinics	7	50	55
Hospitals	0	8	9
Places of Worship	39	345	400
Public Pools	38	196	238
Schools	7	149	171
Parks	5	115	126
Existing Trails	3 (22 miles)	12 (39 miles)	14 (51 miles)
Residential Areas	363 (1,903 acres)	5,398 (18,124 acres)	6,882 (25,704 acres)

Table 5-5: Summary of Noise Sensitive Sites

*All area and length calculations account for the entire polygon/line, not only what lies within the buffers.

Sources: Florida Natural Areas Inventory (FNAI), 2013; Florida Department of Community Affairs (DCA), 2012; Florida Department of Revenue, 2012; Florida Department of Transportation (FDOT) District 5 DTS GeoPlan Center, 2007; University of Florida GeoPlan Center, 2012; Florida Division of Emergency Management, 2008; Florida Department of Health, 2011.

Given the size of the Study Area, it is not surprising to find noise sensitive sites present throughout the entire Study Area. The noise sensitive sites that meet the above criteria include cemeteries, community centers, civic centers, cultural centers, day care centers, golf courses, government buildings, health facilities and hospitals, places of worship, public pools, schools, trails, and parks.

Noise sensitive sites located directly abutting the corridors include a Florida Department of Agriculture Forestry Site (in Apopka), Lakeside Inn Reception Hall, Golden Triangle Eagle's Community Center, International Fellowship Hall, and Solid Rock Christian School. Other noise sensitive sites include seven civic centers (active sports arenas, amphitheaters, auditoriums, public meeting rooms); 13 community buildings (community association clubs and organizations); five cultural centers (four libraries and one theater); five day care centers; two golf courses (Country Club of Mount Dora and Country Club of Orlando); seven municipal government buildings; seven health clinics; 39 places of worship; 38 pools; seven schools; five



parks (Florida Department of Agriculture Forestry Site, City Commons Plaza, Wall Street Plaza, Spring Lake Park and Wooton Park); three existing trails (Palm Island Park Trail, Eustis Trail, and West Orange Trail); and 1,903 acres of residential land use.

Ground-Borne Vibration

In contrast to airborne noise, ground-borne vibration is not a common environmental issue. Typical sources of ground-borne vibration include trains, buses on rough roads, and construction-related activities such as pile driving, blasting and operating heavy earth-moving equipment. Ground-borne vibration from transit vehicles is characterized in terms of vibration velocity amplitude. The threshold of vibration perception for most humans is approximately 65 V_{dB} . Levels at 70 to 75 V_{dB} are often noticeable but acceptable, and levels greater than 80 VdB are typically considered unacceptable. For fixed guideway transit projects, limits for acceptable levels of residential ground-borne vibration are usually between 70 and 75 VdB. Transit enhancements, such as those being evaluated during the US 441 Corridor Study, may potentially create additional noise and vibration beyond existing levels. Potentially averse noise impacts can occur if these projects are located in close proximity to noise sensitive sites. Three general types of noise impacts are as follows:

- 1. Noise associated with fixed transit facilities (i.e., horns, braking, squeals, etc.);
- 2. Noise from traffic diverted due to implementation of the proposed project; and
- 3. Transit vehicle operating noise (i.e., braking and acceleration).

Along the US 441 Corridor, the major noise sources are motor vehicles, trucks, and trains along the FCEN railroad tracks. In addition, airplanes contribute to the project corridor's noise levels, particularly near the airports and airfields located in the Study Area. The community areas directly adjacent to the proposed alignments are already exposed to, at a minimum, moderate noise levels.

As existing ambient noise levels increase, the allowable level of transit noise increases. By comparing existing (ambient) noise levels within a community with the changes in noise levels predicted by the proposed project, a relative measure of increase can be used to determine the potential impacts to the community. These potential impacts will be assessed further in the next stage of project development.

In compliance with Chapter 17 of the FDOT PD&E Manual, the assessment of noise impacts from rail and transit facilities shall be done using the Federal Railroad Administration (FRA) guidance ("Railroad Noise Emissions Compliance Regulations") and Federal Transit Administration (FTA) guidance ("Transit Noise and Vibration Impact Assessment"). The FDOT will give primary consideration to exterior areas where frequent human use occurs in determining noise and vibration impacts.



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Sources: Florida Natural Areas Inventory (FNAI), 2013; Florida Department of Community Affairs (DCA), 2012; Florida Department of Revenue, 2012; Florida Department of Transportation (FDOT) District 5 DTS GeoPlan Center, 2007; University of Florida GeoPlan Center, 2012; Florida Division of Emergency Management, 2008; Florida Department of Health, 2011.



5.6 Waters of the US

The *Rivers and Harbors Act, Clean Water Act (CWA)*, and other state and federal regulations restore and maintain existing aquatic resources. Waters of the US refers to the limits of jurisdiction for the US Army Corps of Engineers (USACE) under the CWA of 1972 and subsequent amendments. The USACE is supported by EPA, US Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS).Non-tidal waters of the US include "lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes or natural ponds and tributaries or impoundments of such bodies" (33 CFR 328.3). The six lakes that cross into the abutting buffer include:

Lake Dora

Lake Carlton

Lake Eustis

Lake FairviewSpring Lake

- Lake Beauclair
- Table 5-6 summarizes the waters of the US. Figures 5-7 and 5-8 indicate the general location of these waters within the Study Area.

Existing wetlands identified within the US 441 Study Area were obtained from the US Fish and Wildlife Service's (USFWS) National Wetland Inventory (NWI) to determine the quality and habitat preference. These wetlands are classified as emergent, forested, and scrub/shrub systems. These classifications are based on substrate material, vegetation, and flooding regime. Of the 25 wetlands, seven are freshwater emergent wetlands. This type of wetland is dominated by erect, rooted, herbaceous (not woody) wetland plants. The NWI wetlands are shown on Figures 5-9 and 5-10.

In compliance with Executive Order 11990, and the FHWA Technical Advisory T640.8A, Title 23 CFR, Part 777, and Part 2, Chapter 18 of the FDOT's PD&E Manual, extensive assessments of wetlands and natural resources will be performed as part of the next phase of the project development.

Waters of the US	Abutting Buffer	One-Mile Buffer	Study Area
Wetlands	25 (553 acres)	536 (4,436 acres)	679 (5, 216 acres)
Ponds	32 (618 acres)	377 (1,315 acres)	498 (1,673 acres)
Lakes	6 (14,258)	72 (36,931 acres)	80 (19,295 acres)

Table 5-6: Summary of Waters of the US

*All area and length calculations account for the entire polygon/line, not only what lies within the buffers. Source: Florida Geographic Data Library (FGDL), 2013.



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Source: Florida Geographic Data Library (FGDL), 2013

















Source: US Fish and Wildlife Service (USFWS), National Wetland Inventory, 2013



5.7 Water Quality

Water quality is also protected under the Clean Water Act of 1972.Potential environmental effects of the proposed project include impacts on water quality. To determine poor water quality within the Study Area, the GIS analysis included a review of the verified Impaired Waters in the State of Florida. These are water bodies that fail to attain any of its designated uses and/or meet the minimum criteria for surface waters established in the Surface Water Quality Standards (Section 62-302, F.A.C.) and the Impaired Waters Rule (Section 62-303, F.A.C.). Outstanding Florida Waters (OFW) are waters designated worthy of special protection because of their natural attributes.

The Impaired Waters crossing into the abutting buffer of the Study Area include: Lake Lucerne (Downtown Orlando), Wolf Branch (Mr. Dora), Spring Lake (Downtown Orlando), Lake Fairview (Near John Young Parkway/US 441), Lake Dot (Downtown Orlando), Lake Eustis (west of Eustis), Lake Copeland (Downtown Orlando), and Dora Canal (southwest of Tavares).

There are no OFWs within the Study Area. Table 5-7 summarizes water quality issues. Figures 5-11 and 5-12 indicate their general location within the Study Area.

Water Quality Designation	Abutting Buffer	One-Mile Buffer	Study Area
Impaired Waters	10 (16,895 acres)	35 (23,019 acres)	40 (61,167 acres)
Outstanding Florida Waters	0	0	0

Table 5-7: Summary of Impaired and Outstanding Waters

*All area and length calculations account for the entire polygon/line, not only what lies within the buffers. Sources: Florida Department of Environmental Protection, 2012; University of Florida GeoPlan Center, 2013.



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Source: Florida Department of Environmental Protection, 2012; University of Florida GeoPlan Center, 2013



5.8 100-Year Floodplain

Floodplains and floodways are protected by *Executive Order 11988, "Floodplain Management", USDOT Order 5650.2, "Floodplain Management and Protection",* and *Federal-Aid Policy Guide 23 CFR 650A*. The regulations are intended to avoid or minimize highway encroachments within the 100-year floodplains and to avoid supporting land use development that may impact the floodplain values.

To identify 100-year floodplain regions within the Study Area, a GIS review was conducted using the Florida Digital Flood Insurance Rate Maps (DFIRM). The DFIRM data are used by the Federal Emergency Management Agency (FEMA) to designate the Special Flood Hazard Areas (SFHAs). The primary risk classification for SFHAs used is the one-percent-annual-chance flood event, or 100-year floodplain. The flood zone designations that depict 100-year floodplain include flood zones A, AE, and AH. Zone A is an approximate method of analysis, Zone AE is determined by detailed methods of analysis using base flood elevations, and Zone AH is annual chance shallow flooding with a constant water-surface elevation where average depths are between one and three feet.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), the Study Area contains several areas designated as part of the 100-year floodplain. Approximately 51 segments (19,758 acres) of the 100-year floodplain (Type A, AE, and AH) are within or adjacent to the US 441 Corridor. Potential impacts to floodplains will be assessed further as part of the next phase of project development. Table 5-8 summarizes the 100-year floodplain. Figures 5-13 and 5-14 indicate their general location within the Study Area.

Table 5-8: Summary of 100-Year Floodplain

100-Year Floodplain	Abutting Buffer	One-Mile Buffer	Study Area
100-Year Floodplain	51 (19,758 acres)	274 (189,909 acres)	323 (230,462 acres)
*All area and length calculations account for the entire polygon/line, not only what lies within the buffers.			

*All area and length calculations account for the entire polygon/line, not only what lies within the

Source: Federal Emergency Management Agency (FEMA), 2012



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Source: Federal Emergency Management Agency (FEMA), 2012



5.9 Contaminated Sites

A contamination screening generally follows the Federal Highway Administration's Technical Advisory T 6640.8A, dated October 30, 1987 and the FDOT's Project Development and Environment Manual, Part 2, Chapter 22, dated January 2008. The contamination screening of the Study Area helps to determine the potential for contamination from adjacent facilities, sites, or places. The GIS review identified the active contamination facilities, collected by the EPA, that are subject to environmental regulation or of environmental interest. These facilities are generated from the following national environmental programs:

- Superfund National Priorities List (NPL);
- Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal Facilities (TSDF);
- Resource Conservation and Recovery Act-Large Quantity Generators (RCRA LQG);
- Air Facility System (AFS);
- Major Air Pollutants Toxics Release Inventory (TRI);
- National Pollutant Discharge Elimination System (NPDES);
- Assessment and Cleanup and Redevelopment Exchange System (ACRES), also known as brownfield areas; and
- Risk Management Program Section Seven Tracking System (SSTS) for the EPA Pesticide Program.

The one-mile study buffer contains 88 active sites and the Study Area contains 98 active sites. The abutting buffer contains 17 sites, shown with locations in Table 5-9. Figures 5-15 and 5-16 summarize the Contaminated and Potentially Contaminated Sites within the Study Area.



Table 5-9: Contaminated	/ Potentially	y Contaminated Sites
-------------------------	---------------	----------------------

Site	Location	Classification
Mount Dora Ace Hardware	18691 US Hwy 441, Mt Dora	SSTS
Chevron Chemical Company	3100 N Orange Blossom Trl, Orlando	NPL/RCRA
Rosenwald Gardens	Lot 9, 10, & 37, Eustis	ACRES/Brownfield
Former Wells Fargo/Ikeler Property	1520 S Bay St, Eustis	ACRES/Brownfield
City of Orlando stormwater discharge (MS4)	400 S Orange Ave, Orlando	NPDES
1400 Bay Street	1400 Bay St, Eustis	ACRES/Brownfield
417 South Bay Street	417 S Bay St, Eustis	ACRES/Brownfield
Pinch a Penny #110	5772 N Orange Blossom Trl, Orlando	SSTS
Joshua Martin Property	1224 Railroad Ave, Eustis	ACRES/Brownfield
Phillips 66 Food Mart	1911 S Bay St, Eustis	ACRES/Brownfield
Pinch a Penny #61	17973 US Hwy 441, Mt Dora	SSTS
Gorman Co. Division of HAJOCA Corporation	1845 S Orange Blossom Trl, Apopka	SSTS
Florida Rock Carder Road Ready Mix	5109 Carder Rd, Orlando	TRI
300 North Bay and adjacent parcels	300 North Bay St, Eustis	ACRES/Brownfield
Bronson Ace Hardware	26 E Orange Ave, Eustis	RCRA LQG/SSTS
Wal-Mart Supercenter #0705	17030 US Hwy 441, Mt Dora	RCRA LQG
Triquint Semiconductor Inc.	1818 S US Hwy 441, Apopka	RCRA LQG/TRI

Source: Environmental Protection Agency (EPA), 2013.

















Source: Environmental Protection Agency (EPA), 2013.



5.10 Threatened and Endangered Species

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, federal agencies are required to ensure that their actions are not likely to jeopardize the continued existence of endangered and threatened species or result in the destruction or adverse modification of critical habitat.

The purpose of this effort was to assess the potential for protected wildlife and plants to be found within the Study Area. A literature review of the Florida Natural Areas Inventory (FNAI) was performed along with a review of GIS data from the USFWS to identify critical habitat and/or consultation areas for threatened or endangered species. Consultation areas, identified by USFWS, encompass all areas where populations are known to exist. These threatened and endangered species consultation areas and/or critical habitats are summarized in Table 5-10 and shown in Figures 5-17 and 5-18.

Wildlife and Habitat	Abutting Buffer	One-Mile Buffer	Study Area
Eagle Nest Sites	0	18	25
Scrub Jay Localities	1	6	8
Wood Stork Nesting Colony Core Foraging Areas	Yes (2)	Yes (2)	Yes
Red Cockaded Woodpecker Consultation Areas	No	Yes	Yes
Sand Skink Consultation Areas	Yes	Yes	Yes
Scrub Jay Consultation Areas	Yes	Yes	Yes
Snail Kite Consultation Areas	Yes	Yes	Yes
Lake Wales Ridge Plant Consultation Areas	Yes	Yes	Yes

Table 5-10: Summary of Wildlife and Habitat

Source: US Fish and Wildlife Service (USFWS), 2011; Florida Natural Areas Inventory (FNAI), 2009.

Several USFWS consultation areas for the sand skink, scrub jay, snail kite, Lake Wales ridge plant, red cockaded woodpecker, and a wood stork nesting colony core foraging area fall within the Study Area. No potentially active eagle nests are located in the abutting buffer; however, three eagle nests are located along US 441 in the northern portion of the Study Area. A Florida scrub jay nest site is located adjacent to the FCEN rail line within the Study Area south of Mount Dora.



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PRINCETON ST 50



46

441





*Scrub Jay and Snail Kite Consultation Areas Cover the entire Study Area Source: US Fish and Wildlife Service (USFWS), 2011; Florida Natural Areas Inventory (FNAI), 2009.



5.11 Summary

The Study Area contains numerous important features, assets, and resources. This includes a summary of historical resources, archaeological sites, recreational facilities and sites, air quality conditions and criteria, noise and vibration criteria and sensitive sites, wetlands and floodplains, hydrological features, contaminated sites, and endangered and protected species. The resource conditions are identified based upon a desktop review of readily available state and regional data for these resources, consistent with the PD&E Manual and the FDOT Environmental Screening Tool datasets. The project has been entered in the FDOT Efficient Transportation Decision Making (ETDM) screening process and will be updated as the project moves forward. In subsequent project development phases, more detailed analyses will be conducted in accordance with the appropriate chapters of the PD&E Manual.





APPENDIX B

ETDM SUMMARY REPORT, 2010

ETDM Summary Report

Project #12816 - Orange Blossom Express Rail Project

Planning Screen - Published on 09/07/2010

Generated by Kathaleen Linger (on behalf of FDOT District 5)

Printed on: 10/24/2011

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Introduction to Planning Screen Summary Report

The Planning Screen Summary Report shown below is a read-only version of information contained in the Planning Screen Summary Report generated by the ETDM Coordinator for the selected project after completion of the ETAT Planning Screen review. The purpose of the Planning Screen Summary Report is to summarize the results of the ETAT Planning Screen review of the project; provide details concerning agency comments about potential effects to natural, cultural, and community resources; and provide additional documentation of activities related to the Planning Phase for the project. Available information for a Planning Screen Summary Report includes:

- Screening Summary Report chart
- Project Description information (including a summary description of the project, a summary of public comments on the project, and community-desired features identified during public involvement activities)
- Purpose and Need information (including the Purpose and Need Statement and the results of agency reviews of the project Purpose and Need)
- Alternative-specific information (consisting of descriptions of each alternative and associated road segments; an overview of ETAT Planning Screen reviews for each alternative; and agency comments concerning potential effects and degree of effect, by issue, to natural, cultural, and community resources)
- Summary of the Secondary and Cumulative Effects analysis conducted during the Planning Screen
- General Project Commitments resulting from the ETAT Planning Screen review
- Dispute Resolution Activity Log (if any) for the project

The legend for the Degree of Effect chart is provided in an appendix to the report.

For complete documentation of the project record, also see the GIS Analysis Results Report published on the same date as the Planning Screen Summary Report.



#12816 Orange Blossom Express Rail Project									
District	District 5	Phase		Planning Screen					
County	Lake , Orange	From		Near the City of Umatilla					
Planning Organization	Lake-Sumter MPO	То		Downtown Orlando					
Plan ID		Financial Mana	igement No.						
Federal Involvement	Potential Future Federal Fur	nding							
Contact Information	Name: Pamela Richmond	E-mail: prichmond@lakes	umtermpo.com						
Snapshot Data From: Planning Screen Summary Report Published on 09/07/2010 by Kathaleen Linger									

Overview

	Evaluation of Direct Effects																				
					N	latu	ral					С	ultu	ral		C	omr	nuni	ty		
Legend																					
N/A N/A / No Involvement												s									cts
0 None (after 12/5/2005)												Site									Effe
1 Enhanced									ntity			gical									ative
2 Minimal (after 12/5/2005)		n	~ v					ns	Qua		_	eolo	1	ial							mula
3 Moderate		larine	Site					natio	and		abita	rcha	eas	otent							d Cu
4 Substantial		M pu	ated	6	s	Inre	_	esigi	ality		Нр	Nd A	n Are	(f) Pc	6				_		y and
5 Potential Dispute (Planning)	Jality	tal ai	min	and	plair	truct	atio	a	Ŋ	spu	fe ar	ic aı	atio	on 4(etice	omic	Use	ity	ation	_	ndar
	Air Qi	Coast	Conta	Farm	Flood	Infras	Navig	Speci	Wate	Wetla	Wildli	Histor	Recre	Sectio	Aesth	Econe	Land	Mobil	Reloc	Socia	Secol
ETAT Review Period: 04/06/2010 - 06/05/2010. Published: 09/07/2010																					
Alternative #1	1	0	2	0	2	2		2	2	2	2	4	2	2	2	1	2	1	0	2	2
Orlando		0	2	0	2	2	IN/A	2	2	2	2	4	2	2	2		2		0	2	2

Project Description Data

Description Statement

The proposed project, the Orange Blossom Express Commuter Rail, extends from the northern terminus of the Florida Central Rail line near Umatilla in north Lake County through Eustis, south through Tavares, then southeast across the Lake-Orange county line through Zellwood and Apopka, ending in downtown Orlando where it meets the CSX A-Line adjacent to the LYNX Central Station. There is also a spur to Mt. Dora that is included in this analysis.

The project follows the U.S. 441 corridor along the existing Florida Central Railroad line between Umatilla and downtown Orlando. The rail line is owned by CSX, however, the infrastructure and surrounding right-of-way are leased to Florida Central Railroad, who operates a freight service along the tracks. Portions of the track are leased from Florida Central Railroad by Florida Rail Adventures to operate the Mount Dora Meteor for different tourist events and other related passenger rail activities.

The Orange Blossom Express, formerly referred to as the Northwest Commuter Rail, has been under consideration since 1992. In 1999, a feasibility study was conducted for the project and the outcome was not favorable for a successful rail operation because of the lack of any fixed route bus service to feed the rail project in Lake County and the lack of sufficient population densities to support the project in Orange County. Since that time, the region has implemented the LakeXpress fixed route bus service which serves all of the potential rail stations along the route through Lake County and population all along the corridor has experienced significant growth. In particular, growth in northwest Orange County and the City of Apopka has increased in density and total population.

Communities potentially impacted by the Orange Blossom Express are Umatilla, Eustis, Mt. Dora, Lake Jem and Tavares in Lake County; Zellwood, Lockhart, Apopka, Rosemont/Ben White and Orlando in Orange County.

This Orange Blossom Express is included in the METROPLAN Orlando 2030 Long Range Transportation Plan as cost feasible. The project was not included in the 2025 Lake-Sumter Metropolitan Planning Organization Long Range Transportation Plan as cost feasible but is anticipated to be included as a cost feasible project in the 2035 plan update scheduled for adoption in December 2010. The project has been endorsed through resolution by the City of Eustis, City of Tavares, City of Mt. Dora, City of Apopka, Lake County, and the Lake-Sumter MPO. The system could be fully functional in 5 years or sooner if the schedule were to be accelerated.

Summary of Public Comments not available at this time

Consistency

- Consistency with Air Quality Conformity is unknown.
- Consistency with Air Quality Conformity is unknown.
- Consistent with Local Government Comp Plan.
- Consistent with MPO Goals and Objectives.

Potential Lead Agencies

Federal Transit Administration

Exempted Agencies

No exemptions have been assigned for this project.

Community Desired Features

No desired features have been entered into the database. This does not necessarily imply that none have been identified.

Purpose and Need

Purpose and Need Statement

Project Purpose

The Orange Blossom Express rail project proposes an alternative premium transit mode to improve the mobility of travelers along the U.S. 441 corridor between the Golden Triangle Area (Eustis/Tavares/Mt. Dora) of Lake County and Downtown Orlando in Orange County. The study corridor, which is the primary travel corridor between these two areas, is highly congested in places and experiences poor levels of service during the peak traffic periods of the day. This traffic congestion inhibits travel mobility, causes longer and more frequent delays, impairs air quality, wastes fuel and personal time, limits economic growth and diminishes the overall quality of life.

The purpose of the project is to relieve congestion on U.S./441 corridor in Lake County and Orange County, improve regional mobility, provide an additional route choice opportunity particularly for the transportation disadvantaged, serve as feeder line to SunRail. This project would provide relief to U.S. 441 where it is approaching capacity on some segments; provide significant time savings for commuters during peak periods, especially as growth further congests roadways; provide an additional north-south travel option between Lake County and Downtown Orlando; and improve traveler safety by reducing traffic volumes on the congested segments of U.S. 441 along the corridor.

Project Need

Population and employment growth within the region, combined with increased vehicle trips per capita and longer trip lengths are the cause of the growing traffic congestion. Non-automotive, alternative transportation modes within the Central Florida Region are needed to alleviate the resultant roadway congestion on U.S. 441 and provide alternative routes for the regions residents. An alternative mode is also needed to improve travel mobility, shorten trip lengths, decrease emergency response time, decrease fuel consumption, and lessen wasted personal time.

As roadway capacity projects compete for diminishing transportation dollars, transportation alternatives are needed. The Orange Blossom Express is an alternative that would: assist in the implementation of regional and local growth management plans as well as the vision for growth that was developed as a result of "Our Community, Our Future" and "How Shall We Grow" outreach processes that would allow more intense land uses and

Transit Oriented Development (TOD) practices at the activity center station locations; implement a financially feasible multi-modal transportation system that includes commuter rail and the corresponding growth management plans with established goals, objectives and policies in the two counties and respective cities; and provide an efficient regional transit system that is consistent with local transportation and community based plans and regarded as a good investment. This project is needed to incentivize economic growth and improve overall equality of life.

Purpose and Need Reviews								
Agency	Acknowledgment	Review Date						
FL Department of Community Affairs	Understood	07/07/2010						
FL Department of Environmental Protection	Understood	05/25/2010						
FL Department of State	Understood	05/20/2010						
FL Fish and Wildlife Conservation Commission	Understood	05/19/2010						
Federal Highway Administration	Understood	05/20/2010						
National Marine Fisheries Service	Understood	04/22/2010						
Comments: None.								
Natural Resources Conservation Service	Understood	04/22/2010						
South Florida Water Management District	Understood	05/11/2010						
Comments: The project limits are just outside the jurisdictional boundary of	f the SFWMD.							
US Army Corps of Engineers	Understood	05/07/2010						
US Coast Guard	Understood	04/26/2010						
Comments: No navigable waters of the United States in the project vicinity.								
US Environmental Protection Agency	Understood	05/18/2010						
US Fish and Wildlife Service	Understood	04/28/2010						

The following organizations were notified but did not submit a review of the Purpose and Need statement:

- FL Department of Agriculture and Consumer Services

- Federal Transit Administration

- Miccosukee Tribe of Indians of Florida

- National Park Service

- Saint Johns River Water Management District

- Seminole Tribe of Florida

- US Forest Service

Alternative #1

Alternative Desc	ription										
From:	Near the Cit	y of Umatilla	То:								
Туре:	New Alignm	ent		Status:		ETAT Review Complete					
Total Length:	51.45 mi.			Cost:							
Modes:	Rail			SIS:		Ν					
Segment Descrip	otion(s)										
			Location a	and Length							
Segment No.	Name	Beginning Location	Ending Location	Length (mi.)	Ro	adway Id	BMP		EMP		
				51.45							
			Jurisdictio	n and Class							
Segment No.		Jurisdiction		Urban Service Area Funct				ional Class			
			Base Co	onditions							
Segment No.	Year		AADT		Lanes			Config			
			Interii	m Plan							
Segment No.	Year		AADT		Lanes			Config			
			Need	e Plan							
Segment No.	Year		AADT	5 1 1011	Lanes			Confia			
g								J			
-			Cost Fea	sible Plan							
Segment No.	Year		AADT		Lanes			Config			
			Funding	Sources							
No funding source	es found.										

Project Effects Overview

Issue	Degree of Effect	Organization	Date Reviewed
		Natural	
Air Quality	2 Minimal	Federal Highway Administration	05/20/2010
Air Quality	1 Enhanced	US Environmental Protection Agency	05/18/2010
Coastal and Marine	0 None	National Marine Fisheries Service	04/22/2010
Contaminated Sites	2 Minimal	US Environmental Protection Agency	05/28/2010
Contaminated Sites	0 None	FL Department of Environmental Protection	05/25/2010
Contaminated Sites	2 Minimal	Federal Highway Administration	05/20/2010
Farmlands	0 None	Natural Resources Conservation Service	04/22/2010
Floodplains	2 Minimal	US Environmental Protection Agency	05/21/2010
Floodplains	0 None	South Florida Water Management District	05/11/2010
Infrastructure	2 Minimal	Federal Highway Administration	05/20/2010
Navigation	0 None	US Army Corps of Engineers	05/07/2010
Navigation	N/A N/A / No Involvement	US Coast Guard	04/15/2010
Special Designations	2 Minimal	US Environmental Protection Agency	05/21/2010
Water Quality and Quantity	2 Minimal	US Environmental Protection Agency	05/27/2010
Water Quality and Quantity	0 None	FL Department of Environmental Protection	05/25/2010
Water Quality and Quantity	0 None	South Florida Water Management District	05/11/2010
Wetlands	0 None	FL Department of Environmental Protection	05/25/2010
Wetlands	2 Minimal	US Environmental Protection Agency	05/21/2010
Wetlands	2 Minimal	US Fish and Wildlife Service	05/17/2010

Wetlands	0	None	South Florida Water Management District	05/11/2010		
Wetlands	2	Minimal	US Army Corps of Engineers	05/07/2010		
Wetlands	0	None	National Marine Fisheries Service	04/22/2010		
Wildlife and Habitat	2	Minimal	FL Fish and Wildlife Conservation Commission	05/19/2010		
Wildlife and Habitat	2	Minimal	US Fish and Wildlife Service			
			Cultural			
Historic and Archaeological Sites	4	Substantial	FL Department of State	05/20/2010		
Historic and Archaeological Sites	4	Substantial	Miccosukee Tribe of Indians of Florida	04/26/2010		
Recreation Areas	0	None	FL Department of Environmental Protection	05/25/2010		
Recreation Areas	2	Minimal	US Environmental Protection Agency	05/21/2010		
Section 4(f) Potential	No r	eviews recorded.				
			Community			
Aesthetics	2	Minimal	Federal Highway Administration	05/20/2010		
Economic	1	Enhanced	FDOT District 5	05/20/2010		
Economic	2	Minimal	Federal Highway Administration	05/20/2010		
Land Use	2	Minimal	FL Department of Community Affairs	07/07/2010		
Mobility	1	Enhanced	FDOT District 5	05/20/2010		
Mobility	2	Minimal	Federal Highway Administration	05/20/2010		
Relocation	No r	eviews recorded.				
Social	0	None	FL Department of Community Affairs	07/07/2010		
Social	2	Minimal	US Environmental Protection Agency	05/21/2010		
		Second	ary and Cumulative			

Secondary and Cumulative Effects No reviews recorded.

ETAT Reviews and Coordinator Summary: Natural Issues

Coordinator Summary: Air Quality Issue

Enhanced assigned 09/07/2010 by FDOT District 5

Comments: The Federal Highway Administration (FHWA) indicated that coordination with the FHWA transportation engineer will be required if the project crosses an interstate. The project does not cross an interstate.

The Environmental Protection Agency (EPA) does not anticipate any negative impacts to air quality resulting from the project. The FDOT concurs with EPA and assigns the project a Summary Effect of Enhanced.

The project area is currently designated as attainment for all of the National Ambient Air Quality Standards (NAAQS) under the criteria provided in the Clean Air Act. Therefore, the Clean Air Act conformity requirements do not apply to this project at this time. Further evaluation of the impact of the project on air quality will be made during later project phases.

ETAT Reviews: Air Quality Issue: 2 found

2 Minimal assigned 05/20/2010 by Cathy Kendall, Federal Highway Administration

Coordination Document: No Involvement Dispute Information:N/A

Identified Resources and Level of Importance: If the project crosses an interstate, which would therefore require FHWA interstate access approval, coordination will be needed with FHWA transportation engineer.

Comments on Effects to Resources: Please coordinate any interstate access locations with the FHWA transportation engineer to address clearance, visual issues, etc.

Coordinator Feedback: None

Enhanced assigned 05/18/2010 by Madolyn Dominy, US Environmental Protection Agency

Coordination Document: No Selection

Dispute Information:N/A

Identified Resources and Level of Importance: Resources: Air Quality

Comments on Effects to Resources: EPA does not anticipate any negative air quality impacts relating specifically to the project. EPA is assigning an enhanced degree of effect to the air quality issue. As population growth and vehicle volumes increase, there is the potential to have air quality

conformity and non-attainment issues in the future. The development of alternative modes of transportation such as the proposed Orange Blossom Express Commuter Rail project help to reduce the number of vehicles and vehicle miles traveled.

Some of the benefits outlined in the project description which support EPA's enhanced degree of effect include:

Providing a non-automotive, alternative transportation mode within the Central Florida Region to alleviate roadway congestion on U.S. 441 and provide alternative routes for the regions residents.

Improving travel mobility, shorten trip lengths, decrease emergency response time, decrease fuel consumption, and lessen wasted personal time.

Assisting in the implementation of regional and local growth management plans as well as the vision for growth that was developed which would allow more intense land uses and Transit Oriented Development (TOD) practices at the activity center station locations.

Implementation of a financially feasible multi-modal transportation system that includes commuter rail and the corresponding growth management plans with established goals, objectives and policies in the two counties and respective cities.

Providing an efficient regional transit system that is consistent with local transportation and community based plans.

Providing an incentive for economic growth and improvement of overall quality of life.

Additional Comments (optional): EPA recommends that study, design and implementation of the project include an analysis of ways to minimize air impacts from the commuter rail project. This primarily includes the use of trains which utilize low-emission diesel or other fuels. Consultation with experts in the field of commuter rail projects is recommended regarding ways to avoid or minimize air impacts from construction and/or operation of the project.

Coordinator Feedback: None

Coordinator Summary: Coastal and Marine Issue

0 None assigned 09/07/2010 by FDOT District 5

Comments: The FDOT concurs with the comments by NMFS. The project is not located in a coastal area and will not impact any coastal or marine resources. A Coastal Zone Consistency determination will be obtained during later project phases in accordance with FDOT's Project Development & Environment Manual.

ETAT Reviews: Coastal and Marine Issue: 1 found

0 None assigned 04/22/2010 by Brandon Howard, National Marine Fisheries Service

Coordination Document: No Involvement

Dispute Information:N/A

Identified Resources and Level of Importance: None

Comments on Effects to Resources: None

Additional Comments (optional): Magnuson-Stevens Act: Email correspondence with the MPO indicates that no new rail construction is proposed. Passenger trains will be added to the existing tracks. Based on the project location, information provided in the ETDM website, and GIS-based analysis of impacts, NOAA's National Marine Fisheries Service (NMFS) concludes the proposed work would not directly impact areas that support essential fish habitat (EFH) or NOAA trust fishery resources. NMFS has no comments or recommendations to provide pursuant to the EFH requirements of the Magnuson-Stevens Fishery Conservation and Management Act (P.L. 104-297); and this project will not require an EFH Assessment. Further consultation on this matter is not necessary unless future modifications are proposed and you believe that the proposed action may result in adverse impacts to EFH.

Endangered Species Act: We are not aware of any threatened or endangered species or critical habitat under the purview of NMFS that occur within the project area. However, it should be noted that a "no effect" determination must be made by the action agency and the reasoning underlying the determination should be documented in a project file. Please coordinate closely with the U.S. Fish and Wildlife Service for other species listed under the Endangered Species Act that may require consultation.

Fish and Wildlife Coordination Act: Based on the project location, information provided in the ETDM website, and GIS-based analysis of impacts, NOAA's National Marine Fisheries Service (NMFS) concludes the proposed work would not directly impact wetlands areas that support NOAA trust fishery resources. NMFS has no comments or recommendations to provide pursuant to the Fish and Wildlife Coordination Act. **Coordinator Feedback:** None

The following organization(s) were expected to but did not submit a review of the Coastal and Marine issue for this alternative: Federal Highway Administration, Saint Johns River Water Management District, South Florida Water Management District

Coordinator Summary: Contaminated Sites Issue

2 Minimal assigned 09/07/2010 by FDOT District 5

Comments: Based on the GIS analysis of this project, numerous contaminated sites exist within the project area that could be affected by the project. However, at the current time, no detailed information is available regarding what modifications of the existing rail facilities will be needed to accommodate the proposed commuter rail. FDOT concurs with the comments by EPA, based on the expectation that minimal ground disturbing activity and additional right-of-way will be required to complete this project.

ETAT Reviews: Contaminated Sites Issue: 3 found

2 *Minimal* assigned 05/28/2010 by Madolyn Dominy, US Environmental Protection Agency

Coordination Document: No Selection

Dispute Information:N/A

Identified Resources and Level of Importance: Resources: Soils, groundwater, surface water which have the potential to be negatively affected by contaminated site features such as underground petroleum storage tanks, industrial/commercial facilities with onsite storage of hazardous materials, solid waste facilities, hazardous waste facilities, National Priority List (NPL) sites, etc.

Level of Importance: These resources are of a high level of importance in the State of Florida. A minimal degree of effect is being assigned to the contaminated sites issue for the proposed project.

Comments on Effects to Resources: EPA reviewed contaminated sites GIS analysis data for buffer distances of 100 and 200 feet. Based upon the GIS analysis data, there are the following contaminated sites features located within proximity of the proposed project:

Brownfield Location Boundaries -City of Tavares CRA Economic Enhancement District DEEDS Orlando Expanded Eustis Downtown & East Town Brownfield Area

Brownfield projects are defined as abandoned, idled or under-utilized property where expansion or redevelopment is complicated by the presence or potential presence of environmental contamination. Previous thriving areas of economic activity are listed as Brownfield if the area is abandoned by contamination from past uses. Areas being unused or under-utilized are impediments to economic development in rural and urban communities. Redeveloped, these Brownfield areas can be catalysts for community revitalization. The Brownfield program brings together federal agencies to address cleanup and redevelopment in a more coordinated approach. Often times, federal grant programs and public/private organizations assist in the cleanup and redevelopment of Brownfield areas. The environmental review phase of the project should evaluate whether the classification of an area as a Brownfield Site will impact the transit project.

FDEP Offsite Contamination Notices -2 features within 100-foot buffer distance 5 features within 200-foot buffer distance

National Priority List Sites -Zellwood Groundwater Contamination (100-foot buffer distance) Chevron Chemical ORTHO (200-foot buffer distance)

Solid Waste Facilities -2 features within 100-foot buffer distance 4 features within 200-foot buffer distance

Toxic Release Inventory Sites -2 features within 100-foot buffer distance 4 features within 200-foot buffer distance

USEPA RCRA Facilities -34 features within 100-foot buffer distance 77 features within 200-foot buffer distance

EPA is assigning a minimal degree of effect to the contaminated sites issue for this project. Although there are several contaminated sites features listed in the GIS analysis data at the planning screen phase of the project, the proposed project is planned to operate along an existing rail line and it is expected that there will be minimal impact to these types of features. The degree of direct contaminates sites impacts associated with the project will be dependent upon the amount of right-of-way needed for the project and how much natural environment, if any, will be impacted. EPA recommends that any studies for this project focus on identifying the areas to be potentially impacted by the project and what type of additional analyses, if any, will be needed. Future studies and later phases of the project should focus on identifying those areas to be potentially impacted by the entire project, including transit rail stations, parking lots, outdoor passenger shelters, etc.

EPA offers the following general comments regarding the evaluation of contaminated sites features:

As the project progresses, EPA recommends that a survey of the area be conducted to confirm the location of current listed contaminated site features, along with other contaminated site features which may have been previously located in the area. EPA strongly recommends that at least a Phase I and potentially a Phase II environmental audit should be conducted to assess possible contamination areas and sources. Some of the potential issues relating to contaminated sites include leaking underground storage tanks, leaking above ground storage tanks, improper storage and/or disposal of hazardous material, spills and/or leaks from transportation vehicles (trucks, trains, etc.). Direct and indirect impacts resulting from these issues include contamination of soils, groundwater, and surface water. This type of survey should focus on identifying the contaminated sites areas which may be potentially impacted and what type of additional analyses or remediation may be needed. If any contaminated sites features are to be impacted or removed during the construction phase of the project, sampling and analysis should be conducted to determine if pollutants are present above regulatory levels. If high levels of pollutants are identified, remediation may be required prior to commencement of construction of the project. The project should be designed such that negative impact to/from contaminated sites is avoided or minimized to the best extent practicable. **Additional Comments (optional):** At the planning screen phase of the project, it is unclear how much modification or upgrade to the existing rail line (tracks) will be needed for the project. EPA is reviewing the project and providing comments based only upon the Orange Blossom Express Rail Project utilizing the existing rail line and the assumption that all work will be within existing railroad right-of-way. EPA's review does not include comments regarding train station locations, parking lots, etc.

Coordinator Feedback: None

0 None assigned 05/25/2010 by Lauren P. Milligan, FL Department of Environmental Protection

Coordination Document: No Selection Dispute Information:N/A

2 Minimal assigned 05/20/2010 by Cathy Kendall, Federal Highway Administration

Coordination Document: No Involvement Dispute Information:N/A

Identified Resources and Level of Importance: If the project crosses an interstate, which would therefore require FHWA interstate access approval, coordination will be needed with FHWA transportation engineer.

Comments on Effects to Resources: Please coordinate any interstate access locations with the FHWA transportation engineer to address clearance, visual issues, etc.

Coordinator Feedback: None

The following organization(s) were expected to but did not submit a review of the Contaminated Sites issue for this alternative: Saint Johns River Water Management District, South Florida Water Management District

Coordinator Summary: Farmlands Issue

0 None assigned 09/07/2010 by FDOT District 5

Comments: The National Resources Conservation Service has reviewed the project for Prime, Unique or Locally Important Farmlands and determined that none were identified through the GIS analysis. However, NRCS is anticipating updates to the ETDM data base and has requested an opportunity to review the project after these updates are completed. FDOT concurs with NRCS comments and notes that review of the ETDM soils data relating to the Farmlands evaluation should be conducted during later project phases.

ETAT Reviews: Farmlands Issue: 1 found

0 None assigned 04/22/2010 by Rick Allen Robbins, Natural Resources Conservation Service

Coordination Document: No Selection

Dispute Information:N/A

Identified Resources and Level of Importance: The USDA-NRCS considers soil map units with important soil properties for agricultural uses to be Prime Farmland. In addition, the USDA-NRCS considers any soils used in the production of commodity crops (such as, cotton, citrus, row crops, specialty crops, nuts, etc.) to possibly be considered as Unique Farmlands. Nationally, there has been a reduction in the overall amount of Prime and Unique Farmlands through conversion to non-farm uses. This trend has the possibility of impacting the nation's food supply and exporting capabilities. **Comments on Effects to Resources:** Conducting GIS analysis of Prime Farmland (using USDA-NRCS data) and Important (Unique) Farmland Analysis (using 2004 SJRWMD data) has resulted in the determination that there are no Prime and Unique Farmland soils within any buffer width within the Project Area. Therefore, no degree of effect to agricultural resources.

Additional Comments (optional): The Florida USDA-NRCS has completed an evaluation of soil map units statewide to determine there applicability to either the Unique Farmland and/or Locally Important Farmland designations. We are awaiting the EDTM soil data refresh to more accurately depict the impacts of transportation projects on Prime, Unique, or Locally Important Farmlands. Therefore, another analysis will need to be performed when the EDTM refreshes the USDA-NRCS SSURGO soils data for Florida.

CLC Commitments and Recommendations: Coordinator Feedback: None

The following organization(s) were expected to but did not submit a review of the Farmlands issue for this alternative: Federal Highway Administration

Coordinator Summary: Floodplains Issue

2 Minimal assigned 09/07/2010 by FDOT District 5

Comments: The FDOT concurs with the comments provided by EPA. The need for analysis of floodplain impacts and the appropriate level of environmental documentation will be determined during later project phases as additional detail regarding the scope of the project is provided. Also, SFWMD indicated that no further coordination on this project is desired, since the project lies outside of their jurisdiction.

ETAT Reviews: Floodplains Issue: 2 found

2 Minimal assigned 05/21/2010 by Madolyn Dominy, US Environmental Protection Agency

Coordination Document: No Selection Dispute Information:N/A

Identified Resources and Level of Importance: Resources: Floodplains

Level of Importance: Development within the 100-year floodplain is of a high level of importance. Development and construction may occur within the Special Flood Hazard Area, provided that development complies with floodplain management ordinances and/or local, state, and federal requirements. EPA is assigning a minimal degree of effect to the floodplains issue for ETDM Project #12816.

Comments on Effects to Resources: A review of GIS analysis data (DFIRM and Special Flood Hazard Areas) in the EST at the planning screen phase of the project indicates that some of the area surrounding the proposed project lies within the 100-year floodplain (Zones A/AE). The remaining area surrounding the project area lies outside of the 100-year floodplain (Zones X and X500).

EPA is assigning a minimal degree of effect to the floodplain issue for this project. The proposed project is planned to operate along an existing rail line and it is expected that there will be minimal impact to natural resources such as floodplains. Floodplain impacts associated with the project will be dependent upon the amount of right-of-way needed for the rail project and how much natural environment, if any, will be impacted. EPA recommends that any studies for this project focus on identifying the types of special flood hazard areas to be potentially impacted and what type of additional analyses, if any, will be needed. FDOT should consider alternatives to avoid adverse effects to floodplains. Efforts should be made to avoid or minimize impacts to floodplain resources and functions. General comments relating to floodplains include the fact that any development within the 100-year floodplain has the potential for placing citizens and property at risk of flooding and producing changes in floodplain elevations and plan view extent. Development (such as roadways, housing developments, strip malls and other commercial facilities) within floodplains increases the potential for flooding by limiting flood storage capacity and exposing people and property to flood hazards. Development also reduces vegetated buffers that protect water quality and destroys important habitats for fish and wildlife.

Additional Comments (optional): At the planning screen phase of the project, it is unclear how much modification or upgrade to the existing rail line (tracks) will be needed. Also, the project description does not include information regarding train stations, parking lots, and other ancillary structures that will be needed for the project. EPA is reviewing the project and providing comments based only upon the Orange Blossom Express Rail Project utilizing the existing rail line and the assumption that all work will be within existing railroad right-of-way. EPA's review does not include comments regarding train station locations, parking lots, etc.

Coordinator Feedback: None



Coordination Document: No Involvement

Dispute Information:N/A

Identified Resources and Level of Importance: None found.

Comments on Effects to Resources: The project limits are just outside the jurisdictional boundary of the SFWMD. It appears that there will be no direct effects to natural resources in the SFWMD.

CLC Commitments and Recommendations: Coordinator Feedback: None

The following organization(s) were expected to but did not submit a review of the Floodplains issue for this alternative: FL Department of Environmental Protection, Federal Highway Administration, Saint Johns River Water Management District

Coordinator Summary: Infrastructure Issue

2 *Minimal* assigned 09/07/2010 by FDOT District 5

Comments: The project passes through numerous communities in a highly populated region of Florida. The GIS analysis identifies a multitude of infrastructure within the project's 100 ft. buffer, including an airport, railroads, numerous schools, wells and solid waste facilities. The FHWA indicated the project would have minimal effect on infrastructure. As additional detail regarding the project is determined, impacts to infrastructure will be assessed further.

ETAT Reviews: Infrastructure Issue: 1 found

2 Minimal assigned 05/20/2010 by Cathy Kendall, Federal Highway Administration

Coordination Document: No Involvement

Dispute Information:N/A

Identified Resources and Level of Importance: If the project crosses an interstate, which would therefore require FHWA interstate access approval, coordination will be needed with FHWA transportation engineer.

Comments on Effects to Resources: Please coordinate any interstate access locations with the FHWA transportation engineer to address clearance, visual issues, etc.

Coordinator Feedback: None

Coordinator Summary: Navigation Issue

N/A N/A / No Involvement assigned 09/07/2010 by FDOT District 5

Comments: The US Army Corp of Engineers and the US Coast Guard reviewed the project and determined that there are no navigable waters in the project area. FDOT assigns a Summary Effect of No Involvement. No further coordination with the US Coast Guard is needed, unless there are major changes to the project.

ETAT Reviews: Navigation Issue: 2 found

0 None assigned 05/07/2010 by Randy Turner, US Army Corps of Engineers

Coordination Document: No Selection

Dispute Information:N/A Identified Resources and Level of Importance: No navigable waters were identified within the project area. The project will have no impacts to navigation. Comments on Effects to Resources: None found. Coordinator Feedback: None

N/A N/A / No Involvement assigned 04/15/2010 by Evelyn Smart, US Coast Guard

Coordination Document: No Involvement Dispute Information:N/A Identified Resources and Level of Importance: No Coast Guard involvement. Comments on Effects to Resources: None found. Coordinator Feedback: None

The following organization(s) were expected to but did not submit a review of the Navigation issue for this alternative: Federal Highway Administration

Coordinator Summary: Special Designations Issue

Minimal assigned 09/07/2010 by FDOT District 5

Comments: The EPA identified numerous concerns including; Brownfields, Public Lands and Special Flood Hazard Areas. Based on FDOT coordination with the Lake-Sumter MPO to date, all work on the project will be performed within the existing railroad right-of-way. The FDOT concurs with the comments by EPA and assigns a Summary Effect of Minimal. As the study progresses, potential impacts to these resources will be evaluated further.

ETAT Reviews: Special Designations Issue: 1 found

2 Minimal assigned 05/21/2010 by Madolyn Dominy, US Environmental Protection Agency

Coordination Document: No Selection

Dispute Information:N/A

Identified Resources and Level of Importance: Resources: Brownfield Location Boundaries, Public Lands, Special Flood Hazard Areas

Level of Importance: The resources listed above (identified as special designations) are of a high level of importance in the State of Florida. EPA is assigning a minimal degree of effect to this issue for the proposed project. Comments relating to special designation features located within the vicinity of the project are detailed in each resource area issue (Contaminated Sites, Floodplains, Recreation Areas).

Comments on Effects to Resources: A review of GIS analysis data at the planning screen phase of the project indicates that the following features identified as Special Designations are located within proximity of the project:

Brownfield Location Boundaries - See Comments under Contaminated Sites issue regarding Brownfields areas.

Public Lands - See Comments under Recreation Areas issue regarding public lands.

Special Flood Hazard Areas - See Comments under Floodplains issue regarding potential floodplain impacts.

Additional Comments (optional): At the planning screen phase of the project, it is unclear how much modification or upgrade to the existing rail line (tracks) will be needed. Also, the project description does not include information regarding train stations, parking lots, and other ancillary structures that will be needed for the project. EPA is reviewing the project and providing comments based only upon the Orange Blossom Express Rail Project utilizing the existing rail line and the assumption that all work will be within existing railroad right-of-way. EPA's review does not include comments regarding train station locations, parking lots, etc.

Coordinator Feedback: None

The following organization(s) were expected to but did not submit a review of the Special Designations issue for this alternative: FL Department of Agriculture and Consumer Services, Federal Highway Administration, Saint Johns River Water Management District, South Florida Water Management District

Coordinator Summary: Water Quality and Quantity Issue

2 Minimal assigned 09/07/2010 by FDOT District 5

Comments: The project area contains several water bodies and wetland resources. The FDOT agrees with the comments made by EPA regarding the potential impacts to these resources. The need for analysis of water quality and quantity impacts and the appropriate level of environmental documentation and permit requirements will be determined during later project phases as additional detail regarding the scope of the project is provided. Also, no further coordination with SFWMD is needed, since the project lies outside of the agency's jurisdiction.

ETAT Reviews: Water Quality and Quantity Issue: 3 found

2 *Minimal* assigned 05/27/2010 by Madolyn Dominy, US Environmental Protection Agency

Coordination Document: No Selection Dispute Information:N/A Identified Resources and Level of Importance: Resources: Water quality, surface water, groundwater

Level of Importance: These resources are of a high level of importance in the State of Florida. A minimal degree of effect is being assigned to this issue. However, EPA recommends avoidance and minimization strategies be utilized which would reduce water quality impacts from this project. **Comments on Effects to Resources:** There is the potential for water quality concerns due to the overall water quality in the watershed(s) that this project encompasses. EPA is assigning a minimal degree of impact to the water quality issue due to the nature of the project and the fact that avoidance of minimization strategies can and should be used to reduce potential water quality impacts. The total length of the rail project is approximately 52 miles. The project crosses several water bodies. Many of the waterbodies in the watershed(s) are listed on the 303(d) list of impaired waters for various pollutants failing to meet water quality standards. These may also have Total Maximum Daily Loads (TMDLs) either proposed or being developed.

There may be special permitting requirements for stormwater management and treatment. Stormwater runoff and the increase of pollutants into surface waters as a result of the transit project and other point and nonpoint sources is a concern from a water quality standpoint. Stormwater runoff from urban sources, including roadways, carries pollutants such as volatile organics, petroleum hydrocarbons, heavy metals, and pesticides/herbicides. Proper stormwater conveyance, containment, and treatment will be required in accordance with state and federal regulations and guidelines. The project will need to coordinate with regulatory and permitting agencies regarding specific permitting requirements relating to stormwater as well as other water quality issues.

Additional Comments (optional): At the planning screen phase of the project, it is unclear how much modification or upgrade to the existing rail line (tracks) will be needed. Also, the project description does not include information regarding train stations, parking lots, and other ancillary structures that will be needed for the project. EPA is reviewing the project and providing comments based only upon the Orange Blossom Express Rail Project utilizing the existing rail line and the assumption that all work will be within existing railroad right-of-way. EPA's review does not include comments regarding train station locations, parking lots, etc.

Coordinator Feedback: None

0 None assigned 05/25/2010 by Lauren P. Milligan, FL Department of Environmental Protection

0 None assigned 05/11/2010 by Annette Burkett, South Florida Water Management District

Coordination Document: No Involvement

Dispute Information:N/A

Identified Resources and Level of Importance: None found.

Comments on Effects to Resources: The project limits are just outside the jurisdictional boundary of the SFWMD. It appears there will be no direct effects to resources located within the SFWMD.

CLC Commitments and Recommendations: Coordinator Feedback: None

The following organization(s) were expected to but did not submit a review of the Water Quality and Quantity issue for this alternative: Federal Highway Administration, Saint Johns River Water Management District

Coordinator Summary: Wetlands Issue

2 Minimal assigned 09/07/2010 by FDOT District 5

Comments: The FDOT agrees with the comments provided by ACOE, EPA and FWS regarding potential impacts to wetland resources. More details regarding the scope of the project will be provided in later project phases in order that the appropriate level of environmental documentation, wetland evaluation, mitigation and permit requirements can be determined. FWS noted that the project passes through Core Foraging Areas of several active nesting colonies of the endangered wood stork. The potential for impacts to CFAs will be evaluated in later project phases.

ETAT Reviews: Wetlands Issue: 6 found

0 None assigned 05/25/2010 by Lauren P. Milligan, FL Department of Environmental Protection

Coordination Document: No Selection Dispute Information:N/A Identified Resources and Level of Importance: None found. Comments on Effects to Resources: None found. Coordinator Feedback: None

2 Minimal assigned 05/21/2010 by Madolyn Dominy, US Environmental Protection Agency

Coordination Document: No Selection Dispute Information:N/A

Identified Resources and Level of Importance: Resources: Wetlands, wetlands habitat, water quality

Level of Importance: These resources are of a high level of importance in the State of Florida and within the project corridor. EPA is assigning a minimal degree of effect for the wetlands issue for ETDM Project #12816.

Comments on Effects to Resources: A review of GIS analysis data in the EST for wetlands at the planning screen phase of the project indicates that there is are approximately 19 acres of wetlands within the 100-foot buffer distance and 76 acres within the 200-foot buffer distance for the proposed project. The amount of wetland acreage is calculated along the entire length of the project (51.45 miles).

EPA is assigning a minimal degree of effect to the wetland issue for this project. The proposed project is planned to operate along an existing rail line and it is expected that there will be minimal impact to natural resources such as wetlands. The degree of direct wetlands impacts associated with the project will be dependent upon the amount of right-of-way needed for the project and how much natural environment, if any, will be impacted by these. EPA recommends that any studies for this project focus on identifying the wetland areas to be potentially impacted and what type of additional analyses, if any, will be needed.

Future studies and later phases of the project should focus on identifying wetlands areas to be potentially impacted by the entire project, including transit rail stations, parking lots, outdoor passenger shelters, etc. Wetlands of concern may be those associated with certain surface water bodies and bridges or other water crossings. Additional analyses may be needed such as delineation of wetlands; functional analysis of wetlands to determine their value and function; an evaluation of stormwater pond sites (if applicable) to determine their impact on wetlands; avoidance and minimization strategies for wetlands; and mitigation plans to compensate for adverse impacts.

Another issue of concern is increased stormwater runoff and the increase of pollutants into surface waters and wetlands as a result of the Orange Blossom Express Rail Project and other point and nonpoint sources

Additional Comments (optional): At the planning screen phase of the project, it is unclear how much modification or upgrade to the existing rail line (tracks) will be needed. Also, the project description does not include information regarding train stations, parking lots, and other ancillary structures that will be needed for the project. EPA is reviewing the project and providing comments based only upon the Orange Blossom Express Rail Project utilizing the existing rail line and the assumption that all work will be within existing railroad right-of-way. EPA's review does not include comments regarding train station locations, parking lots, etc. Coordinator Feedback: None

2 Minimal assigned 05/17/2010 by Jane Monaghan, US Fish and Wildlife Service

Coordination Document: To Be Determined: Further Coordination Required Dispute Information:N/A

Identified Resources and Level of Importance: Federally listed species and other fish and wildlife that are dependent on wetlands. Comments on Effects to Resources: The project corridor passes through the Core Foraging Areas (CFA) of several active nesting colonies of the endangered wood stork (Mycteria americana) in North Florida. The Service has determined that the loss of wetlands within a CFA due to an action could result in the loss of foraging habitat for the wood stork. To minimize adverse effects to the wood stork and other wetland dependent species, we recommend that impacts to suitable foraging habitat be avoided. Please refer to the North Florida Field Office website for WOST colony locations, definitions and effect determinations for any wetland impacts: http://www.fws.gov/northflorida/

0 None assigned 05/11/2010 by Annette Burkett, South Florida Water Management District

Coordination Document: No Involvement

Dispute Information:N/A

Identified Resources and Level of Importance: None found.

Comments on Effects to Resources: The project limits are just outside the jurisdictional boundary of the SFWMD. It appears that there will be no direct effects to natural resources in the SFWMD.

CLC Commitments and Recommendations: Coordinator Feedback: None

2 Minimal assigned 05/07/2010 by Randy Turner, US Army Corps of Engineers

Coordination Document: No Selection

Dispute Information:N/A

Identified Resources and Level of Importance: A review of the EST revealed a minimal amount of low quality wetlands along a 100 foot buffer of the existing rail line. The 100 foot buffer over the entire length of project rail line contains the presence of approximately 13.2 acres of Palustrine wetlands, approximately 2.5 acres of Riverine system and approximately 3.3 acres of Lacustrine system.

Comments on Effects to Resources: It appears impacts would be minimal; however, a functional assessment should be competed to determine the functional value of the system(s).

Coordinator Feedback: None

0 None assigned 04/22/2010 by Brandon Howard, National Marine Fisheries Service

Coordination Document: No Involvement

Dispute Information:N/A

Identified Resources and Level of Importance: None

Comments on Effects to Resources: None

Additional Comments (optional): Magnuson-Stevens Act: Email correspondence with the MPO indicates that no new rail construction is proposed. Passenger trains will be added to the existing tracks. Based on the project location, information provided in the ETDM website, and GIS-based analysis of impacts, NOAA's National Marine Fisheries Service (NMFS) concludes the proposed work would not directly impact areas that support essential fish habitat (EFH) or NOAA trust fishery resources. NMFS has no comments or recommendations to provide pursuant to the EFH requirements of the Magnuson-Stevens Fishery Conservation and Management Act (P.L. 104-297); and this project will not require an EFH Assessment. Further consultation on this matter is not necessary unless future modifications are proposed and you believe that the proposed action may result in adverse impacts to EFH.

Endangered Species Act: We are not aware of any threatened or endangered species or critical habitat under the purview of NMFS that occur within the project area. However, it should be noted that a "no effect" determination must be made by the action agency and the reasoning underlying the determination should be documented in a project file. Please coordinate closely with the U.S. Fish and Wildlife Service for other species listed under the Endangered Species Act that may require consultation.

Fish and Wildlife Coordination Act: Based on the project location, information provided in the ETDM website, and GIS-based analysis of impacts, NOAA's National Marine Fisheries Service (NMFS) concludes the proposed work would not directly impact wetlands areas that support NOAA trust fishery resources. NMFS has no comments or recommendations to provide pursuant to the Fish and Wildlife Coordination Act. **Coordinator Feedback:** None

The following organization(s) were expected to but did not submit a review of the Wetlands issue for this alternative: Federal Highway Administration, Saint Johns River Water Management District

Coordinator Summary: Wildlife and Habitat Issue

2 Minimal assigned 09/07/2010 by FDOT District 5

Comments: The Florida Fish and Wildlife Conservation Commission (FFWCC) and US Fish and Wildlife Service assigned the project a Minimal Effect for the potential impact to fish, wildlife and habitat resources, including listed species. FDOT concurs with a Summary Effect of Minimal. The FFWCC notes that the potential significance of railroad kill of wildlife has not been studied in Florida. Additional wildlife and habitat evaluations will be conducted in later project phases.

ETAT Reviews: Wildlife and Habitat Issue: 2 found

2 Minimal assigned 05/19/2010 by Scott Sanders, FL Fish and Wildlife Conservation Commission

Coordination Document: To Be Determined: Further Coordination Required

Dispute Information:N/A

Identified Resources and Level of Importance: The Habitat Conservation Scientific Services Section of the Florida Fish and Wildlife Conservation Commission (FWC) has coordinated an agency review of ETDM #12816, Lake and Orange counties, and provides the following comments related to potential effects to fish and wildlife resources on this Planning Phase project.

The Project Description Summary states that this project involves the establishment of passenger rail service on the existing Florida Central Railroad line between Umatilla and downtown Orlando, with a connecting spur to Mount Dora. Communities potentially impacted by the Orange Blossom Express include Umatilla, Eustis, Mount Dora, Lake Jem, and Tavares in Lake County; and Zellwood, Lockhart, Apopka, Rosemont/Ben White, and Orlando in Orange County. Total length of the existing rail line that would be utilized for passenger service is 51.45 miles. At this time, the trains are

proposed to run at 60 miles per hour, which will require an unspecified amount of upgrade to the existing track. Also unspecified are any required new stations, or upgrades to existing stations and siding track.

The project area was evaluated for potential fish, wildlife, and habitat resources within 500 feet of the proposed alignment. Our assessment reveals that the project area predominantly consists of man-altered land use (71.43%), including 3,213.0 acres of High and Low Impact Urban, 487.5 acres of Improved Pasture, 304.6 acres of Citrus, 188.7 acres of Other Agriculture, 186.9 acres of Row/Field Crops, 51.6 acres of Bare Soil/Clearcut, and 16.5 acres of Unimproved/Woodland Pasture. Native land cover types include: Mixed Hardwood/Pine Forests (359.1 acres), Shrub and Brushland (330.4 acres), Open Water (254.6 acres), Pinelands (242.1 acres), Hardwood Hammocks and Forests (158.0 acres), Dry Prairies (118.6 acres), Shrub Swamp (93.9 acres), Mixed Wetland Forest (88.6 acres), Freshwater Marsh and Wet Prairie (65.4 acres), Hardwood Swamp (44.5 acres), Cypress Swamp (15.4 acres), Grassland (6.7 acres), Bay Swamp (1.6 acres), Sand Pine Scrub (0.2 acres), Xeric Oak Scrub (0.2 acres), and Sandhill (0.2 acres).

Based on range and preferred habitat type, the following species listed by the State of Florida as Endangered (E), Threatened (T), or Species of Special Concern (SSC) may occur along the project area: Lake Eustis pupfish (SSC), gopher frog (SSC), Eastern indigo snake (T), Florida pine snake (SSC), short-tailed snake (T), sand skink (T), gopher tortoise (T), limpkin (SSC), snowy egret (SSC), little blue heron (SSC), tricolored heron (SSC), white ibis (SSC), wood stork (E), Florida sandhill crane (T), Florida burrowing owl (SSC), Southeastern American kestrel (T), Florida scrub jay (T), Florida black bear (T), Sherman's fox squirrel (SSC), and Florida mouse (SSC).

The GIS analysis revealed several specific characteristics associated with lands along the project alignment that provide an indication of potential habitat quality or sensitivity that will require field studies to verify the presence or absence of listed wildlife species and the quality of wildlife habitat resources. Within the assessment area, there are 92 FWC Biodiversity Hot Spots capable of supporting 3 to 4, 5 to 6, or 7 or more focal species, or with species occurrence records. There are also 30 FWC Priority Wetlands Habitats capable of supporting 1 to 3 or 4 to 6 focal species in wetlands, and 1 to 3 focal species in uplands. The alignment is within U.S. Fish and Wildlife Service Consultation Areas for Lake Wales Ridge Plants, Scrub Jay, and Snail Kite. The nearby Ocklawaha Chain of Lakes supports populations of both the Lake Eustis pupfish and the ironcolor shiner, classified as Rare and Imperiled Fish Species. Public lands in the assessment area include the Lake Apopka Restoration Area, owned and managed by the St. Johns River Water Management District; the Wolf Branch Sink Preserve, owned and managed by the Lake County Water Authority; and the Promise Ranch Conservation Easement, managed by the Florida Department of Environmental Protection.

Primary wildlife issues associated with this project include: potential adverse effects to species listed by the State of Florida as Endangered, Threatened, or Species of Special Concern during construction of any required replacement track, new or upgraded stations, or new siding; potential water quality degradation as a result of additional stormwater runoff from the construction sites; and the potential for increased wildlife mortality resulting from collisions with high-speed trains.

The issue of railroad kill of wildlife has not, to our knowledge, ever been examined in Florida. With high-speed passenger rail service becoming an increasingly prominent part of the State's long-range transportation planning, it would be prudent to initiate a study of the potential for significant impacts from wildlife railroad kill, and possible solutions for actual or anticipated problem areas. European and North American studies have documented a large number of wildlife species that are killed by collisions with trains, ranging from small rodents, snakes, toads, frogs, birds, and bats, to large ungulates and carnivores. Train speed has been found to be a factor affecting the number of train-kills.

Comments on Effects to Resources: Based on the project information provided, we believe that the direct and indirect effects of this project could be minimal, provided that track upgrades and new siding are generally confined to the existing railroad Right-of-way, and any new stations are sited on previously disturbed land.

Additional Comments (optional): We recommend that the Project Development and Environment (PD&E) Study address natural resources by including the following measures for conserving fish and wildlife and habitat resources that may occur within and adjacent to the project area. Plant community mapping and wildlife surveys for the occurrence of wildlife species listed by our agency as Endangered, Threatened, or Species of Special Concern should be performed, both within the project construction areas and any staging areas. Based on the survey results, a plan should be developed to address direct, indirect, and cumulative effects of the project on wildlife and habitat resources, including listed species. Avoidance, minimization, and mitigation measures should also be formulated and implemented. If gopher tortoises are present within any permanent or temporary construction area, a permit should be obtained from the FWC. Equipment staging areas should be located in previously disturbed sites to avoid habitat destruction or degradation. A compensatory mitigation plan should include the replacement of any wetland, upland, or aquatic habitat lost as a result of the project. This could be achieved by purchasing land, or securing conservation easements over lands adjacent to existing public lands, and by habitat restoration. Replacement habitat for mitigation should be type for type, as productive, and equal to or of higher functional value. Land acquisition and restoration of appropriate tracts adjacent to existing public conservation lands near the project area, or tracts placed under conservation easement or located adjacent to large areas of jurisdictional wetlands that currently serve as regional core habitat areas, would be supported by our agency. Please notify us immediately if the design, extent, or footprint of the current project is modified, as we may choose to provide additional comments and/or recommendations.

We appreciate the opportunity to provide input on this project and the conservation of fish and wildlife resources. Please contact Brian Barnett at (850) 528-6316 or email brian_barnett@urscorp.com to initiate the process for further overall coordination on this project. **Coordinator Feedback:** None

2 Minimal assigned 05/17/2010 by Jane Monaghan, US Fish and Wildlife Service

Coordination Document: To Be Determined: Further Coordination Required **Dispute Information:**N/A

Identified Resources and Level of Importance: Federally listed species and fish and wildlife habitat.

Comments on Effects to Resources: Federally listed species: The Service has reviewed our Geographic Information Systems (GIS) database for recorded locations of federally listed threatened and endangered species on or adjacent to the project study area. The GIS database is a compilation of data received from several sources.

Bald Eagles

The nest locator database on the FFWCC (Florida Fish and Wildlife Conservation Commission) website (MyFWC.com/Eagle) should be checked for documented nests. However, new nests may not be in the database and a thorough examination of the proposed areas from the air is recommended. Any bald eagle nest within 700 feet of the proposed alternatives should be documented and all future actions should be coordinated with the USFWS Office of Migratory Birds, Eagle permitting section. The current permit coordinator is Resee Collins (404-314-6526). USFWS office websites can provide further information on the new Eagle Act regulations.

Florida Scrub-Jays (FLSJ)

This species may be found within rural or urban areas. Surveys should be done according to guidelines found on the USFWS website (http://www.fws.gov/northflorida) if suitable habitat is present or know territories are within 1/2 mile of the impact areas. Survey methodology and results should be submitted to this office.

Sand Skinks

This species may occupy sandy, well drained soils within any new impact areas. If the habitat conditions are suitable for sand skinks, pedestrian surveys should be done before any vegetation is cleared.

Federally listed plant surveys should also be done if any vegetated areas are cleared for new rail line, staging equipment, etc. **Coordinator Feedback:** None

The following organization(s) were expected to but did not submit a review of the Wildlife and Habitat issue for this alternative: Federal Highway Administration, US Forest Service

ETAT Reviews and Coordinator Summary: Cultural Issues

Coordinator Summary: Historic and Archaeological Sites Issue

4 Substantial assigned 09/07/2010 by FDOT District 5

Comments: The Department of State and the Miccosukee Tribe of Indians of Florida reviewed the project and both indicated that the project may have Substantial effects. The GIS analysis of the project corridor identified numerous archaeological and historical resources including: archaeological sites, NRHP-eligible historic structures and potential historic districts. As the project moves forward, the project's area of potential effect will be determined and a cultural resources assessment survey conducted to identify any significant archaeological sites, historic structures, or historic districts that may suffer either direct, indirect or cumulative effects as a result of the proposed project. Coordination with these agencies will continue as needed to address concerns regarding impacts to these resources.

ETAT Reviews: Historic and Archaeological Sites Issue: 2 found

4 Substantial assigned 05/20/2010 by Jennifer R Ross, FL Department of State

Coordination Document: PD&E Support Document As Per PD&E Manual Dispute Information:N/A

Identified Resources and Level of Importance: ****FDOT RCI BRIDGES

The GIS analysis revealed there are two previously-identified, historic-age FDOT RCI BRIDGES within close vicinity (500 feet) of the project area. These resources include:

FDOT Bridge No. 750167, the US-441SB over SCLRR, erected in 1957 FDOT Bridge No.750002 US-441 NB over SCLRR, erected in 1957

Both bridges are located in the project's 100 foot buffer and have yet to be documented or evaluated by this agency. Three other FDOT RCI BRIDGES are located within 200 feet or closer to the project corridor. These resources include FDOT Bridge Nos. 750066, 750707, and 750704. These bridges were not located in the Florida Bridge Information Inventory, therefore SHPO was unable to determine their original date of construction. Because they are within close vicinity to the project, they will have to be located in the field and their age determined at that point.

****FLORIDA SITE FILE HISTORIC BRIDGES

The GIS analysis revealed there are two previously-identified, historic-age FLORIDA SITE FILE HISTORIC BRIDGES within close vicinity (500 feet) of the project area. These resources include:

MT. DÓRA OVERPASS (LA02043), NOT EVALUATED BY SHPO TORONTO BRIDGE (OR00468), NOT EVALUATED BY SHPO

Both bridges are located in the project's 100 foot buffer and have yet to be evaluated by this agency.

****FLORIDA SITE FILE ARCHAEOLOGICAL OR HISTORIC SITES

The GIS analysis revealed there are two previously-identified FLORIDA SITE FILE ARCHAEOLOGICAL OR HISTORIC SITES within close vicinity (500 feet) of the project area. The resources include the TAVARES MOUND (LA00052) and SMALL MOUND NEAR TAVARES (LA00053), both of which are in the project's 100 foot buffer. Nether site has been evaluated by the SHPO.

****NATIONAL REGISTER OF HISTORIC PLACES The GIS analysis revealed there are eight previously-identified NATIONAL REGISTER OF HISTORIC PLACES-listed buildings within close vicinity (500 feet) of the project area. These resources include:

The following six buildings within the 100 foot buffer: CLIFFORD HOUSE (LA00116) LAKESIDE INN (LA00269), MOUNT DORA A. C. L. RAILROAD STATION, OLD (LA00281) DUNCAN, HARRY C., HOUSE (LA02027) EUSTIS COMMERCIAL HISTORIC DISTRICT (LA02940) APOPKA SEABOARD AIR LINE RAILWAY DEPOT (OR03515)

The following properties within the 200 foot buffer: FERRAN PARK AND THE ALICE MCCLELLAND MEMORIAL BANDSHELL (LA00978) LAKE COUNTY COURTHOUSE (LA02123) ****RESOURCE GROUPS

The GIS analysis revealed there are 10 previously-identified RESOURCE GROUPS within close vicinity (500 feet) of the project area. These resources include:

The following nine properties within the 100 foot buffer:

LAKESIDE INN (LA00269), NRHP Listed EUSTIS COMMERCIAL HISTORIC DISTRICT. LA02940. NRHP-LISTED

EUSTIS COMMERCIAL HISTORIC DISTRICT, LA02940, NRHP-LISTED SEABOARD COAST LINE RR GRADE LA02957, ELIGIBLE FOR NRHP APOPKA BEAUCLAIR CANAL (LA03427), ELIGIBLE FOR NRHP LAKE REGION PACKING ASSOCIATION (LA03569), INELIGIBLE FOR NRHP FLORIDA STATE ROAD 46 (LA03584) INELIGIBLE FOR NRHP OVERBROOK PARK (OR06028), ELIGIBLE FOR NRHP LAKE ADAIR-LAKE CONCORD HISTORIC DISTRIC (OR06046), ELIGIBLE FOR NRHP MOUNT DORA HISTORIC DISTRICT (LA04008), ELIGIBLE FOR NRHP

The following property within the 200 foot buffer: COLLEGE PARK HISTORIC DISTRICT (OR08483), ELIGIBLE FOR NRHP

****FLORIDA SITE FILE HISTORIC STANDING STRUCTURES

The GIS analysis revealed there are 464 previously-identified FLORIDA SITE FILE HISTORIC STANDING STRUCTURES within close vicinity (500 feet) of the project area. Many of these resources have not yet been evaluated by this agency. The included map indicates that the project corridor passes through the central business distract of a number of communities, including Eustis, Tavares, Mount Dora, Lockhart, and Orlando. As a result there are clusters of historic standing structures within the communities of that could represent potential historic districts within the project area of potential effects.

Comments on Effects to Resources: ****FDOT RCI BRIDGES

The two historic-age FDOT RCI BRIDGES within the project's 100 foot buffer - FDOT Bridge No. 750167 and 750002 - are likely to suffer direct affects from the proposed activities. Furthermore the three bridges of undetermined age - FDOT Bridge Nos. 750066, 750707, and 750704 - could also suffer direct affects from the project due to their close vicinity to the proposed work.

****FLORIDA SITE FILE HISTORIC BRIDGES

The two previously-recorded FLORIDA SITE FILE HISTORIC BRIDGES within the project's 100 foot buffer - MT. DORA OVERPASS (LA02043) and TORONTO BRIDGE (OR00468) - are likely to suffer direct affects from the proposed activities.

****FLORIDA SITE FILE ARCHAEOLOGICAL OR HISTORIC SITES

Based upon the nature and location of the proposed work, the both TAVARES MOUND (LA00052) and SMALL MOUND NEAR TAVARES (LA00053) could be directly impacted by the work. Neither resource has been evaluated by this office.

****NATIONAL REGISTER OF HISTORIC PLACES

The eight previously-identified NATIONAL REGISTER OF HISTORIC PLACES-listed buildings within close vicinity (500 feet) of the project area have the potential to suffer direct as well as indirect/cumulative effects as the result of the proposed work activities. These resources include:

CLIFFORD HOUSE (LA00116) LAKESIDE INN (LA00269), MOUNT DORA A. C. L. RAILROAD STATION, OLD (LA00281) DUNCAN, HARRY C., HOUSE (LA02027) EUSTIS COMMERCIAL HISTORIC DISTRICT (LA02940) APOPKA SEABOARD AIR LINE RAILWAY DEPOT (OR03515) FERRAN PARK AND THE ALICE MCCLELLAND MEMORIAL BANDSHELL (LA00978) LAKE COUNTY COURTHOUSE (LA02123)

****RESOURCE GROUPS

The 10 previously-identified RESOURCE GROUPS within close vicinity (500 feet) of the project area have the potential to suffer direct as well as indirect/cumulative effects as the result of the proposed work activities. The resources include:

COLLEGE PARK HISTORIC DISTRICT (OR08483), ELIGIBLE FOR NRHP LAKESIDE INN (LA00269), NRHP Listed EUSTIS COMMERCIAL HISTORIC DISTRICT, LA02940, NRHP-LISTED SEABOARD COAST LINE RR GRADE LA02957, ELIGIBLE FOR NRHP APOPKA BEAUCLAIR CANAL (LA03427), ELIGIBLE FOR NRHP LAKE REGION PACKING ASSOCIATION (LA03569), INELIGIBLE FOR NRHP FLORIDA STATE ROAD 46 (LA03584) INELIGIBLE FOR NRHP OVERBROOK PARK (OR06028), ELIGIBLE FOR NRHP LAKE ADAIR-LAKE CONCORD HISTORIC DISTRIC (OR06046), ELIGIBLE FOR NRHP

****FLORIDA SITE FILE HISTORIC STANDING STRUCTURES The 464 previously-identified FLORIDA SITE FILE HISTORIC STANDING STRUCTURES within close vicinity (500 feet) of the project area have the potential to suffer direct and or indirect/cumulative affects of the project activities. Many of these resources have not yet been valuated by this agency. The GIS analysis also indicated the potential for unrecorded historic districts within the project area that have the potential to suffer direct and/or indirect/cumulative effects of the project.

Additional Comments (optional): After a review of the GIS analysis, it appears that there are portions of the project corridor that have not been subjected to a survey. The GIS analysis also revealed that a number of previously-recorded cultural resources are located within/extend into the

project's direct right-of-way, adjacent to the tracks, and in close vicinity to the rail corridor. Furthermore, the project corridor passes through a number of potential historic districts. It will therefore be necessary to undertake a cultural resources assessment survey to identify any significant archaeological sites, historic structures, or historic districts that may suffer either direct or indirect/cumulative affects effects as a result of the proposed project activities. Previously recorded sites should also be reassessed. The survey effort should also document if there is any potential for unrecorded or unevaluated historic districts within the project area, within the communities of Eustis, Tavares, Mount Dora, Lockhart, and Orlando. It is therefore our recommendation that prior to initiating any project related land clearing or ground disturbing activities within the project area it should be subjected to a systematic archaeological and architectural survey. All historic-age resources, including potential historic districts, within the area of potential effects should be documented and assessed for NRHP eligibility. Please note that any property that is subjected to use or groundbreaking activities for this project (i.e., temporary or permanent equipment staging sites, borrow pits, parking, etc.) should be subjected to a cultural resource study. The resultant **Coordinator Feedback**: None

4 Substantial assigned 04/26/2010 by Steve Terry, Miccosukee Tribe of Indians of Florida

Coordination Document: No Selection

Dispute Information:N/A

Identified Resources and Level of Importance: There are numerous recorded archaeological sites reported near this project, including two burial mounds within 100 feet. A Cultural Resources Survey will need to be done to ascertain if there are any archaeological sites within the project boundaries.

Comments on Effects to Resources: Once a Cultural Resources Survey has been done, then effects, if any, to archaeological sites can be ascertained.

Additional Comments (optional): If the Cultural Resources Survey shows there are no archaeological sites that will be impacted by this project, then no further consultation is necessary. However, if the Cultural Resources Survey does show that archaeological sites will be impacted by this project, then further consultation with the Miccosukee Tribe should be done. Coordinator Feedback: None

The following organization(s) were expected to but did not submit a review of the Historic and Archaeological Sites issue for this alternative: Federal Highway Administration, Seminole Tribe of Florida

Coordinator Summary: Recreation Areas Issue

2 *Minimal* assigned 09/07/2010 by FDOT District 5

Comments: The FDOT concurs with the comments of EPA regarding impacts to the recreational resources identified within the project area including, schools, parks and trails. A more detailed analysis of the projects impacts on recreational resources will be completed in later project phases.

ETAT Reviews: Recreation Areas Issue: 2 found

0 None assigned 05/25/2010 by Lauren P. Milligan, FL Department of Environmental Protection

Coordination Document: No Selection Dispute Information:N/A Identified Resources and Level of Importance: None found. Comments on Effects to Resources: None found. Coordinator Feedback: None

2 *Minimal* assigned 05/21/2010 by Madolyn Dominy, US Environmental Protection Agency

Coordination Document: No Selection

Dispute Information:N/A

Identified Resources and Level of Importance: Resources: Recreation Areas - Florida Managed Areas, school, public parks, private parks, recreational trails, etc.

Level of Importance: These recreational areas are of a high level of importance in the State of Florida. A minimal degree of effect is being assigned to this issue for the proposed project.

Comments on Effects to Resources: The recreational features listed as being located within close proximity to the proposed project include a Florida Managed Area (Wolf Branch Sink Preserve), several schools, several public parks, and recreational trails.

EPA is assigning a minimal degree of effect to the recreation areas issue for this project. The proposed project is planned to operate along an existing rail line and it is expected that there will be minimal impact to resources such as recreation areas. Recreation areas impacts associated with the project will be dependent upon the amount of right-of-way needed for the rail project and how much natural environment, if any, will be impacted. EPA recommends that any studies for this project focus on identifying the types of recreational resources to be potentially impacted and what type of additional analyses, if any, will be needed.

EPA recommends that a survey of the area be conducted to confirm the location of current listed recreation area features, along with other recreation area features not listed in the GIS analysis data. FDOT will need to evaluate direct, indirect, and cumulative impacts to listed recreation area features and any other features not listed. Opportunities to avoid and or minimize impacts and fragmentation to recreational resources should be evaluated and considered to the greatest extent practicable. FDOT must evaluate whether a Section 4(f) review is necessary.

Additional Comments (optional): At the planning screen phase of the project, it is unclear how much modification or upgrade to the existing rail line (tracks) will be needed. Also, the project description does not include information regarding train stations, parking lots, and other ancillary structures that will be needed for the project. EPA is reviewing the project and providing comments based only upon the Orange Blossom Express Rail Project utilizing the existing rail line and the assumption that all work will be within existing railroad right-of-way. EPA's review does not include comments regarding train station locations, parking lots, etc.

Coordinator Feedback: None

The following organization(s) were expected to but did not submit a review of the Recreation Areas issue for this alternative: Federal Highway

Coordinator Summary: Section 4(f) Potential Issue

2 Minimal assigned 09/07/2010 by FDOT District 5

Comments: Results of the GIS Analysis identified numerous resources within the 100 ft. project buffer, for which Section 4(f) may be applicable. These resources include schools, recreational trails, protected public lands and parks, historic structures including bridges and historic districts. FDOT assigns a Summary Effect of Minimal based on the current project description, which was provided by the Lake/Sumter MPO. However, FDOT notes that further evaluation will be needed as details of the project are developed.

ETAT Reviews: Section 4(f) Potential Issue: None found

The following organization(s) were expected to but did not submit a review of the Section 4(f) Potential issue for this alternative: Federal Highway Administration

ETAT Reviews and Coordinator Summary: Community Issues

Coordinator Summary: Aesthetics Issue

2 *Minimal* assigned 09/07/2010 by FDOT District 5

Comments: The project passes through numerous communities in a highly populated region of Florida. Residential and commercial business areas may be affected by the project. The project's impact on aesthetics, including noise and vibration impacts, will be evaluated further as additional detail regarding the project become available. Opportunities for public input on the project will also be provided. The FDOT concurs with FHWA, and assigns a Summary Effect of Minimal.

ETAT Reviews: Aesthetics Issue: 1 found

2 Minimal assigned 05/20/2010 by Cathy Kendall, Federal Highway Administration

Coordination Document: No Involvement

Dispute Information:N/A

Identified Resources and Level of Importance: If the project crosses an interstate, which would therefore require FHWA interstate access approval, coordination will be needed with FHWA transportation engineer.

Comments on Effects to Resources: Please coordinate any interstate access locations with the FHWA transportation engineer to address clearance, visual issues, etc.

Coordinator Feedback: None

Coordinator Summary: Economic Issue

Enhanced assigned 09/07/2010 by FDOT District 5

Comments: The project would provide multi-modal opportunities and other positive impacts such as reduced VMT, facilitate economic development and job creation. As the project progresses, economic impacts will be evaluated further.

ETAT Reviews: Economic Issue: 2 found

1 Enhanced assigned 05/20/2010 by Kathaleen Marie Linger, FDOT District 5

Coordination Document: No Selection

Dispute Information:N/A

Identified Resources and Level of Importance: -

Comments on Effects to Resources: Reviewer: David Marsh (District 5 FDOT / Lake-Sumter MPO liaison)

This will provide multi-modal opportunities (other than the automobile).

Expect long-term positive impacts, reducing cross-county commutes on the highway system. Expect long-term economic gains (jobs and retail activity), particularly around the stations with new development and redevelopment.

Coordinator Feedback: None

2 Minimal assigned 05/20/2010 by Cathy Kendall, Federal Highway Administration

Coordination Document: No Involvement

Dispute Information:N/A

Identified Resources and Level of Importance: If the project crosses an interstate, which would therefore require FHWA interstate access approval, coordination will be needed with FHWA transportation engineer.

Comments on Effects to Resources: Please coordinate any interstate access locations with the FHWA transportation engineer to address clearance, visual issues, etc.

Coordinator Feedback: None

Coordinator Summary: Land Use Issue

2 Minimal assigned 09/07/2010 by FDOT District 5

Comments: As the project progresses into later phases, public involvement opportunities will be developed to obtain feedback from local governments, residents and businesses.

The Florida Department of Community Affairs notes: The proposed project is not a new rail line and does not increase capacity or create new access

and does not include any new passenger stations, In accordance with the definitions of "major transportation Improvement" provided in s.339.166, F.S., and the Florida Transportation Department PD&E and ETDM manuals, the Department understands that this project is not a major transportation improvement. A Class of Action Determination for this project will be made as additional detail becomes available.

FDCA also noted that the rail project is not depicted in the comprehensive plans of Orange County and the following cities; Umatilla, Eustis, Mount Dora, Tavares and Apopka. The Lake/Sumter MPO and local governments will need to resolve inconsistencies in the comprehensive plans as the project progresses.

ETAT Reviews: Land Use Issue: 1 found

2 Minimal assigned 07/07/2010 by Gary Donaldson, FL Department of Community Affairs

Coordination Document: No Selection

Dispute Information:N/A

Identified Resources and Level of Importance: The ORANGE BLOSSOM EXPRESS RAIL ETDM project connects multiple local governments and has been reviewed for consistency with currently adopted comprehensive plans and transportation maps contained within the plans of the affected local governments.

The proposed project is not a new rail line and does not increase capacity or create new access and does not include any new passenger stations, In accordance with the definitions of "major transportation Improvement" provided in s.339.166, F.S., and the Florida Transportation Department PD&E and ETDM manuals, the Department understands that this project is not a major transportation improvement.

PURPOSE AND NEED

The ETDM Purpose and Need Statement states that this proposed rail project is needed to relieve congestion on the U.S. 441 corridor in Lake County and Orange County, improve regional mobility, provide an additional route choice particularly for the transportation disadvantaged, and serve as a feeder line to SunRail commuter service. The project will follow the U.S. 441 corridor along the existing Florida Central Railroad line between Umatilla and downtown Orlando. The project connects the following municipalities Umatilla, Eustis, Mount Dora and Tavares (Lake County) and Apopka and Orlando (Orange County).

COMMENTS AND RECOMMENDATONS

The Proposed Project is Consistent with the Comprehensive Plans of the following local governments: Lake County; City of Orlando

The Proposed Project is Inconsistent with the Comprehensive Plans of the following local governments: Orange County; Cities of Umatilla, Eustis, Mount Dora, Tavares, and Apopka

The area below is provided to explain project inconsistencies if answering "Inconsistent" and to provide statutory references as necessary. In addition, if a "Consistent" response requires explanation, the area below will be for further illustration if necessary.

This project is consistent with the following policy contained within the East Central Florida Regional Planning Council Strategic Regional Policy Plan: Policy 5.1.3: The High Speed Rail system should support the continuation and expansion of multi-modal transit facilities to ensure integration of high speed rail into the region's transit system.

The project is consistent with the following future land uses of the affected local governments identified along the rail line:

Lake County

Land Uses: Rural Village(2), Neighborhood Activity Center, Rural (1), Suburban, Urban Expansion

Mount Dora

Land Uses: Medium Density Residential, Commercial, Public Lands, Hi-Density Residential (12), Passive Recreation, Industrial

Tavares

Land Uses: Industrial, Low Density, Public Commercial, Medium Density, Municipal, Commercial (Mixed Use)

Eustis

Land Uses: Railroad, General Commercial, Commercial Business District, Mixed Commercial Residential

Umatilla Land Uses: Commercial, General Recreational

Orange County

Land Uses: Rural, Rural (1/1), Commercial, Low Density Residential, Industrial

Orlando

Land Uses: Mixed Use Corridor Medium Intensity, Community Activity Center, Residential Medium Intensity, Office Medium Intensity, Industrial, Urban Activity Center, Residential Low Intensity, Office Low Intensity, Public/Recreational and Institutional, Downtown Activity Center

Apopka

Land Uses: Residential Low, Commercial, Industrial, Mixed Use

However, the future transportation maps of the comprehensive plans of the following local governments do not depict the rail line as required by Rule 9J-5.019(5)(a)8, F.A.C., and these maps should be amended accordingly:

Orange County City of Umatilla City of Eustis City of Mount Dora City of Tavares City of Apopka

Also, the cities of Eustis, Mount Dora, Tavares, Apopka and Orlando are Dense Urban Land Areas/Transportation Concurrency Exception Areas (s.163.3164(34), F.S.) These cities are required to transmit by July 2011 comprehensive plan amendments creating land use and transportation strategies to fund mobility (s. 163.3180(5)(b)(4), F.S.). Rail may be one component of such strategies. Rail service that reduces automobile trips is also a strategy for greenhouse gas reduction consistent with the requirements of s.163.3177(6)(j), F.S.: "The transportation element shall incorporate transportation strategies to address reduction in greenhouse gas emissions from the transportation sector."

Coordinator Feedback: None

The following organization(s) were expected to but did not submit a review of the Land Use issue for this alternative: Federal Highway Administration

Coordinator Summary: Mobility Issue

1 Enhanced assigned 09/07/2010 by FDOT District 5

Comments: The FHWA indicated that coordination with the transportation engineer would be required if the project crosses an interstate. No interstate crossings are proposed. The purpose of the project is to improve mobility between Lake County and downtown Orlando. The existing highway serving this area is highly congested during peak travel periods. The project's effect on mobility will be evaluated in greater detail as the project progresses.

ETAT Reviews: Mobility Issue: 2 found

1 Enhanced assigned 05/20/2010 by Kathaleen Marie Linger, FDOT District 5

Coordination Document: No Selection

Dispute Information:N/A

Identified Resources and Level of Importance: -

Comments on Effects to Resources: Reviewer: David Marsh (District 5 FDOT / Lake-Sumter MPO liaison)

This will provide multi-modal opportunities (other than the automobile).

Expect long-term positive impacts, reducing cross-county commutes on the highway system. Expect long-term economic gains (jobs and retail activity), particularly around the stations with new development and redevelopment.

Coordinator Feedback: None

2 Minimal assigned 05/20/2010 by Cathy Kendall, Federal Highway Administration

Coordination Document: No Involvement

Dispute Information:N/A

Identified Resources and Level of Importance: If the project crosses an interstate, which would therefore require FHWA interstate access approval, coordination will be needed with FHWA transportation engineer.

Comments on Effects to Resources: Please coordinate any interstate access locations with the FHWA transportation engineer to address clearance, visual issues, etc.

Coordinator Feedback: None

The following organization(s) were expected to but did not submit a review of the Mobility issue for this alternative: Federal Transit Administration

Coordinator Summary: Relocation Issue

0 None assigned 09/07/2010 by FDOT District 5

Comments: Further assessment of relocation effects will be conducted during the programming phase of the project and as more detailed project information becomes available.

ETAT Reviews: Relocation Issue: None found

The following organization(s) were expected to but did not submit a review of the Relocation issue for this alternative: Federal Highway Administration

Coordinator Summary: Social Issue

2 Minimal assigned 09/07/2010 by FDOT District 5

Comments: The EPA indicated that the project is likely to have an overall social benefit to the communities along the corridor and within the region, but that there may be adverse impacts of the project, such as noise and vibration that should be avoided or minimized. An analysis of the social effects of the project, including noise and vibration impacts, will be conducted during later phases of the project. Public involvement opportunities will be provided as the project develops to solicit input from affected communities and populations and ensure that transportation needs are addressed, while minimizing adverse impacts.

ETAT Reviews: Social Issue: 2 found

Coordination Document: No Selection Dispute Information:N/A Identified Resources and Level of Importance: Social impact comments for tihs project cannot currently be determined. Comments on Effects to Resources: None found. Coordinator Feedback: None

2 Minimal assigned 05/21/2010 by Madolyn Dominy, US Environmental Protection Agency

Coordination Document: No Selection

Dispute Information:N/A

Identified Resources and Level of Importance: Resources: Social impacts such as residential populations, commercial businesses, local and city governments, economic growth and development, commuter populations, tourist populations, residential communities, minority or low-income populations, disadvantaged populations, archeological and historic areas or structures, etc.

Level of Importance: These resources are of a high level of importance. Impacts to these types of resources, both positive and negative, should be evaluated and documented throughout the project. EPA is assigning a minimal degree of effect for this issue due to the fact that EPA strongly supports alternative modes of transportation such as the proposed Orange Blossom Express Rail Project. EPA believes that the community and region can significantly benefit from this type of transportation project. However, there may be environmental or human impacts from the project that should be avoided or minimized.

Comments on Effects to Resources: Some of the benefits outlined in the project description which support EPA's degree of effect include:

Assisting in the implementation of regional and local growth management plans as well as the vision for growth that was developed which would allow more intense land uses and Transit Oriented Development (TOD) practices at the activity center station locations;

Implementation of a financially feasible multi-modal transportation system that includes commuter rail and the corresponding growth management plans with established goals, objectives and policies in the two counties and respective cities;

Providing an efficient regional transit system that is consistent with local transportation and community based plans;

Providing an incentive for economic growth and improvement of overall quality of life.

The project studies and public outreach activities should consider social impacts, both positive and negative. Rapid transit systems such as the proposed Orange Blossom Express Rail Project offer alternative modes of transportation to the public. This transit system can provide the public with a high-quality, high-capacity, reliable mode of transportation between communities, counties, and cities. This can benefit various sectors of the population such as work commuters, tourist populations, and persons without access to other modes of transportation.

The entire project should take into account various social issues and impacts for the rail line. These issues may include, but are not limited to, population and growth estimates, community cohesion, noise, vibration, visual aesthetics, environmental justice issues (low income populations (highlight positives and negatives)), elderly populations, economic development, land acquisition, displacements or relocations, effects on special populations (highlight positives and negatives), archeological and historic areas or structures, and other social features that may be affected by the project.

EPA recommends that any negative direct and indirect impacts to social resources and affected communities be avoided or minimized to the best extent practicable. Public involvement on this project should be ongoing and continual throughout the project.

Additional Comments (optional): At the planning screen phase of the project, it is unclear how much modification or upgrade to the existing rail line (tracks) will be needed. Also, the project description does not include information regarding train stations, parking lots, and other ancillary structures that will be needed for the project. EPA is reviewing the project and providing comments based only upon the Orange Blossom Express Rail Project utilizing the existing rail line and the assumption that all work will be within existing railroad right-of-way. EPA's review does not include comments regarding train station locations, parking lots, etc.

Coordinator Feedback: None

The following organization(s) were expected to but did not submit a review of the Social issue for this alternative: Federal Highway Administration

ETAT Reviews and Coordinator Summary: Secondary and Cumulative Issues

Coordinator Summary: Secondary and Cumulative Effects Issue

2 *Minimal* assigned 09/07/2010 by FDOT District 5

Comments: No ETAT comments were received regarding the secondary and cumulative effects of the project. FDOT assigns the issue a Minimal DOE. As the project progresses and more information becomes available regarding proposed transit related development, additional analysis of potential secondary and cumulative impacts will be completed. FDOT will avoid and minimize secondary and cumulative impacts to important natural, cultural and community resources to the greatest extent practicable.

ETAT Reviews: Secondary and Cumulative Effects Issue: None found

No eliminated alternatives present.

General Project Commitments

No General Project Commitments Found

Dispute Resolution Activity Log

No Dispute Actions Found.

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12816 Orange Blossom Express Rail Project Near the City of Umatilla to Downtown Orlando



Map Generated on: 3/31/2010

12816 Orange Blossom Express Rail Project Near the City of Umatilla to Downtown Orlando



Note: Historic properties depicted on this map represent resources listed in the Florida Master Site File excluding archeological site locations, which, pursuant to Chapter 267.135, Florida Statutes, may be exempt from public record (Chapter 119.07, Florida Statutes). Absence of features on the map does not necessarily indicate an absence of resources in the project vicinity.





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12816 Orange Blossom Express Rail Project Near the City of Umatilla to Downtown Orlando







Geographic Data Technology, Inc.; Florida Department of Transportation; Florida Fish and Wildlife Conservation Commission

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Appendices

Degree of Effect Legend

	Legend				
Color Code	Meaning	ETAT	Public Involvement		
N/A	Not Applicable / No Involvement	There is no presence of the issue in relationship to the project the proposed transportation action.	ct, or the issue is irrelevant in relationship to		
0	None (after 12/5/2005)	The issue is present, but the project will have no impact on the issue; project has no adverse effect on ETAT resources; permit issuance or consultation involves routine interaction with the agency. The <i>None</i> degree of effect is new as of 12/5/2005.	No community opposition to the planned project. No adverse effect on the community.		
1	Enhanced	Project has positive effect on the ETAT resource or can reverse a previous adverse effect leading to environmental improvement.	Affected community supports the proposed project. Project has positive effect.		
2	Minimal	Project has little adverse effect on ETAT resources. Permit issuance or consultation involves routine interaction with the agency. Low cost options are available to address concerns.	Minimum community opposition to the planned project. Minimum adverse effect on the community.		
2	Minimal to None (assigned prior to 12/5/2005)	Project has little adverse effect on ETAT resources. Permit issuance or consultation involves routine interaction with the agency. Low cost options are available to address concerns.	Minimum community opposition to the planned project. Minimum adverse effect on the community.		
3	Moderate	Agency resources are affected by the proposed project, but avoidance and minimization options are available and can be addressed during development with a moderated amount of agency involvement and moderate cost impact.	Project has adverse effect on elements of the affected community. Public Involvement is needed to seek alternatives more acceptable to the community. Moderate community interaction will be required during project development.		
4	Substantial	The project has substantial adverse effects but ETAT understands the project need and will be able to seek avoidance and minimization or mitigation options during project development. Substantial interaction will be required during project development and permitting.	Project has substantial adverse effects on the community and faces substantial community opposition. Intensive community interaction with focused Public Involvement will be required during project development to address community concerns.		
5	Potential Dispute (Planning Screen)	Project may not conform to agency statutory requirements and may not be permitted. Project modification or evaluation of alternatives is required before advancing to the LRTP Programming Screen.	Community strongly opposes the project. Project is not in conformity with local comprehensive plan and has severe negative impact on the affected community.		
5	Dispute Resolution (Programming Screen)	Project does not conform to agency statutory requirements and will not be permitted. Dispute resolution is required before the project proceeds to programming.	Community strongly opposes the project. Project is not in conformity with local comprehensive plan and has severe negative impact on the affected community.		
	No ETAT Consensus	ETAT members from different agencies assigned a different ETDM coordinator has not assigned a summary degree of et	degree of effect to this project, and the ffect.		
	No ETAT Reviews	No ETAT members have reviewed the corresponding issue thas not assigned a summary degree of effect.	for this project, and the ETDM coordinator		
CIC Analyses					

GIS Analyses

Since there are so many GIS Analyses available for Project #12816 - Orange Blossom Express Rail Project, they have not been included in this ETDM Summary Report. GIS Analyses, however, are always available for this project on the Public ETDM Website. Please click on the link below (or copy this link into your Web Browser) in order to view detailed GIS tabular information for this project:

http://etdmpub.fla-etat.org/est/index.jsp?tpID=12816&startPageName=GIS%20Analysis%20Results

Special Note: Please be sure that when the GIS Analysis Results page loads, the Planning Screen Summary Report Published on 09/07/2010 by Kathaleen Linger Milestone is selected. GIS Analyses snapshots have been taken for Project #12816 at various points throughout the project's life-cycle, so it is important that you view the correct snapshot.

Project Attachments

There were no attachments associated with this project at the time the report was published.

Technical Memorandum | Preliminary Environmental Evaluation



APPENDIX C

SUPPLEMENTAL GIS DATA



Social Features

Land Use

Existing Conditions

The US 441 Study Area extends approximately 33 miles from downtown Orlando northwest along US 441 through Apopka and into Lake County, terminating in the City of Eustis. Portions of the Cities of Orlando, Apopka, Tavares, Mount Dora, and Eustis, Florida are included within the Study Area boundary which is includes about 112,000 acres. The most significant land use categories located in the US 441 Study Area include agriculture (18 percent), residential (23 percent), vacant residential (18 percent), and recreation (12 percent). The Study Area includes unincorporated portions of Orange, Seminole, and Lake Counties as well as the Cities of Orlando, Apopka, Tavares, Mount Dora, and Eustis. Several Rural Settlements are also located in the Study Area but they remain unincorporated. Each of the communities has identified future land uses for their respective jurisdictions. In northwest Orange County and southwest Seminole County, certain areas including the areas surrounding Zellwood and the Wekiva River Basin are anticipated to retain their existing development patterns. Population density is 1.33 persons per acre and housing density is 0.53 households per acre in the US 441 Study Area. Average household size is 2.49 persons per household and the percent living in poverty is 15.3 percent. Median age is 39.4 years and the percent of the population over 65 is 14.2 percent, according to 2010 Census Tract data.

The number of households with access to one vehicle or less is 0.25 households per acre. Minority population is 37.2 percent in the Study Area. Data from the Florida Department of Economic Opportunity was used to summarize the number of DRIs and PUDs in the US 441 Study Area; there are 25 DRIs covering more than 9,300 acres and 128 PUDs covering more than 7,200 acres. These developments have the potential to significantly increase the number of residents and change the composition of land development in the US 441 Study Area.



Community Facilities

Existing Conditions

A desktop analysis of community facilities was completed using readily available GIS data from the Florida Geographic Data Library (FGDL). The presence and location of community facilities was based on a review of information from the Florida Division of Emergency Management, University of Florida GeoPlan Center, and Florida Natural Areas Inventory (FNAI). A specific set of statewide FDOT layers was used by the Environmental Technical Advisory Team (ETAT) during the Efficient Transportation Decision Making (ETDM) process to understand the range and location of community facilities when reviewing major transportation projects. The analysis presented here is consistent with the standard ETAT analysis. Verifications were completed to refine the cultural features to screen out movie theaters from performing arts theaters, for example. A check was also completed to eliminate double counting of facilities.

These community facilities reflect nearly every category including airports, municipal buildings, civic centers, cemeteries, social service centers, community centers, law enforcement facilities, places of worship, cultural centers, fire stations, health care facilities, schools, and parks. The community facilities are summarized below.

Community Facilities	Alt. 1-2 Buffer	Alt. 1-5 Buffer	Alt. 2-4 Buffer
Government	5	7	4
Airport	1	2	0
Cemeteries	0	0	0
Civic Centers	4	5	2
Community Centers	3	4	4
Cultural Centers	0	1	0
Day Care Centers	3	3	1
Golf Courses	3 (6.0 acres)	1 (5.8 acres)	2 (14.6 acres)
Government Buildings	1	0	1
Health Clinics	1	2	1
Hospitals	0	0	1
Places of Worship	7	9	6
Public Pools	4	10	13
Schools	4	3	4
Fire Station	8	12	4
Park	2	4	2
Social Service	7	8	4
Recreational Trail Segments	10 (1 mile)	33 (15 miles)	8 (3 miles)
Conservation Area	1 (156 acres)	8 (20,743 acres)	8 (20,743 acres)

Table C-1: Summary of Community Facilities

Sources: Florida Natural Areas Inventory (FNAI), 2013; Florida Department of Community Affairs (DCA), 2012; Florida Department of Revenue, 2012; Florida Department of Transportation (FDOT) District 5 DTS GeoPlan Center, 2007; University of Florida GeoPlan Center, 2012; Florida Division of Emergency Management, 2008; Florida Department of Health, 2011.





Wetland and other Surface Waters

The Clean Water Act (CWA) of 1972, and other state and federal regulations established the basic structure for regulating discharges of pollutants into the waters of the US and regulating quality standards for surface waters. Section 404 of the CWA establishes a program to regulate the discharge of dredged and fills materials into waters of the US, including wetlands. Waters of the US refers to the limits of jurisdiction for the US Army Corps of Engineers (USACE) under the CWA and subsequent amendments. Regulation of waters of the US, including wetlands and surface water, is under the jurisdiction of the USACE. The USACE is supported by the USEPA, US Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS).

Wetlands and surface waters provide essential environmental functions such as providing habitat, water quality protection, and floodwater storage. Non-tidal waters of the US include "lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes or natural ponds and tributaries or impoundments of such bodies" (33 CFR 328.3).

Existing Conditions

Wetlands and other water were identified from a GIS analysis of the USFWS's National Wetland Inventory (NWI) and the NMFS database. The NWI data includes emergent, forested, and scrub/shrub systems. These types of systems are based on substrate material, vegetation, and flooding regime. The majority of these wetlands are freshwater emergent wetlands. This type of wetland is dominated by erect, rooted, herbaceous (not woody) wetland plants.

Waters of the US	Alt. 1-2 Buffer	Alt. 1-5 Buffer	Alt. 2-4 Buffer
Lakes/Ponds	17 (21.0 acres)	27 (37.1 acres)	34 (49.9 acres)
Reservoirs	32 (20.2 acres)	30 (18.2 acres)	25 (16.1 acres)
Swamps/Marshes	5 (7.3 acres)	21 (49.4 acres)	19 (43.1 acres)
Wetlands	69 (76.7 acres)	105 (151.8 acres)	98 (151.5 acres)

Table C-2: Summary of Wetlands and Other Surface Waters

* All area and length calculations account solely for the portion of polygon/line that lies within the buffers.

Source: Florida Geographic Data Library (FGDL), 2014.



100-Year floodplain

Existing Conditions

Floodplains and floodways are protected by Executive Order 11988, "Floodplain Management", USDOT Order 5650.2, "Floodplain Management and Protection", and Federal-Aid Policy Guide 23 CFR 650A. The regulations are intended to avoid or minimize transportation corridor encroachments within the 100-year floodplains and to avoid supporting land use development that may impact floodplain values.

To identify floodplains associated with the three Viable Build Alternatives, a GIS analysis was conducted reviewing the digital Florida Digital Flood Insurance Rate Maps (DFIRM) for the area within the 500-foot buffer for each of the alternative. The DFIRM data are used by the Federal Emergency Management Agency (FEMA) to designate the Special Flood Hazard Areas (SFHAs). The primary risk classification for SFHAs used is the one-percent-annual-chance flood event, or 100-year floodplain. The flood zone designations that depict 100-year floodplain include flood zones A, AE, and AH. Zone A is an approximate method of analysis, Zone AE is determined by detailed methods of analysis using base flood elevations, and Zone AH is annual chance shallow flooding with a constant water-surface elevation where average depths are between one and three feet.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), the buffer areas contain 20 to 30 segments designated as part of the 100-year floodplain. Approximately 50 to 160 acres of the 100-year floodplain (Type A, AE, and AH) are within the Viable Build Alternative buffer areas.

100-Year Floodplain	Alt. 1-2 Buffer	Alt. 1-5 Buffer	Alt 2-5 Buffer
100-Year Floodplain	20 (50.9 acres)	31 (156.4 acres)	21 (148.3 acres)

Table C-3: Summary of 100-Year Floodplain

* All area and length calculations account solely for the portion of polygon/line that lies within the buffers.

Source: Federal Emergency Management Agency (FEMA), 2012.





Water quality

Existing Conditions

Water quality is protected under the CWA. Impaired waters in the State of Florida are water bodies that fail to attain any of its designated uses and/or meet the minimum criteria for surface waters established in the Surface Water Quality Standards (Section 62-302, F.A.C.) and the Impaired Waters Rule (Section 62-303, F.A.C.). Outstanding Florida Waters (OFW) are waters designated worthy of special protection because of their natural attributes. FDEP's OFW dataset contains boundaries for designated water features considered worthy of special protection because of their natural attributes of their natural attributes per Section 62-302.700, FAC.

To identify the potential for water quality impacts of the three Viable Build Alternatives, a GIS analysis was conducted reviewing water quality resources within the 500-foot buffer for each of the alternatives, including impaired waters and OFW. The table below summarizes impaired waters and OFW identified in the project areas. There are no OFWs located within the buffer areas for the three alternatives.

Table C-4: Summary of Impaired and Outstanding Waters

Water Quality Designation	Alt. 1-2 Buffer	Alt. 1-5 Buffer	Alt. 2-4 Buffer
Impaired Waters	4 (307.5 acres)	6 (430.3 acres)	6 (253.4 acres)
Outstanding Florida Waters	0	0	0

*All area and length calculations account solely for the portion of polygon/line that lies within the buffers.

Sources: Florida Department of Environmental Protection, 2013; University of Florida GeoPlan Center, 2014.



Threatened and Endangered Species

Existing Condition

Pursuant to Section 7 of the Endangered Species Act of 1973, federal agencies are required to ensure that their actions are not likely to jeopardize the continued existence of endangered and threatened species or result in the destruction or adverse modification of critical habitat.

The purpose of this effort was to assess the potential for threatened and endangered species to potentially be impacted by project Viable Alternatives. A literature review of the Florida Natural Areas Inventory (FNAI) was performed along with review of GIS data from the USFWS was conducted to identify critical habitat and/or consultation areas for threatened or endangered species. Consultation areas, identified by USFWS, encompass all areas where populations are known to exist. These threatened and endangered species consultation areas and/or critical habitats are summarized in the table below. The review of these datasets concluded that along the project area's southern and northern portions, two federally listed species may be present – eagles and scrub jays. In addition, wood stork nesting colony core foraging areas (CFA) are included within the analysis buffer for the three Viable Alternatives.

Threatened and Endangered Species	Alternative 1-2	Alternative 1-5	Alternative 2-4
Eagle Nest Sites	1	1	0
Scrub Jay Localities	0	1	0
Wood Stork Nesting Colony Core Foraging Areas (CCFA)	Yes (2)	Yes (2)	Yes (2)
Wood Stork Nesting CCFA (acres in buffer)	1,435	1,892	1,335
Red Cockaded Woodpecker Consultation Areas	No	No	No
Sand Skink Consultation Areas	Yes	Yes	Yes
Scrub Jay Consultation Areas	Yes	Yes	Yes
Snail Kite Consultation Areas	Yes	Yes	Yes
Lake Wales Ridge Plant Consultation Areas	Yes	Yes	Yes

Table C-5: Threatened and Endangered Species Summary

* All area and length calculations account solely for the portion of polygon/line that lies within the buffers. Source: US Fish and Wildlife Service (USFWS), 2012; Florida Natural Areas Inventory (FNAI), 2009.

Data downloaded from the Florida Geographic Data Library (FGDL), 2014.

Several USFWS consultation areas for the Sand Skink, Scrub Jay, Snail Kite, Lake Wales Ridge Plant, Red Cockaded Woodpecker, and a Wood Stork Nesting Colony Core Foraging Area fall within the Study Area. One potentially active eagle nest is located in the buffer area for Viable Alternatives 1-2 and 1-5. A Florida scrub jay nest site is located adjacent to the FCEN rail line south of Mount Dora.





Parklands and Recreational Areas

Existing Condition

Section 4(f) of the U.S. Transportation Act of 1966 provides protection of public parks, wildlife management areas, and other public lands. Public lands are considered parks, recreational areas, or wildlife and waterfowl refuges when the land has been designated by federal, state, or local officials having jurisdiction over the land. In addition, Section 6(f) of the Land and Water Conservation Act of 1972 provide protection of public lands that were purchased with funds from this program. Potential Section 4(f) properties are protected when federal funds are used to advance transportation improvements while Section 6(f) properties are protected regardless of funding source. A formal determination of the applicability of Section 4(f) as well Section 6(f) will be made during subsequent project development phases.

A geospatial analysis was completed, for the three Viable Build Alternatives, examining public parks, wildlife management areas, and other public lands located within the 500-foot buffer for each of the alternatives. Public parks, wildlife management areas, and other public lands located within the buffer areas of the three Viable Build Alternatives are summarized below.

There is no involvement for Areas of Critical State Concern, Florida Forever Lands, Greenway Projects, Public Pinelands, Scenic Byways, State Parks, and National Parks. There are a variety of recreational trails located adjacent to the proposed Viable Alternatives. The GIS review identified recreational trails within the buffer areas for the Viable Alternatives. There are four existing trails (Palm Island Park Trail in Mount Dora near the CSX railroad, City of Eustis Trail also located near the CSX railroad, and two segments of West Orange Trail in Apopka). The identified trails include:

- Gertrude's Walk, Orange County
- West Orange Trail, Orange County
- Lake Apopka Loop, Orange County
- Lake Orange Loop, Orange County
- Lake Wekiva Trail, Lake, Seminole and Orange Counties
- Palm Island Park Trail, Lake County
- Tav-Dora Trail, Lake County
- Tav-Lee Trail, Lake County
- North Lake Trail, Lake County
- City of Eustis Trail, Lake County

Several multipurpose trail facilities have been collocated by design to enhance mobility and access to both transit options and recreational facilities, as reflected in local redevelopment plans. The collocated multipurpose trails include: Gertrude's Walk (Orlando); West Orange Trail (Apopka); Tav-Lee Trail/ North Lake Trail (Tavares); and City of Eustis Trail (Eustis).





Parklands and Recreation Areas	Alt. 1-2 Buffer	Alt. 1-5 Buffer	Alt. 2-4 Buffer
Areas of Critical Concern	0	0	0
Existing Trails	10 (0.96 miles)	33 (14.79 miles)	8 (2.97 miles)
Florida Land Management Areas	0	0	1 (0.6 acres)
Florida Forever Lands	0	0	0
Golf Courses	3 (6.0 acres)	1 (5.8 acres)	2 (14.6 acres)
Greenways Projects	0	0	0
Parks	2	4	2
Park Boundaries	8 (10.3 acres)	11 (24.4 acres)	6 (14.7 acres)
Public Pinelands	0	0	0
Scenic Byways	0	0	0
State Park Management Zones	0	0	0
State Parks	0	0	0
National Parks	0	0	0

Table C-6: Summary of Parklands and Recreational Areas

* All area and length calculations account solely for the portion of polygon/line that lies within the buffers.

Sources: Florida Natural Areas Inventory (FNAI), 2013; Florida Department of Community Affairs (DCA), 2012; Florida Department of Revenue, 2012; Florida Department of Transportation (FDOT) District 5; University of Florida GeoPlan Center, 2012.

The GIS review identified parklands and recreational areas within the abutting buffer: four existing golf courses and five parks (Florida Department of Agriculture Forestry Site, City Commons Plaza, Wall Street Plaza, Spring Lake Park, and Wooten Park). Also included are the following park boundaries:

- Aesop's Park (Tavares), Lake County
- City Ball Fields Park, Mount Dora
- City Commons Plaza, Orange County
- Country Club Of Orlando, Orange County
- Demetree Miracle Park, Orange County
- Eustis Farran Park, Lake County
- Eustis Lake Walk, Lake County
- Eustis School/Park, Lake County
- Expo Center, Orange County
- Florida Department of Agriculture Forestry Site
- Lake Dot Park, Orange County
- Lake Fairview Park, Orange County
- Overbrook Park, Orange County
- Parramore Community Garden, Orange County
- Southern Gateway, Orange County
- Spring Lake Park, Orange County
- Trotters Park, Orange County
- Wooten Park, Lake County



For Alternative 1-2, portions of eight park polygons were included in the buffer area:

- City Commons Plaza (on South Street in Orlando)
- Parramore Community Garden (Robinson Street in Orlando)
- Overbrook Park (Overbrook Drive in Orlando)
- Spring Lake Park (Shady Lane Drive in Orlando)
- Lake Fairview Park (Lee Road in Orlando)
- Demetree Miracle Park (Lee Road in Orlando)
- Trotter's Park (Lee Road in Orlando), and
- City Ball Fields Park in Mount Dora.

Three golf courses are located with the GIS buffer area for Alternative 1-2:

- Country Club of Orlando,
- Mount Dora Golf Club, and
- Country Club of Mount Dora.

The existing trail segments identified within the Alternative 1-2 buffer are the West Orange Trail, North Lake Trail, and the Palm Island Park Trail.

For Alternative 1-5, portions of 11 park polygons were included in the buffer area:

- City Commons Plaza (on South Street in Orlando)
- Parramore Community Garden (Robinson Street in Orlando)
- Overbrook Park (Overbrook Drive in Orlando)
- Spring Lake Park (Shady Lane Drive in Orlando)
- Lake Fairview Park (Lee Road in Orlando)
- Demetree Miracle Park (Lee Road in Orlando)
- Trotter's Park (Lee Road in Orlando)
- Aesop's Park (Tavares)
- Wooten Park (Tavares)
- Eustis Lake Walk, and
- Farran Park in Eustis.

The Country Club of Orlando is also located within the buffer area for Alternative 1-5. Thirtythree existing trail segments have been identified within the Alternative 1-5 buffer relative to Gertrude's Walk; West Orange Trail, Tav-Lee Trail, North Lake Trail, and the City of Eustis Trail.

For Alternative 2-4, portions of 6 park polygons were included in the buffer area:

- Lake Dot Park (Colonial Drive in Orlando)
- Overbrook Park (Overbrook Drive in Orlando)
- Lake Fairview Park (Lee Road in Orlando)
- Demetree Miracle Park (Lee Road in Orlando)



- Trotter's Park (Lee Road in Orlando), and
- City Ball Fields Park in Mount Dora.

Two golf courses are located within the Alternative 2-4 buffer area and they are the Country Club of Orlando and Zellwood Station Country Club. Eight trail segments have been identified within the Alternative 2-4 buffer area relative to the West Orange Trail, Lake-Wekiva Trail, and Mount Dora Trails.

The Lake Apopka Restoration Conservation lands are located south of the FCEN rail corridor in Orange and Lake Counties and are managed by the St. Johns River Water Management District (SJRWMD).

Approximately eight of Florida's Managed Areas are located within the Study Area; they include:

- Cuyler Lanier Sanctuary South of Lake Dora
- Hidden Waters Preserve Eustis
- Holiday Highlands Sanctuary Located near US 441/SR 46
- Lake Apopka Restoration Area North of Lake Apopka
- Lake Lotus Park North of Maitland Boulevard
- Trimble Park Southeast corner of Lake Dora
- Trout Lake Nature Center North of the City of Eustis
- Wolf Branch Sink Preserve South of SR 46 in Mt. Dora

The Florida Natural Areas Inventory (FNAI) has identified as having natural resource value, and that are being managed at least partially for conservation purposes. As determined by the SJRWMD land use/land cover data sets and FNAI public lands boundary data set, public pine lands identified as conducive to prescribed burning have been identified within the Study Area. These public pine lands are located in the Hidden Waters Preserve, Lake Apopka Restoration Area, and the Wolf Branch Sink Preserve.

The buffer areas do not contain existing Florida Scenic Highways and Byways, planned greenway projects, state parks and state park management zones, prioritized hiking trail opportunities, Florida Forever Lands, or Areas of Critical Concern. These terms are explained as follows:

- Florida Scenic Highways and Byways are designated by the FDOT Environmental Management Office (EMO) to promote a heightened awareness of the state's exceptional resources and unique history through educational and visual experiences.
- Planned greenway projects contain cultural and historic features recommended by the Bureau of Archaeological Research, Division of Historical Resources, Florida Department of State, and edited by the GeoPlan Center, DEP Office of Greenways and Trails, and Public Comment (Regional Greenways Task Force).
- State Park Management Zones are divisions of land within Florida State Parks based on factors such as the natural community types, physical boundaries, land use and geography that are used to reference management activities.
- Prioritized hiking trail opportunities are pathways and essential associated lands required for proper functioning of the Florida National Scenic Trails network.



- Florida Forever Lands are areas that have been proposed for acquisition or have been acquired because of outstanding natural resources, opportunity for natural resource-based recreation, or historical and archaeological resources.
- Areas of Critical Concern are areas designated by a program that protects resources and public facilities of major statewide significance. Areas of Critical Concern are further described in Title XXVIII, Chapter 380.05 (2)(a) and (b), Florida Statues.



Cultural Resources

Existing Conditions

Cultural resources are defined by the National Historic Preservation Act (NHPA) of 1966 and governed by federal and state regulations. Section 106 of the NHPA provides a general process for cultural resource assessments, and requires that historic and archaeological resources be considered in project planning for federally funded or permitted projects. Cultural resources or "historic properties" include any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the *National Register of Historic Places (NRHP).*" The NRHP places high importance on its listed resources giving them higher priority for preservation. A formal Cultural Resources Assessment Survey (CRAS) will be performed during subsequent project development phases to identify additional cultural resources.

The Florida Division of Historical Resources (FDHR)created the GIS data evaluated by the State Historic Preservation Officer (SHPO) including structures, bridges, cemeteries, and resource groups (historic districts, designated historic landscapes, linear resources/sites, and building complexes). Desktop reviews of the NRHP and the digital database of the Florida Master Site File (FMSF) were conducted to determine the presence of cultural resources within the buffer areas for the three Viable Alternatives. This review identified resources that are listed, potentially, not evaluated, or considered ineligible. The table below focuses on SHPO evaluated resources considered eligible for listing or potentially eligible for listing in the NRHP.

Cultural Resources	Alt. 1-2 Buffer	Alt. 1-5 Buffer	Alt. 2-4 Buffer
SHPO Structures	36/189+	37/217+	32/98+
SHPO Bridges	1	1	1
SHPO Resource Groups	4/9+	5/11+	2/7+
SHPO Cemeteries	0	0	0
National Register Districts	3 (594 acres) [*]	3 (473 acres) [*]	3 (493 acres) [*]
SHPO Survey Areas	46 (1,581 acres) [*]	52 (1,540 acres) [*]	39 (2,130 acres) [*]

Summary of Cultural Resources

* All area and length calculations account solely for the portion of polygon/line that lies within the buffers. + Items listed as ratios are a comparison of the State Historic Preservation Office (SHPO) Eligible features as compared to the full universe of "eligible, not eligible, not evaluated, or ineligible for listing" data points. Source: Florida Master Site File (FMSF) of the Department of State, Bureau of Historic Preservation (2013).

More than 50 SHPO cultural resource surveys have been conducted in the study area. They cover more than 2,000 acres. Five were completed in 2012 and 2013.

No cemeteries are present within the any of the three Viable Build Alternative buffers. The SHPO resources located in the buffer area for Alternatives 1-2 are listed below.

- Atlantic Coastline Station/Old Orlando Railroad Depot
- Bumby Hardware Store
- Strand Hotel



- Broadwell Building
- Purcell Building/Cheyenne Saloon
- 1006 Edgewater Court
- 1114 Seville Place
- 1029 Edgewater Court
- 1146 Edgewater Court
- 1227 Country Club Drive
- Apopka Seaboard Air Line Railway Depot

The SHPO resources located in the buffer area for Alternatives 1-5 are listed below.

- Atlantic Coastline Station/Old Orlando Railroad Depot
- Bumby Hardware Store
- Strand Hotel
- Broadwell Building
- Purcell Building/Cheyenne Saloon
- 1006 Edgewater Court
- 1114 Seville Place
- 1029 Edgewater Court
- 1146 Edgewater Court
- 1227 Country Club Drive
- Apopka Seaboard Air Line Railway Depot
- Ferran Park/McClelland Bandshell

The SHPO resource sites located in the buffer area for Alternatives 2-4 are listed below.

- Colonial Garage
- 1022 Edgewater Court
- 1006 Edgewater Court
- 1107 Seville Place
- 1132 Edgewater Court
- 1015 Edgewater Court
- 1204 Edgewater Court
- 1215 Country Club Drive

Resources within the abutting buffer are:

- One bridge (Tremain Street Bridge is eligible for NRHP), and
- Four historic and prehistoric archaeological sites (Tavares Mound, Small Mound near Tavares, Lake Concord building remains, and FUMCO homestead site).



Contaminated Sites

Existing Conditions

A contamination screening generally follows the FHWA's Technical Advisory T 6640.8A, dated October 30, 1987 and the FDOT's Project Development and Environment Manual, Part 2, Chapter 22, dated January 2008. The contamination screening of the Study Area helps to determine the potential for contamination from adjacent facilities, sites, or places. The desktop review identified contaminated sites located near the stations that are known to be contaminated. These facilities are listed in the table below.

Additionally, a GIS analysis was performed using EPA data to identify sites that are subject to environmental regulation or of environmental interest. These facilities were generated from the following national environmental programs:

- Superfund National Priorities List (NPL);
- Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal Facilities (TSDF);
- Resource Conservation and Recovery Act-Large Quantity Generators (RCRA LQG);
- Air Facility System (AFS);
- Major Air Pollutants Toxics Release Inventory (TRI);
- National Pollutant Discharge Elimination System (NPDES);
- Assessment and Cleanup and Redevelopment Exchange System (ACRES), also known as Brownfield areas; and
- Risk Management Program Section Seven Tracking System (SSTS) for the EPA Pesticide Program.

Alternative 1-2 includes four potential hazardous materials and/or petroleum sites within the GIS buffer in an area measuring approximately 188 acres. Six potential hazardous materials and/or petroleum sites are located within the Alternative 1-5 GIS buffer in an area measuring approximately 242 acres. Alternative 2-4 includes three potential hazardous materials and/or petroleum sites in an area measuring approximately 67 acres.



Potentially Contaminated Sites

Station/Facilities	Relative Location	Database	File Summary
Amelia Street Station (Rail)			
Railroad Corridor	Commuter Rail Platform	None	Potential for arsenic and PAH
Orlando Feed Mill 501 Harris Ave FDEP# 8520419	Adjoining West	SCTM	Storage Tank Registration/Notification Form dated 1/14/1985 indicates a 1,000- gal unleaded gasoline and a 2,000- gal and a 6,000-gal diesel fuel removed. Tank locations and closure assessment information not identified.
Orlando Refrigeration 1040 E Amelia St FDEP# 8627484	300 Feet Southeast	CLM STCM	Storage Tank Notification Form dated 12/27/1990 indicates two 2,000-gal unleaded gasoline USTs removed. FDEP 3/6/1991 correspondence facility is eligible to participate in petroleum cleanup program.
Amelia Street Station (Bus)			
Dr. Phillips Vacant Property 445 N OBT FDEP# 8520419	Both Express Bus Platforms	CLM STCM	Limited Site Assessment Report Addendum dated 6/25/2010 indicates petroleum contamination is present in groundwater below both express bus platforms. Shallow groundwater flow to the east-northeast.
Helen Beam Trust Fund Property 500 N OBT FDEP# COM_296136	300 Feet West	CLS Waste Cleanup SIS #169	FDEP 9/22/2011 correspondence indicates dry cleaning solvent contamination found in groundwater requiring additional assessment.
Princeton Street (Rail)			
Amazon Hose & Rubber 1625 W Princeton St FDEP# 8732655	Park-n- Ride	STCM	Storage Tank Notification Form dated 7/23/1986 indicates a 1,000- gal and 400-gal tank removed in 1986, additional 400-gal UST not in use apparently remained. Tanks stored a preservative fruit coating containing xylenes. Tank locations and closure assessment information not identified. Site operation as a citrus packing plant indicates potential for arsenic introduced into the subsurface associated with wash waters.
Southeast Recycling Corp 1625 W Smith St FDEP# 9101050	Park-n- Ride	STCM	Storage Tank Notification Form dated 10/9/1990 indicates a 1,000- gal diesel fuel AST was installed in 1990. A Storage Tank Registration Form dated 6/23/1992 indicates two 500-gal diesel fuel ASTs were installed in 1992. Tank locations and closure assessment information not identified.
Railroad Corridor	Commuter Rail Platform	None	Potential for arsenic and PAH
Andrews Filter & Supply 2335 Coolidge Ave FDEP# 9201255	Approx. 300 feet East	STCM	A Storage Tank Registration Form dated 4/28/1992 indicates a 1,000- gal unleaded gasoline UST installed in 1992.



Station/Facilities	Relative Location	Database	File Summary
Princeton Street (Bus)			
Amazon Hose & Rubber 1625 W Princeton St FDEP# 8732655	Express Bus Platform	STCM	Storage Tank Notification Form dated 7/23/1986 indicates a 1,000- gal and 400-gal tank removed in 1986, additional 400-gal UST not in use apparently remained. Tanks stored a preservative fruit coating containing xylenes. Tank locations and closure assessment information not identified. Site operation as a citrus packing plant indicates potential for arsenic introduced into the subsurface associated with wash waters.
Southeast Recycling Corp 1625 W Smith St FDEP# 9101050	Express Bus Platform	STCM	Storage Tank Notification Form dated 10/9/1990 indicates a 1,000- gal diesel fuel AST was installed in 1990. A Storage Tank Notification Form dated 6/23/1992 indicates two 500-gal diesel fuel ASTs were installed in 1992. Tank locations and closure assessment information not identified.
Lockhart/Rosemont Station (Rail)			
Railroad Corridor	Commuter Rail Platform	None	Potential for arsenic and PAH
Sears Termite & Pest Control 6290 Edgewater Dr FDEP# COM_142488	Adjoining East	CLM	Groundwater Monitoring Event – September 2013 indicates radial groundwater flow and pesticide concentrations exceeding groundwater cleanup target levels in the closest monitoring well located approximately 50 feet southeast of the south portion of the proposed Park and Ride.
Orange County Property 6400 Edgewater Dr FDEP# 8513003	Adjacent West	STCM	Underground Storage Tank Closure Report dated January 4, 1990 indicates four gasoline 4,000-gal fuel tanks were removed and indications of petroleum impacted soil were not observed. BTEX concentrations in a groundwater sample did not exceed groundwater cleanup target levels.
Rosemont Station (Bus)			
Valet Cleaners 5578 N OBT FDEP# 9501430	200-300 Feet East	CLM	Documents not identified. Anticipated groundwater flow to the west.
Apopka Station (Rail)			
Railroad Corridor	Commuter Rail Station	None	Potential for arsenic and PAH
Lumberjack Enterprises 537 S Central Ave FDEP# 9101468	Adjacent North of Commuter Rail Station	STCM	FDEP 3/17/1993 correspondence indicates facility denied participation in Abandoned Tank Restoration Program due to lack of documented contamination.



Station/Facilities	Relative Location	Database	File Summary
Shubert's Cabinet Shop 550 S Central Ave FDEP# 8840672	200 Feet North of Park-n- Ride	STCM	Remedial Action Plan dated 5/292008 approved by FDEP on February 2, 2009. Groundwater flow to the east and extent of petroleum contamination defined north of the railroad tracks.
Jemco 96 E Station Street FDEP# COM_221695	300 Feet East of Commuter Rail Station	CLM CERCLA	Final Removal Assessment Letter dated 1/5/2011 indicates concentrations of lead, arsenic, pesticides and semi-volatile organic aromatics exceed soil cleanup target levels. A USEPA letter dated February 8, 2011indicates the facility was given a no further action for removal eligibility under EPA's Removal Program
SR 428 Station (Rail)			
Railroad Corridor	Commuter Rail Station	None	Potential for arsenic and PAH
ACCO Aerated Concrete 3151 W OBT FDEP# 9801233	Adjoining East and South	STCM	Storage Tank Facility Registration Form dated 2/19/1999 indicates a 3,000-gallon and a 15,000-gallon fuel oil ASTs either installed or removed. Closure assessment information not identified. Tank locations apparently south, down gradient of SR 429 Station.
Shalom Tire & Auto Service 3355 W OBT FDEP# 101358	300 Feet North	SWF	FDEP Inspection Checklist dated 6/17/2013 indicates potential violations or indications of environmental concern were not identified in connection with the waste tire collection. Terracon notes the facility is an automotive repair facility potentially on septic and located generally up gradient of the SR 429 Station.
SR 429 Station (Rail and Bus)			
Railroad Corridor	Commuter Rail Station	None	Potential for arsenic and PAH
ACCO Aerated Concrete 3151 W OBT FDEP# 9801233	Adjoining East and South	STCM	Storage Tank Facility Registration Form dated 2/19/1999 indicates a 3,000-gallon and a 15,000-gallon fuel oil ASTs either installed or removed. Closure assessment information not identified. Tank locations apparently south, down gradient of SR 429 Station.
Shalom Tire & Auto Service 3355 W OBT FDEP# 101358	300 Feet North	SWF	FDEP Inspection Checklist dated 6/17/2013 indicates potential violations or indications of environmental concern were not identified in connection with the waste tire collection. Terracon notes the facility is an automotive repair facility potentially on septic and located generally up gradient of the SR 429 Station.
SR 429 Station (Bus)			
ACCO Aerated Concrete	Adjoining East and	STCM	Storage Tank Facility Registration Form dated 2/19/1999 indicates a



Station/Facilities	Relative Location	Database	File Summary
3151 W OBT FDEP# 9801233	South		3,000-gallon and a 15,000-gallon fuel oil ASTs either installed or removed. Closure assessment information not identified. Tank locations apparently south, down gradient of SR 429 Station.
Shalom Tire & Auto Service 3355 W OBT FDEP# 101358	300 Feet North	SWF	FDEP Inspection Checklist dated 6/17/2013 indicates potential violations or indications of environmental concern were not identified in connection with the waste tire collection. Terracon notes the facility is an automotive repair facility potentially on septic and located generally up gradient of the SR 429 Station.
Zellwood Station (Bus)			
Raynor Shine Tree Service 5960 W Jones Ave FDEP #95260	300 Feet Southwest	SWL	FDEP 4/22/2008 correspondence indicates a registration as a yard trash processing facility.
Zellwood Station (Rail)			
Railroad Corridor	Commuter Rail Station	None	Potential for arsenic and PAH
Raynor Shine Tree Service 5960 W Jones Ave FDEP# 95260	300 Feet Southwest	SWL	FDEP 4/22/2008 correspondence indicates a registration as a yard trash processing facility.
Tavares Station (Rail)			
Railroad Corridor	Commuter Rail Station	None	Potential for arsenic and PAH
Tavares City 100 N Disston Ave FDEP# 8622961	Park-N- Ride	STCM	Storage Tank Registration Form dated 8/15/1991 indicates two 1,000-gal leaded gasoline USTs and a 2,000-gallon kerosene UST removed. Underground Storage tank Closure Report dated October 1991 indicates a 1,000-gal and a 5,600-gal gasoline USTs were removed. Concentrations of tested petroleum constituents in soil and groundwater did not exceed cleanup target levels. A Lake County Department of Environmental Services review letter dated 2/21/1992 indicates it appears no further action will be required.
Eventia Otation (De'l)			
Railroad Corridor	Commuter Rail Platform	None	Potential for arsenic and PAH
Former Adolph's Auto Repair 232 N Bay St. FDEP# 9812648	Park-N- Ride	STCM	Underground Storage tank Closure Report dated May 1, 2011 indicates a 550-gal diesel fuel UST was removed. Concentrations of tested petroleum constituents in soil and groundwater did not exceed



Station/Facilities	Relative Location	Database	File Summary
			cleanup target levels. The Lake County Department of Conservation & Compliance issued a letter dated June 9, 2011 indicating the report results did not indicated the presence of petroleum contamination in the area addressed.
Former Kennedy Chevron 300 N Bay St FDEP# 8510101	Adjacent North	STCM	A Proposal of LSSI Site Assessment dated March 15, 2013 prepared for the FDEP's Petroleum Cleanup Program indicates several petroleum USTs were previously removed.
Florida Waterman Hospital 205 N Bay St FDEP# 9806890	Adjacent East	STCM	An Interim Report dated December 2012 indicates petroleum concentrations exceeding cleanup target levels extended west of the facility below Bay Street. However, sampling results of a monitoring well located on the Park-n-Ride area sampled in 2011 indicated petroleum concentrations did not exceed groundwater cleanup target levels.
Mount Dora Station (Rail)	-		
Railroad Corridor	Commuter Rail Platform	None	Potential for arsenic and PAH
Mount Dora Dry Cleaners 2720 W Old Hwy 441 FDEP# 9600313	Adjoining South of Park-n- Ride	STCM	FDEP Map Direct information indicates dry-drop off location.
Amoco #81 1439 Old Hwy 441 FDEP# 9600313	200 Feet North	STCM	FDEP 3/6/1991 correspondence facility is eligible to participate in petroleum cleanup program because contamination had not been documented. Pollutant <i>Storage Tank System Inspection</i> <i>Report</i> dated 12/14/1989 indicates one of eight petroleum storage tanks was removed.
Mount Dora Station (Bus-			
Publix Shopping Center)			
Publix Supermarket #1275 6651 N OBT FDEP # 9811519	Adjoining South	STCM	Storage Tank Facility Annual Compliance Site Inspection Report dated 10/3/2011 indicates an AST was in compliance.
Mount Dora Station (Bus- Employment Center)			
Facilities not identified within 300 feet			
Tavares/Eustis Station (Bus)	L		
Florida Hospital Waterman 2475 Huffstetler Dr FDEP# 9800102	Adjoining West	STCM	Correspondence by SECO dated 7/14/2010 indicates a 1,100-gal diesel fuel AST with an emergency generator is within a mobile trailer.



Station/Facilities	Relative Location	Database	File Summary
Robinson Street & Hughey Avenue			
Railroad Corridor	Commuter Rail Platform	None	Potential for arsenic and PAH
Orlando Marriott-Downtown 400 W Livingston St FDEP# 9202631	Adjacent North	STCM	A 550-gallon diesel fuel AST installed in 1986 apparently associated with an emergency generator was replaced by a 180- gallon AST in 1998.
FL Department of Management Services 400 W Robinson St FDEP# 8841133	Adjacent southwest	STCM	A 1,000-gallon diesel fuel AST was installed in 1997 apparently associated with an emergency generator. <i>Storage Tank Facility</i> <i>Annual Compliance Site Inspection</i> <i>Report</i> dated 7/18/2013 indicates the AST was in compliance.
FAMU Law School Hughey/Beggs FDEP# COM_209807	200 Feet South	CLM	FAMU Law School, FDEP Site Investigation Report issued December 2012 indicates trichloroethene (TCE) concentrations at the base of the surficial aquifer beneath the proposed station area may exceed the groundwater cleanup target level. The extent of chlorinated solvent concentrations exceeding cleanup target levels in shallow groundwater is defined approximately 700 feet south of the site. Shallow groundwater flow was measured toward the northeast in April 2009 and north-northeast in January 2010.
Orlando Gasification Plant 600 W Robinson St FDEP# COM_241803	250 Feet West	CLM	Record of Decision Summary of Remedial Alternative Selection, Operable Unit 1 (OU1) dated September 2013 indicates the extent of soil and surficial groundwater requiring remediation is defined approximately 200 to 300 feet west of the proposed station area.
Orlando City Expo 500 W Livingston St FDEP# 9807359	500 Feet West- Northwest	STCM	Storage Tank Facility Annual Compliance Site Inspection Report dated 8/7/2012 indicates an AST was in compliance.

Source: Environmental Protection Agency (EPA), 2013.

Technical Memorandum | Preliminary Environmental Evaluation



APPENDIX D

STATION AREA MAPS AND EVALUATION MATRIX












Ameriscapes Landscapes Management

Services, Inc.

Provest, LLC

Hodges Brothers Roofing, Inc

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2777		
	Commuter Rail Platform Impaired Waters	Golf Courses
ORAIDOR STUD	1/2 Mile Radius Around Station ///// Wetlands	Park Boundaries





5	—— Viable Alternative 2-4	Parks	100 - Year Floodplain	
	Express Bus Platform	Impaired Waters	Golf Courses	
ORRIDOR STUD	1/2 Mile Radius Around Station	n //// Wetlands	Park Boundaries	Aerial Image

Viable Alternative 2-4

ge Source: Orange County Property Appraiser, 2013. rce: Florida Department of Revenue,Tax Parcels, 2012. Downloaded from the Florida Geographic Data Library.



100 - Year Floodplain

Golf Courses

Express Bus Platform

A Parks

1/2 Mile Radius Around Station Impaired Waters



Viable Alternative 2-4

200

Aerial Image Source: FDOT, Orange County, 2012. Parcel Source: Florida Department of Revenue, Tax Parcels, 2012. Downloaded from the Florida Geographic Data Library.

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The Reserve at Rosemont















Apopka Station (Rail)

Viable Alternatives 1-2 and 1-5

Aerial Image Source: FDOT, Orange County, 2012. Parcel Source: Florida Department of Revenue, Tax Parcels, 2012. Downloaded from the Florida Geographic Data Library.





















Legend

---- Viable Alternative 1-5 ----- Commuter Rail Platform **[**_____1/2 Mile Radius Around Station Wetlands



Impaired Waters

 100 - Year Floodplain Park Boundaries

Viable Alternative 1-5

Aerial Image Source: FDOT, Lake County, 2011. Parcel Source: Florida Department of Revenue, Tax Parcels, 2012. Downloaded from the Florida Geographic Data Library.















Impaired Waters

100 - Year Floodplain

Public Pinelands

Florida Managed Areas

Legend

Viable Alternative 2-4

1/2 Mile Radius Around Station

Proposed Wekiva Pkwy Extension /// Wetlands



Aerial Image Source: FDOT, Lake County, 2011. Parcel Source: Florida Department of Revenue, Tax Parcels, 2012. Downloaded from the Florida Geographic Data Library.

US 441 Corridor Study Preliminary Evaluation of Environmental Conditions

Street

	Ameli	Amelic	Princet	Princet	Lockho	Rosen	APOPE	SRAZS	Lettwo	1ethv0	Tavare	FUSTS	Moun	Noun	Mount	Tavare
Viable Alternatives																
Alt 1-2: Commuter Rail: Orlando to SR 429 + Express Bus from SR 429 to Lake County	✓		✓		✓		✓	\checkmark	\checkmark					✓		✓
Alt 1-5: Commuter Rail: Orlando to Eustis/Mount Dora	\checkmark		\checkmark		√		✓	✓		\checkmark	✓	✓	✓			
Alt 2-4: Express Bus: Orlando to Lake County		✓		✓		✓		✓							✓	✓
PARK-N-RIDE			✓	✓	✓		✓	\checkmark	✓	✓	✓	✓	✓	✓	\checkmark	\checkmark
KISS-N-RIDE	\checkmark		\checkmark	\checkmark	\checkmark		✓	\checkmark								
Environmental Conditions					•				•		•	•	•			
Social																
Public Lands	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No
Schools	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Churches	No	No	No	No	No	No	Yes	No								
Police Stations	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Fire Stations	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
Boat Ramps	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Day Care Centers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Civic Center	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Government Buildings	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No
Neighborhoods	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Low-Income Population	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Community & Emergency Facilities	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Social Services	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Retirement Centers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Retail/Business	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No
Physical Barriers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Traffic Pattern Changes	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
Natural	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
Wetlands	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No
Water Quality (Impaired Water Bodies)	No	Yes	No	No	No	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	No
Floodplain	No	No	No	No	No	Yes	No	No	No	No	No	Yes	Yes	Yes	No	No
Parks/Recreation	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No
Cultural																
Cultural Centers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
National Register of Historic Places (NRHP)	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No
State Historic Preservation Office (SHPO)	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No
Physical																
Air Quality	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Noise	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Contamination Risk	High	High	High	High	High	Mod	Mod	Mod	Low	Mod	Mod	Mod	Mod	Low	Low	Low
Soil Risk	Low	Low	Low	Low	Mod	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
	Low to	Low to	Low	Low	Mod to	Mod to	Low	Low	Low to	Low to	Low to	Low	Low	High	Low	Mod
Sinkhole Risk	Mod	Mod	LOW	LOW	High	High	LOW	LOW	Mod	Mod	Mod	LOW	LOW	rigil	LOW	widd

- IFUS