LYNX

Comprehensive Operational Analysis of LYNX Transit Route Network

Final Report

January 2014

VHB

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ES

Executive Summary

ES-1. Introduction

This report documents the Comprehensive Operations Analysis (COA) conducted for LYNX, the Central Florida Regional Transportation Authority. The COA is a means of evaluating and adjusting current LYNX operations to be more efficient while developing a framework to adapt the system to achieve the objectives of the Transit Development Plan (TDP), which itself is intended to lead toward implementation of the Vision 2030 Long Range Plan. Therefore the recommendations of the COA are intended to strike a balance between the realities, constraints and needs of the region as presently served by LYNX and the desired longer term future of transit in the LYNX service area.

The goals of the COA are to:

1. **Establish a framework for making decisions about existing and future transit service**
2. **Evaluate the effectiveness of current operational investments (routes)**
3. **Identify opportunities to improve system efficiency**
4. **Develop recommendations to strengthen and effectively grow the LYNX system**
5. **Guide implementation of a system modifications to better serve LYNX's partners and customers**

The LYNX COA began with the development of Service Guidelines which were based upon a comprehensive review of similar guidelines throughout the transit industry and customized for the LYNX service region **(GOAL 1)**. Each Link in the LYNX system was then evaluated against the guidelines to determine if the Link's performance was deficient or consistent with the guideline **(GOAL 2)**. Based upon the results of that evaluation, recommendations were developed to address the Links with deficiencies **(GOAL 3)**. In addition, as a result of a review of regional demographics, previous planning studies such as the TDP and Vision 2030, new routes were developed and added to the recommendations. Based upon the feedback we gathered from the COA Outreach campaign the

list of recommendations were refined and finalized **(GOAL 4)**. Each recommendation was then assessed for cost and Title VI implications[1] and prioritized as part of a short and long term implementation plan **(GOAL 5)**.

The development of the COA was supported by an extensive stakeholder and public outreach program. Multiple outreach meetings were conducted with the following groups:

- The General Public
- The Regional Working Group (funding partners and internal LYNX staff)
- The LYNX Executive Committee
- The LYNX Audit Committee

A project website, passenger and LYNX operator surveys, and meetings with LYNX staff also supported the development of the COA.

ES-2. Service Guidelines

As part of this Comprehensive Operations Analysis project, potential service guidelines that will be used to evaluate and measure the service LYNX provides have been developed. Unless otherwise mentioned, these guidelines apply to the fixed route service only and are not applicable to other service types. Service Guidelines are used throughout the transit industry as a way to measure the performance of transit service and also help to create a guide/framework for the creation of new services or modification of existing services. Service Guidelines balance the competing goals a transit agency has of maximizing potential ridership, providing transportation services to those without the ability to drive or who don't own a vehicle and minimizing overall operating costs. Table ES-1 presents the Service Guidelines.

The purpose of the service guidelines is to provide LYNX with a framework for continuous improvement. They are not ranked, and one guideline is not more important than any other. They have been designed to balance the competing needs of the LYNX system, which seeks to optimize network coverage, financial efficiency and customer mobility. These guidelines provide LYNX staff and the community targets which to work toward over time. The guidelines may be modified from time to time at the discretion of the LYNX Board of Directors.

These guidelines will be used to conduct an annual performance assessment of existing routes and assess the anticipated performance of proposed routes. LYNX staff will work in collaboration with regional partners to prioritize implementation of recommended changes based on available financial resources.

The service guidelines can be divided into two categories: fixed and rolling. Fixed service guidelines have a definite pass/fail metric. Routes that fail can be improved, however improvements are subject to funding availability and consideration of other system needs. Rolling guidelines rank each route relative to each other. There will always be routes at the bottom of the list. LYNX staff and regional partners must use professional judgment in determining how best to invest limited resources to work toward the goals outlined in the service guidelines.

[1] Title VI analysis was performed for the first three years of prioritized recommendations.

Table ES-1: Summary of LYNX Service Guidelines

	Guideline	Metric
Route Design Guidelines	Fixed Route Network Spacing In Residential Areas	• Routes should be spaced between ¼ and 1 mile apart, based on population density and percent of households without automobiles • When planning for service, every attempt should be made to locate routes on roads that are appropriate for reliable operations. These include roads with TSP and/or synchronized signal progression based on posted speed limits. • When planning for service, every attempt should be made to locate routes on roads with appropriate amenities (sidewalks/crosswalks/ pedestrian signals).
	Fixed Route Network Spacing In Commercial and Other Areas	Criteria for extending or adding transit service to major commercial and institutional uses based on overall square footage and/or number of employees.
	Bus Stop Spacing Guidelines	• There should be an average of 4 bus stops per mile when population density is over 10 households per acre. • There should be an average of 2 bus stops per mile when population density is from 4 to 9.9 households per acre. • There should be an average of 1 bus stop (as needed) per mile when population density is 4 households per acre. • FastLink service should have an average of 1 bus stop per mile where the route overlays with local service.
	Guideline for Serving a Park and Ride Directly	• Direct service should be provided to park and rides that attract over 150 daily passengers (weekday). • Park-and-ride facilities should be provided at appropriate stops on rapid and express services to serve transit users from Low and High density residential areas.
	Overall Directness of Route Guideline	Fixed Route diversions should be allowed only when they are less than 10-15 percent of the overall route length.
	Bus Rapid Transit Design Guideline	Bus Rapid Transit (BRT) routes should be designed consistent with the Federal Transit Administration's guidelines on the development of BRT routes. These guidelines include defined stations, traffic signal priority for public transportation vehicles, short headway bidirectional services for a substantial part of weekday and weekend days.
Schedule Design Guidelines	Frequency of Service	• Bus service should be scheduled to allow for loading on the vehicle with no standees during the off-peak and to allow for 1.25 passengers per seat during the peak hour. • Routes which are experiencing capacity issues for a single trip should be candidates for articulated buses rather than increased frequency. • NeighborLink service should operate at a minimum headway of one hour. • XpressLink bus service should be scheduled to allow for no standees at all times. • FastLink service should be scheduled based on the demand of a FastLink route or the combined FastLink and local bus service demand.
	Policy Headway Guideline	• Local Service should be scheduled at a policy headway of 30 minutes or better. • BRT service should be scheduled at a policy headway of 15 minutes or better. • FastLink service should be scheduled at a policy headway of 15 minutes or better.
	Guideline for enhancing headway on routes with "Plug Buses"	If plug buses are used more than twice in one week or more than three times in one month to address crowding, a route should be examined for enhanced headways.
Schedule Design Guidelines	Guideline for Span of Service	• Base hours of service should be between 6:00 AM and 10:00 PM on weekdays. • Expansion of the span of service should occur when ridership is such that it begins to exceed the off-peak service guideline in the first or last hours of service.

Percent of Households without Autos	Over 10 (Urban)	7 to 10 (High Density Suburban)	4 to 6.9 (Low Density Suburban)	Under 4 (Rural)
Over 15.0	1,300 Feet (1/4 Mile)	1,300 Feet (1/4 Mile)	1,300 Feet (1/4 Mile)	2,600 Feet (1/2 Mile)
10.0 to 15.0	1,300 Feet (1/4 Mile)	1,300 Feet (1/4 Mile)	2,600 Feet (1/2 Mile)	5,280 Feet (1 Mile)
5.0 to 9.9	1,300 Feet (1/4 Mile)	2,600 Feet (1/2 Mile)	5,280 Feet (1 Mile)	*
Below 5.0	2,600 Feet (1/2 Mile)	5,280 Feet (1 Mile)	*	*

* These areas should be served with NeighborLink

Table ES-1: Summary of LYNX Service Guidelines

	Guideline	Metric
Service Delivery Guidelines	Guideline wait time for transferring between services	Routes should be scheduled so that the wait time for transferring passengers is no more than ½ the headway of the connecting service.
Economic and Productivity Guidelines	Guideline for Route Investigation based on Farebox Recovery	Routes that are in the lowest quartile (25%) of farebox recovery for their route type should be examined for improvements that might increase ridership or lower costs.
	Guideline for Route Investigation based on Passengers per Vehicle Hour and Vehicle Mile	Routes that are in the lowest quartile (25%) for all routes ranked by passengers per vehicle hour and/or passengers per vehicle mile should be examined for potential operating improvements.
	Guideline for Route Investigation based on Ratio of Non-Revenue to Revenue Miles	Routes that are in the lowest quartile for all routes as ranked by the ratio of non-revenue to revenue miles should be examined for potential operating improvements including interlining and utilizing satellite operating centers to reduce non-revenue miles.
Service Delivery Guidelines	Guideline for Route Investigation based on On-Time Performance	Routes which are in the bottom ten percent for this metric (buses arriving earlier than scheduled or over five minutes after schedule) should be examined further for potential improvements.
	Guideline for Route Investigation based on Average Speed	Routes with runtime more than twice the runtime for a single occupancy vehicle should be examined for potential speed improvements.
	Guideline for Route Investigation based on Trips Operated and Trips Completed	• Any route that has a missed trip average 20 percent or greater than the system average should be investigated for potential improvements. • Maintenance staff should be alerted during any month where the mean distance between failures is below 19,000 miles to identify potential causes of breakdowns.
	Guideline for Route Investigation based on Passenger Complaints	Routes that are in the top quartile (25%) for all routes ranked by number of passenger complaints should be examined for potential operating improvements.
	Guideline for Amenities at Bus Stops	• Bus stops with 25 average daily boardings should be prioritized for shelters and benches. • Bus stops with 15 average daily boardings should be prioritized benches. • Facilities should follow applicable codes of governing jurisdictions. • Co-location of non-LYNX facilities should be avoided unless expressly requested by governing jurisdiction or partner.

- The purpose of the service guidelines is to provide LYNX with a framework for continuous improvement. They are not ranked, and one guideline is not more important than any other. They have been designed to balance the competing needs of the LYNX system, which seeks to optimize network coverage, financial efficiency and customer mobility. These guidelines provide LYNX staff and the community targets which to work toward over time.
- The guidelines may be modified from time to time at the discretion of the LYNX Board of Directors.
- These guidelines will be used by the transit agency to conduct an annual overall performance assessment of existing routes and anticipated performance of proposed routes. LYNX staff will work in collaboration with regional partners to prioritize implementation of recommended changes or improvements based on available financial resources.
- Guidelines apply to fixed route service only.
- The service guidelines can be divided into two categories: fixed and rolling. Fixed service guidelines have a definite pass/fail metric. Routes that fail can be improved, however improvements are subject to funding availability and consideration of other system needs. Rolling guidelines rank each route relative to each other. There will always be routes at the bottom of the list.
- LYNX staff and regional partners must use professional judgment how best to invest limited resources to work toward the goals outlined in the service guidelines.
- The 30 minute policy headway is a guideline for new routes only, and will be applied to existing routes as resources are available.

ES-3. System Evaluation

The results of the evaluation of the system as it compares to the Service Guidelines is shown in Table ES-2.

In most analyses, routes are divided into two categories, local routes (including all Links, FastLinks and other circulator type service), and those that operated non-stop for a portion of the route via a limited access highway (including XpressLinks and Limited Direct routes). This distinction is important as non-stop routes generally have different operating characteristics from local routes due to their high percentage of non-revenue travel and limited span of operation. For each topical section, metrics were used to evaluate each route's performance relative to the rest of the system or relative to their route type (local or express). The metrics were based on the service guidelines. The data analysis indicates that several routes perform poorly with respect to the service guidelines and with respect to the overall system performance. Routes that are shown with service characteristics that are poor (denoted by a minus sign and pink shading) in Table ES-2 were considered for adjustment. Specifically, there appears to be issues related to the Downtown Disney Limited Direct service, service in East Orlando (particularly Links 6 and 15), service in Sanford (particularly Links 46E, 46W, 34 and 45) and service in the International Drive/Universal Studios area.

Portfolio Analysis

The portfolio analysis provides insights into route performance by including the financial contribution, positive or negative, that each route has on the overall system. In this way, insights can be gained on how individual routes contribute to the overall system performance. The LYNX fixed bus routes were examined from three perspectives:

- Passenger contribution (ridership);
- Revenue hour contribution; and
- Combination passenger revenue recovery/deficit approach.

Table ES-3 combines the three factors examined as part of the portfolio analysis. Those routes that ranked 1 or 2 in these analyses should be considered for improvements. The routes that rated well for ridership would likely contribute more to overall system ridership with improvements, while the routes that rated well for revenue hours would contribute to the reduction in overall service costs with minor reductions in service. Many of the routes that scored highly for ridership were also routes that scored higher for revenue hours. There appears to be a correlation between revenue hours of service provided and ridership contribution to the overall system. Reductions in revenue hours will need to be closely weighed against the ridership impacts. Lastly, the routes that rated Priority 1 or 2 in the Passenger Revenue Recovery and Deficit Contribution combination would produce better revenue recovery with the least impact to system deficits with improvements over those that rated 3 or 4. Many of the routes that scored high in this rating are routes that do not provide a lot of service, but do have a reasonably high ridership for the amount of service provided. There were some routes that scored high for revenue/deficit and ridership contribution. Those routes were – Link 4, Link 8, Link 17, Link 21, Link 31, Link 37, and Link 41.

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Table ES-2: Route Performance

Route	Bus Stop Spacing Guideline (Stops per Mile)	Guideline for Span of Service (Volume/Capacity in First/Last Trip)	Ridership (Weekday)	Ridership Trend	Guideline for Route Investigation Based on Passengers per Vehicle Mile (Weekday)	Guideline for Route Investigation Based on Passengers per Vehicle Hour (Weekday)	Guideline for Enhancing Headway on Routes with "Plug Buses"	Guideline for Investigation based on Farebox Recovery	Guideline for Route Investigation based on Ratio of Non-Revenue to Revenue Miles	Guideline for Route Investigation Based on On Time Performance	Guideline for Route Investigation based on Average Speed (Average Speed)	Guideline for Route Investigation based on Average Speed (Operating vs Scheduled Speed)
1	-			+								
3	-	-									-	
4	-	-	+		+	+	-	+	+	-	-	
6	-	-	-	-		-		-			+	+
7	-				+	+			+	+	-	
8	-	-	+		+	+	-	+				
9	-			+		+			+			-
10		-					-		+			
11	-			-				-	+			
13	-	-						-				
14	-		-			-		-		+	-	+
15	-	-		-					+			
17		-	+				-	+		+		
1792			-		-	-			-	-	+	
18		-		+								
20	-				+	+	-		+		-	
21	-		+			+		+			-	
23	-			+				-				
24	-		-			+						
25	-			-	+				+		-	
26		-		+	-	-	-	+			+	
28	-	-		-	+	+		+	+		-	
29	-	-			+			+	+	+		
31	-		+	-	+	+		+		-	-	
34	-	-	-	-	-	-		-	-	+		
36	-	-								+	+	+
37	-		+					+		-		
38					-						+	-
40	-	-			+			+			-	
41	-	-	+		+	+		+		-	-	+
42	-		+	-								
44				-	-					-	+	
45	-	-	-	+	-	-		-		+		
46 East			-	+	-	-		-	-	+		
46 West			-	+	-	-		-	-	+		
48	-		+	-	+	+		+	+			
49	-		+		+	+		+	+		-	-
50			+	+	-		-		+		+	
51	-	-		+	+	+				+		

Table ES-2: Route Performance (Continued)

Route	Bus Stop Spacing Guideline (Stops per Mile)	Guideline for Span of Service (Volume/Capacity in First/Last Trip)	Ridership (Weekday)	Ridership Trend	Guideline for Route Investigation Based on Passengers per Vehicle Mile (Weekday)	Guideline for Route Investigation Based on Passengers per Vehicle Hour (Weekday)	Guideline for Enhancing Headway on Routes with "Plug Buses"	Guideline for Investigation based on Farebox Recovery	Guideline for Route Investigation based on Ratio of Non-Revenue to Revenue Miles	Guideline for Route Investigation Based on On Time Performance	Guideline for Route Investigation based on Average Speed (Average Speed)	Guideline for Route Investigation based on Average Speed (Operating vs Scheduled Speed)
54				-					+	+		
55							-	+	+		+	
56		-	+		-		-		+	-	+	
57				+		+	-	+	+	-	+	
58			-		-	-	-	-	-	+	+	
102	-		+								-	
103					-	-			+	+	+	+
104						-						
105	-											
111				+	-	-		-		-	+	
125	-		+							-		
210		-	-					-			+	
211			-					-				+
313	-		-	+	-	-					-	
319	-			-	+					+	-	
405	-	-	-	-		-		-	-	+		-
426		-	-							+	+	
441		-	-		-	-				-		-
443				-						-		
Express Routes												
200			-	-	-	-		-	-		+	
300			-	-		+		+	-			
301		-	+						-	-		-
302		-							-	-	-	
303		-			+				-	-	-	-
304		-			+				-		-	
305		-	-	+		+		+	-	-	-	-
306			-	+	-	-		+	-	+		
434			+	+	-	-		-	+			
445		-	+		+	+		-	-	-		+
NeighborLink Routes												
601	N/A	N/A	+		N/A	+		+	N/A	N/A	N/A	N/A
603	N/A	N/A			N/A			+	N/A	N/A	N/A	N/A
604	N/A	N/A	-		N/A	-		-	N/A	N/A	N/A	N/A
611	N/A	N/A	+	-	N/A				N/A	N/A	N/A	N/A
612	N/A	N/A			N/A				N/A	N/A	N/A	N/A
613	N/A	N/A		-	N/A				N/A	N/A	N/A	N/A
621	N/A	N/A			N/A	+			N/A	N/A	N/A	N/A
622	N/A	N/A		-	N/A				N/A	N/A	N/A	N/A
631	N/A	N/A			N/A				N/A	N/A	N/A	N/A
641	N/A	N/A	-	+	N/A	-		-	N/A	N/A	N/A	N/A

Legend: Minus sign (-) and red shading indicates that a route is performing poorly or is in the bottom quartile of all routes by type. Plus sign (+) and green shading indicates that a route is performing well or is in the top quartile of all routes by type.

Table ES-3: Summary of Portfolio Contribution

Route	Route Name	Passenger Contribution	Revenue Hour Contribution	Combination Recovery/ Deficit Ranking
1	Winter Park/Altamonte Springs	4	4	3
3	Lake Margaret	4	4	4
4	South U.S. 441/Kissimmee	1	1	2
6	Dixie Belle	4	4	3
7	South Orange Ave./Florida Mall	4	4	1
8	West Oak Ridge Rd./International Dr.	1	1	2
9	Winter Park/Rosemont	4	4	3
10	East U.S. 192/St. Cloud	4	4	3
11	South Orange Ave./OIA	4	3	4
13	UCF	4	3	4
14	Calvary Towers	4	4	3
15	Curry Ford Rd./Valencia College East	3	3	4
17	North U.S. 441/Apopka	2	2	2
1792	Sanford/Orlando	4	4	3
18	South Orange Ave./Kissimmee	3	3	4
20	Malibu St./Mercy Dr.	4	4	3
21	Carver Shores	2	2	2
23	Winter Park/Spring Village	4	4	3
24	Millenia	4	4	3
25	Mercy Dr./Shader Rd.	4	3	4
26	Pleasant Hill Rd.	4	4	1
28	East Colonial Dr./Azalea Park	3	3	1
29	East Colonial Dr./Goldenrod Rd.	3	3	1
31	LYMMO	2	2	2
34	Sanford/Goldsboro	4	4	3
36	Lake Richmond	4	4	4
37	Pine Hills/Florida Mall	1	1	2
38	Downtown Orlando/International Dr.	4	4	3
40	Americana Blvd./Universal Orlando	3	3	2
41	S.R. 436 Crosstown	1	1	2

Table ES-3: Summary of Portfolio Contribution (Continued)

Route	Route Name	Passenger Contribution	Revenue Hour Contribution	Combination Recovery/ Deficit Ranking
42	International Dr./OIA	2	2	4
44	Hiawassee Rd./Zellwood	4	4	3
45	Lake Mary	4	4	3
46E	Seminole Centre/Downtown Sanford	4	4	3
46W	S.R. 46/Seminole Towne Center	4	4	3
48	West Colonial Dr./Pine Hills	3	4	1
49	West Colonial Dr./Pine Hills Rd.	3	4	1
50	Downtown Orlando/Magic Kingdom	2	2	4
51	Conway Rd./OIA	4	4	3
54	Old Winter Garden Rd.	4	4	3
55	West U.S. 192/Four Corners	3	3	2
56	West U.S. 192/Magic Kingdom	3	2	2
57	John Young Pkwy.	4	4	1
58	Shingle Creek Circulator	4	4	3
102	Orange Ave./South U.S. 17-92	2	2	4
103	North U.S. 17-92 Sanford	4	3	4
104	East Colonial	3	2	4
105	West Colonial	3	3	4
111	OIA/SeaWorld	2	2	4
125	Silver Star Rd. Crosstown	2	1	4
200	West Volusia Xpress	4	4	3
204	Clermont Xpress	4	4	3
210	KnightLYNX Blue	4	4	3
211	KnightLYNX Green	4	4	3
300	Limited Direct	4	4	1
301	Limited Direct	4	4	1
302	LImited Direct	4	4	3
303	Limited Direct-Washington Shores/Disney-MGM	4	4	3
304	Limited Direct-Rio Grande/Vistana Resort	4	4	1
305	Limited Direct-MetroWest/All-Star Resort	4	4	1
306	Downtown Disney Limited Direct	4	4	1
313	Winter Park	4	4	3
319	Richmond Heights	3	3	4
405	Apopka Circulator	4	4	3
426	Poinciana Circulator	4	4	1
434	S.R. 434 Crosstown	4	3	4
441	Kissimmee/Orlando	4	4	3
443	Winter Park/Pine Hills	4	4	3
445	Apopka/West Oaks Mall	4	4	3
601	Poinciana	1	2	2
603	Southwest Poinciana	3	4	1
604	Intercession City/Campbell City	4	4	3
611	Ocoee	2	1	4
612	Winter Garden	2	1	2
613	Pine Hills	3	2	4
621	East Colonial Dr./Bithlo	2	2	2
622	Oviedo	4	3	4
631	Buena Ventura Lakes	4	4	3
641	Williamsburg	4	3	4

County Level Analysis

On a county-level, the performance analysis was mixed, with the performance of routes reflecting the underlying economic characteristics of the county. Counties with long established bus service showed the need for modifications to reverse "cost saving" changes from past years. Counties that are growing rapidly show the need for significant investment to support and encourage this growth.

Orange County

- Orange County's routes have mixed performance: some are the best in the system while others need improvement
- High performing routes (i.e. Link 8) require investment to maintain high performance
- Service on other routes has been altered in a piecemeal fashion and requires a comprehensive overhaul (i.e. East Orlando/Pine Hills)

Osceola County

- Majority of routes have growing ridership and need service expansions to meet growing demand
- There are a very few efficiencies that could be implemented on Osceola County's routes
- For the most part there is a need for significant financial investment in transit service in the county

Seminole County

- Many Seminole County routes have not adapted to changing land use and have suffered in overall performance (i.e. Link 34)
- Some areas require new transit investment to meet new demands (i.e. Verizon Call Center)
- Some areas are over-served by transit and could be better served by different types/a mix of services (parts of Link 46E)
- Some locations could be potential candidates for Xpress Link services
- Seminole SunRail stations need to be served

ES-4. Recommendations

Based upon the results of the system-wide performance evaluation, recommendations were developed to address the Links with deficiencies. In addition, as a result of a review of regional demographics, previous planning studies such as the TDP and Vision 2030, and this project's outreach efforts, new routes were developed and added to the recommendations. Based upon the feedback we gathered from the COA Outreach campaign the list of recommendations were refined and finalized.

The types of improvements are generally described, as follows.

- **Global Recommendations**: Lists the system-wide recommendations that do not apply to specific routes or locations.

- **Short Term Service Improvements:** Lists the route-specific recommendations that are proposed to be implemented within the next five years. This includes changes to existing routes, new routes, new SuperStops, and changes due to SunRail.

- **Long Term Service Improvements:** Lists the route-specific recommendations that are proposed to be implemented by 2030.

Global Recommendations

This study has a few global recommendations that would apply to all routes in LYNX's system. These recommendations can be divided into two major categories:

Schedule Improvements

One of the major recommendations of this study is that rather than expanding greatly outside of its existing service area, LYNX should focus on providing frequent, reliable service to a concentrated core network in its existing system. This type of service investment will have the greatest results in increasing ridership for both transit-dependents and new, choice riders while improving customer satisfaction and the system's cost-effectiveness.

The Service Guidelines propose that higher capacity (articulated) vehicles only be used on Links that are experiencing capacity issues for a single trip. All other Links with capacity issues should have added service instead of increased vehicle sizes.

LYNX should improve its data management and analysis procedures to ensure that the Automatic Vehicle Locator (AVL) and Automatic Passenger Counter (APC) data is accurate and can be used to inform planning and scheduling decisions. Using this data, LYNX should conduct a re-examination of the run-time assumptions currently being used in their scheduling software to create more accurate schedules based on traffic conditions during times-of-day. Finally, LYNX should look at the potential for the implementation of Transit Signal Priority (TSP). TSP allows transit vehicles to receive preferential treatment at intersections.

Customer Information and Amenities

LYNX should implement real-time schedule information, accessible through digital message boards at stops or accessible through smart phone apps. LYNX's current AVL system should be able to accommodate this extension of information to the public. Real-time passenger information is a rapidly emerging hallmark of modern transit systems. Another recommendation is for LYNX to improve the availability and quality of information about transit service that is available to the public. To improve the overall legibility of the system LYNX should develop a numbering scheme that is linked to route type to provide a clear pattern to the customer and they could also adopt a "Frequent Service Map" similar to those used in Spokane, Portland, and Los Angeles. LYNX should adopt a standard for their SuperStops, including enhanced amenities such as restrooms, off-board fare collection and real time information. LYNX should also look at creation of additional localized operating bases to lower deadhead mileage.

Short-term and Long-term Service Improvements

The following section presents the recommended service improvements for the LYNX system over the next thirty years. The organization of the recommendations is by service type. LYNX routes are listed in order. Table ES-4 summarizes the changes proposed for each existing route while Table ES-5 summarizes the recommendations for new routes.

A few geographic locations are proposed for significant improvement through multi-route restructurings. These locations were identified by LYNX staff and through the analysis of all of the data as needing a better route network in order to accommodate the existing and projected demand. These route restructurings are called "packages" in this COA. The following is a summary of the recommended packages. All of the route changes proposed in a particular package must be implemented together to achieve the full benefit of the restructuring.

East Orlando Package

The East Orlando package of improvements seeks to improve the financial performance of routes in this area and to improve overall network readability (by eliminating multiple branches, and removing one-way loops). This package includes the following routes: Link 3, Link 6, Link 15, Link 29 and the new Goldenrod route.

Sanford Package

The Sanford package of improvements seeks to improve transit operations and expand network coverage. This package includes the following routes: Link 34, Link 45, Link 46E/W and two new NeighborLinks.

Pine Hills Package

The Pine Hills package of improvements seeks to improve safety, transit operations and customer convenience by rerouting bus service to different SuperStops due to the closure of the Park Promenade Plaza SuperStop. This package includes the following routes: Link 37, Link 44, Link 9, Link 49, Link 48, Link 443.

Link 125 Package

The Link 125 package of improvements seeks to improve transit routing by providing a more direct connection between the Silver Star area and downtown Orlando, and the financial viability of routes in the area. This package includes the following routes: Link 1, Link 14, Link 125.

Limited Directs Package

Ridership on the Limited Direct routes has increased significantly. To re-distribute the loads between the various Limited Direct Routes, a restructuring of four of the routes (Link 301, Link 302, Link 304 and Link 305) is proposed, along with a new route that would help alleviate this situation.

Kissimmee Intermodal Facility (KIF) Package

The Kissimmee Intermodal Facility (KIF) plan in the COA would re-route bus service in Kissimmee to serve the newly completed Kissimmee Intermodal Facility. This package includes the following routes: Link 4, 10, 18, 26, 55, 56, and 441.

With the completion of KIF in late 2013, LYNX and Osceola County have agreed to implement the reroute of Links 4 (now 107), 10, 26, 55, 57 and 441 to KIF in January 2014. Link 56 will continue to serve the Osceola Square Mall. This COA recommends that in 2015 Link 56 be rerouted to KIF and Link 57 be returned to Osceola Square Mall.

A review of the *LYNX 2030 Vision Plan* and the *LYNX Transit Development Plan 2013-22* along with demographic forecasts provided by LYNX for the year 2030 were reviewed to develop long-term recommendations. The long-term improvements are detailed in are based on a review of the future land use and demographic data included in the *Vision Plan* as well as other recommendations made in this COA and other planning documents like the *SunRail Feeder Bus Plan*. The recommendations are focused on primary corridors identified by LYNX staff and the community as part of the *Vision Plan*. Service types were made based on the data available.

SunRail

As part of the planning efforts for the start of SunRail, FDOT has developed a feeder bus plan to provide intermodal connectivity along the corridor. Feeder bus service would be paid for in part through funds reimbursed by Florida Department of Transportation. As of December 2013, the FDOT-proposed SunRail feeder plan is generally consistent with the proposed recommendations in this COA.

SuperStops

As part of this analysis, two potential changes to existing SuperStops (Park Promenade and Central Florida Greeneway) were identified, and a new SuperStop location (International Drive) was also identified.

Table ES-4: Link Specific Recommendations (Local and Express)

Link	Route Name	Description	Change Type
1	Winter Park/Altamonte Springs	Extend route to LCS (Link 125 Package)	Routing Changes
3	Lake Margaret Drive	Truncate route at Social Security Administration (East Orlando Package)	Routing Changes
6	Dixie Bell Drive	Extend route to LCS (East Orlando Package)	Routing Changes
8	W. Oak Ridge Road/International Drive	Truncate route at Destination Parkway (part of Link 8/42 swap)	Routing Changes
		Double headway between 7AM and 11 AM in the outbound direction	Schedule Improvements
		Double headway between 1PM and 5PM in the inbound direction	Schedule Improvements
9	Winter Park/Rosemont	Add seven minutes of running time to existing route to improve reliability	Schedule Improvements
		Pine Hills Re-route (Pine Hills Package)	Routing Changes
10	East US 192/St. Cloud	Add service on Sunday	Service Span Improvements
		Increase headway to 30 minutes throughout the day	Headway Improvements
		Restructure route as part of KIF Package	Routing Changes
		Add non-stop route	Schedule Improvements
13	University of Central Florida	Reduce morning span of service	Service Span Improvements
		Increase headway between 6AM and 12:00PM in the outbound direction	Headway Improvements
14	Calvary Towers/Winter Park Village	Extend to LOC (Link 125 Package)	Routing Changes
15	Curry Ford Road/Valencia College East	Consolidate service on S. Goldenrod Road (eliminate service on Egan); East Orlando Package	Routing Changes
		Reduce stop spacing	Bus Stop Spacing
17	North US 441/Apopka	Create a FastLink Service	Schedule Improvements
18	S. Orange Avenue/Kissimmee	Expand AM span of service	Service Span Improvements
		Restructure route as part of KIF Package	Routing Changes
20	Malibu Street/Pine Hills	Reduce stop spacing	Bus Stop Spacing
21	Universal Studios	Extend route to Walt Disney World	Routing Changes
26	Pleasant Hill Road/Poinciana	Restructure route as part of KIF Package	Routing Changes
28	E. Colonial Drive/Azalea Park	Reduce stop spacing	Bus Stop Spacing
		Reduce evening span of service	Service Span Improvements

Table ES-4: Link Specific Recommendations (Local and Express) (Continued)

Link	Route Name	Description	Change Type
29	W. Colonial Drive/Goldenrod	Restructure route to remove Goldenrod Section (East Orlando Package)	Routing Changes
		Reduce evening span of service	Service Span Improvements
34	Sanford/Goldsboro	Restructure route to serve French Ave. and Central Florida Regional Hospital and remove from Airport Blvd. (Sanford Package)	Routing Changes
36	Lake Richmond	Reduce stop spacing	Bus Stop Spacing
		Reduce evening span of service	Service Span Improvements
		Remove running time from schedule	Schedule Improvements
37	Pine Hills/Florida Mall	Restructure route (Pine Hills Package)	Routing Changes
		Increase headway between 5AM and 9AM in the southbound direction	Headway Improvements
		Increase headway between 4AM and 8AM in the northbound direction	Headway Improvements
38	Downtown Orlando/International Drive	Increase span of service to all day	Service Span Improvements
40	Americana Boulevard/Universal Orlando	Expand morning span of service	Service Span Improvements
		Reduce stop spacing	Bus Stop Spacing
41	SR 436 Crosstown	Reduce stop spacing	Bus Stop Spacing
		Expand morning span of service	Service Span Improvements
		Increase headway around 3PM in the westbound direction	Headway Improvements
		Split Route to improve reliability	Schedule Improvements
42	International Drive/Orlando Airport	Extend route to Premium Outlets (part of Link 8/42 swap)	Routing Changes
		Increase headway between 10AM and 5PM in the eastbound direction	Headway Improvements
		Increase headway between 6AM and 3PM in the westbound direction	Headway Improvements
44	Hiawassee Road/Zellwood	Restructure route (Pine Hills Package)	Routing Changes
		Adjust time points	Schedule Improvements
45	Lake Mary	Extend route on the east to Central Florida Greenway, and on the west to International Parkway and C.R. 46A (Sanford Package)	Routing Changes
46 E	West SR 46/Seminole Town Center/Downtown Sanford	Extend route to Central Florida Greeneway via Melonville and Sanford Ave. Remove from French Avenue (Sanford Package)	Routing Changes

Table ES-4: Link Specific Recommendations (Local and Express) (Continued)

Link	Route Name	Description	Change Type
46 W		Extend route to Sand Pond Road, remove from French Avenue (Sanford Package)	Routing Changes
48	W. Colonial Drive/Pine Hills	Restructure route (Pine Hills Package)	Routing Changes
		Reduce evening span of service	Service Span Improvements
		Increase headway between 6AM and 10AM in the eastbound direction	Headway Improvements
49	W. Colonial Drive/Pine Hills Road	Restructure route (Pine Hills Package)	Routing Changes
50	Downtown Orlando/Magic Kingdom	Remove route from SeaWorld	Routing Changes
51	Conway Road/Orlando International Airport	Expand the morning span of service	Service Span Improvements
54	Old Winter Garden Road	Eliminate Saturday service	Service Span Improvements
55	West US 192/Four Corners	Restructure route as part of the KIF Package	Routing Changes
56	West US 192/Magic Kingdom	Expand morning span of service	Service Span Improvements
		Restructure route as part of the KIF Package	Routing Changes
58	Shingle Creek Circulator	Eliminate Route	Routing Changes
103	North 17-92 Sanford	Increase headway around between 6AM and 10AM in the northbound direction	Headway Improvements
104	East Colonial	Increase headway to 15 minutes throughout the day	Headway Improvements
111	SeaWorld/Orlando International Airport	Extend to Walt Disney World	Routing Changes
125	Silver Star Road Crosstown	Restructure route to serve downtown Orlando (Link 125 Package)	Routing Changes
301	Limited Direct - Pine Hills/Animal Kingdom	Restructure route	Routing Changes
302	Limited Direct - Rosemont/Magic Kingdom	Restructure route (Limited Directs Package)	Routing Changes
304	Limited Direct - Rio Grande/Visitana Resort	Restructure route (Limited Directs Package)	Routing Changes
305	Limited Direct - Metrowest/All Star Resorts	Restructure route (Limited Directs Package)	Routing Changes
319	Richmond Heights	Reduce evening span of service	Service Span Improvements
405	Apopka Circulator	Eliminate Route	Routing Changes
426	Poinciana Circulator	Expand morning span of service	Service Span Improvements
441	Kissimmee/Downtown Orlando	Expand span of service	Service Span Improvements
443	Lee Road Crosstown	Reroute (Pine Hills Package)	Routing Changes
445	Apopka/West Oaks Mall	Adjust time points	Schedule Improvements

Table ES-5: Proposed New Local Routes

Description
Add new neighborlink on Celery Ave
Create New Circulator/Neighborlink in Lake Mary
Create new Goldenrod Route
Create new KIF to Lake Nona and OIA Route
Create new Kissimmee to International Drive route
Convert new Downtown Orlando to Lake Nona route (Service Grant) into a Downtown Orlando to OIA to Lake Nona XpressLink
Create new Celebration circulator
Create new Kissimmee circulator
Create new Baldwin Park Circulator
Create new LCS - Universal/SeaWorld Route
Create a new Limited Direct route to Buena Ventura Lakes
Create a new Limited Direct route in Pine Hills
Connects Oviedo and Altamonte Springs via Red Bug Lake Road and Semoran Blvd.
Create new Sanford SunRail Airport Blvd Route
Create new West Town Center to Maitland SunRail Local Route
Create new John Young Parkway Circulator Route
Create new Orlovista Circulator Route
Create new XpressLink along SR 50 between West Oaks and UCF
Create new Xpress Link along SR 423 from Downtown to I-Drive
Create new XpressLink from Apopka to Altamonte SunRail Station
Create New XpressLink from UCF to Downtown
Create new FastLink along SR 527 from Downtown to Sand Lake SunRail Station
Create new Xpress Link from Sanford to Oveido to UCF
Create new Xpresslink from UCF to Innovation Way
Create new FastLink from Fern Park to OIA
Create new XpressLink from Oviedo to Downtown
Create new BRT along US 192 from Lake County to Kissimmee
Create new BRT along US 192 from Disney to Kissimmee
Create new BRT along 435 from Park Promenade to I-Drive
Create new BRT from Winter Park to Downtown
Create new BRT from Downtown to Florida Mall

ES-5. Implementation of Alternatives and Phasing

In order to further evaluate the proposed recommendations, incremental operating and maintenance (O&M) costs, capital costs and ridership were estimated. O&M costs were estimated using the FDOT-developed TDP operating cost model which assigns a cost factor to each revenue hour of service. The current cost factor is $63.70 per revenue hour. This cost factor was inflated using a rate of 2.5% per year. Statistics (revenue hours) were developed for the proposed recommendations for each implementation year (2014-2028). Statistics for Long Term improvements were developed directly from the information used in the 2013 Update to the TDP; this information did not provide numbers of buses required and as such they are not included in the capital cost estimate in this COA. Incremental ridership associated with each recommendation was calculated using LYNX's TBEST direct-demand estimation tool. Capital costs for the short term recommendations were developed based upon recent LYNX vehicle procurement costs. Itemized O&M costs per recommendation and implementation year are listed in Appendix B.

Phasing is proposed based on data analysis, input from partners and the public, and a desire to spread the short term recommendations over a five-year period. Phasing may be adjusted based on available resources. The following phasing program was used:

In **2014**, the following packages of improvements are recommended for implementation:

- **Pine Hills Package**
- **Spans of Service Changes**
- **All no cost items**
- **Sanford Package**
- **Changes due to the opening of the Kissimmee Intermodal Facility (KIF)**

In **2015**, the following packages of improvements are recommended for implementation:

- **Link 125 Package**
- **Limited Directs Package**
- **The changes due to the opening of the Kissimmee Intermodal Facility (KIF) not implemented in 2014**
- **Some headway enhancements (Link 13, 41, 42, 48)**

In **2016**, the following packages of improvements are recommended for implementation:

- **Changes to running time on existing routes**
-

In **2017**, the following packages of improvements are recommended for implementation:

- **Creation of all new routes not associated with any package of improvements**

- **East Orlando Package**
- **Changes to remaining headways not implemented in 2015**

In **2018**, the remaining short term improvements are recommended for implementation.

For the long term proposals, program elements are recommended to be implemented evenly amongst the remaining years to allow LYNX to grow at a constant rate and to keep costs from increasing dramatically year over year.

Table ES-6 presents the phasing of the COA recommendations. O&M costs by funding partner and implementation year are presented in Table ES-7.

Capital Costs

The capital costs associated with these improvements consist primarily of additional vehicles required to operate service. By 2018, LYNX will need to expand their bus fleet by 103 total buses to accommodate the recommended short term service changes. The cost of 103 new buses would likely be $51.5 - $103M.

Table ES-6: Proposed Recommendations Phasing

Link	Recommended Year of Implementation	Description
1	2015	Extend route to LCS (Link 125 package)
3	2017	Truncate route at Social Security Administration (East Orlando Package)
4	2015	Restructure Route as Park of KIF Package
6	2017	Extend route to LCS (East Orlando Package)
7	NA	No Change Proposed
8	2018	Truncate route at Destination Parkway (part of Link 8/42 swap)
	2017	Double headway between 7AM and 11 AM in the outbound direction
	2017	Double headway between 1PM and 5PM in the inbound direction
9	2016	Add seven minutes of running time to existing route to improve reliability
	2014	Pine Hills Re-Route (Pine Hills Package)

Table ES-6: Proposed Recommendations Phasing (Continued)

Link	Recommended Year of Implementation	Description
10	2014	Add service on Sunday
	2017	Increase headway to 30 minutes throughout the day
	2015	Restructure route as part of KIF Package
	2017	Add non-stop route
11	NA	No change proposed
13	2015	Reduce morning span of service
	2015	Increase headway between 6AM and 12:00PM in the outbound direction
14	2015	Extend to LOC (Link 125 Package)
15	2017	Consolidate service on S. Goldenrod Road and eliminate service on Egan (East Orlando Package)
	2014	Reduce stop spacing
17	2014	Create a FastLink Service
18	2014	Expand AM span of service
	2015	Restructure route as part of KIF Package
20	2014	Reduce stop spacing
21	2018	Extend route to Walt Disney World
23	NA	No Change Proposed
24	NA	No Change Proposed
25	NA	No Change Proposed
26	2015	Restructure route as part of KIF Package
28	2014	Reduce stop spacing
	2015	Reduce evening span of service
29	2017	Restructure route to remove Goldenrod Section (East Orlando Package)
	2015	Reduce evening span of service
31	NA	No Change Proposed
34	2014	Restructure route to serve French Ave. and Central Florida Regional Hospital and remove from Airport Blvd. (Sanford Package)
36	2014	Reduce stop spacing
	2015	Reduce evening span of service
	2016	Remove running time from schedule
37	2014	Restructure route as part of Pine Hills Package
	2016	Increase headway between 5AM and 9AM in the southbound direction
	2016	Increase headway between 4AM and 8AM in the northbound direction

Table ES-6: Proposed Recommendations Phasing (Continued)

Link	Recommended Year of Implementation	Description
38	2018	Increase span of service to all day
40	2015	Expand morning span of service
	2014	Reduce stop spacing
41	2014	Reduce stop spacing
	2014	Expand morning span of service
	2015	Increase headway around 3PM in the westbound direction
	2016	Split Route to improve reliability
42	2018	Extend route to Premium Outlets (part of Link 8/42 swap)
	2015	Increase headway between 10AM and 5PM in the eastbound direction
	2015	Increase headway between 6AM and 3PM in the westbound direction
44	2014	Restructure route as part of Pine Hills Package
	2017	Adjust time points
45	2014	Extend route on the east to Central Florida Greeneway, and on the west to International Parkway and C.R. 46A (Sanford Package)
46-E	2014	Extend route to Central Florida Greenway via Melonville and Sanford Ave. Remove from French Avenue (Sanford Package)
46-W	2014	Extend route to Sand Pond Road, remove from French Avenue (Sanford Package)
48	2014	Restructure route as part of Pine Hills Package
	2014	Reduce evening span of service
	2016	Increase headway between 6AM and 10AM in the eastbound direction
49	2014	Restructure route as part of Pine Hills Package
50	2018	Remove route from SeaWorld
51	2014	Expand the morning span of service
54	2014	Eliminate Saturday service
55	2015	Restructure route as part of the KIF Package
56	2014	Expand morning span of service
	2015	Restructure route as part of the KIF Package
57	NA[2]	No Change Proposed
58	2014	Proposed for elimination; more discussion required
102	NA	No Change Proposed

[2] As part of LYNX's proposals for KIF in 2014, this route would be extended to KIF.

Table ES-6: Proposed Recommendations Phasing (Continued)

Link	Recommended Year of Implementation	Description
103	2016	Increase headway around between 6AM and 10AM in the northbound direction
104	2015	Increase headway to 15 minutes throughout the day
105	NA	No Change Proposed
107	NA	No Change Proposed
111	2018	Extend to Walt Disney World
125	2015	Restructure route to serve downtown Orlando (Link 125 Package)
200	NA	No Change Proposed
204	NA	No Change Proposed
210	NA	No Change Proposed
211	NA	No Change Proposed
212	NA	No Change Proposed
300	NA	No Change Proposed
301	2015	Restructure route as part of Limited Directs Package
302	2015	Restructure route as part of Limited Directs Package
303	2015	No Change Proposed
304	2015	Restructure route as part of Limited Directs Package
305	2015	Restructure route as part of Limited Directs Package
306	2015	No Change Proposed
313	NA	No Change Proposed
319	2014	Reduce evening span of service
405	2014	Eliminate Route
416	NA	No Change Proposed
426	2014	Expand morning span of service
427	NA	No Change Proposed
434	NA	No Change Proposed
441	2014	Expand span of service
	2015	Restructure route as part of KIF Package
443	2014	Pine Hills Package
445	2014	Adjust time points
17/92	2014	Adjust Stop Spacing
	2014	Add new Neighborlink on Celery Ave
	2014	Create New Circulator/Neighborlink in Lake Mary

Table ES-6: Proposed Recommendations Phasing (Continued)

Link	Recommended Year of Implementation	Description
	2017	Create new Goldenrod Route
	2017	Create new KIF to Lake Nona and OIA Route
	2017	Create new Kissimmee to International Drive route
	2017	Convert new Downtown Orlando to Lake Nona route (Service Grant) into a Downtown Orlando to OIA to Lake Nona XpressLink
	2018	Create new Celebration circulator
	2018	Create new Kissimmee circulator
	2018	Create new Baldwin Park Circulator
	2017	Create new LCS - Universal/SeaWorld Route
	2015	Create a new Limited Direct route to Buena Ventura Lakes
	2015	Create a new Limited Direct route in Pine Hills
	2018	Connects Oviedo and Altamonte Springs via Red Bug Lake Road and Semoran Blvd.
	2018	Create new Sanford SunRail Airport Blvd Route
	2019	Create new West Town Center to Maitland SunRail Local Route
	2020	Create new John Young Parkway Circulator Route
	2021	Create new Orlovista Circulator Route
	2019	Create new XpressLink along SR 50 between West Oaks and UCF
	2019	Create new Xpress Link along SR 423 from Downtown to I-Drive
	2019	Create new XpressLink from Apopka to Altamonte SunRail Station
	2019	Create New XpressLink from UCF to Downtown
	2022	Create new FastLink along SR 527 from Downtown to Sand Lake SunRail Station
	2019	Create new Xpress Link from Sanford to Oveido to UCF
	2019	Create new Xpresslink from UCF to Innovation Way
	2022	Create new FastLink from Fern Park to OIA
	2019	Create new XpressLink from Oviedo to Downtown
	2023	Create new BRT along US 192 from Lake County to Kissimmee
	2018	Create new BRT along US 192 from Disney to Kissimmee
	2024	Create new BRT along 435 from Park Promenade to I-Drive
	2025	Create new BRT from Winter Park to Downtown
	2026	Create new BRT from Downtown to Florida Mall

Table ES-7: Annual Change in Costs by County and by Year

Year	Cost of COA Change by Year				
	Orange	Osceola	Seminole	Lake, Polk & Volusia	TOTAL
2014	$1,797,879	$209,857	$855,564	$-	**$2,863,300**
2015	$4,312,277	$2,502,835	$1,072,444	$ -	**$7,887,556**
2016	$6,816,399	$3,732,530	$1,687,021	$ -	**$12,235,950**
2017	$17,340,620	$7,012,487	$1,725,778	$ -	**$26,078,885**
2018	$24,899,347	$13,506,231	$4,269,387	$ -	**$42,674,965**
Subtotal 2014-2018	*$55,166,522*	*$26,963,940*	*$9,610,194*	*$ -*	***$91,740,656***
2019	$31,380,035	$13,938,268	$7,563,837	$ -	**$52,882,140**
2020	$32,459,142	$14,440,431	$7,752,933	$ -	**$54,652,506**
2021	$33,570,868	$14,801,428	$7,946,756	$ -	**$56,319,053**
2022	$34,960,023	$15,171,464	$8,240,811	$ -	**$58,372,298**
2023	$35,834,023	$18,211,625	$8,446,831	$ -	**$62,492,480**
2024	$38,352,466	$18,666,916	$8,658,002	$ -	**$65,677,384**
2025	$42,084,943	$18,672,914	$8,874,452	$ -	**$69,632,309**
2026	$46,830,556	$21,111,430	$9,096,313	$ -	**$77,038,299**
Subtotal 2019-2026	*$295,472,056*	*$135,014,476*	*$66,579,936*	*$ -*	***$497,066,468***
TOTAL	**$350,638,578**	**$161,978,415**	**$76,190,130**	**$ -**	$588,807,124

ES-6. Evaluation of Proposed Changes and Conclusions

Using the ridership results and the future route statistics, a revised performance evaluation was conducted to determine the effectiveness of the proposed changes. The ability to evaluate all of the service guidelines was limited by the forecasting tools available. Some guidelines can be evaluated quantitatively (i.e. the information for future ridership can be projected using available tools) while other guidelines can only be evaluated qualitatively (i.e. the information about loads in the first and last trip cannot be forecasted accurately). Additionally, as discussed in Section ES-2, some metrics are rolling (i.e. some routes in the system will always be failing) and some are fixed (routes can fail, but it is possible for LYNX to have no routes failing).

The list below shows how the following guidelines were evaluated.

- Overall Stop Spacing (Fixed Metric)
- Vehicle/Capacity (V/C) Ratio in the First and Last Trip (Fixed Metric)
- Weekday Ridership (Rolling Metric)
- Passengers per Total Weekday Hour (Rolling Metric)
- Passengers per Total Weekday Mile (Rolling Metric)

The evaluation was not conducted for the following criteria as data was not available to forecast the future performance of these metrics:

- Farebox Recovery (Rolling Metric)
- Revenue to Total Mileage (Rolling Metric)
- Scheduled Speed to Actual Speed (Fixed Metric)
- Insufficient Service (Plug Buses) (Fixed Metric)

ES-7. County-Level Summary

With the implementation of the COA recommendations, bus service in **Orange County** would improve in the following ways (relative to the Service Guidelines):

- Average weekday ridership for all existing routes serving Orange County would increase from 87,194 in the existing condition to 141,168[3] with the short term recommendations (62% increase) and 193,472[4] (122% increase) with the short and long term Recommendations.
- Passengers per average weekday hour would increase from 23.3 in the existing condition to 26.8 (2018) with all short term recommendations and 32.7 (2030) with all short and long term recommendations.

[3] Includes ridership growth as a result of the COA modifications and demographic growth; per TBEST

[4] Ibid

With the implementation of the COA recommendations, bus service in **Osceola County** would improve in the following ways (relative to the Service Guidelines):

- Average weekday ridership for all existing routes serving Osceola County would increase from 19,269 in the existing condition to 41,280[5] with the short term recommendations (89% increase) and 53,603[6] (46% increase) with the short and long term recommendations.
- Passengers per average weekday hour would change from 23.5 in the existing condition to 35 (2018) with all short term recommendations and 41.6 (2030) with all short and long term recommendations.

With the implementation of the COA recommendations, bus service in **Seminole County** would improve in the following ways (relative to the Service Guidelines):

- Average weekday ridership for all existing routes serving Seminole County would increase from 14,983 in the existing condition to 27,003[7] with the short term recommendations (80% increase) and 38,372[8] (156% increase) with the short and long term recommendations.
- Passengers per average weekday hour would change from 12.9 in the existing condition to 32.6 (2018) with all short term recommendations and 33.9 (2030) with all short and long term recommendations.

ES-8. Evaluation of Revised Existing Routes

The LYNX system is a complicated network of routes that are interdependent on each other. Improving the entire system requires changes that might benefit some routes and hurt others. Route performance pivots primarily off of ridership. Routes that serve more riders are more efficient than routes that serve fewer riders. With limited ridership potential, increasing the ridership of one route might be done by decreasing the ridership on another route. Decreasing ridership on a route might be beneficial by lowering over-crowding or making the route more reliable.

Fixed Performance Metric Evaluation

Tables ES-8 through ES-10 show the performance evaluation of the existing routes for the fixed performance guidelines, arranged by county both before and after the implementation of the route recommendations. Routes which fail the service guideline are shown in red. Routes with the fewest shaded cells are performing the best. Those that pass the service guideline are in green. As can be seen, all fixed metrics, except for those related to average operating speed and on-time performance would be remedied with the implementation of COA recommendations.

[5] Ibid
[6] Ibid
[7] Ibid
[8] Ibid

Rolling Performance Metric Evaluation

At a system level, ridership is projected to increase from 93,000 average weekday riders to 150,000 average weekday riders by 2018 and 205,000 average weekday riders by 2030. Passengers per hour are projected to increase from 22.8 to 30.8, passengers per mile is expected to increase from 1.6 to 2.0. This increase in ridership, coupled with recommendations that would improve the overall efficiency of routes in the system leads to an overall improvement for the service guidelines.

This trend would also continue at an individual county level. For each county, the majority of the routes improve in their performance on the rolling performance measures. Given the inter-connected nature of LYNX's network and the nature of the rolling metrics, some routes would decline in the overall rolling performance metrics.

ES-9. Evaluation of New Routes

Using the results from TBEST and the future route statistics, the proposed new routes were evaluated for financial performance. These results are shown in Table ES-11. The remaining service guidelines (route design, schedule design, and service delivery) were not applicable.

Similar to the evaluation of the existing routes, this evaluation includes only certain performance metrics (Passengers per Hour/Passengers per Mile) as some could not be evaluated with the tools available in this study.

New routes were evaluated using the lower quartile threshold of the existing system (in the future). This number is 395 for passengers, 17.25 for passengers per hour and .92 for passengers per mile. Any route that falls below this threshold should be refined or reconsidered before being implemented.

The majority of the poorest performing new route recommendations are the XpressLinks and the circulators. These routes are projected to carry very few riders and have long running times. If these routes are implemented, every attempt should be made to optimize ridership on these two route types. This could be done by:

1) Providing enhanced park-and-ride locations along the XpressLink Routes.
2) Marketing the XpressLink routes to business commuters.
3) Not charging a fare on the circulators.
4) Providing timed-transfers between the circulators and other local routes.

Table ES-8: Fixed Metric Evaluation (Osceola County Routes)

		Before COA	After COA	Notes
Route Design Guidelines	Bus Stop Spacing Guideline (Stops per Mile)	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	
Schedule Design Guidelines	Guideline for Span of Service (Volume/Capacity in First/Last Trip) - Weekdays Only	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	
	Guideline for Enhancing Headway on Routes with "Plug Buses"	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	
Service Delivery Guidelines	Guideline for Route Investigation Based upon On-time Performance	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Average Speed)	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Operating vs. Scheduled Speed)	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	

Table ES-9: Fixed Metric Evaluation (Seminole County)

		Before COA	After COA	Notes
Route Design Guidelines	Bus Stop Spacing Guideline (Stops per Mile)	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	
Schedule Design Guidelines	Guideline for Span of Service (Volume/Capacity in First/Last Trip) - Weekdays Only	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	
	Guideline for Enhancing Headway on Routes with "Plug Buses"	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	
Service Delivery Guidelines	Guideline for Route Investigation Based upon On-time Performance	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Average Speed)	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Operating vs. Scheduled Speed)	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	

Routes shaded in red fail the performance metric

Table ES-10: Fixed Metric Evaluation (Orange County)

		Before COA	After COA	Notes
Route Design Guidelines	Bus Stop Spacing Guideline (Stops per Mile)	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	
Schedule Design Guidelines	Guideline for Span of Service (Volume/Capacity in First/Last Trip) - Weekdays Only	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	
	Guideline for Enhancing Headway on Routes with "Plug Buses"	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	
Service Delivery Guidelines	Guideline for Route Investigation Based upon On-time Performance	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Average Speed)	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Operating vs. Scheduled Speed)	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	

Routes shaded in red fail the performance metric

Table ES-11: Evaluation of New Routes

	Route Description	Ridership	Passengers per total hour	Passengers per Total Mile
Long Term New Route	Create new Xpress Link from Sanford to Oveido to UCF	12	0.14	0.04
Long Term New Route	Create new XpressLink from Apopka to Altamonte SunRail Station	21	0.36	0.03
Short Term New Route	Create new Celebration circulator	39	1.15	0.09
Long Term New Route	Create New XpressLink from UCF to Downtown	45	2.01	0.35
Long Term New Route	Create new XpressLink along SR 50 between West Oaks and UCF	59	1.51	0.11
Long Term New Route	Create new Orlovista Circulator Route	103	5.69	0.29
Long Term New Route	Create new FastLink along SR 527 from Downtown to Sand Lake SunRail Station	124	10.15	0.75
Short Term New Route	Create new Baldwin Park Circulator	141	7.13	0.56
Short Term New Route	Convert new Downtown Orlando to Lake Nona route into a Downtown Orlando to OIA Xpress	240	2.26	0.17
Long Term New Route	Create new Xpresslink from UCF to Innovation Way	65	5.31	N/A
Long Term New Route	Create new Xpress Link along SR 423 from Downtown to I-Drive	82	6.70	N/A
Short Term New Route	Create new Sanford SunRail Airport Blvd Route	223	6.71	N/A
Short Term New Route	Create new XpressLink from Oviedo to Downtown	108	46.07	1.42
Short Term New Route	Create new LCS - Universal/SeaWorld Route	344	90.53	6.42
Short Term New Route	Create new Kissimmee circulator	534	15.45	1.15
Short Term New Route	Create new KIF to Lake Nona and OIA Route	1154	9.24	0.69
Long Term New Route	Create new BRT along US 192 from Lake County to Kissimmee	2175	21.68	0.85
Short Term New Route	Create a new limited direct route to Buena Ventura Lakes	426	87.82	6.22
Long Term New Route	Create new John Young Parkway Circulator Route	729	25.90	1.31
Long Term New Route	Create new West Town Center to Maitland SunRail Local Route	1051	20.52	2.86
Short Term New Route	Create a new limited direct route in Pine Hills	1309	170.05	12.05
Long Term New Route	Create new FastLink from Fern Park to OIA	1511	123.45	N/A
Short Term New Route	Create new Kissimmee to International Drive route	1911	19.28	1.44
Short Term New Route	Connects Oviedo and Altamonte Springs via Red Bug Lake Road and Semoran Blvd.	2367	28.98	3.23
Short Term New Route	Create new Goldenrod Route	3329	39.25	3.00
Long Term New Route	Create new BRT from Winter Park to Downtown	3336	40.18	6.41
Long Term New Route	Create new BRT along 435 from Park Promenade to I-Drive	4941	82.76	3.65
Long Term New Route	Create new BRT from Downtown to Florida Mall	7449	78.78	14.30
Short Term New Route	Create new BRT along US 192 from Disney to Kissimmee	12678	37.33	1.38
Short Term New Route	Add new neighborlink on Celery Ave	N/A	N/A	N/A
Short Term New Route	Create New Circulator/Neighborlink in Lake Mary	N/A	N/A	N/A

Routes shaded in Red are below the quartile of the system average for that performance metric.

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ES-10. Title VI Evaluation

The COA recommendations were evaluated as part of a separate effort for consistency with Title VI of the US Civil Rights Act. The COA recommendations were reviewed to determine the routes that would exceed the Major Service Policy threshold of a 25 percent change to revenue hours or revenue miles. The recommendations of this analysis are included in Appendix C.

ES-11. Implementation Steps

In each year, the recommendations and their associated phasing will need to be agreed to by the various partners (the City of Orlando, Orange County, Osceola County and Seminole County) that fund the LYNX system. Concurrent with the annual update of the agency's Transit Development Plan, LYNX planning staff will meet with funding partners to discuss system and route performance, and recommendations to both achieve efficiencies and improve service. It is anticipated that this will happen during the third quarter of the LYNX fiscal year (April – June). Once implementation priorities are set, the incremental funding can be allocated to LYNX during their annual funding cycle in October.

Once elements are allocated in the annual funding cycle, LYNX will take the steps required to implement the change. This includes developing schedules and specifications, presenting them to the public, and finally, allowing the bus operators union to pick the work in a Bid (which occurs in April, August and December).

The recommendations included in this COA are consistent with the LYNX system and Orlando-area demographics as of September 2012. LYNX will conduct a re-evaluation of the system based on the service guidelines with each annual TDP update. This will enable a re-evaluation of potential changes and adjustments to the recommendation and implementation priorities.

ES-12. Conclusion

This Comprehensive Operations Analysis provides LYNX with the guidelines and framework to improve the LYNX system today and in the future. Through the development of the Service Guidelines, LYNX will now be able to gather data specific to the system and use that data to determine where network modifications are needed and where new investments may be warranted. Development of consistent data will enable a year to year comparison of LYNX's performance and it will enable LYNX to better communicate that system performance with their partners and customers. Overall, the analysis of today's system provided in this document demonstrated that LYNX is operating efficiently, though there are opportunities to tighten the overall system in order to provide better service to LYNX's customers.

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Project Background

1.1 Introduction

This report documents the Comprehensive Operations Analysis (COA) conducted for LYNX, the Central Florida Regional Transportation Authority. The COA is a means of evaluating and adjusting current LYNX operations to be more efficient while developing a framework to adapt the system to achieve the objectives of the Transit Development Plan (TDP), which itself is intended to lead toward implementation of the Vision 2030 Long Range Plan. Therefore the recommendations of the COA are intended to strike a balance between the realities, constraints and needs of the region as presently served by LYNX and the desired longer term future of transit in the LYNX service area.

The goals of the COA are to:

1. **Establish a framework for making decisions about existing and future transit service**
2. **Evaluate the effectiveness of current operational investments (routes)**
3. **Identify opportunities to improve system efficiency**
4. **Develop recommendations to strengthen and effectively grow the LYNX system**
5. **Guide implementation of a system modifications to better serve LYNX's partners and customers**

The LYNX COA began with the development of Service Guidelines which were based upon a comprehensive review of similar guidelines throughout the transit industry and customized for the LYNX service region **(GOAL 1)**. Each Link in the LYNX system was then evaluated against the guidelines to determine if the Link's performance was deficient or consistent with the guideline **(GOAL 2)**. Based upon the results of that evaluation, recommendations were developed to address the Links with deficiencies **(GOAL 3)**. In addition, as a result of a review of regional demographics, previous planning studies such as the TDP and Vision 2030, new routes were developed and added to the recommendations. Based upon the feedback we gathered from the

developed and added to the recommendations. Based upon the feedback we gathered from the COA Outreach campaign the list of recommendations were refined and finalized **(GOAL 4)**. Each recommendation was then assessed for cost and Title VI implications[8] and prioritized as part of a short and long term implementation plan **(GOAL 5)**.

These efforts are detailed in the following chapters of this report.

The LYNX system presented and evaluated in this report is the system that existed in September 2012. The data-driven COA was initiated in early 2013, and September 2012 represented the snapshot of the LYNX system where the most recent data was available. Since September 2012, the LYNX system has continued to change and develop. Where relevant, these changes are noted in this COA report. This COA proposes service recommendations to improve the LYNX system based upon the September 2012 data. However, the recommendations and their associated costs have been updated and are consistent with the changes made to the LYNX system as part of LYNX's Bid processes in December 2012, April 2013 and August 2013. LYNX has recently released the proposed January 2014 Bid which includes routing changes associated with the opening of the Kissimmee Intermodal Facility. This COA also recommended those routing changes; however, they are included in 2015 vs. 2014 throughout this document. See Section 1.6 of this report for more detail.

1.15 Background Information

In the conduct of the COA efforts the following data sources were utilized:

- Previous studies and planning documents
  - LYNX Comprehensive Operations Analysis (March 2006)
  - LYNX 5-Year Service Plan (May 2010)
  - LYNX Vision 2030 (October 2011)
  - LYNX Transit Development Plan (TDP) 2013-2022
  - LYNX Draft TDP 2014 Update (April 2013)
- Demographic and land use patterns within the service area as well as anticipated changes in the future
- September 2012 automatic passenger count (APC) data
- Previous on-board rider surveys ("Before" Passenger Survey for the Central Florida Commuter Rail Transit Project, 2010)
- Route diagnostics analysis which presented individual route performance through a variety of techniques
- Service guidelines from transit providers across the industry
- LYNX 2010 On-Board Survey
- Consultation and advice from LYNX operating and executive staff, as well as with the Regional Working Group and Audit Committee including meetings (see Outreach Summary in Chapter 7)
- Outreach and survey of existing riders conducted between March 26-28, 2013
- Outreach and survey of LYNX operators conducted in April 2013
- LYNX GIS Data

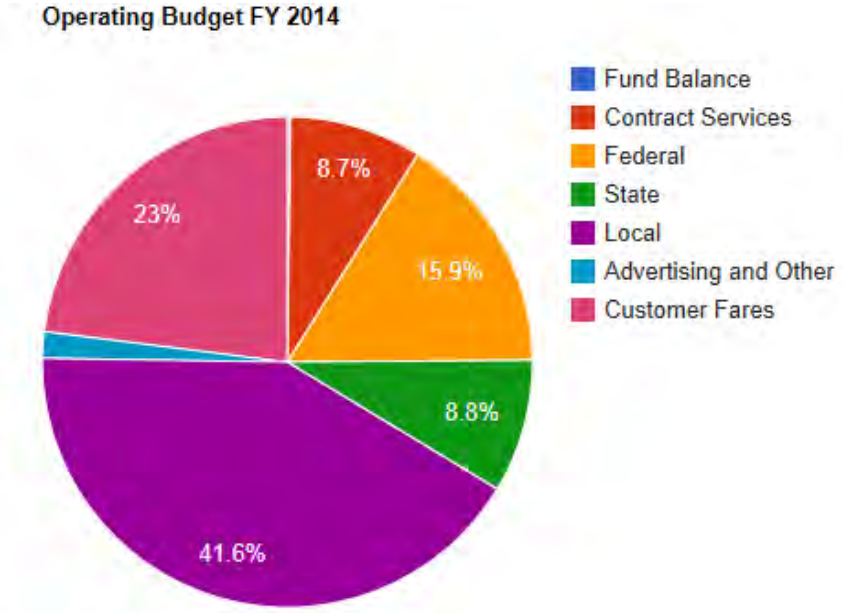
[8] Title VI analysis was performed for the first three years of prioritized recommendations.

- LYNX Schedule Data
- LYNX Fleet Data

This document begins with the overarching premise that LYNX needs to invest in its existing system to provide frequent transit service for its passengers. Expansions outside of the existing core network should be minimal and are programmed for select areas with a high level of development and forecasted growth.

1.3 System Overview

LYNX is a stand-alone, governmental unit with an operating budget of $127,867,296 for FY2014. The majority (41.6 percent) of the agency's funding comes from four local funding partners: Orange, Osceola and Seminole counties, plus the city of Orlando. LYNX system generated funds (fares, advertising, contract services, interest and other income) account for 32 percent with federal (15.9 percent) and state (8.8 percent) funding plus the fund balance (1.7 percent) completing the operating budget.



LYNX primarily serves Orange, Seminole and Osceola counties; an area of approximately 2,500 square miles with a resident population of more than 1.8 million people. Small portions of Polk and Volusia counties are served as well.

Service Overview

In September 2012, LYNX operated a total of 55 local fixed bus routes (or links), 10 NeighborLinks, one bus rapid transit (BRT) route referred to as LYMMO, two FastLinks, two circulators, five express routes, seven “limited direct” routes serving Walt Disney World (formerly known as 3-D routes), complementary Americans with Disabilities (ADA) paratransit service, Transportation Disadvantaged (TD) services, and commuter assistance vanpools within a three county region comprised of Orange, Osceola, and Seminole counties.

In August 2013, Lake County notified LYNX that it would no longer fund service on a portion of Link 55 and for all of Link 204. As a result, Polk County rerouted Link 427 to serve a portion of the former Link 55 route. Link 204, an express route, was eliminated on October 18, 2013. At the December 2013 LYNX Board meeting, funding for the eliminated portion of Link 55 was restored.

See Table 1-1 for the routes considered in the COA; the route types are described below.

Fixed-route Links – Regular local bus service providing frequent stops.

FastLink – Commuter service operating Monday through Friday morning and afternoon to provide quicker service by reducing stops along specific corridors. FastLinks are available along US 17-92 between Seminole Center and LYNX Central Station (LCS) in Downtown Orlando and along Orange Blossom Trail (OBT) between Osceola Square Mall in Osceola County and LCS in downtown Orlando.

Limited Directs – Express bus service with limited stops to and from Walt Disney World (WDW). Limited Direct routes have only one round trip per day, going to WDW in the morning and returning in the evening.

Express Link Service – Express bus service with limited stops from Volusia county connecting with Park and Ride locations. It should be noted that Volusia County is outside the LYNX service area and it is served by a separate transit system (Votran).

LYMMO – Free Downtown Orlando bus rapid transit (BRT) circulator with designated lanes and signal priority controls for traffic signals along the 2.5 mile route. LYMMO operates Monday through Sunday every five minutes during the peak hours for downtown travel and every 10 minutes in the evening. Expansion of LYMMO is currently underway.

NeighborLink – Community circulators operating within designated service boundaries in less-populated areas. The service provides transportation anywhere within the designated area or to a LYNX local bus stop. Most NeighborLinks operate Monday through Saturday from approximately 5:30 a.m. to 8 p.m. Residents in the designated areas must call at least two hours before they want to leave their home and schedule a pickup time or access the service from the scheduled fixed point connection.

Access LYNX - Shared ride door-to-door transportation service provided by private contractors under the supervision of LYNX. The ACCESS LYNX program provides complementary service for eligible individuals who are not able to use the regular fixed-route bus service because of a disability or other limitations.

Table 1-1: COA Study Routes

Route	Route Name	Jurisdiction(s)	Service
1	Winter Park/Altamonte Springs	Orange & Seminole	Local
3	Lake Margaret	Orange	Local
4	South U.S. 441/Kissimmee	Orange & Osceola	Local
6	Dixie Belle	Orange	Local
7	South Orange Ave./Florida Mall	Orange	Local
8	West Oak Ridge Rd./International Dr.	Orange	Local
9	Winter Park/Rosemont	Orange	Local
10	East U.S. 192/St. Cloud	Osceola	Local
11	South Orange Ave./OIA	Orange	Local
13	UCF	Orange & Seminole	Local
14	Calvary Towers	Orange	Local
15	Curry Ford Rd./Valencia College East	Orange	Local
17	North U.S. 441/Apopka	Orange & Seminole	Local
1792	Sanford/Orlando	Orange & Seminole	Ltd. Stop
18	South Orange Ave./Kissimmee	Orange & Osceola	Local
20	Malibu St./Mercy Dr.	Orange	Local
21	Carver Shores	Orange	Local
23	Winter Park/Spring Village	Orange & Seminole	Local
24	Millenia	Orange	Local
25	Mercy Dr./Shader Rd.	Orange	Local
26	Pleasant Hill Rd.	Orange & Osceola	Local
28	East Colonial Dr./Azalea Park	Orange	Local
29	East Colonial Dr./Goldenrod Rd.	Orange & Osceola	Local
31	LYMMO	Orange	Circulator
34	Sanford/Goldsboro	Seminole	Local
36	Lake Richmond	Orange	Local
37	Pine Hills/Florida Mall	Orange	Local
38	Downtown Orlando/International Dr.	Orange	Local
40	Americana Blvd./Universal Orlando	Orange	Local
41	S.R. 436 Crosstown	Orange & Seminole	Local
42	International Dr./OIA	Orange	Local
44	Hiawassee Rd./Zellwood	Orange	Local
45	Lake Mary	Seminole	Local
46E	Seminole Centre/Downtown Sanford	Seminole	Local
46W	S.R. 46/Seminole Towne Center	Seminole	Local
48	West Colonial Dr./Pine Hills	Orange	Local
49	West Colonial Dr./Pine Hills Rd.	Orange	Local
50	Downtown Orlando/Magic Kingdom	Orange	Local
51	Conway Rd./OIA	Orange	Local
54	Old Winter Garden Rd.	Orange	Local
55	West U.S. 192/Four Corners	Orange & Osceola	Local
56	West U.S. 192/Magic Kingdom	Orange & Osceola	Local
57	John Young Pkwy.	Orange & Osceola	Local
58	Shingle Creek Circulator	Orange	Circulator
102	Orange Ave./South U.S. 17-92	Orange & Seminole	Local
103	North U.S. 17-92 Sanford	Seminole	Local
104	East Colonial	Orange	Local

Table 1-1: COA Study Routes (Cont.)

Route	Route Name	Jurisdiction(s)	Service
105	West Colonial	Orange & Osceola	Local
111	OIA/SeaWorld	Orange	Local
125	Silver Star Rd. Crosstown	Orange	Local
200	West Volusia Xpress	Orange & Lake	Express
204	Clermont Xpress	Orange & Lake	Express
210	KnightLYNX Blue	Orange (UCF)	Circulator
211	KnightLYNX Green	Orange (UCF)	Circulator
300	Limited Direct	Orange	Ltd. Stop
301	Limited Direct	Orange	Ltd. Stop
302	Downtown Disney Limited Direct	Orange	Ltd. Stop
303	Limited Direct-Washington Shores/Disney-MGM	Orange	Ltd. Stop
304	Limited Direct-Rio Grande/Vistana Resort	Orange	Ltd. Stop
305	Limited Direct-MetroWest/All-Star Resort	Orange	Ltd. Stop
306	Downtown Disney Limited Direct	Orange & Osceola	Ltd. Stop
313	Winter Park	Orange	Local
319	Richmond Heights	Orange	Local
405	Apopka Circulator	Orange	Circulator
426	Poinciana Circulator	Osceola & Polk	Circulator
434	S.R. 434 Crosstown	Orange & Seminole	Local
441	Kissimmee/Orlando	Orange & Osceola	Ltd. Stop
443	Winter Park/Pine Hills	Orange	Local
445	Apopka/West Oaks Mall	Orange	Local
601	Poinciana	Osceola & Polk	Flex Route
603	Southwest Poinciana	Osceola & Polk	Flex Route
604	Intercession City/Campbell City	Osceola	Flex Route
611	Ocoee	Orange	Flex Route
612	Winter Garden	Orange	Flex Route
613	Pine Hills	Orange	Flex Route
621	East Colonial Dr./Bithlo	Orange	Flex Route
622	Oviedo	Seminole	Flex Route
631	Buena Ventura Lakes	Orange & Osceola	Flex Route
641	Williamsburg	Orange	Flex Route

Profiles of each existing route can be found in Appendix A.

Vehicle Maintenance and Storage Facilities

LYNX uses three facilities (located at South Street in Orange County, the LYNX Operations Center on Princeton Street also in Orange County, and at the Southern Operations Base on Alaska Avenue in Osceola County to maintain and store its fixed route and paratransit services.) Most of LYNX's fleet is stored and maintained at the LYNX Operations Center (LOC) with the remainder if the fleet at either the South Street or Southern operations bases. The majority of the Osceola County routes are stored in the leased Southern Operations Base on Alaska Avenue.

LYNX Central Station (LCS) and LYNX SuperStops

LYNX Central Station, opened in 2004, is the hub of the LYNX system. Located in downtown Orlando between Garland and Orange Avenues, LCS serves 31 LYNX routes in 26 bus bays.

LYNX has ten SuperStops throughout its service area as follows:

- Rosemont
- Seminole Center
- West Oaks Mall
- Apopka
- Washington Shores
- Colonial Plaza
- University of Central Florida (UCF)
- Florida Mall
- Disney
- Osceola Square Mall
- Fern Park

SuperStops are locations that provide for efficient transfers between multiple Links and services and that include enhanced stop amenities such as benches, sheltered waiting areas, schedule displays and other features.

Figure 1-1 depicts the LYNX system.

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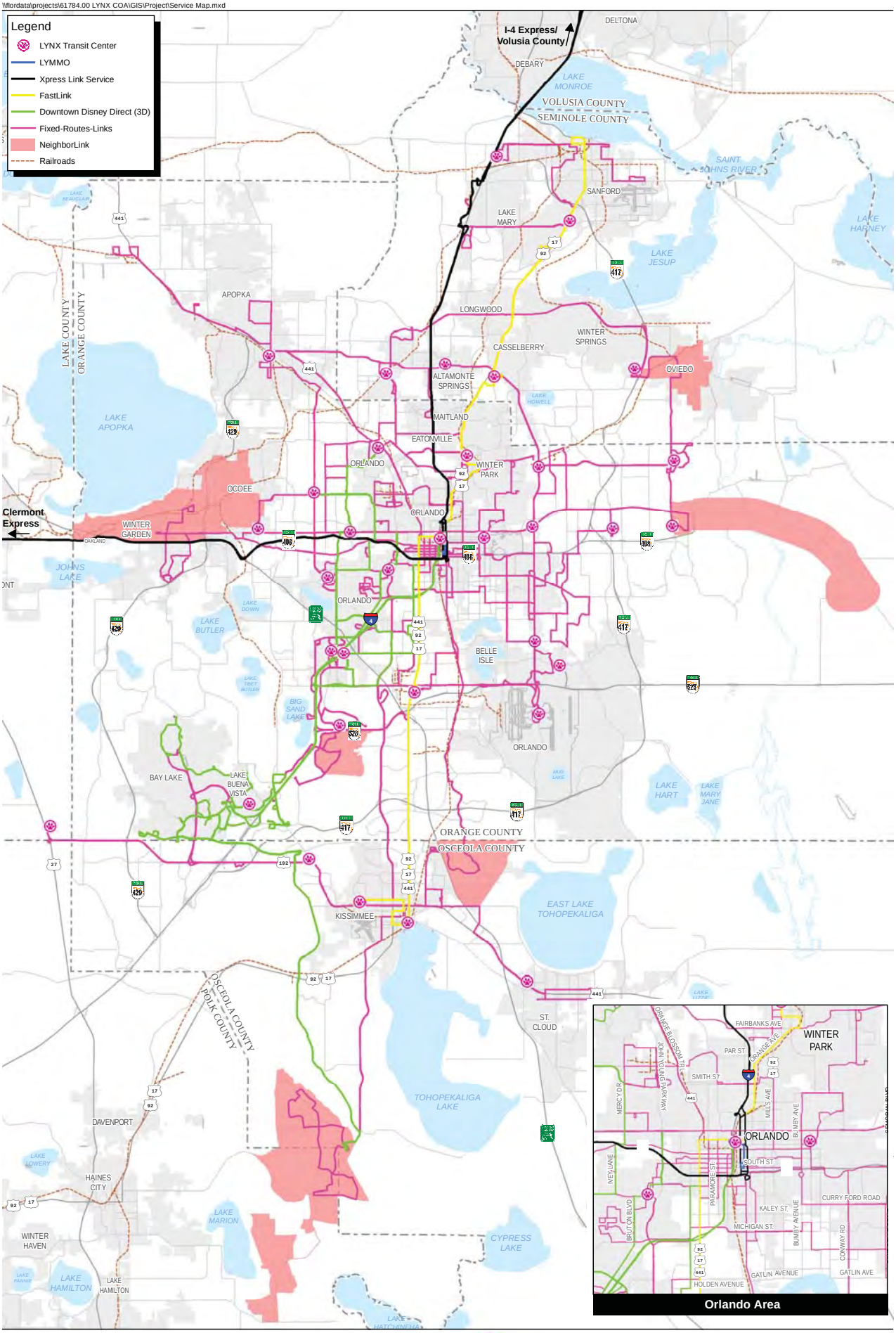

LYNX

Comprehensive Operations Analysis

Figure 1-1
System Wide Map

December 2013

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Service Characteristics

LYNX provides service up to 22 hours per day, seven days a week. Most local routes provide roughly 18-20 hours of service during weekdays with most routes starting service between 5:00-6:00 a.m. and concluding service around 10:00 p.m. Weekend services for the local routes operate with a similar to slightly reduced service span on Saturdays and Sundays. Sunday service shows the greatest reduction, with most local routes only operating around 15 hours of the day and twenty-four routes not providing service. Express and limited stop routes, which are designed to serve commuting public, operate Monday through Friday and during the peak travel times only. These routes have a significantly shorter service span that is between four and six hours, which are divided between the two travel peaks. The Limited Direct routes are designed to serve employees traveling to and from Disney. These routes typically provide a single morning and single evening trip. Other services, such as the University of Central Florida KnightLYNX routes have a short service span that starts later in the evening around 8 p.m. and runs into the early morning on just Fridays and Saturdays.

Bus frequency for LYNX routes is typically 30 minutes or 60 minutes depending on the route. A handful of routes provide service with greater frequency (15-20 minutes). Frequency does tend to remain constant throughout the course of a routes service span. Some routes provide a more frequent service during the peak travel times in the morning and evening, with a reduced frequency during the other time periods of the day. To show these changes in frequency during the course of the service span, the following time periods were developed:

- Early Morning – 4:00 a.m. to 6:00 a.m.
- AM Peak – 6:00 a.m. to 9:00 a.m.
- Base – 9:00 a.m. to 4:00 p.m.
- PM Peak – 4:00 p.m. to 7:00 p.m.
- Evening – 7:00 p.m. to 10:00 p.m.
- Night – 10:00 p.m. to 3:00 a.m.

To concisely organize and provide for a detailed analysis, Tables 1-2 and 1-3 were developed. Table 1-2 displays the service span for each route during for the weekday, Saturday, and Sunday. It also displays the number of trips provided by each route in each direction for the same periods. Table 1-3 shows the frequency for each study route during the six defined periods for the weekday, Saturday, and Sunday. NeighborLink routes have been left off these tables because they don't have a defined headway in the traditional sense. They do have a timepoint where they connect to the system-at-large. Most NeighborLink routes average about an hour between timepoint arrivals.

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Table 1-2: LYNX Service Span

	WEEKDAY				SATURDAY				SUNDAY			
Link	Time Frame	Total Hours	NB/EB Trips	SB/WB Trips	Time Frame	Total Hours	NB/EB Trips	SB/WB Trips	Time Frame	Total Hours	NB/EB Trips	SB/WB Trips
1	5:10a - 9:30p	16.5	16	16	5:10a - 9:05p	16.0	16	16		no service		
3	4:30a - 9:55p	17.5	17	16	4:30a - 9:55p	17.5	17	16	4:15a - 8:35p	16.5	15	15
4	4:15a - 2:05a	22.0	46	44	4:45a - 11:35p	19.0	37	34	4:31a - 10:05p	17.5	33	30
6	4:21a - 9:11p	17.0	17	17	4:21a - 9:11p	17.0	17	17		no service		
7	4:15a - 12:50a	20.5	20	20	4:15a - 12:50a	20.5	20	20	5:15a - 8:35p	15.5	15	15
8	4:45a - 3:10a	22.5	71	71	4:45a - 1:10a	20.5	39	38	4:45a - 10:05p	17.5	35	32
9	5:40a - 12:29a	19.0	18	18	5:40a - 9:59p	16.5	16	16	5:40a - 7:55p	14.5	14	14
10	4:00a - 11:06p	19.0	18	18	4:00a - 11:06p	19.0	18	18		no service		
11	5:00a - 12:35a	19.5	33	33	5:00a - 10:35a	17.5	31	31	5:45a - 9:05p	15.5	15	15
13	4:30a - 11:05p	19.5	19	19	4:30a - 11:05p	19.5	19	19	5:45a - 10:05p	16.5	15	15
14	6:15a - 8:35p	14.5	15	15	6:15a - 8:35p	14.5	15	15	6:15a - 6:35p	12.5	13	13
15	4:45a - 1:12a	20.5	34	35	4:45a - 11:05p	18.5	31	32	5:15a - 9:50p	16.5	16	17
17	4:45a - 1:25 a	20.5	42	47	4:45a - 10:35p	18.0	31	33	4:45a - 8:35p	16.0	15	15
18	4:52a - 11:30p	18.5	18	15	4:52a - 11:30p	18.5	18	15		no service		
20	4:51a - 10:14p	17.5	18	17	4:51a - 10:14p	17.5	18	17	5:15a - 8:50p	15.5	15	15
21	4:11a - 1:50a	21.5	38	35	4:11a - 1:50a	21.5	38	35	4:41a - 9:50p	17.0	17	15
23	5:15a - 8:44p	15.5	15	16	5:15a - 8:44p	15.5	15	16		no service		
24	6:05a - 6:26p	12.5	12	13	6:05a - 6:26p	12.5	12	13	6:35a - 6:20p	12.0	12	12
25	5:00a - 9:38p	16.5	33	30	5:00a - 9:38p	16.5	33	29	6:00a - 9:30p	15.5	16	15
26	5:20a - 9:54p	16.5	24	25	5:30a - 9:44p	16.0	16	16		no service		
28	4:15a - 1:05a	21.0	35	35	4:45a - 10:05p	17.5	17	17	4:45a - 8:05p	15.5	15	15
29	4:30a - 1:35a	21.0	35	35	5:15a - 10:35p	17.5	17	17	5:15a - 8:35p	15.5	15	15
31	6:00a - 10:00p	16.0	180 (circulator)		10:00a - 12:00a	14.0	84 (circulator)		10:00a - 10:00p	12.0	48 (circulator)	

Table 1-2: LYNX Service Span (Cont.)

	WEEKDAY				SATURDAY				SUNDAY			
Link	Time Frame	Total Hours	NB/EB Trips	SB/WB Trips	Time Frame	Total Hours	NB/EB Trips	SB/WB Trips	Time Frame	Total Hours	NB/EB Trips	SB/WB Trips
34	5:15a - 9:05p	16.0	16	16	5:30a - 9:00p	15.5	16	16		no service		
36	4:45a - 12:20a	19.5	34	34	4:55a - 9:20p	16.5	31	31	6:00a - 8:05p	14.0	14	14
37	4:45a - 11:25p	18.5	36	35	4:50a - 10:25p	17.5	32	33	4:50a - 10:25p	17.5	17	17
38	6:00a - 5:55p	12.0	23 (circulator)		6:00a - 5:55p	12.0	23 (circulator)		6:15a - 5:40p	11.5	11 (circulator)	
40	4:00a - 1:35a	21.5	21	21	4:00a - 1:35a	21.5	21	21	4:45a - 8:35p	16.0	16	15
41	4:15a - 1:09a	21.0	40	36	4:15a - 1:09a	21.0	40	36	4:58a - 11:21p	18.5	17	17
42	4:44a - 12:30a	20.0	38	36	4:44a - 12:30a	20.0	38	36	4:59a - 11:20p	18.5	18	17
44	5:01a - 9:10p	16.0	16	16	5:01a - 9:10p	16.0	16	16		no service		
45	5:06a - 7:57p	15.0	15	15	5:27a - 7:57p	14.5	15	14		no service		
46W	5:14a - 9:22p	16.0	18	15	6:55a - 9:34p	14.5	15	15	6:04a - 8:17p	14.0	14	14
46E	7:01a - 7:56p	13.0	13	13	6:48a - 7:43p	13.0	13	13		no service		
48	4:15a - 12:16a	20.0	35	35	4:45a - 10:05p	17.5	17	17	4:45a - 8:05p	15.5	15	15
49	4:30a - 12:45a	20.5	34	35	5:15a - 10:35p	17.5	17	17	5:15a - 8:35p	15.5	15	15
50	5:15a - 1:05a	20.0	36	36	5:15a - 1:05a	20.0	36	36	5:15a - 1:05a	20.0	36	36
51	5:15a - 10:20p	17.0	17	17	5:15a - 10:20p	17.0	17	17	5:15a - 9:05p	16.0	16	15
54	5:25a - 8:22p	15.0	15	15	5:25a - 8:22p	15.0	15	15		no service		
55	5:45a - 10:30p	17.0	31	31	5:45a - 10:30p	17.0	31	31	5:30a - 10:13p	16.5	31	31
56	5:30a - 11:45p	18.5	35	33	5:30a - 11:45p	18.5	35	33	5:45a - 11:30p	18.0	35	33
57	5:00a - 9:11p	16.0	16	15	5:00a - 9:11p	16.0	16	15		no service		
58	6:29a - 11:43p	17.0	18	18	6:29a - 11:43p	17.0	18	18	6:29a - 11:43p	17.0	18	18
102	4:30a - 12:35a	20.0	54	55	5:00a - 11:50p	19.0	35	35	5:00a - 10:50p	18.0	33	34
103	5:10a - 9:00p	16.0	55	56	5:04a - 9:04a	16.0	29	32	5:30a - 7:59p	14.5	14	15

Table 1-2: LYNX Service Span (Cont.)

	WEEKDAY				SATURDAY				SUNDAY			
Link	Time Frame	Total Hours	NB/EB Trips	SB/WB Trips	Time Frame	Total Hours	NB/EB Trips	SB/WB Trips	Time Frame	Total Hours	NB/EB Trips	SB/WB Trips
104	4:59a - 11:42p	18.5	33	32	4:59a - 11:42p	18.5	33	32	6:00a - 9:05p	15.0	15	15
105	4:53a - 12:21a	19.5	33	35	4:58a - 11:47p	19.0	34	34	4:59a - 8:47p	16.0	15	15
111	5:30a - 11:17p	18.0	18	18	5:30a - 11:17p	18.0	18	18	5:30a - 11:17p	18.0	18	18
125	4:23a - 1:23a	21.0	48	50	4:27a - 1:05a	20.5	35	35	4:27a - 8:20p	16.0	16	16
200	6:00a - 6:35p	12.5	3	3	no service				no service			
204	5:30a - 6:50p	13.5	6	6	no service				no service			
210	8:00p - 2:40a	6.5	19 (circulator)		8:00p - 2:40a	6.5	19 (circulator)		no service			
211	8:00p - 2:51a	7.0	24 (circulator)		8:00p - 2:51a	7.0	24 (circulator)		no service			
300	6:30a - 6:00p	11.5	1	1	6:30a - 6:00p	11.5	1	1	6:30a - 6:00p	11.5	1	1
301	6:05a - 6:20p	12.5	1	2	6:05a - 6:20p	12.5	1	2	6:05a - 6:20p	12.5	1	2
302	5:55a - 6:26p	12.5	1	2	5:55a - 6:26p	12.5	1	2	5:55a - 6:26p	12.5	1	2
303	6:15a - 6:00p	12.0	1	2	6:15a - 6:00p	12.0	1	2	6:15a - 6:00p	12.0	1	2
304	6:11a - 6:25p	12.0	1	2	6:11a - 6:25p	12.0	1	2	6:11a - 6:25p	12.0	1	2
305	6:09a - 7:19a	1.0	0	1	6:09a - 7:19a	1.0	0	1	6:09a - 7:19a	1.0	0	1
306	6:15a - 6:05p	12.0	1	1	6:15a - 6:05p	12.0	1	1	6:15a - 6:05p	12.0	1	1
313	5:48a - 7:35p	14.0	13	14	5:48a - 7:35p	14.0	13	14	no service			
319	4:30a - 1:05a	20.5	35	35	4:30a - 1:05a	20.5	35	35	4:45a - 8:05p	15.5	15	15
405	4:45a - 12:51a	20.0	15	21	4:35a - 8:51p	16.5	15	17	4:35a - 7:51p	15.5	15	16
416	6:15a - 7:08a	13.0	13	13	7:15a - 3:08a	8.0	8	8	no service			
426	5:15a - 10:05p	17.0	17 (circulator)		5:15a - 10:05p	17.0	17 (circulator)		no service			
427	5:48a - 7:39p	14.0	13	13	6:48a - 3:38p	9.0	4	4	no service			
434	5:30a - 9:51p	16.5	16	16	5:30a - 9:51p	16.5	16	16	no service			

Table 1-2: LYNX Service Span (Cont.)

Link	WEEKDAY Time Frame	WEEKDAY Total Hours	WEEKDAY NB/EB Trips	WEEKDAY SB/WB Trips	SATURDAY Time Frame	SATURDAY Total Hours	SATURDAY NB/EB Trips	SATURDAY SB/WB Trips	SUNDAY Time Frame	SUNDAY Total Hours	SUNDAY NB/EB Trips	SUNDAY SB/WB Trips
443	5:01a - 8:20p	15.5	15	16	4:57a - 8:18p	15.5	15	16	6:26a - 6:23p	12.0	12	12
445	6:53a - 7:20a 5:40p - 6:07p	0.90	1	1	6:53a - 7:20a 5:40p - 6:07p	0.90	1	1	no service			
441	6:30a - 6:50p	12.5	6	6	no service				no service			
1792	6:00a - 6:44p	12.5	3	3	no service				no service			
601	6:05a - 7:15p	13.2	14 (flex)		6:05a - 7:15p	13.2	14 (flex)		no service			
603	6:05a – 6:15p	12.2	7 (flex)		6:05a – 6:15p	12.2	7 (flex)		no service			
604	6:00a - 10:00a 3:00p - 7:00p	8	7 (flex)		no service				no service			
611	5:40a - 7:50p	14.2	15 (flex)		5:40a - 7:50p	14.2	15 (flex)		no service			
612	5:45a - 7:25p	13.7	14 (flex)		6:00a - 7:10p	13.2	14 (flex)		no service			
613	6:15a - 7:25p	13.2	14 (flex)		6:15a - 7:25p	13.2	14 (flex)		no service			
621	5:45a - 7:25p	13.7	10 (flex)		5:45a - 7:25p	13.7	10 (flex)		no service			
622	6:20a - 7:30p	13.2	14 (flex)		6:20a - 7:30p	13.2	14 (flex)		no service			
631	6:20a - 7:22p	13.0	14 (flex)		no service				no service			
641	6:05a - 7:15p	13.2	14 (flex)		6:05a - 7:15p	13.2	14 (flex)		no service			

Table 1-3: LYNX Frequency in Minutes

Link	Early Morning			AM Peak			Base		
	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday
1	60	60	N/A	60	60	N/A	60	60	N/A
3	60	60	60	60	60	60	60	60	60
4	30	30	30	30	30	30	30	30	30
6	60	60	N/A	60	60	N/A	60	60	N/A
7	60	60	60	60	60	60	60	60	60
8	15	30	60	15	15	15	15	30	30
9	N/A	N/A	N/A	60	60	60	60	60	60
10	60	60	N/A	60	60	N/A	60	60	N/A
11	30	30	N/A	30	30	60	30	30	60
13	60	60	N/A	60	60	60	60	60	60
14	N/A	N/A	N/A	60	60	60	60	60	60
15	30	30	60	30	30	60	30	30	60
17	30	30	60	30[2]	30	60	30	30	60
18	N/A	N/A	N/A	60	60	N/A	60	60	N/A
20	60	60	60	60	60	60	60	60	60
21	30	30	60	30	30	60	30	30	60
23	60	60	N/A	60	60	N/A	60	60	N/A
24	N/A	N/A	N/A	60	60	60	60	60	60
25	30	30	60	30	30	60	30	30	60
26	30	60	N/A	30	60	N/A	60	60	N/A
28	30	60	60	30	60	60	30	60	60
29	30	60	60	30	60	60	30	60	60
31	N/A	N/A	N/A	5	N/A	N/A	5	10	15
34	60	60	N/A	60	60	N/A	60	60	N/A
36	30	30	N/A	30	30	60	30	30	60
37	30	30	60	30	30	60	30	30	60
38	N/A	N/A	N/A	15	15	30	15	15	30
40	60	60	60	60	60	60	60	60	60
41	30	30	60	30	30	60	30	30	60
42	30	30	60	30	30	60	30	30	60
44	60	60	N/A	60	60	N/A	60	60	N/A
45	60	N/A	N/A	60	60	N/A	60	60	N/A
46W	30	N/A	N/A	60	60	60	60	60	60
46E	N/A	N/A	N/A	60	60	N/A	60	60	N/A
48	30	60	60	30	60	60	30	60	60

[2] 15-minute frequency provided from 6:00 am – 7:15 am

Table 1-3: LYNX Frequency in Minutes (Cont)

Link	Early Morning			AM Peak			Base		
	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday
49	30	60	60	30	60	60	30	60	60
50	30	30	30	30	30	30	30	30	30
51	60	60	60	60	60	60	60	60	60
54	N/A	N/A	N/A	60	60	N/A	60	60	N/A
55	N/A	N/A	N/A	30	30	30	30	30	30
56	N/A	N/A	N/A	30	30	30	30	30	30
57	60	60	N/A	60	60	N/A	60	60	N/A
58	N/A	N/A	N/A	30	30	30	30	30	30
102	30	30	30	15	30	30	30	30	30
103	30	30	N/A	15	30	60	15	30	60
104	30	30	N/A	30	30	60	30	30	60
105	30	30	60	30	30	60	30	30	60
111	N/A	N/A	N/A	60	60	60	60	60	60
125	30	30	60	20	30	60	20	30	60
200	N/A	N/A	N/A	30	N/A	N/A	N/A	N/A	N/A
204	N/A	N/A	N/A	30	N/A	N/A	N/A	N/A	N/A
210	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
211	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
300	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
301	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
302	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
303	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
304	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
305	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
306	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
313	N/A	N/A	N/A	60	60	N/A	60	60	N/A
319	30	30	60	30	30	60	30	30	60
405	60	60	60	60	60	60	60	60	60
416	N/A	N/A	N/A	60	60	N/A	60	60	N/A
426	N/A	N/A	N/A	60	60	N/A	60	60	N/A
427	60	60	N/A	60	60	N/A	60	60	N/A
434	N/A	N/A	N/A	60	60	N/A	60	60	N/A
443	60	60	N/A	60	60	60	60	60	60
445	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
441	N/A	N/A	N/A	30	N/A	N/A	N/A	N/A	N/A
1792	45	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 1-3: LYNX Frequency in Minutes (Continued)

Route	PM Peak			Evening			Night		
	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday
1	60	60	N/A	60	60	N/A	60	60	N/A
3	60	60	60	60	60	60	60	60	60
4	15	30	30	30	30	30	30	30	N/A
6	60	60	N/A	60	60	N/A	60	60	N/A
7	60	60	60	60	60	N/A	60	60	N/A
8	15	30	30	30	30	N/A	60	N/A	N/A
9	60	60	60	60	60	N/A	N/A	N/A	N/A
10	60	60	N/A	60	60	N/A	N/A	N/A	N/A
11	15	30	60	60	60	N/A	N/A	N/A	N/A
13	60	60	60	60	60	N/A	N/A	N/A	N/A
14	60	60	60	60	60	60	N/A	N/A	N/A
15	30	30	60	60	60	N/A	N/A	N/A	N/A
17	30[3]	30	60	60	60	N/A	30	30	N/A
18	60	60	N/A	60	60	N/A	N/A	N/A	N/A
20	60	60	60	60	60	60	N/A	N/A	N/A
21	30	30	60	60	60	60	60	60	N/A
23	60	60	N/A	60	60	N/A	N/A	N/A	N/A
24	60	60	60	N/A	N/A	N/A	N/A	N/A	N/A
25	30	30	60	30	30	60	N/A	N/A	N/A
26	30	60	N/A	60	60	N/A	N/A	N/A	N/A
28	15	60	60	60	60	60	60	N/A	N/A
29	30	60	60	60	60	60	60	N/A	N/A
31	5	10	15	10	10	15	10	10	N/A
34	60	60	N/A	60	60	N/A	30	30	N/A
36	15	30	60	60	30	N/A	60	N/A	N/A
37	30	30	60	30	30	60	N/A	N/A	N/A
38	15	15	30	N/A	N/A	N/A	N/A	N/A	N/A
40	60	60	60	60	60	60	60	60	N/A
41	30	30	60	30	30	60	30	30	N/A
42	30	30	60	30	30	60	30	30	60
44	60	60	N/A	60	60	N/A	N/A	N/A	N/A
45	60	60	30	N/A	N/A	N/A	N/A	N/A	N/A
46W	60	60	60	60	60	N/A	N/A	N/A	N/A
46E	60	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A
48	30	60	60	60	60	N/A	60	N/A	N/A

[3] 15-minute frequency provided from 5:00 pm – 6:45 pm

Table 1-3: LYNX Frequency in Minutes (Continued)

Route	PM Peak			Evening			Night		
	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday
49	30	60	60	60	60	60	60	N/A	N/A
50	30	30	30	30	30	30	30	30	30
51	60	60	60	60	60	60	N/A	N/A	N/A
54	60	60	N/A	60	60	N/A	N/A	N/A	N/A
55	30	30	30	30	30	30	N/A	N/A	N/A
56	30	30	30	30	30	30	30	30	30
57	60	60	N/A	60	60	N/A	N/A	N/A	N/A
58	30	30	30	30	30	30	30	30	30
102	15	30	30	60	30	30	60	60	N/A
103	15	30	60	30	30	N/A	N/A	N/A	N/A
104	30	30	60	60	60	60	60	60	N/A
105	30	30	60	60	30	60	60	60	N/A
111	60	60	60	60	60	60	N/A	N/A	N/A
125	20	30	60	30	60	60	30	60	N/A
200	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
204	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
210	N/A	N/A	N/A	40	40	N/A	15	15	N/A
211	N/A	N/A	N/A	20	20	N/A	15	15	N/A
300	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
301	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
302	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
303	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
304	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
305	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
306	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
313	60	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A
319	30	30	60	60	60	60	60	60	N/A
405	60	60	60	60	60	60	60	N/A	N/A
416	60	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A
426	60	60	N/A	60	60	N/A	N/A	N/A	N/A
427	60	60	N/A	60	60	N/A	60	60	N/A
434	60	60	N/A	60	60	N/A	N/A	N/A	N/A
443	60	60	60	60	60	N/A	N/A	N/A	N/A
445	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
441	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1792	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Fare Policy

LYNX charges $2.00 for a full-fare ride on its local bus routes. Discounted passes are available which can lower the cost of multiple rides. LYNX does not currently charge for LYMMO since the cost of that service is off-set by parking revenues collected from the City of Orlando. LYNX implements small incremental fare increases every two to three years. LYNX reviews fare revenue to ensure that fare collections continue to pay an adequate share of operating costs. Transfers are free and valid for 90 minutes.

1.4 Historical Trends

The performance and operation of LYNX over the past five years (FY 2006 through 2011) provides a general understanding of the direction of the system. Delving into this historic data offers a broad context for understanding the current condition of the system: have the levels of service been increasing, decreasing, or stable? A historic overview also provides insight to the system performance in terms of ridership and operating costs.

Based on data LYNX has reported to the National Transit Database (NTD), several system-wide performance and operational variables were readily available for the past five years. In general, LYNX appears to have followed the fluctuations of the overall economy, with service levels and number of employees dropping in 2009 and 2010 due to declining funding levels. As funding became available, service levels were increased in 2011, which led to an uptick in ridership.

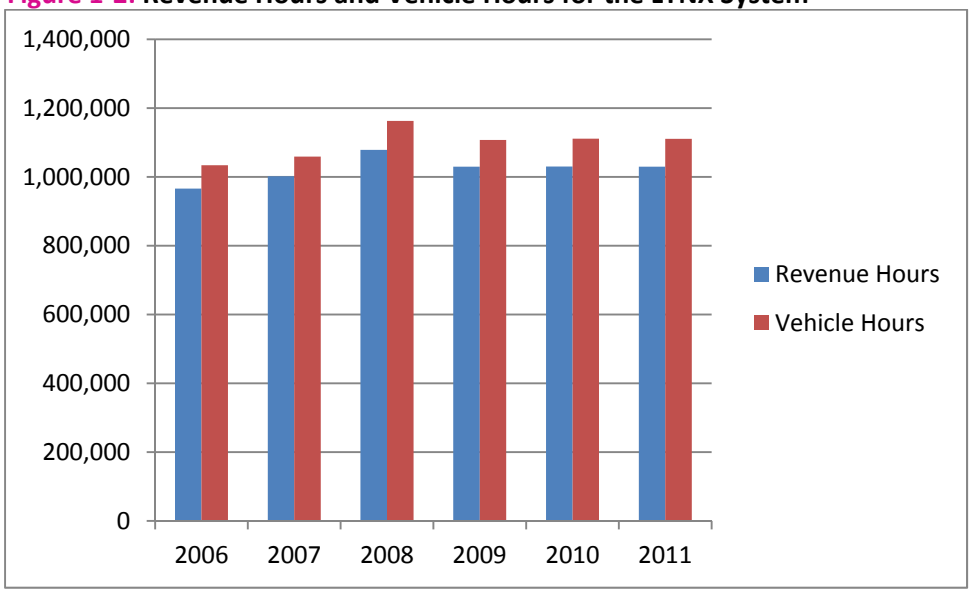
Operating Statistics

The historic operating statistics of LYNX are measured in revenue and vehicle hours and revenue and vehicle miles. Revenue hours and miles measure the time and distance the system provides service to customers. Whereas, vehicle hours and miles measure the total time and distance that operators are in a bus or being paid, including both revenue and deadhead (when the bus is not in service for customers) operation. This could also include the any time that the operator is being paid but is not operating a bus, such as “swing shifts” or the time required to “clear” at the beginning and end of a shift.

Revenue and Vehicle Hours

Revenue hours for LYNX, shown below in Figure 1-2, have grown steadily from 2006 to 2008 as funding availability allowed for the expansion of service. The reduction in funds that occurred in 2008 and 2009 are responsible for the decline in revenue hours between 2008 and 2009 (service reductions in response to this funding decline were put into effect towards the end of 2008/beginning of 2009). Since 2009, revenue hours have stayed relatively level. Vehicle hours have changed roughly proportional to revenue hours, with the ratio hovering around 1.07 vehicle hours to every revenue hour.

Figure 1-2: Revenue Hours and Vehicle Hours for the LYNX System

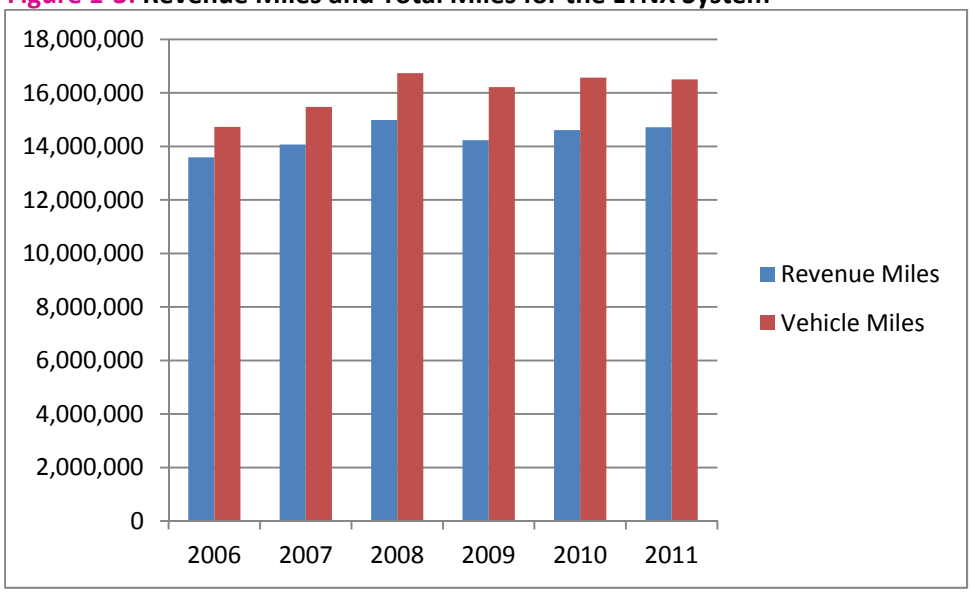


Note: 2011 National Transit Database (NTD) data included identical numbers for revenue and vehicle hours. Vehicle hours were adjusted based on the ratio between the two from 2010.
Source: NTD

Revenue Miles and Total Miles

Revenue Miles and Total Miles for LYNX, shown below in Figure 1-3, grew steadily from 2006 to 2008 as funding allowed for the expansion of service. Similar to Revenue and Vehicle Hours, the reduction in funding that occurred in 2008 and 2009 are reflected in the decline in mileage between 2008 and 2009 (service reductions in response to this funding decline were put into effect towards the end of 2008/beginning of 2009).

Figure 1-3: Revenue Miles and Total Miles for the LYNX System

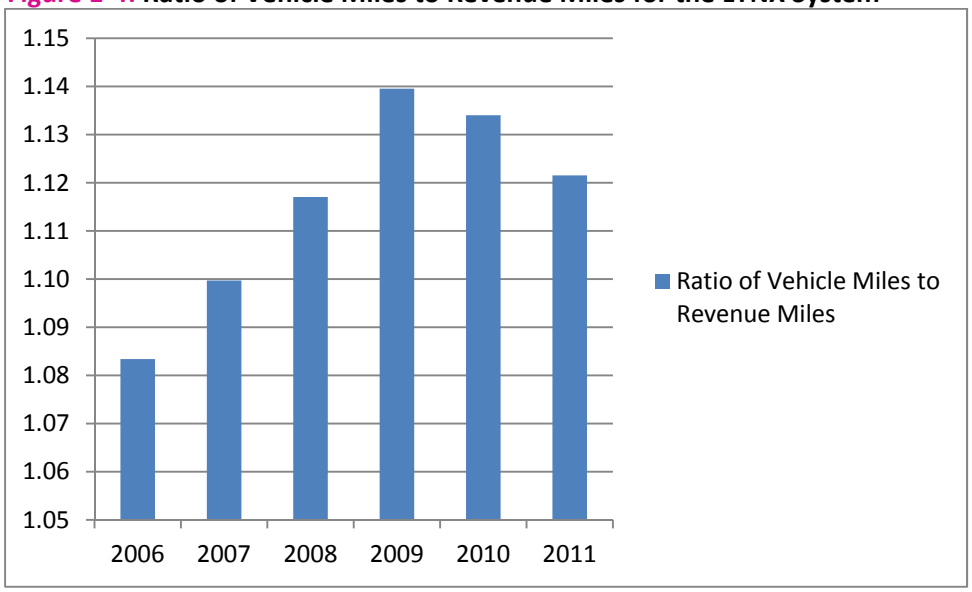


Source: NTD

The ratio of vehicle miles to revenue miles (Figure 1-4) increased steadily from 2006 to 2009. This is indicative of a more deadhead miles per each route and corresponds to LYNX's expansion into

various areas outside of its traditional service area (including adding service in Osceola County). This ratio started to fall in 2009 as routes have been scheduled more efficiently and LYNX has opened up an additional Southern Operations Base.

Figure 1-4: Ratio of Vehicle Miles to Revenue Miles for the LYNX System



Source: NTD

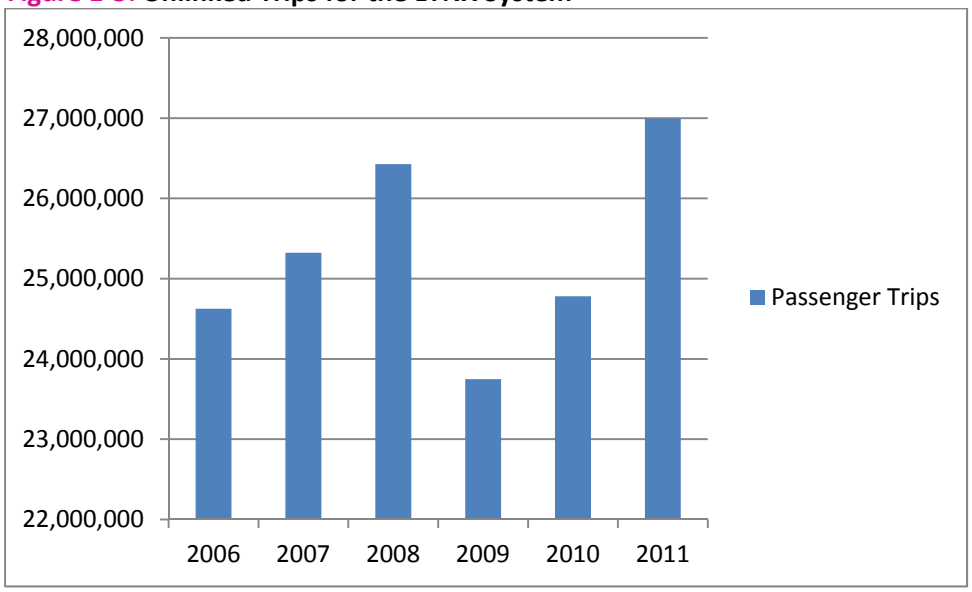
Trip Statistics

Trip statistics focus on the amount of LYNX service consumed over the five-year period. The two most relevant measures of service consumption reported to the NTD are unlinked trips and passenger miles. Unlinked trips measures ridership and accounts for each time a rider boards a bus. Therefore, a trip that requires one transfer counts as two unlinked trips. This should not be confused with the number of passengers. Passenger miles represent the total distance riders traveled throughout the system.

System-wide Unlinked Trips (Ridership)

The number of unlinked trips (Figure 1-5) on LYNX dropped significantly in 2009 when LYNX reduced service due to economic circumstances. This sharp decline has reversed in the last two years as unlinked trips have increased steadily. For 2011, the latest year that was available, unlinked trips actually exceeded the pre-2009 reduction number

Figure 1-5: Unlinked Trips for the LYNX System



Source: NTD

Ridership by Route

Monthly ridership by route was collected for the last two years and is shown in Table 1-4. This information helps to identify the routes which contributed to the significant growth in overall ridership on the LYNX system, and which routes are struggling in terms of overall performance.

The three top routes (with growth over 50 percent) were Link 46E and 46W in Sanford as well as Link 306 in Poinciana. The growth in Link 46E and 46W could be in part due to the recent extension (in 2011) to the Wal-Mart at Seminole Centre. The growth in Link 306 is probably due to an increased number of employees working at Walt Disney World commuting from Poinciana. The only route with a decline over 50 percent is Link 30, which lost a portion of its route in the 2011 Service Efficiencies to the new Link 105.

Table 1-4: Monthly Ridership by Route

Link	Route Name	FY10 Average Monthly	FY11 Average Monthly	FY12 Average Monthly	Percent Change from FY10	Percent Change from FY11
1	N Orange Ave./Altamonte Mall	6,940	7,732	9,389	11%	21%
3	Lake Margaret	22,396	23,555	25,482	5%	8%
4	South U.S. 441/Kissimmee	148,038	159,946	159,557	8%	0%
6	Dixie Belle	3,987	4,038	3,959	1%	-2%
7	S. Orange Ave./Florida Mall	25,431	28,189	29,529	11%	5%
8	W. Oak Ridge Rd./Int'l Dr.	186,115	196,106	205,342	5%	5%
9	N. Orange Ave./Rosemont	164,58	20,808	20,914	26%	1%
10	East U.S. 192/St. Cloud	25,384	29,462	29,448	16%	0%
11	S. Orange Ave./OIA	28,914	29,113	30,488	1%	5%
13	University of Central Florida	25,183	26,827	26,977	7%	1%
14	Princeton Street/Plymouth Apts.	2,046	1,851	2,232	-10%	21%
15	Curry Ford Rd./V.C.C. East	48,110	50,035	48,918	4%	-2%
17	North U.S. 441/Apopka	52,875	59,860	64,852	13%	8%
18	S. Orange Ave./Kissimmee	35,085	38,488	43,470	10%	13%
20	Malibu/Pine Hills	20,080	21,439	22,614	7%	5%
21	Carver Shores/Tangelo Park	75,914	81,784	82,664	8%	1%
23	Winter Park/Forest City	11,326	13,841	14,511	22%	5%
24	Millenia	6,388	6,764	7,524	6%	11%
25	Silver Star Rd.	32,398	32,233	34,358	-1%	7%
26	Pleasant Hill Rd./Poinciana	16,177	20,015	22,327	24%	12%
28	E. Colonial Dr./Azalea Park	41,400	43,759	43,319	6%	-1%
29	E. Colonial Dr./Goldenrod	37,587	39,847	43,607	6%	9%
30	Colonial Dr. Crosstown	83,173	93,966	18,756	13%	-80%
31	LYMMO	98,393	84,543	76,135	-14%	-10%
34	Sanford/Goldsboro	4,859	4,165	4,515	-14%	8%
36	Lake Richmond	19,105	20,558	21,871	8%	6%
37	Park Promenade Plaza/Florida Mall	77,658	89,714	93,721	16%	4%
38	Downtown Orlando/Int'l Dr.	13,163	14,877	16,207	13%	9%
40	Americana/Universal Orlando	36,199	41,417	44,592	14%	8%
41	S.R. 436 Crosstown	137,837	152,490	151,218	11%	-1%
42	International Dr./OIA	76,951	82,385	78,971	7%	-4%
44	Clarcona/Zellwood	17,366	18,717	17,479	8%	-7%
45	Lake Mary	4,918	5,730	6,141	17%	7%
46E	Central Florida Regional Hospital/Downtown Sanford	2,658	3,109	5,565	17%	79%
46W	W. S.R. 46/Seminole Towne Center	3,259	4,621	11,066	42%	139%
48	W. Colonial Dr./Park Promenade	50,451	55,249	52,887	10%	-4%

Table 1-4: Monthly Ridership by Route (Cont.)

Link	Route Name	FY10 Average Monthly	FY11 Average Monthly	FY12 Average Monthly	Percent Change from FY10	Percent Change from FY11
49	W. Colonial Dr./Pine Hills	43,485	47,794	50,170	10%	5%
50	Downtown Orlando/Magic Kingdom	50,708	59,446	63,275	17%	6%
51	Conway/OIA	20,228	22,928	26,708	13%	16%
54	Old Winter Garden Rd.	13,076	13,429	12,988	3%	-3%
55	West U.S. 192/Orange Lake	46,313	51,076	55,321	10%	8%
56	West U.S. 192/Magic Kingdom	47,492	52,212	55,257	10%	6%
57	John Young Pkwy.	20,732	23,614	26,094	14%	11%
58	Shingle Creek	2,495	2,934	3,040	18%	4%
102	Orange Ave/South 17/92	61,262	68,180	68,494	11%	0%
103	North 17/92 Sanford	36,454	42,671	39,876	17%	-7%
104	East Colonial	0	0	46,242	0%	0%
105	West Colonial	0	0	45,163	0%	0%
111	OIA/Disney	31,990	47,013	57,747	47%	23%
125	Silver Star Rd. Crosstown	62,285	68,747	71,219	10%	4%
200	Volusia Express	1,427	1,670	1,791	17%	7%
204	Clermont Express	3,296	2,903	3,325	-12%	15%
210	KnightLYNX Blue Line	-	721	864	-	20%
211	KnightLYNX Green Line	-	721	555	-	-23%
300	Downtown Orlando/Hotel Plaza	1,756	1,792	2,229	2%	24%
301	Pine Hills/Animal Kingdom	3,893	4,072	5,053	5%	24%
302	Rosemont/Magic Kingdom	3,548	4,034	4,508	14%	12%
303	Washington Shores/Disney-MGM	2,340	2,810	3,666	20%	30%
304	Rio Grande/Vistana Resort	4,104	4,646	4,821	13%	4%
305	Metro West/All-Star Resort	1,563	1,775	2,473	14%	39%
306	Poinciana/Downtown Disney Westside Transfer Center	455	1,381	2,265	203%	64%
313	VA Clinic	11,243	12,865	14,650	14%	14%
319	Richmond Heights	44,719	45,362	46,165	1%	2%
405	Apopka Circulator	7,609	8,122	7,164	7%	-12%
426	Pleasant Hill Rd./Poinciana	4,716	10,618	12,436	125%	17%
434	SR 434 Crosstown	10,623	11,915	13,790	12%	16%
441	FastLink 441	0	5,303	6,254	0%	18%
443	Lee Rd. Crosstown	25,357	24,668	23,309	-3%	-6%
445	Apopka/West Oaks Mall	0	0	343	0%	0%
17/92	FastLink 17/92		1,716	2,196	-	28%
601	Poinciana	2,224	2,171	1,750	-2%	-19%
603	Southwest Poinciana	599	1,094	1,243	83%	14%

Table 1-4: Monthly Ridership by Route (Cont.)

Link	Route Name	FY10 Average Monthly	FY11 Average Monthly	FY12 Average Monthly	Percent Change from FY10	Percent Change from FY11
604	Intercession City/Campbell City		Service started October 2012			
611	Ocoee	1,676	1,992	1,730	19%	-13%
612	Winter Garden	958	1,499	1,425	57%	-5%
613	Pine Hills		1,027	1,323		29%
621	East Colonial Dr./Bithlo	1,224	1,589	1,524	30%	-4%
622	Oviedo	832	867	850	4%	-2%
631	Buena Ventura Lakes	1,200	1,416	1,173	18%	-17%
641	Williamsburg	301	538	674	79%	25%

In fiscal year (FY) 2012, LYNX provided more than 29 million passenger trips. Ridership on the LYNX services continues to increase.

Table 1-5 presents the highest ridership routes in September 2012.

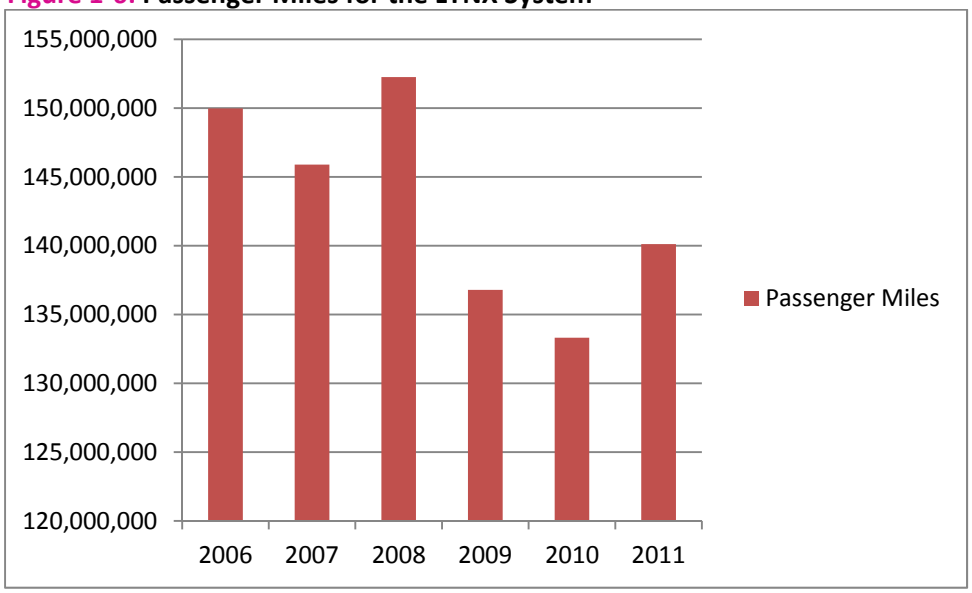
Table 1-5: Highest Ridership Routes, September 2012

Link	Name	September 2012 Ridership
8	West Oak Ridge Rd./International Dr.	207,643
4	South U.S. 441/Kissimmee	159,412
41	S.R. 436 Crosstown	143,711
37	Park Promenade Plaza/Florida Mall	95,827
21	Carver Shores/Tangelo Park	82,282
42	International Drive/OIA	76,661
LYMMO	LYMMO	74,803
125	Silver Star Rd. Crosstown	73,791
102	Orange Ave./South 17/92	69,413
17	North U.S. 441/Apopka	64,976

Passenger Miles

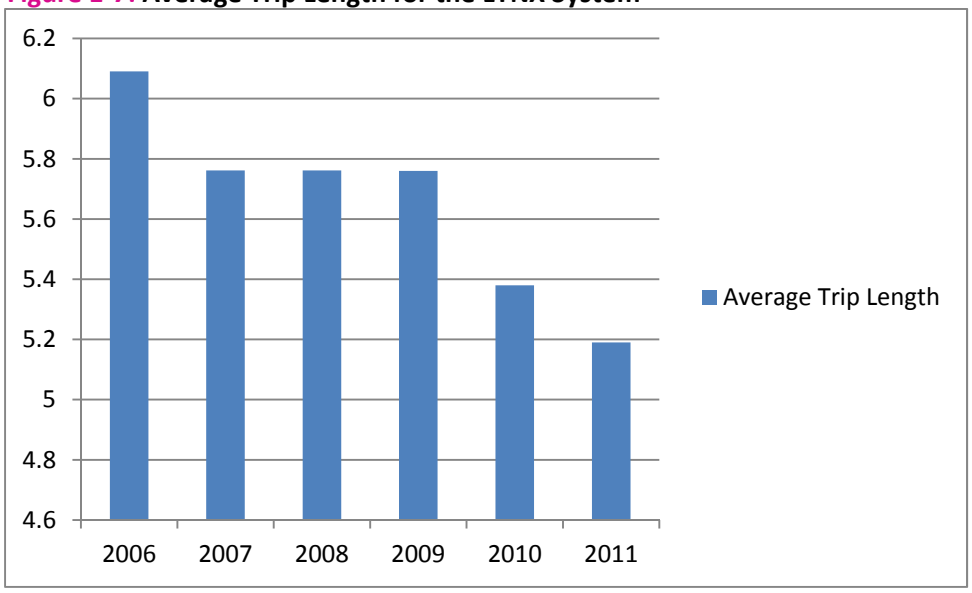
The number of passenger miles on LYNX (the total distance traveled by all passengers) has fluctuated significantly in the last five years. This is shown below in Figure 1-6. This is in part due to the change in number of unlinked trips, but is also due to the decline in average trip length per passenger. The steep decline in 2009 is due to the drop in total number of unlinked trips, while the change in 2010 is due to the change in average trip length. The large increase in 2011 is primarily due to the increase in number of unlinked trips and was slightly diminished by a decrease in the average trip length, which is shown in Figure 1-7.

Figure 1-6: Passenger Miles for the LYNX System



Source: NTD

Figure 1-7: Average Trip Length for the LYNX System



Source: NTD

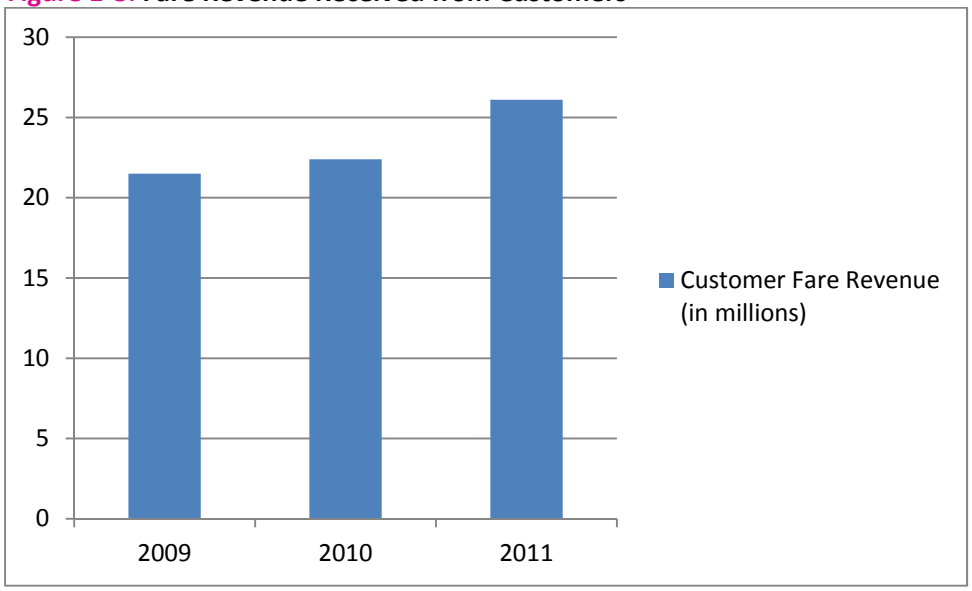
Farebox

Revenue generated from the farebox of a transit system is an important source of funding to offset operating costs. No American public transit system generates enough farebox funding to completely cover operating costs. It is important to look not only at the total farebox revenue collected, but at the recovery ratio. The recovery ratio measures the portion of the operating cost covered by farebox revenue.

Revenue

Revenue from customer fares for LYNX (Figure 1-8) has grown steadily over the last three years. As fares have remained constant during this time, this is primarily due to the recent increases in ridership.

Figure 1-8: Fare Revenue Received from Customers

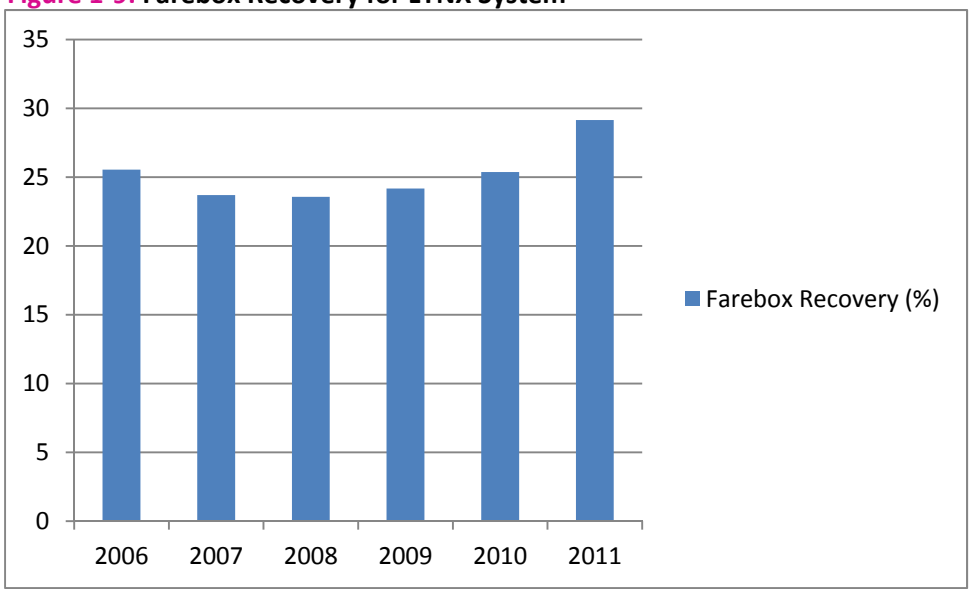


Source: 2011 LYNX Comprehensive Annual Financial Report

Farebox Recovery Ratio

The farebox recovery ratio for LYNX (Figure 1-9) has been rising steadily since 2008. This is in part due to some of the service reductions that occurred in 2008 and 2009 and the fare increase that occurred at the beginning of 2008 but also due to LYNX's continued commitment to reducing costs and providing more efficient service.

Figure 1-9: Farebox Recovery for LYNX System



Source: NTD

Vehicle Fleet

LYNX's fixed-route vehicle fleet consists of a variety of buses representing a range of purchase years and models. For the purpose of this overview, the primary distinctive feature of each vehicle is its type of accessibility for people with disabilities, either ramp/low floor or accessible lifts. Another important measure of a transit system's vehicle fleet is the number of vehicles required to operate the annual maximum service. In other words, what are the most vehicles that will be required at any one time during the year to operate all service? This measure is important because the Federal Transit Administration uses it in part to measure if it will provide a system with capital funding for additional vehicles.

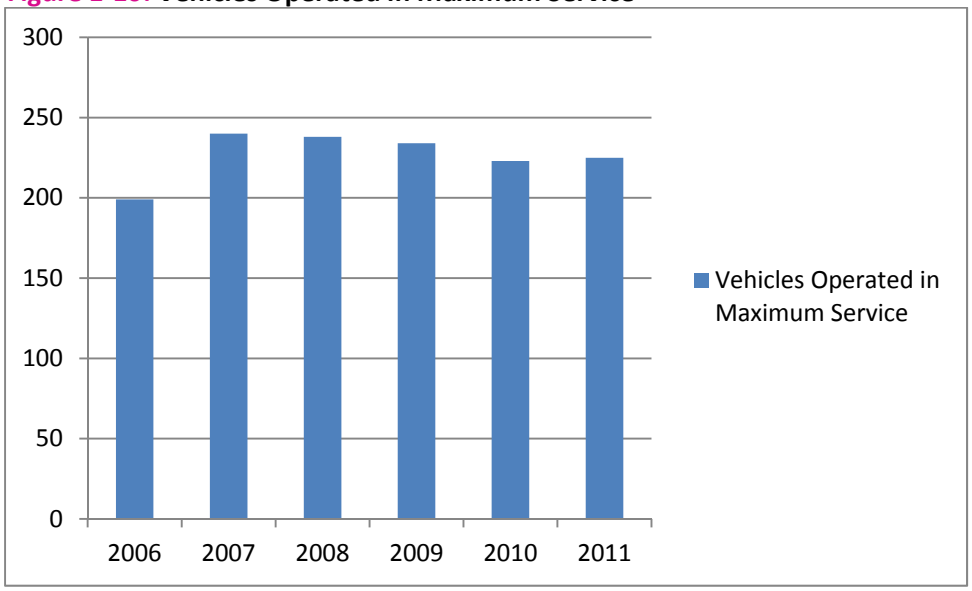
Vehicle Fleet Size

As of the beginning of 2013, LYNX operates its fixed-route service using a fleet of 270 buses. Of these, 259 are bio-diesel and 11 are hybrid-electric. The fleet consists of primarily standard 40' buses, with two 60' articulated vehicles used for routes with heavy ridership. All LYNX vehicles are 100% compliant with the Americans with Disabilities Act (ADA) and include low floors and wheelchair lifts.

Vehicles Operated in Annual Maximum Service

The number of vehicles operated in maximum service (Figure 1-10) remained relatively constant from 2006 to 2011 following the recent high achieved in 2007 (when 240 vehicles were used). The relatively slight change in number of vehicles operated following 2009 is reflective of the minor changes in overall service levels provided by LYNX during that time. Vehicle inventory has increased since 2011 to meet increasing demand and fleet diversification needs.

Figure 1-10: Vehicles Operated in Maximum Service



Source: NTD

1.5 Regional Demographics

A regionally-focused review of the spatial distribution of population and households in relation to LYNX's service network provides the foundation for how well the existing service is meeting the regional population's transportation needs. Identification of areas with a higher concentration of populations that demonstrate characteristics linked to higher transit usage is useful in determining where transit service could be expanded if service is not currently available. While these analyses cannot determine the exact need for transit services, they can provide evidence for areas that could support new service or expanded service.

Demographic data from the 2010 U.S. Census reveal a number of transit-dependent persons in the LYNX service area. The ridership demand for a transit system is typically correlated to several demographic characteristics. Higher concentrations of persons demonstrating these demographic characteristics indicate areas with potentially high demand for transit service. They are:

- Persons living below the poverty line
- Persons age 65 or older
- Persons living in a household with no vehicle available
- Persons living in a household with one vehicle available

Persons who fall into one or more of the following categories may have difficulty accessing even the most essential destinations such as places of employment, medical facilities, and shopping centers without sufficient transit service.

Assessing LYNX's current network of bus service requires examining how effectively the existing services cover those areas identified through the demographic analysis as being most likely to use transit. Through the use of geographic information systems (GIS) software, a ¼ mile buffer of the LYNX bus routes was overlaid on the regional demographic maps (Figures 1-11 through 1-16). The ¼ mile bus was selected because this is considered to be the service area for a traditional local bus route. A ¼ mile is viewed as the distance a person is willing to walk to access transit. This spatial evaluation can highlight those areas where service improvements may be warranted as well as those areas where service expansion may be considered.

Regional Density

In general, the regional population for the LYNX service area is concentrated around Downtown Orlando with some smaller pockets of density located around Kissimmee and Deltona. While the population density is concentrated around the Downtown Orlando area, the areas of highest concentration are not necessarily downtown. Traditionally, one would expect to see the highest densities located around Downtown Orlando and a tapering as one moves away from the center; much like a bulls eye. The pattern viewed here is often associated with a region that does not have a highly developed downtown core, but a more suburban development pattern. There are pockets of higher density around Conway, Pine Hills, Azalea Park, Altamonte Springs, Goldenrod, Maitland, Sanford, Kissimmee, and Deltona. These concentrations tend to follow major transportation corridors, such as Interstate 4 and U.S. 17-92. These are all areas that fall within the existing service area for LYNX and many have extensive transit service. As one moves away from Downtown Orlando and towards the fringe of the service area, there are lower population densities. This is especially true south and west of Kissimmee. The only area with a density

greater than 2 persons per acre and outside the current route service area is the Eustis and Mount Dora area northwest of Orlando.

Housing density follows a very similar pattern, not surprisingly. There is a small concentration of higher density housing development near the Downtown Orlando area. The graphic resembles a donut that isn't centered directly over Downtown Orlando. There is an area between Pine Hills and Orlando that shows a very low housing density with a ring of higher density surrounding it. This ring includes areas such as Pine Hills, Maitland, Altamonte Springs, Winter Park, Conway, and the area south of Downtown Orlando. There are also areas of higher density located in Kissimmee, Sanford, and Deltona in the outer portion of the service area. Even within the ring, there are areas that show higher densities (4 or more HH/acre), but these areas are not focused in one area or even along a particular corridor. These areas are "peppered" throughout the region. This pattern of density can present a challenge in providing transit service. Outside these areas, the densities are extremely low (0-1 HH/acre), and would likely not support traditional local bus. Again, just like with the population density, the pattern of higher density housing tends to follow major transportation routes. This is often associated with traditional suburban development patterns.

Demographic Indicators of Transit Dependence

The four indicators of transit dependence—living below the poverty line, being age 65 or older, and living in a household with either no or one vehicle—available through the US Census identify areas within the region that will likely have the highest demands for LYNX bus service. These characteristics are not determinants of transit use, but they are prevalent characteristics for transit users without other transportation options. Many people possessing one or more of these characteristics will not use transit, and many people without any of these traits will use transit.

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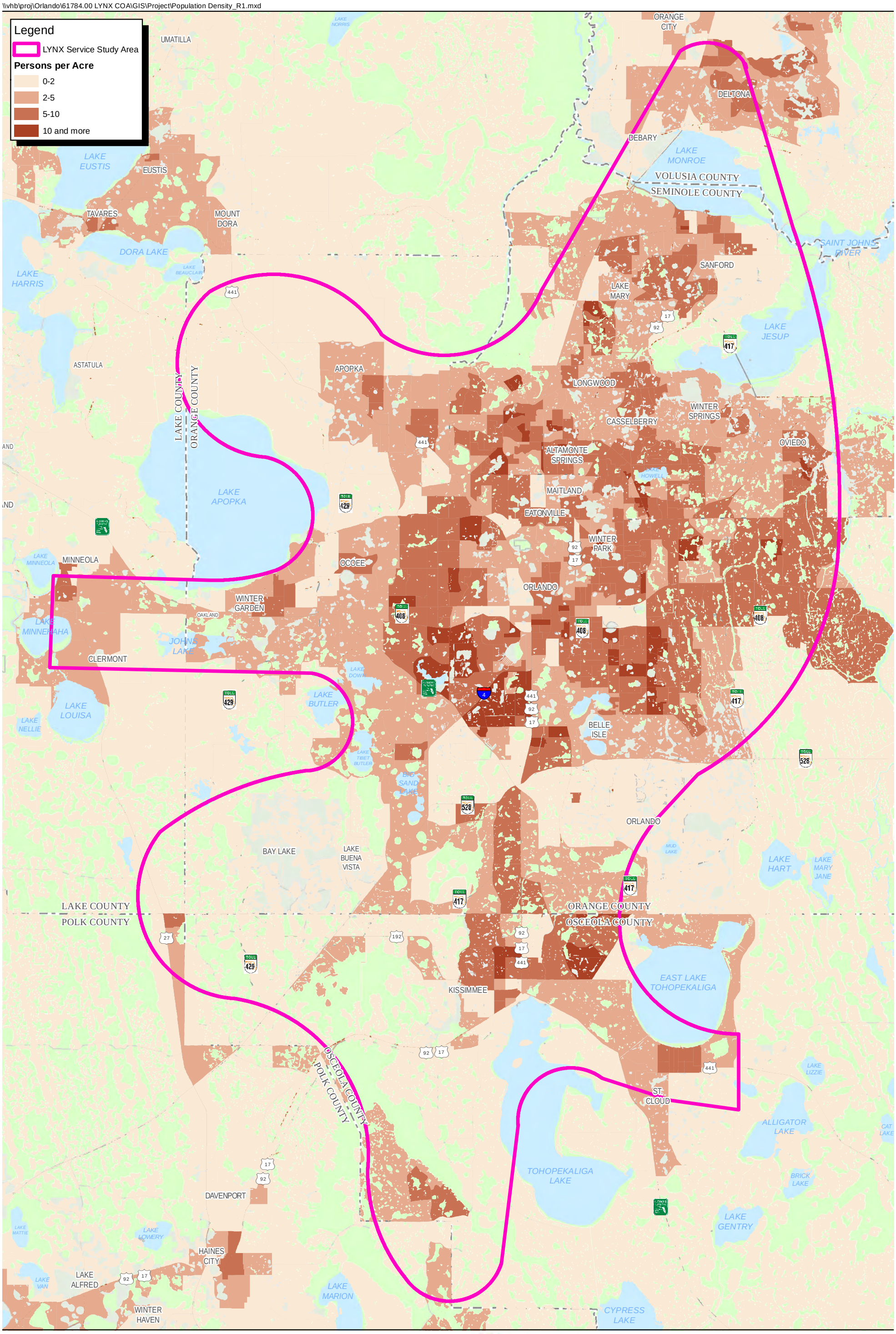

LYNX

Comprehensive Operations Analysis

Figure 1-11
Population Density

December 2013

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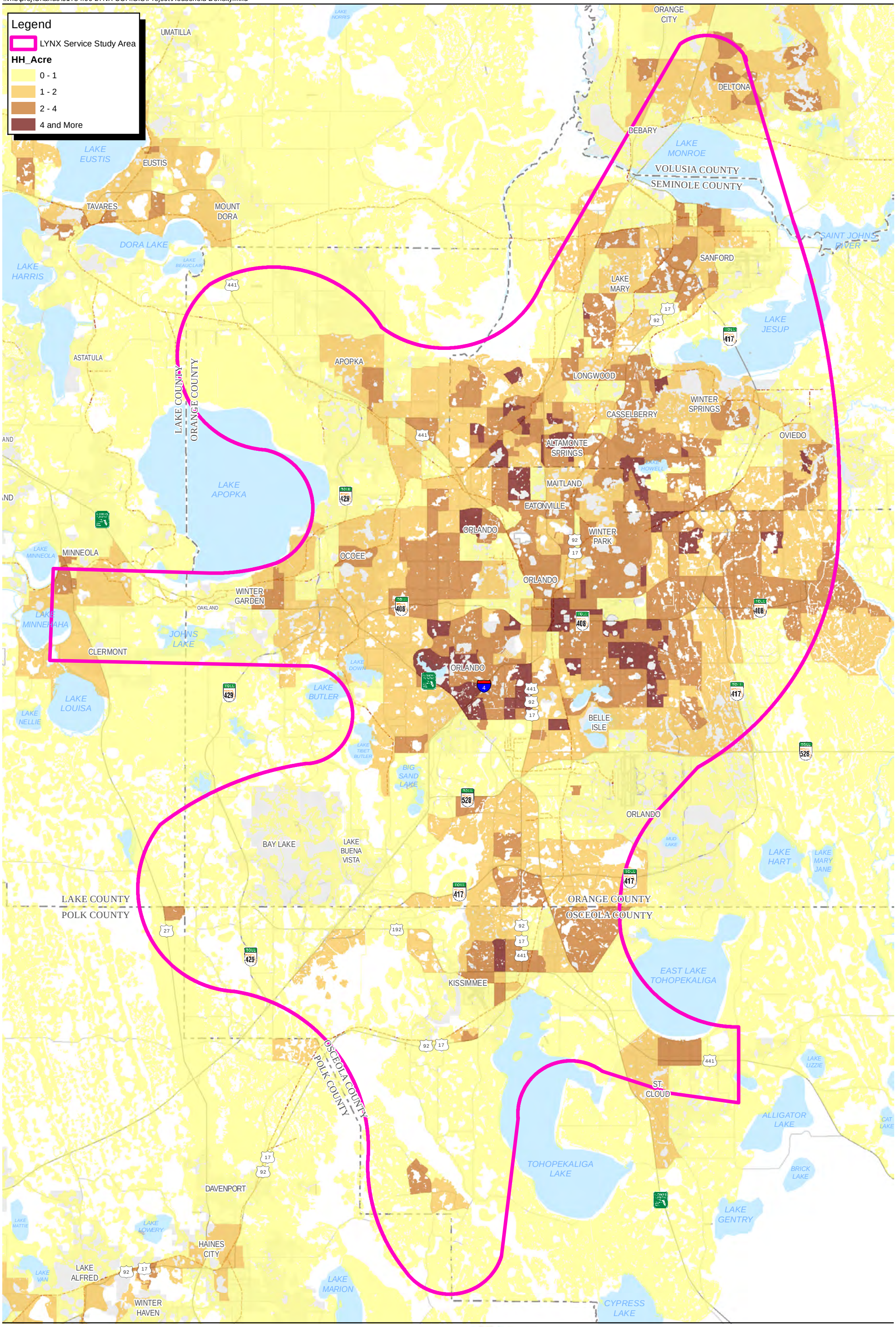
\\vhb\proj\Orlando\61784.00 LYNX COA\GIS\Project\Household Density.mxd



LYNX

Comprehensive Operations Analysis

Figure 1-12
Household Density

December 2013

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Ultimately, an individual's use of transit service will depend on personal circumstances and choices. Nonetheless, the indicators of transit dependence identify persons and households whose personal circumstances and choices correspond to an above average rate of transit use.

Four maps (Figures 1-13 through 1-16) show the spatial distribution of each population with one of the indicators of transit dependence in relation to the LYNX bus service area. Viewing these maps makes it evident that some areas with high concentrations of populations expressing one or more of the transit dependent characteristics are better served than others. Although areas identified as having service gaps should be considered for service improvements, not all of the identified areas will be candidates for service expansions or increases. But taken together, these maps can reveal common areas with high concentrations of populations that generally rely on and benefit from transit service. This analysis helps fill in part of a larger puzzle of where and how LYNX should deliver service. Only once the entire puzzle is pieced together can fully informed service decisions be made.

Persons Living in Poverty

The greatest concentration of persons in poverty can be found around Downtown Orlando. Again, the analogy of the donut is appropriate here. The areas with the highest concentrations are found in Pine Hills, south of Orlando, Azalea Park, Winter Park, Union Park, and Maitland. There are also higher concentrations in Kissimmee to the south and Sanford to the northeast. All these areas fall within the LYNX service area. Some areas are undoubtedly served with higher quality transit service than others. It is difficult to determine those areas at this level of analysis; a more detailed analysis can be performed at the individual route level. This region-wide analysis indicates that LYNX does a reasonable job covering those areas that demonstrate a higher concentration of persons in poverty.

As shown in Table 1-6, within the last ten years, the region has seen a tremendous increase in the number of people living in poverty. This has particularly been true in Seminole County, which has seen the number of such people and the percent of the total population double.

Table 1-6: Change in Persons Living in Poverty

	2010		2000	
	Population Living In Poverty	Percent of Total Population	Population Living In Poverty	Percent of Total Population
Orange County	147,225	13%	106,233	12%
Osceola County	33,839	13%	19,532	11%
Seminole County	40,758	10%	16,804	5%
Regional Total	221,822		142,569	

Source: US Census

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Legend

LYNX Service Study Area

Persons per Acre

- 0.2 or fewer
- 0.3- 0.5
- 0.6 - 0.9
- 1.0 or more

UMATILLA
ORANGE CITY
DELTONA
DEBARY
LAKE EUSTIS
EUSTIS
LAKE MONROE
VOLUSIA COUNTY
SEMINOLE COUNTY
TAVARES
MOUNT DORA
DORA LAKE
SAINT JOHNS RIVER
LAKE HARRIS
SANFORD
LAKE MARY
LAKE JESUP
ASTATULA
APOPKA
LONGWOOD
LAKE COUNTY
ORANGE COUNTY
WINTER SPRINGS
CASSELBERRY
OVIEDO
ALTAMONTE SPRINGS
LAKE APOPKA
MAITLAND
EATONVILLE
WINTER PARK
MINNEOLA
OCOEE
ORLANDO
WINTER GARDEN
OAKLAND
LAKE MINNEHAHA
JOHNS LAKE
CLERMONT
LAKE DOWN
LAKE BUTLER
LAKE LOUISA
LAKE NELLIE
BELLE ISLE
LAKE TIBET BUTLER
BIG SAND LAKE
BAY LAKE
LAKE BUENA VISTA
LAKE HART
LAKE MARY JANE
LAKE COUNTY
POLK COUNTY
ORANGE COUNTY
OSCEOLA COUNTY
KISSIMMEE
EAST LAKE TOHOPEKALIGA
OSCEOLA COUNTY
POLK COUNTY
ST. CLOUD
LAKE LIZZIE
ALLIGATOR LAKE
TOHOPEKALIGA LAKE
BRICK LAKE
LAKE GENTRY
DAVENPORT
HAINES CITY
LAKE ALFRED
LAKE MARION
WINTER HAVEN
CYPRESS LAKE

0 1 2 4 Miles

LYNX

Comprehensive Operations Analysis

Figure 1-13
Persons in Poverty

December 2013

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Persons Age 65 and Older

Persons Age 65 and Older are not concentrated in Downtown Orlando. There are some small pockets of higher concentrations scattered around Downtown Orlando, Winter Park, and Casselberry. There are also concentrations west of Kissimmee and north of Sanford. These all fall within the existing LYNX service area. The greatest concentration of persons age 65 and older can be found northwest of the service area around Eustis. This indicates that the majority of the population age 65 and older around Orlando does not rely on public transportation for their traveling needs. If they did, it would be more likely to find greater concentrations around the Downtown Orlando area.

In the last ten years, the number of people aged 65 and older has grown dramatically in all three counties, although the overall share of the total population has stayed constant. Table 1-7 and Figure 1-14 show the relevant number of people aged 65 and older within the three county region.

Table 1-7: Change in Population Age 65 and Older

	2010		2000	
	Population Age 65 and Older	Percent of Total Population	Population Age 65 and Older	Percent of Total Population
Orange County	110,919	10%	89,959	10%
Osceola County	29,656	11%	19,709	11%
Seminole County	50,677	12%	38,853	11%
Regional Total	191,252		148,521	

Source: US Census

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Legend

LYNX Service Study Area

Percent of Population Age 65 and Older

- 0-10%
- 10-20%
- 20-30%
- 30-40%
- NWI Wetlands

LAKE NORRIS
ORANGE CITY
DELTONA
DEBARY
LAKE MONROE
VOLUSIA COUNTY
SEMINOLE COUNTY
LAKE EUSTIS
EUSTIS
TAVARES
MOUNT DORA
DORA LAKE
LAKE BEAUCLAIR
LAKE HARRIS
SAINT JOHNS RIVER
SANFORD
LAKE MARY
LAKE JESUP
ASTATULA
APOPKA
LAKE COUNTY
ORANGE COUNTY
LONGWOOD
WINTER SPRINGS
CASSELBERRY
OVIEDO
ALTAMONTE SPRINGS
LAKE APOPKA
MAITLAND
LAKE HOWELL
EATONVILLE
ORLANDO
WINTER PARK
MINNEOLA
LAKE MINNEOLA
OCOEE
WINTER GARDEN
OAKLAND
LAKE MINNEHAHA
JOHNS LAKE
CLERMONT
LAKE DOWN
LAKE BUTLER
LAKE LOUISA
LAKE NELLIE
BELLE ISLE
LAKE TIBET BUTLER
BIG SAND LAKE
BAY LAKE
LAKE BUENA VISTA
MUD LAKE
LAKE HART
LAKE MARY JANE
LAKE COUNTY
POLK COUNTY
ORANGE COUNTY
OSCEOLA COUNTY
KISSIMMEE
EAST LAKE TOHOPEKALIGA
LAKE LIZZIE
ST. CLOUD
ALLIGATOR LAKE
TOHOPEKALIGA LAKE
BRICK LAKE
LAKE GENTRY
DAVENPORT
LAKE MATTIE
LAKE LOWERY
HAINES CITY
LAKE ALFRED
LAKE VAN
WINTER HAVEN
LAKE MARION
CYPRESS LAKE

0 1 2 4 Miles

LYNX

Comprehensive Operations Analysis

Figure 1-14
Age 65 and Over

December 2013

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Households with No Vehicles

Those areas with a greater concentration of households with no vehicle available are located primarily around Downtown Orlando, Azalea Park, Kissimmee, Winter Park, and Sanford. These are areas where it is less challenging to live without a vehicle due to the availability of transit that can provide that essential connection to employment and shopping. People living in a household with no vehicle tend to locate where they can travel easily by transit, walking, or biking. It is not surprising to find fewer households with no vehicle available further from the core transit network since alternative transportation alternatives are limited.

In the last ten years, the number of people with no vehicles has stayed relatively constant in Osceola and Seminole County, as is shown in Table 1-8. Orange County has actually seen an improvement in the number of households with no vehicle, with the total number falling by almost 1,000 in terms of real growth and two percent in terms of percent of the total population.

Table 1-8: Change in Households with No Vehicle

	2010		2000	
	Households With No Vehicle	Percent of Total Population	Households With No Vehicle	Percent of Total Population
Orange County	23,926	5%	24,460	7%
Osceola County	4,897	1%	3,492	1%
Seminole County	6,002	1%	6,253	2%
Regional Total	34,825		34,825	

Source: US Census

Households with One Vehicle

The areas with a high density of households with one vehicle are primarily focused around Downtown Orlando and those areas immediately surrounding. These are areas where LYNX service is greater and more frequent. Moving away from the city, the densities begin to fall. There are still some pockets of higher density found in Kissimmee, Sanford, Deltona, and Mount Dora. The only area not falling within the LYNX service area is Mount Dora.

While these households are not as dependent on transit for transportation as a household with no vehicle; those individuals living in larger person households can have travel needs that can't be met by just one vehicle. These individuals may be more likely to need a good transportation alternative to meet their travel needs, especially in areas that are suburban in nature and aren't designed for traveling by foot or bicycle.

Within the last ten years, the number of households with only one vehicle has grown in all three counties as shown in Table 1-9. The percent of the total population that has only one vehicle has also grown. This is, perhaps, reflective of the economic climate within the last ten years or even the gradual shrinking of overall household size.

Table 1-9: Change in Households with One Vehicle

	2010		2000	
	Households With One Vehicle	Percent of Total Population	Households With One Vehicle	Percent of Total Population
Orange County	153,532	31%	126,852	38%
Osceola County	31,872	7%	23,125	7%
Seminole County	52,601	11%	47,057	14%
Regional Total	238,005		197,034	

Source: US Census

Summary of the Demographic Indicators of Transit Dependence

Conducting a spatial analysis of the demographic indicators for transit dependence is one piece of the puzzle for determining where service should be expanded or improved. These indicators are associated with a greater need and demand for public transportation. A review of these indicators for the LYNX service area showed that LYNX does a pretty good job of covering those areas where higher concentrations were identified. These areas were focused around the Downtown Orlando area and following major transportation corridors. The only indicator where higher concentrations didn't fall within the LYNX service area was for persons 65 and older. This would appear to indicate that this population, which traditionally shows a greater need for transportation alternatives, does not require public transportation to travel. If this were the case, higher concentrations would have been observed in the core of LYNX's service area in and around Downtown Orlando.

In terms of the trend in transit dependence indicators, the two indicators that stand out for use in analyzing the service offered by LYNX are the number of people living below the poverty line and the number of people who are age 65 or older. Both of these indicators have grown in the last ten years, with the number of people age 65 or older growing constantly in all counties and the number of people below the poverty line growing significantly more in Seminole County than the others.

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Legend

LYNX Service Study Area

Households per Acre

- 0.2 or fewer
- 0.2 - 0.5
- 0.6 - 0.9
- 1.0 or more

UMATILLA
LAKE NORRIS
ORANGE CITY
DELTONA
DEBARY
LAKE EUSTIS
EUSTIS
LAKE MONROE
VOLUSIA COUNTY
SEMINOLE COUNTY
TAVARES
MOUNT DORA
DORA LAKE
LAKE BEAUCLAIR
SAINT JOHNS RIVER
LAKE HARRIS
SANFORD
LAKE MARY
LAKE JESUP
ASTATULA
APOPKA
LONGWOOD
WINTER SPRINGS
CASSELBERRY
OVIEDO
LAKE COUNTY
ORANGE COUNTY
ALTAMONTE SPRINGS
LAKE HOWELL
LAKE APOPKA
MAITLAND
EATONVILLE
ORLANDO
WINTER PARK
MINNEOLA
LAKE MINNEOLA
OCOEE
WINTER GARDEN
OAKLAND
LAKE MINNEHAHA
JOHNS LAKE
CLERMONT
LAKE DOWN
LAKE BUTLER
LAKE LOUISA
LAKE NELLIE
BELLE ISLE
LAKE TIBET BUTLER
BIG SAND LAKE
BAY LAKE
LAKE BUENA VISTA
MUD LAKE
LAKE HART
LAKE MARY JANE
POLK COUNTY
OSCEOLA COUNTY
KISSIMMEE
EAST LAKE TOHOPEKALIGA
ST. CLOUD
LAKE LIZZIE
ALLIGATOR LAKE
CAT LAKE
TOHOPEKALIGA LAKE
BRICK LAKE
LAKE GENTRY
DAVENPORT
LAKE MATTIE
LAKE LOWERY
HAINES CITY
LAKE ALFRED
LAKE VAN
WINTER HAVEN
LAKE MARION
CYPRESS LAKE

0 1 2 4 Miles

LYNX

Comprehensive Operations Analysis

Figure 1-15
Households with No Vehicle Available

December 2013

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Legend

LYNX Service Study Area

Households per Acre

- 0.2 or fewer
- 0.3 - 0.5
- 0.6 - 0.9
- 1.0 or more

UMATILLA
LAKE NORRIS
ORANGE CITY
DELTONA
DEBARY
LAKE MONROE
VOLUSIA COUNTY
SEMINOLE COUNTY
LAKE EUSTIS
EUSTIS
TAVARES
MOUNT DORA
DORA LAKE
LAKE BEAUCLAIR
LAKE HARRIS
SAINT JOHNS RIVER
SANFORD
LAKE MARY
LAKE JESUP
ASTATULA
LAKE COUNTY
ORANGE COUNTY
APOPKA
LONGWOOD
WINTER SPRINGS
CASSELBERRY
OVIEDO
ALTAMONTE SPRINGS
LAKE HOWELL
MAITLAND
LAKE APOPKA
EATONVILLE
ORLANDO
WINTER PARK
MINNEOLA
LAKE MINNEOLA
OCOEE
WINTER GARDEN
OAKLAND
LAKE MINNEHAHA
JOHNS LAKE
CLERMONT
LAKE DOWN
LAKE BUTLER
LAKE LOUISA
LAKE NELLIE
LAKE TIBET BUTLER
BIG SAND LAKE
BELLE ISLE
BAY LAKE
LAKE BUENA VISTA
MUD LAKE
LAKE HART
LAKE MARY JANE
LAKE COUNTY
POLK COUNTY
ORANGE COUNTY
OSCEOLA COUNTY
KISSIMMEE
EAST LAKE TOHOPEKALIGA
OSCEOLA COUNTY
POLK COUNTY
ST. CLOUD
LAKE LIZZIE
ALLIGATOR LAKE
CAT LAKE
TOHOPEKALIGA LAKE
BRICK LAKE
LAKE GENTRY
DAVENPORT
HAINES CITY
LAKE MATTIE
LAKE LOWERY
LAKE ALFRED
LAKE VAN
WINTER HAVEN
LAKE MARION
CYPRESS LAKE

0 1 2 4 Miles

LYNX

Comprehensive Operations Analysis

Figure 1-16
Households with One Vehicle

December 2013

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1.6 Future Infrastructure

As the region continues to grow, new infrastructure and transit service that has been planned will be constructed and become operational. As the region's transit provider, LYNX will develop or modify service to support connectivity with this future infrastructure.

SunRail

The region's first commuter rail service, SunRail, is currently under construction and will be operated by the Florida Department of Transportation (FDOT) for the first seven years. This project's first phase from Sand Lake Road in Orange County to DeBary in Volusia County will open in 2014 and will include stations at DeBary, Sanford, Lake Mary, Longwood, Altamonte Springs, Maitland, Winter Park, Florida Hospital Health Village, Lynx Central Station, Church Street, Orlando Amtrak Station and Sand Lake Road. SunRail will pay for the incremental operational costs of extending existing LYNX routes to SunRail stations, as well as for 16 additional buses. The SunRail Phase I ridership is projected (2013) to be 4,300 trips and by 2030, with the completion of Phase II, the system is expected to carry 7,400 passengers per day. The second phase will include stations at Meadow Woods, Osceola Parkway, Kissimmee Amtrak, and Poinciana in the south and DeLand in the north.

Kissimmee Intermodal Facility (KIF)

The Kissimmee Intermodal Facility (KIF), located on Broadway at the Amtrak Station, will provide intermodal connectivity to SunRail, Amtrak, and long distance bus service. LYNX, in partnership with Osceola County, is in the process of transitioning the major Osceola County transfer location from Osceola Square Mall to the Kissimmee Intermodal Facility (KIF).

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2

Service Guidelines

2.1 Introduction

As part of this Comprehensive Operations Analysis project, potential service guidelines that will be used to evaluate and measure the service LYNX provides have been developed. Unless otherwise mentioned, these guidelines apply to the fixed route service only and are not applicable to other service types. Service Guidelines are used throughout the transit industry as a way to measure the performance of transit service and also help to create a guide/framework for the creation of new services or modification of existing services. Service Guidelines balance the competing goals a transit agency has of maximizing potential ridership, providing transportation services to those without the ability to drive or who don't own a vehicle and minimizing overall operating costs.

Service Guidelines are a particularly timely topic as the passage of Moving Ahead for Progress in the 21st Century (MAP-21) includes a requirement for performance based evaluation of transportation programs as part of the overall funding mechanism. While the FTA has yet to issue guidance implementing this portion of the law, creating a sound foundation of adopted service planning guidelines will place LYNX in a good position to comply with this requirement.

To create these recommended Service Guidelines, the following reports on the use of service guidelines at transit properties throughout the country were reviewed:

- TCRP Synthesis 10, "Bus Route Evaluation Standards, A Synthesis of Transit Practice," a summary of the service standards for over 60 agencies.
- "Best Practices in Transit Service Planning" prepared for the Florida Department of Transportation Research Center
- "Transit Development Plans," prepared by LYNX
- "Central Florida Mobility Manual," prepared by LYNX
- "Vision 2030," prepared by LYNX
- Information currently available on the implementation of performance standards through the MAP-21 law

These reports formed the basis for the development of these service guidelines. These reports covered numerous properties throughout the country, including some of those which LYNX

considers to be in the top ten of their peers.[4] In addition, the following Comprehensive Operations/Benchmarking Analyses and Service Standards were also reviewed for background information:

- "Greater Richmond Transit Company (GRTC) Comprehensive Operations Analysis"
- "Southeastern Regional Transit Authority (SRTA) Benchmarking Analysis"
- "New York City Transit Service Procedures"
- "New York City Transit Service Guidelines"
- New Jersey Transit Service Guidelines, May 27, 2010

LYNX already records and tracks a wide variety of operating statistics in its Transit Development Plans (TDP). These statistics are gathered in compliance with Florida regulations regarding reporting and transit funding, and are shown in Table 2-1. LYNX is currently in conformance with these regulations. Some of these statistics form a suitable basis for the proposed performance metrics.

[4] *LYNX Transit Development Plan 2013-2022,* Page 48

Table 2-1: LYNX Transit Development Plan (TDP) Operating Statistics Reported

TDP Performance Measure
Service
Service Area Size
Service Area Population
Service Area Density
Vehicle Miles
Passenger Trips
Passenger Miles
Revenue Miles
Revenue Hours
Vehicle
Vehicles Available in Maximum Service
Vehicles Operated in Maximum Service
Revenue Hours per Vehicle in Max. Service
Labor
Revenue Hours per Employee FTE
Passenger Trips per Employee FTE
Effectiveness
Passenger Trips per Capita
Passenger Trips per Revenue Hour
Passenger Trips per Revenue Mile
Passenger Trips per Vehicles in Max. Service
Revenue Hours per Capita
Revenue Miles per Capita
Revenue Miles per Vehicles in Max. Service
Vehicle Hours / Revenue Hours
Admin. Hours / Revenue Hours
Maintenance Hours / Revenue Hours
Expenses and Revenue
Operating Expenses
Maintenance Expenses
Fare Box Recovery Rate
Efficiency
Operating Expenses per Passenger Trip
Operating Expenses per Revenue Mile
Operating Expenses per Revenue Hour

The service guidelines that have been developed have been divided into the following four categories:

- **Route Design Guidelines;**
- **Schedule Design Guidelines;**
- **Economic and Productivity Guidelines;**
- **Service Delivery Guidelines**

These service guidelines are designed to assist in the identification of operational issues which could be remedied through standard service planning tools. They are intended act like a "yearly checkup" for LYNX; bringing to light issues that have the potential to become impactful to the successful delivery of transit services if not remedied in a timely fashion. As part of LYNX's annual TDP process, these statistics could be reviewed to provide a foundation for the overall service planning process. They are not designed to identify or target potential defects or maintenance issues, or other non-service planning related issues.

While the service guidelines presented in this document were used to evaluate route and system performance as part of the COA (Chapter 3), it is highly desirable to have them formally adopted by LYNX. The public involvement process of the COA has included a public review of these guidelines before the evaluation of routes was performed provided a foundation for the consideration of changes upon which the public will have the opportunity to comment should they be implemented. In this way the process whereby changes have been identified and evaluated will be open to public review and may be understood as part of the process to improve LYNX.

The service guidelines can be divided into two categories: fixed and rolling. Fixed service guidelines have a definitive pass/fail metric. Routes that fail can be improved and it is possible for LYNX to meet this guideline for 100 percent of its routes, provided sufficient funding is available. The following Service Guidelines are "fixed" service guidelines:

1) Route Design Guidelines
    a. Network Spacing in Residential/Commercial areas
    b. Bus Stop Spacing guidelines
    c. Guideline for serving a park-and-ride directly
    d. Overall directness of route
    e. BRT Design
2) Schedule Design Guidelines
    a. Frequency of service
    b. Policy Headway
    c. Enhancing headway on routes with "plug buses"
    d. Span of service
    e. Wait time for transferring between services
3) Service Delivery Guidelines
    a. Route Investigation based on Average speed
    b. Route Investigation based on Trips Operated and Trips Completed
    c. Amenities at bus stops

Rolling guidelines rank each route in the system relative to each other. Routes that fail (fall into the lowest quartile, for instance) can be improved, but there will always be routes that fail this guideline because some routes will always fall below the established pass/fail threshold. The purpose of these guidelines is to provide LYNX with a continuous framework for system improvement. The following Service Guidelines are "rolling" service guidelines.

1) Economic and Productivity Guidelines
    a. Route Investigation based on Farebox recovery
    b. Route Investigation based on Passengers per vehicle hour and vehicle mile
    c. Route Investigation based on Ratio of non-revenue to revenue miles

2) Service Delivery Guidelines
   a. Route Investigation based on On-time performance
   b. Route Investigation based on Passenger complaints

The service guidelines are not ranked, and one guideline is no more important than the other. They have been designed to balance the competing needs of the LYNX system, which seeks to optimize network coverage, financial efficiency and customer mobility. In fact, some guidelines may be in conflict with others in certain situations. That is why an **overall assessment** of route performance should be conducted and the trade-offs of the performance discussed. For instance, making a route more financially efficient by eliminating underperforming bus stops might mean that the route can no longer meet the bus stop spacing metric. In this example, the trade-off between cost and service is being highlighted. Decision-makers will therefore have all of the information to make an informed decision about route modification.

Each of the service guidelines are described in more detail, by category, below.

2.2 Route Design Guidelines

Route design guidelines are used to determine where bus routes should operate and how frequently they should stop. This includes network coverage, stop spacing, park and ride locations and the directness of routes.

Fixed Route Network Spacing

Network coverage guidelines are used to identify the balance between coverage and frequency of service every transit system seeks. Because funding is always limited there is a trade-off required between coverage (route miles) and frequency of service. The trade-off for users is the average distance walked to a stop versus the length of time between buses. A dense route structure with infrequent service can be poorer quality service than a more moderate density of routes with more frequent service. Concentrating bus service in select corridors may mean more people have to walk slightly further, but they have more frequent service upon arrival at their stop.

Given the cost infeasibility of providing both a highly dense route structure with frequent service, a minimum target density of routes is needed. The following network coverage guidelines detail the average spacing between routes in residential areas as well as which major commercial/industrial and institutional traffic generators (shopping malls, schools, and hospitals) should be served by direct service.

Residential/Household Areas

Network coverage guidelines need to vary based on population density and auto ownership. Serving a rural area with the same level of service as a densely developed portion of the city would be inefficient. Additionally in some locations, population density or automobile ownership would be more suited to serving the area with LYNX's demand response "NeighborLink" service because the demand for transit service would be low. LYNX should provide bus service at the following route spacing based on vehicle ownership and household density shown on Table 2-2. The lack of a full roadway grid system throughout the LYNX system area means that the streets

of operation are important and should be taken into account when factoring in route spacing. Every attempt should be made to consider the street network/roadway type in examining route spacing needs. If multiple roadways are available, bus service should be operated on the road most suitable (i.e. an arterial road versus an unpaved rural road or a road with pedestrian amenities versus one without).

Table 2-2: Network Spacing in Residential Areas

	Population Density (Households per Acre)			
Percent of Households without Autos	Over 10 (Urban)	7 to 10 (High Density Suburban)	4 to 6.9 (Low Density Suburban)	Under 4 (Rural)
Over 15.0	1,300 feet (1/4 mile)	1,300 feet (1/4 mile)	1,300 feet (1/4 mile)	2,600 feet (1/2 mile)
10.0 to 15.0	1,300 feet (1/4 mile)	1,300 feet (1/4 mile)	2,600 feet (1/2 mile)	5,280 feet (1 mile)
5.0 to 9.9	1,300 feet (1/4 mile)	2,600 feet (1/2 mile)	5,280 feet (1 mile)	*
Below 5.0	2,600 feet (1/2 mile)	5,280 feet (1 mile)	*	*

* These areas should be served using NeighborLink services

Commercial/Other Uses

Commercial and other uses (such as universities and hospitals) should be served by transit if they are large enough to attract an adequate number of transit trips to justify service. To assist in this determination, "threshold levels" have been established for different categories of activity centers. These threshold levels, which are based on past experience and judgment, will serve as guidelines in determining which centers in each category should be given consideration for service (primarily extensions of existing routes). In general, developments of this size could be expected to be able to support transit service with a 30-minute headway or better. Other factors, such as proximity of the center to existing bus routes and other site specific conditions should be considered before providing new service to a major activity center.

- **Businesses:** Employers with 350 or more employees are large enough to warrant consideration for service. This guideline applies to either individual employers or groups of employers in a concentrated area (e.g., industrial or office park).
- **Shopping Centers:** Shopping trips constitute a major reason for transit travel. Shopping centers (including malls and major plazas) with more than 100,000 square feet of leased retail space are large enough to warrant consideration for bus service.
- **Hospitals/Nursing Homes:** These usually do not attract a large number of trips. However, they often serve those who depend on transit. Therefore, institutions of 100 beds or more may be considered candidates for service.
- **Colleges/Universities:** Students often comprise a major segment of the transportation dependent population in a community. Colleges and other post-secondary schools with residential populations and with an enrollment of at least 1,000 full-time students warrant consideration for service. Commuter schools should be considered where it can be shown through the use of surveys or other instruments that there would be sufficient demand for expanded service.
- **Social Service/Government Centers:** Public agencies, government centers and community facilities attract some volume of traffic. Since the nature and size of these facilities varies greatly, no numerical threshold will be set. Judgment as well

as trip purpose and characteristics of the users (e.g., elderly and low income citizens) should be considered in deciding whether to serve such a facility.

Bus Stop Spacing

Bus stop spacing guidelines seek to balance the need for accessibility with the need for a high-speed, reliable service. Operating bus service that stops every block to pick up and discharge passengers limits the amount of walking required to access a bus stop, but stopping a bus at every single block degrades the overall speed of the bus.

Table 2-3: Bus Stop Spacing Guidelines

	Population Density (Households per Acre)		
	Over 10 (Urban)	4 to 9.9 (Suburban)	Under 4 (Rural)
Stops per Mile	4 per mile	2 per mile	1 or less (or as needed)

Bus stop placement should be consistent with the guidelines shown in Table 2-3 which are developed based off industry standards. FastLink service should have an average of one bus stop per mile when the route overlays with local service. Any community originated request to move or eliminate a bus stop must have support from all parties affected by the move before being considered by LYNX. In areas served by bus service with a high number of gated communities, the additional walk access required by residents of this community should be considered in this evaluation and every attempt should be made to locate bus stops near gated community entrances. In areas with mobility impaired populations (senior centers, hospitals, etc.), every attempt should be made to locate bus stops in a location that would minimize walking for these customers.

Park and Ride Service

Park and Rides should be in convenient locations where commuters can safely park their vehicle and continue their trip via public transit. Park-and-ride facilities should be provided at appropriate stops on rapid and express services to serve transit users from medium and low density residential areas. Facilities which attract 150 passengers per day for a service should be served with direct service. The potential to attract passengers can be estimated using the number of spaces at each park and ride. Direct service to a park and ride should be considered in concert with the "Overall Directness of Route" so as to not degrade existing route travel time.

Overall Directness of Route

Bus routes should generally allow passengers to travel to their destination via the shortest route possible. The straighter the route, the more likely it is that passengers can understand its destination and can expect consistent and reliable service. The simplest method of calculating route directness uses route length and straight "air line" distance between the routes two terminal points. Diversions should only be allowed if they do not significantly impact the overall travel time of existing passengers (less than 10-15% of the overall route length).

Bus Rapid Transit Design Guidelines

Bus Rapid Transit (BRT) routes should be designed consistent with the Federal Transit Administration's guidelines on the development of BRT routes. These guidelines include the following elements:

- Defined stations;
- Traffic signal priority for public transportation vehicles;
- Short headway bidirectional services for a substantial part of weekday and weekend days[5]

2.3 Schedule Design Guidelines

Schedule design guidelines describe minimum and maximum headways, spans of service and days of operation.

Frequency of Service

In general, frequencies, or "headways' (i.e. the time between buses at the same location) are established to provide enough vehicles past the maximum load point(s) on a route to accommodate the passenger volumes and stay within recommended vehicle loading guidelines. If passenger loads are so light that an excessive time is needed between vehicles to meet loading guidelines, a "policy headway" (described below) should be set to provide a minimum level of service.

The Transit Capacity and Quality of Service Manual (TCRP Report 100) includes level-of-service criteria as related to overall passenger comfort as shown in Table 2-4.

Table 2-4: Load Factor and Passenger Comfort

LOS	Load Factor	Comments
A	0.00-0.50	No passengers need to sit next to each other
B	0.51-0.75	Passengers can choose where to sit
C	0.76-1.00	All passengers can sit
D	1.01-1.25	Comfortable standee load for design
E	1.26-1.50	Maximum schedule load
F	>1.5	Crush load

Source: TCRP Report 100 - Transit Capacity and Quality of Service Manual

5 **Title 49, Section 5302(a)(2) Bus Rapid Transit System**

Unless loads are so light that bus service would fall below the policy headways listed in the next section, LYNX should schedule all local service to a LOS of C (.76-1.00 passengers/seat) or better in the off-peak periods and to a LOS of D (1.01 -1.25) or better during the peak periods. Routes which are experiencing capacity issues for a single trip should be candidates for articulated service. Xpress Link Bus service should be scheduled to no less than LOS of C at all times, as having standees on an express bus can be uncomfortable given the length of the trip.

FastLink service should be scheduled based on the overall load on the bus or by using the combined load between the underlying local and FastLink service.

NeighborLink service should be scheduled at a minimum headway of one hour.

Bus service should be scheduled for the peak hour (highest hourly ridership) in the AM, Midday and PM peak periods.

Policy Headways

LYNX should adopt three types of policy headways:

- **Policy headways for all local routes.** If passenger loads are so light that an excessive time is needed between vehicles to meet loading guidelines, then headways should be set on the basis of policy considerations, even if it results in an LOS lower than the frequency of service guideline.
  For local service, the policy headway should be 30 minutes.

- **Policy headways for Bus Rapid Transit Services**. The Federal Transit Administration definition of Bus Rapid Transit (BRT) includes a specific criterion that the service must have short, bi-directional headways. BRT service should be operated at a minimum headway of every 15 minutes.

- **LYNX Policy headways for FastLink Services.** LYNX should schedule FastLink service at a minimum headway of 15 minutes to start (see above), with a short span of service. If a local route is operating at 7.5 minutes or better, LYNX should consider converting the route to FastLink with one bus operating local and the other operating as a FastLink.

Enhanced Headway on Routes with "Plug Buses" (Supplemental Service)

Routes which are consistently crowded often require supplemental bus service using so called "plug buses." Plugging service is inefficient and prevents the customer from benefiting from more frequent service. It also increases costs for LYNX and prevents them from reliably planning and operating service. Routes which require plugging more than twice in one week, or more than three times in one month due to overcrowding should be examined for increased headways.

Span of Service

Span of Service is the hours that a bus route operates each day. On weekdays, LYNX's existing service is predominately between 6:00 AM and 10:00 PM (with multiple routes that exceed this base span). At a minimum, routes should operate during these hours on weekdays. When loads on the last or first trip are high (LOS C nearing LOS D), expanding the overall span of service should be explored. There is no guideline for a span of service on weekends.

Wait Time for Transfers

The time spent waiting for a connecting bus is important to customers, and should be minimized wherever possible. LYNX should schedule service so that connecting buses are available within ½ the headway of the connecting route.

2.4 Economic and Productivity Guidelines

Economic and productivity guidelines describe the overall cost to operate the route relative to various other metrics (including number of passengers and distance travelled). Economic guidelines include farebox recovery and cost per rider, and productivity guidelines include passengers per vehicle hour and per vehicle mile. Routes should be examined based on productivity guidelines and those which fail to meet such guidelines should be evaluated for potential improvements. Potential improvements could include truncating low performing route sections or extensions to nearby major traffic generators. In general, this route by route evaluation should occur annually with each TDP update.

Route Investigation based on Farebox Recovery

Farebox recovery is the amount of the cost per trip that is covered by the fare paid by the passenger. This statistic should be calculated on a route level, for all routes of a specific type (i.e. fixed-route Links, FastLink and Xpress Link Routes), and for the system as a whole. Individual routes that are in the lowest quartile of farebox recovery for their route type should be examined for improvements that might increase ridership or lower costs.

Route Investigation based on Passengers per Vehicle Hour and Passengers per Vehicle Mile

Passengers per Vehicle Hour and Passengers per Vehicle Mile are useful metrics which can be helpful in identifying causes of low Farebox Recovery ratios. Passengers per vehicle hour measures the amount of passengers carried per hour that a bus is in service, while passengers per vehicle mile measures the amount of passengers carried per mile the bus is being operated. A low number of passengers per vehicle hour could mean that the route is being poorly utilized. Individual routes that are in the lowest quartile for either metric should be examined for potential operating improvements.

Route Investigation based on Ratio of Non-Revenue to Revenue Miles

The ratio of revenue to non-revenue mileage is an important statistic that measures how efficiently the route is scheduled. Non-revenue mileage from the operating base to the start of the route is not productive as the transit agency is spending money on fuel and salaries while not carrying passengers. A high ratio of non-revenue to revenue mileage would indicate that the route has to travel a significant amount of non-revenue miles. Individual routes that are in the lowest quartile for this metric should be examined for potential operating improvements (including interlining and utilizing satellite operating centers).

2.5 Service Delivery Guidelines

Service delivery guidelines describe the operations of the routes, including travel time and on-time performance. These guidelines affect a customer's day-to-day impression of the system and are very important in projecting an efficient, comfortable system. Similar to the Economic and Productivity Guidelines, this route by route evaluation should occur annually with each TDP update.

Guideline for Route Investigation based on On-Time Performance

The passenger's experience with bus service depends highly on on-time performance. Using LYNX's APC and AVL data, the on-time performance for each stop should be calculated. Instances where buses arrive earlier than the scheduled time or over five minutes later than the scheduled time should be investigated further to determine the cause of delay and potential improvements. Routes which are in the bottom ten percent for this metric should be examined further for potential improvements.

Route Investigation based on Average Speed

The running speed of a bus, which excludes layover, is the most meaningful measure of speed for passengers. This metric has been developed with differing guidelines depending on the operating environment of the route. According to LYNX, the average system speed was 15 MPH. Routes which operate at less than twice the average travel speed on a particular segment for a single occupancy vehicle (as reported by MetroPlan) should be investigated for potential improvement.

Route Investigation based on Trips Operated and Trips Completed

The number of trips operated is an important statistic that helps assure that service is operated consistently from day-to-day. If bus operators or vehicles are not available, gaps in service may occur as scheduled trips are not operated. This in turn could result in a decrease in overall ridership. Any route in which missed trips are 20% greater than the system average should be investigated.

Similar to Trips Operated, the mean distance between failures is an important metric to ensure consistency of operation. If trips are not completed due to maintenance failures, passengers will be adversely affected. During any month where the mean distance between failures (MDBF) for both major and minor incidents is above 19,000 miles, maintenance staff should work to identify the cause of the failures and if it is a systematic problem identify a potential solution.

Route Investigation based on Passenger Complaints

Passenger input on bus operations is essential to LYNX's everyday operations. LYNX will gather and calculate the number of route-specific complaints and use them as a tool to determine whether or not there are potential improvements that are not apparent from the above metrics. Routes in the top twenty five percent for overall complaints should be examined for specific operational issues.

Guideline (Passenger) Amenities at Bus Stops

LYNX currently has shelters at almost one-quarter of its overall stops.[6] LYNX is in the process of evaluating passenger amenities at bus stops and should use that information to adopt a formal guideline for passenger amenities at bus stops. These could include (but are not limited to):

- Shelters
- Benches
- Garbage Cans
- Bicycle Racks

A bus stop with 25 average daily boardings should be considered for a shelter and bench for passenger comfort. Stops with 15 average daily boardings should be considered for a bench. This metric is based on professional experience and based off other agencies guidelines.

2.6 Summary of LYNX Service Guidelines

The Service Guidelines developed for the LYNX system are summarized in Table 2-5.

[6] http://www.golynx.com/about-lynx/what-we-are-working-on/bus-shelter.stml

Table 2-5: Summary of LYNX Service Guidelines

<table>
<tr><th></th><th>Guideline</th><th>Metric</th></tr>
<tr><td rowspan="7">Route Design Guidelines</td><td>Fixed Route Network Spacing In Residential Areas</td><td>• Routes should be spaced between ¼ and 1 mile apart, based on population density and percent of households without automobiles
• When planning for service, every attempt should be made to locate routes on roads that are appropriate for reliable operations. These include roads with TSP and/or synchronized signal progression based on posted speed limits.
<table>
<tr><th>Percent of Households without Autos</th><th>Over 10 (Urban)</th><th>7 to 10 (High Density Suburban)</th><th>4 to 6.9 (Low Density Suburban)</th><th>Under 4 (Rural)</th></tr>
<tr><td>Over 15.0</td><td>1,300 Feet (1/4 Mile)</td><td>1,300 Feet (1/4 Mile)</td><td>1,300 Feet (1/4 Mile)</td><td>2,600 Feet (1/2 Mile)</td></tr>
<tr><td>10.0 to 15.0</td><td>1,300 Feet (1/4 Mile)</td><td>1,300 Feet (1/4 Mile)</td><td>2,600 Feet (1/2 Mile)</td><td>5,280 Feet (1 Mile)</td></tr>
<tr><td>5.0 to 9.9</td><td>1,300 Feet (1/4 Mile)</td><td>2,600 Feet (1/2 Mile)</td><td>5,280 Feet (1 Mile)</td><td>*</td></tr>
<tr><td>Below 5.0</td><td>2,600 Feet (1/2 Mile)</td><td>5,280 Feet (1 Mile)</td><td>*</td><td>*</td></tr>
<tr><td colspan="5">* These areas should be served with NeighborLink</td></tr>
</table>
• When planning for service, every attempt should be made to locate routes on roads with appropriate amenities (sidewalks/crosswalks/ pedestrian signals).</td></tr>
<tr><td>Fixed Route Network Spacing In Commercial and Other Areas</td><td>Criteria for extending or adding transit service to major commercial and institutional uses based on overall square footage and/or number of employees.</td></tr>
<tr><td>Bus Stop Spacing Guidelines</td><td>• There should be an average of 4 bus stops per mile when population density is over 10 households per acre.
• There should be an average of 2 bus stops per mile when population density is from 4 to 9.9 households per acre.
• There should be an average of 1 bus stop (as needed) per mile when population density is 4 households per acre.
• FastLink service should have an average of 1 bus stop per mile where the route overlays with local service.</td></tr>
<tr><td>Guideline for Serving a Park and Ride Directly</td><td>• Direct service should be provided to park and rides that attract over 150 daily passengers (weekday).
• Park-and-ride facilities should be provided at appropriate stops on rapid and express services to serve transit users from Low and High density residential areas.</td></tr>
<tr><td>Overall Directness of Route Guideline</td><td>Fixed Route diversions should be allowed only when they are less than 10-15 percent of the overall route length.</td></tr>
<tr><td>Bus Rapid Transit Design Guideline</td><td>Bus Rapid Transit (BRT) routes should be designed consistent with the Federal Transit Administration’s guidelines on the development of BRT routes. These guidelines include defined stations, traffic signal priority for public transportation vehicles, short headway bidirectional services for a substantial part of weekday and weekend days.</td></tr>
</table>

Table 2-5: Summary of LYNX Service Guidelines

	Guideline	Metric
Schedule Design Guidelines	Frequency of Service	• Bus service should be scheduled to allow for loading on the vehicle with no standees during the off-peak and to allow for 1.25 passengers per seat during the peak hour. • Routes which are experiencing capacity issues for a single trip should be candidates for articulated buses rather than increased frequency. • NeighborLink service should operate at a minimum headway of one hour. • XpressLink bus service should be scheduled to allow for no standees at all times. • FastLink service should be scheduled based on the demand of a FastLink route or the combined FastLink and local bus service demand.
	Policy Headway Guideline	• Local Service should be scheduled at a policy headway of 30 minutes or better. • BRT service should be scheduled at a policy headway of 15 minutes or better. • FastLink service should be scheduled at a policy headway of 15 minutes or better.
	Guideline for enhancing headway on routes with "Plug Buses"	If plug buses are used more than twice in one week or more than three times in one month to address crowding, a route should be examined for enhanced headways.
Schedule Design Guidelines	Guideline for Span of Service	• Base hours of service should be between 6:00 AM and 10:00 PM on weekdays. • Expansion of the span of service should occur when ridership is such that it begins to exceed the off-peak service guideline in the first or last hours of service.
	Guideline wait time for transferring between services	Routes should be scheduled so that the wait time for transferring passengers is no more than ½ the headway of the connecting service.
Economic and Productivity Guidelines	Guideline for Route Investigation based on Farebox Recovery	Routes that are in the lowest quartile (25%) of farebox recovery for their route type should be examined for improvements that might increase ridership or lower costs.
	Guideline for Route Investigation based on Passengers per Vehicle Hour and Vehicle Mile	Routes that are in the lowest quartile (25%) for all routes ranked by passengers per vehicle hour and/or passengers per vehicle mile should be examined for potential operating improvements.
	Guideline for Route Investigation based on Ratio of Non-Revenue to Revenue Miles	Routes that are in the lowest quartile for all routes as ranked by the ratio of non-revenue to revenue miles should be examined for potential operating improvements including interlining and utilizing satellite operating centers to reduce non-revenue miles.

Table 2-5: Summary of LYNX Service Guidelines

	Guideline	Metric
Service Delivery Guidelines	Guideline for Route Investigation based on On-Time Performance	Routes which are in the bottom ten percent for this metric (buses arriving earlier than scheduled or over five minutes after schedule) should be examined further for potential improvements.
	Guideline for Route Investigation based on Average Speed	Routes with runtime more than twice the runtime for a single occupancy vehicle should be examined for potential speed improvements.
	Guideline for Route Investigation based on Trips Operated and Trips Completed	• Any route that has a missed trip average 20 percent or greater than the system average should be investigated for potential improvements. • Maintenance staff should be alerted during any month where the mean distance between failures is below 19,000 miles to identify potential causes of breakdowns.
	Guideline for Route Investigation based on Passenger Complaints	Routes that are in the top quartile (25%) for all routes ranked by number of passenger complaints should be examined for potential operating improvements.
	Guideline for Amenities at Bus Stops	• Bus stops with 25 average daily boardings should be prioritized for shelters and benches. • Bus stops with 15 average daily boardings should be prioritized benches. • Facilities should follow applicable codes of governing jurisdictions. • Co-location of non-LYNX facilities should be avoided unless expressly requested by governing jurisdiction or partner.

- The purpose of the service guidelines is to provide LYNX with a framework for continuous improvement. They are not ranked, and one guideline is not more important than any other. They have been designed to balance the competing needs of the LYNX system, which seeks to optimize network coverage, financial efficiency and customer mobility. These guidelines provide LYNX staff and the community targets which to work toward over time.
- The guidelines may be modified from time to time at the discretion of the LYNX Board of Directors.
- These guidelines will be used by the transit agency to conduct an annual overall performance assessment of existing routes and anticipated performance of proposed routes. LYNX staff will work in collaboration with regional partners to prioritize implementation of recommended changes or improvements based on available financial resources.
- Guidelines apply to fixed route service only.
- The service guidelines can be divided into two categories: fixed and rolling. Fixed service guidelines have a definite pass/fail metric. Routes that fail can be improved, however improvements are subject to funding availability and consideration of other system needs. Rolling guidelines rank each route relative to each other. There will always be routes at the bottom of the list.
- LYNX staff and regional partners must use professional judgment how best to invest limited resources to work toward the goals outlined in the service guidelines.
- The 30 minute policy headway is a guideline for new routes only, and will be applied to existing routes as resources are available.

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3

Data Analysis and System-wide Performance Assessment

3.1 Introduction

This chapter documents the data analyzed for the LYNX system routes. The efforts described in this chapter build off of the Service Guidelines described in Chapter 2.

The System Evaluation is divided into the following sections:

- Portfolio Analysis
  - Ridership Contribution
  - Revenue Hour Contribution
  - Combination of Revenue Recovery and Deficit Contribution
- Route and System Design
  - Route Spacing
  - Bus Stop Spacing
  - Park and Ride Service
  - Overall Directness of Route
- Economic and Productivity Guidelines
  - Route Ridership
  - Ridership Trends
  - Passengers per Mile
  - Passengers per Hour
  - Farebox Recovery
  - Non-Revenue to Revenue Mileage
- Operational Performance and Service Delivery
  - On-Time Performance
  - Operating Speed
  - Operating Speed vs. Scheduled Speed
  - Bus Stop Amenities

The goal of this exercise was to identify routes which are potential candidates for service changes. These changes are identified in Chapter 4. Using numerical data that ranks routes based on overall performance, the bottom and top quartile of routes were identified and are denoted

in the tables using red shading (for the poor performing quartile) and green shading (for the best performing quartile).

In most analyses, routes are divided into two categories, local routes (including all Links, FastLinks and other circulator type service), and those that operated non-stop for a portion of the route via a limited access highway (including XpressLinks and Limited Direct routes). This distinction is important as non-stop routes generally have different operating characteristics from local routes due to their high percentage of non-revenue travel and limited span of operation.

3.2 Data Collected

In Section 1.2 of this report, a list of data sources is provided. Those sources provided the data that was used to evaluate the LYNX system according to the Service Guidelines defined in Chapter 2.

Data Challenges

The analysis of the collected data identified a few inconsistencies and issues. These data issues are typical for transit properties which have recently implemented advanced data collection systems such as Automated Passenger Counters (APC) and Automated Vehicle Location (AVL).

AVL Data Issues

AVL Data was used to calculate on-time performance and trip running time.

The on-time performance data that was provided had accuracy issues that could be indicators of other larger issues in overall AVL data. Routes were shown arriving at stops 30 minutes in advance of the scheduled arrival and then arriving at the next stop on time. There was no available “benchmark” data (manually collected running time information) to calibrate this AVL data, which made it difficult to determine the validity and source of this error.

On-time performance data can be calculated in many different ways, either using high-tech data collection methods, or using simple pencil and paper calculations. Most properties have road supervision personnel at the end of the line who keep track of bus arrival and departures. LYNX could and should implement this practice to validate AVL-collected data and create a more robust data set.

To accommodate these data issues, the COA relied only on running time information that was corroborated by multiple sets of data. Running time and Time Point adjustment recommendations were made to routes only where it was clear that the actual running time was insufficient. With more robust data, these recommendations could be enhanced and improved.

APC/Ridership Data Issues

APC Data was used to calculate stop by stop ridership. This was correlated (in some cases) with farebox data that was available based on the number of fare paying passengers.

A few issues occurred with this data:

- In many cases, the overall boarding and alighting passengers (ons and offs) and total passenger load did not balance correctly (the sum of ons and sum of offs should equal zero). This discrepancy could be a result of customers riding through an interlined bus, the accuracy of APC counters, or bus operator error (not setting the APC equipment correctly).

- Ridership Data can be calculated in many different ways, either using high-tech data collection methods, using "ride checks" (riding each route manually), or "point checks" where a count is conducted at a stationary point (usually the peak load point).

- Transfer data was provided, but only in paper tabular form, making it difficult to use on a wide-scale.

To accommodate these data issues, the COA relied only on this data using professional judgment. Unless the difference in ons/offs/total load was significant (higher than 10 people) it was assumed to be generally valid.

These data issues did not adversely affect the performance assessment or the individual recommendations presented in this COA. In addition to the data provided, the COA relied on the professional knowledge of both LYNX staff (who are intimately familiar with the system) as well as the judgment of the consultant team. No transit property is able to collect fully complete, statistically accurate data (to do so would be too costly). This study took the data that was available (the vast majority of which was without issues) to evaluate the LYNX system and develop recommendations.

Unavailable Data

Data was not available to assess the performance of the LYNX system for two of the Service Guidelines:

- Route Investigation Based Upon Customer Complaints
- Guideline for Route Investigation based on Trips Operated and Trips Completed

While this data is collected by LYNX, it was not available in a readily usable format for inclusion in this COA. These categories were included in the Service Guidelines despite the inability to assess them so that the Service Guidelines were comprehensive. It is recommended that LYNX collect this data in a useable fashion for future performance assessments using the Service Guidelines.

3.3 Service Guidelines Evaluation

The results of the evaluation of the system as it compares to the Service Guidelines is shown in Table 3-2, the data used in the evaluation is shown in Table 3-1. A description of the results is shown below. Some metrics were not suitable for summation on the table and the description of the results is shown below.

Table 3-1: Data Used in Service Evaluation

Guideline	Metric	Data Used in Analysis
Fixed Route Network Spacing In Residential Areas	• Routes should be spaced between ¼ and 1 mile apart, based on population density and percent of households without automobiles • When planning for service, every attempt should be made to locate routes on roads that are appropriate for reliable operations. These include roads with TSP and/or synchronized signal progression based on posted speed limits. • When planning for service, every attempt should be made to locate routes on roads with appropriate amenities (sidewalks/crosswalks/ pedestrian signals).	LYNX Route Maps Population Density Data (US Census)
Fixed Route Network Spacing In Commercial and Other Areas	• Criteria for extending or adding transit service to major commercial and institutional uses based on overall square footage and/or number of employees.	N/A
Bus Stop Spacing Guidelines	• There should be an average of 4 bus stops per mile when population density is over 10 households per acre. • There should be an average of 2 bus stops per mile when population density is from 4 to 9.9 households per acre. • There should be an average of 1 bus stop (as needed) per mile when population density is 4 households per acre. • FastLink service should have an average of 1 bus stop per mile where the route overlays with local service.	LYNX Bus Stop GIS data

Table 3-1: Data Used in Service Evaluation (Continued)

Guideline	Metric	Data Used in Analysis
Guideline for Serving a Park and Ride Directly	• Direct service should be provided to park and rides that attract over 150 daily passengers (weekday). • Park-and-ride facilities should be provided at appropriate stops on rapid and express services to serve transit users from Low and High density residential areas.	Park and Ride parking space data
Overall Directness of Route Guideline	• Fixed Route diversions should be allowed only when they are less than 10-15 percent of the overall route length.	N/A
Frequency of Service	• Bus service should be scheduled to allow for loading on the vehicle with no standees during the off-peak and to allow for 1.25 passengers per seat during the peak hour. • Routes which are experiencing capacity issues for a single trip should be candidates for articulated buses rather than increased frequency. • NeighborLink service should operate at a minimum headway of one hour. • XpressLink bus service should be scheduled to allow for no standees at all times. • FastLink service should be scheduled based on the demand of a FastLink route or the combined FastLink and local bus service demand.	LYNX Ridership Summary by trip for September 2012 Bid LYNX Schedules
Policy Headway Guideline	• Local Service should be scheduled at a policy headway of 30 minutes or better. • BRT service should be scheduled at a policy headway of 15 minutes or better. • FastLink service should be scheduled at a policy headway of 15 minutes or better.	LYNX Schedules
Guideline for Enhancing Headway on routes with "Plug Buses"	• If plug buses are used more than twice in one week or more than three times in one month to address crowding, a route should be examined for enhanced headways.	Plug bus data

Table 3-1: Data Used in Service Evaluation (Continued)

Guideline	Metric	Data Used in Analysis
Guideline for Span of Service	• Base hours of service should be between 6:00 AM and 10:00 PM on weekdays. • Expansion of the span of service should occur when ridership is such that it begins to exceed the off-peak service guideline in the first or last hours of service.	LYNX Ridership Summary by trip for 1209 Bid
Guideline wait time for transferring between services	• Routes should be scheduled so that the wait time for transferring passengers is no more than ½ the headway of the connecting service.	N/A
Guideline for Route Investigation based on Farebox Recovery	• Routes that are in the lowest quartile (25%) of farebox recovery for their route type should be examined for improvements that might increase ridership or lower costs.	TDP financial model Ridership by route
Guideline for Route Investigation based on Passengers per Vehicle Hour and Vehicle Mile	• Routes that are in the lowest quartile (25%) for all routes ranked by passengers per vehicle hour and/or passengers per vehicle mile should be examined for potential operating improvements.	LYNX APC Data for all BIDs back to 2008 LYNX Route Statistics
Guideline for Route Investigation based on Ratio of Non-Revenue to Revenue Miles	• Routes that are in the lowest quartile for all routes as ranked by the ratio of non-revenue to revenue miles should be examined for potential operating improvements including interlining and utilizing satellite operating centers to reduce non-revenue miles.	LYNX Route Statistics
Guideline for Route Investigation based on On-Time Performance	• Routes which are in the bottom ten percent for this metric (buses arriving earlier than scheduled or over five minutes after schedule) should be examined further for potential improvements.	APC schedule adherence data for BIDs back to 2008
Guideline for Route Investigation based on Average Speed	• Routes with runtime more than twice the runtime for a single occupancy vehicle should be examined for potential speed improvements.	APC schedule adherence data for BIDs back to 2008

Table 3-1: Data Used in Service Evaluation (Continued)

Guideline	Metric	Data Used in Analysis
Guideline for Route Investigation based on Trips Operated and Trips Completed	• Any route that has a missed trip average 20 percent or greater than the system average should be investigated for potential improvements. • Maintenance staff should be alerted during any month where the mean distance between failures is below 19,000 miles to identify potential causes of breakdowns.	N/A
Guideline for Route Investigation based on Passenger Complaints	• Routes that are in the top quartile (25%) for all routes ranked by number of passenger complaints should be examined for potential operating improvements.	N/A
Guideline for Amenities at Bus Stops	• Bus stops with 25 average daily boardings should be prioritized for shelters and benches. • Bus stops with 15 average daily boardings should be prioritized benches. • Facilities should follow applicable codes of governing jurisdictions. • Co-location of non-LYNX facilities should be avoided unless expressly requested by governing jurisdiction or partner.	N/A; Being conducted as part of a separate LYNX effort

N/A=Data was not available for the COA; analysis was not conducted for this metric

Route Spacing

To identify potential geographic locations which may warrant expansion of service, information on household and employment density from 2009 was mapped relative to the overall LYNX network. Two metrics were used in this evaluation; the service guidelines and a metric called "Transit Supportive Land Use" were used. Transit Supportive Land Use is defined as any land area with four employees or three dwelling units per acre.[7] As a result of the analysis a few areas were identified as being potentially suited for expanded service:

- Baldwin Park
- East Orlando
- Universal/International Drive

[7] TCRP Report 100: Transit Capacity and Quality of Service

- Lake Nona
- Celebration
- Kissimmee
- Buena Ventura Lakes

Bus Stop Spacing

Based on the service guidelines, the majority of LYNX's system has a population density that supports 1-2 bus stops per mile, with a few exceptions. The exceptions include specific areas clustered around downtown Orlando and State Route 436 which have higher densities that might warrant bus stops spaced closer than 1-2 stops per mile. Any route that falls out of the overall bounds of the bus stop spacing guideline (less than one stop per mile or greater than six stops per mile) is identified as deficient in the guideline.

Span of Service

Quite a few routes have a high volume to capacity (V/C) ratio (above 80 percent) in the first or last trip, an indicator that the route is being heavily used during these times and could use expanded service. In some of the cases, the routes with a high V/C ratio are among the top performing routes in terms of ridership and ridership growth. It is important to note however that some routes with low ridership in the first and last trip already have short spans of service and therefore LYNX may not want to implement further cuts in service. Potential solutions to both of these issues would be adjustments in service spans, or possibly changing the size of the vehicle used or the type of service provided.

Park and Ride Locations

Of the eleven park and ride locations in Lake, Orange Osceola and Volusia County, only four locations have adjacent routes that could be considered for direct service. [8] Given the low number of spaces in each park and ride and the fact that most park and rides already have direct service, it would not be recommended to extend any bus service to these locations as no location could attract enough riders (above 150 passengers per day) to meet the guideline.

Route Ridership

The primary foundation for economic and productivity analysis is route-level ridership. Ridership is the basis for most of the other metrics of route productivity and it is a good measure of a route's effectiveness. There are multiple routes that are performing very well for ridership and ridership trends, for example, Link 50. There are also routes that are performing poorly, but are showing high growth in ridership (Links 313, 45, and 46E/46W are some examples). Finally, there are routes that are performing poorly and are losing riders, such as Link 34 and Link 405.

[8] http://www.rethinkyourcommute.com/park-and-ride/where-are-the-lots/

Passengers per Total Mile and Passengers per Hour

There is a high correlation between routes that perform poorly in terms of overall ridership and those routes that have a low number of passengers per mile (or hour). However, a few of the non-stop routes, including Link 434, are in the top quartile for ridership, but are in the bottom quartile for total passengers per mile. This reflects the fact that these routes travel for very long distances and it also reflects the relatively high cost to operate these routes. Geographically, routes which are performing poorly tend to be a few of long distance routes which operate from Orlando. The number of poor performing routes grows as the evaluation shifts from Weekdays to Saturdays to Sundays.

Farebox Recovery

Farebox recovery, or the percent of the operating cost covered by the fares received, is one of the more common metrics of calculating route efficiency. There are quite a few routes that cover almost 50 percent of their total costs through the farebox; which is a good indicator of success.

Routes with a higher farebox recovery tend to be clustered around the southwest portion of LYNX's study area near I-4.

Revenue to Total Mileage

Revenue mileage to total mileage reflects the distance a bus travels when it is available for passenger use. Total mileage includes both revenue and non-revenue mileage. Non-revenue mileage is required to get buses to the start of their route, but it is also unproductive as the buses are not carrying passengers during this time.

While most of the express routes are in the bottom quartile for the ratio of non-revenue to revenue miles, a few local routes are also included such as Links 24, 34, 58, 103, and FastLink 17-92.

On-Time Performance

As described above under "AVL Data Issues," the on-time-performance data was not reliable. None-the less, schedule adherence data was drawn from the Automatic Vehicle Location system for the September 2012 BID to assess on-time performance. The goal was to identify those routes that have issues arriving early and/or late based on the published timetable. Issues with on-time performance can affect the way the public views the system's reliability. The analysis identified trips for each route where the bus was early (1 minute or greater) or late (5.5 minutes or greater). Based on this analysis, LYNX buses departed early 20.7 percent of the time and departed late 22.0 percent of the time. When these early and late arrivals were combined, 88 percent of the LYNX routes were not on schedule 30 percent of the time. The PM Peak and Evening service periods showed the worst on-time performance issues. The PM Peak trips departed late 33.6 percent of the time. The guideline for on-time performance indicates the need for schedule adjustments for the bottom 10 percent of routes. Links 31, 44, 57, 302, 443, and 17-92 were in the bottom 10 percent for overall schedule adherence as shown in Table ES-2.

Though Link 31 (LYMMO) is included, the issue is not significant for that route considering its high frequency of service. The issue was significant for the other routes since all of their trips missed their schedule more than 50 percent of the time.

Operating Speed vs. Scheduled Speed

The operating speeds from the Automatic Passenger Count (APC) data from 2012 were compared with the scheduled speeds[9] for each route in the LYNX system to identify routes that experience a significant amount of traffic congestion or require modifications to the route or the public timetable. In general, the APC speed data and the scheduled speeds aligned reasonably well, with approximately three-fourths of the APC speed data falling within 10 percent of the scheduled speeds. Links 9, 38, 49, 405, and Link 441 fell into the lower quartile with APC speeds lower than the scheduled speed.

Bus Loading

The average maximum load per trip is also a good indicator of the utilization of each route and can be used to determine where a bus is over/under loaded. Some of the trips LYNX operates have very low load factors (below 0.6); while some are quite high (above 1.2) and could merit having their service enhanced. These routes include Link 8, 10, 13, 37, 41, 42, 48, 103, and 104. All of these routes had more than one trip that was overloaded and would require added service.

Bus Stop Amenities

LYNX currently has shelters at almost one-quarter of its overall stops and is in the process of evaluating passenger amenities at bus stops. This COA developed a guideline for passenger amenities at bus stops which should be applied to the bus stop inventory underway to determine locations that do not meet the guideline.

[9] Scheduled speed was calculated using the length of the route and the run time based on the public timetable.

Conclusions

The data analysis indicates that several routes perform poorly with respect to the service guidelines and respect to the overall system performance. Routes that are shown with service characteristics that are poor (denoted by a minus sign and pink shading) in Table ES-2 should be considered for adjustment. Specifically, there appears to be issues related to the Downtown Disney Direct service, service in East Orlando (particularly Links 6 and 15), service in Sanford (particularly Links 46E, 46W, 34 and 45) and in the International Drive/Universal Studios area.

The routes were highlighted in red, green, or nothing depending on how they scored against the service guidelines. Routes that performed well in a given category were highlighted in green, and are candidates for service expansion. Those routes highlighted in red rated below average or poorly based on the service guidelines, and should be looked at more closely to identify causes for poor performance and receive service improvements to correct them. The routes that are not highlighted are considered average performers. This does not mean they won't receive service improvements based on the service guidelines, but are considered a secondary focus. Table 3-2 shows how each route rated for each of the characteristics analyzed. The results narrowed the focus for service improvements, highlighting areas of need and providing direction into what improvements may be successful.

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Table 3-2: Service Evaluation

Route	Ridership			Trend	Route Design Guidelines		Schedule Design Guidelines					Economic and Productivity Guidelines									Service Delivery Guidelines		
							Guideline for Span of Service (Volume/Capacity in First/Last Trip)					Guideline for Route Investigation Based on Passengers per Hour			Guideline for Route Investigation based on Passengers per Vehicle Mile			Guideline for Investigation based on Farebox Recovery	Guideline for Route Investigation based on Ratio of Non-Revenue to Revenue Miles			Guideline for Route Investigation Based on On Time Performance	Guideline for Route Investigation based on Average Speed (Average Speed)	Guideline for Route Investigation based on Average Speed (Operating vs Scheduled Speed)
	WD	SAT	SUN	Annual	Bus Stop Spacing Guideline (Stops per Mile)		OB/NB/EB		IB/SB/WB		Guideline for Enhancing Headway on Routes with "Plug Buses"	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday		Weekday	Saturday	Sunday			
							First Trip	Last Trip	First Trip	Last Trip														
1	476	321		35%	4.43	4.78	30%	11%	18%	11%		24.53	17.41		1.87	1.29		23%	91%	93%	**	38.50%	15.9	-3%
3	884	551	354	14%	5.16	5.26	57%	41%	56%	10%		20.88	12.88	9.27	1.6	1	0.73	22%	95%	95%	97%	56.00%	14	-1%
4	5,487	4,120	3,067	8%	9.39	9.07	32%	26%	50%	8%	2 X Weekly/3 X Monthly	35.81	29.33	25.72	2.7	2.22	1.8	41%	95%	92%	90%	59.80%	14.5	3%
6	356	255		-1%	5.15	5.77	121%	11%	111%	18%		19.27	14.18		1.36	1.02		10%	88%	91%	**	*	32.21	96%
7	1,080	722	590	16%	5.54	4.95	16%	13%	48%	13%		30.14	20.16	25.55	2.65	1.78	1.96	32%	95%	95%	96%	38.50%	14.2	4%
8	7,850	5,112	4,055	10%	9.86	12.27	88%	40%	76%	50%	3 X Monthly	35.17	37.38	33.66	2.6	2.7	2.55	39%	92%	85%	86%	53.30%	14.7	-6%
9	822	532	371	27%	3.88	5.14	74%	36%	79%	11%		28.35	21.4	16.25	1.98	1.52	1.2	30%	90%	95%	94%	40.10%	17.5	-17%
10	1,143	759		16%	4.48	3.52	35%	38%	47%	8%	2 X Weekly/3 X Monthly	26.09	16.48		1.79	1.18		29%	96%	95%	**	54.90%	15.9	6%
11	1,256	745	596	5%	4.26	3.92	22%	17%	33%	14%		20.96	13.45	24.65	1.46	0.91	1.51	21%	98%	97%	97%	50.90%	17.9	8%
13	1,242	681	313	7%	4.44	4.51	8%	20%	41%	19%		23.27	12.77	7.93	1.67	0.92	0.53	19%	94%	94%	96%	50.90%	15.8	0%
14	101	74	55	9%	5.41		14%					15.41	11.87	9.35	1.6	1.29	0.98	13%	91%	100%	90%	*	13.2	25%
15	1,700	1,110	560	2%	11.44	10.93	11%	38%	66%	8%		24.05	16.71	18.68	1.8	1.25	1.21	26%	96%	96%	94%	40.80%	15.1	4%
17	2,286	1,499	358	23%	3.7	3.68	24%	57%	78%	8%	2 X Weekly/3 X Monthly	24.79	23.15	11.83	1.72	1.69	0.87	38%	88%	95%	97%	49.40%	17.3	2%
1792	8				0.34	0.34	28%	17%	17%	22%		0.81			0.04			13%	49%	**	**	61.10%	21.1	6%
18	1,892	1,212		24%	4.06	3.89	89%	52%	78%	38%		27.84	17.76		1.86	1.19		28%	92%	92%	**	60.00%	16.1	-3%
20	1,320	840	481	13%	6.33	9.9	24%	32%	55%	12%	3 X Monthly	42.28	27.35	17.87	3.76	2.4	1.57	27%	96%	96%	95%	50.00%	12.8	2%
21	2,992	2,268	1,248	9%	4.3	4.56	23%	46%	23%	46%		28.93	21.96	27.4	2.14	1.62	2.04	32%	94%	94%	94%	56.20%	14	-1%
23	656	409		28%	4.24	7.02	13%	17%	22%	15%		20.18	12.57		1.36	0.85		21%	91%	91%	**	68.00%	16.6	2%
24	370	278	200	18%	4.82	4.5	19%	23%	22%	17%		29.16	21.91	16.46	2.07	1.56	1.29	23%	81%	81%	90%	0.00%	14.8	-4%
25	1,490	944	487	6%	4.62	5.13	13%	33%	44%	15%		27.2	17.34	25.05	2.61	1.66	1.71	25%	99%	99%	98%	52.00%	12.7	0%
26	940	716		38%	3.11	2.95	64%	20%	10%	75%	2 X Weekly/3 X Monthly	19.75	28.39		1.26	1.55		40%	91%	96%	**	47.80%	21.8	1%
28	1,713	863	539	5%	6.74	5.81	15%	24%	76%	6%		28.1	33.14	23.34	2.82	2.96	2.08	41%	95%	96%	96%	59.40%	12.7	1%
29	1,627	958	703	16%	5.37	6.06	19%	18%	38%	3%		26.84	36.93	30.68	2.34	2.86	2.37	43%	96%	97%	97%	59.00%	15.9	5%
31	3,296	1,011	847	-23%	8.8		26%	10%				34.09	22.68	24.72	5.84	4.05	4.37	37%	82%	85%	84%	39.40%	6.7	n/a

Table 3-2: **Service Evaluation (Continued)**

Route	Ridership			Trend	Route Design Guidelines		Schedule Design Guidelines					Economic and Productivity Guidelines									Service Delivery Guidelines		
							Guideline for Span of Service (Volume/Capacity in First/Last Trip)					Guideline for Route Investigation Based on Passengers per Hour			Guideline for Route Investigation based on Passengers per Vehicle Mile			Guideline for Investigation based on Farebox Recovery	Guideline for Route Investigation based on Ratio of Non-Revenue to Revenue Miles			Guideline for Route Investigation Based on On Time Performance	Guideline for Route Investigation based on Average Speed (Average Speed)	Guideline for Route Investigation based on Average Speed (Operating vs Scheduled Speed)
	WD	SAT	SUN	Annual	Bus Stop Spacing Guideline (Stops per Mile)		OB/NB/EB		IB/SB/WB		Guideline for Enhancing Headway on Routes with "Plug Buses"	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday		Weekday	Saturday	Sunday			
							First Trip	Last Trip	First Trip	Last Trip														
34	292	225		-7%	6.78	5.86	11%	33%	25%	4%		15.59	13.42		0.93	0.81		12%	68%	77%	**	31.30%	15.5	0%
36	896	521	264	14%	11.77	10.36	14%	13%	22%	3%		21.05	13.24	14.83	1.76	1.14	1.29	21%	94%	96%	97%	38.90%	28.7	118%
37	3,182	2,011	1,503	21%	6.98	6.73	25%	53%	56%	24%		23.89	19.83	27.23	1.9	1.43	1.96	32%	86%	86%	84%	54.80%	15.4	8%
38	581	558	634	23%	0.81		49%	50%				19.93	19.23	52.84	0.89	0.85	2.04	25%	91%	90%	91%	37.80%	24.7	-20%
40	1,567	1,215	870	23%	9.17	12.24	18%	37%	80%	28%		28.02	21.79	27.22	2.21	1.7	1.87	32%	94%	93%	96%	56.40%	13.3	1%
41	5,246	4,072	2,269	10%	3.82	22.45	38%	13%	85%	39%		28.65	22.24	32.03	2.26	1.75	1.96	44%	92%	92%	84%	61.20%	14.5	12%
42	2,839	2,851	1,552	3%	6.4	6.6	24%	39%	42%	24%		24.88	23.99	29.12	1.68	1.52	1.92	29%	90%	81%	89%	51.20%	15.8	0%
44	667	438		1%	3.88	3.43	22%	38%	47%	15%		20.05	13.15		0.98	0.64		24%	93%	93%	**	93.00%	23.2	-4%
45	234	170		25%	6.02	3	5%	4%	21%	0%		12.68	10.8		0.77	0.65		16%	83%	94%	**	48.60%	17.8	0%
46 West	199	143		109%	0.53	0.54	21%	30%	40%	14%		6.83	6.68		0.52	0.39		11%	81%	86%	*	50.80%	17.7	10%
46 East	395	284	212	240%	0.8	0.53	32%	23%	21%	31%		15	26.67	51.27	0.93	1.55	0.62	19%	79%	87%	88%	59.00%	18.4	18%
48	1,979	1,109	774	5%	5.24	3.89	13%	38%	61%	9%		37.12	42.44	33.71	3.43	3.93	3.09	56%	97%	96%	96%	53.60%	17	1%
49	1,980	1,121	730	15%	5.19	5.78	21%	39%	33%	8%		37.53	43.27	31.68	3.19	3.73	2.74	58%	96%	97%	96%	64.10%	14.6	-11%
50	2,201	2,118	1,868	25%	0.69	0.68	21%	17%	27%	22%	2 X Weekly/3 X Monthly	24.08	23.1	20.38	1.13	1.09	0.96	25%	98%	98%	98%	64.10%	26	6%
51	1,248	890	577	32%	5.11	5	33%	25%	111%	31%		31.76	22.65	18.04	2.37	1.69	1.22	26%	93%	93%	94%	51.40%	16.5	-1%
54	503	312		-1%	3.96	4.09	18%	38%	44%	23%		21.59	13.4		1.38	0.86		24%	95%	95%	**	35.20%	18.7	6%
55	1,841	1,803	1,343	19%	2.5	2.25	69%	25%	45%	36%	2 X Weekly/3 X Monthly	23.02	22.6	22.34	1.63	1.59	1.23	36%	95%	95%	99%	43.40%	19.3	9%
56	1,926	1,870	1,503	16%	1.8	1.58	42%	31%	82%	37%	2 X Weekly/3 X Monthly	22.11	21.47	21.53	1.06	1.03	0.83	32%	97%	97%	97%	47.80%	19	8%
57	1,012	734		26%	2.79	2.99	39%	32%	34%	26%	2 X Weekly/3 X Monthly	30.56	22.16		1.61	1.17		35%	96%	96%	**	68.50%	21	-7%
58	124	106	91	22%	2.37	2.16	55%	22%	10%	25%	2 X Weekly/3 X Monthly	9.02	7.73	6.7	0.49	0.45	0.36	12%	55%	58%	55%	53.80%	19.4	3%
102	2,426	1,455	913	12%	4.9	5	31%	28%	42%	41%		21.36	20.37	13.36	1.86	1.85	1.22	20%	89%	95%	95%	45.00%	14.5	5%
103	1,239	867	391	9%	3.19	3.41	29%	50%	28%	42%		13.58	18.2	15.92	0.87	1.29	1.16	27%	71%	84%	79%	50.80%	18.9	11%
104	1,651	1,189	889		3.35	3.46	43%	61%	78%	50%		19.54	14.07	25.73	1.32	0.95	1.66	26%	86%	86%	92%	36.30%	15.9	6%

Table 3-2: Service Evaluation (Continued)

Route	Ridership			Trend	Route Design Guidelines		Schedule Design Guidelines					Economic and Productivity Guidelines										Service Delivery Guidelines		
							Guideline for Span of Service (Volume/Capacity in First/Last Trip)					Guideline for Route Investigation Based on Passengers per Hour			Guideline for Route Investigation based on Passengers per Vehicle Mile			Guideline for Investigation based on Farebox Recovery	Guideline for Route Investigation based on Ratio of Non-Revenue to Revenue Miles			Guideline for Route Investigation Based on On Time Performance	Guideline for Route Investigation based on Average Speed (Average Speed)	Guideline for Route Investigation based on Average Speed (Operating vs Scheduled Speed)
	WD	SAT	SUN	Annual	Bus Stop Spacing Guideline (Stops per Mile)		OB/NB/EB		IB/SB/WB		Guideline for Enhancing Headway on Routes with "Plug Buses"	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday		Weekday	Saturday	Sunday			
							First Trip	Last Trip	First Trip	Last Trip														
105	1,613	1,161	868		7.99	6.31	11%	46%	28%	20%		20.03	16.53	36.39	1.56	1.27	2.73	23%	91%	88%	88%	70.30%	15.2	-1%
111	718	672	51	81%	1	1.13	30%	28%	23%	20%		6.08	5.43	0.43	0.28	0.24	0.02	25%	81%	75%	81%	44.60%	22.4	3%
125	2,439	1,504	675	14%	4.56	4.53	11%	33%	41%	17%		20.89	20.71	20.52	1.43	1.26	1.23	24%	94%	96%	96%	57.10%	16.6	2%
200	82			1%	0.82	0.73	35%	46%	13%	30%		7.2	26.55		0.22			14%	50%	**		*	32.7	9%
204	140			17%	0.45	0.51	36%	53%	47%	60%		7.72	23.95		0.27			15%	58%	**		37.50%	25.2	-16%
210	31	22			1.53		77%	11%					1.82			0.08		4%	*	71%	**	*	22.7	-3%
211	20	14			2.08		8%	2%					0.93			0.07		2%	*	64%	**	*	16.7	22%
300	89	77	61	26%	0.76	0.52	43%	58%				30.47	21.11	20.89	1.22	1.07	0.84	41%	67%	67%	67%	*	24.2	-1%
301	166	170	147	27%	2.53	1.31	132%	24%	108 %			23.4	22.12	19.82	1.24	1.26	0.81	33%	72%	72%	54%	*	18.6	-20%
302	132	154	141	27%	1.89	1.78	155%	21%	92%			18.14	25.08	19.37	0.86	1	0.92	26%	77%	77%	77%	61.90%	18.3	-8%
303	139	125	132	30%	2.43	1.17	64%	18%	114 %			24.6	37.97	23.22	1.3	1.17	1.23	28%	75%	75%	75%	*	18.4	-13%
304	142	167	133	30%	2.56	4.15	100%	124 %	43%			21.37	12.43	19.96	1.27	1.49	1.19	32%	80%	80%	80%	26.30%	18.4	3%
305	71	82	82	57%	1.55		96%					32.85	55.89	37.97	1.26	1.46	1.46	75%	49%	49%	49%	*	18.2	-18%
306	80	58	43	58%	0.32	0.28	54%	47%				17.14		9.21	0.77	0.56	0.78	40%	50%	50%	50%	33.30%	24	-5%
313	210	109		30%	5.59	4.95	35%	15%	11%	15%		8.58	4.48		0.73	0.38		26%	94%	94%		56.30%	13.1	1%
319	1,759	1,055	389	3%	7.03	6.41	27%	36%	38%	8%		21.86	13.22	16.8	2.41	1.45	1.75	23%	94%	94%	94%	38.90%	11.7	0%
405	279	175	93	-6%	7.37	2.75	17%	28%	8%	11%		15.06	10.24	5.56	1.38	0.91	0.49	15%	80%	79%	78%	0.00%	15.8	-11%
426	444	319		16%	3.91		96%	57%				24.11	15.19		1.28	0.79		31%	90%	77%	**	45.60%	21.1	-2%
434	293	282		398%	3.02	2.84	16%	17%	37%	6%		5.98			0.33	2.48		13%	96%	*	**	51.70%	21.6	4%
441	24				0.29	0.27	80%	41%	51%	41%		1.69			0.09			27%	90%	**	**	59.00%	18.8	-21%
443	815	498	279	-8%	4.81	5.33	38%	43%	31%	27%		25.23	15.81	11.05	1.76	1.12	0.78	28%	90%	94%	92%	80.40%	17.3	-3%
445	199	143			0.56	0.52	8%	8%				77.65			3.45			16%	34%	34%	*			26%

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3.4 Portfolio Analysis

The portfolio analysis provides insights into route performance by including the financial contribution, positive or negative, that each route has on the overall system. In this way, insights can be gained on how individual routes contribute to the overall system performance. This analysis is presented first since it provides an overall picture of the LYNX system.

The LYNX fixed bus routes were examined from three perspectives:

- Passenger contribution (ridership);
- Revenue hour contribution; and
- Combination passenger revenue recovery/deficit approach.

Ridership Contribution

The distribution of passengers among LYNX routes is an important factor to consider when developing an improvement program. In most systems, there are a small number of routes that carry a large portion of the system's users. Small percentage increases in ridership on these routes can significantly improve overall system ridership.

Ridership on the LYNX system follows this typical pattern. Figure 3-1 shows a cumulative distribution of LYNX ridership with the routes ordered from highest to lowest ridership. Four routes—Link 8 W. Oak Ridge Rd./International Dr. , Link 4 South U.S. 441/Kissimmee, Link 41 SR 436 Crosstown, and Link 37 Pine Hills/Florida Mall—carry over 25 percent of the LYNX passengers. A lot of analysis attention was given to these routes because of their potential for increasing system ridership.

The next eight routes carry another 25 percent of the system's passengers. These routes also received analysis attention and are a second priority after the top three routes.

In contrast, 45 low-ridership routes carry 25 percent of the system's passengers. Unless there were obvious improvements, less attention was given to these routes.

Revenue Hours Contribution

The distribution of revenue hours of service among LYNX routes is also an important factor to consider when developing an improvement program. In most systems, a large portion of the system's service is scheduled on a small number of routes. Small percentage changes in service operated on these routes can significantly improve the overall financial condition of the system. Route service levels on the LYNX routes follow this typical pattern. Figure 3-2 shows a cumulative distribution of LYNX service levels with the routes ordered from highest to lowest amounts of scheduled revenue hours. Over 25 percent of LYNX revenue hours are operated on six routes—Link 8 W. Oak Ridge Rd./International Dr., Link 41 SR 436 Crosstown, Link 4 South U.S. 441/Kissimmee, Link 37 Pine Hills/Florida Mall, Link 50 Downtown Orlando/Magic Kingdom,

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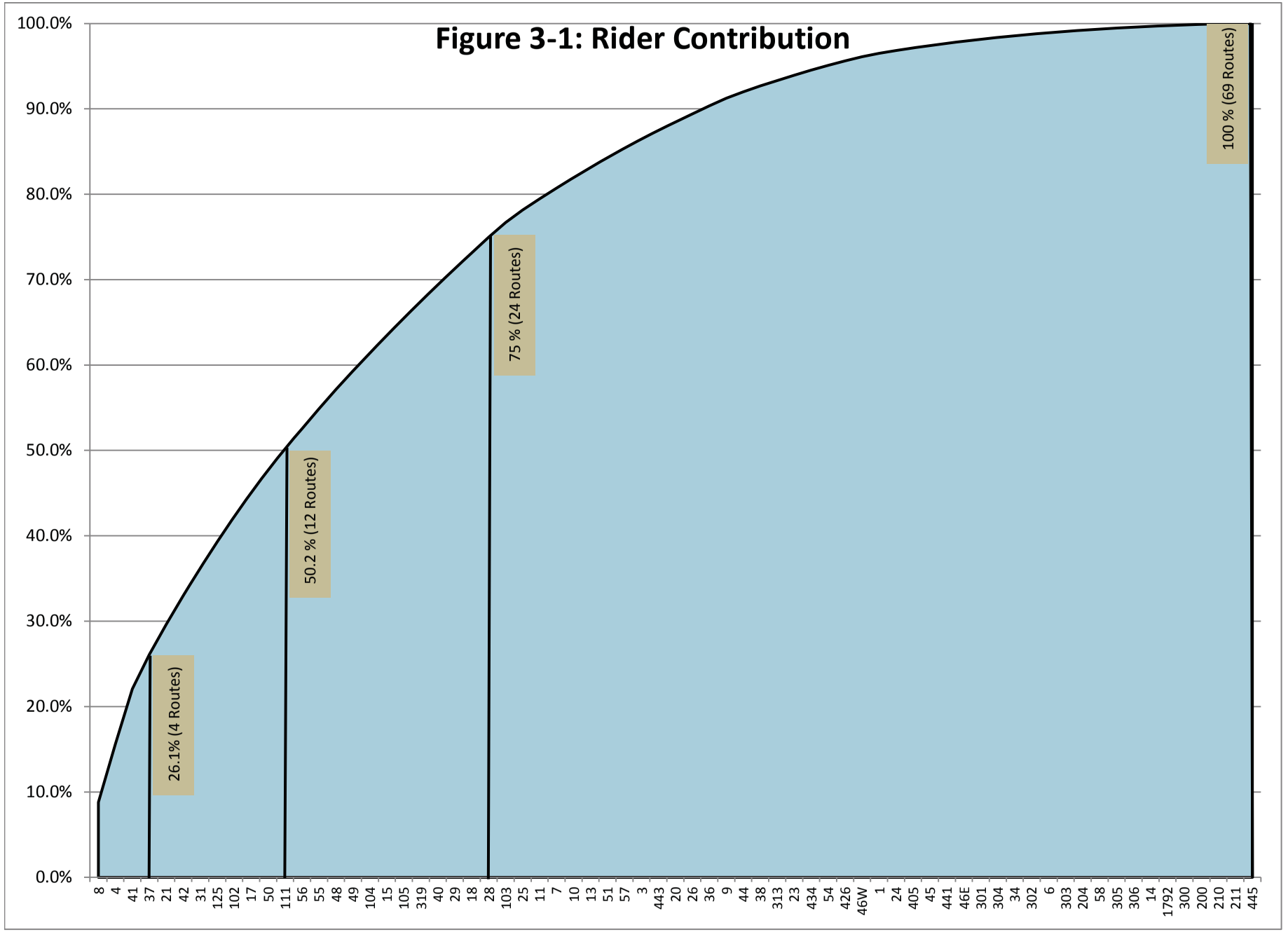
Figure 3-1: Rider Contribution
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40.0%
30.0%
20.0%
10.0%
0.0%
26.1% (4 Routes)
50.2 % (12 Routes)
75 % (24 Routes)
100 % (69 Routes)
8 4 41 37 21 42 31 125 102 17 50 111 56 55 48 49 104 15 105 319 40 29 18 28 103 25 11 7 10 13 51 57 3 443 20 26 36 9 44 38 313 23 434 54 426 46W 1 24 405 45 441 46E 301 304 34 302 6 303 204 58 305 306 14 1792 300 200 210 211 445

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and Link 125 Silver Star Rd./Crosstown. Attention was provided to these routes because of their potential for improving LYNX's financial condition.

Another 25 percent of the system's revenue hours are operated on the next eight routes. These routes also received analysis attention and are a second priority after the top six routes.

In contrast and at the other end of the service scale, about 25 percent of the system's revenue hours are operated on 40 small-scale routes. Unless there were obvious improvements, less attention was given to these routes.

Combination of Passenger Revenue Recovery and Deficit Contribution

Another method for rating routes and categorizing their performance is to examine both passenger revenue recovery and deficit amounts in combination. The performance of each route is compared to the average passenger recovery (29.7 percent) and average deficit ($927,949 for all weekdays in 2012). Using the two ratings, the routes can be plotted (Figure 3-3) and categorized into four categories described in Table 3-3.

Table 3-3: Passenger Revenue Recovery and Deficit Quadrants

Service Increase Priority	Route Performance Compared to Average	
	Passenger Revenue Recovery	Contribution to Deficit
1	Better (Higher)	Better (Lower)
2	Better (Higher)	Worse (Higher)
3	Worse (Lower)	Better (Lower)
4	Worse (Lower)	Worse (Higher)

The 13 routes in Service Increase Priority 1 have superior ratings in both measures. These routes have the highest priority for increasing service since these routes have the best opportunity for good financial performance for a relatively small increase in added deficit.

The 10 routes in Service Increase Priority 2 have a good rating in passenger revenue recovery, but have relatively high absolute deficits. These routes have a moderate priority for increasing service since these routes have a good opportunity for reasonable financial performance, but for a relatively large increase in added deficit.

In contrast, the 46 routes in Service Increase Priorities 3 and 4 have poor passenger revenue recovery rates. These routes will not improve their financial performance with small (Priority 3) or large (Priority 4) increases in service.

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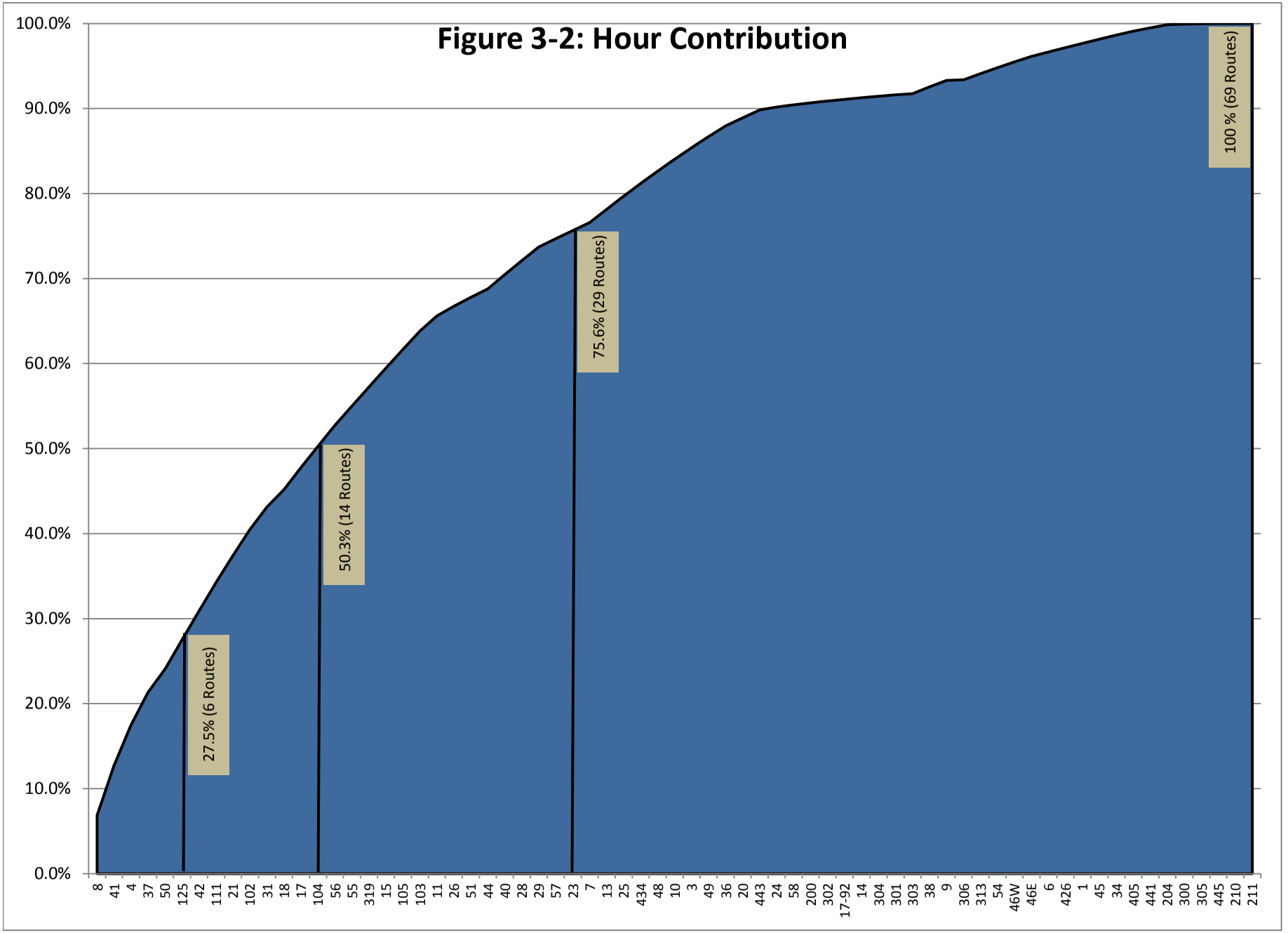
Figure 3-2: Hour Contribution
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30.0%
20.0%
10.0%
0.0%
27.5% (6 Routes)
50.3% (14 Routes)
75.6% (29 Routes)
100 % (69 Routes)
8 41 4 37 50 125 42 111 21 102 31 18 17 104 56 55 319 15 105 103 11 26 51 44 40 28 29 57 23 7 13 25 434 48 10 3 49 36 20 443 24 58 200 302 17-92 14 304 301 303 38 9 306 313 54 46W 46E 6 426 1 45 34 405 441 204 300 305 445 210 211

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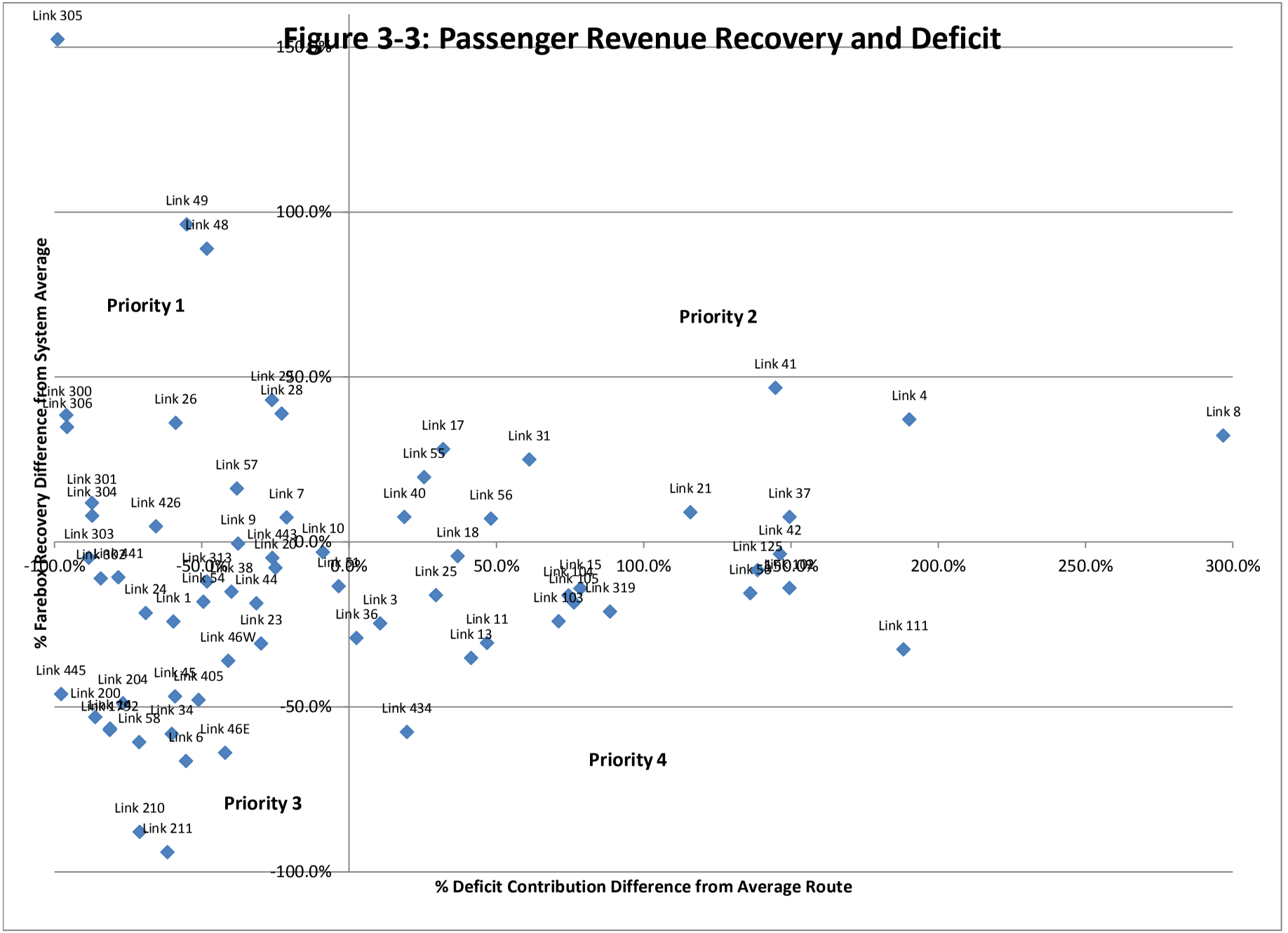
Figure 3-3: Passenger Revenue Recovery and Deficit



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Summary

Table 3-4 combines the three factors examined as part of the portfolio analysis. Those routes that ranked 1 or 2 in these analyses should be considered for improvements. The routes that rated well for ridership would likely contribute more to overall system ridership with improvements, while the routes that rated well for revenue hours would contribute to the reduction in overall service costs with minor reductions in service. Many of the routes that scored highly for ridership were also routes that scored higher for revenue hours. There appears to be a correlation between revenue hours of service provided and ridership contribution to the overall system. Reductions in revenue hours will need to be closely weighed against the ridership impacts. Lastly, the routes that rated Priority 1 or 2 in the Passenger Revenue Recovery and Deficit Contribution combination would produce better revenue recovery with the least impact to system deficits with improvements over those that rated 3 or 4. Many of the routes that scored high in this rating are routes that do not provide a lot of service, but do have a reasonably high ridership for the amount of service provided. There were some routes that scored high for revenue/deficit and ridership contribution. Those routes were – Link 4, Link 8, Link 17, Link 21, Link 31, Link 37, and Link 41.

Table 3-4: Summary of Portfolio Contribution

Route	Route Name	Passenger Contribution	Revenue Hour Contribution	Combination Recovery/ Deficit Ranking
1	Winter Park/Altamonte Springs	4	4	3
3	Lake Margaret	4	4	4
4	South U.S. 441/Kissimmee	1	1	2
6	Dixie Belle	4	4	3
7	South Orange Ave./Florida Mall	4	4	1
8	West Oak Ridge Rd./International Dr.	1	1	2
9	Winter Park/Rosemont	4	4	3
10	East U.S. 192/St. Cloud	4	4	3
11	South Orange Ave./OIA	4	3	4
13	UCF	4	3	4
14	Calvary Towers	4	4	3
15	Curry Ford Rd./Valencia College East	3	3	4
17	North U.S. 441/Apopka	2	2	2
1792	Sanford/Orlando	4	4	3
18	South Orange Ave./Kissimmee	3	3	4
20	Malibu St./Mercy Dr.	4	4	3
21	Carver Shores	2	2	2
23	Winter Park/Spring Village	4	4	3
24	Millenia	4	4	3
25	Mercy Dr./Shader Rd.	4	3	4
26	Pleasant Hill Rd.	4	4	1
28	East Colonial Dr./Azalea Park	3	3	1
29	East Colonial Dr./Goldenrod Rd.	3	3	1
31	LYMMO	2	2	2
34	Sanford/Goldsboro	4	4	3
36	Lake Richmond	4	4	4
37	Pine Hills/Florida Mall	1	1	2
38	Downtown Orlando/International Dr.	4	4	3
40	Americana Blvd./Universal Orlando	3	3	2
41	S.R. 436 Crosstown	1	1	2

Table 3-4: Summary of Portfolio Contribution (Continued)

Route	Route Name	Passenger Contribution	Revenue Hour Contribution	Combination Recovery/ Deficit Ranking
42	International Dr./OIA	2	2	4
44	Hiawassee Rd./Zellwood	4	4	3
45	Lake Mary	4	4	3
46E	Seminole Centre/Downtown Sanford	4	4	3
46W	S.R. 46/Seminole Towne Center	4	4	3
48	West Colonial Dr./Pine Hills	3	4	1
49	West Colonial Dr./Pine Hills Rd.	3	4	1
50	Downtown Orlando/Magic Kingdom	2	2	4
51	Conway Rd./OIA	4	4	3
54	Old Winter Garden Rd.	4	4	3
55	West U.S. 192/Four Corners	3	3	2
56	West U.S. 192/Magic Kingdom	3	2	2
57	John Young Pkwy.	4	4	1
58	Shingle Creek Circulator	4	4	3
102	Orange Ave./South U.S. 17-92	2	2	4
103	North U.S. 17-92 Sanford	4	3	4
104	East Colonial	3	2	4
105	West Colonial	3	3	4
111	OIA/SeaWorld	2	2	4
125	Silver Star Rd. Crosstown	2	1	4
200	West Volusia Xpress	4	4	3
204	Clermont Xpress	4	4	3
210	KnightLYNX Blue	4	4	3
211	KnightLYNX Green	4	4	3
300	Limited Direct	4	4	1
301	Limited Direct	4	4	1
302	LImited Direct	4	4	3
303	Limited Direct-Washington Shores/Disney-MGM	4	4	3
304	Limited Direct-Rio Grande/Vistana Resort	4	4	1
305	Limited Direct-MetroWest/All-Star Resort	4	4	1
306	Downtown Disney Limited Direct	4	4	1
313	Winter Park	4	4	3
319	Richmond Heights	3	3	4
405	Apopka Circulator	4	4	3
426	Poinciana Circulator	4	4	1
434	S.R. 434 Crosstown	4	3	4
441	Kissimmee/Orlando	4	4	3
443	Winter Park/Pine Hills	4	4	3
445	Apopka/West Oaks Mall	4	4	3
601	Poinciana	1	2	2
603	Southwest Poinciana	3	4	1
604	Intercession City/Campbell City	4	4	3
611	Ocoee	2	1	4
612	Winter Garden	2	1	2
613	Pine Hills	3	2	4
621	East Colonial Dr./Bithlo	2	2	2
622	Oviedo	4	3	4
631	Buena Ventura Lakes	4	4	3
641	Williamsburg	4	3	4

3.5 Results of the Performance Analysis: County-Level Analysis

On a county-level, the performance analysis was mixed, with the performance of routes reflecting the underlying economic characteristics of the county. Counties with long established bus service showed the need for modifications to reverse "cost saving" changes from past years. Counties that are growing rapidly show the need for significant investment to support and encourage this growth:

Orange County:

- Orange County's routes have mixed performance: some are the best in the system while others need improvement
- High performing routes (i.e. Link 8) require investment to maintain high performance
- Service on other routes has been altered in a piecemeal fashion and requires a comprehensive overhaul (i.e. East Orlando/Pine Hills)

Osceola County:

- Majority of routes have growing ridership and need service expansions to meet growing demand
- There are a very few efficiencies that could be implemented on Osceola County's routes
- For the most part there is a need for significant financial investment in transit service in the county

Seminole County:

- Many Seminole County routes have not adapted to changing land use and have suffered in overall performance (i.e. Link 34)
- Some areas require new transit investment to meet new demands (i.e. Verizon Call Center)
- Some areas are over-served by transit and could be better served by different types/a mix of services (parts of Link 46E)
- Some locations could be potential candidates for Xpress Link services
- Seminole SunRail stations need to be served

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4

Recommendations

4.1 Introduction

This chapter discusses the short and long term service recommendations for the LYNX system in response to the demographic opportunities identified in Chapter 1 and the route deficiencies and identified in Chapter 3. Included in this chapter are the following sections:

- **Development of Recommendations**: lists the types of changes proposed and how they tie to the service guidelines and performance analysis. Included is a discussion of the proposed phasing program for the recommendations.
- **Global Recommendations**: Lists the system-wide recommendations that do not apply to specific routes or locations.
- **Short Term Service Improvements:** Lists the route-specific recommendations that are proposed to be implemented within the next five years. This includes changes to existing routes, new routes, new SuperStops, and changes due to SunRail.
- **Long Term Service Improvements:** Lists the route-specific recommendations that are proposed to be implemented within the next thirty years.

4.2 Development of Recommendations

Each Link in the LYNX system was evaluated against the service guidelines (Chapter 2) to determine if the Link's performance was deficient or consistent with each guideline (Chapter 3). Based upon the results of that evaluation, recommendations were developed to address the Links with deficiencies. In addition, as a result of a review of regional demographics, previous planning studies such as the TDP and Vision 2030, and this project's outreach efforts, new routes were developed and added to the recommendations. Based upon the feedback we gathered from the COA Outreach campaign the list of recommendations were refined and finalized.

The service and network recommendations will also support SunRail and other future network improvements. Ultimately, all the improvements proposed seek to improve the system, making it a more attractive transportation option for the region. The proposed service improvements will not only provide a better service for the existing riders, but also attract new riders. Ridership impacts associated with the proposed improvements were developed using the latest version

(4.1) of the Transit Boardings Estimation and Simulation Tool (TBEST). Fiscal impacts of the recommendations were estimated with current funding frameworks and compared LYNX's 2014 budget. The types of recommended improvements include:

- Global Recommendations
- Link-specific recommendations
    - Routing Changes
    - Schedule Improvements
    - Service Span Improvements
    - Bus Stop Spacing Changes
- New Route Recommendations

The types of improvements are generally described, as follows.

Global Recommendations

Global improvements are not route-specific and could be applicable to any number of routes in the LYNX system. They include recommendations to improve schedule adherence and provide for improved customer information/amenities. New technologies, administrative and marketing recommendations are included.

Routing Changes

The following Service Guidelines were used to develop potential route restructurings, extensions or truncations:

- **Standard Network Spacing in Residential and Commercial Areas**
- **Overall Directness of Route**
- **Standard for Serving a Park and Ride Directly**
- **Standard for Route Investigation based on Farebox Recovery**

Overall, the existing route structure functions well for LYNX and its customers. Routing changes have been proposed as part of the COA where unproductive segments were identified, simplification was desired, or improvements to schedule adherence were needed. September 2012 stop level ridership data was used to identify underperforming segments of a route.

Routing improvements can decrease travel times and have positive impacts on schedule adherence. Additionally, based on demographic analysis and feedback from LYNX staff and riders, recommendations for extensions of routes were made where appropriate.

There were some Links where simplification of the routing is recommended to improve efficiency. For instance, while one-way loops for a transit route allow for simple low-cost increases in service coverage, they can result in the transit rider sitting through a longer trip than

necessary. Where feasible, it was recommended to convert one-way loops to two-way loop service or to open the loop and provide point-to-point service in both directions.

Additionally, the schedule adherence data from the Automatic Vehicle Location (AVL) system indicated issues with on-time performance for many routes. Both schedule adjustments and splitting Links were explored as a result. LYNX provides a number of long-distance cross-town routes. These routes travel major corridors which are already congested, presenting a challenge to maintaining a tight schedule. The difficulty in maintaining schedule adherence on a longer route is that once the bus gets behind schedule it becomes difficult to make the time up, and the bus continues to fall behind. "Breaking" the route at a logical midpoint, provides two shorter routes where it is easier to maintain a schedule. Since riders on these longer routes don't typically ride from beginning to end due to the length, selecting a midpoint where a significant number of transfers aren't introduced was an objective. Finally, rudimentary transfer data on a route-to-route level for a full year was used to support routing changes where effects to transferring passengers might be important.

A few geographic locations are proposed for significant improvement through multi-route restructurings. These locations were identified by LYNX staff and through the analysis of all of the data as needing a better route network in order to accommodate the existing and projected demand. These route restructurings are often called "packages" in the route specific recommendations that follow indicating that all of the route changes proposed must be implemented together to achieve the full benefit of the restructuring. Detailed descriptions of these "package" improvements are included in Section 4.4 of this report.

Schedule Improvements

The following Service Guidelines were used to develop potential schedule improvements:

- **On-Time Performance**
- **Average Speed**
- **Headway/Loading**

Data used to develop recommendations for schedule improvements include APC and AVL data. Recommendations for improving the schedule include changes to headway as well as running time. The goal of these proposed improvements is to schedule buses to arrive frequently, regularly, and reliably.

Service Span Improvements

The following Service Guideline was used to develop potential service span changes:

- **Spans of Service/Days of Operation**

Many of LYNX's routes were candidates for service span adjustments based on the service guideline set out in Chapter 2. An adjustment in service span was considered if the load factor (volume to capacity) of the first or last trip of a route exceeded the service guideline. Those

routes showing higher load factors (over 76 percent) on the first or last trip were candidates for extending the service span. Routes where the load factor on the first or last trip was below 10 percent were candidates for proposed service span reductions. APC data was used for the development of these recommendations.

Overall, LYNX should strive to keep the minimum service span of 6 a.m. to 10 p.m. However, some routes do not have the ridership demand to warrant this. On those routes that do not operate from 6 a.m. to 10 p.m., LYNX should conduct a more detailed schedule and operator assignment review to see if they could be expanded via interlining efficiencies to meet the overall service span objective without cost impact.

Bus Stop Spacing Changes

The following Service Guidelines were used to develop potential changes to bus stop spacing:

- **Bus Stop Spacing**

The spacing of stops can have an impact on schedule adherence as well. If a bus has to stop frequently, it will increase the run time for a route. Therefore, routes identified to be in violation of the stop spacing guideline would be candidates to have stops removed or possibly added. This COA review did not identify specific stops to remove or locations to add, but instead proposes a proper spacing and identified links which require further analysis at the stop level. Our recommendation would be to use a combination of stop-level ridership data and knowledge of activity centers to determine specific locations for stop reductions. GIS data of bus stop locations was used to support these recommendations.

New Route Recommendations

The following service guidelines were used in developing potential new routes:

- **Standard Network Spacing in Residential and Commercial Areas**

As part of the COA (see Chapter 1), a review of future demographic trends was conducted to identify potential areas for expansion (Transit Supportive Areas). The data used was 2030 population forecasts at the TAZ level provided by MetroPlan Orlando.

A review of the *LYNX Vision 2030* and *LYNX Transit Development Plan 2013-22* was also used to identify areas for longer term expansion of LYNX service. The Vision 2030 plan reviewed future land use projections, demographic forecasts, and regional traffic growth to identify significant corridors for future expansion. Twenty-two corridors were identified and services were proposed based on a scoring methodology that combined all the data reviewed. These expansion corridors were reviewed as part of the COA and the recommendations herein were developed in consideration of those recommendations as well as the recommendations made in more recent planning efforts (the current 2013 TDP update and the draft SunRail feeder bus plan). The review of the existing routes and data generated for the routes as compared with the Service Guidelines

also contributed to recommendations for new routes. These are described in greater detail in the long-term recommendations section.

4.3 Global Recommendations

Throughout this COA review of LYNX routes and operations, several potential opportunities to improve the overall LYNX system were discussed.

Schedule Improvements

Headways for the majority of the routes in the LYNX system range from 30 to 60 minutes. Many stay static throughout the day without any increases during peak travel times. Having frequent (less than 15 minute) service along bus routes is important as it encourages "choice riders" (people who are not transit dependent) to ride the system, and improves the overall quality of service for everyone. There is a trade-off between providing frequent service on existing routes and expansion of the network with low-frequency service. One of the major recommendations of this study is that rather than expanding greatly outside of its existing service area, **LYNX should focus on providing frequent, reliable service to a concentrated core network in its existing system**. This type of service investment will have the greatest results in increasing ridership for both transit-dependents and new, choice riders while improving customer satisfaction and the system's cost-effectiveness.

Modifying fleet size was looked at as a potential alternative to headway adjustments at a system-wide level. LYNX predominantly operates 40 foot buses with a few articulated buses available. The Service Guideline proposes that higher capacity (articulated) vehicles only be used on Links that are experiencing capacity issues for a single trip. All other **Links with capacity issues should have added service instead of increased vehicle sizes.**

Schedule adherence was an issue noted in the route evaluation. The analysis of the AVL data revealed that LYNX buses departed early or arrived late 30 percent of the time on 88 percent of the LYNX routes. This was also an issue noted through conversations with customers as well as LYNX staff. During the analysis, a problem with the LYNX AVL data for each route between time points was discovered. The data contained large on-time performance issues that could not be explained by staff, but were viewed as false. Staff consulted with their vendor about these issues, but no definitive solution was arrived at. LYNX provided a table that provided the number of trips early or late for each route, but without the ability to view route segments. This limited the use of the data to target specific segments of routes for on-time performance issues. It is recommended that **LYNX resolve these and other AVL/APC data issues** to provide a solid database for future performance evaluations. **Employment of a data analyst to manage the collection and reporting of performance data is recommended** since current staff is only accessing the data on an "as needed" basis which has resulted in inefficiencies and an inability to identify data issues. Additionally, LYNX should be employing **Ride-checks, Terminal-checks or other means to validate data** collected through electronic "smart bus" technologies.

LYNX should conduct **a re-examination of the run-time assumptions currently being used in their scheduling software to create more accurate schedules** based on traffic conditions during times-of-day. Review of in-the-field running times should be conducted periodically to account for changes in regional traffic congestion. Basing schedule times on up-to-date traffic and travel information would improve on-time performance. The vast majority of LYNX's routes are scheduled with a single running-time throughout the day. This makes maintaining on-time-

performance difficult, given the fact that traffic can fluctuate greatly throughout the day. LYNX should use AVL data and traffic information available from regional agencies to support this effort.

Another system-wide consideration for improving running times and bus schedules would be the **implementation of Transit Signal Priority (TSP)**. TSP allows transit vehicles to receive preferential treatment at intersections. Depending on the complexity chosen, this technology could require TSP-enabled equipment at intersections, on vehicles, and at traffic management centers. This can be accomplished a number of different ways, but the goal is always the same; to provide a benefit to the bus, allowing it to improve travel times by receiving a green signal more often when it approaches an intersection. Determining what routes and/or corridors would benefit from this investment would require further study. LYNX should consider this as congestion in the Orlando region increases. An initial focus may be on the heavily traveled LYNX corridors and FastLink routes. These services are already marketed as a faster service than the local service. The addition of TSP could improve travel times and improve reliability in the schedule.

Customer Information/Amenities

It is also important to be able to communicate how frequently a service operates or if that frequency changes throughout the day to accommodate fluctuations in demand. **LYNX should implement real-time schedule information**, accessible through digital message boards at stops or accessible through smart phone apps. LYNX's current AVL system should be able to accommodate this extension of information to the public. Real-time passenger information is a rapidly emerging hallmark of modern transit systems.

Another recommendation is for LYNX to **improve the availability and quality of information about transit service** that is available to the public. The LYNX website is available in on-line and mobile versions. The on-line version provides information about routes, different services, alerts, fares, trip planning, and information about the system and working with the system. The mobile version is much more streamlined and provides route maps, service alerts, trip planning through Google maps, press releases, a calendar, and a "contact us" button. LYNX also provides information through the Facebook page and Twitter account. The Twitter account does not currently have a lot of followers and could be marketed more. One issue mentioned in the community outreach efforts was associated with better communication of alerts. This could be done by setting up a text alert service for riders to join or by creating a specific Twitter account for LYNX Alerts. This would allow those riders who only want to receive alerts and not other public information on LYNX to receive a focused feed. This would also reduce the need to search for alerts through the feed as it becomes more active.

LYNX could also adopt a "Frequent Service Map" similar to those used in Spokane, Portland, and Los Angeles. These maps provide information to riders on what routes operate the most frequently in the system, and are useful in attracting choice riders. Figure 4-1 shows an example of this type of map for Spokane Transit. They use different color and thickness lines to indicate the type and frequency of the service provided in a particular color. In the case of the Spokane Map, routes that are frequent in service are highlighted in red, and other routes are shown in blue. This appears to be a common way to graphically represent service levels for a system. Other methods can be developed, but the overall goal should be to easily communicate to the rider the type and frequency of service available to them. These are two of the most important factors when deciding to use transit.

The route numbering scheme has no discernible pattern and impedes customer legibility of the LYNX system. Many transit systems use their numbering scheme to indicate the type of service (local vs. express), the general geography served, or other characteristics important to the rider. A quality numbering scheme can provide riders visiting the area who aren't familiar with the system to understand certain aspects of the LYNX system easily. The 2006 COA developed a numbering system around their recommendations for service improvements. This system has been implemented on a limited basis, but should be fully implemented throughout the LYNX system. The numbering system proposed assigns number ranges to certain types of routes. Transit emphasis corridor routes receive a number beginning at 100. They provide high quality, frequent service. Regional routes were given a designation between 200-299, Primary local routes (300-series), and Secondary local routes (400-series). While the exact numbering range doesn't need to be followed, **LYNX should develop a numbering scheme that is linked to route type to provide a clear pattern to the customer.**

Through the outreach effort with LYNX operators, concerns were raised about customers not being prepared to pay their fare which slows the boarding process. Depending on the number of people boarding the bus, this could be a contributing factor to the on-time performance issues. There are a number of solutions that could improve this issue, and each has its pros and cons. One consideration could be to **better market the passes that LYNX offers**. LYNX provides customers with the ability to purchase all day, 7-day, and 30-day passes for both the local and express routes. These passes do provide a level of discount when compared to the comparable amount of cash fare that would be required to ride the same number of days. It is acknowledged that low-income riders have difficulty in paying for the larger passes due to the one-time amount of money required. However, marketing materials developed to highlight the amount of service that could be received for some of the smaller passes compared to the cash required could communicate the benefit. It would also be beneficial to produce and market a campaign for **"How to Ride LYNX"**. This outreach effort would highlight customer expectations such as having their cash fare ready prior to boarding, and explaining the impacts of not being ready to pay.

Another request of riders received through the community outreach efforts was for **improved amenities at bus stops and SuperStops**. The SuperStops do provide schedule information, but there are a limited number of SuperStops within the system. LYNX should consider identifying other high usage stops and providing at the very least route maps and schedules. There are a number of schedule holders on the market that can be attached to the stop pole. LYNX should also provide as much information as possible at SuperStops and other major transfer points. These locations should include system maps, and schedules for the routes that serve that location. LYNX should consider adding real-time passenger information to SuperStops. This can

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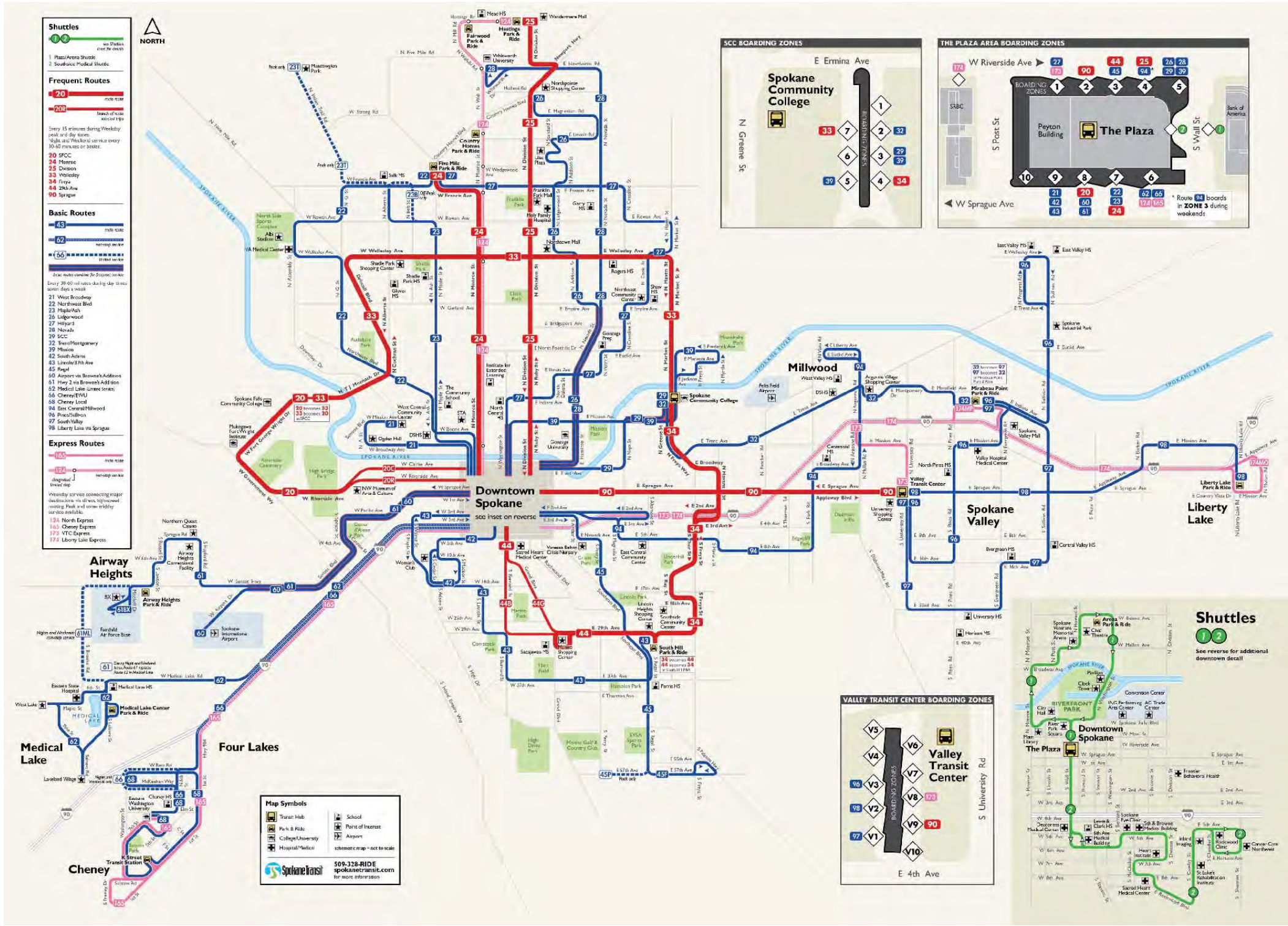
Figure 4-1: Example of "Frequent Transit Service" Map (Spokane Transit)

Source: Spokane Transit website – www.spokanetransit.com



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be accomplished through the automatic vehicle location (AVL) software. LYNX should also make sure SuperStops have appropriate amenities for both customers and operators, including lighting, rest-room facilities, seating, and shelter from the elements. These guidelines should be used in the development of all future SuperStops.

Another consideration could be the use of **off-board fare collection at SuperStops** or other busy locations. This would require a certain level of investment, requiring machines to read and/or load fare cards, reloadable fare cards, infrastructure to keep people from accessing the bus without paying, and policing resources. This investment would support the future implementation of bus rapid transit service.

Finally, LYNX should consider constructing **one or two new, localized operating bases to minimize deadhead mileage**. These bases could be used for fleet storage and minimal maintenance to minimize capital cost requirements.

4.4 Phasing/Implementation of Recommendations

Recommendations have been divided into two categories, short-term and long-term. Short-term recommendations are intended to occur over the next five years. All recommendations for existing Links are included in the short-term time frame. The Long-term recommendations are for new routes that would likely not be suitable for implementation over the next five years. This is due to the fact that the service area conditions (population growth, land use changes, and/or demand) over the next five years do not appear to be suitable to support the types of new or expanded service included in the Long-term recommendations. The projected implementation time frame for the long-term recommendation is between five and twenty five years. See Chapter 5 for more information.

4.5 Short-term Service Improvements (Existing and New Routes)

The following section presents the recommended service improvements for the LYNX system over the next five years. The organization of the recommendations is by service type. LYNX routes are listed in order. If no recommendation has been made, the reasoning is provided in the paragraphs below. Routes that have received a recommendation for a service improvement are supported by the results of the route performance review and an explanation of how the improvements would be effective. For routes where restructuring or a new service is proposed, a graphic is included to show the new or revised route. Table 4-1 summarizes the changes proposed for each existing route.

Table 4-1: Link Specific Recommendations (Local and Express)

Link	Route Name	Description	Change Type
1	Winter Park/Altamonte Springs	Extend route to LCS (Link 125 Package)	Routing Changes
3	Lake Margaret Drive	Truncate route at Social Security Administration (East Orlando Package)	Routing Changes
6	Dixie Bell Drive	Extend route to LCS (East Orlando Package)	Routing Changes
8	W. Oak Ridge Road/International Drive	Truncate route at Destination Parkway (part of Link 8/42 swap)	Routing Changes
		Double headway between 7AM and 11 AM in the outbound direction	Schedule Improvements
		Double headway between 1PM and 5PM in the inbound direction	Schedule Improvements
9	Winter Park/Rosemont	Add seven minutes of running time to existing route to improve reliability	Schedule Improvements
		Pine Hills Re-route (Pine Hills Package)	Routing Changes
10	East US 192/St. Cloud	Add service on Sunday	Service Span Improvements
		Increase headway to 30 minutes throughout the day	Headway Improvements
		Restructure route as part of KIF Package	Routing Changes
		Add non-stop route	Schedule Improvements
13	University of Central Florida	Reduce morning span of service	Service Span Improvements
		Increase headway between 6AM and 12:00PM in the outbound direction	Headway Improvements
14	Calvary Towers/Winter Park Village	Extend to LOC (Link 125 Package)	Routing Changes
15	Curry Ford Road/Valencia College East	Consolidate service on S. Goldenrod Road (eliminate service on Egan); East Orlando Package	Routing Changes
		Reduce stop spacing	Bus Stop Spacing
17	North US 441/Apopka	Create a FastLink Service	Schedule Improvements
18	S. Orange Avenue/Kissimmee	Expand AM span of service	Service Span Improvements
		Restructure route as part of KIF Package	Routing Changes
20	Malibu Street/Pine Hills	Reduce stop spacing	Bus Stop Spacing
21	Universal Studios	Extend route to Walt Disney World	Routing Changes
26	Pleasant Hill Road/Poinciana	Restructure route as part of KIF Package	Routing Changes
28	E. Colonial Drive/Azalea Park	Reduce stop spacing	Bus Stop Spacing
		Reduce evening span of service	Service Span Improvements

Table 4-1: Link Specific Recommendations (Local and Express) (Continued)

Link	Route Name	Description	Change Type
29	W. Colonial Drive/Goldenrod	Restructure route to remove Goldenrod Section (East Orlando Package)	Routing Changes
		Reduce evening span of service	Service Span Improvements
34	Sanford/Goldsboro	Restructure route to serve French Ave. and Central Florida Regional Hospital and remove from Airport Blvd. (Sanford Package)	Routing Changes
36	Lake Richmond	Reduce stop spacing	Bus Stop Spacing
		Reduce evening span of service	Service Span Improvements
		Remove running time from schedule	Schedule Improvements
37	Pine Hills/Florida Mall	Restructure route (Pine Hills Package)	Routing Changes
		Increase headway between 5AM and 9AM in the southbound direction	Headway Improvements
		Increase headway between 4AM and 8AM in the northbound direction	Headway Improvements
38	Downtown Orlando/International Drive	Increase span of service to all day	Service Span Improvements
40	Americana Boulevard/Universal Orlando	Expand morning span of service	Service Span Improvements
		Reduce stop spacing	Bus Stop Spacing
41	SR 436 Crosstown	Reduce stop spacing	Bus Stop Spacing
		Expand morning span of service	Service Span Improvements
		Increase headway around 3PM in the westbound direction	Headway Improvements
		Split Route to improve reliability	Schedule Improvements
42	International Drive/Orlando Airport	Extend route to Premium Outlets (part of Link 8/42 swap)	Routing Changes
		Increase headway between 10AM and 5PM in the eastbound direction	Headway Improvements
		Increase headway between 6AM and 3PM in the westbound direction	Headway Improvements
44	Hiawassee Road/Zellwood	Restructure route (Pine Hills Package)	Routing Changes
		Adjust time points	Schedule Improvements
45	Lake Mary	Extend route on the east to Central Florida Greenway, and on the west to International Parkway and C.R. 46A (Sanford Package)	Routing Changes
46 E	West SR 46/Seminole Town Center/Downtown Sanford	Extend route to Central Florida Greeneway via Melonville and Sanford Ave. Remove from French Avenue (Sanford Package)	Routing Changes

Table 4-1: Link Specific Recommendations (Local and Express) (Continued)

Link	Route Name	Description	Change Type
46 W		Extend route to Sand Pond Road, remove from French Avenue (Sanford Package)	Routing Changes
48	W. Colonial Drive/Pine Hills	Restructure route (Pine Hills Package)	Routing Changes
		Reduce evening span of service	Service Span Improvements
		Increase headway between 6AM and 10AM in the eastbound direction	Headway Improvements
49	W. Colonial Drive/Pine Hills Road	Restructure route (Pine Hills Package)	Routing Changes
50	Downtown Orlando/Magic Kingdom	Remove route from SeaWorld	Routing Changes
51	Conway Road/Orlando International Airport	Expand the morning span of service	Service Span Improvements
54	Old Winter Garden Road	Eliminate Saturday service	Service Span Improvements
55	West US 192/Four Corners	Restructure route as part of the KIF Package	Routing Changes
56	West US 192/Magic Kingdom	Expand morning span of service	Service Span Improvements
		Restructure route as part of the KIF Package	Routing Changes
58	Shingle Creek Circulator	Eliminate Route	Routing Changes
103	North 17-92 Sanford	Increase headway around between 6AM and 10AM in the northbound direction	Headway Improvements
104	East Colonial	Increase headway to 15 minutes throughout the day	Headway Improvements
111	SeaWorld/Orlando International Airport	Extend to Walt Disney World	Routing Changes
125	Silver Star Road Crosstown	Restructure route to serve downtown Orlando (Link 125 Package)	Routing Changes
301	3-D - Pine Hills/Animal Kingdom	Restructure route	Routing Changes
302	3-D - Rosemont/Magic Kingdom	Restructure route (Limited Directs Package)	Routing Changes
304	3-D - Rio Grande/Visitana Resort	Restructure route (Limited Directs Package)	Routing Changes
305	3-D - Metrowest/All Star Resorts	Restructure route (Limited Directs Package)	Routing Changes
319	Richmond Heights	Reduce evening span of service	Service Span Improvements
405	Apopka Circulator	Eliminate Route	Routing Changes
426	Poinciana Circulator	Expand morning span of service	Service Span Improvements
441	Kissimmee/Downtown Orlando	Expand span of service	Service Span Improvements
443	Lee Road Crosstown	Reroute (Pine Hills Package)	Routing Changes
445	Apopka/West Oaks Mall	Adjust time points	Schedule Improvements

Packages of Improvements

Some of the short-term improvements listed above include changes to multiple routes, which was a product of the network-based approach taken in the COA. In these packages, changes would be required to all routes to achieve the benefits of the package of improvements.

East Orlando Package

The East Orlando package of improvements seeks to improve the financial performance of routes in this area and to improve overall network readability (by eliminating multiple branches, and removing one-way loops). This package includes the following routes: Link 3, Link 6, Link 15, Link 29 and the new Goldenrod route.

Sanford Package

The Sanford package of improvements seeks to improve transit operations and expand network coverage. This package includes the following routes: Link 34, Link 45, Link 46E/W and two new NeighborLinks.

Pine Hills Package

The Pine Hills package of improvements seeks to improve transit operations and customer convenience by rerouting bus service to different SuperStops due to the closure of the Park Promenade Plaza SuperStop. This package includes the following routes: Link 37, Link 44, Link 9, Link 49, Link 48, Link 443.

Link 125 Package

The Link 125 package of improvements seeks to improve transit routing by providing a more direct connection between the Silver Star area and downtown Orlando, and the financial viability of routes in the area. This package includes the following routes: Link 1, Link 14, Link 125.

Limited Directs Package

Ridership on the Limited Direct routes has increased significantly. To re-distribute the loads between the various Limited Direct Routes, a restructuring of four of the routes (Link 301, Link 302, Link 304 and Link 305) is proposed, along with a new route that would help alleviate this situation.

Kissimmee Intermodal Facility (KIF) Package

The Kissimmee Intermodal Facility (KIF) plan in the COA would re-route bus service in Kissimmee to serve the newly completed Kissimmee Intermodal Facility. This package includes the following routes: Link 4, 10, 18, 26, 55, 56, and 441.

With the completion of KIF in late 2013, LYNX and Osceola County have agreed to implement the reroute of Links 4 (now 107), 10, 26, 55, 57 and 441 to KIF in January 2014. Link 56 will continue to serve the Osceola Square Mall. This COA recommends that in 2015 Link 56 be rerouted to KIF and Link 57 be returned to Osceola Square Mall.

Link-specific Recommendations for Local Routes

Link 1 – Winter Park/Altamonte Springs

Link 1 is considered to be an average performer based on the route performance analysis. In order to improve performance, the route is recommended for **an extension from Winter Park to downtown Orlando**. This extension would provide a direct connection to downtown Orlando via Mills Avenue and into the LYNX Central Station via Colonial Drive. A high level of transfer activity was observed in the 2010 *"Before" Passenger Survey for the Central Florida Commuter Rail Transit Project* between Link 1 and Link 102 to access downtown Orlando. The proposed route extension would eliminate the need for this transfer. This extension would also facilitate the proposed elimination of Link 125 by providing service along Orange Avenue (which is adjacent to Mills Avenue and is currently served by Link 125). See Figure 4-2 for the recommended, revised Link 1 routing.

*NOTE: the recommendation to reroute this route is part of the **Route 125 package** and changes to this route would be contingent on changes to other routes.*

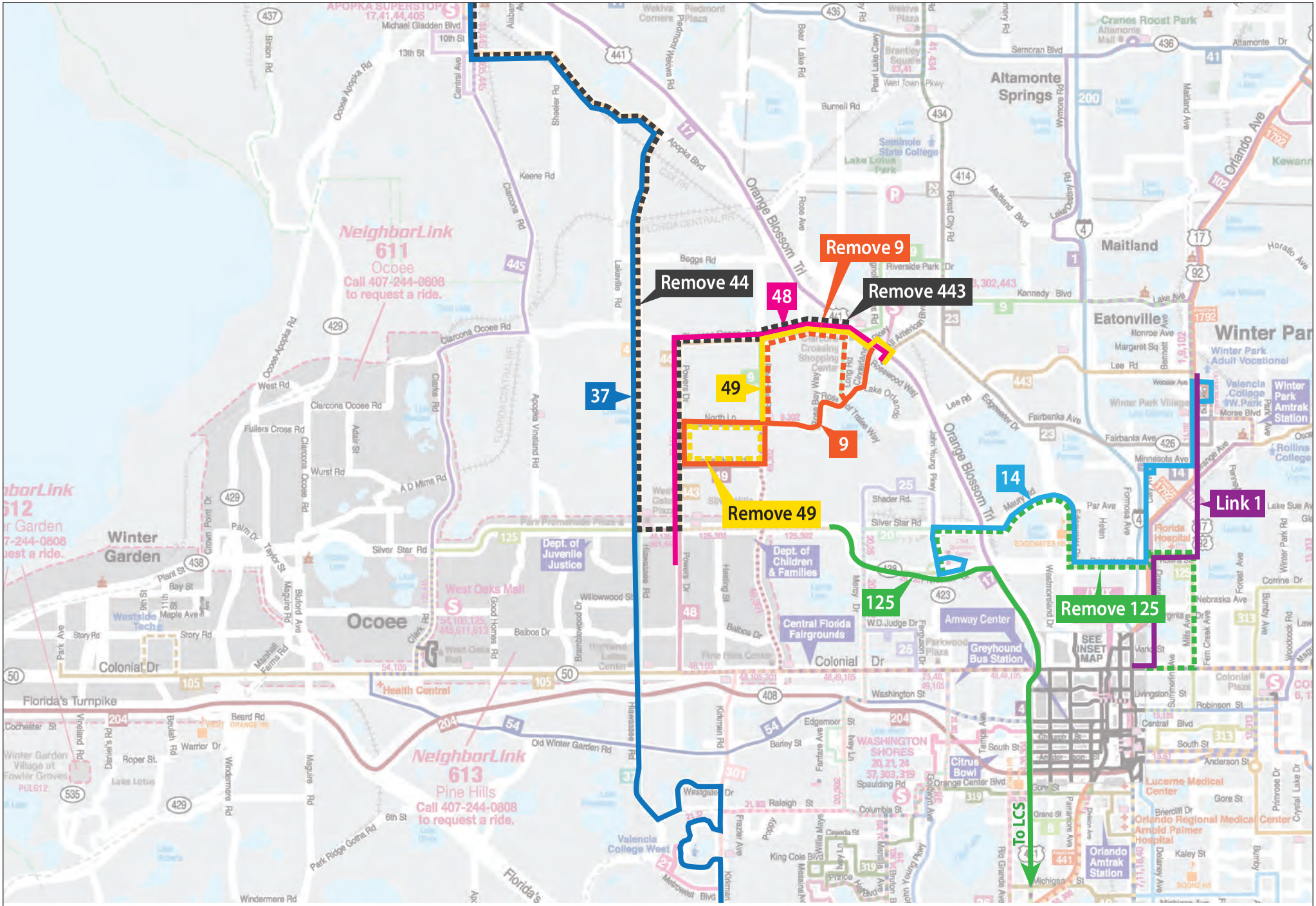
Link 3 – Lake Margaret

Link 3 performed poorly in the route performance analysis for service span and route speed. However, a revision of the service span is not recommended because it is proposed **that the portion of the route from the Social Security Administration office on Gatlin Avenue be eliminated**. The portions of the loop that are proposed for elimination in Link 3 are included in recommendation for the Link 6 restructuring. See Figure 4-3 for the recommended, revised Link 3 routing.

*NOTE: the recommendation to reroute this route is part of the **East Orlando package** and changes to this route would be contingent on changes to other routes. In January 2014, LYNX is increasing the span of service on Link 3. This change affects the cost for the proposed Link 3 Recommendation made in this COA. Prior to implementation of the COA recommendation, the cost savings should be recalculated using the longer span of service as the basis of cost comparison.*

Link 4 (and Link 107) – South U.S. 441/Kissimmee

Overall, Link 4 performed well in many categories (ridership, passengers per mile, passengers per hour, farebox recovery, and revenue per mileage). It did not perform well for bus stop spacing, span of service, on-time performance, and route speed. The review of ridership to vehicle capacity indicated that the last inbound trip fell below the 10 percent load factor set as a guideline. Based on this analysis, it is recommended that the **evening span of service be shortened.** It is also advised that the **bus stops on this route are assessed for elimination** since the stop spacing for Link 4 exceeds the six bus stops per mile guideline. The only routing change, on the southern end, **extends Link 4 to serve the Kissimmee Intermodal Facility**. This would require a minor route change as the route heads south into downtown Kissimmee it would turn east onto E. Drury Avenue, south into the transit center, west onto Sproule Avenue, and then continue south along E. Broadway Avenue.



LYNX Comprehensive Operational Analysis (COA) of LYNX Transit Route Network

FIGURE 4-2

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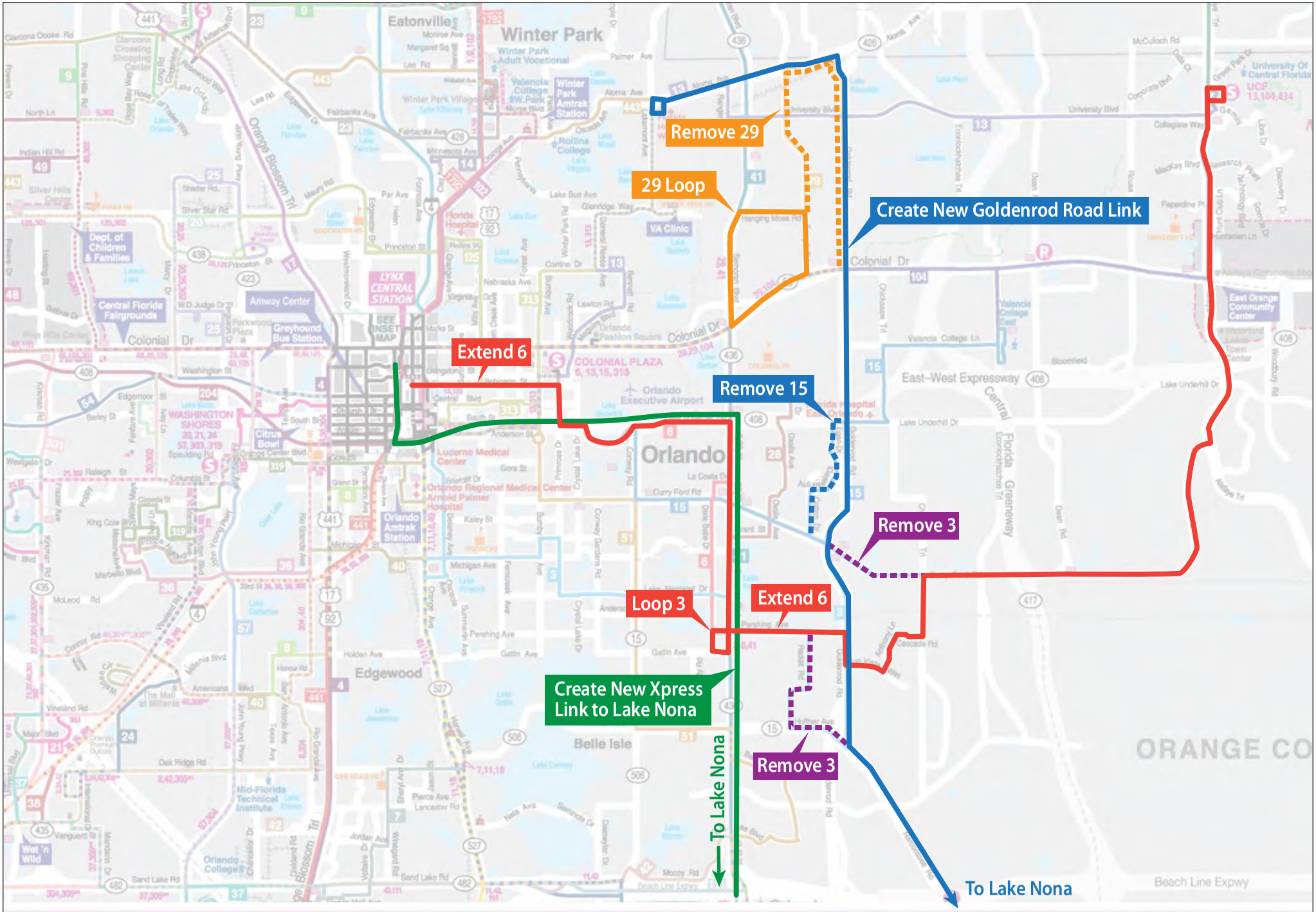

LYNX Comprehensive Operational Analysis (COA) of LYNX Transit Route Network

FIGURE 4-3

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In August 2013, LYNX split Link 4 at the Florida Mall, creating **Link 107** between the Florida Mall and Osceola Square Mall. LYNX should review loading and transfers on Link 4 and Link 107 to ensure that service levels and the ability to make transfers are being optimized.

NOTE: In January 2014, LYNX will rename Link 4 (providing service north of the Florida Mall) as Link 108.

Link 6 – Dixie Bell

Link 6 was overall a poor performing route. It scored poorly for span of service, ridership, and farebox recovery. It did score highly for route speed, which would not be unexpected since the route is not picking up many passengers. To generate more ridership by expanding its service area, it is recommended that the **Link 6 be extended to the University of Central Florida on the east end and to LYNX Central Station (LCS) on the west end**. This would eliminate the route's one-way loop the while improving efficiencies with Link 3. The route should continue to operate with the same service span and headway as it currently does. See Figure 4-3 for the recommended, revised Link 6 routing.

*NOTE: the recommendation to reroute this route is part of the **East Orlando package** and changes to this route would be contingent on changes to other routes.*

Link 7 – S. Orange Avenue/Florida Mall

Link 7 performed well for passengers per mile and hour as well as revenue per mileage and on-time performance. The only area where Link 7 performed poorly was route speed. Otherwise, the route was average. Therefore, **no changes are proposed to Link 7**.

Link 8 – W. Oak Ridge Rd./International Drive

Link 8 was one of the highest performing routes for ridership and farebox recovery. This is reflected in the high quality of service operated on Link 8. The route did score poorly for stop spacing and span of service. Links 8 and 42 currently serve the Orlando Premium Outlets at International Drive and Vineland, but ridership to the Orlando Premium Outlets – International Drive is currently low. Frequency on Link 8 is 30 minutes and 15 minutes on Link 42. It is recommended to **terminate Link 8 at Destination Parkway** and continue service to the International Drive outlets via Link 42. Additionally, trips need to be added on Link 8 around 8:00 a.m. in the outbound direction and 2:00 p.m. in the inbound direction. **Up to four hours of added service during these times is proposed to be added to this route**. The observed passenger loads were greater than 1.25 during these times. See Figure 4-4 for the recommended, revised Link 8 routing.

Link 9 – Winter Park/Rosemont

Link 9 performed above average for ridership and revenue per mile. This route performed poorly in a comparison of actual speed to scheduled speed, indicating an issue with the schedule. While the Link 9 was not flagged as a poor performer for schedule adherence (on-time 63 percent of trips), this does indicate there could be room for improving the schedule. It is recommended that approximately **7 minutes of running time be added to the schedule**, with the headway for the route remaining constant. In addition, to accommodate improvements to Link 49 that remove

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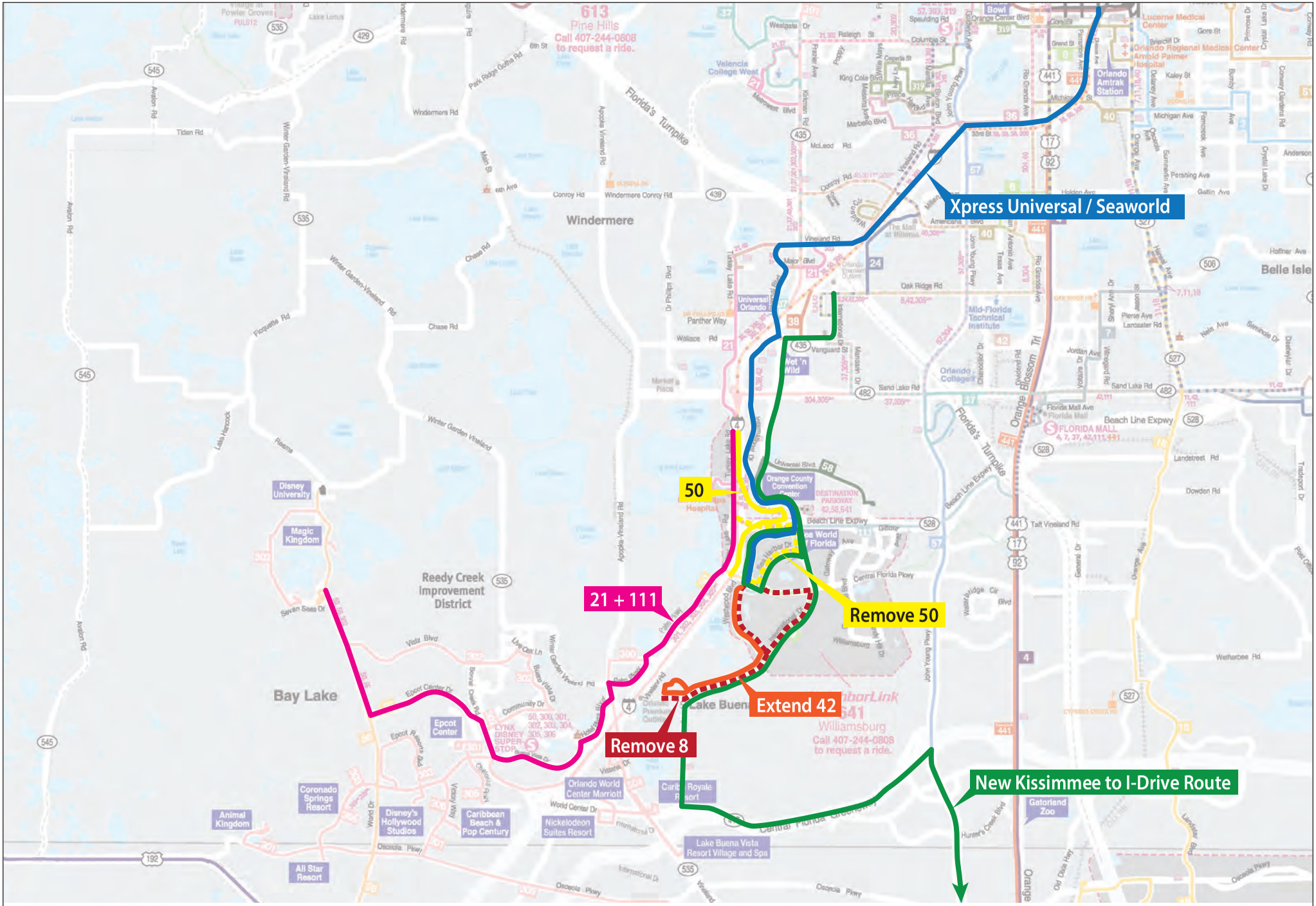
Xpress Universal / Seaworld
50
21 + 111
Remove 50
Extend 42
Remove 8
New Kissimmee to I-Drive Route
Windermere
Bay Lake
Reedy Creek Improvement District
Belle Isle
Lake Buena Vista
Disney University
Magic Kingdom
Epcot Center
Animal Kingdom
Disney's Hollywood Studios
All Star Resort
Coronado Springs Resort
Caribbean Beach & Pop Century
Nickelodeon Suites Resort
Orlando World Center Marriott
Lake Buena Vista Resort Village and Spa
Universal Orlando
Orange County Convention Center
Mid-Florida Technical Institute
Orlando Amtrak Station
Florida Mall
Gatorland Zoo
Florida's Turnpike
Orange Blossom Trl
Beach Line Expwy
Central Florida Pkwy
Osceola Pkwy
Conroy Rd
Windermere Conroy Rd
Vineland Rd
Chase Rd
Oak Ridge Rd
Sand Lake Rd
Taft Vineland Rd
Dowden Rd
Landstreet Rd
Wetherbee Rd
Valencia College West
Lucerne Medical Center
Orlando Regional Medical Center
Arnold Palmer Hospital
Orlando Science Center
Mall at Millenia
Florida Mall
Orlando Vineland Premium Outlets
Williamsburg
Call 407-244-0808 to request a ride.
613 Pine Hills
Call 407-244-0808 to request a ride.

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the Indian Hill Road loop, **a minor rerouting of Link 9 is proposed** as part of the Pine Hills Package. Link 9 will continue west into Rosemont and south along Cinderlane Parkway, west on Rose of Tralee Way, and south on Rose Bay Drive. Link 9 will turn west on North Lane, continuing over N Pine Hills Road, before turning south on N Powers Drive. The route will turn east on Indian Hill Road, then north on N Pine Hills Road, before turning east on North Lane and following the same routing back through Rosemont and east. See Figure 4-2 for the recommended, revised Link 9 routing.

*NOTE: the recommendation to reroute this route is part of the **Pine Hills package** and changes to this route would be contingent on changes to other routes.*

Link 10 – East U.S. 192/St. Cloud

Link 10 was an overall average performing route. The route performed in the top quartile for revenue to mileage and in the bottom quartile for service span. Ridership for the route has been showing a positive trend (between 2010 and 2011, average weekday ridership grew 10 percent) and community outreach efforts indicated a desire for Sunday service and increased frequency. It is recommended that Link 10's span of service is expanded to **provide Sunday service** from 6:00 a.m. to 6:00 p.m. and that Link 10's headway **be increased to 30 minutes throughout the day** on weekdays. Since the route travels through Kissimmee, it is **recommended that Link 10 serve the Kissimmee Intermodal Facility**. The route will travel west along E. Vine Street as it currently does, but turn south onto N. Main Street, east onto E. Drury Avenue, south into the transit center, west onto Sproule Avenue, and then return to the existing routing by returning north along N. Main Street.

Additionally, in order to improve running times, **a FastLink route that operates straight on US 192 non-stop from Simpson Road to Boggy Creek Road should be implemented** in order to improve the travel time along this corridor. This new route is described further below under "Proposed New Routes".

*NOTE: the recommendation to reroute this route is part of the **KIF package** and changes to this route would be contingent on changes to other routes.*

Link 11 – S. Orange Avenue/Orlando International Airport

Link 11 was a poor performer for farebox recovery and showed a decreasing ridership trend. The route did perform well for revenue to mileage. Overall, the route was average in performance. There were no major indicators for service improvements and no major comments from LYNX staff or the community outreach efforts. Therefore, **no service changes are recommended** for Link 11.

Link 13 – University of Central Florida

Link 13 performed poorly for service span and farebox recovery. The load factor analysis indicates that the first trip in the eastbound direction fell below 0.10, indicating a need to **reduce the morning service span**. This would result in the service starting at 5:30 a.m. rather than 4:30 a.m. Conversely, the trips around 7:30 a.m. in the eastbound direction showed a load factor of 1.25. This warrants an **increase in service frequency** from 6:00 a.m. to 12:00 p.m. to 30 minutes to alleviate the crowding.

Link 14 – Calvary Towers

Link 14 scored poorly for ridership, farebox recovery, and route speed. It did score high for on-time performance. The route is one of the shortest at 3.7 miles. In an effort to improve performance and provide coverage to areas impacted by the proposed Link 125 restructuring, it is recommended to **extend the Link 14 to the LYNX Operations Center**. The route will continue to start at Winter Park and travel down N Denning Drive to W Morse Boulevard to S Orlando Ave and Minnesota Avenue, no longer looping down to Michigan Avenue. The new Link 14 will continue west along Minnesota Avenue, turning south onto Formosa Avenue, west along W Par Street, west along Maury Road which changes to N Rio Grande Avenue, then west along Silver Star Road, south down N John Young Parkway, and turning east onto Lynx Lane to end at the LYNX Operations Center. The new route would continue to provide the same service span and headway as the existing Link 14. See Figure 4-2 for the recommended, revised Link 14 routing.

*NOTE: the recommendation to reroute this route is part of the **Link 125 package** and changes to this route would be contingent on changes to other routes.*

Link 15 – Curry Ford Road/Valencia College East

Link 15 rated poorly for stop spacing, service span, and ridership trend. The route scored high for revenue to total mileage. Additionally, based on a review of the ridership data it is **recommended that service along Cotton Drive, Autumnvale Drive, and Eagan Drive be removed**. Consolidating service on S Goldenrod Road has the benefit of increasing headway for the majority of the route's ridership in this segment, as ridership along Cotton Drive, Autumnvale Drive and Eagan Drive was low. Stop spacing should also be examined because Link 15 exceeds the six stops per mile maximum spacing with greater than 10 per mile. See Figure 4-3 for the recommended, revised Link 15 routing.

*NOTE: the recommendation to reroute this route is part of the **East Orlando package** and changes to this route would be contingent on changes to other routes.*

Link 17 – North U.S. 441/Apopka

Link 17 rated poorly for service span, but high for ridership, farebox recovery, and schedule adherence. A review of the maximum bus loading indicates that northbound trips around 5:00 p.m. are over capacity with a load factor of 1.40. The recommendation is to **increase service frequency for Link 17** around this time period to accommodate the increased demand in the northbound direction.

In order to do so, it is recommended that **a FastLink Service be implemented along this route** to provide faster, more frequent service. Given the running-time and potential improvements in speed, this could be done using the existing buses assigned to the route, operating at a more frequent rate. This route is described further below under "Proposed New Routes."

Link 18 – S. Orange Avenue/Kissimmee

Link 18 rated poorly for service span. The load factor for the first northbound trip was 0.89. This exceeds the service guideline of 0.76, indicating that the **service span should be extended in the morning**. The first trip for Link 18 will start at 3:50 a.m. rather than 4:52 a.m. It is recommended that Link 18 have earlier trips implemented to accommodate the early morning demand. Link 18 did demonstrate a positive ridership trend for the three year period observed. In addition, Link 18 should be **rerouted to serve the Kissimmee Intermodal Facility**. Link 18 will follow a similar routing to Link 10 to access the facility. Headed southbound, Link 18 will turn south from E. Vine Street to N. Main Street. The route will then turn east onto E. Drury Avenue, south into the transit center, west onto Sproule Avenue, and then return to the existing routing by returning north along N. Main Street.

*NOTE: the recommendation to reroute this route is part of the **KIF package** and changes to this route would be contingent on changes to other routes.*

Link 20 – Malibu Street/Mercy Drive

Link 20 rated high for passengers per mile and hour, as well as revenue to mileage. The route rated poorly for stop spacing and route speed. The only recommendation for this route is to have **the stop spacing reviewed**. While the stop spacing just slightly exceeds the six stops per mile maximum guideline, a review could yield elimination of stops with low ridership which would also improve route speed.

Link 21 – Carver Shores

Link 21 rated high for ridership, passengers per hour, and farebox recovery. The route did score poorly for route speed. The route currently provides service to Universal Studios Orlando. Comments were received from LYNX staff requesting a connection between Universal Studios and Walt Disney World. It is recommended that **Link 21 be extended to serve Walt Disney World.** The existing route would be continued, but instead of terminating near Big Sand Lake it is recommended that Link 21 continue south along Turkey Lake Road, maintaining the same headway and span of service. The route would continue on Palm Parkway, turning south on S Apopka Vineland Road, and then west onto Hotel Plaza Boulevard. Link 21 would then follow the routing of Link 50 around Buena Vista Drive, serving Pleasure Island, and continuing north onto Epcot Center Drive to World Drive and the Magic Kingdom. The existing service span and headway will be maintained. See Figure 4-4 for the recommended, revised Link 21 routing.

Link 23 – Winter Park/Springs Village

Link 23 scored well for ridership trend and low for average farebox recovery. The route did not score high or low in any of the performance categories reviewed. The route did not exceed any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. **No recommended changes are proposed** for Link 23.

Link 24 - Millenia

Link 24 scored well for passengers per hour and low for ridership. The route did not score high or low in any of the performance categories reviewed. The route did not exceed any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. Given the routes efficiency, **no recommended changes are proposed** for Link 24.

Link 25 – Mercy Drive/Shader Road

Link 25 scored well for passengers per mile and low for ridership trend. The route did not score high or low in any of the performance categories reviewed. The route did not exceed any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. Given the routes efficiency, **no recommended changes are proposed** for Link 25.

Link 26 – Pleasant Hill Road

Link 26 scored high for ridership trend, farebox recovery, and route speed. The route scored low for service span, and passengers per mile and hour. Link 26 should be **rerouted to serve the Kissimmee Intermodal Facility**. The existing routing will be modified to route east from N. Thacker Avenue along Martin Luther King Jr. Boulevard. The route will turn south onto W. Drury Avenue and into the intermodal facility. The route will exit the facility onto E. Sproule Avenue, turn west onto E Broadway Avenue, continuing through onto W. Emmett Street, then turn south onto S. Thacker Avenue back to the original routing.

*NOTE: the recommendation to reroute this route is part of the **KIF package** and changes to this route would be contingent on changes to other routes.*

Link 28 – E. Colonial Drive/Azalea Park

Link 28 scored high for passengers per mile and hour, farebox recovery, and revenue to mileage. The route scored low for stop spacing, service span, ridership trend, and route speed. The existing stop spacing is just a bit over the maximum six stops per mile service guideline, but the route could still benefit from **eliminating some stops** to be increase route speed. The load factor for the last westbound trip was 0.06. This falls below the service guideline minimum of 0.10. The **recommendation is to shorten the evening service span** as a result of the low observed demand.

Link 29 – East Colonial Drive/Goldenrod Road

Link 29 scores high for passengers per mile, farebox recovery, revenue to mileage, and schedule adherence. The route scores low for service span. The last westbound trip has a load factor of 0.03, well below the minimum service guideline of 0.10. A **reduction in the evening service span is recommended** for Link 29 as a result of the low observed demand. Additionally, in an effort to remove duplicative service along lower use corridors and to accommodate the introduction of a new Goldenrod Road route, it is **recommended to discontinue Link 29 north of Hanging Moss Road on both Goldenrod Road and Forsyth Road**. This shortens the loop and removes lower performing segments of the route. See Figure 4-3 for the recommended, revised Link 29 routing.

*NOTE: the recommendation to reroute this route is part of the **East Orlando package** and changes to this route would be contingent on changes to other routes.*

Link 34 – Sanford/Goldsboro

Link 34 showed consistently poor performance across most of the service categories reviewed. The route scored low for service span; warranting a reduction in service span based on a low load factor. Link 34 also scored low for ridership, ridership trend, passengers per mile/hour, farebox recovery, and revenue to mileage. Based on the poor performance, it is **recommended that Link 34 be rerouted to provide feeder service to the Sanford SunRail station and move it from Airport Road to French Avenue**. This recommendation would take a route that is performing

poorly and reorient it to provide feeder service to the Sanford Station. The route would operate between Seminole Center and the station. Starting at Seminole Station Link 34 would travel north along S Orlando Drive/French Avenue into downtown Sanford, no longer turning west onto Airport Boulevard. Once north of W 1st Street the route follows along Seminole Boulevard, around to Mangoustine Avenue where it continues south until it turns right on West 1st Street. From there, it continues to the new SunRail Station in Sanford. Once the bus reaches the station, it turns begins the route going westbound traveling around the hospital, and turning south on French Avenue returning to Seminole Center. Link 34 will maintain its current service span and headway. See Figure 4-5 for the recommended, revised Link 34 routing.

*NOTE: the recommendation to reroute this route is part of the **Sanford package** and changes to this route would be contingent on changes to other routes.*

Link 36 – Lake Richmond

Link 36 scored high for schedule adherence, route speed, and operating speed vs. scheduled speed. It is also **recommended that the service span be reduced in the evening**. The last trip in the eastbound direction had a load factor of 0.03, well below the service guideline minimum of 0.10. Due to the large discrepancy between the scheduled speed (13 mph) and the operating speed observed through the APC data (28 mph), it is **recommended that running time be removed** from the schedule and that these resources be invested elsewhere.

Link 37 – Pine Hills/Florida Mall

Link 37 scored high for ridership and farebox recovery. The route was fourth for ridership contribution and fourteenth for farebox recovery when compared to the other routes in the system. This indicates that Link 37 is overall a successful route. It did score low for schedule adherence however. As part of the overall changes in routes to accommodate the loss of the SuperStop on Hiawassee Road, **this route is proposed to be restructured**. In an effort to provide better connections, it is recommended to extend Link 37 north along N Hiawassee Road/Sandy Lane Drive, north onto Apopka Boulevard, west onto E 13th Street, then north along S Park Avenue to the Apopka SuperStop. Link 37 will retain its existing service span and headway throughout most of the day. Trips should be added to the route in the southbound direction around 6:00 a.m. and in the northbound direction around 4:00 p.m. to accommodate the observed demand. Ridership data from the APC show that load factors exceed the service guideline of 1.25 passengers per seat, warranting an **increase in frequency**. See Figure 4-2 for the recommended, revised Link 37 routing.

*NOTE: the recommendation to reroute this route is part of the **Pine Hills package** and changes to this route would be contingent on changes to other routes.*

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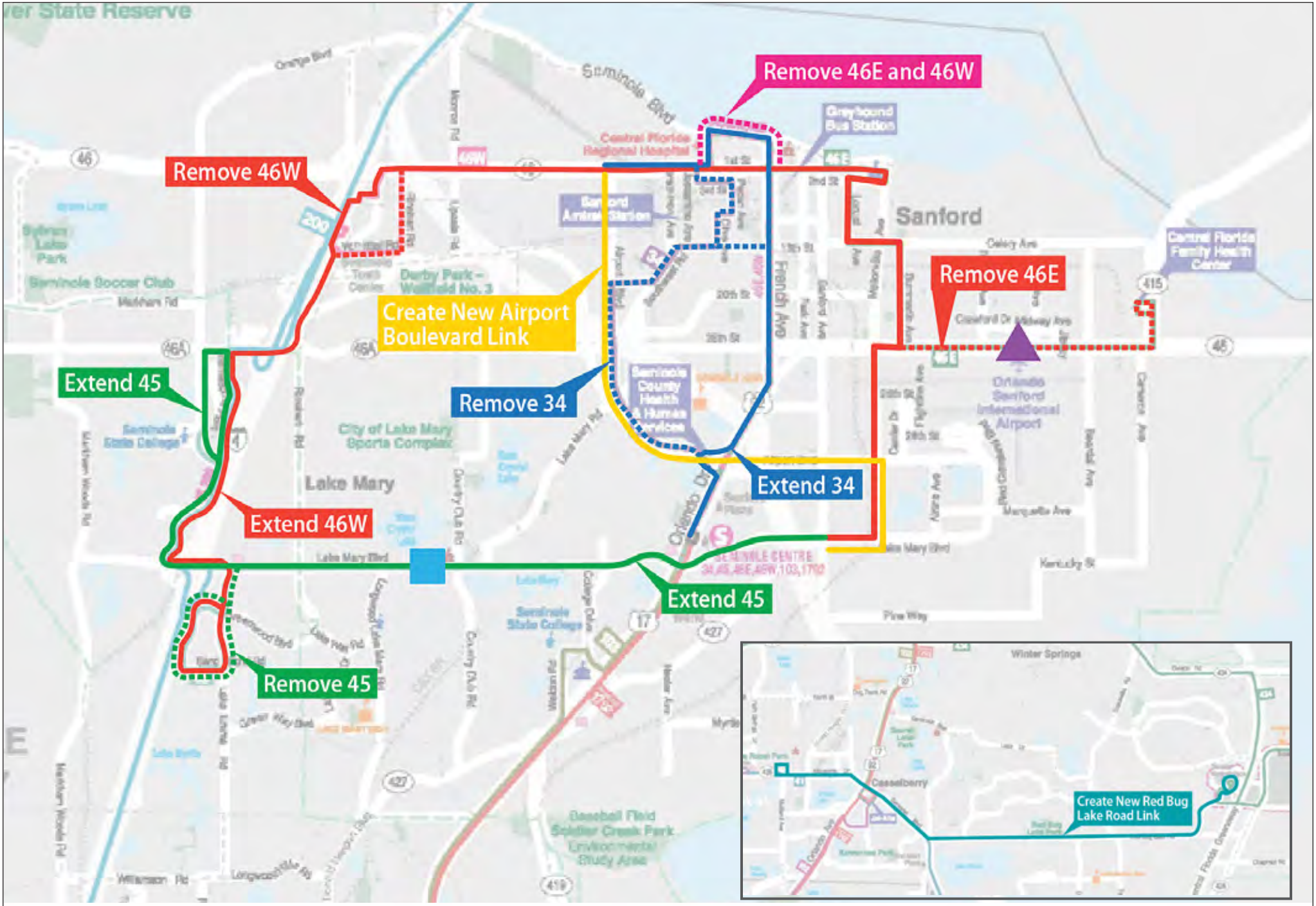
Remove 46E and 46W
Remove 46W
Create New Airport Boulevard Link
Remove 46E
Extend 45
Remove 34
Extend 34
Extend 46W
Extend 45
Remove 45
Create New Red Bug Lake Road Link
Sanford
Lake Mary
Orlando Sanford International Airport
Seminole State College
Greyhound Bus Station
Central Florida Regional Hospital
Seminole County Health & Human Services
City of Lake Mary Sports Complex
Derby Park – Wetfield No. 3
Seminole Soccer Club
Baseball Field Soldier Creek Park Environmental Study Area
Winter Springs
Casselberry

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Link 38 – Downtown Orlando/International Drive

Link 38 scored high for route speed. This isn't surprising since a significant portion of the route travels along Interstate 4. The route did score low for passengers per mile and operating speed vs. scheduled speed. The low passengers per mile should not be a large concern since the bus does not pick up passengers along the interstate. Therefore, there is mileage traveled where no one is boarding. The route is not recommended for routing changes, however **service span is recommended to extend throughout the day** to accommodate more riders and to off-set the proposed removal of Link 50 from SeaWorld.

NOTE: In January 2014, LYNX is expanding the span of service for Link 38 to all day, as recommended in this COA.

Link 40 – Americana Blvd/Universal Orlando

Link 40 scored high for farebox recovery and passengers per mile. The route scored low for stop spacing, service span, and route speed. Based on this review it is **recommended that the morning service span be expanded**. The first trip in the inbound direction had a load factor of 0.80, which exceeds the service guideline of 0.76. Additionally, the stop spacing for Link 40 is greater than 10 per mile. This exceeds the service guideline maximum of six stops per mile and warrants an **examination to determine if there are stops that could be eliminated.**

Link 41 – S.R. 436 Crosstown

Link 41 scored high for ridership, passengers per mile/hour, farebox recovery, and operating speed versus scheduled speed. The route scored low for stop spacing, service span, schedule adherence, and route speed. A review of the schedule adherence data provided by LYNX shows the route is early or late roughly 50 percent of the time. The average speed observed in the LYNX APC data was 14.5 mph. Though the route ranks in the lower quartile for the system, but is not considered a slow speed for a bus route. The stop spacing for Link 41 is 13 stops per mile; well over the six stops per mile maximum service guideline. It is recommended that **stops be reviewed for possible elimination**. Increasing stop spacing could have positive impacts on speed and schedule adherence. Additionally, a review of the schedule is warranted based on the high percentage of buses not on schedule and the discrepancy (12 percent) between scheduled speed and actual speed which may indicate that more time is needed in the schedule. It is also recommended that the **morning service span be extended**. The first trip in the westbound direction had a load factor of 0.85, which is above the service guideline of 0.76. **Service should also be added to the westbound trips around 3:00 p.m**. A maximum load of 1.40 was observed in the APC data, which is well above the load factor guideline of 1.25. In order to improve reliability, the **route is also recommended to be split into two connecting routes**, in the middle of the route at Casselberry.

Link 42 – International Drive/Orlando International Airport

Link 42 was overall an average performer when compared to the other routes. It did score highly for ridership, but poorly for the ridership trend. This indicates that while it carries more riders than many of the routes within the system, it is carrying fewer riders than previous years. This route along with Link 8 provides access to the Orlando Premium Outlets - Vineland. The observed ridership to the Orlando Premium Outlets – International Drive was low. This low ridership resulted in a recommendation to discontinue service to the outlets for Link 8. **Link 42 will instead serve the International Drive Outlets**. It was also observed that during certain times of the day

Link 42 buses were crowded. Load factor analyses indicate that **service needs to be added in the westbound direction** around 10:00 a.m. and 5:00 p.m., **and in the eastbound direction** around 6:00 a.m. and 3:00 p.m.

Link 44 – Hiawassee Road/Zellwood

Link 44 scored high for route speed, which isn't surprising given the stop spacing (4 per mile) and the low density land uses along the northern end of the route. The route scored low for ridership trend, passengers per mile, and schedule adherence. The **schedule for Link 44 should be reviewed and adjustments made to the schedule** to improve on-time performance. Link 44 is early or late on 63 percent of its trips according to schedule adherence data provided by LYNX. This bus is late more often than it is early, but the schedule speed and observed speed only differ by a percent. This indicates that the running time from end to end is not an issue, but perhaps the scheduled times for the time points require adjustment within the schedule. Additionally, as part of the Pine Hills package, this route would be cut back to the Apopka SuperStop and replaced by Link 37.

*NOTE: the recommendation to reroute this route is part of the **Pine Hills package** and changes to this route would be contingent on changes to other routes.*

Link 45 – Lake Mary

Link 45 scored high for ridership trend and schedule adherence. The route scored low for service span, ridership, passengers per mile/hour, and farebox recovery. Through discussions with LYNX it was discovered that there is unmet demand in the Longwood area south of Sanford. The 2006 COA also indicated a need for service in this area. **It is recommended that Link 45 be extended.** The revised Link 45 should start along the west side at International Parkway and C.R. 46 A. After following International Parkway towards the south, it turns left along its current route at Lake Mary Blvd. It will no longer detour towards the Social Security Building at Sand Pond Road. Additionally, instead of ending at the Seminole Center it will continue along Lake Mary Road to the Florida Greeneway. At the Greeneway (route 417), it will loop around Andrews Road to return to Lake Mary Road to return back to International Parkway and C.R. 46A. The revised route will provide the following service span (5:00 a.m. – 9:00 p.m. Monday through Saturday) and headway (60 minutes). See Figure 4-5 for the recommended, revised Link 45 routing.

*NOTE: the recommendation to reroute this route is part of the **Sanford package** and changes to this route would be contingent on changes to other routes.*

Link 46E – S.R. 46/Midway

Link 46E scored high for ridership trend and schedule adherence. The route rated low for stop spacing, ridership, passengers per mile/hour, farebox recovery, and revenue to mileage. As part of the proposed feeder bus plan for SunRail, **Links 46E and 46W would be restructured**. Along the East side, it is recommended that the route no longer service area along SR 46, east of Summerlin Ave; and that this service be taken over by a **new NeighborLink**. The 46E would be rerouted to stay on Mellonville Avenue, heading southbound, until the Central Florida Greeneway. At Andrews Avenue, it would loop around in the same routing as Link 45 and head back up Mellonville Avenue in the northbound direction. This route would also no longer continue southbound to Seminole Center along 17/92 (French Avenue). On the north end, the route would be **extended to the Sanford SunRail station**. This restructuring will not result in

changes to the service span or headway. See Figure 4-5 for the recommended, revised Link 46 routing.

*NOTE: the recommendation to reroute this route is part of the **Sanford package** and changes to this route would be contingent on changes to other routes.*

Link 46W – S.R. 46/Seminole Towne Center

The Link 46W scored the same as the 46E above. **Link 46W would begin at Sanford SunRail Station, and no longer continue along French Avenue** (which would be replaced by Link 34). The route would continue along its current route westbound, turning at Towne Center Blvd., ahead of its current turn, and traveling southbound. After the Towne Center Stop, instead of looping it will continue further along International Parkway via the H.E. Thomas Jr. Parkway. Once on International Parkway, it will follow the eliminated portion of Link 45 route, along Lake Mary Blvd, right onto Lake Emma Rd. There it will continue the loop that Link 45 used to take, along Commerce Street and Sand Lake Road. The route will head northbound on Lake Emma Road and reverse the route back to the SunRail Station.

*NOTE: the recommendation to reroute this route is part of the **Sanford package** and changes to this route would be contingent on changes to other routes.*

Link 48 – W. Colonial Drive/Pine Hills

Link 48 scored high for ridership, passengers per mile/hour, farebox recovery, and revenue to mileage. It scored low for ridership trend. As part of the overall changes in routes to accommodate the loss of the SuperStop on Hiawassee Road, it is recommended that this route be **extended to replace Link 443 between Silver Star Road and the Rosemont Super Stop**. A review of the passenger loading on the first and last trips for Link 48 showed the last westbound trip with a load factor of 0.09. This falls below the minimum threshold set in the service guidelines for service span and warrants a **reduction in the evening service span**. The same review of passenger loading by trip indicated that eastbound trips in the morning exceeded the 1.25 threshold set in the service guidelines. This would warrant an **increase in service frequency beginning around 6:30 a.m. in the eastbound direction**. See Figure 4-2 for the recommended, revised Link 48 routing.

*NOTE: the recommendation to reroute this route is part of the **Pine Hills package** and changes to this route would be contingent on changes to other routes.*

Link 49 – W. Colonial Drive/Pine Hills

Link 49 scored high for ridership, passengers per mile/hour, farebox recovery, and revenue to mileage. The route scored low for route speed and operating speed versus scheduled speed. As part of the overall changes in routes to accommodate the loss of the SuperStop on Hiawassee Road, a **restructuring of Link 49 is proposed**. The new route would travel north along N Pine Hills Road, no longer performing the loop through Indian Hill Road, before turning east onto Clarcona Ocoee Road. The route would turn south onto N. Orange Blossom Trail and west onto All American Boulevard and into Rosemont. The route would follow the reverse routing to return to LYNX Central Station. See Figure 4-2 for the recommended, revised Link 49 routing.

*NOTE: the recommendation to reroute this route is part of the **Pine Hills package** and changes to this route would be contingent on changes to other routes.*

Link 50 – Downtown Orlando/Magic Kingdom

Link 50 scored high for ridership, ridership trend, revenue to mileage, and route speed. A significant portion of the route is on Interstate 4, which contributes to the higher route speed. The route scored low for stop spacing and passengers per mile. The route's stop spacing of less than one per mile is attributed to the route operating along Interstate 4. The route does not have stops along the interstate, but this length is considered when determining stop spacing. Similarly, the low riders per mile can be linked to the fact that the route does not pick up riders along the interstate. Comments were received from LYNX staff and the community related to crowding on the buses. As the main route between Downtown Orlando and Walt Disney World, Link 50 receives overflow riders from some of the limited direct routes as well as riders accessing Sea World. In an effort to alleviate crowding and provide a more streamlined service in the area, **it is recommended that Link 50 no longer serve SeaWorld**. To accommodate this change Link 38 would operate for the same span as Link 50 – creating a route to SeaWorld and a route to Magic Kingdom. The route would continue on Interstate 4 to Palm Parkway and onto Walt Disney World instead of exiting at Martin Andersen Beachline Expressway. Service span and headway would remain the same. See Figure 4-4 for the recommended, revised Link 50 routing.

NOTE: In the January 2014 Bid, LYNX is adding service frequency to Link 50. This proposed increased frequency could be a first step to implementation of the COA's recommendation to remove service from SeaWorld.

Link 51 – Conway Road/Orlando International Airport

Link 51 scored high for ridership trend, passengers per mile/hour, and schedule adherence. The route scored low for service span. The first trip in the southbound direction (towards OIA) had a passenger loading of 1.11 based on ridership data provided by LYNX. This far exceeds the 0.76 maximum threshold for service span. It is **recommended that Link 51 expand the morning service span**.

Link 54 – Old Winter Garden Road

Link 54 scored high for schedule adherence and revenue to mileage. It scored low for ridership trend. Ridership for the Saturday service was low, 312 riders daily, as reviewed from the farebox data provided by LYNX. It is recommended that LYNX **eliminate Saturday service for Link 54**.

Link 55 – US 192/Four Corners

Link 55 scored high for farebox recovery, revenue mileage to total mileage, and route speed. The route did not exceed any of the maximum or minimum service guidelines. **It is recommended that Link 55 serve the Kissimmee Intermodal Facility**. This new routing would extend the route east past the Osceola Square Mall SuperStop. The route will continue east down US 192, south onto S. John Young Parkway, east onto W. Emmett Street, then north onto E. Broadway Avenue. The route would then turn east onto W. Drury Avenue and into the intermodal facility. The route will exit the facility onto E. Sproule Avenue, turn south onto E. Broadway Avenue, continuing through onto W. Emmett Street, then turn north onto S. John Young Parkway, turning west onto US 192 and back to the original routing.

*NOTE: the recommendation to reroute this route is part of the **KIF package** and changes to this route would be contingent on changes to other routes.*

Link 56 – US 192/Magic Kingdom

Link 56 scored high for ridership, revenue mileage to total mileage, and route speed. The route scored low for service span, passengers per mile, and schedule adherence. The first westbound trip in the morning had a load factor of 0.82. This exceeds the service guideline of 0.76, warranting **expansion of morning service to 5:00 a.m**. In addition, the **route should be extended east to the Kissimmee Intermodal facility**. This new routing would extend the route east past the Osceola Square Mall SuperStop. The route will continue east down US 192, south onto S. John Young Parkway, east onto W. Emmett Street, then north onto E. Broadway Avenue. The route would then turn east onto W. Drury Avenue and into the intermodal facility. The route will exit the facility onto E. Sproule Avenue, turn south onto E. Broadway Avenue, continuing through onto W. Emmett Street, then turn north onto S. John Young Parkway, turning west onto US 192 and back to the original routing.

*NOTE: the recommendation to reroute this route is part of the **KIF package** and changes to this route would be contingent on changes to other routes.*

Link 57 – John Young Parkway

Link 57 scored high for ridership trend, passengers per hour, farebox recovery, revenue mileage to total mileage, and route speed. The route scored low for schedule adherence. No major issues or comments were received from the public or LYNX staff. **No recommended changes** are proposed for Link 57 at this time.

NOTE: As part of the January 2014 Bid, LYNX will re-route Link 57 to KIF. The cost of that re-route is not included in this COA.

Link 58 – Shingle Creek

Link 58 was one of the poorer performing routes within the system. The route scored low for ridership, passengers per mile/hour, farebox recovery, and revenue mileage to total mileage. The route did score high for schedule adherence and route speed. This can likely be attributed to the route stopping infrequently. The route picks up less than 1 passenger per mile during the weekday according to the FY2012 farebox data.

If Link 58 were a regular fixed route it would not meet the standard for continued service. However the route is privately funded and it meets its intended purpose. Therefore, as long as the route remains privately funded, it should continue.

Link 102 – Orange Avenue/South US 17-92

Link 102 was an average route, which scored high for ridership and low for route speed. The route did not exceed any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. **No recommended changes** are proposed for Link 102 at this time.

Link 103 – North US 17-92/Sanford

Link 103 scored high for revenue mileage to total mileage, schedule adherence, route speed, and operating speed versus scheduled speed. The route scored low for passengers per mile/hour. Link 103 was reviewed as part of the planned changes for the implementation of SunRail for Sanford. The recommendation was to extend every other trip north to the Sanford SunRail

station. This proposal is viewed as duplicative with the improvements recommended for Link 34. Based on the new routing for Link 34, **no routing changes are proposed for Link 103**. A review of LYNX APC ridership data shows the load factor for morning northbound trips around 7:30 a.m. is 1.35. This exceeds the service guideline of 1.25 and warrants increased service frequency. **Service frequency should be increased from 15 minutes to 7.5 minutes from 6:00 a.m. to 10:00 a.m.**

Link 104 – East Colonial

Link 104 is an average performing route. The only low score is associated with passengers per hour. A review of the service guidelines associated with the performance data for this route indicates a need to increase service frequency for the morning southbound trips. The load factor for the 7:29 a.m. trip in the southbound direction was 1.40. This is above the service guideline of 1.25 and warrants increase frequency. **The frequency should be increased from 30 minutes to 15 minutes throughout the day based on the passenger loading observed for each trip in the APC data.** Passenger loads for the majority of trips approached 40 riders per bus, the capacity for the vehicle used to provide service. No other recommendations are proposed for Link 104.

Link 105 – West Colonial

Link 105 is an average performing route. The route did not score high or low in any of the performance categories reviewed. The route did not exceed any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. **No recommended changes are proposed for Link 105.**

Link 111 – OIA/SeaWorld

Link 111 scored high for ridership trend and route speed. The route scored low for passengers per mile/hour, farebox recovery, and schedule adherence. This route formerly connected Orlando International Airport with Walt Disney World. The grant funding for the route ended, and service was reduced. Now the route terminates at Sea World. The TDP and 2030 Vision Plan proposed service between OIA and Walt Disney World. **It is recommended that the former routing for Link 111 to Walt Disney World be reinstituted**. The route will now travel its former routing west from OIA to Walt Disney World via Westwood Blvd, Central Florida Parkway, I-4, Apopka-Vineland Road, Hotel Plaza Blvd, Buena Vista Dr., Epcot Center Dr., and World Drive. See Figure 4-4 for the recommended, revised Link 111 routing.

Link 125 – Silver Star Road Crosstown

Link 125 scored well for ridership, but poorly for on-time performance. In an effort to improve performance of the route and provide a more direct connection to downtown Orlando, **it is recommended to reroute the Link 125**. The new Link 125 would continue the inbound trip from West Oaks Mall along Silver Star Road and W. Princeton Street, continuing through to N. Orange Blossom Trail. The route then turns south onto N. Orange Blossom Trail, following the Link 17 routing into the LYNX Central Station. The route would follow the reverse routing back to West Oaks Mall. The revised Link 125 would continue to operate using the current service span and headway. See Figure4-2 for the recommended, revised Link 125 routing.

*NOTE: the recommendation to reroute this route is part of the **Link 125 package** and changes to this route would be contingent on changes to other routes. In the January 2014 Bid, LYNX will be increasing the service frequency of Link 125.*

Link 210 – KnightLYNX Blue

Link 210 scored high for route speed. The route scored low for service span, ridership, and farebox recovery. The service is primarily used by University of Central Florida students on weekends. Students ride for free with a valid student ID, so it isn't surprising farebox recovery is low. Link 210's ridership rates low against other routes that provide greater amounts of service. The route is funded by the Student Government Association and has been viewed as a success by the University. A third route (KnightLYNX 212) to downtown Orlando from the University was started in January of 2013. Due to the specialized type of service and the financial support of the University, **no changes are recommended for Link 210.**

Link 211 – KnightLYNX Green

Link 211 scored high for operating speed versus scheduled speed. The route did score low for ridership and farebox recovery. As with Link 210, the low scores can be explained by the amount of service provided against other routes in the system and the fare free service for UCF students. Similar to Link 210, **no changes are proposed for Link 211.**

Link 313 - Winter Park

Link 313 scored high for ridership trend. The route scored low for ridership, passengers per mile/hour, and route speed. The route did not exceed any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. **No changes are proposed for Link 313.**

Link 319 – Richmond Heights/Richmond Estates

Link 319 scored high for passengers per mile and schedule adherence. The route scored low for ridership trend and route speed. A review of APC ridership data from LYNX shows that the load factor for the last westbound trip was 0.08. This is below the service guideline minimum of 0.10 and warrants a service span reduction. **Link 319 is recommended for a reduction of the evening service span.**

Link 405 – Apopka Circulator

Link 405 scored high for schedule adherence. However this route scored low for ridership, service span, ridership trend, passengers per mile/hour, farebox recovery, revenue mileage to total mileage, and operating speed to scheduled speed. Due to the poor financial performance and ridership, **Link 405 is recommended for elimination.**

Link 426 – Poinciana Circulator

Link 426 scored high for schedule adherence and route speed. The route scored low for service span and ridership. A more detailed review of the APC ridership data showed a load factor of 0.96 on the first trip of the circulator. This exceeds the maximum service guideline of 0.76 for service span, and warrants consideration for service span expansion. **It is recommended that the morning span of service for Link 426 be expanded to 4:15 a.m.**

Link 434 – SR 434 Crosstown

Link 434 scored high for ridership, ridership trend, and revenue mileage to total mileage. The route scored low for passengers per mile/hour and farebox recovery. The route did not exceed

any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. **No recommended changes are proposed for Link 434.**

Link 443 – Winter Park/Pine Hills

Link 443 did not score high for any performance category. The route did score low for ridership trend and schedule adherence. As part of the overall changes in routes to accommodate the loss of the SuperStop on Hiawassee Road, **it is recommended that this route be cut back at the Rosemont SuperStop and replaced by Link 49.** See Figure 4-2 for the recommended, revised Link 443 routing.

Link-specific Recommendations for Express Routes

Link 200 – West Volusia Xpress

Link 200 scored high for route speed. The route scored low for stop spacing, ridership, ridership trend, passengers per mile/hour, farebox recovery, and revenue mileage to total mileage. Stop spacing for an express stop should be higher than the service guidelines. This spacing provides for the increased speed of the service. The route did not exceed any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. **No changes are proposed for Link 200.**

Link 204 – Clermont Xpress

Link 204 scored high for route speed. The route scored low for stop spacing, ridership trend, passengers per mile/hour, farebox recovery, revenue mileage to total mileage, and operating speed versus scheduled speed. Stop spacing for an express stop should be higher than the service guidelines. This spacing provides for the increased speed of the service. The route did not exceed any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. **No changes are proposed for Link 204.**

Link 300 – Downtown Orlando/Hotel Plaza Limited Direct

Link 300 scored high for passengers per hour and farebox recovery. The route scored low for stop spacing, ridership, ridership trend, and revenue mileage to total mileage. Stop spacing for this route is below the minimum service guideline, but is acceptable for an express service. The small number of trips provided by Link 300 contributes to its low rating for ridership when compared to other express routes that provide more service. The high passengers per hour rating indicates that for the service provided, Link 300 is carrying a higher number of passengers when compared to some other routes. The route did not exceed any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. **No changes are proposed for Link 300.**

Link 301 – Pine Hills/Animal Kingdom Limited Direct

Link 301 scored high for ridership. The route scored low for service span, revenue mileage to total mileage, schedule adherence, and operating speed versus scheduled speed. In an effort to help alleviate overcrowding on the limited direct routes and provide a more understandable route for customers it is **recommended that Link 301 and portions of Link 302 be combined**. The new Link 301 would begin at the Rosemont SuperStop and head south on Cinderlane Parkway,

then turn west onto N Lake Orlando Parkway. The route would then turn west onto Rose of Tralee Way, south on Rose Bay Drive, and west onto North Drive. Link 301 would then turn south on N Pine Hills Road, picking up the existing Link 301 routing at N Pine Hills Road and Silver Star Road. The route would continue south to Walt Disney World following the existing routing. The new Link 301 would provide one morning and one evening trip in the peak travel direction. Schedule times will be developed to coincide with transfers to other routes at the West Side Transfer Center. See Figure 4-6 for the proposed revised Link 301 routing.

*NOTE: the recommendation to reroute this route is part of the **Limited Direct package** and changes to this route would be contingent on changes to other routes. More information on this package is listed below.*

Link 302 – Rosemont/Magic Kingdom Limited Direct

Link 302 scored low for service span, revenue mileage to total mileage, schedule adherence, and route speed. The route did not score high for any performance category. Since the majority of the northern segment of the existing Link 302 is proposed to be combined with Link 301, a **new Link 302 is proposed**. This route would provide service to the Pine Hills areas which has demonstrated demand for limited direct service according to LYNX staff. The new route would begin at the intersection of N Hiawassee Road and Silver Star Road. Link 302 would travel west along Silver Star Road, turning south on Clark Road, then west onto Colonial Drive. The route would then turn south onto Winter Garden Vineland Road and travel into the West Side Transfer Center. The new Link 302 would operate one morning and one evening trip in the peak travel direction. Scheduled times would be coordinated to allow for transfers to occur at the West Side Transfer Center. See Figure 4-6 for the proposed revised Link 301 routing.

*NOTE: the recommendation to reroute this route is part of the **Limited Direct package** and changes to this route would be contingent on changes to other routes.*

Link 303 – Washington Shores/Disney-MGM Limited Direct

Link 303 scored high for passengers per mile. The route scored low for service span, revenue mileage to total mileage, schedule adherence, route speed, and operating speed versus scheduled speed. While nothing is proposed for Link 303, it is assumed that the addition of a new route and the restructuring of the Link 305 will help to alleviate some of the loading issues on Link 303. **No changes are proposed for Link 303.**

Link 304 – Rio Grande/Vistana Resort Limited Direct

Link 304 scored high for passengers per mile. The route scored low for service span, revenue mileage to total mileage, and route speed. In an effort to provide a more direct service, **rerouting of Link 304 is recommended**. The new route would begin S. Orange Blossom Trail and Long Street and following the existing routing to W. Oak Ridge Road. Link 304 would travel west along W Oak Ridge Road, turning south onto International Drive. The route would turn west onto Sand Lake Road from International Drive and get onto Interstate 4, continuing the existing routing in Walt Disney World. Link 304 would continue to provide a southbound morning and afternoon trip as well as an evening northbound trip as it currently does. See Figure 4-6 for the proposed revised Link 304 routing.

*NOTE: the recommendation to reroute this route is part of the **Limited Direct package** and changes to this route would be contingent on changes to other routes. In January 2014, LYNX will be extending Link 304 to LCS which does not affect this recommendation or its cost.*

Link 305 – Metro West/All-Star Resort Limited Direct

Link 305 scored high for ridership trend, passengers per hour, and farebox recovery. The route scored low for service span, ridership, revenue mileage to total mileage, schedule adherence, route speed, and operating speed versus scheduled speed. The route is circuitous and requires backtracking to reach destinations. Therefore, it is **recommended to reroute Link 305 to provide a more direct route between Orlovista and Disney**. The new Link 305 would start at the Washington Shores SuperStop. The route would travel south along John Young Parkway, turning west onto Sand Lake Road, and then follow the existing routing along Interstate 4 into the West Side Transfer Center. Link 305 would become an all-day service to help alleviate the overcrowding on other limited direct routes. See Figure 4-6 for the proposed revised Link 305 routing.

*NOTE: the recommendation to reroute this route is part of the **Limited Direct package** and changes to this route would be contingent on changes to other routes.*

Link 306 – Poinciana/Downtown Disney Westside Transfer Limited Direct

Link 306 scored high for ridership trend, farebox recovery, and schedule adherence. The route scored low for stop spacing, ridership, passengers per total mile/hour, and revenue mileage to total mileage. The route did not exceed any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. **No changes are proposed for Link 306.**

BEFORE

Limited Direct

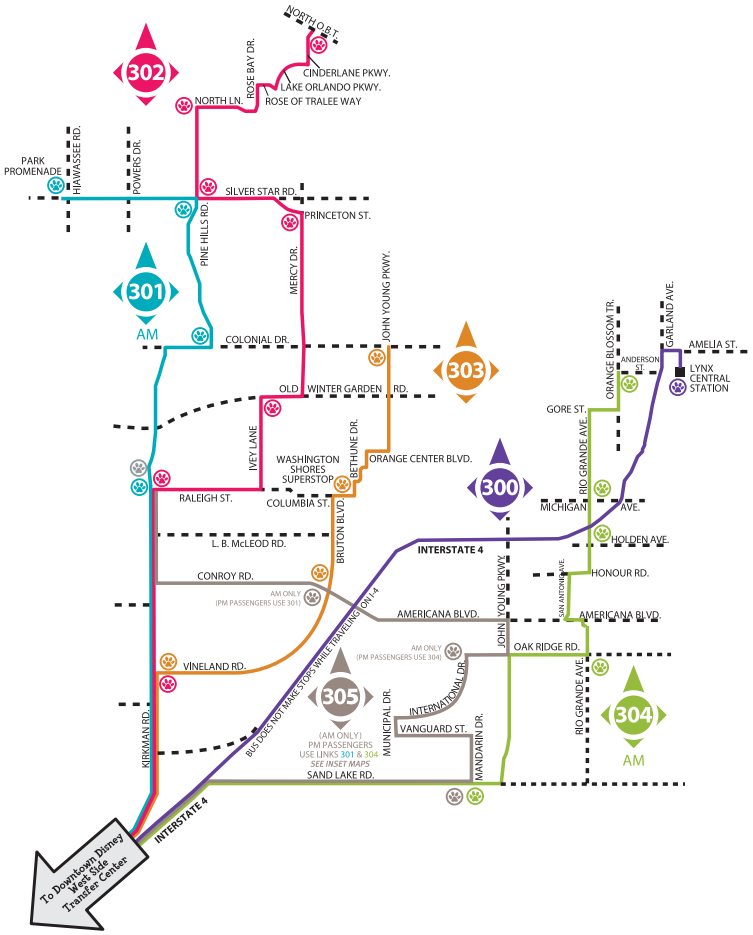
Downtown Disney Direct

Monday–Sunday & Holiday service

Additional stops are located near resorts and work locations along each Link.

SERVING:

- Link 300 Downtown Orlando
- Link 301 Pine Hills
- Link 302 Rosemont
- Link 303 Washington Shores
- Link 304 Rio Grande
- Link 305 MetroWest (am only) pm passengers use 301 & 304 see inset maps



AFTER

Limited Direct

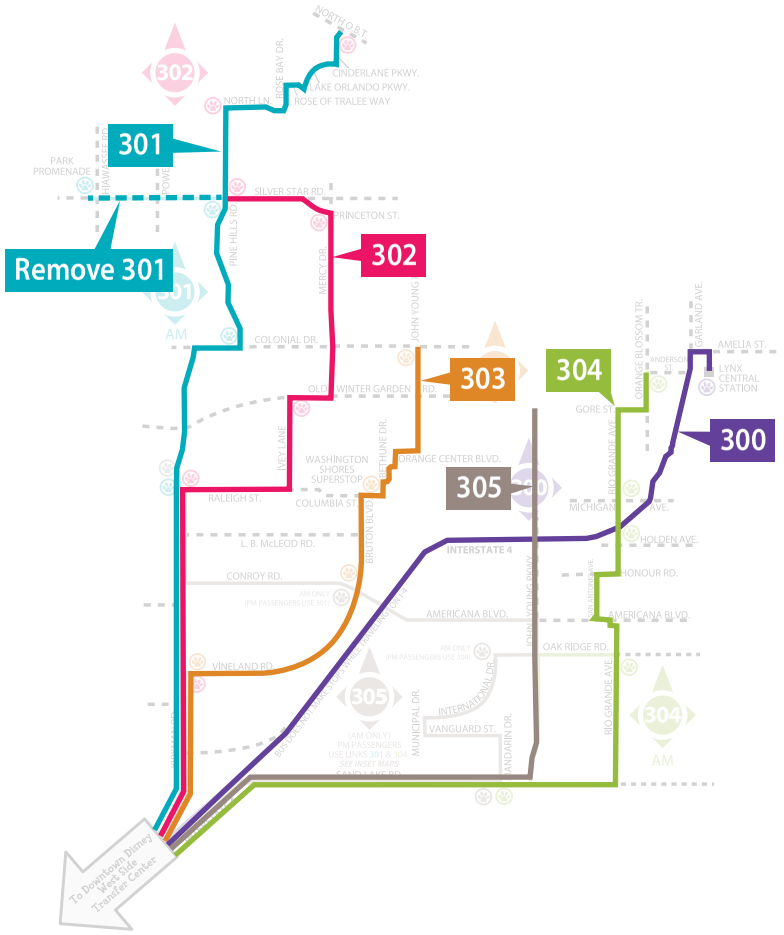
Downtown Disney Direct

Monday–Sunday & Holiday service

Additional stops are located near resorts and work locations along each Link.

SERVING:

- Link 300 Downtown Orlando
- Link 301 Pine Hills
- Link 302 Rosemont
- Link 303 Washington Shores
- Link 304 Rio Grande
- Link 305 MetroWest (am only) pm passengers use 301 & 304 see inset maps



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FastLink 441 – US 441

Link 441 scored low for stop spacing, service span, ridership, passengers per mile/hour, schedule adherence, and operating speed versus scheduled speed. A more detailed review of the ridership data revealed that the first northbound trip had a load factor of 0.80. This exceeds the maximum service guideline of 0.76. Due to the high ridership along this corridor for the Links 4 and 441, **an expansion of the service span for Link 441 is recommended**, with six additional trips being added (which would fill the gap between the existing AM and PM service periods).

Link 445 – Apopka/West Oaks Mall

Link 445 scored high for ridership, passengers per mile/hour, and operating speed versus scheduled speed. The route scored low for stop spacing, service span, farebox recovery, revenue mileage to total mileage, and schedule adherence. Stop spacing for Link 445 is roughly one stop every two miles. This is acceptable for an express route. The load factors fell below the minimum service guideline for service span, but since there is only one morning and one evening trip, reducing the service would eliminate this route. **A review of the schedule is warranted** based on the high rate of early and/or late buses and discrepancy between schedule speed and observed speed from the APC data. An adjustment in the schedule would resolve these issues.

FastLink 17-92 – US 17/92

Link 17-92 scored high for route speed. The route scored low for stop spacing, ridership, passengers per mile/hour, revenue mileage to total mileage, and schedule adherence. The route did not exceed any of the maximum or minimum service guidelines. No major issues or comments were received from the public or LYNX staff. Given the fact that this route is relatively new and needs time to develop a market, no routing changes are recommended for Link 17-92. However, because of its low score, it is recommended that the **stop spacing be adjusted** to improve the quality of service.

Proposed New Local Routes

New Link – Goldenrod Road

The TDP identified this as a corridor for future service. The creation of this route would enable the elimination of circuitous portions of some existing routes (Links 6 and 29). The route would begin on Aloma Avenue at N Lakemont Avenue and head east to N Goldenrod Road. The route would then turn south onto N Goldenrod Road and then east onto Narcoossee Road. The route would terminate at the park and ride on Narcoossee Road. The route would provide 30-minute service with a weekday service span of 6:00 a.m. until 10:00 p.m. See Figure 4-3 for the recommended new routing.

*NOTE: the recommendation is part of the **East Orlando package** and changes to this route would be contingent on changes to other routes.*

New Link – KIF/Lake Nona/ OIA

This new link would provide service between two important transportation hubs as well as a crucial connection to a new, state of the art medical development in the area. The route would start at the Kissimmee Intermodal Facility and then travel east on Vine Street. It would continue northbound along Boggy Lake Road. It would turn right, along the Central Florida Greeneway

bearing left into Narcoossee Road. It would then loop into Lake Nona, back onto Narcoossee Road where it would turn left along Martin Andersen Beachline Expressway. It would then stop at the Orlando International Airport, and reverse directions back to the Kissimmee intermodal Facility. See Figure 4-10 for the recommended new routing.

New Link – Kissimmee to International Drive

This route would provide a direct connection between Kissimmee and the area including Sea World and Universal Studios. The route would travel north along John Young Parkway to the Martin Andersen Beachline Expressway. The route would travel west along the expressway, turning south onto International Drive, and then west onto Sea Harbor Drive. The route would then turn west onto Central Florida Parkway and then north onto Turkey Lake Road. The route would follow Turkey Lake Road into Universal Studios. The route would provide a 30-minute service on weekdays from 8:00 a.m. until 10:00 p.m. See Figure 4-4 for the recommended new routing.

New Link – Oviedo/Altamonte Springs via Red Bug Lake Road and Semoran Blvd.

This service will provide a new Link from Oviedo to Altamonte Springs in an area that is underserved by the current LYNX system. This route would travel from the Oviedo Marketplace, near the Central Park Greenway, Westbound to Casselberry and Altamonte Springs, connecting with the splitting point for the new Link 41 It would travel along the entire length of Red Bug Lake Road, and some of the connecting Semoran Blvd. See Figure 4-5 for the recommended new route.

New NeighborLink – Sanford SunRail/Airport Blvd

This link would connect the Sanford SunRail Station southbound along the Martin Luther King Jr. Blvd connecting to Airport Blvd. It would then travel east along Airport Blvd. looping at the Central Florida Greeneway. It would then reverse its travel and return to the SunRail station. This service would provide an important connection to the new Sanford SunRail Station to the Central Florida Greeneway which will also connect with many of the Local Links to create a comprehensive network for travel within Sanford. See Figure 4-5 for the recommended new route.

*NOTE: the recommendation is part of the **Sanford package** and changes to this route would be contingent on changes to other routes.*

New Link – Celebration Circulator

Previous planning efforts including the TDP and 2006 COA have identified the transit friendly area of Celebration as an area for service expansion. The land use would support a circulator service that would operate via Celebration Place to Campus Street to Celebration Avenue to Old Brush Road/Oak Shadow Road/Eastlawn Drive and return via Celebration Avenue. A connection to US 192 and the bus service (and planned BRT service) would be available at the intersection of US 192 and Celebration Place. The service would be operated with a 30-minute headway, seven days a week from 8:00 a.m. to 10:00 p.m. See Figure 4-7 for the recommended new routing.

New Link – Kissimmee Circulator

Previous planning efforts including the TDP and 2006 COA have identified the transit-friendly area of downtown Kissimmee as an area for service expansion. The land use would support a

circulator service that would operate via W Columbia Avenue to N Main Street to Broadway Avenue/Drury Avenue/Pleasant Street to Central Avenue to W Oak Street to Dyer Boulevard back to Columbia Avenue, with a stop at the Kissimmee Intermodal Facility as it loops through the downtown. Connections to other services, as well as SunRail would be available at KIF. The service would operate with a 30-minute headway, seven days a week from 8:00 a.m. to 10:00 p.m. See Figure 4-8 for the recommended new routing.

New Link – Baldwin Park Circulator

Previous planning efforts including the TDP and 2006 COA have identified the transit-friendly area of Baldwin Park as an area for service expansion. The land use would support a circulator service that would operate from the Colonial Plaza SuperStop via Maguire Boulevard to New Broad Street to Jake Street to Lakemont Avenue to Lower Park Road to Meeting Place and then returning. The service would operate with a 30-minute headway, seven days a week from 8:00 a.m. to 10:00 p.m. See Figure 4-9 for the recommended new routing.

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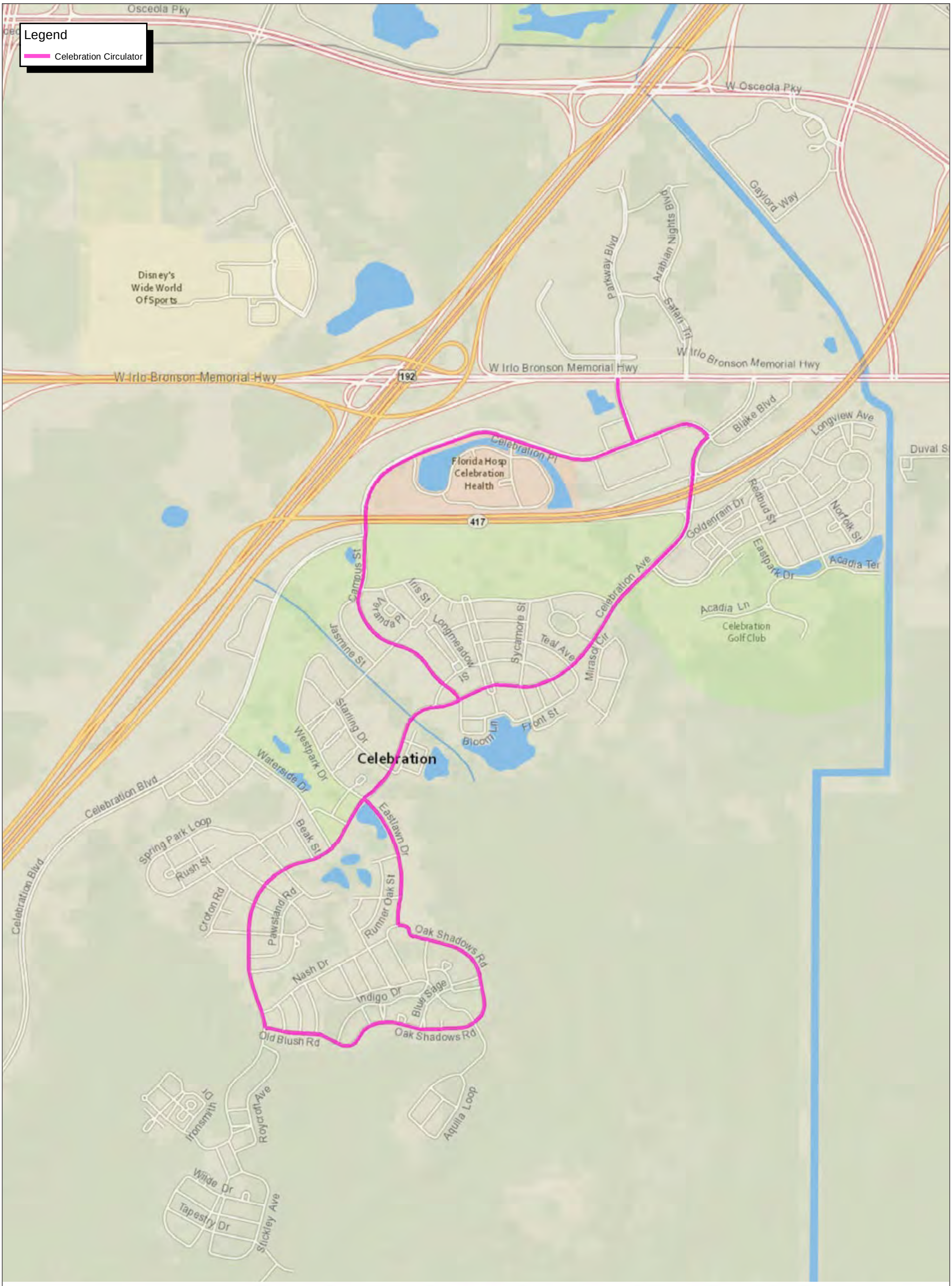

LYNX

Comprehensive Operational Analysis (COA) of LYNX Transit Route Network

FIGURE 4-7

Celebration Circulator

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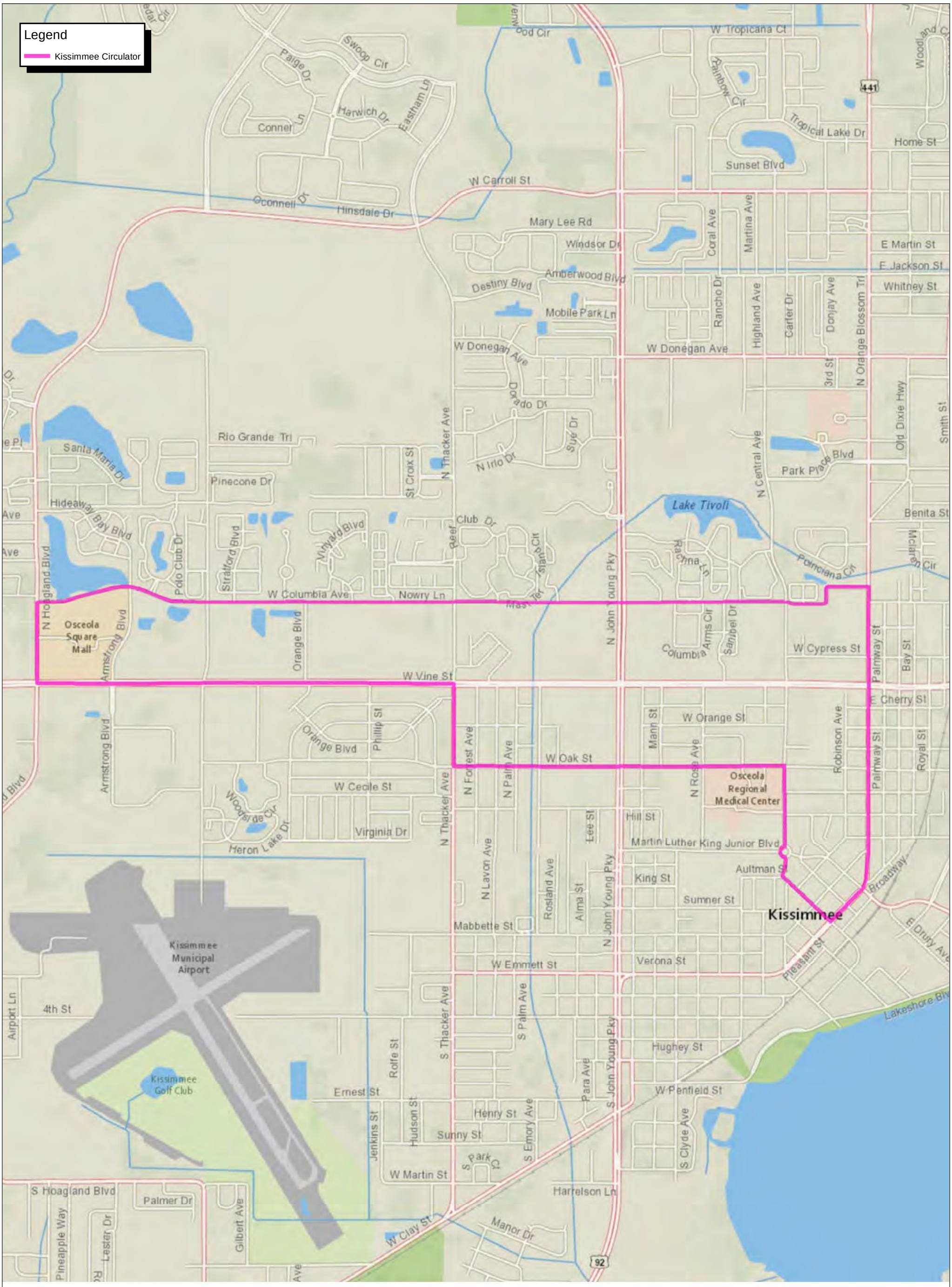

LYNX

Comprehensive Operational Analysis (COA)
of LYNX Transit Route Network

FIGURE 4-8

I gqqg k k cc Circulator

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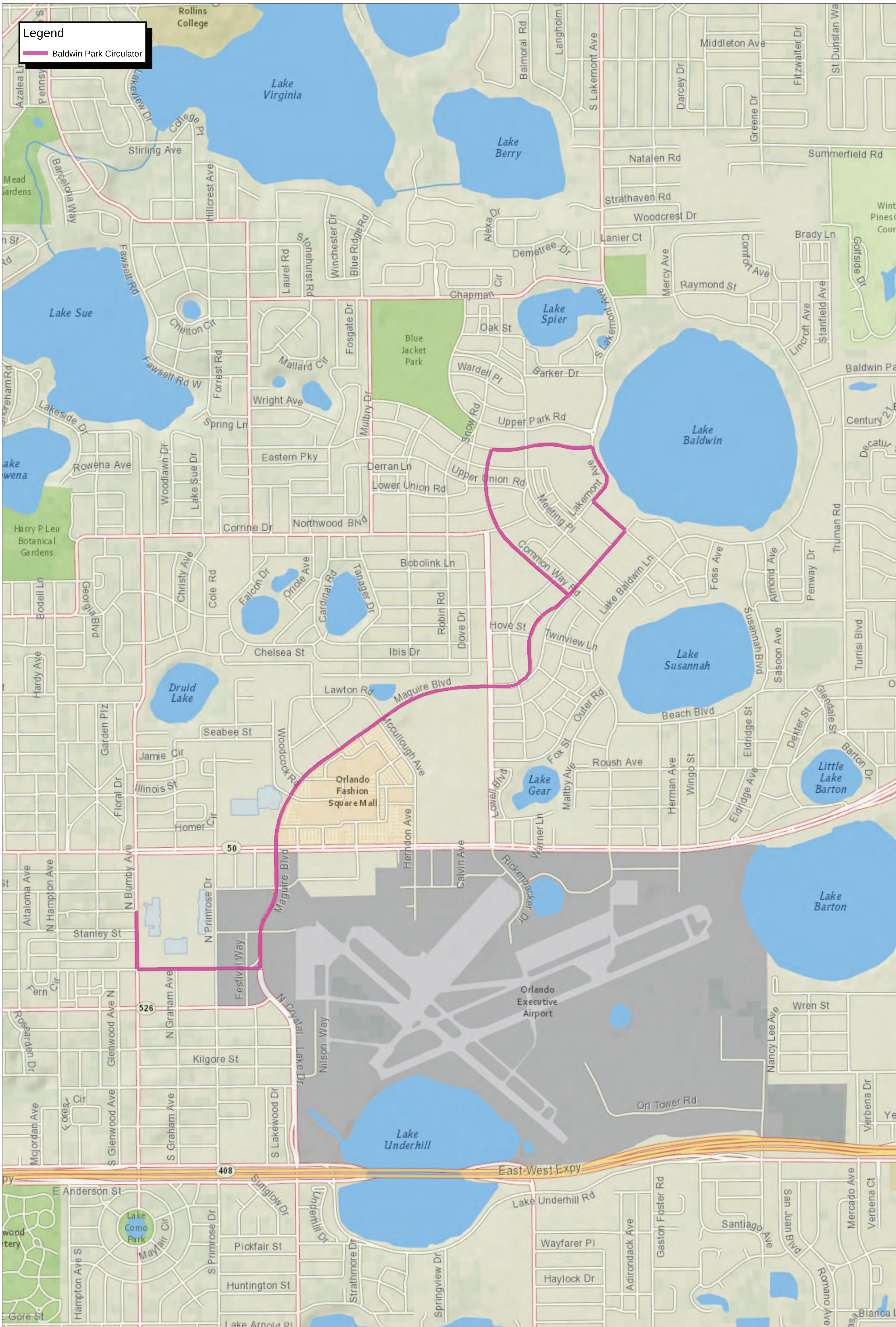

FIGURE 4-9
Baldwin Park Circulator

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Proposed New Express Routes

New Xpress Link – Downtown Orlando/OIA/Lake Nona

Currently, no direct service is provided between downtown Orlando and Orlando International Airport. Additionally, the Lake Nona development has been identified in other planning efforts, including the TDP and 2006 COA, as an area for future expansion. LYNX has plans to use Service Development Grant funding to implement a new route between Downtown Orlando and Lake Nona. This route would operate two to three trips in the a.m. and the p.m.

Expanding on this proposed route, the COA recommends converting the route into an all-day Xpress Link, adding a stop at OIA and continuing to Lake Nona. This revised route would begin at LYNX Central Station and enter Interstate 4 headed west. The route would then head east along the East-West Expressway, then south on S. Semoran Boulevard into OIA. The route would then continue onto the S Access Road, east onto the Central Florida Greenway, exiting south onto Lake Nona Boulevard. The route will terminate at the Veterans Administration Hospital. Service would be operated with a 30-minute headway and a service span from 8:00 a.m. to 10:00 p.m. seven days a week. See Figure 4-3 for the recommended new routing.

New XpressLink – Oviedo/ Downtown

This route would start in Oviedo and travel southbound on State Route 434. It would then travel westbound along Colonial Drive into downtown Orlando into LYNX Central Station where it would turn around and continue back towards Oviedo. See Figure 4-12 for the recommended new route.

New XpressLink – LCS to Universal/SeaWorld

This proposed route would provide service to alleviate some of the demand currently being carried by Link 50. The route would begin at the LYNX Central Station and travel west along Interstate 4. The route would exit onto Universal Boulevard heading south. The route would provide one morning and one evening trip in the peak travel direction. Schedules would be designed to coincide with the highest demand for SeaWorld and Universal Studios. See Figure 4-4 for the recommended new routing.

New Limited Direct – Buena Ventura Lakes

Comments received from LYNX staff and the public indicate a demand for service to Walt Disney World from the Buena Vista Lakes area. There is a concentration of employees not currently being served. The new route would operate via Florida Parkway to Buenaventura Road to Osceola Parkway, headed west. The route would then turn north onto Vineland Road and west onto World Center Drive and into the West Side Transfer Center. The route would operate one morning and one evening trip in the peak travel direction. The schedule would be designed to accommodate transfers at the West Side Transfer Center. See Figure 4-10 for the recommended new routing.

New Limited Direct – Pine Hills

Comments received from LYNX staff and the public indicate a demand for service to Walt Disney World from the Pine Hills area, operating direct from the north. There is a concentration of employees not currently being served and the limited direct route 301 is overcrowded. The new

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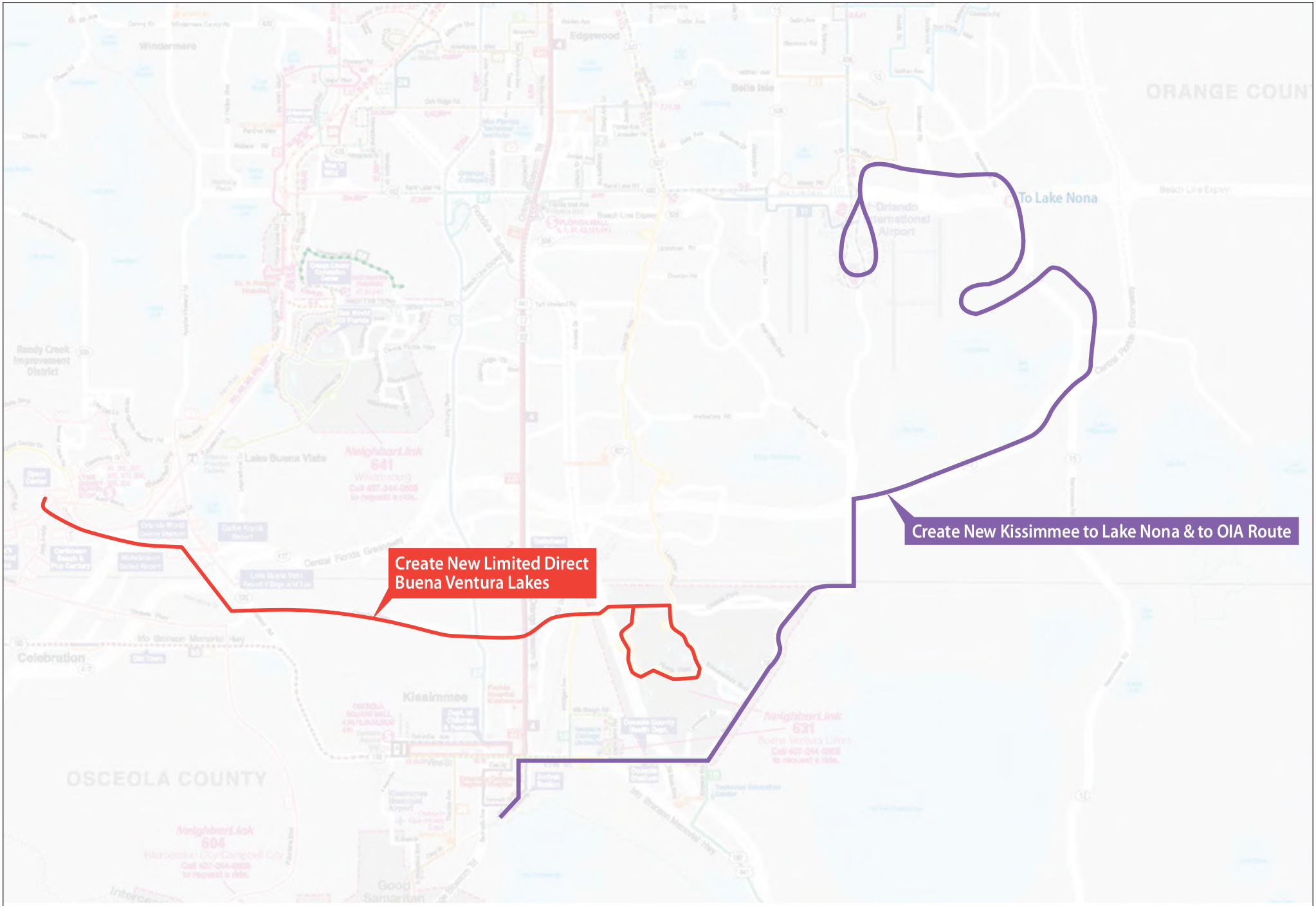
To Lake Nona
Create New Kissimmee to Lake Nona & to OIA Route
Create New Limited Direct
Buena Ventura Lakes
OSCEOLA COUNTY

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route would operate via Silver Star Road, Colonial Drive, Beulah Road, Winter Garden/Vineland Road to the West Side Transfer Center. The route would operate one morning and one evening trip in the peak travel direction. The schedule would be designed to accommodate transfers at the West Side Transfer Center. See Figure 4-11 for the recommended new routing.

*NOTE: the recommendation is part of the **Limited Direct package** and changes to this route would be contingent on changes to other routes.*

New FastLink – Apopka to Downtown Orlando

This corridor was identified in the *2030 Vision Plan, 2013-22 TDP,* and *2006 COA* as a new express service that would run from Apopka to downtown Orlando via Orange Blossom Trail. This corridor is currently served by the Link 17 and along the southern portion by the revised Link 125. The proposed express service would begin in Apopka at the SuperStop and travel east along E. Semoran Boulevard, turning south onto Orange Blossom Trail. The route would turn east onto Amelia Street and in LYNX Central Station. Stop locations for this route should be determined based on a review of existing stop counts and transfer activity with other routes. The service should operate seven days a week from 6:00 a.m. to 10:00 p.m. with a 30-minute headway. By splitting the existing Link 17's 15 minute headway, this new FastLink service could be implemented at no cost.

Additionally, an Alternatives Analysis has been recently started by the Florida Department of Transportation (FDOT) to develop a preferred transportation alternative for the US 441 corridor from Lake County to downtown Orlando. Possible alternatives under consideration are bus rapid transit and commuter rail service. The project is slated for completion in the Fall of 2014. Ridership along the corridor is high. The corridor is currently congested according to data reviewed in the *Vision Plan*. Providing a limited stop service would provide a faster alternative to local bus for accessing downtown Orlando from Apopka.

Proposed Changes to LYMMO

LYNX is currently in the process of designing/constructing an expanded LYMMO system in the Parramore section of Orlando, as well as on Colonial Drive. This expansion will better integrate the various long-range feeder services to the Orlando area and will serve as a circulator system around the city.

Proposed Changes to NeighborLink Routes

One new NeighborLink route is proposed to replace a section of Link 46E in Sanford (along Celery Avenue). Density and ridership in this area is low and this area would be better served by a NeighborLink. This NeighborLink would provide a transfer at the Sanford SunRail station.

Additionally, a NeighborLink/Circulator is proposed for Lake Mary Boulevard. This route would operate as a circulator in the AM and PM and as a NeighborLink during other times. This route would provide a transfer at the Lake Mary SunRail station.

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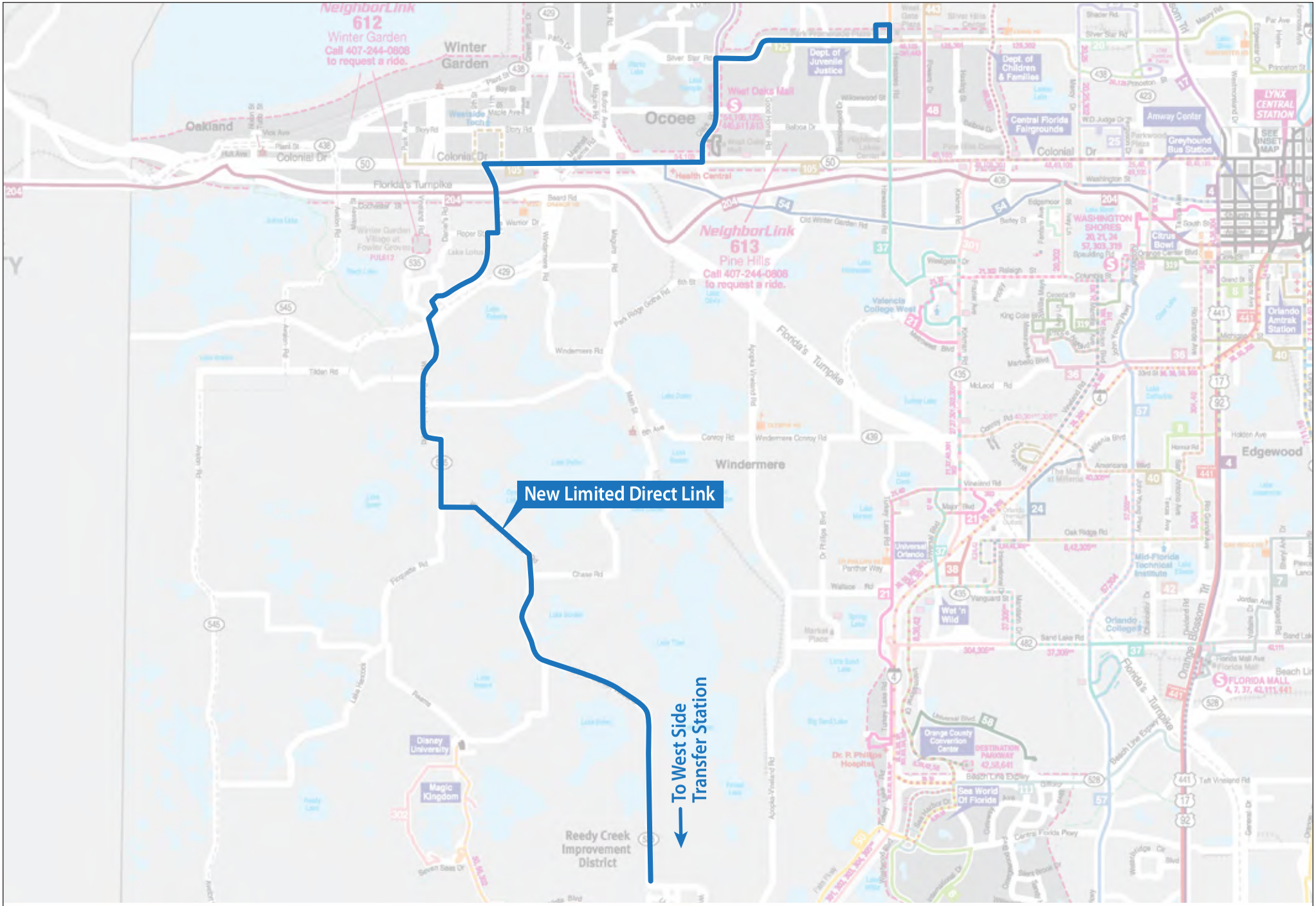
NeighborLink
612
Winter Garden
Call 407-244-0808
to request a ride.
NeighborLink
613
Pine Hills
Call 407-244-0606
to request a ride.
New Limited Direct Link
To West Side
Transfer Station
Winter Garden
Oakland
Ocoee
Windermere
Edgewood
Florida's Turnpike
Colonial Dr
West Oaks Mall
Health Central
Central Florida Fairgrounds
Amway Center
Greyhound Bus Station
LYNX CENTRAL STATION
Orlando Amtrak Station
Citrus Bowl
Valencia College West
Universal Orlando
Wet 'n Wild
Orlando College
Mid-Florida Technical Institute
Orange County Convention Center
Sea World Of Florida
Dr. P. Phillips Hospital
Disney University
Magic Kingdom
Reedy Creek Improvement District
FLORIDA MALL

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SunRail

As part of the planning efforts for the start of SunRail, a feeder bus plan has been developed to provide intermodal connectivity along the corridor. Feeder bus service would be paid for in part through funds reimbursed by Florida Department of Transportation. The latest version of the feeder bus plan (as of November 2013) includes changes in access to the following stations (and bus routes):

Sanford Station

Link 34: Reroute via 17/92, increase peak period service to 30 minutes
Link 46E: Eliminate French Avenue service. Increase peak period service to 30 minutes
Link 46W: eliminate French Avenue service. Increase peak period service to 30 minutes

Lake Mary Station

Link 45: Increase peak period service to 30 minutes

Longwood Station

Link 434: Add 30-minute peak period service on portion of the route

Altamonte Springs Station

Link 41: extend to Altamonte Springs Station
Link 102/103: Extend to Altamonte Springs Station or have transfer to Link 41

Maitland Station

Link 102: On-street connection

Winter Park Station

Link 1: Extend to Winter Park station during peak periods
Link 9: Extend to Winter Park station during peak periods
Link 14: Extend to Winter Park station during peak periods
Link 23: Extend to Winter Park station during peak periods
Link 102: Provide connection at Winter Park station
Link 443: Provide connection at Winter Park station

Florida Hospital Station

Link 102: Provide connection to Florida Hospital station
Link 125: Provide connection to Florida Hospital staiton

Orlando Health Station

Link 40: Provide connection to Orlando Health Station

Sand Lake Road Station

Link 11: Connect to Sand Lake Road station during peak periods
Link 18: Connect to Sand Lake Road station during peak periods
Link 42: Connect to Sand Lake Road station during peak periods
Link 111: Connect to Sand Lake Road station during peak periods
Link 18L: Create limited stop, peak period service between Sand Lake Road station and Kissimmee Intermodal Facility.

Given that these changes are still being negotiated between LYNX and FDOT, **they were not included in the COA's recommendations.** However, with the exception of one proposal (connecting Link 125 at Florida Hospital Station), these proposals are consistent with the changes proposed in the COA.

SuperStops

As part of this analysis, two potential changes to existing SuperStops were identified.

Park Promenade SuperStop

In 2011, LYNX was required to discontinue use of the Park Promenade SuperStop due to contractual issues. This change resulted in the need for customers to transfer at different locations and also resulted in inadequate layover locations at the end of the line for many routes. As part of this study, it is recommended that routes in the vicinity of the former Park Promenade SuperStop (near Pine Hills) be rerouted to serve either the Rosemont SuperStop or the Apopka SuperStop. However**, if a replacement SuperStop were to be located near the former Park Promenade location, the Pine Hills Package of Link improvements would no longer be needed**.

International Drive SuperStop

Given the number of routes in the International Drive area, there could be the potential need for a SuperStop in this area. LYNX should work closely with FDOT to identify potential locations using land from the I-4 reconstruction project.

Central Florida Greeneway SuperStop

With the proposal for both Link 45 and Link 46E to turn-around at the Central Florida Greeneway, a SuperStop could be located in this vicinity to provide for end-of-line reliefs. In the long-term, LYNX should consider relocating all SuperStop activity from the Seminole Centre location to this location.

4.6 Long-term Service Improvements (New Routes)

A review of the *LYNX 2030 Vision Plan* and the *LYNX Transit Development Plan 2013-22* along with demographic forecasts provided by LYNX for the year 2030 were reviewed to develop long-term recommendations. The following long-term improvements are based on a review of the future land use and demographic data included in the *Vision Plan* as well as other recommendations made in this COA and other planning documents like the *SunRail Feeder Bus Plan*. The recommendations are focused on primary corridors identified by LYNX staff and the community as part of the *Vision Plan*. Service types were made based on the data available.

Local Routes

New Route – West Town Center to Maitland SunRail Connector

There is currently no service that provides an east/west connection between the future West Town Center SuperStop and the Maitland SunRail Station. The feeder bus plan does not provide for any new service to SunRail. The *2030 Vision Plan* proposed this as a corridor connection, but did not carry the route from the West Town Center. This new route would start at the future

West Town Center SuperStop and travel south along SR 434, turning east onto Maitland Boulevard, and terminating at the Maitland SunRail Station. The route will provide 30-minute service from 6:00 a.m. to 10:00 p.m. See Figure 4-12 for the recommended new routing.

New Route – John Young Parkway Circulator

A review of 2020 demographic forecasts, provided by LYNX, was reviewed for future growth areas. The household densities around Link 57 are forecasted to be around three dwelling units per acre. These projections increase closer to Kissimmee. This density does not necessarily support local bus service, but could support NeighborLink service. This area is also limited by the number of through streets available to provide local bus service, making it difficult to create a strong corridor. NeighborLink service would extend the service area for LYNX around Link 57 into the neighborhoods around John Young Parkway. The service would operate within the area bounded by Sand Lake Road and US 192 around John Young Parkway. Service would be provided weekdays from 6:00 a.m. to 6:00 p.m. with connections made at the Kissimmee Intermodal Transportation Center. See Figure 4-13 for the recommended new routing.

New Route – Orlovista Circulator

As part of the *2013-22 TDP* a circulator route was proposed to cover an area of Orlovista south of SR 526. The route was short, at 5 miles, and was no more than ½ mile from an existing local bus. A review of the 2020 demographic forecasts showed areas west of the proposed circulator that could support a demand response service. These areas are greater than ½ mile from an existing route, making it difficult to access. It is recommended to provide NeighborLink service in the area bounded by the East-West Expressway, SR 435, and the Florida Turnpike. The service would operate weekdays from 6:00 a.m. to 6:00 p.m., with connections made at the Washington Shores SuperStop. See Figure 4-12 for the recommended new routing.

Express Bus

Many of the existing LYNX corridors currently experiencing high ridership and covered by a large amount of local service are recommended for higher frequency and/or higher capacity services in the future based on the 2030 Vision Plan and 2013-22 TDP. Many of the recommendations are for additional FastLink routes (this COA is recommending two specific FastLink Routes, one for Link 17 and one for Link 10). FastLink routes operate with limited stops along the same path as a local route. While these routes provide a much more streamlined and faster service for customers, there are additional improvements that could be made along these corridors that would improve the travel time and reliability for FastLink routes without incurring the high costs associated with dedicated running ways. Some of the concepts that could be considered for FastLink routes would be the deployment of TSP along the corridors. The ability for the bus to request or hold the green at an intersection should improve travel times and predictability for the routes. Each corridor would have to be studied to determine the cost/benefit prior to implementation. These benefits could even be extended to local buses by installing the hardware onto all LYNX buses.

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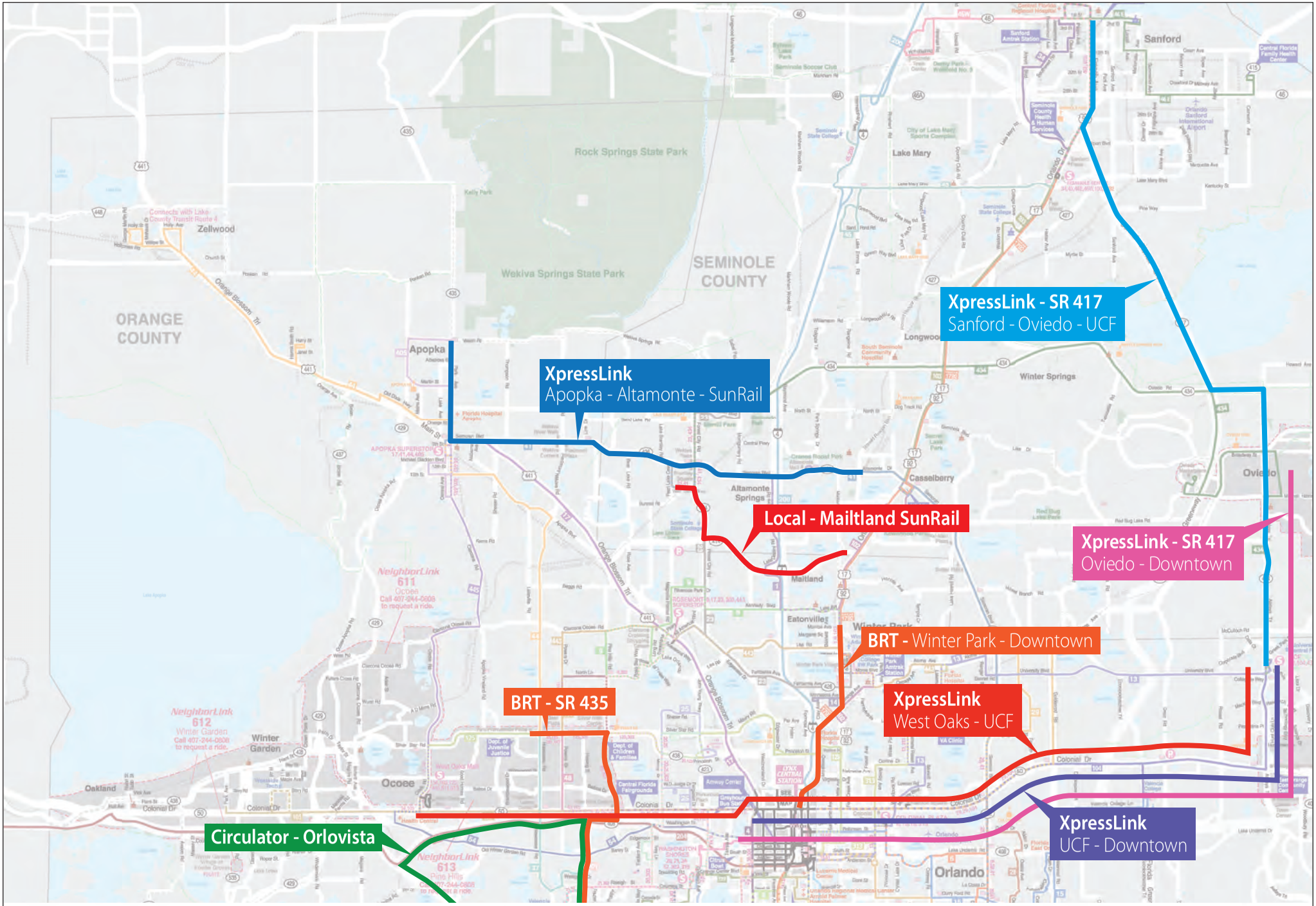
XpressLink - SR 417
Sanford - Oviedo - UCF
XpressLink
Apopka - Altamonte - SunRail
Local - Mailtland SunRail
XpressLink - SR 417
Oviedo - Downtown
BRT - Winter Park - Downtown
BRT - SR 435
XpressLink
West Oaks - UCF
XpressLink
UCF - Downtown
Circulator - Orlovista
ORANGE COUNTY
SEMINOLE COUNTY
Rock Springs State Park
Wekiva Springs State Park
Sanford
Lake Mary
Longwood
Winter Springs
Casselberry
Oviedo
Apopka
Zellwood
Altamonte Springs
Maitland
Eatonville
Winter Park
Winter Garden
Ocoee
Oakland
Orlando

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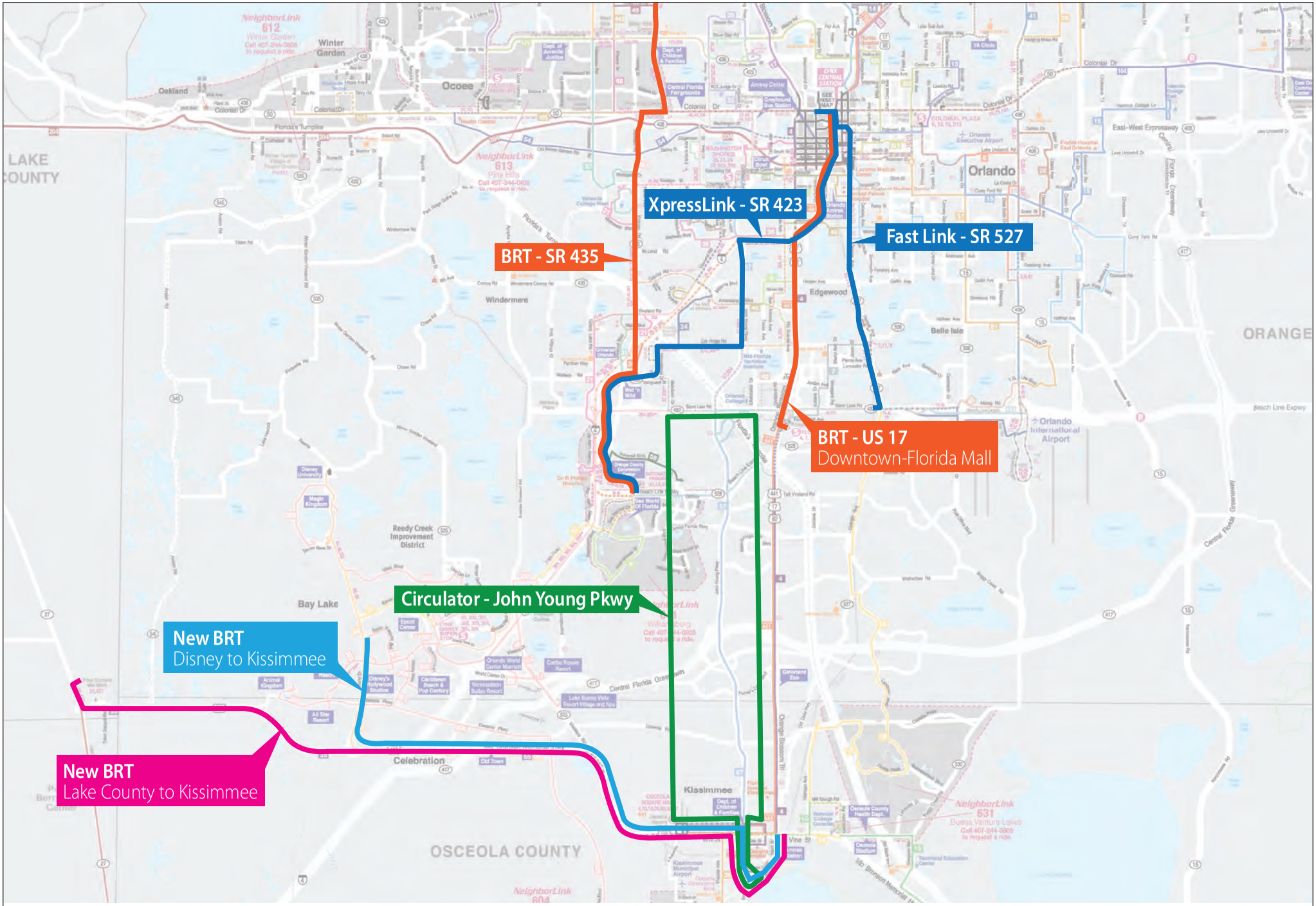

LYNX Comprehensive Operational Analysis (COA) of LYNX Transit Route Network

FIGURE 4-13

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Other considerations would be the construction of queue jumps at intersections that are especially problematic for LYNX buses. This infrastructure investment is significantly less than constructing a full bus-only lane. Providing a queue jump and TSP together would allow the bus to move ahead in the queue at an intersection as well as receive the green sooner. Together these two improvements could dramatically improve operations.

Lastly, the use of off-board fare collection for FastLink routes could improve boarding times, and ultimately travel times for higher use stops. This improvement would require investment in off-board fare collection equipment and the ability to keep those who haven't paid from boarding the bus. This is a concept that is considered for future BRT routes in the LYNX system, so extending them to other major stops would likely not be as costly since some of the costs could be shared across the system.

These improvements, while not creating a full BRT route, would provide benefits to the travel times and reliability of the FastLink routes currently in operation and proposed in this section. A cost/benefit analysis would be able to determine the size of the impact realized from the cost incurred. In many cases, this should be much less than the cost of constructing a full BRT corridor, but provide many of the benefits. As demand increases along each corridor or land use changes, and warrants expansion to a BRT corridor, many of the improvements would already be in place.

New SR 50 XpressLink – West Oaks Mall to University of Central Florida

As part of the short-term recommendations, Link 6 would be rerouted to provide a similar local service between West Oaks Mall and UCF. This short-term recommendation will provide a local service along this corridor. If the demand for the local service grows, consideration can be given to implementing this service sooner. The proposed corridor shows population and employment densities in the future that could support a higher capacity service. Future land use is also proposed to be more transit-friendly. In the future, the recommendation is to provide a new FastLink service between West Oaks Mall and the University of Central Florida. This route could be broken into two routes with the LYNX Central Station as the breaking point. The route will begin at West Oaks Mall and travel east along Colonial Drive, turning north on Alafaya Trail and ending at UCF. See Figure 4-12 for the recommended routing. The service should at the very least have increased stop spacing to provide for a faster service than the existing local buses. The initial service should operate at 30-minute headways seven days a week from 6:00 a.m. to 10:00 p.m.

New SR 423 XpressLink – Downtown to International Drive

This corridor was identified as a focus in both the *2030 Vision Plan* and the *2013-22 TDP*. A review of forecasted data for 2030 from the *Vision Plan* show high population densities toward the northern end of the corridor and higher employment densities along the International Drive portion of the corridor. Link 8 currently provides service between downtown Orlando and International Drive. Ridership for Link 8 is one of the highest in the system. Providing a more direct and faster service would be a benefit to those accessing employment along International Drive. The route would depart LYNX Central Station heading west along Colonial Drive and onto westbound Interstate 4. The route would then head south along John Young Parkway and west onto W. Oak Ridge Road. The route would then travel south along International Drive, terminating at the Martin Andersen Beachline Expressway. The service would provide morning and evening trips only during the weekday. See Figure 4-13 for the recommended new routing.

New SR 436 XpressLink – Apopka to Altamonte Springs

This corridor is currently served by Link 41. This route has shown high ridership and is recommended for service span expansion and increased frequency as part of the short-term improvements. Link 41 would serve as the connection to the Altamonte Springs SunRail Station from Apopka according to the *SunRail Feeder Bus Plan*. As demand along the corridor increases, it is recommended that FastLink service be introduced between Apopka and the Altamonte Springs SunRail Station. This service would provide a direct and faster connection between Apopka and SunRail. The service should operate weekdays from 6:00 a.m. until 10:00 p.m. with a 30-minute frequency. An interim solution would be to provide a morning and evening limited stop version of the Link 41. Stops would be identified based on demand and transfer patterns. See Figure 4-12 for the recommended new route.

New XpressLink – UCF/ Downtown

This express link will provide fast and convenient service to Downtown Orlando from the University of Florida Campus. This route would start at UCF and travel southbound along North Alafaya Trail. It would then turn right and travel westbound along Colonial Drive into downtown Orlando into LYNX Central Station where it would turn around and continue back towards UCF. See Figure 4-12 for the recommended new route.

New SR 527 FastLink – Downtown to Sand Lake Road SunRail Station

This corridor is currently served by three routes (Links 7, 11, and 18). Ridership from the APC data shows that demand for the three routes is high. Reviewing the ridership by trip shows no pronounced peaking characteristics, indicating demand throughout the day. This type of demand cannot be served by SunRail, which will operate only during peak travel times. Other nearby north/south corridors have been identified for BRT in the *Vision Plan*, therefore express bus service is recommended for this corridor. A review of the ridership data by stop showed that those stops with higher passenger activity were spaced further apart. This provides a starting point for determining which stops to use for a limited stop service. This route would travel between LYNX Central Station and the Sand Lake Road SunRail Station using Orange Avenue. Service should be operated seven days a week from 6:00 a.m. to 10:00 p.m. every 30 minutes. See Figure 4-13 for the recommended new route.

New SR 417 FastLink – Sanford to University of Central Florida

There is currently no direct connection between Sanford and the University of Central Florida by public transportation. The number of direct route options is limited by the existing road network. The *2030 Vision Plan* proposed a corridor that travels south along French Avenue to Seminole Expressway to Alafaya Trail. The forecasted densities and land use do not support a frequent, high capacity service such as BRT. The recommended service is recommended to be a peak hour express service designed to connect commuters to the college. As demand for this service increases, service could be expanded. The initial service would provide two morning and two evening trips, Monday through Friday. See Figure 4-12 for the recommended new route.

New XpressLink – UCF to Innovation Way

Ultimately, the 2030 Vision Plan and TDP call for a connection from the University of Central Florida through Innovation to the airport. Some of the southern portion of this corridor is being served by new routes to Lake Nona. As development continues and Innovation Way is extended, it is likely this service will be expanded. Connecting University and the tech-focused businesses

forecasted to locate in Innovation make logical sense. An express route would provide a direct and rapid connection between the two. This route would begin at the UCF campus and travel south along the proposed Innovation Way, connecting to the existing Innovation Way and ending at SR 528. This route would operate Monday through Friday, providing service from 6:00 a.m. until 8:00 p.m. See Figure 4-14 for the recommended new route.

New FastLink – Fern Park to Orlando International Airport

This corridor is currently served by Link 41. The current route has high ridership, but does demonstrate difficulties with on-time performance. Providing a faster connection between the Altamonte Springs SunRail Station and OIA would not only provide a more reliable service for existing riders, but also provide a rapid connection between the SunRail and the airport for those coming from the north. The route would depart the Altamonte Springs SunRail Station and head south along SR 436. The route would operate weekdays from 6:00 a.m. until 6:00 p.m. Connections to SunRail train arrivals at Altamonte Springs should be coordinated. See Figure 4-14 for the recommended new route.

Bus Rapid Transit

New US 192 BRT – Lake County to Kissimmee

The *2030 Vision Plan, 2013-22 TDP* and *2006 COA* all recommend some version of this corridor as a bus rapid transit service. A review of the demographic, land use, congestion, and ridership data for the corridor from the *Vision Plan* support higher capacity transit. Currently, LYNX is conducting the US 192 Alternatives Analysis Project which is assessing improved transit service in this corridor. The conclusion of the AA will be a recommend a preferred alternative. Alternatives range from limited stop express bus to full BRT with a dedicated bus lane for most of the corridor. The recommendation is to provide BRT along US 192 from US 27 in Lake County east to downtown Kissimmee. See Figure 4-13 for the recommended new route.

New US 192 BRT – Disney to Kissimmee

The *2030 Vision Plan* and *2013-22 TDP* both recommend the corridor from the Disney Transportation Center south along World Drive, turning east onto US 192, and terminating in downtown Kissimmee. The portion of this corridor along US 192 overlaps the above proposed BRT line and can share costs. A review of the demographic, land use, congestion, and ridership data for the corridor from the *Vision Plan* support higher capacity transit. The alternatives analysis discussed above is also considering this corridor as part of the recommended alternative. The recommendation is to provide BRT from the Walt Disney World south to US 192, and then east into downtown Kissimmee. See Figure 4-13 for the recommended new route.

New SR 435 BRT – Park Promenade to International Drive

The *2030 Vision Plan, 2013-22 TDP,* and *2006 COA* all recommend BRT service in this corridor. The TDP proposes a service from Colonial Drive to International Drive via Kirkman Road. The *Vision Plan* proposes a slightly longer route from Park Promenade to International Drive. A review of forecasted demographics, land use, congestion, and existing ridership support a higher capacity service. Currently, the Link 37 travels between Park Promenade and International Drive. This route has a high observed ridership. It is recommended that BRT service be provided between Park Promenade and International Drive. The route would start traveling east along

Silver Star Road from Park Promenade, turning south onto Pine Hills Road, then west onto Colonial Drive. The route will then turn south onto Kirkman Road and then east onto International Drive. See Figures 4-12, 4-13 and 4-14 for the recommended new route.

New US 17-92 BRT –Winter Park to Downtown Orlando

A longer version of this corridor was proposed as part of the *2030 Vision Plan*, *2013-22 TDP*, and *2006 COA*. The corridor followed US 17-92 from Fern Park to downtown Orlando. A review of the future demographics and land use in the *Vision Plan* for the segment from Fern Park to Winter Park do not appear sufficient to support BRT. The high level of transit currently provided by Links 102 and 17-92, as well as the recommendations described above in the Short-term Improvements section should provide adequate service. The second segment from Winter Park to downtown Orlando showed more transit supportive densities and land uses in the *Vision Plan* data. Additionally, the high level of congestion along this segment supports the recommendation for BRT. The route would travel from the Winter Park SunRail Station to the LYNX Central Station via US 17-92. See Figure 4-12 for the recommended new route.

New US 17 BRT –Downtown Orlando to Florida Mall

This corridor is one of the busier corridors for LYNX. Link 4 and 441 currently provide high quality service along this corridor. The corridor has high ridership, and 2030 forecasts for demographics and land use show a high capacity transit-supportive corridor. It is recommended that BRT service be operated between Downtown Orlando and the Florida Mall. This coincides with recommendations in the 2030 Vision Plan and 2006 COA. A short-term recommendation for the corridor was to expand the service span for Link 441. Upon completion of BRT between Orlando and Florida Mall, it may be advisable to only operate Link 441 from Kissimmee to Florida Mall. The duplication of service isn't warranted. The proposed BRT should not compete with SunRail due to the different travel patterns served. SunRail is designed as a commuter rail service with long distances between stops, while BRT would serve the local trips with a premium service. This is supported by analysis done as part of the US 192 Alternatives Analysis, which showed no impact to Link 441 ridership from SunRail. The route would travel west along Amelia Avenue from LYNX Central Station, turning south onto S. Orange Blossom Trail to Florida Mall. See Figure 4-13 for the recommended new route.

5

Cost Estimation, Ridership Evaluation and Phasing

5.1 Introduction

In order to further evaluate the proposed recommendations, incremental operating and maintenance (O&M) costs were estimated using LYNX's TDP operating cost model. Additionally, the incremental ridership associated with each recommendation was calculated using LYNX's TBEST direct-demand estimation tool.

5.2 Operating and Maintenance Costs and Service Statistics

Using LYNX's single factor operating and maintenance cost model that was used to develop costs for the 2013 TDP, the projected O&M costs for each recommendation were developed.

Service Statistic Assumptions

The baseline for the development of the service statistics for these recommendations was data that was available from LYNX for the existing services.[10] For new routes, wherever possible, existing speeds and ratios of revenue to pay hours for nearby routes were used to improve the overall accuracy of the cost estimate. Each proposed new route was assumed to have a span of service of 6:00 AM to 10:00 PM, with a frequency of 30 minutes, unless otherwise noted. For existing routes that have recommended service changes, the change in statistics was calculated based on the change in miles, hours or trips (Delta vs. September 2012).

Statistics were developed for each day of operation and were then annualized based on the year-specific days of the week. The statistics for each recommendation are listed in Table 5-1. Statistics for Long Term improvements were developed directly from the information used the 2013 Update to the TDP, this information did not provide numbers of buses required and as such they are not included in the capital cost estimate in this COA.

[10] Service Statistics for September 2012 BID

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Table 5-1: Changes to Operations Statistics for COA Recommendations (Annual Vehicle Hours)

Link	Phasing	Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	2015	Extend route to LCS (part of the restructuring of Link 125)	0	2,889	3,111	3,091	3,071	3,152	3,152	3,152	3,152	3,152	3,152	3,152	3,152
3	2017	Truncate route at Social Security Administration	0	0	0	(7,241)	0	0	0	0	0	0	0	0	0
4	2015	Restructure Route as Park of KIF Plan	0	(29,597)	0	0	0	0	0	0	0	0	0	0	0
6	2017	Extend route to LCS (part of the restructuring of Link 3/6)	0	0	0	12,108	12,029	12,345	12,345	12,345	12,345	12,345	12,345	12,345	12,345
7		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
8	2018	Truncate route at Destination Parkway (part of Link 8/42 swap)	0	0	0	0	(24,462)	0	0	0	0	0	0	0	0
	2017	Double headway between 7AM and 11 AM in the outbound direction	0	0	0	16,276	16,148	16,789	16,789	16,789	16,789	16,789	16,789	16,789	16,789
	2017	Double headway between 1PM and 5PM in the inbound direction	0	0	0	16,276	16,148	16,789	16,789	16,789	16,789	16,789	16,789	16,789	16,789
9	2016	Add seven minutes of running time to existing route to improve reliability	0	0	1,064	1,052	1,043	1,085	1,085	1,085	1,085	1,085	1,085	1,085	1,085
	2014	Pine Hills Re-Route	4,107	3,934	4,068	4,115	4,158	3,978	3,978	3,978	3,978	3,978	3,978	3,978	3,978
10	2014	Add service on Sunday	2,146	2,146	2,072	2,146	2,220	1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924
	2017	Increase headway to 30 minutes throughout the day	0	0	0	11,125	11,038	11,476	11,476	11,476	11,476	11,476	11,476	11,476	11,476
	2015	Restructure route as part of KIF plan	0	(1,452)	0	0	0	0	0	0	0	0	0	0	0
	2017	Add non-stop route	0	0	0	11,125	11,038	11,476	11,476	11,476	11,476	11,476	11,476	11,476	11,476
11		No change proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
13	2015	Reduce morning span of service	0	(576)	0	0	0	0	0	0	0	0	0	0	0
	2015	Increase headway between 6AM and 12:00PM in the outbound direction	0	4,186	4,202	4,153	4,120	4,284	4,284	4,284	4,284	4,284	4,284	4,284	4,284
14	2015	Extend to LOC as part of Link 125 Restructuring	0	2,335	2,368	2,365	2,361	2,375	2,375	2,375	2,375	2,375	2,375	2,375	2,375

Table 5-1: Changes to Operations Statistics for COA Recommendations (Annual Vehicle Hours) (Continued)

Link	Phasing	Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
15	2017	Consolidate service on S. Goldenrod Road (eliminate service on Egan)	0	0	0	(82)	0	0	0	0	0	0	0	0	0
	2014	Reduce stop spacing	0	0	0	0	0	0	0	0	0	0	0	0	0
17	2014	Create a FastLink Service	0	0	0	0	0	0	0	0	0	0	0	0	0
18	2014	Expand AM span of service	1,208	1,208	1,213	1,199	1,189	1,237	1,237	1,237	1,237	1,237	1,237	1,237	1,237
	2015	Restructure route as part of KIF plan	0	20,294	20,294	20,294	20,294	20,294	20,294	20,294	20,294	20,294	20,294	20,294	20,294
20	2014	Reduce stop spacing	0	0	0	0	0	0	0	0	0	0	0	0	0
21	2018	Extend route to Walt Disney World	0	0	0	0	16,626	16,963	16,963	16,963	16,963	16,963	16,963	16,963	16,963
23		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
24		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
25		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
26	2015	Restructure route as part of KIF plan	0	14,171	14,171	14,079	13,987	14,354	14,354	14,354	14,354	14,354	14,354	14,354	14,354
28	2014	Reduce stop spacing	0	0	0	0	0	0	0	0	0	0	0	0	0
	2015	Reduce evening span of service	0	(328)	0	0	0	0	0	0	0	0	0	0	0
29	2017	Restructure route to remove Goldenrod Section (part of Goldenrod Package)	0	0	0	(5,558)	0	0	0	0	0	0	0	0	0
	2015	Reduce evening span of service	0	(328)	0	0	0	0	0	0	0	0	0	0	0
31		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
34	2014	Restructure route to serve French Ave. and Central Florida Regional Hospital and remove from Airport Blvd.	3,803	3,591	3,756	3,841	3,906	3,607	3,607	3,607	3,607	3,607	3,607	3,607	3,607
36	2014	Reduce stop spacing	0	0	0	0	0	0	0	0	0	0	0	0	0
	2015	Reduce evening span of service	0	(261)	0	0	0	0	0	0	0	0	0	0	0
	2016	Remove running time from schedule	0	0	(4,575)	0	0	0	0	0	0	0	0	0	0

Table 5-1: Changes to Operations Statistics for COA Recommendations (Annual Vehicle Hours) (Continued)

Link	Phasing	Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
37	2014	Restructure route as part of Pine Hills Plan	10,678	10,586	10,710	10,675	10,641	10,779	10,779	10,779	10,779	10,779	10,779	10,779	10,779
	2016	Increase headway between 5AM and 9AM in the southbound direction	0	0	3,050	3,014	2,990	3,109	3,109	3,109	3,109	3,109	3,109	3,109	3,109
	2016	Increase headway between 4AM and 8AM in the northbound direction	0	0	3,050	3,014	2,990	3,109	3,109	3,109	3,109	3,109	3,109	3,109	3,109
38	2018	Increase span of service to all day	0	0	0	0	40,764	40,351	40,351	40,351	40,351	40,351	40,351	40,351	40,351
40	2015	Expand morning span of service	0	563	565	559	554	576	576	576	576	576	576	576	576
	2014	Reduce stop spacing	0	0	0	0	0	0	0	0	0	0	0	0	0
41	2014	Reduce stop spacing	0	0	0	0	0	0	0	0	0	0	0	0	0
	2014	Expand morning span of service	3,383	3,383	3,396	3,356	3,330	3,462	3,462	3,462	3,462	3,462	3,462	3,462	3,462
	2015	Increase headway around 3PM in the westbound direction	0	4,915	4,934	4,877	4,838	5,030	5,030	5,030	5,030	5,030	5,030	5,030	5,030
	2016	Split Route to improve reliability	0	0	6,055	6,033	6,010	6,100	6,100	6,100	6,100	6,100	6,100	6,100	6,100
42	2018	Extend route to Premium Outlets (part of Link 8/42 swap)	0	0	0	0	7,905	8,055	8,055	8,055	8,055	8,055	8,055	8,055	8,055
	2015	Increase headway between 10AM and 5PM in the eastbound direction	0	4,498	4,515	4,463	4,428	4,603	4,603	4,603	4,603	4,603	4,603	4,603	4,603
	2015	Increase headway between 6AM and 3PM in the westbound direction	0	5,783	5,806	5,738	5,693	5,919	5,919	5,919	5,919	5,919	5,919	5,919	5,919
44	2014	Restructure route as part of Pine Hills Plan	(136)	0	0	0	0	0	0	0	0	0	0	0	0
	2017	Adjust time points	0	0	0	0	0	0	0	0	0	0	0	0	0
45	2014	Extend route on the east to Central Florida Greenway, and on the west to International Parkway and C.R. 46A.	2,777	2,777	2,796	2,779	2,761	2,830	2,830	2,830	2,830	2,830	2,830	2,830	2,830
46-E	2014	Extend route to Central Florida Greenway via Melonville and Sanford Ave. Remove from French Avenue	(1,234)	0	0	0	0	0	0	0	0	0	0	0	0
46-W	2014	Extend route to Sand Pond Road, remove from French Avenue	563	558	566	568	567	565	565	565	565	565	565	565	565

Table 5-1: Changes to Operations Statistics for COA Recommendations (Annual Vehicle Hours) (Continued)

Link	Phasing	Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
48	2014	Restructure route as part of Pine Hills Plan	6,979	6,916	6,991	6,955	6,930	7,052	7,052	7,052	7,052	7,052	7,052	7,052	7,052
	2014	Reduce evening span of service	(289)	0	0	0	0	0	0	0	0	0	0	0	0
	2016	Increase headway between 6AM and 10AM in the eastbound direction	0	0	3,135	3,099	3,074	3,196	3,196	3,196	3,196	3,196	3,196	3,196	3,196
49	2014	Restructure route as part of Pine Hills Plan	3,609	3,582	3,618	3,597	3,583	3,653	3,653	3,653	3,653	3,653	3,653	3,653	3,653
50	2018	Remove route from SeaWorld	0	0	0	0	(2,303)	0	0	0	0	0	0	0	0
51	2014	Expand the morning span of service	974	974	977	966	958	996	996	996	996	996	996	996	996
54	2014	Eliminate Saturday service	(1,367)	0	0	0	0	0	0	0	0	0	0	0	0
55	2015	Restructure route as part of the KIF plan	0	7,778	7,778	7,778	7,778	7,778	7,778	7,778	7,778	7,778	7,778	7,778	19,374
56	2014	Expand morning span of service	193	194	3,731	3,728	3,727	3,735	3,735	3,735	3,735	3,735	3,735	3,735	26,750
	2015	Restructure route as part of the KIF plan	0	7,672	7,672	7,672	7,672	7,672	7,672	7,672	7,672	7,672	7,672	7,672	7,672
57		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
58	2014	Proposed for elimination; more discussion required	(4,271)	0	0	0	0	0	0	0	0	0	0	0	0
102		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
103	2016	Increase headway around between 6AM and 10AM in the northbound direction	0	0	5,654	5,588	5,544	5,544	5,544	5,544	5,544	5,544	5,544	5,544	5,544
104	2015	Increase headway to 15 minutes throughout the day	0	21,632	21,717	21,463	21,294	22,139	22,139	22,139	22,139	22,139	22,139	22,139	22,139
105		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
107		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
111	2018	Extend to Walt Disney World	0	0	0	0	30,037	30,027	30,027	30,027	30,027	30,027	30,027	30,027	30,027
125	2015	Restructure route to serve downtown Orlando	0	(6,264)	0	0	0	0	0	0	0	0	0	0	0
200		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
204		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 5-1: Changes to Operations Statistics for COA Recommendations (Annual Vehicle Hours) (Continued)

Link	Phasing	Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
210		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
211		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
212		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
300		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
301	**2015**	Restructure route as part of 3-D Restructuring	0	(129)	0	0	0	0	0	0	0	0	0	0	0
302	**2015**	Restructure route as part of 3-D Restructuring	0	(129)	0	0	0	0	0	0	0	0	0	0	0
303	**2015**	No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
304	**2015**	Restructure route as part of 3-D Restructuring	0	36	37	37	37	37	37	37	37	37	37	37	37
305	**2015**	Restructure route as part of 3-D Restructuring	0	(212)	0	0	0	0	0	0	0	0	0	0	0
306	**2015**	No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
313		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
319	**2014**	Reduce evening span of service	(323)	0	0	0	0	0	0	0	0	0	0	0	0
405	**2014**	Eliminate Route	(6,567)	0	0	0	0	0	0	0	0	0	0	0	0
416		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
426	**2014**	Expand morning span of service	127	127	128	126	125	130	130	130	130	130	130	130	130
427		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
434		No Change Proposed	0	0	0	0	0	0	0	0	0	0	0	0	0
441	**2015**	Expand span of service	0	1,342	1,349	1,334	1,323	1,376	1,376	1,376	1,376	1,376	1,376	1,376	1,376
	2015	Restructure route as part of KIF plan	0	(694)	0	0	0	0	0	0	0	0	0	0	0
443	**2014**	Reroute for Pine Hills	12,579	12,579	12,660	12,578	12,496	12,825	12,825	12,825	12,825	12,825	12,825	12,825	12,825
445	**2014**	Adjust time points	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 5-1: Changes to Operations Statistics for COA Recommendations (Annual Vehicle Hours) (Continued)

Link	Phasing	Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
17/92	2014	Adjust Stop Spacing	0	0	0	0	0	0	0	0	0	0	0	0	0
	2014	Add new neighborlink on Celery Ave	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680
	2014	Create New Circulator/Neighborlink in Lake Mary	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680	4,680
	2017	Create new Goldenrod Route	0	0	0	28,269	28,269	28,269	28,269	28,269	28,269	28,269	28,269	28,269	28,269
	2017	Create new KIF to Lake Nona and OIA Route	0	0	0	41,492	41,610	41,610	41,610	41,610	41,610	41,610	41,610	41,610	41,610
	2017	Create new Kissimmee to International Drive route	0	0	0	33,113	32,988	33,164	33,164	33,164	33,164	33,164	33,164	33,164	33,164
	2017	Convert new Downtown Orlando to Lake Nona route (Service Grant) into a Downtown Orlando to OIA to Lake Nona XpressLink	0	0	0	35,474	35,474	35,474	35,474	35,474	35,474	35,474	35,474	35,474	35,474
	2018	Create new Celebration circulator	0	0	0	0	11,313	11,382	11,382	11,382	11,382	11,382	11,382	11,382	11,382
	2018	Create new Kissimmee circulator	0	0	0	0	11,506	11,572	11,572	11,572	11,572	11,572	11,572	11,572	11,572
	2018	Create new Baldwin Park Circulator	0	0	0	0	6,578	6,613	6,613	6,613	6,613	6,613	6,613	6,613	6,613
	2017	Create new LCS - Universal/SeaWorld Route	0	0	0	1,267	1,267	1,267	1,267	1,267	1,267	1,267	1,267	1,267	1,267
	2015	Create a new 3-D route to Buena Ventura Lakes	0	1,590	1,617	1,617	1,617	1,617	1,617	1,617	1,617	1,617	1,617	1,617	1,617
	2015	Create a new 3-D route in Pine Hills	0	2,524	2,566	2,566	2,566	2,566	2,566	2,566	2,566	2,566	2,566	2,566	2,566
	2018	Connects Oviedo and Altamonte Springs via Red Bug Lake Road and Semoran Blvd.	0	0	0	0	27,230	27,230	27,230	27,230	27,230	27,230	27,230	27,230	27,230
	2018	Create new Sanford SunRail Airport Blvd Route	0	0	0	0	8,368	8,623	8,623	8,623	8,623	8,623	8,623	8,623	8,623
	2019	Create new West Town Center to Maitland SunRail Local Route	0	0	0	0	0	17,074	17,074	17,074	17,074	17,074	17,074	17,074	17,074
	2020	Create new John Young Parkway Circulator Route	0	0	0	0	0	0	9,447	9,447	9,447	9,447	9,447	9,447	9,447
	2021	Create new Orlovista Circulator Route	0	0	0	0	0	0	0	6,173	6,173	6,173	6,173	6,173	6,173
	2019	Create new XpressLink along SR 50 between West Oaks and UCF	0	0	0	0	0	13,101	13,101	13,101	13,101	13,101	13,101	13,101	13,101

Table 5-1: Changes to Operations Statistics for COA Recommendations (Annual Vehicle Hours) (Continued)

Link	Phasing	Description	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
	2019	Create new Xpress Link along SR 423 from Downtown to I-Drive	0	0	0	0	0	4,242	4,242	4,242	4,242	4,242	4,242	4,242	4,242
	2019	Create new XpressLink from Apopka to Altamonte SunRail Station	0	0	0	0	0	19,292	19,292	19,292	19,292	19,292	19,292	19,292	19,292
	2019	Create New XpressLink from UCF to Downtown	0	0	0	0	0	7,220	7,220	7,220	7,220	7,220	7,220	7,220	7,220
	2022	Create new FastLink along SR 527 from Downtown to Sand Lake SunRail Station	0	0	0	0	0	0	0	0	4,073	4,073	4,073	4,073	4,073
	2019	Create new Xpress Link from Sanford to Oveido to UCF	0	0	0	0	0	28,200	28,200	28,200	28,200	28,200	28,200	28,200	28,200
	2019	Create new Xpresslink from UCF to Innovation Way	0	0	0	0	0	4,242	4,242	4,242	4,242	4,242	4,242	4,242	4,242
	2022	Create new FastLink from Fern Park to OIA	0	0	0	0	0	0	0	0	4,241	4,241	4,241	4,241	4,241
	2019	Create new XpressLink from Oviedo to Downtown	0	0	0	0	0	800	800	800	800	800	800	800	800
	2023	Create new BRT along US 192 from Lake County to Kissimmee	0	0	0	0	0	0	0	0	0	33,448	33,448	33,448	33,448
	2018	Create new BRT along US 192 from Disney to Kissimmee	0	0	0	0	91,980	91,980	91,980	91,980	91,980	91,980	91,980	91,980	91,980
	2024	Create new BRT along 435 from Park Promenade to I-Drive	0	0	0	0	0	0	0	0	0	0	19,899	19,899	19,899
	2025	Create new BRT from Winter Park to Downtown	0	0	0	0	0	0	0	0	0	0	0	27,674	27,674
	2026	Create new BRT from Downtown to Florida Mall	0	0	0	0	0	0	0	0	0	0	0	0	31,517
		TOTAL	**48,297**	**124,151**	**186,179**	**383,517**	**620,790**	**747,675**	**757,122**	**763,294**	**771,608**	**805,056**	**824,955**	**852,629**	**918,758**

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Cost Model Assumptions

LYNX's cost model is a one-factor model based on the latest financial data available. Costs are developed using Revenue Hours as the cost factor variable. The current cost factor is $63.70 per revenue hour. This cost factor is inflated using a rate of 2.5% per year. Itemized costs per recommendation and implementation year are listed in Appendix B.

5.3 Capital Costs

The capital costs associated with these improvements consist primarily of additional vehicles required to operate service. Vehicle requirements were calculated using projected cycle times and headways and the change in requirements by year are listed in Table 5-2. As stated above, the Long Term Recommendations cost estimate was based off of the information included in the TDP and does not include a change in bus requirements, so this Capital Cost phasing plan only projects bus requirements for the short term recommendations. Capital costs for the global recommendations are not provided.

Table 5-2: Cumulative Bus Requirements by Year

Year	Cumulative Number of New 40' Buses Required
2014	15
2015	24
2016	17
2017	35
2018	12

By 2018, LYNX will need to expand their bus fleet by 105 total buses to accommodate the recommended short term service changes. In current dollars, buses range in price from $500,000 to $1,000,000, depending on the features (discounts are offered when buses are purchased in bulk). The cost of 103 new buses would likely be $51.5 - $103M.

5.4 Implementation of Recommendations

LYNX's 2014 Operating Budget was approved by the LYNX Board of Directors at the September 2013 Board of Directors Meeting. The total operating expenses in 2014 represent a 5.6 percent increase from the amended FY13 budget to $124,867,296,817 (see Table 5-3).

Table 5-3: LYNX 2014 Operating Budget[11]

	2014
Salaries/Wages/Fringes	$66,047,747
Other Services	$11,030,844
Fuel	$16,720,015
Materials and Supplies	$7,436,393
Utilities	$1,401,578
Casualty and Liability	$1,397,267
Taxes and Tags	$432,141
Purchased Transportation	$20,902,452
Miscellaneous	$874,399
Leases	$181,120
Reserves	$1,443,340
Total Operating Expenses	$127,867,296

Source:
http://www.golynx.com/core/fileparse.php/97316/urlt/0056190-09-19-2013-Board-Report-Pkg.pdf

The suggested implementation of the COA recommendations for 2014 reflect the limited funding available in the systemwide 2014 operating budget for service expansions.

The cost of implementing the proposed 2014 recommendations is approximately 2.2% of the approved 2014 budget. During this time-frame, only no-cost changes, or changes of immediate operating need are recommended. In general, the proposed recommendation phasing seeks to prioritize immediate operating needs, followed by strengthening key routes in the network, and then the creation of new routes.

Implementation of the remaining short term recommendations are spread over the following four years and can be adjusted based on resource availability.

In **2014**, the following packages of improvements are recommended for implementation:

- **Pine Hills Package**
- **Spans of Service Changes**
- **All no cost items**
- **Sanford Package**
- **Changes due to the opening of the Kissimmee Intermodal Facility (KIF)**

[11] Does not include costs associated with rerouting Links to KIF in January 2014.

In **2015**, the following packages of improvements are recommended for implementation:

- **Link 125 Package**
- **Limited Directs Package**
- **The changes due to the opening of the Kissimmee Intermodal Facility (KIF) not implemented in 2014**
- **Some headway enhancements (Link 13, 41, 42, 48)**

In **2016**, the following packages of improvements are recommended for implementation:

- **Changes to running time on existing routes**

In **2017**, the following packages of improvements are recommended for implementation:

- **Creation of all new routes not associated with any package of improvements**
- **East Orlando Package**
- **Changes to remaining headways not implemented in 2015**

In **2018**, the remaining short term improvements are recommended for implementation.

For the long term proposals, program elements are recommended to be implemented evenly amongst the remaining years to allow LYNX to grow at a constant rate and to keep costs from increasing dramatically year over year. The proposed phasing of the recommendations is shown in Table 5-4.

Table 5-4: Proposed Recommendations Phasing

Link	Recommended Year of Implementation	Description
1	2015	Extend route to LCS (Link 125 package)
3	2017	Truncate route at Social Security Administration (East Orlando Package)
4	2015	Restructure Route as Park of KIF Package
6	2017	Extend route to LCS (East Orlando Package)
7	NA	No Change Proposed
8	2018	Truncate route at Destination Parkway (part of Link 8/42 swap)
	2017	Double headway between 7AM and 11 AM in the outbound direction
	2017	Double headway between 1PM and 5PM in the inbound direction
9	2016	Add seven minutes of running time to existing route to improve reliability
	2014	Pine Hills Re-Route (Pine Hills Package)

Table 5-4: Proposed Recommendations Phasing (Continued)

Link	Recommended Year of Implementation	Description
10	2014	Add service on Sunday
	2017	Increase headway to 30 minutes throughout the day
	2015	Restructure route as part of KIF Package
	2017	Add non-stop route
11	NA	No change proposed
13	2015	Reduce morning span of service
	2015	Increase headway between 6AM and 12:00PM in the outbound direction
14	2015	Extend to LOC (Link 125 Package)
15	2017	Consolidate service on S. Goldenrod Road and eliminate service on Egan (East Orlando Package)
	2014	Reduce stop spacing
17	2014	Create a FastLink Service
18	2014	Expand AM span of service
	2015	Restructure route as part of KIF Package
20	2014	Reduce stop spacing
21	2018	Extend route to Walt Disney World
23	NA	No Change Proposed
24	NA	No Change Proposed
25	NA	No Change Proposed
26	2015	Restructure route as part of KIF Package
28	2014	Reduce stop spacing
	2015	Reduce evening span of service
29	2017	Restructure route to remove Goldenrod Section (East Orlando Package)
	2015	Reduce evening span of service
31	NA	No Change Proposed
34	2014	Restructure route to serve French Ave. and Central Florida Regional Hospital and remove from Airport Blvd. (Sanford Package)
36	2014	Reduce stop spacing
	2015	Reduce evening span of service
	2016	Remove running time from schedule
37	2014	Restructure route as part of Pine Hills Package
	2016	Increase headway between 5AM and 9AM in the southbound direction
	2016	Increase headway between 4AM and 8AM in the northbound direction

Table 5-4: Proposed Recommendations Phasing (Continued)

Link	Recommended Year of Implementation	Description
38	2018	Increase span of service to all day
40	2015	Expand morning span of service
	2014	Reduce stop spacing
41	2014	Reduce stop spacing
	2014	Expand morning span of service
	2015	Increase headway around 3PM in the westbound direction
	2016	Split Route to improve reliability
42	2018	Extend route to Premium Outlets (part of Link 8/42 swap)
	2015	Increase headway between 10AM and 5PM in the eastbound direction
	2015	Increase headway between 6AM and 3PM in the westbound direction
44	2014	Restructure route as part of Pine Hills Package
	2017	Adjust time points
45	2014	Extend route on the east to Central Florida Greeneway, and on the west to International Parkway and C.R. 46A (Sanford Package)
46-E	2014	Extend route to Central Florida Greenway via Melonville and Sanford Ave. Remove from French Avenue (Sanford Package)
46-W	2014	Extend route to Sand Pond Road, remove from French Avenue (Sanford Package)
48	2014	Restructure route as part of Pine Hills Package
	2014	Reduce evening span of service
	2016	Increase headway between 6AM and 10AM in the eastbound direction
49	2014	Restructure route as part of Pine Hills Package
50	2018	Remove route from SeaWorld
51	2014	Expand the morning span of service
54	2014	Eliminate Saturday service
55	2015	Restructure route as part of the KIF Package
56	2014	Expand morning span of service
	2015	Restructure route as part of the KIF Package
57	NA[12]	No Change Proposed
58	2014	Proposed for elimination; more discussion required
102	NA	No Change Proposed

[12] As part of LYNX's proposals for KIF in 2014, this route would be extended to KIF.

Table 5-4: Proposed Recommendations Phasing (Continued)

Link	Recommended Year of Implementation	Description
103	2016	Increase headway around between 6AM and 10AM in the northbound direction
104	2015	Increase headway to 15 minutes throughout the day
105	NA	No Change Proposed
107	NA	No Change Proposed
111	2018	Extend to Walt Disney World
125	2015	Restructure route to serve downtown Orlando (Link 125 Package)
200	NA	No Change Proposed
204	NA	No Change Proposed
210	NA	No Change Proposed
211	NA	No Change Proposed
212	NA	No Change Proposed
300	NA	No Change Proposed
301	2015	Restructure route as part of Limited Directs Package
302	2015	Restructure route as part of Limited Directs Package
303	2015	No Change Proposed
304	2015	Restructure route as part of Limited Directs Package
305	2015	Restructure route as part of Limited Directs Package
306	2015	No Change Proposed
313	NA	No Change Proposed
319	2014	Reduce evening span of service
405	2014	Eliminate Route
416	NA	No Change Proposed
426	2014	Expand morning span of service
427	NA	No Change Proposed
434	NA	No Change Proposed
441	2014	Expand span of service
	2015	Restructure route as part of KIF Package
443	2014	Pine Hills Package
445	2014	Adjust time points
17/92	2014	Adjust Stop Spacing
	2014	Add new Neighborlink on Celery Ave
	2014	Create New Circulator/Neighborlink in Lake Mary

Table 5-4: Proposed Recommendations Phasing (Continued)

Link	Recommended Year of Implementation	Description
	2017	Create new Goldenrod Route
	2017	Create new KIF to Lake Nona and OIA Route
	2017	Create new Kissimmee to International Drive route
	2017	Convert new Downtown Orlando to Lake Nona route (Service Grant) into a Downtown Orlando to OIA to Lake Nona XpressLink
	2018	Create new Celebration circulator
	2018	Create new Kissimmee circulator
	2018	Create new Baldwin Park Circulator
	2017	Create new LCS - Universal/SeaWorld Route
	2015	Create a new Limited Direct route to Buena Ventura Lakes
	2015	Create a new Limited Direct route in Pine Hills
	2018	Connects Oviedo and Altamonte Springs via Red Bug Lake Road and Semoran Blvd.
	2018	Create new Sanford SunRail Airport Blvd Route
	2019	Create new West Town Center to Maitland SunRail Local Route
	2020	Create new John Young Parkway Circulator Route
	2021	Create new Orlovista Circulator Route
	2019	Create new XpressLink along SR 50 between West Oaks and UCF
	2019	Create new Xpress Link along SR 423 from Downtown to I-Drive
	2019	Create new XpressLink from Apopka to Altamonte SunRail Station
	2019	Create New XpressLink from UCF to Downtown
	2022	Create new FastLink along SR 527 from Downtown to Sand Lake SunRail Station
	2019	Create new Xpress Link from Sanford to Oveido to UCF
	2019	Create new Xpresslink from UCF to Innovation Way
	2022	Create new FastLink from Fern Park to OIA
	2019	Create new XpressLink from Oviedo to Downtown
	2023	Create new BRT along US 192 from Lake County to Kissimmee
	2018	Create new BRT along US 192 from Disney to Kissimmee
	2024	Create new BRT along 435 from Park Promenade to I-Drive
	2025	Create new BRT from Winter Park to Downtown
	2026	Create new BRT from Downtown to Florida Mall

The costs by year and by county are shown in Table 5-5.

Table 5-5: Annual Change in Costs by County and by Year

Year	Cost of COA Change by Year				
	Orange	Osceola	Seminole	Lake, Polk & Volusia	TOTAL
2014	$1,797,879	$209,857	$855,564	$-	**$2,863,300**
2015	$4,312,277	$2,502,835	$1,072,444	$ -	**$7,887,556**
2016	$6,816,399	$3,732,530	$1,687,021	$ -	**$12,235,950**
2017	$17,340,620	$7,012,487	$1,725,778	$ -	**$26,078,885**
2018	$24,899,347	$13,506,231	$4,269,387	$ -	**$42,674,965**
Subtotal 2014-2018	*$55,166,522*	*$26,963,940*	*$9,610,194*	*$ -*	***$91,740,656***
2019	$31,380,035	$13,938,268	$7,563,837	$ -	**$52,882,140**
2020	$32,459,142	$14,440,431	$7,752,933	$ -	**$54,652,506**
2021	$33,570,868	$14,801,428	$7,946,756	$ -	**$56,319,053**
2022	$34,960,023	$15,171,464	$8,240,811	$ -	**$58,372,298**
2023	$35,834,023	$18,211,625	$8,446,831	$ -	**$62,492,480**
2024	$38,352,466	$18,666,916	$8,658,002	$ -	**$65,677,384**
2025	$42,084,943	$18,672,914	$8,874,452	$ -	**$69,632,309**
2026	$46,830,556	$21,111,430	$9,096,313	$ -	**$77,038,299**
Subtotal 2019-2026	*$295,472,056*	*$135,014,476*	*$66,579,936*	*$ -*	***$497,066,468***
TOTAL	**$350,638,578**	**$161,978,415**	**$76,190,130**	**$ -**	$588,807,124

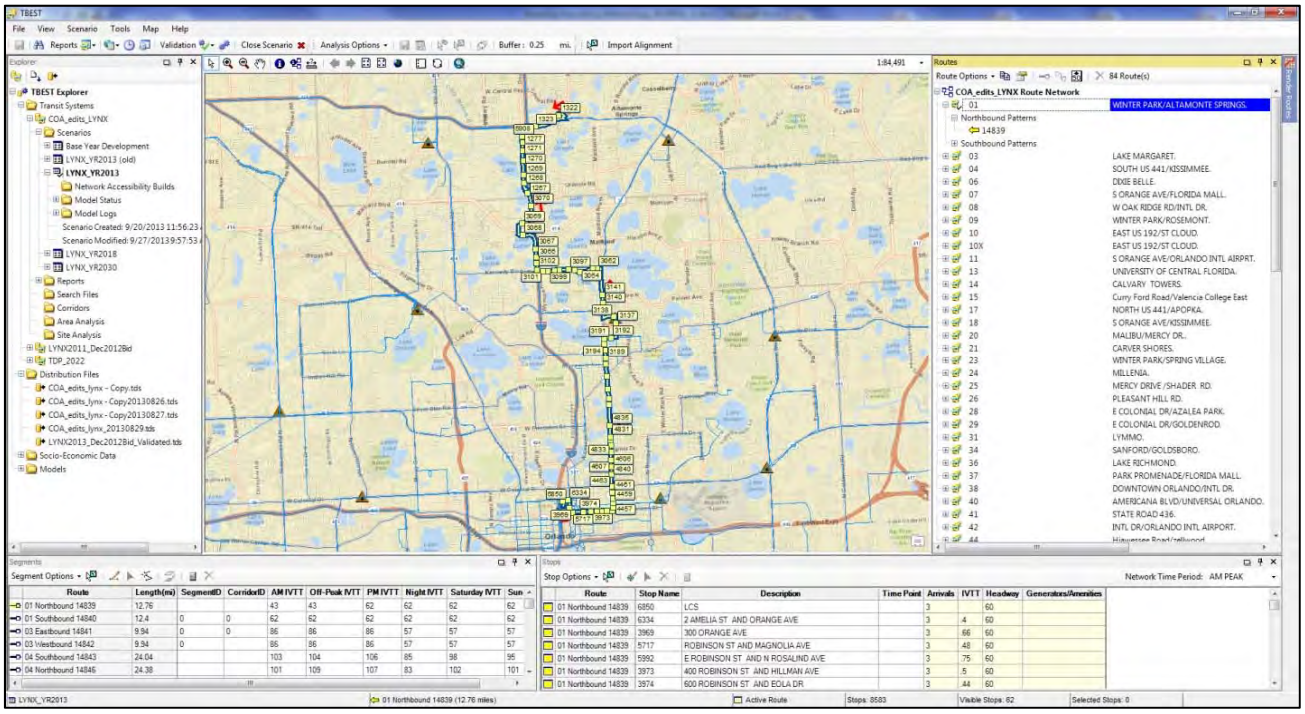
5.5 Ridership Results and Evaluation of Proposed Recommendations

In order to evaluate the performance of the proposed recommendations the Transit Boardings Estimation and Simulation Tool (TBEST) direct demand forecasting model was applied. TBEST is a tool developed by the Florida Department of Transportation (FDOT) used extensively in Florida for transit planning. It is a comprehensive transit analysis and ridership forecasting model that is capable of simulating travel demand at the individual stop-level while accounting for network connectivity, spatial and temporal accessibility, time-of-day variations, and route competition

and complementarity. The forecasting effort for this project was started using TBEST Version 4.0, but the software and models were updated during the project's schedule and the analysis migrated to Version 4.1 to correct certain errors in the results. Further updates included ArcGIS updates, which required additional software updates for TBEST. The final version of TBEST used was Version 4.1.4972 and included ridership forecasting models updated for the LYNX service as of August 2013. Center for Urban Transportation Research (CUTR) provided the calibrated models.

TBEST provides stop level boardings by route for weekday and weekend scheduled service. Figure 5-1 shows the TBEST screen interface. The inputs into TBEST include:

Figure 5-1: TBEST Input Screen



- **Route type (Radial, Circulator, Crosstown, Express, and BRT),**
- **Technology (Bus, Heavy Rail, People Mover, Streetcar, Other, Commuter Rail, Light Rail),**
- **Path (inputted by the user in an ArcView based screen),**
- **Stops(inputted by the user in an ArcView based screen),**
- **Run time from point to point by time period, and**
- **Headway by time period.**

For weekday service time-periods included morning, mid-day, evening, and night service. These periods are not defined by time but rather span of service hours. The maximum for the morning and evening weekday periods is three hours. The off-peak weekday period has a maximum of six hours. The night period has a maximum span of 12 hours. For weekends there was a single time-period but the span for this period could vary, with a maximum of 24 hours for each day. Unique inputs were used for both Saturday and Sunday.

Two scenarios/years were modeled for the COA project, 2018 and 2030. The base year 2013 was also modeled to calibrate the TBEST results and ensure that the model could accurately predict route level ridership. Year 2018 was used as the final year of implementation for the Short Term Recommendations and included all short term service changes. Year 2030 was used as the final year of implementation for the Long Term Recommendations and included all long term and short term service changes (cumulative).

The proposed changes included in the COA can be grouped together into six major categories, listed below along with the general methodology for inputting data into TBEST.

New Routes

New routes were developed using service statistics from the service planning process. Routes were drawn and headways/span of service/running times were input in TBEST.

Route-Path Modifications

Route-path modifications were developed based on the existing route information in TBEST. Routes were shortened or lengthened based on information from the scheduling process and over-all running time was adjusted to reflect this change.

Change in Headways

Headway changes generally occurred in four hour bi-directional blocks. This information as translated into the TBEST required inputs and updates in the model.

Change in Running Time

Run time changes generally reflected changes in service type (e.g., express, etc.) or changes in the route that required recalculating the run time.

Change in Span of Service

Changes in span were for the most part a reduction or addition of one round trip (in the AM or PM). TBEST did not allow changes in span in increments other than one hour so these changes were rounded to the nearest hour.

Change in Stop Spacing

Stop spacing changes occurred only for routes where service type was changed or additional routes were added to account for new generators and/or transfer opportunities.

As compared to the existing year (2013) most of the additional recommended service changes are proposed to occur on the weekday. TBEST forecasts that for the short-term recommendations there would a 41 percent increase in revenue miles and 30 percent increase in revenue hours. For the long-term recommendations there would be a 57 percent increase in revenue miles and a 41 percent increase in revenue hours. For the weekend service the increase in revenue miles was forecast at 26 percent for the short term improvements and 38 percent for the long term improvements. Correspondingly the weekend revenue hours would increase by 20 percent in the short-term and 29 percent in the long-term.

TBEST is a direct demand model. This model provides route level forecast and is very useful for understanding changes to existing routes under short term scenarios. The forecast is dependent on the population and employment changes in the surrounding area adjacent to the service provided. The model does not look at origin and destination choice impacts on transit ridership. Nor does it look at highway in-vehicle time versus transit in-vehicle and out-vehicle time – there is no accounting for the network performance. This type of model limits the ability to accurately predict long term service changes on ridership levels.

There are also issues with how changes in service are represented in the model. Like any model, the ability to accurately describe service that varies throughout the day is hard to represent in the model. Transit service that starts before the morning peak period would be coded into the night period, although it might correctly belong in the morning peak period even though it starts before the morning peak period. This can typically be found with commuter bus routes.

The ridership results for the COA recommendations for the existing routes are shown in Table 5-6. Table 5-7 presents the ridership forecasts for the recommended new routes.

Table 5-6: Ridership forecast for Existing Routes

Route	Forecasted Ridership Existing (2013)	2018	2030
1	356	1,255	1,480
3	999	2,077	1,207
4	6109	7,530	10,342
6	118	386	458
7	1054	1,050	1,207
8	7915	12,803	15,180
9	860	510	635
10	1264	1,644	2,062
11	1231	1,242	1,332
13	1149	1,206	1,410
14	49	76	106
15	1995	2,898	3,346
17	2838	3,297	4,062
18	1922	1,622	1,944
20	864	830	963
21	3328	4,035	4,665
23	670	735	960
24	266	312	392
25	1425	1,343	1,533
26	980	423	546
28	1657	1,536	1,736
29	1798	1,496	1,678
31	2958	2,688	2,238
34	218	229	311
36	935	407	509
37	3795	9,128	12,160
38	635	246	298
40	1726	1,804	2,261
41	5992	12,210	16,260
42	2895	6,375	7,654
44	759	319	677
45	298	301	404
46E	0	90	123
46W	0	494	695
48	1971	2,833	3,265
49	2284	2,825	3,384
50	2506	2,399	2,690

Table 5-6: Ridership forecast for Existing Routes (Continued)

Route	Forecasted Ridership		
	Existing (2013)	2018	2030
51	1042	1,092	1,309
54	630	1,079	885
55	2123	6,241	7,087
56	2124	5,436	6,011
57	1170	1,593	2,012
58	124	*	*
102	2738	2,904	3,862
103	1613	2,344	3,190
104	2580	6,440	7,916
105	2375	2,616	3,437
111	624	1,023	1,208
125	3081	1,785	2,255
200	105	241	319
204	162	236	313
300	90	135	173
301	193	132	296
302	184	150	202
303	112	480	609
304	171	312	392
305	83	268	346
306	79	187	244
313	316	308	368
319	1631	1,358	1,577
405	332	*	*
416	32	56	77
426	465	836	1,090
427	101	115	163
434	665	813	1,192
441	274	546	813
443	981	748	1,024
445	29	33	46
1792	117	149	221

*Route would be eliminated

Table 5-7: Ridership Forecast for New Routes

New Routes	Forecasted Ridership 2018	2030
Create new Goldenrod Route	2,604	3,329
Create new KIF to Lake Nona and OIA Route	888	1,154
Create new Kissimmee to International Drive route	1,681	1,911
Convert new Downtown Orlando to Lake Nona route (Service Grant) into a Downtown Orlando to OIA to Lake Nona XpressLink	182	240
Create new Celebration circulator	30	39
Create new Kissimmee circulator	473	534
Create new Baldwin Park Circulator	120	141
Create new LCS - Universal/SeaWorld Route	251	344
Create a new limited direct route to Buena Ventura Lakes	333	426
Create a new limited direct route in Pine Hills	1,031	1,309
Connects Oviedo and Altamonte Springs via Red Bug Lake Road and Semoran Blvd.	1,771	2,367
Create new Sanford SunRail Airport Blvd Route	170	223
Create new West Town Center to Maitland SunRail Local Route	NA	1,051
Create new John Young Parkway Circulator Route	NA	729
Create new Orlovista Circulator Route	NA	103
Create new XpressLink along SR 50 between West Oaks and UCF	NA	59
Create new Xpress Link along SR 423 from Downtown to I-Drive	NA	82
Create new XpressLink from Apopka to Altamonte SunRail Station	NA	21
Create New XpressLink from UCF to Downtown	NA	45
Create new FastLink along SR 527 from Downtown to Sand Lake SunRail Station	NA	124
Create new Xpress Link from Sanford to Oveido to UCF	NA	12
Create new Xpresslink from UCF to Innovation Way	NA	65
Create new FastLink from Fern Park to OIA	NA	1,511
Create new XpressLink from Oviedo to Downtown	NA	108
Create new BRT along US 192 from Lake County to Kissimmee	NA	2,175
Create new BRT along US 192 from Disney to Kissimmee	10,300	12,678
Create new BRT along 435 from Park Promenade to I-Drive	NA	4,921
Create new BRT from Winter Park to Downtown	NA	3,336
Create new BRT from Downtown to Florida Mall	NA	7,449

6

Evaluation of Proposed Changes and Conclusions

6.1 Introduction

Using the results from TBEST and the future route statistics, a revised performance evaluation was conducted to determine the effectiveness of the proposed changes. The ability to evaluate all of the service guidelines is limited by the forecasting tools available. Some guidelines can be evaluated quantitatively (i.e. the information for future ridership can be projected using available tools). Some guidelines can only be evaluated qualitatively (i.e. the information about loads in the first and last trip cannot be forecasted accurately). Additionally, as discussed in Chapter 2, some metrics are rolling (i.e. some routes in the system will always be failing) and some are fixed (routes can fail, but it is possible for LYNX to have no routes failing).

The list below shows how the following guidelines were evaluated.

Overall Stop Spacing (Fixed Metric)

Overall stop spacing was evaluated qualitatively as future stop locations were not identified in this report. If the COA recommended altering stop spacing, then the COA would improve the route. All routes that failed in this metric would be improved by the COA's proposals.

Vehicle/Capacity (V/C) Ratio in the First and Last Trip (Fixed Metric)

Vehicle/Capacity (V/C)[13] ratio in the first and last trip was evaluated qualitatively as modeling trip level ridership in the future is highly inaccurate. If the COA recommended eliminating or adding a trip, then the COA would improve the route. Most routes that failed in this metric would be improved, although in some cases, routes with over/under loading in the first/last trip were not adjusted due to other changes proposed for the route that might affect loading.

[13] V/C is the number of riders per trip divided by the guideline capacity of the bus.

Weekday Ridership (Rolling Metric)

Weekday ridership is evaluated using the results from the TBEST model (described further above). If ridership increases, the COA would improve the route (although there are numerous other factors that could affect this performance metric). Overall, ridership for the system would increase, although there are some routes which would decline.

Passengers per Total Weekday Hour (Rolling Metric)

Passengers per Total Hour is based on the results of the TBEST model compared to the projected future hours of service (both the base and the delta change from the COA). If this number increases, the COA would improve the route. Overall, passengers per hour for the system would increase, although there are some routes which would decline.

Passengers per Total Weekday Mile (Rolling Metric)

Passengers per Total Mile is based on the results of the TBEST model compared to the projected future miles of service (both the base and the delta change from the COA). If this number increases, the COA would improve the route. Overall, passengers per mile for the system would increase, although there are some routes which would decline.

The evaluation was not conducted for the following criteria:

Farebox Recovery (Rolling Metric)

Farebox recovery was not evaluated as it is not possible to project future fare revenue (from passengers). In general, routes with improvements to passengers per total hour would see their farebox recovery improve as well.

Revenue to Total Mileage (Rolling Metric)

Revenue to total mileage was not evaluated as the location of Bus Maintenance Facilities was not changed and routes generally kept this same ratio.

Scheduled Speed to Actual Speed (Fixed Metric)

Scheduled speed to actual speed was not evaluated as it is not possible to project the future travel times with general traffic using the tools available to this project.

Insufficient Service (Plug Buses) (Fixed Metric)

Insufficient Service was not evaluated as it is not possible to project future vehicle availability/overcrowding at a per-trip level.

6.2 County-Level Summary

With the implementation of the COA recommendations, bus service in **Orange County** would improve in the following ways (relative to the Service Guidelines):

- Average weekday ridership for all existing routes serving Orange County would increase from 87,194 in the existing condition to 141,168[14] with the short term recommendations (62% increase) and 193,472[15] (122% increase) with the short and long term recommendations.
- Passengers per average weekday hour would increase from 23.3 in the existing condition to 26.8 (2018) with all short term recommendations and 32.7 (2030) with all short and long term recommendations.

With the implementation of the COA recommendations, bus service in **Osceola County** would improve in the following ways (relative to the Service Guidelines):

- Average weekday ridership for all existing routes serving Osceola County would increase from 19,269 in the existing condition to 41,280[16] with the short term recommendations (89% increase) and 53,603[17] (46% increase) with the short and long term recommendations.
- Passengers per average weekday hour would change from 23.5 in the existing condition to 35 (2018) with all short term recommendations and 41.6 (2030) with all short and long term recommendations.

With the implementation of the COA recommendations, bus service in **Seminole County** would improve in the following ways (relative to the Service Guidelines):

- Average weekday ridership for all existing routes serving Osceola County would increase from 14,983 in the existing condition to 27,003[18] with the short term recommendations (80% increase) and 38,372[19] (156% increase) with the short and long term recommendations.
- Passengers per average weekday hour would change from 12.9 in the existing condition to 32.6 (2018) with all short term recommendations and 33.9 (2030) with all short and long term recommendations.

[14] Includes ridership growth as a result of the COA modifications and demographic growth; per TBEST
[15] Ibid
[16] Ibid
[17] Ibid
[18] Ibid
[19] Ibid

6.3 Evaluation of Revised Existing Routes

The LYNX system is a complicated network of routes that are interdependent on each other. Improving the entire system requires changes that might benefit some routes and hurt others. Route performance pivots primarily off of ridership. Routes that serve more riders are more efficient than routes that serve fewer riders. With limited ridership potential, increasing the ridership of one route might be done by decreasing the ridership on another route. Decreasing ridership on a route might be beneficial by lowering over-crowding or making the route more reliable.

Fixed Performance Metric Evaluation

Tables 6-1 through 6-3 shows the performance evaluation of the existing routes for the fixed performance guidelines, arranged by county. Routes which fail the service guideline are shown in red. As can be seen, all fixed metrics, except for those related to average operating speed and on-time performance would be remedied with the implementation of COA recommendations. As was discussed above in Chapter 3, the on-time performance and speed data had irregularities in it and it was difficult to determine its validity. A general recommendation of this report is for LYNX to better collect and monitor on-time performance and running time data.

Table 6-1: Fixed Metric Evaluation (Osceola County Routes)

		Before COA	After COA	Notes
Route Design Guidelines	Bus Stop Spacing Guideline (Stops per Mile)	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	
Schedule Design Guidelines	Guideline for Span of Service (Volume/Capacity in First/Last Trip) - Weekdays Only	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	
	Guideline for Enhancing Headway on Routes with "Plug Buses"	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	
Service Delivery Guidelines	Guideline for Route Investigation Based upon On-time Performance	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Average Speed)	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Operating vs. Scheduled Speed)	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	4, 10, 18, 26, 55, 56, 57, 301, 426, 441	

Table 6-2: Fixed Metric Evaluation (Seminole County)

		Before COA	After COA	Notes
Route Design Guidelines	Bus Stop Spacing Guideline (Stops per Mile)	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	
Schedule Design Guidelines	Guideline for Span of Service (Volume/Capacity in First/Last Trip) - Weekdays Only	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	
	Guideline for Enhancing Headway on Routes with "Plug Buses"	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	
Service Delivery Guidelines	Guideline for Route Investigation Based upon On-time Performance	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Average Speed)	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Operating vs. Scheduled Speed)	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	1, 17, 23, 34, 41, 45, 46E, 46W, 102, 103, 200, 211, 434	

Routes shaded in red fail the performance metric

Table 6-3: Fixed Metric Evaluation (Orange County)

		Before COA	After COA	Notes
Route Design Guidelines	Bus Stop Spacing Guideline (Stops per Mile)	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	
Schedule Design Guidelines	Guideline for Span of Service (Volume/Capacity in First/Last Trip) - Weekdays Only	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	
	Guideline for Enhancing Headway on Routes with "Plug Buses"	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	
Service Delivery Guidelines	Guideline for Route Investigation Based upon On-time Performance	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Average Speed)	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	Recommendations were not made for this metric due to issues with the original data
	Guideline for Route Investigation based on Average Speed (Operating vs. Scheduled Speed)	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 15, 17, 1792, 18, 20, 21, 23, 24, 25, 28, 29, 31, 36, 37, 38, 40, 41, 42, 44, 48, 49, 50, 51, 54, 55, 56, 57, 58, 102, 104, 105, 107, 111, 125, 200, 204, 210, 211, 212, 300, 301, 302, 303, 304, 305, 313, 319, 405, 441, 443, 445	

Routes shaded in red fail the performance metric

Rolling Performance Metric Evaluation

Figures 6-1 to 6-18 show the performance evaluation of the existing routes for the rolling performance guidelines, arranged by county.

At a system level, ridership is projected to increase from 93,000 average weekday riders to 150,000 average weekday riders by 2018 and 205,000 average weekday riders by 2030. Passengers per hour are projected to increase from 22.8 to 30.8, passengers per mile is expected to increase from 1.6 to 2.0. This increase in ridership, coupled with recommendations that would improve the overall efficiency of routes in the system leads to an overall improvement for the service guidelines.

This trend would also continue at an individual county level. For each county, the majority of the routes improve in their performance on the rolling performance measures.

Given the inter-connected nature of LYNX's network and the nature of the rolling metrics, some routes would decline in the overall rolling performance metrics. These routes are listed below:

Link 6

Link 6 would be extended to UCF. This increase in service would not off-set by a comparable increase in forecasted ridership (although ridership does increase on the route), causing the overall efficiency of this route to go down. This decline would be off-set by an increase in the overall passengers per hour for Link 3, which would be modified as part of the recommendation for Link 6.

Link 7

The COA does not propose to modify Link 7. The change in passengers per hour and passengers per mile would be so slight this change in efficiency is not significant.

Link 9

Ridership and passengers per hour on Link 9 would both decline. This is primarily due to the recommended restructuring of this route that would cut it back to the Rosemont SuperStop. While the overall efficiency of Link 9 would decline with this change, the efficiency of several other routes in the Pine Hills Package would become more efficient (including Link 49, which would take over part of Link 9).

Link 10

Ridership on Link 10 would increase, but the overall passengers per hour would decline. This could be indicative of an over-serving of the corridor (three routes would operate in the long term between Kissimmee and St. Cloud, a local route, a BRT route and a non-stop route). Better allocation of resources along this corridor could improve the efficiency of these routes.

Link 13

Ridership on Link 13 would increase, while the passengers per hour/mile would decline. None-the-less, this decline in efficiency would not be significant and the route would continue to have a passengers/hour/mile ratio close to the average for the system.

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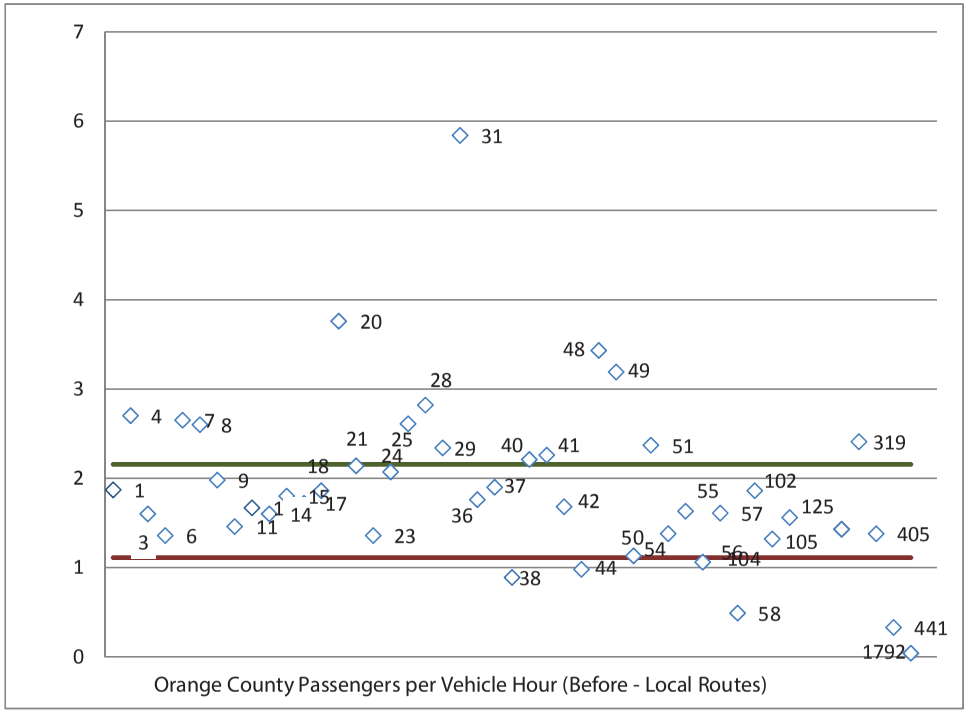

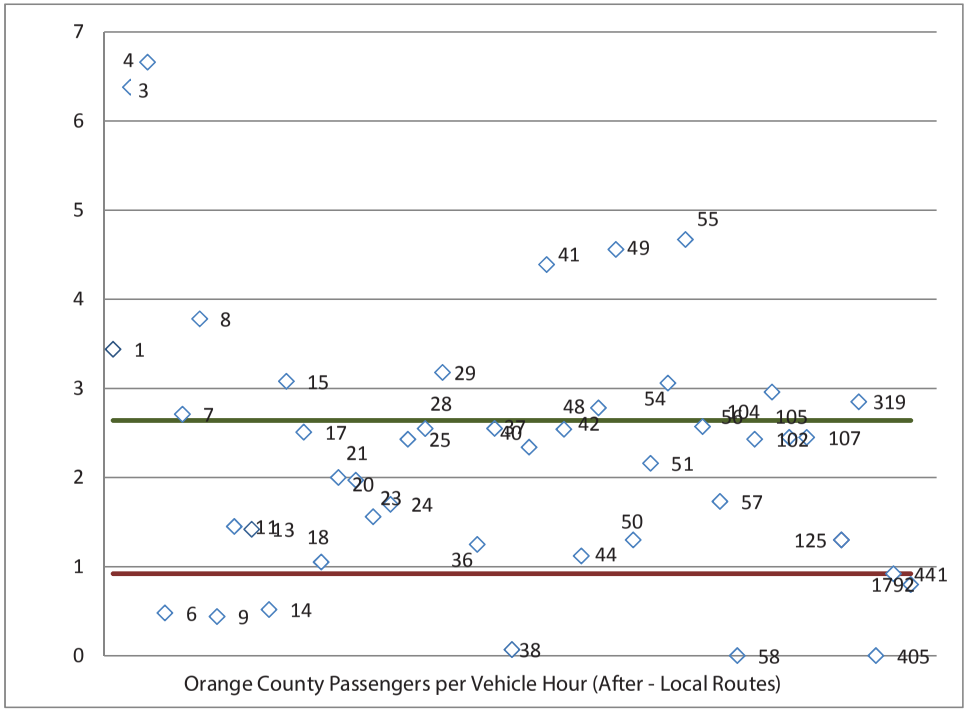

Figure 6 - 1
Orange County Passengers Per Vehicle Hour Local

Route
Top Quartile
Bottom Quartile

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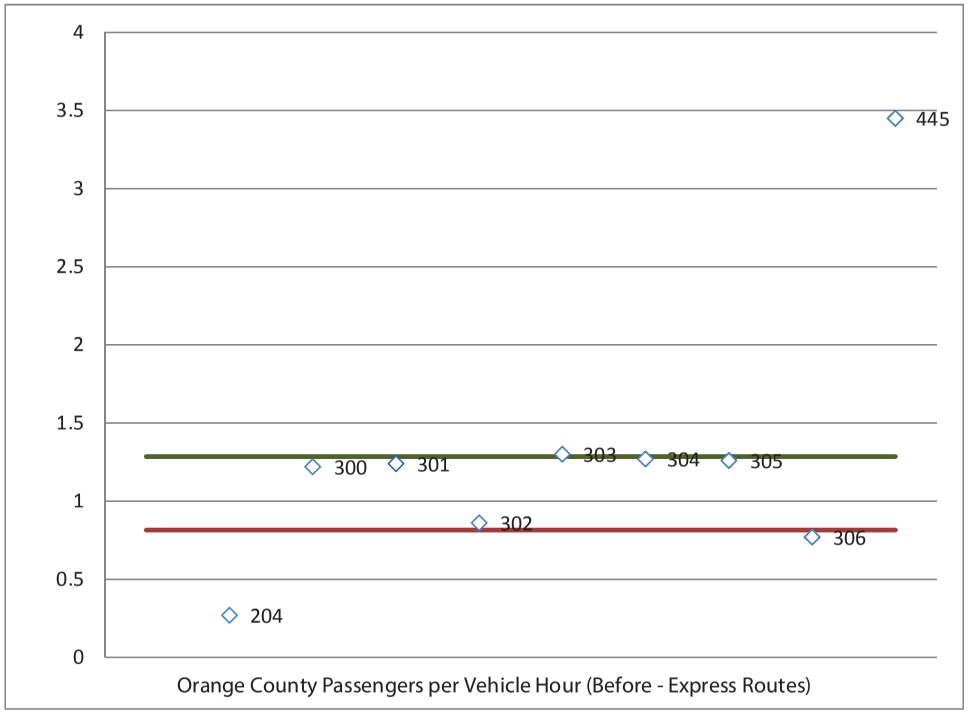

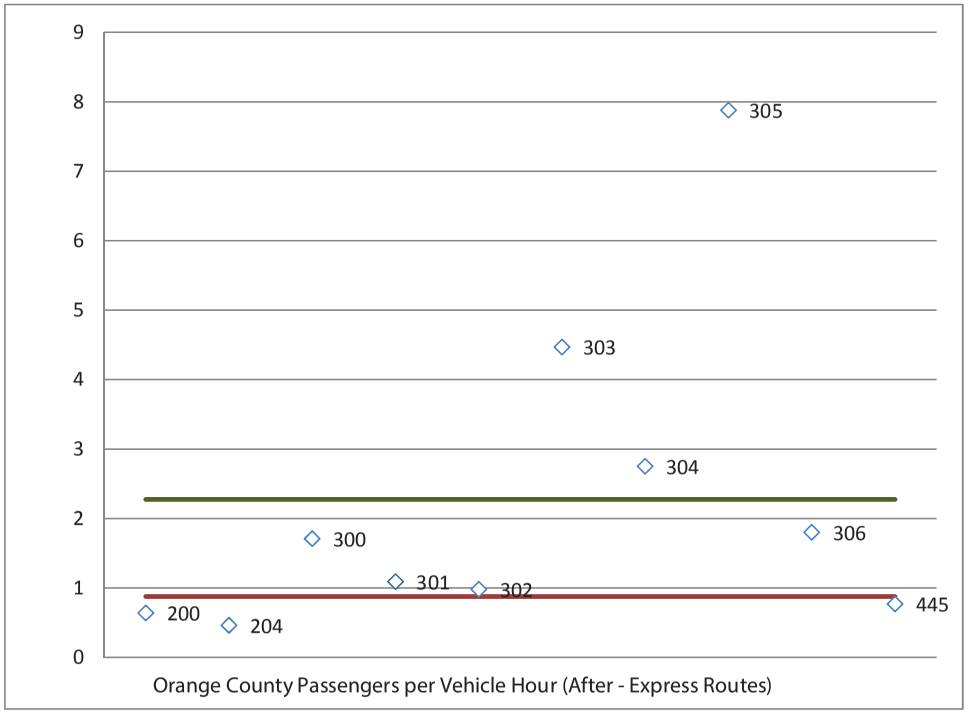

Figure 6 - 2
Orange County Passengers Per Vehicle Hour Express

Route
Top Quartile
Bottom Quartile

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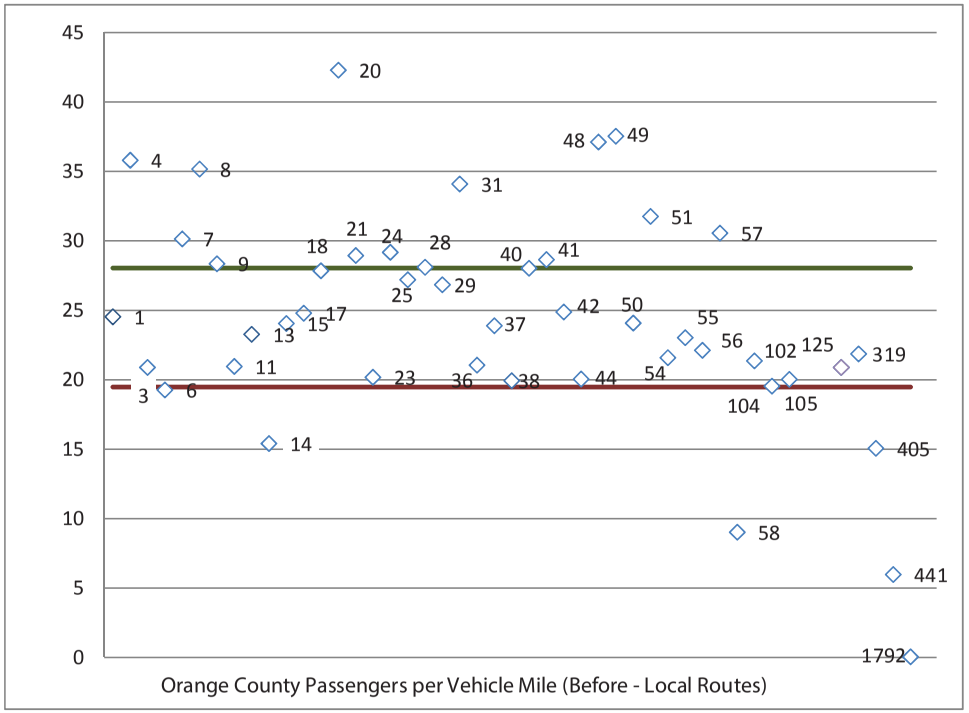

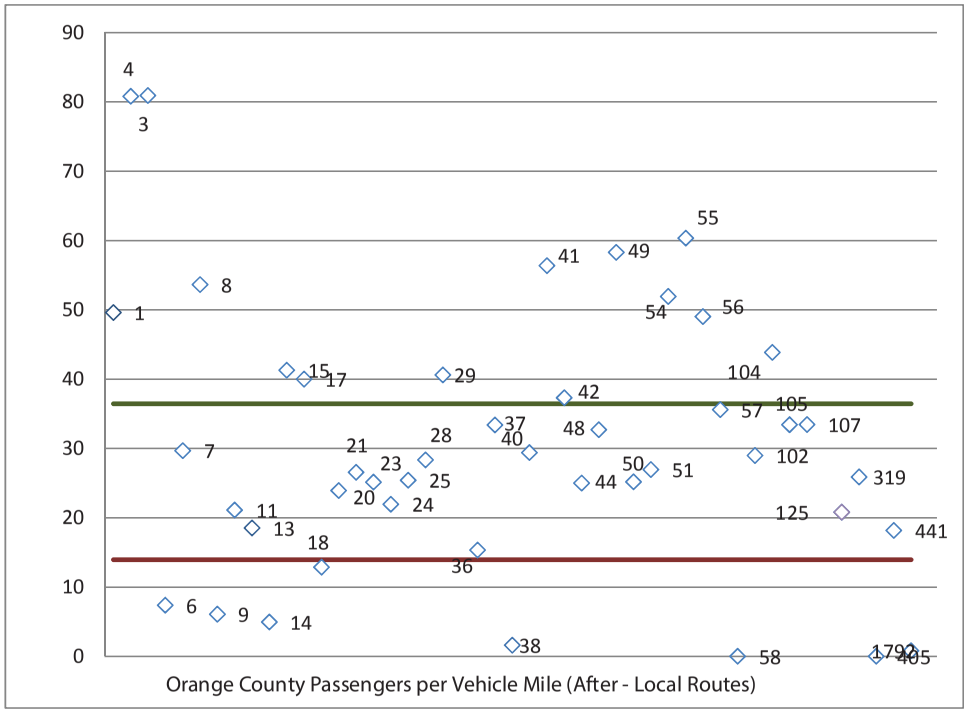

Figure 6 - 3
Orange County Passengers Per Vehicle Mile Local

Route
Top Quartile
Bottom Quartile

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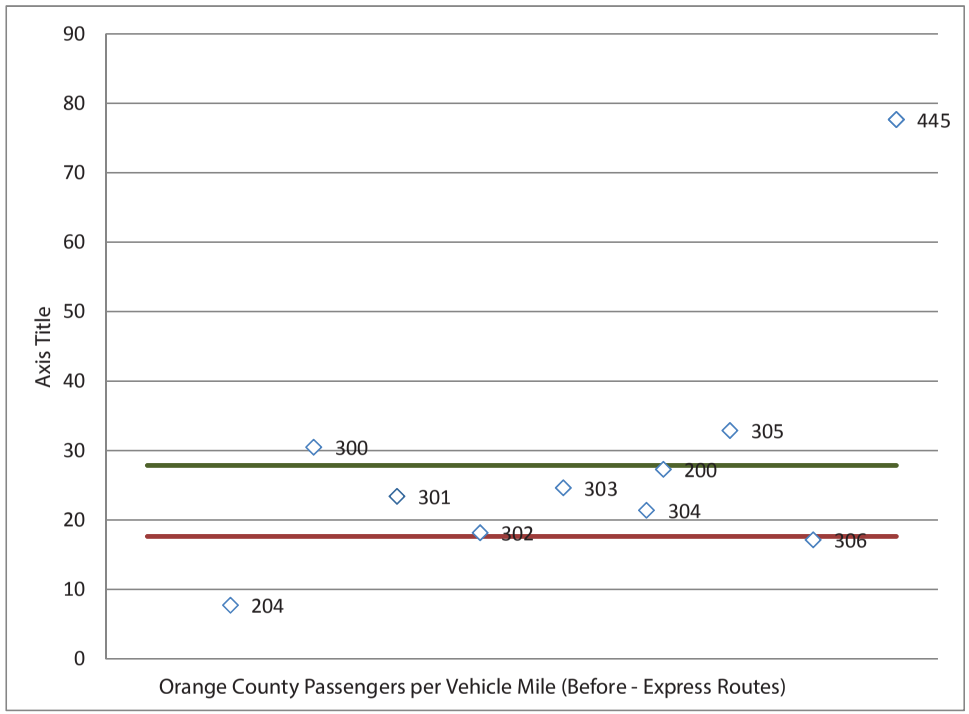

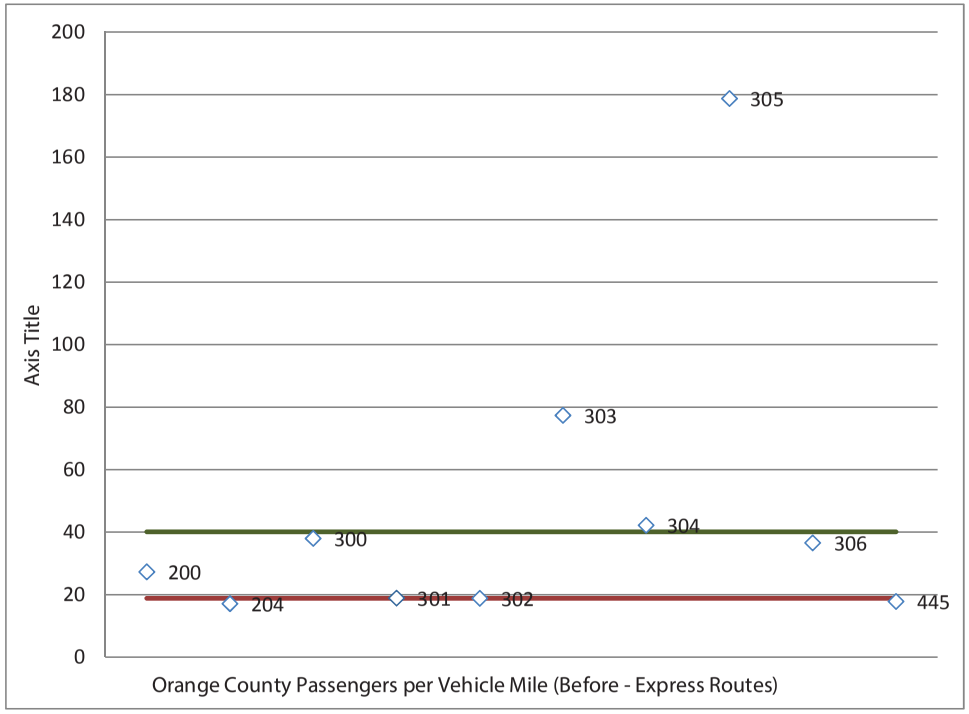

Figure 6 - 4
Orange County Passengers Per Vehicle Mile Express

Route
Top Quartile
Bottom Quartile

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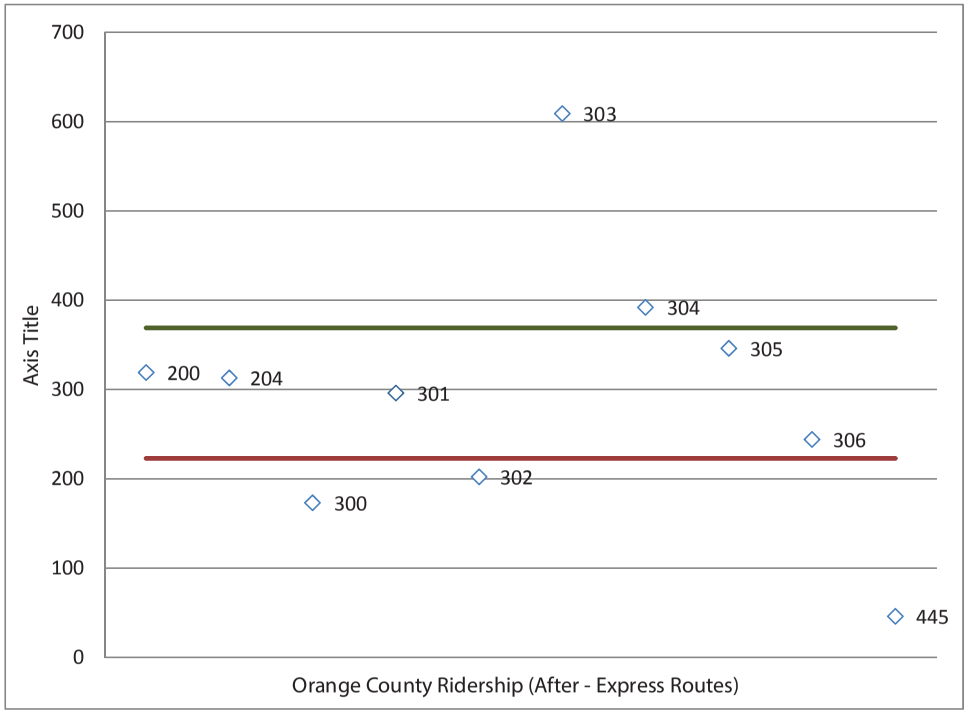

Figure 6 - 5
Orange County Ridership Express

Route
Top Quartile
Bottom Quartile

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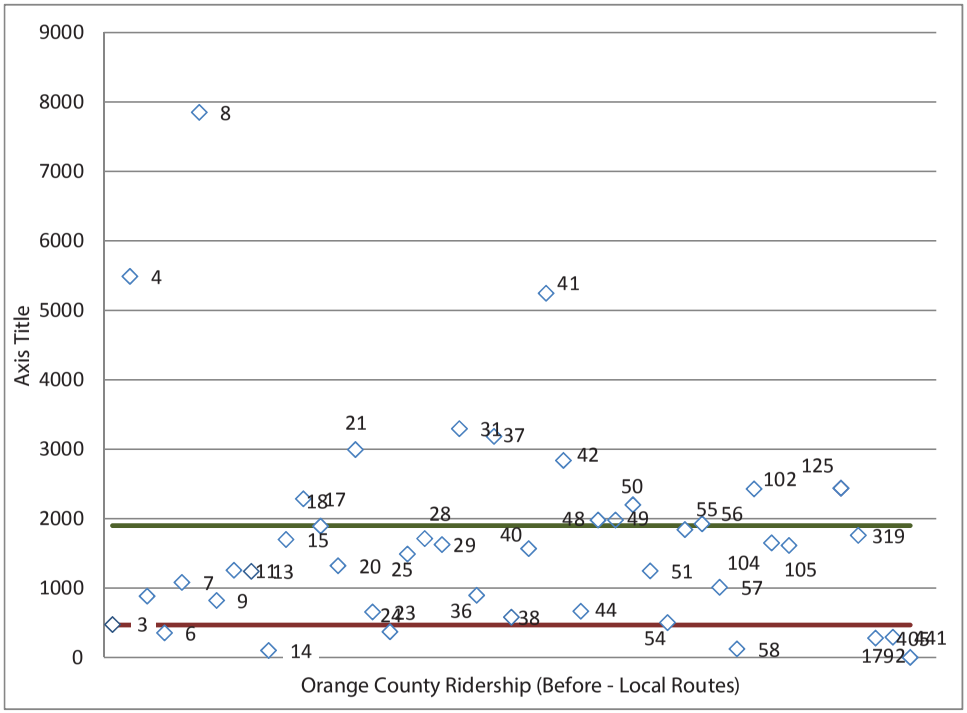

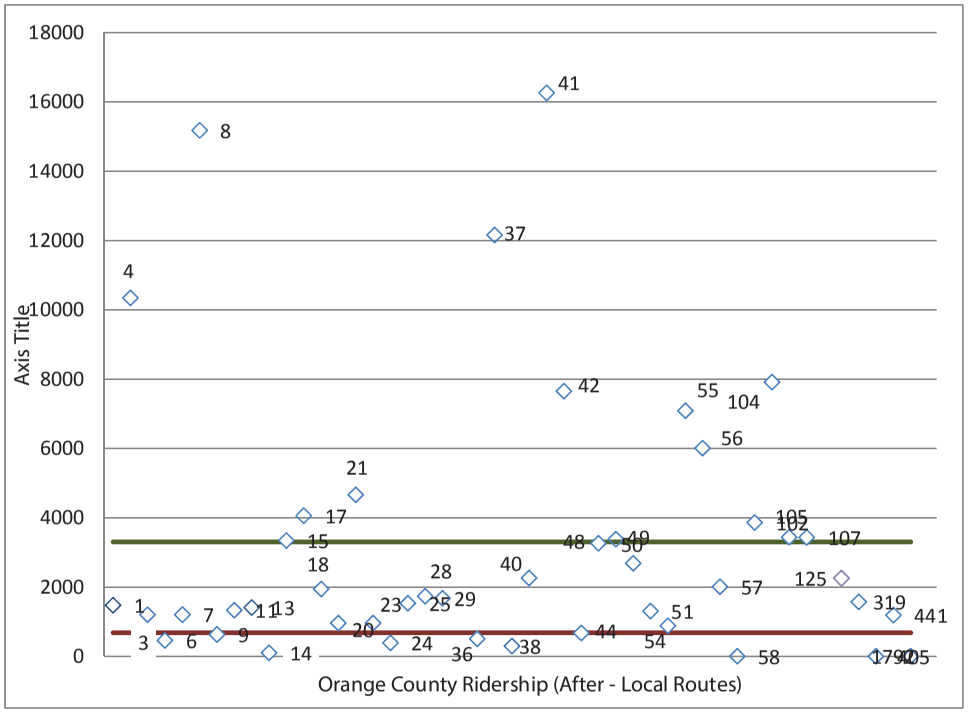

Figure 6 - 6
Orange County Ridership Local

Route
Top Quartile
Bottom Quartile

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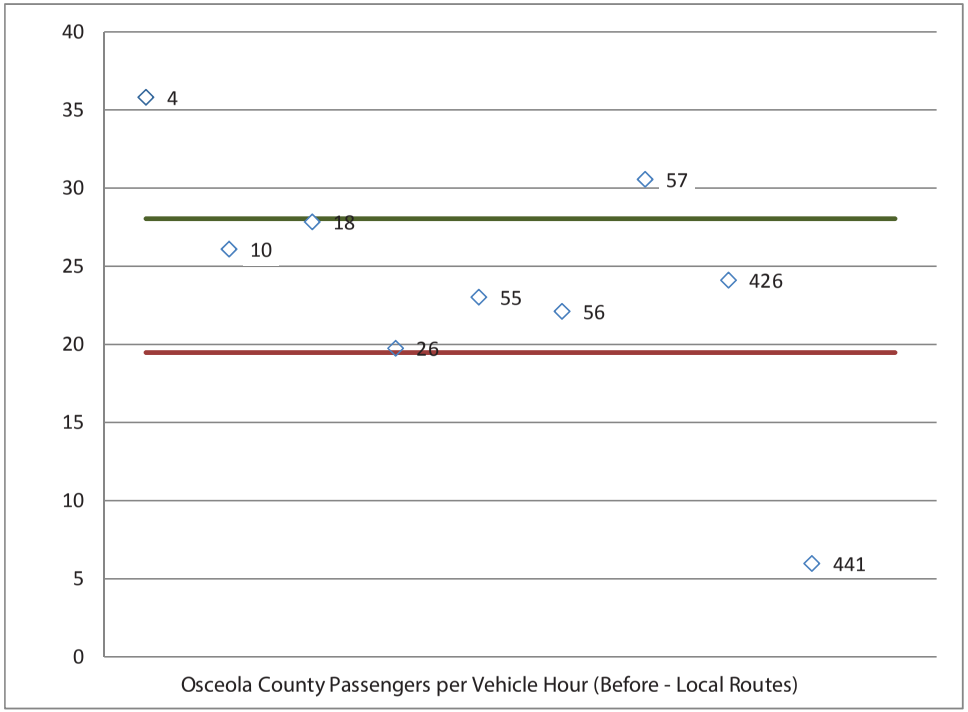

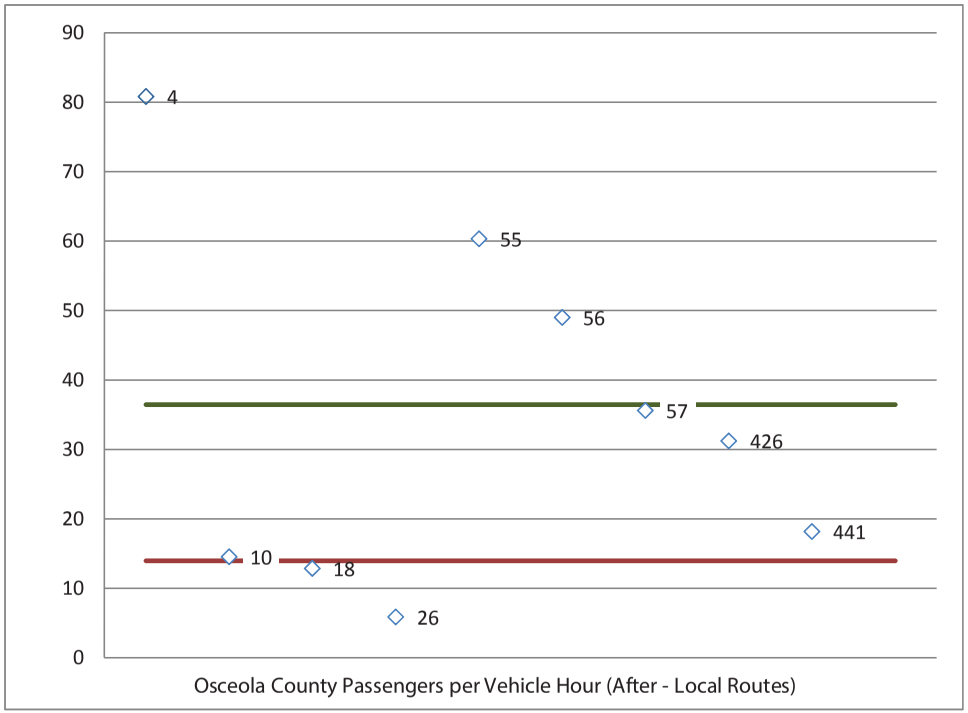

Figure 6 - 7
Osceola County Passengers Per Vehicle Hour Local

Route
Top Quartile
Bottom Quartile

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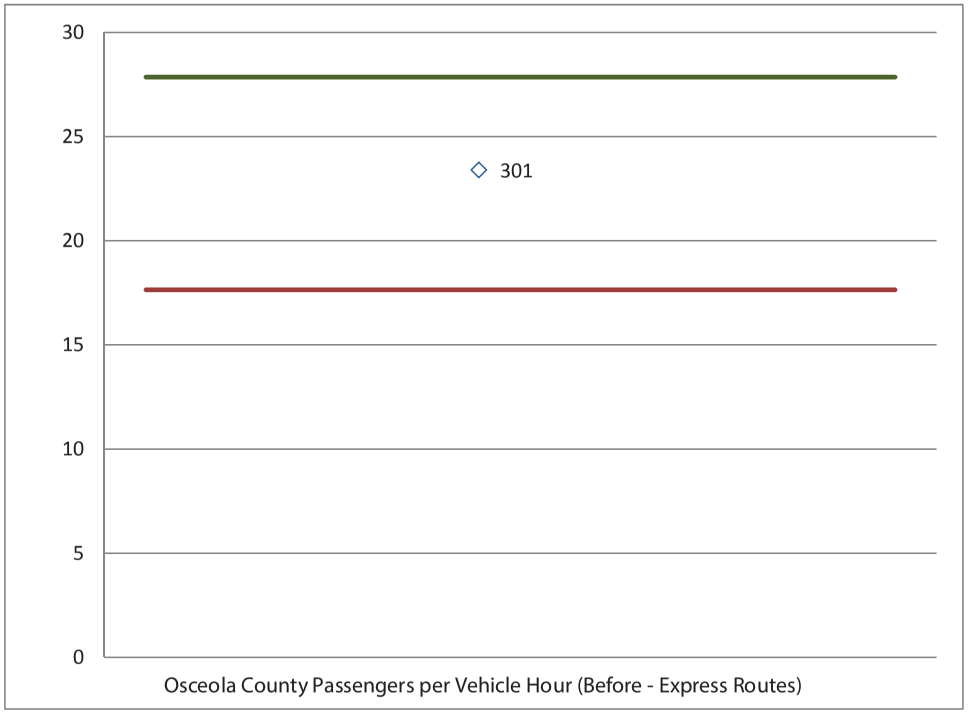

Figure 6 - 8
Osceola County Passengers Per Vehicle Hour Express

Route
Top Quartile
Bottom Quartile

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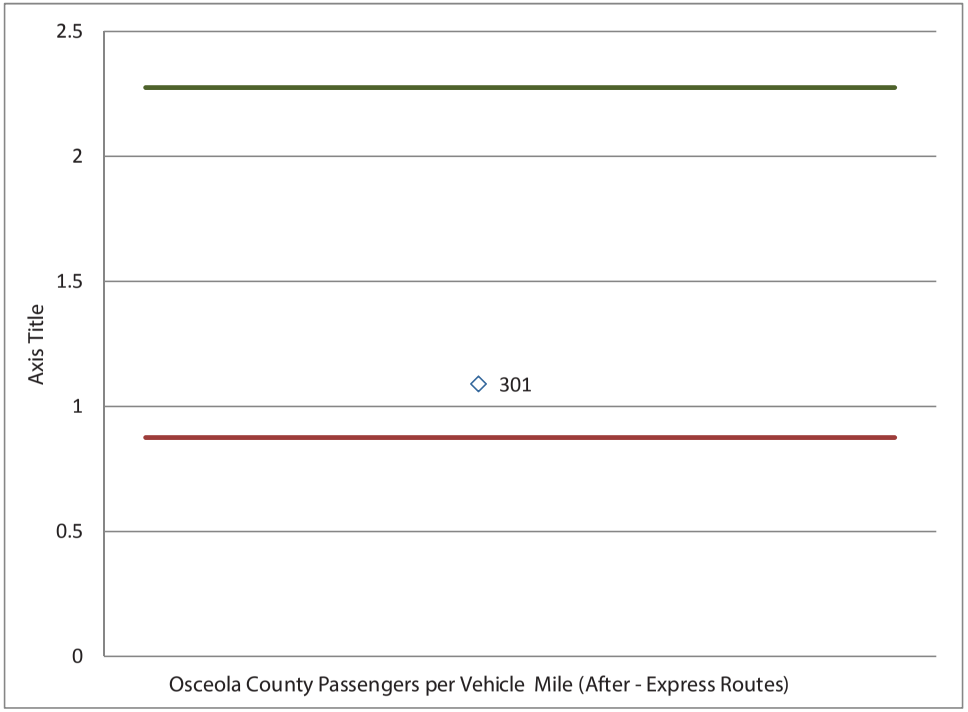

Figure 6 - 9
Osceola County Passengers Per Vehicle Mile Express

Route
Top Quartile
Bottom Quartile

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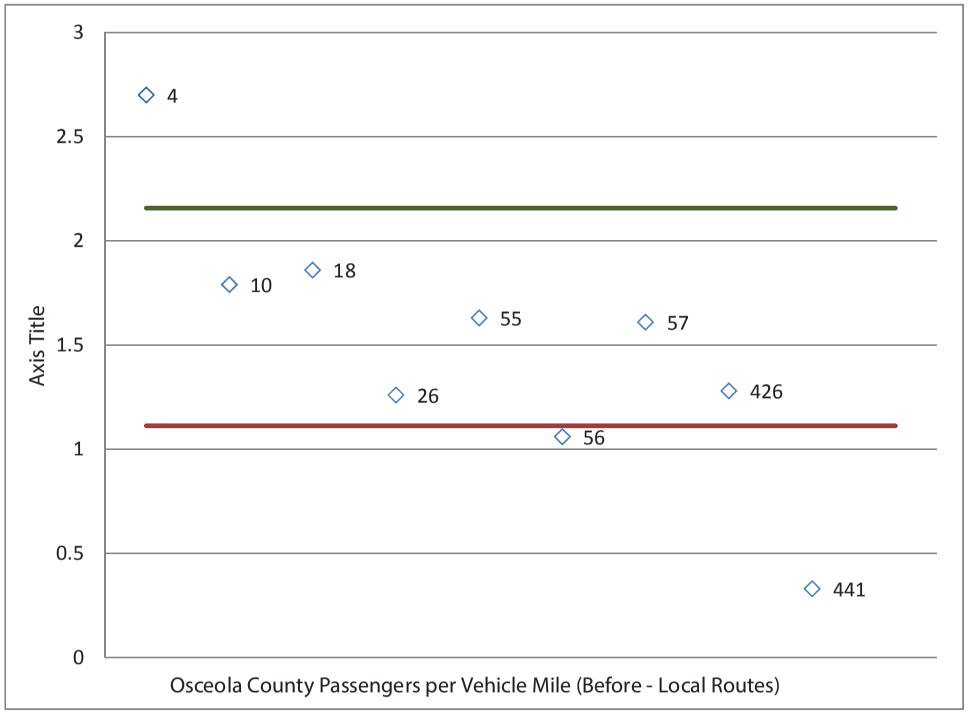

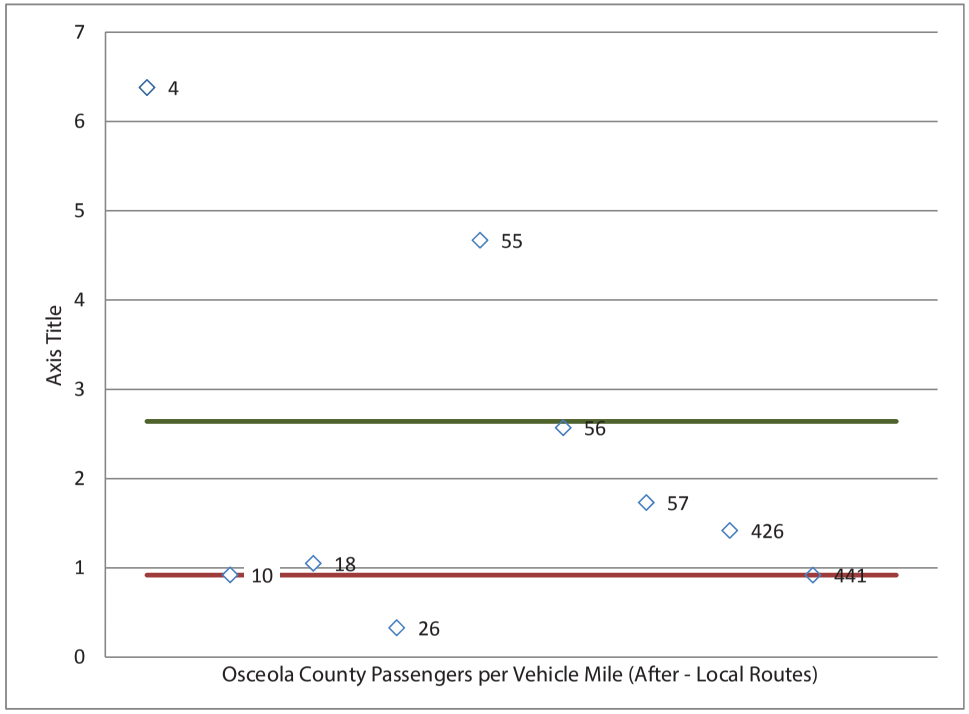

Figure 6 - 10
Osceola County Passengers Per Vehicle Mile Local

Route
Top Quartile
Bottom Quartile

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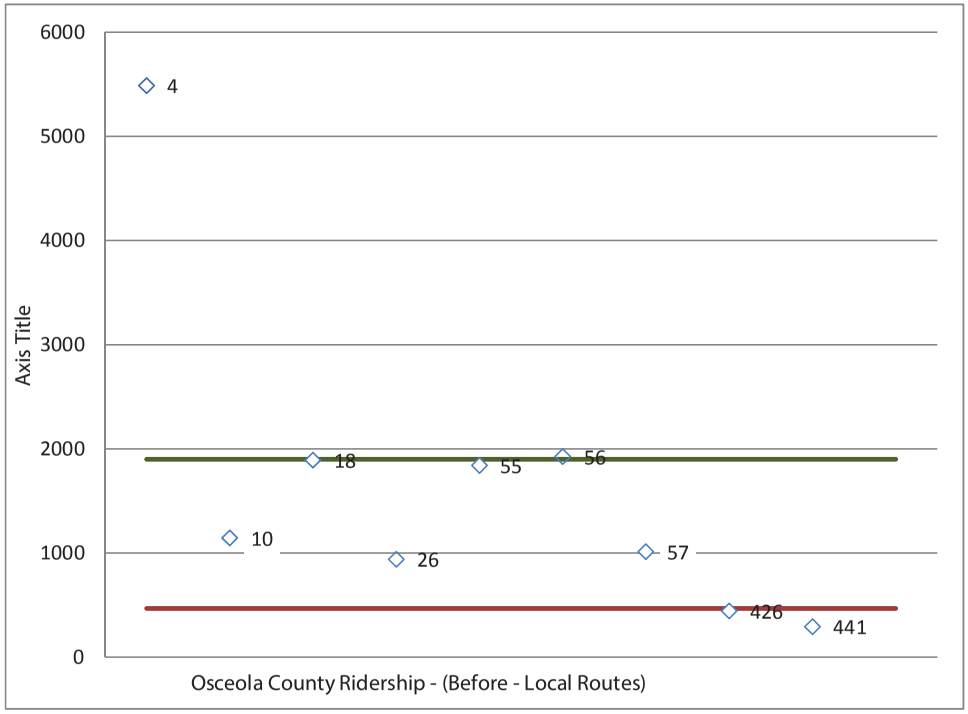

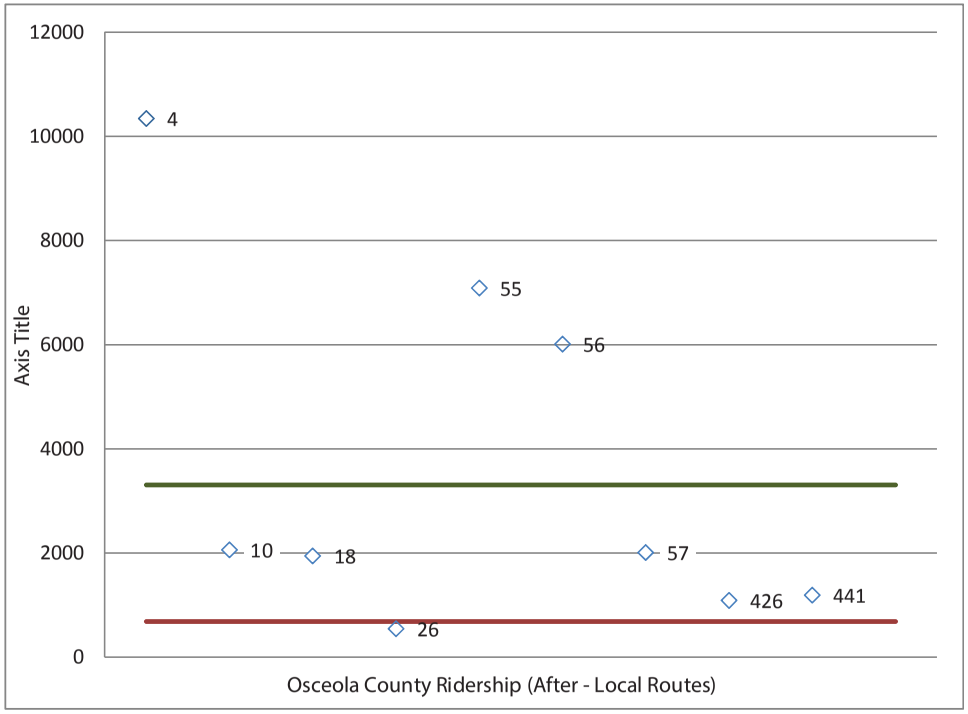

Figure 6 - 11
Osceola County Ridership Local

Route
Top Quartile
Bottom Quartile

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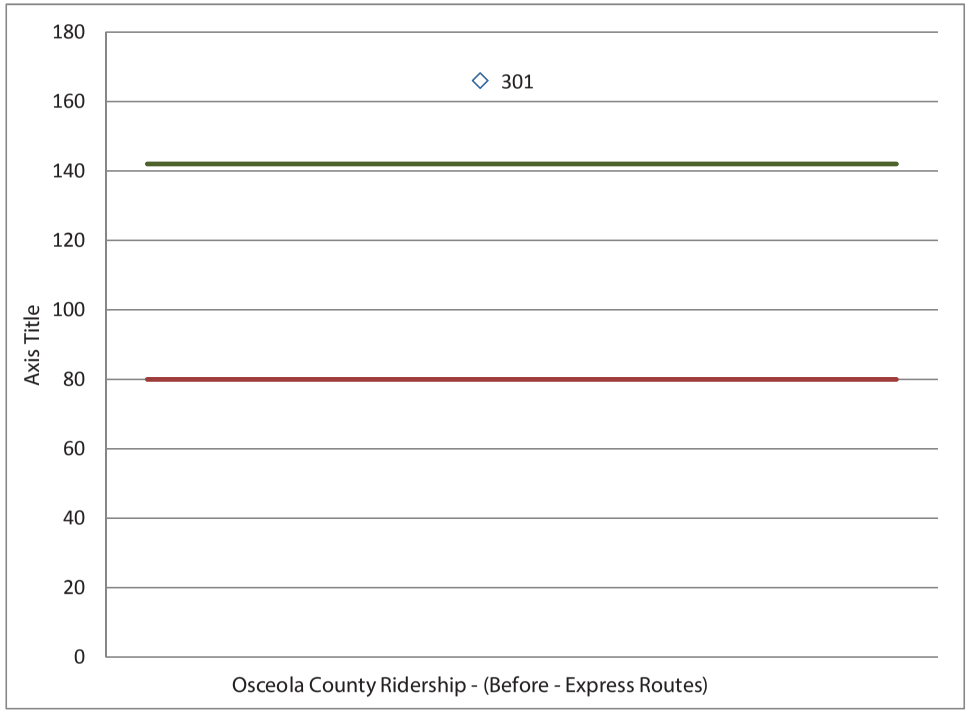

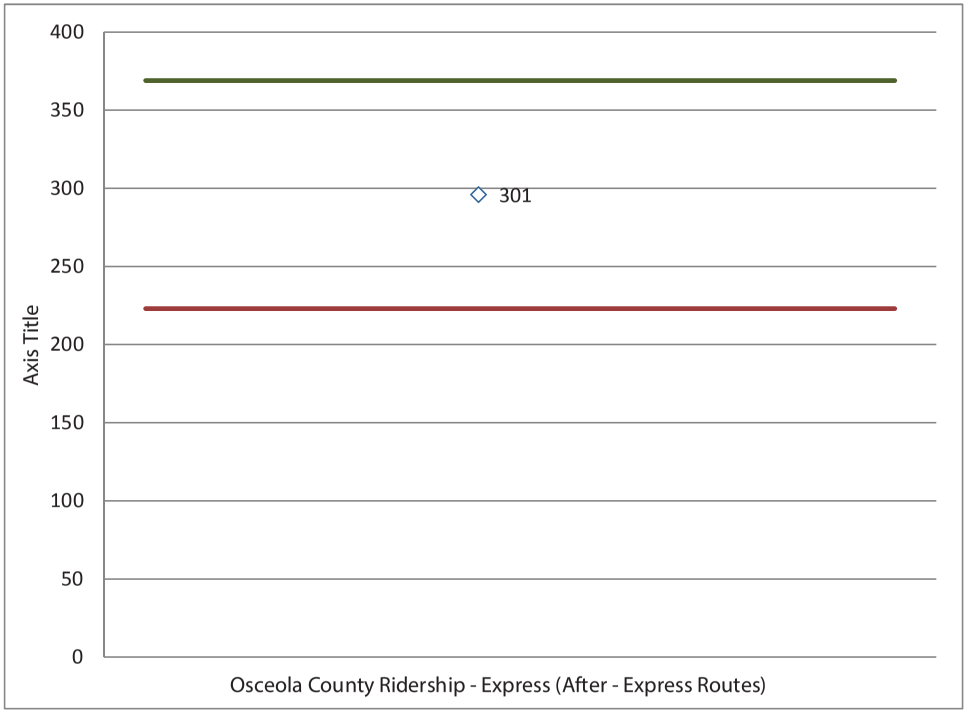

Figure 6 - 12
Osceola County Ridership Express

Route
Top Quartile
Bottom Quartile

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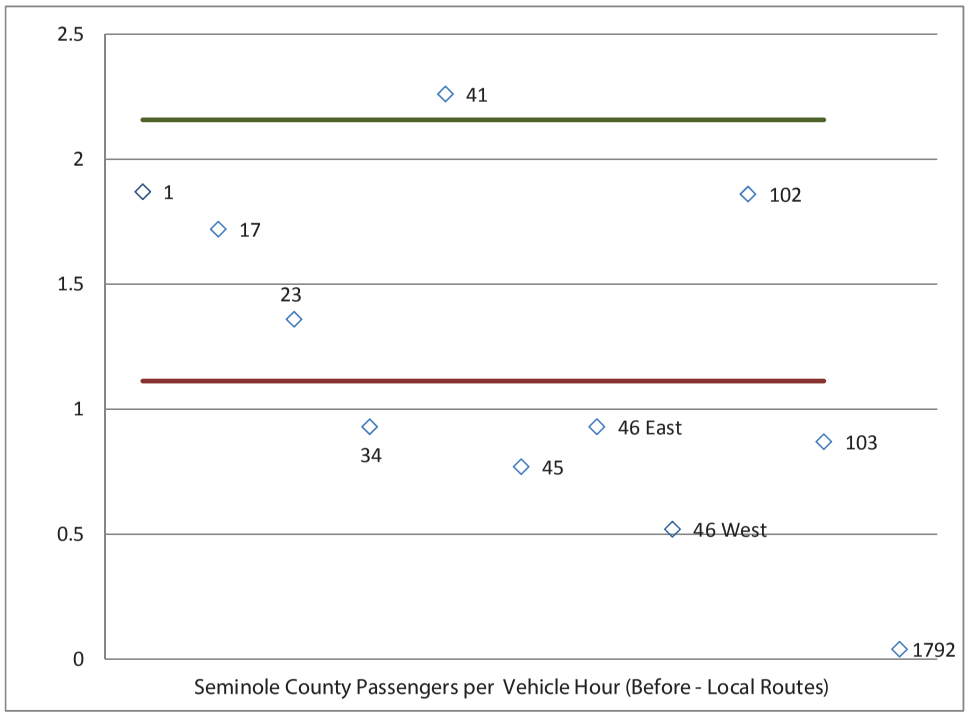

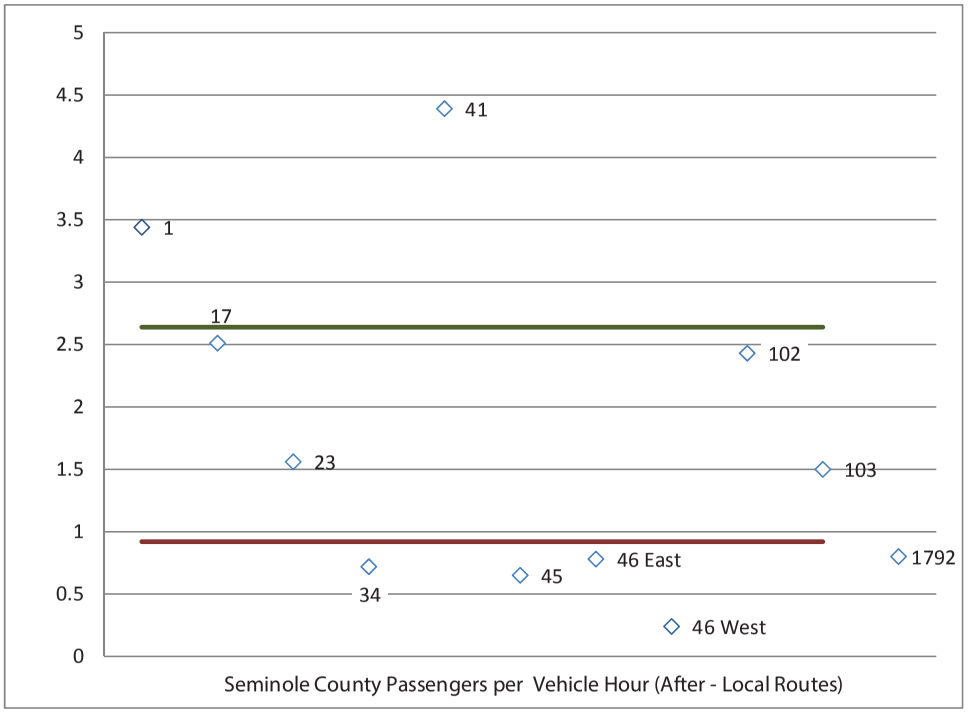

Figure 6 - 13
Seminole County Passsengers Per Vehicle Hour Local

Route
Top Quartile
Bottom Quartile

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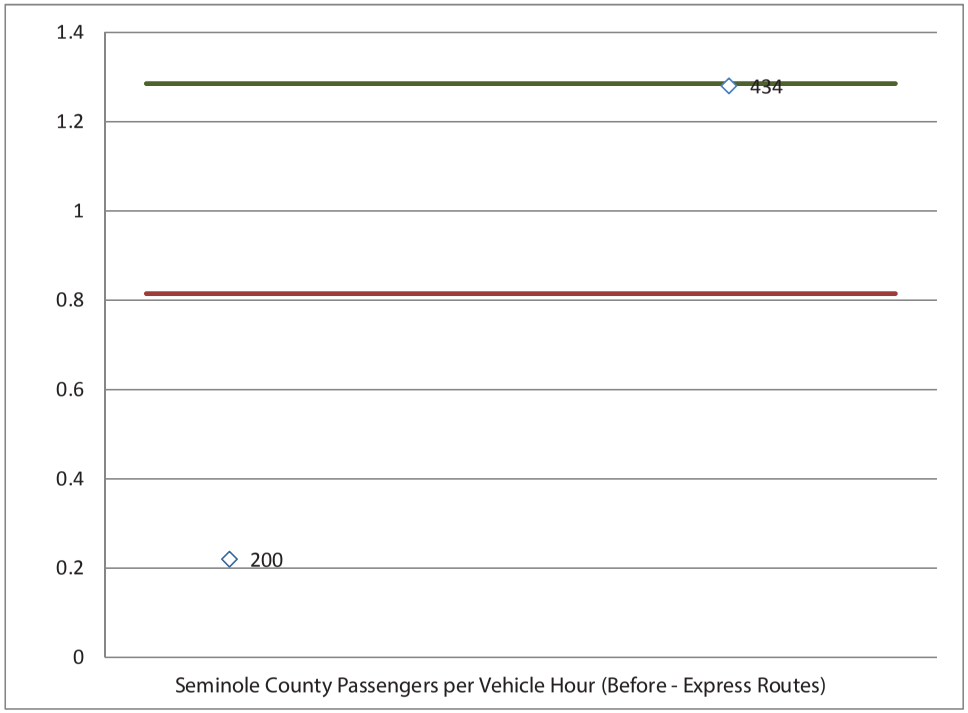

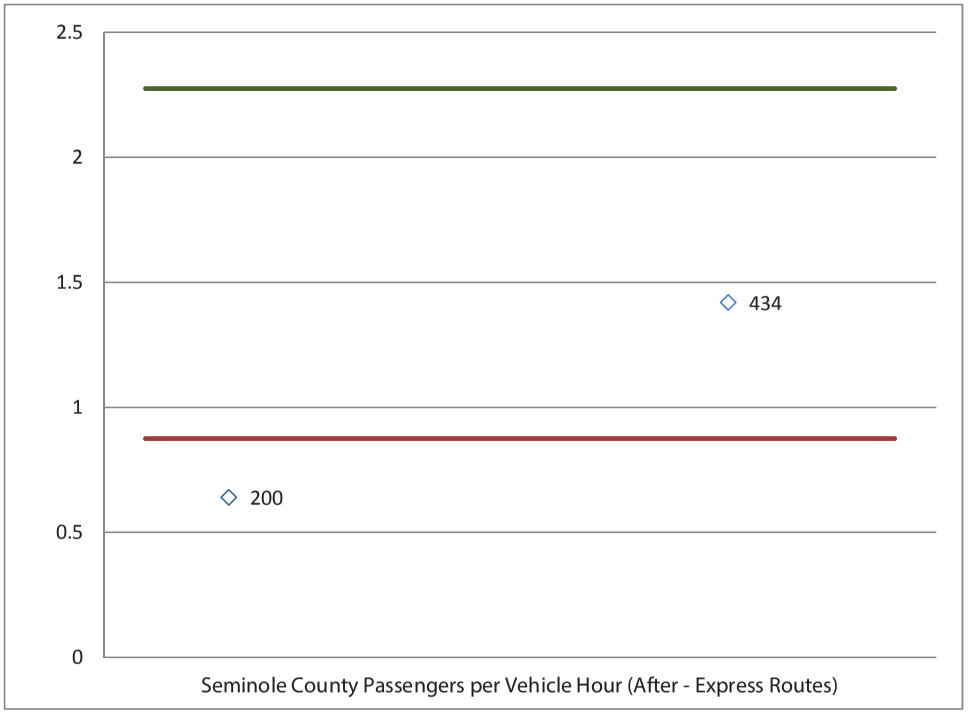

Figure 6 - 14
Seminole County Passsengers Per Vehicle Hour Express

Route
Top Quartile
Bottom Quartile

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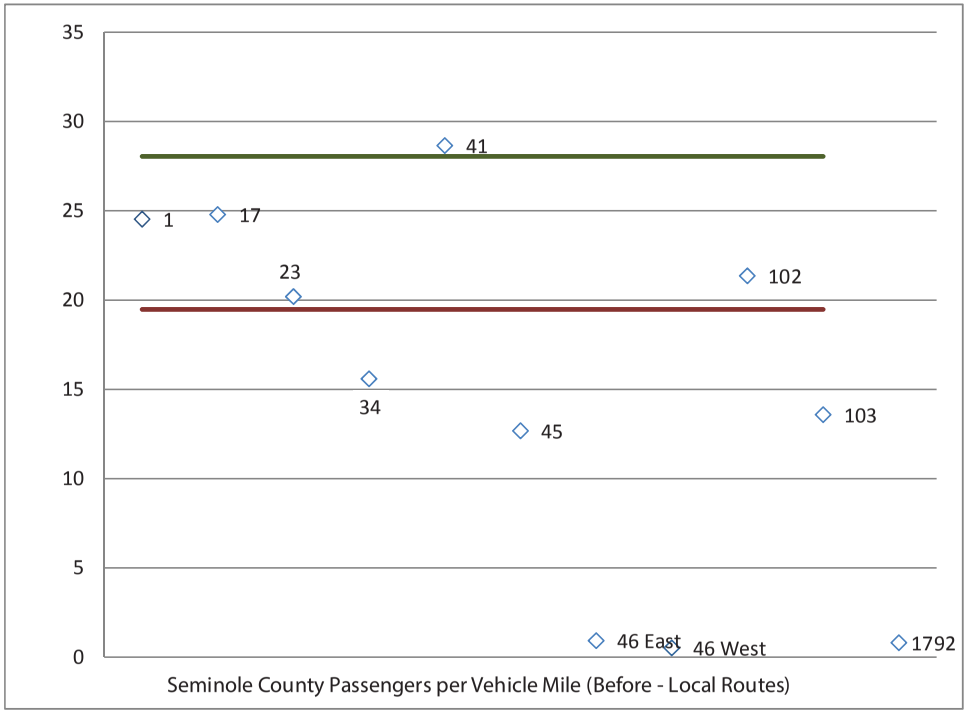

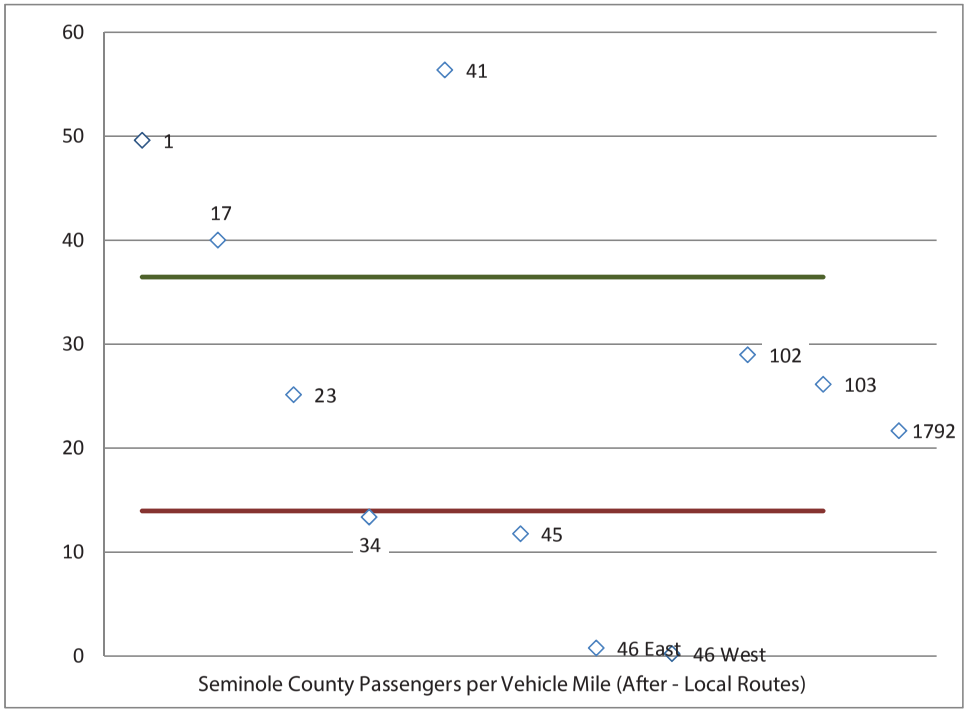

Figure 6 - 15
Seminole County Passsengers Per Vehicle Mile Local

Route
Top Quartile
Bottom Quartile

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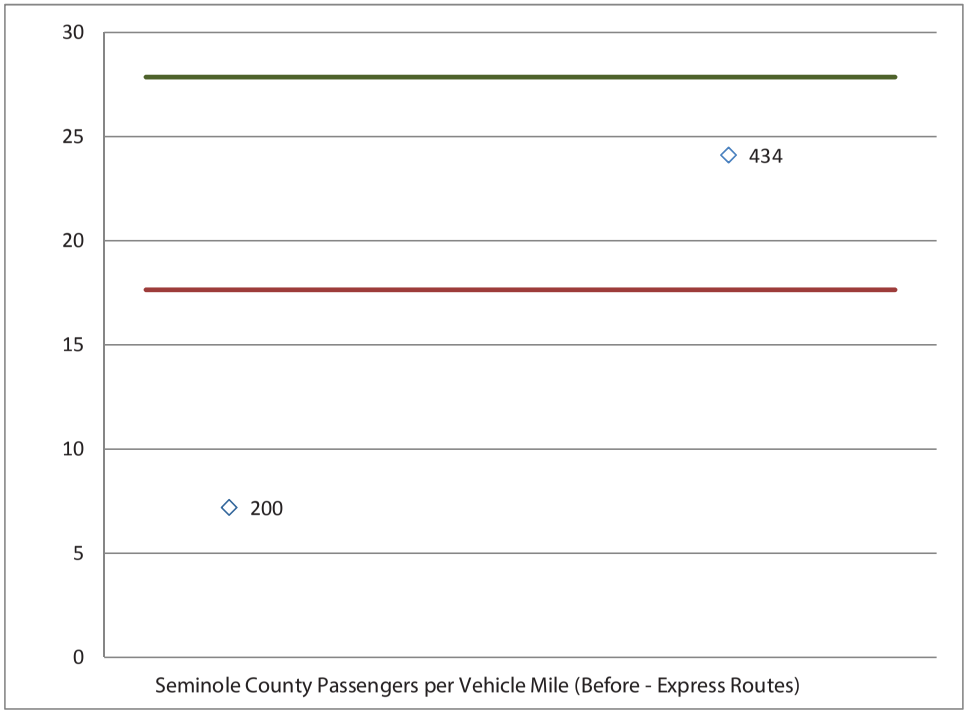

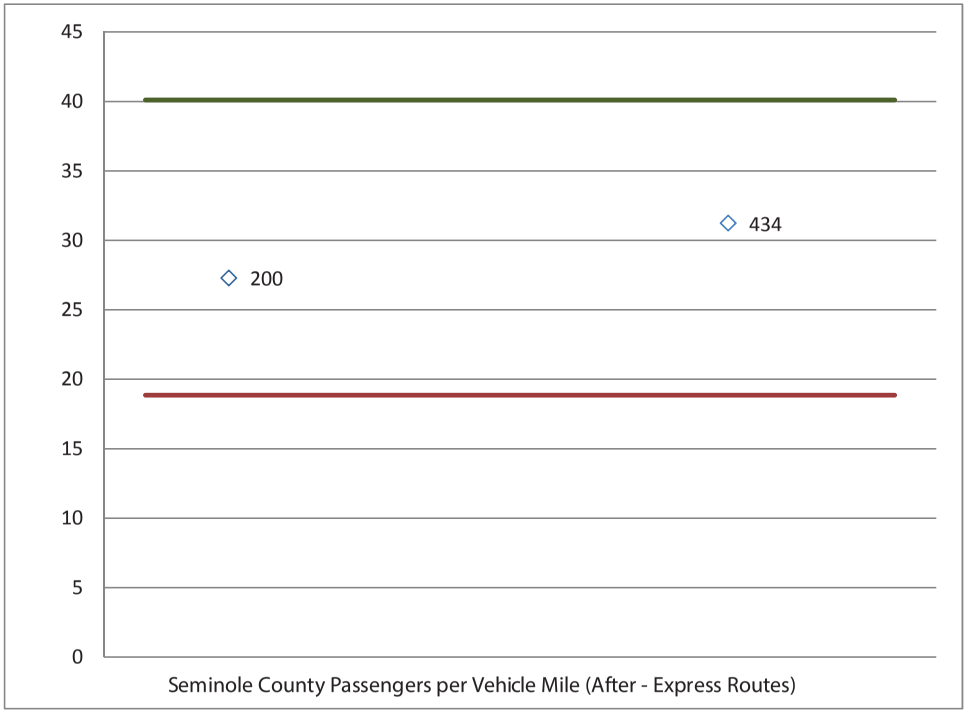

Figure 6 - 16
Seminole County Passsengers Per Vehicle Mile Express

Route
Top Quartile
Bottom Quartile

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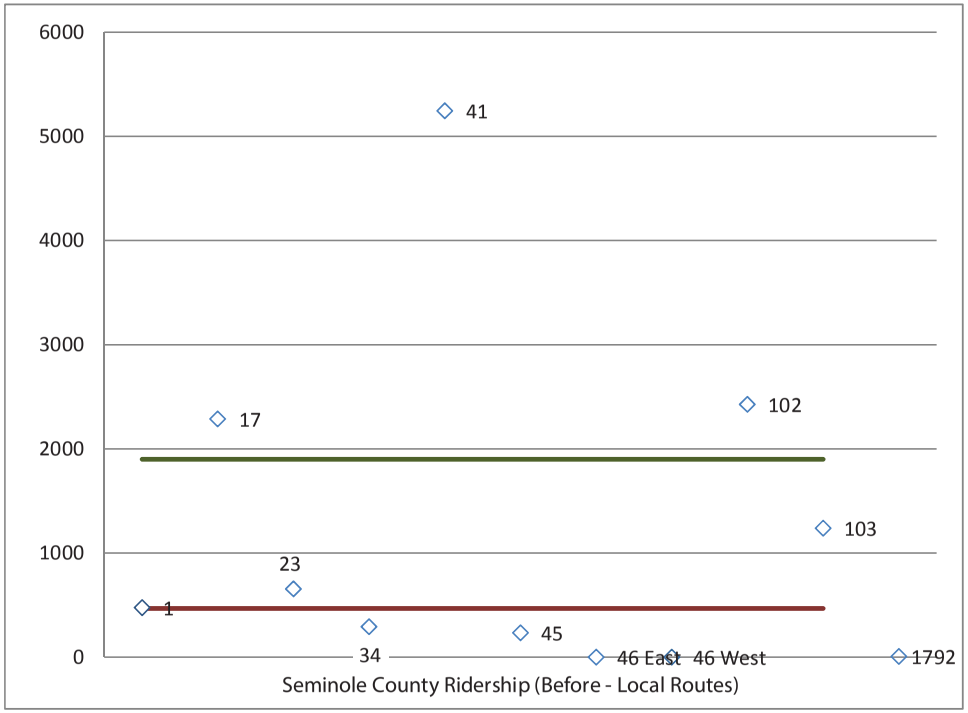

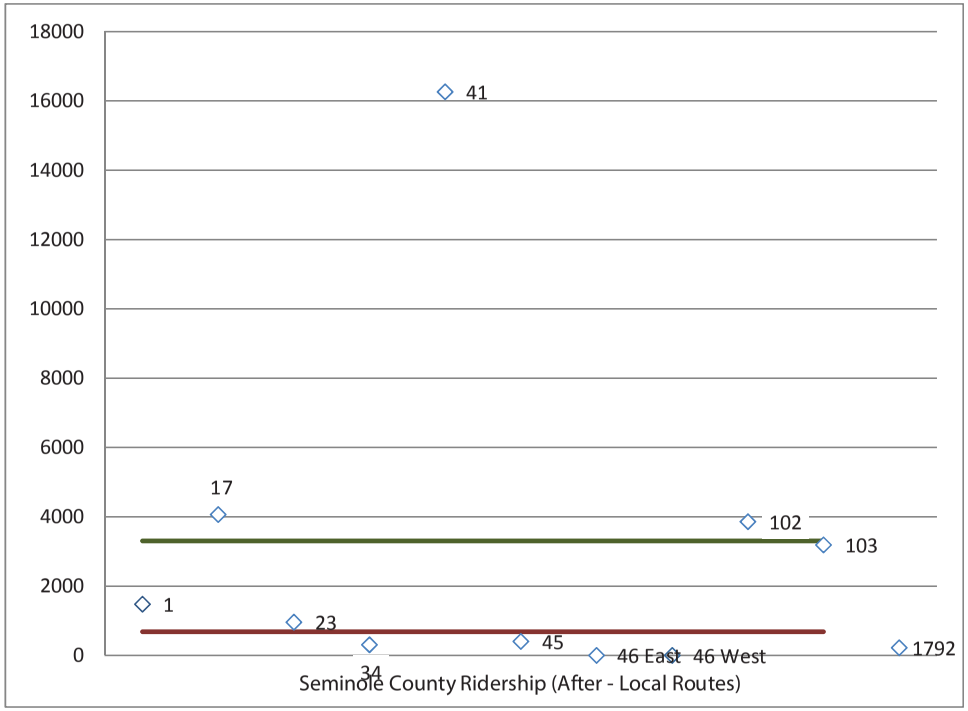

Figure 6 - 17
Seminole County Ridership Local

Route
Top Quartile
Bottom Quartile

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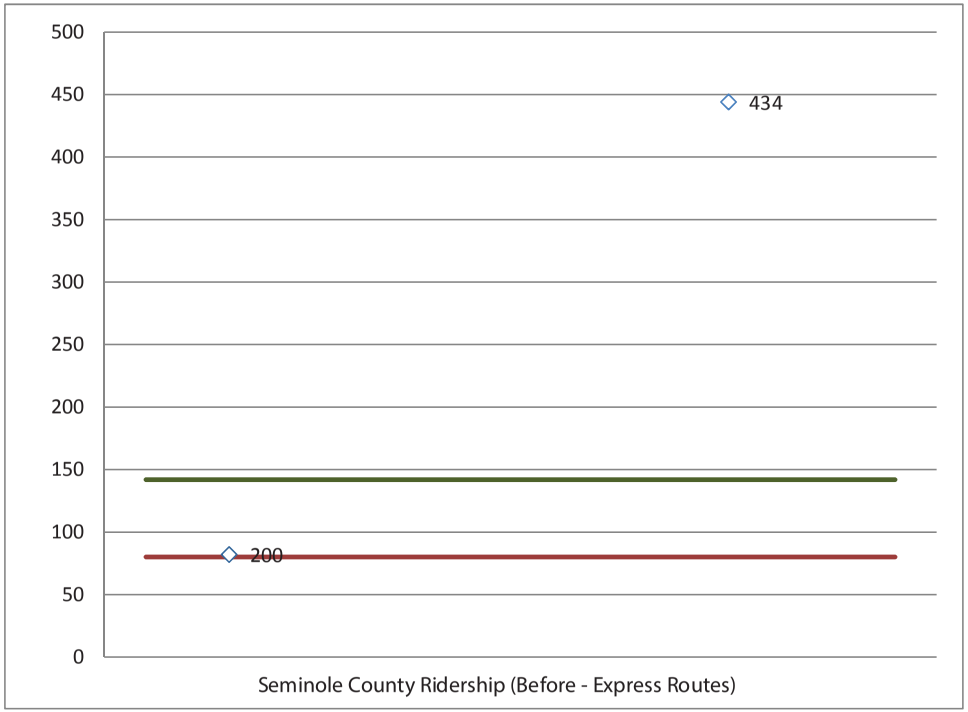

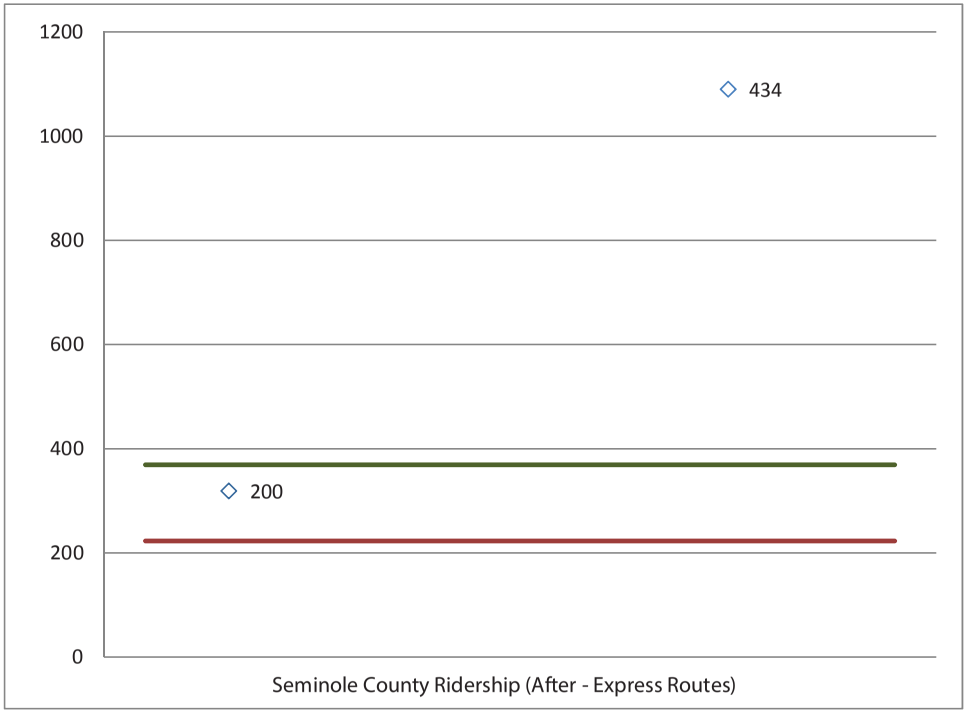

Figure 6 - 18
Seminole County Ridership Express

Route
Top Quartile
Bottom Quartile

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Link 14

Ridership on Link 14 would increase only slightly and passengers per hour/mile would decline significantly. This result is unexpected. The intention of recommending an extension of Link 14 was to improve its ridership, something that did not occur. **As such, this recommendation should not be advanced.**

Link 18

Ridership on Link 18 would increase, while passengers per mile and hour would decrease. This decline is not enough to significantly affect the overall performance of the route (it would be slightly below average).

Link 20

Ridership on Link 20 would decline, while the passengers per hour/mile would decline. The route would continue to have a passengers/hour/mile ratio close to the average for the system.

Link 21

Ridership on Link 21 would increase, while the passengers per hour/mile would decline. None-the-less, this decline in efficiency would not be significant and the route would continue to have a passengers/hour/mile ratio close to the average for the system. Extending Link 21 to Walt Disney World would provide connectivity that does not currently exist in the LYNX system.

Link 24

Ridership on Link 24 would increase, while the passengers per hour/mile would decline slightly. This decline in efficiency would not be significant and the route would continue to have a passengers/hour/mile ratio close to the average for the system.

Link 25

Ridership on Link 25 would increase, while the passengers per hour/mile would decline slightly. This decline in efficiency would not be significant and the route would continue to have a passengers/hour/mile ratio close to the average for the system.

Link 26

Ridership on Link 26 would decline significantly and passengers per hour/mile would decline significantly as well. Re-routing Link 26 away from Walt Disney World (the main destination of people living in Poinciana) would affect the route negatively and **this change should be reconsidered in concert with the plan for the Kissimmee Intermodal Facility**.

Link 34

Ridership on Link 34 would increase, while the passengers per hour/mile would decline slightly. This decline in efficiency would not be significant and the route would continue to have a passengers/hour/mile ratio close to the average for the system.

Link 36

Ridership on Link 36 would decline by a large margin and passengers per hour/mile would decline significantly. This result is unexpected. The recommended removal of running time and shortening the span of service for Link 36 should not have had such a significant effect on the route and could be a consequence of TBEST's inability to accurately model spans of service changes. This recommendation should be retested prior to implementation.

Link 38

Ridership on Link 38 would decline by a large margin and passengers per hour/mile would decline significantly. This result is unexpected. The recommended addition of service Link 38 to make the route run all day should not have had such a significant effect on the route and could be a consequence of TBEST's inability to accurately model spans of service changes. This recommendation should be retested prior to implementation.

Link 45

Ridership on Link 45 would increase, while the passengers per hour/mile would decline slightly/remain the same. This trade-off of gaining riders while not really improving efficiency is a reflection of the low-density land uses in Seminole County.

Link 46E

Ridership on Link 46E would increase, while the passengers per hour/mile would decline. None-the-less, this decline in efficiency would not be significant.

Link 46W

Ridership on Link 46W would decline, while the passengers per hour/mile would decline. None-the-less, this decline in efficiency would not be significant.

Link 51

Ridership on Link 51 would increase, while the passengers per hour/mile would decline slightly. This decline in efficiency would not be significant and the route would continue to have a passengers/hour/mile ratio close to the average for the system.

Link 125

Ridership on Link 125 would decrease, while the passengers per hour/mile would decline slightly. This decline in efficiency would not be significant and the route would continue to have a passengers/hour/mile ratio close to the average for the system.

Link 301

Ridership on Link 301 would increase, while the passengers per hour/mile would decline slightly. This decline in efficiency would not be significant and the route would continue to have a passengers/hour/mile ratio close to the average for the system.

Link 443

Ridership on Link 443 would increase, while the passengers per hour/mile would decline slightly. This decline in efficiency would not be significant and the route would continue to have a passengers/hour/mile ratio close to the average for the system.

Link 445

Ridership on Link 445 would decline by a large margin and passengers per hour/mile would decline significantly. This result is unexpected. There are no major changes recommended for Link 445 and as such there should not be such a significant effect on the route and could be a consequence of TBEST's inability to accurately model some of the service changes. This recommendation should be retested prior to implementation.

6.4 Evaluation of New Routes

Using the results from TBEST and the future route statistics, the proposed new routes were evaluated for financial performance. These results are shown in Table 6-4. The remaining service guidelines (route design, schedule design, and service delivery) were not applicable.

Similar to the evaluation of the existing routes, this evaluation includes only certain performance metrics (Passengers per Hour/Passengers per Mile) as some could not be evaluated with the tools available in this study.

New routes were evaluated using the lower quartile threshold of the existing system (in the future). This number is 395 for passengers, 17.25 for passengers per hour and .92 for passengers per mile. Any route that falls below this threshold should be refined or reconsidered before being implemented.

The majority of the poorest performing new route recommendations are the XpressLinks and the circulators. These routes are projected to carry very few riders and have long running times. If these routes are implemented, every attempt should be made to optimize ridership on these two route types. This could be done by:

1) Providing enhanced park-and-ride locations along the XpressLink Routes.
2) Marketing the XpressLink routes to business commuters.
3) Not charging a fare on the circulators.
4) Providing timed-transfers between the circulators and other local routes.

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Table 6-4: Evaluation of New Routes

	Route Description	Ridership	Passengers per total hour	Passengers per Total Mile
Long Term New Route	Create new Xpress Link from Sanford to Oveido to UCF	12	0.14	0.04
Long Term New Route	Create new XpressLink from Apopka to Altamonte SunRail Station	21	0.36	0.03
Short Term New Route	Create new Celebration circulator	39	1.15	0.09
Long Term New Route	Create New XpressLink from UCF to Downtown	45	2.01	0.35
Long Term New Route	Create new XpressLink along SR 50 between West Oaks and UCF	59	1.51	0.11
Long Term New Route	Create new Orlovista Circulator Route	103	5.69	0.29
Long Term New Route	Create new FastLink along SR 527 from Downtown to Sand Lake SunRail Station	124	10.15	0.75
Short Term New Route	Create new Baldwin Park Circulator	141	7.13	0.56
Short Term New Route	Convert new Downtown Orlando to Lake Nona route (Service Grant) into a Downtown Orlando to OIA to Lake Nona XpressLink	240	2.26	0.17
Long Term New Route	Create new Xpresslink from UCF to Innovation Way	65	5.31	N/A
Long Term New Route	Create new Xpress Link along SR 423 from Downtown to I-Drive	82	6.70	N/A
Short Term New Route	Create new Sanford SunRail Airport Blvd Route	223	6.71	N/A
Short Term New Route	Create new XpressLink from Oviedo to Downtown	108	46.07	1.42
Short Term New Route	Create new LCS - Universal/SeaWorld Route	344	90.53	6.42

Table 6-4: Evaluation of New Routes (Continued)

	Route Description	Ridership	Passengers per total hour	Passengers per Total Mile
Short Term New Route	Create new Kissimmee circulator	534	15.45	1.15
Short Term New Route	Create new KIF to Lake Nona and OIA Route	1154	9.24	0.69
Long Term New Route	Create new BRT along US 192 from Lake County to Kissimmee	2175	21.68	0.85
Short Term New Route	Create a new limited direct route to Buena Ventura Lakes	426	87.82	6.22
Long Term New Route	Create new John Young Parkway Circulator Route	729	25.90	1.31
Long Term New Route	Create new West Town Center to Maitland SunRail Local Route	1051	20.52	2.86
Short Term New Route	Create a new limited direct route in Pine Hills	1309	170.05	12.05
Long Term New Route	Create new FastLink from Fern Park to OIA	1511	123.45	N/A
Short Term New Route	Create new Kissimmee to International Drive route	1911	19.28	1.44
Short Term New Route	Connects Oviedo and Altamonte Springs via Red Bug Lake Road and Semoran Blvd.	2367	28.98	3.23
Short Term New Route	Create new Goldenrod Route	3329	39.25	3.00
Long Term New Route	Create new BRT from Winter Park to Downtown	3336	40.18	6.41
Long Term New Route	Create new BRT along 435 from Park Promenade to I-Drive	4941	82.76	3.65
Long Term New Route	Create new BRT from Downtown to Florida Mall	7449	78.78	14.30
Short Term New Route	Create new BRT along US 192 from Disney to Kissimmee	12678	37.33	1.38
Short Term New Route	Add new neighborlink on Celery Ave	N/A	N/A	N/A
Short Term New Route	Create New Circulator/Neighborlink in Lake Mary	N/A	N/A	N/A

Routes shaded in Red are below the quartile of the system average for that performance metric.

6.5 Title VI Evaluation

The COA recommendations were evaluated as part of a separate effort for consistency with Title VI of the US Civil Rights Act. The COA recommendations were reviewed to determine the routes that would exceed the Major Service Policy threshold of a 25 percent change to revenue hours or revenue miles. The recommendations of this analysis are listed below and are included in Appendix C.

"… it is important to note that each COA recommendation should be reviewed prior to implementation to ensure that the modification is evaluated against the current LYNX operating environment and considering any recommendations that may have been implemented in the previous year. While this analysis reviewed the COA recommendations for FY2014, the recommendations were reviewed comprehensively and consideration was given to recommendations that may offset the impact of other recommendations within the same vicinity. This Title VI review was completed on the FY2014 COA recommendations in their entirety. If only a portion of the recommendations are implemented, it could impact the outcome of the Title VI review and therefore, should be evaluated when implemented.
The LYNX formal public outreach process should be followed to give the public an opportunity to provide input on all of the COA recommendations, particularly those that are discussed in this report and exceed the established Major Service policy threshold."

6.6 Implementation Steps

In each year, the recommendations and their associated phasing will need to be agreed to by the various partners (the City of Orlando, Orange County, Osceola County and Seminole County) that fund the LYNX system. Concurrent with the annual update of the agency's Transit Development Plan, LYNX planning staff will meet with funding partners to discuss system and route performance, and recommendations to both achieve efficiencies and improve service. It is anticipated that this will happen during the third quarter of the LYNX fiscal year (April – June). Once implementation priorities are set, the incremental funding can be allocated to LYNX during their annual funding cycle in October.

Once elements are allocated in the annual funding cycle, LYNX will take the steps required to implement the change. This includes developing schedules and specifications, presenting them to the public, and finally, allowing the bus operators union to pick the work in a Bid (which occurs in December, April, June and September).

The recommendations included in this COA are consistent with the LYNX system and Orlando-area demographics as of September 2012. LYNX will conduct a re-evaluation of the system based on the service guidelines with each annual TDP update. This will enable a re-evaluation of potential changes and adjustments to the recommendation and implementation priorities.

6.7 Conclusion

This Comprehensive Operations Analysis provides LYNX with the guidelines and framework to improve the LYNX system today and in the future. Through the development of the Service Guidelines, LYNX will now be able to gather data specific to the system and use that data to determine where network modifications are needed and where new investments may be warranted. Development of consistent data will enable a year to year comparison of LYNX's performance and it will enable LYNX to better communicate that system performance with their partners and customers. Overall, the analysis of today's system provided in this document demonstrated that LYNX is operating efficiently, though there are opportunities to tighten the overall system in order to provide better service to LYNX's customers.

7

Public Outreach

7.1 Introduction

The public outreach program for the Comprehensive Operations Analysis (COA) was designed with the following goals:

1) Coordinate with LYNX staff and advisory committees (LYNX Board of Directors, Regional Working Group, Service Efficiency Review Committee and Executive Steering Committee) to identify service gaps and improvements, and implementation strategies.
2) Provide opportunities for the community to comment on existing LYNX bus routes and schedules.
3) Develop a variety of communication methods and community participation programs that are easily accessible to maximize the number of citizens who are able to participate and comment on the project.
4) Comply with FHWA/FTA Title VI Program to ensure that no person shall, on the grounds of race, color, or national origin, be excluded from participating in, or denied the benefits of, or be subject to discrimination relating to this project.

The obligation to provide information and consider community input in decision-making was made explicit by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). This strong federal emphasis on community participation was continued in the Transportation Equity Act for the 21st Century (TEA-21) in 1998 through Moving Ahead for Progress in the 21st Century (MAP-21 in 2012). The true test of a successful community participation program is the quality of public awareness and feedback. Too often, community participation does not occur until after the community-at-large becomes aware of an unpopular decision, at which point large citizen efforts become necessary to change decisions after the fact. A planning process that involves the average citizen early makes the public a participant in any decision that is ultimately made.

Meetings/Workshops and Outreach Events

The project team conducted outreach meetings with the following groups:

- The General Public
- The Regional Working Group (funding partners and internal LYNX staff)
- The LYNX Executive Committee
- The LYNX Audit Committee

These meetings are described below:

March, 26, 27, 28 2013 – 3 locations (general public)

On March 26, 27, 28, 2013 three public outreach sessions were held to kick off the COA project. These meetings were held at the following locations:

- Osceola Square Mall SuperStop
- LYNX Central Station
- Seminole Centre SuperStop

The meetings included an information booth and project staffers who were there to answer questions and conduct interviews to determine people's opinions of existing transit. Additionally, as a result of the public advertisement, some interviews were conducted by phone.

During this outreach period, 320 interviews/surveys were conducted of LYNX passengers. While a diverse array of comments and suggestions were received (which are detailed in the Appendix D), the list below summarizes the most frequently expressed comments:

- Increase bus frequency (from 1 hour to 15 or 30 minutes) or utilization of an articulated bus on high ridership routes or during peak hours of the day.
- Extend service to areas where there is limited or no transit service (Celebration, Lake Nona, etc.).
- Recognize the non-traditional workday and workplaces by extending service hours earlier in the day and later in the evening and providing Sunday and Holiday service.
- Improve connections between routes by communicating any delays to operators and scheduling (or building) in some "wiggle room" to compensate for unexpected delays.
- Reduce fares (for children) and offer yearly pass discounts.
- Improve passenger amenities and environments (i.e. smoke-free/clean transfer stations, availability of bathrooms at the Central Station during hours of bus operation, improved lighting for safety, improved shelters, and accommodations for persons with disabilities and mothers with strollers).
- Add bicycle racks that fit three bicycles on all buses (instead of some buses fitting two bikes and some fitting three bikes).
- Improve operator customer service and training (particularly in terms of etiquette, enforcement of bus rules, knowledge of routes, and driving skills).

April 9, 2013 – LYNX Service Planning/Operations Team Workshop

On April 9th, an outreach meeting with the LYNX operators, line supervision and other personnel was held. At this meeting, the goals of the project, potential types of major and minor short term recommendations were presented, as well as the long term network modifications,

infrastructure improvements, and other changes. LYNX personnel expressed strong support for the project and potential improvements, including adjusting spans of service, adding frequency, and restructuring in East Orlando. Feedback was received regarding service and operational issues that the service planning and operating staff have observed including the need for plug buses on certain routes, the lack of facilities for operators at layover locations, outdated timepoints, time-consuming fare collection and operator safety.

May 10, 2013 – Executive Committee

On May 10, 2013 a meeting of the Executive Committee was held at LYNX Headquarters. The Executive Committee includes internal members of LYNX staff (staff from planning, scheduling, government relations and other departments) and Mr. John Lewis, LYNX Chief Executive Officer.

At this meeting, the project team presented an overview of the COA, the project goals, presentation of the proposed service guidelines, a summary of the performance analysis, and the initial recommendations including the priorities for funding. These included immediate operating needs and the elements that would have the biggest impact in assisting LYNX become compliant with the service guidelines. The priorities identified include the following:

- Sanford Route Restructuring Package
- Spans of Service
- Pine Hills Route Restructuring Package
- Running Time Changes
- Route 125 Straight Line

These priorities were used in structuring the phasing program for the service implementation. Feedback received from the public outreach events and survey and the April 9, 2013 internal LYNX workshop were also presented. At this meeting, Mr. Lewis noted that LYNX desired to have the Service Guidelines adopted by the Board of Directors. Other Executive Committee members provided input on the Service Guidelines, proposed recommendations and priorities.

June 13, 2013 – Regional Working Group Meeting

On June 27, 2013 a Regional Working Group meeting was held at LYNX headquarters. The Regional Working Group included internal members of LYNX staff (staff from planning, scheduling, government relations and other departments), as well as representatives from the funding partners.

The workshop was attended by 31 working group members, including 12 participants representing Seminole, Osceola, and Orange Counties, the Cities of Longwood, Casselberry, Altamonte Springs, Orlando, Apopka, and Kissimmee, MetroPlan Orlando, and ReThink. The remaining 19 participants were comprised of consultant team members and LYNX staff including Mr. John Lewis, Chief Executive Officer, LYNX, who joined in the discussions during the exercises. The workshop opened by a presentation on the purpose and background of the Comprehensive Operational Analysis (COA), data and collection efforts, and outreach efforts to date.

Two exercises designed to solicit participation were held at this workgroup: a “dotmocracy” exercise that allowed attendees to indicate which change(s) they would prioritize, and a “wish not/want not” exercise that allowed attendees to list one change they would not do and one change that was not included (but that they would like to include).

Dotmocracy

The change to existing routes with the most number of votes in the "dotmocracy" exercise was the reduction of stop spacing on Link 41.

The changes with the most number "1" ranks were: truncating Link 8 at Destination Parkway and Link 10, increasing the headway to 30 minutes throughout the day.

For the new routes, the changes with the most number of votes were:

- Create Kissimmee Circulators
- Create new Downtown Orlando/OIA/Lake Nona FastLink route
- Create a new limited direct route in Pine Hills
- Create new Baldwin Park Circulator
- Create new West Town Center to Maitland SunRail Local Route

The changes with the most number "1" ranks were:

- Create new KIF to Lake Nona and OIA Route
- Create new Kissimmee circulator
- Create a new limited direct route in Pine Hills
- Create new FastLink from Apopka to Downtown Orlando
- Create new BRT along US 192 from Disney to Kissimmee*

Final Wishes

The general operational wishes included more frequent service, better use of technology, more reliable service and support for specific improvements included in the COA. More information on these wishes are listed in Appendix D.

The route specific requests confirmed the needs for operational service improvements, thus, further supporting the need for improvements to those identified Link routes and exploring the costs associated with implementing those improvements.

Attendees were not in favor of some of the Seminole Proposals (which were revised later) and of eliminating service without providing a travel alternative.

SUMMARY OF THE OPEN DISCUSSION

Some interesting observations can be made from the results on the open discussion. They are summarized below:

- The Seminole County Table expressed a strong need for having an express route for Link 45 to get work commuters to, from and between their jobs. However, based on the rider and operator surveys, no recommendations were made to propose any changes to this route, and no recommendations or "wishes" were offered on Link 45 during the One Final Wish Exercise.
- Link 10 and Link 18 (both of which received 1st priority rankings) have been identified by riders, operators, and LYNX staff as needing improvements in service (e.g. increasing headway to 30 minutes and expanding the AM span of service). Both of these would be covered by the COA recommendations.
-

June 27/28, 2013 – Executive Committee

On June 27, 2013 another meeting of the Executive Committee was held at LYNX Headquarters. At this meeting, the opinions expressed in the Regional Working Group, the revised recommendations, the revised priorities and the proposed service guidelines were further discussed with the Executive Committee. Issues associated with the availability and quality of data was also discussed. A framework for presentation to the LYNX Audit Committee was also formulated.

July 19, 2013 – Regional Working Group Update

On July 19, 2013 the Regional Working Group met and was updated on the progress of the study, this included further information on the Service Guidelines and potential recommendations.

July 25, 2013 – LYNX Audit Committee

On July 26, 2013 a presentation was given to the Audit Committee of the LYNX Board. This presentation laid out the vision for the three major planning efforts underway at LYNX, the TDP, the Strategic Plan and the COA. The COA portion of the presentation provided an overview of the COA project including the Service Guidelines, performance analysis and initial recommendations.

September 13, 2013 – Regional Working Group Update

On July 19, 2013 the Regional Working Group met and was updated on the progress of the study, this included further information on the inter-relationship between the TDP and COA.

December 4, 2013 – LYNX Audit Committee

On December 4, 2013 a presentation was made to the LYNX Audit Committee seeking concurrence on the Service Guidelines. The adoption of the proposed Service Guidelines was postponed to a future meeting pending additional information requested by the Audit Committee members.

Funding Partner Briefings (Various)

Throughout the project's time-line, briefings with LYNX various funding partners were conducted to inform them of the study's progress and results. These meetings were held on:

- June 11, 2013 Osceola County
- June 20, 2013 Seminole County
- October 8, 2013 City of Orlando
- October 10, 2013 Orange County
- October 14, 2013 Seminole County
- November 8, 2013 Osceola County
- November 21, 2013 Osceola County
- December 10, 2013 Orange County
- December 13, 2013 City of Orlando
- January 10, 2014 Seminole County

Website

A project website was developed to inform the public of the study process. The website is:

http://www.golynx.com/about-lynx/what-we-are-working-on/COA.stml

The website included information on the project status and press releases; contact information of key Project Team members; a search function; Title VI Plan; complaint procedures and complaint form; and a comment form so visitors may comment directly on any subject. Finally, public outreach was extended to LYNX operators to obtain their feedback on improvements to bus routes and schedules and identify LYNX service needs and opportunities for improvement.

Operator Surveys

A short comment sheet was distributed to the operators in their inboxes at the LYNX Central Station, LYNX Operations Center and the Osceola Facility on April 15, with a closing date of April 19, 2013. Some additional comment sheets were received after this period on May 31 in the "Ask the CEO" Box.

A total of 58 operator comment sheets were completed and are shown in Table 7-1. In general, operators shared similar concerns and offered similar comments and suggestions as the LYNX riders, particularly with route scheduling issues, operator issues, and route connection issues due to unexpected delays and/or insufficient time to make connections and transfers.

Table 7-1: Operator Survey Results

Comments on Operations/Service Issues	Routes*	Additional Feedback Locations
1. **Need** larger or use of articulated buses **due to overcrowded** conditions	3, **4**, **8**, **10**, **18**, **37**, **40**, 46E, **57**, 103, 313, 319	Links 46E and 103 go thru 2 school zones – need more capacity morning and evening school peak. Combo: 40-3-313 needs articulated buses to accommodate wheelchair space for passengers going to VA hospitals/Amtrak with luggage. Link 319 typically has heavy wheelchair demand. Disney produces high ridership from employees.
2**. Improve coordination on schedules** with other routes to **improve connections**	**4**, **8**, **10**, **17**, **18**, **21**, **23**, **37**, **41**, **42**, **44**, 46E, 46W, 102, 103, **104**, 130	Link 17 connection to Link 41 at Apopka SuperStop. 23 connection to 41. Links 41, 102, 103 need to be timed to meet at Fernwood. Link 41 layover should extend a few minutes to pick up Links 102 and 103. Links 46E and 46W should run until last Link 103 at Seminole Center to take stranded passengers home.
3. **Unable to make connections – additional layover time needed** ** (impediments to schedule: **traffic conditions/delays**, time needed for wheelchair access, **fare collection**, **passengers loading issues,** including: Passengers not ready to board bus (not waiting at stops) Passengers not having fares/tickets ready when boarding Long lines to board bus (heavy ridership)	**4**, 6, **8**, **10**, Combo: 13-51-**23**, **15**, **17**, **20**, **21**, 25, **37**, **40**, **41**, **42**, **57**, **104**, 111, **125**, 319, **441**, Extra Board	Combo: 13-51-23: Insufficient inbound time at 1:55 PM. Links 21, 25, 319 always miss Links 40 and 37 by 3-4 minutes. Link 41: second to last pullout from OIA at 10:50 too long between transfers => missed connection with #104. Leaves just as # 103 comes in => no connection (needs longer layover). Link 42: Need longer outbound time to get out of Premium Outlet to Convention Center due to traffic. Link 111: last bus to airport does not connect to #41. Link 4 is always late. Links 4, 6, 18, 20 have lots of lights and passengers who are persons with disabilities requiring additional time.
4. **Unnecessary number of stops** along the routes	**8**, **10**, Combo: 11-36-**48**; 39, **42**,	Link 10: Time point at 17th St and Vermont Ave. unnecessary – congestion at St. Cloud WalMart causing bus to be late.
5. **Improper placement** of bus stop signs along the routes	**8, 42, Extra Board**	Link 42 stop at McCoy Rd/Daetwyler Dr. blocks the road for about 5-7 minutes. Going thru Florida Mall parking lot creates safety concerns.

Table 7-1: Operator Survey Results (Continued)

Comments on Operations/Service Issues	Routes*	Additional Feedback Locations
6. **Coordination** of stop schedules **with timing of signal lights**	9	Link 9 on Wednesdays at 7:05am (Rosemont SuperStop) delayed at light – miss connection with Link 17.
7. **Safety** concerns at stops or along the routes	**4, 8, Combo: 11-36-48; 18**	Safety issues at WalMart, bus stops on both directions on Howell Branch Rd. need to be moved (unsafe for passengers). Some stops are too close to traffic light. Need transit security on buses. Brochures on bus rules/safety etiquette.
8. **Insufficient** room for bus **pull-in area/lack of layover area**	**8, 37, 40**	
9. **Missing** bus stop **sign/bench**	**23, 405**	Link 23 at Riverside Park Dr. sign/bench gone.
10. Availability of **restrooms/bathroom** breaks needed	**23**, 24, 55, **57**, 500,	Link 500: Sat AM shift 4 hours no breaks and Sun shift 3 hours no breaks. Link 23: 6 hour drive without break problematic because if operator takes a bathroom break, route will be late.
11. **Route length** too long	**4, 8, 10, 23, 41, 441**	Need Express 441 during mid-day so Link 4 takes less people or divide Link 4 to Florida Mall and return to Osceola. Link 8 should terminate at Oak Ridge Rd. and I-Drive. Circulator should pick up other half to outlets (i.e. 102 and 103 routes).
12. Increase **service frequency** (current schedule not sufficient to meet rider demands)	**4, 5, 6, 50**	Should switch to FastLink on Links 4, 5, 6. Link 50 needs to increase to every 15 minutes with loss of Link 111.
13. Need more time to complete route	50; Combo: 7-**20**-54; Combo: 11-36-**48**; **41**; Extra Board	Link 50: More overcrowded due to loss of Link 111 at Disney.
14. **Alternate route/stops needed**	38, 102	Heavy I-4 traffic. Restructure some routes to run on larger roads, avoiding neighborhood streets (let NeighborLink bring passengers to central stations on larger roads). Maybe add a stop between the 1st and 2nd stops on Orange Ave. Consider a route connecting Bay Harbor Dr. through Ctrl FL Parkway to Orange Ave. to improve connection to Link 4.
15. Too much **inbound waiting time**	7, 37	At Lancaster Rd. and Winegard Rd. on Saturdays only.
16. Should be **stand-alone routes**	**10, 26**	

Table 7-1: Operator Survey Results (Continued)

Comments on Operations/Service Issues	Routes*	Additional Feedback Locations
17. Need **Sunday** service	**10, 18, 26, 57**	Need Sunday routes where there are none and need to be coordinated with time of day (work commutes/school hours).
18. **Extended service hours** needed	Link 1792 and Link 441	On these routes, express service needed.
19. Create reduced service **schedule for holidays**	Martin Luther King, Jr., Good Friday, etc.	
20. **Passenger amenities**	Better informational displays, bus shelters at Link 55 (4 corners WalMart).	

BOLDED LYNX Routes were identified by Operators as "Routes known to have problems that operators try to avoid"

** RED text indicates Operator responses as contributors to their "Biggest impediments to route schedule"

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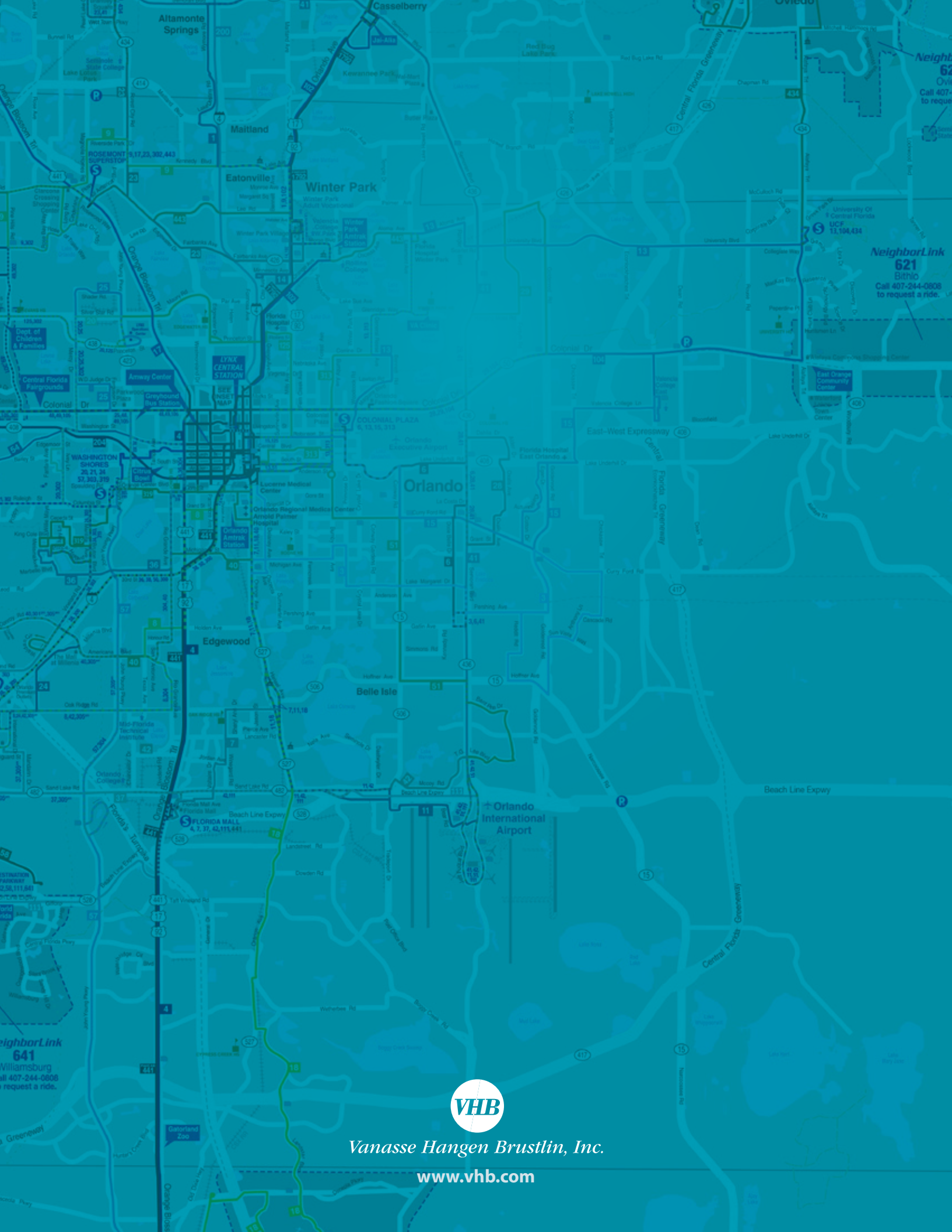

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