

2040 Long Range Transportation Plan



2040 Addendum

Performance-Based Planning

Adopted - June 2018

Updated - April 2019



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Introduction

MetroPlan Orlando, the metropolitan planning organization for Central Florida, recently updated the region's Long Range Transportation Plan (LRTP) to include a Performance-Based Planning Process. The Moving Ahead for Progress in the 21st Century Act (MAP-21) Act enacted in 2012 and the Fixing America's Surface Transportation Act (FAST Act) enacted in 2015 require that the Florida Department of Transportation and metropolitan planning organizations (MPOs) must apply a transportation performance-based planning approach to transportation decision-making.

The 2040 Long Range Transportation Plan includes Orange, Osceola, and Seminole counties, along with 23 municipalities, offering a regional approach to future transportation challenges and opportunities.

MetroPlan Orlando, in cooperation with the state and public transportation operators, must now develop a Long Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP) through a performance-driven, outcome-based approach to planning for metropolitan areas of the state that meet the federal planning factors. This addendum summarizes how MetroPlan Orlando is incorporating performance-based planning into the plans, programs and process for the Central Florida Region. Historically, project priorities have been established through the Long Range Transportation Plan Process and evaluated and discussed annually for the development of the Prioritized Project List (PPL).



The current 2040 Long Range Transportation Plan was adopted on December 9, 2015 by a unanimous vote of the MetroPlan Orlando Board. This performance-based planning addendum was adopted in phases by unanimous votes of the MetroPlan Orlando Board on:

- February 14, 2018 - Performance Measure 1: Safety
- June 13, 2018 - MPO Planning Requirements / MetroPlan Orlando Performance-based planning process
- November 14, 2018 - Performance Measure 2: Bridge & Pavement Condition
- November 14, 2018 - Performance Measure 3: Travel Time Reliability
- December 3, 2018 - LRTP Addendum published on web

Planning Rule Framework

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) jointly issued a Planning Rule to document changes in the statewide and metropolitan planning processes consistent with the Moving Ahead for Progress in the 21st Century (MAP-21) Act and the Fixing America's Surface Transportation (FAST) Act. Among other changes, this rule specifies the requirements for State DOTs and MPOs to implement a performance-based approach to planning and programming. Under this framework, the three FHWA Performance Measures (PM) rules and FTA transit rule established various performance measures required to monitor the performance of safety (PM1), bridge and pavement (PM2), system performance (PM3), and transit asset management (TAM).

The rules also indicate how MPOs should set targets, report progress, and integrate performance management into their Long-Range Transportation Plans (LRTPs) and Transportation Improvement Programs (TIPs). More details can be found in the Florida Department of Transportation (FDOT) Fact sheets located in the appendix.

There are two methods for target setting: 1) MPO establishing their own target and reporting performance, or, 2) supporting the statewide target established by FDOT. For the three federal performances measures (PM1, PM2 & PM3) addressing the National Highway System and State Roads, MetroPlan Orlando by resolution supported the FDOT targets for Safety, Bridge & Pavement Condition and System Performance. Figure 1 identifies the Performance Measures and Targets the MetroPlan Orlando Board supported.



Figure 1 - Federal Performance Measures & Targets

PM	Federal Performance Measures	Target
PM1 - Safety	Number of Fatalities (Motorized)	Vision Zero: Zero (0) fatalities, Zero (0) Serious Injuries and Rate of Zero (0) per 100 million VMT
	Number of Fatalities (Transit)	
	Number of Fatalities (Bicycle)	
	Number of Fatalities (Pedestrian)	
	Number of Serious Injuries (Motorized)	
	Number of Serious Injuries (Transit)	
	Number of Serious Injuries (Bicycle)	
	Number of Serious Injuries (Pedestrian)	
	Rate of Fatalities per 100 million vehicle miles of travel (all modes)	
	Rate of Serious Injuries per 100 million vehicle miles of travel (all modes)	
PM2 - Bridge & Pavement Condition	Percent of National Highway Bridges in good condition	> 60% in good condition & < 5% in poor condition
	Percent of National Highway Bridges in poor condition	
	Percent of interstate pavement in good condition	> 40% in good condition & < 5% in poor condition
	Percent of interstate pavement in poor condition	
	Percent of non-interstate pavement in good condition	> 50% in good condition & < 10% in poor condition
	Percent of non-interstate pavement in poor condition	
PM3 - System Performance	Travel Time Reliability - Percent of interstate providing reliable travel times	70% reliable
	Travel Time Reliability - Percent of non- interstate providing reliable travel times	50% reliable
	Truck Travel Time Reliability Index	2.0

The Transit Asset Management (TAM) Rule is a set of federal regulations (49 Code of Federal Regulations [CFR] part 625) that sets out minimum asset management practices to guide transit providers on how to manage capital assets and prioritize funding to improve or maintain assets in a state of good repair (SGR). The underlying purpose of the performance measures is to determine to what extent the asset is (or is not) in a SGR. The FTA Final Rule at 625.41 states that “A capital asset is in a state of good repair if it meets the following objective standards –

- a) the asset is able to perform its desired function;
- b) the use of the asset in its current condition does not pose an identified unacceptable safety risk; and
- c) the life-cycle investment needs of the asset have been met or recovered, including all scheduled maintenance, rehabilitation, and replacements.”

As stated in the Final Rule (49 CFR 625.43), SGR performance measures for capital assets are described as follows:

- Rolling Stock: The performance measure for rolling stock is the percentage of revenue vehicles within an asset class that have either met or exceeded their Useful Life Benchmark (ULB) for all assets for which there is direct capital responsibility.
- Equipment: (non-revenue/ service vehicles). The performance measure for non-revenue, support-service and maintenance vehicle equipment is the percentage of those vehicles that have either met or exceeded their ULB for all assets for which there is direct capital responsibility.
- Infrastructure: (rail fixed-guideway, track, signals, and systems). The percentage of track segments with performance restrictions for all assets for which there is direct capital responsibility. Note that the asset inventory does not include non-rail fixed guideway assets.
- Facilities: The performance measure for facilities is the percentage of facilities within an asset class that are rated below condition 3.0 on the Transit Economic Requirements Model (TERM) scale for which there is direct capital responsibility.

The SGR performance measures and target setting requirements are separate from the TAM Plan requirement. The FTA performance measures used in this section therefore differ from the asset classification in the rest of this TAM Plan. Therefore, performance measures for the inventoried assets were calculated for the required asset categories. It is important to note that the FTA performance measure for infrastructure refers only to rail fixed guideway infrastructure with direct capital responsibility; it does not include non-rail fixed guideway infrastructure such as is present in the LYNX inventory. Non-rail fixed guideway infrastructure assets were included in the inventory and condition assessments, but not in the performance measure calculations.

Figure 2 summarizes the asset vehicle performance and facility condition using the FTA TAM performance measures. The ULBs shown in the table are defined as “the expected life cycle or the acceptable period of use in service for a capital asset.” This term should be differentiated from the FTA Grant Minimum Useful Life requirement. Current performance was calculated as the total exceeding the ULB divided by the total number of assets. In the case of facilities, the number of facilities exceeding the 3.0 TERM rating was used to

determine facility condition. The equipment performance and overall asset performance shown in Figure 2 were based on all asset classes shown in the table. However, FY2019 performance targets were shown for only those asset classes required by the FTA TAM Rule. As such, overall asset performance and category performance were based on just the required performance classes.

Figure 2 - LYNX TAM Performance Measures and Targets

Category	Asset Class	UBR (Yrs.)	Total Number	Rolling Stock & Total Equipment Exceeding ULB / # of Facilities Below Condition 3.0	Current Performance	FY 2019 Performance Targets
Rolling Stock	Motor Bus					
	Articulated Bus	15	18	0	0.0%	0.0%
	Bus	15 (12 yrs. <30 ft.)	292	0	0.0%	0.0%
	Demand Response					
	Automobile	7	5	5	100.0%	75.0%
	Cutaway	7	183	39	21.3%	17.0%
	Van	7	30	0	0.0%	1.0%
	Vanpool					
	Van	7	194	7	3.6%	2.3%
	Rolling Stock Total	-	722	51	7.1%	6%
Equipment*	Automobiles	7	23	4	17.4%	15.0%
	Trucks/Other Rubber Tire Vehicles	7	80	57	71.3%	70%
	Special	4	8	8	100%	n/a
	Maintenance Equipment*	17	219	75	34.0%	n/a
	MIS/IT/Network Systems	5 (software) 7/10 (hardware)	309	182	58.9%	n/a
	Other Systems	6.8	155	24	15.5%	n/a
	Equipment Total	-	639	326	51%	58%
Facilities	Passenger Facilities	n/a	14	0	0.0%	0.0%
	Administration and Maintenance	n/a	4	1	25.0%	23.0%
	Facilities Total	-	18	1	5.6%	5.1%
	Overall	-	1,382	382	27.6%	12.7%

*Under the Equipment category, FTA requires performance measures for service vehicles only. Special vehicles include assets such as forklifts and sweepers. The other performance measure asset classes include assets such as phone systems and security cameras. For the Infrastructure category, the FTA performance measure is only required for a fixed-rail guideway. For the Central Station, the Transfer Center and Office Tower counted separately as passenger facility and administration/maintenance facility respectively.

Source: LYNX Transit Asset Management Plan, September 2018

During the fall of 2017, SunRail developed its SGR targets consistent with Federal guidance. The specific targets (outlined below, including in Figures 3 and 4) were set in a workshop in which all major asset owners and the CEO participated. It is to be noted that SunRail does not need to submit the Equipment SGR target since they do not own or operate any non-revenue equipment. These types of equipment (pick-up trucks, hi-rails, etc.) are owned and operated by Bombardier and Herzog as contractors to SunRail.

Figure 3 - SunRail TAM Performance Measure: Rolling Stock

Fleet	Rebuild Frequency (Yrs.)	Min. Useful Life (Yrs.)	ULB * (Yrs.)	Units in Current Fleet	Age in 2017	Performance Measure	Target
Locomotive	10	25	43	11	23 (NTD:1994)	% met/ exceeded ULB	0% fleet above ULB
Coach Cars	10	25	39	7	3**	% met/ exceeded ULB	0% fleet above ULB
Cab Cars	10	25	39	13	3**	% met/ exceeded ULB	0% fleet above ULB

* 39 is the ULB identified by FTA for locomotives, coach and cab cars.

** Vehicles were built in 2013 and were put into revenue service in 2014.

Source: SunRail Transit Asset Management Plan, October 2018, Table 3-3

Figure 4 - SunRail TAM Performance Measure: Facilities

Asset Type	Total Number	Planning/Funding Useful Life	Age in 2017	Performance Measure	Target
Maintenance Facility (VSMF) and OCC	1	20-60 Years	4	Above 3 on TERM Scale - Physical Inspection	100% of facilities at 3 or above on TERM Scale
Maintenance Facility (VSLMF)	1	20-60 Years	*	Above 3 on TERM Scale - Physical Inspection	100% of facilities at 3 or above on TERM Scale
Stations	12	20-60 Years	3**	Above 3 on TERM Scale - Physical Inspection	100% of facilities at 3 or above on TERM Scale
Park and Ride Lots	8	20 Years	3**	Above 3 on TERM Scale - Physical Inspection	100% of facilities at 3 or above on TERM Scale

* New in 2018 so not included in the inventory

** Construction was underway in 2013 and the stations and park/ride lots opened in 2014.

Source: SunRail Transit Asset Management Plan, October 2018, Table 3-4

As addressed in the SunRail TAM Plan - the target for track, percentage of guideway DRMs with speed restrictions is set at 3%. The rationale for target setting is mainly a result of current performance as well as achievable performance with future expansions. In addition, Equipment performance measures and targets are not applicable as contractor-owned support vehicles are principally used by the contractors for their own use. FDOT pays their share for usage of the equipment through its operating contract, therefore ULBs and target setting are not applicable to SunRail for NTD reporting.

MetroPlan Orlando supports the performance targets established by LYNX and the Central Florida Commuter Rail Commission (SunRail) as shown in Figures 2, 3, and 4. MetroPlan Orlando is working to incorporate this into a written agreement between the transit providers, the MPO, and FDOT. In addition, a committee made up of the Technical Advisory

Committee (TAC), Transportation Systems Management & Operations (TSMO) and Community Advisory Committee (CAC) developed a set of localized performance measures important to the region and addressing rest of the federal aid system. Each performance measure includes an associated listing of the evaluation criteria to quantify these performance measures and targets. Each performance measure and target will be evaluated annually, and presented in a scorecard for the project prioritization process.

Figure 5 - MetroPlan Orlando Performance Measures & Targets

PM	MetroPlan Orlando Performance Measures	Target
1	Evacuation route lane miles per 1,000 household	4 Lane miles per 1,000 households
2	Transportation System miles per person that include more than three (3) of the following (auto, transit, designated bike & sidewalk) designed and functioning up to code	75%
3	Federal Aid System Miles within 20 minutes travel time to Attractions (Auto/Transit)	50%
	Federal Aid System Miles within 20 minutes travel time to Convention Center (Auto/Transit)	
	Federal Aid System Miles within 20 minutes travel time to Regional Airports (Auto/Transit)	
4	Percent of Population within 30 minute travel time to Activity Center (Auto/Transit)	90%
5	Number of Performance Measures or indicators where Environmental Justice Areas fall below the regional measure or indicator	0
6	Percent of Limited Access, Arterials & Freight Corridors with Average Speed / Posted Speed Ratio less than 0.75	100%
7	Total Carbon dioxide equivalent Emissions in million metric tons	3% less than 16.7mT (2016)
	Total Particulate Matter (Highest daily average reading for 2016)	35 µg/m ³
	Total Ozone (in 3 year (2016) fourth highest average in parts per billion)	70 ppb
8	System miles that are actively managed / monitored (TSMO)	50%
9	% of System miles that have documented storm water issues	0%

2040 Regional Vision & Goals

To incorporate the performance-based planning approach, MetroPlan Orlando will now evaluate corridors based on performance measures and an adopted set of targets that reflect the goals and vision of the region.

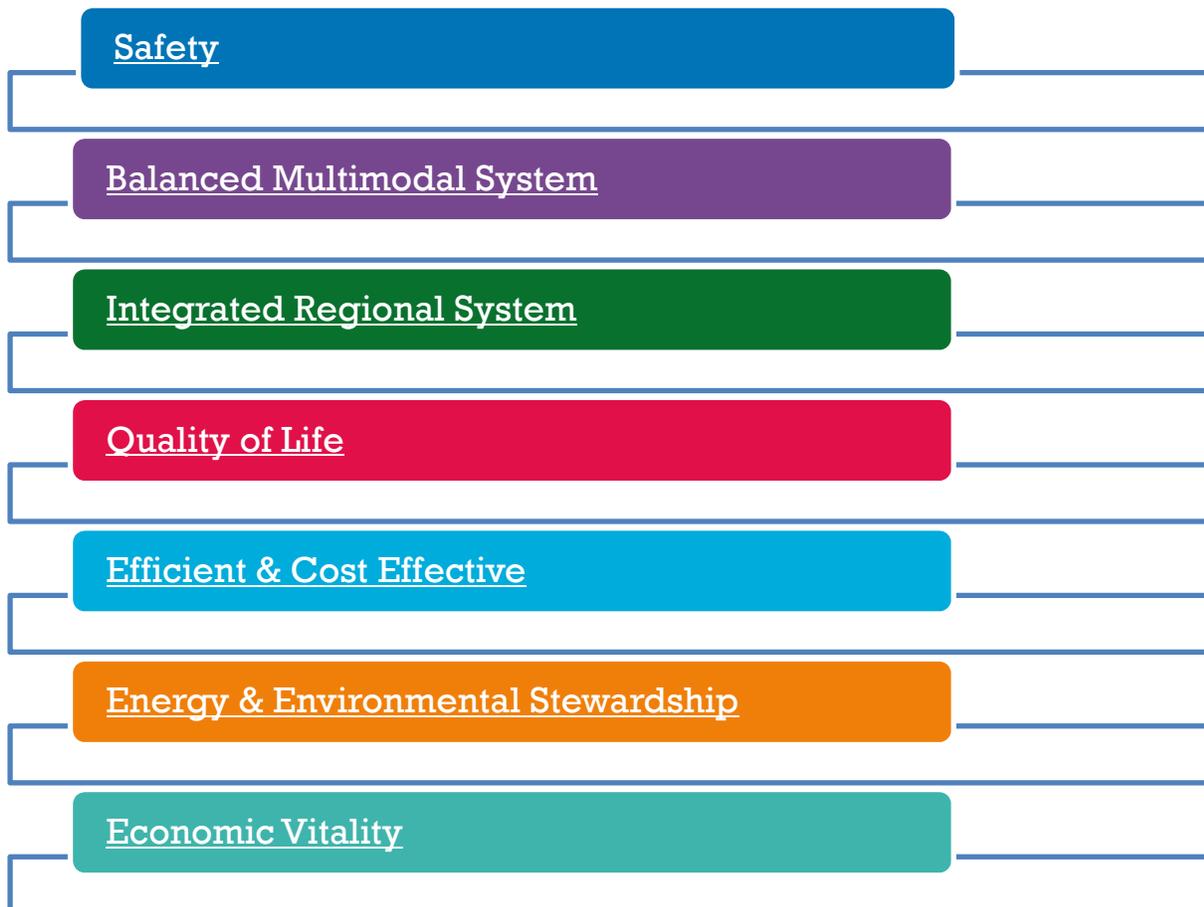
Vision

A regional transportation system that safely and efficiently moves people and goods through a variety of options that support the region's vitality

Mission

To provide leadership in transportation planning by engaging the public and fostering effective partnerships

Consistent with the regional transportation vision, seven overarching goals were established for the 2040 Long Range Transportation Plan (2040 LRTP; Plan Overview). The vision and goals remain unchanged from the 2040 LRTP.



Performance-Based Planning Process

The purpose and intent of the process, is to link the adopted Long Range Transportation Plan goals and the Federal Planning Factors with Performance Measures to develop priorities for mobility projects that help achieve the Regional Vision and Goals.

PERFORMANCE-DRIVEN, OUTCOME-BASED APPROACH TO PLANNING: 450.306(a)

The MPO, in cooperation with the State and public transportation operators, shall develop LRTPs and TIPs through a performance driven, outcome-based approach to planning for metropolitan areas of the State that meet the Federal Planning Factors. The MetroPlan Orlando Performance-Based Planning process will utilize the Tracking the Trends as the required performance monitoring report, supporting the prioritization process as well as showing significant progress toward achieving performance measures and targets. The Tracking the Trends is an annual evaluation of the system's performance. The evaluation will now incorporate both the federal and local performance measures and targets established. The process will now include a technical ranking of corridors within the Central Florida Region based on the performance measures and targets established. The process will use a layering approach to identify the corridors that are not meeting the desired performance measurement and targets established for the region. Top-ranked corridors will be cross-referenced with cost feasible projects from the LRTP and the highest-ranked projects in the plan identified by performance measures and targets will be advanced into the TIP.

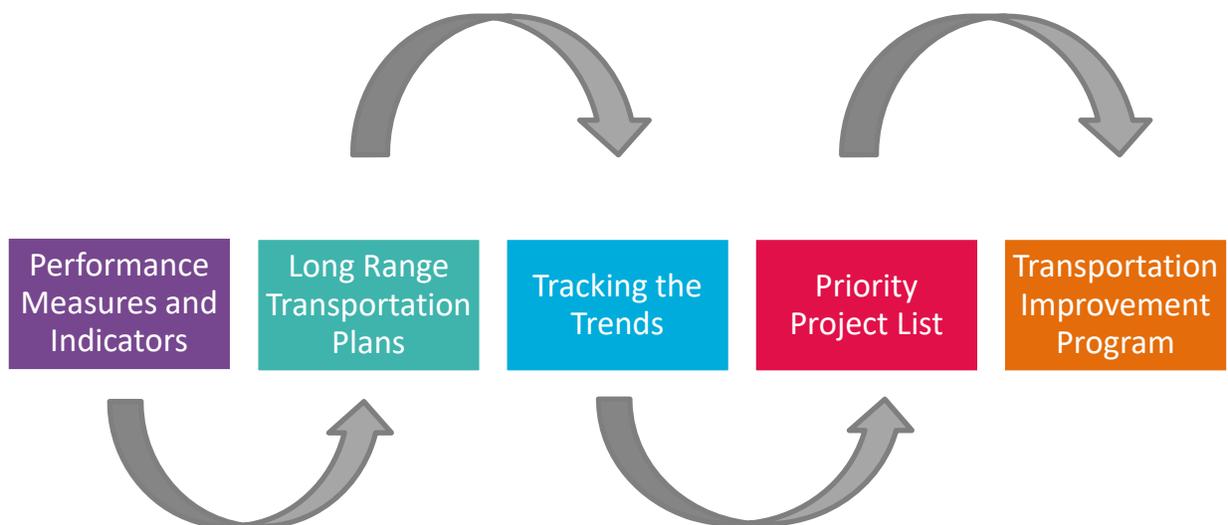


Figure 6 - LRTP, Planning Factors & Performance Measure Linkage

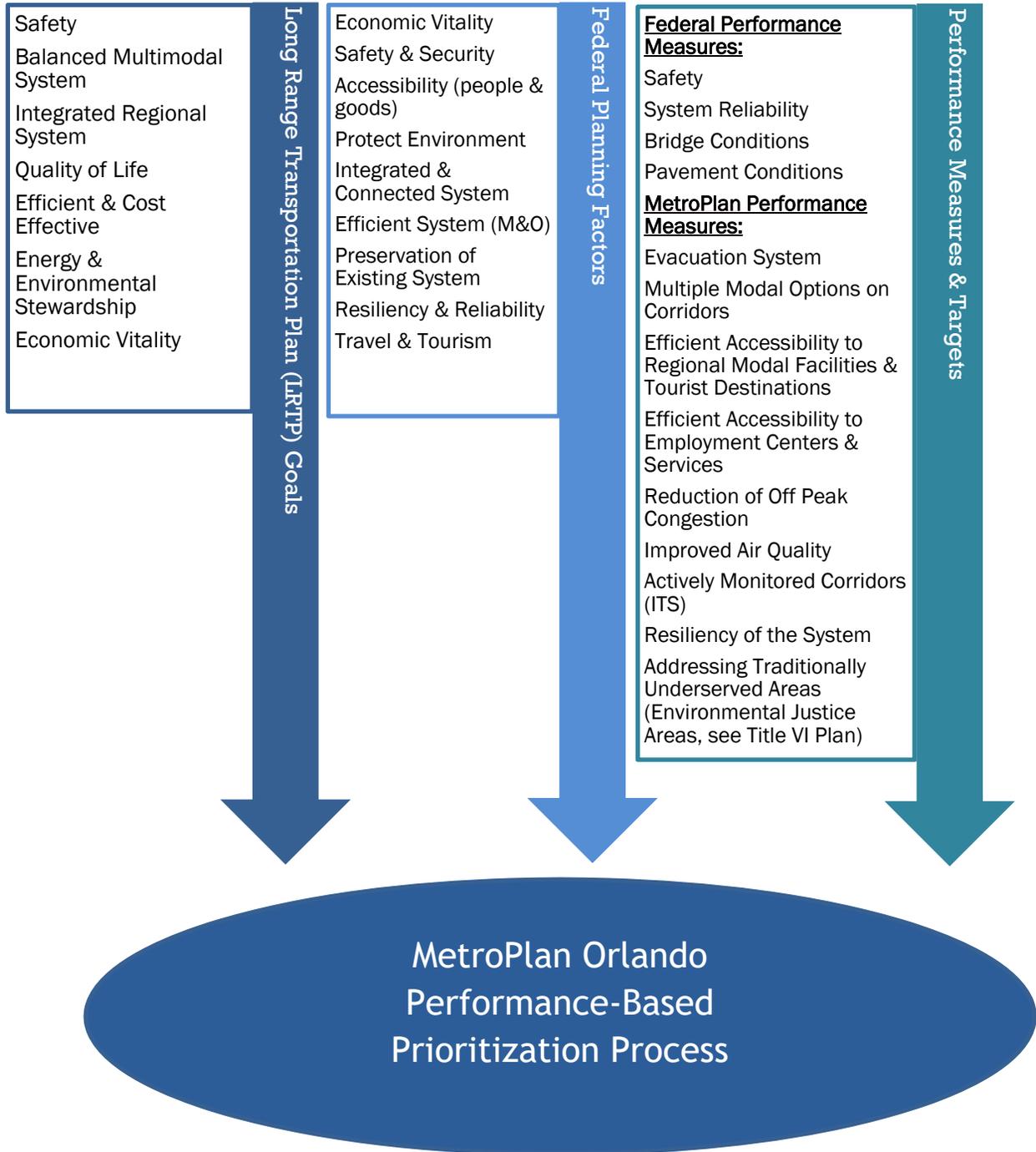
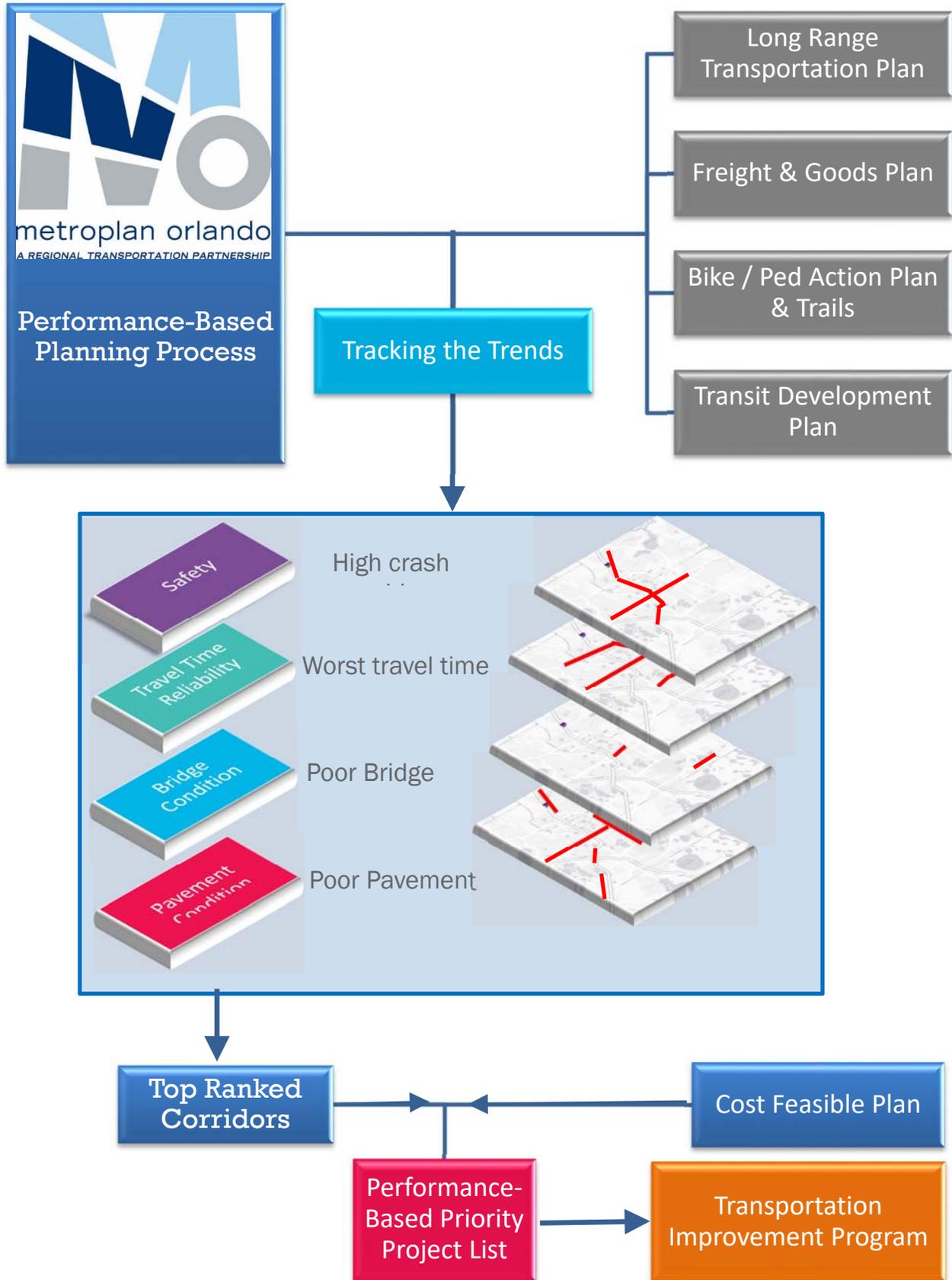


Figure 7 - MetroPlan Orlando Performance-Based Planning Process



Reporting & Performance Monitoring Scorecard

MetroPlan Orlando researches current trends annually to help plan for the region’s transportation needs. Tracking regional trends gives insight into where the transportation system is doing well and what areas need improvement. It also gives an indication of future needs. The Scorecard below will report each performance measure and target for three geographic areas. There will be an evaluation of system performance in the three-county regional planning area, the urbanized area of MetroPlan Orlando and the MetroPlan Orlando Environmental Justice Areas identified in the Title VI Plan located on the [MPO’s website](#). The Scorecard below represents system conditions from the 2015 calendar year. MetroPlan Orlando will develop a new Tracking the Trends in 2019 using 2018 data. Transit Asset Management (TAM) performance measures and targets for LYNX and SunRail are shown in Figures 2, 3, and 4.

Figure 8 - Federal Performance Measures Scorecard

	Federal Performance Measures	Target		MetroPlan Region	MetroPlan Urbanized Area	Environmental Justice Areas	
PM1 - Safety	Number of Fatalities (Motorized)			186	158	44	
	Number of Fatalities (Transit)						
	Number of Fatalities (Bicycle)			11	11	3	
	Number of Fatalities (Pedestrian)			78	74	41	
	Number of Serious Injury (Motorized)	Vision Zero - Zero (0) fatalities, Zero (0) Serious Injuries and Rate of Zero (0) per 100 million VMT			2614	2361	1115
	Number of Serious Injury (Transit)						
	Number of Serious Injury (Bicycle)			119	114	54	
	Number of Serious Injury (Pedestrian)			220	203	109	
	Rate of Fatalities per 100 million vehicle miles of travel (all modes)			0.828	1.406	1.054	
	Rate of Serious Injuries per 100 million vehicle miles of travel (all modes)			11.638	21.005	26.713	
PM2 - Bridge & Pavement Condition	Percent of National Highway Bridges in Good condition	> 60% in good condition & < 5% in poor condition		99.18			
	Percent of National Highway Bridges in Poor condition			0.82			
	Percent of interstate pavement in Good condition	> 40% in good condition & < 5% in poor condition		100%			
	Percent of interstate pavement in Poor condition			0%			
	Percent of non-interstate pavement in Good condition	> 50% in good condition & < 10% in poor condition		94.90%			
	Percent of non-interstate pavement in Poor condition			5.10%			
PM3 - System Performance	Travel Time Reliability – Percent of interstate providing reliable travel times	70% reliable		52%			
	Travel Time Reliability – Percent of non- interstate providing reliable travel times	50% reliable		84%			
	Truck Travel Time Reliability Index	2		2.62			
<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <p style="text-align: center;">LEGEND</p> <ul style="list-style-type: none"> Meets the target Less than the target Exceeds the target Measure that needs to be reduced </div>							

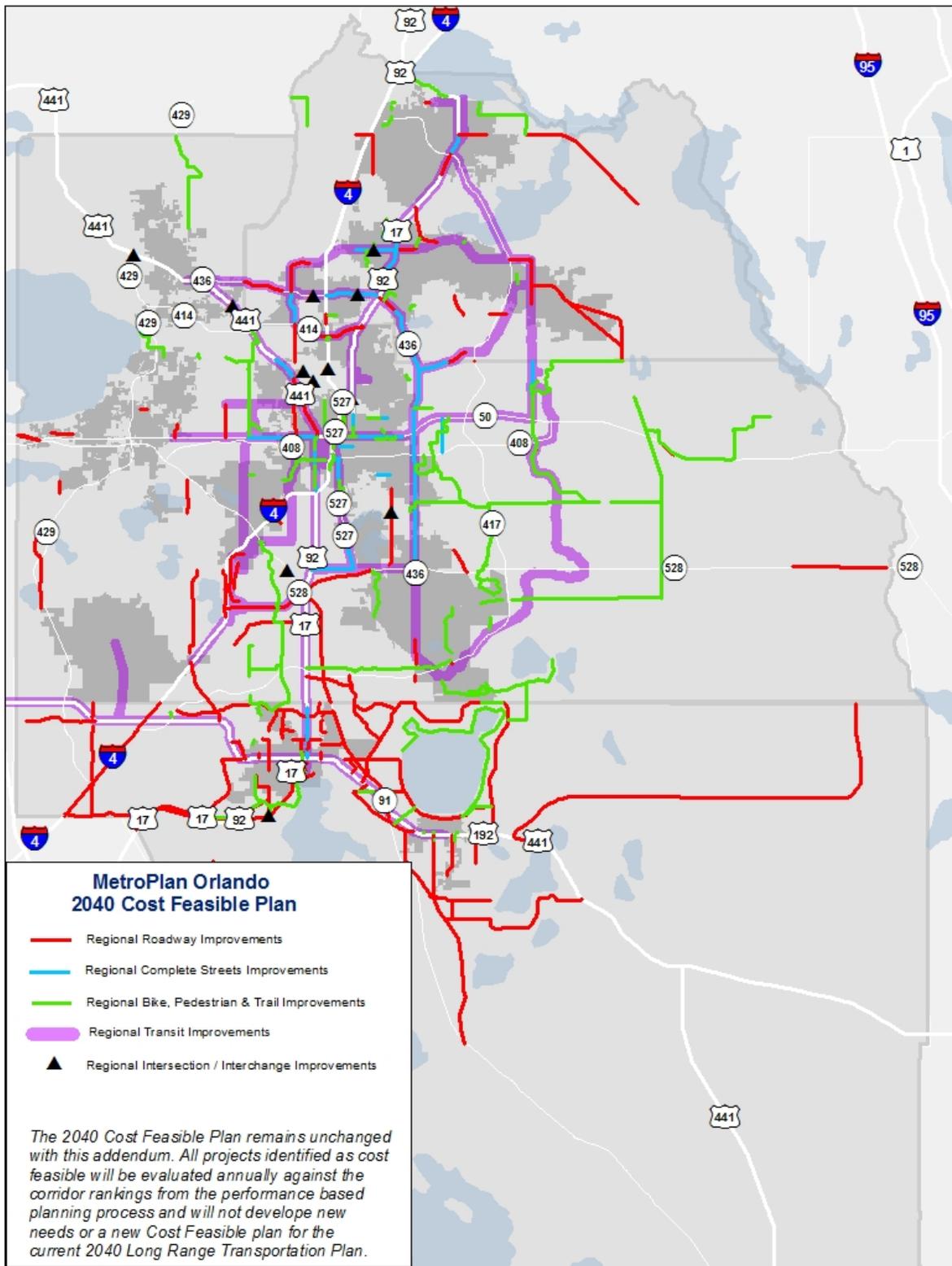
Figure 9 - MetroPlan Orlando Performance Measures Scorecard

	MetroPlan Orlando Performance Measures	Target		MetroPlan Region	MetroPlan Urbanized	Environmental Justice Areas		
1	Evacuation route lane miles per 1,000 household	4 Lane miles per 1,000 households	-	2.480	<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">LEGEND</div> <div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="width: 15px; height: 10px; background-color: #add8e6; border: 1px solid black; margin-right: 5px;"></div> Meets the target </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="width: 15px; height: 10px; background-color: #ff4500; border: 1px solid black; margin-right: 5px;"></div> Less than the target </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="width: 15px; height: 10px; background-color: #90ee90; border: 1px solid black; margin-right: 5px; text-align: center; line-height: 10px; font-size: 8px;">+ Exceeds the target </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 10px; background-color: #ff69b4; border: 1px solid black; margin-right: 5px;"></div> Measure that needs to be reduced </div> </div> </div>			
2	Transportation System miles that include more than three (3) of the following (auto, transit, designated bike & sidewalk) designed and functioning up to code per Person	75%		Data not available				
3	Federal Aid System Miles within 20 minutes travel time to Attractions (Auto/Transit)		-	29.40%				
	Federal Aid System Miles within 20 minutes travel time to Convention Center (Auto/Transit)	50%	-	17.84%				
	Federal Aid System Miles within 20 minutes travel time to Regional Airports (Auto/Transit)		-	21.44%				
4	Percent of Population within 30 minute travel time to Activity Center (Auto/Transit)	90%	+	90.42%			87.36%	92.60%
5	Number of Performance Measures or indicators where Environmental Justice Areas fall below the regional measure or indicator	0	-	7				
6	Percent of Limited Access, Arterials & Freight Corridors with Average Speed / Posted Speed Ratio less than 0.75	100%		Data not available				
7	Total Carbon dioxide equivalent Emissions in million metric tons	3% less than 16.7mT (2016)	+	16.2 mT				
	Total Particulate Matter (Highest daily average reading for 2016)	35 µg/m3	+	27.5 µg/m3				
	Total Ozone (in 3 year (2016) fourth highest average in Parts per billion)	70 ppb	+	62 ppb				
8	System miles that are actively managed / monitored (TSMO)	50%	-	30%				
9	% of System miles that have documented storm water issues	0%	-	Data not available				

Moving Forward with Performance-Based Planning

MetroPlan Orlando embraces and supports the Planning Requirements outlined in the Federal Legislation. Incorporating the process does not change the adopted 2040 Long Range Transportation Plan Goals or resulting Cost Feasible Plan (https://metroplanorlando.org/wp-content/uploads/6_TR3_PlanDevelopmentCostFeasibleProjects_061417_Amendments-1.pdf). It merely enhances the transparency of the planning and prioritization process for the local government partners, elected officials, and public. The adopted process will be used to further support a balanced system and implement the 2040 Long Range Transportation Plan. The process will remain the same, but MetroPlan Orlando will be beginning the development of the 2045 Metropolitan Transportation Plan (MTP) in early 2019, and the goals and performance measures may change to support the vision of Central Florida.

Figure 10 - Adopted 2040 Cost Feasible Project Map



Appendix A – FDOT Performance Measures Fact Sheets

- MPO Planning Requirements
- Performance Measure 1: Safety
- Performance Measure 2: Bridge & Pavement
- Performance Measure 3: System Performance
- Transit Asset Management (TAM)

Figure 11 - MPO Planning Requirements (FDOT Fact Sheet)

MPO Requirements



MAP-21 Performance Management

June 2018

OVERVIEW

Between 2016 and 2017, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) published several rules establishing performance measures and reporting requirements for State Departments of Transportation (DOTs), Metropolitan Planning Organizations (MPOs), and transit agencies. This document highlights key provisions of these rules and their implications for Florida’s MPOs. It also provides a timeline, reporting requirements and options for target setting.

PLANNING RULE FRAMEWORK

FHWA and FTA jointly issued a Planning Rule to document changes in the statewide and metropolitan planning processes consistent with the Moving Ahead for Progress in the 21st Century (MAP-21) Act and the Fixing America’s Surface Transportation (FAST) Act. Among other changes, this rule specifies the requirements for State DOTs and MPOs to implement a performance-based approach to planning and programming. Under this framework, the three FHWA Performance Measures (PM) rules and FTA transit rule established various performance measures required to monitor the performance of safety (PM1), bridge and pavement (PM2), system performance (PM3), and transit asset management (TAM). The rules also indicate how MPOs should set targets, report progress, and integrate performance management into their Long-Range Transportation Plans (LRTPs) and Transportation Improvement Programs (TIPs).



Long-Range Transportation Plans

The Planning Rule specifies how performance management is incorporated into the MPO’s LRTP. The LRTP must:

- » Describe the performance measures and performance targets used in assessing the performance of the transportation system.
- » Include a System Performance Report that:
 - Evaluates the condition and performance of the transportation system with respect to performance targets.
 - Documents the progress achieved by the MPO in meeting the targets in comparison to performance recorded in past reports.
- » Integrate the goals, objectives, performance measures, and targets described in all the plans and processes required as part of a performance-based program.

Transportation Improvement Programs

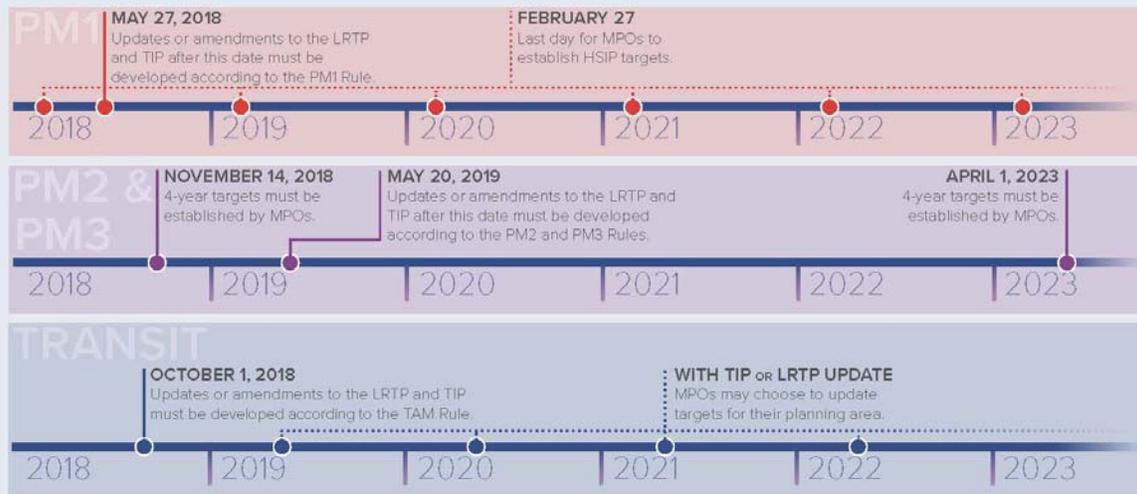
MPO TIPs shall:

- » Reflect the investment priorities established in the current metropolitan transportation plan.
- » Be designed such that once implemented, it makes progress toward achieving the performance targets established.
- » Include, to the maximum extent practicable, a description of the anticipated effect of the TIP toward achieving the performance targets identified in the metropolitan transportation plan, linking investment priorities to those performance targets.

FDOT and the Metropolitan Planning Organization Advisory Council (MPOAC) have developed model language for inclusion of performance measures and targets in the LRTPs and TIPs

*Please refer to the four accompanying fact sheets to obtain key information for the three FHWA performance measures rules and FTA transit rule.

TIMELINE



TARGET SETTING OPTIONS

The Florida Department of Transportation (FDOT), the MPOs, and providers of public transportation will set their respective performance targets in coordination with one another. Each MPO will establish a target for each applicable federally required performance measure. MPOs should establish their targets through existing processes such as the TIP and LRTP update. For the TAM measures, MPOs will set their own target in coordination with transit agencies and FDOT. For the PM1, PM2, and PM3 measures, each MPO will have the option of establishing a target by one of two options:

Support the statewide target established by FDOT.

If the MPO chooses to support the statewide target, the MPO should provide documentation to FDOT stating that the MPO agrees to plan and program projects so that they contribute toward the accomplishments of FDOT's statewide target for that performance measure.

OR

Set own target, using a quantifiable methodology for MPO planning area.

If the MPO chooses to set its own target, the MPO will develop the target in coordination with FDOT. The MPO will provide documentation to FDOT that includes the target adopted by the MPO board and when it was set.

MPOs must provide the selected option to FDOT no later than 180 days after FDOT sets its target.

ASSESSMENT OF SIGNIFICANT PROGRESS

While FHWA will determine whether FDOT has met or made significant progress toward meeting the adopted targets, it will not directly assess MPO progress toward meeting their targets. However, FHWA will review MPO performance relative to targets as part of periodic transportation planning process reviews, including the MPO certification reviews and reviews of adopted and amended LRTPs and adopted and amended MPO TIPs.

FOR MORE INFORMATION PLEASE CONTACT

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Figure 12 - PM1 - Safety (FDOT Fact Sheet)

PM1: Safety



MAP-21 Performance Management

June 2018

OVERVIEW

The first of the performance measures rules issued by Federal Highway Administration (FHWA) became effective on April 14, 2016, establishing measures to assess the condition of road safety. This fact sheet summarizes the requirements of this rule and the targets that the Florida Department of Transportation (FDOT) selected to meet them.*

PERFORMANCE MEASURES – APPLICABLE TO ALL PUBLIC ROADS

NUMBER OF FATALITIES	The total number of persons suffering fatal injuries in a motor vehicle crash during a calendar year.	COORDINATION WITH OTHER PLANS FDOT's Florida Transportation Plan and Metropolitan Planning Organization's (MPO) Long-Range Transportation Plans (LRTPs) updated on or after May 27, 2018 must include safety performance measures and targets. Statewide Transportation Improvement Programs (STIPs) and Transportation Improvement Programs (TIPs) updated on or after May 27, 2018 must include a description of how the STIP/TIP contributes to achieving performance targets in the LRTP.
RATE OF FATALITIES	The ratio of total number of fatalities to the number of vehicle miles traveled (VMT) in a calendar year.	
NUMBER OF SERIOUS INJURIES	The total number of persons suffering at least one serious injury in a motor vehicle crash during a calendar year.	
RATE OF SERIOUS INJURIES	The ratio of total number of serious injuries to the number of VMT (in 100 million VMT) in a calendar year.	
NUMBER OF NON-MOTORIZED FATALITIES AND NON-MOTORIZED SERIOUS INJURIES	The combined total number of non-motorized fatalities and non-motorized serious injuries involving a motor vehicle during a calendar year.	

TIMELINE



The timeline shows key dates from 2018 to 2023. Blue dots represent FDOT actions, and purple dots represent MPO actions.

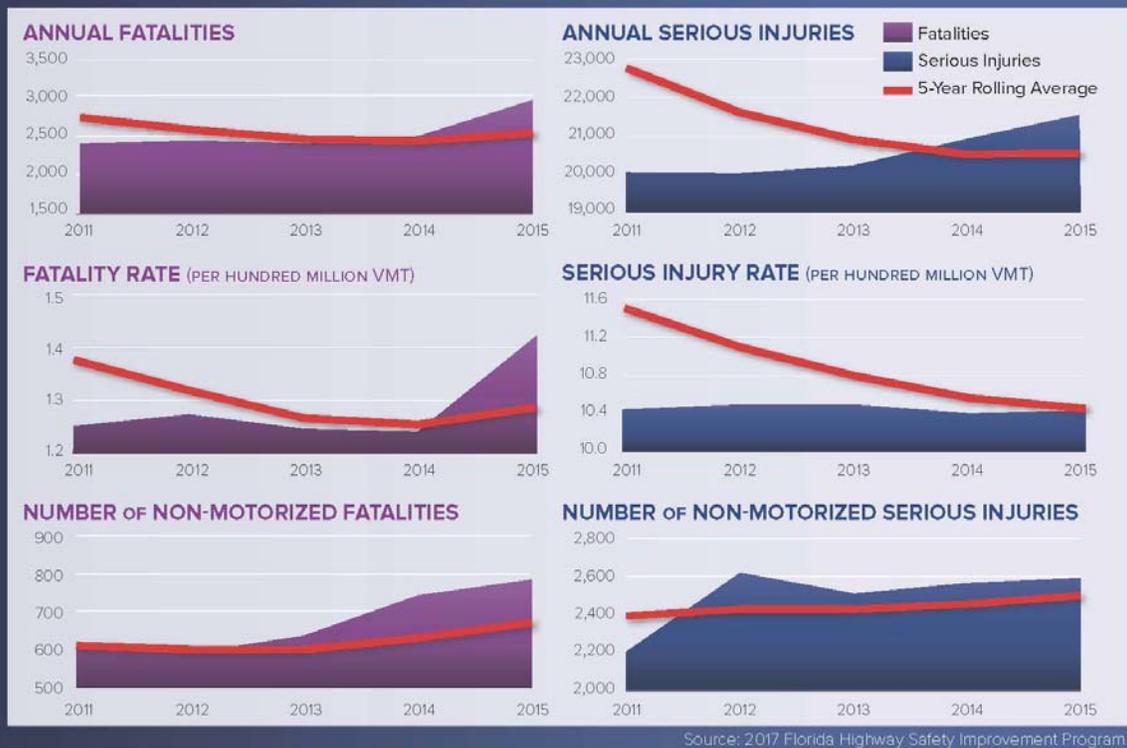
- MAY 27, 2018 (MPOs):** MPO Updates or amendments to the LRTP and TIP must be developed according to the PM1 Rule.
- NO LATER THAN AUGUST 31 (Annually) (FDOT):** FDOT Safety Office updates targets for all five measures in its Highway Safety Improvement Program (HSIP) to FHWA.
- FEBRUARY 27 (Annually) (MPOs):** Last day for MPOs to establish HSIP targets (no later than 180 days after FDOT sets targets).

* Please refer to the fact sheet addressing *MPO Requirements* for information about MPO targets and planning processes.

2040 Long Range Transportation Plan: Performance-Based Planning Addendum

20

EXISTING STATEWIDE CONDITIONS



STATEWIDE TARGETS

- » FDOT established statewide targets for calendar year 2018 in the Highway Safety Plan (submitted on July 1, 2017) and HSIP Annual Report (submitted on August 31, 2017), and will update **annually** thereafter.
- » Targets are applicable to all public roads regardless of functional classification or ownership.

Given FDOT's firm belief that every life counts, **the target set for all safety performance measures is ZERO.**

Based on statistical forecasting, the five-year rolling average for each performance measure for 2018 is projected to be 3,052 fatalities, 1.65 fatalities per 100 million VMT, 20,861 serious injuries, 11.06 serious injuries per 100 million VMT, and 3,447 non-motorized fatalities and serious injuries.

MPO TARGETS

If an MPO decides to establish its own targets, it has 180 days after FDOT reports its targets on the HSIP Annual Report.

This means that MPOs would need to report their safety targets no later than February 27 **every year.**

ASSESSMENT OF SIGNIFICANT PROGRESS

FHWA considers a State to have met or made significant progress when at least four out of the five safety performance targets are met or the actual outcome for the safety performance target is better than baseline performance.

If FHWA determines that FDOT has not met or made significant progress toward meeting safety performance targets, FDOT must: 1) use a portion of its obligation authority only for HSIP projects, and 2) submit an annual implementation plan that describes actions FDOT will take to meet their targets.

FHWA will not directly assess MPO progress toward meeting their targets. Rather, it will do so through the periodic transportation planning reviews, including the MPO certification reviews and reviews of adopted/amended L RTPs and TIPs.

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Figure 13 - PM2 - Bridge & Pavement (FDOT Fact Sheet)

PM2: Bridge and Pavement



MAP-21 Performance Management

June 2018

OVERVIEW

The second of the performance measures rules issued by Federal Highway Administration (FHWA) became effective on May 20, 2017, establishing measures to assess the condition of the pavements and bridges on the National Highway System (NHS). This fact sheet summarizes the requirements of this rule and the targets Florida Department of Transportation (FDOT) selected to meet them.*

PAVEMENT PERFORMANCE MEASURES

- » Percentage of pavements on the Interstate System in *GOOD* condition.
- » Percentage of pavements on the Interstate System in *POOR* condition.
- » Percentage of pavements on the non-Interstate NHS in *GOOD* condition.
- » Percentage of pavements on the non-Interstate NHS in *POOR* condition.

BRIDGE PERFORMANCE MEASURES

- » Percentage of NHS bridges by deck area classified as in *GOOD* condition.
- » Percentage of NHS bridges by deck area classified as in *POOR* condition.

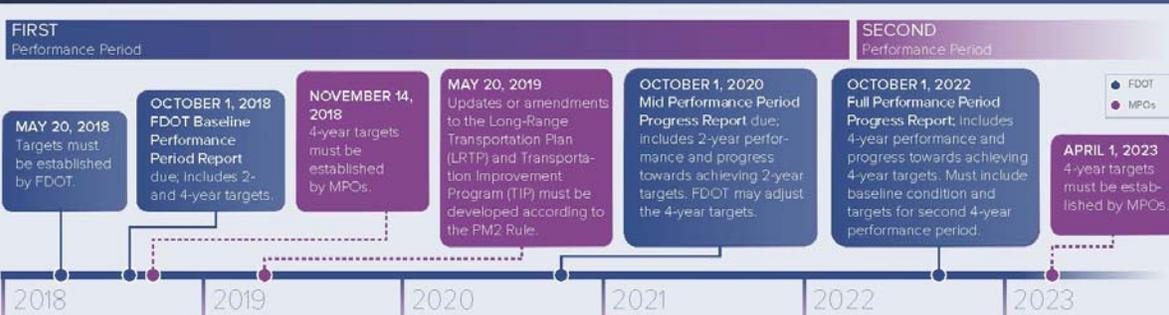
GOOD CONDITION

Suggests no major investment is needed.

POOR CONDITION

Suggests major investment is needed.

TIMELINE



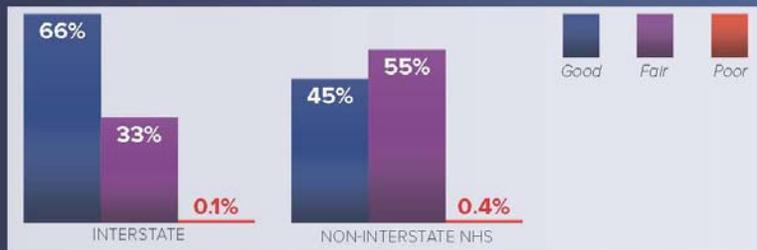
The timeline is divided into two performance periods: **FIRST Performance Period** (2018-2020) and **SECOND Performance Period** (2021-2023). Key milestones include:

- MAY 20, 2018:** Targets must be established by FDOT.
- OCTOBER 1, 2018:** FDOT Baseline Performance Period Report due, includes 2- and 4-year targets.
- NOVEMBER 14, 2018:** 4-year targets must be established by MPOs.
- MAY 20, 2019:** Updates or amendments to the Long-Range Transportation Plan (L RTP) and Transportation Improvement Program (TIP) must be developed according to the PM2 Rule.
- OCTOBER 1, 2020:** Mid Performance Period Progress Report due; includes 2-year performance and progress towards achieving 2-year targets. FDOT may adjust the 4-year targets.
- OCTOBER 1, 2022:** Full Performance Period Progress Report; includes 4-year performance and progress towards achieving 4-year targets. Must include baseline condition and targets for second 4-year performance period.
- APRIL 1, 2023:** 4-year targets must be established by MPOs.

* Please refer to the fact sheet addressing *MPO Requirements* for information about MPO targets and planning processes.

EXISTING STATEWIDE CONDITIONS

Pavement (Flexible and Rigid Combined)



NHS Bridge Deck Area



Source: FDOT State Materials Office and Maintenance Office.

STATEWIDE TARGETS

FDOT established 2- and 4-year targets on May 18, 2018 for the full extent of the NHS in Florida. Two-year targets reflect the anticipated performance level at the mid point of each performance period, while 4-year targets reflect it for the end of the performance period. FDOT is also responsible for developing an Asset Management Plan, intended to manage NHS pavement and bridge assets.

Performance Measure	2-Year Target	4-Year Target
Pavement		
% of Interstate pavements in GOOD condition	Not Required	≥ 60%
% of Interstate pavements in POOR condition	Not Required	≤ 5%
% of non-Interstate NHS pavements in GOOD condition	≥ 40%	≥ 40%
% of non-Interstate NHS pavements in POOR condition	≤ 5%	≤ 5%
Bridge		
% of NHS bridges by deck area classified as in GOOD condition	≥ 50%	≥ 50%
% of NHS bridges by deck area classified as in POOR condition	≤ 10%	≤ 10%

MPO TARGETS

If a Metropolitan Planning Organization (MPO) decides to establish its own target, it has 180 days after FDOT sets its 4-year statewide targets. This means that MPOs would need to report their bridge and pavement targets no later than November 14, 2018 for the first performance period. For the second performance period and onwards, MPO targets would be reported every 4 years starting on April 1, 2023.

ASSESSMENT OF SIGNIFICANT PROGRESS

On August 16, 2020 and every two years thereafter, FHWA will determine that FDOT has made significant progress toward the achievement of each 2-year or 4-year applicable statewide target if either:

- » The actual condition/performance level is better than the baseline condition/performance; or
- » The actual condition/performance level is equal to or better than the established target.

If FDOT does not make significant progress, it must document the actions it will take to achieve the target. FHWA will not directly assess MPO progress toward meeting their targets. Rather, it will do so through the periodic transportation planning reviews, including the MPO certification reviews and reviews of adopted/amended LRTPs and TIPs.

MINIMUM CONDITIONS

Every year, FHWA will assess if FDOT is meeting the statewide minimum condition requirements. If it is not, FDOT must obligate funds to meet minimum requirements.

FDOT IS ON TRACK TO MEET MINIMUM CONDITION REQUIREMENTS

- » **Pavement:** No more than 5 percent of the Interstate System in **Poor** condition for most recent year. ✓
- » **Bridge:** No more than 10 percent of total deck area of NHS bridges classified as Structurally Deficient (**Poor** condition) for three consecutive years. ✓

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Figure 14 - PM3 - System Performance (FDOT Fact Sheet)

PM3: System Performance



MAP-21 Performance Management

June 2018

OVERVIEW

The third of the three performance measures rules issued by Federal Highway Administration (FHWA) became effective on May 20, 2017, establishing measures to assess the performance of the National Highway System (NHS), freight movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program (CMAQ). This fact sheet summarizes the requirements of this rule and the targets that the Florida Department of Transportation (FDOT) selected to meet them.*

PERFORMANCE MEASURES

Performance Measure	Typically Referred to As	What It Measures
Percent of Person-Miles Traveled on the Interstate that Are Reliable	Interstate Reliability	Seeks to assess how reliable the NHS network is by creating a ratio (called level of travel time reliability, or LOTTR) that compares the worst travel times on a road against the travel time that is typically experienced. Road miles with a LOTTR less than 1.5 are considered reliable.
Percent of Person-Miles Traveled on the Non- Interstate NHS that Are Reliable	Non-Interstate Reliability	Traffic volume and an average vehicle occupancy are factored in to determine the person miles that are reliable, and this is converted to a percent of total miles.
Truck Travel Time Reliability (TTTR) Index	Freight Reliability	Seeks to assess how reliable the Interstate network is for trucks by creating a ratio (called Truck Travel Time Reliability, or TTTR) that compares the very worst travel times for trucks against the travel time they typically experience.

This rule also contains measures addressing the Congestion Mitigation and Air Quality Improvement (CMAQ) Program. These are applicable only for areas that are designated as nonattainment or maintenance, of which Florida currently has none. Therefore, they are currently not applicable to Florida or any of its Metropolitan Planning Organizations (MPOs).

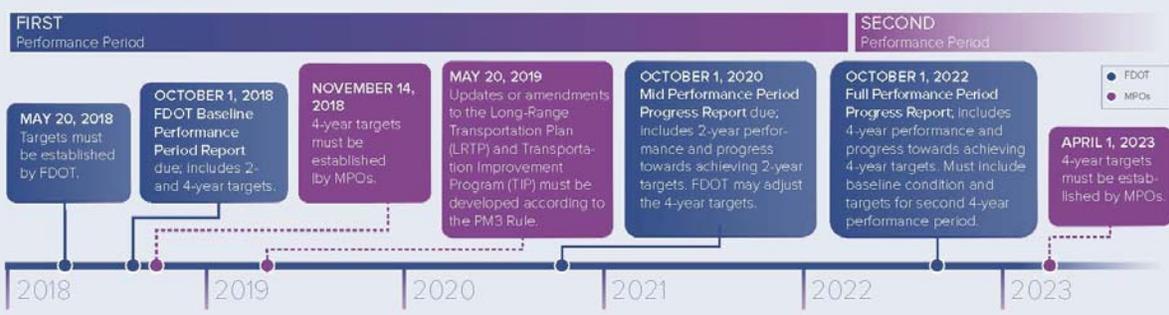
TIMELINE

FIRST Performance Period

- MAY 20, 2018**
Targets must be established by FDOT.
- OCTOBER 1, 2018**
FDOT Baseline Performance Period Report due; includes 2- and 4-year targets.
- NOVEMBER 14, 2018**
4-year targets must be established by MPOs.
- MAY 20, 2019**
Updates or amendments to the Long-Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP) must be developed according to the PM3 Rule.

SECOND Performance Period

- OCTOBER 1, 2020**
Mid Performance Period Progress Report due; includes 2-year performance and progress towards achieving 2-year targets. FDOT may adjust the 4-year targets.
- OCTOBER 1, 2022**
Full Performance Period Progress Report; includes 4-year performance and progress towards achieving 4-year targets. Must include baseline condition and targets for second 4-year performance period.
- APRIL 1, 2023**
4-year targets must be established by MPOs.



* Please refer to the fact sheet addressing MPO Requirements for information about MPO targets and planning processes.

EXISTING STATEWIDE CONDITIONS

INTERSTATE

Percent of the Person-Miles Traveled on the Interstate that Are Reliable in 2017



NON-INTERSTATE

Percent of the Person-Miles Traveled on the Non-Interstate NHS that Are Reliable in 2017



TRUCK

Truck Travel Time Reliability Index (Interstate) in 2017



Note: a higher TTTR Index means lower reliability.

Source: NPMRDS and FHWA Occupancy Factor.

STATEWIDE TARGETS

FDOT established the following 2- and 4-year targets on May 18, 2018. Two-year targets reflect the anticipated performance level at the mid point of each performance period, while 4-year targets reflect it for the end of the performance period.

Performance Measure	2-Year Target	4-Year Target
Interstate Reliability	75%	70%
Non-Interstate Reliability	Not Required	50%
Freight Reliability	1.75	2.00

MPO TARGETS

If a Metropolitan Planning Organization (MPO) decides to establish its own targets, it has 180 days after FDOT sets its 4-year statewide targets. This means that MPOs would need to report their system performance targets no later than November 14, 2018 for the first performance period. For the second performance period and onwards, MPO targets would be reported every 4 years starting on April 1, 2023.

ASSESSMENT OF SIGNIFICANT PROGRESS

On August 16, 2020 and every two years thereafter, FHWA will determine that FDOT has made significant progress toward the achievement of each 2-year or 4-year applicable statewide target if either:

- » The actual condition/performance level is better than the baseline condition/performance; or
- » The actual condition/performance level is equal to or better than the established target.

If FDOT does not make significant progress for the Interstate and Non-Interstate reliability measures, it must document the actions it will take to achieve the target. For the freight reliability measure, it must provide additional documentation. FHWA will not directly assess MPO progress toward meeting their targets. Rather, it will do so through the periodic transportation planning reviews, including the MPO certification reviews and reviews of adopted/amended LRTPs and TIPs.

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Figure 15 - TAM - Transit Asset Management (FDOT Fact Sheet)

TRANSIT Asset Management



MAP-21 Performance Management

June 2018

OVERVIEW

The Transit Asset Management rule from the Federal Transit Administration (FTA) became effective on October 1, 2016. This rule applies to all recipients and subrecipients of Federal transit funding that own, operate, or manage public transportation capital assets. The rule introduces three key requirements: 1) new State of Good Repair (SGR) performance measures and targets, 2) revised National Transit Database (NTD) reporting requirements, and 3) new Transit Asset Management (TAM) Plan.

STATE OF GOOD REPAIR PERFORMANCE MEASURES

Transit agencies are required to report performance measures and targets annually, while Metropolitan Planning Organizations (MPOs) do not have to do so every year. However, in consultation with Florida Department of Transportation (FDOT) and transit providers, MPOs may choose to revise or maintain their performance targets when they update their Transportation Improvement Programs (TIPs) or Long-Range Transportation Plans (LRTPs) regardless of the frequency of those updates. Consistent with best practices, MPOs are encouraged to consult and communicate with State DOTs and transit providers to ensure alignment of targets any time these agencies update or establish new targets.

Transit Asset Categories and Related Performance Measures

FTA Asset Categories	Type of Measure	Performance Measures
EQUIPMENT Non-revenue support-service and maintenance vehicles	Age	Percentage of non-revenue, support-service and maintenance vehicles that have met or exceeded their useful life benchmark (ULB)
ROLLING STOCK Revenue vehicles	Age	Percentage of revenue vehicles within a particular asset class that have either met or exceeded their ULB
INFRASTRUCTURE Rail fixed-guideway track	Performance	Percentage of track segments with performance restrictions
FACILITIES Buildings and structures	Condition	Percentage of facilities within an asset class rated below condition 3 on the TERM scale

Targets should be supported by the most recent condition data and reasonable financial projections. These are reported annually to the National Transit Database (NTD).

“State of good repair” is defined as the condition in which a capital asset is able to operate at a full level of performance. This means the asset:

1. Is able to perform its designed function.
2. Does not pose a known unacceptable safety risk.
3. Its lifecycle investments have been met or recovered.

REVISED NATIONAL TRANSIT DATABASE REPORTING REQUIREMENTS

Starting in the 2018 reporting year, FDOT and transit agencies must submit the following information to the NTD:

- » **NTD ASSET INVENTORY MODULE (AIM)** with expanded data on the condition of transit assets in four asset classes, plus performance targets indicating the expected level of performance in one year; and
- » **NTD NARRATIVE REPORT (due in 2019)** with a description of progress toward previous year’s targets, reasons for any discrepancies, and expected changes in condition over the next year given investments being made in SGR.

TAM PLAN

By October 1, 2018 (two years from effective date of the Final Rule), providers must adopt their first Transit Asset Management Plan (TAM Plan). The plan must be updated every four years.

Tier I versus Tier II Agencies

The rule makes a distinction between Tier I and Tier II transit providers and establishes different requirements for them.

TIER I

≥ 101 vehicles across **ALL** fixed route modes

OR

≥ 101 vehicles in **ONE** non-fixed route mode

OR

Operates rail

TIER II

≤ 100 vehicles across **ALL** fixed route modes

OR

≤ 100 vehicles in **ONE** non-fixed route mode

OR

Subrecipient of 5311 funds

OR

Native American Tribe

FDOT Group Plan Efforts

- » FDOT is in the process of developing a group plan for all subrecipients.
- » This group plan will be submitted by October 1, 2018.
- » FDOT will also set collective targets for subrecipients in collaboration with transit agencies and MPOs.

TAM Plan Elements

1. Inventory of Capital Assets **ALL PROVIDERS**
2. Condition Assessment **ALL PROVIDERS**
3. Decision Support Tools (Tiers I and II)
4. Investment Prioritization
5. TAM and SGR Policy **TIER I ONLY**
6. Implementation Strategy **TIER I ONLY**
7. List of Key Annual Activities
8. Identification of Resources
9. Evaluation Plan

Group Plans

- » A Tier I provider must develop its own TAM Plan.
- » Tier II agencies may develop their own plans or participate in a group TAM plan, which is compiled by a group TAM plan sponsor.
- » State Departments of Transportation (DOTs) that pass FTA funds to subrecipients are required to be group TAM plan sponsors.
- » The unified targets and narrative report for group plan participants will be submitted on behalf of all participating agencies by the sponsor.
- » Group plan sponsors must make the group plan, targets, and supporting materials available to the State DOTs and MPOs that program projects for any participants of the group plan.

MPO COORDINATION

MPOs should incorporate TAM performance measures and targets in their LRTP and TIP. They may also choose to adopt their performance targets when they update these two documents. This process should be documented in a written agreement between the transit providers, the MPO, and FDOT.

MPOs' compliance and progress will be evaluated during the MPO Certification Reviews

TIMELINE



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Appendix B – Transit Asset Management Plans

- Central Florida Regional Transportation Authority (LYNX)
- Central Florida Commuter Rail Commission (SunRail)



Transit Asset Management Plan for Central Florida Regional Transportation Authority (d.b.a. LYNX)

September, 2018



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Revision History

Revision	Revision Date	Details	Authorized	Name	Position

Distribution List

# Hard Copies	PDF Required	Association / Company Name

Prepared for:

The Central Florida Regional Transportation Authority (d.b.a. LYNX)

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Acronyms and Abbreviations

ADA	Americans with Disabilities Act
CCTV	Closed-Circuit Television
CFRTA	Central Florida Regional Transit Authority
CEO	Chief Executive Officer
CNG	Compressed Natural Gas
d.b.a.	doing business as
ERP	Enterprise Resource Planning
FDOT	Florida Department of Transportation
FTA	Federal Transit Administration
FY	Fiscal Year
HVAC	Heating, Ventilation, and Air-Conditioning
IT	Information Technology
LOC	LYNX Operations Center
O&M	Operations and Maintenance
OSOTA	Orange-Seminole-Osceola Transportation Authority
SGR	State of Good Repair
Southern Operations Facility	LYNX Southern Operations, Maintenance, and Transportation Training Center
TAM	Transit Asset Management
TAP	Transit Access Pass
TDP	Transit Development Plan
TERM	Transit Economic Requirements Model
ULB	Useful Life Benchmark

Executive Summary

The Transit Asset Management (TAM) Rule is a set of federal (49 Code of Federal Regulations [CFR] part 625) regulations that sets out minimum asset management practices to guide transit providers on how to manage capital assets and prioritize funding to improve or maintain assets in a state of good repair (SGR). Requiring agencies to develop TAM Plans and set performance targets will lower long-term maintenance costs for each individual transit agency and ultimately decrease the national budget dedicated to repair or replacement of public transportation assets.

A TAM Plan tracks system performance and conditions that will be used to develop strategies for efficiently managing assets for a SGR in addition to maintaining funding eligibility. As outlined in the TAM Final Rule, each fiscal year (FY) that a transit agency receives or provides federal assistance to any public transportation operator, the agency is required to report information on the condition of its public transportation assets as provided in Federal Transit Administration (FTA) regulations, "Transit Asset Management; National Transit Database," 49 CFR parts 625 and 630.

LYNX is considered a Tier I agency since it operates more than 101 vehicles and therefore must develop its own TAM Plan, which includes these nine elements: (1) Inventory of Capital Assets, (2) Condition Assessment, (3) Decision Support Tools, (4) Investment Prioritization, (5) TAM and SGR Policy, (6) Implementation Strategy, (7) List of Key Annual Activities, (8) Identification of Resources, and (9) Evaluation Plan.

LYNX provides a wide range of public transportation services to the Orlando Metropolitan area, and has been working diligently since the passage of 49 CFR part 625 to develop a TAM Plan based on performance measures that support the agency's operating vision and dedication to the community.

The TAM Plan provides a comprehensive picture of LYNX's current capital assets, LYNX's asset management policy, and a detailed plan of asset management activities within the TAM Plan horizon. This Executive Summary highlights the LYNX TAM Plan covering the period from October 2018 to October 2022.

TAM and SGR Policy

LYNX's asset management policy consists of four basic principles: safety, reliability, preservation first, and environmental sustainability.

Safety is the agency's first core value, and one that underlies the agency's other values, priorities, and goals. LYNX therefore adopts safety as the primary principle of its TAM Policy. With its dedication to customer service, LYNX adopts reliability as the second principle of its TAM Policy.

LYNX adheres to the definition of a SGR described in 49 CFR 625.41. Assets are in a SGR when they are able to perform their intended functions without posing an unacceptable safety risk; when the assets' life cycle investment needs have been met or recovered; and when the assets have not exceeded their Useful Life Benchmarks.

LYNX recognizes the links between safety, reliability, and SGR. The LYNX 2018 Transit Development Plan (TDP) demonstrates the agency's commitment to "explore and implement appropriate technologies and service delivery models to improve reliability and experience of transportation systems," to "maintain [the] system in [a] state of good repair," and to "enhance system reliability." The TDP specifically calls for maintenance of "an up-to-date TAM Plan to ensure all capital assets remain within [a] state of good repair to service LYNX customers with high-quality services and facilities."

LYNX recognizes the need for the Accountable Executive to balance operations and maintenance expenditures with the capital renewal expenditures to meet the goal of minimizing life cycle costs. LYNX further recognizes the need to balance minimizing assets' life cycle costs with safety, expansion, and service improvement needs and prudent fare policies in carrying out the agency's responsibilities. LYNX acknowledges the fiscal constraints that require such a balance.

Preservation first is therefore the third principle of LYNX's TAM and SGR Policy. LYNX will optimize in a manner that achieves and, wherever practicable, extends an asset's useful life, and will not defer maintenance or renewal at the expense of future safety, reliability, or fiscal resources.

LYNX has a strong commitment to the environment and quality of life. Sustainability is a theme embedded in LYNX's vision, mission, core values, and strategic goals. The agency's strategic plan calls for increasing environmentally friendly business practices, including, specifically, the expanding the use of alternative fuel vehicles and expanding bicycle parking and storage capacity at LYNX facilities and on its vehicles. Environmental sustainability is the fourth principle of LYNX's TAM and SGR Policy.

Through application of these four principles, and by using data-driven analyses, LYNX will continuously improve its asset management practices and achieve the agency's strategic goals.

Asset Inventory and Condition

In 2015, an asset inventory and asset condition assessment for all LYNX's facilities, including Super Stops and the transfer center, was completed. This was followed in 2017, with an inspection of a representative sample of all revenue and non-revenue vehicles that were in the fleet. A SGR analysis and report were completed for both vehicles and facilities, and were accepted by LYNX in October 2017.

The LYNX asset inventory consists of 1,113 asset line items with a total replacement value of \$270.2 million in 2018 dollars and an overall asset condition rating of 3.4 on the FTA 5 (Excellent)-to-1 (Poor) asset condition scale. The average percent of useful life remaining based on replacement value is 54.4%. Currently, LYNX has a SGR backlog of \$16.2 million in 2018 dollars; vehicles are the asset class with the greatest backlog. On average, an annual capital investment of \$24.0 million in 2018 dollars is required over the next 20 years to maintain a SGR for all assets.

Planned Activities and Implementation Strategy

Implementation of the TAM Plan will be led by the LYNX Asset Management Team, which is a task force composed of LYNX senior managers with direct or supporting responsibilities in asset management. The Chief Executive Officer (CEO) is the Accountable Executive, who is ultimately responsible for the development and implementation of the TAM Plan. The CEO designated the Deputy Director of Facilities to be the Asset Manager who oversees and coordinates the development and implementation of the TAM Plan. The other Asset Management Team members will lead the asset management activities in their respective functional areas. LYNX will provide continuous training to its employees so that its workforce will stay up-to-date with the evolving technologies. LYNX will recruit additional administrative staff as necessary.

The LYNX 2018 TDP projects that the 10-year total capital needs will be \$673.8 million for the period from FY2018 to FY2027. However, the total capital revenue is projected to be \$506.4 million. This would result in a 10-year shortfall of \$167.4 million.

LYNX will need to identify and secure additional capital funding to meet the projected backlog of needs. LYNX has been looking for other sources of funding, such as discretionary federal grants. Also, LYNX is discussing how to build support for a dedicated source of transit funding with regional partners.

Within the TAM Plan horizon, LYNX will perform the planned preventive maintenance and implement the scheduled asset renewal and replacement projects. LYNX has planned to implement the following major capital projects:

- Parking Lot and Modular Facility for LYNX Paratransit Operations (LOC Expansion)
- LYNX Southern Operations, Maintenance, and Transportation Training Center (Southern Operations Facility)
- Pine Hill Transfer Center
- Purchase of Compressed Natural Gas (CNG) Buses
- Bus Stop Improvement Program
- Information technology system upgrades (including an automated fuel and mileage tracking tool, expansion of VUEWorks to address all facilities maintenance, and new enterprise resource planning software)

Table ES-1 shows an implementation timeline for the major planned capital projects within the TAM Plan horizon.

Table ES-1: TAM Plan Implementation Timeline

Calendar Year		2018					2019					2020					2021					2022				
Capital Project	Calendar Quarter	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
New Paratransit Facility (LOC Expansion)																										
Southern Operations Facility																										
Pine Hill Transfer Center																										
Purchase of Compressed Natural Gas (CNG) Buses																										
Bus Stop Consolidation and Improvements																										
Implement Automated Fuel & Mileage Tracking Tool																										
Expand VUEWorks to All Facility Maintenance																										
Acquire New Enterprise Resource Planning Software																										

Evaluation Plan

LYNX will evaluate its implementation of the TAM Plan on an annual basis and update the TAM Plan every 3 years. The annual TAM Plan evaluation process has two components: (1) performance target setting and reporting, as required by the TAM Rule, and (2) measuring the progress of planned asset management activities. The TAM Plan updating process involves a more thorough evaluation of the plan that covers all aspects of the plan, including TAM and SGR Policy, asset inventory and conditions, funding and investment prioritization, in addition to the scope of the annual evaluation.

1 Introduction

1.1 Overview of LYNX

The Central Florida Regional Transportation Authority (CFRTA), doing business as (d.b.a.) LYNX, provides public transportation services to the general public in the Orlando, Florida, metropolitan area, which includes Orange, Seminole, and Osceola Counties. LYNX also offers some out-of-county flexible and fixed-route services to Polk County. LYNX provides alternative transportation services in the form of fixed-route bus services, bus rapid transit, neighborhood circulators, paratransit services, and vanpool services.

1.2 Transit Asset Management Plan Purpose

The Transit Asset Management (TAM) Plan covers the period from October 2018 to October 2022. The TAM Plan was developed to guide LYNX's asset management activities to enhance safety, reduce maintenance costs, increase reliability, and improve performance. It was also developed to fulfill the requirements of the Federal Transit Administration (FTA) Transit Asset Management Rule, 49 Code of Federal Regulations [CFR] Parts 625 and 630.

1.3 Transit Asset Management Plan Organization

The TAM Plan provides a comprehensive picture of LYNX's current capital assets and a detailed plan of asset management activities within the TAM Plan horizon. The TAM Plan is structured as follows:

- **Section 2 Inventory of Capital Assets:** This section documents the LYNX asset inventory, which includes the physical assets that LYNX owns. LYNX is responsible for funding the maintenance (in the operating budget) and renewal and replacement (in the capital program) of these assets.
- **Section 3 Assessment of Asset Condition:** This section describes the process for assessing the condition of assets in the LYNX asset inventory.
- **Section 4 Decision Support Tool:** This section describes the application of the decision support tool, an analytical process applied to examine the infrastructure renewal requirements of LYNX and to support the prioritization of assets.
- **Section 5 Investment Prioritization:** This section summarizes the application of the decision support tool with a capital funding constraint and the identification of projects to be funded in the near term in the LYNX capital program.
- **Section 6 TAM and SGR Policy:** This section addresses the LYNX TAM and State of Good Repair (SGR) Policy, which is the systemwide direction regarding expectations for transit asset management and a strategy that supports the implementation of the policy.
- **Section 7 Implementation Strategy:** This section lays out LYNX's strategy to achieve its TAM goals and policy.
- **Section 8 List of Key Annual Activities:** This section describes the key annual activities needed to implement the TAM Plan.
- **Section 9 Identification of Resources:** This section is a summary of the financial and human resources that LYNX needs to develop and carry out this TAM Plan.
- **Section 10 Evaluation Plan:** This section describes how LYNX will monitor, evaluate, and update the TAM Plan and related business practices.

2 Inventory of Capital Assets

2.1 Introduction

The LYNX asset inventory includes the physical assets that LYNX owns, and LYNX is responsible for funding the maintenance (in the operating budget) and renewal and replacement of these assets (in the capital program). The asset inventory is the foundation of the TAM Plan.

Section 2.2 describes the assembly of the asset inventory.

Section 2.3 summarizes the replacement value of the asset inventory by asset class

2.2 Asset Inventory Data Assembly

Data assembly included the following activities:

- **Assessed data readily available:** Established information from the existing Capital Asset/Condition Assessment as a baseline and identified the data available in Microsoft Excel and database formats in order to evaluate the existing format and how it conformed to the desired asset classification needs. Information reviewed included the existing building and capital equipment inventories, super stops and passenger amenities inventories, revenue and non-revenue vehicle inventories.
- **Interviewed LYNX staff:** This included a discussion of previous studies and inventories undertaken. Key staff interviews were used to capture personal knowledge of assets and technical study information. Key field personnel, including the Maintenance Manager and Building Supervisors, were also interviewed to help identify the status of LYNX assets, day-to-day issues, and problem areas.
- **Identified missing and/or outdated information:** Identified inventory and condition information documented by field inspection.
- **Conducted field data collection:** Once the existing data were collected and missing data identified, additional field visits or information requests to LYNX staff were initiated to collect the missing data.

The following base level of detail was applied in identifying components of the asset inventory

- **Asset Type:** First-level category for classifying an Asset Type or group of assets.
- **Asset Group:** Next level to break out individual groups of an asset type.
- **Asset Name:** Unique descriptor to identify an Asset Name or for a section of a linear asset. This information varied depending on the level of detail proposed.
- **Renewal Actions:** A description of significant maintenance activities that are required to maintain the useful life of a particular asset.

An example of the application of the above is the following typical asset line item:

- Asset Type: Stations
- Asset Group: Structure
- Asset Name: Roof
- Renewal Actions: re-coating

Special attention was applied to determining the service year (year of construction or acquisition) and unit replacement cost, as this information is typically difficult to obtain. LYNX

and the project team made informed assumptions about the service year if the information was not available from LYNX records or knowledgeable LYNX staff.

2.3 Summary of Asset Inventory

This section provides a summary of the asset inventory applied in the SGR analysis. Table 2-1: is a snapshot of the LYNX asset inventory as applied in this analysis.

Table 2-1: Snapshot of LYNX's Inventory

Measure	Value
Number of asset line items	1,113
Total replacement value (2018\$)	\$ 270.2 M
Average age of asset (by replacement value)	7.9 years
Average % of useful life remaining (by replacement value)	54.4%

The asset inventory's 1,113 line items were identified through field observations and capital asset records. Note for the purposes of this analysis, vehicle line items represented entire subfleets of similar model and service year (not individual vehicles). Figure 2-1 breaks down the asset replacement value by asset category.

Figure 2-1: Replacement Value by Asset Category (Millions of 2018\$)

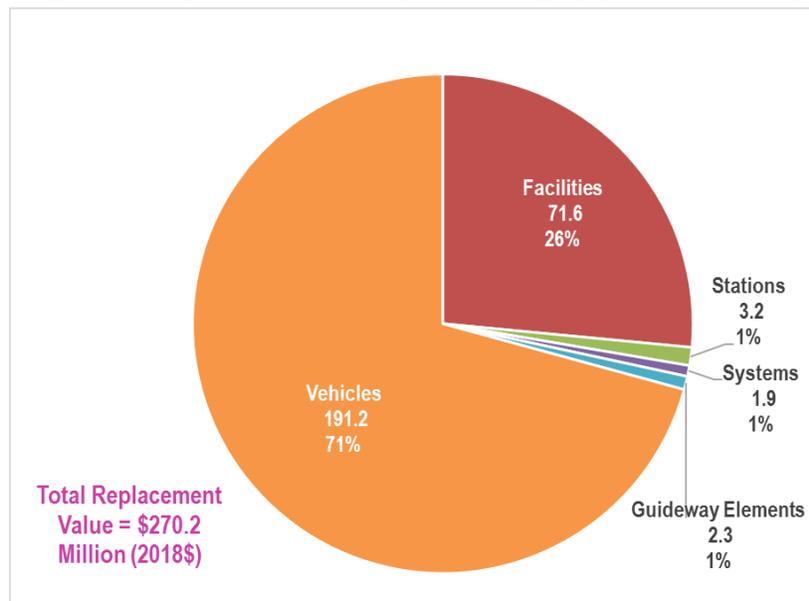


Table 2-2: summarizes the replacement value of the assets by category and subcategory. The asset type with the largest replacement value was buses, which have a replacement value of \$159.9 million—59 percent of the total. Other major asset types include facility building components, demand response vehicles, information technology (IT) equipment, maintenance equipment, and non-revenue cars.

Table 2-2: Replacement Value by Detailed Asset Type

Detailed Asset Type	Replacement Value (millions of 2018\$)
Facilities Total	\$ 71.6
Building components	\$51.4
Maintenance equipment	\$8.8
IT/network equipment	\$8.9
Office furniture	\$2.5
Guideway Elements Total	\$2.3
Bus guideway	2.3
Stations Total	\$3.2
Platform	\$0.8
Signage	\$0.2
Station building components	\$0.4
Bus shelters	\$1.7
Access	\$0.0
Systems Total	\$1.9
Passenger communications	\$0.0
Safety and security	\$1.5
Phone system	\$0.4
Vehicles Total	\$191.2
Buses	\$159.9
Demand response	\$27.5
Non-revenue cars	\$3.4
Other non-revenue (Special)	\$0.4

The average age of all assets considered in this analysis was 7.9 years, weighted by replacement value. This statistic was considered descriptively, as the useful lives for assets varied greatly; the average age was not necessarily indicative of the average asset condition or the overall SGR. The average percentage of useful life remaining—54.4 percent—was a better way to assess the overall SGR. These two measures considered together suggested that, overall, LYNX assets were halfway through their useful life and will require some investment in asset replacement in the near term.

3 Assessment of Asset Condition

3.1 Introduction

- This section summarizes the condition and lays out the performance measures of LYNX assets. Appendix A provides detailed descriptions of the process for assessing the condition of vehicles, facilities, and other assets. Appendix B summarizes the condition rating descriptions by vehicle type.

3.2 Condition of LYNX Assets

LYNX adopted the FTA condition rating 5 (Excellent)-to-1 (Poor) scale. A condition rating of 2.5 was considered the target for asset replacement.

Table 3-1 summarizes asset replacements costs by asset class and by SGR condition rating. The table indicates that 84.3 percent of the assets had a current condition of 3.1 or higher on the TERM scale. Based on TERM Lite condition ratings, LYNX had an overall cost-weighted asset condition of 3.4 out of 5.

Table 3-1: Estimated LYNX Asset Replacement Costs (2018 Dollars)

	FY 2018 Replacement Cost (thousands) Based on TERM Condition				
	5.0-4.1	4.0-3.1	3.0-2.1	2.0-1.0	Total
Facilities	\$46,255	\$12,354	\$9,316	\$3,707	\$71,632
Guideway Elements*	\$529	\$1,417	\$382	\$-	\$2,327
Systems	\$-	\$482	\$954	\$469	\$1,905
Stations	\$193	\$2,394	\$376	\$201	\$3,164
Vehicles	\$40,390	\$125,166	\$23,565	\$2,033	\$191,154
LYNX Overall	\$87,367	\$141,813	\$34,592	\$6,410	\$270,182
Percent of Total	32.3%	52.5%	12.8%	2.4%	100.0%

*Non-rail fixed guideway assets

3.3 FTA Performance Measures and Targets

The FTA Final Rule establishes SGR performance measures for capital assets and requires performance targets to be set for each of these measures. The underlying purpose of the performance measures is to determine to what extent the asset is (or is not) in a state of good repair. The FTA Final Rule at 625.41 states that “A capital asset is in a state of good repair if it meets the following objective standards —

- the asset is able to perform its desired function;*
- the use of the asset in its current condition does not pose an identified unacceptable safety risk; and*
- the life-cycle investment needs of the asset have been met or recovered, including all scheduled maintenance, rehabilitation, and replacements.”*

As stated in the Final Rule (49 CFR 625.43), SGR performance measures for capital assets are described as follows:

- **Rolling Stock:** The performance measure for rolling stock is the percentage of revenue vehicles within an asset class that have either met or exceeded their Useful Life Benchmark (ULB) for all assets for which there is direct capital responsibility.
- **Equipment:** (non-revenue/ service vehicles). The performance measure for non-revenue, support-service and maintenance vehicle equipment is the percentage of those vehicles that have either met or exceeded their ULB for all assets for which there is direct capital responsibility.
- **Infrastructure:** (rail fixed-guideway, track, signals, and systems). The percentage of track segments with performance restrictions for all assets for which there is direct capital responsibility. Note that the asset inventory does not include non-rail fixed guideway assets.
- **Facilities:** The performance measure for facilities is the percentage of facilities within an asset class that are rated below condition 3.0 on the Transit Economic Requirements Model (TERM) scale for which there is direct capital responsibility.

The SGR performance measures and target setting requirements are separate from the TAM Plan requirement. The FTA performance measures used in this section therefore differ from the asset classification in the rest of this TAM Plan.

Therefore, performance measures for the inventoried assets were calculated for the required asset categories. It is important to note that the FTA performance measure for infrastructure refers only to rail fixed guideway infrastructure with direct capital responsibility; it does not include non-rail fixed guideway infrastructure such as is present in the LYNX inventory. Non-rail fixed guideway infrastructure assets were included in the inventory and condition assessments, but not in the performance measure calculations.

Table 3-2 summarizes the asset vehicle performance and facility condition using the FTA TAM performance measures. The ULBs shown in the table are defined as “the expected life cycle or the acceptable period of use in service for a capital asset.” This term should be differentiated from the FTA Grant Minimum Useful Life requirement. Current performance was calculated as the total exceeding the ULB divided by the total number of assets. In the case of facilities, the number of facilities exceeding the 3.0 TERM rating was used to determine facility condition.

The equipment performance and overall asset performance shown in Table 3-2 were based on all asset classes shown in the table. However, FY2019 performance targets were shown for only those asset classes required by the FTA TAM Rule. As such, overall asset performance and category performance were based on just the required performance classes.

Table 3-2: FTA TAM Performance Measures and FY 19 Targets

Category	Asset Class	ULB (Yrs.)	Total Number	Rolling Stock and Equipment Total Exceeding ULB / Number of Facilities Below Condition 3.0	Current Performance	FY2019 Performance Targets
Rolling Stock	Motor Bus					
	Articulated Bus (AB)	15 yrs.	18	0	0.0%	0.0%
	Bus (BU)	15 yrs. (12 yrs. for <30ft)	292	0	0.0%	2.5%
	Demand Response					
	Automobile (AO)	7 yrs.	5	5	100.0%	75.0%
	Cutaway (CU)	7 yrs.	183	39	21.3%	17.0%
	Van (VN)	7 yrs.	30	0	0.0%	1.0%
	Vanpool					
	Van (VN)	7 yrs.	194	7	3.6%	2.3%
	Rolling Stock Total		-	722	51	7.1%
Equipment*	Automobiles	7 yrs.	23	4	17.4%	15.0%
	Trucks and Other Rubber Tire Vehicles	7 yrs.	80	57	71.3%	70.0%
	Special	4 yrs.	8	8	100%	n/a
	Maintenance Equipment*	17 yrs.	219	75	34%	n/a
	MIS/IT/Network Systems	5 yrs. (software) 7 yrs. or 10 yrs. (hardware)	309	182	58.9%	n/a
	Other Systems	6.8	155	24	15.5%	n/a
	Equipment Total		-	639	326	51%
Facilities	Passenger Facilities	n/a	14	0	0.0%	0.0%
	Administration and Maintenance	n/a	4	1	25.0%	23.0%
	Facilities Total		-	18	1	5.6%
Overall		-	1,382	382	27.6%	12.7%

*Under the Equipment category, FTA requires performance measures for service vehicles only. Special vehicles include assets such as forklifts and sweepers. The Other Systems asset classes include assets such as phone systems and security cameras.

For the Infrastructure category, the FTA performance measure is only required for a fixed-rail guideway.

For the Central Station, the Transfer Center and Office Tower counted separately as passenger facility and administration/maintenance facility respectively.

3.3.1 Summary of Revenue Vehicle (Rolling Stock) Condition

There are 725 revenue vehicles were identified in the asset inventory: 310 motor buses, 218 demand response vehicles, and 194 vanpool vehicles. Table 3-3 provides a breakdown of revenue vehicle condition.

Table 3-3: Summary of Revenue Vehicle (Rolling Stock) Condition Breakdown

Mode/Vehicle Type	ULB (Yrs.)	Average Age (Years)	Total Quantity	Vehicles Past ULB	Average Replacement Cost (Thousands of 2018\$)
Motor Bus					
Articulated Bus (60 ft.) - Compressed Natural Gas (CNG)	15	2.0	10	0	\$ 830
Articulated Bus (60 ft.) - Hybrid	15	5.7	8	0	\$ 830
Bus (30 ft.) - Diesel	12	10.5	12	0	\$ 470
Bus (35 ft.) - Diesel	15	10.5	340	0	\$ 470
Bus (35 ft.) - Hybrid	15	5.7	25	0	\$ 545
Bus (40 ft.) - Diesel	15	7.6	152	0	\$ 475
Bus (40 ft.) - Hybrid	15	4.0	3	0	\$ 550
Bus (40 ft.) - CNG	15	2.5	60	0	\$ 550
Subtotal	-	7.0	310	0	\$ 516
Demand Response					
Automobile	7	7.0	5	5	\$ 28
Heavy-Duty Van	7	3.0	5	0	\$ 161
Light-Duty Van	7	3.0	30	0	\$ 28
Medium-Duty Van	7	5.3	178	39	\$ 96
Subtotal	-	4.5	218	44	\$ 86
Vanpool					
Automobile	7	3.3	100	0	\$ 28
Heavy-Duty Van	7	6.3	74	7	\$ 102
Light-Duty Van	7	6.0	1	0	\$ 28
Medium-Duty Van	7	3.0	19	0	\$ 27
Subtotal	-	5.1	194	7	\$ 56
Overall	-	5.7	722	51	\$ 259

3.3.2 Summary of Equipment Condition

Of the 794 equipment assets in the inventory, there are 103 service vehicles, 8 special vehicles (e.g., forklifts, golf carts, and sweepers), 219 maintenance equipment assets, 309 (computer hardware/software) assets, and 155 other systems assets (e.g., closed-circuit television (CCTV) and phone systems).

It should be noted that the FTA performance measure for the equipment category applies only to service vehicles.

Table 3-4: Summary of Non-Revenue (Equipment) Vehicle Condition

Equipment Type	ULB (Yrs.)	Average Age (Yrs.)	Total Quantity	Total Past ULB	Average Replacement Cost (Thousands of 2018\$)
Automobile (AO)	7	6.1	23	4	\$ 28
Special	4	15.6	8	8	\$ 54
Trucks and Other Rubber Tire Vehicles	7	9.0	80	57	\$ 36
Maintenance Equipment	17	10.1	219	75	\$ 40
MIS/IT/Network Systems	5 yrs. (software) 7 yrs. or 10 yrs. (hardware)	7.8	309	182	\$ 29
Other Systems	6.8	5.6	155	24	\$ 12
Overall	-	9.6	794	350	\$ 33

3.3.3 Summary of Facility Condition

The inspection identified 18 facilities in the asset inventory: 14 passenger facilities and 4 administrative/maintenance facilities (i.e., 1 vehicle maintenance facility, 2 operations centers, and 1 administrative facility). Average facility condition values were weighted by total asset value. Table 3-5 provides a summary of facility condition. The facility condition used in this section was based on field observations. These are not TERM Lite SGR condition estimates, as described in Section 3.2.

Table 3-5: Summary of Facility Condition

Facility Type	Total Quantity	Average Weighted Condition	Total Below 3.0 Rating	Average Replacement Cost (Thousands of 2018\$)
Passenger Facilities*	14	3.6	1	\$ 738
Administrative/Maintenance	4	3.9	0	\$ 11,693
Overall	18	3.6	1	\$ 3,173

*Central Station Transfer Center is separated from the Central Station Office Tower.

3.3.4 Summary of Infrastructure Condition

The infrastructure category consists of 36 line items for bus guideway assets. This includes bus drive lanes and pavement assets. The FTA performance measure for the infrastructure asset category applies only to fixed rail guideway assets. Condition was therefore determined using TERM Lite SGR condition estimates. Table 3-6 provides a summary of infrastructure condition.

Table 3-6: Summary of Infrastructure Condition

Infrastructure Type	Total Quantity	Average Age	Average Weighted Condition	Average Replacement Cost (Thousands of 2018\$)
Bus Guideway	36	17.4	3.6	\$ 65*

*Valuation based on average bus guideway line item

4 Decision Support Tool

4.1 Introduction

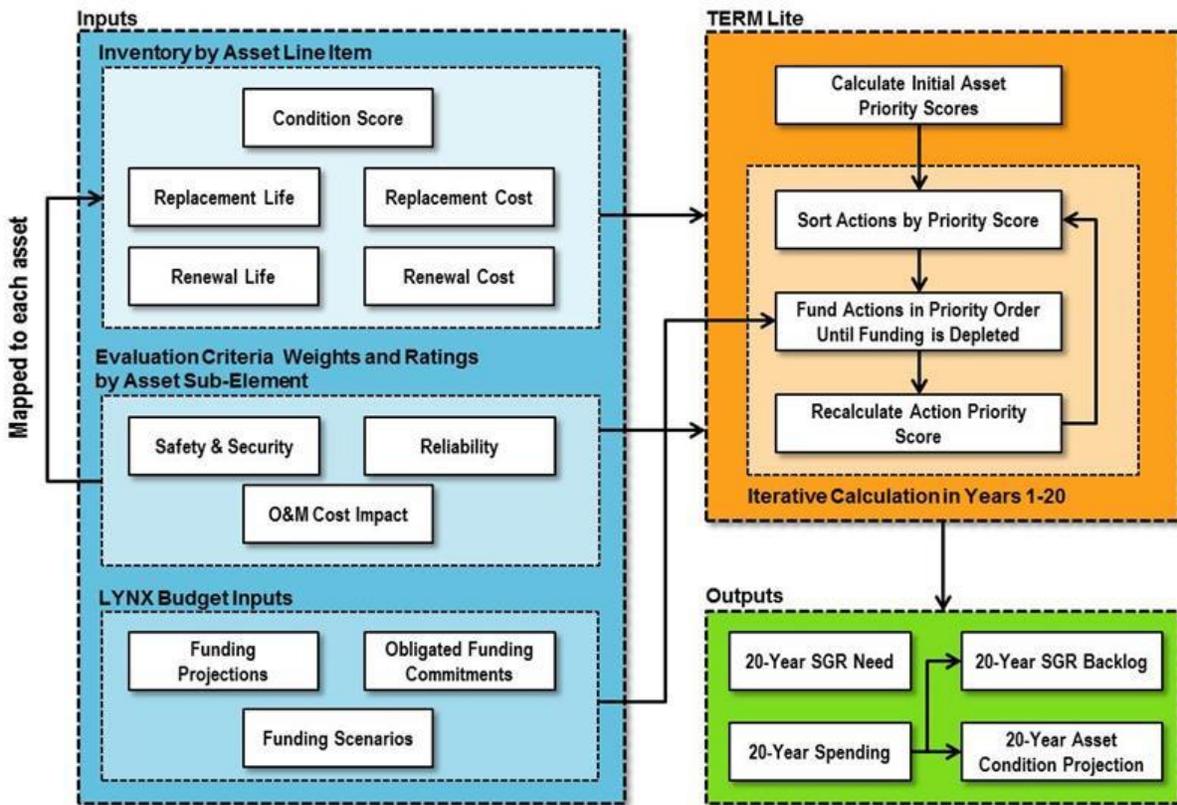
This section describes the application of the decision support tool, an analytical process applied to examine the infrastructure renewal requirements of LYNX and impacts of alternative funding scenarios on future asset and to support the prioritization of assets. A SGR analysis was undertaken based on the comprehensive asset inventory and condition assessment described in *Section 2 Inventory of Capital Assets* and *Section 3 Assessment of Asset Condition*. The SGR analysis was accomplished through the application of TERM Lite, a decision support tool developed by the FTA.

The following sections describe the application of TERM Lite in the SGR analysis and the findings of the SGR analysis in terms of projection of SGR needs, SGR backlog, and asset condition.

4.2 SGR Analysis Process and Methodology

Figure 4-1 summarizes the methodological process. The analysis consists of three main steps, which are described in the following TERM Lite inputs; TERM Lite outputs; and the application of TERM Lite outputs to complete the SGR analysis. For a detailed description of the SGR analysis methodology, see Appendix C.

Figure 4-1: SGR Analysis Process



4.3 TERM Life Output

This section summarizes the findings of the application of the decision support tool with respect to the current SGR backlog and 20-year annual SGR needs:

- **Current SGR Backlog:** This included the renewal and replacement values of all assets that were beyond their renewal or replacement life.
- **20-Year Annual SGR Need:** The needs were the result of applying an unlimited funding constraint to fund the current backlog and to fund future renewal and replacement needs as they occur. In this scenario, the future backlog remains at zero.

4.3.1 SGR Backlog

The SGR backlog represents the sum of (i) the dollar replacement value of assets that are beyond their useful lives and (ii) the dollar renewal value of renewals that are past due. Table 4-1 summarizes the current SGR backlog.

Table 4-1: Snapshot of LYNX's Current Backlog

Measure	Value
Total current SGR backlog (2018\$)	\$ 16.2 M
Number of assets in current backlog	333
Asset category with largest SGR backlog	Facilities

Figure 4-2 breaks down the \$16.2 million total by asset category. The asset category with the largest backlog was facilities, with a \$8.0 million backlog, comprising approximately 50 percent of the total backlog. The second largest backlog category was vehicles, with \$6.6 million dollars in backlog, comprising approximately 41 percent of the total backlog. The remaining asset categories (guideway elements, systems, and stations) represented 9 percent of the total backlog, with \$1.6 million dollars in backlog.

Figure 4-2: Current SGR Backlog by Asset Category (Millions of 2018\$)

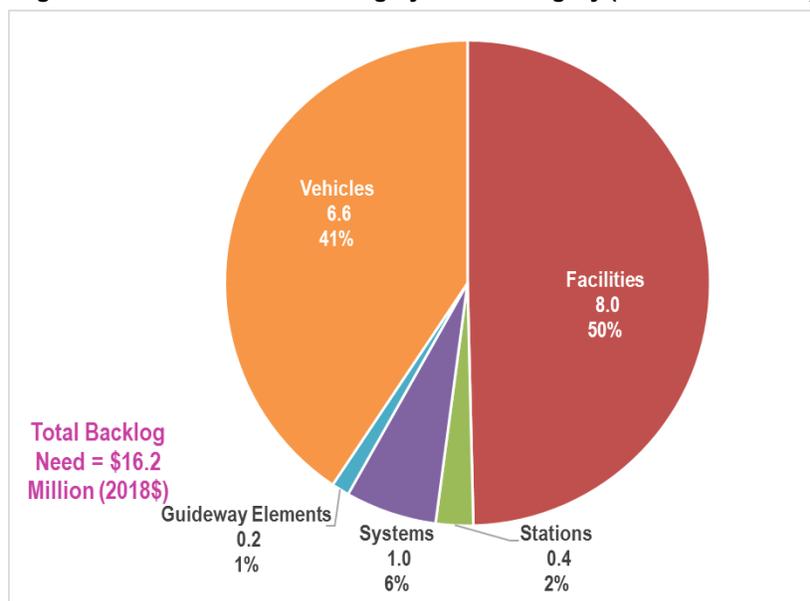


Table 4-2: summarizes the SGR backlog by asset category and subcategory. The asset type with the largest SGR backlog was Management Information Systems (MIS) / IT /Network Systems, which had a replacement value of \$6 million, approximately 37 percent of the total SGR backlog. Other major assets in the SGR backlog included demand response vehicles, non-revenue vehicles, and maintenance equipment.

Table 4-2: Current SGR Backlog by Detailed Asset Type

Detailed Asset Type	Replacement Value (millions of 2018\$)
Facilities Total	\$8.0
Building components	\$0.5
Maintenance equipment	\$1.6
MIS/IT/network Systems	\$6.0
Office furniture	-
Guideway Elements Total	\$0.2
Bus guideway	\$0.2
Stations Total	\$0.4
Platform	-
Signage	\$0.0
Station building components	\$0.2
Bus shelters	\$0.2
Access	-
Systems Total	\$1.0
Passenger communications	-
Safety and security	\$0.8
Phone system	\$0.2
Vehicles Total	\$6.6
Buses	-
Demand response	\$4.2
Non-revenue vehicles	\$1.9
Other non-revenue	\$0.4

4.3.2 20-Year SGR Need

This section summarizes the 20-year SGR asset needs for LYNX. This is the result of an unconstrained funding scenario. Table 4-3 is a snapshot of LYNX’s total 20-year SGR needs.

Table 4-3: Snapshot of LYNX’s 20-Year Needs

Measure	Value (2018\$)
Total 20-year need	\$480.1 M
Average annual need	\$24.01 M
Asset category with the largest 20-year need	Vehicles

The total 20-year SGR need of \$480.1 million (2018\$) is about twice LYNX’s total asset replacement value of \$270.2 million. An average annual capital investment of \$24.01 million would be required over the next 20 years to maintain a SGR for all assets (that is, to maintain all assets in a SGR within their useful life). Figure 4-3 breaks out the 20-year SGR needs by asset category. Vehicles make up the largest share of the need (87 percent), with facilities, systems, stations, and guideway elements making up smaller shares of the total need.

Figure 4-3: 20-Year SGR Need by Asset Category (Millions of 2018\$)

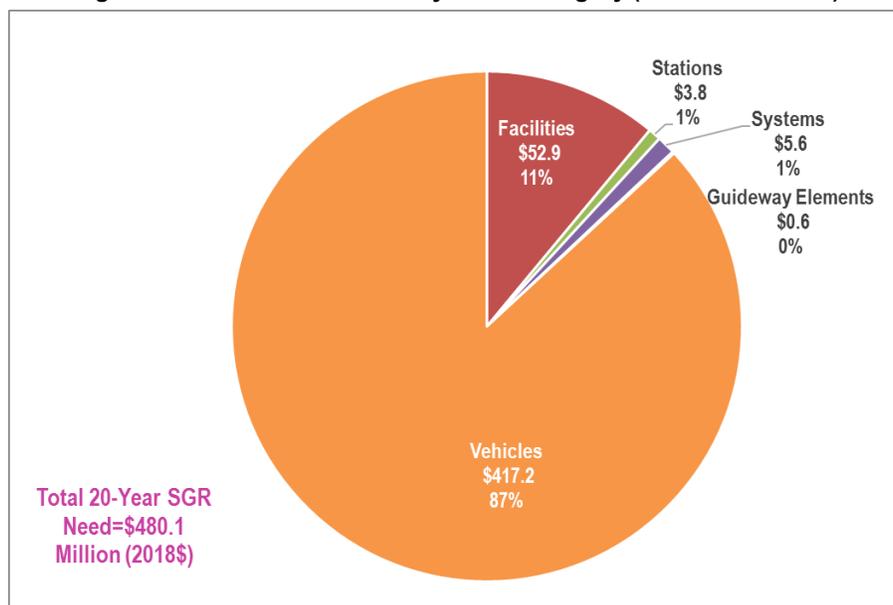


Table 4-4 summarizes the 20-year SGR needs by category and subcategory. The asset type with the largest need is buses, which require \$322.9 million (2018\$) in investment over the 20 years, approximately 67 percent of the total needs. Other major asset types included demand response vehicles, MIS/IT/network equipment, and non-revenue vehicles.

Table 4-4: 20-Year SGR Need by Detailed Asset Type

Detailed Asset Type	20-Year SGR Need (millions of 2018\$)
Facilities Total	\$52.9
Building components	\$11.7
Maintenance equipment	\$11.0
IT/network equipment	\$30.1
Office furniture	\$0.2
Guideway Elements Total	\$0.6
Bus guideway	\$0.6
Stations Total	\$3.8
Platform	\$0.3
Signage	\$0.2
Station building components	\$1.1
Bus shelters	\$2.1
Access	\$0.0
Systems Total	\$5.6
Passenger communications	\$0.0
Safety and security	\$4.8
Phone system	\$0.8
Vehicles Total	\$417.2
Buses	\$322.9
Demand response	\$82.0
Non-revenue vehicles	\$10.1
Other non-revenue (special)	\$2.1

Figure 4-4 summarizes SGR needs by year. TERM Lite projects that major bus fleet replacements will be required in 2022, 2030, 2031, and 2037. Overall, the investment in vehicles comprises 87 percent of the total SGR need over the 20-year analysis period. Facilities make up 11 percent, systems and stations each make up 1 percent, and guideway elements make up less than 1 percent of the total SGR need.

Figure 4-4: 20-Year SGR Needs by Asset Category by Year

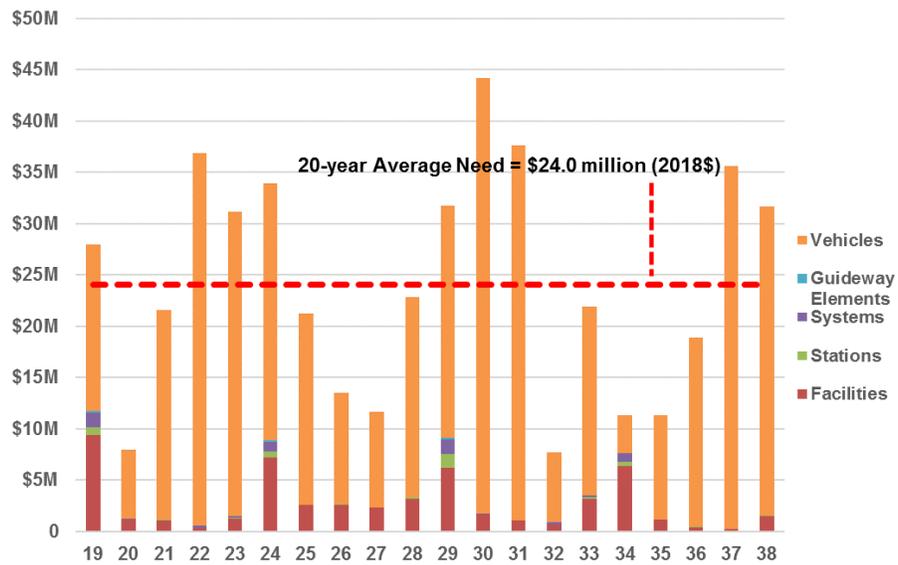


Figure 4-5 summarizes the SGR needs for vehicles by type over the 20-year analysis period. Overall, the model projects a need of \$417.2 (2018\$) million for the rehabilitation and replacement of vehicles, which is an average of \$20.9 million annually.

- Buses: SGR need totals \$322.9 million (2018\$) over the analysis period, or \$16.1 million annually on average.
- Demand response vehicles: SGR need totals \$82.0 million (2018\$) over the analysis period, or \$4.1 million annually on average.
- Non-revenue vehicles: SGR need totals \$12.2 million (2018\$) over the analysis period, or \$0.6 million annually on average.

Figure 4-5: Summary of Annual Unconstrained SGR Needs – Vehicles (2018\$)

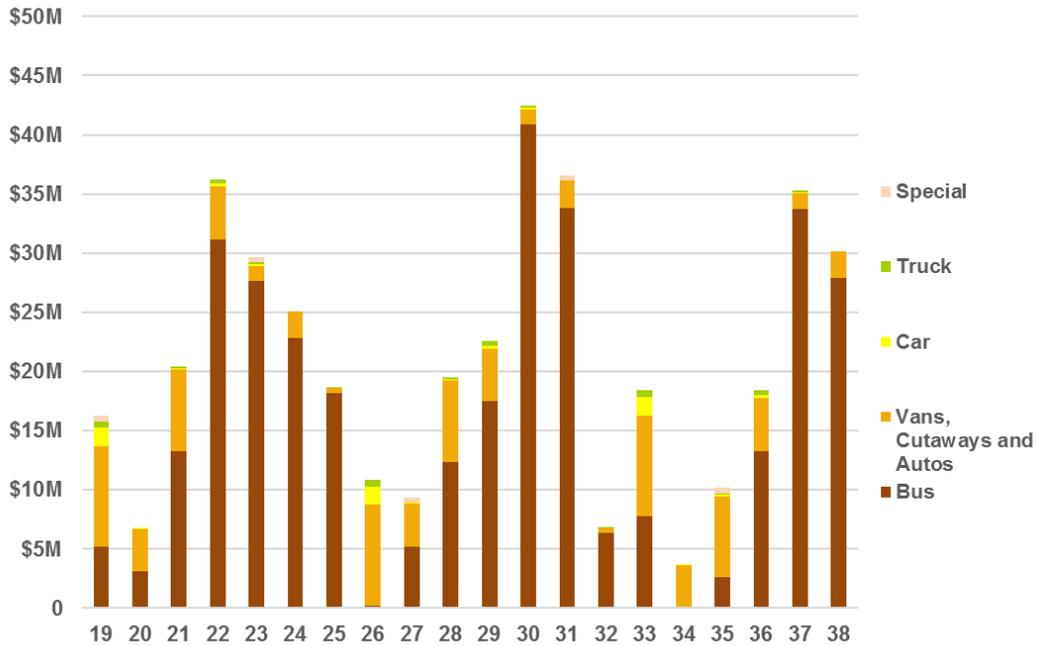
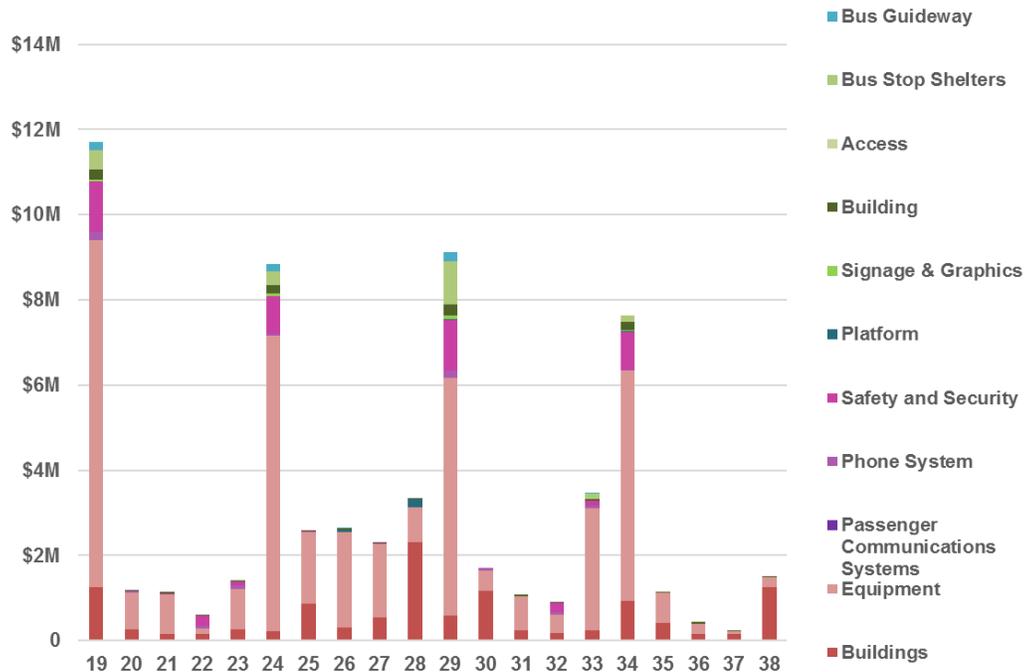


Figure 4-6 summarizes the SGR needs for non-vehicles over the 20-year analysis period. Overall, TERM Lite projects a need of \$62.9 (2018\$) million for the rehabilitation and replacement of non-vehicle assets, or an average of \$3.1 million annually.

Figure 4-6: Summary of Annual Unconstrained SGR Needs – Non-Vehicles



Appendix E provides a further breakdown of SGR needs for each non-vehicle asset class.

5 Investment Prioritization

5.1 Introduction

This section describes the analysis of the outputs of total needs from the decision support tool against the capital funding constraints and the identification of projects to be funded in the near term in the LYNX capital program. This includes the capital funding constraints; the prioritization process applied in the decision support tool; and the outcome of applying the capital funding constraints using the prioritization process.

5.2 Capital Funding Constraints

The capital funding constraints applied in the SGR analysis represent a projection and annual funding for the replacement and rehabilitation of existing capital assets. Capital funds allocated to expansion assets or to the improvement or enhancement of existing capital assets are excluded from the SGR analysis.

For this analysis, three annual funding constraints were applied: (1) the average annual need over the 20-year period, \$24.01 million, (2) 50 percent of the annual need for each year, and (3) 80 percent of the annual need for each year. The latter two scenarios were applied to provide a realistic approach to capturing the cyclical peaks brought about by short-term assets reaching the end of their useful lives.

The average annual investment in capital replacement and renewals made by LYNX from 2005 to 2016 (in 2018\$) was \$20.6 million. Table 5-1: summarizes historic LYNX's capital replacement and renewal spending. The total does not include capital spending on asset improvements, expansions, or new assets.

Table 5-1: Historic Annual Investment in Capital Replacements and Renewals

Year	Capital Investment (millions of 2018\$)
2005	\$47.38
2006	\$22.66
2007	\$30.28
2008	\$36.15
2009	\$0.00
2010	\$20.50
2011	\$21.94
2012	\$11.74
2013	\$8.96
2014	\$6.28
2015	\$4.43
2016	\$16.27
Total	\$226.6
Average	\$20.6

Source: LYNX reports to the National Transit Database, adjusted using the Engineering News-Record Construction Cost Index

5.3 Prioritization Process

TERM Lite followed four steps to prioritize renewal and replacements actions as matched to the capital funding constraints:

1. Calculate priority scores.
2. Sort actions by priority scores.
3. Fund actions.
4. Age assets and recalculate priority scores.

Appendix D provides a detailed description of these four steps.

5.4 Investment Prioritization

This section summarizes the following analyses for the LYNX system over the 20-year period:

- Spending by year and asset category
- SGR backlog by year and asset category
- Condition by year and asset category

For each analysis type, four scenarios are shown:

- Scenario 1: Unconstrained spending (SGR need)
- Scenario 2: Constrained at 20-year average annual need (\$24.8 million)
- Scenario 3: Constrained at 50 percent of annual need
- Scenario 4: Constrained at 80 percent of annual need

5.4.1 20-Year SGR Spending

Figure 5-1 and Figure 5-2 show the annual SGR spending by asset category for the four spending scenarios, i.e., unconstrained spending, constrained at \$24.01 million, constrained at 50 percent of annual need, and constrained at 80 percent of annual need. In all four scenarios, vehicle spending makes up the largest share of the 20-year analysis. Furthermore, the funding peaks in 2022, 2030, and 2037 in three of the four scenarios are a result of a large number of assets reaching the end of their useful lives in those years.

Figure 5-1: 20-Year SGR Spending, Unconstrained and Average Annual Funding Scenarios

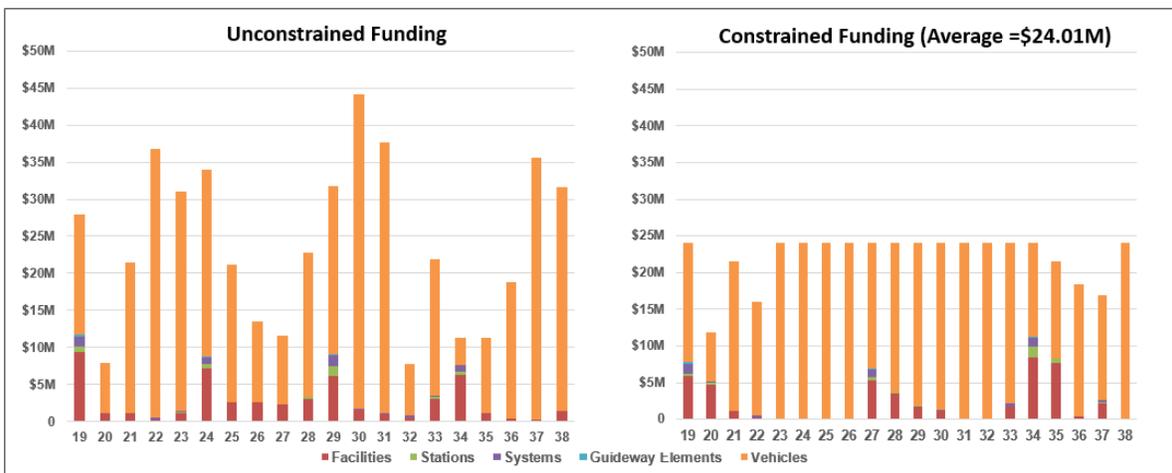


Figure 5-2: 20-Year SGR Spending, 50% and 80% of Annual SGR Needs

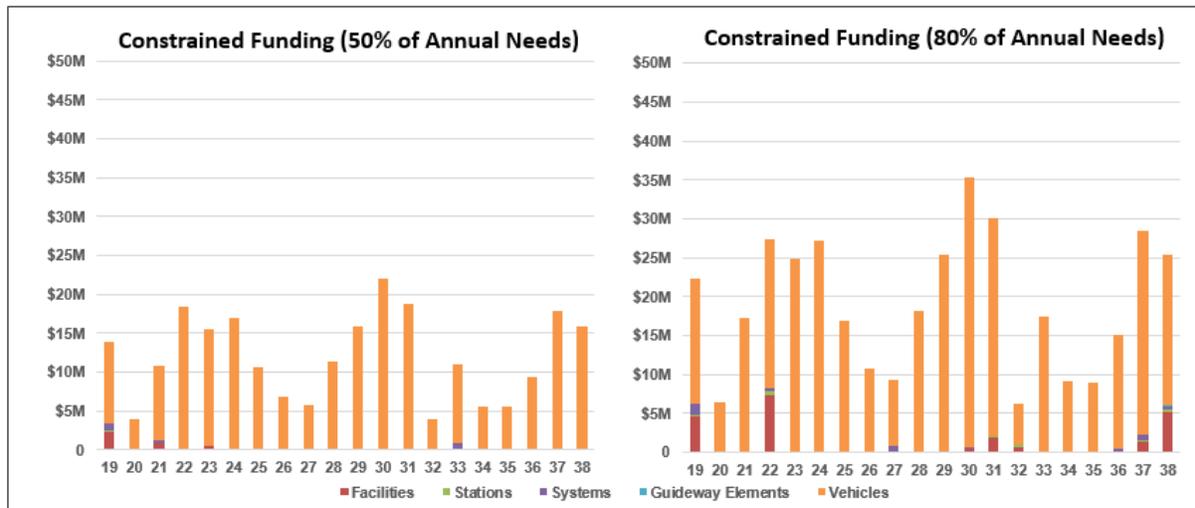


Table 5-2 provides a summary of spending by asset category between 2019 and 2022 for each of the four scenarios. At the higher funding levels, spending by asset category is similar, except in the case of vehicles, where the unconstrained scenario allocates the most funding compared to the other scenarios. In future applications of TERM Lite, the analysis can split large vehicle purchases into multiple smaller purchases to better fit available annual funding to annual capital needs.

This analysis was performed without unspent funds carried over to the subsequent years. Also, TERM Lite does not spread cost over time. The large purchase of forty-four 40-ft. buses in 2022 is excluded from the 2022 spending and is moved to 2023. The average of \$24.01 million per year is based upon the 20 year SGR spending needs. Since the average funding is less than the spending in the 2019-2022 analysis period, these funds will need to be carried over to meet future years with higher spending needs.

Table 5-2: Total 4-Year (2019-2022) Spending by Category for the Four Funding Scenarios (in thousands-2018\$)

Asset Category	Unconstrained	Average \$24.01M	80% Annual Need	50% Annual Need
Facilities	\$11,902	\$11,902	\$11,896	\$3,181,336.16
Stations	\$192	\$192	\$192	\$-
Systems	\$793	\$793,	\$787	\$29
Guideway Elements	\$1,721	\$1,721	\$1,721	\$1,357
Vehicles	\$79,634	\$58,734	\$58,734	\$42,300
Total Four-Year Spending	\$94,244	\$73,344	\$73,332	\$47,130

See Appendix E for the investment prioritization charts and summaries of annual spending by subcategory for the four scenarios.

5.4.2 20-Year SGR Backlog

Figure 5-3 and Figure 5-4 summarize the changes in SGR backlog by asset category over the 20-year analysis period. In all scenarios other than the unconstrained, the estimated SGR budget is insufficient to eliminate the backlog over the analysis period. Furthermore, the first 4

years of the three constrained scenarios have relatively low levels of backlog; however, the backlog quickly rebuilds, particularly in the 50 percent of annual needs. This means that at lower funding levels, the asset backlog is likely to increase rapidly if corrective actions are not taken.

Figure 5-3: Change in the Backlog by Asset Category, Unconstrained and Average Annual Funding Scenarios

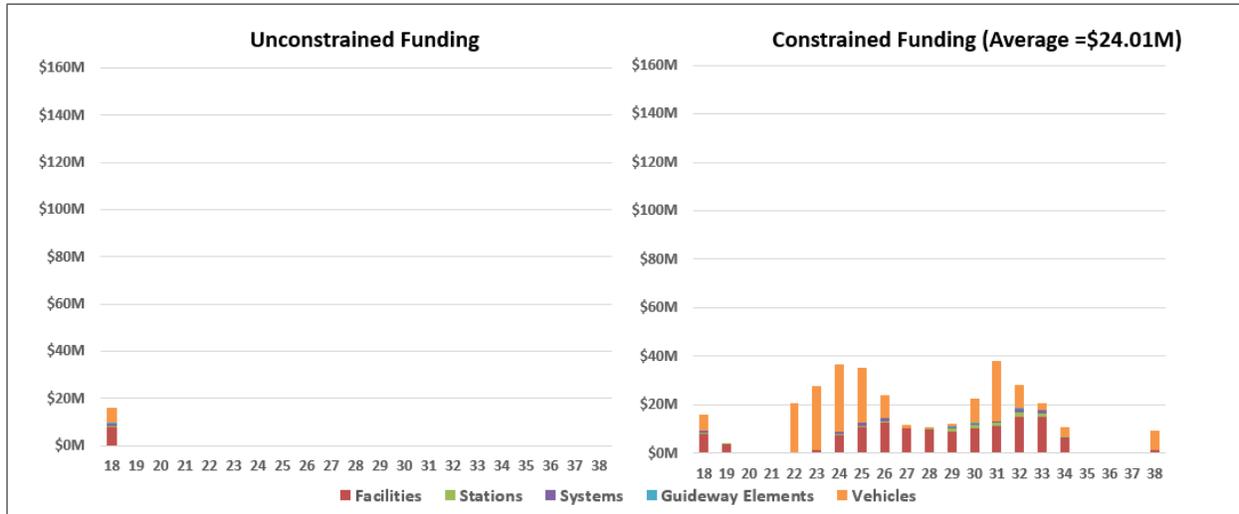
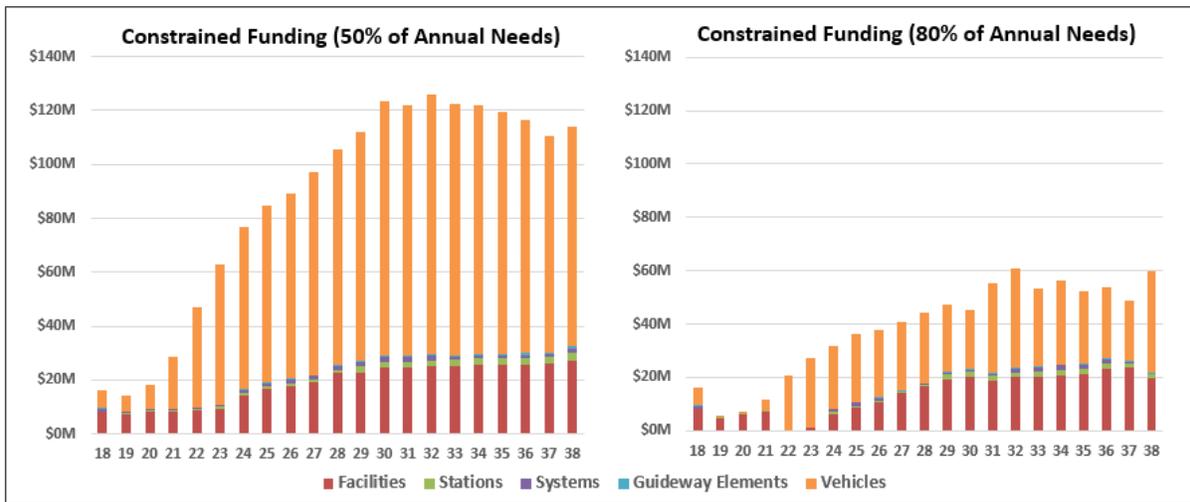


Figure 5-4: Change in the Backlog by Asset Category, 50% and 80% Annual SGR Needs



5.4.3 20-Year Condition Assessments

Figure 5-5 and Figure 5-6 project the changes in average TERM Lite asset condition score over the 20 years of the analysis. Overall, the current average TERM Lite condition score for all assets is above the 2.5 TERM Lite threshold in all scenarios. However, by 2035, the average condition for the 50 percent funding scenario falls below 3.0, the lowest in all four scenarios. Assets that decline the most in this scenario are stations, systems, and vehicles. In the 80 percent funding scenario, the average asset condition is above 2.5; however, the condition score for stations and systems falls below 2.5 by 2034.

Figure 5-5: Average TERM Lite Condition Score by Asset Category, Unconstrained and Average Annual Funding Scenarios

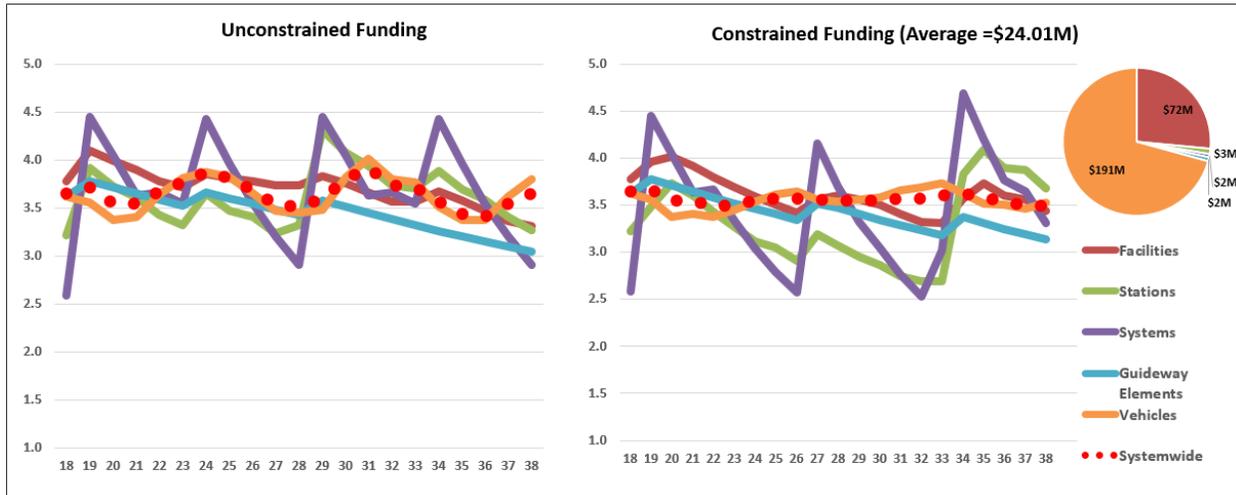
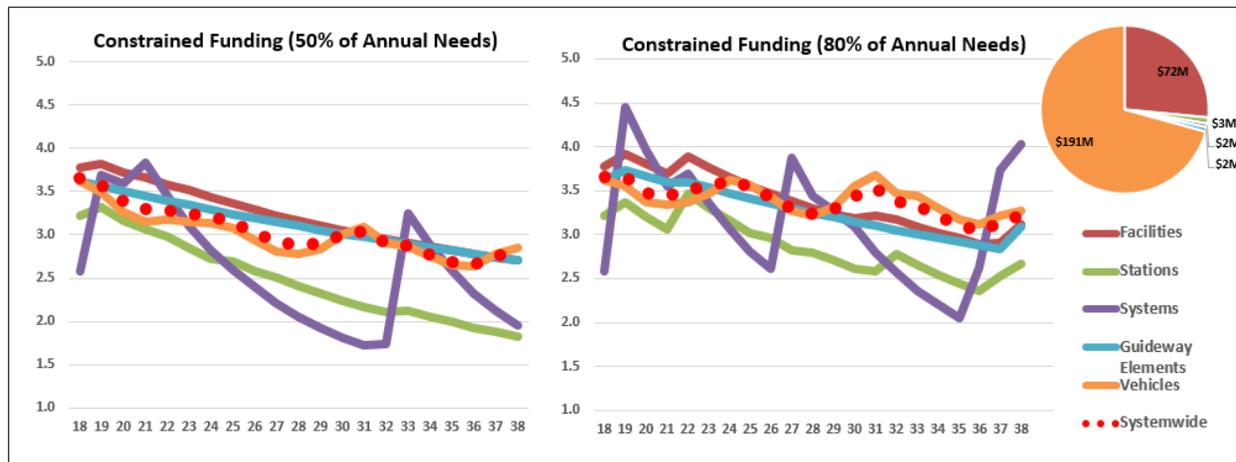


Figure 5-6: Average TERM Lite Condition Score by Asset Category, 50% and 80% Annual SGR Need



See Appendix E for the investment prioritization charts and summaries of annual condition by subcategory for the four scenarios.

6 TAM and SGR Policy

The TAM and SGR Policy is the systemwide direction regarding expectations for transit asset management and a strategy that supports the implementation of the policy. This policy is intended to document LYNX's commitment to achieving and maintaining the agency's capital assets in a SGR, and to set forth LYNX's priorities and objectives, which will guide the agency's efforts and provide a benchmark for evaluation.

6.1 LYNX's Vision, Mission, Core Values, and Strategic Goals

The TAM and SGR Policy is driven by LYNX's overarching vision, mission, core values, and strategic goals as identified in the LYNX 2018 Transit Development Plan.

LYNX's vision is to be recognized as a leader for providing a world-class, state-of-the-art, environmentally friendly transportation system that provides an array of mobility choices for all users.

LYNX's mission is to link our community by providing affordable, reliable, and innovative mobility options that reflect our core values and guiding principles.

LYNX's core values are safety, courtesy, efficiency, and the environment.

LYNX's strategic goals are:

- Promote economic competitiveness, sustainability, and quality of life.
- Advance an equitable, safe, dynamic, and performance-driven transit system.
- Deliver a seamless network of transportation services for the region.
- Enhance customer experience and communication.

6.2 TAM and SGR Policy

The four principles of the TAM and SGR Policy are safety, reliability, preservation first, and environmental sustainability.

Safety is the agency's first core value and one that underlies the agency's other values, priorities, and goals. LYNX therefore adopts safety as the primary principle of its TAM Policy. With its dedication to customer service, LYNX adopts reliability as the second principle of its TAM Policy.

LYNX adheres to the definition of SGR described in 49 CFR 625.41. Assets are in a SGR when they are able to perform their intended functions without posing an unacceptable safety risk; when the assets' life cycle investment needs have been met or recovered; and when the assets have not exceeded their ULBs.

LYNX recognizes the links between safety, reliability, and SGR. The LYNX 2018 TDP demonstrates the agency's commitment to "explore and implement appropriate technologies and service delivery models to improve [the] reliability and experience of transportation systems," to "maintain system[s] in [a] state of good repair," and to "enhance system reliability." The TDP specifically calls for maintenance of "an up-to-date TAM Plan to ensure all capital assets remain within [a] state of good repair to service LYNX customers with high-quality services and facilities."

LYNX recognizes the need for the Accountable Executive to balance operations and maintenance expenditures and the capital renewal expenditures to meet the goal of minimizing life cycle costs. LYNX further recognizes the need to balance minimizing assets' life cycle costs

with safety, expansion, and service improvement needs and prudent fare policies in carrying out the agency's responsibilities. LYNX acknowledges the fiscal constraints that require such a balance.

Preservation first is therefore the third principle of LYNX's TAM and SGR Policy. LYNX will optimize in a manner that achieves and, wherever practicable, extends an asset's useful life, and will not defer maintenance or renewal at the expense of future safety, reliability, or fiscal resources.

LYNX has a strong commitment to the environment and quality of life. Sustainability is a theme embedded in LYNX's vision, mission, core values, and strategic goals. The agency's strategic plan calls for increasing environmentally friendly business practices, including, specifically, expanding the use of alternative fuel vehicles and expanding bicycle parking and storage capacity at LYNX facilities and on its vehicles. Environmental sustainability is the fourth principle of LYNX's TAM and SGR Policy.

Through application of these four principles, and by using data-driven analyses, LYNX will continuously improve its asset management practices and achieve the agency's strategic goals.

7 Implementation Strategy

This section describes LYNX's implementation strategy for achieving its TAM goals and policy.

7.1 Governance

The CFRTA was created in 1989 pursuant to Section 343.63, Florida statutes. This same legislation was amended in 1993, allowing the CFRTA to assume the operations of the former Central Florida Commuter Rail Authority and to provide an opportunity to merge with the local transportation provider, Orange-Seminole-Osceola Transportation Authority (OSOTA), d.b.a. LYNX, thereby creating a one-stop public transportation entity. The CFRTA continues to use LYNX as its "doing business as" name and serves as the focal point in developing all modes of public transportation in the Central Florida region. Through formal action by both the CFRTA and OSOTA Board of Directors, the merger of the two organizations was ratified in March 1994 and became effective on October 1, 1994.

LYNX is governed by a five-member Governing Board. The members of the Governing Board are as follows: one Commissioner from Osceola County, one Commissioner from Seminole County, the Mayor of the City of Orlando, the Mayor of Orange County (or her designee), and a representative of the Florida Department of Transportation (FDOT). Each serves a term as designated by Section 343.63, Florida Statutes. The Board of Directors typically meets every other month on the fourth Thursday to conduct the business of the CFRTA.

The daily operation of the agency is overseen by its CEO. The CEO is designated the Accountable Executive for safety and asset management. The Accountable Executive is supported by an Executive Management Team, the members of which supervise core agency functions. Members of the Executive Management Team report and are responsible to the Accountable Executive, and work cooperatively to implement sound asset management practices. The Asset Manager and Asset Management Team report to the Accountable Executive and coordinate asset management activities throughout the organization. Accountability of LYNX staff in relation to this TAM Plan is laid out in Section 7.2.

7.2 Accountability

Responsibility for carrying out this policy rests with the Accountable Executive, the agency's CEO. As described in 49 CFR 625.5, the Accountable Executive is ultimately responsible for carrying out both the agency's safety management system and its TAM practices. The Accountable Executive exercises direction over LYNX's human and capital resources.

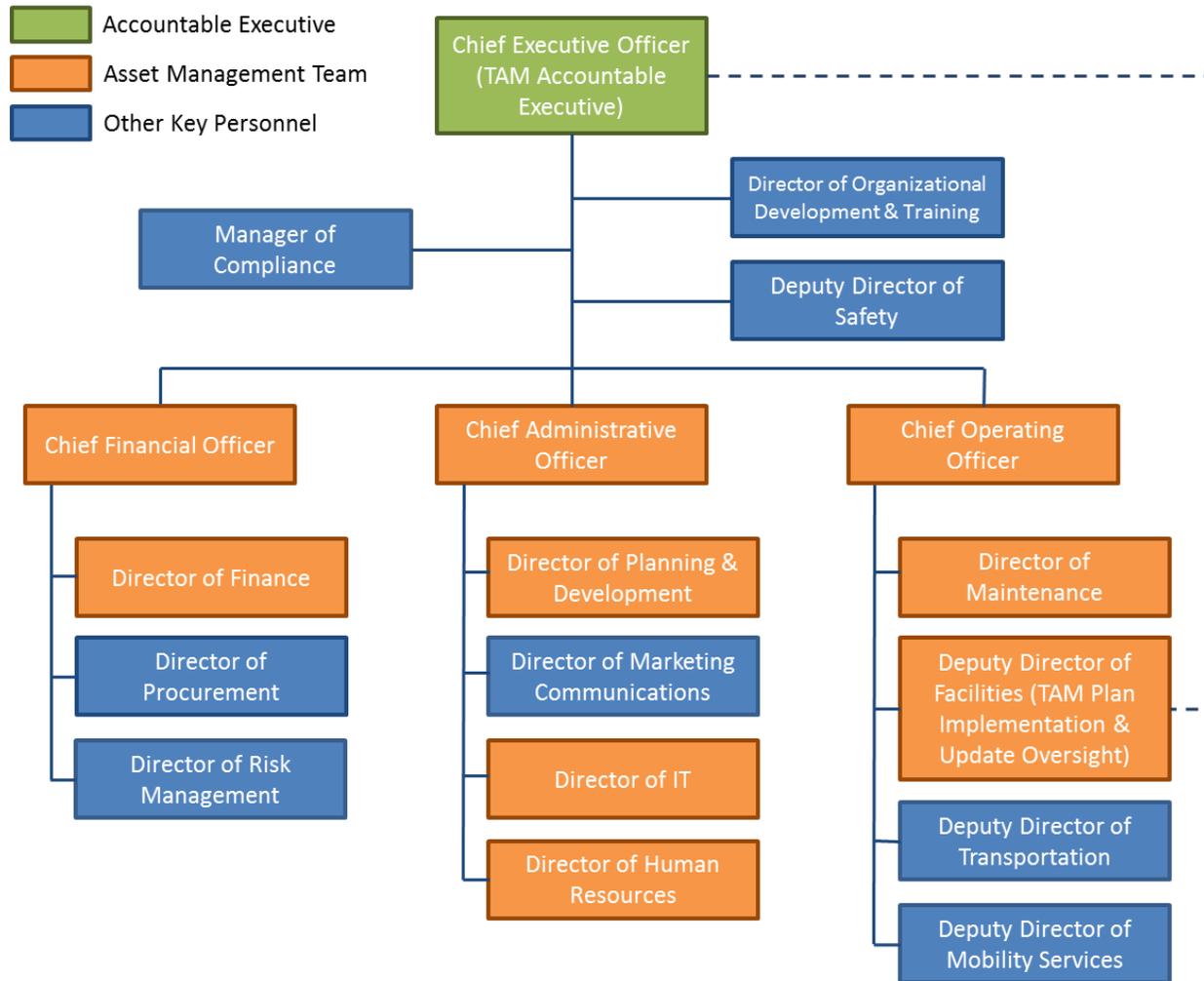
The CEO delegated responsibility for overseeing the implementation, evaluation, and update of this TAM Plan to the Deputy Director of Facilities. The Deputy Director of Facilities and other LYNX managers with direct and/or supporting responsibilities in asset management form the Asset Management Team, which consists of the following:

- Chief Operating Officer
- Chief Financial Officer
- Chief Administrative Officer
- Director of Maintenance
- Deputy Director of Facilities
- Director of Planning and Development
- Director of Finance

- Director of IT
- Director of Human Resources

Figure 7-1 is LYNX’s organizational chart, which shows its executive team and senior managers, the Accountable Executive, and the Asset Management Team.

Figure 7-1: LYNX Organizational Chart with Asset Management Team Indicated



7.3 Key Changes in Assets

In the period from October 2018 through October 2022, LYNX plans to implement the following major capital renewal and expansion projects:

- **Parking Lot and Modular Facility for LYNX Paratransit Operations (LOC Expansion):** LYNX is building a new facility for its paratransit operations. The new paratransit facility will be adjacent to the existing LOC, which is a fixed-route operations center. LYNX will include structures and equipment for maintenance, fueling, operations, administration, and parking. LYNX expects to award a design-build contract for this project in September 2018.
- **LYNX Southern Operations, Maintenance, and Transportation Training Center (Southern Operations Facility):** The Southern Operations Facility is designed to support the expansion of LYNX transit service to enhance mobility and quality-of-life options for

residents and visitors in Osceola County. The Southern Operations Facility will be constructed in two phases: Phase I is a 60- to 75,000-square-foot, 13-bay operations and maintenance facility with 286,000 square feet of parking to support 470 employees; Phase II is a 25,000-square-foot transportation training and conference center.

- **Pine Hill Transfer Center:** Pine Hill Transfer Center is a multimodal passenger facility that will include a mixed-use building, a kiss-and-ride area, green space, pedestrian paths, and enhanced lighting. It will provide real-time arrival and departure information, off-board fare payment, and protection from inclement weather. With its highly visible architectural elements, the center will also enhance the unique identity of Pine Hills. Design of this facility started as this plan was being prepared. Construction is estimated to be completed in early 2020.
- **Purchase of Compressed Natural Gas Buses:** Starting in 2015, LYNX has been purchasing CNG buses to replace diesel buses that are beyond their useful lives. By 2020, LYNX plans to purchase 150 CNG buses in total. Meanwhile, LYNX has started exploring the possibility of purchasing electric buses. As the current fleet ages, LYNX plans to eventually replace all diesel buses with alternative-fuel buses. LYNX already started taking the operation and maintenance needs of CNG and electric buses into consideration in current and future capital projects and staff training.
- **Bus Stop Improvement Program:** LYNX will implement a series of bus stop consolidation and improvement projects. LYNX is evaluating the need to consolidate bus stops to deliver faster, more efficient service. LYNX will install new bus shelters and retrofit bus stops with boarding and alighting areas throughout its service area that are compliant with the Americans with Disabilities Act (ADA). LYNX will also build “Super Stops” at major regional activity centers. Super Stops are major bus stops with elaborate bus bays that serve multiple bus routes. They have improved information signage, enhanced lighting, and more seating than a regular bus stop.

7.4 Asset Information Strategy

LYNX has several information systems in place for asset management and is planning for upgrades and new systems.

- **Fleet Management:** LYNX uses FA Suites and Trapeze for fleet management. These systems keep an inventory of LYNX’s fleet. A fleet plan is created and maintained separately in Microsoft Excel. LYNX is considering AVL for fleet maintenance and a tool for automated fuel usage and mileage tracking.
- **Facility Management:** LYNX uses VUEWorks to maintain an inventory of bus stops, passenger amenities, and LYNX’s other facilities. For maintenance purposes, VUEWorks is used mainly for bus stops, but not for other facilities. LYNX is considering expanding the use of VUEWorks to include all facility maintenance. LYNX will also expand facility records to include condition, remaining useful life, and next scheduled capital activity.
- **Enterprise Resource Planning (ERP) System:** LYNX is considering a new ERP system.

7.5 Implementation Timeline

Table 7-1 shows an implementation timeline for the major planned capital projects within the plan horizon.

Table 7-1: TAM Plan Implementation Timeline

Calendar Year		'18	2019				2020				2021				2022			
Capital Project	Calendar Quarter	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
New Paratransit Facility (LOC Expansion)																		
Southern Operations Facility																		
Pine Hill Transfer Center																		
Purchase of Compressed Natural Gas (CNG) Buses																		
Bus Stop Consolidation and Improvements																		
Implement Automated Fuel/Mileage Tracking Tool																		
Expand VUEWorks to All Facility Maintenance																		
Acquire New Enterprise Resource Planning Software																		

7.6 Challenges

LYNX faces two major challenges in carrying out this TAM Plan: funding and human resources.

7.6.1 Funding

Besides federal formula grants, LYNX relies heavily on subsidies from local jurisdictions and, to a lesser extent, state funding for both operating and capital expenditures. As demonstrated in *Section 5 Investment Prioritization*, LYNX needs to secure additional funding for capital renewal projects.

In addition to capital renewal projects, some capital expansion projects are strategic investments to save operating costs and help LYNX achieve a SGR more efficiently in the long run (for example, the Southern Operations Facility and information system improvement projects). LYNX needs to identify funding for these strategic capital expansion projects.

Currently, capital funding from local jurisdictions is based on a \$2 per service hour formula, which when combined with federal formula funds has proved insufficient for LYNX to maintain a SGR. Meanwhile, substantial federal funds are used for maintenance due to the lack of operating funding. LYNX has been considering other sources of funding, such as discretionary federal grants. LYNX is also discussing how to build support for a dedicated source of transit funding with regional partners.

7.6.2 Human Resources

Human resources are another major challenge for LYNX to carry out this TAM Plan.

LYNX has a shortage of administrative personnel—the number of administrative employees per bus dropped from 0.74 in 2007 to 0.5 in 2017, which suggests that as LYNX expanded its service level, its administrative staff did not expand at a similar pace. The application of contemporary asset management methodologies is new to the U.S. transit industry, and the application of these methodologies to meet the requirements of the FTA Final Rule requires deeper experience and skills than have been developed internally by LYNX. For LYNX, this will require a combination of training, application of new information technology solutions, and hiring of staff with asset management background.

Legally required vehicle inspection is another area with a personnel shortage. Annual inspection on all vehicles is labor-intensive and very costly. LYNX conducts monthly spot inspections.

LYNX will identify the resources needed and consider delegating vehicle inspection to a contractor.

While LYNX increases its recruitment efforts, it will also face unmet training needs. LYNX has been adopting new technologies to improve operating efficiency and effectiveness, such as implementing automated preventive maintenance systems and changing the fleet mix with an increasing number of CNG buses. Staff training is required to be certain that such new technologies are being used properly and to their full potential. Since technology upgrades are expected to be an ongoing process at LYNX, staff training will always be a necessity. LYNX will program staff training as part of its capital improvement plans.

8 List of Key Annual Activities

This section describes the key annual activities needed to implement the TAM Plan.

The two groups of key activities are:

- Execute the respective scheduled and preventive maintenance programs for all assets, including correcting defects identified during scheduled inspections.
- Execute the capital renewal and expansion projects mentioned in *Section 7 Implementation Strategy*:
 - New paratransit operations facility (LOC Expansion)
 - Southern Operations Facility
 - Purchase of CNG buses
 - Pine Hill Transfer Center
 - Bus stop consolidation and improvement
 - IT system improvement
 - VUEWorks application for facility maintenance
 - Acquisition of a tool for fuel usage and mileage tracking
 - Expansion of facility records to include condition, remaining useful life and next scheduled capital activity
 - Acquisition of AVL for fleet maintenance
 - Acquisition of a new ERP system

LYNX's implementation plan will update TAM Plan initiatives through the following key activities.

- Every year, LYNX will:
 - Update the respective asset inventories in the asset management system.
 - Maintain ongoing condition assessment information.
 - Update operation and maintenance cost experience by asset items and classifications.
 - Evaluate priorities among investment needs.
 - Conduct annual budgeting and updating of the Capital Improvement Plan.
 - Establish annual SGR targets.
 - Evaluate TAM Plan progress.
 - Evaluate the TAM Plan to identify necessary updates for the next formal update.
- Every 3 years, LYNX will conduct a formal update of the TAM Plan.

9 Identification of Resources

This section is a summary of the financial and human resources that LYNX needs to develop and carry out this TAM Plan.

9.1 Funding

LYNX receives most of its capital funding from federal formula grants. Table 9-1 shows LYNX's FY2019 capital funding sources.

Table 9-1: FY2019 Preliminary Capital Budget Contributions

Capital Contributions	FY2019 Preliminary Budget	FY2018 Adopted Budget	Dollar Amount Change
Federal	\$98,675,594	\$59,730,965	\$38,944,629
State	\$728,162	\$1,080,235	(\$352,073)
Local	\$2,237,276	\$2,769,274	(\$531,998)
Total	\$101,641,032	\$63,580,474	\$38,060,558

Besides federal formula grants, LYNX relies on capital funding from local jurisdictions and, to a lesser extent, state funding. Currently, capital funding from local jurisdictions is based on a \$2 per service hour formula.

LYNX's 2018 TDP identifies total 10-year capital needs of \$673.8 million and total 10-year capital revenues of \$506.4 million. That is a projected \$167.4 million shortfall over the 10-year period. Table 9-2: shows LYNX's projected capital funding sources and capital funding shortfall in the period from FY2018 to FY2027.

Table 9-2: Projected Capital Funding and Shortfall FY2018 to FY2027

Funding Source	10-Year Total (million 2018\$)
Federal	
5307	\$261.3
5310	\$23.7
Surface Transportation Program (STP) Transfer	\$171.8
5337	\$7.6
5339	\$6.9
State	
FDOT Road Rangers	\$3.4
Local	
Local General Revenue	\$31.7
Total Projected Capital Revenue	\$506.4
Total Projected Capital Needs	\$673.8
Total Projected Capital Shortfall	\$167.4

LYNX will need to identify and secure additional funding to reduce its SGR backlog and implement the planned capital expansion projects. Currently, substantial federal funds are used for maintenance due to a lack of operating funding. LYNX has been looking for other sources of funding, such as discretionary federal grants. LYNX is also collaborating with regional partners to build support for a dedicated source of transit funding.

9.2 Human Resources

Implementation of this TAM Plan requires a workforce qualified and experienced in various functions related to asset management. LYNX has identified an Asset Management Team, which consists of the senior managers who oversee such key asset management functions as fleet maintenance, facility maintenance, finance, planning, and IT. The Asset Management Team members lead the middle management and frontline employees who carry out the day-to-day asset management activities.

As described in Section 7.2, the CEO is the Accountable Executive of the TAM Plan. The CEO delegated the responsibility of overseeing and coordinating TAM Plan development and implementation to the Deputy Director of Facilities. The Deputy Director of Facilities and other LYNX senior managers who have direct and/or supporting responsibilities in asset management form an Asset Management Team. The Asset Management Team consists of the following:

- Chief Operating Officer
- Chief Financial Officer
- Chief Administrative Officer
- Director of Maintenance
- Deputy Director of Facilities
- Director of Planning and Development
- Director of Finance
- Director of IT
- Director of Human Resources

Although LYNX has a qualified and experienced workforce, staff training is an ongoing commitment in workforce development and asset management. Part of LYNX's mission is to provide innovative mobility options. Technology plays an important role in innovation. LYNX constantly seeks opportunities to adopt technologies that will improve service quality, operation efficiency and effectiveness, and reduce environmental impacts.

Section 8 List of Key Annual Activities indicates how LYNX will gradually transition to a CNG fleet. LYNX is exploring the possibility of using electric vehicles, and several IT system improvement projects will be under way within the TAM Plan horizon. Technology upgrades and new technology deployment will require continuous training of the workforce to capitalize on the full potential of the technologies. LYNX will develop and update its workforce training program in concert with its capital planning and asset management planning processes.

As identified in Section 7.6.2, the shortages of administrative and vehicle inspection staff are two major human resource challenges for LYNX. LYNX will increase its recruitment efforts to fill administrative positions that are critical to asset management.

10 Evaluation Plan

This section describes how LYNX will monitor, evaluate, and update the TAM Plan and related business practices.

10.1 TAM Plan Evaluation and Update Frequency

LYNX will evaluate its implementation of the TAM Plan on an annual basis. LYNX will update the TAM Plan every 3 years.

10.2 TAM Plan Evaluation

The annual TAM Plan evaluation process includes two components: (1) performance target setting and reporting, as required by the TAM Rule, and (2) evaluating the progress of planned asset management activities.

10.2.1 TAM Rule Required Performance Target Setting and Reporting

The annual evaluation process will include setting targets with the approval of the Accountable Executive for each Asset Class in LYNX's National Transit Database inventory of assets, using the following FTA-required performance measures:

- Percent of assets past their ULB (rolling stock and non-revenue vehicles)
- Percent of facilities below a rating of 3.0 on the TERM facility condition rating scale

The process will also include an annual narrative report to the National Transit Database that provides a description of any change in the condition of the LYNX transit system from the previous year. The annual report will also describe the progress made during the year to meet the performance targets set in the previous year (49 CFR 525.55 (a)(2)).

10.2.2 Progress of Planned Asset Management Activities

LYNX will monitor and evaluate the completion or progress of the following planned asset management activities:

- Completion of scheduled preventive maintenance
- Progress on major capital renewal and expansion projects identified in this document
- Progress on IT improvement projects
- Progress on planned organizational changes, including planned changes in asset management team organizational structure, staffing, accountability, and the decision-making process

10.3 TAM Plan Update

In addition to the annual evaluation, LYNX will conduct a more thorough evaluation of the TAM Plan and update the TAM Plan every 3 years. The evaluation and update process described in Section 10.3 is in addition to the evaluation process described in Section 10.2.

10.3.1 Alignment of TAM Policy with Agency-Wide Strategic Plan

LYNX will review its TAM Policy with its latest agency-wide strategic plan. The purpose is to ensure that the TAM Policy is consistent with LYNX's overall vision, mission, and strategic goals.

When the TAM Policy is updated, the Accountable Executive or the Accountable Executive's designee will present the updated TAM Policy to the Board for approval.

10.3.2 Update Asset Inventory and Condition

LYNX will update its asset inventory and condition in the TAM Plan every 3 years to reflect the latest changes.

10.3.3 Evaluation of Funding Level and Investment Priorities

LYNX will evaluate the projected funding level in the TAM Plan based on the latest changes. The FTA-required annual performance target update and reporting, as described in Sections 3.5 and 10.2.1, does not involve condition inspections except for facilities. The performance targets for revenue and non-revenue vehicles are purely based on asset age. To update the TAM Plan every 3 years, LYNX will conduct a more thorough update of its inventory and condition. That may involve inspection of a sample of LYNX's revenue and non-revenue fleet and a more thorough inspection of its facilities.

10.3.4 Update List of Key Annual Activities

LYNX will update the list of key annual activities based on its latest preventive maintenance needs and capital improvement program.

10.3.5 Formulate New Implementation Strategy

Along with other updates to the plan, LYNX will identify and formulate a new implementation strategy. LYNX will examine the organizational structure of the Asset Management Team and make updates as necessary. The asset information strategy will also be updated to reflect the latest IT improvement needs in relation to asset management. LYNX will update the implementation timeline for the newly identified asset management activities.

LYNX will identify and document any anticipated challenges in implementing the updated TAM Plan as well as the mitigation strategies LYNX will adopt.

Appendix A: Condition Assessment

A.1 Assessment of Vehicles

Vehicle condition was assessed through a 10 percent sampling of vehicles in the LYNX fleet. From February through April 2017, 118 vehicles were sampled: 36 buses, 20 paratransit (demand response) vehicles, 40 service vehicles, and 22 vanpool vehicles. The sampling approach maximized relevance and value of the condition data to LYNX while avoiding excessive inspection and on-site hours. The methodology included the following steps:

- **Prepared sampling plans for each asset type:** This listed the vehicle numbers (or range of numbers) to be inspected for each asset type based on the sampling frequency agreed to by LYNX in the previous step.
- **Prepared questionnaires:** These were applied to collect relevant data for interviewing LYNX staff and for determining which staff (who and how many) should be interviewed.
- **Prepared condition assessment forms for each asset type:** These forms listed the systems and components that were physically examined on each vehicle.
- **Prepared condition rating descriptions for each system/component for each asset/vehicle type:** Descriptions for each rating (1 through 5) were patterned after FTA's Transit Economic Requirements Model (TERM) rating system. The TERM scale is the five-category rating system used to describe the condition of an asset: 5.0—Excellent, 4.0—Good; 3.0—Adequate, 2.0—Marginal, and 1.0—Poor. These rating descriptions are specific to each system/component row on each condition assessment sheet. This reduced the subjectivity and variability of the data, and increased the ability of inspectors to assign consistent ratings for similar conditions. All condition rating descriptions were provided to LYNX for approval to confirm that the ratings to be used for this assessment are consistent with previous ratings in LYNX's system. The condition rating descriptions are summarized in Appendix B.
- **Developed condition assessment metric:** This metric was used to compute a total vehicle condition rating from the individual system/component ratings.

After the preparatory work was completed and approved by LYNX, data collection and assessment was conducted. This phase included the following activities:

- Interviewed LYNX maintenance staff.
- Reviewed asset and maintenance records, including maintenance and reliability/performance information such as failure reports, parts usage records, work orders, out-of-service / mean distance between failures performance data, overhaul/component replacements records, maintenance practices, and other records.
- Performed physical condition assessment by inspecting the vehicles (and assets) per the agreed-upon sampling plan.
- Documented findings for each vehicle using condition assessment forms.
- Uploaded completed assessment forms into the database.

After field work, maintenance data and condition assessment scores were analyzed and summarized with the following inventory data:

- Description
- Asset classification in the TERM Lite asset hierarchy
- Acquisition year

- Useful life
- Replacement cost
- Condition
- If renewable, last renewal year
- If renewable, renewal useful life
- If renewable, cost of renewal.

A.2 Facilities and Other Assets

A combination of field assessments and samplings were performed on each of the asset categories identified in *Section 2 Inventory of Capital Assets*. From April through August 2015, field teams were assembled with the requisite engineering disciplines to perform the inventory and condition assessments.

The results of the condition assessments were documented in data collection sheets and photographs, which identified the locations of deficiencies; the sheets also summarized the condition of the LYNX assets inspected.

In the field inventory and condition assessments, each discipline was involved in one or more of the following activities prior to or during the assessment:

- Participated in a training session for all inspectors on the data collection forms and condition-rating metrics. This was intended to result in consistency in condition measurement.
- Performed an initial familiarization review to note conspicuous aspects for special attention and to begin the finalization of asset identification.
- Interviewed the appropriate LYNX personnel for input regarding day-to-day issues, problem areas, and access to equipment records.
- Reviewed available management information data and documents, and maintenance records and schedules.
- Reviewed as-built plans for assets.
- Conducted field surveys to finalize the asset identification and augment the information and data obtained above. The field surveys involved hands-on inspections of assets and engineering judgment to identify whether further evaluation or investigations were needed.
- Reviewed renewals/ongoing maintenance to identify any recent replacements and upgrades, and ongoing maintenance requirements.
- Reviewed spare assets owned by LYNX.
- During the site visits and personnel interviews, collected the following information for each asset to assist in the overall assessment:
 - Extent and ease of usage
 - Criticality to operations and to public safety
 - Reliability and availability
 - Maintenance requirements, maintenance contracts, maintenance experience, in-house support, and training

- Expandability (new functions, new users, new field devices, new input/output points, and new interfaces)
- Upgradability
- Planned life span, life expectancy
- Identified known deficiencies and impacts to operations, code compliance, or life safety.

The condition assessments addressed the following subcategories and elements:

- **Stations and Parking:**

- Structures
 - Passenger waiting platforms
 - Security/closed-circuit television (CCTV) camera
- Platforms and Canopies
- Benches
- Site Utilities (platform and site lighting, irrigation)
- Site and Circulation (bus drive lanes, sidewalks, stairs, ramps)
 - Landscaping
 - Handrail
- Retaining Walls (that are not part of the right-of-way inspection)
- Parking (off-street)
 - Pavement
 - Site Utilities (lighting, drainage, and stormwater management)
 - Site Access (access drives, traffic control)
 - Site Circulation (sidewalks, stairs, and ramps)
- **Communications:** The LYNX Operations Center (LOC) includes the control room, computer room, communications room, and other areas. LYNX computers, software, telephones, and printers were used to enter the information into the database.
- **Facilities:** Each of the LYNX maintenance facilities was inspected by a facilities team that included architectural, civil, MEP (mechanical, electrical and plumbing), and shop equipment specialists. The facilities included LYNX Corporate Offices, the LOC, and the Southern Operations Facility in Kissimmee. The assessments included the building shell and mechanical elements, standby power, fueling facilities, access and service facilities, and shop equipment. Shop equipment and fueling facilities were inventoried at the major component level to allow for a more detailed condition assessment and life cycle definition. Code-compliant issues were not addressed.
- **Information Systems:** The assessment identified existing hardware and software from inventory lists and databases, which included IT equipment such as desktop computers, software, and peripherals.

Appendix B: Condition Rating Definitions by Vehicle Type

B.1 Buses

Equipment	Condition Rating 1	Condition Rating 2	Condition Rating 3	Condition Rating 4	Condition Rating 5
Exterior	Heavy corrosion or damage, holes evident, access doors loose, parts worn beyond reasonable service limits	Corrosion evident, hinges or latches frozen, major cosmetic damage, some non-critical parts broken	Minor corrosion or scrapes present but could be repaired with cleaning priming and painting, minor cosmetic damage, parts heavily worn but serviceable	Condition generally good, may need painting	Like new condition, clean and tight
Interior: Driver Area & Passenger Area	Parts broken or missing, not functional	Visible leakage, switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable with cleaning, painting or adjusting	Clean and mechanically sound but age apparent	Like new condition, clean and tight
Electrical Systems & Door Control	Parts broken or missing, not functional	Visible leakage, switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable	Mechanically sound but age apparent	Like new condition, clean and tight
Lighting System	Parts broken or missing, not functional	Switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable	Mechanically sound but age apparent	Like new condition, clean and tight
Engine Compartment & Drive Train	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts.	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight
Chassis / Under-structure	Heavy corrosion, holes and cracking, massive leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged hoses, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn hoses and bushings, some components require adjustment	Generally clean, mechanically sound, visible wear, minimal leakage	Like new condition, clean and tight
Pneumatic System	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight
Suspension System	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight
Brakes	Parts broken or missing, not functional	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn hoses and some components require adjustment	Mechanically sound but age apparent	Like new condition, clean and tight

Equipment	Condition Rating 1	Condition Rating 2	Condition Rating 3	Condition Rating 4	Condition Rating 5
HVAC System	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight
ADA Lift / Ramp	Parts broken or missing, not functional	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn hoses and some components require adjustment	Mechanically sound but age apparent	Like new condition, clean and tight

B.2 Ride Share Vehicles

Equipment	Condition Rating 1	Condition Rating 2	Condition Rating 3	Condition Rating 4	Condition Rating 5
Exterior	Heavy corrosion or damage, holes evident, access doors loose, parts worn beyond reasonable service limits	Corrosion evident, hinges or latches frozen, major cosmetic damage, some non-critical parts broken	Minor corrosion or scrapes present but could be repaired with cleaning priming and painting, minor cosmetic damage, parts heavily worn but serviceable	Condition generally good, may need painting	Like new condition, clean and tight
Interior: Driver Area & Passenger Area	Parts broken or missing, not functional.	Visible leakage, switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable with cleaning, painting or adjusting	Clean and mechanically sound but age apparent	Like new condition, clean and tight
Electrical Systems	Parts broken or missing, not functional.	Visible leakage, switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable	Mechanically sound but age apparent	Like new condition, clean and tight
Lighting System	Parts broken or missing, not functional	Switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable	Mechanically sound but age apparent	Like new condition, clean and tight
Engine Compartment & Drive Train	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts.	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight
Chassis / Under-structure	Heavy corrosion, holes and cracking, massive leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged hoses, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn hoses and bushings, some components require adjustment	Generally clean, mechanically sound, visible wear, minimal leakage	Like new condition, clean and tight

Equipment	Condition Rating 1	Condition Rating 2	Condition Rating 3	Condition Rating 4	Condition Rating 5
Suspension System	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts.	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight
Brakes	Parts broken or missing, not functional	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn hoses and some components require adjustment	Mechanically sound but age apparent	Like new condition, clean and tight
HVAC System	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning.	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight

B.3 Paratransit Vehicles

Equipment	Condition Rating 1	Condition Rating 2	Condition Rating 3	Condition Rating 4	Condition Rating 5
Exterior	Heavy corrosion or damage, holes evident, access doors loose, parts worn beyond reasonable service limits	Corrosion evident, hinges or latches frozen, major cosmetic damage, some non-critical parts broken	Minor corrosion or scrapes present but could be repaired with cleaning priming and painting, minor cosmetic damage, parts heavily worn but serviceable	Condition generally good, may need painting	Like new condition, clean and tight
Interior: Driver Area & Passenger Area	Parts broken or missing, not functional	Visible leakage, switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable with cleaning, painting or adjusting	Clean and mechanically sound but age apparent	Like new condition, clean and tight
Electrical Systems	Parts broken or missing, not functional	Visible leakage, switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable	Mechanically sound but age apparent	Like new condition, clean and tight
Lighting System	Parts broken or missing, not functional	Switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable	Mechanically sound but age apparent	Like new condition, clean and tight
Engine Compartment & Drive Train	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts.	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight

Equipment	Condition Rating 1	Condition Rating 2	Condition Rating 3	Condition Rating 4	Condition Rating 5
Chassis / Under-structure	Heavy corrosion, holes and cracking, massive leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged hoses, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn hoses and bushings, some components require adjustment	Generally clean, mechanically sound, visible wear, minimal leakage	Like new condition, clean and tight
Suspension System	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight
Brakes	Parts broken or missing, not functional	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn hoses and some components require adjustment	Mechanically sound but age apparent	Like new condition, clean and tight
HVAC System	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight
ADA Lift / Ramp	Parts broken or missing, not functional	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts.	Minor corrosion or cracking present but repairable, minor leakage, worn hoses and some components require adjustment	Mechanically sound but age apparent	Like new condition, clean and tight

B.4 Support Vehicles

Equipment	Condition Rating 1	Condition Rating 2	Condition Rating 3	Condition Rating 4	Condition Rating 5
Exterior	Heavy corrosion or damage, holes evident, access doors loose, parts worn beyond reasonable service limits	Corrosion evident, hinges or latches frozen, major cosmetic damage, some non-critical parts broken	Minor corrosion or scrapes present but could be repaired with cleaning priming and painting, minor cosmetic damage, parts heavily worn but serviceable	Condition generally good, may need painting	Like new condition, clean and tight
Interior: Driver Area & Passenger Area	Parts broken or missing, not functional.	Visible leakage, switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable with cleaning, painting or adjusting	Clean and mechanically sound but age apparent	Like new condition, clean and tight

Equipment	Condition Rating 1	Condition Rating 2	Condition Rating 3	Condition Rating 4	Condition Rating 5
Electrical Systems	Parts broken or missing, not functional	Visible leakage, switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable	Mechanically sound but age apparent	Like new condition, clean and tight
Lighting System	Parts broken or missing, not functional	Switches or hinges frozen, non-critical parts broken or loose	Corroded or dirty but repairable	Mechanically sound but age apparent	Like new condition, clean and tight
Engine Compartment & Drive Train	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts.	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight
Chassis / Under-structure	Heavy corrosion, holes and cracking, massive leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged hoses, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn hoses and bushings, some components require adjustment	Generally clean, mechanically sound, visible wear, minimal leakage	Like new condition, clean and tight
Suspension System	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight
Brakes	Parts broken or missing, not functional	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn hoses and some components require adjustment	Mechanically sound but age apparent	Like new condition, clean and tight
HVAC System	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight
Specialty Equipment	Heavy corrosion, holes evident, major leaks, parts broken or missing, not functioning	Corrosion and cracking evident, heavy leakage, some mountings broken, damaged cables and belts, heavy wear, broken or missing parts	Minor corrosion or cracking present but repairable, minor leakage, worn cables and belts.	Generally clean, mechanically sound, wear visible, minimal leakage	Like new condition, clean and tight

Appendix C: SGR Analysis Methodology

C.1 Inputs

This section describes the TERM Lite model inputs used in the SGR analysis. The three primary inputs from the LYNX inventory:

- **Asset inventory:** Consists of LYNX individual asset line items in the LYNX asset inventory.
- **Asset type data:** Consists of asset types addressed in TERM Lite.
- **Annual budget constraints:** An unconstrained scenario is described in Section 4.2.3. A constrained scenario is described in *Section 5 Investment Prioritization*.

C.1.1 Asset Inventory

The asset inventory in the SGR analysis included the following data fields for each of the 1,113 line items, based on field observations, professional judgment, LYNX's inventory, and industry standards:

- **Replacement life:** This was determined using LYNX's standard and industry standards.
- **Condition rating:** A combination of field observations and professional judgment was used to determine the asset condition ratings. The condition assessment process is described in *Section 3 Assessment of Asset Condition*.
- **Replacement cost:** Asset records, LYNX's standards and industry standards, and professional judgment were applied to assign a loaded replacement cost to all assets.
- **Renewal cost:** For applicable assets, these costs (e.g., the cost of a new drivetrain in a bus) were assigned to asset types as a percentage of asset replacement costs. These percentages were mapped to each asset based on asset type.
- **Renewal life:** For applicable assets, these costs were assigned to asset types as a percentage of assets replacement life. These percentages were mapped to each asset based on asset type.
- **Annual capital maintenance cost:** For applicable assets, these costs were assigned to asset types as a percentage of asset replacement costs. These percentages were mapped to each asset based on asset type.

C.1.2 Asset Type Data

Each of the LYNX asset line items included in the inventory was categorized into one of the 600 asset types applied in TERM Lite. These asset types are arranged in a hierarchy summarized below:

- **Asset category:** The five asset categories used in this analysis were facilities, guideway elements, stations, systems, and vehicles.
- **Asset subcategory:** The 5 asset categories were further broken out into 32 subcategories.
- **Asset element:** The 32 subcategories were further broken out into a total of 152 elements.
- **Asset sub-element:** The 152 elements were further broken out into a total of 600 sub-elements.

Note that the LYNX asset inventory does not include assets in every one of the 600 asset types. (The asset classification in TERM Lite was created to be comprehensive for all transit agencies nationwide, including modes not operated by LYNX).

C.1.3 Outputs

TERM Lite produced four primary outputs that were used in the SGR analysis:

- **20-Year Annual SGR Needs:** This included average total annual SGR needs, annual SGR needs by category, and annual SGR needs by subcategory. Note that a calculation of 20-year SGR need was not a direct output of TERM Lite. Therefore, an unconstrained scenario (i.e., a scenario with an effectively unlimited budget) was required. Because unconstrained spending equals total need, a spending output report, which was a direct output of the model, was used in place of a needs report.
- **20-Year Annual SGR Spending:** This included average total annual SGR spending and annual SGR spending by asset type. Note that, unlike the 20-year SGR needs calculation, a 20-year spending report is a direct output of TERM Lite.
- **20-Year Annual SGR Backlog:** This included total initial SGR backlog, initial SGR backlog by asset type, change in SGR backlog over the analysis time frame, and change in SGR backlog by asset type.
- **20-Year Annual Asset Condition:** This included the overall change in asset condition over the analysis period and the change in asset condition by asset type and location.

Appendix D: Investment Prioritization Process

D.1 Step 1: Calculate Priority Scores

TERM Lite prioritizes based on asset condition (based on asset age) and a set of three criteria ratings: safety and security risk ratings, operations and maintenance (O&M) cost impact ratings, and reliability ratings. A set of ratings were assigned to each asset class on a scale from 5 (most impact) to 1 (least impact). Table D-1 summarizes these ratings.

Table D-1: Asset Ratings for Select Asset Types

Asset	Safety & Security	O&M Cost Impact	Reliability
Facilities: bus washer	3	3	2
Facilities: office computers	2	1	2
Guideway elements: bus guideway	2	3	3
Stations: parking lots	3	3	2
Stations: bus shelters	4	3	2
Stations: platform	4	3	2
Systems: CCTV	5	1	3
Systems: public address systems	4	1	1
Vehicles: 40-foot bus	5	5	5
Vehicles: non-revenue car	3	3	3

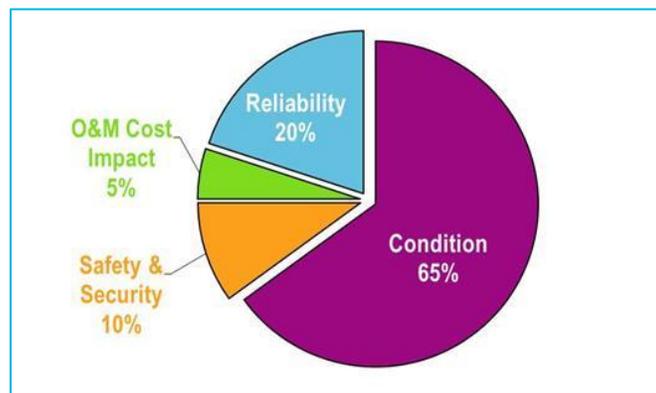
Note: These are default values developed by the FTA and do not necessarily reflect LYNX's policy. They are not absolutes and could be changed by LYNX.

The model applied these ratings to the weights described below to calculate an initial set of asset priority scores on a scale from 100 (highest priority) to 0 (lowest priority), (including fractional values). The priority scores were used to sort all asset line items by priority in order to identify those assets most in need of investment in a budget-constrained scenario.

Four evaluation factors were used to calculate the asset priority score: condition score, safety and security, O&M cost impact, reliability, and user-defined factor (a fifth evaluation factor, a user-defined criterion, was not applied). These factors were weighted (default weights in TERM Lite were applied in this analysis; LYNX-specific weights could be applied in future analyses).

Figure D-1 summarizes the weights applied to the five asset evaluation factors in this analysis. The subsequent sections explain the different factors and their weights as applied in TERM Lite for this SGR analysis.

Figure D-1: Asset Evaluation Factors and Weights

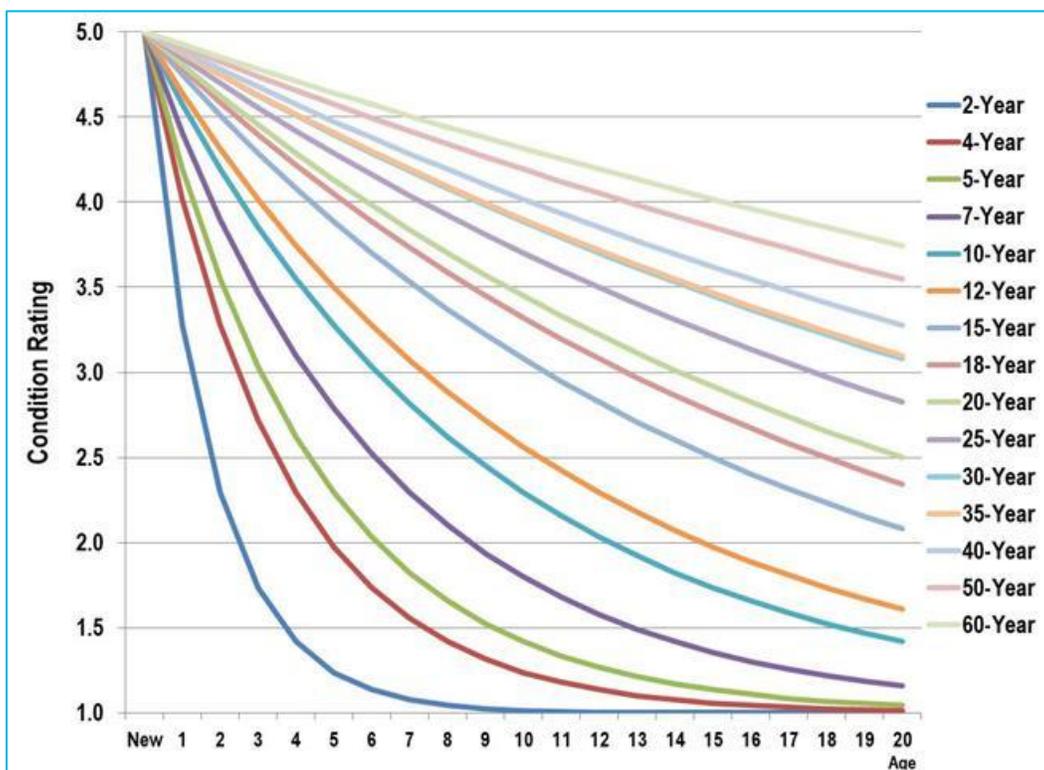


D.1.1 Asset Condition

Asset condition accounted for 65 percent of the total priority score for each asset. As applied in TERM Lite, the asset condition rating was a function of asset age. This condition rating is different from the condition rating assessed through field observations prior to the SGR analysis. Asset decay curves, which were used to calculate the asset condition rating for all assets, varied based on an asset’s useful life. New assets were assigned an asset condition rating of 5.0; assets decay to a rating of 1.0 along a uniform curve that varied based on an asset’s useful life. The asset decay curves were calibrated so that a rating of 2.5 occurred at the end of an asset’s useful life.

Figure D-2 is a summary of all asset decay curves applied in the TERM Lite in this analysis.

Figure D-2: Asset Decay Curves in TERM Lite



The various major asset types associated with each useful life and decay curve are listed below:

- **2-year:** CCTV cameras
- **4-year:** demand response sedans, non-revenue sedans, building landscaping
- **5-year:** office software, CCTV cameras, industrial equipment
- **7-year:** demand response vans, non-revenue vans, office hardware
- **10-year:** simulators, bus washers, phone systems, copiers
- **12-year:** buses, vehicle lifts, bus vacuums
- **15-year:** heating, ventilation, and air-conditioning (HVAC) systems, vehicles lifts
- **18-year:** vehicle lifts, forklifts, compressors
- **20-year:** building components, generators, paint booths
- **25-year:** building roofs, fueling equipment
- **30-year:** electric power supply equipment, building pollution control
- **35-year:** elevator motors
- **40-year:** building structural components, overhead cranes
- **50-year:** building components
- **60-year:** building structural components, platforms

The condition priority score calculation is:

$$\text{Asset condition priority score} = 6 - \text{condition rating}$$

For example, a new asset with a condition rating of 5.0 would have a condition priority score of 1.0, while a highly deteriorated asset with a condition rating of 2 would have a high condition priority score of 4. Figure D-2 is a summary of the relationship between an asset’s condition rating and its condition priority score.

Table D-2: Summary of Condition Ratings and Condition Priority Scores

Condition Description	Condition Rating	Condition Priority Score
New	5	1
Good	4	2
Marginal	3	3
Worn	2	4
Obsolete	1	5

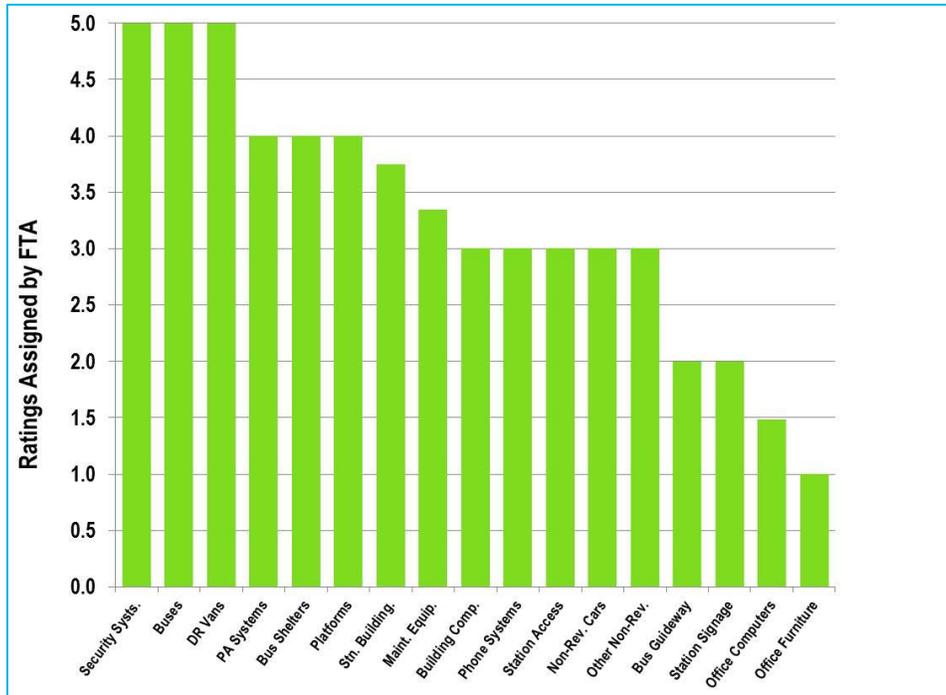
D.1.2 Safety and Security

The safety and security risk rating accounts for 10 percent of an asset’s total priority score. All assets were assigned a score of 1 to 5 using the default values in TERM Lite.

Figure D-3 summarizes the safety and security risk ratings of the 17 asset subcategories included in the LYNX inventory. Each of the 600 asset category/ subcategory/element/sub-

element types included in TERM Lite has a default safety and security risk rating that is a whole number between 1 and 5. In Figure D-3 these ratings were rolled up into an average rating weighted by the replacement value of LYNX assets.

Figure D-3: Safety and Security Risk Ratings by Asset Subcategory



*Weighted by replacement value

The priority score for safety and security is:

$$\text{Safety and security priority score} = (\text{safety and security risk rating} * \text{asset condition evaluation score}) / 5$$

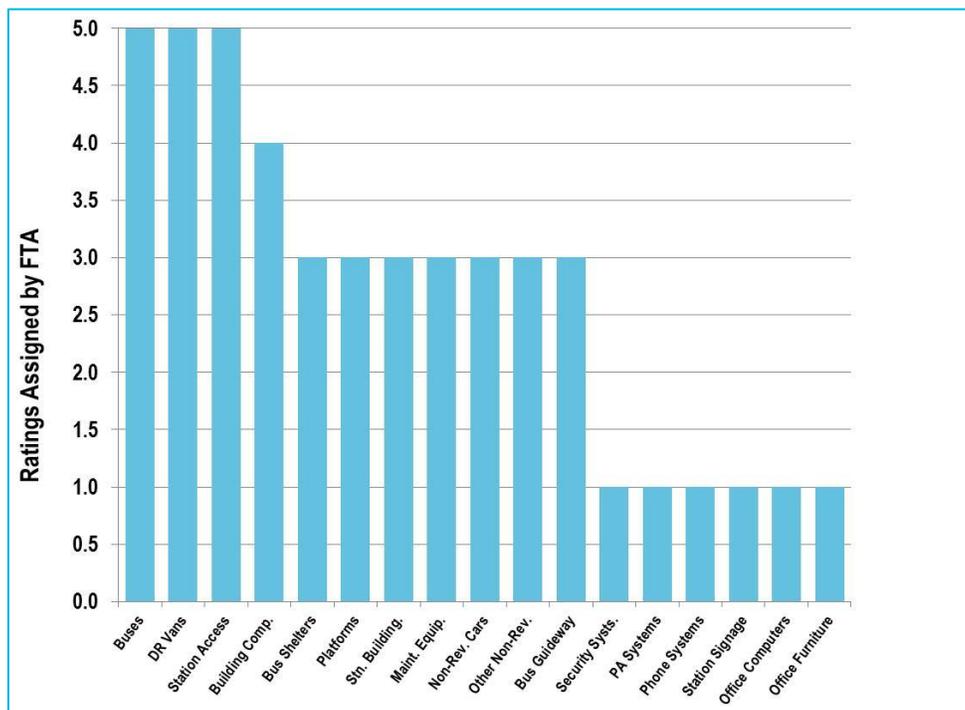
The safety and security priority score incorporates asset condition because safety risk is not static over the life of an asset. As an asset deteriorates, the safety risks increase.

D.1.3 O&M Cost

The O&M cost impact rating accounts for 5 percent of an asset’s total priority score. All assets were assigned a score of 1 to 5, using the default values in TERM Lite.

Figure D-4 summarizes the O&M cost impact ratings of the 17 detailed asset subcategories included in the LYNX inventory. All 600 asset category/subcategory/element/sub-element types included in TERM Lite have an assigned O&M cost impact rating that is a whole number between 1 and 5. In Figure D-4 these ratings were rolled up into an average rating weighted by the replacement value of LYNX assets.

Figure D-4: O&M Cost Impact Ratings by Asset Subcategory



*Weighted by replacement value

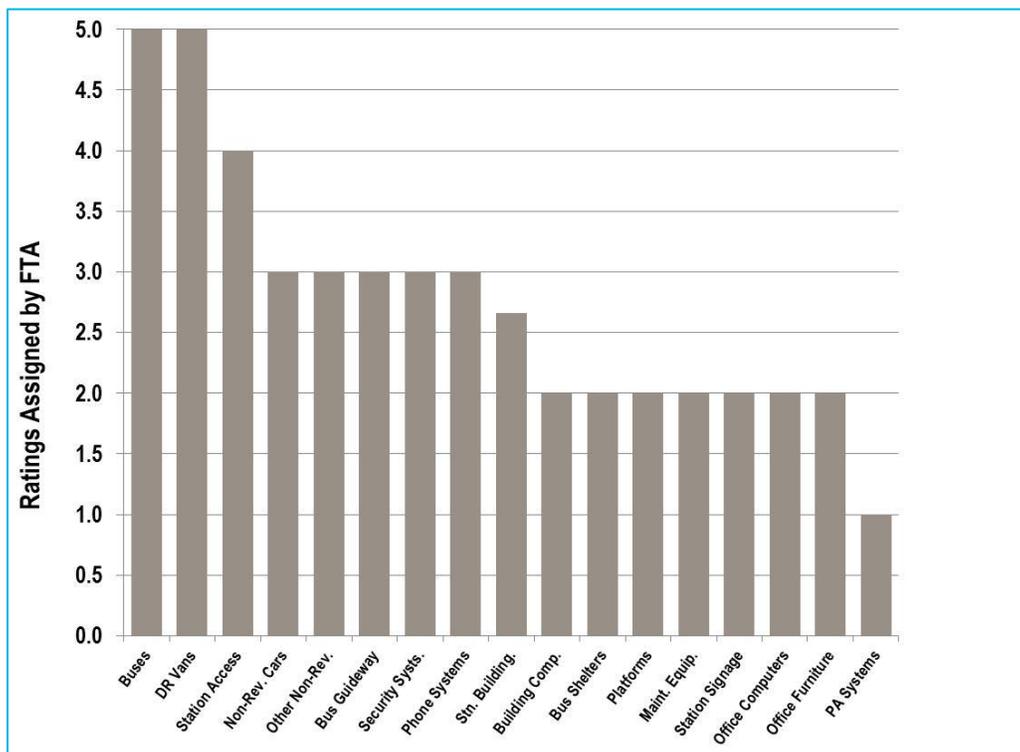
The O&M cost impact priority score does not change over the life of an asset.

D.1.4 Reliability

The reliability rating accounted for 20 percent of an asset’s total priority score. All assets were assigned a score of 1 to 5 using the default values in TERM Lite.

Figure D-5 summarizes the reliability ratings of the 17 asset subcategories included in the LYNX inventory. Note that all 600 asset category/subcategory/element/sub-element types included in TERM Lite have an assigned reliability rating that is a whole number between 1 and 5. In Figure D-5 these ratings were rolled up into an average rating weighted by the replacement value of LYNX assets.

Figure D-5: Reliability Ratings by Asset Subcategory



*Weighted by replacement value

The priority score for reliability is:

$$\text{Reliability priority score} = (\text{reliability rating} * \text{asset condition score}) / 5$$

The reliability priority score incorporates the asset’s condition because asset reliability is not static over the life of an asset. As an asset deteriorates, its reliability decreases.

D.1.5 Consolidated Asset Priority Score Calculation

The consolidated priority score calculation for an asset in a given year is:

$$\text{Asset priority score} = [(\text{condition score} * 65) + (\text{safety and security score} * 10) + (\text{O\&M cost impact score} * 5) + (\text{reliability score} * 20)] / 5$$

D.2 Step 2: Sort Action by Priority Score

Once the priority scores for all assets in the asset inventory were calculated in each analysis year, TERM Lite sorted the line items in descending order, from highest priority score to lowest priority score.

D.3 Step 3: Fund Actions

After the asset line items were sorted by priority score, TERM Lite applied the budget constraint (based on recent LYNX capital plans) to fund actions in descending order of priority. In each analysis year, TERM Lite begins at the top of the list, allocating funds to replacement, renewal, and capital maintenance actions until funding runs out.

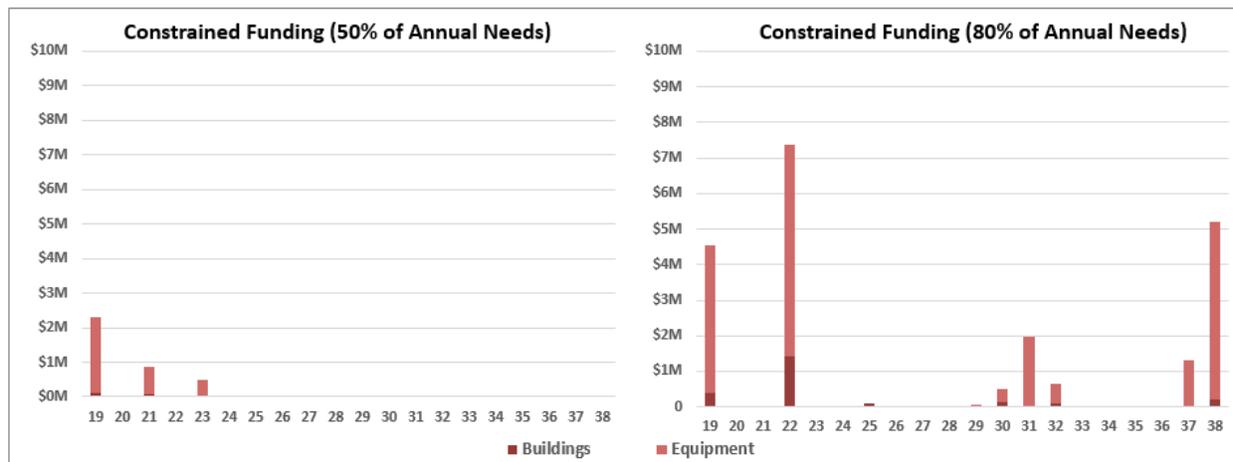
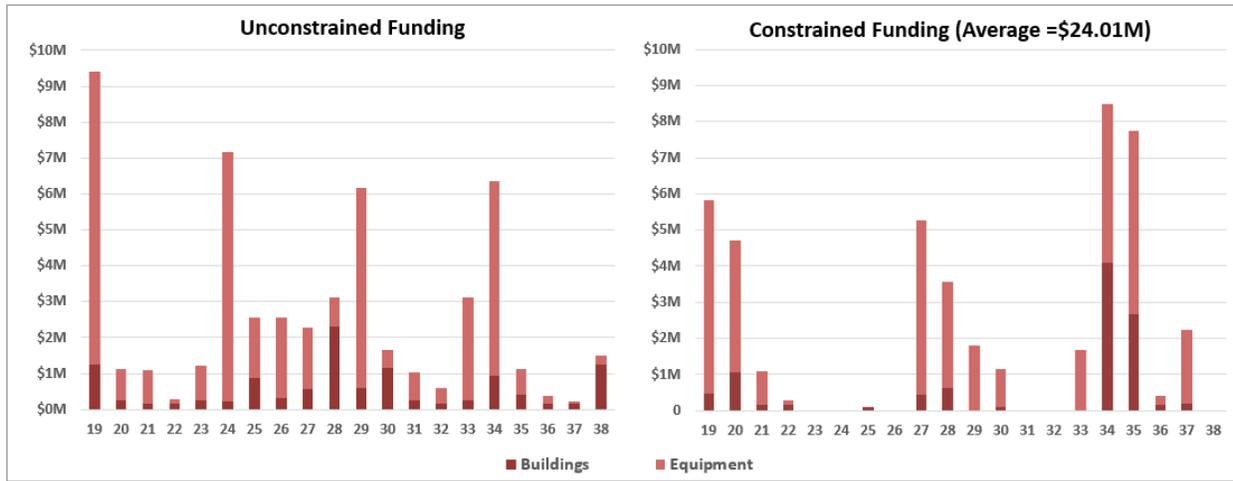
D.4 Step 4: Age Assets and Recalculate Priority Scores

Once all funding in each year has been exhausted, TERM Lite ages the assets by 1 year. Assets that did not receive investments in the previous year will have a high-priority score due to their worsened condition. The model repeats Steps 1 through 3 in each year of the SGR analysis period.

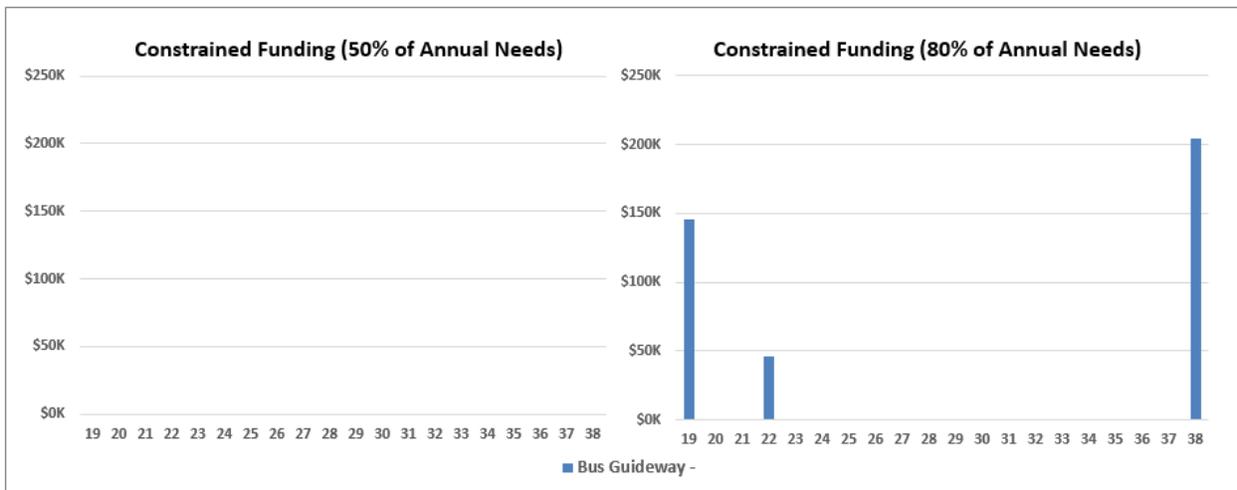
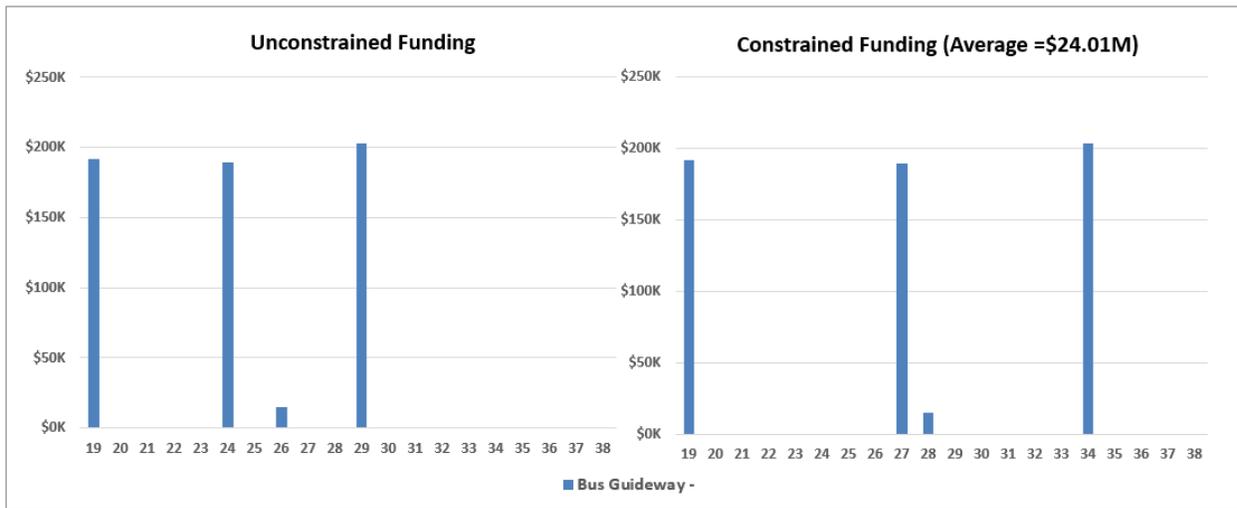
**Appendix E: Investment Prioritization Charts Based on
Application of TERM Lite**

E.1 SGR Funding by Subcategory

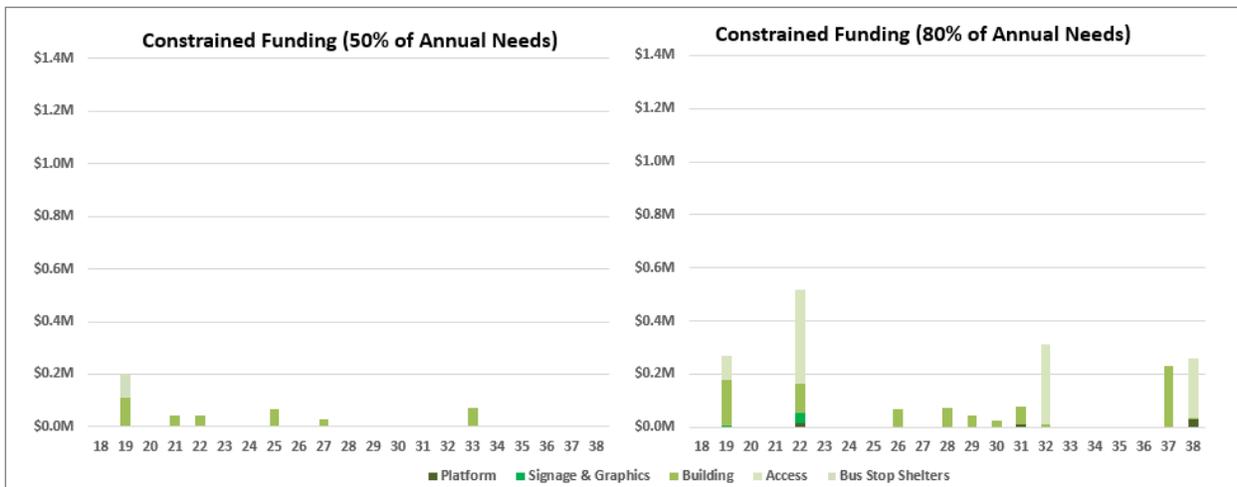
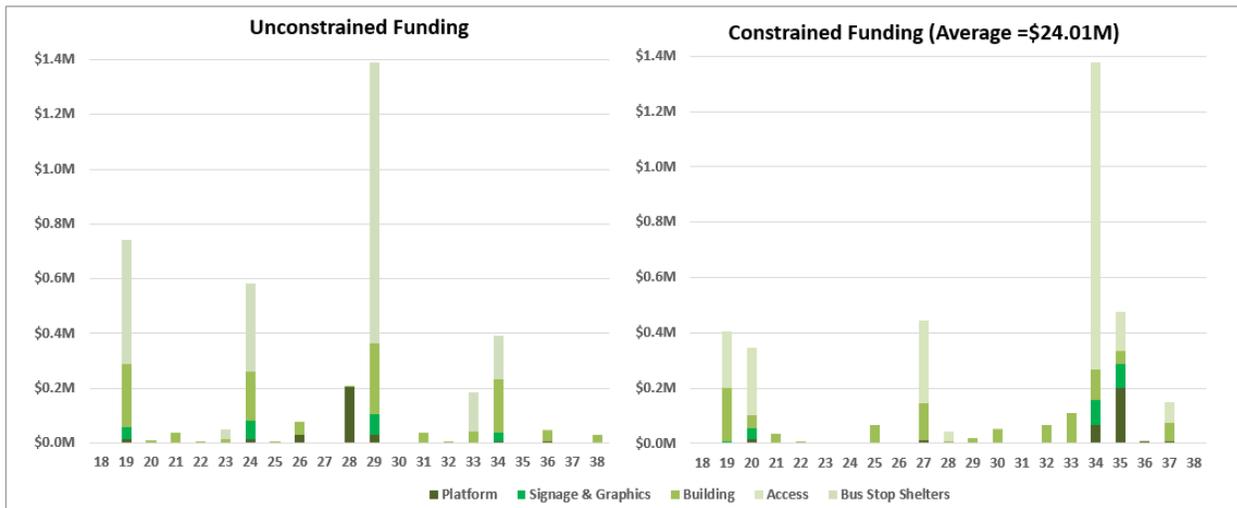
E.1.1 Facilities Funding



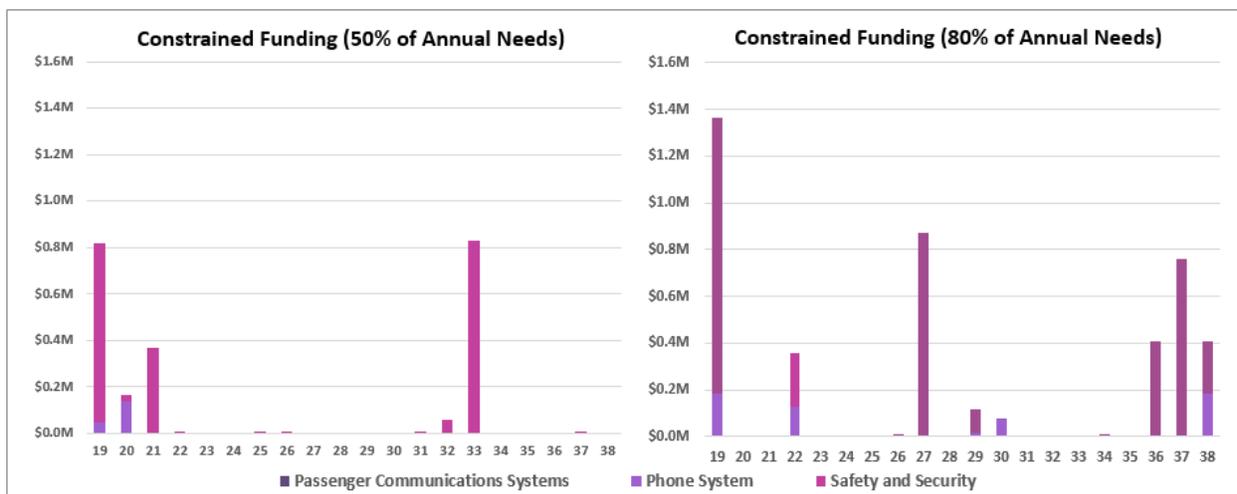
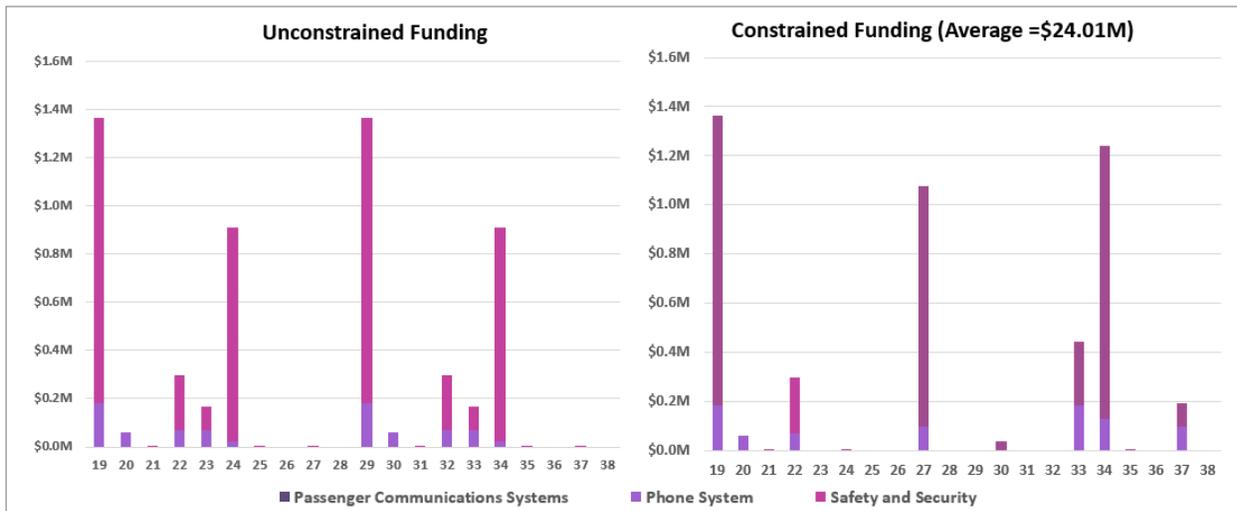
E.1.2 Bus Guideway Funding



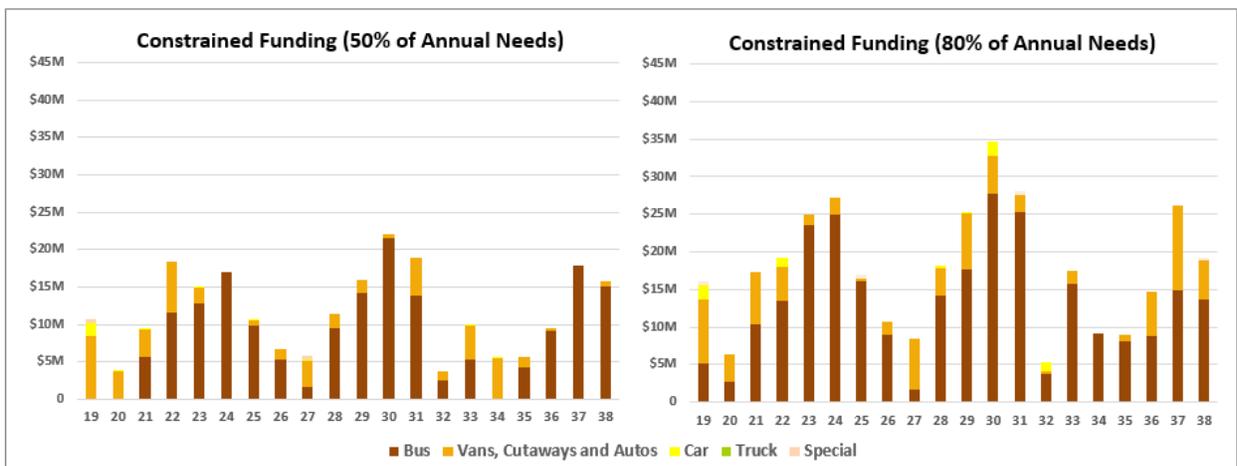
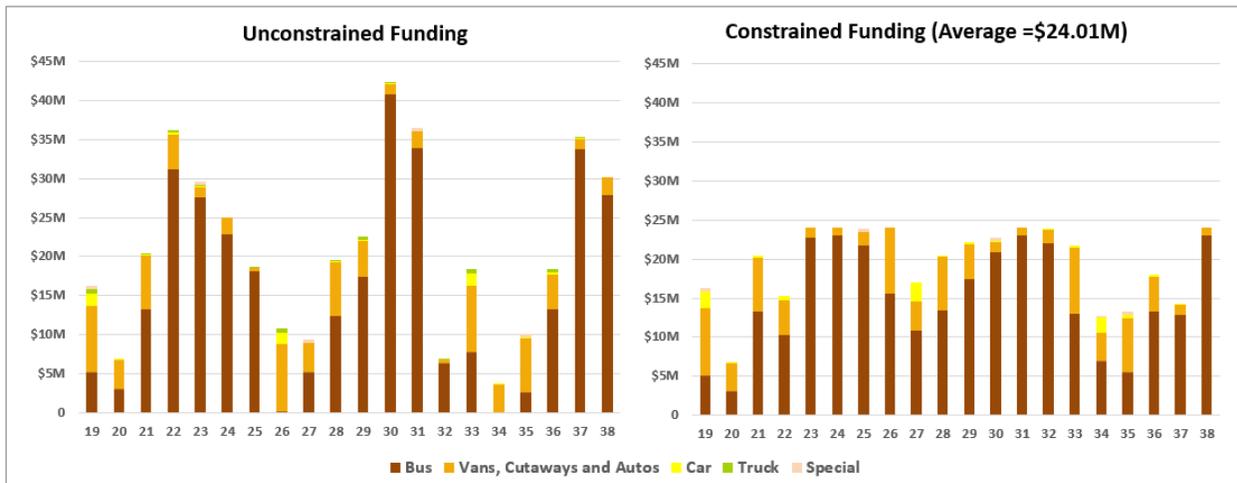
E.1.3 Stations Funding



E.1.4 Systems Funding

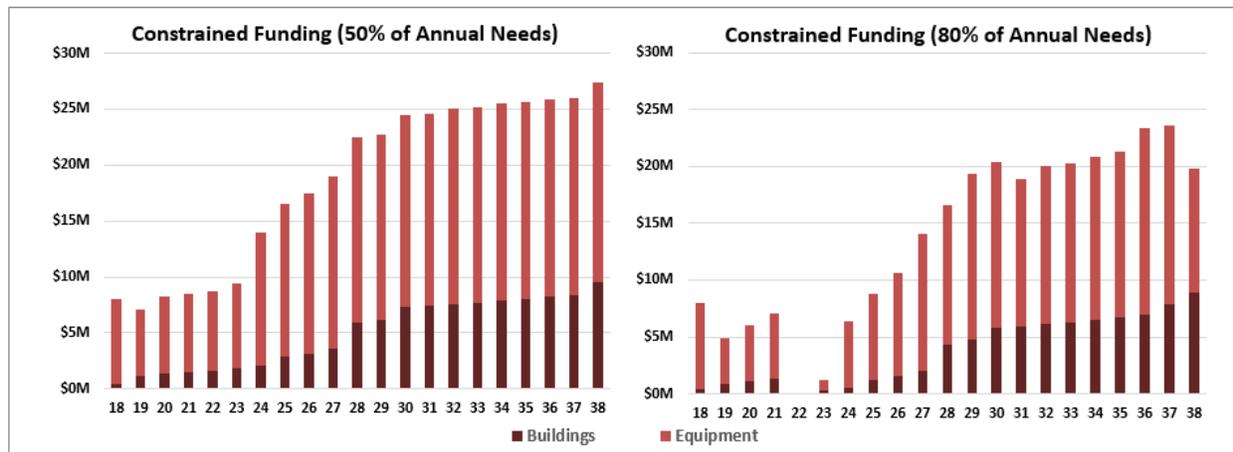
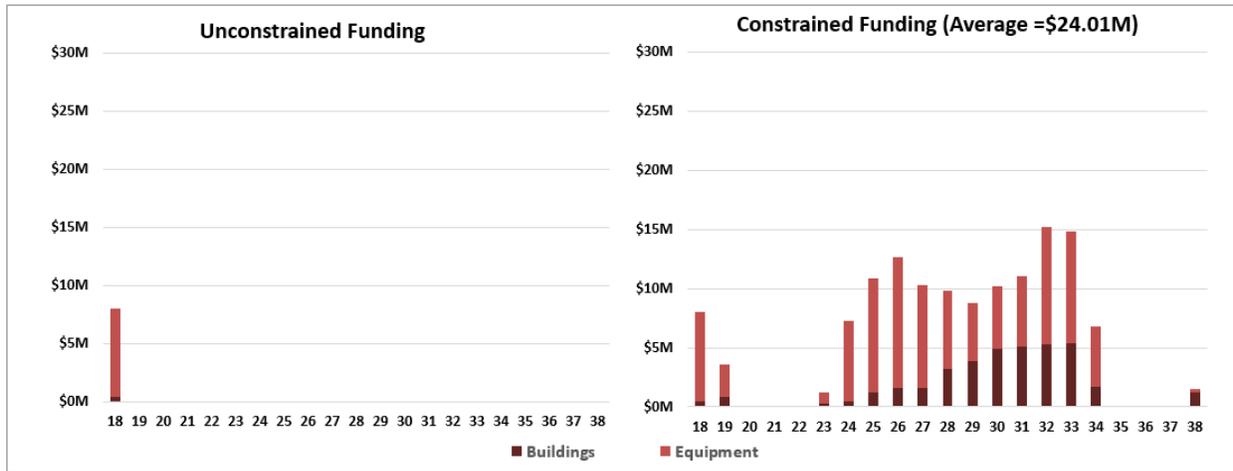


E.1.5 Vehicles Funding

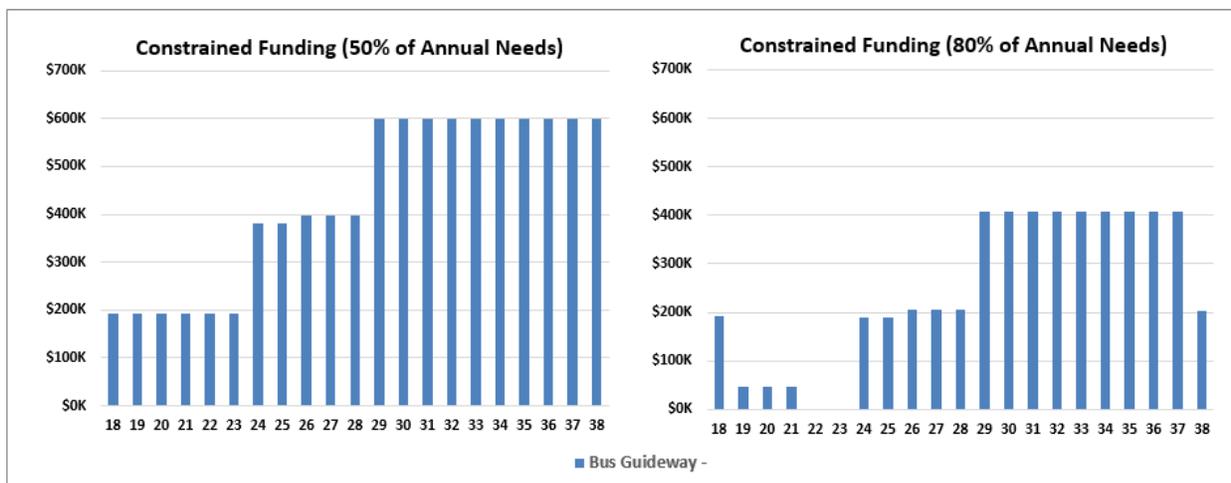
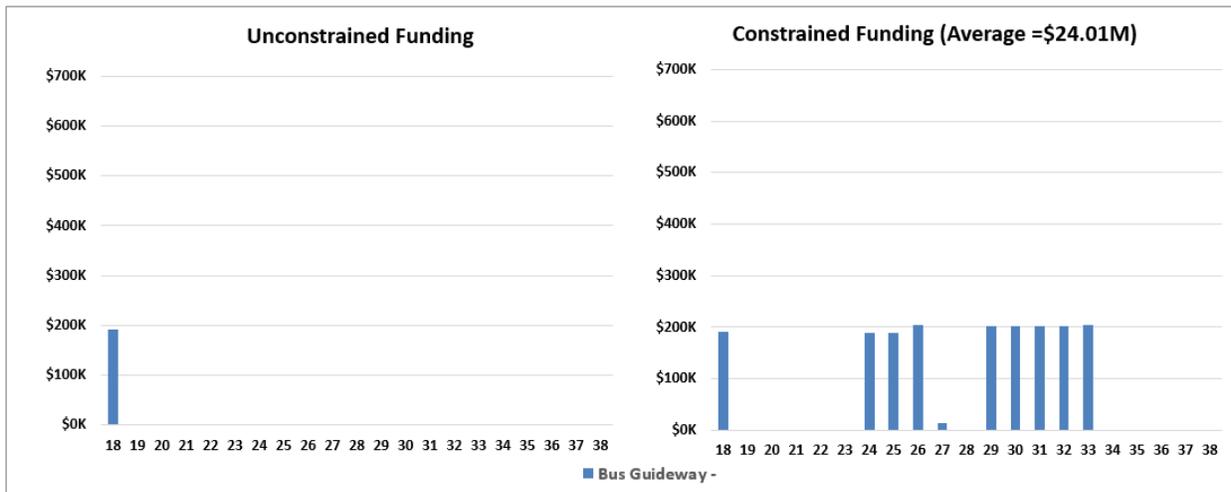


E.2 SGR Backlog by Subcategory

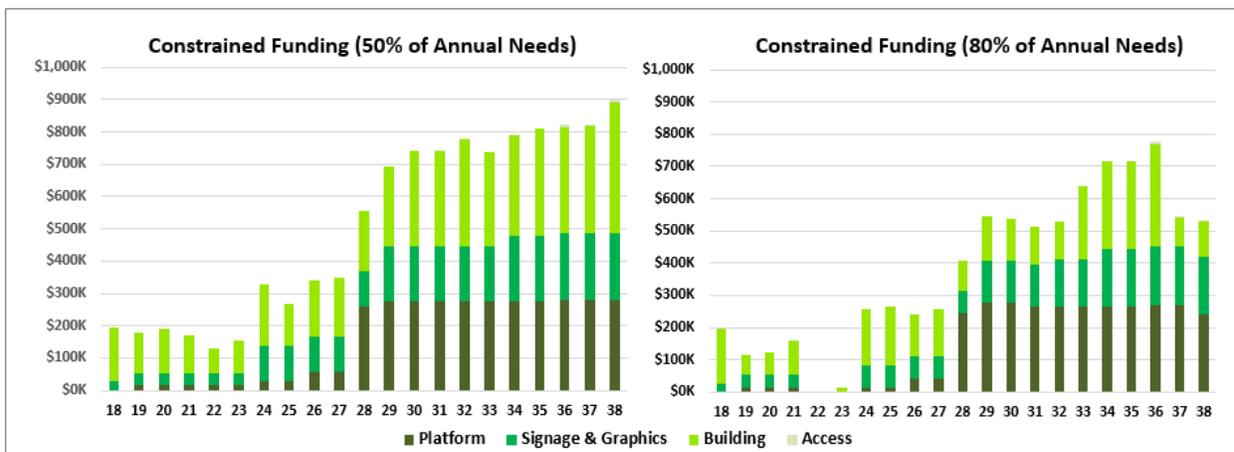
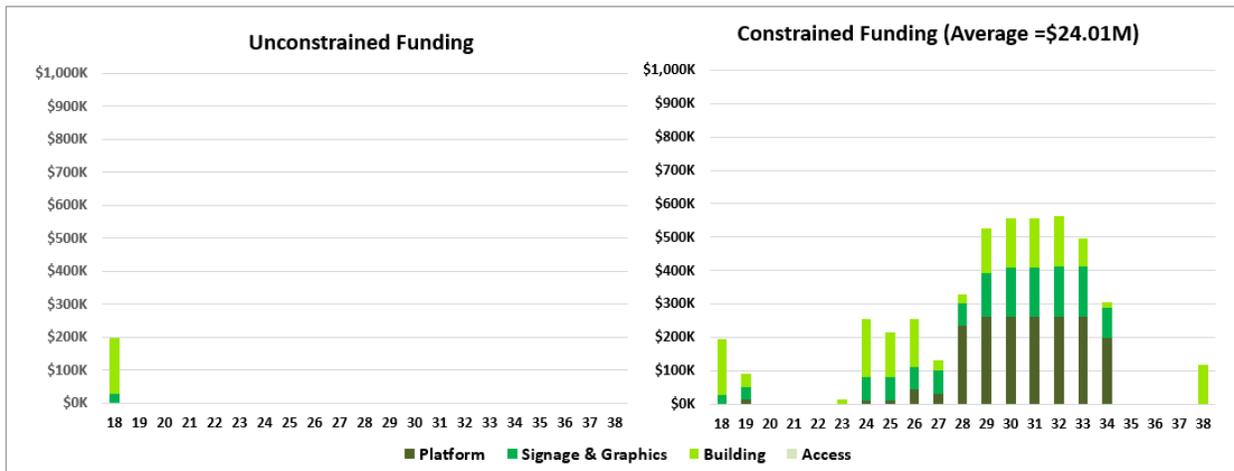
E.2.1 Facilities Backlog



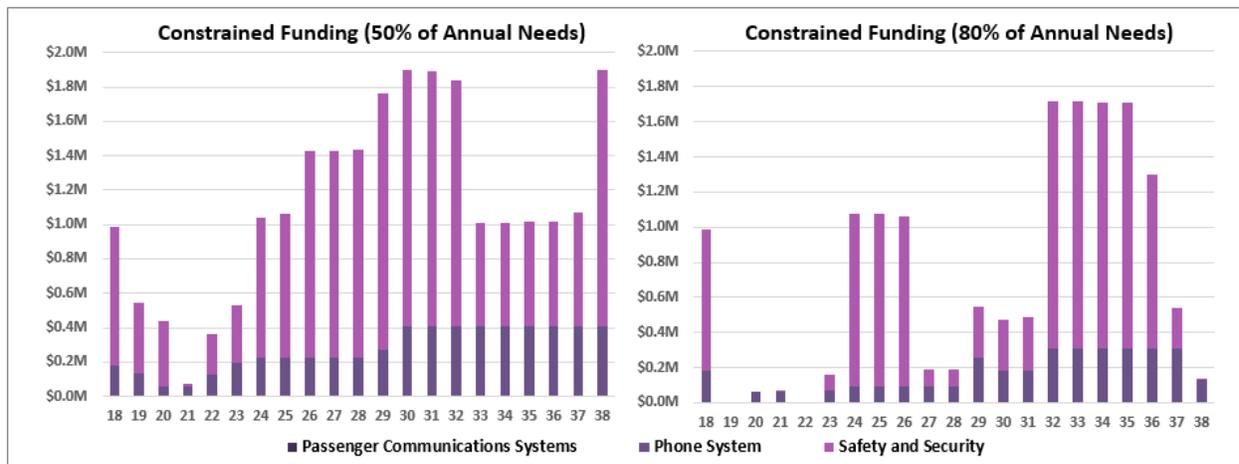
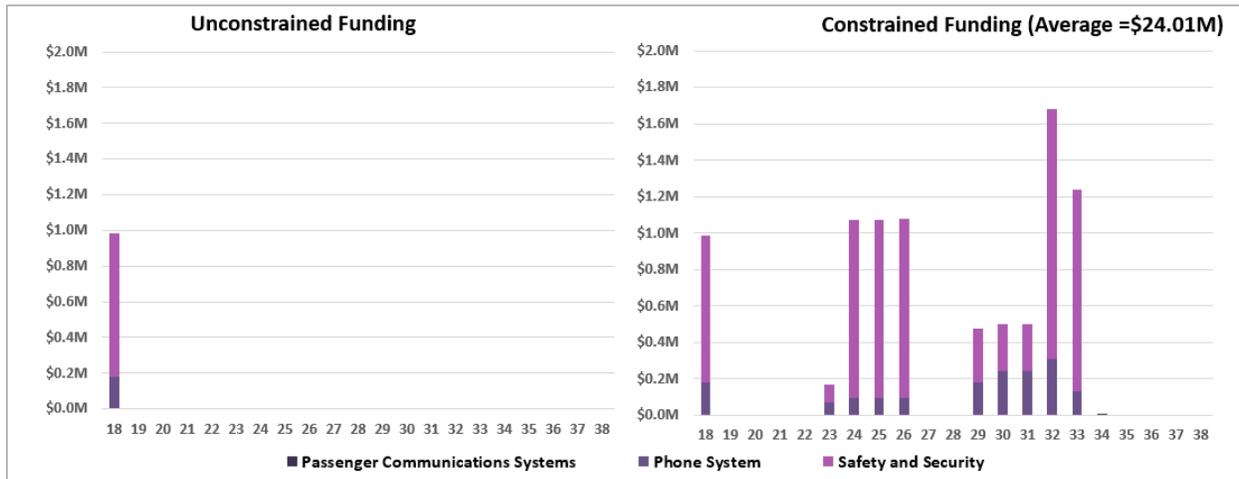
E.2.2 Bus Guideway Backlog



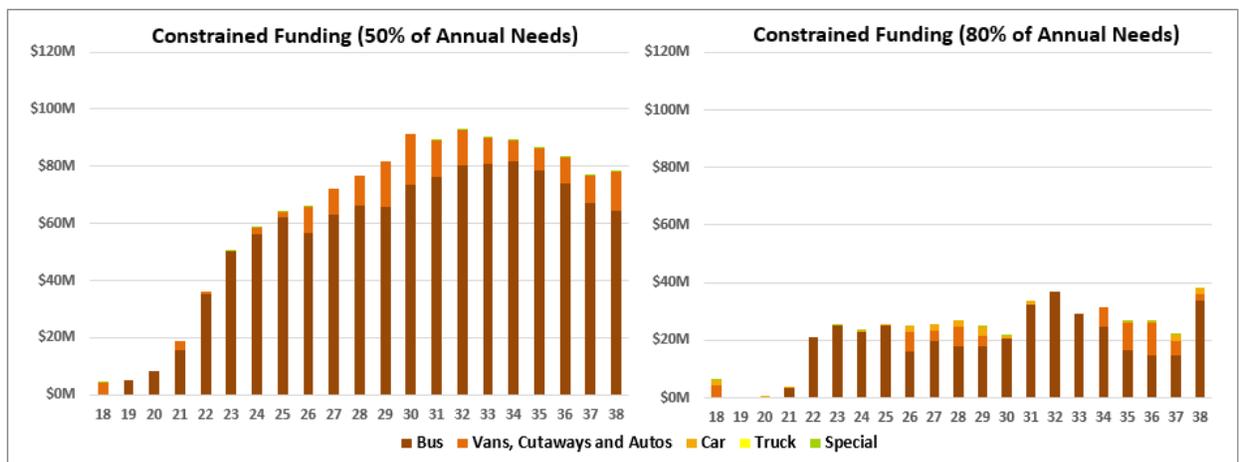
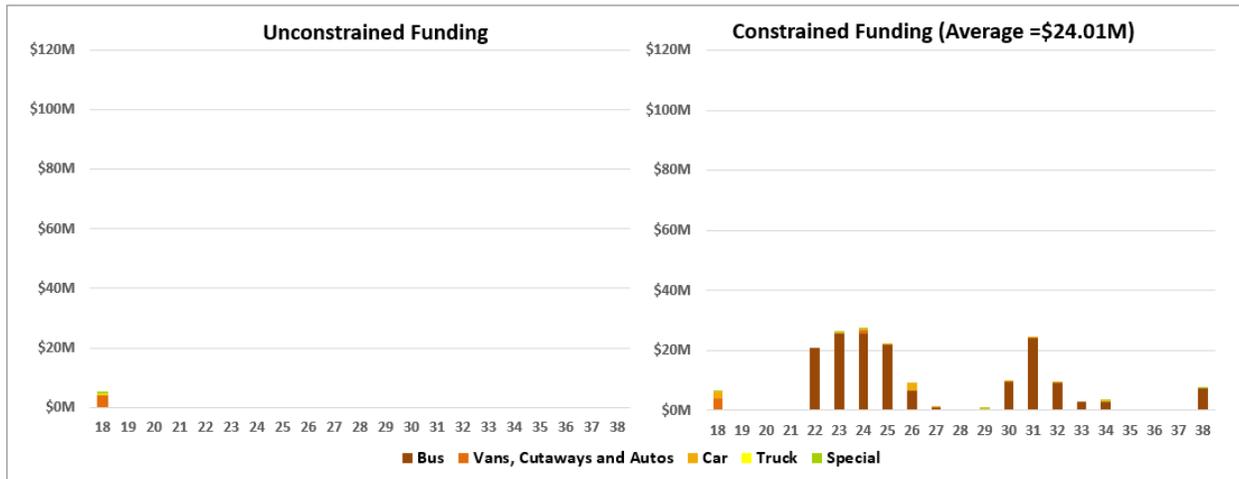
E.2.3 Stations Backlog



E.2.4 Systems Backlog

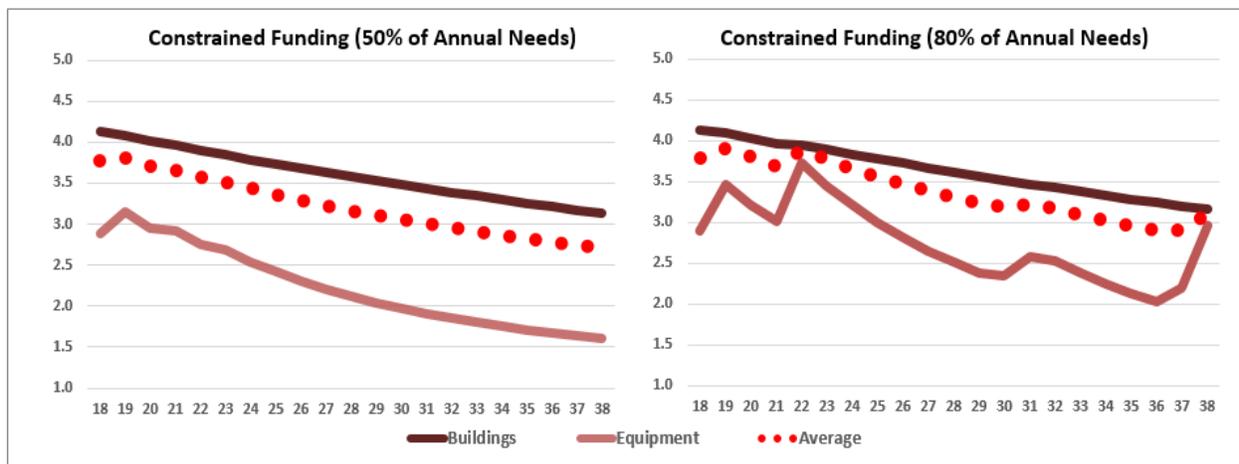
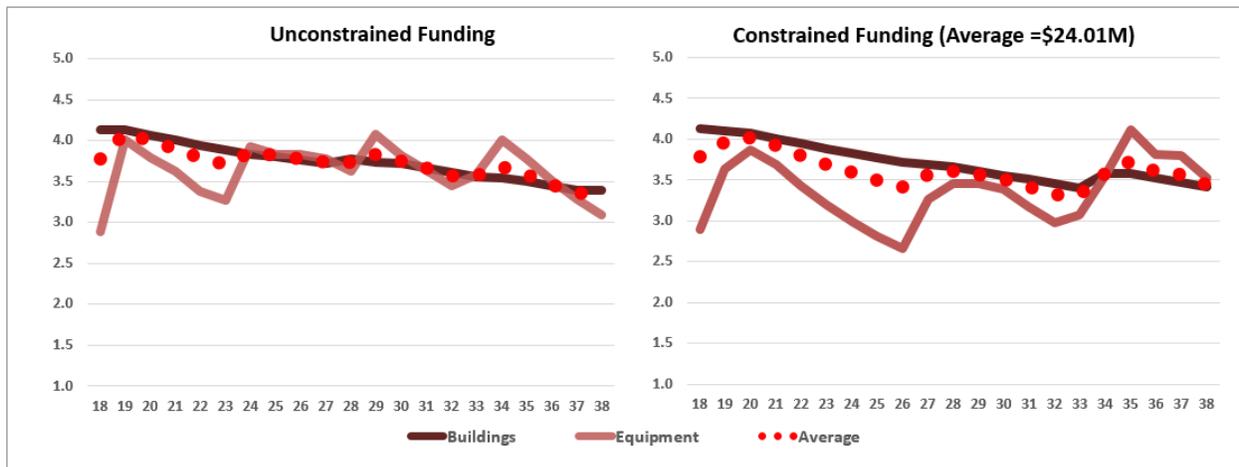


E.2.5 Vehicles Backlog

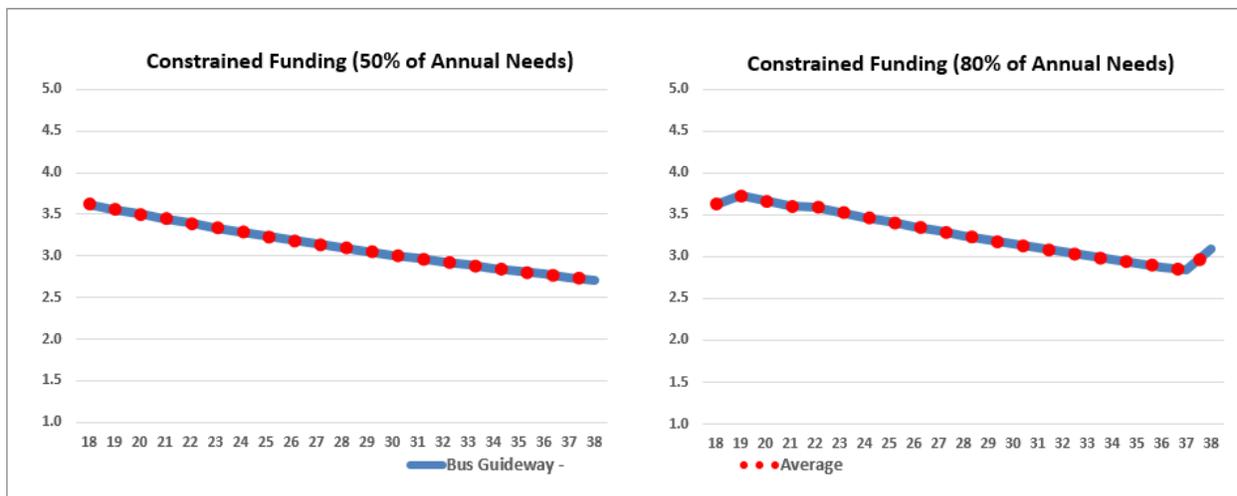
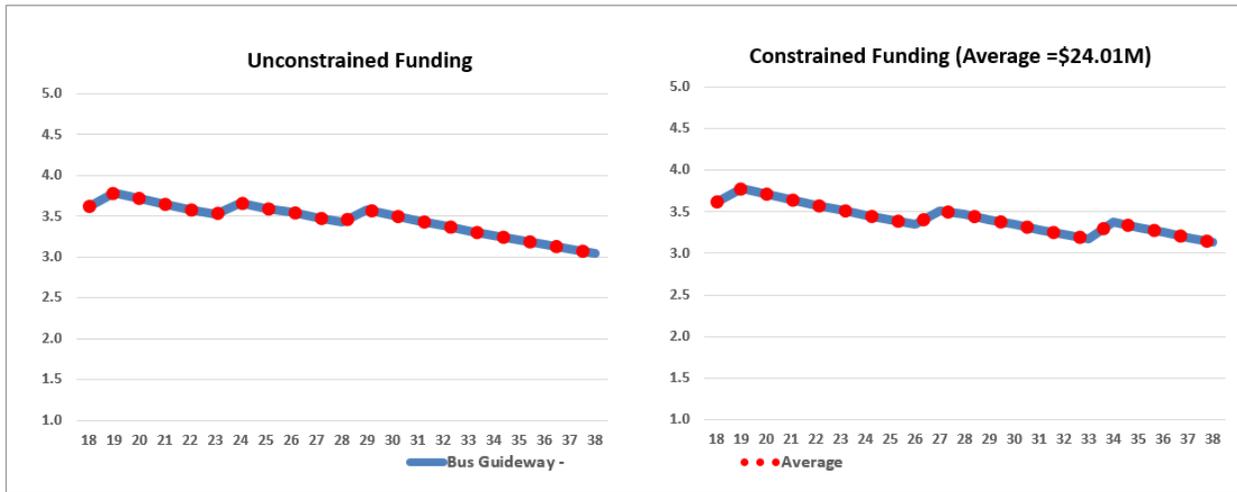


E.3 Asset Condition by Subcategory

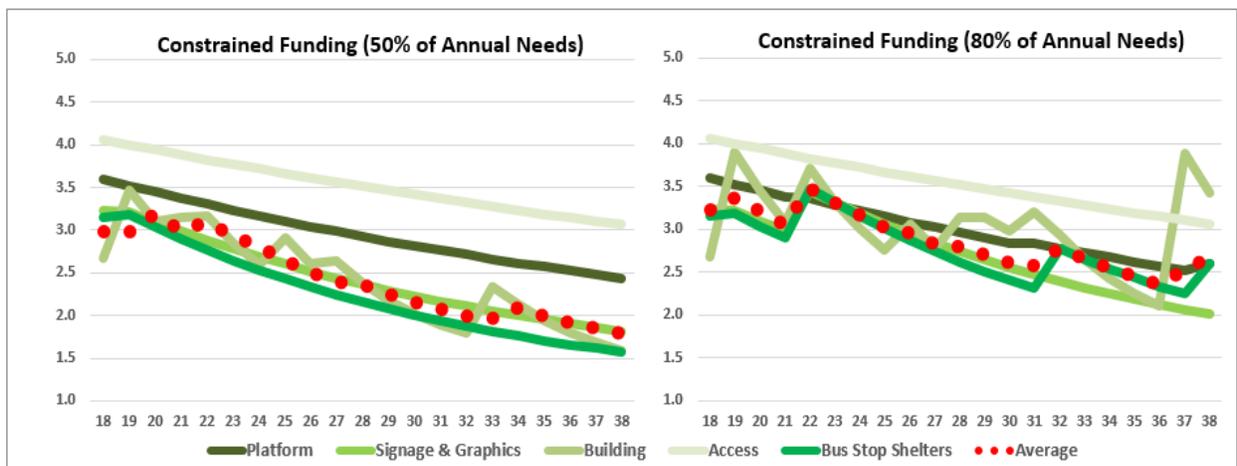
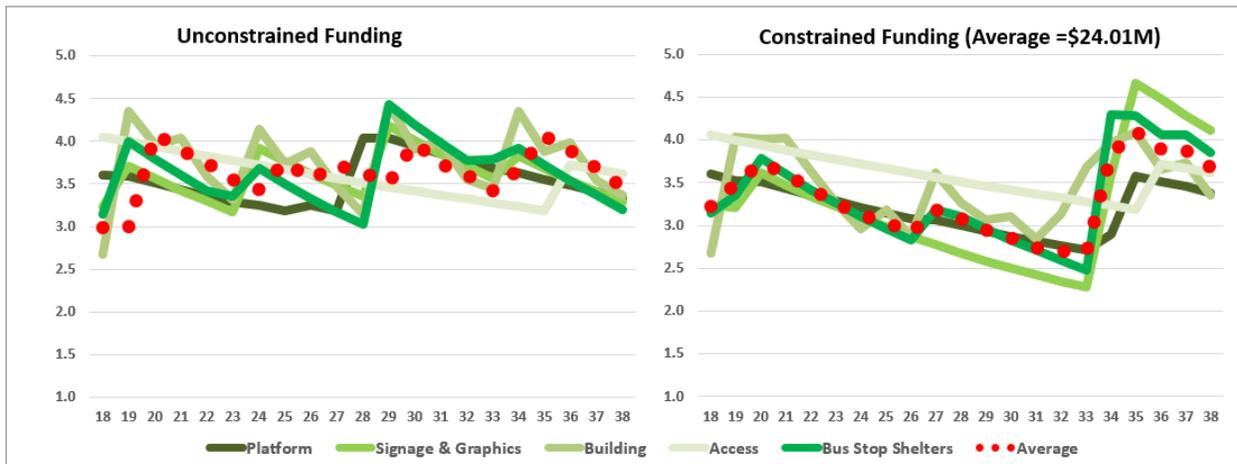
E.3.1 Facilities Condition



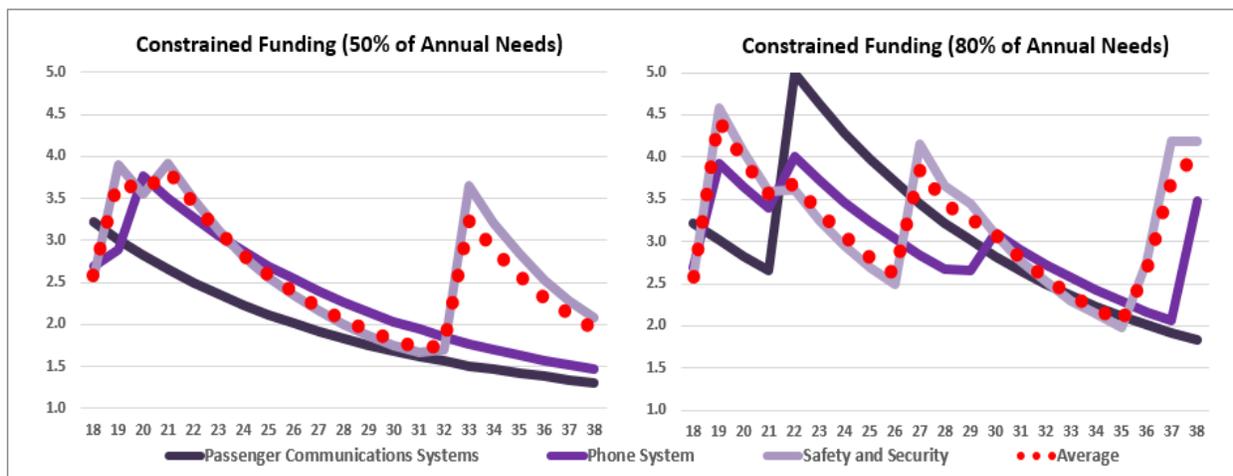
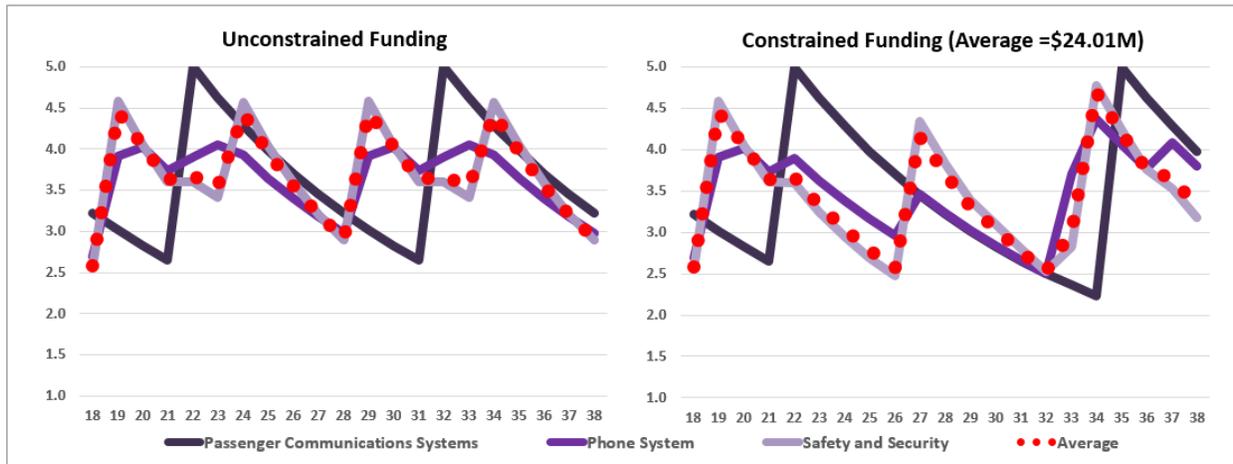
E.3.2 Bus Guideway Condition



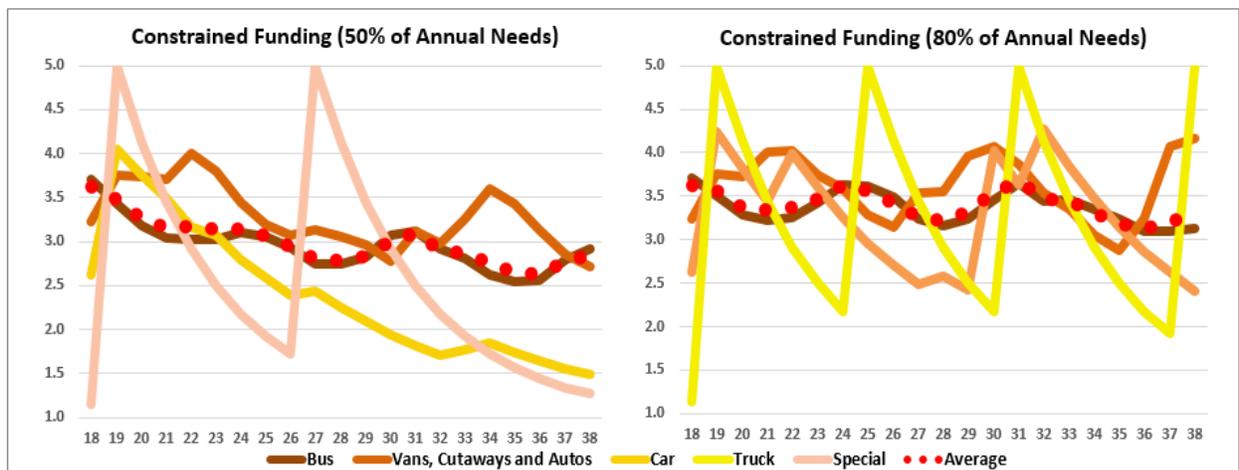
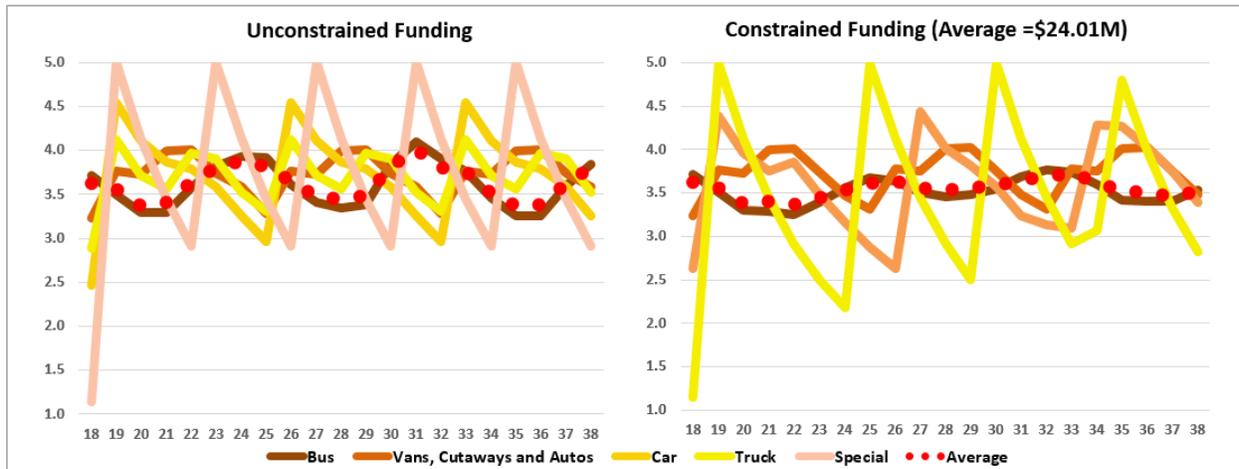
E.3.3 Stations Condition



E.3.4 Systems Condition



E.3.5 Vehicles Condition



E.4 Spending Summary by Category and Class for the \$24.01 Million Funding Scenario

Asset Category/Class	Spending by Year (Thousands of 2018\$)				
	2019	2020	2021	2022	4 Yr Total
Facilities	\$ 5,826	\$ 4,701	\$ 1,092	\$ 283	\$ 11,903
Buildings	\$ 462	\$ 1,051	\$ 159	\$ 146	\$ 1,818
Building Components	\$ 462	\$ 1,051	\$ 159	\$ 146	\$ 1,818
Equipment	\$ 5,364	\$ 3,651	\$ 933	\$ 137	\$ 10,085
Furniture	\$ -	\$ -	\$ -	\$ -	\$ -
Maintenance	\$ 676	\$ 1,040	\$ 233	\$ 106	\$ 2,055
MIS/IT/Network Systems	\$ 4,689	\$ 2,611	\$ 700	\$ 31	\$ 8,031
Guideway Elements	\$ 192	\$ -	\$ -	\$ -	\$ 192
Bus Guideway	\$ 192	\$ -	\$ -	\$ -	\$ 192
-	\$ 192	\$ -	\$ -	\$ -	\$ 192
Stations	\$ 406	\$ 345	\$ 34	\$ 8	\$ 793
Access	\$ -	\$ -	\$ -	\$ -	\$ -
-	\$ -	\$ -	\$ -	\$ -	\$ -
Building	\$ 192	\$ 49	\$ 34	\$ 7	\$ 282
Building Components	\$ 192	\$ 49	\$ 34	\$ 7	\$ 282
Complete Station	\$ 207	\$ 244	\$ -	\$ -	\$ 451
Bus Stop Shelters	\$ 207	\$ 244	\$ -	\$ -	\$ 451
Platform	\$ 1	\$ 14	\$ -	\$ -	\$ 15
Platform	\$ 1	\$ 14	\$ -	\$ -	\$ 15
Signage & Graphics	\$ 6	\$ 39	\$ -	\$ 1	\$ 45
-	\$ 6	\$ 39	\$ -	\$ 1	\$ 45
Systems	\$ 1,362	\$ 61	\$ 4	\$ 295	\$ 1,721
Communications	\$ 1,362	\$ 61	\$ 4	\$ 295	\$ 1,721
Passenger Communications Systems	\$ -	\$ -	\$ -	\$ 0	\$ 0
Phone System	\$ 182	\$ 61	\$ -	\$ 68	\$ 311
Safety and Security	\$ 1,179	\$ -	\$ 4	\$ 227	\$ 1,410
Vehicles	\$ 16,224	\$ 6,761	\$ 20,389	\$ 15,360	\$ 58,735
Non-Revenue Vehicles	\$ 2,555	\$ 29	\$ 243	\$ 630	\$ 3,457
Car	\$ 2,125	\$ 29	\$ 243	\$ 630	\$ 3,027
Special	\$ 430	\$ -	\$ -	\$ -	\$ 430
Revenue Vehicles	\$ 13,669	\$ 6,732	\$ 20,146	\$ 14,730	\$ 55,278
Bus	\$ 5,170	\$ 3,083	\$ 13,285	\$ 10,248	\$ 31,785
Vans, Cutaways and Autos	\$ 8,499	\$ 3,650	\$ 6,861	\$ 4,483	\$ 23,493
Grand Total	\$ 24,010	\$ 11,869	\$ 21,520	\$ 15,946	\$ 73,344

SunRail Transit Asset Management Plan



OCTOBER 1, 2018



SunRail Transit Asset Management Plan Self-Certification

I certify that this SunRail Transit Asset Management Plan has been developed in accordance with Moving Ahead for Progress in the 21st Century (MAP-21) and Federal Transit Administration (FTA) rules on Transit Asset Management and includes the nine FTA required elements as outlined below.

Nicola A. Liquori
Nicola A. Liquori, SunRail Chief Executive Officer

9/26/18
Date

FTA TAM Plan Requirements

	TAM Plan Elements	Description	TAM Plan Section
1	Asset Inventory	List of transit capital assets and their condition (TAM and NTD)	3
2	Condition Assessment	Asset condition ratings; facilities/stations from onsite assessment	3
3	Decision Support Tools	Methodology/tools used to create TAM Plan (e.g., Transit Economic Requirements Model [TERM] Lite)	4
4	Prioritization	Prioritized list of SGR projects, using criteria such as safety and cost	4
5	TAM and SGR Policy	Policies, strategies, executive directions to support goals for TAM Plan	2
6	Implementation Plan	Processes to follow to achieve TAM Plan	5
7	List of Annual Activities	Activities deemed critical to achieving TAM goals for the year	5
8	Resources	Estimate of financial resources necessary to implement TAM Plan	5
9	Monitor, Evaluate and Update	Continuous TAM improvement plan with milestone and timelines	6
NTD	Performance Measures	Agency-and FTA-required performance measures/targets	6

Sources: FTA TAM final rule, Subpart C – Transit Asset Management Plans, 625.25 Transit Asset Management Plan Requirements, (b) Transit asset management plan elements (1) through (9); Subpart D -Performance Management, 625.43 SGR performance measures for capital assets

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Acronyms and Abbreviations

ACM – Annual Capital Maintenance

ADKAR – Awareness, Desire, Knowledge, Ability and Reinforcement

CCTV – Closed Circuit Television

CEO – Chief Executive Officer

CFCRC - Central Florida Commuter Rail Commission

CFOMA - Central Florida Operating and Management Agreement

CFRC – Central Florida Rail Corridor

COO – Chief Operating Officer

CSXT – CSX Transportation

dba – Doing Business As

DRM - Directional Route Mile

EA – Environmental Assessment

FAST – Fixing America’s Surface Transportation Act

FDOT – Florida Department of Transportation

FFGA – Full Funding Grant Agreement

FRA – Federal Railroad Administration

FTA – Federal Transit Administration

HEP – Head-End Power

IOS – Initial Operating Segment

IT – Information Technology

KPI – Key Performance Indicator

LPA – Locally Preferred Alternative

LYNX – Central Florida Regional Transportation Authority dba LYNX

MAP-21 - Moving Ahead for Progress in the 21st Century Act

MCDA - Multi-Criteria Decision Analysis

MPO – Metropolitan Planning Organization

NEPA – National Environmental Policy Act

NTD – National Transit Database

OCC – Operations Control Center

O&M – Operations and Maintenance

PM – Performance Measure

PTC – Positive Train Control

RTU – Remote Terminal Unit

ACRONYMS AND ABBREVIATIONS

SGR - State of Good Repair

S&I – Service and Inspection

TAM – Transit Asset Management

TBD – To Be Determined

TERM – Transit Economics Requirements Model

TAMP – Transit Asset Management Plan

TPO – Transportation Planning Organization

TVM – Ticket Vending Machine

ULB – Useful Life Benchmark

UPS – Uninterrupted Power Supply

U.S. – United States

U.S.C – United States Code

VSMF - Vehicle Storage and Maintenance Facility

VSLMF – Vehicle Storage and Light Maintenance Facility

YOE – Year of Expenditure

Glossary

Accountable Executive – A single person identified at a transit provider who has ultimate responsibility for the safety management system, Transit Asset Management (TAM) practices and policy, as well as control or direction over the human and capital resources needed to develop and maintain the safety and TAM plans.

Asset Types/ Categories – Assets are divided into four major categories: Vehicles, Facilities, Guideways, and Systems. Asset types are within each category. For instance, vehicles include revenue and non-revenue vehicles.

Backlog – Those assets that are in operation beyond their expected useful life.

Capital Asset – Includes equipment, rolling stock, infrastructure, and facilities for use in public transportation that is owned or leased by the transit provider. The Federal Transit Administration (FTA) typically considers five main categories for capital assets: Vehicles, Systems, Guideway Elements, Facilities, and Stations.

Condition Assessment – The process of inspecting the asset to collect data, document, and measure condition and performance. Condition assessment can also be carried out through modeling.

Condition Rating Levels – Rating levels established by the FTA to categorize the physical condition of assets. The five levels are: 5 (excellent), 4 (good), 3 (adequate), 2 (marginal), and 1 (poor).

Decision Support Tool – A decision support tool is an analytic process or repeatable methodology that 1. helps prioritize capital projects to maintain state of good repair (SGR) of assets based on available condition data and objective criteria; or 2. Assesses financial requirements of asset investments over time.

For example, the FTA Transit Economic Requirements Model (TERM) for local agencies (referred to as TERM Lite) uses a transit provider's asset inventory condition data to predict future SGR needs.

Facilities – Facilities include all assets related to maintenance and administrative facilities, as well as stations and substation enclosures.

Guideway – Includes track and associated structures, line equipment, signals, power equipment, and substations.

Moving Ahead for Progress in the 21st Century Act (MAP-21) – A funding and authorization bill for federal surface transportation. Signed into law in July 2012, Section 20019 requires transit agencies to develop a Transit Asset Management Plan (TAMP) and to implement a Transit Asset Management System.

State of Good Repair – A capital asset is in SGR if it meets the following objective standards:

1. The capital asset can perform its designed function
2. The use of the asset in its current condition does not pose an identified unacceptable safety risk
3. The life-cycle investment needs of the asset have been met or recovered, including all scheduled maintenance, rehabilitation, and replacements.

Transit Economic Requirements Model - TERM is FTA's capital needs analysis tool. FTA also developed a regional/local version of the tool called TERM Lite.

TERM Lite - An analysis tool designed to help transit agencies assess their SGR backlog and other items.

Transit Asset Management – A strategic and systematic process through which an organization procures, operates, maintains, rehabilitates, and replaces transit assets over their lifecycle to manage

their performance, risks, and costs to provide safe, cost-effective, reliable service to current and future customers.

Transit Asset Management Plan - A plan developed by an agency that includes, at a minimum, a discussion of current transit capital asset inventories and condition assessments, decision support project prioritization, and SGR performance.

Useful Life Benchmark - Expected life of an asset (e.g., 12 years for a transit bus per the FTA). Expected useful lives for individual assets are driven by several factors that include historical performance, manufacturer recommendations, and transit provider policy.

Vehicles – includes both revenue vehicles (e.g., buses, light rail vehicles), and non-revenue vehicles (e.g., trucks, passenger vans).

Forward

This Transit Asset Management (TAM) Plan is SunRail's first. Transit Asset Management is a system for monitoring and managing public transportation capital assets to enhance safety, reduce maintenance costs, increase reliability, and improve performance. All transit agencies receiving Chapter 53 funding from the Federal government are required to develop TAM Plans, per the Moving Ahead for Progress in the 21st Century (MAP-21) legislation. The first plans must be completed by October 1, 2018, and updates are then required every four years.

The Federal Transit Administration (FTA) requirements will enhance current efforts and are part of a larger performance management context. Overall, a TAM Plan has value far beyond simply compliance. It represents an opportunity for SunRail to better anticipate lifecycle costs, have a deeper understanding of asset management benefits, and to maintain its startup rail system in a State of Good Repair (SGR). In addition to setting out SunRail's asset management approach, this plan makes recommendations for maintenance and capital programs necessary to meet service and performance goals, including the achievement of a SGR for SunRail's portfolio of assets.

SunRail is a new agency, having begun service on May 1, 2014. The system is being built in phases. Currently administered by the Florida Department of Transportation (FDOT), SunRail will be transferred to the Central Florida Commuter Rail Commission (CFCRC) in accordance with an Interlocal Operating Agreement between FDOT and its Local Government Partners. These include the City of Orlando and the Counties of Volusia, Seminole, Orange, and Osceola.

The Interlocal Operating Agreement recognizes that FDOT is responsible for the design, permitting, and construction of the Commuter Rail System, and will be responsible for its funding, operation, management, and maintenance for seven years following the Revenue Operation Date. The Revenue Operation date for SunRail Phase 1 was May 1, 2014; therefore, the expected transfer date to the CFCRC would be May 1, 2021.

Section 3.05 (E), Conveyance Requirements in the Interlocal Operating Agreement states "When components of the Commuter Rail System are conveyed to the Commission, all such components shall be in a State of Good Repair, subject to normal wear and tear, and all guarantees, warranties, and similar rights held by FDOT relating to such components shall be assigned to the Commission."

Introduction

1.1 SunRail History

The Central Florida Rail Corridor (CFRC), was acquired by FDOT from CSX Transportation (CSXT) in November 2011 for passenger rail operations. In July 2011, FDOT received a Full Funding Grant Agreement to begin construction on the Phase 1 Initial Operating Segment (IOS), a 31.5-mile stretch. FDOT selected “SunRail” as the name for the new passenger rail service to be operated on this corridor. SunRail revenue operations on the IOS commenced on May 1, 2014.

The Project was designed to operate entirely at-grade, sharing track owned by FDOT with freight service provided by CSXT and Florida Central Railroad, as well as by Amtrak intercity passenger rail service. The Project alignment generally parallels Interstate 4 and US 17/92.

FDOT, in cooperation with the Central Florida Regional Transportation Authority (dba LYNX); MetroPlan Orlando (MPO); River to Sea Transportation Planning Organization (TPO); and Volusia, Seminole, Orange, and Osceola Counties; and the City of Orlando, proposed extending SunRail from the southern and northern terminal of the Phase

Figure 1-1. SunRail Commencement



1 IOS. Both extensions are along the previous CSXT A-line railroad right of way, now owned by FDOT. The Southern Expansion project, which opened on July 30, 2018, extends commuter rail service 17.2 miles to the south, from the Sand Lake Road Station in Orange County to an additional station in Orange County and three stations in Osceola County. When funding becomes available, the Northern Expansion project will extend commuter rail service approximately 12.3 miles north from the DeBary Station to the DeLand Amtrak Station (both in Volusia County).

Between 2011 through the opening of the IOS in 2014, FDOT completed the acquisition, design, and construction of all infrastructure required for a successful commuter rail start-up. The list of assets includes right of way, track, stations, station parking, administration, maintenance facilities, and systems, as well as revenue (rail cars and locomotives) vehicles. The Southern Expansion added revenue vehicles, stations, parking, and track assets to this inventory.

1.2 SunRail Operations

SunRail offers an alternative mode of transportation to improve the mobility of travelers along I-4 and other major roadways within metropolitan Orlando. I-4, being the primary travel corridor in the region, is highly congested, and experiences poor highway levels of service during a large portion of the day. The Southern Expansion is 17.2 miles long with four new commuter rail stations. The stations include Meadow Woods in Orange County and Tupperware, Kissimmee, and Poinciana in Osceola County. The Southern Expansion corridor generally parallels US 17/92 and serves areas of dense residential development in southern Orange County. This corridor also traverses large Developments of Regional Impact and includes sections of densely developed land use areas through downtown Kissimmee. For this extension, FDOT installed 11.8 miles of additional tracks within the existing right of way, realigned approximately 2.9 miles of existing track, upgraded approximately 3.7 miles of existing siding tracks, and installed a new railway operations signal system. Additional improvements included grade-crossing enhancements, station platforms, canopies, and parking lots. The Northern Expansion project will be a 12.3-mile extension of the Locally Preferred Alternative (LPA) further north to DeLand and will include one new commuter rail station at DeLand Amtrak.

The current service plan includes a 30-minute bi-directional weekday peak hour service, and both 60- and 120-minute midday service. This is expected to increase to a 15-minute bi-directional service during the morning and afternoon peak periods, and 60-minute service during the midday in 2034. There is no scheduled service on weekends; however, SunRail operates special event services as funded by others.



1.3 Capital Program

1.3.1 Phase 1 Initial Operating Segment

Phase 1 IOS (depicted with the Southern Expansion in Figure 1-2) is a 31.5-mile long corridor extending from Fort Florida Road (DeBary) in Volusia County to Sand Lake Road in Orange County. Twelve stations were constructed in the IOS between DeBary Station in Volusia County and the Sand Lake Road Station in Orange County. Approximately 18 miles of additional second track, and a new railway operations signal system were added to the already-existing eleven miles of double track. Additional improvements included grade crossing enhancements, station platforms, canopies, and parking lots. The CFRC Vehicle Storage and Maintenance Facility (VSMF), which includes the CFRC Operations Control Center (OCC) and Service and Inspection (S&I), Shop, was constructed as part of the Phase 1 IOS Project. The VSMF is located at Rand Yard in Sanford, Florida.

The passenger stations, station parking, and vehicles are considered new, having been built and put in service in 2014. Guideways, tracks, and signals have varying ages; some date from the CSXT operations, and some have been rehabilitated or replaced for SunRail operations.

1.3.2 Southern Expansion

The Southern Expansion project, also shown in Figure 1-2, consists of a new, 17.2-mile that extends south of Orlando through Kissimmee to unincorporated Osceola County. The segment includes four new commuter rail stations, and the construction of a Vehicle Storage and Light Maintenance Facility (VSLMF), bringing the total number of stations to 16.



Figure 1-2. SunRail System Map

The Southern Expansion includes two additional locomotives, three cab passenger cars, and one coach passenger car. Approximately 11.8 miles of second track were added to the existing 2.9 miles of double track, along with a new railway wayside signal and communication system, grade crossing upgrades, station platforms, canopies, and parking at all four stations, as well as other elements necessary to achieve project implementation. A VSLMF adjacent to the Poinciana Station serves as an end of the line fueling and layover facility for up to four train sets. Train wash services and heavy vehicle maintenance will continue to be provided at the existing Amtrak Auto Train Yard in Sanford.

1.3.3 Northern Expansion

When funding is available, the commuter rail system will be extended from the DeBary Station (Fort Florida Road) to the DeLand Amtrak Station, approximately twelve miles (Northern Expansion). A 12.3-mile extension of the LPA further north to DeLand is a defining factor for the Full Build Alternative, which was evaluated under the Federal National Environmental Policy Act (NEPA) process in the Environmental Assessment (EA). The total number of stations for the entire corridor is thus expected to be 17, for a 61-mile total track length.

1.4 What is Transit Asset Management?

Asset Management applies to all industries. However, in reference to public transportation, the overarching goal of a TAM program is to ensure that providers of public transportation manage their assets in a consistent, measurable SGR.

FTA defines TAM as a strategic and systematic process through which an organization procures, operates, maintains, rehabilitates, and replaces transit assets to manage their performance, risks and costs over their lifecycle to provide safe, cost-effective, and reliable service to current and future customers. The term “asset” refers to physical equipment and infrastructure including rolling stock, right-of-way, stations, facilities, systems, tools, etc. that make up a transit system.



**Federal Transit
Administration**

In 2012, MAP-21 mandated—and in 2015, the Fixing America’s Surface Transportation Act (FAST)—reauthorized FTA to develop a rule to establish a strategic and systematic process of operating, maintaining, and improving public transportation capital assets effectively through their entire life cycle. FTA’s national Transit Asset Management System Rule:

- Defines “state of good repair”
- Requires grantees to develop a TAM Plan
- Establishes performance measures
- Establishes annual reporting requirements to the National Transit Database (NTD)
- Requires FTA to provide technical assistance.

It is often said that for a transit agency embarking on an asset management program, the benefits far outweigh compliance. The aforementioned benefits of the asset management activities described in this plan are listed in Table 1-1.

Table 1-1. Benefits of Transit Asset Management for SunRail

Agency Business Benefits	Results
Improved customer service	Improves reliability / on-time performance and service operations; vehicles and facility cleanliness; reduces missed trips, speed restrictions. Strengthens customer confidence in system safety and reliability. Avoids or minimizes repair or replacement on failure scenarios often resulting in unplanned reactive type repairs and replacements. Focuses investments around customer-centered goals/metrics.
Improved productivity and focused, optimized and planned investments	Maintains assets more efficiently, using condition-based approaches and using predictive and preventive maintenance strategies (where these can be employed) to focus and optimize investments with sufficient lead times to avoid costly repairs/replacement on failure or crisis repairs while improving service delivery. Benefits for SGR projects exceed expenditures. For example, a Benefit Cost Ratio of 2.6 to 2.8 was calculated for San Francisco Bay Area transit SGR funding.
Optimized resource allocation	Helps implement the SGR commitments in Long Range and Short-Range Transportation Plans. Better aligns spending with an agency’s goals and objectives to obtain the greatest return from limited funds. Incorporates life-cycle cost, risk and performance trade-offs into capital programming and operations and maintenance budgeting.
Improved stakeholder communications	Provides stakeholders with timely, accurate, and transparent SGR assessments and commensurate needs. Allows SGR to be implemented in an organized, methodical manner.

Table 1-1. Benefits of Transit Asset Management for SunRail

Agency Business Benefits	Results
	Provides stakeholders with more accurate and timely customer-centered performance indicators.
	Provides tools to communicate forecasted performance metrics (including level of service) based on different levels of funding.

1.5 Transit Asset Management (TAM) Plan

In July 2016, FTA published a Final Rule for TAM requiring nine main elements of reporting shown in Table 1-2, in addition to some new NTD reporting requirements. The rules require FTA grantees to develop asset management plans for their public transportation assets, including vehicles, facilities, equipment, and other infrastructure. Table 1-2 serves both as a listing of the requirements, and as a look-up table to identify where in the TAM Plan the elements are located.

Table 1-2. FTA TAM Plan Requirements

TAM Plan Elements	Description	TAM Plan Section
1	Asset Inventory List of transit capital assets and their condition (TAM and NTD)	3
2	Condition Assessment Asset condition ratings; facilities/stations from onsite assessment	3
3	Decision Support Tools Methodology/tools used to create TAM Plan (e.g., Transit Economic Requirements Model [TERM] Lite)	4
4	Prioritization Prioritized list of SGR projects, using criteria such as safety and cost	4
5	TAM and SGR Policy Policies, strategies, executive directions to support goals for TAM Plan	2 and Appendix A
6	Implementation Plan Processes to follow to achieve TAM Plan	5
7	List of Annual Activities Activities deemed critical to achieving TAM goals for the year	5
8	Resources Estimate of financial resources necessary to implement TAM Plan	5
9	Monitor, Evaluate and Update Continuous TAM improvement plan with milestone and timelines	6
NTD	Performance Measures Agency-and FTA-required performance measures/targets	6

Sources: FTA TAM final rule, Subpart C – Transit Asset Management Plans, 625.25 Transit Asset Management Plan Requirements, (b) Transit asset management plan elements (1) through (9); Subpart D -Performance Management, 625.43 SGR performance measures for capital assets

This TAM Plan is a living document that provides a strategy to coordinate various interdependent business processes, activities, and tools necessary to give SunRail the ability to manage its assets. The Plan examines current TAM practices at SunRail, experiences from peer agencies, and FTA guidance, and recommends an action plan that will help ensure that the SunRail system continues to provide safe, reliable, and high-quality service over the long term.

One key purpose of this TAM Plan is to elevate the importance of TAM to the entire SunRail organization. This has been accomplished through interviews with asset class managers and specialists, executives, workshops, and ongoing dialogue and discussion with asset owners throughout the process.

A second key purpose is for SunRail to demonstrate compliance with the FTA reporting requirements related to the MAP-21 rulemaking and the NTD.

The third key purpose is to present a roadmap for TAM Implementation. This includes a program of activities which will guide SunRail efforts in the short, medium, and long term. Benefits, in addition to compliance with FTA requirements, are expected to include improved customer service, improved productivity and reduced costs, optimized resources allocation, and improved stakeholder communications. Finally, the TAM Plan will support an orderly implementation of SGR programs and projects.

Beyond this introduction, Acronyms, Abbreviations, and Glossary, this TAM Plan consists of six sections and appendices as follows:

- **Asset Management Policy, Goals and Objectives** – This section presents SunRail’s vision for asset management: documentation of asset management policy, governance for asset management, and drivers for program implementation.
- **SunRail Inventory and Condition Assessment** – This section summarizes SunRail’s asset inventory and major asset holdings as well as the methodology by which the inventory is maintained. The chapter also presents a snapshot of the condition of all assets; targets for SGR measures; and facility condition results from late 2017.
- **Reinvestment Needs and Prioritization** – This section presents SunRail’s decision support tools and process for capital project prioritization. The chapter also presents SunRail’s 2018 backlog and 5-year capital investment need projections.
- **Implementation Program** – This section presents SunRail’s implementation program for asset management. This includes governance; implementation timeline and an action plan.
- **Evaluation and Continuous Improvement** – Key elements of an evaluation and improvement program are discussed.

Asset Management Policy, Goals, and Objectives

This section presents SunRail’s vision for asset management: documentation of asset management policy, goals, and objectives, governance for asset management, roles and responsibilities, and drivers for program implementation.

2.1 Asset Management Policy

Asset management policy, according to the U.S. Department of Transportation, outlines the scope and principles of asset management, as well as incorporates federal, state, local, industry, and agency asset management goals and policies. This policy is the executive-level direction regarding expectations for transit asset management and falls under both the Tier I and Tier II TAM plan elements.¹

All FDOT’s transportation projects, including SunRail, are contained in a five-year work program as prescribed by law. The work program is continuously balanced to available finances during the year (Section 339.135, Florida Statutes). The Secretary of Transportation “adopts” the five-year work program, and funds are allocated to FDOT’s districts. This process is referred to as “Policy to Projects”. The intent is to meet local needs and provide a stable, multi-year program driven by overall policy rather than allocations to specific projects.

SunRail developed an asset management policy intended to support and formalize implementation of the FDOT-owned CFRC (dba SunRail), TAM program, maintain assets in a SGR, and communicate to all relevant stakeholders. The scope of assets identified under this policy include all stations, right-of-way, track, station parking, administration and maintenance facilities, systems, and revenue (rail cars and locomotives) vehicles. The policy is found in Appendix A of this Plan.

SunRail TAM Policy:

SunRail will maintain system assets in a SGR through transparency, financial stewardship and reinvestment, and promoting a culture that supports asset management best practices.

The TAM policy encompasses the following goals for the SunRail system:

- Demonstrate organizational efficiency to deliver efficient and reliable service
- Prioritize available resources to meet SGR requirements
- Maintain condition of assets in SGR to support system safety
- Actively promote an agency-wide asset management culture

2.2 Asset Management Goals and Objectives

Through the same process, SunRail developed a set of goals and objectives to guide its asset management program as shown in Table 2-1.

¹ Each transit provider that receives Chapter 53 funds as a recipient or sub-recipient and either owns, operates, or manages capital assets used in the provision of public transportation, is required to develop and carry out a TAM Plan.

- Tier I (over 100 vehicles or Rail operator) must submit their own TAM Plan
- Tier II (under 100 vehicles) may choose to participate in group submission from State or Metropolitan Planning Organization (MPO)

Table 2-1. SunRail Asset Management Goals and Objectives

TAM Goals	TAM Objectives
Demonstrate organizational efficiency to deliver efficient and reliable service	<ul style="list-style-type: none"> • Develop business processes and tools to report and monitor asset inventory, conditions and performance. • Align procurement policies with lifecycle cost management. • Establish formal asset management turnover procedures (e.g., transition of inventory data for the Southern Expansion, final acceptance). • Support development of data and decision support tools for TAM processes to provide value in a timely manner.
Prioritize available resources to meet SGR requirements	<ul style="list-style-type: none"> • Incorporate asset management criteria into SunRail long range and capital investment prioritization for asset rehabilitation/replacement. • Leverage agency wide resource planning to ensure sufficient funding to achieve a SGR. • Manage backlog of capital repair needs to an acceptable level.
Maintain condition of assets in SGR to support system safety	<ul style="list-style-type: none"> • Meet standards for maintenance, rehabilitation and replacement. • Establish SGR performance targets related to SGR measures consistent with FTA and coordinated with state/metropolitan planning processes. • Conduct condition assessments for facilities and update every two years. • Develop risk-based asset register to integrate with project prioritization and keep it current. • Establish requirement that contractors provide updated asset inventory and asset failure rate data on at least an annual basis (embed requirement in future service and maintenance contracts).
Actively promote an agency-wide asset management culture	<ul style="list-style-type: none"> • Develop TAM Plan and update it every four years. • Establish/communicate clear governance roles and responsibilities for TAM including with SunRail contractors. • Advance awareness, dialogue and cooperation within SunRail and its contractors regarding asset management.

2.3 Contractual Governance

SunRail makes use of contractors for major operations functions. The contractual governance framework in place since the opening of the system is shown in Table 2-2.

Table 2-2. SunRail Roles and Responsibilities Regarding Assets (2018)

Asset Responsibilities	Owner	Maintainer	Principal Capital Reinvestment Responsibility	Primary Condition Assessment Responsibility	Asset Inventory Responsibility
Guideway Land	FDOT	N/A	N/A	N/A	N/A
Track	FDOT	Bombardier	FDOT	FDOT	FDOT
Bridges	FDOT	Bombardier	FDOT	FDOT	FDOT
Grade Crossing Systems	FDOT	Herzog	FDOT	FDOT	FDOT
Signals	FDOT	Herzog	FDOT	FDOT	FDOT
Rolling Stock	FDOT	Bombardier, Amtrak (Heavy Repair)	FDOT	FDOT	FDOT
Equipment 1 (High Rail)	Bombardier Herzog	Bombardier Herzog	Bombardier Herzog	N/A	N/A
Equipment 2 (Track support)	Bombardier	Bombardier	Bombardier	N/A	N/A
Equipment 3 (Pick-ups)	Herzog	Herzog	Herzog	N/A	N/A
Equipment 4 Heavy Maintenance Facility	Amtrak	Amtrak	Amtrak	N/A	N/A
VSMF & VSLMF	FDOT	Bombardier	FDOT	FDOT	FDOT
Stations**	FDOT	Local Government Partners*	FDOT	FDOT	FDOT
Station Platforms***	FDOT	Bombardier	FDOT	FDOT	FDOT
OCC	FDOT	Bombardier	FDOT	FDOT	FDOT
Station Parking	Counties	Counties	Counties	N/A	N/A
Fare Collection Equipment	FDOT	Conduent	FDOT	FDOT	FDOT
Communications including Dispatch	FDOT	Bombardier	FDOT	FDOT	FDOT

*City of Orlando; Volusia, Seminole, Orange and Osceola Counties

** Includes vehicle, bus and pedestrian access to platforms and within station property; utilities; housekeeping; janitorial; and general appearance

*** Includes communication systems, Closed Circuit Televisions (CCTVs), lighting, information systems, water fountains, furniture

NOTE: This table may change after transition of the system to the CFCRC.

NOTE: Items highlighted in gray are not SunRail assets.

2.4 TAM Roles and Responsibilities

The roles and responsibilities inherent to implementing and maintaining the TAM Plan follow four core functions: (1) Policy Leadership and Guidance by the Accountable Executive; (2) Overall planning and

policy implementation; (3) Asset Ownership; and (4) Additional support (Finance and Information Technology). These functions are executed and managed by several groups within SunRail's organization.

As of 2018, SunRail is a heavily contracted organization, with only a half dozen full time FDOT employees. SunRail relies heavily on contractors for day-to-day operation and maintenance of the railroad. The FDOT positions include:

- Chief Executive Officer (CEO)
- Chief Operating Officer (COO)
- Corridor & Facilities Manager
- Financial Operations Manager
- Contracts Manager
- Intermodal Contracts and Funds Administrator (This position is shared with FDOT District 5).

One of the critical asset management oversight functions is that of the Accountable Executive. Per FTA, the Accountable Executive is a single person identified as a transit provider whom has ultimate responsibility for the safety management system, TAM practices and policy, and control or direction over the human and capital resources needed to develop and maintain the safety and TAM plans. For SunRail the CEO is the Accountable Executive.

Table 2-3 specifies which departments and positions will oversee the four overarching TAM functions.

Table 2-3. FDOT Roles and Responsibilities

TAM Function	Department(s)	FDOT Responsible Position*
Agency-wide		
Policy Enforcement	System Safety, Security and Compliance	Chief Executive Officer
Accountable Executive		
Capital Planning and Policy Implementation	Planning & Development	Financial Operations Manager
Asset Owners	Dispatching Operations and Services, Signals and Communication, Engineering and Construction, Public Projects, Positive Train Control (PTC) Network Control Operations, and Track & Structures Rehabilitation	Chief Operating Officer
	Maintenance of Equipment (Rolling Stock), Facilities and Fleet Management, Materials Management and Warehousing	
Other Supportive Functions	Information Technology (IT), Finance, Budget, Purchasing, Contracts, and Compliance	FDOT District 5 (IT), Professional Services, SunRail Contracts Manager, Intermodal Contracts and Funds Administrator

*This column may change after transition of the system to the CFCRC

2.5 Drivers for TAM Program Implementation

Implementation of the SunRail TAM program should be driven by the policy itself (highest level), TAM Plan implementation plan, FTA guidance, and best practices.

Last published in 2016, the FTA Asset Management Guide: Focusing on the Management of our Transit Investments (FTA TAM Guide), provides organizational structures and describes best practices for gaps categorization (opportunities for improvement).

The FTA TAM Guide has five distinct Business Process “areas” shown in Table 2-4.

Table 2-4. FTA TAM Guide Business Processes

Process Area	Description
Asset Management Vision and Direction	Led by policy and strategic planning processes to address the question: “What policy and strategic objectives should the SunRail TAM strategy advance?”
Lifecycle Management	Data-driven set of activities to evaluate the lifecycle cost, condition, and performance of each class of assets-ideally during the design/procurement stage.
Cross Asset Planning and Management	Enterprise-level decision-making processes, including capital planning and operations and maintenance budgeting used to communicate the level of service that can be delivered at different funding levels, and make performance-based decisions in financially constrained capital plans and budgets.
Information Technology Systems	A critical TAM component that allows for data-driven, performance-based decision making.
Enablers	Supportive processes and activities to ensure that the asset management business processes can be successful.

SunRail Inventory and Condition Assessment

3.1 Inventory and Major Asset Holdings

3.1.1 Data Sources

At present, SunRail asset data resides in three different “system of record” databases. The primary database is the State Inventory System. Other assets are included in the IBM/Maximo and RailDocs databases managed by SunRail’s Operations and Maintenance (O&M) and Signal Maintenance of Way contractors. As most assets are owned directly by FDOT, it is expected that a large percentage will be documented in the State Inventory System, leading to some overlap with assets documented in IBM/Maximo and RailDocs.

3.1.2 Development of SunRail Asset Inventory

To complete its TAM Plan, SunRail has developed an asset inventory based on the information systems identified above.

Process: The first step was to pull asset records from each of these systems and remove any instances of double-counting assets across data systems. Given that these systems do not house all the data fields required for asset condition and needs assessment analyses (e.g., industry sources of unit cost and useful life data), additional data was obtained from a variety of data sources available to the consultant team supporting this effort. Once assembled, the asset data was evaluated to assure that all data types owned by SunRail were properly represented in the database.

Level of Detail: The level of asset detail in the inventory was ultimately determined by the level of asset detail in the source data. The resulting inventory data was found to be of sufficient detail to support long-term capital planning, but not so detailed as to require extensive annual updates.

Aggregation: FTA recommends \$50,000 as a minimum threshold for the value of assets to be inventoried (i.e., assets should be inventoried down to this level), unless the asset is a service vehicle in which case all should be included. It is then up to the grantee to determine if they want to go below this level of asset detail.

Format: Given that all data must be obtained from multiple sources and represented in a format suitable for manipulation and analysis by SunRail staff, the initial inventory data is housed in both Microsoft Excel and Access databases. It should stay housed in Excel and Access at least in the short term, instead of migrating to another database format.

Expected Challenges: Many SunRail assets consist of pre-existing (vs. new) assets acquired from CSXT (e.g., trackwork, signals, crossings). Given that the original acquisition of these assets occurred over a period spanning many decades, it is unlikely that the completed inventory accurately reflects the actual in-service dates of many assets. Rather, the in-service dates for many of these assets were estimated based on the knowledge and prior experience of asset maintainers (e.g., Herzog and Bombardier staff).

Update Process: The inventory will require periodic updating in future years (preferably annually, and at least timed with TAM Plan updates).

3.1.3 Inventory Summary and Major Asset Holdings

SunRail's capital asset inventory documents the capital assets used to operate and maintain SunRail's public transit services for which SunRail has direct capital responsibility.² As of April 2018, this inventory includes over 1,100 asset records (in some instances, these records represent multiple individual assets which have been grouped together (e.g., segments of track). FTA guidance dictates a minimum requirement for a capital asset to be either:

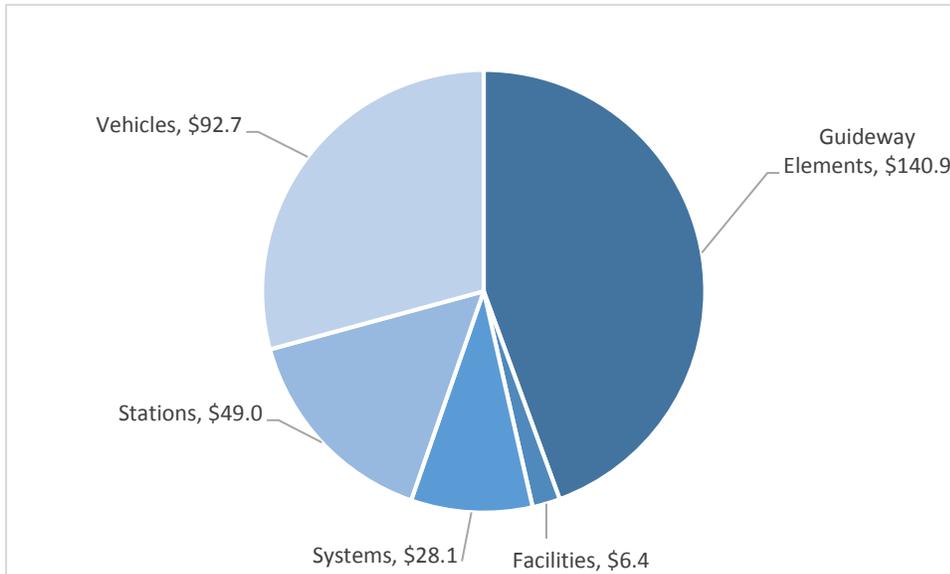
- A revenue or non-revenue vehicle; or
- Worth \$50,000 or more in acquisition value.

The inventory meets these requirements. It is important to note that this inventory is distinct from the inventory required for financial auditing purposes, which is maintained in FDOT's fixed asset ledger. However, there is overlap in terms of both asset records and data sources.

3.1.4 SunRail's Asset Base

SunRail's current asset inventory was compiled as of April 1, 2018 and is still subject to additional updates and improvements. The inventory included the IOS only and does not include signal upgrades that have been made under other safety and security projects nor does it include upgrades underway with the installation of PTC. Once completed, these assets will be added to the inventory. Figure 3-1 also does not include the value of the right of way purchased by FDOT. The current replacement value of SunRail's existing asset inventory is estimated to be roughly \$317 million (\$2018). The distribution of value by asset category is presented in Figure 3-1. Guideway elements, which consist of track and structures, are the largest of SunRail's asset classes by value with an estimated value of \$140 million, or roughly 44% of SunRail's total asset base. Vehicles, which includes passenger railcars and locomotives, are the second largest asset category at \$93 million, or roughly one-quarter of SunRail's total asset base. Other asset categories include systems (train control, communications and revenue collection), facilities (primarily the administrative and maintenance facilities located in Sanford), and SunRail's 12 passenger stations.

² "Direct capital responsibility" is defined by the FTA in the MAP-21 rule when a transit agency has spent or plans to spend capital on maintenance, improvements or replacement of an asset.

Figure 3-1. Estimated Replacement Value by Asset Category (millions of \$2018)

Note: excludes IOS right of way value

3.2 Condition Assessment

3.2.1 Methodologies

A condition assessment is the process of inspecting an asset to measure its condition and performance. The condition assessment process involves regular inspections that evaluate an asset's visual and physical conditions, as well as performance characteristics.

Agencies are required to report the overall condition of all facilities for which they have direct or shared capital responsibility using a single numeric value. Facilities can be divided into primary rating levels and secondary rating levels.

Agencies routinely collect condition information as part of their maintenance practices and as part of their preventive maintenance practices. These typically differ markedly whether the asset is a rail car, track, or station parking. The condition assessment prescribed by FTA uses the Transit Economic Requirements Model (TERM) scale described in Table 3-1. Some assets, especially facilities, may have a non-integer condition rating, because the rating for the entire facility can be a weighted average of the many components that make up that asset.

Table 3-1. FTA TERM Scale

Rating	Description	Condition
5	Excellent	New asset; no visible defects
4	Good	Some slightly defective/deteriorated component(s)
3	Adequate	Some moderately defective/deteriorated component(s)
2	Marginal	Increasing number of defective/deteriorated component(s) and maintenance needs
1	Poor	In need of immediate repair or replacement; may have critically damaged component(s)

This TAM Plan presents SunRail condition information as follows:

- TERM Lite-generated condition snapshot based on asset inventory data for all non-station asset types
- Station condition data – based on the results of on-site, visual inspections
- SGR performance measures for condition
 - Rolling stock condition (percent of Useful Life Benchmark)
 - Equipment condition (percent of Useful Life Benchmark)
 - Facility condition (compared to condition 3 on the TERM scale)
 - Guideway condition (slow zones on the track measured by segment percentage).

3.2.2 SunRail Asset Condition Snapshot

Asset conditions were assessed using two different methods for this TAM Plan. First, the condition of all non-station and non-facility assets was estimated using the asset inventory data assembled by SunRail staff. The results of this analysis are dependent on useful life assumptions for each asset type. A sample of the assumed useful life values underlying this analysis – focused on several key asset types – is presented in Table 3-2.

Table 3-2: Sample Asset Useful Life Assumptions

Category	Sub-Category	Type	Useful Life (Years)
Guideway	Structures	Grade Crossings	5 to 15
		Bridge	80 - 100
	Trackwork	Tangent	40
		Curved	35
Systems	Communications	Remote Terminal Unit/Uninterrupted Power Supply (RTU/UPS)	15
		CCTV	15
		Mobile Radios, Handpack	5
	Revenue Collection	Ticket Vending Machines (TVMs)	15
Vehicles	Revenue Vehicles	Revenue Locomotive	43
		Passenger Car	39
		Cab Car	39

The results of the resulting condition distribution analysis are presented in Figure 3-2. Specifically, this figure presents the distribution of asset conditions for all guideway (track and structure), systems and revenue vehicles. Based on this analysis, over 95 percent of SunRail assets are in “adequate” condition or better. The roughly 10 percent of track assets in “marginal” condition reflects the fact that (1) some track assets are approaching their expected useful life and (2) this analysis is based entirely on asset age (and not assessed condition). It may well be that these track assets are at a higher condition rating than reflected here.

Figure 3-2. Inventory Based Condition Snapshot by Asset Category

Category	Sub-Category	Value (\$Millions)	Excellent	Good	Adequate	Marginal	Worn
Guideway	Guideway	\$51.6	40%	17%	39%	5%	0%
	Trackwork	\$89.3	21%	12%	58%	10%	0%
Systems	Communications	\$1.0	0%	100%	0%	0%	0%
	Revenue Collection	\$4.8	31%	69%	0%	0%	0%
	Train Control	\$22.3	15%	78%	4%	3%	0%
Vehicles	Revenue Vehicles	\$92.7	0%	100%	0%	0%	0%

In contrast, SunRail stations and facilities were assessed through visual condition assessments conducted by on-site inspectors (in compliance with FTA’s TAM requirements). The results of these on-site inspections are presented in Figures 3-3 and 3-4. Note here that the assessed conditions of SunRail’s stations and facilities ranges from 4.6 to 4.9 (at or near “excellent”), implying that all SunRail stations and facilities are in a “SGR” based on FTA reporting requirements. PM in the Figures refers to Performance Measure as shown in Table 3-1. SunRail stations in the IOS were included however, the four Southern Expansion (Phase II) stations and the VSLMF were not included because they were not open to service by June 30, 2018 which is the end of the NTD reporting year.

Figure 3-3. Condition Assessment Snapshot – Stations

Station Summary Report (Including FTA Station PM Reporting)								Percent below condition 3 (FTA PM)	0.0 %
Phase	Station	Avg. Condition	In SGR? (FTA NTD)	Station Structure	Station Systems and Electrical	Other Station Assets	Station Access Area (Between Station and Parking)	Station Parking Area	
Phase I	DeBary	4.8	Yes	4.8	4.8	4.8	4.4	4.9	
Phase I	Sanford	4.8	Yes	4.8	4.9	4.9	4.9	4.4	
Phase I	Lake Mary	4.9	Yes	5.0	4.9	4.8	4.9	4.7	
Phase I	Longwood	4.8	Yes	4.7	4.9	4.7	5.0	5.0	
Phase I	Altamonte Springs	4.9	Yes	5.0	4.9	4.8	4.7	4.9	
Phase I	Maitland	5.0	Yes	5.0	4.9	4.8	5.0	5.0	
Phase I	Winter Park	4.9	Yes	5.0	4.9	4.8	0.0	0.0	
Phase I	Florida Hospital Health Village	4.9	Yes	4.9	4.9	4.7	4.9	0.0	
Phase I	LYNX Central	4.8	Yes	5.0	4.9	4.8	4.5	0.0	
Phase I	Church Street	4.9	Yes	5.0	4.9	4.8	4.9	0.0	
Phase I	Orlando Health / Amtrak	4.8	Yes	5.0	4.9	4.8	4.1	0.0	
Phase I	Sand Lake Road	4.9	Yes	5.0	4.9	4.5	5.0	4.8	
Phase II	Meadow Woods	0.0	No Data	0.0	0.0	0.0	0.0	0.0	
Phase II	Tupperware Station	0.0	No Data	0.0	0.0	0.0	0.0	0.0	
Phase II	Kissimmee	0.0	No Data	0.0	0.0	0.0	0.0	0.0	
Phase II	Poinciana Station	0.0	No Data	0.0	0.0	0.0	0.0	0.0	

Figure 3-4. Condition Assessment Snapshot – Facilities

Facility Summary Report (Including FTA Station PM Reporting)											Percent below condition 3
Phase	Facility	Avg. Condition	In SGR? (FTA NTD)	Site	Sub-Structure	Building Shell	Roof	Interior	HVAC	Plumbing	
Phase I	Sanford: Ops Control Center	4.9	Yes	4.9	5.0	4.9	4.9	4.6	5.0	5.0	
Phase I	Sanford: VSMF & Service Track	4.9	Yes	5.0	5.0	5.0	5.0	4.5	5.0	5.0	
Phase II	Light Maintenance Facility (south)	0.0	No Data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Phase II	New Facility 2	0.0	No Data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

3.2.3 SGR Targets

During the fall of 2017, SunRail developed its SGR targets consistent with Federal guidance. The specific targets (outlined below, including in Tables 3-3 and 3-4) were set in a workshop in which all major asset owners and the CEO participated. It is to be noted that SunRail does not need to submit the Equipment SGR target since they do not own or operate any non-revenue equipment. These types of equipment (pick-up trucks, hi-rails, etc.) are owned and operated by Bombardier and Herzog as contractors to SunRail.

Table 3-3: Performance Measure Targets, Rolling Stock

Fleet	Rebuild Frequency	Minimum Useful Life	Useful Life Bench-mark (ULB)*	Units in Current Fleet	Age in 2017	Performance Measure	Target
Loco-motives	10 years	25	43	11	23 (NTD 1994)	Percent met or exceeded ULB	0% Fleet above ULB
Coach Cars	10 years	25	39	7	3**	Percent met or exceeded ULB	0% Fleet above ULB
Cab cars	10 years	25	39	13	3**	Percent met or exceeded ULB	0% Fleet above ULB

* 39 is the ULB identified by FTA for locomotives, coach and cab cars.

** Vehicles were built in in 2013 and were put into revenue service in 2014.

Discussion on Rationale for the Rolling Stock Targets –

The workshop group elected to adopt **0% of the Fleet beyond its ULB**, as the target for each of the three rolling stock fleets – locomotives, coach cars, and cab cars.

The main rationale for setting the targets was to be consistent with FTA’s guidance on ULBs, currently at 39 years. Currently, the fleet is considered very young with almost new coach and cab cars. The FTA guidance of 39 years was adopted as the ULB for coach and cab cars. It is assumed that to reach this ULB coach/cab cars will require a rebuild about every 10 years.

Setting ULBs for locomotives was different. The locomotives are older, initially built in 1994 (NTD record), rebuilt in 2010, and put into use in April before passenger service began in May 2014 plus one additional locomotive delivered in late 2017. As a result, the ULB chosen considered the effective age of the locomotives (23) and added 20 years to the 2010 built date to reach an estimated ULB of 43 years. This means the locomotives are expected to be replaced by 2030, 12 years from 2017. This is higher than the coach/cab cars but also means the locomotives would be retired sooner (2030 versus 2052).

Table 3-4: Performance Measure Targets, Facilities

Asset Type	Assets	Planning / Funding Useful Life	Age in 2017	Performance Measure	Target
Maintenance Facility (VSMF) and OCC	1	20-60 years	4	Above 3 on TERM Scale – Physical inspection	100% of facilities at 3 or above on TERM Scale
Maintenance Facility (VSLMF)	1	20-60 years	New in 2018 so not included in the inventory	Above 3 on TERM Scale – Physical inspection	100% of facilities at 3 or above on TERM Scale

Asset Type	Assets	Planning / Funding Useful Life	Age in 2017	Performance Measure	Target
Stations	12	20-60 years	3*	Above 3 on TERM Scale – Physical inspection	100% of facilities at 3 or above on TERM Scale
Park and Ride Lots	8	20 years	3*	Above 3 on TERM Scale – Physical inspection	100% of facilities at 3 or above on TERM Scale

* Construction was underway in 2013 and the stations and park and ride lots opened in 2014.

Discussion on Rationale for Facilities Targets –

When the targets were developed, the facility ratings as measured by the TERM scale were unknown. However, all assets are almost new. The proposed target is that 100% of all facilities be above 3 on the TERM scale.

Guideway

- Track segmentation for performance measurement is understood to be by Directional Route Mile (DRM).
- SunRail’s current corridor length is 61 miles, which is considerably longer than the IOS of 31.5 miles. SunRail plans on reporting track performance for the entire 61-mile corridor length (approximately 89 directional route miles) since it owns the entire corridor and tenant railroads operate on sections beyond the IOS. The Southern Expansion added 17.5 miles to the 31.5 miles of the IOS.
- The main causes of operating speed restrictions experienced for SunRail include: Construction (e.g., Southern Expansion); Weather (summer heat/effect on rail); Unique operating restrictions; Maintenance (Switch/track repair). SunRail recognizes that all speed restrictions regardless of reason must be included in the calculation.
- Segmentation of the track will be accomplished by milepost segment: IOS, Southern Expansion, Northern Expansion. Reporting by milepost segment is the most effective since daily bulletin speed performance is currently conducted by milepost.
- Current performance is estimated at about 1.5 to 2% of total DRMs with speed restrictions. After some discussion, the group recommended using 3% as the maximum number of DRMs that would be affected by speed restrictions as the annual average as measured the first Wednesday of each month at 9:00 am local time.

Discussion on Rationale for Guideway Targets –

The target for track, percentage of guideway DRMs with speed restrictions, is set at 3%.

Rationale for target setting is mainly a result of current performance as well as expectation of achievable performance with future expansions.

Equipment – Not Applicable

Rationale on Equipment Targets –

Contractor-owned support vehicles are principally used by the contractors for their own use. FDOT pays their share for usage of the equipment through its operating contract, therefore ULBs and target setting are not applicable to SunRail for NTD reporting.

Reinvestment Needs and Prioritization

FTA's MAP-21 requirements and best practices both call for the development and implementation of objective methods and processes to identify and prioritize required reinvestment actions. This is to help ensure that limited capital funds are allocated to those investments that best support SunRail's TAM objectives (including service quality, safety and reliability). As part of an ongoing TAM implementation and improvement process, it is recommended that SunRail prioritize work-to-date and consider development of a more asset and project-oriented process.

4.1 Decision Support Tools

Decision support tools provide transit agencies information to support decision making, including investment prioritization, and support performance monitoring of SGR programs. TERM Lite is the FTA's decision support tool, initially developed to determine capital reinvestment needs for a nationwide analysis of transit SGR. TERM Lite uses asset inventories and life-cycle plans to determine capital reinvestment needs and analyze changes to the SGR backlog over time. TERM Lite uses the process illustrated in Figure 4-1, to project reinvestment needs over a 20-year period.

Figure 4-1. TERM Lite Process for Projecting Reinvestment Needs



There are three types of reinvestment needs calculated by TERM Lite:

- **Replacement**, which is based on an individual asset's age compared to useful life. Some asset types are not "replaceable", such as tunnels, and are kept in perpetuity. These asset types are designated as such in the model and never receive full replacement value.
- **Rehabilitation**, the number and cost of which are determined by SunRail. The cost is calculated as a percentage of full replacement value, and the timing is based on percentage of useful life consumed (i.e., midlife = 50%).
- **Annual capital maintenance (ACM)**, is only applicable to a handful of asset types as it is generally used for large infrastructure assets which require a periodic, low level of reinvestment for maintenance. ACM is normally below 1% of the replacement value of an asset.

Along with reinvestment needs, TERM Lite determines which assets receive reinvestment under constrained funding using a prioritization routine (detailed in Section 4.4) and which assets enter/leave

the SGR backlog based on that funding allocation. This analysis is redone in each year of the 20 years of analysis.

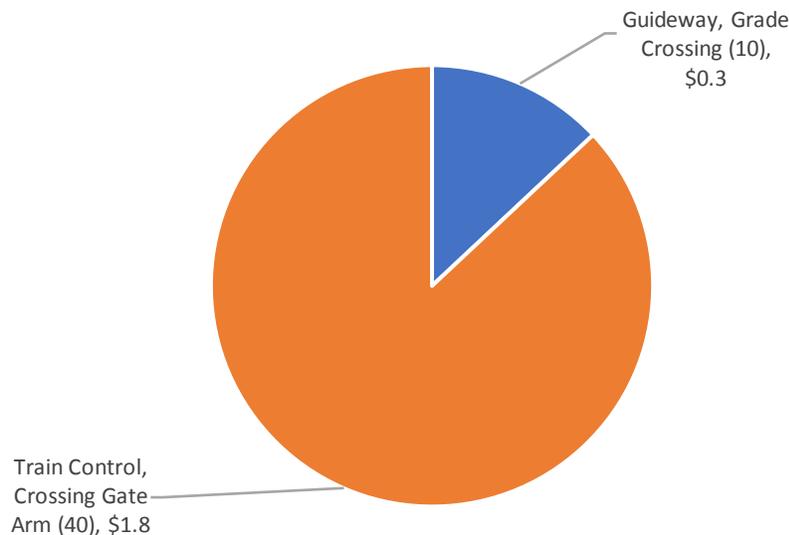
4.2 State of Good Repair (SGR) Backlog

To quantify the SGR backlog, FTA’s TERM Lite tool was used to determine which SunRail assets exceed their expected useful lives, or have deferred capital maintenance needs (i.e., rehabilitation or annual capital maintenance). These calculations are based solely on SunRail’s asset inventory data and agency input assumptions regarding the asset’s useful life and replacement costs.

Based on this TERM Lite analysis, SunRail’s SGR backlog as of April 2018 is estimated to be approximately \$2.1 million; meaning as of April 2018, it would require roughly \$2.1 million to perform the necessary reinvestment actions to bring all SunRail assets to a full state of good repair. Subsequent to the April analysis, a decision was made to make approximately \$2 million in improvements to the Lake Monroe Drawbridge in 2019/2020 so that is not reflected in the backlog analysis in Figure 4-2. Given that SunRail’s transit assets have an estimated total replacement value of \$317 million, the SGR backlog is estimated to represent roughly 0.7 percent of all SunRail assets (by value), which is extremely low by industry standards, and effectively indicates a “state of good repair”.

The composition of SunRail’s backlog is shown below in Exhibit 4-2. This chart only shows those asset types determined to currently be in the backlog (based solely on expected useful life), with the expected useful life of each asset type presented in parentheses. Note that the backlog consists primarily of bridge and crossing gate reinvestment needs.

Figure 4-2. Estimated Current SGR Backlog (Millions of \$2018)



4.3 Reinvestment Needs Forecast

The forecasts in this section of the TAM Plan extend five years after revenue service began (July 30, 2018) on the Southern Expansion. Per its FTA FFGA, the hours of service and headways for the Southern Expansion must remain in place no less than five years after revenue service began which extends until July 30, 2023.

4.3.1 Unconstrained Needs Analysis

The unconstrained needs analysis is designed to determine the level of investment required to address SunRail’s total reinvestment needs for the upcoming five-year period. This analysis assumes that SunRail has unlimited access to reinvestment funding and has the planning and project management capacity to address each reinvestment need within a one-year period. While not always unattainable in the real world, this analysis is helpful in identifying all existing and upcoming capital needs as well as a method to assess the gap between total needs and expected funding capacity.

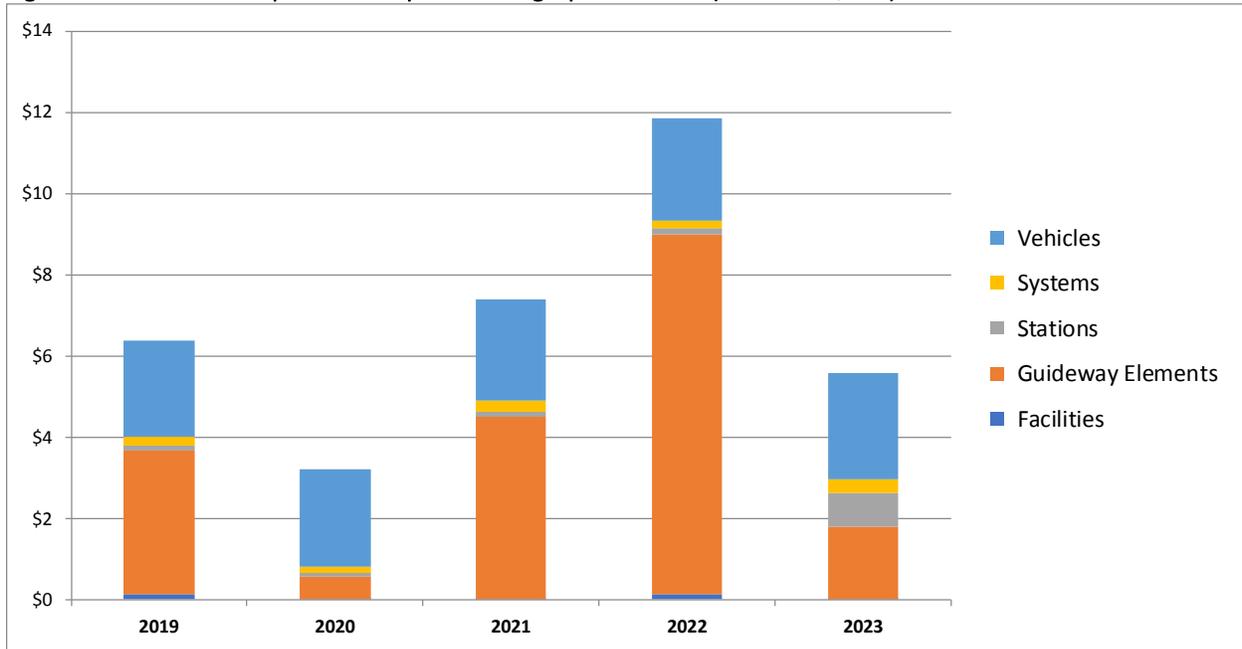
To assess SunRail’s unconstrained needs, the TERM Lite model was run for a five-year time span, assuming no funding constraint and 2.7% cost inflation; therefore, all needs are in year of expenditure (YOE) dollars. In this scenario, the current SGR backlog can be eliminated in the first year of analysis. The resulting unconstrained 5-year needs are shown in Figure 4-3, grouped by asset type. The average annual needs amount provides a sense of the typical level of annual funding required to attain and maintain full SGR throughout the five-year period.

Figure 4-3. SunRail Unconstrained 5-Year Needs: 2019-2023 (Millions of \$YOE)

Asset Type	2019-2023
Facilities	\$0.3
Guideway Elements	\$19.2
Stations	\$1.3
Systems	\$1.2
Vehicles	\$12.3
Total	\$34.4
Average Annual Needs	\$6.9

Figure 4-4 presents the annual reinvestment needs for the 5-year time horizon, segmented by asset category. Note that SGR investments in “guideway elements” including ongoing trackwork, bridges, and roadway crossing reinvestments constitute the largest investment need over this period. This projection includes approximately \$2.5 million annually for locomotive rehabilitation to address a top deck overhaul every four years and a Head-End Power (HEP) overhaul every three years. For example, based on a 2018 analysis of the Lake Monroe Drawbridge and FDOT planned capital maintenance investments, the bridge can be maintained in an SGR for 30+ more years provided the planned maintenance investments are implemented.

Figure 4-4. Investment Expenditures by Asset Category: 2019-2023 (Millions of \$YOE)



4.3.2 Constrained Analysis

TERM Lite was also run under a “constrained” scenario. Specifically, the constrained run assumes SunRail will receive the level of reinvestment funds documented in SunRail’s 2015 Financial Plan (including FTA 5337 State of Good Repair funds and Local Capital Funding for the period 2019 through 2023).

The constrained analysis is designed to highlight two key issues. First, given that reinvestment funds are expected to be less in some periods than is required to address all outstanding reinvestment needs, how should these funds be prioritized (i.e., what assets should the funds be spent on)? Second, given that some reinvestment needs will not be addressed, what will happen to the SGR backlog? Will it decline, remain constant, or will it grow and if so by how much?

The results of the constrained analysis are presented in Figures 4-5 and 4-6. Figure 4-5 shows how TERM Lite chose to invest the \$34 million in reinvestment funding estimated to be available over the upcoming 5-year period (using TERM Lite’s internal prioritization routine). Note that all budgeted funds were expended. Moreover, consistent with the unconstrained run, a very large share of the total funding is expended on revenue vehicles (rail cars and locomotives) and guideway assets (track and bridges). FTA provides State of Good Repair Grants (40 U.S.C. 5337) to eligible recipients that include state and local government authorities with fixed guideway and high intensity motorbus systems in revenue service for at least seven years. SunRail will become eligible for these grants in 2021.

Figure 4-5. Constrained and Prioritized Expenditures: 2019 to 2023 (Millions of \$YOE)

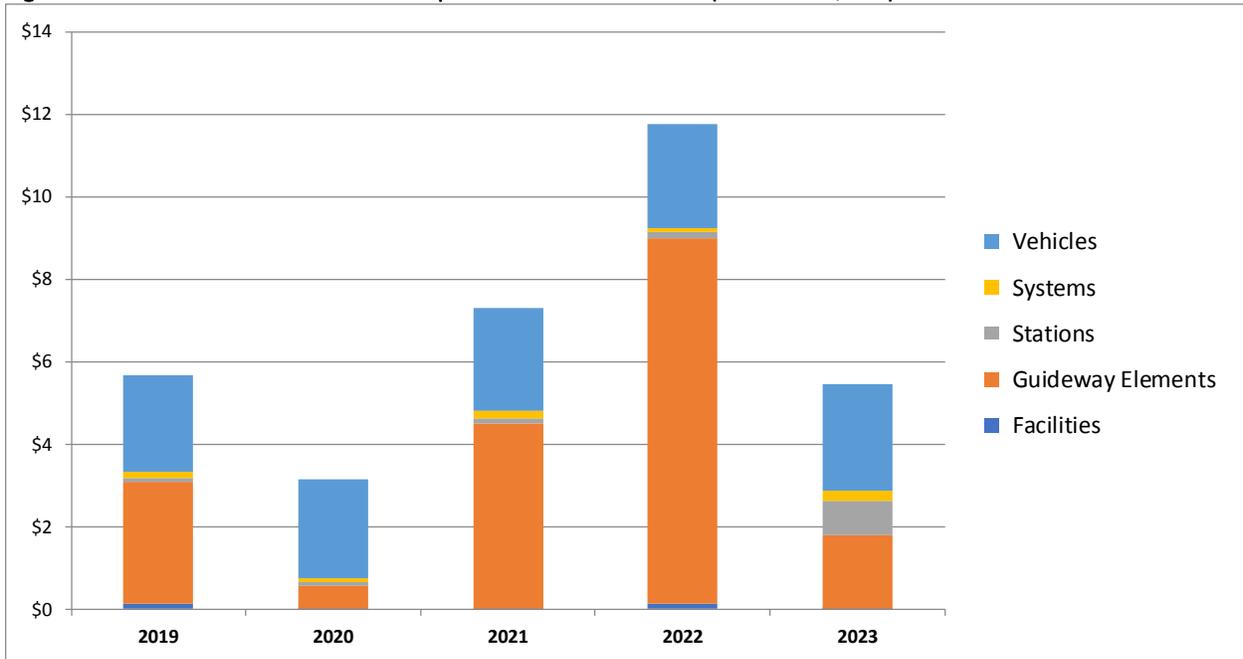
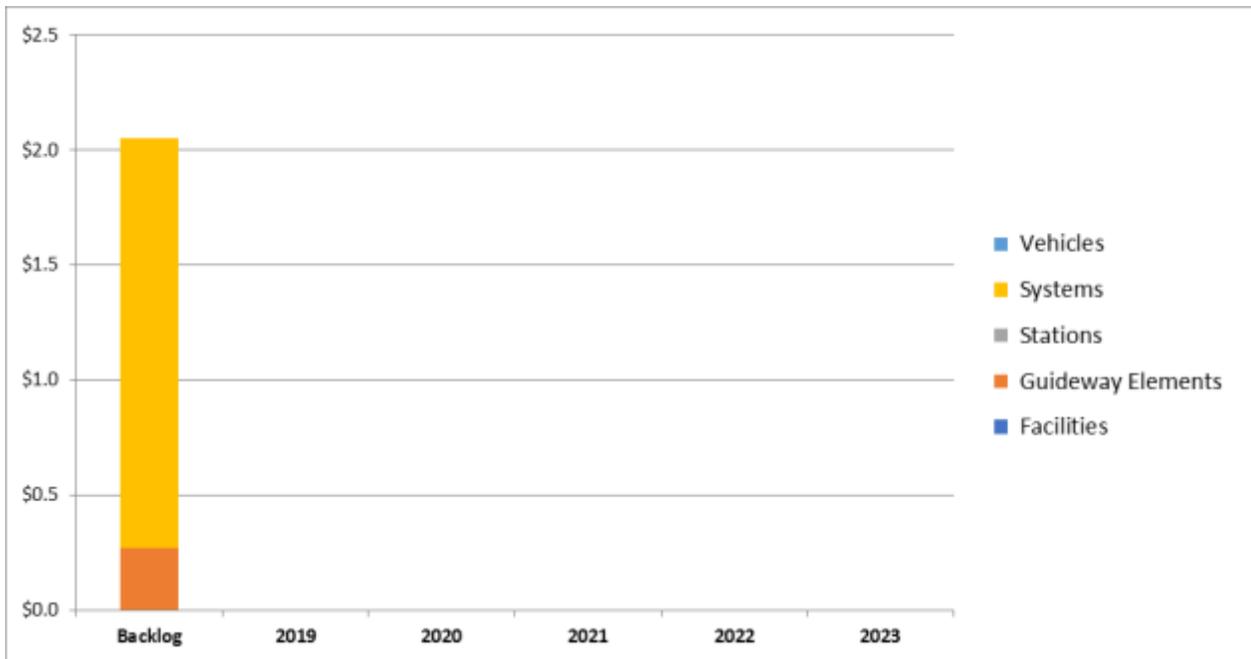


Figure 4-6 presents the SGR backlog projection associated with this constrained funding scenario. Based on this analysis, SunRail’s expected capital funding (as documented in the 2015 Financial Plan), is sufficient to control the size of the backlog, with the backlog being fully eliminated from 2019 through the end of the five-year projection period.

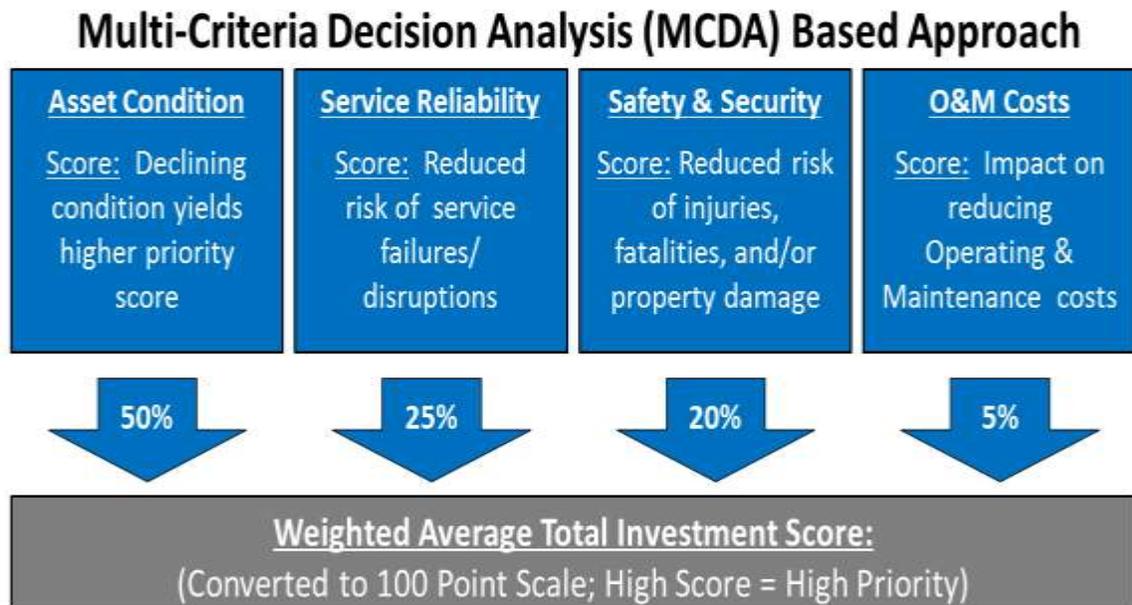
Figure 4-6. Constrained Scenario: SGR Backlog Projection for 2019 to 2023 (Millions of \$YOE)



4.4 Capital Project Prioritization

TERM Lite uses a Multi-Criteria Decision Analysis (MCDA) approach to rank individual asset investments based on the criteria shown in Figure 4-7. The prioritization criteria used in the model include: asset condition (age-based estimates), service reliability ratings, safety and security ratings, and O&M cost impacts. Asset conditions apply to individual assets as they decay; the lower the condition, the higher the priority for replacement. The ratings for the other criteria are based on the impact of each asset type on the defined outcome. For example, a revenue vehicle will be rated much higher for service reliability than the elevator in an administrative building. Each criterion is then weighed against others to determine how important those criteria are with respect to one another, as shown in Figure 4-7.

Figure 4-7. TERM Lite Multi-Criteria Analysis Prioritization Process



TERM Lite considers all the possible reinvestment actions with their respective priority in each year and reinvests in assets subject to funding constraints. This results in an SGR backlog forecast, where the lower priority assets are deferred for investment, and guidance on when each reinvestment should occur based on the higher priority rankings.

It is important to note that the prioritization routine in TERM Lite works at an individual asset level and only applies when there is a funding constraint. The model will reinvest in the highest priority assets until the budget constraint is hit, and the remainder of assets with needs are deferred until their priority increases or there is room in the budget.

Expansion assets are not prioritized along with SGR reinvestments. TERM Lite assumes that all planned expansion assets are acquired outside of the budget constraint. However, when expansion assets require reinvestment for rehabilitation or replacement, those actions will be prioritized and fall under the budget constraint.

As SunRail will not be able to fully address all backlogged needs with expected funding, the prioritization of assets in the backlog can inform initial investment decisions. The TERM Lite model has been used to categorize SunRail's reinvestment needs into three "Investment Tiers". Within this analysis, each tier reflects a differing level of reinvestment priority, with "Tier 1" representing the highest priority needs ("what should we do first"), and "Tier 3" the lowest priority ("what do we postpone if we have to"). The reinvestment tiers shown in Figure 4-8 are based on default 100-point TERM Lite prioritization scores.

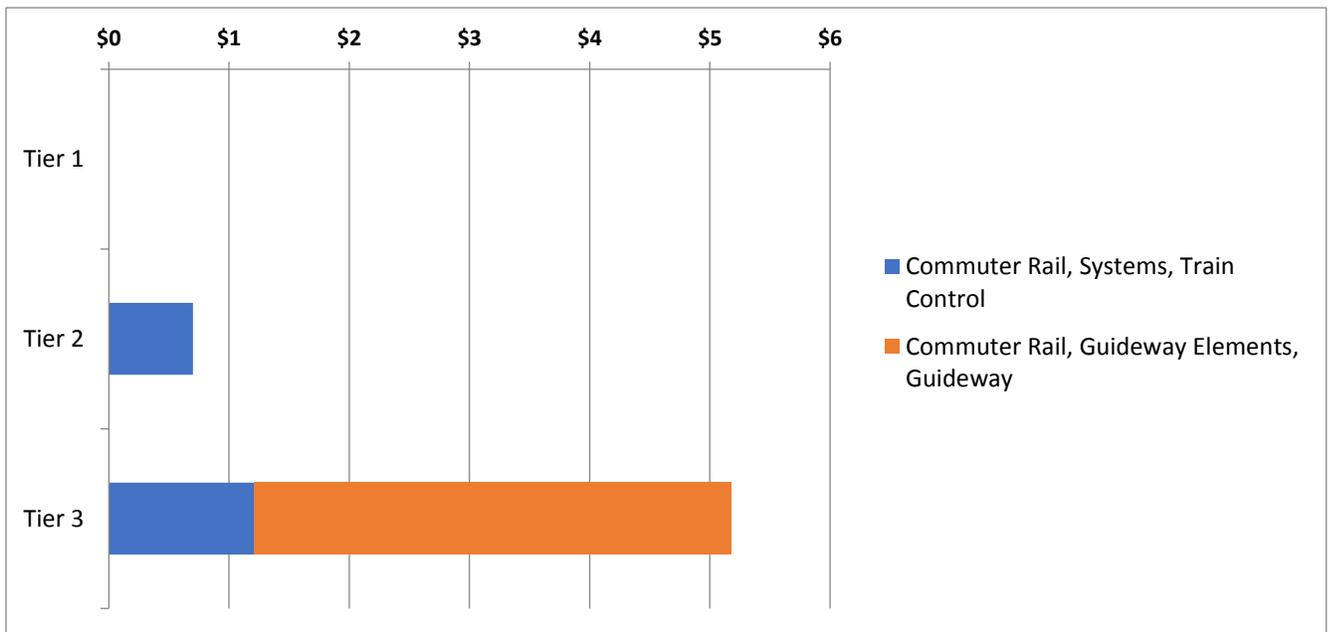
Figure 4-8. Prioritization Score Thresholds

Tier	Prioritization Score Thresholds (100-point scale)	Description
Tier 1	Over 80	Highest Priority (do first)
Tier 2	70 to 80	Mid-Level Priority
Tier 3	Under 70	Lowest Priority (do if funds available)

4.4.1 Prioritized SunRail Backlog

Based on the TERM Lite analysis, close to 90 percent of SunRail’s roughly \$5.8 million backlog falls into Tier 3, the lowest level of reinvestment priority shown in Figure 4-9, with the remaining \$0.7 million in Tier 2. This reflects the fact that SunRail assets are in, or very near a state of good repair. Hence, assets that are determined to be in the backlog represent a very small share of SunRail’s asset portfolio (less than 2 percent) and have entered the backlog relatively recently (i.e., recently exceeded their expected useful lives) and are therefore unlikely to have any negative impact on service quality.

Figure 4-9. SGR Backlog: Priority Tiers



Implementation Program

5.1 Implementation Approach

This section details how the asset management improvement program is structured and describes the main drivers that form the foundation of the program, the resources needed for implementation, and the overall expected outcomes (which are expected to be in alignment with SunRail's Goals, Objectives and TAM Policy principles). The asset management improvement program includes a set of actions that individually might vary in nature (e.g., policy and strategy, life-cycle management, cross-asset planning and management). The program lists the individual actions to be implemented during the Plan's 4-year horizon.

All asset management actions in this section aim at advancing asset management best practices at SunRail. The fundamental concepts of asset management are straightforward; however, implementing changes and improvements within an organization requires careful planning and higher levels of coordination. The asset management improvement program is directed at further institutionalizing asset management at SunRail and moving the agency toward a more results-driven environment, focused on reliability, optimized life-cycle management, and reduced risk while achieving better performance and delivering higher levels of service, as called for by SunRail goals, objectives and TAM Policy.

The FTA defines the implementation strategy (or approach) as the operational actions that a transit provider decides to conduct to achieve its TAM goals. The following action plan addresses those improvement steps required by the FTA, as well as steps that address opportunities for improvement that were identified during the plan development process. The four actions specifically required by the FTA are:

- Annual asset inventory update
- Annual setting of performance targets
- Report on attainment of previous year's targets (begins in 2019)
- TAM Plan update (at least once every four years)

The asset management improvement program has been designed to align with SunRail's TAM Policy. The SunRail TAM Policy goals and objectives listed in Section 2 of this document define SunRail's overall direction for all asset management-related activities. Ideally, these goals and objectives provide a link to planning, budgeting, and day-to-day work performed across all departments. High performing asset management entities aim at working across functional disciplines such as operations, engineering, planning and finance. Also, as described in Section 4, asset management practice looks beyond current budget cycles by linking forecasts of future capital and maintenance funding needs to future budget cycles.

After establishing the list of activities to be implemented over the next 4 years and confirming that adequate resources are in place (i.e., staff and funding), SunRail will institute the appropriate mechanisms to track asset management activity progress on a regular basis. In addition, SunRail will establish internal and external asset management communication strategies to inform staff within the organization and any external stakeholders about asset management activities in general, progress made, and any need of additional efforts to meet established asset management targets.

5.2 Policy, Governance, Accountability and Commission (CFCRC) Transition

In 2007, FDOT and its Local Government Partners, the City of Orlando and the Counties of Volusia, Seminole, Orange and Osceola, signed a series of Interlocal Agreements for Governance, Funding, and Operation of the SunRail system. In December 2009, the Florida Legislature passed legislation allowing the SunRail project to move forward.

The Interlocal Governance Agreement, which was executed on July 19, 2007, and has been amended since then, created the CFCRC. This is a five-member Governing Board of the five Local Government Partners created to oversee and operate SunRail. During the FDOT Funding Period, which is essentially the first seven years of revenue service, the CFCRC serves in an advisory role regarding SunRail policies. This Agreement also details the CFCRC's roles and responsibilities once the SunRail system transitions to its control after the FDOT Funding Period.

The Interlocal Operating Agreement, also signed on July 19, 2007 and amended since then, recognizes that FDOT is responsible for the design, permitting, and construction of the Commuter Rail System, and is responsible for its funding, operation, management, and maintenance for seven years following the Revenue Operation Date. Based on the Revenue Operation Date of May 1, 2014 for SunRail Phase 1, the expected transfer date to the CFCRC would be on May 1, 2021.

The CFRC is owned and managed by FDOT. In November 2007, FDOT executed a contract with CSXT to purchase the corridor. In addition, FDOT and CSXT executed the Central Florida Operating and Management Agreement (CFOMA) that details how CSXT will operate on the corridor and the fees it will pay to FDOT for those operations. The CFOMA will be reviewed every ten years to set any fee changes. At the time of the transition to the CFCRC, FDOT will provide the CFCRC with a Commuter Rail Easement in the CFRC and fee title to the station property. The CFCRC understands that the Easement will be encumbered by CFOMA, and that the CFCRC will accept liability under CFOMA to the same extent as FDOT. Simultaneously with conveyance of the Easement, FDOT will transfer to the CFCRC all of its rights, titles, and interest in the rolling stock, equipment, tracks and other personal property of the Commuter Rail System, both tangible and intangible. FDOT will also transfer all of its rights, titles, and interest in Station property subject to any of the joint use agreements FDOT has executed. The Joint Use Agreements with each Local Government Partner delineate responsibilities for station amenities, maintenance, and ownership. These agreements will be assigned to the CFCRC as part of the transition. The Easement and the transfers are subject to a reverter clause to FDOT under certain conditions.

In the Interlocal Operating Agreement Section 3.05 (E), Conveyance Requirements states "When components of the Commuter Rail System are conveyed to the Commission, all such components shall be in a State of Good Repair, subject to normal wear and tear, and all guarantees, warranties and similar rights held by FDOT relating to such components shall be assigned to the Commission." This TAM Plan will support FDOT in complying with this SGR provision.

Section 4.02, Capital Plan Funding, of the Interlocal Governance Agreement, states that after the FDOT Funding Period, the Local Government Partners will pay a set amount for capital funding based on the percentage of track miles in their jurisdiction multiplied by the Capital Cost of the Five-Year Capital Plan. This agreement will provide funds for future capital needs as described in this TAM Plan.

The Interlocal Funding Agreement, also executed on July 19, 2007, and amended since then, establishes how FDOT and the Local Government Partners will fund various aspects of the Commuter Rail System, and what rights the Local Government Partners have regarding subjects such as land use around stations, parking charges, and property maintenance.

During the FDOT Funding Period, FDOT has contracted with a number of companies to provide the day-to-day operations of SunRail. As described in Table 2-2 of this TAM Plan, several contractors are responsible for inventory and maintenance of SunRail's current assets. In addition, Bombardier is responsible for operating the SunRail trains and dispatch on the CFRC. FDOT also has a number of consultants providing staff augmentation and other support services for SunRail. As noted in Section 2.4 of this TAM Plan, FDOT has a minimal number of full-time FDOT staff who work on SunRail. It is unknown how the CFRC will choose to staff and operate SunRail once the Commuter Rail System is transitioned to their control.

5.3 Implementation Timeline and Action Plan

The SunRail asset management improvement program incorporates existing and new actions expected to be implemented right before or in the four-year horizon of this TAM Plan (between October 1, 2018 and October 1, 2022). In addition, the FTA TAM Rule requires that the TAM Plan describes the resources necessary to carry out the Plan. Table 5-1 shows the Action Plan and its Implementation Time Frame. Specifically, the table lists action items along with an expected timeframe for their implementation (short, medium, or long term). The list combines existing asset management-related actions with newly identified actions aimed at improving asset management practice at SunRail.

The scopes and time frames are the best estimates at the time of the release of this Plan. The time periods are defined as short term (present to two years), medium term (three to four years), and long term (five years and beyond). The list of Action Items includes activities which have been assembled into four Action Groups as follows:

Action Group 1: TAM Policy, Goals and Objectives

This first group encompasses actions that address policy and governance issues. As identified in the asset management gap assessment exercise, it is critical to the success of this plan to have all its activities clearly align with SunRail's TAM Policy and its goals and objectives. Likewise, for the TAM Plan to be successful, it is expected that the agency governance structure provides the support and resources necessary for its successful implementation.

Action Group 2: Data Collection and Management

The second group includes action items that focus on improving asset data collection and management practices. As a result, SunRail will be able to continually improve data quality that encompasses completeness and accuracy with corresponding data validation processes. This, in return, will provide SunRail the necessary tools to closely monitor asset performance for better investment decision-making.

Action Group 3: Lifecycle and Capital Planning

The third group incorporates actions that are aimed at guiding SunRail to undertake decisions on a whole life cost approach that balances costs, risks and performance across the life of its assets. Necessary intervention options are then evaluated from a cost, risk and performance perspective. A balanced approach is sought that will enable SunRail to reduce its risk exposure and increase operational performance while optimizing whole life cost.

Action Group 4: Change Management

The implementation of this plan requires a commitment from SunRail to ensure the continuity of asset management practice at the agency, but more importantly, to improve asset management practice over time. The two actions listed in this category are aimed at establishing an asset management evaluation and continual improvement program, as well as a communications plan aimed at keeping internal and external stakeholders informed of all asset management-related activities at SunRail.

Table 5-1. Action Plan and Implementation Timeframe

Transit Asset Management Plan

Identified Gaps	Action Item Number	Proposed Action	Department(s) Entity or Individual Responsible and/or Accountable	Completion Status	Short Term			Medium Term		Long Term	
					Year (0-2)			Year (3-4)		(5 Years +)	
					0	1	2	3	4	5	6+
TAM Policy, Goals and Objectives											
Establish a TAM Plan (TAM Rule Requirement)	1	Adopt TAM Plan Update at least once every four years	CEO	Completed							
Establish a TAM Policy	2	Adopt TAM Policy; can be accomplished as an element of TAM Plan	CEO	Completed							
Need to assess progress against TAM Plan	3	Assess and report on progress against TAM Plan, including project schedules, milestones, and funding issues if applicable	CEO								
Data Collection and Management											
Refinement of Asset Inventory	4	Continue to refine and improve the quality of asset inventory, emphasizing development of more detailed train control records including PTC equipment. Develop a process to improve consistency and consolidation of data obtained from SunRail’s contractors and assist in determining remaining useful life of assets. Include a process to transition inventory data to the CFCRC.	Financial Operations Manager and COO								
Annual submission and update of asset inventory (TAM Rule Requirement)	5	Annual submission of updated asset inventory to NTD. This may include efforts to harmonize the various asset inventory registries now in place as SunRail’s asset management matures.	Financial Operations Manager	Annual submission							

Table 5-1. Action Plan and Implementation Timeframe

Transit Asset Management Plan

Identified Gaps	Action Item Number	Proposed Action	Department(s) Entity or Individual Responsible and/or Accountable	Completion Status	Short Term			Medium Term		Long Term	
					Year (0-2)			Year (3-4)		(5 Years +)	
					0	1	2	3	4	5	6+
Effective maintenance management system	6	Develop a system with SunRail's contractors to improve maintenance reporting to support visibility into the performance of assets and identify maintenance needs, scheduling and budgeting.	COO								
Desk Reference for inventory updates	7	Develop a desk reference to document the process to be used for future TAM Plan inventory updates.	Corridor & Facilities Manager								
Lifecycle and Capital Planning											
Annual submission of performance targets into NTD (TAM Rule Requirement) Submit a narrative report on performance target results (TAM Rule Requirement)	8	Annual submission of performance targets; Narrative regarding performance targets attainment for the previous year	Financial Operations Manager	Annual submission							
Key Performance Indicator (KPI) system not used to full potential	9	Analysis and Improvement of KPI data collection and reporting (See Section 6 for detailed discussion)	TBD								
Incomplete Track Information	10	Assess expected useful life for new track and expected remaining useful life for existing track, with emphasis on curved track segments	COO								

Table 5-1. Action Plan and Implementation Timeframe
Transit Asset Management Plan

Identified Gaps	Action Item Number	Proposed Action	Department(s) Entity or Individual Responsible and/or Accountable	Completion Status	Short Term			Medium Term		Long Term	
					Year (0-2)			Year (3-4)		(5 Years +)	
					0	1	2	3	4	5	6+
Change Management											
Lack of Communication and Feedback Program	11	Develop an Asset Management Communications Program, incorporating different avenues for evaluation and feedback regarding asset management throughout the agency	CEO								
Lack of Asset Management Training Program	12	Establish an Asset Management Training Program for both FDOT and contractor staff	CEO								

5.4 Resources Required to Implement Plan

Table 5-2 identifies the estimated staff support required to implement the listed action items in the four-year plan horizon and beyond. The table also identifies the department or individual (if applicable) responsible or accountable for implementation. It is expected that all action items will have an in-house personnel participation.

Human Resources Required to Implement

These categories are listed to establish the type of human resources required to implement the actions.

In-House: This category indicates whether SunRail expects to use existing personnel to implement the action items. All actions items listed in this plan require strong in-house staff support.

Staff Augmentation: This category shows whether the actions will require the hiring of new personnel to support their implementation.

Outsource: This category identifies the action items that require contractor and/or consultant support. SunRail will try to include a knowledge transfer component in the contracts.

To Be Determined (TBD): Considering that the scope of some action items is yet to be determined, there is no staffing estimation at this time.

The resource estimates for most action items are preliminary and subject to SunRail's budgeting process and other factors. Additional refinements will be necessary as the action items are further developed and closer to implementation.

Table 5-2. Resources Required to Implement Action Plan

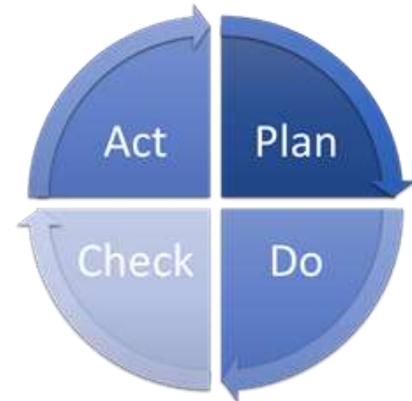
#	Proposed Action	Department(s) or Individual Responsible and/or Accountable	Human Resources Required to Implement			
			In-House	Staff Augmentation	Outsource	TBD
1	Establish and update a TAM Plan once every four years (TAM Rule Requirement)	CEO				
2	Establish a TAM Policy	CEO				
3	Assess and report on progress against TAM Plan, including project schedules, milestones, and funding issues if applicable	CEO				
4	Refine and improve the quality of the asset inventory including a process to transition inventory date to the CFCRC	Financial Operations Manager and COO				
5	Annual submission and update of asset inventory and harmonize asset inventory registries (TAM Rule Requirement for the annual submission)	Financial Operations Manager				
6	Develop a system to improve maintenance reporting	COO				
7	Develop a desk reference to document the process to be used for future TAM Plan inventory updates	Corridor & Facilities Manager				
8	Annual submission of performance targets into NTD (TAM Rule Requirement) Submit a narrative report on performance target results (TAM Rule Requirement)	Financial Operations Manager				
9	Analysis and Improvement of KPI data collection and reporting	TBD				
10	Assess expected useful life for new track and expected remaining useful life for existing track, with emphasis on curved track segments	COO				
11	Develop an Asset Management Communications Program	CEO				
12	Establish an Asset Management Training Program	TBD				

Evaluation and Continuous Improvement

This TAM Plan sets objectives, strategies, and performance measures for continual improvement of SunRail's asset management. To successfully implement this TAM Plan and advance the agency's TAM maturity and capability, it is recommended that senior management conduct an annual review of implementation plan progress, and SGR performance measures. This review can help refine the annual work program and identify potential new projects to further SunRail's progress towards successful implementation. SunRail's executive management will review and approve revisions to this TAM Plan to ensure alignment with other strategic activities.

SunRail's annual approach to reviewing and updating TAM documents and performance measures will follow the continual improvement approach of:

1. Plan – plan for improvement activities and set performance targets (such as this TAM Plan).
2. Do – execute the annual TAM activities.
3. Check – review the outcomes of the TAM activities to determine their impacts; reviews could include further Gap Assessments, performance modeling or lessons learned from project improvements.
4. Act – capture improvements and document the new baselines for these activities, leverage lessons learned in the TAM Plan for the next four years.



This approach to continual improvement is already implemented to some extent, with the annual process of monitoring performance and setting targets.

6.1 Communications and Change Management

Successful asset management implementation requires good communications. This includes ongoing dialogue, progress updates, and change management. Change management is an active process used to build awareness, enlist participation of key stakeholders (including SunRail's contractors), implement necessary changes, and sustain the change over time to achieve the asset management goals. When specifically dealing with business process change, it is important to reach agreement on the need to make the change among the responsible people (including contractors) as well as the need to support the change through to implementation.

Perhaps one of the most important actions in this respect is the development of internal asset management communication items. Such items can convey to key staff and contractors the importance of asset management, the key actions being conducted, and progress on those actions.

A common approach for change management is represented by the Awareness, Desire, Knowledge, Ability, and Reinforcement (ADKAR) acronym, which is a useful aid for understanding and promoting organizational change.



As change management requires awareness, desire, and knowledge, one of the Implementation Program action items in this TAM Plan is the development of a Communication Plan that addresses internal and external stakeholders on an ongoing basis. This feedback loop will be an essential part of how the successes and challenges of the Communication Plan will be monitored and evaluated going forward. Ultimately, the communications plan will include reinforcement of those activities that have benefited SunRail and will be maintained and memorialized as part of SunRail's practices. As an example, the improved condition of assets that results from the region's increased investment in SunRail will be part of internal and external communications that reinforce SunRail's TAM improvements.

6.2 Stakeholder Involvement

Efficient management of SunRail's transit assets depends on not only SunRail employees, but also on a variety of external stakeholders, partner jurisdictions, elected/appointed officials, customers/community, contractors, regulators, and vendors who all have their expectations from the system.

- Customers/community: SunRail's reason to exist are the customers who use its service. SunRail's customers depend on transit to access employment, education, healthcare, shopping, and entertainment. In addition, SunRail customers need to trust that the equipment and operators will get them to their destinations safely. When a customer is injured due to infrastructure or equipment failure, SunRail risks losing its most important stakeholder.
- Partner jurisdictions: SunRail depends to a large degree on its federal, state, and local partners for funding. As such, it must collaborate very closely with these partner jurisdictions, especially with respect to communicating current and future reinvestment needs.
- Contractors: SunRail's operations and asset maintenance are carried out by a combination of contractors. These contractors are essential partners in the agency's asset management program, both in terms of providing input into the program and implementing it.
- Planning Partners: SunRail's service area includes two Metropolitan Planning Organizations (MPOs) which serve as the regional planning organizations for transportation. MetroPlan Orlando (Seminole, Orange and Osceola Counties) and the River to Sea Transportation Planning Organization (TPO) (Volusia County) are legislatively empowered to authorize the use of federal funds on transit projects, and since the institution of MAP-21, are also required to coordinate their SGR performance measures with SunRail and all other local transit operators in the region.
- Regulators: Through rulemaking and oversight, the FTA, the Federal Railroad Administration (FRA), U.S. Environmental Protection Agency, Occupational Safety and Health Administration, and other agencies all directly influence how SunRail's transit assets are managed.
- Vendors: The performance and pricing of service providers, contractors, consultants, material suppliers, and other vendors directly affect SunRail's ability to deliver projects on-time and on-budget. Issues with vendor performance and/or pricing may have a profound impact on the performance of the transit system at large.

This TAM Plan was written with an understanding of what each stakeholder expects from the transit system and is designed to help meet those expectations, while simultaneously balancing SunRail's internal priorities. Stakeholders should be engaged in meaningful ways in the implementation of the actions from this Plan.

6.3 Key Performance Indicators

Deliberate and thorough tracking of performance measures is essential to a strong asset management program and has been targeted as an action item in this plan. While this task is focused on TAM and SGR, it will benefit all performance measurement and reporting at SunRail.

Data Collection: The first activity will be to review the three major contracts (i.e., Bombardier, Herzog, Amtrak) for performance reporting and developing a list of all the measures contained therein. It will be helpful to follow that activity by interviewing the contract overseers at FDOT to assess the efficacy of the current approach. It takes time to make changes to contracts; however, if the information is readily available and beneficial to SunRail, contractors should be willing and able to supply the information. Next, interviewing the contractors themselves will lead to the identification of the measures they themselves collect. This will allow for a comparison and identification of potential additions or modifications to what currently funnels up to SunRail.

Mapping of Performance Measures: This second activity consists of documenting the flows of information and sorting them by function. Flows of information include a data generator, data compiler, system of record, aggregation/modification by the transmitting party, transmittal to SunRail, aggregation/modification at SunRail, and potential transmittal to other parties.

Sorting of the measures include categories such as: operations, maintenance, reliability, finance, asset management/SGR, safety/security, and customer satisfaction.

Formulating Recommendations: The third activity will be a critical review of the information above, and determining the following:

- Does SunRail receive sufficient performance reporting data from its contractors?
- Is the data collected and presented in the best manner possible, or are changes warranted?
- What is the best way to address performance reporting between Preservation (i.e., SGR), Operations, and Expansion?
- Do new measures need to be generated?
- What is the desired reporting frequency?
- What are the most strategic performance measures for SunRail, and should they be the subject of a special dashboard?
- Is data for all required NTD performance measures satisfactorily collected and reported?
- Once performance measures are reported, what happens to that information? Is it used to make changes and improvements to operations, policies, and procedures?

The resulting recommendations will be assembled to clarify, structure, and simplify performance reporting for years to come, including but not limited to, asset management. The recommendations should also include the design and development of a sample dashboard with an easy to understand set of measures for SunRail senior management and the CFCRC.

6.4 Training

Integrating asset management principles into the larger culture of SunRail requires training staff in multiple roles and at many levels in different aspects of asset management to provide them with the Ability (the second A in ADKAR) to deliver change. As part of its commitment to accomplishing the actions detailed in this plan, and to continually improving its asset management implementation, SunRail will train the appropriate personnel in the necessary aspects of asset management, including the

theory behind it, creation of asset management plans, and use of asset management software applications. Both training and the creation of reusable training materials are detailed in the Implementation Plan.

6.5 Future TAM Plans

At least every four years, SunRail is required to fully review and revise its TAM Plan in accordance with FTA requirements. In addition, certain actions (such as, the opening of a new facility that was not addressed in the Plan, a natural disaster that significantly affects the agency's assets, or a major increase/decrease in the agency's funding levels) may justify a revision prior to the four-year deadline. These revisions will require input from various stakeholders including SunRail's contractors and will be approved by the Accountable Executive. SunRail will strive for better asset performance, risk reduction, and agency cost savings with each revision of the TAM Plan.

Appendix A
Transit Asset Management Policy



Effective: 9/24/2018

TRANSIT ASSET MANAGEMENT POLICY – SUNRAIL

The Moving Ahead for Progress in the 21st century (MAP-21) Final Rule passed in July 2016 requires transit operator grantees recipient of Chapter 53 funding to develop a Transit Asset Management (TAM) system. The system, among other requirements, requires identification of policies and strategies to develop an effective TAM strategy. Policy is defined as “documented commitment to achieving state of good repair for all capital assets”.

Asset Management is a proactive and integrated approach for asset and operations management that minimizes the life-cycle costs of owning, operating and maintaining assets, at an acceptable level of risk, while continuously delivering expected levels of service.

This policy is intended to support and formalize implementation of the Central Florida Rail Corridor owned by the Florida Department of Transportation (FDOT) (dba SunRail) Transit Asset Management program, maintain assets in a State of Good Repair (SGR), and communicate to all relevant stakeholders. The scope of assets identified under this policy include the right of way, track, all stations, station parking, administration and maintenance facilities, systems, as well as revenue (rail cars and locomotives) and non-revenue vehicles.

The policy itself is to maintain assets in a State of Good Repair through transparency, financial stewardship and reinvestment, and promoting a culture that supports asset management best practices.

The Transit Asset Management policy encompasses the following goals:

- Demonstrate organizational efficiency to deliver efficient and reliable service
- Prioritize available resources to meet State of Good Repair requirements
- Maintain condition of assets in State of Good Repair to support system safety
- Actively promote an agency-wide asset management culture.

Definitions

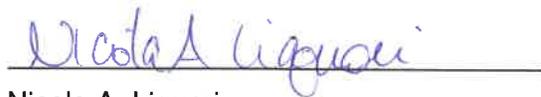
Asset Management – A proactive and integrated approach for asset and operations management that minimizes the life-cycle costs of owning, operating and maintaining assets, at an acceptable level of risk, while continuously delivering expected levels of service.

Transit Asset Management (TAM) Plan – Plan through which SunRail will document its asset base, asset conditions, backlog and State of Good Repair, asset management policy, Asset Management Program goals and objectives, governance structure for asset management, strategy for capital asset funding and prioritization, and key priorities and short/medium term actions for asset management.

State of Good Repair (SGR) – State of Good Repair assumes that assets are maintained in a condition where they can continue to safely and cost effectively perform their intended purpose (including all mid-life overhaul and/or intermediate rehabilitation cycles) and are replaced or rehabilitated once they reach their useful life.

Capital Asset Inventory – A capital asset inventory lists SunRail's capital assets for the purposes of strategic asset management planning, procurement planning; short and long-term asset replacement forecasting; and regional/federal reporting. This differs from the financial asset inventory kept by the State, in that Asset Management assets may be broken down into more detail for asset management planning purposes than the capital assets included in the State financial ledger.

Condition Assessment – Asset evaluation system focused on categorizing the physical condition and performance of assets, both towards Federal Transit Administration (FTA) asset condition reporting and for SunRail's own internal uses. Definitions and approach for each asset class are established in SunRail's TAM Plan.

A handwritten signature in blue ink that reads "Nicola A. Liquori". The signature is written in a cursive style and is positioned above a horizontal line.

Nicola A. Liquori

Chief Executive Officer, SunRail