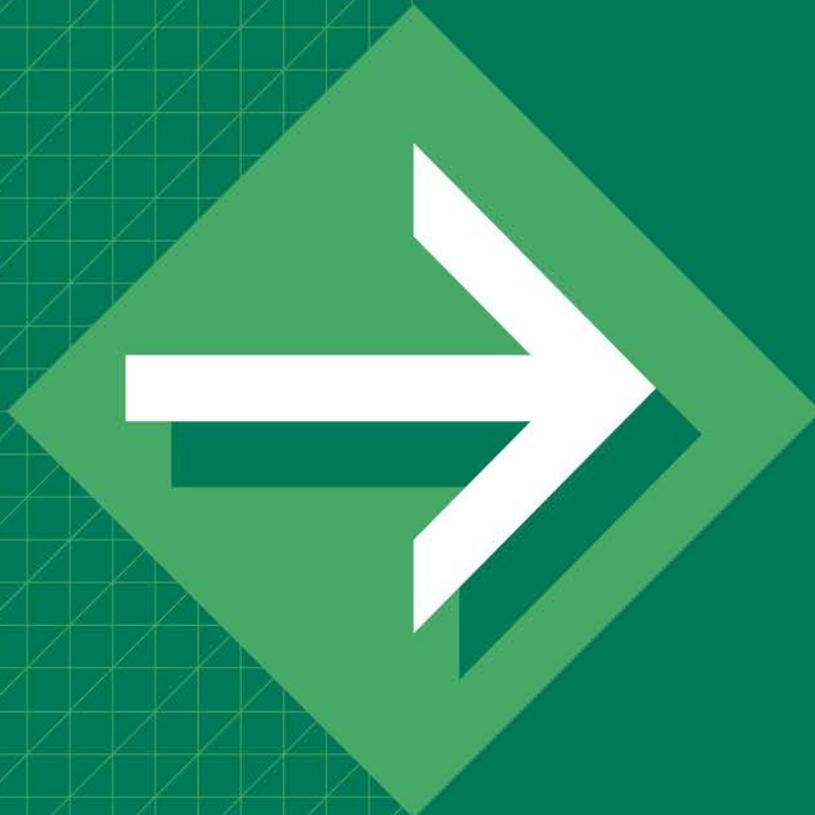


Transit Asset Management Plan

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Transit Asset Management Plan

The condition of a public transportation system's capital assets is critical to the safety and quality of its service. Most notably, a system's equipment, rolling stock, infrastructure, and facilities determine its effectiveness in serving its community. When transit assets are not in a state of good repair, the consequences include increased safety risks, decreased system reliability, higher maintenance costs, and lower system performance.

The Greater Mankato Transit System (GMTS) is committed to providing safe, efficient, and reliable service to its customers. Having a transit asset management (TAM) plan which assesses current and future needs and prioritizes investments to resolve those needs is critical to meeting this mission.

Overview

To comply with Federal Transit Administration (FTA) guidance, the GMTS must use inventory and condition data and well-defined objectives to provide a systematic approach for improving resource allocation decision-making. This chapter includes:

- ◆ Documentation of the decision support process used by GMTS to establish capital investment needs and develop investment prioritization
- ◆ An inventory of capital assets, including number, type, and value
- ◆ A condition assessment of inventoried assets to monitor and predict asset condition
- ◆ An estimation of funding levels from all available sources that are reasonably expected to be available in each fiscal year during the TAM Plan horizon period
- ◆ A prioritization of investments, including rank/priority and anticipated project year to improve or manage the state of good repair

Best Practices in Asset Management

Preventative Maintenance

Traditionally, asset management is a reactive find-and-fix maintenance method. Improved transit asset management uses a predict-and-prevent approach to reduce cost and improve safety and reliability of the system. This approach to asset management aligns with the guidance of the FTA, which requires that recipients of federal funding report on:

- ◆ The condition of their system
- ◆ Any change in condition since the last report
- ◆ Targets set for the state-of-good-repair performance measures
- ◆ Progress towards meeting those targets

Regular Inspections

In addition to reporting data, inspections should be conducted on all assets. These inspections are critical to maintaining an accurate database that can help make investment decisions. Regular vehicle and equipment inspections should be conducted based upon vehicle type, mileage, road conditions, and other policies.

- ◆ Vehicle type: Due to deterioration from stop frequency and wear and tear from congestion and general use, revenue vehicles require a more frequent and in-depth preventative maintenance inspection than other vehicles
- ◆ Mileage: Vehicles with the highest mileage should be inspected frequently
- ◆ Road conditions: Vehicles used in inclement weather or road conditions, such as ice, snow, or gravel, should be inspected more frequently than the manufacturer recommendation

Inspections should occur on a regular schedule, should be organized and consistent, and should be fully documented. Many agencies identify a specific person to manage this task.

Review and Adjust

Finally, GMTS staff should continually review these maintenance practices to identify improvements to the program. The current condition assessment portion of this chapter includes the first iteration of a FTA-compliant report on state of good repair. Continually updating this section of the report with current numbers, budgets, and the state of good repair is the first recommended change.

Existing Asset Management Practices at GMTS

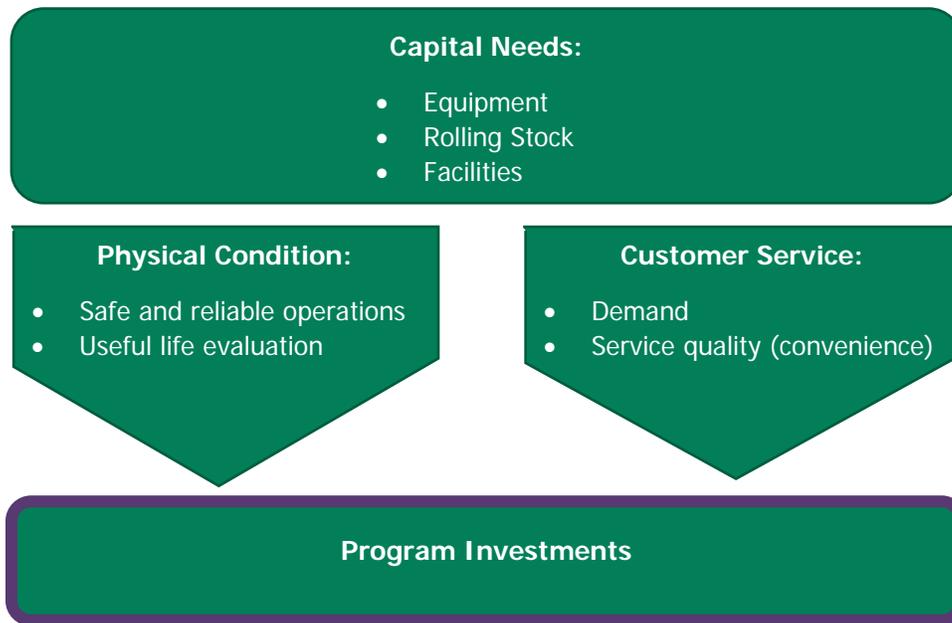
The GMTS has a daily vehicle maintenance program. Managed by the Superintendent of Transit, this program employs one full-time mechanic who maintains and cleans all 17 buses, garage equipment, and transit facilities. This employee's responsibilities include interior and exterior cleaning of buses and bus shelters, fueling and repair of buses and other maintenance equipment as well as cleaning and repair of shelters and other bus facilities.

Having only one person responsible for vehicle and bus shelter maintenance is an issue for system functionality. Successful maintenance is essential to system safety and reliable operations. Vacations, sick-leave, or any sudden departure from the maintenance position has an immediate impact on daily operations. The FTA has noted that GMTS needs more maintenance staff to safely and reliably execute the existing service plan.

Investment Framework: Goals, Performance Measures and Targets

The GMTS is committed to maintaining current stock and replacing assets that are no longer in a state of good repair. This is an essential part of providing a transportation system that promotes the safety and security of all users. Proper maintenance increases the system's reliability, improves quality of service, and maximizes the useful life of transit assets. GMTS should strive to maintain the condition and functionality of its transportation inventory through the establishment of goals and use of performance measures and performance targets for its capital assets. These maintenance goals and metrics are nested within the Existing Asset Management Decision Making Process.

The Existing Asset Management Decision Making Process considers both physical condition and customer service factors to determine asset maintenance and replacement needs. Equipment, rolling stock, and facilities goals, performance measures and performance targets are contained within the process (**Figure 1**).



► Figure 1: Existing Asset Management Decision Making Process evaluates assets against Physical Condition and Customer Service criteria to establish investment priority

Goals, Performance Measures and Targets

Capital needs are determined by evaluating Equipment, Rolling Stock, and Facilities assets against Physical Condition and Customer Service goals, performance measures, and performance targets. Goals, performance measures and targets for each asset category are described below.

EQUIPMENT

Goals and Objectives

- ◆ Safety - Develop and maintain a transportation system that promotes the safety of all users
Support a safe, secure, and comfortable transportation system
- ◆ Preservation - Develop a regional system that promotes the preservation of the existing and future transportation system

Performance Measures and Targets

- ◆ Useful life evaluation: 50 percent of non-revenue vehicles meet or exceed useful life

ROLLING STOCK

Goals and Objectives

- ◆ Access and Reliability - Develop a transportation system that increases access and reliability options for all users
 - Objective 7: Increase system ridership each year
 - Objective 8: Minimize overcrowding on buses
 - Objective 9: Improve system on-time performance
- ◆ Safety - Develop and maintain a transportation system that promotes the safety of all users
Support a safe, secure, and comfortable transportation system
 - Objective 1: Promote the safety of all users by developing an agency safety plan and training staff and drivers in incident response

- ◆ Preservation - Develop a regional system that promotes the preservation of the existing and future transportation system
- ◆ Environmental Conservation and Sustainability - Support transportation improvements that promote energy conservation to improve community quality of life, health, and character
 - Objective 1: Reduce CO2 emissions
 - Objective 3: Increase alternative fuel vehicles in the GMTS fleet
- ◆ System Management: Promote efficient system management and operations while increasing collaboration among businesses, community and industry groups, and federal, state, and local governments to better target investments and improve accountability
 - Objective 1: Establish service standards for each mode regarding vehicle loads, vehicle headways, on-time performance, and service availability, as required by Title VI
 - Objective 2: Establish systemwide service policies for transit amenities and vehicle assignment by mode, as required by Title VI
 - Objective 4: Monitor and reduce operating costs per passenger

Performance Measures and Targets

- ◆ Increase system ridership by three percent each year
- ◆ Maximum seated passenger load: 120 percent
- ◆ On-time performance: 90 percent
- ◆ Revenue hours per capita: 0.7 revenue hours per capita
- ◆ Crashes per 100,000 revenue miles: 0.4
- ◆ Fleet condition: At least 80 percent of all regular fleet available for operations
- ◆ Spare Ratio: Spare vehicles to peak requirement less than 20 percent
- ◆ Rolling Stock: 20 percent of revenue vehicles meet or exceed useful life
- ◆ Propulsion technology: Add an electric bus to the fleet in the next 5 years
- ◆ Vehicle load standard: 1.2
- ◆ Vehicle headway standard
 - Weekday: 30 minutes
 - Weekend: 60 minutes
- ◆ Vehicle assignment standard: vehicles with greater capacity will be assigned to routes with the greater ridership
- ◆ Operating cost per passenger: Less than or equal to \$3

FACILITIES

Goals and Objectives

- ◆ Access and Reliability - Develop a transportation system that increases access and reliability options for all users
 - Objective 7: Increase system ridership each year
- ◆ Safety - Develop and maintain a transportation system that promotes the safety of all users
Support a safe, secure, and comfortable transportation system
 - Objective 3: Ensure safe waiting areas for passengers by providing lighting, benches, and/or shelters at major stops
- ◆ Preservation - Develop a regional system that promotes the preservation of the existing and future transportation system
- ◆ Multimodal Transportation - Develop and maintain a transportation system that integrates multimodal options for all users, while considering active living and public health initiatives
 - Objective 1: Connect to other local and regional transit services (Minnesota River Valley Transit and True Transit)
 - Objective 2: Provide bicycle parking at transit centers and major bus stops

- Objective 3: Locate bus stops along sidewalks and trails
- ◆ Coordination and Collaboration - Maintain intergovernmental cooperation and coordination, along with community participation and input in all stages of the transportation planning process
 - Objective 6: Seek opportunities for public-private partnerships to improve transportation options
- ◆ Environmental Conservation and Sustainability - Support transportation improvements that promote energy conservation to improve community quality of life, health, and character
 - Objective 1: Reduce CO2 emissions
 - Objective 2: Integrate GMTS into development of quality of life initiatives in the Greater Mankato area
- ◆ Land Use - Establish a strong connection between transportation modes and the land uses that they serve
 - Objective 1: Facilitate and promote moderate to higher density and mixed-use development in areas near or along planned/existing transit routes
 - Objective 2: Encourage the concentration of employment and services along transit routes
 - Objective 3: Promote transit-oriented development into small area plans, master-planned developments, and site plans
- ◆ Security - Increase security of the transportation system for motorized and non-motorized users in preparedness for emergency events and natural disasters
 - Objective 1: Develop an Emergency Event and Natural Disasters Plan and seek opportunities to utilize the region's transit service in such events
 - Objective 3: Maintain or reduce the number of security-related complaints
 - Objective 4: Maintain or improve customer satisfaction regarding perceptions of safety and security
- ◆ System Management: Promote efficient system management and operations while increasing collaboration among businesses, community and industry groups, and federal, state, and local governments to better target investments and improve accountability
 - Objective 2: Establish systemwide service policies for transit amenities and vehicle assignment by mode, as required by Title VI

Performance Measures and Targets

- ◆ Increase system ridership by three percent each year
- ◆ Facilities: 50 percent of facilities (including passenger amenities) adequate or better
- ◆ 90 percent of regional transit routes have no wait transfers to GMTS routes
- ◆ Bicycle parking at transit stops with 20 or more boardings per day
- ◆ Pedestrian sidewalks or trails within ¼ mile of bus stops with at least 20 boardings per day
- ◆ Transit amenity standards
 - Shelters at stops with at least 20 boardings per day or major transfer points
 - Benches at bus stops with 15 or more daily boardings
 - Lights at bus stops with 15 or more daily boardings

Current Condition Assessment

Methodology

The FTA Transit Economic Requirements Model (TERM) Lite tool estimates transit capital investment needs over an extended time horizon. It estimates asset condition based on age, useful life, and asset decay curves. This tool was used to identify the current condition of the GMTS transit system features

and create recommendations for resource allocation to reach and maintain a state of good repair (SGR) for years to come. The assumptions used for the base model were:

- ◆ 10-year horizon year
- ◆ All assets have the same priority
- ◆ Agency soft costs are 5 percent for most non-rolling stock, and 10 percent for the central maintenance facility
- ◆ Inflation is set at 3 percent
- ◆ GMTS capital budget is set at “unconstrained”

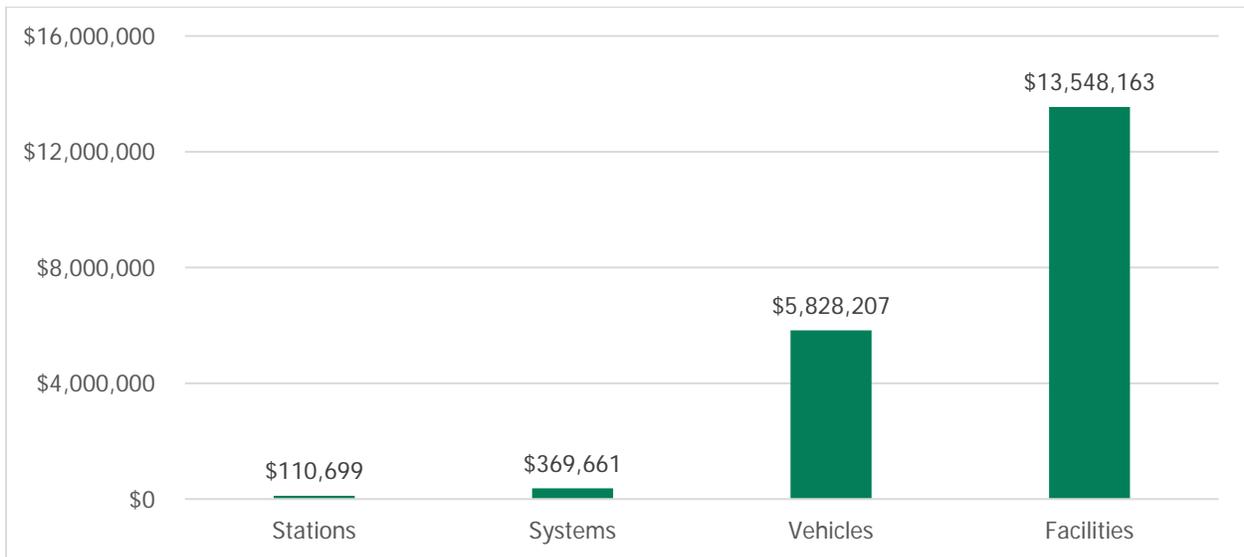
INPUTS

The inputs for the TERM Lite model include 41-line items such as 17 fixed-route and demand response revenue vehicles, seven bus shelters, various office equipment and supplies, maintenance and repair equipment pieces, and a maintenance facility.

Useful lives were identified for every asset. Revenue vehicle useful lives ranged from 7 to 15 years, non-revenue vehicles have useful lives of 10 years, and maintenance equipment ranged from 10 to 40 years.

Asset Inventory Replacement Value

Figure 2 shows the existing replacement value of GMTS’ capital assets at \$19.9 million. Facilities, which include the existing central maintenance facility, make up the largest single asset type at \$13.5 million. Revenue vehicles make up over one-quarter of the value of GMTS’ assets, while bus stops (stations) and systems assets make up roughly 2.5 percent of the value.



► **Figure 2: GMTS Capital Assets (reported in 2018 dollars)**

Table 1 shows GMTS’s capital asset inventory, broken down by asset type, quantity, and replacement value.

► **Table 1: GMTS Capital Asset Inventory**

ASSET CATEGORY	ASSET DESCRIPTION	QUANTITY	ASSET REPLACEMENT VALUE	ESTIMATED ASSET REPLACEMENT YEAR
Vehicles	Demand Response (DR)	1	\$ 145,282	2025

ASSET CATEGORY	ASSET DESCRIPTION	QUANTITY	ASSET REPLACEMENT VALUE	ESTIMATED ASSET REPLACEMENT YEAR
	Demand Response (DR)	1	\$ 152,221	2018
	Demand Response (DR)	1	\$ 151,626	2020
	Demand Response (DR)	1	\$ 143,839	2022
	Motor Bus (MB)	1	\$ 462,512	2024
	Motor Bus (MB)	3	\$ 1,471,137	2029
	Motor Bus (MB)	1	\$ 473,105	2032
	Motor Bus (MB)	3	\$ 1,375,264	2025
	Motor Bus (MB)	1	\$ 492,272	2027
	Motor Bus (MB)	1	\$ 479,026	2028
	Motor Bus (MB)	1	\$ 155,483	2020
	Motor Bus (MB)	1	\$ 144,946	2030
	Motor Bus (MB)	1	\$ 158,666	2030
	Non-Revenue vehicle (truck)	1	\$ 22,822	2020
Systems	Revenue Collection - on vehicle (SY)	17	\$ 298,162	2023
	Two-way Radios - portable (SY)	12	\$ 25,250	2028
	Two-way radios - mobile (SY)	17	\$ 46,248	2028
Stations/Bus Stops	Bus Pad Shelter Estimate	7	\$ 6,615	2033
	Bus shelter (SY)	1	\$ 41,832	2018
	Bus shelters (SY)	6	\$ 62,251	2015
Facilities	Access and parking (SY)	1	\$ 347,121	2031
	Administrative space in public works (SY)	1	\$ 764,041	2046
	Air compressor (SY)	1	\$ 20,690	2031
	Built in equipment and specialties - interior sprinkler system (SY)	1	\$ 46,952	2056



ASSET CATEGORY	ASSET DESCRIPTION	QUANTITY	ASSET REPLACEMENT VALUE	ESTIMATED ASSET REPLACEMENT YEAR
	Built in equipment and specialties - overhead crane (SY)	1	\$ 82,941	2041
	Built in equipment and specialties - overhead doors (SY)	13	\$ 169,299	2056
	Built in equipment and specialties- bus wash equip (SY)	1	\$ 275,027	2026
	Built in equipment and specialties-interior paintings/coating (SY)	1	\$ 66,656	2036
	Built in equipment and specialties-tubular daylighting (SY)	20	\$ 59,487	2056
	Drainage (SY)	1	\$ 29,654	2056
	Electrical (SY)	1	\$ 449,303	2056
	Exterior (SY)	1	\$ 1,324,507	2056
	Fire Alarm (SY)	1	\$ 8,986	2031
	HVAC (SY)	1	\$ 780,664	2036
	Maintenance Facility (SY)	1	\$ 8,281,624	2056
	Mobile Lifts (SY)	1	\$ 44,299	2031
	Office technology/computers	1	\$ 12,837	2021
	Plumbing (SY)	1	\$ 386,401	2056
	Roof (SY)	1	\$ 322,375	2036
	Scrubber sweeper (SY)	1	\$ 56,034	2032
	Vertical lift (SY)	1	\$ 19,255	2037

Asset Conditions

An asset is in a SGR if it has not reached the end of its useful life. The SGR backlog represents the value of all assets in the transit system that are beyond their useful life and should be replaced. Based on the provided inventory, one percent of the total value of GMTS's transit system is in backlog (**Table 2**).

► **Table 2: Assets in Backlog by Category**

ASSET CATEGORY	REPLACEMENT VALUE	VALUE OF ASSETS IN BACKLOG	PERCENT OF ASSETS IN BACKLOG
Stations	\$110,699	\$104,084	94%
Systems	\$369,661	\$0	0%
Vehicles	\$5,828,207	\$152,221	3%
Facilities	\$13,548,163	\$0	0%
Total Assets	\$19,856,730	\$256,306	1%

Table 3 shows how each element fits into the five FTA defined asset-condition categories¹ based on how soon it will reach its useful life.

► **Table 3: Asset Condition by Category and Type**

CATEGORY	ELEMENT	USEFUL LIFE	REPLACEMENT VALUE (2018\$)	EXCELLENT	GOOD	ADEQUATE	MARGINAL	POOR*
Facilities	Administration	30 years	\$764,042	100%				
Facilities	Building Components	15 - 40 years	\$4,178,436	98%		2%		
Vehicles	Bus	15 years	\$4,753,319	49%	51%			
Facilities	Maintenance	10 - 40 years	\$8,696,931	100%				
Facilities	MIS/IT/Network Systems	5 years	\$12,837		100%			

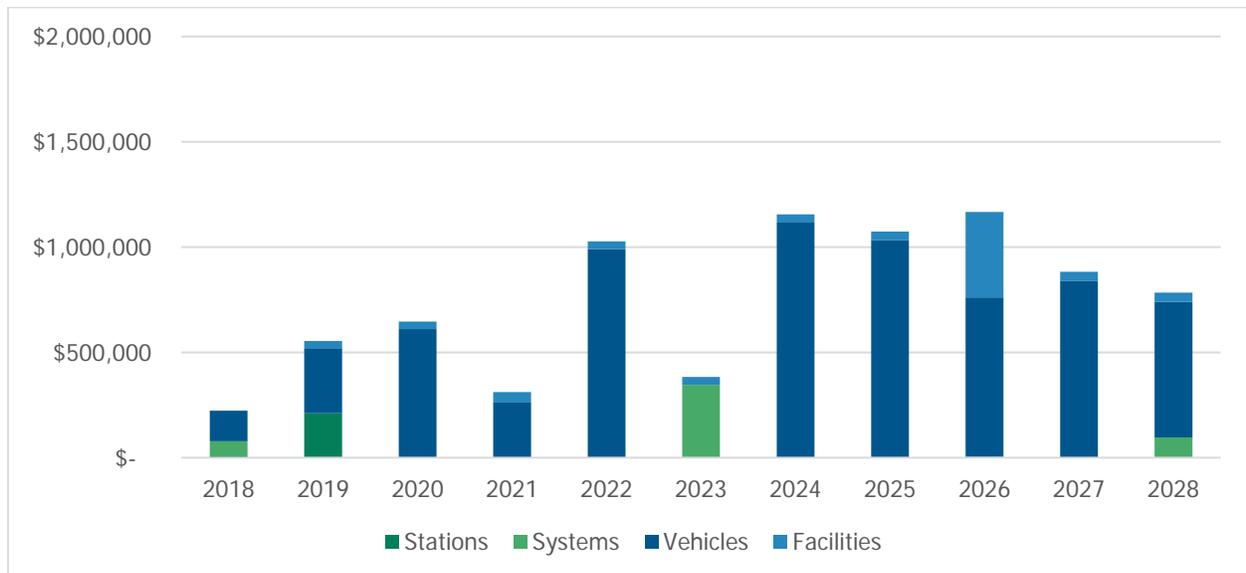
¹<https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/Facility%20Performance%20Assessment%20Guidebook.pdf>

CATEGORY	ELEMENT	USEFUL LIFE	REPLACE MENT VALUE (2018\$)	EXCEL LENT	GOOD	ADEQ UATE	MARG INAL	POO R*
Systems	On-Vehicle	15 years	\$298,162		100%			
Stations	Platform	15 years	\$6,615	100%				
Systems	Radio	10 years	\$71,499	100%				
Vehicles	Truck	10 years	\$22,822			100%		
Vehicles	Vans, Cutaways and Autos	7 - 15 years	\$1,052,066	43%	14%	43%		

Recommendations for Guiding Resources

Current Funding Scenario

Under GMTS’s current service and funding conditions, a total of \$8.5 million is spent over the next decade to replace assets (**Figure 3**). Given the assumption of unrestrained funding, the current system backlog is eliminated during the first full year (2019), and assets are replaced as soon as they reach the end of their useful life.

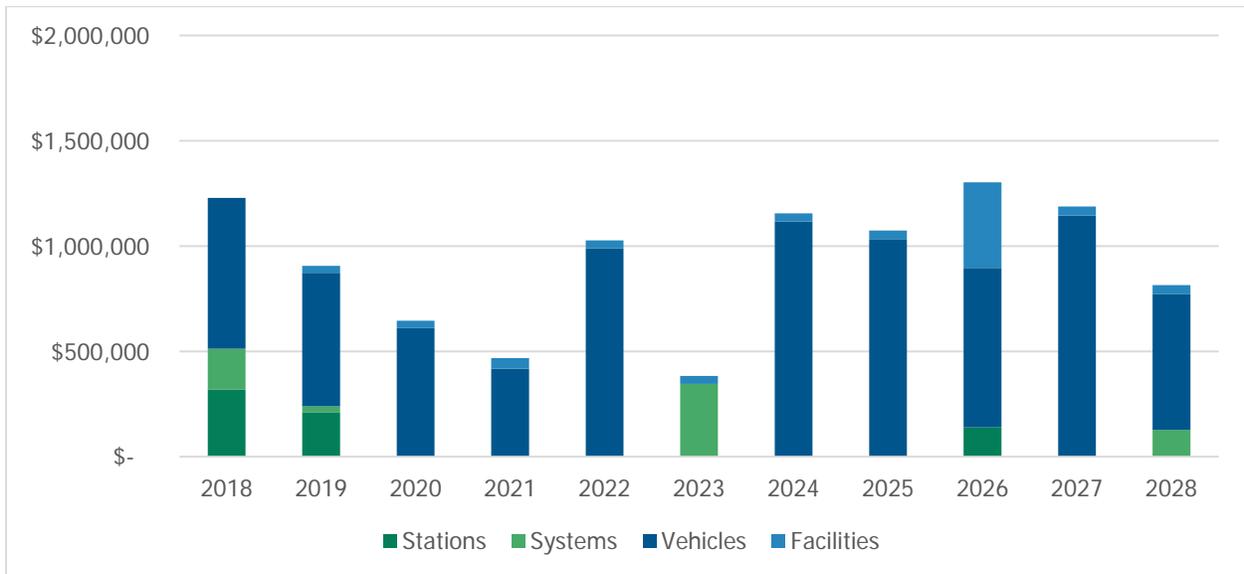


► Figure 3: Current funding scenario asset replacement expenditures by year, separated by asset category

New Service Expansion Scenario

The New Service Expansion (NSE) funding scenario models the asset replacement expenditures that would occur under the NSE service plan, as described in the Service Recommendation Report and Financial Plan. Under this plan, GMTS would make immediate additions to its asset inventory that include 5 revenue vehicles, 13 bus shelters, and various radio and revenue collection units. Given the assumption of unrestrained funding, the current system backlog is eliminated during the first full year (2019), and assets are replaced as soon as they reach the end of their useful life.

Under the NSE scenario, a total of \$10.8 million is spent over the project horizon (**Figure 4**).

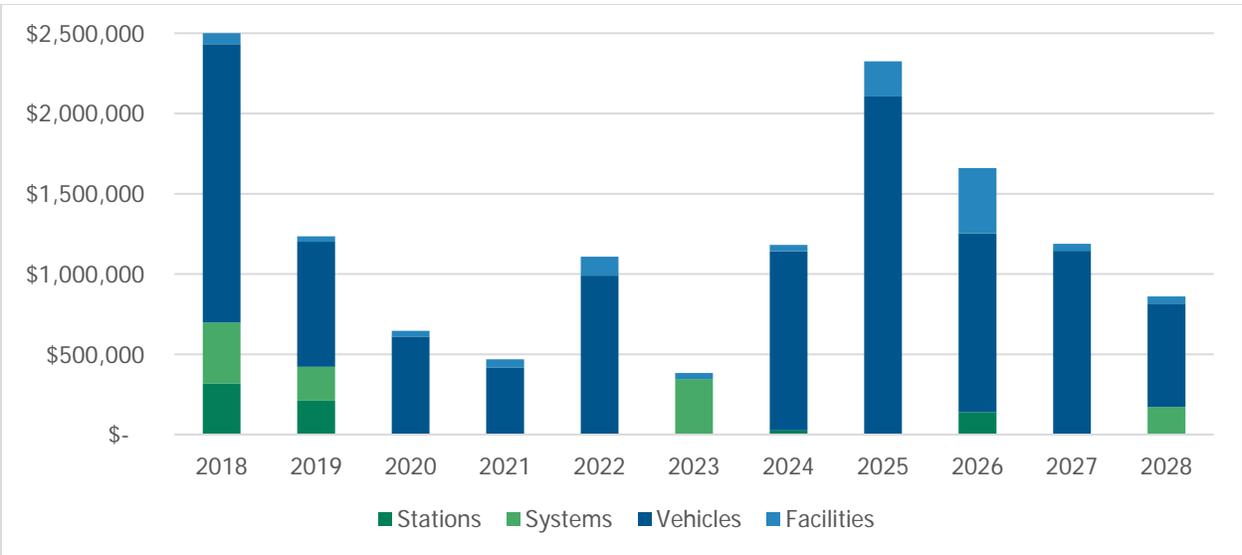


► **Figure 4: New Service Expansion funding scenario asset replacement expenditures by year, separated by asset category**

Illustrative Funding Scenario

The Illustrative funding scenario models the asset replacement expenditures that would occur under the Illustrative expanded service plan, as described in the Service Recommendation Report and Financial Plan. Under this plan, GMTS would make immediate additions to its asset inventory that include 14 revenue vehicles, 13 bus shelters, an integrated Automatic Passenger Counter (APC) system, dispatching software, and various radio and revenue collection units. Given the assumption of unrestrained funding, the current system backlog is eliminated during the first full year (2019), and assets are replaced as soon as they reach the end of their useful life.

Under the Illustrative Funding Scenario, a total of \$14.6 million is spent over the project horizon (**Figure 5**).



► Figure 5: Illustrative funding scenario asset replacement expenditures by year, separated by asset category