TRANSIT AUTHORITY OF RIVER CITY

TRANSIT ASSET MANAGEMENT PLAN

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DOCUMENT CONTROL HISTORY

Version	Document Title	Date	Comments
Draft	Transit Asset Management Plan	08/15/2018	ABB Initial Draft
1.3	Transit Asset Management Plan	09/06/2018	Client Review & Comments
1.4	Transit Asset Management Plan	09/07/2018	Additional Client input
1.5	Transit Asset Management Plan	09/08/2018	Consolidate Client input
1.5.1	Transit Asset Management Plan	09/09/2018	Incorporate Comments, compile all input
1.8	Transit Asset Management Plan	10/11/2018	Final draft for approval

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ACKNOWLEDGEMENTS

This document is the culmination of a collaborative effort during the period of March 20, 2018 through September 10, 2018 between The Transit Authority of River City (TARC) and ABB Asset Management Consulting Services (ABB). The core team members are shown above as the Document Development Committee.

This initiative began with ABB facilitating the development of TARC's Asset Management Policy. With the executive commitment and expectations established, the Policy was board approved, setting the tone for the project.

With the Policy established, an independent assessment was conducted by ABB through a series of facilitated workshops, document reviews and personnel interviews. This identified the baseline current state and levels of maturity toward compliance against the requirements of the Federal Transit Administration's (FTAs) Final Rule on Transit Asset Management (TAM).

The gaps between current state and future state were documented in a final report and, along with considerations for international best practices, served as the basis for the development of this TAM Plan.

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EXECUTIVE SUMMARY

ASSET MANAGEMENT AND TARC'S MISSION

TARC's **Mission** is to "Explore and implement transportation opportunities that enhance the social, economic and environmental well-being of the Greater Louisville community." In keeping with that mission, the TARC Team is embracing the principles of Transit Asset Management (TAM). Our **Vision** is to use TAM to "Become a best-in-class, sustainable, data-driven transportation provider that manages its publicly funded assets as effectively and efficiently as possible." This TAM Plan, our initial effort to describe the path we will take to achieve that vision, is not a destination; it is the beginning of a journey.

TARC's primary **TAM Goal** is to "Achieve and maintain assets in a state of good repair (SGR)." TARC's commitments to this mission, vision and goal are documented in TARC's Board of Directors approved **TAM Policy** (Appendix A).

This **Plan** implements TARC's TAM Policy and defines how our **Critical Success Factors** and **Commitments** will be executed through **TAM Strategies** as shown below in Table E-1.

TABLE E-1 – SUCCESS FACTORS AND COMMITMENTS ALIGNMENT WITH TAM STRATEGIES

Critical Success Factors	Commitments		TAM Strategies
• Adequate Financial Resources • Effective Team • Effective Visionary Leadership • Community Support • Focus on Customer Needs • Quality Services • Prudent Fiscal Management • Strategic Management • Focus on Safety	• Allocating the resources necessary to reach asset management goals; • Financial stewardship, transparency, and collaboration with funding partners; • Promoting a culture that supports optimal asset management across the organization; • Focusing on high quality data-driven decision making to provide safe, reliable, sustainable service to the our community; • Supporting the timely implementation of projects and programs to maintain assets in a State of Good Repair over their entire life; and • Continually improving asset management strategies and plans, including setting annual goals, objectives, and measures to monitor and improve performance		• Maintain a complete and accurate asset inventory • Monitor asset condition • Employ risk management approach • Employ risk-based prioritization for asset investments • Employ sustainable asset management strategies that align with asset management policy • Optimize preventive maintenance of assets with life-cycle management • Employ total cost of ownership investment strategy • Refine employee hiring and development processes • Enhance methods of communication

This TAM Plan sets the direction and provides the Strategic Roadmap that will help TARC to enhance safety, reduce maintenance costs, increase reliability, improve performance, and meet or exceed Level of Service commitments to our community. To that end, each of the TAM Strategies identified above in Table E-1 are further distilled into prioritized, actionable

initiatives that are designed to incrementally drive TARC towards its TAM Goal and establish a more mature asset management system. These prioritized initiatives are spread over the 4 year horizon of this initial TAM Plan. The Strategic Roadmap is shown below in Figure E-1 and the initiatives are captured in Appendix B – Continuous Improvement Plan.
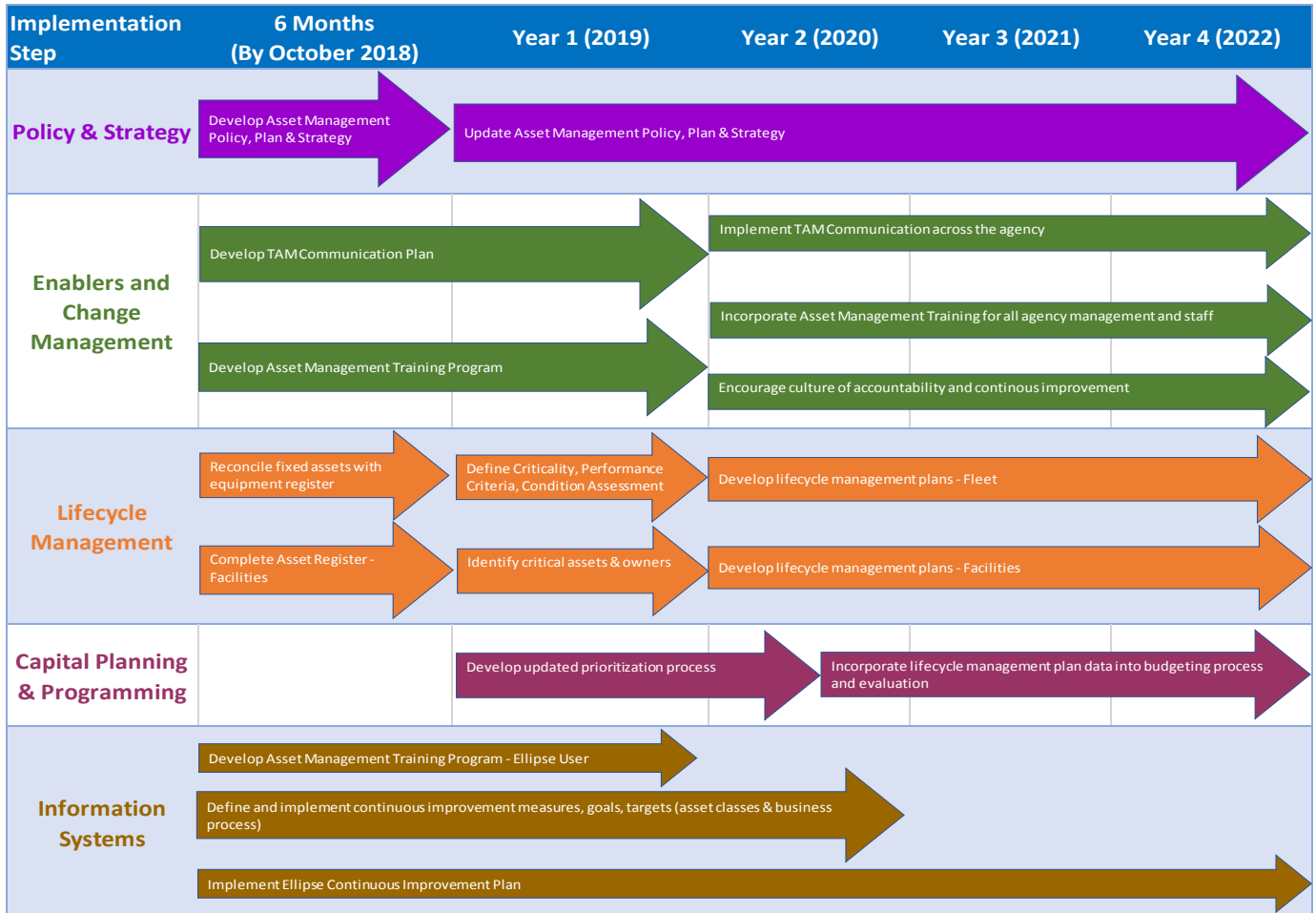
Implementation Step	6 Months (By October 2018)	Year 1 (2019)	Year 2 (2020)	Year 3 (2021)	Year 4 (2022)
Policy & Strategy	Develop Asset Management Policy, Plan & Strategy	Update Asset Management Policy, Plan & Strategy			
Enablers and Change Management	Develop TAM Communication Plan		Implement TAM Communication across the agency		
			Incorporate Asset Management Training for all agency management and staff		
	Develop Asset Management Training Program		Encourage culture of accountability and continous improvement		
Lifecycle Management	Reconcile fixed assets with equipment register	Define Criticality, Performance Criteria, Condition Assessment	Develop lifecycle management plans - Fleet		
	Complete Asset Register - Facilities	Identify critical assets & owners	Develop lifecycle management plans - Facilities		
Capital Planning & Programming		Develop updated prioritization process	Incorporate lifecycle management plan data into budgeting process and evaluation		
Information Systems	Develop Asset Management Training Program - Ellipse User				
	Define and implement continuous improvement measures, goals, targets (asset classes & business process)				
	Implement Ellipse Continuous Improvement Plan				

FIGURE E-1 – TAM HIGH-LEVEL STRATEGIC ROADMAP

This TAM Plan also establishes a series of performance measures to track progress in the attainment of the TAM Goal. These measures are detailed in Section 4.2. While many of these performance measures are currently in use at TARC, future versions of this TAM Plan will capture more meaningful and complex performance measures as TARC's performance management capabilities mature.

LIFECYCLE MANAGEMENT AND DOCUMENTATION HIERARCHY

TARC's ability to successfully achieve our Vision hinges upon the ability of the entire TARC Team to align our procedures with our TAM Policy and this TAM Plan. The documentation hierarchy shown below in Figure E-2 is intended to describe the bi-directional flow of information necessary to fully implement this Plan. It is also intended to help Team members better understand how their daily job functions lead directly to the achievement of TARC's strategic goals.

FIGURE E-2– TAM DOCUMENTATION HIERARCHY
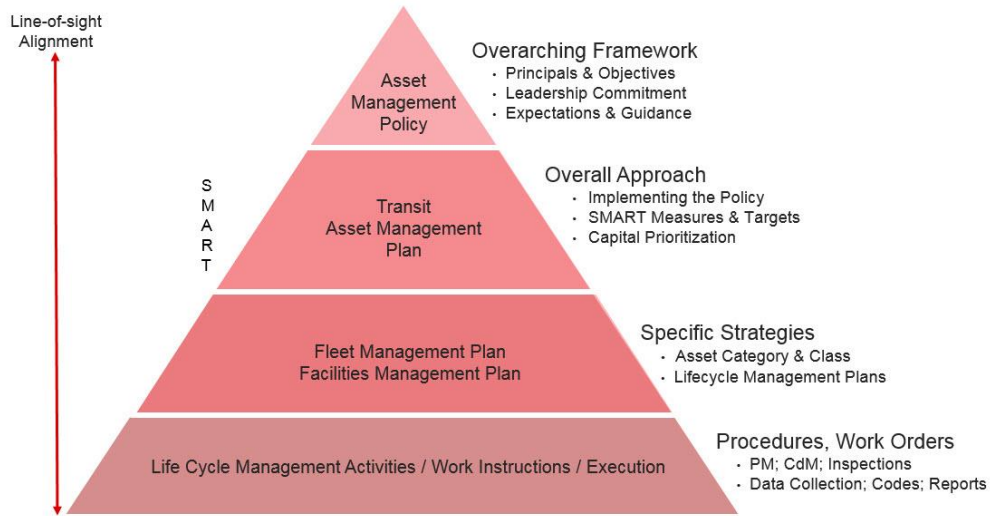
INTEGRATED APPROACH TO ENSURE SUCCESSFUL OUTCOMES

TARC's TAM Plan outlines technical strategies to improve asset management. The Plan provides direction to guide daily processes, data analysis and decision-making. It also recognizes the need for an integrated change management approach and an ongoing education and training program to give Team members the tools and skills they need to collect data, assess asset conditions, and manage processes successfully.

CONTINUAL EVALUATION AND IMPROVEMENT

While Federal Regulations require that the TAM Plan be updated at least once every four years (Plan horizon), at a minimum, the TARC Team intends to review and revise our TAM Plan and Maintenance Plan (MP) as necessary on an annual basis, or if events or changing business conditions dictate the need.

Additionally, as a matter of best practice, TARC will continually improve our business processes by building upon lessons learned. This will be accomplished by establishing a TAM Technical Working Group (TWG) as shown in Figure E-3. This group will help guide implementation of the Plan and support the "Top-Down and "Bottom-Up" culture described in Figure E-4.

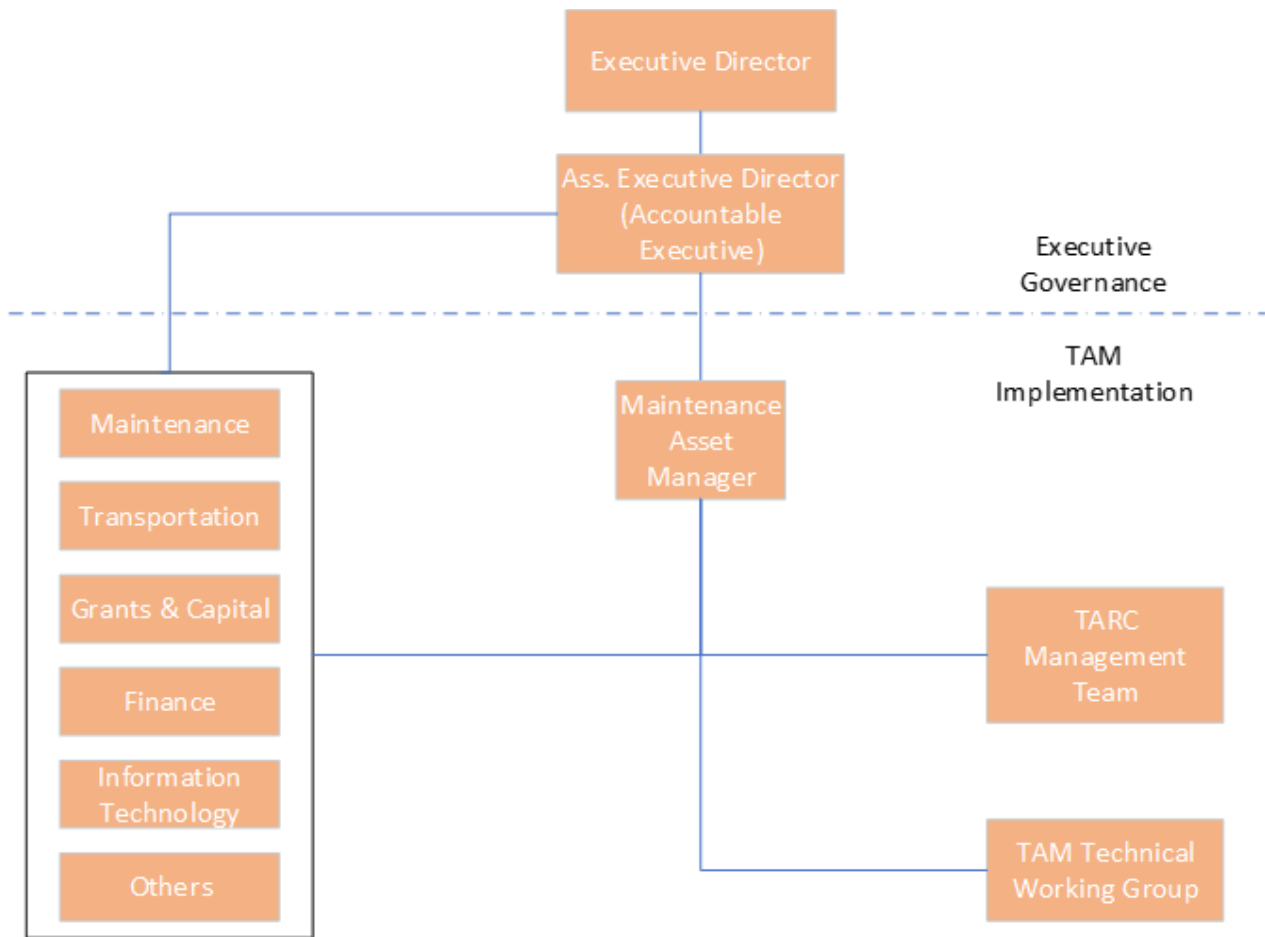**FIGURE E-3 – TARC TAM CORE TEAM FOR IMPLEMENTATION**

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                    │  Executive Director │
                    └─────────────────────┘
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                    ┌─────────────────────┐
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          │         │  Director           │         Governance
          │         │  (Accountable       │
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 │ │   Others     │ │
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FIGURE E-4 – COMBINED TOP-DOWN AND BOTTOM-UP TAM APPROACH

Driven by a strong executive sponsor who sets clear direction in line with organization mission, vision policies

Aligning asset management activities with organization strategic goals

Improve internal and external communications

TRANSIT ASSET MANAGEMENT IMPLEMENTATION

Driven by managers of specific asset group

Improvement focus on department-specific asset inventories

Improvement focus on department-specific Lifecycle Management Plans (LMPs)

1. INTRODUCTION

OVERVIEW OF TARC

The Transit Authority of River City (TARC) is the major public transportation provider for the Louisville, Kentucky metro area, the Kentucky suburbs of Oldham County, Bullitt County, , as well as Clark and Floyd Counties in southern Indiana. TARC began bus operations in 1974, is publicly funded, and includes various earlier private mass transit companies in Louisville, the largest of which was the Louisville Transit Company.

TARC provides service 365 days a year, and serves 15 million passenger trips per year who ride almost 14 million miles annually. It also operates many specialized routes providing transportation to major local employers, educational institutions and recreational events.

TARC operates a fleet of 225 accessible buses, including numerous hybrids, and all-electric buses have been circulating downtown Louisville since early 2015. TARC also owns 102 paratransit vehicles, and have over 600 employees including almost 400 coach operators.

The main administrative and maintenance facility is situated in the 128 year-old Union Station property on West Broadway in Louisville, and is supported by additional maintenance facilities across the road on Broadway, as well as a Unit Shop on 29th Street and Broadway.

Also, unique to TARC, and a point of great pride, is the "Ticket to Ride" (TTR) ridesharing program. This partnership between TARC and the Kentuckiana Regional Planning and Development Agency (KIPDA) provides ridematching services to anyone whose commute begins and/or ends in the KIPDA nine-county region. As part of its larger ridesharing mission, and administered through a Memorandum of Understanding (MOU), KIPDA administers a vanpool program in partnership with TARC. The Vanpool assets are part of TARC's inventory because they are owned by TARC. TARC also performs maintenance on the vehicles. However, the monthly and annual NTD reporting is performed by KIPDA.

KIPDA has also developed their own combined TAM Policy and TAM Plan that covers all 9 of the Tier I TAM requirements. That document is incorporated here by reference, and included as Appendix D.

TAM APPROACH

This TAM Plan sets forth TARC's approach to improving its TAM capabilities in compliance with requirements initially established by the Moving Ahead for Progress in the 21st Century (MAP-21) Act of 2012 and further defined by the Federal Transit Administration's (FTA's) Final Rule on TAM (49 CFR 625 and 630). This document sets agency-wide objectives and strategies associated with the commitments in TARC's TAM Policy and mission. In addition, this TAM Plan identifies priority projects to improve TARC's TAM capabilities and lifecycle management activities across the agency.

FIGURE 1-1- TYPICAL LIFECYCLE PHASES OF A TRANSIT ASSET

TARC exists to deliver safe, efficient, and reliable transportation with world class customer service within the limitations of its resources. To do this, TARC must continually improve its management of fleet and facilities. When executed properly with dedicated resources, TAM improves coordination of all departments across all phases of an asset's lifecycle to manage assets more efficiently as shown in Figure 1-1.
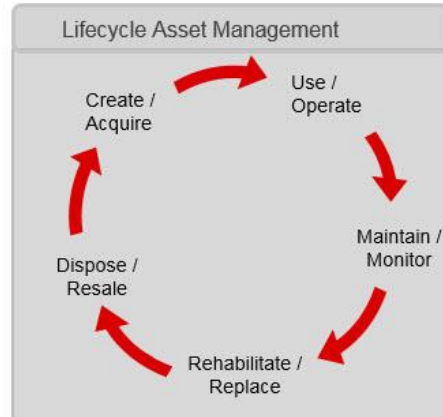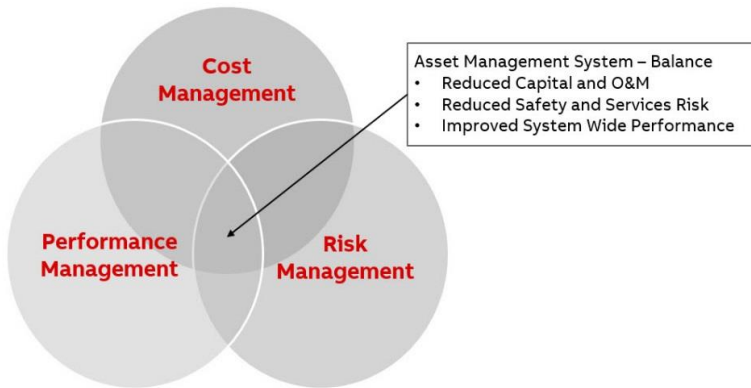

FIGURE 1-2 – ASSET MANAGEMENT OPTIMIZES COST, PERFORMANCE AND RISK

Accordingly, this TAM Plan aims to optimize the costs, risks, and performance of the transit system, and provide benefits to TARC through an ongoing planning effort as depicted in Figure 1-2. It also aims to enhance TARC's ability to communicate with the public and legislators about the benefits of investing in the transit system and the consequences of underinvestment.

Federal regulations currently require that all assets used in the provision of public transit be subject to this TAM Plan. Industry best practices suggest that the scope of this TAM Plan include all assets procured through TARC's capital program. This TAM Plan includes objectives and strategies to optimize the management of Fleet and Facilities Assets that align with FTA reporting requirements for the National Transit Database (NTD). Figure 1-3 illustrates the hierarchy of TARC's asset categories and asset classes.

FIGURE 1-3 – TARC's ASSET HIERARCHY BY CATEGORY AND CLASS

Rolling Stock	Equipment	Facilities	Systems *
Buses	Non-Revenue Support Vehicles	Administrative Facilities	Security
Cutaways	Non-Revenue Support Equipment	Maintenance Facilities	IT and Communication
Lift Vans		eBus Charging	CAD AVL
		Emergency Power Station	Revenue Collection
			Business Software

Systems structure is under development
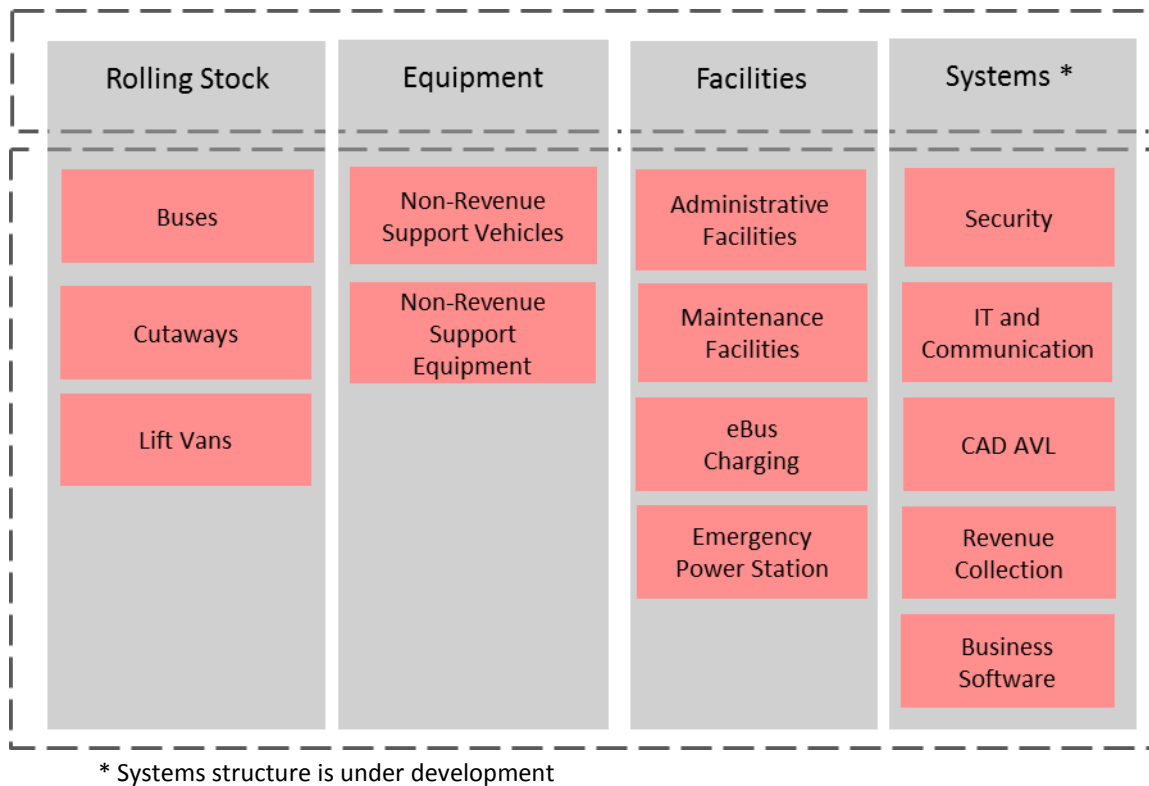
1.1 FEDERAL TAM REQUIREMENTS

1.1.1 OVERVIEW

The final TAM Rule was published on July 26, 2016 and went into effect on October 1, 2016. The rule itself amended the United States (U.S.) Code of Federal Regulations (CFR) Title 49 Parts 625 and 630, which relate to TAM and the NTD respectively. The TAM Final Rule refers to larger transit agencies as:

Tier I provider:
- "Owns, operates, or manages either 101 or more vehicles in revenue service during peak regular service or in any one non-fixed route mode" Or,
- "Operates rail transit."

Based on these criteria, and the type of service provided, TARC is a Tier I provider.

1.1.2 STATE OF GOOD REPAIR PERFORMANCE MEASURES

The TAM Rule requires that transit agencies establish state of good repair (SGR) performance measures and targets for each asset class. As a Tier I provider, TARC must report on the SGR measures for the following asset categories:

- Rolling stock (revenue vehicles): Percent of vehicles that have either met or exceeded their Useful Life Benchmark (ULB)

- Equipment (including non-revenue service vehicles): Percent of vehicles or other equipment that have either met or exceeded their ULB
- Facilities: Percent of facilities rated below condition 3 on the FTA TERM scale

Note: Infrastructure (rail fixed guideway, track, signals and systems) do not apply to TARC.

Transit agencies may also develop additional SGR performance measures for each asset category or class. TARC may choose to do so in future iterations of this TAM Plan.

1.1.3 TAM PLAN REQUIREMENTS

As a Tier I provider, TARC must develop its own TAM Plan. This TAM Plan must include all nine elements of the Final Rule and must:

- Define the TAM and SGR policy;
- Include the capital asset inventory;
- Provide asset condition assessment information;
- Describe the decision support tools used to prioritize capital investment needs;
- Identify project-based prioritization of investments;
- Discuss the TAM Plan implementation strategy;
- Describe the key TAM activities to be undertaken during the Plan's four year horizon period;
- List resources needed to carry out the TAM Plan; and
- Outline how the TAM Plan will be monitored and updated to support continuous improvement.

To provide a visual reference for compliance, Table 1-1 below reflects the strategy that TARC will be using to satisfy all requirements listed above. This table also lists the minimum requirements of the initial TAM Plan. TAM Plans must be updated in their entirety at least once every four years.

TABLE 1-1 – TARC's TAM PLAN AND U.S. 49 CFR COMPLIANCE MATRIX

TARC's Tier I TAM Plan includes the following elements:			
No:	U.S.49CFR625:	Requirement	TAM Plan Compliance
1	49CFR§625.25 (b)(1)	Inventory of the number and type of all capital assets a provider owns, except equipment with an acquisition value under $50,000 that is not a service vehicle.	Capital Inventory for all asset-classes, including assets with an acquisition value greater than $50,000, is presented in Section 4 "Transit Asset Inventory" of the TAM Plan. Annual changes to the inventory will also be reported in Section 4 in future issues of the TAM Plan.

No:	U.S.49CFR625:	Requirement	TAM Plan Compliance
	TARC's Tier I TAM Plan includes the following elements:		
2	49CFR§625.25 (b)(1)	An inventory must also include third-party owned or jointly procured exclusive-use maintenance facilities, passenger station facilities, administrative facilities, rolling stock, and guideway infrastructure used by a provider in the provision of public transportation.	Ownership of inventory is included in Section 4.1 "Asset Inventory" of the TAM Plan, which captures TARC - owned inventory. TARC does not own any guideway infrastructure and, third party-owned assets are identified in the respective asset classes.
3	49CFR§625.25 (b)(2)	Condition assessment of those inventoried assets for which a provider has direct capital responsibility and to level of detail to monitor, predict performance of assets, and inform investment prioritization.	The assessed condition of the assets is included in Section 4.3 "Asset Condition" of the TAM Plan. Performance targets for future years are set out where appropriate in Section 4.2 "Asset Performance Measures" of the TAM Plan and reported through NTD.
4	49CFR§625.25 (b)(3)	Description of analytical processes or decision-support tools to estimate capital investment needs over time and develop its investment prioritization.	Use of tools, asset lifecycle strategies, and approaches to support decision making is described in Section 7 "Investment Prioritization and Funding" of the TAM Plan.
5	49CFR§625.25 (b)(4)	Project-based prioritization of investments.	The prioritized list of investment projects is set out in Section 7 "Investment Prioritization and Funding" of the TAM Plan
6	49CFR§625.25 (b)(5)	Provider's TAM and SGR policy.	TAM and SGR Policy is presented in TARC's Board of Directors approved "Asset Management Policy." This Policy is referenced in Section 2 "Asset Management Policy Goals and Objectives" and is included as Appendix A of the TAM Plan.
7	49CFR§625.25 (b)(6)	Provider's TAM Plan implementation strategy.	TAM Plan implementation strategy, including how the Plan and associated business activities will be monitored, updated, and evaluated, and how continuous improvement will take place is set out in Section 8"Asset Management Enablers" of this TAM Plan.
8	49CFR§625.25 (b)(7)	A description of key TAM activities that a provider intends to engage in over the TAM Plan horizon period.	Section 8 "Asset Management Enablers" describes the TAM business process activities. Section 9 "TAM Continuous Improvement Plan" describes the TAM improvement activities over the 4 year plan horizon period.

No:	U.S.49CFR625:	Requirement	TAM Plan Compliance
TARC's Tier I TAM Plan includes the following elements:			
9	49CFR§625.25 (b)(8)	A summary or list of the resources, including personnel that a provider needs to develop and carry out the TAM Plan.	Resource including Roles and Responsibilities is included in Section 2.3. Additionally, Asset Management resources and initiatives are defined in Section 8 "Asset Management Enablers", Sub-Section 8.1.
10	49CFR§625.25 (b)(9)	An outline of how a provider will monitor, update, and evaluate, as needed, it's TAM Plan and related business practices, to ensure the continuous improvement of its TAM practices.	TAM business processes related to TAM Planning and continuous improvement are included in Section 8 "Asset Management Enablers" in the TAM Plan.
When developing its investment prioritization, TARC must:			
11	49CFR§625.33 (a)	Identify a program of projects to improve or manage the SGR of capital assets for which the provider has direct capital responsibility over the TAM Plan horizon period;	Prioritization of investments, work Plans, cost and budget schedules by year are presented in Section 7 "Investment Prioritization and Funding" in the TAM Plan.
12	49CFR§625.33 (b)	Rank projects to improve or manage the SGR of capital assets in order of priority and anticipated project year;	Prioritization of investments, work Plans, cost and budget schedules by year are presented in Section 7 "Investment Prioritization and Funding" in the TAM Plan.
13	49CFR§625.33 (c)	Ensure project rankings are consistent with its TAM policy and strategies;	The approach to prioritizing projects is presented in Section 7 "Investment Prioritization and Funding" in the TAM Plan.
14	49 CFR § 625.33 (d)	Give due consideration to state of good repair projects to improve those that pose an identified unacceptable safety risk;	Identification and management of risks are set out in Section 5 "TAM Risk Management" of the TAM Plan. Also, Prioritization of investments are defined in Section 7 Investment Prioritization, and the criteria are presented in Section 7.2 'Capital Investment Prioritization in the TAM Plan.
15	49 CFR § 625.33 (e)	Take into consideration its estimation of funding levels from all available sources that it reasonably expects will be available in each fiscal year during the TAM Plan horizon period;	Prioritization of investments, work Plans, cost and budget schedules by year are presented in Section 7 "Investment Prioritization and Funding" in the TAM Plan.

TARC's Tier I TAM Plan includes the following elements:			
No:	U.S.49CFR625:	Requirement	TAM Plan Compliance
16	49 CFR § 625.33 (f)	Take into consideration requirements under 49 CFR 37.161 and 37.163 concerning maintenance of accessible features and the requirements under 49 CFR 37.43 concerning alteration of transportation facilities.	Strategies for maintaining assets are set out in Section 6 "Asset Lifecycle Strategies." Strategies will ensure compliance with Maintenance of accessibility features and also include and alterations to facilities consider accessibility as well.

Each section of this TAM Plan contains references to the requirements of the Final Rule on Asset Management in the U.S. CFR. A glossary of key terms can be found in Appendix E: Key Definitions.

1.1.4   TAM REPORTING REQUIREMENTS

All public transit provider's initial TAM Plan must be completed by October 1, 2018. Title 49 of the Code of Federal Regulations (CFR), section §625.29 (a), states that a TAM Plan should cover a Planning horizon of at least four years. Revisions of the TAM Plan may be undertaken at any time and should be initiated following any major change to the asset inventory, condition assessment, or investments. The TAM Plan should also be updated following any change to prioritization processes affecting the timing of future projects. Although TAM Plans are required to be updated in their entirety at least once every four years, TARC will update this TAM Plan on an annual basis as needed.

Congress established the National Transit Database (NTD) to be the Nation's primary source for information and statistics on the transit systems of the United States. Statute requires that recipients or beneficiaries of grants from the FTA under the Urbanized Area Formula Program (§5307) or other than Urbanized Area (Rural) Formula Program (§5311) submit data to the NTD. The legislative requirement for the NTD is found in Title 49 U.S.C. 5335:

(a) NATIONAL TRANSIT DATABASE — To help meet the needs of individual public transportation systems, the United States Government, State and local governments, and the public for information on which to base public transportation service planning, the Secretary of Transportation shall maintain a reporting system, using uniform categories to accumulate public transportation financial and operating information and using a uniform system of accounts. The reporting and uniform systems shall contain appropriate information to help any level of government make a public sector investment decision. The Secretary may request and receive appropriate information from any source.

(b) REPORTING AND UNIFORM SYSTEMS — the Secretary may award a grant under Section 5307 or 5311 only if the applicant and any person that will receive benefits directly from the grant, are subject to the reporting and uniform systems.

(c) DATA REQUIRED TO BE REPORTED - The recipient of a grant under this chapter shall report to the Secretary, for inclusion in the National Transit Database, any information relating to a transit asset inventory or condition assessment conducted by the recipient.

In addition to the performance targets and TAM Plan, the TAM Final Rule requires that two additional asset management reports be submitted to the NTD annually:

- The **Data Report** should describe the condition of the transportation system currently and the SGR performance targets for the upcoming year.
- The **Narrative Report** should describe changes in the transportation system condition and report progress on meeting the performance targets from the prior year.

The first Data Report is due no later than four months after the end of TARC's 2018 fiscal year, or October 2018. The first Narrative Report is due within four months of TARC's 2019 fiscal year end. Subsequently, both reports are due to the NTD no later than four months after the end of TARC's fiscal year.

2.   ASSET MANAGEMENT POLICY, GOALS AND OBJECTIVES

TARC is committed to improving its TAM capability to effectively manage its capital assets and maintain its system in a State of Good Repair, to support safe, efficient, and reliable transit. TARC has developed TAM goals, objectives, and a policy statement to aid the process of formally adopting TAM across the organization.

This section addresses TAM and SGR policy consistent with policy and current federal regulations (49 U.S.C. 5326), and sets the direction for establishing and maintaining transit asset management strategies and plans that are achievable with available funds.

2.1   ASSET MANAGEMENT GOALS AND OBJECTIVES

TARC has developed TAM goals and objectives as part of developing its TAM plan. The steps included reviewing our latest mission, vision and organizational goals. The following five TAM goals were established to implement TARC's asset management policy with the aim of promoting TAM activities in day-to-day operations, and thereby achieving an enhanced level of maturity in asset management.

TABLE 2-1: TARC GOALS AND OBJECTIVES

No:	Area	Proposed TAM Goal	TAM Plan Objectives
1	Safety	Maintain assets in SGR to support a safe operating environment	• Maintain assets (Rolling and non-rolling) in SGR • Reinforce customer confidence in TARC safety and reliability • Identify measures to reduce accident rates
2	Prudent Fiscal Management	Build financial sustainability by implementing asset management best practices	• Develop multi-year SGR needs, linked to the annual budget and Capital improvement program • Establish methodology and processes for prioritization of capital projects • Implement lifecycle cost process
3	State of Good Repair Investment	Prudent investment in assets to meet SGR requirements	• Maintain a TAM policy and plan that meets FTA guidelines • Establish processes for capital replacement and rehabilitation of assets

No:	Area	Proposed TAM Goal	TAM Plan Objectives
4	Organizational efficiency	Improve organizational efficiency and effectiveness by implementing asset management processes	• Develop asset management skills in key personnel Implement tools to support data driven asset management decision-making
5	People and TAM culture	Promote asset management culture throughout the agency	• Promote awareness of TAM across all levels throughout the agency • Build understanding and support for asset management agency wide

TARC anticipates that adopting and implementing effective Asset Management systems and processes will have a positive impact on the following areas:

- Safety
  - Mitigating public exposure to unsafe environments such as air and noise pollution
  - Collision reduction based on known accident locations/time using past collision data collected
  - Increasing proactive repairs leading to improvement in safety
- Environment
  - Reducing hazardous and industrial material usage and exposure to the environment
- Economy
  - Collecting data to guide future investment planning
  - Maximizing useful life of assets in the most cost-effective manner
  - Reducing emergency repairs that cannot be accurately budgeted
- Levels of Service
  - Collecting and analyzing asset condition and criticality data for replacement in a prioritized and planned manner
  - Utilizing RCM (Reliability Centered Maintenance) to maximize useful life of assets
- Strategic Plan
  - Aligning TAM plan with TARC Critical Success Factors
  - Reducing the incidence of "departmental silos" by establishing cross-departmental Technical Working Group and enhancing our communications plan

2.2   TRANSIT ASSET MANAGEMENT POLICY

Policy: The intention of TARC's TAM Policy is to support the development and implementation of a TAM Program which will facilitate the realization of long term benefits related to effective asset management. This policy outlines the drivers, principles and responsibilities for TAM

within TARC as identified in this TAM plan. Achievement of the TARC mission, "…enhance the social, economic and environmental well-being of the Greater Louisville community" is fully supported by this policy.

TARC's TAM Policy complies with the Federal Requirements of MAP-21 law which reauthorized surface transportation programs and introduced new NTD reporting requirements.

TARC TAM Policy: A signed copy of Resolution 2018-22 and this Board of Directors approved Policy is attached as **Appendix A.**

Purpose: This policy has been developed to communicate to the Board of Directors, staff, and external stakeholders TARC's commitment to maintain its system in a State of Good Repair and foster a culture of continuous improvement.

2.3   ROLES AND RESPONSIBILITIES

TARC's TAM implementation is a shared responsibility across all divisions with the overall responsibility residing with Assistant Executive Director as laid out in Figure 2-1.

- Overall Responsibility:
  The Assistant Executive Director has the overall responsibility for executing the development of asset management plans and procedures, in cooperation with executive leadership team, and reporting to the Board (through Executive Director) on the status of TAM implementation and achievements

- Day-to-Day Responsibility:
  The lead responsibility towards execution of TAM across the agency resides within TARC's Maintenance Department, specifically Maintenance Asset Manager. Key responsibilities include the implementation of the TAM Plan.

- Departmental Support:
  All departments across the agency will adopt and support the TAM policy, with particular support coming from the following divisions:

  - ❖ Maintenance:
    The Maintenance Department will support the policy by participating in technical working group discussions and strategy; providing asset management data and assumptions; and implementing TAM plan actions. Actions may include resource management; risk registers; continuous improvement for preventative and corrective maintenance; operational costs of individual assets and facilities; developing lifecycle cost of assets; and other asset management related activities.
  - ❖ Transportation:

The Transportation Department will support the policy by participating in technical working group discussions and strategy; and maintaining KPIs related to transportation.

❖ Finance

The Finance Department will support the policy by participating in technical working group discussions and strategy; providing asset management data and assumptions; and implementing TAM plan actions. These may include the linking of financial accounting data to asset management data; managing and administering budgets for asset management.

❖ Information Technology (IT)

The IT Department will support the policy by participating in technical working group discussions and strategy; providing tools for asset management data; and implementing TAM plan actions. These may include tools to collate, maintain, utilize and dispose of asset information to support both strategic planning and life cycle costing to provide improved decision-making and support the day-to-day delivery of asset management related activities.

❖ Grants and Capital Programs

The Grants and Capital Programs Department will support the policy by participating in technical working group discussions and strategy; providing tools for asset management data; and implementing TAM plan actions. Prioritization of capital projects for replacement and rehabilitations; implementation of lifecycle costing into procurement of assets, asset costing and valuation; and other asset management related activities.

3.   LEVELS OF SERVICE

"Levels of service" is an industry term that refers to the measurement of transit system performance. This TAM Plan is built around achieving improvements in these levels of service. Customer levels of service are typically in the form of published schedules and/or policy for minimum service frequencies, on-time-performance goals, customer comfort considerations (e.g., climate control), etc. TARC's asset management practices directly impact these customer levels of service.

TARC has a long-standing commitment to serving the transit needs of all of our customers in the Louisville, Kentucky metro area. Toward that end, TARC has developed the fleet, facilities, systems and infrastructure to not only ensure that our assets are maintained in a state of good repair, but also help to enhance our operations by providing safe, frequent and reliable service.

3.1   RIDERSHIP TRENDS

In the decade ending in 2016, ridership fluctuated around 15 million passenger trips per year. Since then it has declined and in fiscal year 2018 ridership declined by 4.8% to approximately 13 million passenger trips. This decline in ridership over the two years has many causes, including sustained low gas prices, the condition and reliability of our fleet, and the growth of rideshare services (Uber, Lyft, etc.). However, ridership is expected to increase again over 2019 by about 3%, especially when the Dixie Highway BRT corridor becomes operational in December 2019. Ridership is projected to increase by about 40% in this corridor, which will have an overall positive impact system wide. Historic ridership, revenue and cost are shown below in Figure 3-1.

FIGURE 3-1 – FY 2002 TO 2017 ANNUAL RIDERSHIP AND ASSOCIATED COSTS
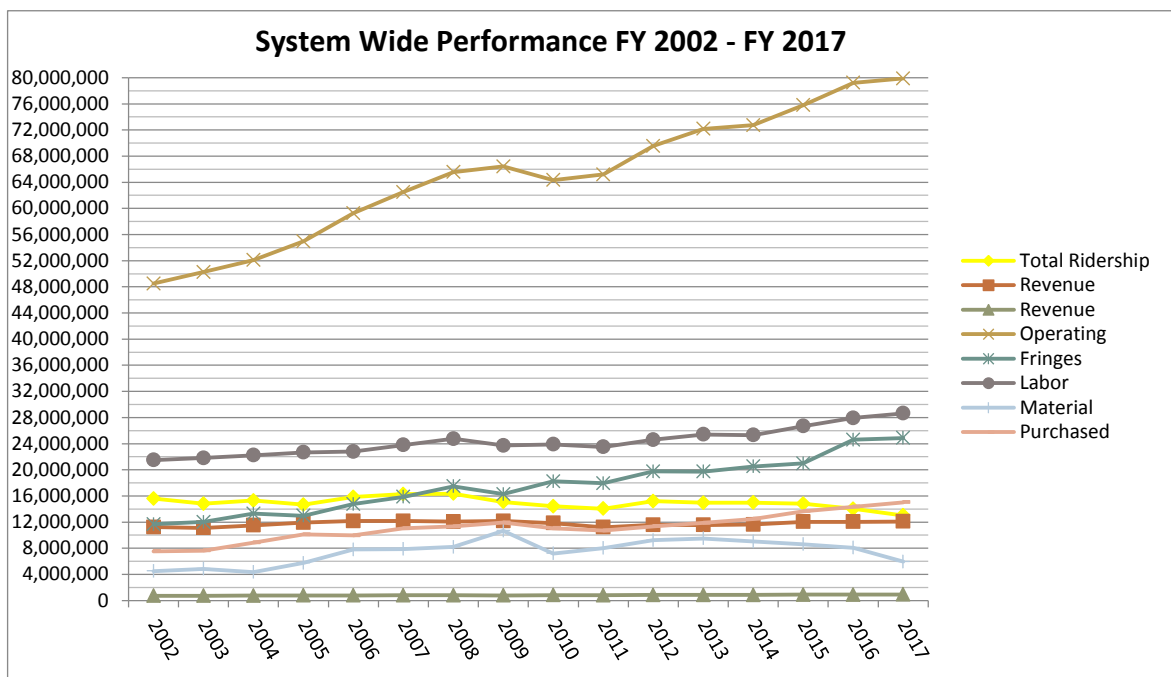
While TARC ridership has historically been fairly stable, it has remained so in the context of a many-fold increase in the size of TARC's service area. That means TARC buses travel more miles per passenger than they have at any time in the past. As can be seen in Figure 3-1, the trend is that operating costs are increasing substantially while ridership is declining. The condition of TARC's assets has and will continue to have an impact, however slight, on ridership. Simply put, buses that are safe, reliable, and comfortable encourage ridership. Maintaining TARC assets in a state of good repair is important to assure that they continue to have a positive impact.

## 4.	ASSET INVENTORY, MONITORING AND CONDITION

### 4.1	ASSET INVENTORY

TARC manages an asset portfolio estimated to be worth approximately $167,463,155 in 2018-2019 Cash Value. This does not including soft costs associated with asset replacement such as design and construction management costs. Soft costs could be estimated to be an additional 35% for major systems, and 10% for equipment and vehicles. These estimates do not reflect Replacement Asset Value (RAV). Additionally, cash value does not include contingency variables.

This asset portfolio is comprised of the Asset Categories Rolling Stock, Equipment, Facilities and System which are further broken down by Asset Class. A summary of the Inventory is shown on the following page in Table 4-1.

TABLE 4-1 – ASSET INVENTORY BY CATEGORY AND CLASS WITH VALUATION

Category	Class	Description	Qty	2018-2019 Cash Value [1]	Total Cash Value
Rolling Stock					
Revenue	Buses (BU)	Gillig BRT 40'	21	$5,415,228	$43,571,871
		Gillig Low Floor 40'	137	$18,578,382	
		Proterra Calyst 40'	6	$4,638,042	
		Proterra Ecoliner 35'	9	$6,309,503	
		Gillig Low Floor 35'	2	$899,994	
		Gillig Low Floor 30'	20	$99,980	
		Gillig Hybrid-Electric	33	$6,596,707	
	Cutaways (CU)	7 + 3 Passenger	10	$942,001	
	Minivans (MV)	3 + 1 Passenger	4	$0	
	Van Pool (VN)	Ford 350 and Transit	105	$1,034,035	
Equipment					
Non-Revenue	Support Vehicles	Cars, SUVs and Trucks	49	$319,540	$319,540 $
Facilities					
Buildings	Administration and Maintenance *(including Envelope, Roofing, Windows and Systems, eBus Chargers and USTA Emergency Power Station)*	1000 W Broadway [2]	8	$62,665,973	$102,307,122
		2903-23 W Broadway [3]		$29,223,520	
		908 W Broadway		$5,203,787	
		925 W Broadway		$1,062,762	
		2900 W Broadway [4]		$94,368	
		2901 W Broadway [5]		$2,573,324	
		816 S Third St – Charger		$741,694	
		834 W Market St - Charger		$791,694	
Systems [6]					
Information and Communication	IT includes: Hardware such as workstations, laptops, SCADA, printers, copiers, monitors, routers, switches, etc.;	1	$2,505,605	$21,264,622
	Comms includes: Dispatch Consoles, Dispatch Radios, Bus Equipment, Radios, Portable Radios, Software		$3,370.890	
CAD-AVL Inventory	Includes all associated Hardware and Infrastructure equipment and software	1	$4,729,725	
Revenue Collection	Includes all Revenue Collection Hardware and Infrastructure equipment and software	1	$10,658,402	

[1] Cash Value: Straight line depreciation. Does not reflect actual Replacement Asset Value (RAV).
[2] 1000 W. Broadway property includes the value of the USTA Emergency Power Station of approximately $850,000
[3] Added new paint booths in the bus storage facility at 2903-23 W. Broadway. Total cost $1,641,435
[4] Nia Center owned by TARC, leased to City. Under terms of lease, City responsible for insuring building.
[5] Reoccupied 2901 W. Broadway as office space; 8,250 ft^2; 4.93 acres; actual depreciated construction and improvements costs
[6] Security and Software systems will be added to the TAM Plan as they are added to our EAM register.

The detailed asset inventory with associated attributes and characteristics is maintained in Ellipse. During procurement and receipt or acceptance, specific asset data such as cost, useful life, gross vehicle weight, fluid capacities, warranty information and maintenance interval information is collected from the Original Equipment Manufacturer (OEM). This practice

ensures the appropriate data and important attributes are properly recorded into the system in support of asset lifecycle management practices. Figure 4-1 is an example of an Ellipse Asset Register Nameplate Screen for a single Revenue vehicle asset.

FIGURE 4-1 – ELLIPSE EQUIPMENT REGISTER NAMEPLATE EXAMPLE
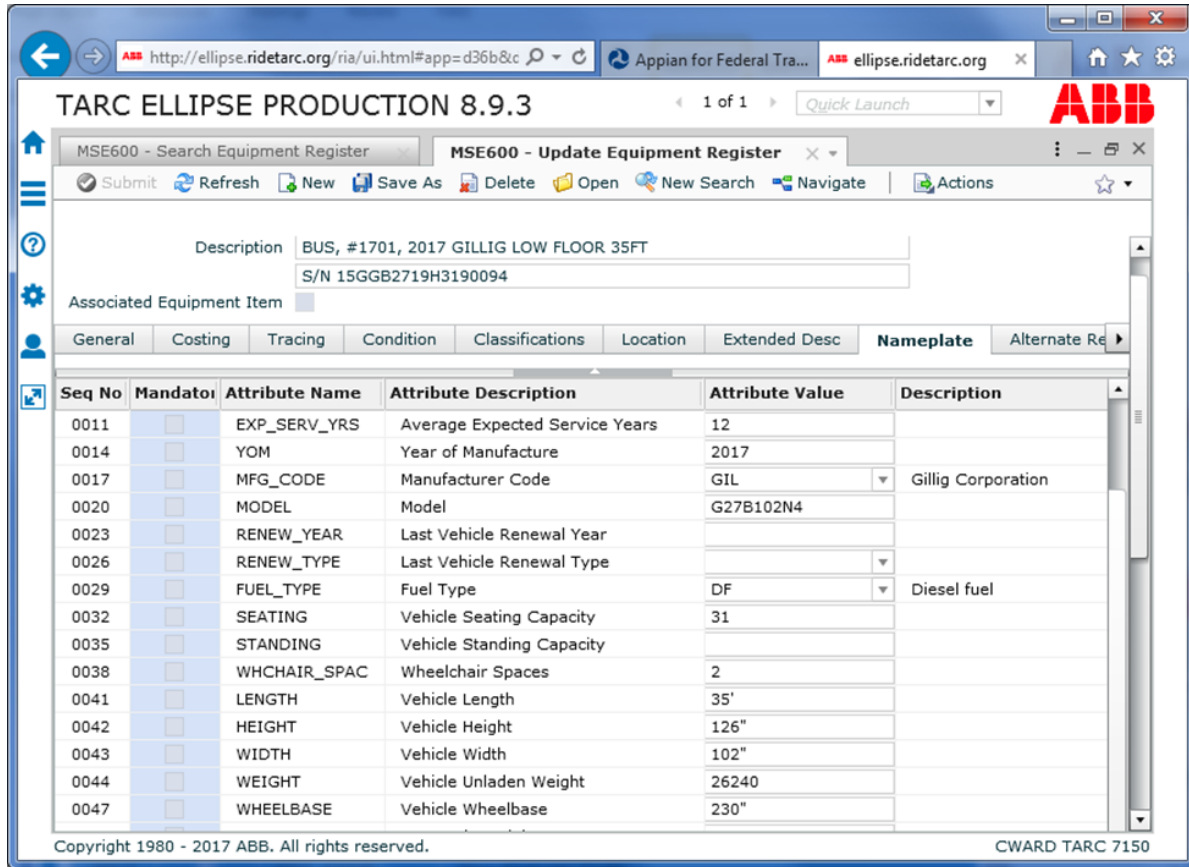
All relative data is captured to consolidate and create the Asset Inventory in Ellipse. This information is organized and structured into a taxonomy that supports TARC's business processes. Figure 4-2 is an example of the Asset Hierarchy. In this example, the highlighted asset is the highest level of the taxonomy – TARC Transit Authority of River City.

FIGURE 4-2 – ASSET HIREARCHY EXAMPLE
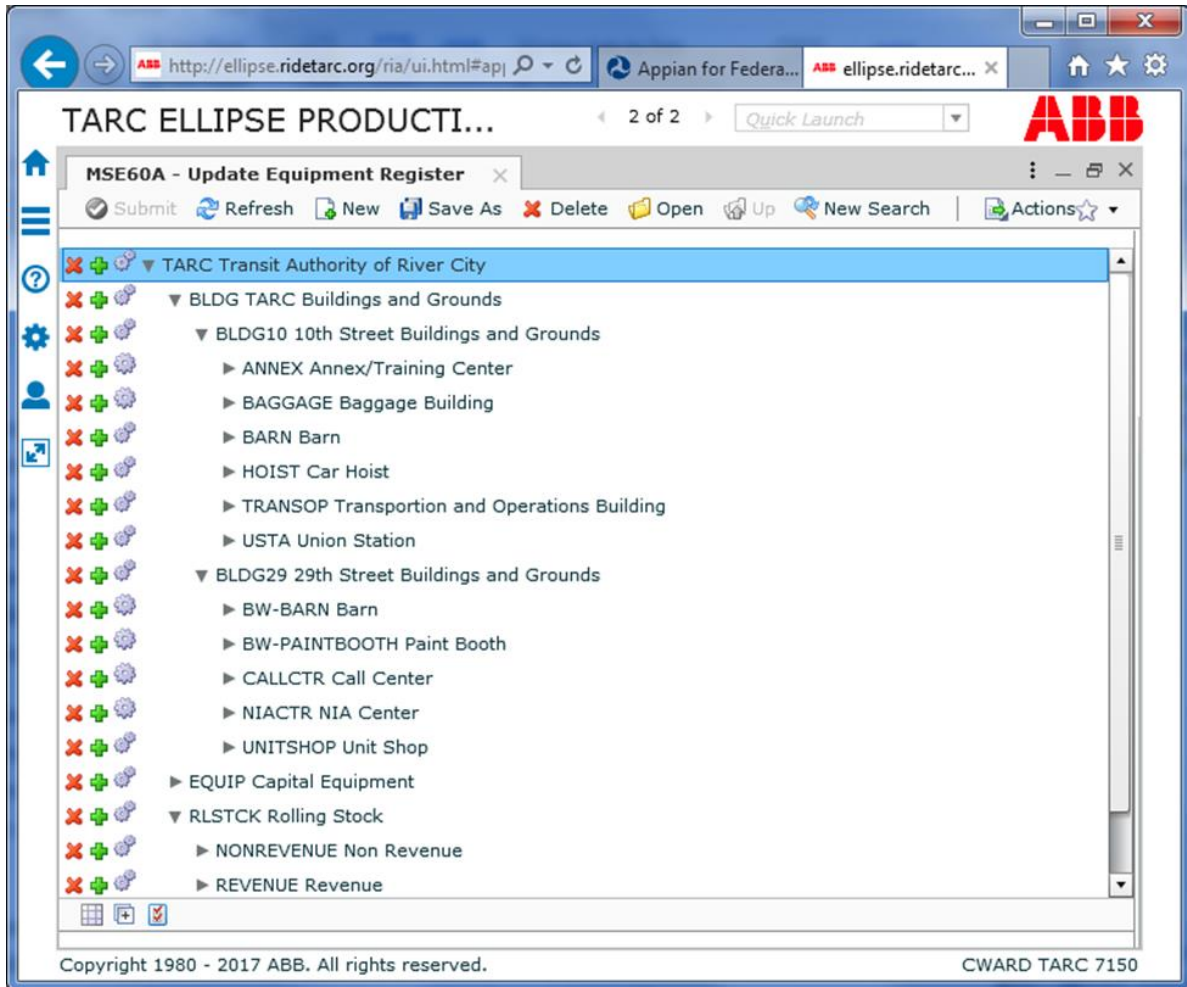
4.2   ASSET PERFORMANCE MEASURES

To comply with the FTA requirements associated with SGR, performance measures for capital assets have been established for each asset class along with performance targets.   The following is a summary of the FTA requirements:

> **The TAM Rule requires SGR performance measures for capital assets.**
>
> Reference: *49CFRPart625, Subpart D, Section 625.43 "SGR performance measures for capital assets. (a) Equipment: (non- revenue) service vehicles*. The performance measure for non-revenue, support-service and maintenance vehicles equipment is the percentage of those vehicles that have either met or exceeded their ULB. *(b) Rolling stock*. The performance measure for rolling stock is the percentage of revenue vehicles within a particular asset class that have either met or exceeded their ULB. *(d) Facilities*. The performance measure for facilities is the percentage of facilities within an asset class, rated below condition 3 on the TERM scale.
>
> **The TAM Rule requires setting targets for performance measures.**
>
> Reference: *49CFRPart625 Subpart D, Section 625.45 "(a)(1)* A provider must set one or more performance targets for each applicable performance measure. *(a)(2)* A provider must set a performance target based on realistic expectations, and both the most recent data available and the financial resources from all sources that the provider reasonably expects will be available during the TAM Plan horizon period. *(b)(2)* At least once every fiscal year after initial targets are set, a provider must set performance targets for the following fiscal year.

Targets for Revenue Vehicles are expressed in terms of percentage of assets that are at or beyond the Useful Life Benchmark (ULB), therefore the ideal situation is to be less than the target.   For all Non-Revenue Vehicles, TARC identifies a particular Useful Life based on the vehicle characteristics at time of purchase.

Targets for Facilities and associated sub-systems are expressed in terms of the percentage of assets that are rated less than desirable (<3.0) according to the Transit Economic Requirements Model (TERM) Scale of 1 to 5.   Therefore the ideal situation is to be on the higher end of that scale.   TARC standard practice is for all revenue vehicles to be replaced at end of useful life.   Funding and procurement can delay this, but targets have been established. Future revisions to this TAM Plan will include a more granular look at the TARC Assets.   For example, the Facilities will be broken down in the appropriate parent-child relationships to the sub-systems level. For this initial TAM Plan, the current targets are shown below in Table 4-2.

TABLE 4-2 – FLEET AND FACILITIES TAM PERFORMANCE TARGETS

Asset Category	Asset Class	Performance Target
Rolling Stock	Buses (BU)	≤10% of fleet exceeds default ULB of 15 Years/600K miles in service
	Cutaway Buses (CU)	≤5% of fleet exceeds default ULB of 10 Years/300K miles in service
	Vans (VN)	≤10% of fleet exceeds default ULB of 10 Years/300K miles in service
Equipment	Automobile – Supervisor, Support, and Security	≤10% of non-revenue service vehicles exceeds default ULB of 8 Years in service
Facilities	Admin / Maintenance Facility	≤10% of Facilities rated under 3.0 on TERM scale
	USTA Emergency Power Station	>95% availability
	On-Route Bus Charging Stations	Each station >3.0 on TERM scale

Additionally, a number of operational metrics are monitored and used for National Transportation Database (NTD) reporting and internal purposes on a monthly basis. The Key Performance Indicators (KPIs) shown in Table 4-3 are some of those that are monitored for Revenue Fleet. These include Safety, Reliability, Level and Quality of Service and Financial Effectiveness. TARC is transparent with this operational data and, makes it available on our intranet SharePoint platform for use throughout the organization.

TABLE4-3 – OPERATIONAL KEY PERFORMANCE INDICATORS

Performance Measure	Indicators
Safety	Preventable Accidents / 100,000 Miles Non-Preventable Accidents / 100,000 Miles Injury Accidents / 1,000,000 Customers
Reliability	Vehicle Trips On-Time Vehicle Pull-outs Chargeable Roadcalls Miles Between Chargeable Roadcalls
Level of Service / Quality of Service	Revenue Vehicle Miles Revenue Vehicle Hours Customers / Revenue Vehicle Hour Average Weekday Customers Total Customers Customer Commendations / 100,000 Miles Customer Complaints / 100,000 Miles

Performance Measure	Indicators
Financial	Farebox Revenue Operating Cost = $ $ / Revenue Vehicle Mile $ / Revenue Vehicle Hours

After completion of some foundational process improvements, data cleansing activities and other asset management initiatives, TARC has an overall goal of monitoring program and process effectiveness and efficiencies as well in the areas of Work Control, Capital Planning and others. These measures will be outlined in our Continuous Improvement Plan (Appendix B).

4.3   ASSET CONDITION

The TAM Rule requires inclusion of condition assessments in an agency's TAM Plan. Condition assessments should collect sufficient information to inform asset replacement.

Reference: 49 CFR Part 625 Subpart C Section 625.25(b)(2) "… a TAM Plan must include … (2) A condition assessment of those inventoried assets for which a provider has direct capital responsibility. A condition assessment must generate information in a level of detail sufficient to monitor and predict the performance of the assets and to inform the investment prioritization."

Rolling Stock Condition Assessment: Condition ratings for vehicles are expressed in terms of the percentage of assets that are 'at', or 'beyond' the Useful Life Benchmark (ULB) or TARC specific Useful Life as defined in Section 4.2., Table 4-2 - Fleet and Facilities TAM Performance Targets.

The current Condition Assessment results are maintained in an MS Excel spreadsheet as The Condition Assessment Report. In future iterations of this TAM Plan, this data will be controlled and managed in Ellipse using the Condition Monitoring Module for both assessment and repository of result. A sample of the current Condition Assessment results for Rolling Stock is shown below in Table 4-4.

TABLE 4-4 SAMPLE OF CONDITION ASSESSMENT RESULTS – ROLLING STOCK

Class	Qty	Year	Asset	TAM	NTD	#Exceeded ULB
Performance Target: ≤10% of fleet exceeds default ULB of 15 years/600K miles in Service						
Buses	15	2002	Gillig Low-Floor 30'	Yes	Yes	15
	19	2003	Gillig Low-Floor 40'	Yes	Yes	19
	5	2004	Gillig Hybrid-Electric 40'	Yes	Yes	0
	16	2005	Gillig Low-Floor 40'	Yes	Yes	0
	4	2007	Gillig Hybrid-Electric 40'	Yes	Yes	0

	6	2008	Gillig Low-Floor 40'	Yes	Yes	0
Performance Target: ≤5% of fleet exceeds default ULB of 10 years/300K miles in Service						
Cutaway	15	2012	Ford Supreme	Yes	Yes	15
	7	2012	Chevrolet Supreme	Yes	Yes	2
	12	2014	Ford Goshen	Yes	Yes	0

Facilities Condition Assessment: The FTA's TERM Scale is being used to define facility conditions. The TERM scale condition rating ranges from (5) Excellent to (1) Poor. Per the FTA TAM Final Ruling, assets with a condition rating score of 3.0 and above are in a state of good repair. Assets with a condition score lower than 2.9 are not, and may require prioritization during capital programing to ensure safe, efficient, and reliable transit service. This scale is shown below in Table 4-5.

TABLE 4-5 – FACILITY CONDITION ASSESSMENT RATING CRITERIA

Rating	Condition	Description
5	Excellent	No visible defects, new or near new condition, may still be under warranty if applicable
4	Good	Good condition, but no longer new, may have some slightly defective or deteriorated component(s), but is overall functional
3	Adequate	Moderately deteriorated or defective component(s), but has not exceeded useful life
2	Marginal	Defective or deteriorated component(s) in need of replacement; exceeded useful life
1	Poor	Critically damaged component(s) or in need of immediate repair; well past useful life

For Facilities assets, condition assessments are scheduled and completed using in-house staff, or where a particular set of skills or experience are necessary, TARC will utilize outside contractors. These results are compiled into The Condition Assessment Report which can aggregate (roll-up) the individual asset condition assessments to the Asset Class level. The formula for aggregation of this data is as follows:

$$\textbf{Asset Condition Assessment Formula} = \frac{\sum \textbf{(Asset Rating, Asset Qty)}}{\textbf{Asset Qty}}$$

Facilities assets with a condition rating score of 3.0 and above are considered to be in a State of Good Repair (SGR). Assets with a condition score lower than 3.0 are **not**, and may require prioritization during capital programing to ensure safe, efficient, and reliable transit service. Note that these condition scores can represent individual asset conditions or can represent the average condition of all assets in each category/class depending on aggregation. The Facilities and Facilities Equipment assessments are still a work in progress. As reflected below, some assessments in this category are not yet complete. As with the Rolling Stock, in future

iterations of this TAM Plan, this data will be controlled and managed in Ellipse using the Condition Monitoring Module for both assessment and repository of result. Table 4-6 provides a sample of the current facilities asset condition assessment summary report.

TABLE 4-6 – SAMPLE OF CONDITION ASSESSMENT RESULTS - FACILITIES

Class	Qty	Asset	TAM	NTD	Condition
Performance Target: ≤10% of facilities rated under 3.0 on Term scale					
Administrative / Maintenance Facility	1	Union Station Facility - 1000 W. Broadway	Yes	Yes	Not Assessed
	1	Union Station Baggage Building - 1000 W. Broadway	Yes	Yes	Not Assessed
	1	Transportation and Operations Facility - 1000 W. Broadway	Yes	Yes	3.15
	1	Bus Storage Barn - 1000 W. Broadway	Yes	Yes	3.4
	1	Car Hoist Facility – 925 W. Broadway	Yes	Yes	3.25

5. TAM RISK MANAGEMENT

TARC's risk management for assets is based on periodic condition assessments. Planned and frequent preventive maintenance and inspection activities are employed to maintain assets that are safe, reliable, and meet level of service requirements. All revenue and service vehicles are programmed for inspections every 3,000 miles to perform preventive maintenance, identify potential issues, and collect condition data.

TARC Managers consider this assessment data in order to determine risk. They consider the formula Risk = Probability X Consequence. What, in other words, is the likelihood of failure, and what is the potential impact of failure? With that determination of criticality in hand work is then planned.

When condition assessments identify non-critical maintenance needs, corrective work is planned as soon as the asset will be available for maintenance. For critical issues, vehicles remain out of service until the identified maintenance need has been addressed. All fixed-route vehicles that are available for service are stored indoors at a single location allowing for prompt attention to issues identified.

Scheduled work for revenue and non-revenue vehicles is triggered by elapsed mileage through Maintenance Scheduled Tasks (MST) in TARC's Ellipse asset management system. Vehicle mileage is updated in Ellipse each time revenue vehicles are fueled, ensuring schedule compliance. In addition to scheduled work, TARC's single bus storage facility provides bus operators the ability to request service in response to any issue they discover during their pre-trip inspection.

Similarly, facilities are inspected regularly and frequently. Inspection activities are currently managed with a focus on criticality, quality assurance, and extending asset life. The 2018 Ellipse EAM system upgrade will allow TARC to migrate scheduling for those activities into MSTs. Using the Ellipse system will assist with consistency, documentation, and data collection and analysis.

A key element of TARC's risk management is the use of dedicated staff for inspection of rolling stock, equipment, and facilities. TARC has dedicated inspection bays and mechanics for vehicle inspections and dedicated building maintenance staff for facilities inspection. This division of labor ensures that technicians are appropriately trained to assess condition consistently and accurately.

For all assets, TARC is attentive to trends such as increased material consumption and repeat failures, and looks for opportunities to improve asset reliability. Currently, risk assessment activity is focused on rolling stock and facilities. However, TARC anticipates expanding formal risk oversight to complementary and supporting systems that are part of providing modern mobility services.

6.   ASSET LIFECYCLE MANAGEMENT STRATEGY

> **The TAM Rule requires that TAM Plans provide the implementation strategy**.
>
> Reference: 49 CFR Part 625 Subpart C Section 625.25(b) "Transit asset management Plan elements … (6) a provider's TAM Plan implementation strategy; (7) A description of key TAM activities that a provider intends to engage in over the TAM Plan horizon period"

This section identifies TARC's key asset management practices across the Fleet and Facilities. The asset lifecycle management strategies, will be captured in the Fleet and Facilities Lifecycle Maintenance Plan (MP) during Year 2 (2019) of this TAM Plan horizon. As part of the TAM Continuous Improvement Plan (CIP), the updated MP will capture and refine existing MP content and combine Fleet and Facilities activities. The MP will set out the approach for managing the assets and, will deliver TARC's strategic objectives by aligning with the TARC Mission, TAM Policy and the TAM Vision as described in the Executive Summary.

Recognizing that each asset category and asset class is challenged with a unique set of performance characteristics and resource requirements, the MP will provide specific guidance at the asset class level, managing the Fleet and Facilities to align with this TAM Plan.

TARC uses Ellipse integrated EAM / ERP/ APM software to manage all of the lifecycle management activities that exist today. These activities will make up the MP and will include all of the Preventative Maintenance Tasks, Standard Operating Procedures (SOPs), Inspections and proactive maintenance activities performed to ensure consistent asset lifecycle management.

These activities will all align with the organization's business goals and objectives providing "Line-of-Sight" organizational alignment to ensure a consistent collection and analysis of data as a fundamental element of TARC's implementation approach. TARC's document hierarchy for these lifecycle activities are reflected in Figure 6-1.

FIGURE 6-1 – ASSET MANAGEMENT DOCUMENT HIERARCHY
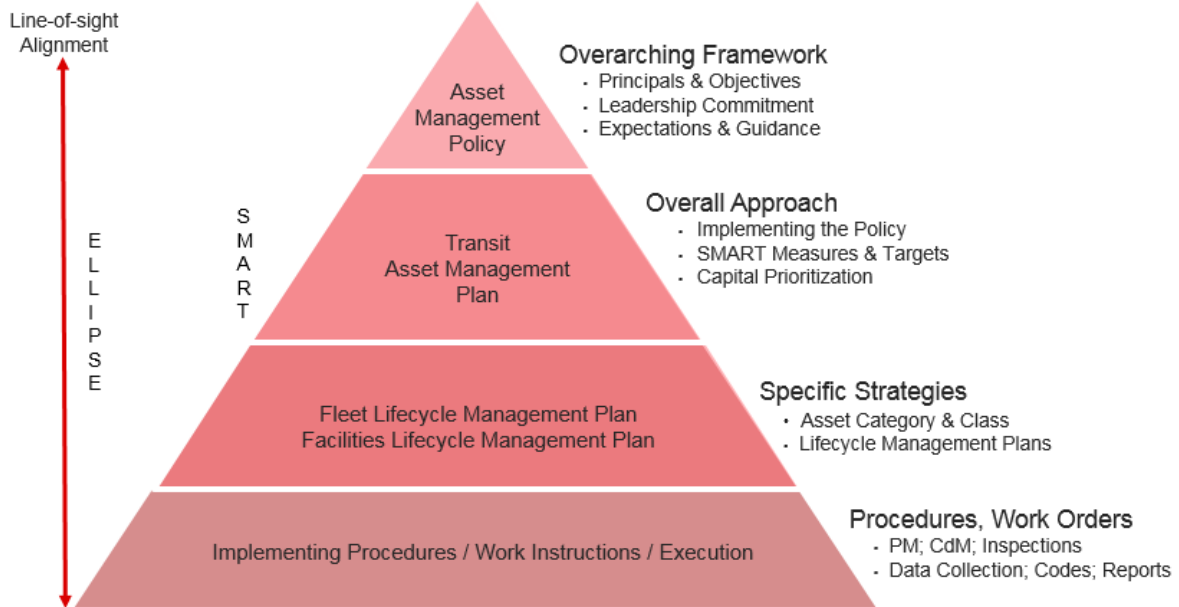
6.1 LIFECYCLE MANAGEMENT STRATEGIES

Transit Asset Management is a strategic approach in managing fleet and facilities; to optimize their performance; their useful life; and to minimize the total cost of ownership. TARC has worked with ABB Asset Management Consultants to development our asset management framework. TARC will also be developing the necessary implementing procedures along with the Fleet and Facilities MP that defines the strategies. This framework will be used to monitor and manage assets to achieve and maintain a state of good repair, improve safety and increase reliability and performance as shown in Figure 6-2 below.

FIGURE 6-2 – ASSET LIFECYCLE MANAGEMENT FRAMEWORK
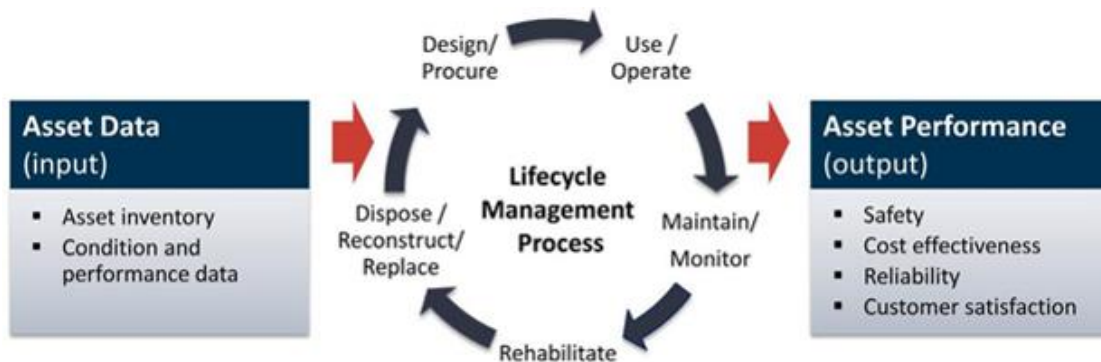
6.1.1   FLEET - LIFECYCLE MAINTENANCE PLAN (MP)

TARC will develop the Fleet Section of its MP during Year 2 (2019) of this TAM Plan. This Section of the MP will monitor and manage fleet assets to achieve and maintain a state of good repair, improve safety and increase reliability and performance and comply with the Americans with Disabilities Act (ADA). The purpose of the Fleet MP is to provide an overview of the Department's budget, structure, asset management, and maintenance programs.

For all operating revenue and non-revenue fleet assets, the Fleet MP will address:

- Asset Inventory (A-00, A-30, R-20)
- Condition Assessment and Performance Measures
- Condition Reporting
- Organization Structure
- Fiscal Budget
- Replacement Schedule
- Maintenance Program Structure
- Training
- Vehicle Acceptance
- Decommissioning
- PM Tasks, Inspections and Cleanliness Activities
- EAM and Work Control
- Warranty Program
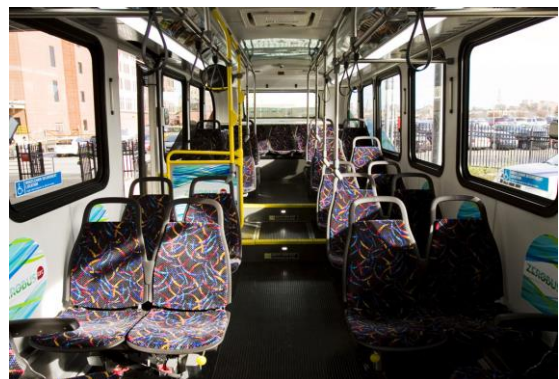
- Capital Improvement Program

The existing activities that apply to the Fleet are already captured in the Ellipse software. The scheduled preventative maintenance activities are based on OEM recommendations and performance history of the assets. Figure 6-3 below is a sample of the Maintenance Scheduled Tasks (MSTs) for a single Bus.

FIGURE 6-3 MAINTENENACE SCHEDULE TASKS SAMPLE

6.1.2   FACILITIES - LIFECYCLE MAINTENANCE PLAN (MP)

TARC will also develop the Facilities Section of its MP during Year 2 (2019) of this TAM Plan. This MP will monitor and manage facility assets to achieve and maintain a state of good repair, improve safety and increase reliability and performance. The purpose of the Facilities MP is to provide an overview of the Department's budget, structure, asset management, and maintenance programs. For all operations and support facilities, the Facilities MP will address:

- Asset Inventory (A-00, A-10, A-20)
- Condition Assessment and Performance Measures
- Condition Reporting
- Organization Structure
- Fiscal Budget
- Training
- Maintenance Program Structure
- PM Tasks , Inspections and Cleanliness Activities
- Regulatory Compliance and Cleanliness
- Critical Equipment Inventory
- EAM and Work Control
- Warranty Program
- Capital Improvement Program
  - Improvement Cost Estimates
  - State of Good Repair Needs

7. INVESTMENT PRIORITIZATION AND FUNDING

> **The TAM Rule describes the specific requirements for investment prioritization.**
>
> Reference: 49 CFR Part 625 Subpart C Section 625.33 "(a) A TAM Plan must include an investment prioritization that identifies a provider's programs and projects to improve or manage over the TAM Plan horizon period the state of good repair of capital assets for which the provider has direct capital responsibility. (b) A provider must rank projects to improve or manage the state of good repair of capital assets in order of priority and anticipated project year. (c) A provider's project rankings must be consistent with its TAM policy and strategies. (d) When developing an investment prioritization, a provider must give due consideration to those state of good repair projects to improve that pose an identified unacceptable safety risk when developing its investment prioritization. (e) When developing an investment prioritization, a provider must take into consideration its estimation of funding levels from all available sources that it reasonably expects will be available in each fiscal year during the TAM Plan horizon period. (f) When developing its investment prioritization, a provider must take into consideration requirements under 49 CFR 37.161 and 37.163 concerning maintenance of accessible features and the requirements under 49 CFR 37.43 concerning alteration of transportation facilities."

This chapter identifies and highlights TARCs capital and operational budget needs, the process used to prioritize investments, and the anticipated impact on current and future staffing resources, based on TARCs organizational goals, asset management strategies, core principles and processes, and annual updates to its planned Long-Term Planning (10-year) approach.

7.1   PROCESS OVERVIEW

TARC, as part of developing their investment priorities, accounts for various factors that include revenue trends, federal and state law, level-of-service provided and public input. Over the next 4 years, TARC will utilize asset management processes to optimize funds for asset inventory, to help achieve and maintain a state of good repair. TARCs priorities are focused on balancing investment in preservation of existing assets, with investment in new technology, safety and training.

TARC currently adopts a yearly operating and capital budget. The capital budget for year 2019 has focused on improving public transportation, with an emphasis on professional development and enhancing the customer experience, with projects such as new electronic fare collection system, the region's first BRT light route, and other major upgrades.

TARC's capital budget includes both capital and operating funds. TARC's capital budget funds the planning, design, acquisition, maintenance and rehabilitation of all assets subject to this TAM Plan. The operating budget funds the use of those same assets, including the staff needed to perform those functions.

Currently, TARC's Grants & Capital Programs office is central to its CIP programming process. The Director of this office works in conjunction with departmental leaders of Maintenance, Finance, Transportation, Purchasing, Paratransit and Planning, to develop the fiscal requirements. The basic process for assembling a multi-year CIP is shown below in Figure 7-1.

FIGURE 7-1 – CAPITAL IMPROVEMENT PLANNING PROCESS
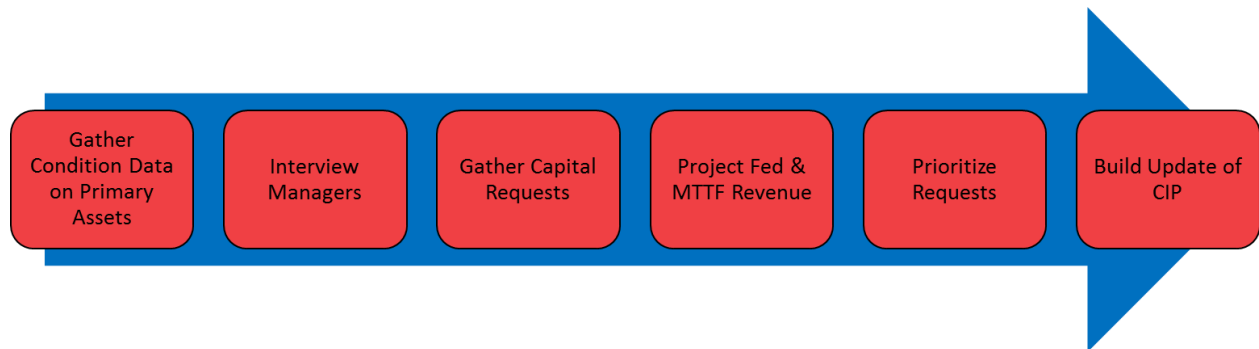
The capital planning and prioritization process will become more data driven with the implementation of this multi-year CIP plan. It will begin with an understanding of the asset inventory, by analyzing the asset inventory and condition assessment, so that asset programming can be based off an updated set of data. This inventory and condition data gives the department leaders a clear picture for their requirements and helps them in the next step for the creation of project requests. The collated project requests help Grants & Capital Programs office to develop the capital funding projections for the span of the years to be programmed.

The next step in this process is the prioritization of the projects. Currently, prioritization is more based on the most urgent and immediate needs of the agency. Some projects are prioritized simply because their source of funding is earmarked by the funder, typically the United States Congress. In order to prioritize the remaining programmable funds, age and condition of the fixed route and paratransit fleets is examined. Inputs from Maintenance managers on other assets are gathered on their condition. Additionally, Department Directors submit requests for their equipment needs. However, revenue fleet replacement is always the priority. The CIP list is then developed and presented to the Executive Director for finalization in the budget for the fiscal year. For the entire CIP, funding availability limits the requests than can be accommodated, and the scope of the various funding sources also limit what projects can be linked to what funds. This preliminary CIP is approved by the Executive Director. TARC's annual Capital Budget is based on the CIP. The Capital Budget must be approved by the Executive Director, TARC's Board of Directors and finally, the Louisville Metro Council before it can be acted upon.

In the new CIP process, in addition to the steps listed currently undertaken, a qualitative and quantitative prioritization of projects will be carried out based on CIP prioritization categories as covered in Section 7.2.

7.2   CAPITAL INVESTMENT PRIORITIZATION

TARC uses an existing capital project prioritization process which considers asset criticality, condition or age along with other factors for investment categorization discussed in above section 7.1.

The recommended asset renewals, maintenance and operations projects/programs have been developed on an 'asset needs' basis, applying predominant drivers of renewals investment for each asset class:

- Current condition

TARC schedules facility condition assessments for significant assets at intervals appropriate to the asset type. TARC uses FTA's Transit Economic Requirements Model (TERM) scale for condition assessment with TERM scale ranges from (1) Poor to (5) Excellent.

- Rate of deterioration

TARC currently uses FTA's Useful Life Benchmark (ULBs) to determine the rate of deterioration.

TARC plans to roll out a comprehensive risk-based approach to assess and analyze the rate of deterioration of its assets, in the future.

- Renewals time period

TARC currently uses FTA's TERM scale and Useful Life Benchmark (ULBs) which guides the asset replacement.

TARC plans to roll out a risk-based approach towards asset replacement which will be part of the capital prioritization process for all assets in the future.

TARC's Grants & Capital Programs office requests capital needs from each department and uses the factors discussed above for their prioritization. Project requests are created by division staff based on their understanding of priority and requirements. TARC capital needs are not identified using any lifecycle management planning, "total cost of ownership" considerations, or risk considerations. Additionally, risk is not consistently quantified and used to support capital programming decisions.

In future, TARC staff will initiate capital requests through submission of the project request form shown in Figure 7-2. Project requests will be created by division staff based on their understanding of priority and requirements. The asset inventory and condition assessment will be used so that project requests will be based on the asset age or condition (as applicable to that asset class) for rehabilitation or replacement of the assets that are indicated within the

CIP period. Requests can cover individual assets, or groups of assets, and include a cost estimate, sponsoring department and project manager information, and any relevant documentation.

Table 7-1 lists the prioritization criteria with the highest priority item at the top.

TABLE 7-1 – CIP PRIORITIZATION CATEGORIES

Priority	Description
Public and employee safety	Requests that concern safety or security of critical assets. This applies to the safety of both riders and employees.
Reliable service delivery	Requests that impact the reliability and timeliness of our service.
Sustainability	Requests that have a positive impact on TARC's sustainability, or improve the performance of or the useful life of TARC assets. For instance, requests that move TARC assets further toward a state of good repair.
Responsible stewardship of public funds	Requests that can show a quantifiable, economic benefit from their implementation. These requests are generally not necessary from a maintenance standpoint but could save TARC money in an identifiable and specific way.

All project requests must go through an approval process before they are programmed. A project request is initiated using the Ellipse Work Request workflow. This workflow goes through the following approval steps:

(1) Grants and Capital Programs Director

(2) Executive Director.

(3) Requests approved at the Executive level are then included in the annual capital budget.

Those requests that are incorporated into the capital budget will be programmed. Finally, the Grants and Capital Programs Department creates a project from the request and obligates the funding. An example of the Project Request Form is shown below in Figure 7-2.

**FIGURE 7-2 – CAPITAL PROJECT REQUEST FORM**

7.3 CAPITAL INVESTMENT PLANNING & BUDGET

TARC's operating budget funds service delivery and maintenance, including employee wages, spare parts, consumables, and a variety of support services used throughout the organization. This also includes payments to third-party contractors responsible for consulting and maintenance activities.

The operating budget is currently approved on a yearly basis through the Board of Directors. TARC's FY 2019 operating budget is $68 million, with transportation department expenses being the largest portion (44%) of the budget. Figure 7-3 shows the composition of FY 2019 estimated department operating budget.

FIGURE 7-3 – FY 2019 ESTIMATED OPERATING EXPENSE BUDGET

BUDGETED EXPENSES FY 2019
by
DEPARTMENT
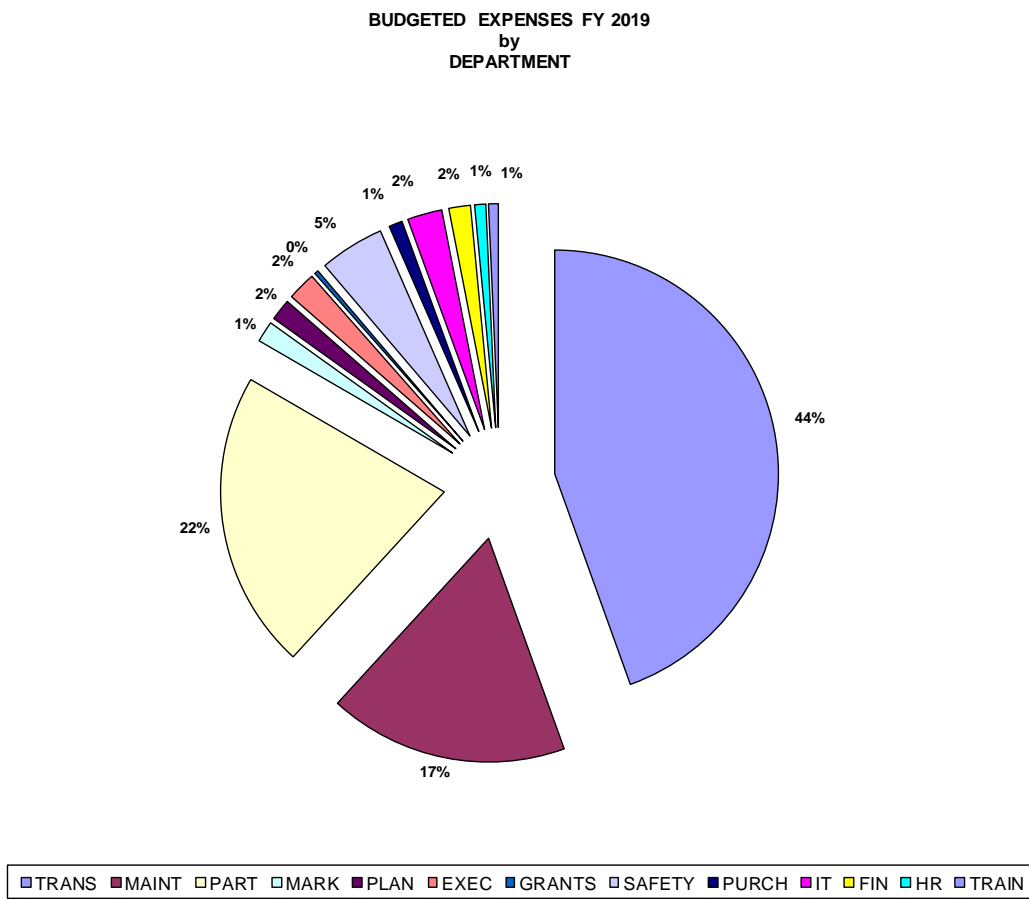
In addition to the operating budget, the Board also approves a capital budget for the fiscal year. The capital budget for the year includes the projected grant and District Capital spending for the projects included in the CIP.

Figure 7-4 below shows the current capital budget and projection.

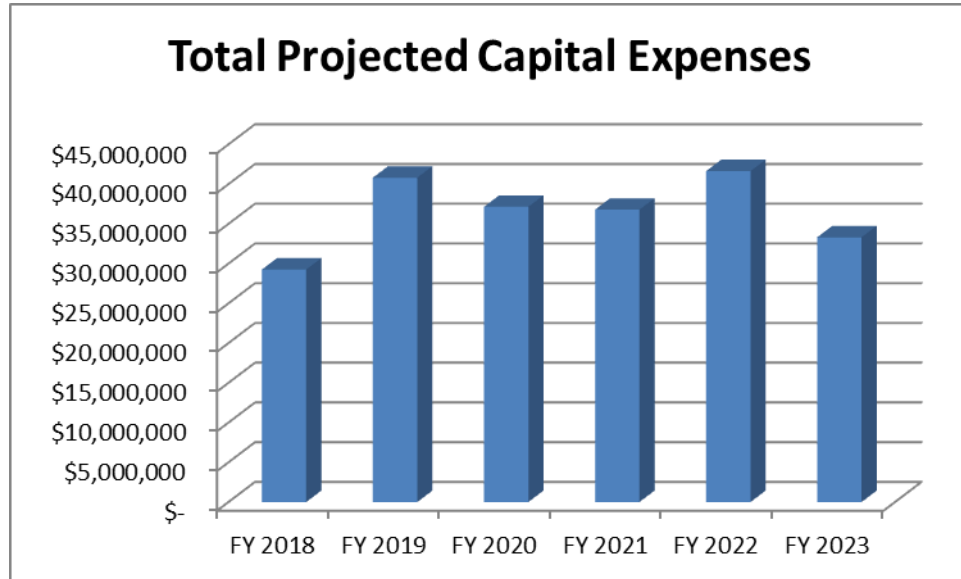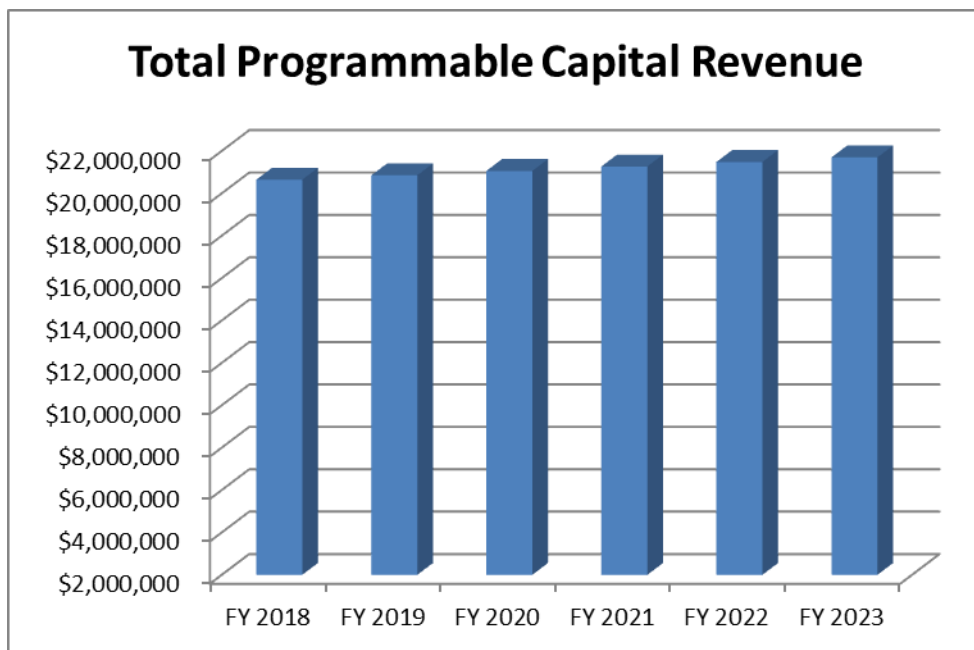**FIGURE 7-4 – CAPITAL PROGRAM PROJECTED EXPENSES**

Figure 7-5 details the fund sources for five-year CIP.

FIGURE 7-5 – FIVE YEAR CIP FUNDING SOURCES

8. ASSET MANAGEMENT ENABLERS

> **The TAM Rule requires that TAM Plan provide a description of key TAM activities**.
>
> Reference: 49 CFR Part 625 Subpart C Section 625.25(b) "Transit asset management plan elements … (8) A summary or list of the resources, including personnel, that a provider needs to develop and carry out the TAM plan "A description of key TAM activities that a provider intends to engage in over the TAM plan horizon period"

A comprehensive Asset Management Application system is fundamental to any sophisticated Asset Management System. However, any mature system must also contain and be supported by associated policies, processes, cultural maturity and the human effort.

"Asset management" encompasses everything an organization does to derive value from its assets. An "asset management system" refers to a strategic set of systematic and integrated business processes for operating, maintaining and improving physical assets, with a focus on both engineering and economic analysis of high-quality information. This information (data) is used to define maintenance strategies that will achieve and sustain the desired state of good repair, as defined by the Final Rule. The result is a balance between cost, risk and performance over the lifecycle of the assets.

An asset management system does not happen overnight, nor can it happen in a vacuum. It cannot be the responsibility of a single department or two; it is an agency-wide effort that must responsibly flow down from top-level business objectives. This will often require more than just process changes – it may require cultural changes as well.

8.1 ORGANIZATION, RESOURCE PLANNING AND PRIORITIZATION

ASSET MANAGEMENT WITHIN THE ORGANIZATION

TARC's various departments work in collaboration with outside entities like City of Louisville Metro, other governmental entities and business development districts to provide efficient transit service "on the street". Accordingly, Asset Management cannot be the responsibility of a single department or two; it is an agency-wide effort that must responsibly flow down from top-level business objectives. To maximize the benefit of their efforts, TAM must be coordinated across the agency through a comprehensive planning and change management process which may also need to address cultural changes within the organization. The Grants & Capital Programs Department is currently spearheading this cross-departmental coordination on behalf of the agency.

As stated above, all District employees are asset owners. The overall organization chart is shown in Figure 8-2. The TAM Core Team is shown in Figure 8-1 and, reflects the roles and responsibilities of each of the stakeholders as it relates to implementation of TAM practices district-wide. A detailed description is included in Appendix B of this TAM Plan.

FIGURE 8-1 – TAM CORE TEAM
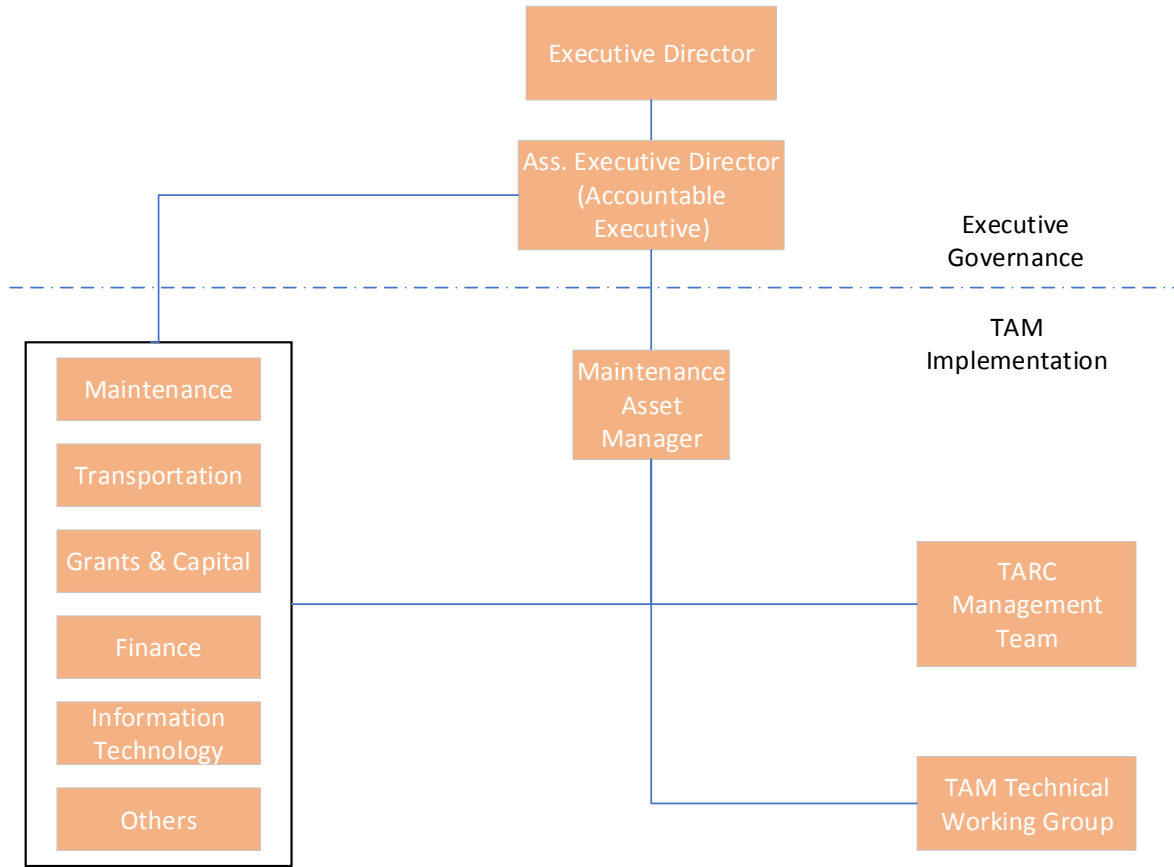
FIGURE 8-2 – TARC ORGANIZATION CHART
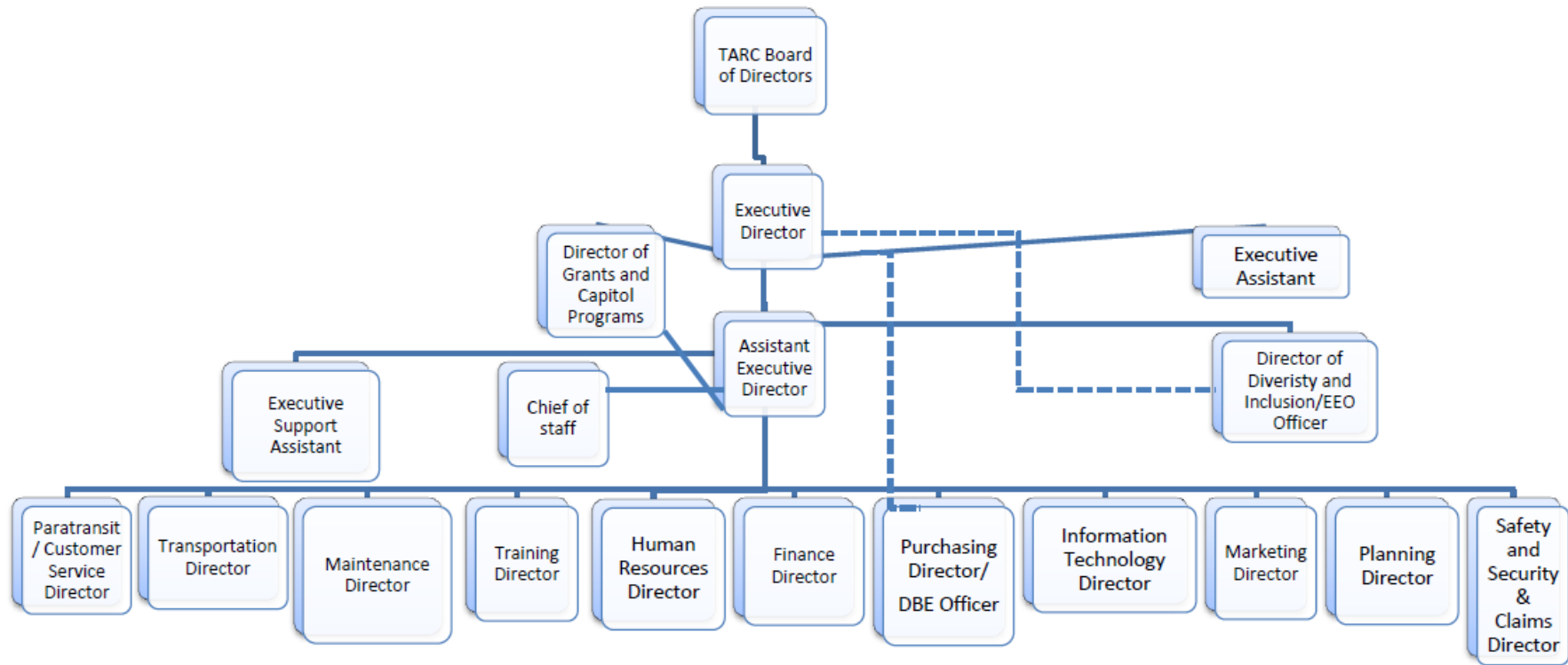
8.2   CORE BUSINESS PROCESSES

> **The TAM Rule requires key TAM activities be included in the TAM Plan.**
>
> Reference: 49 CFR Part 625 Subpart C Section 625.25(b) "Transit asset management plan elements … (7) A description of key TAM activities that a provider intends to engage in over the TAM plan horizon period"

TAM PLANNING PROCESS

TARC has initiated their TAM plan development, in compliance with FTA Report No. 0098 (2016).

Before initiating the TAM planning process, the consultant team conducted a Maturity Assessment and Gap Analysis, to compare findings from in-depth interviews against transit asset management industry best practice. Interviews were conducted with most members of the TARC's Asset Management Stakeholder Team. Those Assessment Findings are reflected in Figure 8-3 – Maturity Assessment Results

This Gap Analysis also served to identify the agency's strengths and weaknesses across all areas of business, focusing the planning process on business areas with the greatest need for improvement. The top three strengths and weaknesses can be found in Figure 8-3 and Table 8-1.

FIGURE 8-3 – MATURITY ASSESSMENT RESULTS - ENABLERS
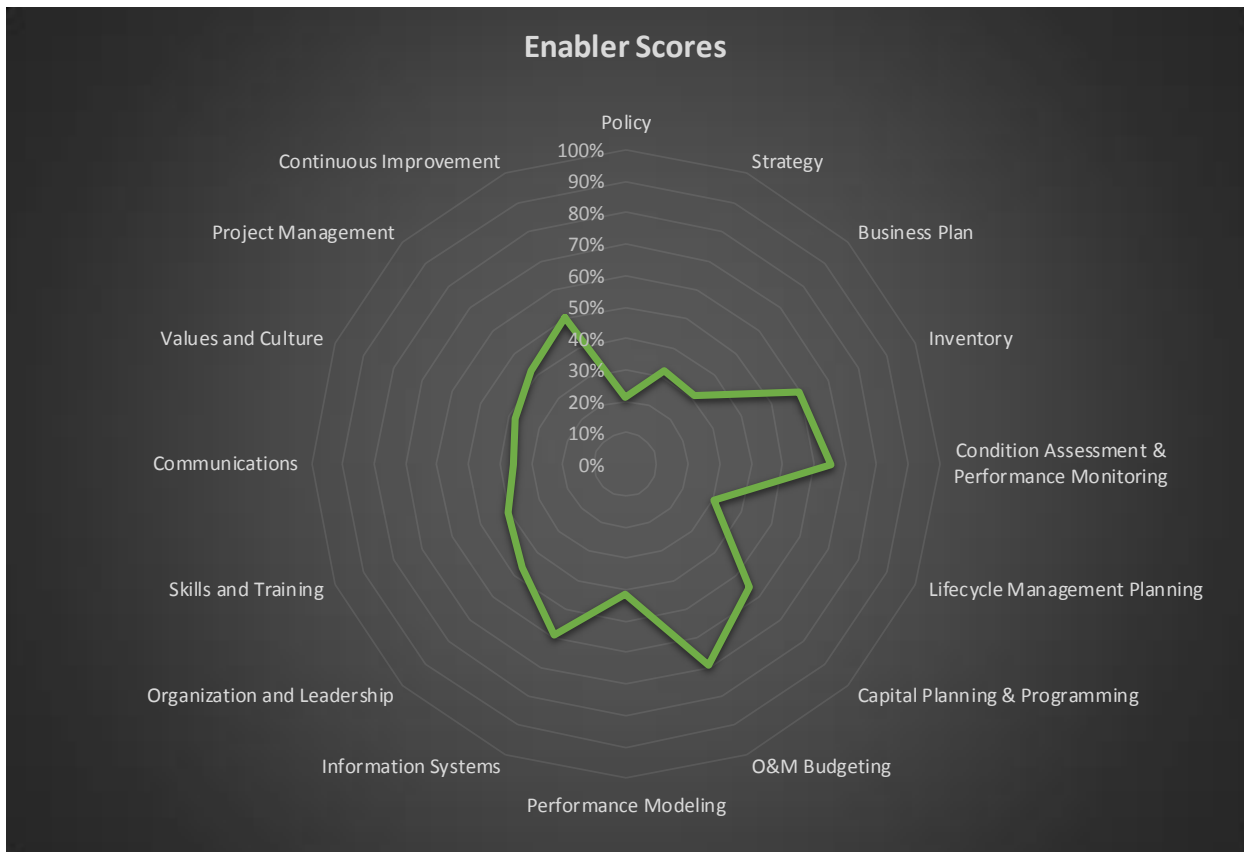
TABLE 8-1 – TOP THREE STRENGTHS AND WEAKNESSESSBASED ON MATURITY ASSESSMENT

Biggest Strengths	Biggest Weaknesses
Information Systems	Skills and Training
Organization and Leadership	Communication
Continuous Improvement	Performance Modeling

TARC has initiated a Top-down and Bottom-up approach towards embracing and implementing this TAM as shown in Figure 8-4

FIGURE 8-4 –COMBINED TOP-DOWN AND BOTTOM-UP TAM IMPLEMENTATION APPROACH

This TAM plan improves performance in the near term while making changes that will institutionalize asset management and build a foundation for continual improvement and maturity over the long term. The Asset Management Improvement Program is summarized in Figure 8-5. TARC's TAM plan is linked to a hierarchy of documentation, starting with the development of TAM Vision elements, reconciliation of assets in a single digitized platform and individual Lifecycle Management Plans (LMPs) for each Asset Owner within TARC. These LMPs will guide Asset Owners to deliver the objectives and strategies defined within this TAM plan at an asset class level, establishing "line of sight" from the front line of the agency to the executive suite.

FIGURE 8-5 – TAM IMPEMENTATION OVERVIEW
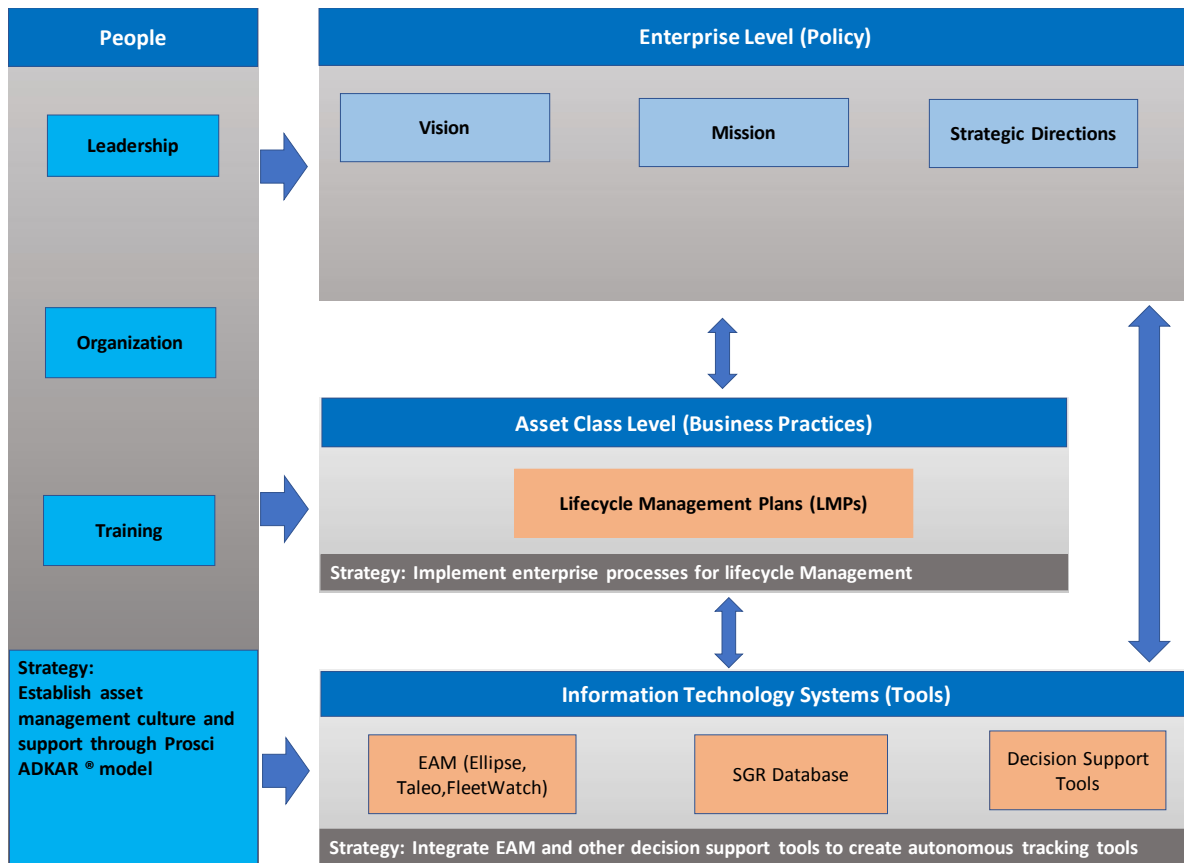
DATA/INVENTORY MANAGEMENT AND QUALITY CONTROL

TARC will use ABB's Ability™ Ellipse® EAM system as the repository for Transit Asset Management inventory, including FTA mandated asset classes, to maintain its rolling stock asset inventories and associated procedures for inventory updates and quality assurance. This inventory is updated constantly, with efforts to continually improve the quality of data. Additionally, TARC uses Taleo-DLT/Oracle Software (HR), FleetWatch (IT/Operations), Trapeze FX, PASS, OPS, CAD/AVL and Bonfire Solicitation Software for the organization.

TARC has recently updated Ability™ Ellipse® EAM system towards integrating existing data systems to enhance business analysis capabilities, replace obsolete systems, or create new data systems as needed. This will provide TARC with semi-automated performance measure tracking, and reduce the administrative burden associated with performance reporting, as well as decrease the incidence of human error.

PROGRAM CONTROL AND PROJECT DELIVERY

TARC's Grants & Capital Programs Department coordinates the development of this TAM plan and all associated requirements towards enhancement of this TAM plan. Each

participating department is responsible for implementation of these plans and will provide input into TAM plan revision process after necessary lifecycle management plan updates.

The analysis of asset inventories and TAM strategies identified in this TAM plan serve to guide the development of TARC's annual capital and operating budgets, as shown in Figure 8-6.

FIGURE 8-6 – ANNUAL TAM PLAN DEVELOPMENT PROCESS
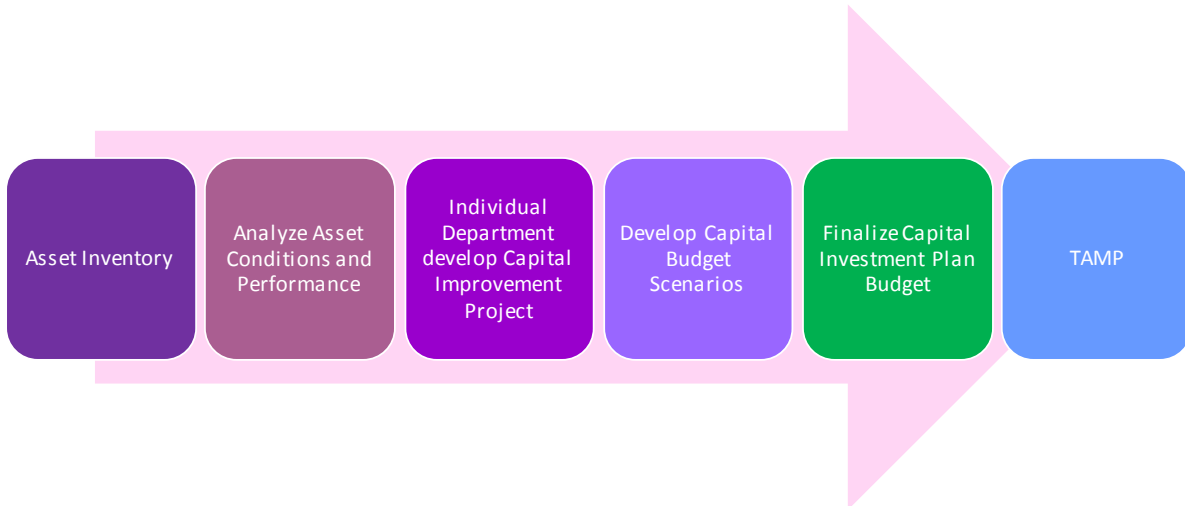
TRAINING AND WORKFORCE DEVELOPMENT

Currently, TAM awareness is limited to TARC's core TAM team. TARC recognizes this awareness shortfall and intends to disseminate this to the entire organization by providing all employees with formal training (see Appendix B) on new policies, procedures, and tools as they are developed through the TAM program. Additionally, TARC's TAM Advisory Group (TAG) and Technical Working Group (TWG) will continually assess when training is appropriate as new changes are made to the TAM program and provide training opportunities accordingly.

8.2.1 ORGANIZATIONAL CHANGE MANAGEMENT

This TAM plan is designed to drive a systematic and technical approach towards improving efficiencies around TARC. However, organizational and institutional changes in asset management will likely present greater challenges than changes in technical or analytic capabilities. This approach will require a great deal of implementation support to ensure that TAM benefits are realized. Based on the Prosci CMROI model, "The more dependent a project's benefits are on adoption and usage, the larger contribution change management makes". Accordingly, a strong change management approach, based on an adaptation of the Prosci ADKAR® model, will be employed through the stages depicted in Figure 8-7.

FIGURE 8-7 – CHANGE MANAGEMENT APPROACH AND STAGES

Awareness	Awareness includes explaining to employees about TAM policies, principles and structures and how it integrates with the organization goals. Employees must me made aware of their roles and responsibilities and take care of their reaction "How soon will this happen and how will this impact me?"
Desire	TARC must build the desire of employees to adaptation and implementation of asset management activities through identification of key stakeholders to disseminate the necessary information to all the employees
Knowledge	Employees must receive sufficient information regarding asset management implementation and how it will affect them on a daily basis. TARC must identify the need to provide asset management training to all employees on an annual basis
Ability	Knowing how to perform in the future changed state and having the ability to actually perform in the future changed state are very different. To bridge the knowledge to ability gap, TARC must identify training programs for coaching the employees and provide an environment to practice where they can make mistakes and ask questions
Reinforcement	TARC's TAM program is subject to an annual review and will be continually improved over time. Communication and support efforts will be continually reinforced as well to accommodate for changes to the TAM program and ensure that new staff understand their role in the TAM system.

TAM changes will be communicated to all external and internal stakeholders through each stakeholder group's champion. TAM changes will always aim to establish "line of sight"; changes will be communicated in a way that enables the entire team to understand how the change will ultimately enhance TARC's ability to meet its TAM Objectives.

8.3 CONTINUAL IMPROVEMENT

> **The TAM Rule requires an outline for continual improvement.**
>
> Reference: 49 CFR Part 625 Subpart C Section 625.25(b)(6) and (9) "Transit asset management plan elements must include … (9) an outline of how a provider will monitor, update, and evaluate, as needed, its TAM plan and related business practices, to ensure the continuous improvement of its TAM practices."

CONTINUOUS IMPROVEMENT

This TAM plan will be reviewed and revised, as necessary, on an annual basis. The revisions will come from the TAM Advisory Group and TAM Technical Working group with inputs from various internal and external stakeholders. Executive Governance (Leadership Team) of TARC will provide input for any changes or proposed federal legislation. All inputs will be coordinated annually through internal meetings. External stakeholder input will be through a

variety of means, such as customer satisfaction surveys and vendor surveys. TARC will aim towards improving asset performance, risk reduction, and agency cost savings with each revision of the TAM plan.

CAPABILITY ASSESSMENTS

TARC, as mentioned above, will aim to improve the value of its asset management system towards developing a mature asset management organization. Implementation Strategy in Appendix C provides a template for ACT to periodically assess the maturity of its asset management system, and track progress accordingly.

8.4   TECHNOLOGY

The TAM Rule requires that TAM Plans describe decision support tools.

Reference: 49 CFR Part 625 Subpart C Section 625.25(b) "Transit asset management plan elements … (3) A description of analytical processes or decision-support tools that a provider uses to estimate capital investment needs over time and develop its investment prioritization"

Information technology is a critical asset management enabler. Contemporary best practice in asset management, either at the enterprise level or during any aspect of lifecycle management for individual asset class - is data driven. Converting massive volumes of data into information that can be used for decision making requires innovative and creative technologies.

TARC's Information Technology (IT) department provides and maintains technology tools that are primarily software-based. These tools are used to collect, process and manage critical information across the enterprise in support of TARC's business processes. The overall objective around technologies is to integrate the data from all of the sources and use that information to support TAM requirements as well as ongoing business processes and asset management maturity goals.

TARC's technology tools are primarily software-based including maintenance of asset inventory and ability to track performance measures. These products while in the process of being integrated to achieve the TAM objectives, TARC relies on creation of intermediary spreadsheets from each of the software system and email transfer data between existing software systems. TARC has plans to configure the Enterprise Asset Management (EAM) system which will integrate existing software products and dramatically increase the efficiency and quality of daily information management. Table 8-2 describes TARC's main technology tools used and the primary users of these tools.

TABLE 8-2 – TECHNOLOGY PRODUCTS USED THROUGHOUT TARC

TECHNOLOGY	DESCRIPTION / CONFIGURATION	OWNER(s) \ USER(s)
Ellipse	ABB's Ellipse is an integrated Enterprise Asset Management (EAM); Enterprise Resource Planning (ERP); Asset Performance Management (APM) system. Ellipse is used for maintaining data on all fleet, facilities and equipment to manage all aspects of asset and works management. Ellipse is also used to manage inventory of parts and requisitions. Ellipse is the source repository and will play key roles in meeting TAM requirements as follows: • Asset Inventory • Asset Condition Assessment • Analytics and Decision Support • Investment Prioritization and O&M Budgeting • Implementation Strategy • Evaluation and Continuous Improvement	IT / Maintenance, Transportation, Finance & Grants, Planning, Human Resources
Taleo-DLT / Oracle	Human Resources Software	Human Resources
FleetWatch (Planned Acquisition)	S&A Systems, Inc.'s FleetWatch provides real-time control and data acquisition for mileage capture, fuel and other fluids management, tank monitoring systems and fluids reconciliation.	IT / Transportation, Maintenance, Finance & Grants
Trapeze FX, PASS, OPS	Trapeze FX is the fixed route scheduling software. PASS is paratransit scheduling and dispatching software. These products provide planning, scheduling, operations, passenger information and analysis.	IT / Transportation, Maintenance, Finance & Grants
Trapeze Novus CAD/AVL	Trapeze Group's Computer Aided Dispatch /Automated Vehicle Location system connects vehicles with the back office scheduling and dispatching software. It automatically collects vital data used by dispatchers such as bus GPS locations, schedule adherence status, breakdowns and emergencies	IT, Transportation
Bonfire Solicitation	Contract Solicitation/Bidding	Purchasing

8.5   ASSET KNOWLEDGE AND INFORMATION

TARC has plans to develop the Fleet and Facilities Maintenance Plan to monitor and manage TARC's assets to achieve and maintain a state of good repair, improve safety, and increase reliability and performance. The purpose of the Fleet and Facilities Maintenance Plans are to provide detailed documentation on the Department's budget, structure, asset management, and maintenance programs and procedures. Asset management reports shall be developed to manage and monitor the revenue fleet service demands, cost effectiveness, and reliability. The Maintenance Department is transparent with its operational and Key Performance Indicator (KPI) statistics, and plan in future to beam these onto screens at important locations, for the edification of stakeholders.

9. TAM CONTINUOUS IMPROVEMENT PLAN

> **The TAM Rule requires an outline for continual improvement.**
>
> Reference: 49 CFR Part 625 Subpart C Section 625.25(b)(6) and (9) "Transit asset management plan elements must include … (9) an outline of how a provider will monitor, update, and evaluate, as needed, its TAM plan and related business practices, to ensure the continuous improvement of its TAM practices."
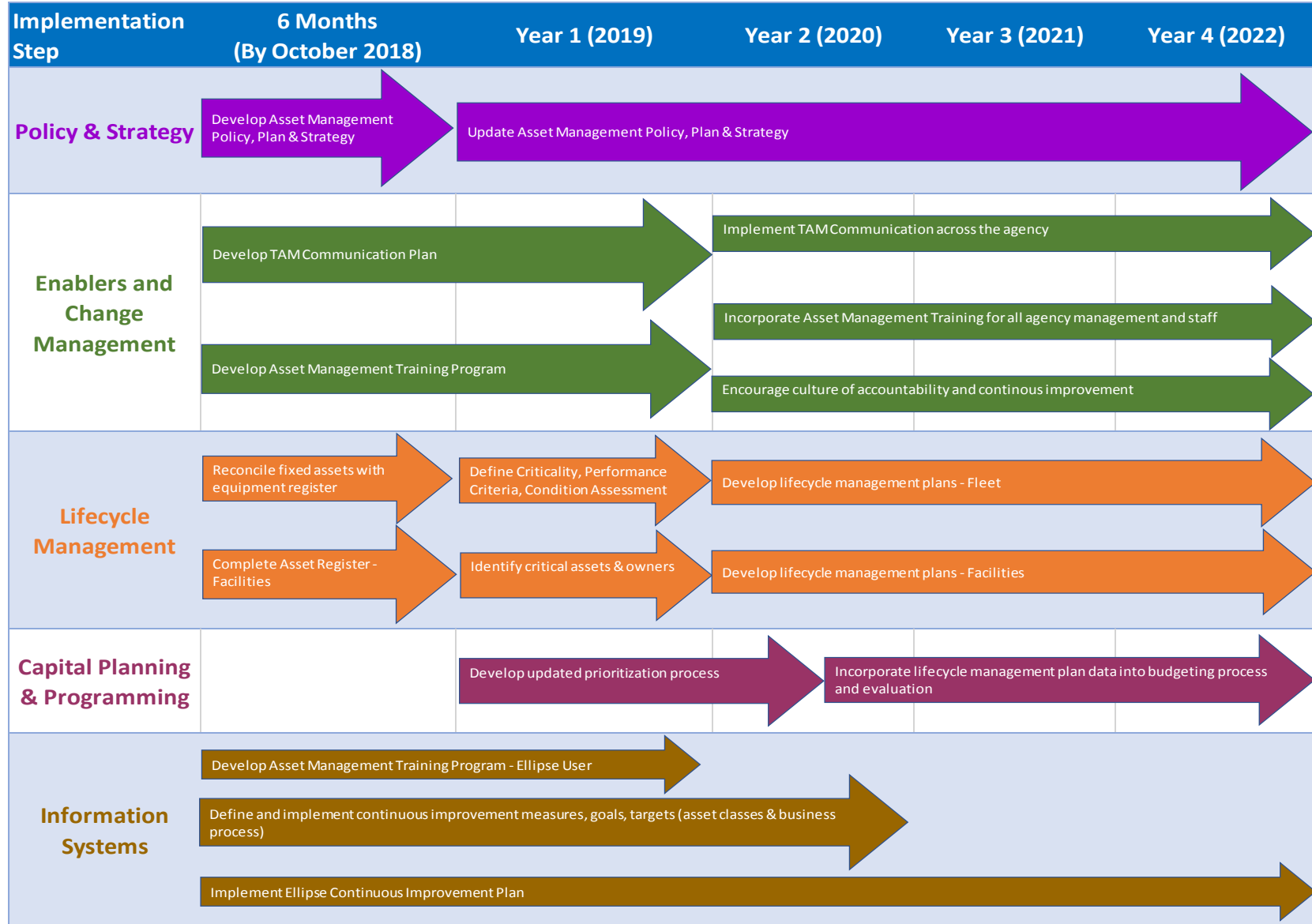>
> **The TAM Rule requires that TAM Plans provide the implementation strategy**
>
> Reference: 49 CFR Part 625 Subpart C Section 625.25(b) "Transit asset management plan elements … (6) a provider's TAM plan implementation strategy; (7) A description of key TAM activities that a provider intends to engage in over the TAM plan horizon period"

In compliance to FTA's Report No. 0098, ABB has worked with TARC to carry out a maturity assessment to establish their desired level of maturity across each of the 9 elements of the TAM framework. This assessment has identified several gaps that need to be addressed to achieve a heightened level of maturity. These 'gaps' identified during the maturity assessment should not be considered negatively, and should instead be approached as 'opportunities' for TARC's asset management improvement to maintain their system in a State of Good Repair given limited resources. An example will be making better use of integrated Enterprise Asset Management to link capital prioritization and budgeting process.

This maturity analysis helped TARC to develop its overall strategy towards implementation of Asset Management Program shown in Figure 9-1. This figure provides a road map to initiate asset management plan implementation within the first 4 years and beyond. It defines the overall implementation strategy for accomplishing asset management objectives and then details the organizational structure for implementation, including policy direction, governance, and accountabilities.

FIGURE 9-1 – TAM STRATEGY INITIATIVES

Implementation Step	6 Months (By October 2018)	Year 1 (2019)	Year 2 (2020)	Year 3 (2021)	Year 4 (2022)
Policy & Strategy	Develop Asset Management Policy, Plan & Strategy	Update Asset Management Policy, Plan & Strategy			
Enablers and Change Management	Develop TAM Communication Plan		Implement TAM Communication across the agency		
			Incorporate Asset Management Training for all agency management and staff		
	Develop Asset Management Training Program		Encourage culture of accountability and continous improvement		
Lifecycle Management	Reconcile fixed assets with equipment register	Define Criticality, Performance Criteria, Condition Assessment	Develop lifecycle management plans - Fleet		
	Complete Asset Register - Facilities	Identify critical assets & owners	Develop lifecycle management plans - Facilities		
Capital Planning & Programming		Develop updated prioritization process	Incorporate lifecycle management plan data into budgeting process and evaluation		
Information Systems	Develop Asset Management Training Program - Ellipse User				
	Define and implement continuous improvement measures, goals, targets (asset classes & business process)				
	Implement Ellipse Continuous Improvement Plan				

MEMORANDUM

J. Barry Barker, Executive Director
Transit Authority of River City
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Louisville, KY 40203
Phone: 502.561.5100
Fax: 502.213.3244
www.ridetarc.org

tarc

TO: **TARC Board of Directors**
           Cedric Merlin Powell, Chair

FROM: **J. Barry Barker**
           Executive Director

DATE: **July 24, 2018**

RE: **Resolution 2018-22 Transit Asset Management (TAM) Policy**

In 2016, the Federal Transit Administration (FTA) issued a final rule establishing a National Transit Asset Management (TAM) System in accordance with the Moving Ahead for Progress in the 21st Century Act (MAP-21). MAP-21 required that all Chapter 53 recipients and subrecipients develop a TAM plan defining its "strategic and systematic process of operating, maintaining, and improving public transportation capital assets effectively through the life cycle of such assets." This new requirement is closely aligned with FTA's State of Good Repair program, through which TARC has received several discretionary grant awards.

TARC is currently working with consultants from ABB, our Ellipse Enterprise Asset Management system provider, to develop a compliant TAM plan that is consistent with the functionality of Ellipse and supportive of TARC's efforts to maximize asset performance and minimize life cycle costs.

One of the nine elements of a TAM plan is a policy that provides executive level direction regarding expectations. Adoption of a TAM policy is an enabling step toward development of the overall plan. Following adoption of this policy, TARC and ABB will complete the TAM plan for submission to the Kentuckiana Regional Planning and Development Agency (KIPDA) and reference in the regional performance management plan.

The structure of the MAP-21 requirement and final rule reflect the influence of the international standard for asset management, referred to as ISO 55000. The transit community anticipates additional development of the requirement in parallel to the more detailed ISO format. Accordingly, development of TARC's TAM plan marks the initial stage of a larger long-term effort to develop the organizational capacity and data maturity necessary to support practices associated with ISO 55000 compliance.

I have attached a draft Transit Asset Management policy for your review and approval. Once approved, this policy will help to guide our internal decision-making.

If you have any questions, please call me at 561-5100.

Google maps

Resolution 2018-22

A resolution adopting the attached statement regarding TARC's Transit Asset Management (TAM) policy.

WHEREAS, TARC is required by Section 49 U.S.C. 5326, created by the Moving Ahead for Progress in the 21st Century (MAP-21) Act, to establish a Transit Asset Management plan; and

WHEREAS, TARC is classified as a Tier I agency, operating more than 100 buses in fixed route service; and

WHEREAS, it is in the best interest of TARC and its community for TARC to foster a culture of continuous improvement in asset management planning and performance; and

WHEREAS, adoption of the attached Transit Asset Management Policy Statement will help to guide our internal decision-making;

Now, therefore, be it resolved by the Board of Directors of the Transit Authority of River City that,

The attached statement regarding TARC's Transit Asset Management is adopted as official policy.

ADOPTED THIS 24th DAY OF JULY, 2018.

Cedric Merlin Powell
Chairman

TARC Transit Asset Management (TAM) Policy

Adopted: July 24, 2018
THIS POLICY SHALL BE REVIEWED ANNUALLY.

I. PURPOSE

In keeping with TARC's mission "to explore and implement transportation opportunities that enhance the social, economic and environmental well-being of the Greater Louisville community," TARC is committed to maintaining assets in a state of good repair to support safe, efficient, reliable public transportation.

This policy also expresses our intention to foster a culture of continuous improvement in asset management planning and performance.

This policy is specific to the management of TARC Assets that are included in TARC's Transit Asset Inventory.

This policy will be made accessible to all Board members, staff and members of the public.

This policy outlines TARC's overall asset management approach in a manner consistent with current federal regulations (49 U.S. Code § 5326) and sets the direction for establishing and following through with transit asset management strategies and plans that are achievable with available funds. This policy complies with the Federal Transit Administration (FTA) Transit Asset Management (TAM) Final Ruling on July 26, 2016.

II. POLICY

TARC's COMMITMENT

TARC is committed to

- The allocation of resources necessary to reach its asset management goals;
- Financial stewardship, transparency, and collaboration with our funding partners;
- Promoting a culture that supports optimal asset management across the organization;
- Focusing on high quality data-driven decision making to provide safe, reliable, sustainable service for the communities we serve;
- Supporting the timely implementation of projects and programs to maintain our assets in a State of Good Repair over their entire life; and
- Continually improving its asset management strategies and plans, including setting annual goals, objectives, and measures to monitor and improve performance.

TARC's TAM investment priorities are:

- Public and employee safety
- Reliable service delivery
- Sustainability
- Responsible stewardship of public funds

Date Effective: July 24, 2018   1   Effective Until: July 24, 2022
Revised

TARC Transit Asset Management (TAM) Policy

T A R C ' s TAM PLAN ELEMENTS

The FTA regulation defines TARC as a Tier I agency and, as such, requires TARC to implement a TAM Plan that includes the nine TAM Elements listed below.

1. Inventory of assets – A register of capital assets and information about those assets
2. Condition assessment – A rating of the asset's physical state
3. Decision support tool – Analytic process or tool to assist in capital asset investment prioritization needs
4. Prioritized list of investments – A prioritized list of projects or programs to manage or improve the State of Good Repair (SGR) of capital assets
5. TAM and SGR policy – Executive-level direction regarding expectations for transit asset management
6. Implementation strategy – Operational actions to achieve District TAM goals and policies
7. Key annual activities – Those activities that are critical to achieving goals
8. Identification of resources – List resources needed to carry out the TAM Plan
9. Evaluation plan – Monitor and update to support continuous TAM improvement

IV. AUTHORITY

A. Board Authority

TARC's Board of Directors has the authority to approve and amend TARC's TAM Policy.

B. Executive Director Authority

TARC's Executive Director or designee will have overall responsibility for overseeing the development of asset management plans and procedures, in cooperation with the team, and reporting to the Board on the status of asset management for TARC.

In accordance with this policy, implementation of the TAM Plan will be a shared responsibility for all departments.

V. ATTACHMENTS

A. Definitions

TARC Transit Asset Management (TAM) Policy

ATTACHMENTS

I. DEFINITIONS

"Asset Management" is a strategic and systematic process through which an organization procures, operates, maintains, rehabilitates, disposes of and replaces assets to manage their performance, risks, and costs over their lifecycle to provide safe, cost-effective, reliable service to current and future customers.

"Transit Asset Management Plan (TAM Plan)" means the Plan through which TARC will document its asset base, asset conditions, and State of Good Repair, asset management policy, TAM goals and objectives, governance structure for asset management, strategy for capital asset funding and prioritization, and key priorities for asset management.

"Transit Asset" as defined by the FTA, means both fixed long-life infrastructure assets (for example, facilities and electric bus charge stations) and equipment (bus, paratransit and non-revenue vehicles).

"State of Good Repair (SGR)" means a condition in which a capital asset is able to operate at a full level of performance. A capital asset is in a state of good repair when that asset:

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

"TAM Final Ruling" means a set of federal regulations that sets out minimum asset management practices for transit providers to bring all of the nation's transit assets into a state of good repair.

"Capital Improvement Plan (CIP)" means a short-range plan, usually four to ten years, which identifies capital projects and equipment purchases given fiscal constraints, provides a planning schedule, and identifies options for funding the plan.

"Tier I Agency" as defined by the FTA, means agencies that operate rail, or own more than 100 vehicles fixed-route modes, or with 101 vehicles or more in one non-fixed route mode.

APPENDIX B: CONTINUOUS IMPROVEMENT PLAN

Implementation Strategy 1:

Asset Management Plan – Provide agency-wide direction and leadership to increase TARC's asset management maturity

TARC Baseline:

Owner	Geoff Hobin, Director - Grants & Capital Programs Department
Scope	Develop a FTA – 0098 rule compliant asset management plan that provides TARC the necessary path for asset management maturity. This Asset Management Plan, when approved by the leadership team and board, will provide the direction for improving asset management practices and outcomes. TARC's asset management plan describes the people, processes, and technology applications required to achieve its asset management policy and goals. This asset management plan specifies activities, roles, responsibilities, and accountabilities for increasing the maturity of asset management practices. It can be used to communicate asset management goals and activities to internal and external stakeholders, and as an accountability mechanism.
Outcome	• A finalized Asset Management Plan, providing TARC with a "roadmap" for improved asset management practice, which will lead to improved asset outcomes • Top down and Bottom up approach; for line of sight asset management improvement accountability and implementation
Implementation Team Members	Director and Assistant Director of Maintenance, Maintenance Asset Manager, designees from Finance, IT, Marketing, Planning, Training and Transportation, Chief of Staff; Reports to Assistant Executive Director (TAM Plan Sponsor)
Estimated Duration	• Initial version will be complete in September 2018 • Annual update of the Plan will require on-going effort
Level of Impact	High
Implementing Steps	1. TARC leadership/Board adoption and long-term commitment 2. Create TAM Working Group, that will include cross-departmental SMEs that are critical TARC stakeholders 3. Identify gaps, develop plan to close the gaps, define governance, implementation accountabilities, and associated resource requirements

Owner	Geoff Hobin, Director - Grants & Capital Programs Department
	4. Communicate TAM Plan internally and to external stakeholders 5. TAM working group has oversight of Plan implementation and half-yearly implementation status update 6. Review and update TAM Plan as necessary
Dependencies	Dependent of leadership/board approval and adoption
Change Management	Leadership commitment and communication plan
Resource Requirements	Resource requirements and their time: • Initial coordination of the TAM working group • Core TAM members and supporting asset managers Coordination of dissemination of TAM requirements throughout the organization
Risks	• TAM working group and its leader do not have dedicated function or adequate direction; if TAM working group formation delayed, the implementation process will be slowed down • Without explicit and visible endorsement of TAM plan by leadership, its adoption may not be implemented effectively or in a timely way • Plan needs the commitment of resources to be implemented successfully TAM Plan needs clear change management and communication plan with targeted information at each asset class and organizational level
Mitigation Strategy	• TAM working group has the final responsibility of TAM plan development, implementation and modification as required. • TAM working group leader should communicate regularly with leadership to ensure continued support and buy-in • Communication of TAM efforts and results should be done at regular intervals to leadership and staff • TAM working group supports effective ways of implementing and communicating the TAM plan both to internal and external stakeholders • Most up-to-date version of the TAM plan is available in an accessible electronic location for all TARC staff

Implementation Strategy 2:

Asset Management Communication Plan – Develop agency-wide communication strategy that embraces top-down and bottom-up feedback

Implementing Action: Develop communication plan that provides for clear implementation of TAM plan and to receive constructive bottom-up feedback on the implementation actions at the enterprise and asset class levels

TARC Baseline:

Owner	Director of Marketing
Scope	• Develop and implement a communication and outreach plan to guide the implementation and dissemination of the TAM Program, and foster the transition towards a TAM focused organizational culture • Implement the communication plan to support effective communication between executive leadership, TAM working group and stakeholders (both internal and external), to support implementation and monitoring of the Plan, and to receive feedback for its update and adaptation • Ensure clear communication of leadership's long-term commitment towards implementation of asset management policy and strategies across all levels of the organization
Outcome	• Greater employee participation and engagement in implementation of TAM Plan • Structured communication process for regularly reporting on existing and new TAM plan actions, requirements, and progress to staff
Implementation Team Members	Assistant Executive Director (Sponsor), Director of Marketing and TAM working group
Estimated Duration	• Communication Plan development to be completed by year 2019 • Implementation of the Communication Plan from year 2020 and will be an on-going effort • Annual revision of the Communication Plan will be on-going effort
Level of Impact	Medium
Implementing Steps	• Evaluate the current systems of communication and identify any barriers that are preventing effective top-down direction and bottom-up feedback for current policies within the organization

Owner	Director of Marketing
	• Establishing a regular TAM-focused feature article in the TARC organizational newsletter • Establishing Email communication of TAM updates, general information, circulation of documentation for review or approval and arrangement of meetings • Conducting team meetings towards communication of strategy development, task level agendas, action item progress, schedule updates, performance review, general feedback and identification of issues which may affect the implementation of a TAM Program
Dependencies	• Leadership adoption of TAM plan • Understanding key business processes
Change Management	• TAM working group provides suitable responsive measures to facilitate positive change and avoid substantial delays to implementation
Resource Requirements	Resource requirements and their time: • Core TAM members and supporting asset managers • New tools (feedback forms, increasing frequency of newsletter etc.) to support communication
Risks	• Lack of structured communication process • Lack of conformance to communication process • Lack of staff involvement of adherence to communication guidelines • Lack of acceptance of bottom-up feedback process
Mitigation Strategy	• Utilize the existing effective communication processes and discard the non-effective processes • TAM working group to work with marketing group to revise existing and develop structured communication processes • Communication process should be simple and delivered to target audience • TAM working group and leadership to respond to feedback received from stakeholders • Communication process should be included as part of training and during onboarding process

Implementation Strategy 3:

Asset Management Training – Develop agency-wide asset management training

Implementing Action: Develop and impart training on asset management both at enterprise and asset level to staff to enhance their asset management competencies and lifecycle management capabilities.

TARC Baseline:

Owner	Director of Training
Scope	• Develop enterprise-level asset management training • Develop asset class-level trainings to cover critical skills related to lifecycle management activities (plan, design/procurement, maintenance and rehabilitation, engineering and analysis, etc.) where they exist • Training curriculum should include monitoring performance and effectiveness
Outcome	• Greater efficiency of operation • Clearly defined long term maintenance and capital works budgets • Reduction in asset failures and increased Return on Investment • Transparent budget justification, identification of synergies across departmental groups • Reduction of unplanned impacts to customers
Implementation Team Members	TAM working group + Human Resource Department + Training Department
Estimated Duration	• Training Plan and curriculum development to be completed by year 2019 • Implementation of the training from year 2020 and will be an on-going effort • Annual revision of the training curriculum will be on-going effort
Level of Impact	High
Implementing Steps	• Implement skills assessment measures for all the staff • Develop new or modify existing training programs to become more asset-specific to address critical skill gaps for critical maintenance skills, lifecycle activities • Design training modules such that critical skillsets are imparted in training classes while non-critical skillsets can be gained over digital training platforms.

Owner	Director of Training
	• Develop an enterprise-level introductory training course on Asset Management • Training programs should be linked with career development/advancement to specific and verifiable skill acquisition requirements • Monitor training effectiveness w.r.t skill acquisition, impact on key asset management performance metrics
Dependencies	• Leadership adoption of TAM plan • Understanding and implementing skill gaps assessment
Change Management	• Leadership's long term financial commitment to training • Review of the training programs by TAM working group • Transparency in career development requirements for all staff • Training program feed-back for improvement of existing training modules
Resource Requirements	Resource requirements and their time: • Core TAM working group + HR team + Training team • Division Asset Managers to review skills gap within their divisions • Trainee attendance and execution • External consultants support for development of training modules
Risks	• Lack of resources for proper skill gap assessment within each asset level • Lack of capability to develop high quality, targeted asset-specific training programs • Lack of oversight to ensure training execution and quality • Lack of resources to update training in a timely manner
Mitigation Strategy	• Leadership/TAM working group should increase awareness of the need for technical training • TAM working group + HR + Training team should review training effectiveness for all asset class • TAM working group + HR + Training team should monitor availability of trainings for all staff across the organization • TAM working group + HR + Training team should hire external consultants to help in developing high quality training programs

Implementation Strategy 4:

Lifecycle Management Plans – Develop lifecycle management plans for all asset classes

Implementing Action: Develop Lifecycle Management Plans (LMP) for improvement of managing costs, risks, and performance to achieve higher cost savings, service reliability and customer satisfaction

TARC Baseline:

Owner	Director of Maintenance
Scope	• Establish standard framework and business processes for developing Fleet LMP and Facilities LMP. • Identify data, records and standards to track lifecycle costs across various asset classes • Identify key asset owners, their roles and responsibilities for lifecycle management activities
Outcome	• Fleet and Facilities division will have a more effective lifecycle-based Reliability Centered Maintenance (RCM) programs in place with well-documented procedures and preventive maintenance and overhaul planning processes • All asset class will have a well-defined and consistent approach for condition inspection and performance measurement • All asset class will have a digital document repository that supports the asset management strategy including transparent budgeting and capital investment prioritization
Implementation Team Members	Director, Assistant Director of Maintenance, Maintenance Supervisors, Maintenance Asset Management
Estimated Duration	• Reconciliation of fixed assets with equipment register to be completed by October 2018 • Complete facilities asset registers to be completed by October 2018 • Complete criticality, performance criteria, condition assessment by year 2019 • Identify critical assets and owners by year 2019 • Development of Fleet and Facilities LMPs will start year 2020 and complete by year 2022. • Annual revision of Fleet and Facilities LMPs will be on-going effort
Level of Impact	Medium
Implementing Steps	• Identify key asset owners and define their responsibilities for development of lifecycle management framework

Owner	Director of Maintenance
	• Key asset owners job descriptions should be revised to include responsibilities for lifecycle management of assets • Identify critical asset classes and develop its LMPs at the beginning for improvement based on asset criticality • Reconcile fixed assets with equipment register • Complete facilities asset registers • Develop an overall Fleet LMPs and Facilities LMPs • Develop standard documentation to monitor lifecycle management planning and processes consistently across the organization • Provide training in both foundational and technical skills to support asset management at all levels • Hire external consultant to develop RCM processes for all asset classes • TAM working group oversees implementation of LMP processes and establishment of Fleet and Facilities LMPs
Dependencies	• Ownership responsibilities by designated asset owners
Change Management	• Institute a culture focused on lifecycle management planning • Focus on standardization and documentation of procedures
Resource Requirements	Resource requirements and their time: • Core TAM members and supporting asset managers
Risks	• Lack of SMEs to develop the process and standardized lifecycle management documentation • Lack of SMEs to identify and address gaps in lifecycle management practice for different asset classes
Mitigation Strategy	• Provide all around awareness for the need of implementing lifecycle management planning • Provision of sufficient resources and technical support for developing Fleet and Facilities LMPs

Implementation Strategy 5:
Capital Investment Prioritization – Develop risk-based approach to prioritize capital investments

Implementing Action: Develop a risk-based approach to prioritize capital investments for transparent and efficient allocation of capital funding resources

TARC Baseline:

Owner	TAM Working Group + Finance
Scope	• Establish an organization wide approach towards developing an asset risk model that helps in identifying asset criticality with respect to performance objectives and associated level of risk and quality of service • Develop asset risk model whose output helps to incorporate organization's enterprise level and operational level risk criteria into capital investment prioritization processes.
Outcome	• Allocation of capital funding to those assets that are considered critical at both enterprise and operational level • Transparent and standardized evaluation of capital project funding requests across asset classes and divisions • Efficient allocation and prioritization of capital funding resources due to risk-based framework
Implementation Team Members	TBD
Estimated Duration	• Risk based framework for capital prioritization process to start at January 2019 and complete by June 2020 • Incorporate lifecycle management data into capital prioritization process starting June 2020 • Annual revision risk-based framework due to change in Fleet and Facilities LMPs will be on-going effort
Level of Impact	TBD
Implementing Steps	• Develop and assign asset criticality ratings based on business impacts • Develop asset risk register that incorporates assets' condition, safety, probability of failure, life expectancy and other risk data as applicable • Develop risk model that identifies and ranks highest critical assets based on several factors such as benefit-cost ratio, resource availability • Utilize risk model output for capital programming scoring as well as update in maintenance procedures and other applicable

Owner	TAM Working Group + Finance
	standard operating procedures • Utilize above-mentioned capital programming score for capital project evaluation and selection • Key staff members should be provided training on risk-based approaches to asset management
Dependencies	• Leadership adoption of TAM plan • Reconciliation of fixed assets with equipment register • Completion of facilities asset registers • Completion of criticality, performance criteria, condition assessment • Identification of critical assets and owners • Development of Fleet and Facilities LMPs
Change Management	• Collaboration by all divisions towards recording of data and application of risk methodologies
Resource Requirements	Resource requirements and their time: • Core TAM members and supporting asset managers time to develop and implement risk analysis requirements • Staff members implementing new data collection processes and recording data in risk registers
Risks	• Development of SGR database • Development of risk framework • Data integrity to support asset risk evaluation • Adoption of risk methodologies organization wide and across multiple assets/asset classes • Introduction of risk analysis in the capital planning processes
Mitigation Strategy	• TAM working group to champion the risk framing process using internal resources or using external consultants. • Asset managers to educate and prioritize data collection by asset criticality and other factors

Implementation Strategy 6:
Information Technology – Enhance usage of tools for Asset Management

Implementing Action: An independent Ellipse Customer Value Assessment (CVA) was performed by ABB.   The purpose of the CVA is to reduce costs and increase efficiencies by implementing a series of sub-projects (work packages) relating to the use of the Ellipse Enterprise Asset Management (EAM), Enterprise Resource Planning (ERP) and Asset Performance Management (APM) system.

The CVA resulted in separate Continuous Improvement Plan (CIP) specific to Ellipse. That Assessment and Report provides a high-level definition of the CIP stating the programs vision, goals, scope, and business work packages. This document should be considered an interim plan until such time as additional scoping and further refinement of the recommendations can be completed with the TARC Team.

That Ellipse CVA CIP has been provided under separate cover and is included here by reference. The TAM Plan CIP and the Ellipse CIP are joined. Therefore, both must be considered as an integrated approach to satisfying TAM Requirements

APPENDIX C: ABB MATURITY ASSESSMENT RESULTS

ABB Asset Management Consulting performed an agency-wide, detailed maturity assessment and gap analysis at TARC in the 2nd Quarter of 2018. The approach included interviews with key personnel, both within and outside of TARC's TAM core group, along with detailed documentation reviews and a series of workshops, to ensure a rigorous assessment of the current maturity of TARC's asset management program.

Figures C-1 through C-3 reflect the results of that maturity assessment. This process followed the recommended TAM Implementation Guidelines found in FTA Report 0098 and made use of an ABB Adopted version of the FTA's TAM Assessment tool.

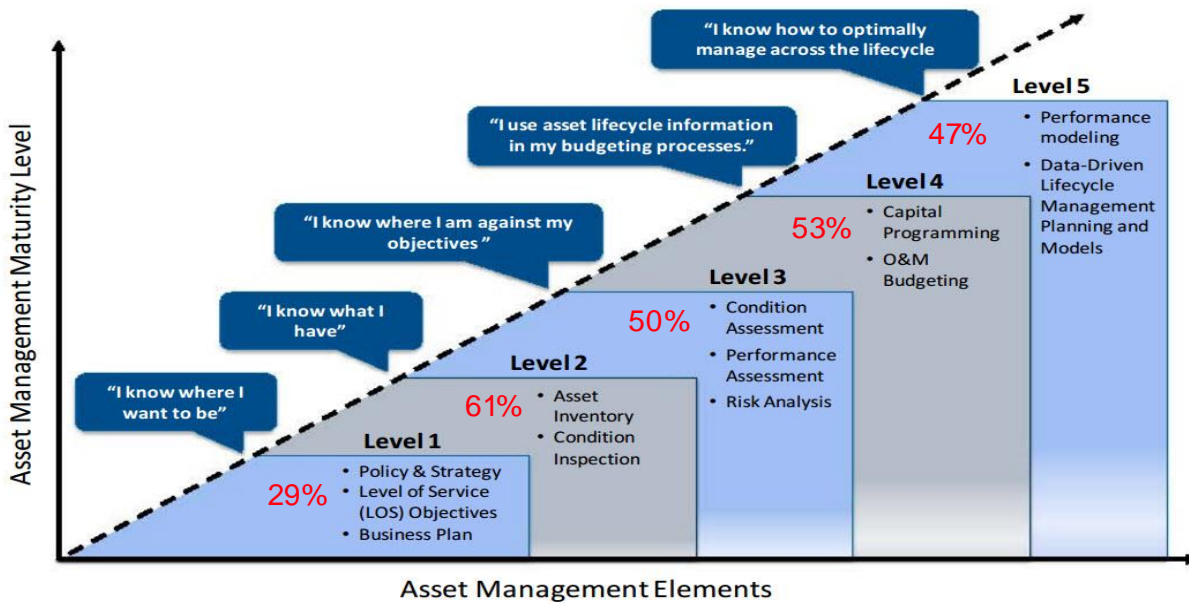**FIGURE C-1 – MATURITY ASSESSMENT RESULTS – TAM LEVELS**

Figure C-1 illustrates a simplified view of TARC's current maturity for the five levels defined by the FTA to establish a basic understanding of and measure common practices of asset management maturity across the organization. ABB's maturity assessment provided scores (shown in RED) for each of these five levels. The assessment process looked at business processes and enablers (detailed in Figure C-2) and specific Asset Classes (detailed in Figure C-3) as specified by the FTA. All results were gathered during interviews with a horizontal and vertical cross section of 15 members of the organization.

This maturity scale, developed by FTA, is designed to reflect TARC's awareness of their current strengths and gaps as well as the degree to which the organization practices the principles of asset management. There are no specific targets defined by the FTA. Rather, the assessment and scale serves as a mechanism to quantify current practices and capture a snapshot of TARC's maturity. An increase in scores will reflect the increased level of asset management awareness and practices as the organization matures.

This is not a linear scale. And, TARC obviously exhibits varying degrees of maturity within each Level when measured against the asset management elements.

For example, a score of 29% for Level 1 illustrates that among the people interviewed during this maturity assessment workshop, only 29% were aware of TARC having an asset management policy and strategy at that time. Additionally, this section also reveals 29% of people (interviewed) are aware of any existing business plan that clearly details the people, activities, and resources needed for addressing the asset management policy and strategy. Similarly, a score of 61% for Level 2 indicates that 61% of people interviewed are aware of TARC having an existing asset inventories with condition data that support multiple business processes. Figures C-2 and C-3 gives a breakdown of the scores illustrated in Figure C-1.

FIGURE C-2 – MATURITY ASSESSMENT RESULTS – BUSINESS PROCESS ENABLERS
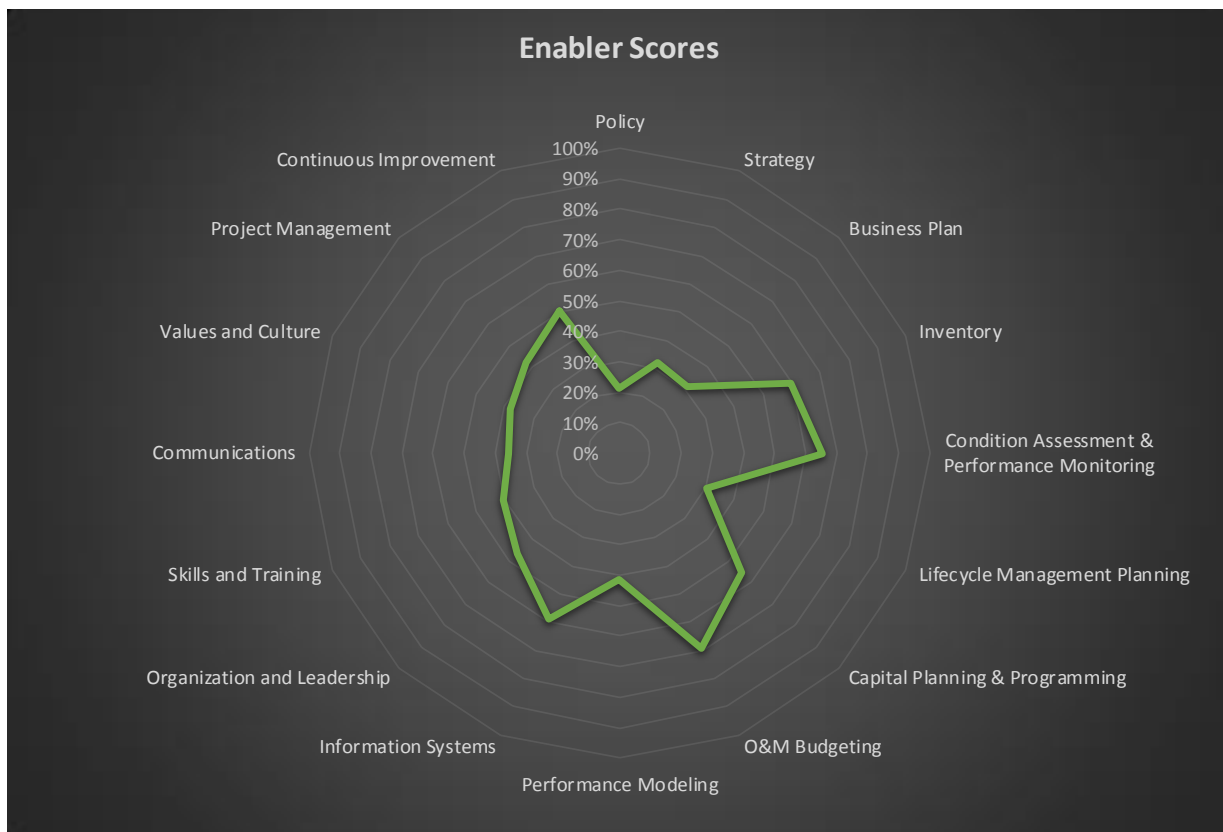

Figure C-2 reflects the Business Process Enablers assessment results summarized in Figure C-1. For each Enabler, the score is a cumulative average of data gathered during interviews with a horizontal and vertical cross section of 15 members of the organization. The interview questions reflect both the level of awareness and, the degree to which asset management principles are embedded in the current practices at TARC.

FIGURE C-3 – MATURITY ASSESSMENT RESULTS – ASSET CLASS

Scores by Asset Class

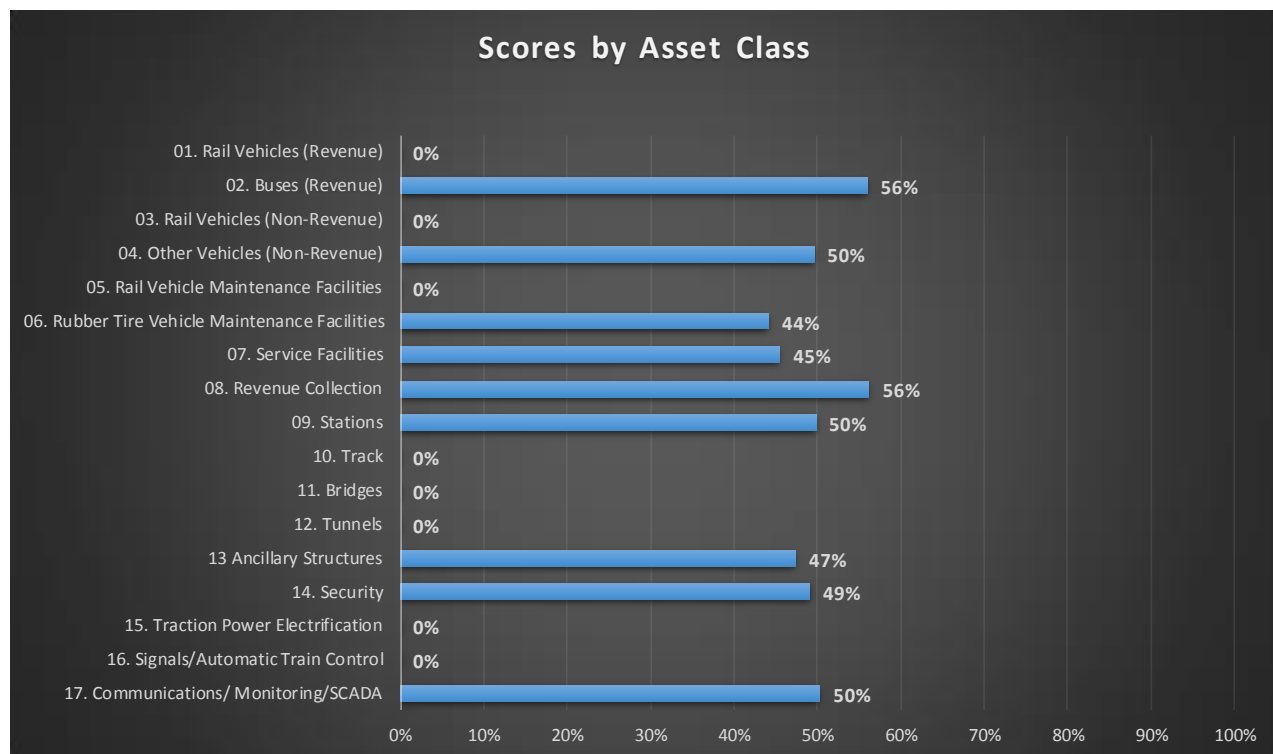| Asset Class	Score
01. Rail Vehicles (Revenue)	0%
02. Buses (Revenue)	56%
03. Rail Vehicles (Non-Revenue)	0%
04. Other Vehicles (Non-Revenue)	50%
05. Rail Vehicle Maintenance Facilities	0%
06. Rubber Tire Vehicle Maintenance Facilities	44%
07. Service Facilities	45%
08. Revenue Collection	56%
09. Stations	50%
10. Track	0%
11. Bridges	0%
12. Tunnels	0%
13 Ancillary Structures	47%
14. Security	49%
15. Traction Power Electrification	0%
16. Signals/Automatic Train Control	0%
17. Communications/ Monitoring/SCADA	50%

Figure C-3 reflects the Asset Class assessment results summarized in Figure C-1. For each Asset Class, the score is a cumulative average of data gathered during interviews with a horizontal and vertical cross section of 15 members of the organization. The interview questions reflect both the level of awareness and, the degree to which asset management principles are embedded in the current practices at TARC.

For each Asset Class, these practices include the level of maturity associated with:

- Condition Inspection and Monitoring Program
- Commensurate level of resources applied to satisfy level of service requirements
- Existence and effectiveness of dynamic condition / performance targets
- Existence and effectiveness of dynamic lifecycle management plans
- Data collection and usage to support performance modeling and capital prioritization
- Data collection and usage to support reliability modeling and maintenance scheduling

AGENCY-WIDE IMPLEMENTATION STRATEGIES

ABB, as part of this maturity assessment, has worked with TARC to establish their desired level of maturity across each of the 9 elements of the TAM framework and identified several gaps that still need to be addressed to achieve this target level of maturity. Many of these gaps are already being addressed as part of TARC's policy development, or through other separate initiatives. Addressing these remaining gaps will enable TARC to achieve its objective of going beyond compliance and, of ensuring each element of its AM program meets the definition of good practice, and achieving an optimal balance of costs, risks and performance.

FTA's Report No. 0098 suggests that the transit agency should have established expectations, in terms of maturity, where they want to be in 4 – 5 years. An agency can target to have all its assets having a minimum condition score of 3 out of 5, or to have 'best in class' process, or to be a 'global leader' in transit asset management. Based on the maturity assessment result shown in Figures C-1 through C-3 above, TARC has developed timeframes shown in Table C-1 to work on the key gaps identified in the maturity assessment exercise. The identified gaps have been developed as initiatives (High, Medium Low) as part of asset's lifecycle to make decisions that will influence costs, risks and performance of the transit system. Appendix B lists all the TAM Plan Initiatives and the time frame associated with each of the initiatives. These initiatives will precipitate the development projects that will help achieve the vision and objectives laid out in the TAMP.

TABLE C-1 – INITIATIVE AND TIMEFRAMES

Priority	Timeframe
High	0 - 1 Year
Medium	6 Months – 3 Years
Low	3 – 4 Years

Each of the identified gaps are grouped into the following categories:
- Asset Management Policy & Strategy
- Enablers and Change Management
- Lifecycle Management
- Capital Planning and Programming
- Information Systems

Each identified gap is presented along with the related 9 TAM element(s), the relative priority of each gap (High, Medium, Low) based upon importance and urgency, and steps for closing the gap. Addressing these gaps is required to achieve the targeted level of maturity. Many of these gaps are already being addressed as part of the asset management program, or through other separate initiatives. Addressing these remaining gaps will enable the core asset management team to achieve its objective of ensuring each element of its AM program meets the definition of good practice, and achieving an optimal balance of costs, risks and performance.

APPENDIX D: KIPDA TAM POLICY AND PLAN

KIPDA TARC Regional Vanpool Program

In July 2016, FTA published a Final Rule for Transit Asset Management (TAM). The rule requires FTA grantees to develop asset management plans for their public transportation assets, including vehicles, facilities, equipment, and other infrastructure. TAM is an essential practice for providing safer, more reliable transit service nationwide, while helping lower operating costs.

In 2012, the Moving Ahead for Progress in the 21st Century Act (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 TAM 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
- Requires FTA to provide technical assistance

Transit asset management (TAM) lays out a strategic approach to maintain and improve capital assets, based on objective planning and improved decision-making, such as reviewing inventories and setting performance targets and budgets to achieve state of good repair goals. The rule, required under MAP-21 legislation, is intended to close the gap on aging and poorly maintained transit assets. The TAM requirements are part of a larger performance management context. MAP-21 created a performance-based and multimodal program to strengthen the U.S. transportation system, which is comprised of a series of nine rules overseen by FTA and the Federal Highway Administration (FHWA). The TAM rule is intended to save costs associated with breakdowns and benefit agencies through increased reliability, transparency, and accountability.

Under the TAM rule, each FTA-supported transit provider is required to inventory and assess the conditions of their assets, develop priorities for investment based on the inventory, and establish performance targets to keep assets in a state of good repair. In July 2016, the Federal Transit Administration (FTA) issued at final rule requiring those agencies that own and/or manage transit fleets funded through FTA to develop, maintain, and document minimum TAM standards. Federal law requires recipients and sub-recipients of Federal financial assistance (from the FTA) to develop a TAM Plan to be completed no later than October 1, 2018.

THE KIPDA TARC REGIONAL VANPOOL PROGRAM TAM APPROACH

The Kentuckiana Regional Planning and Development Agency (KIPDA) administers the regional ridesharing program. This program provides ridematching services to anyone whose commute begins and/or ends in the KIPDA nine-county region. As part of its larger ridesharing mission, KIPDA administers a vanpool program in partnership with the Transit Authority of River City (TARC).

TARC and KIPDA have a Memorandum of Understanding (MOU) governing the roles and responsibilities of the two agencies with regard to the regional vanpool program. This MOU provides, "KIPDA and TARC will work together for the development of a Transit Asset Management Plan for the vanpool program as required by 49 CFR Parts 625 and 630." Annual and monthly reporting to the National Transit Database (NTD) are responsibilities assigned to KIPDA in the MOU.

Implementation of the TAM Policies and TAM Plan will be a shared responsibility for KIPDA in partnership with TARC: TARC owns and maintains the regional vanpool vehicles, while KIPDA administers the program and comes into more frequent contact with the vehicles and the vanpool members. Because TARC owns and maintains the regional vanpool vehicles, the overarching principles and policy of the vanpool TAM are provided by the TARC TAM approach.

TARC TRANSIT ASSET MANAGEMENT (TAM) POLICY

Adopted by the TARC Board of Directors on July 24, 2018

I.   PURPOSE

In keeping with TARC's mission "to explore and implement transportation opportunities that enhance the social, economic and environmental well-being of the Greater Louisville community," TARC is committed to maintaining assets in a state of good repair to support safe, efficient, reliable public transportation.

This policy also expresses our intention to foster a culture of continuous improvement in asset management planning and performance.

This policy is specific to the management of TAC Assets that are included in TARC's Transit Asset Inventory.

This policy will be made accessible to all Board members, staff and members of the public.

This policy outlines TARC's overall asset management approach in a manner consistent with current Federal regulations (49 U.S. Code § 5326) and sets the direction for establishing and following through with transit asset management strategies and plans that are achievable with available funds. This policy complies with the Federal Transit Administration (FTS) Transit Asset Management (TAM) Final Ruling on July 26, 2016.

II.   POLICY

TARC's COMMITMENT

TARC is committed to

- The allocation of resources necessary to reach its asset management goals;
- Financial stewardship, transparency, and collaboration with our funding partners;
- Promoting a culture that supports optimal asset management across the organization;
- Focusing on high quality data-driven decision making to provide safe, reliable, sustainable service for the communities we serve;

- Supporting the timely implementation of projects and programs to maintain our assets in a State of Good Repair over their entire life; and
- Continually improving its asset management strategies and plans, including setting annual goals, objectives, and measures to monitor and improve performance.

III.   **TARC's TAM investment priorities are:**
- Public and employee safety
- Reliable service delivery
- Sustainability
- Responsible stewardship of public funds

TARC's TAM PLAN ELEMENTS

The FTA regulation defines TARC as a Tier I agency and, as such, requires TARC to implement a TAM Plan that includes the nine TAM Elements listed below.

1. Inventory of assets – A register of capital assets and information about those assets
2. Condition assessment – A rating of the asset's physical state
3. Decision support tool – Analytic process or tool to assist in capital asset investment prioritization needs
4. Prioritized list of investments – A prioritized list of projects or programs to manage or improve the State of Good Repair (SGR) of capital assets
5. TAM and SGR policy – Executive-level direction regarding expectations for transit asset management
6. Implementation Strategy – Operation actions to achieve District TAM goals and policies
7. Key annual activities – Those activities that are critical to achieving goals
8. Identification of resources – List resources needed to carry out the TAM Plan
9. Evaluation plan – Monitor and update to support continuous TAM improvement

IV.   **AUTHORITY**

  A. **Board Authority**

   TARC's Board of Directors has the authority to approve and amend TARC's TAM Policy.

  B. **Executive Director Authority**

   TARC's Executive Director or designee will have overall responsibility for overseeing the development of asset management plans and procedures, in cooperation with the team, and reporting to the Board on the status of asset management for TARC.

   In accordance with this policy, implementation of the TAM Plan will be a shared responsibility for all departments.

PRIORITIZED LIST OF INVESTMENTS

1) Maintaining existing fleet vehicles in a state of good repair. This may include, but is not limited to the following: Inspections, oil changes, repairs as needed, cleaning, etc.
2) Providing replacement vehicles for existing vanpools.
3) Obtaining new vehicles for new vanpools.

IMPLEMENTATION STRATEGIES

- Assign each vanpool a permanent vehicle. Permanent vehicle assignment supports better forecasting for estimating mileage for inspection, service, maintenance, and retirement and replacement schedules, which supports a more efficient use of anticipated resources. A vanpool may have their permanently assigned vehicle change in the event ridership levels change, vehicle replacement, and/or related items.
- Require all vanpools to get the oil changed in their assigned Regional Vanpool Program Vehicle at 3,000-mile intervals.
- Inspect all Regional Vanpool Program Vehicles at 9,000 mile intervals or no less than once annually in order to identify and address any needed maintenance issues.
- All Regional Vanpool Program Vehicles will be cleaned and detailed at 9,000 mile intervals (at the same time of the 9,000 mile inspection) to ensure the upkeep and maintenance of the vehicle's interior.
- Complete a condition report every time KIPDA staff returns and/or provides a vehicle to a vanpool in order to assess condition on a regular and ongoing basis. This is to occur not only at 9,000 mile intervals when the inspection, cleaning and detailing occur, but also at any time a vehicle is brought in for a repair or other issue outside of regularly scheduled maintenance.
- Replace Regional Vanpool Program vehicles regularly in order to provide each active vanpool with a vehicle that is safe and in good repair.
- Annually assess current vanpool program to determine capital asset needs.
- Annually assess the Regional Vanpool Program fleet using the Decision Support Tools and Processes listed herein.
- For every 10 active vanpools, ensure there are a minimum of 1.5 Regional Vanpool Program vehicles to serve as back-up vans in the event of maintenance and/or repair of their regularly assigned van. This assures that there will be little to no disruption to vanpool operation while vehicles are maintained and repaired.
- Retire any vehicle immediately that cannot exceed a poor rating without incurring excessive repair cost relative to the vehicle's value.

KEY ANNUAL ACTIVITIES

KIPDA and TARC annual review of TAM as it pertains to the regional vanpool program.

Annual review and meeting between KIPDA Regional Vanpool Program staff and TARC staff to discuss and address any issues with regard to the Regional Vanpool Program and related TAM.

Annual regional vanpool program vehicle review to determine the acquisition of new vehicles and the retirement of existing fleet vehicles.

RESOURCES

The primary resource for the KIPDA regional rideshare program, including the regional vanpool program, is annual funding through the Surface Transportation Block Grant Program and continued support from the Louisville (KY-IN) Metropolitan Planning Organization. This funding provides for the administration and vehicle acquisition of the vanpool program on an annual basis. To maintain the regional vanpool vehicles once they are in the fleet and in service following acquisition, in a state of good repair, each active vanpool is charged a monthly maintenance fee for any needed maintenance and repairs. This allows the existing vanpool vehicles to be maintained in a state of good repair.

Should additional funding be needed or desired for additional vehicles, administration, or related items, additional Surface Transportation Block Grant funds may be requested through the KIPDA Louisville (KY-IN) Metropolitan Planning Organization. Additionally, other funding may be requested from other Federal sources, such as the Congestion Mitigation and Air Quality Improvement Program and/or the Transportation Alternatives Program, as well as any other Federal, state or local funding opportunities that may be available at the time.

EVALUATION & UPDATES

Annually, the TAM Plan will be updated with an annual inventory of assets and their condition at the time of the assessment as well as list any assets that had been retired the previous year.

The TAM Plan for the KIPDA Regional Vanpool Program will also be evaluated on an annual basis for effectiveness at carrying out the Transit Asset Management and State of Good Repair policies as stated herein. Should changes need to occur outside of the annual inventory and condition report, those changes would be developed by KIPDA staff in partnership with TARC staff, and presented to the TARC Board for approval.

The TAM Plan for the KIPDA Regional Vanpool Program will be presented for approval no less than once every five (5) years even if no additional changes are needed.

APPENDIX E: KEY DEFINITIONS

CBM: CONDITION BASED MAINTENANCE

CIP: CAPITAL IMPROVEMENT PLAN

CAD/AVL: Computer Aided Dispatch (CAD) and Automated Vehicle Location (AVL)

EAMS: ENTERPRISE ASSET MANAGEMENT SYSTEM

FTA: FEDERAL TRANSIT ADMINISTRATION

NTD: NATIONAL TRANSIT DATABASE

PDM: PREDICTIVE MAINTENANCE

PM: PREVENTATIVE MAINTENANCE

OEM: ORIGINAL EQUIPMENT MANUFACTURER

SRTP: SHORT RANGE TRANSIT PLAN

SOP: STANDARD OPERATING PROCEDURE

State Of Good Repair (SGR): Defined by 49 U.S.C. Chapter 53 as the "condition in which a [transit asset or] capital asset is able to [safely] operate at a full level of performance." The State of Good Repair is further defined by an asset's Useful Life Benchmark (for rolling stock and equipment) or physical condition (for facilities). Assets are considered in a State of Good Repair when they do not meet or exceed their ULB or physical condition threshold. Vehicle and equipment assets, for example, are considered in a State of Good Repair, when rated as a 2.5 or above on AC Transit's TERM Lite scale, where 2.5 is equivalent to the ULB set for an asset class. Additionally, facilities, are considered in a State of Good Repair when rated as a 3 or above on FTA's TERM scale. *Also see definition for Useful Life Benchmark.*

TERM Scale: The five category rating system used in the FTA's Transit Economic Requirements Model (TERM) to describe the condition of an asset, where 5 is excellent condition and 1 is poor condition.

Tier I Transit Provider: An entity that receives Federal financial assistance under 49 U.S.C. Chapter 53, either directly from FTA or as a subrecipient, that owns, operates, or manages either (1) one hundred and one (101) or more vehicles in revenue service during peak regular service across all fixed route modes or in any one non-fixed route mode, or (2) rail transit.

Transit Asset Management (TAM): Defined by 49 U.S.C. Chapter 53 as "the strategic and systematic practice of procuring, operating, inspecting, maintaining, rehabilitating, and replacing transit capital assets to manage their performance, risks, and costs over their life cycles, for the purpose of providing safe, cost-effective, and reliable public transportation."

Transit Asset Management Plan (TAM Plan): This document, which describes: the capital asset inventory; condition of inventoried assets; TAM performance measures, targets, and prioritization of

investments aligned with the agency's TAM and SGR policy, strategic goals and objectives; as well as the strategies, activities, and resources required for delivering this Plan (including decision support tools and processes); and other agency-wide approaches to continually improve TAM practices. While this TAM Plan exists as a standalone document, LMPs may be considered an extension of the TAM Plan by reference.

Useful Life: Defined by 49 U.S.C. Chapter 53 as "either the expected life cycle of a capital asset or the acceptable period of use in service determined by FTA." It generally defines the minimum eligibility for retirement, replacement, or disposal of an asset.

Useful Life Benchmark (ULB): Defined by 49 U.S.C. Chapter 53 as "the expected life cycle or the acceptable period of use in service for a capital asset, as determined by a transit provider, or the default benchmark provided by FTA." The ULB is the realistic expectation for when an asset would be disposed or replaced based on operating environment and procurement timelines. It is not the same as "Useful Life" in FTA grant programs, is reported by age (in years), and usually only pertains to rolling stock or equipment. It is a single number shared for or within specified asset classes, although may vary across different asset classes and providers.

END