

# CTA'S INAUGURAL TRANSIT ASSET MANAGEMENT PLAN

**Leah Mooney**  
**Director of Strategic Planning & Policy**  
**Chicago Transit Authority**

TAM Roundtable  
Cambridge, MA  
August 28, 2017



# CTA Overview

## Rail ('L') System Map

For Travel Information Call:  
1-312-636-7000  
For Customer Assistance Call:  
1-888-YOUR-CTA  
Hearing Impaired:  
1-888-CTA-TTY1  
Online:  
transitchicago.com



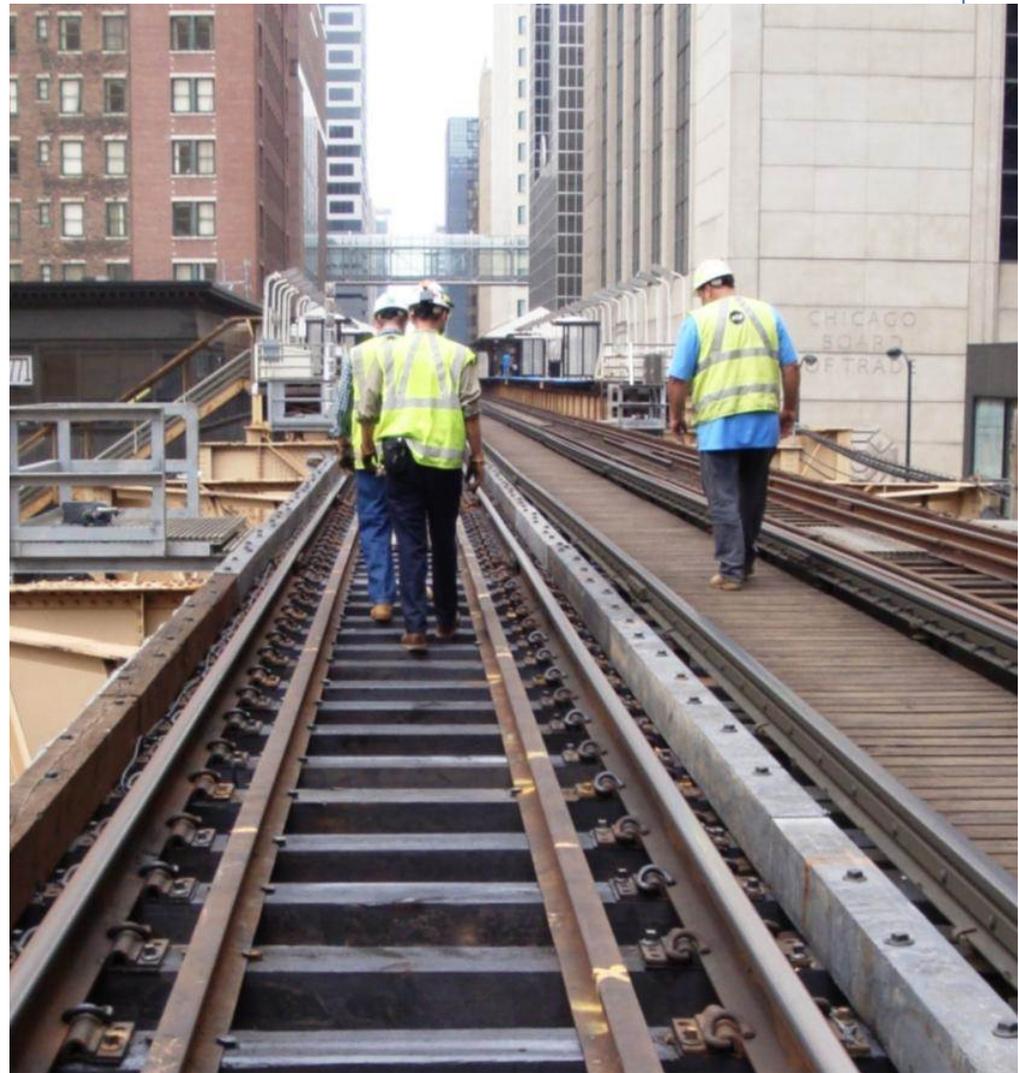
- 2<sup>nd</sup> Largest Public Transit System in US:
  - 1.6 million rides per day
  - 8 Rail Lines and 128 Bus Routes
- System was started in the 1890s
- Serves Chicago and 35 suburbs
- 10,000 Budgeted positions
- Provides 83% of transit trips in the six-county Chicago metro area
- One of few cities in the world that has rail service to 2 major airports
- 24 hour service on Red and Blue Lines, other rail lines run 4am to 1am, + night-owl bus service

Moving Chicago Transit Forward



# TAM AT CTA: PROGRESS TO DATE

- 1992: Asset inventory and engineering condition assessment
- 2007: Vehicle maintenance management system implemented (MMIS)
- 2008: Implemented Infor Enterprise Asset Management (EAM) System for Facilities
- 2010: Regional capital asset inventory
- 2010: CTA receives FTA TAM Grant of \$5.4 million to help develop EAM
  - Condition Assessment for rail shops, bus garages, and rail electrical substation buildings
- 2012: CTA receives additional FTA grant of \$2.5 million for continued EAM development
  - Expanded asset management system to incorporate steel elevated structure and track, replacing legacy systems. Implemented Infor mobile.
- 2016-2017: Completed TAM Plan, Expanding Infor, and upgrading MMIS
  - Expanding Infor for Signal, Power & Subway assets (signal uses paper) and Mobile
  - TAM Plan complete on 6/28/17
- Next Steps: Continue to expand inventory; address “gaps” identified in plan process



# TAM PLAN: REQUIREMENTS RECAP

Transit Asset Management (TAM) Plans have the following requirements:

- Transit provider must designate an Accountable Executive
- TAM Plan to be coordinated with regional (MPO) planning
- TAM Plan should look at least four years out
- TAM Plan requirements (for a large agency like CTA):

1. Inventory of Capital Assets
2. Condition Assessment
3. Decision Support Tools
4. Investment Prioritization
5. TAM and SGR Policy
6. Implementation Strategy
7. List of Key Annual Activities
8. Identification of Resources
9. Evaluation Plan

# TAM PLAN PURPOSE

- The Asset Management Plan provides an organization-wide view of the work necessary to deliver the organizations goals and objectives
- The **purpose** of the Asset Management Plan (AMP) is:
  - Meet Federal legislative requirements set by the FTA
  - Support funding applications – justify additional funding and grants
  - Provide input into long-term strategic and financial planning
  - Identify lifecycle management needs and enable communication of those needs to key decision makers
  - Assess the capital and operating budgets necessary to support safe and reliable service delivery

# TAM PLAN: SCOPING & PROCUREMENT

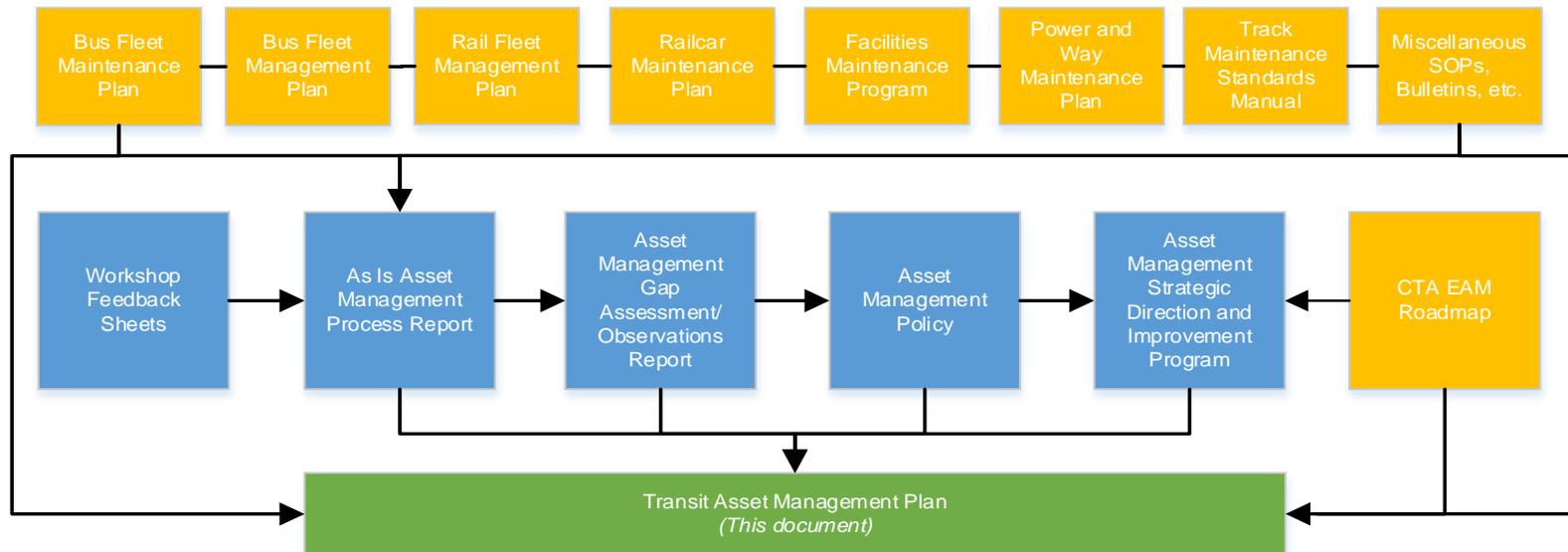
- CTA procured a Task Order under our General Planning Contract
  - Scope would work as a standalone contract
  - Total negotiated price \$435k
  - Total time: 13 months (original schedule was 10 months)
  - Consultant: WSP (PB)
- CTA bid scope had the following requirements:
  - Provide a **comprehensive AMP** that complies with all applicable guidance and **requirements from FTA** and applicable federal legislation (Moving Ahead for Progress in the 21st century or “MAP-21”).
  - Compare CTA’s current asset management activities against **best practice**; identify **goals and objectives** to help improve CTA’s project prioritization process for investments to operate, maintain, renew, and acquire assets within a constrained resource environment.
  - Outline an **implementation strategy** that allows CTA to achieve these goals.



# TAM PLAN: SCOPING & PROCUREMENT

- Negotiated Scope included the following elements:
  - Phase One: Baseline Assessment
    - Materials Review
    - Workshops with multiple departments
    - Benchmarking against best practices
    - Asset Management Vision/Policy
    - Strategic Direction/Improvement Program
    - Deliverables: “As-Is” Report; Gap Assessment; AM Policy; Roadmap/Improvement Program
  - Phase Two: Asset Management Plan
    - Utilize information from workshops
    - AMP Outline
    - Asset Management Plan (Draft(s) and Final)

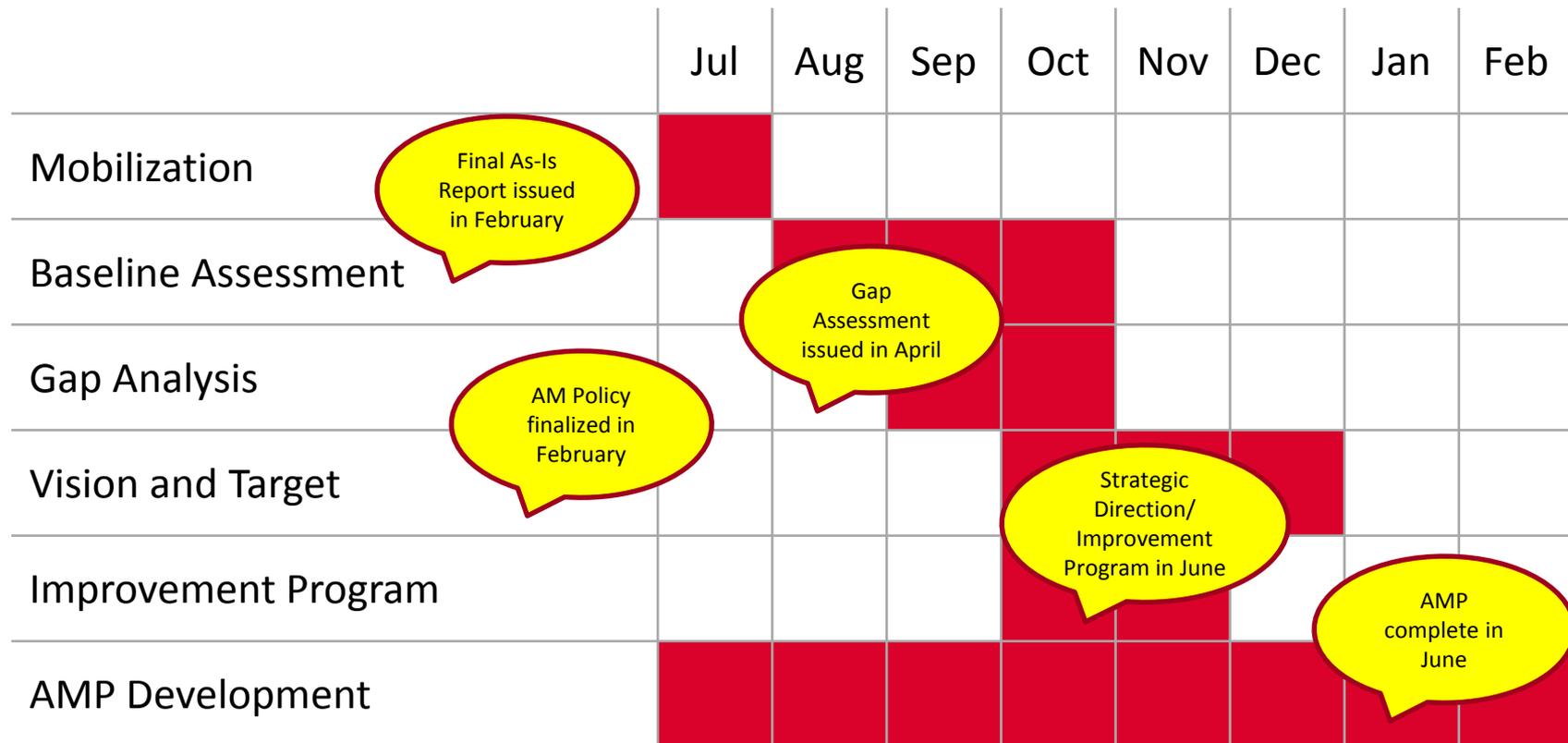
# TAM PLAN: DELIVERABLES



- **As-Is Report:** Summarized the information gathered in workshops with staff to capture processes related to capital planning, capital delivery/construction, asset lifecycle maintenance and management (vehicle, facilities, power & way and technology), engineering, safety, supply chain, performance and finance
- **Gap Assessment:** Report analyzed CTA's performance across key areas; developed "Maturity Scorecard" and 81 recommendations
- **AM Policy:** One page document signed by "Accountable Executive" that sets the overall direction for asset management
- **Strategic Direction/Improvement Program:** Organizes the 81 projects into 20 discrete projects
- **Asset Management Plan:** Plan describes what CTA owns, its condition/age, life cycle strategies, and CTA's capital improvement program

# TAM PLAN PROCESS

## Annotated Schedule:

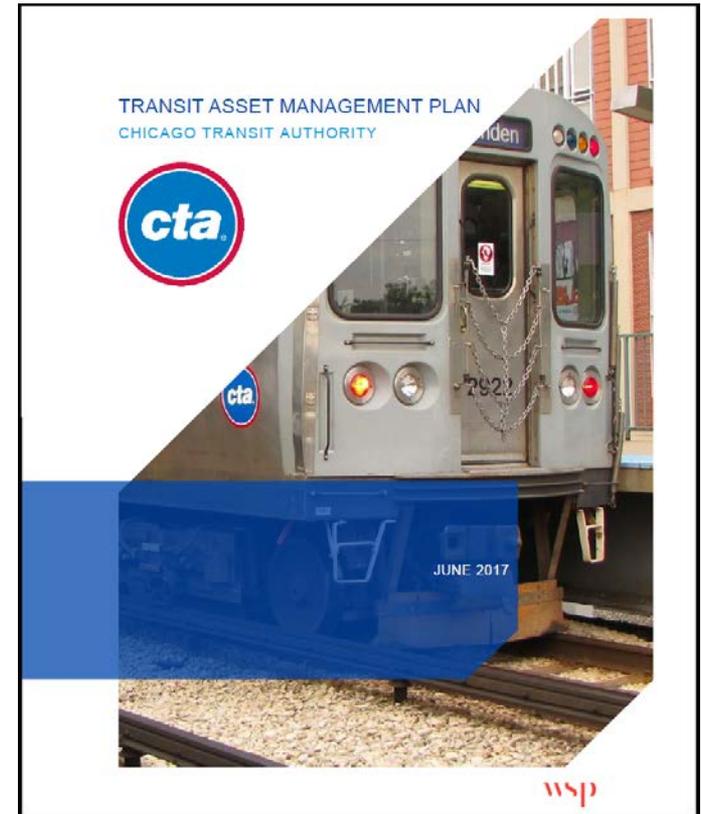


# CONTENTS OF CTA'S TAM PLAN

1. Executive Summary
2. Introduction / Background
3. Asset Management Policy
4. Levels of Service
5. Asset Portfolio
6. Asset Management Enablers
7. Lifecycle Management Strategies
8. Investment Prioritization
9. Resource Plan
10. Asset Management Improvement Program

## Appendices:

- A. *Buses*
- B. *Rail Cars*
- C. *Facilities / Stations*
- D. *Rail Right of Way*
- E. *Communications and Technology*
- F. *Non-revenue Vehicles*



The bulk of the detail

# LEVELS OF SERVICE

- Links Customer Levels of Service to technical requirements for the assets

- Service standards** (e.g. Vehicle headway during peak periods should not exceed 10 minutes, and at all times of active service, maximum headway should not exceed 30 minutes)
- Core Goals** (e.g. The CTA will minimize safety risks to life, health and property involving CTA customers, employees, and the general public.)
- Performance Metrics** (e.g. < 78 rail system delays/month) 
- Service Trends and Projections** (e.g. Peak Vehicle requirements)

Table 1: CTA Service Performance Targets

CORE GOAL	ACTIVITY OUTCOMES	SUPPORTING POLICY	PERFORMANCE MEASURE	TARGET	REPORTING	
Safe	Provide a safe and secure experience for riders, staff and the public.	Minimize the number of safety/security incidents involving customers, employees, and the general public	Safety/security-related incidents per 100,000 bus/rail miles	N/A	Monthly	
			Monthly rail delays of 10+ minutes	< 78	Monthly	
On-time	Provide predictable and reliable service for customers	Reduce rail system delays	Slow zone mileage	N/A	Monthly	
			Successfully manage intervals between buses	Big gap intervals < 4%	Monthly	
			Bunched intervals	< 3%	Monthly	
Clean	Provide a clean and comfortable atmosphere for riders	Maintain and strive to improve the cleanliness of all vehicles, stations, and work areas	Avg. Bus / Rail Interior Clean Inspection Score	> 90% / 85%	Monthly	
Courteous	Create a pleasant environment for customers and staff	Maintain the highest standards of customer service through timely, reliable, and clear communication with customers, considerate employees, and efficient operational practices	Customer complaints not closed out within 14 days	< 3%	Monthly	
			Customer Service Hotline average wait-time	< 2 minutes	Monthly	
			Buses with defective AVAS	< 2%	Monthly	
			Ensure that the CTA is accessible for all passengers.	ADA complaints reported	N/A	Monthly
			Ramp defects reported	N/A	Monthly	
Efficient	Manage resources to boost performance and provide safe, reliable, comfortable and affordable transit for customers.	TBD	Mean miles between defects for bus / rail	> 5000 / 3950	Monthly	
			Bus / rail fleet unavailable for service	< 12.6% / 11.0%	Monthly	

**Next step: Additional links between service levels and asset needs**



# ASSET PORTFOLIO

- Defines the current portfolio of CTA fleet, facilities and infrastructure assets and its current condition

ASSET CLASS	ASSET TYPE	TOTAL COUNT	% W/ CONDITION BELOW 3	USEFUL LIFE BENCHMARK (YEARS)	% BEYOND USEFUL LIFE
<b>Buses</b>	Buses	1877	6%	15	6%
<b>Rail Cars</b>	Rail Cars	1492	51%	32	25%
<b>Facilities</b>	Rail Stations	46	32%	60	23%
	Rail Terminal + Heavy Maintenance Shops	11	24%	60	3%
	Bus Garages + Heavy Maintenance Shop	8	78%	60	39%
	Other Admin and Maintenance Buildings	6	43%	60	43%
<b>Rail Right of Way</b>	Bus Turnarounds	107	94%	20	92%
	Signals – Interlockings	106	51%	25	26%
	Signals - Wayside Signals	103.8 miles	58%	25	41%
	Signals - Grade Crossings	29	7%	25	0%
	Structure	106.1 miles	44%	80	27%
	Track – Trackwork	224 miles	39%	varies	19%
	Track – Yards	12	50%	50	33%
	Traction Power – Substations	69	61%	varies	43%
	Traction Power – Power Cable	294.4 miles	57%	30	26%
Traction Power – Third Rail	221.5 miles	57%	varies	39%	
<b>Communications and IT</b>	Cable Plant Fiber	42 miles	33%	20	14%
	Fiber Optic Cable Transmission System (FOCS)	At 146 stations	92%	10	80%
	Bus Rail Radio System	3216	N/A	15	0%
	Emergency Location System	At 146 stations	N/A	1	100%
<b>Non-Revenue Vehicles and Equipment</b>	Rubber-tire Vehicles	667	54%	varies	23%
	Steel-wheel vehicles	90	31%	varies	62%
	Work Motor Cars	24	100%	32	100%

Next step: Asset data directly from EAM system reports



# ASSET MANAGEMENT ENABLERS

- States the current asset management enablers including organization, key business processes and technology
  - Asset management staffing: existing and recommended
  - Key decision processes: existing and recommended improvements
  - Enterprise-wide asset management practices: SMS, maintenance management, asset handover, etc.
  - Information and Supporting Technology
    - Reference to EAM Roadmap
  - Continual improvement

625.25 (b) A TAM Plan 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

**Next step:** Update as processes  
and systems evolve  
(e.g. for new SMS processes)

# LIFECYCLE MANAGEMENT STRATEGIES

- Identifies the key asset management approaches across the lifecycle including maintenance overhauls and renewals
  - Overview by Asset Class
    - Bus
    - Rail
    - Facilities
    - Power & Way
    - Communications and Technology
    - Non-Revenue Vehicles and Equipment
  - Additional detail in appendices

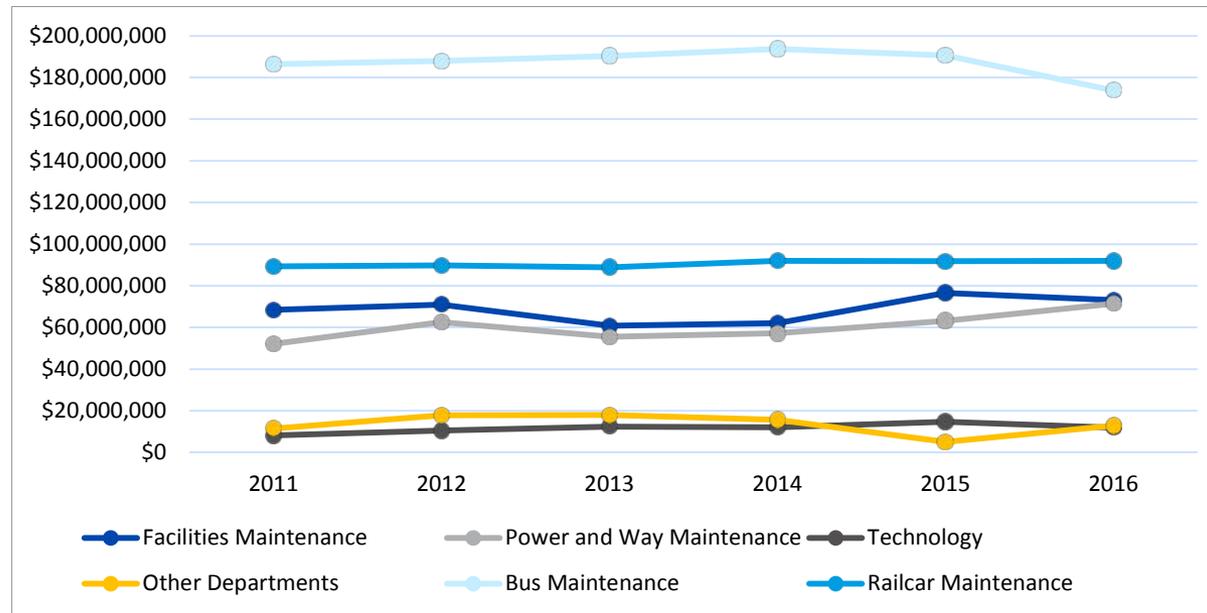
**Next step:** Optimize based on  
asset information and  
performance goals

# INVESTMENT PRIORITIZATION

- Describes CTA's process for developing investment priorities, and lists currently planned projects
- Description of process for investment prioritization
- Project list (Capital Improvement Program)
- Estimate of available capital funding
- Operations & Maintenance costs/investment

Next step: Develop stronger link between asset needs and investment prioritization

Figure 1: CTA Maintenance Expenditures, 2011-2016



- **Resources**

- Describes the resources required to carry out the plan
- Recommends centralized TAM team, program board, departmental resources

625.25 (b) A TAM Plan must include: (8) A summary or list of the resources, including personnel, that a provider needs to develop and carry out the TAM plan

- **Asset Management Improvement Process**

- Summarizes the improvement actions identified in the plan

- **Appendices**

- Provide further information on asset class specific strategies and work plans

# GAP ASSESSMENT FINDINGS

## CTA Results

PATHWAY	GRADE
Alignment to Organizational Goals	Establishing
Control of Assets	Establishing
Asset Management Decision Making	Aware
Capital Planning and Delivery	Compliant
Maintenance Planning and Delivery	Compliant
Operations and Incident Management	Compliant
Informed Decisions	Establishing
Resource Capabilities	Establishing
<b>CTA (OVERALL)</b>	<b>ESTABLISHING</b>

## What it means

GRADE	DESCRIPTION
<b>Innocent</b>	The organization is starting to learn about the importance of Asset Management
<b>Aware</b>	The organization is aware of the importance of Asset Management and is starting to apply this knowledge
<b>Establishing</b>	The organization is developing its Asset Management activities and establishing them as Business As Usual
<b>Compliant</b>	The organization's Asset Management activities are developed, embedded and are becoming effective
<b>Effective</b>	The organization's Asset Management activities are fully effective and are being integrated throughout the business
<b>Excelling</b>	The organization's Asset Management activities are fully integrated and are being continuously improved to deliver optimal whole life value

# GAP ASSESSMENT FINDINGS

## Funding constraints have:

- restricted investment in the workforce,
- undermined the development of an optimized pipeline of capital projects, and
- caused short term planning of maintenance.

*“The CTA continues to maintain the existing **aging system** in its current state in a very **efficient and effective** manner, even amidst increases in peak demand. Targeted capital improvements also support critical rehabilitations, renewals, and expansion.*”

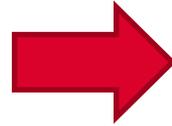
*CTA staff have generated some significant improvement initiatives in their departments, but a **coordinated** asset management approach is required to integrate the processes, to **plan maintenance** that matches the required performance, to develop a prioritized **pipeline of capital investments**, and to foster an approach of continuous improvement.”*



## 81 recommendations were developed 'Top Ten' deemed most important for compliance

Recommendation	Compliance
★ Develop a capital project prioritization methodology, defining the criteria that will be used when deciding which projects better justify funding than others.	Fundamental
★ Define an asset condition assessment approach with specific parameters, e.g., age, physical condition, maintenance backlog, measured tests, etc., at the asset class-level. Condition rating parameters may differ across asset classes but the scoring scale, e.g., 1 to 5, should remain consistent.	Fundamental
★ Establish ownership of the AMS within a dedicated TAM team, which can manage the various activities to implement and maintain the AMS.	Fundamental
★ Develop and articulate enterprise-level objectives. These objectives should act as a guide/direction for departments as they set their own objectives and strategies.	Fundamental
Complete development (in process as part of this project) of AM Policy, AM Objectives, AM Strategy, and Transit Asset Management Plan.	Minimum FTA Compliance
Complete development of an Asset Management System (AMS), started as part of this project.	Minimum FTA Compliance
Capture federal reporting requirements when scoping the AMS.	Minimum FTA Compliance
Complete development of an overarching Transit Asset Management Plan (TAMP), which includes plans, strategies, and policies for each asset class (already in process).	Minimum FTA Compliance
Develop AM Planning procedures to ensure that TAM Plans are embedded into CTA's budgeting and capital planning procedures.	Minimum FTA Compliance
Identify a lead for asset management, who has dedicated staff, to continue to implement the forthcoming asset management improvement plan.	Minimum FTA Compliance

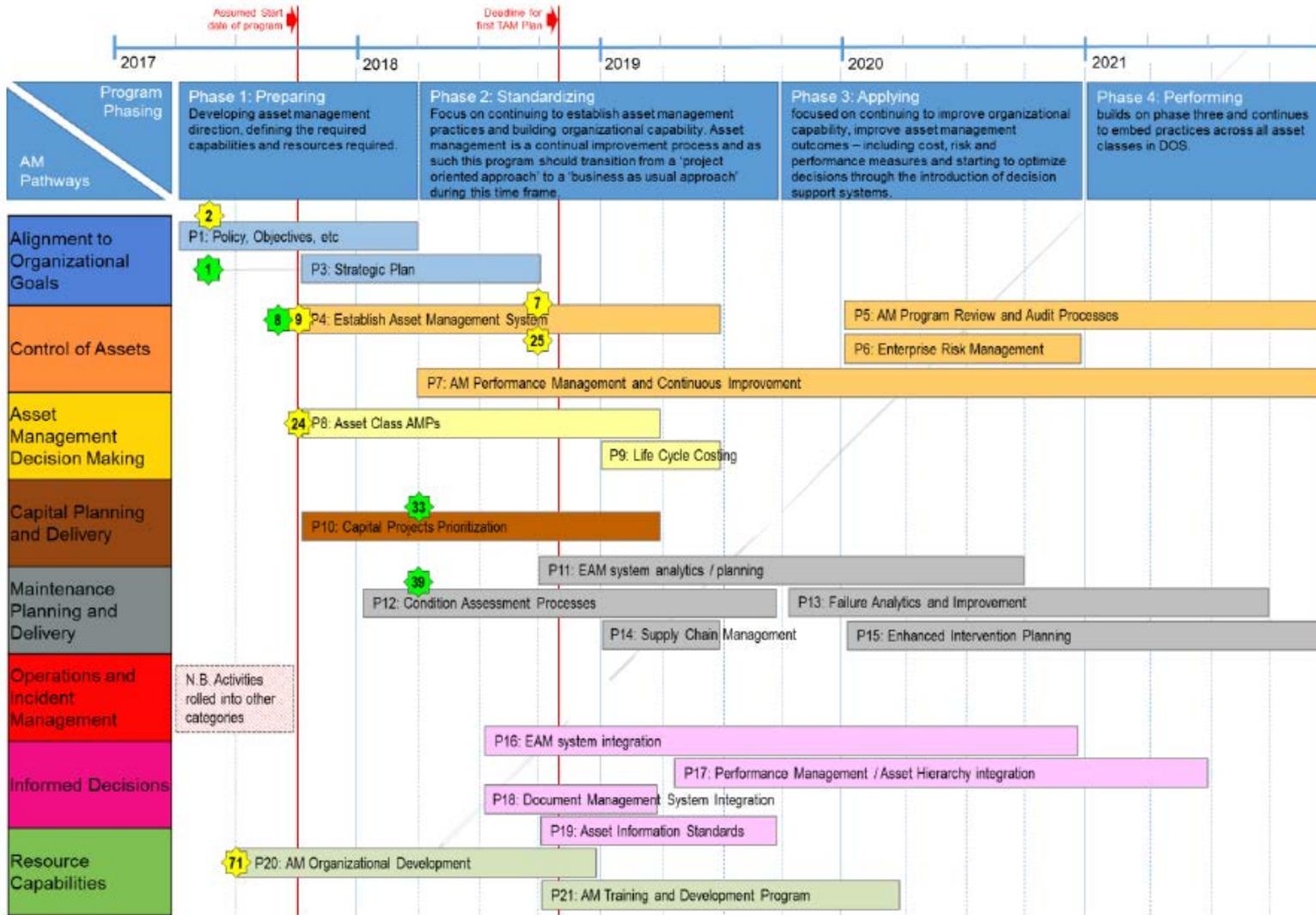
**81 recommendations  
and a Vision for the  
future**



**20 scoped projects for  
implementation  
programmed**

- Initial Focus Areas Include:
  - Implement Condition Assessment Process
  - Improve Capital Project Prioritization Process
  - Refine Asset Management Policy & Objectives
  - Develop Agency-wide Strategic Plan
  - Establish Asset Management System
  - Begin Work on Asset Class AMPs
- Recommended Internal Resources
  - Central Asset Management group to manage and drive the program
  - Departmental resources for implementation and coordination

# ASSET MANAGEMENT IMPROVEMENT ROADMAP



The colored bars show individual projects listed in the Strategic Direction report. "P1" refers to Project number 1 in the report.

Each project has defined objectives, based on the recommendations made in the Observations and Gap Assessment Report.

Colored stars denote the achievement of the 10 highest priority recommendations as described in the Observations and Gap Assessment Report. Numbers refer to the recommendation numbers in the report. Colors denote the category of recommendation:

- Green star: Fundamental
- Yellow star: Minimal compliance

Projects have been placed in the eight Pathways depending on the predominant activities within a project. Many projects actually cover more than one Pathway.



# KEY TAKE-AWAYS

- Asset Management processes will be developed over time.
- We are well positioned to be compliant with FTA requirements.
- A few key areas need attention in the near term for full compliance:
  - Asset condition processes
  - Capital prioritization process
- Guided by the TAM Plan and the Improvement Program, we can incorporate asset management throughout the CTA.
- Even with limited resources, this will make us a stronger organization and result in better service for our customers.



# LESSONS LEARNED

- Keeping focus on near-term and concrete actions (FTA requirements) vs. aspirational and long-term goals (ISO, PAS-55)
- A larger budget would have allowed us to continue to begin implementing initial recommendations
- Collation and QC of the inventory data was much more time consuming than expected
  - Multiple data sources (EAM systems, spreadsheets, etc.), each with different elements
  - Additional data QC will occur as CTA incorporates more assets (and more asset attributes) into its EAM systems

# Questions?

**Leah Mooney**  
**[Imooney@transitchicago.com](mailto:Imooney@transitchicago.com)**  
**312-681-4250**

