Transit Asset Management Implementation Plan

Connecticut Department of Transportation

November 29, 2016

Spy Pond Partners, LLC
with CDM Smith Inc.
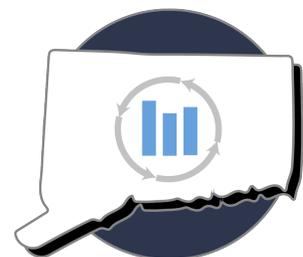
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1.0 Introduction

1.1 Background and Purpose

The mission of the Bureau of Public Transportation at Connecticut Department of Transportation (CTDOT) is "to develop, maintain, and operate a system that provides for the safe, efficient and sustainable movement of people and goods." In pursuit of that mission, CTDOT has three transit objectives:

- Maintain existing systems at a state of good repair and enhance system safety and security
- Improve efficiency and effectiveness of transit service delivery
- Expand services to capture a greater share of existing markets and address specific new markets.

CTDOT faces an unusual challenge because of the transit service delivery model in Connecticut. Unlike many other state DOTs, CTDOT owns transit systems including bus operations throughout the state as well as the Shore Line East commuter rail service. 50% of CTDOT's annual operating budget is dedicated to transit and 80% of bus ridership occurs on state owned CTtransit service.

Shore Line East train: photo courtesy of CTDOT

CTDOT has direct financial responsibility for millions of dollars of transit assets in Connecticut but contracts out the operation of transit service to private companies. To meet the requirements for developing a transit asset management plan recently finalized by the Federal Transit Administration (FTA), CTDOT is obligated to collect data, manage, and report on transit assets throughout the state. However, the various transit operators and transit districts have unclear or inconsistent asset management practices. In anticipation of the FTA transit asset management rulemaking and the eventual need for a transit asset management plan, CTDOT engaged Spy Pond Partners, LLC (SPP) with CDM Smith Inc. to conduct a gap assessment of transit asset management practices in Connecticut and to recommend a set of tasks to improve current practices and achieve FTA compliance.

This project had four objectives:

- Assess the current state of transit asset management practices at CTDOT
- Perform a transit asset management gap assessment
- Assess readiness to comply with FTA transit asset management requirements

- Develop implementation plan for addressing gaps

The project was organized into a series of tasks designed to achieve the project objectives:

- Task A – Project Kickoff
  - The project team met with CTDOT to confirm the scope of work, establish a schedule, and begin the project.
- Task B – Review of Existing Materials
  - The project team reviewed transit asset management materials provided by CTDOT to gain understanding of the current state of practice. The project team also performed a literature review of best practices and asset management and proposed a maturity model for CTDOT based on the review.
- Task C – Conduct In-Depth Interviews
  - The project team prepared an interview guide and conducted a series of interviews with CTDOT and transit operator staff. These interviews provided further detail on the current state of asset management practice in Connecticut.
- Task D – Prepare Gap Assessment Survey
  - The project team prepared a gap analysis survey using the online survey tool SurveyMonkey.
- Task E – Implement Gap Assessment Survey
  - The project team distributed the server to a list of respondents selected with the guidance of CTDOT. Following the completion of the survey, the project team compiled survey results and prepared a summary of the results.
- Task F – Transit Asset Management Workshop
  - The project team organized and facilitated a transit asset management workshop at CTDOT. The workshop presented the results of the gap analysis along with a summary of the project. Group sessions were used to brainstorm implementation tasks to address the gaps.
- Task G – Implementation Plan
  - This document is the final deliverable of Task G. It summarizes the results of the project and suggests an implementation plan with tasks to improve transit asset management practices.
- Task H – Freight Rail Asset Management Gap Assessment
  - This task was added to the project following the completion of the transit gap assessment. The project team prepared an interview guide and conducted interviews with two freight railroads that operate over CTDOT-owned guideway. Freight railroad asset management gaps were integrated into the gap assessment and to the implementation plan.

1.2 Document Organization

This guidebook is organized into four main sections:

- **Section 1** describes the background of the project and the organization of this document.
- **Section 2** defines key asset management concepts and FTA requirements. Section 2 also states CTDOT's asset management vision and objectives.

- **Section 3** details the assessment approach used by the project team to understand the current state of practice and identify gaps in the current practices.

CTfastrak bus and facility: photo courtesy of CTDOT

- **Section 4** presents the recommendations of the project team. The implementation plan is structured as a series of tasks intended to cultivate leading asset management practices and to put CTDOT on a path to compliance with FTA transit asset management rules.

- **Appendix A** includes the interview guides developed for the Task C interviews.

- **Appendix B** includes the interview notes that were taken during the Task C interviews.

- **Appendix C** includes a summary of the review of assessment approaches.

- **Appendix D** presents the list of all questions included in the gap assessment survey.

- **Appendix E** attaches the handout materials from the March 1, 2016 workshop. The materials include an agenda, exercise instructions, and gap assessment survey results.

- **Appendix F** attaches the notes summarizing the results of the workshop.

2.0 Transit Asset Management Overview

2.1 Asset Management Key Concepts

The transportation reauthorization law Moving Ahead for Progress in the 21st Century (MAP-21), for the first time, provides a federal definition of the term "asset management." Section 1103 of the bill defines the term as follows.

> Asset Management – The term 'asset management' means a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on both engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair (SGR) over the lifecycle of the assets at minimum practicable cost.

The FTA Asset Management Guide states that asset management influences customer level of service and lifecycle management. The FTA Guide defines these concepts[1]:

> Customer Level of Service – Asset management can affect level of service by improving on-time performance and vehicle cleanliness, and by reducing missed trips, slow orders, and service and station shutdowns. It can also improve safety, security, and risk management. Asset management provides accountability and communicates performance and asset condition to customers.

> Lifecycle Management – The core of asset management is understanding and minimizing the total cost of ownership of an asset while still maximizing its performance. Transit asset management integrates activities across departments and offices in a transit agency to optimize resource allocation by providing quality information and well-defined business objectives to support decision making within and between classes of assets.

Figure 1 below lays out a framework containing key concepts for implementing transit asset management according to the FTA Asset Management Guide.

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[1] Rose, D., Isaac, L., Shah, K., and T. Blake. *Asset Management Guide*. Federal Transit Administration Report No. 0027, 2012.
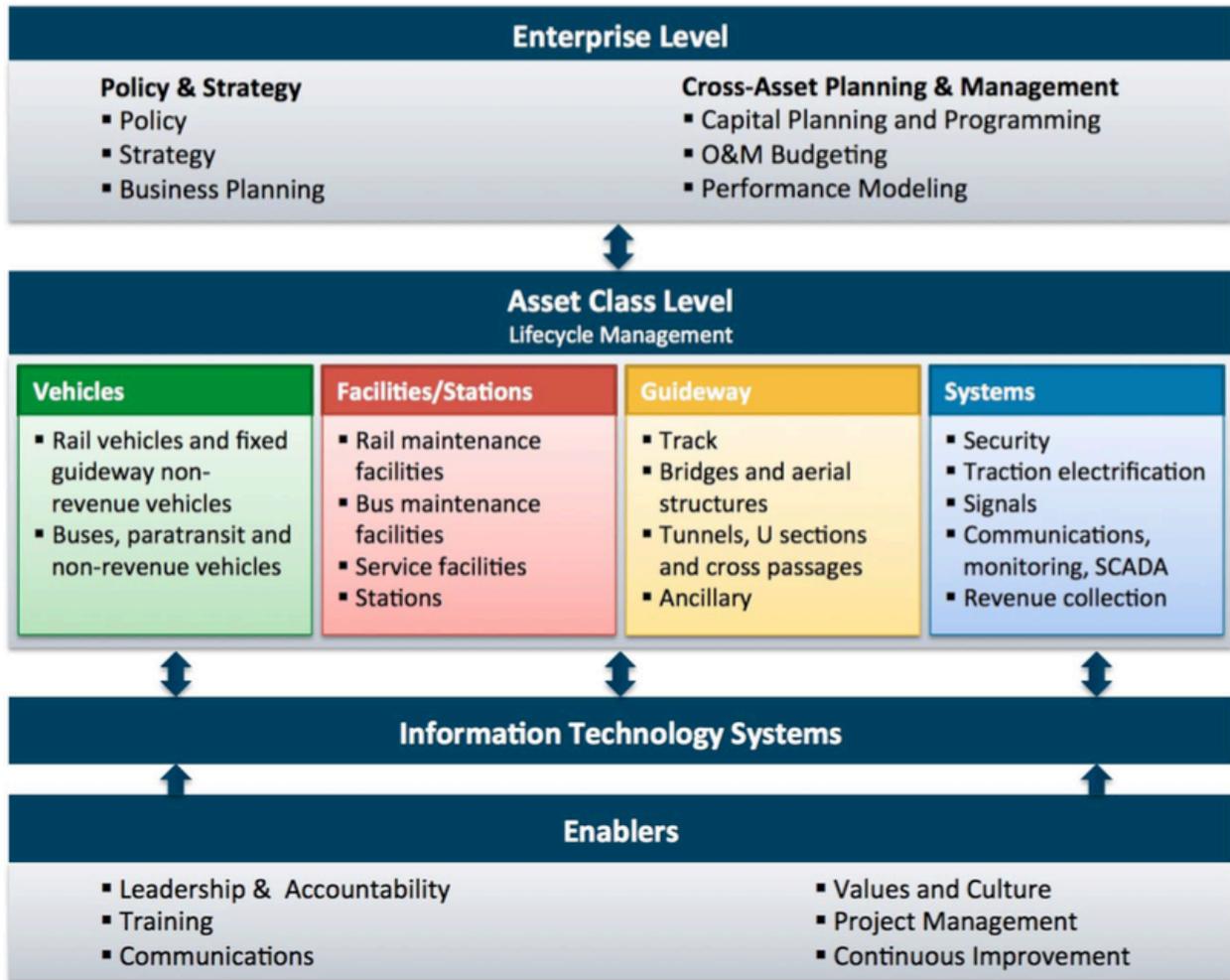
Figure 1. FTA Asset Management Framework

The FTA asset management framework includes three types of business processes: Policy & Strategy, Lifecycle Management, and Cross-Asset Planning. Figure 2 summarizes the business processes below.
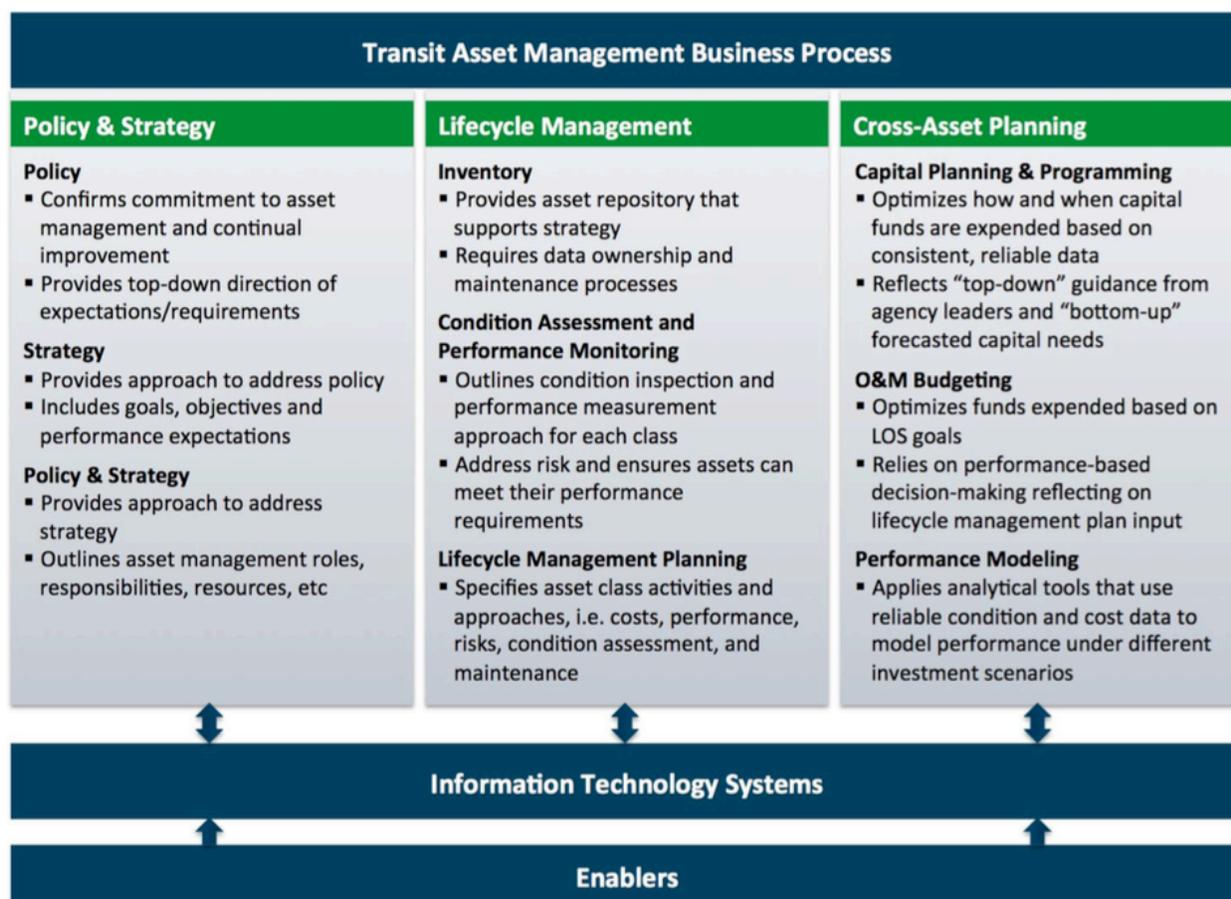
Transit Asset Management Business Process

Policy & Strategy

Policy
- Confirms commitment to asset management and continual improvement
- Provides top-down direction of expectations/requirements

Strategy
- Provides approach to address policy
- Includes goals, objectives and performance expectations

Policy & Strategy
- Provides approach to address strategy
- Outlines asset management roles, responsibilities, resources, etc

Lifecycle Management

Inventory
- Provides asset repository that supports strategy
- Requires data ownership and maintenance processes

Condition Assessment and Performance Monitoring
- Outlines condition inspection and performance measurement approach for each class
- Address risk and ensures assets can meet their performance requirements

Lifecycle Management Planning
- Specifies asset class activities and approaches, i.e. costs, performance, risks, condition assessment, and maintenance

Cross-Asset Planning

Capital Planning & Programming
- Optimizes how and when capital funds are expended based on consistent, reliable data
- Reflects "top-down" guidance from agency leaders and "bottom-up" forecasted capital needs

O&M Budgeting
- Optimizes funds expended based on LOS goals
- Relies on performance-based decision-making reflecting on lifecycle management plan input

Performance Modeling
- Applies analytical tools that use reliable condition and cost data to model performance under different investment scenarios

Information Technology Systems

Enablers

Figure 2. Transit Asset Management Business Processes

The primary MAP-21 provisions related to transit asset management are in Section 20019 of the bill, which amends Section 5326 of Title 49 of United States Code (USC). This section begins with definitions of the terms "transit asset management system" and "transit asset management plan." MAP-21 defines "transit asset management system" as:

> Transit Asset Management System – The term 'transit asset management system' means a strategic and systematic process of operating, maintaining, and improving public transportation capital assets effectively throughout the lifecycle of such assets.

And the law includes the following definition of "transit asset management plan":

> Transit Asset Management Plan – The term 'transit asset management plan' means a plan developed by a recipient of funding under this chapter that—(A) includes, at a minimum, capital asset inventories and condition assessments, decision support tools, and investment prioritization; and (B) the recipient certifies complies with the rule issued under this section.

The FTA Asset Management Guide provides definitions for other key concepts including "asset inventory" and "condition assessment and performance monitoring":

> Asset Inventory – An asset inventory is a register, or repository, of an agency's assets and information about those assets. It is intended to provide accessible, consistent, and comprehensive information about that asset class. It is also intended to provide consistent information across all asset classes to support enterprise-level business processes, including capital programming and operations and

maintenance budgeting.

Condition Assessment and Performance Monitoring – Each asset class has different requirements for condition inspection and monitoring that depend on their performance characteristics, the risks, and impacts   of failure. Gathering condition and performance data can be costly, so agencies often have strategic approaches to gathering the data that is most cost-effectively acquired and valuable. This information is used to improve reliability through an agency's ability to predict failure and address the root causes and proactively plan for the investments required to maintain good performance on the most critical assets. It also is used to manage risk and determine needs to be addressed in asset management plans.

These concepts are core pieces of the MAP-21 legislation and were finalized in the rulemaking process described in 2.2 FTA Asset Management Requirements.

2.2 FTA Asset Management Requirements

Section 20019 of MAP-21 directs the Secretary of Transportation to establish a "national transit management system" and lists the elements to be included in that system. These include:

1. a definition of the term 'state of good repair' that includes objective standards for measuring the condition of capital assets of recipients, including equipment, rolling stock, infrastructure, and facilities;

2. a requirement that the recipients and subrecipients of Federal financial assistance under this chapter develop a transit asset management plan;

3. a requirement that each recipient of Federal financial assistance under this chapter report on the condition of the system of the recipient and provide a description of any change in condition since the last report;

4. an analytical process or decision support tool for use by public transportation systems that—(A) allows for the estimation of capital investment needs of such systems over time; and (B) assists with asset investment prioritization by such systems; and

5. technical assistance to recipients of Federal financial assistance under this chapter.

Section 20019 also requires the Secretary of Transportation, to "establish performance measures based on the state of good repair standards . . ."

The FTA final rule on transit asset management[2] was published on July 26, 2016 and adds a new part 625 to Title 49 of the Code of Federal Regulations. The five components of the rule are the definition of "state of good repair", a requirement to develop transit asset management plans, a requirement to set performance targets based on state of good repair performance measures, a requirement to report annually, and technical assistance from FTA. Major provisions of the rule are summarized below.

Sections 625.25 through 625.33 of Title 49 establish requirements for transit asset management plans. Transit providers may be required to either develop their own TAM plan or participate in a group TAM plan depending on whether they are Tier I or Tier II. The rule defines Tier I and Tier II providers:

Tier I provider means a recipient that owns, operates, or manages either (1) one hundred and one (101)

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[2] FTA. *Final Transit Asset Management Rule*. Federal Register, Volume 81, Number 143. 2016.

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.

Tier II provider means a recipient that owns, operates, or manages (1) one hundred (100) or fewer vehicles in revenue service during peak regular service across all non-rail fixed route modes or in any one non-fixed route mode, (2) a subrecipient under the 5311 Rural Area Formula Program, (3) or any American Indian tribe.

States must develop a group TAM plan for Tier II transit providers, while Tier I providers must develop their own TAM plans. Tier II providers may also choose to forgo the group plan and develop individual plans. A TAM plan needs to include TAM and SGR policy, TAM plan implementation strategy, an asset inventory, condition assessments, a description of systems used to predict capital needs, a project-based prioritization of investments, a description of key TAM activities, a list of TAM resources, and an outline for updating the plan and TAM practices.

An asset inventory will include all equipment, rolling stock, facilities and infrastructure owned by a transit provider. A provider must also conduct condition assessments, set performance targets, and prioritize investment for all assets in the inventory for which the provider has direct capital responsibility.

The performance measures for capital assets are defined by FTA in § 625.43:

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 useful life benchmark (ULB).

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.

Infrastructure: rail fixed-guideway, track, signals, and systems. The performance measure for rail fixed-guideway, track, signals, and systems is the percentage of track segments with performance restrictions.

Facilities. The performance measure for facilities is the percentage of facilities within an asset class, rated below condition 3 on the TERM scale.

Each transit provider must report performance targets and asset condition annually to the National Transit Database (NTD), as well as an annual narrative report that summarizes changes in the transit system and documents the provider's transit asset management efforts. The providers must set performance targets within three months after October 1, 2016, the effective date of the rule. The targets must be updated at least once a year.

2.3 Asset Management Vision and Objectives for CTDOT

CTDOT's goals extend beyond FTA compliance. This project and the effort to write this report began before the FTA rule on transit asset management plans was finalized. CTDOT seeks to implement best practices in asset management to improve the way they do business, to assist other transit operators in Connecticut, and to meet FTA regulatory requirements.
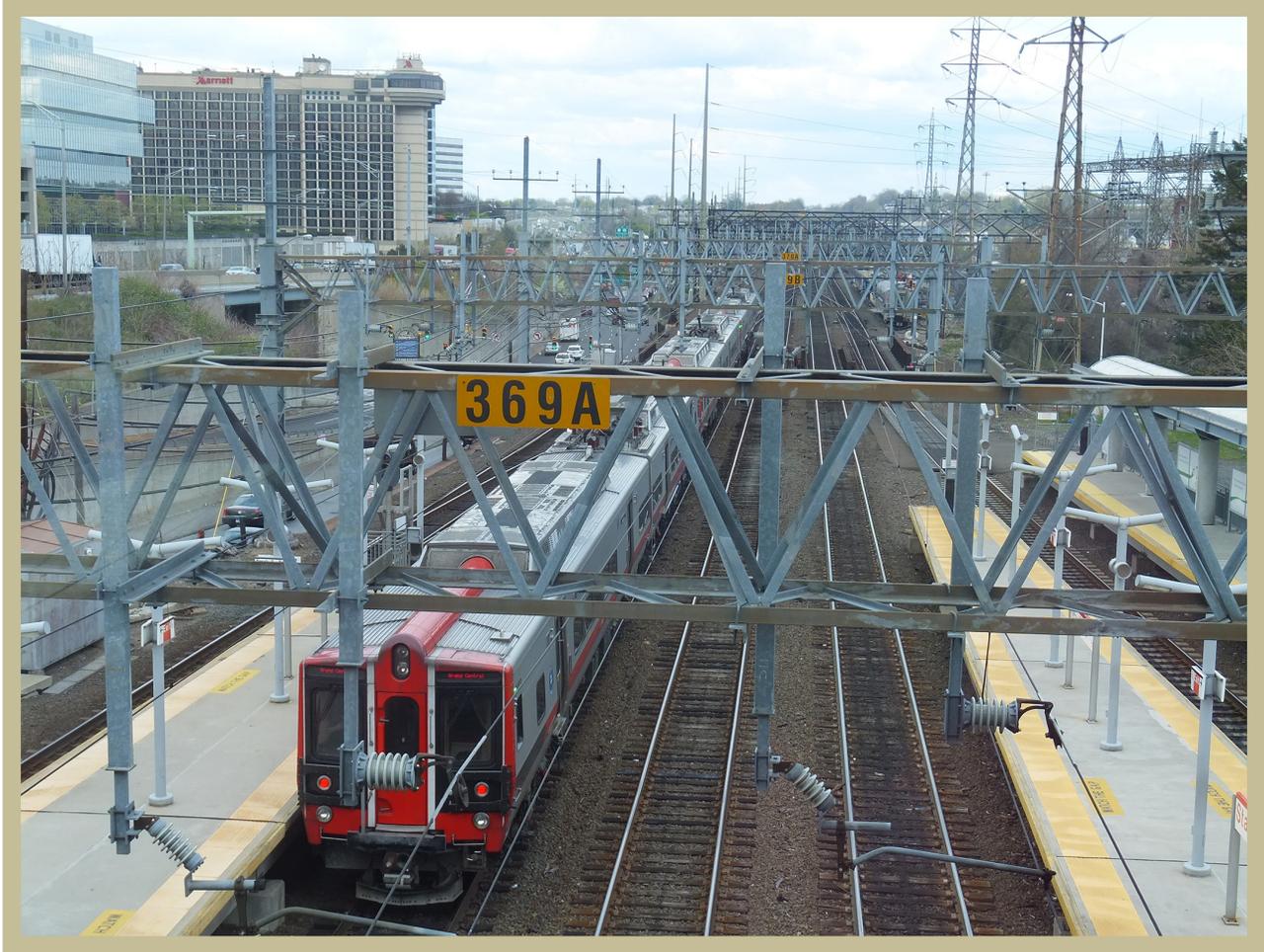
Metro-North Railroad train at Stamford Station: photo courtesy of Ritu Manoj Jethani/shutterstock.com

3.0 Assessment Approach

This section describes the interviews of CTDOT and transit operator staff, the selection and development of an assessment approach, and the assessment approach chosen by the project team.

3.1 Interviews

As part of Task C, Conduct Interviews, the project team interviewed CTDOT staff from a variety of offices and staff from transit providers that operate in Connecticut. The project team prepared interview guides, which varied slightly for different organizations, in conjunction with CTDOT and distributed the guide to interviewees. These in-person interviews helped the project team form an understanding of current transit asset management practices in Connecticut and also illustrated potential gaps in current practices. The interviews, along with the review of existing materials and the gap analysis survey, informed the writing of the gap assessment. The interview guides are presented in Appendix A and the interview notes are presented in Appendix B.

3.2 Self-Assessment Survey

As part of Task B, Review of Existing Materials, the project team reviewed various transportation asset management self-assessment tools and maturity models. The review included documents from federal agencies, state agencies, local agencies, and other organizations. A summary of that review is included in Appendix C. Based on the review, the project team developed a CTDOT transit asset management self-assessment which included 27 multiple choice questions. The self-assessment was implemented as an online survey using SurveyMonkey. The survey was sent to 80 individuals representing five different groups: CTDOT, transit districts, CTtransit, Amtrak, and Metro-North. 34 individuals completed the survey, including 14 from CTDOT.

The CTDOT Transit Asset Management Self-Assessment borrowed the scoring structure of the FTA tool but presented the results differently. The FTA tool calculated scores on a five-point scale according to the statement responses submitted on the survey. Answering "1 – Strongly disagree" yielded one point for that statement, while answering "5 – Strongly agree" yielded five points. Statement points were totaled by area and divided by the total potential points of the statements. The resulting percentage was the maturity score for the area. The total potential points for an area was merely the number of statements in the area multiplied by five. An important exception to this rule was if "Not applicable or don't know" were selected as a response. In this case, the potential points of the statement were zero, effectively removing the statement from the score calculation. This means that maturity scores were neither penalized nor helped by such an answer; it had no effect on the score.

The Inventory, Condition, & Lifecycle questions were asked for each asset class for which the responding organization has responsibility. For example, CTDOT respondents answered questions for all five asset classes, whereas Transit Districts didn't answer questions on Rail Vehicles or Fixed Guideway. Thus CTDOT respondents have separate maturity scores for Inventory, Condition, & Lifecycle for five asset classes, meaning a total of eight maturity scores

including the other three areas. The maturity scores for Inventory, Condition, & Lifecycle by asset class can also be rolled up into one maturity score by dividing the total points of the all Inventory, Condition, & Lifecycle statements by the total potential points of the statements.

The CTDOT Transit Asset Management Self-Assessment used the same underlying five point scale as the FTA tool, but presented the scoring in three tiers instead of as a single percentage or maturity score. The CTDOT tool presented the percentage of responses by three levels of agreement: "Strongly disagree" or "Disagree"; "Neither agree nor disagree"; and "Strongly agree" or "Agree".

This modification was made in order to highlight the varying levels of agreement to the survey statements that might be obfuscated by the FTA approach. For example, when using the FTA scoring approach, four responses of "Strongly agree" and one response of Strongly disagree" for a given area would result in a maturity score of 84% for that area. That would indicate significant progress towards transit asset management objectives. However, that high-percentage score hides the response of "Strongly Disagree". The CTDOT tool scoring was design to avoid this confusion. Using the CTDOT tool for the same example data, the responses would be labeled 80% "Strongly agree/Agree" and 20% "Strongly disagree/Disagree."

Selected summary results are presented in Section 3.3. The survey data were used to create a number of charts showing the survey results. These charts were part of the workshop materials presented at the CTDOT Transit Asset Management Workshop. The workshop handout materials, including the survey results, are presented in Appendix E. Notes from the workshop are attached in Appendix F.

3.3 Assessment Summary

The survey results confirmed the findings of the interviews. As shown below in Figure 3, respondents indicated higher levels of agreement with areas like inventory and condition data for vehicles, capital planning, and policy, goals, and objectives across all organizations. The lowest levels of agreement were for information systems and for inventory and condition for other assets.
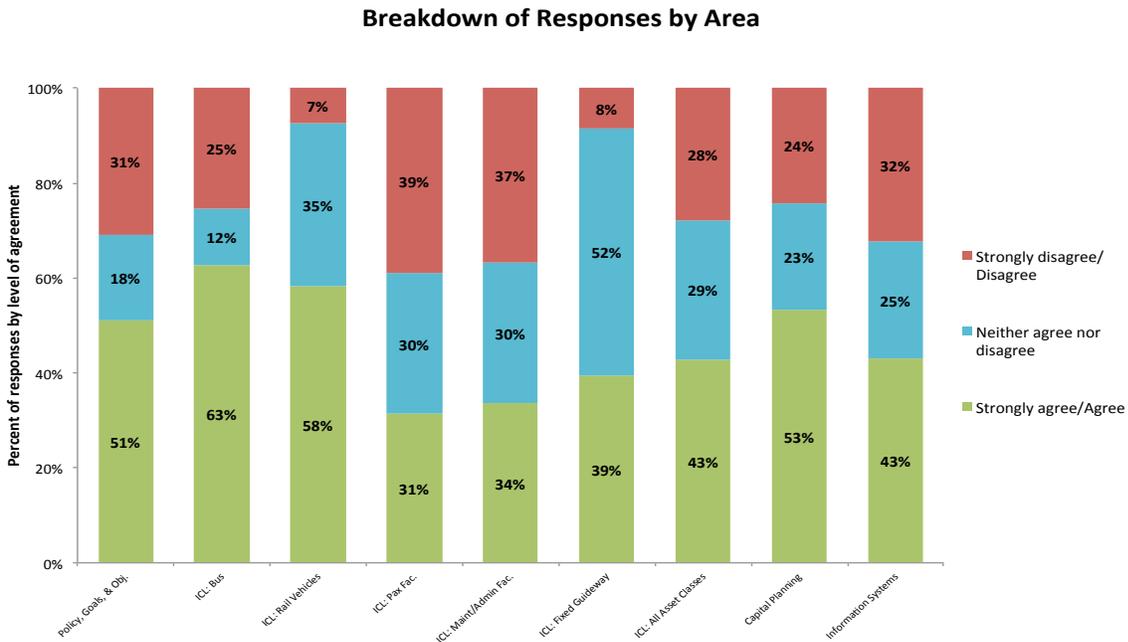
Breakdown of Responses by Area

Figure 3. Self-Assessment Results – All Organizations

Figures 4 and 5 show the self-assessment results for respondents with the CTDOT Bus and Rail groups, respectively. Respondents from CTDOT Bus had higher levels of agreement for statements in Policy, Goals, & Objectives; Capital Planning; and Information Systems. Both bus and rail responses exhibit a consistent trend of higher agreement for vehicles than facilities.
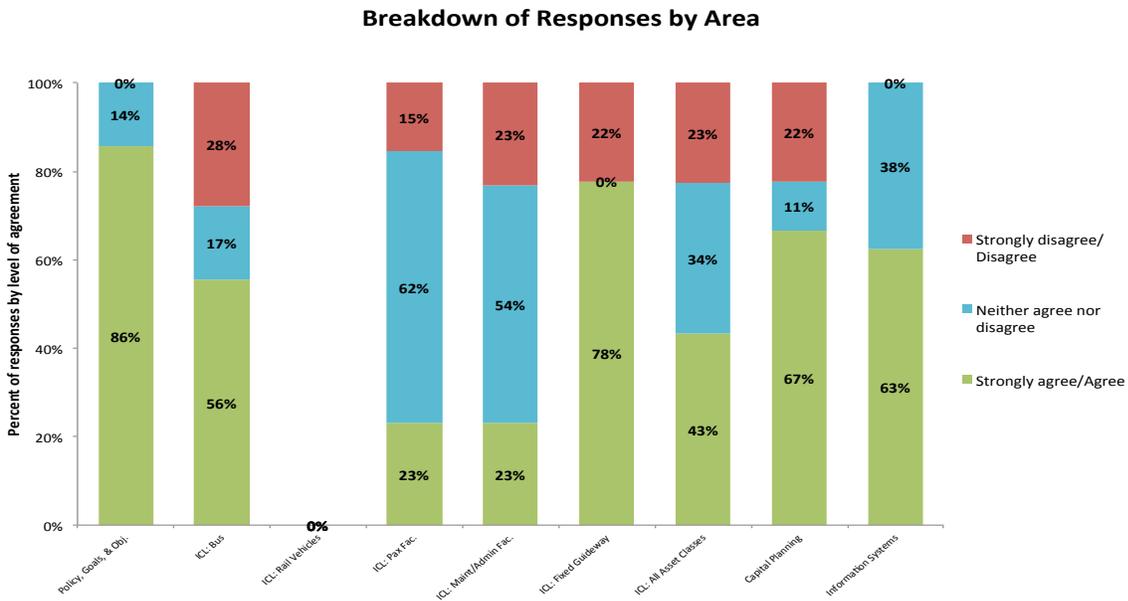

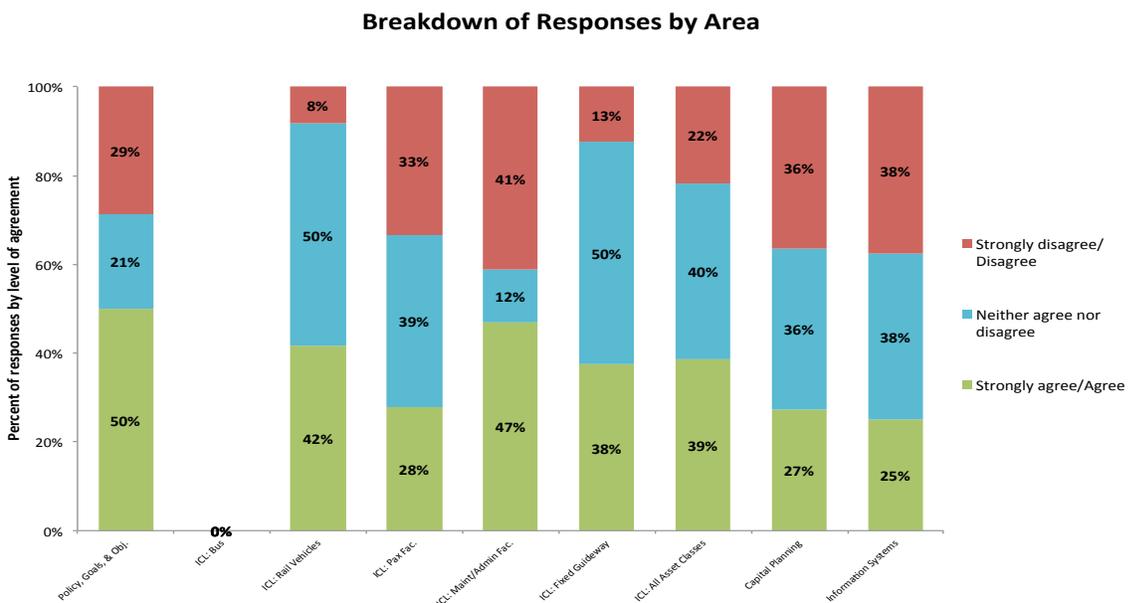**Figure 4. Self-Assessment Results – CTDOT Bus**

Figure 5. Self-Assessment Results – CTDOT Rail

Figure 6 shows the asset management maturity level scores calculated from the survey responses. Maturity levels, described in this report in Appendix C, are defined by the FTA Asset Management Guide and have a target of 80% for each level. Figure 6 below shows that each Maturity Level score was lower than the target of 80%. The results showed a downward trend in scores from Maturity Level 1 to 5, which was consistent with expectations.
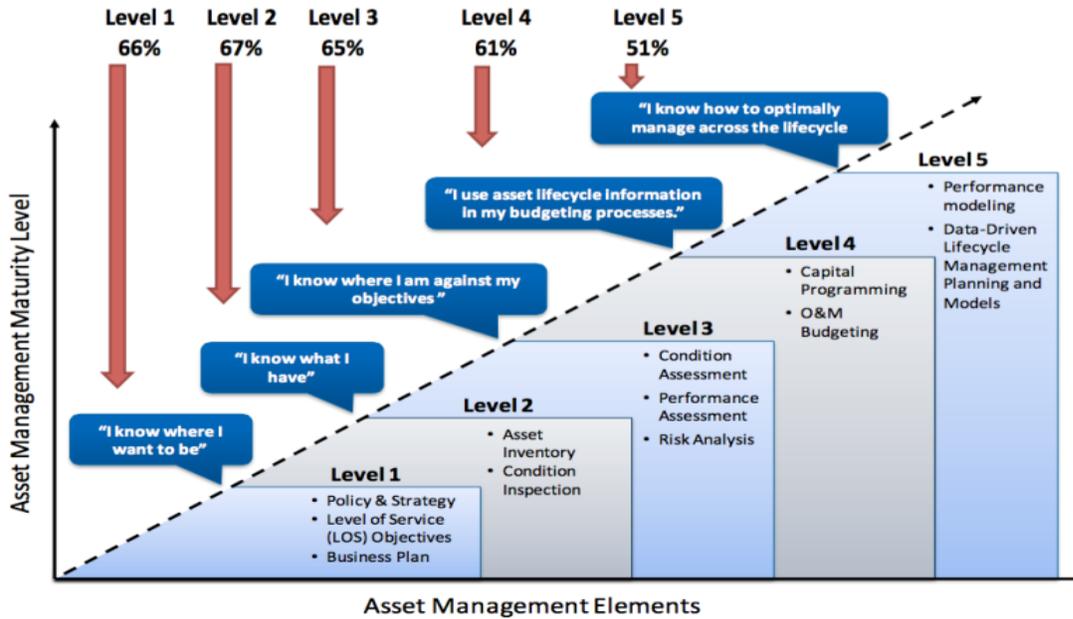

Figure 6. Asset Management Maturity Level Scores

The responses from the interviews and the survey suggest progress and need for improvement in all aspects of asset management. Figure 7 breaks down the responses that made up the maturity level scores.
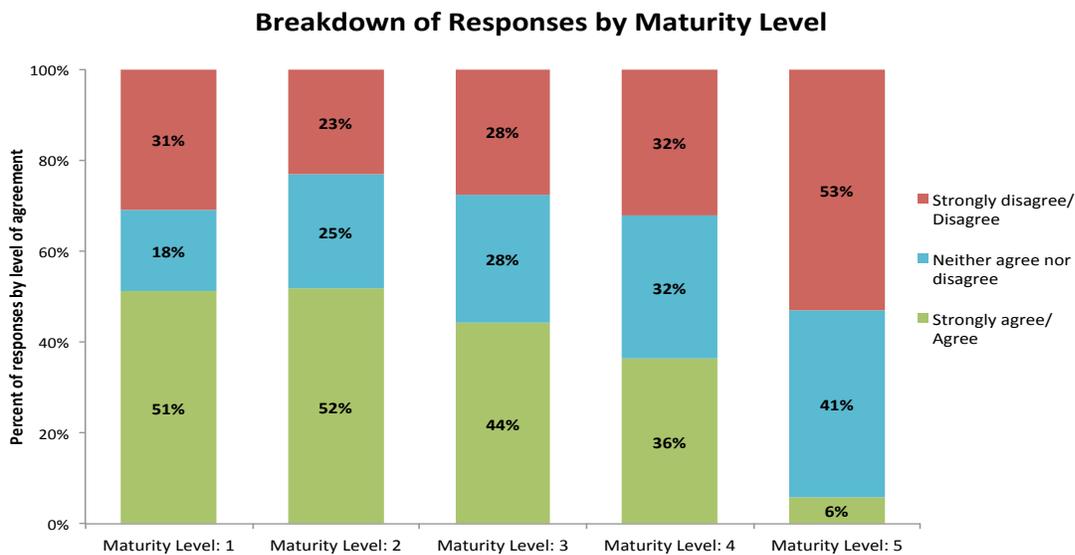

Figure 7. Self-Assessment Responses by Maturity Level

3.4 Gaps

A major product of the project is a gap assessment comparing existing transit asset management practices to best practices and needs for supporting development of an FTA-compliant asset management plan. The gaps generated represent the deficiencies in current practices relative to best practices and/or practices needed to fulfill FTA's asset management requirements. The gaps are organized into four groups: Inventory and Condition Gaps, Business Process Gaps, Information Systems Gaps, and Staffing Gaps. This assessment provides the foundation for the development of the implementation plan detailed in Section 4 of this plan.

3.4.1 Inventory and Condition Data Gaps

The assessment yielded the following results concerning inventory and condition data:

- **Use of Core-CT for inventory data:** Inventory and condition data on state-owned facilities are currently recorded in Core-CT.

  Other transit operator facilities may also be listed in Core-CT if CTDOT has provided capital funding to construct or improve the facility. CTDOT and CT transit providers need better inventory and condition data for their administrative, maintenance, and passenger facilities. CTDOT would benefit from a formal asset hierarchy that defines the systems and individual assets within each facility. Beyond high-level summary data at a facility level, facility inventory data is of inconsistent detail and quality. Administrative and maintenance facilities data are collected at a nominal level. Passenger facilities data, although more in depth, are not collected on a routine basis. In some cases CTDOT or its contractors have defined assets/systems within the facility and inventoried these. Likewise, some transit operators have implemented formal systems or approaches for inventorying their facilities. In other cases, no such formal inventory appears to have been developed.

  Regarding facility condition, Core-CT contains a field for specifying overall condition of a facility on a five-point scale. However, CTDOT provides no detailed guidance for assessing facility condition, and condition is specified only at the overall facility level. Best practices in asset management include assessing conditions at a more detailed level (e.g., for major facility systems) to better support capital investment decisions. Detailed condition assessments have been performed on an ad-hoc basis for individual facilities, or for groups of facilities (e.g., passenger stations). But CTDOT needs a structured approach for performing routine condition assessments. Practices vary between CT transit operators, but based on the project interviews and self-assessment, it appears many, if not most, would benefit from condition assessment approaches.

- **Use of track charts for rail guideway inventory data:** The inventory at CTDOT for rail guideway assets, excluding bridges, is defined primarily through a set of track charts.

  These charts are an invaluable resource but would benefit from detailed inventory and condition data on guideway assets that may be valuable for managing these assets and supporting investment decisions. Rail guideway owned by CTDOT used for transit

service includes the Northeast Corridor (NEC) between New Haven and the New York border, as well as the New Canaan, Danbury, and Waterbury branch lines. Additional lines used for freight service include the Torrington Branch Line, the Middletown Cluster, the Willimantic Line, the Griffin Line, the Wethersfield Secondary Line, the Armory Branch line, and the Suffield Branch Line. The track charts for freight lines are not being maintained. CTDOT has a well-established system for inventorying and inspecting rail bridges along the guideway. Further, CTDOT, its contractors, and freight railroads comply with Federal Railroad Administration (FRA) regulations in inspecting and maintaining this guideway.

CTfastrak's bus rapid transit guideway is owned by the State and is also considered fixed guideway based on FTA definitions. Based on information gained from interviews with CTDOT it is our understanding that CTDOT's Pavement Management System (PMS) serves as the source of inventory and condition data for CTfastrak pavement, while bridges on the guideway are managed through CTDOT's Bridge Management System (BMS).

CTfastrak bus: photo courtesy of CTDOT

3.4.2 Business Process Gaps

The assessment yielded the following results concerning business processes:

- **Estimation of future capital needs:** Currently CTDOT staff estimate capital needs based on historical data.

  CTDOT is challenged to determine the funding required to restore CT transit and freight assets to a state of good repair (SGR) without sufficient data on facilities and guideway. However, CTDOT will likely need to make such estimates for transit to comply with FTA transit asset management requirements. CTDOT does have sufficiently detailed data to support predicting SGR needs for transit vehicles, including CTDOT-owned vehicles and other transit operator-owned vehicles. However, without sufficient data on facility and guideway conditions, CTDOT relies on staff estimates of capital needs and historic data to the extent it predicts future needs.

- **Prediction of future changes in SGR:** CTDOT relies on institutional knowledge and historical data to predict future needs for state of good repair on facilities.

  A challenge CTDOT faces is that it needs a structured approach to predicting future changes in funding required to meet SGR needs for facilities. Addressing this gap requires: predicting current SGR needs; predicting effects of future capital investments; and predicting effects of asset deterioration in the absence of investment. The review of current practices in transit asset management suggests that many agencies would benefit from such a capability and/or rely on FTA tools such as the Transit Economic Requirements Model (TERM) to predict future SGR needs. Some prediction of future need will likely be required to support FTA transit asset management requirements.

- **Performance measure reporting:** CTDOT's Quarterly Performance Measures Summary reports an extensive set of performance measures.

  Concerning rail vehicles, the Quarterly Performance Measures Summary includes data on Mean Distance Between Failures (MDBF) for New Haven Line locomotives and coaches. However, the report currently does not include data on MDBF for the Shoreline East fleet. This appears to stem from limitations in the fleet management system used by CTDOT's contractor for the service, Amtrak. The Amtrak system tracks data by train, but Shoreline East trains are frequently reconstituted, thus complicating the process of localizing failures to specific vehicles. The Department needs more thorough and standardized collection of performance measures for all of its state-owned assets for rail and bus.

  The Quarterly Performance Measures Summary described above similarly would benefit from measures of performance for CTDOT's fixed transit and freight assets, including guideway, administrative/maintenance facilities and passenger facilities. Such measures are included for highway assets such as pavement and bridges. CTDOT has sufficient data to report performance for rail bridges, similar to that reported for highway bridges, but needs more data to report performance for other fixed transit and freight assets given the gaps described previously.

- **Developing a transit capital plan:** CTDOT staff utilize extensive knowledge and experience to develop placeholder estimates of future capital needs based on historical data.

Despite needing more detailed data on transit facilities and guideway, CTDOT capital programming staff are nonetheless charged with developing a capital program that includes funds for these assets. Fortunately, CTDOT staff have extensive knowledge and experience regarding these assets, and are able to work around the data issues described above through techniques such as developing placeholder estimates of future capital needs based on historic data. However, the process for developing the transit capital plan is not well documented. CTDOT needs a well-documented, data-driven process for developing its transit capital plan, particularly with respect to plans for facility investments.

- **Oversight of maintenance plans:** Generally CTDOT and transit operators develop and actively follow maintenance plans for vehicles and facilities. Routine maintenance on facilities is commonly outsourced.

Absent carefully structured contracts and maintenance plans, outsourcing maintenance can create disincentives for instituting effective asset maintenance practices. In the case of CTDOT these plans are particularly important given CTDOT relies on outsourcing for much of its routine maintenance. CTDOT develops maintenance plans

CTtransit maintenance facility: photo courtesy of SPP

for new facilities, but appears to need mechanisms for confirming these plans are followed. Further, many older facilities may not have maintenance plans altogether. FTA requires transit providers to develop maintenance plans for their vehicles and facilities. These plans effectively describe the lifecycle asset maintenance policies employed to maintain SGR for the vehicle fleet or facility. They are thus important as a means of establishing a transit agency's day-to-day asset management practices.

Generally the project team found that CT transit providers were well aware of the importance of developing maintenance plans, have developed these documents, and actively maintain them. However, it appears there are gaps in CTDOT's practices for developing maintenance plans for facilities. These plans appear to be routinely developed for new facilities, but may not exist for older facilities. Also, based on the interviews conducted as part of the project it is unclear how or whether these plans are
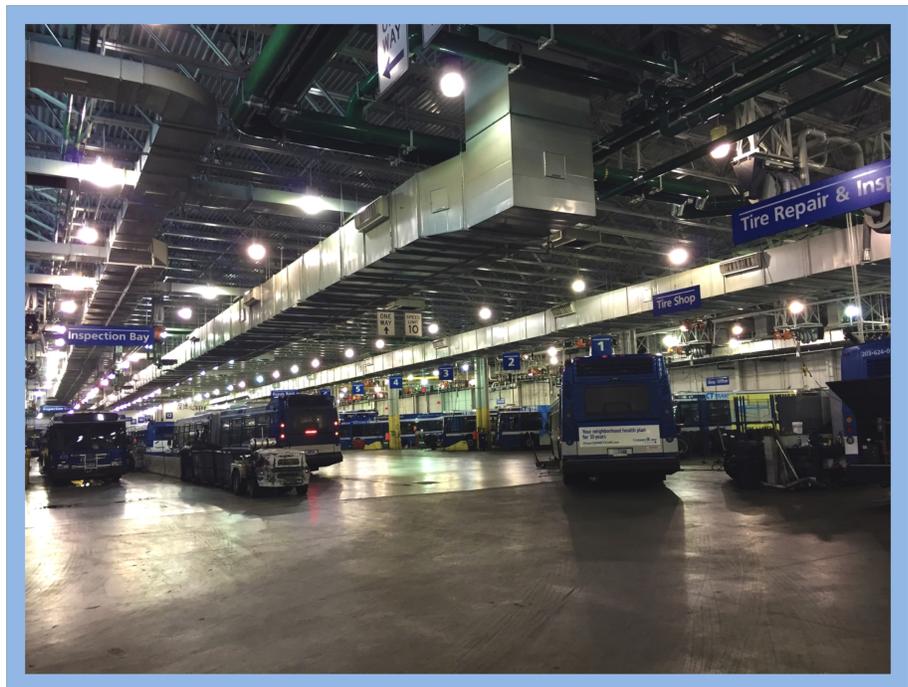
being shared with CTDOT contractors responsible for facility maintenance.

- **Tracking maintenance on state-owned guideway:** Private freight railroads have trackage rights agreements with CTDOT to operate over and maintain state-owned guideway.

The freight railroads perform significant maintenance on the state-owned guideway, but CTDOT only receives a record of the work if it is performed with state or federal funds. Maintenance performed by the freight railroads on state-owned guideway using private funds is not reported to CTDOT, leaving the agency with an incomplete record of rail maintenance. It appears that there are no requirements or mechanisms for reporting privately-funded maintenance work to CTDOT. CTDOT needs mechanisms for tracking maintenance work performed by freight railroads on state-owned guideway.

3.4.3 Information System Gaps

The assessment yielded the following results concerning information systems:

- **Asset management system:** Core-CT is the financial management tool for the State of Connecticut and CTDOT relies on the asset management module as its system of record for tracking asset inventory.

Core-CT is intended to support financial management and is ill-suited for supporting day-to-day asset management functions. The asset management module is used for purposes such as tracking asset value. CTDOT asset owners (and some transit agencies with vehicles or facilities purchased/improved with CTDOT funds) are provided with a list of assets on an annual basis and asked to update the condition of the asset stored in the system (using a single value specified on a five-point scale).

While the project team has no reason to doubt the adequacy of Core-CT as a financial management system, its is clearly not intended as a system that supports day-to-day asset management functions such as tracking inspections, condition data, and maintenance work. As noted previously assets are specified at a very high level, typically with a single record for each vehicle and facility (though in some cases movable pieces of equipment within a facility may also be tagged as assets). Asset owners do not typically have direct assess to the system. The system does not track inspections or work performed on individual assets. In the case of vehicles, CTDOT's transit providers (CTtransit, Metro-North Railroad and Shoreline East) maintain supplement vehicle management systems that complement Core-CT, while also storing an asset identifier derived from the system. For facilities, such systems are either in development, incomplete, or lacking.

- **Asset management systems for transit operators:** Several transit operators have or are in the process of implementing asset management systems to support facility maintenance.

Many transit operators don't own systems for supporting day-to-day management of their facilities, in part because it would be cost-prohibitive to implement such systems for managing individual facilities. Several CT transit providers reported in interviews or the self-assessment performed for the project that they have or are in the process of implementing asset management systems that will support day-to-day management of

their facilities. But most reported they didn't have a formal asset management system. Further, most CT transit agencies operate only one or two facilities, and it is not clear whether it would be practical for them to shoulder the cost of implementing a formal, commercial off-the-shelf asset management system for tracking day-to-day asset management work. Thus, while there are clearly potential benefits to implementing asset management systems to support facility maintenance, and implementing such systems is consistent with best practice, it does not appear realistic for most CT transit providers to implement their own such systems.

3.4.4 Staffing Gaps

The assessment yielded the following results concerning staffing:

- **Asset management staffing:** CTDOT works with transit operators and third party contractors to collect data necessary for transit operations.

  CTDOT would benefit from more staff time to perform extensive review or independent verification of data submitted to CTDOT related to outsourced contracts and to conduct engineering assessments and/or condition assessments. A key issue CTDOT staff face is that staff time is highly constrained, making it difficult for CTDOT to take on new initiatives unless they immediately result in time savings. And for highly specialized activities the constraints can be all the more pressing. Critical areas identified through the assessment where staff time is needed but in short supply are in reviewing/verifying data related to outsourced contracts, and conducting engineering or condition assessments. Regarding review/verification activities, CTDOT retains the right to perform independent verification of data reported by its contractors, e.g. to verify that contractors are performing the maintenance to which the committed to perform on a CTDOT facility as part of their contract. But CTDOT staff charged with reviewing contractor invoices simply do not have the time to perform extensive reviews. Regarding the need for engineering/condition assessments, CTDOT will need to devote greater staff time to assessing asset conditions to address the needs identified above, but it is not clear that staff with the requisite skills are available given their other competing priorities.

4.0 Implementation Plan

4.1 Improvement Tasks

This section presents an implementation plan for addressing the gaps identified in Section 3.4. A set of ten improvement tasks is recommended to improve CTDOT transit asset management practice. A draft version of these tasks was assembled as part of the project workshop held on March 1, 2016. The following paragraphs present additional details on the highest-priority improvements identified at the workshop. The task descriptions are followed by an initial schedule illustrating time requirements and interrelationships between tasks.

The discussion below provides the following details for each task:

- **Description:** brief description of the task.
- **Motivation:** how the tasks addresses the gaps identified in Section 3.4 and/or relates to other needed tasks.
- **Work Steps:** initial list of specific activities to be performed as part of the task.
- **Deliverables:** results that will be produced once the work steps have been completed.
- **Timeframe:** estimated calendar time required to complete the task assuming sufficient staff are available to perform the work.
- **Level of Effort:** initial estimate of effort to complete the work on a low/medium/high scale. Note we have not attempted to calculate a specific cost for each task, and the estimates provided are intended primarily to support comparisons between tasks. However, to a first approximation, we expect that tasks with a low level of effort specified can be performed with two weeks or less of staff or consultant time. Tasks with a medium level of effort are expected to require between two weeks and two months of time, while a high level of effort is specified for more time-intensive tasks.
- **Required for Compliance:** initial assessment of whether the task is required for complying with FTA's transit asset management rule. Tasks not required for compliance are recommended to support a comprehensive asset management approach, but do not directly impact performance reporting or transit asset management plan (TAMP) development required by the rule.

Task 1. Develop the Asset Hierarchy

Description

This task involves defining a hierarchy of assets and sub-assets for use in day-to-day asset management activities, including inventory tracking, condition assessment, and maintenance tracking. The task should address the hierarchy for guideway-related assets (including bridges), administrative/maintenance facilities, and passenger facilities. We expect the hierarchy will be three or more levels in depth and will break assets into systems and sub-assets. To the maximum extent possible the hierarchy should be based on available existing approaches, such as those used by other transit agencies and/or implemented in FTA's TERM Lite tool.

For rail assets we have assumed that the hierarchy will be derived from the work to define a

hierarchy performed previously by Metro-North Railroad. If a revised structure is needed then additional time and effort would be required for this task.

Motivation

CTDOT relies on the asset management module of Core-CT as its system for tracking the asset inventory. However, this system specifies assets only at a high level. To address the gaps with respect to inventory and condition data identified in Section 3.4.1, CTDOT should first define a comprehensive hierarchy then proceed with other improvements described in the following sections that utilize the hierarchy.

Work Steps

1. Form a set of working groups of CTDOT, transit provider, and railroad staff to review and finalize the asset hierarchies. Separate groups should be formed for facilities and guideway.
2. Review existing asset hierarchies, including those used by CT transit providers and railroads, established in TERM and detailed in recent FTA publications.
3. Develop a proposed hierarchy.
4. Conduct two to three meetings with each working group, including an initial meeting to review existing practices and one or more meetings to review and finalize the proposed hierarchies.
5. Finalize the hierarchy and map existing assets to the hierarchy where feasible.

Deliverables

- Standards for asset classes and inventory structure, including attributes to be collected and protocol for hierarchy of assets.
- Draft asset inventory including existing data that can be readily mapped to the inventory.

Time Frame

6 months

Level of Effort

High

Required for Compliance

Yes

Shore Line East locomotive: photo courtesy of CTDOT

Task 2. Standardize Condition Assessment Approaches

Description

This task involves developing a condition assessment approach for transit administrative, maintenance and passenger facilities and rail guideway. The approach should describe what assets need to be assessed, at what level of detail, and how the assessment should be performed. For facilities. this task should leverage recent work performed by project team members for FTA (pending publication). For guideway assets CTDOT should coordinate with Amtrak and Metro-North Railroad, in particular, and implement an approach that best meets the needs of CTDOT and its stakeholders.

Motivation

Condition data are needed to best assess the state of repair of CTDOT's fixed assets. Defining a condition assessment approach will address the gaps identified in Section 3.4.1 and is needed to meet expected FTA requirements.

Work Steps

1. Meet with Amtrak and Metro-North Railroad to review condition assessment approaches in use by or under development by these stakeholders.

2. Review condition assessment approaches identified above or under development by FTA.

3. Define the rating system to assess asset condition (e.g., the five point TERM scale and/or other rating scales). If the rating scale is different from that in TERM, then this step should also involve logic for translating ratings into the TERM scale.

4. Define the levels at which condition assessments should be performed on the asset hierarchy defined in Task 1. It is expected that assessments will be performed by asset system rather than overall facility.

5. Develop a condition assessment language, checklist and templates for inspections/assessments.

6. Meet with the working groups formed previously to review the approach and define a set of implementation steps.

Deliverables

- Recommended condition assessment approach for facilities and guideway assets. This should include the rating scale to use for assessing condition, description of the assessment process, and condition assessment language,

- Templates for performing inspections for each asset class.

Time Frame

1 year

Level of Effort

High

Required for Compliance

Yes

Task 3. Establish Performance Measures

Description

For this task, CTDOT will define and implement performance measures for facility condition and Shoreline East vehicles. The facility measures should be derived from the condition assessment data defined in Task 2. The vehicle measures should be based on existing measures for other rail vehicles. The task may also include development of measures for other asset classes if desired.

Motivation

Two of the gaps described in Section 3.4.2 related to the need for performance measures for selected asset types. This task will build upon Tasks 1 and 2 to define performance measures characterizing asset conditions that can be incorporated into CTDOT's Quarterly Performance Measures Summary.

Work Steps

1. Following completion of Task 2, define one or more measures of facility performance measures for reporting condition of administrative/maintenance and passenger facilities.
2. Convene one or more meetings with CTDOT and Amtrak staff to establish an approach to obtaining MDBF data for the Shoreline East fleet on a routine basis using a systematic approach.
3. Establish a short-term approach to determining Shoreline East MDBF pending completion of any needed system/process changes.
4. Evaluate whether additional measures are needed for other asset classes besides vehicles and facilities, and if so define these.
5. Work with relevant CTDOT staff to propose changes to the structure of the Quarterly Performance Measures Summary and develop a schedule for implementing the changes.

Deliverables

- Recommended set of performance measures to be included in the Quarterly Performance.
- Plan detailing needed changes to the Quarterly Performance Measures Summary and the schedule for implementing these changes.

Time Frame

6 months

Level of Effort

Medium (potentially greater if the task is expanded to encompass additional asset classes)

Required for Compliance

No

Task 4. Implement a Statewide Facilities Asset Management System

Description

In this task, CTDOT will define the requirements for, purchase/acquire and implement an asset management system that will support day-to-day management of Connecticut transit facilities, including administrative, maintenance and passenger facilities. Once implemented the system will be used for managing CTDOT-owned assets, but could be made available for other CT transit providers to use as well. Note this task could be extended to address management of other CTDOT facilities in addition to transit facilities.

It is important to note that implementing a new asset management system would be a significant undertaking, potentially requiring a multi-million dollar system acquisition or development project. This task should be undertaken only if an appropriate level of management support exists for this effort and it is not strictly required for complying with FTA requirements.

Motivation

Using an asset or facilities management system to track day-to-day inspection and maintenance activities is consistent with best practices in asset management. As noted in Section 3.4.3, CTDOT and other CT transit providers typically have systems for managing maintenance of their vehicles but tend to need systems for facility management. We recommend that CTDOT lead the implementation of such a system, and make the system available to other CT transit providers to use on an optional basis.

Work Steps

1. Define a stakeholder group or steering committee to oversee work on this task, at a minimum including staff from the Office of Information Systems, CTDOT transit staff, and one or more other CT transit providers interested in using the State's system.
2. Define the functional requirements for a facilities management system.
3. Review existing COTS systems that may meet the requirements
4. Determine whether CTDOT should develop a new system or license an existing COTS asset management system.
5. Proceed with system development or acquisition.
6. Implement the new system.
7. Conduct a set of sessions with CTDOT transit providers to familiarize them with the features of the new system, as well as the benefits of using the new system versus other approaches.

Deliverables

- Asset management system for managing CT transit facilities.

Time Frame

2 years

Level of Effort

High

Required for Compliance

No

Task 5. Improve Oversight of Maintenance Plans and Maintenance Activities

Description

This task consists of standardizing the methods or processes for creating and maintaining maintenance plans, as well as for tracking maintenance work. In general, the work for improving maintenance plans would include: a) collect existing plans, b) create a repository of plans, c) develop process for review of plans, d) standardize components of maintenance plans, and, e) better

documentation of existing practices. Regarding tracking of maintenance activities, the most significant gap is in tracking maintenance work performed by freight railroads on CTDOT-owned guideway. Further discussion is needed within CTDOT regarding what data are needed and how these data should best be obtained.
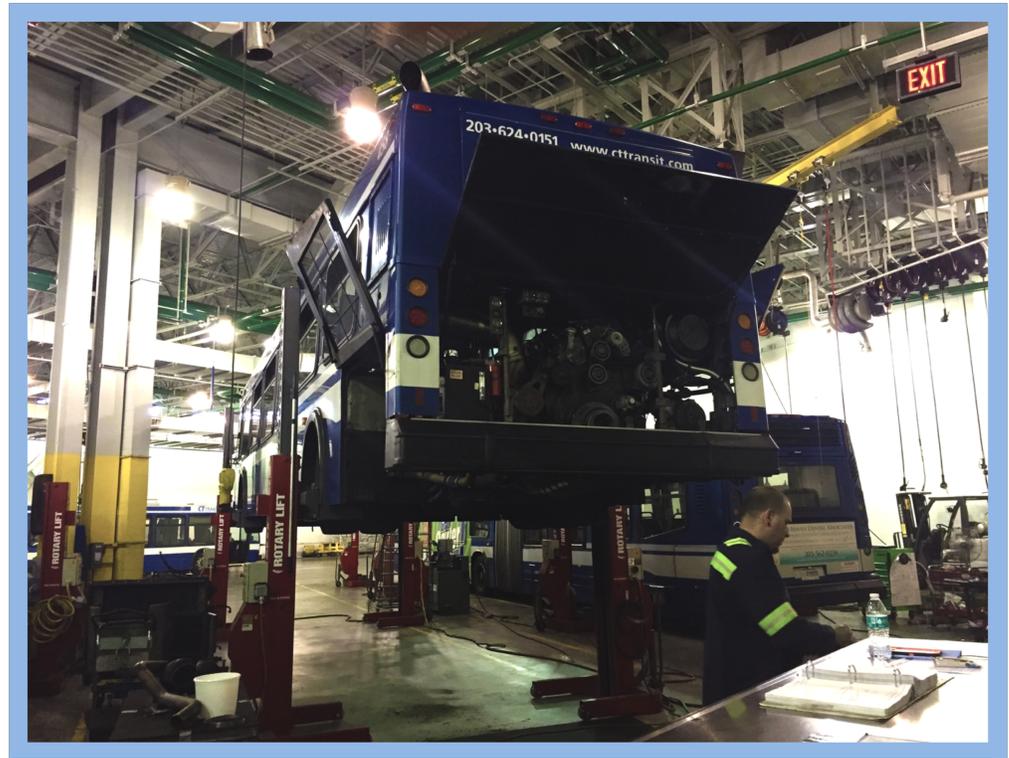
CTtransit maintenance facility: photo courtesy of SPP

Motivation

Regarding maintenance plans, as noted in Section 3.4.2, CTDOT develops maintenance plans for new facilities, but appears to need mechanisms for confirming these plans are followed. Further, many older facilities may not have maintenance plans altogether. With respect to tracking maintenance activities, this is a particular issue in cases where freight railroads have performed significant work to improve the condition of CTDOT-owned guideway.

Work Steps

1. Identify best practices for maintenance planning (labor, material, tools, frequency).
2. Develop template plans.
3. Define strategy for incorporating maintenance plans into the facility design or turnkey process.
4. Centralize tracking and management of facility maintenance plans within CTDOT.

5. Perform one or more case studies assessing effort required to implement a facility's plan relative to resources assigned for this purpose.

6. Establish protocol for periodic review of maintenance plans by asset class or facility type.

7. Conduct internal discussions to establish what data are needed from freight railroads to track maintenance on CTDOT-owned guideway and potential approaches for obtaining the needed data.

Deliverables

- Report detailing:
    - o Best management practices for maintenance planning and for maintaining an accessible and digital repository of transit facility plans and warranties.
    - o Recommended approach to centralized tracking and periodic review of maintenance plans, and the case study results.
    - o Needed data on maintenance of CTDOT-owned guideway and assessment of potential data collection approaches.
- Plan templates for administrative facilities, maintenance facilities and passenger facilities.

Time Frame

1 year

Level of Effort

High

Required for Compliance

No

Task 6. Document Capital Programming Procedures

Description

In this task, CTDOT will document existing approaches used to develop the capital program with respect to transit assets, including vehicles, guideway and facilities. The result of the task will be a technical memorandum summarizing current procedures and identifying opportunities for improvement.

Motivation

One gap identified in Section 3.4.2 is a need for detail on the approach used to estimate capital needs, particularly with respect to transit facilities. This task will address this gap and facilitate improvement of existing approaches in Task 7.

Work Steps

1. Review the existing capital program and available documents detailing plan development procedures.

2. Meet with CTDOT capital programming staff to review the existing plan development

process and further detail the approach used with respect to transit facilities.

3. Identify opportunities for improving the existing plan development approach.

4. Prepare a report detailing the results of the task.

Deliverables

- Report detailing existing capital program development procedures and opportunities for improvement.

Time Frame

3 months

Level of Effort

Low

Required for Compliance

Yes

Task 7. Improve Predictive Capability for Fixed Assets

Description

In this task, CTDOT will implement an improved approach to assessing current and future SGR needs, building on the improved data and systems developed in prior tasks.

Motivation

Assessing SGR needs is an important function for supporting an asset management approach. Section 3.4.2 describes that CTDOT would benefit from the capability for assessing current SGR needs, as well as an approach for predicting future needs. This task is intended to address these gaps.

Work Steps

1. Review available tools/approaches for assessing and predicting transit capital needs, including FTA's TERM Lite, the Transit Asset Prioritization Tool (TAPT) presented in TCRP Report 172, and functionality provided by other CTDOT systems. Based on the review, establish a set of candidate approaches (which may include improved or hybrid approaches besides those incorporated in existing systems).

2. Establish data needs for supporting the candidate approaches.

3. Test the prediction of SGR needs using one or more approaches, evaluating the reasonableness of the predictions generated, sensitivity of the results to variations in modeling and budget assumptions, and other factors.

4. Determine the predictive approach CTDOT should use for future capital plans and transit asset management plans. Identify desired enhancements to existing system/approaches and additional data needed to support the recommended approach.

5. Generate a prioritized list of SGR needs for inclusion in the TAMP developed in Task 8.

6. Work with CTDOT staff to implement the analysis approach for developing future capital plans.

Deliverables

- SGR analysis results, including a prioritized list of SGR needs, generated using one or more candidate analytical approaches

- Report detailing the SGR needs analysis approach and testing results

Time Frame

1 year

Level of Effort

High

Required for Compliance

Yes

Task 8. Prepare a Transit Asset Management Plan

Description

In this task, CTDOT will develop its initial TAMP. The plan should describe what transit assets CTDOT owns, their conditions, and the investments needed to achieve and maintain SGR. The plan should be developed based on the approach described in TCRP Report 172, and should address FTA transit asset management requirements. The plan should address all CTDOT owned and operated assets. It should also serve as a group plan reporting data for smaller CT transit agencies that would prefer to report as part of a group plan.

CTtransit bus: photo courtesy of CTDOT

As shown in the schedule in the next section, this tasks is assumed to occur only after completion of other supporting tasks, most notably Task 7 described above, and would need to be re-scoped if these tasks are deferred. Thus, the full scope and schedule required for developing a TAMP is defined by the set of tasks indicated as being required for compliance with FTA requirements.

Motivation

Developing a TAMP is consistent with best practice in asset management and is required by FTA. Many of gaps identified in Section 3.4 describe issues that should be resolved in some manner to support developing the TAMP. Thus, this task is proposed following completion of tasks to address the data and business process gaps, in particular.

Work Steps

1. Review relevant guidance, including the finalized FTA rule on development of transit asset management plans and TCRP Report 172.
2. Meet with CTDOT and external stakeholders to discuss the scope of the plan, and establish the extent of participation of other CT transit providers.
3. Prepare a draft plan outline. Note that TCRP Report 172 includes a recommended outline, but this may require modification to support FTA requirements.
4. Compile transit asset inventory and condition data.
5. Perform the investment analysis for the plan utilizing the approach developed in Task 7.
6. Prepare the draft plan.
7. Meet with CTDOT and other stakeholders to review the draft.
8. Finalize the plan based on CTDOT/stakeholder comments.

Deliverables

- Draft and final versions of the TAMP.

Time Frame

6 months (assuming completion of prior tasks, or longer if these tasks are deferred or incomplete)

Level of Effort

Medium (assuming completion of prior tasks, or High if these tasks are deferred or incomplete)

Required for Compliance

Yes

Task 9. Define Staffing / Funding Needs

Description

For this task CTDOT will define staffing/funding needs for improving its transit asset management practices. Areas of particular concern are staffing needs for: performing additional review or independent verification of data submitted to CTDOT related to outsourced contracts; and conducting engineering assessments or condition assessments. Note this task is intended to address staffing needs outside of those required to address the tasks detailed here.

Motivation

Improving CTDOT's transit asset management practices is an ambitious undertaking that will involve nearly every department within CTDOT, especially the Bureau of Policy and Planning, Office of Strategic Planning and Projects, the Bureau of Public Transportation, and the Bureau of Finance and Administration. Part of the premise of an asset management approach is that it

is more cost effective and can reduce lifecycle costs of maintaining an asset. This may be true, but in the short term a number of the improvements discussed in this document will require additional staff time to implement, and this time is in short supply. This task will identify the critical staffing/funding gaps described in Section 3.4.4.

Work Steps

1. Define gap in CTDOT capacity to support asset management improvements, including aggregate person-hours to improve management of transit assets internally, field staff necessary to conduct condition assessments, staff needed to coordinate with transit districts and other external partners and staff needed to document, report and track transit asset records. The calculation should consider the difference between existing staff hours available to conduct this work and hours needed, as well as potential attrition of existing staff.
2. Identify critical roles for which additional staff hours are required
3. Prepare documentation for hiring additional staff to address the need for additional staff and/or funding.

Deliverables

- Memorandum detailing staff needs and gaps.

Time Frame

6 months

Level of Effort

Low

Required for Compliance

No

Task 10. Information Sharing

Description

Task 10 includes a set of activities to facilitate exchange of information on asset management practices between CT transit providers. Participants in this task should include CTDOT staff, as well as transit providers under contract to CTDOT and other CT transit providers and the transit districts.

Motivation

Asset management represents a new way of doing business, and implementing an asset management approach is in many respects an exercise in training people to think about how they manage in a different and more comprehensive way. Thus, training and information exchange activities are critical for implementing an asset management approach.

Work Steps

1. Identify CTDOT staff and other non-DOT staff that should be invited to participate in information exchange activities.
2. Develop a program of periodic peer exchanges and/or facilitated workshops to

communicate current status of CTDOT transit asset management activities and facilitate exchange of information on asset management approaches/lessons learned.

3. Conduct the planned information sharing activities.

4. As needed prepare summaries of information presented and/or other communication materials.

Deliverables

- Schedule and agenda for planned information exchange activities.

- Summaries of information exchanged/lessons learned and other communications materials.

Time Frame

2 years (potential leading to an ongoing effort)

Level of Effort

Medium

Required for Compliance

No

4.2 Schedule

Below is a table of the tasks presented in Section 4.1. The columns of the table identify the task, prerequisite tasks, and the estimated time needed to complete the task. Certain tasks, most notably Task 4 and Task 10, may lead to follow-up activities that extend beyond the period shown on the figure. The timing of Task 8 should be adjusted so that this task commences following finalization of FTA transit asset management requirements, and concludes within the period allowed by FTA for initial submission of asset management plans.

Table 1. Proposed Transit Asset Management Improvement Tasks

Action Item	Prerequisites	Estimated Time
1) Identify Asset Hierarchy	None	6 months
2) Standardize Condition Assessment Approach	1-Identify Asset Hierarchy	1 year
3) Establish Performance Measures	1-Identify Asset Hierarchy 2-Standarize Condition Assessment Approach	6 months
4) Asset Management System	1-Identify Asset Hierarchy	2 years
5) Improve Oversight of Maintenance Plans	1-Identify Asset Hierarchy 2-Standarize Condition Assessment Approach	1 year
6) Document Capital Programming Procedures	None	3 months
7) Improve Predictive Capability for Fixed Assets	6-Document Capital Programming Procedures	1 year
8) Prepare a Transit Asset Management Plan	1-Identify Asset Hierarchy 2-Standarize Condition Assessment Approach 6-Document Capital Programming Procedures 7-Improve Predictive Capability for Fixed Assets	6 months
9) Define Staffing / Funding Needs	None	6 months
10) Information Sharing	None	2 years

Appendix A. Interview Guides

In-Depth Interview Guide – CTDOT Capital Planning

Overview

The Connecticut Department of Transportation (CTDOT) is undertaking a project to identify and analyze gaps in CTDOT's transit asset management program, and develop an implementation plan to help improve the program moving forward. This plan will help CTDOT comply with the transit asset management requirements of the recent federal legislation Moving Ahead for Progress in the 21st Century (MAP-21). The project is being performed by a consultant team led by Spy Pond Partners, LLC (SPP).

Following a set of preliminary interviews of CTDOT staff to gather information about current data, systems, and processes related to asset management, key staff were identified as potential in-depth interview candidates. This guide describes the topics we would like to address in the in-depth interviews. We hope to cover these topics in a set of one-hour interviews conducted in-person. We appreciate your participation in the project.

For more information, please contact:

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1165R Massachusetts Avenue, Suite 101R
Arlington, MA 02476
(617) 500-4853
wrobert@spypondpartners.com

Contact Information:

Please provide:

1. Name

2. Position

3. Overview of responsibilities

Transit Asset Management Policies, Goals and Objectives

1. Does the agency have any specific goals or objectives related to transit asset management or state of good repair (SGR)? If so please describe. How do the agency's transit-related policies, goals and objectives relate to those of transit providers?

2. Please describe any specific business plans, strategies or specific processes for assessing or improving CT transit asset management practices.

3. Has CTDOT established any performance measures for summarizing transit asset management/SGR? If so please describe.

4. What specific needs and gaps do you perceive within the agency regarding transit asset management?

5. Are you aware of any specific asset management programs/initiatives underway within transit agencies? If so please describe.

6. How is transit SGR addressed in CTDOT's strategic planning?

Life Cycle Management

1. How does CTDOT use available data on asset condition to support decision-making regarding maintenance?

2. Have the required levels of service and performance delivery been defined for each asset?

3. Has CTDOT identified which assets are critical to sustained performance delivery?

Capital Planning & Programming

1. How does CTDOT use available data on asset condition to support decision-making regarding specific capital investments?

2. How does CTDOT use available data to shape its asset investment plan?

3. Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?

4. How are maintenance and repairs for assets addressed and prioritized during investment decisions?

5. How is risk management built into investment strategies?

Additional Questions

1. Please describe any reporting requirements transit agencies have for reporting asset and financial data to CTDOT.

2. To what extent do asset management data and processes appear to vary between transit providers?

3. Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?

4. Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?

5. Please describe any other issues or relevant factors you feel we should consider in performing the project.

In-Depth Interview Guide – CTDOT Bus & Ferry

The Connecticut Department of Transportation (CTDOT) is undertaking a project to identify and analyze gaps in CTDOT's transit asset management program, and develop an implementation plan to help improve the program moving forward. This plan will help CTDOT comply with the transit asset management requirements of the recent federal legislation Moving Ahead for Progress in the 21st Century (MAP-21). The project is being performed by a consultant team led by Spy Pond Partners, LLC (SPP).

Following a set of preliminary interviews of CTDOT staff to gather information about current data, systems, and processes related to asset management, key staff were identified as potential in-depth interview candidates. This guide describes the topics we would like to address in the in-depth interviews. We hope to cover these topics in a set of one-hour interviews conducted in-person. We appreciate your participation in the project.

For more information, please contact:

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wrobert@spypondpartners.com

Contact Information:

Please provide:

1. Name

2. Position

3. Overview of responsibilities

Asset Inventory and Condition Assessments

Bus

1. Revenue and Non-Revenue Vehicles

    - What inventory data does CTDOT collect on vehicles?

    - What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?

    - How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

    - What processes have been established for keeping the inventory updated? How often is the inventory updated?

    - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

2. Fixed guideway, bridges and other related assets

    - What inventory data does CTDOT collect on fixed guideway?

    - What systems are used for collecting and managing data?

    - How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

    - What processes have been established for keeping the inventory updated? How often is the inventory updated?

    - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

3. Passenger Facilities, including stations, bus shelters, park and rides, etc.

    - What inventory data does CTDOT collect on passenger stations?

    - What systems are used for collecting and managing data?

    - How will data be shared between CTDOT and transit operators? Will additional inventory data be collected but not shared with CTDOT?

    - What processes have been established for keeping the inventory updated? How often is the inventory updated?

    - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

4. Maintenance and Administrative Facilities

    - What inventory data does CTDOT collect on maintenance and administrative facilities?

- What systems are used for collecting and managing data?

- How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

- What processes have been established for keeping the inventory updated? How often is the inventory updated?

- To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

5. Systems and Equipment, including fare collection, automatic vehicle location, communication, etc.

- What inventory data does CTDOT collect on systems and equipment?

- What systems are used for collecting and managing data?

- How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

- What processes have been established for keeping the inventory updated? How often is the inventory updated?

- To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

6. Condition Assessment

- What approaches are used to measure the condition of CT transit bus assets?

- What data are available to CTDOT regarding asset condition?

- Does CTDOT have a process to assess the quality of collected data?

- How are data shared between CTDOT and transit operators? Is additional condition data collected but not shared with CTDOT?

Ferry

1. Ferries

- What inventory data does CTDOT collect on ferries?

- What systems are used for collecting and managing data?

- What processes have been established for keeping the inventory updated? How often is the inventory updated?

- To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

2. Passenger Stations

- What inventory data does CTDOT collect on passenger stations?

- What systems are used for collecting and managing data?

- How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

- What processes have been established for keeping the inventory updated? How often is the inventory updated?

- To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

3. Maintenance and Administrative Facilities

- What inventory data does CTDOT collect on maintenance and administrative facilities?

- What systems are used for collecting and managing data?

- How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

- What processes have been established for keeping the inventory updated? How often is the inventory updated?

- To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

4. Systems and Equipment

- What inventory data does CTDOT collect on systems and equipment?

- What systems are used for collecting and managing data?

- How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

- What processes have been established for keeping the inventory updated? How often is the inventory updated?

- To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

5. Condition Assessment

- What approaches are used to measure the condition of CTDOT ferry assets?

- What data are available to CTDOT regarding asset condition?

- Does CTDOT have a process to assess the quality of collected data?

- How are data shared between CTDOT and transit operators? Is additional condition data collected but not shared with CTDOT?

Capital Planning & Programming

1. How does CTDOT use available data on asset condition to support decision-making regarding specific capital investments?

2. How does CTDOT use available data to shape its asset investment plan?

3. Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?

4. How are maintenance and repairs for assets addressed and prioritized during investment decisions?

5. How is risk management built into investment strategies?

Life Cycle Management

1. How do you forecast the useful life of assets as part of life cycle management?

2. How does CTDOT use available data on asset condition to support decision-making regarding maintenance?

3. Have the required levels of service and performance delivery been defined for each asset?

4. Has CTDOT identified which assets are critical to sustained performance delivery?

In-Depth Interview Guide – CTDOT Rail

The Connecticut Department of Transportation (CTDOT) is undertaking a project to identify and analyze gaps in CTDOT's transit asset management program, and develop an implementation plan to help improve the program moving forward. This plan will help CTDOT comply with the transit asset management requirements of the recent federal legislation Moving Ahead for Progress in the 21st Century (MAP-21). The project is being performed by a consultant team led by Spy Pond Partners, LLC (SPP).

Following a set of preliminary interviews of CTDOT staff to gather information about current data, systems, and processes related to asset management, key staff were identified as potential in-depth interview candidates. This guide describes the topics we would like to address in the in-depth interviews. We hope to cover these topics in a set of one-hour interviews conducted in-person. We appreciate your participation in the project.

For more information, please contact:

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Contact Information:

Please provide:

1. Name

2. Position

3. Overview of responsibilities

Asset Inventory and Condition Assessments

Rail

1. Revenue and Non-Revenue Vehicles

   - What inventory data does CTDOT collect on vehicles?

   - What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?

   - How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

   - What processes have been established for keeping the inventory updated? How often is the inventory updated?

   - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

2. Fixed guideway, including track, grade crossings, bridges, and other related assets

   - What inventory data does CTDOT collect on fixed guideway?

   - What systems are used for collecting and managing data?

   - How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

   - What processes have been established for keeping the inventory updated? How often is the inventory updated?

   - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

3. Passenger Facilities, including stations, park and rides, etc.

   - What inventory data does CTDOT collect on passenger facilities?

   - What systems are used for collecting and managing data?

   - How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

   - What processes have been established for keeping the inventory updated? How often is the inventory updated?

   - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

4. Maintenance and Administrative Facilities

- What inventory data does CTDOT collect on maintenance and administrative facilities?

- What systems are used for collecting and managing data?

- How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

- What processes have been established for keeping the inventory updated? How often is the inventory updated?

- To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

5. Systems and Equipment, including catenary, power, signals, communication, etc.

- What inventory data does CTDOT collect on systems and equipment?

- What systems are used for collecting and managing data?

- How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?

- What processes have been established for keeping the inventory updated? How often is the inventory updated?

- To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

6. Condition Assessment

- What approaches are used to measure the condition of CT rail assets?

- What data are available to CTDOT regarding asset condition?

- Does CTDOT have a process to assess the quality of collected data?

- How are data shared between CTDOT and transit operators? Is additional condition data collected but not shared with CTDOT?

Life Cycle Management

1. How do you forecast the useful life of assets as part of life cycle management?

2. How does CTDOT use available data on asset condition to support decision-making regarding maintenance?

3. Have the required levels of service and performance delivery been defined for each asset?

4. Has CTDOT identified which assets are critical to sustained performance delivery?

Capital Planning & Programming

1. How does CTDOT use available data on asset condition to support decision-making regarding specific capital investments?

2. How does CTDOT use available data to shape its asset investment plan?

3. Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?

4.   How are maintenance and repairs for assets addressed and prioritized during investment decisions?

5. How is risk management built into investment strategies?

Additional Questions

1. To what extent do asset management data and processes appear to vary between CT transit providers?

2. Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?

3. Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?

4. Please describe any other issues or relevant factors you feel we should consider in performing the project.

5. Describe Advantages and Limitations of working with Metro North in regards to Asset Management and Data Collection.

In-Depth Interview Guide – Bus Operators

Overview

The Connecticut Department of Transportation (CTDOT) is undertaking a project to identify and analyze gaps in CTDOT's transit asset management program, and develop an implementation plan to help improve the program moving forward. This plan will help CTDOT comply with the transit asset management requirements of the recent federal legislation Moving Ahead for Progress in the 21st Century (MAP-21). The project is being performed by a consultant team led by Spy Pond Partners, LLC (SPP).

Following a set of preliminary interviews of CTDOT staff to gather information about current data, systems, and processes related to asset management, CTDOT bus operators have been identified as potential in-depth interview subjects. This guide describes the topics we would like to address in the in-depth interviews. We hope to cover these topics in a set of one-hour interviews conducted either in-person or via conference call. We appreciate your participation in the project.

For more information, please contact:

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Contact Information

Please provide:

1. Name
2. Position
3. Overview of responsibilities

Transit Asset Management Policies, Goals and Objectives

1. Does the agency have any specific goals or objectives related to transit asset management or state of good repair (SGR). If so please describe. How do the agency's transit-related policies, goals and objectives relate to those of CTDOT?

2. Please describe any specific business plans, strategies or specific processes for assessing or improving CT transit asset management practices.

3. Has the agency established any performance measures for summarizing transit asset management/SGR? If so please describe.

4. What specific needs and gaps do you perceive within the agency regarding transit asset management?

Asset Inventory and Condition Assessments

Bus

1. Revenue and Non-Revenue Vehicles

   - What inventory data does the agency collect on vehicles?

   - What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?

   - How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?

   - What processes have been established for keeping the inventory updated? How often is the inventory updated?

   - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

2. Fixed guideway, including track, grade crossings, bridges, and other related assets

   - What inventory data does the agency collect on fixed guideway?

   - What systems are used for collecting and managing data?

   - How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?

   - What processes have been established for keeping the inventory updated? How often is the inventory updated?

   - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

3. Passenger Facilities, including stations, bus shelters, park and rides, etc.

- What inventory data does the agency collect on passenger facilities?

- What systems are used for collecting and managing data?

- How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?

- What processes have been established for keeping the inventory updated? How often is the inventory updated?

- To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

4. Maintenance and Administrative Facilities

- What inventory data does the agency collect on maintenance and administrative facilities?

- What systems are used for collecting and managing data?

- How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?

- What processes have been established for keeping the inventory updated? How often is the inventory updated?

- To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

5. Systems and Equipment, including fare collection, automatic vehicle location, communication, etc.

- What inventory data does the agency collect on systems and equipment?

- What systems are used for collecting and managing data?

- How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?

- What processes have been established for keeping the inventory updated? How often is the inventory updated?

- To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

6. Condition Assessment

- What approaches are used to measure the condition of CT transit bus assets?

- What data are available to the agency regarding asset condition?

- Does the agency have a process to assess the quality of collected data?

- How are data shared between the agency and CTDOT? Is additional condition data collected but not shared with CTDOT?

Life Cycle Management

1. How do you forecast the useful life of assets as part of life cycle management?

2. How does the agency use available data on asset condition to support decision-making regarding maintenance?

3. Have the required levels of service and performance delivery been defined for each asset?

4. Has the agency identified which assets are critical to sustained performance delivery?

Additional Questions

1. Please describe any reporting requirements the agency has for reporting asset and financial data to CTDOT.

2. Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?

3. Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?

4. Please describe any other issues or relevant factors you feel we should consider in performing the project.

In-Depth Interview Guide – Rail Operators

Overview

The Connecticut Department of Transportation (CTDOT) is undertaking a project to identify and analyze gaps in CTDOT's transit asset management program, and develop an implementation plan to help improve the program moving forward. This plan will help CTDOT comply with the transit asset management requirements of the recent federal legislation Moving Ahead for Progress in the 21st Century (MAP-21). The project is being performed by a consultant team led by Spy Pond Partners, LLC (SPP).

Following a set of preliminary interviews of CTDOT staff to gather information about current data, systems, and processes related to asset management, CTDOT rail operators have been identified as potential in-depth interview subjects. This guide describes the topics we would like to address in the in-depth interviews. We hope to cover these topics in a set of one-hour interviews conducted either in-person or via conference call. We appreciate your participation in the project.

For more information, please contact:

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wrobert@spypondpartners.com

Contact Information

Please provide:

1. Name

2. Position

3. Overview of responsibilities

Transit Asset Management Policies, Goals and Objectives

1. Does the agency have any specific goals or objectives related to transit asset management or state of good repair (SGR)? If so please describe. How do the agency's transit-related policies, goals and objectives relate to those of CTDOT?

2. Please describe any specific business plans, strategies or specific processes for assessing or improving CT transit asset management practices.

3. Has the agency established any performance measures for summarizing transit asset management/SGR? If so please describe.

4. What specific needs and gaps do you perceive within the agency regarding transit asset management?

Asset Inventory and Condition Assessments

Rail

1. Revenue and Non-Revenue Vehicles

   - What inventory data does the agency collect on vehicles?

   - What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?

   - How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?

   - What processes have been established for keeping the inventory updated? How often is the inventory updated?

   - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

2. Fixed guideway, including track, grade crossings, bridges, and other related assets

   - What inventory data does the agency collect on fixed guideway?

   - What systems are used for collecting and managing data?

   - How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?

   - What processes have been established for keeping the inventory updated? How often is the inventory updated?

   - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

CTDOT Transit Asset Management Gap Assessment

3. Passenger Facilities, including stations, park and rides, etc.

   - What inventory data does the agency collect on passenger stations?

   - What systems are used for collecting and managing data?

   - How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?

   - What processes have been established for keeping the inventory updated? How often is the inventory updated?

   - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

4. Maintenance and Administrative Facilities

   - What inventory data does the agency collect on maintenance and administrative facilities?

   - What systems are used for collecting and managing data?

   - How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?

   - What processes have been established for keeping the inventory updated? How often is the inventory updated?

   - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

5. Systems and Equipment, including catenary, power, signals, communication, etc.

   - What inventory data does the agency collect on systems and equipment?

   - What systems are used for collecting and managing data?

   - How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?

   - What processes have been established for keeping the inventory updated? How often is the inventory updated?

   - To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

6. Condition Assessment

   - What approaches are used to measure the condition of CT rail assets?

   - What data are available to the agency regarding asset condition?

   - Does the agency have a process to assess the quality of collected data?

   - How are data shared between the agency and CTDOT? Is additional condition data collected but not shared with CTDOT?

Life Cycle Management

1. How do you forecast the useful life of assets as part of life cycle management?

2. How does the agency use available data on asset condition to support decision-making regarding maintenance?

3. Have the required levels of service and performance delivery been defined for each asset?

4. Has the agency identified which assets are critical to sustained performance delivery?

Additional Questions

1. Please describe any reporting requirements the agency has for reporting asset and financial data to CTDOT.

2. Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?

3. Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?

4. Please describe any other issues or relevant factors you feel we should consider in performing the project.

In-Depth Interview Guide – Freight Railroads

Overview

The Connecticut Department of Transportation (CTDOT) is undertaking a project to identify and analyze gaps in CTDOT's public transportation assets, and develop an implementation plan to help improve the program moving forward. This plan will help CTDOT comply with the transit asset management requirements of the recent federal legislation Moving Ahead for Progress in the 21st Century (MAP-21). The project is being performed by a consultant team led by Spy Pond Partners, LLC (SPP).

As an addition to the existing scope of work, SPP is including Connecticut freight rail assets in the gap assessment. This guide describes the topics we would like to address in the in-depth interviews. We hope to cover these topics in a set of one-hour interviews conducted either in-person or via conference call. We appreciate your participation in the project.

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Contact Information

Please provide:

1. Name

2. Position

3. Overview of responsibilities

Asset Management Policies, Goals and Objectives

1. Does the railroad have any specific goals or objectives related to asset management or state of good repair (SGR)? If so please describe.

2. Please describe any specific business plans, strategies or specific processes for assessing or improving asset management practices.

3. Has the railroad established any performance measures for summarizing asset management/SGR? If so please describe.

4. What specific needs and gaps do you perceive within the railroad regarding asset management?

Asset Inventory and Condition Assessments

1. Rail assets, including track, grade crossings, bridges, and other related assets

   • What inventory data does the railroad collect on rail assets?

   • What systems are used for collecting and managing data?

   • How are data shared between the railroad and CTDOT? Is additional inventory data collected but not shared with CTDOT?

   • What processes have been established for keeping the inventory updated? How often is the inventory updated?

   • To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

2. Systems and Equipment, including signals, communication, etc.

   • What inventory data does the railroad collect on systems and equipment?

   • What systems are used for collecting and managing data?

   • How are data shared between the railroad and CTDOT? Is additional inventory data collected but not shared with CTDOT?

   • What processes have been established for keeping the inventory updated? How often is the inventory updated?

   • To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?

3. Condition Assessment

   • What approaches are used to measure the condition of state-owned rail assets?

   • What data are available to the railroad regarding asset condition?

- Does the railroad have a process to assess the quality of collected data?

- How are data shared between the railroad and CTDOT? Is additional condition data collected but not shared with CTDOT?

Life Cycle Management

1. How do you forecast the useful life of assets as part of life cycle management?

2. How does the railroad use available data on asset condition to support decision-making regarding maintenance?

3. Have the required levels of service and performance delivery been defined for each asset?

4. Has the railroad identified which assets are critical to sustained performance delivery?

Capital Planning & Programming

1. To what extent does the railroad plan and/or perform capital projects impacting CT-owned infrastructure?

2. How does the railroad use available data on asset condition to support decision-making regarding specific capital investments?

3. Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?

4. How is risk management incorporated into developing investment strategies?

5. To what extent has the railroad made investments or obtain assistance through any of the following state programs: State Assistance for Freight Rail in Connecticut, Rail Freight Infrastructure Program, State Surplus Materials Donations, or others?

Additional Questions

1. Please describe any reporting requirements the railroad has for reporting asset and financial data to CTDOT.

2. Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?

3. Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?

4. Please describe any other issues or relevant factors you feel we should consider in performing the project.

Appendix B. Interview Notes

Interview Notes: Northeastern Connecticut Transit District

October 7, 2015

These notes are the result of an interview held at NECTD on October 7, 2015 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide which was created by the DOT and Spy Pond Partners and provided to NECTD in advance.

Attendees

John Filchak, Executive Director of NECCOG and NECTD

Maureen Adams, Finance Director of NECTD

Hoween Flexer, Planning Specialist at NECCOG

Sharon Okoye, CTDOT

Carolann Belforti, CTDOT

Eric Dorsey, CTDOT

Joanna Juskowiak, CTDOT

William Robert, Spy Pond Partners

Nat Cooper, Spy Pond Partners

Aysola Sandeep, CDM Smith (by phone)

Transit Asset Management Policies, Goals and Objectives

1. **Does the agency have any specific goals or objectives related to transit asset management or state of good repair (SGR). If so please describe. How do the agency's transit-related policies, goals and objectives relate to those of CTDOT?**

The SGR-related goals of the NECTD are stated in the "Preventive Maintenance Policies and Plan" document. The goal is "to ensure that assets of the NECTD are protected and maintained so that they each their maximum useful life. The [facility], vehicles, and equipment used in support of public transit at NECTR will be maintained at or above the specification provided with the facility operations and equipment manuals."

The plan also lists nine objectives:

- Safety "first" in all actions concerning maintenance
- Maintain vehicles in accordance with manufacturers guideline at a minimum

- Maximize vehicle life
- Manage preventive maintenance and repair activities to promote the reliability of the service by minimizing service interruptions due to failure
- No loss of accessibility due to equipment failure
- Maintain vehicle exterior and interior appearance in a clean condition
- Maintain a readily accessible system of permanent vehicle maintenance records
- Keep the facility and its components in good repair and structurally sound
- Conduct vehicle operations, repairs, and cleaning in compliance with applicable local state and federal regulations

2. **Please describe any specific business plans, strategies or specific processes for assessing or improving CT transit asset management practices.**

The "Preventive Maintenance Policies and Plan" document was most recently updated in 2013. It contains SGR goals and objectives, a basic vehicle inventory, maintenance and inspection procedures, and an example daily vehicle condition report.

3. **Has the agency established any performance measures for summarizing transit asset management/SGR? If so please describe.**

No.

4. **What specific needs and gaps do you perceive within the agency regarding transit asset management?**

Asset Inventory and Condition Assessments

Bus

1. **Revenue and Non-Revenue Vehicles**

- **What inventory data does the agency collect on vehicles?**

NECTD operates two bus loops and connector buses between the two loops. The loops cover 50% of the 96,000 people in the 16 town region. NECTD delivers 55,000 rides per year and recently increased service from five days per week to seven days per week. The bus fleet comprises 11 vehicles, one of which is a reserve bus.

An inventory in the Maintenance Plan lists each bus, the bus number, the vehicle year, the type/model, size, and capacity.

NECTD keeps bus age, mileage data, and inspection reports, which are reports filed by drivers regarding their daily bus inspections. NECTD monitors driver inspection reports to make sure they are being completed.

- **What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?**

Inspection reports are kept in a paper file. The Parts Log lists the parts used to repair buses. The Road Call Log tracks all road calls.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

NECTD reports fleet inventory data to CTDOT including mileage, deviations and passengers.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

NECTD does not record dropped trips.

2. Fixed guideway, including track, grade crossings, bridges, and other related assets

NECTD does not own fixed guideway.

3. Passenger Facilities, including stations, bus shelters, park and rides, etc.

NECTD does not own passenger facilities.

4. Maintenance and Administrative Facilities

- **What inventory data does the agency collect on maintenance and administrative facilities?**

NECTD operates a single facility. The facility was built in 1994 using FTA funds. The land is owned by the town of Killingly, CT and leased to NECOGG for $1 per year until 2017. After 2017, the lease reverts to a market-priced lease which can be extended for 10 years. This limited length lease prevents NECTD from receiving funding for some physical plant investments because the lease is shorter than the useful life of the capital improvements (50-year roof is an example.)

NECTD doesn't collect any facilities data other than costs needed for maintenance and upgrades.

- **What systems are used for collecting and managing data?**

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

NECTD tracks the expenses that it reports to CTDOT. In some cases, they retain inspection reports for safety reasons (e.g. fire extinguishers).

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

5. **Systems and Equipment, including fare collection, automatic vehicle location, communication, etc.**

- **What inventory data does the agency collect on systems and equipment?**

Refer to the Preventive Maintenance Policies Plan for current procedure.

- **What systems are used for collecting and managing data?**

Refer to the Preventive Maintenance Policies Plan for current procedure.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

Refer to the Preventive Maintenance Policies Plan for current procedure.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

Refer to the Preventive Maintenance Policies Plan for current procedure.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

Refer to the Preventive Maintenance Policies Plan for current procedure.

6. **Condition Assessment**

- **What approaches are used to measure the condition of CT transit bus assets?**

Refer to the Preventive Maintenance Policies Plan for current procedure.

- **What data are available to the agency regarding asset condition?**

Refer to the Preventive Maintenance Policies Plan for current procedure.

- **Does the agency have a process to assess the quality of collected data?**

Refer to the Preventive Maintenance Policies Plan for current procedure.

- **How are data shared between the agency and CTDOT? Is additional condition data collected but not shared with CTDOT?**

Refer to the Preventive Maintenance Policies Plan for current procedure.

Life Cycle Management

1. **How do you forecast the useful life of assets as part of life cycle management?**

NECTD follows the CTDOT recommendations for replacement, using years or mileage as indicators. NECTD is more likely to use years to determine replacement.

2. **How does the agency use available data on asset condition to support decision-making regarding maintenance?**

Scheduled maintenance is performed according to manufacturers guidelines.

3. **Have the required levels of service and performance delivery been defined for each asset?**

NECTD follows the manufacturers guidelines for maintenance. Vehicle purchases were made in 2008 and 2010 because the previous vehicles reached the end of their useful lives.

4. **Has the agency identified which assets are critical to sustained performance delivery?**

For the facility the most important assets are the roof and the HVAC system.

Additional Questions

1. **Please describe any reporting requirements the agency has for reporting asset and financial data to CTDOT.**

NECTD reports RU-20 to CTDOT annually.

2. **Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?**

3. **Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?**

4. **Please describe any other issues or relevant factors you feel we should consider in performing the project.**

NECTD is a part of the Northeastern Connecticut Council of Governments. Admin costs are only $130,000 to run NECTD annually because of this structure.

NECTD is unsure whether they would like to create their own TAMP or participate as a Tier II under a Tier I TAMP.

Interview Notes: CTDOT Capital Planning

October 14, 2015

These notes are the result of an interview held at CTDOT with Capital Planning staff on October 14, 2015 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide which was created by the DOT and Spy Pond Partners and provided to CTDOT Capital Planning staff in advance.

Attendees

Anna Barry, CTDOT

Michael Sanders, CTDOT

Dave Elder, CTDOT

Richard Jankovich, CTDOT

Jon Foster, CTDOT

Carl Jackson, CTDOT

Maureen Kent, CTDOT

Colleen Kissane, CTDOT

Sandy Infantino, CTDOT

Sam Bellucci, CTDOT

Angelo Lluberes, CTDOT

Sharon Okoye, CTDOT

Carolann Belforti, CTDOT

Eric Dorsey, CTDOT

William Robert, Spy Pond Partners

Nat Cooper, Spy Pond Partners

David Sousa, CDM Smith

Transit Asset Management Policies, Goals and Objectives

1. **Does the agency have any specific goals or objectives related to transit asset management or state of good repair (SGR)? If so please describe. How do the agency's transit-related policies, goals and objectives relate to those of transit providers?**

Although CTDOT does not have specific goals / objectives related to transit AM or SGR, it has established a bus replacement policy and midlife overhaul policy for buses. These help maintain vehicles in SGR. Further, CTDOT's current policy is to emphasize maintaining the current transportation system in SGR prior to expanding/enhancing the system.

2. **Please describe any specific business plans, strategies or specific processes for assessing or improving CT transit asset management practices.**

CTDOT has established fleet management plans for bus and rail (the rail fleet management plan is currently being updated). Other relevant documents include the state rail plan, bridge management plan, and Let's Go CT documents.

The fleet management plan for buses is used to manage the CT Transit fleet and thus is not a document used for the transit districts. Separately CTDOT staff work with districts individually to make sure capital needs are addressed through the FTA 5307 program.

The fleet management plan for rail was developed in concert with MNR. The engineering group is working to develop a capital plan for rail.

The Capital Planning and Policy group has a brief document describing the capital planning process and investment criteria.

3. **Has CTDOT established any performance measures for summarizing transit asset management/SGR? If so please describe.**

For vehicles the main performance measures include Mean Distance Between Failures, fleet age and vehicle mileage.

Track and bridge have established their own measures – e.g., bridge ratings.

Meeting participants were not aware of any specific measures for passenger or maintenance facilities. In the absence of specific measures, asset management decisions are made more on lifecycle considerations (when has an asset reached the end of its useful life?) than on performance.

4. **What specific needs and gaps do you perceive within the agency regarding transit asset management?**

SGR isn't integrated directly into CTDOT's goals and objectives. SGR is often the product of the objectives, but is not formally addressed in the stated goals of the DOT.

Another issue is that CTDOT must develop maintenance plans for new assets as an FTA requirement. These plans are now being developed but it is not clear that these plans, once

developed, are actually followed. Also, no such plans have been developed for existing assets (until a capital project is performed).

Participants noted that although there is a process defined for developing the rolling five year capital plan, the plan often needs to be updated over the course of the year, and it would be a benefit to have a more structured approach to managing these updates.

Participants also noted that CTDOT has a number of rail facilities that are now underutilized (e.g, old signal houses). Maintenance and tracking of these assets is a low priority.

- **Are you aware of any specific asset management programs/initiatives underway within transit agencies? If so please describe.**

Participants were not aware of any specific initiatives, other than the recent MNR gap assessment,

- **How is transit SGR addressed in CTDOT's strategic planning?**

SGR is not specifically addressed in a strategic planning document. In practice, $62 million of the $100 million capital plan is intended for preservation activities. $62 million worth of preservation activities yields enhancement/improvement benefits, indirectly addressing the state of good repair.

Life Cycle Management

These topics were deferred to the bus and rail meetings.

1. **How does CTDOT use available data on asset condition to support decision-making regarding maintenance?**

2. **Have the required levels of service and performance delivery been defined for each asset?**

3. **Has CTDOT identified which assets are critical to sustained performance delivery?**

Capital Planning & Programming

1. **How does CTDOT use available data on asset condition to support decision-making regarding specific capital investments?**

CTDOT staff use historic data on past spending to help plan future needs. Often a placeholder value is established for future capital needs (e.g., facility needs for a given transit district), and this figure is replaced with more accurate estimates once specific projects have been scoped.

2. **How does CTDOT use available data to shape its asset investment plan?**

3. **Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?**

CTDOT's five-year capital plan addresses highway and transit investments. This plan is updated annually. Public transportation traditionally has maintained a separate 20-year plan for internal use.

4. How are maintenance and repairs for assets addressed and prioritized during investment decisions?

5. How is risk management built into investment strategies?

Risk is informally considered as a factor when making funding decisions, but there is no money set aside specifically for risk mitigation or held in reserve.

Additional Questions

These topics were deferred to the bus and rail meetings.

1. Please describe any reporting requirements transit agencies have for reporting asset and financial data to CTDOT.

2. To what extent do asset management data and processes appear to vary between transit providers?

3. Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?

4. Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?

5. Please describe any other issues or relevant factors you feel we should consider in performing the project.

Interview Notes: CTDOT Bus

October 14, 2015

These notes are the result of an interview held at CTDOT with Bus Transit staff on October 14, 2015 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide which was created by the DOT and Spy Pond Partners and provided to CTDOT bus staff in advance.

Attendees

Michael Sanders, CTDOT

Phil Scarrozzo, CTDOT

Maureen Lawrence, CTDOT

Maureen Kent, CTDOT

Sandy Infantino, CTDOT

Brian Cunningham, CTDOT

Jacqueline Henry-Rafiq, CTDOT

Kevin Peak, CTDOT

Karen Riemer, CTDOT

Sharon Okoye, CTDOT

Carolann Belforti, CTDOT

Eric Dorsey, CTDOT

William Robert, Spy Pond Partners

Nat Cooper, Spy Pond Partners

David Sousa, CDM Smith

Asset Inventory and Condition Assessments

Bus

1. **Revenue and Non-Revenue Vehicles**

   - **What inventory data does CTDOT collect on vehicles?**

Capital Planning keeps inventories of the bus fleets. The CORE database contains a list of capital assets. Data collected includes mileage, fuel consumption, and head miles.

CTDOT Transit Asset Management Gap Assessment

The Finance Division does the NTD reporting and uses the bus inventory database.

Each transit operator also keeps maintenance records.

- **What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?**

- **How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?**

Transit operators submit monthly invoices, usually paper documents, for reimbursement. These invoices include mileage, fuel, and ridership data. CTDOT staff take the data and enter it into an excel spreadsheet. That data is used for NTD submittals as well. CTDOT keeps a hard copy of the invoice in addition to the computer files.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

The databases are updated monthly according to the invoices from bus contractors. In 2014, Sandy Infantino handled 415 transit district invoices of capital costs. Vehicle leases and maintenance requirements are operating costs and are not included in the invoices.

When an asset becomes property of CTDOT, CORE is updated (also when the asset is disposed of). CORE is a standing static record. CPF looks at CORE only during triennial review.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

Ideally, CTDOT would like to check on operators once per quarter for compliance, but the agency does not have enough staff for that. In 2014, CTDOT had to look into two complaints about operators. They have to make a physical trip to check the files, rather than an online database of maintenance records.

Operators have different reporting forms for maintenance, but use a standardized invoice based on the NTD format.

The operating unit has a greater need than CORE relative to the reporting requirements of the FTA.

2. **Fixed guideway, bridges and other related assets**

- **What inventory data does CTDOT collect on fixed guideway?**

CTfastrak is the only fixed guideway for bus. The guideway and bridges on the CTfastrak line are maintained by CTDOT Highway Division.

- **What systems are used for collecting and managing data?**

- **How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

3. **Passenger Facilities, including stations, bus shelters, park and rides, etc.**

- **What inventory data does CTDOT collect on passenger stations?**

On CT Fastrak, the Hartford division of HNS is responsible for maintaining buses, buildings, and stations. The asset inventory consists of as-built plans. Certain spare parts were provided by contractors. Facilities, including bus shelters are included in the CORE database when they come into service.

- **What systems are used for collecting and managing data?**

There have been facility condition assessments performed in the past.

- **How will data be shared between CTDOT and transit operators? Will additional inventory data be collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

The inventory is updated annually.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

Condition assessment methodology is a gap. There is no consistent rating system or procedure. Another gap is that the forms are in paper and some only in carbon paper.

How do you assess the quality of something that is built into the facility, especially in complex facilities with many working parts?

4. **Maintenance and Administrative Facilities**

- **What inventory data does CTDOT collect on maintenance and administrative facilities?**

Maintenance and administrative facilities which are owned by CTDOT but operated by transit agencies are the responsibility of the operating agencies. CTDOT keeps an inventory of the facilities in CORE.

- **What systems are used for collecting and managing data?**

Facilities are kept in the CORE database.

- **How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

When an asset is introduced into service, it is added to the CORE database.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

Nobody at CTDOT is responsible for overseeing implementation of maintenance plans at facilities. In addition, not all facilities have maintenance plans and even for those that do, there is no process for updating maintenance plans.

No condition assessments; the bus division would like to have more data. The Hartford Garage is doing a facility assessment.

5. **Systems and Equipment, including fare collection, automatic vehicle location, communication, etc.**

   • **What inventory data does CTDOT collect on systems and equipment?**

This inventory data is not available at the systems level.

   • **What systems are used for collecting and managing data?**

   • **How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?**

   • **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

   • **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

6. **Condition Assessment**

   • **What approaches are used to measure the condition of CT transit bus assets?**

Transit operators inspect and maintain vehicle assets, including CTDOT-owned assets.

   • **What data are available to CTDOT regarding asset condition?**

The annual inventory requires a condition assessment for federally funded assets.

   • **Does CTDOT have a process to assess the quality of collected data?**

The definition of good, fair, and poor condition levels is not standardized and is up to the discretion of the inspector.

   • **How are data shared between CTDOT and transit operators? Is additional condition data collected but not shared with CTDOT?**

Capital Planning & Programming

1. **How does CTDOT use available data on asset condition to support decision-making regarding specific capital investments?**

Transit operators request funds from CTDOT for vehicle replacement based on FTA useful minimum life estimates.

2. **How does CTDOT use available data to shape its asset investment plan?**

3. **Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?**

4.   How are maintenance and repairs for assets addressed and prioritized during investment decisions?

5.   How is risk management built into investment strategies?

Life Cycle Management

1.   **How do you forecast the useful life of assets as part of life cycle management?**

There is a forecast for every vehicle based on FTA useful life minimums.

Facilities are billed as 50-year assets but should last 100-150 years.

2.   **How does CTDOT use available data on asset condition to support decision-making regarding maintenance?**

3.   **Have the required levels of service and performance delivery been defined for each asset?**

Maintenance plans for facilities are written into contracts now. Only facilities that have been improved in the last 10 years have maintenance plans.

4.   **Has CTDOT identified which assets are critical to sustained performance delivery?**

Interview Notes: CTDOT Rail

October 14, 2015

These notes are the result of an interview held at CTDOT with Rail staff on October 14, 2015 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide which was created by the DOT and Spy Pond Partners and provided to CTDOT Rail staff in advance.

Attendees

Carl Jackson, CTDOT

Rich Jankovich, CTDOT

Jim Fallon, CTDOT

Yure Kuljis, CTDOT

Marci Petterson, CTDOT

Craig Bordiere, CTDOT

Tim Sullivan, CTDOT

Haresh Dholakia, CTDOT

Jon Foster, CTDOT

Sam Bellucci, CTDOT

Angelo Lluberes, CTDOT

Jayantha Mather, CTDOT

Jacob Booth, CTDOT

Maureen Kent, CTDOT

Sandy Infantino, CTDOT

Sharon Okoye, CTDOT

Carolann Belforti, CTDOT

Eric Dorset, CTDOT

William Robert, Spy Pond Partners

Nat Cooper, Spy Pond Partners

David Sousa, CDM Smith

Asset Inventory and Condition Assessments

Rail

1.   **Revenue and Non-Revenue Vehicles**

   •   **What inventory data does CTDOT collect on vehicles?**

CTDOT maintains an annual inventory of all rail revenue vehicles on Excel. Marci Petterson is in charge of the inventory. It is kept on a shared drive at CTDOT's office in New Haven. The inventory includes date of manufacture, current condition, and car number. Vehicle condition is assessed based on age and visual evidence and is scored according to a 4-point scale.

For non-revenue vehicles (switch engines, hopper cars, maintenance trucks etc.), there is no database. CTDOT generally does not own non-revenue vehicles (also referred to as administrative vehicles), but in the case of MNR shares in their costs. Note MNR has several hopper cars that are owned by CTDOT – these are "legacy assets."

The annual report also has a list of all assets.

CTDOT also maintains records of state-owned assets in CORE but this is not used by rail staff for day-to-day management.

   •   **What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?**

The rail vehicle inventory is kept on Excel.

   •   **How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?**

MNR maintains an inventory with condition assessments in its Asset Management System. CTDOT can view data in this system. Amtrak, CTDOT's contractor for Shoreline East, has a fleet management system, but CTDOT does not have access to this system.

   •   **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

   •   **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

2.   **Fixed guideway, including track, grade crossings, bridges, and other related assets**

   •   **What inventory data does CTDOT collect on fixed guideway?**

Concerning fixed guideway, an area on which CTDOT has focused is bridge management. CTDOT maintains inventory and inspection data on its rail bridges using a system licensed from InspecTech (now Bentley).

CTDOT owns the Northeast Corridor guideway between New York and New Haven, and provides support to MNR to maintain the guideway. CTDOT does not own the Northeast Corridor guideway east of New Haven used by Shoreline East – this is owned by Amtrak.

Track charts serve as the primary inventory for guideway assets. The construction office also has plans, etc. MNR maintains data as well, including inspection records.

CTDOT

Concerning speed restrictions, each day CTDOT receives an email bulletin of MNR speed restritions. MNR also produces speed tables that list permanent speed restrictions in addition to temporary speed restrictions established based on track conditions.

- **What systems are used for collecting and managing data?**

InspecTech is used for rail bridges.

- **How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

Bridges are inspected every year following FRA regulations and the inventory is updated annually. Other guideway assets owned by CTDOT are managed by MNR.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

CTDOT is satisfied with its data on bridges. There is a need for more data on all other guideway assets regarding maintenance work.

Condition reports on track, ballast, signals, catenaries etc. are maintained by MNR and provided to CTDOT upon request.

3. **Passenger Facilities, including stations, park and rides, etc.**

- **What inventory data does CTDOT collect on passenger facilities?**

CTDOT keeps an Excel file of the railroad stations that provides inventory data and limited condition data. Major components of or within facilities are not reported.

Day-to-day maintenance and operation of many facilities is contracted out.

- **What systems are used for collecting and managing data?**

- **How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

4. **Maintenance and Administrative Facilities**

- **What inventory data does CTDOT collect on maintenance and administrative facilities?**

Maintenance and administrative facilities are listed in the CORE database. 10 years ago, CTDOT hired a contractor to do high level facility inspections. They have the ratings from that one-time inspection.

- **What systems are used for collecting and managing data?**

Facilities are listed in the CORE database.

- **How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

CTDOT has limited condition data on facilities.

5. **Systems and Equipment, including catenary, power, signals, communication, etc.**

    Refer to responses above on guideway and facilities.

- **What inventory data does CTDOT collect on systems and equipment?**

- **What systems are used for collecting and managing data?**

- **How are data shared between CTDOT and transit operators? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

6. **Condition Assessment**

    Refer to responses above.

- **What approaches are used to measure the condition of CT rail assets?**

- **What data are available to CTDOT regarding asset condition?**

- **Does CTDOT have a process to assess the quality of collected data?**

- **How are data shared between CTDOT and transit operators? Is additional condition data collected but not shared with CTDOT?**

Life Cycle Management

1. **How do you forecast the useful life of assets as part of life cycle management?**

For vehicles, CTDOT uses the standard FTA assumption (30 years). The oldest vehicles are close to 40 years old on MNR.

For track components, CTDOT uses industry standards for the most part. For tangent rail, useful life is typically 50 years, curve is 30, turnout is 25.

The useful life of a bridge is estimated to be 75 years.

For stations, platforms and retaining walls, the maintenance unit inspects for safety and other criteria. Station parking condition assessments are done by individual towns that own the stations – maintenance is funded through parking revenues. Some preventive maintenance is provided under service contracts with private companies for some features, such as elevators and escalators. Some stations in their entirely are overseen by service contract vendors – they respond on call for repair or replacement of HVAC, lights etc. They also perform custodial services.

2.   **How does CTDOT use available data on asset condition to support decision-making regarding maintenance?**

Bridges receive a condition rating from 0-9 where a 9 indicates a brand new bridge. At 5 or less, CTDOT monitors the bridge more carefully. Culverts greater than 5 feet are treated as bridges.

For facilities, CTDOT looks at condition data to plan capital projects on a case-by-case basis.

CTDOT has a joint advisory committee in New Haven that oversees vendor contracts as well as spot inspection by Staff.

3.   **Have the required levels of service and performance delivery been defined for each asset?**

CTDOT requires that contractors have a building management plan in place. The contractor prepares the O&M manual. There is discretion used based on a given unit.

MNR is responsible for reviewing the O&M manuals for the facilities they maintain.

4.   **Has CTDOT identified which assets are critical to sustained performance delivery?**

Capital Planning & Programming

1.   **How does CTDOT use available data on asset condition to support decision-making regarding specific capital investments?**

The capital plan is updated annually, but can be changed monthly if required, such as to address unplanned failures or safety concerns. The Rail Division prepare a capital projects list to support updates to the capital plan.

2.   **How does CTDOT use available data to shape its asset investment plan?**

3.   **Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?**

4.   **How are maintenance and repairs for assets addressed and prioritized during investment decisions?**

Maintenance history is a major factor in determining how to prioritize investments. All investment decisions are essentially made on a case-by-case basis for rail.

5.   **How is risk management built into investment strategies?**

Additional Questions

1.   **To what extent do asset management data and processes appear to vary between CT transit providers?**

2.   **Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?**

3.   **Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?**

4.   **Please describe any other issues or relevant factors you feel we should consider in performing the project.**

CTDOT needs better oversight for the freight rail network. There are 100 off-system bridges inspected by CTDOT, but limited inspections are performed of the freight network outside of bridges. FRA inspects the track from time to time, but ideally CTDOT would have resources for increased oversight of freight rail lines, such as to review maintenance plans and records for freight railroads, particularly those operating state-owned rail lines.

CTDOT would like to have better information on guideway conditions, such as to compare conditions of the New Haven and Hartford lines.

5.   **Describe Advantages and Limitations of working with Metro North in regards to Asset Management and Data Collection.**

CTDOT would like to have greater transparency of Metro North's data. Currently CTDOT can generally only see MNR's systems upon request.

Interview Notes: Greater Bridgeport Transit

October 15, 2015

These notes are the result of an interview held at GBT on October 15, 2015 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide which was created by the DOT and Spy Pond Partners and provided to GBT in advance.

Attendees

Doug Holcomb, Greater Bridgeport Transit Authority

Tom Gorman, Greater Bridgeport Transit Authority

Adrienne Belanger, Greater Bridgeport Transit Authority

Michael Guerrera, CTDOT

Sharon Okoye, CTDOT

Carolann Belforti, CTDOT

Eric Dorsey, CTDOT

William Robert, Spy Pond Partners

Nat Cooper, Spy Pond Partners

David Sousa, CDM Smith

Transit Asset Management Policies, Goals and Objectives

1. **Does the agency have any specific goals or objectives related to transit asset management or state of good repair (SGR). If so please describe. How do the agency's transit-related policies, goals and objectives relate to those of CTDOT?**

GBT has been working toward SGR through its capital plan. GBT has developed fleet and facilities plans which have SGR goals. GBT intends to use the FTA definition of SGR.

GBT's Facilities Maintenance Plan has nine goals and objectives, including:

- "Keep GBT FTA and State funded facilities in a State of Good Repair and maintain facilities necessary for the provision of quality service"
- "Ensure proper care and maximize the useful service life of facilities and equipment"
- "Ensure sound maintenance, repair, rehabilitation and renewal of facilities and equipment with schedule of activities designed to mitigate degradation and to prevent failure"
- "Ensure a program for predictive maintenance"

- "Avoid a reactive approach to facilities and equipment maintenance"

GBT's Fleet Maintenance Plan has three goals and six objectives, including:

- "Maximize Service Reliability by reducing unplanned service interruptions caused by mechanical failures"

Given the upcoming asset management rule, GBT intends to add to the fleet maintenance plan to reflect a goal of maintaining buses in SGR.

2. **Please describe any specific business plans, strategies or specific processes for assessing or improving CT transit asset management practices.**

GBT has a fleet maintenance plan, a facility maintenance plan, an asset inventory, and a capital program.

The GBT Capital plan is a series of spreadsheets that is developed with Sandy Infantino's help and is updated a few times throughout the year. The inventory includes assets regardless of funding source.

3. **Has the agency established any performance measures for summarizing transit asset management/SGR? If so please describe.**

For vehicles: GBT is currently using FTA useful life funding minimums. GBT propose using age + condition as a measure.

For facilities: GBT want to start using condition + age as a measure.

4. **What specific needs and gaps do you perceive within the agency regarding transit asset management?**

Four gaps:

GBT needs clearer goals and objectives which are more specific to FTA's new TAM requirements.

Inventory doesn't have enough fields. No safety critical criteria, no service critical criteria, not tied to performance standards, not tied to prioritization of investments.

GBT needs to work on assigning assets classes.

GBT needs new processes to include transit asset management in capital programming and prioritization.

Asset Inventory and Condition Assessments

Bus

1. **Revenue and Non-Revenue Vehicles**

   - **What inventory data does the agency collect on vehicles?**

GBT has 57 fixed route vehicles and 30 paratransit vehicles. GBT keeps a vehicle inventory in Fleet Watch. Data in Fleet Watch includes vehicle #, fleet, subfleet, vehicle type, home facility for vehicle, manufacturer, model, year, LTD, and active status.

- **What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?**

 Every purchase greater than $300 is in a database (Sage Software) that ties into Sage 100 accounting software. GBT uses the FTA guidance on useful life. If there is no FTA guidance, they base it on historical data and expectation.

GBT uses Fleet Watch for vehicles. In TransitFleet, software made by StarTran, GBT keeps track of PMs, parts inventory, and work orders

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

CTDOT only asks for data on state owned assets (CTDOT owns two buses that GBT operates).

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

A complete inventory is conducted every two years.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

None, besides those introduced by the NPRM.

2. **Fixed guideway, including track, grade crossings, bridges, and other related assets**

- **What inventory data does the agency collect on fixed guideway?**

GBT owns no fixed guideway assets.

- **What systems are used for collecting and managing data?**

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

3. **Passenger Facilities, including stations, bus shelters, park and rides, etc.**

- **What inventory data does the agency collect on passenger facilities?**

The 30-40 bus shelters in the system are kept on a spreadsheet and are geocoded.

- **What systems are used for collecting and managing data?**

GBT uses Sage Software for fixed asset inventory.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

GBT does not generally provide data to CTDOT.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

A complete inventory is conducted every two years.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

None.

4. **Maintenance and Administrative Facilities**

- **What inventory data does the agency collect on maintenance and administrative facilities?**

GBT has 2 buildings at the maintenance/administrative facility and 1 downtown terminal.

GBT has a facility maintenance plan (17 page doc) and a lengthy checklist for federally funded equipment.

- **What systems are used for collecting and managing data?**

Fixed assets are entered in Sage Software.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

GBT does not generally provide data to CTDOT.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

A complete inventory is conducted every two years.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

None.

5. **Systems and Equipment, including fare collection, automatic vehicle location, communication, etc.**

- **What inventory data does the agency collect on systems and equipment?**

GBT partnered with CTDOT to install an ITS system in 2009 for $3.5 million.

- **What systems are used for collecting and managing data?**

Fixed assets are entered in Sage Software.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

GBT does not generally provide data to CTDOT.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

A complete inventory is conducted every two years.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

None.

6. **Condition Assessment**

- **What approaches are used to measure the condition of CT transit bus assets?**

During inventory, staff conducts an informal, visual assessment of the general condition of assets. No formal grade is assigned.

- **What data are available to the agency regarding asset condition?**

None.

- **Does the agency have a process to assess the quality of collected data?**

No.

- **How are data shared between the agency and CTDOT? Is additional condition data collected but not shared with CTDOT?**

Life Cycle Management

1. **How do you forecast the useful life of assets as part of life cycle management?**

GBT uses depreciation or FTA recommendations. They aim for 12 years for buses, 5 years for cutaways. GBT begins capital planning before 12 years.

For facilities: GBT replaces fuel tanks at 30 years. Facilities are considered 40 year assets.

2. **How does the agency use available data on asset condition to support decision-making regarding maintenance?**

GBT depends on FTA defined useful life criteria.

3. **Have the required levels of service and performance delivery been defined for each asset?**

No. GBT does set goals for miles between road calls.

4. **Has the agency identified which assets are critical to sustained performance delivery?**

GBT has identified operationally critical elements in its System Emergency Management Plan.

Capital Planning & Programming

1. **How does the agency use available data on asset condition to support decision-making regarding specific capital investments?**

Refer to the Facilities and Fleet Maintenance Plans for current procedure.

2. **How does the agency use available data to shape its asset investment plan?**

Refer to the Facilities and Fleet Maintenance Plans for current procedure.

3. **Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?**

Additional Questions

1. **Please describe any reporting requirements the agency has for reporting asset and financial data to CTDOT.**

GBT currently provides information on monthly invoices, annual audit, annual updates to capital program, and annual reporting on state-owned assets.

2. **Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?**

3. **Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?**

4. **Please describe any other issues or relevant factors you feel we should consider in performing the project.**

Interview Notes: Norwalk Transit District

October 15, 2015

These notes are the result of an interview held at Norwalk Transit District on October 15, 2015 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide which was created by the DOT and Spy Pond Partners and provided to Norwalk Transit District in advance.

Attendees

Kim Morton, Norwalk Transit District

Nancy Carroll, Norwalk Transit District

Richard Bangs, Norwalk Transit District

Harold Alvord, Norwalk Transit District

Michael Guerrera, CTDOT

Sharon Okoye, CTDOT

Carolann Belforti, CTDOT

Eric Dorsey, CTDOT

William Robert, Spy Pond Partners

Nat Cooper, Spy Pond Partners

David Sousa, CDM Smith

Transit Asset Management Policies, Goals and Objectives

1. **Does the agency have any specific goals or objectives related to transit asset management or state of good repair (SGR). If so please describe. How do the agency's transit-related policies, goals and objectives relate to those of CTDOT?**

The goal of Norwalk Transit District is to provide safe, reliable, and cost efficient public transportation. Two district objectives are to have enough safe operable vehicles for each pull out each day and to conduct routine inspections.

In addition, Norwalk would like to standardize the fleet by brand to reduce maintenance and parts costs.

2. **Please describe any specific business plans, strategies or specific processes for assessing or improving CT transit asset management practices.**

Norwalk maintains a facility plan and a vehicle plan; both plans are annually updated. Norwalk also has 5-year and 10-year plans.

Norwalk has received funding for a facility analysis, which they will contract out to a firm. Norwalk is considering facility expansion; the current admin/maintenance facility was built for 64 vehicles but they have an 84 vehicle fleet.

Norwalk has always maintained a line in the capital plan for facility state of good repair.

3. **Has the agency established any performance measures for summarizing transit asset management/SGR? If so please describe.**

No performance measures for facilities. One possible measure is the number of complaints from staff

For vehicles, on-time inspections and operability rate.

Norwalk monitors road calls and tracks frequent breakdowns. Roughly 30 failures are reported per month, where a failure means the bus cannot continue in service. Norwalk also monitors road calls, which are problems where the trip can still be completed.

Other bus measures include fare box failures and engine shut-off failures.

4. **What specific needs and gaps do you perceive within the agency regarding transit asset management?**

Asset Inventory and Condition Assessments

Bus

1. **Revenue and Non-Revenue Vehicles**

   • **What inventory data does the agency collect on vehicles?**

There is an inventory of all fixed asset, kept on Excel. The inventory contains whatever data is required for FTA reporting.

   • **What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?**

The bus inventory is kept on excel and maintained monthly.

Right now the maintenance records are all collected manually (except fuel and mileage which are automatic). Norwalk has an AVL project in progress currently. They plan to create a centralized system where all maintenance work automatically creates data items for buses.

Fleetwatch monitors the odometers of the buses, updating whenever buses are refueled. There is a daily printout of mileage of vehicles that have been fueled. Norwalk is currently using

hubometers, but is upgrading to a fully electronic system. When a bus enters the service lane, equipment will identify the individual bus to record data.

Fleetwatch upgrade is not part of the AVL upgrade, but at some point there will be a conjoining of the two. The ITS project is a multiyear project and is coming close to completion. Phase 1 is the installation of location technology. Phase 2 is the maintenance portion.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

NTD data (miles and fuel) are submitted monthly to CTDOT. The submission is a paper document that comes out of Norwalk's accounting system. Excel sheets are printed out, scanned into PDF, and sent to CTDOT. They request money on a quarterly basis.

For vehicles owned by the state but leased to the agency, CTDOT sends an inventory sheet that the agency has to fill out and return.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

2. **Fixed guideway, including track, grade crossings, bridges, and other related assets**

- **What inventory data does the agency collect on fixed guideway?**

Norwalk owns no fixed guideway assets.

- **What systems are used for collecting and managing data?**

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

3. **Passenger Facilities, including stations, bus shelters, park and rides, etc.**

- **What inventory data does the agency collect on passenger facilities?**

There is a transit hub in Norwalk which is only a few years old (WHEELS Hub).

- **What systems are used for collecting and managing data?**

Refer to the facility plan for current procedure.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

Refer to the facility plan for current procedure.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

Refer to the facility plan for current procedure.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

4. **Maintenance and Administrative Facilities**

- **What inventory data does the agency collect on maintenance and administrative facilities?**

Norwalk has one maintenance/admin facility. It is 15 years old.

There is no spreadsheet/inventory of assets/components. But within the facility maintenance plan, the components are noted.

The facility maintenance plan identifies: fire system checks, rain water checks, heating system, HVAC, elevator every 2 years, lifts annually.

- **What systems are used for collecting and managing data?**

Refer to the facility plan for current procedure.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

Refer to the facility plan for current procedure.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

Refer to the facility plan for current procedure.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

5. **Systems and Equipment, including fare collection, automatic vehicle location, communication, etc.**

- **What inventory data does the agency collect on systems and equipment?**

Refer to the vehicle plan for current procedure.

- **What systems are used for collecting and managing data?**

Refer to the vehicle plan for current procedure.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

Refer to the vehicle plan for current procedure.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

Refer to the vehicle plan for current procedure.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

6. **Condition Assessment**

- **What approaches are used to measure the condition of CT transit bus assets?**

Norwalk plans to conduct five and ten year condition assessments.

- **What data are available to the agency regarding asset condition?**

- **Does the agency have a process to assess the quality of collected data?**

- **How are data shared between the agency and CTDOT? Is additional condition data collected but not shared with CTDOT?**

Life Cycle Management

1. **How do you forecast the useful life of assets as part of life cycle management?**

Assets are assessed by foremen on duty. Parts are kept in stock according to usage.

For buses, Norwalk uses the FTA 12-year useful life. Buses are replaced on that cycle. Body over chassis vehicles are kept longer than the FTA-suggested 5 year cycle, but Norwalk would prefer to replace on 5 year cycle.

Norwalk will soon standardize 5 and 10 year "B" inspections of vehicles that will assess all major components and anticipate when critical components (e.g. alternators) should be replace before they fail and cause service issues. These calls are being made intuitively, in the future as the fleet grows and vehicles get more complex, electronic monitoring and diagnostic/parts replacement decisions will be based on actual performance.

It is more difficult to determine lifecycle for other assets like phones, computers, fare collection assets.

2. **How does the agency use available data on asset condition to support decision-making regarding maintenance?**

3. **Have the required levels of service and performance delivery been defined for each asset?**

4. **Has the agency identified which assets are critical to sustained performance delivery?**

Capital Planning & Programming

1. **How does the agency use available data on asset condition to support decision-making regarding specific capital investments?**

Refer to the facility and vehicle plans for current procedure.

2.   How does the agency use available data to shape its asset investment plan?

Refer to the facility and vehicle plans for current procedure.

3.   Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?

Yes, the facility and vehicle plans.

Additional Questions

1.   Please describe any reporting requirements the agency has for reporting asset and financial data to CTDOT.

2.   Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?

3.   Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?

4.   Please describe any other issues or relevant factors you feel we should consider in performing the project.

Interview Notes: CT Transit, Hartford Division

October 28, 2015

These notes are the result of an interview held at CT Transit in Hartford with CT Transit Hartford Division staff on October 28, 2015 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide which was created by the DOT and Spy Pond Partners and provided to CT Transit staff in advance.

Attendees

Mike Arrow, First Transit

Cole Pouliot, First Transit

Ken Baxter, CT Transit

Tim Benson, CT Transit

Eric Fetzer, CT Transit

Ralph Figueroa, CT Transit

Philip Fry, CT Transit

Frank Kolakowski, CT Transit

Russ Osborn, CT Transit

Rich Paterson, CT Transit

Heidi Strom, CT Transit

Jacqueline Henry-Rafiq, CTDOT

Sharon Okoye, CTDOT

Carolann Belforti, CTDOT

Eric Dorsey, CTDOT

William Robert, Spy Pond Partners

Nat Cooper, Spy Pond Partners

David Sousa, CDM Smith

Transit Asset Management Policies, Goals and Objectives

1. **Does the agency have any specific goals or objectives related to transit asset management or state of good repair (SGR). If so please describe. How do the agency's transit-related policies, goals and objectives relate to those of CTDOT?**

Participants first discussed the organization of CT Transit. The name CT Transit is a brand name for CTDOT-owned bus services. Various contractors provide services to CTDOT under this name. Meeting participants included staff from HNS and First Transit. HNS is operates 494 buses for CTDOT in Hartford, New Haven and Stamford. First Transit provides oversight over HNS for CTDOT. CTfastrak is a new bus rapid transit service that is also part of CT Transit. First Transit and HNS provide this service for CTDOT as well, though under a separate contract.

CT Transit's SGR goals are essentially laid out in the fleet/facility maintenance plans. These describe how CT Transit will keep equipment in good repair and maintain good records in order to track asset progress, as well as specific maintenance schedules for various assets. For instance, for its buses CT Transit has a 1,500 mile preventive maintenance (PM) cycle with different inspection and maintenance activities specified at each interval.

2. **Please describe any specific business plans, strategies or specific processes for assessing or improving CT transit asset management practices.**

HNS has a fleet maintenance plan. This was developed internally. HNS performs maintenance on the fleet and maintains maintenance records. Overall polices for management of CT Transit (e.g., when to replace vehicles, what service to provide, etc.) are established by CTDOT.

3. **Has the agency established any performance measures for summarizing transit asset management/SGR? If so please describe.**

Mean Distance Between Failures (road calls) is the primary measure. This is tracked by type of equipment and also by division.

4. **What specific needs and gaps do you perceive within the agency regarding transit asset management?**

See discussion below.

Asset Inventory and Condition Assessments

Bus

1. **Revenue and Non-Revenue Vehicles**

   - **What inventory data does the agency collect on vehicles?**

HNS stores detailed data on the fleet, including records for each vehicle, and for the major systems within the vehicle, such as the engine, transmission, etc. Inventory data include date

purchased, ID numbers, purchase price, and other details. The intent is to store sufficient inventory and maintenance data to support trend analysis, such as to determine the mileage at which key components are failing, and to compare performance of different pieces of equipment. This supports decisions about what work to perform and when to perform it. HNS is equipped to perform the full range of maintenance activities on the vehicles in the fleet, up to and including engine rebuilds.

- **What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?**

The inventory and all maintenance records are stored in Asset Works. HNS is using Version 14 of the system, and testing Version 15.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

HNS and First Transit provide a range of reports to CTDOT per the specifications of their contracts. Much of the basic information on the system is provided via monthly invoices. HNS provides additional information on the fleet to CTDOT upon request. CTDOT does not have direct access to Asset Works.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

The fleet management plan contains for details on each type of inspection. The inventory is updated whenever a new bus is purchased, as well as whenever maintenance is performed on a vehicle, or when a vehicle is inspected. As noted previously, PM inspections are scheduled every 1,500 miles. 5 types of inspections are performed (A-E) depending on the mileage. The basic schedule is:

3,000 miles – A

4,500 miles – E

6,000 miles – B

7,500 miles – E

9,000 miles – C

10,500 miles – E

12,000 miles – D

…

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

Meeting participants did not note any specific gaps in this area. HNS is hoping to automate certain reporting functions. Participants noted that although it is not directly related to

maintenance work, they are in the process of installing a fleet-wide ITS system which will enable real-time tracking of vehicle locations.

2. Fixed guideway, including track, grade crossings, bridges, and other related assets

- **What inventory data does the agency collect on fixed guideway?**

CTfastrak, which recently went into service, has an extensive amount of fixed guideway. CTDOT's Highways Division is responsible for maintaining the CTfastrak roads and bridges.

- **What systems are used for collecting and managing data?**

N/A

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

3. Passenger Facilities, including stations, bus shelters, park and rides, etc.

- **What inventory data does the agency collect on passenger facilities?**

HNS has responsibility for stations, parking lots, and other ancillary assets such as sidewalks, lamp posts, and platforms on CTfastrak. Day-to-day maintenance of the CTfastrak facilities is performed by SJE under contract to HNS.

Other passenger facilities besides those associated with CTfastrak include various bus shelters, the passenger station in Stamford, and sales outlets in Hartford, New Haven and Stamford.

Concerning bus shelters, generally where these have been constructed (in Hartford in New Have) they are the responsibility of the locality. There are 9-10 shelters that the DOT has installed and maintains and are in the CORE database. Also, HNS is now in the process of installing 25 new shelters with space for advertising. Those will be maintained by contractors who use advertising revenue to maintain the shelters. CT Transit will have responsibility for repairing broken glass and other more substantive maintenance activities.

CT Transit does not perform maintenance on the station in Stamford station as this is a DOT facility. CT Transit does operate and maintain the sales outlet in Hartford. The sales outlet in New Haven is in disrepair and discussions are underway to replace it. The Stamford sales outlet is located in the intermodal transit center and maintained by the contractor responsible for that facility.

- **What systems are used for collecting and managing data?**

All CT Transit facilities, including passenger and admin/maintenance facilities, are listed in CORE. However, assets are often represented at a very high level in CORE, and more detailed data are needed for day-to-day management. For instance, each CTfastrak station is a single record in CORE.

For CTfastrak SJE is required to have a maintenance management system; they are currently using Microsoft Word/Excel to manage work orders.

HNS is currently developing the fixed asset inventory for the CTfastrak stations, but it is only approximately 70% complete because CTDOT has not yet taken ownership of all of the CTfastrak assets.

In addition to the inventory in CORE, HNS maintains a bus shelter database.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

4. **Maintenance and Administrative Facilities**

- **What inventory data does the agency collect on maintenance and administrative facilities?**

HNS is responsible for maintaining 3 admin/maintenance facilities: one in Harford, one in Hamden (serving New Haven) and one in Stamford. All 3 facilities are state owned. The Hamden facilities is approximately 5 years old and in very good condition.

As noted above, all state-owned assets are listed in CORE. Also, at HNS any piece of equipment costing more than $250 is tagged. HNS maintains a spreadsheet listing tagged assets, and these are listed in AssetWorks as well.

- **What systems are used for collecting and managing data?**

HNS receives and reviews printouts from CORE on an annual basis, but does not use the system for day-to-day management.

HNS populated AssetWorks with facility data based largely on the data from CORE. However, AssetWorks is not used for day-to-day management of facilities – only vehicles. HNS is currently performing an assessment of the Hartford facility and investigating alternatives to AssetWorks for facility maintenance management. In the absence of a system maintenance records are kept manually.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

As noted above CTDOT has access to all data upon request. Further, CTDOT must approve and costs over $2,000.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

The facilities maintenance plan details this, as well as all PM activities for facilities.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

Tracking of condition of components (e.g. HVAC system) is difficult because tags are not clear and age or condition of components is not tracked. Also, equipment purchased at the time the building was constructed often is not specifically identified (e.g. lifts, boiler). Often an entire building is tagged with a single ID number.

5. **Systems and Equipment, including fare collection, automatic vehicle location, communication, etc.**

    See above discussion.

    - **What inventory data does the agency collect on systems and equipment?**

    - **What systems are used for collecting and managing data?**

    - **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

    - **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

    - **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

6. **Condition Assessment**

    - **What approaches are used to measure the condition of CT transit bus assets?**

HNS follows the fleet management plan when measuring the condition of CT Transit bus assets. HNS inspects for corrosion, frame condition, body panels etc. They don't rely on mileage as the single measure of performance.

Note that for the Hartford facility HNS also performs a monthly environmental inspection.

    - **What data are available to the agency regarding asset condition?**

    - **Does the agency have a process to assess the quality of collected data?**

    - **How are data shared between the agency and CTDOT? Is additional condition data collected but not shared with CTDOT?**

Life Cycle Management

1. **How do you forecast the useful life of assets as part of life cycle management?**

All of the buses HNS maintains are projected to have a useful life of 12 years. This figure was set by CTDOT based on the FTA minimum. In some cases buses need to be maintained out to

15 years. Given the useful life is set, the fleet management plan is structured to enable HNS to maintain buses out to the projected useful life.

As noted above, HNS maintains 494 buses. In Hartford there are 250 "regular" buses and 42 CTfastrak buses.

2.   **How does the agency use available data on asset condition to support decision-making regarding maintenance?**

See above discussion. Note that HNS/First Transit work with CTDOT to develop the capital plan for vehicles and facilities. First Transit has prepared its own assessment of future needs to support this process.

3.   **Have the required levels of service and performance delivery been defined for each asset?**

4.   **Has the agency identified which assets are critical to sustained performance delivery?**

Additional Questions

1.   **Please describe any reporting requirements the agency has for reporting asset and financial data to CTDOT.**

HNS/First Transit are subject to a number of reporting requirements, including monthly reporting to CTDOT, a monthly meeting at CTDOT, quarterly updates on FTA funded projects to CTDOT, and an annual inventory update for CORE.

2.   **Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?**

See above discussion. Initiatives include the facility condition assessment, installing a fleet-wide ITS system, and upgrading all fare collection systems to switch to account-based smart cards.

3.   **Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?**

4.   **Please describe any other issues or relevant factors you feel we should consider in performing the project.**

The inventory of spares is an additional concern.

Interview Notes: CT Transit, New Haven and Stamford Divisions

October 29, 2015

These notes are the result of an interview held at CT Transit in Hamden with staff from both the New Haven and Stamford Division on October 29, 2015 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide which was created by the DOT and Spy Pond Partners and provided to CT Transit staff in advance.

Attendees

Mike Arrow, First Transit

Cole Pouliot, First Transit

Stan Kostka, CT Transit (New Haven)

Bill Bassett, CT Transit (New Haven)

Casey Klaneski, CT Transit (Stamford)

Dan Kane, CT Transit (Stamford)

Sandy Infantino, CTDOT

Jacqueline Henry-Rafiq, CTDOT

Kelsey Bertrand, CTDOT

Mike Rinaldi, CTDOT

Sharon Okoye, CTDOT

Carolann Belforti, CTDOT

Eric Dorsey, CTDOT

William Robert, Spy Pond Partners

Nat Cooper, Spy Pond Partners

David Sousa, CDM Smith

Sandeep Aysola, CDM Smith

Transit Asset Management Policies, Goals and Objectives

Refer to discussion at CT Transit – Hartford interview

1. **Does the agency have any specific goals or objectives related to transit asset management or state of good repair (SGR). If so please describe. How do the agency's transit-related policies, goals and objectives relate to those of CTDOT?**

2. **Please describe any specific business plans, strategies or specific processes for assessing or improving CT transit asset management practices.**

3. **Has the agency established any performance measures for summarizing transit asset management/SGR? If so please describe.**

4. **What specific needs and gaps do you perceive within the agency regarding transit asset management?**

Asset Inventory and Condition Assessments

Bus

1. **Revenue and Non-Revenue Vehicles**

   • **What inventory data does the agency collect on vehicles?**

The New Haven fleet comprises 126 revenue vehicles and 30-40 non-revenue.

The Stamford fleet comprises 76 revenue vehicles and 13 non revenue.

The buses are a variety of size, 40 foot, 45 foot, and 60 foot vehicles. New Haven has one 35 foot bus.

Generally the approach used for fleet management for the New Haven and Stamford divisions of CT Transit is similar to that of the Hartford division detailed in the previous CT Transit interview. Like the Hartford division, New Haven and Stamford use AssetWorks. The system was implemented 3 years ago, replacing Ultramain. All three divisions use the same fleet management plan.

   • **What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?**

See above regarding use of AssetWorks. Note that New Haven will be using the same ITS system as Hartford (Trapeze). Stamford is installing a separate ITS system, ACS Xerox.   Also note that fluids, fuels, and mileage are managed by Fleet Watch. The data is entered automatically and migrated to AssetWorks. Repairs are tracked through AssetWorks.

   • **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

2. **Fixed guideway, including track, grade crossings, bridges, and other related assets**

   N/A

   - **What inventory data does the agency collect on fixed guideway?**

   - **What systems are used for collecting and managing data?**

   - **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

   - **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

   - **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

3. **Passenger Facilities, including stations, bus shelters, park and rides, etc.**

   - **What inventory data does the agency collect on passenger facilities?**

Refer to discussion from the Hartford interview.

   - **What systems are used for collecting and managing data?**

   - **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

   - **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

   - **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

4. **Maintenance and Administrative Facilities**

   - **What inventory data does the agency collect on maintenance and administrative facilities?**

The Stamford facility was built between 1981-83 and rehabbed between 2003-05. A new admin building was built in 2003 and the repair shop was remodeled in 2005.

The assets in the facilities are kept in an Excel spreadsheet. HNS is currently looking for a system to keep track of the assets. The spreadsheet, updated annually keeps data for each asset including: ID # (same ID as in CORE), date purchased, $ value.

Any important work is disclosed on a monthly report.

HNS keeps a printed copy of the CORE database and uses it to find lost assets during the year.

   - **What systems are used for collecting and managing data?**

Maintenance assets are recorded in a written Work Book.

Heating and AC are the biggest issues. Most of the work is contracted out.

For schedule of past repairs, they go back to the book. All bus repairs are tracked on Asset Works but not facilities – might use it in the future if system is set-up and if licensing concerns are overcome. They are exploring a cloud-based system.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

5. **Systems and Equipment, including fare collection, automatic vehicle location, communication, etc.**

- **What inventory data does the agency collect on systems and equipment?**

- **What systems are used for collecting and managing data?**

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

6. **Condition Assessment**

- **What approaches are used to measure the condition of CT transit bus assets?**

Building maintenance staff keeps track of repairs and costs for both Stamford and New Haven facilities. Facility assets are not given a rating; the assessments are comment based. HNS keeps a list of needs manually, including assets that should be replaced.

There is now an HVAC log, also maintained manually.

- **What data are available to the agency regarding asset condition?**

- **Does the agency have a process to assess the quality of collected data?**

- **How are data shared between the agency and CTDOT? Is additional condition data collected but not shared with CTDOT?**

Life Cycle Management

1. **How do you forecast the useful life of assets as part of life cycle management?**

For buses, HNS follows FTA useful life minimums. For non-revenue vehicles, Hartford decides the mileage. For components, HNS maintains them until they fail. Hartford does major repairs for Stamford and Hew Haven.

Roofs and mechanical assets have forecasted useful lives as required by the facilities maintenance plan.

2. **How does the agency use available data on asset condition to support decision-making regarding maintenance?**

3. **Have the required levels of service and performance delivery been defined for each asset?**

In the plans, last updated around 2013.

4. **Has the agency identified which assets are critical to sustained performance delivery?**

Revenue Fleet is the top priority, followed by facility HVAC, and then everything else.

Additional Questions

1. **Please describe any reporting requirements the agency has for reporting asset and financial data to CTDOT.**

All reports from New Haven and Stamford go to Hartford and Hartford sends to CTDOT.

PM inspection report, list of facility repairs, list of bus repairs, personnel reports, and fuel reports are all sent to Hartford monthly.

2. **Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?**

3. **Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?**

4. **Please describe any other issues or relevant factors you feel we should consider in performing the project.**

Participants discussed CT Transit's history. CT Transit was formed in 1976 when the State of Connecticut purchased the Connecticut Company, which operated transit service in Hartford, New Haven and Stamford. Since 1979 CTDOT has contracted with First Transit to operate CT Transit. First Transit's subsidiary corporation HNS Management operates the three original divisions of CT Transit – Hartford, New Haven and Stamford. Two other companies operate the other divisions of CT Transit (New Britain, Bristol, Wallingford, Waterbury, Meriden). First Transit provides oversight overall of the of the CT Transit divisions.

Interview Notes: Shore Line East

November 5, 2015

These notes are the result of an interview held in New Haven with Shore Line East staff on November 5, 2015 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide which was created by the DOT and Spy Pond Partners and provided to Shore Line East staff in advance.

Attendees

Fred Fournier, Amtrak

Ron Egidio, Amtrak

William Mongillo, Amtrak

Chris Purcell, Amtrak

Allen Cable, Amtrak

Marci Petterson, CTDOT

Sharon Okoye, CTDOT

Carolann Belforti, CTDOT

Eric Dorsey, CTDOT

William Robert, Spy Pond Partners

Nat Cooper, Spy Pond Partners

David Sousa, CDM Smith

Sandeep Aysola, CDM Smith

This interview focused on asset management practices of Shore Line East, which provides commuter rail service between New London and New Haven. Amtrak operates this service under contract to CTDOT. Within Amtrak, Shore Line East facilities and equipment are considered a separate entity from the rest of the Amtrak system. Shore Line East operates over Amtrak track, except for in New Haven Station where the track is owned by CTDOT. Amtrak contracts out property management for the stations.

Transit Asset Management Policies, Goals and Objectives

1. **Does the agency have any specific goals or objectives related to transit asset management or state of good repair (SGR)? If so please describe. How do the agency's transit-related policies, goals and objectives relate to those of CTDOT?**

Amtrak places a high priority on operating a safe system. However, for the Shore Line East service Amtrak has no specific SGR goals or contract incentives, though its contract with CTDOT does include on-time performance targets.

2. **Please describe any specific business plans, strategies or specific processes for assessing or improving CT transit asset management practices.**

Amtrak operates Shore Line East based on the preventive maintenance plan developed for the system. The plan incorporates maintenance standards written by Amtrak and tailored for CTDOT. The standards are updated annually.

In all cases Amtrak's practices meet or exceed FRA regulations.

3. **Has the agency established any performance measures for summarizing transit asset management/SGR? If so please describe.**

Amtrak prepares a monthly internal report that shows delays and the causes of those delays (equipment vs track failures). They are currently developing additional metrics in their work management system.

CTDOT is interested in determining Mean Distance Between Failure (MDBF) for Shore Line East, but this measure is not easily generated at present.

4. **What specific needs and gaps do you perceive within the agency regarding transit asset management?**

A major issue is that the Shore Line East fleet, particularly the fleet of locomotives, has exceeded its useful life.

Amtrak is working on a process to more easily calculate MDBF for Shore Line East. Amtrak's management system tracks metrics for trains, but for Shore Line East the calculations need to be performed for each vehicle as pieces of equipment are often exchanged between trains.

Although the Shore Line East yard is good condition, it is not large enough to store all four sets of coaches during winter months. Also there are clearance restrictions in the New Have facility that restrict what work can be performed.

Parts for coach upkeep are becoming obsolete. This puts a strain on maintenance because there are fewer parts and the parts are more expensive.

Asset Inventory and Condition Assessments

Rail

1.   Revenue and Non-Revenue Vehicles

- **What inventory data does the agency collect on vehicles?**

The inventory consists 18 locomotives and 33 coaches. Amtrak operates 4 train sets in daily service and keeps a standby set available. Amtrak stores inventory data on each vehicle, as well as on vehicle components and subcomponents.

Vehicles are inspected according to FRA guidelines at a minimum. Inspections are performed at intervals of 60 days, 92 days (1 FRA quarter), 368 days (1 FRA year), and 4 years.

- **What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?**

Amtrak's Work Management System (WMS) is used to store inventory data and maintenance history. WMS allows Amtrak to track work orders and schedule preventive maintenance. WMS will allow Amtrak to create a "dashboard" of maintenance trends. Amtrak also keeps paper files for daily inspections. However, they are moving away from paper records and transitioning fully to WMS.

Note WMS is used across the entire company, not just for Shore Line East.

Separately CTDOT keeps a spreadsheet with basic inventory data.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

Amtrak sends a daily report on equipment availability for both the morning and afternoon. This is a Word document created by the foreman. Amtrak also sends CTDOT a report if a train doesn't run (which is uncommon). CTDOT does not have direct access to WMS.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

The fleet management plan deals with ages of rail cars and the plans to overhaul, update or replace the fleet. The inventory is updated annually as part of the Department's annual physical inventory. Amtrak examines as many pieces of equipment as possible throughout the year to address condition assessment, with an objective of actually looking at each piece of equipment a minimum of once in the period between FTA triennial reviews.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

See prior discussion on calculation of MDBF.

2.   Fixed guideway, including track, grade crossings, bridges, and other related assets

- **What inventory data does the agency collect on fixed guideway?**

Shore Line East operates on guideway owned by Amtrak and maintained to a standard that meets or exceeds FRA regulations. CTDOT does not own any of the Shore Line East guideway, except that in New Haven.

- **What systems are used for collecting and managing data?**

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

3. **Passenger Facilities, including stations, park and rides, etc.**

- **What inventory data does the agency collect on passenger stations?**

Amtrak does not own the passenger facilities used for Shore Line East. Maintenance work on passenger facilities is contracted out separately. Craig and Marlene at CTDOT have additional information about SLE stations.

- **What systems are used for collecting and managing data?**

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

4. **Maintenance and Administrative Facilities**

- **What inventory data does the agency collect on maintenance and administrative facilities?**

The rail yard at New Haven is owned by the state and maintained by Amtrak. Amtrak keeps maintenance records and certification for facility equipment. This does not include HVAC or fire safety. The intention of the inventory is not to record building systems such as HVAC, but to include pieces of equipment used in rail operations and maintenance.

- **What systems are used for collecting and managing data?**

Amtrak is currently using paper records for managing the facility inventory. Paradigm Version 3 is under development as the eventual facility management solution. Paradigm is a quality control system and controls the revision level of the documents Amtrak uses. WMS is used for work order management.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

Amtrak provides data to CTDOT on a routine basis, and must obtain approval for all major purchase. Amtrak provides additional data upon request.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

5.   **Systems and Equipment, including catenary, power, signals, communication, etc.**

Refer to above discussion. Systems and equipment related to the guideway are managed as guideway elements.

- **What inventory data does the agency collect on systems and equipment?**

- **What systems are used for collecting and managing data?**

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

6.   **Condition Assessment**

- **What approaches are used to measure the condition of CT rail assets?**

Amtrak performs regular inspections that meet or exceed the FRA minimums.

Amtrak has a service contract for maintenance facility inspection. All equipment gets inspected annually. Amtrak also has annual environmental and safety audits. The facility inspection files are kept as paper records in the New Haven office, but will eventually go in Paradigm.

Amtrak does not have specific summary measures of condition for Shore Line East vehicles or facilities (besides age and vehicle mileage).

- **What data are available to the agency regarding asset condition?**

- **Does the agency have a process to assess the quality of collected data?**

- **How are data shared between the agency and CTDOT? Is additional condition data collected but not shared with CTDOT?**

Life Cycle Management

1.   **How do you forecast the useful life of assets as part of life cycle management?**

Amtrak uses manufacturer guidelines, FTA guidelines, and repair history to determine the useful life of assets.

P40 locomotives have 20-year life expectancy by design. The other locomotives in the fleet have a 25-year life and were rebuilt 20 years ago. The useful life of rail coaches is 30 years according to FTA guidelines.

When a vehicle is remanufactured, it resets the age, per FTA. When a vehicle is overhauled (vs. remanufactured), FTA expects an additional 12 years from the vehicle.

2.   **How does the agency use available data on asset condition to support decision-making regarding maintenance?**

Amtrak relies on equipment inspector contractors to determine when assets need to be replaced. If a replacement recommendation is given, Amtrak has to take that recommendation to CTDOT for funding.

Concerning slow orders, Amtrak maintains slow order data that would allow for reporting on guideway performance restrictions.

3.   **Have the required levels of service and performance delivery been defined for each asset?**

4.   **Has the agency identified which assets are critical to sustained performance delivery?**

Additional Questions

1.   **Please describe any reporting requirements the agency has for reporting asset and financial data to CTDOT.**

2.   **Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?**

3.   **Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?**

4.   **Please describe any other issues or relevant factors you feel we should consider in performing the project.**

Interview Notes: Core Database

November 17, 2015

These notes are the result of an interview held with CTDOT staff on November 17, 2015 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith.

Attendees

Ed Stratton, CTDOT
Sue Donlon, CTDOT
Sharon Okoye, CTDOT
Carolann Belforti, CTDOT
Eric Dorsey, CTDOT
William Robert, Spy Pond Partners
Nat Cooper, Spy Pond Partners

1. What is Core and who uses it?

Core-CT is the State of CT's financial management system. It is an implementation of Oracle Applications. It includes various modules, one of which is the Asset Management Module. The CTDOT Asset Management group uses Core-CT. There are no other users of the Core-CT Asset Management Module at CTDOT. The asset management team for DOT logs in to the core and creates, maintains, edits, and deletes records.

2. What assets are listed in Core?

All assets with a value of $5K or more are entered into the system, as well as "controllable property" such as registered vehicles and computers. Prior to July the limit was $1K. Examples of controllable property include registered equipment (trailers, anything with registration plate), laptop, electronics (usually computers and software).

Infrastructure – including roads, bridges and track – is not in the system. The assets are typically equipment and buildings. Core-CT also has a Projects Module but the Asset Management group does not actively use this module.

3. How is the information used?

Core's asset reporting supports compliance with GASB (Statement 60), CT Statute (4-36A), and federal reporting requirements. Also it is needed for insurance purposes.

The primary motivation for use of Core-CT's Asset Management Module is to support the above reporting requirements, but the Asset Management group also receives and responds to various requests for asset data, such as requests for facility listings, etc.

On an annual basis the Asset Management group sends an electronic file to asset managers requesting that they review and update the data from Core-CT for their assets. One field they are asked to update is asset condition (new, good, fair or poor). Strictly speaking this field is required for federally-funded assets only, but it is requested for all assets. It is up to asset managers to determine how to assess condition.

We briefly discussed CTDOT's approach to GASB 34 compliance. This is not Sue's direct responsibility – talk to Wally about this. However, Sue's understanding is that CTDOT uses the "modified method" for calculating asset value described in GASB 34.

4. How are assets coded?

The rule of thumb for asset coding is that a facility is coded as a single asset, and it is further broken down only to the extent that there are individual pieces of equipment that can be removed from the building. For example, if a second structure were to be built on a single parcel of land, then you would warrant having two separate assets. An exception to this rule is that if an improvement is made (e.g., not simply a preventive maintenance replacement) then this may be coded as a new asset. Sue described theoretical examples of elevator and roof replacements that could be classified as improvements.

For more information on what is required in Core-CT see the Office of State Comptroller's Property Control Manual. The recent change to the asset value threshold is noted in an accompanying memorandum.

Interview Notes: Metro-North Railroad

November 19, 2015

These notes are the result of an interview held in New Haven with Metro-North staff on November 19, 2015 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide which was created by the DOT and Spy Pond Partners and provided Metro-North staff in advance.

Attendees

Sharon Okoye, Carolann Belforti, Eric Dorsey, Jaime Vega, Carl Jackson (partial) – CTDOT

John Kesich, Al Santini, Mike Yaeger – MNR

Sandeep Aysola – CDM Smith

Nat Cooper, William Robert – SPP

Transit Asset Management Policies, Goals and Objectives

1. **Does the agency have any specific goals or objectives related to transit asset management or state of good repair (SGR)? If so please describe. How do the agency's transit-related policies, goals and objectives relate to those of CTDOT?**

   See the MNR asset management gap assessment document for MNR's assessment of this topic. The assessment was prepared by a consultant (PB), but MNR reviewed and accepts the results of the assessment.

   Note MTA identifies places a strong emphasis on asset management/SGR. However, historically the focus was more on replacing assets that had exceeded their useful life through the capital plan and less on managing assets effectively over their entire lifecycle through the operations and maintenance (O&M) budget. MNR's current efforts are focused on the latter area, strengthening its approach to better manage assets over their lifecycle.

2. **Please describe any specific business plans, strategies or specific processes for assessing or improving CT transit asset management practices.**

   See the gap assessment document and implementation plan. These were prepared as part of an overall EAM effort underway at MTA. This effort will result in replacement of MNR's Asset Management System (AMS) with a new Enterprise Asset Management (EAM) system and other improvements.

3. **Has the agency established any performance measures for summarizing transit asset management/SGR? If so please describe.**

The key performance measure for the revenue fleet is Mean Distance Between Failures (MDBF). CT has purchased a portion of the fleet, but it is managed as a whole. MTA's needs assessment includes % of asset in good repair for fixed assets, but this document addresses fixed assets in New York only.

MNR does not measure the % of guideway in good repair. The agency looks at impacts on the ability to deliver service. Train service failures act as a proxy for guideway condition.

4.   **What specific needs and gaps do you perceive within the agency regarding transit asset management?**

Refer to gap assessment document.

Asset Inventory and Condition Assessments

Rail

1.   **Revenue and Non-Revenue Vehicles**

Notes on the inventory:

MNR has approximately 1,200 pieces of rolling stock in total. MNR operates electric multiple units (EMU) on the New Haven main line and New Canaan branch lines. On the Danbury and Waterbury lines MNR operates coaches (typically Shoreliners) with diesel locomotives operating in push/pull fashion.

Typically the EMUs used on the line are M-8s. These were recently purchased, with the last of these entering service in 2015. 65% of the funding for these came from the State of Connecticut. Typically the coaches used on the Danbury and Waterbury branch lines are Shoreliners purchased by the State of Connecticut push/pulled by NY-purchased locomotives. However, MNR has purchased other EMUs and other coaches and uses the fleet more or less interchangeably between lines.

MNR still has 36 M-2 EMUs used as a reserve fleet, but these will be phased out of service as the M-8s are completely phased in.

Regarding the Shoreliners, these are typically 18-22 years old, and were bought in 4 groups: 1986-87, 1992, 1995-96 and 2001. The first two groups have end doors, and the second two have additional center doors that allow for more rapid loading/unloading and improved ADA compliance.

- **What inventory data does the agency collect on vehicles?**

   Component-level data are stored on vehicles in AMS. Also, maintenance actions are tracked at this level. The intent of the system is to store data down to the level of component that can be changed on the track – e.g., a logic board.

- **What systems are used for collecting and managing data? Can demonstrations be arranged for the interview session?**

AMS is the current system. It includes a number of integrated modules, such as modules for defect and repair management, train management, etc…

Mike reported that the "fundamentals are in place" with respect to tracking vehicle data, but through the EAM effort MNR would like to further improve its management of the fleet. For instance, MNR still relies on paper-based processes in some cases, and would like to streamline existing processes through use of handheld computers on the floor for tracking maintenance.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

   CTDOT staff have browser access to all of AMS and can see data on all vehicles, not just those purchased using CT funding.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

   See above discussion – the inventory is updated as inspections are performed and maintenance work is completed.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

   Refer to gap assessment document.

2. **Fixed guideway, including track, grade crossings, bridges, and other related assets**

   Notes on the inventory:

   The State of Connecticut owns all guideway used by MNR in CT. CT pays 66.5% of the O&M cost for the New Haven Line (some of which is in NY and some of which is in CT), and 100% for the three CT branch lines. CT pays all of the capital costs for CT guideway.

- **What inventory data does the agency collect on fixed guideway?**

   Generally speaking the inventory consists of track charts, supplemented with spreadsheets and paper forms. Management of the track is handled geographically, and different approaches may be used between geographic areas. Technically the inventory is CT's and MNR views that CT is responsible for managing the inventory. However, MNR uses inventory data on a day-to-day basis, such as when tracking inspections and maintenance activities.

   For three asset types MNR is further advanced in its approach to asset tracking. For signals MNR has initiated a pilot project to test an improved system to track federally mandated inspections. For NY (but not CT) bridges MNR has established a bridge management system (and CT has established a similar system for CT bridges). And for power-related assets MNR has developed "home brew" spreadsheets and databases" for tracking the inventory.

- **What systems are used for collecting and managing data?**

MNR's inventory is stored in the form of track charts. Improving the inventory was as a need in the gap assessment, and the EAM initiative will result in an improved asset inventory.

Separately from the EAM initiative MNR has an effort underway to develop a GIS-based system for track.

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

  As noted above, the official inventory is in the form of track charts and these are shared.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

  See above.

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

  Refer to the gap assessment document.

3. **Passenger Facilities, including stations, park and rides, etc.**

MNR is not responsible for passenger facilities in CT. MNR shares with CTDOT any feedback received from passengers concerning CT facilities.

- **What inventory data does the agency collect on passenger stations?**

- **What systems are used for collecting and managing data?**

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

4. **Maintenance and Administrative Facilities**

MNR shares costs with CTDOT for routine maintenance of CT-based facilities and costs are shared based on the cost-sharing agreement. There are four of these facilities: in New Haven, East Bridgeport, Stamford and Danbury. The service agreement (RSA) spells out MNR's responsibilities. Note for the new component change out facility (CCO) in New Haven, MNR's responsibilities will basically extend to the first and second floors of the facility, while CTDOT will be responsible for the upper floors.

All of the facilities are owned by the State of Connecticut and MNR views that CTDOT is responsible for maintaining inventory data on these facilities. MNR tracks maintenance data for the facilities using paper records and does not maintain a formal inventory of the facilities.

- **What inventory data does the agency collect on maintenance and administrative facilities?**

- **What systems are used for collecting and managing data?**

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

5. **Systems and Equipment, including catenary, power, signals, communication, etc.**

See above responses with respect to guideway and facilities.

- **What inventory data does the agency collect on systems and equipment?**

- **What systems are used for collecting and managing data?**

- **How are data shared between the agency and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

6. **Condition Assessment**

The condition assessment approach for vehicles is well-defined, and condition data are captured in AMS. CTDOT has access to AMS.

For guideway assets MNR has extensive procedures in place for tracking condition and inspection data, but lacks systems for making this data available and transparent, as documented in the gap assessment. MNR's procedures meet or exceed FRA requirements, however.

Data typically tracked include inspection dates, results of tests (e.g., relay testing), work performed, etc.

Regarding track inspection, since 2013 MNR has run a geometry car 4 times per year using services leased from TTCI and Merrimack. MNR is in the process of acquiring a geometry car. Twice a year MNR performs ultrasonic inspections (whereas annual inspections are required by FRA). MNR has also recently performed inspections of rail and ties using a machine vision system. Further, MNR is exploring installation of track geometry measurement equipment on its revenue vehicles.

MNR recently installed a Wheel Impact Load Detector (WILD) at 86th Street in the Park Avenue Viaduct. Two other WILD sites are planned, including one at Green's Farm in CT. MNR does not share the data at the at the existing site with other railroads since no other

railroads operate at this location. However, at the Green's Farm site there will be freight railroads operating. MNR is developing alternative measures to use for spotting issues in its wheels, since the threshold levels established by the Association of American Railroads (AAR) are developed for heavier freight cars. Specifically, MNR looks for a dynamic load that exceeds the mean by a factor of three as a trigger for when further inspection of a wheel is needed.

- **What approaches are used to measure the condition of CT rail assets?**

- **What data are available to the agency regarding asset condition?**

- **Does the agency have a process to assess the quality of collected data?**

- **How are data shared between the agency and CTDOT? Is additional condition data collected but not shared with CTDOT?**

Life Cycle Management

Refer to the findings of the gap assessment. For vehicles MNR does forecast component lives and schedules cyclical replacement of selected components, such as air compressors, shocks, rubber components and major component assemblies. Forecasts of useful life are based on experience and maintenance data.

For rail MNR historically performed replacement when rail reached its wear limit. More recently MNR is beginning to predict need for replacement based on defect rates.

1. **How do you forecast the useful life of assets as part of life cycle management?**

2. **How does the agency use available data on asset condition to support decision-making regarding maintenance?**

3. **Have the required levels of service and performance delivery been defined for each asset?**

4. **Has the agency identified which assets are critical to sustained performance delivery?**

Capital Planning & Programming

1. **How does the agency use available data on asset condition to support decision-making regarding specific capital investments?**

   See gap assessment – planning was identified as an area where improvements are needed. For CT-based assets MNR works with CTDOT to identify needs, but developing the capital plan is CTDOT's responsibility. Recently MNR and CTDOT have been working together on this with a goal of having a rolling 5-year plan for CTDOT-owned assets.

   Note that although no formal condition has been performed for CT guideway, data from the track geometry measurements suggests that the guideway is in similar condition between MNR lines in NY and CT.

2. **How does the agency use available data to shape its asset investment plan?**

See above.

3. **Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?**

   MNR described its efforts to improve stations in New York. NY's experience may be relevant to CT. Although MNR is not aware of any formal assessment of CT passenger facilities, John's impression is that NY stations are in better condition as a result of the investments there.

Additional Questions

1. **Please describe any reporting requirements the agency has for reporting asset and financial data to CTDOT.**

   MNR provides a wide variety of reports and data to CTDOT – we should ask CTDOT for more information on this as needed.

2. **Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?**

   See the gap assessment documents.

3. **Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?**

   Data on vehicles is captured in AMS. See above note on stations.

4. **Please describe any other issues or relevant factors you feel we should consider in performing the project.**

   The group briefly discussed FTA's proposed measure for guideway of % of guideway under performance restriction. MNR staff noted there may be a variety of different ways to measure this and indicated that they would be willing to walk through this issue in further detail. The project team should contact Glen Hayden for more information.

Interview Notes: Central New England Railroad

June 29, 2016

These notes are the result of an interview held in Newington with AJ Belliveau of Central New England Railroad on June 29, 2016 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide which was created by the DOT and Spy Pond Partners.

Attendees

AJ Belliveau – Central New England Railroad (CNZR)

Sharon Okoye, Eric Dorsey – CTDOT

David Sousa – CDM Smith

Nat Cooper, William Robert – SPP

Notes on the railroad:

Central New England Railroad (reporting mark CNZR) owns ten locomotives, some of which are inoperable. The inoperable locomotives are undergoing long-term repairs. CNZR occasionally gets spare parts from locomotives that are being scrapped by other operators. The inventory includes a few switch engines. For track work, CNZR owns three ballast cars and a flat car. The railroad leases a boxcar for tool and material storage on a welded rail track project.

CNZR operates two sections of track, both owned by CTDOT. One, referred to as the "Bloomfield" or "Griffin" branch, is 8.7 miles long and runs from Hartford to Windsor. The line runs between Hartford (beginning at MP 37 of Amtrak's Hartford line) to the Bloomfield-Windsor town line (just north of Day Hill Road). It connects with CT Southern RR which brings freight along the Hartford Line up to West Springfield, and provides connection to CSX network in Massachusetts. Pan Am Southern provides connection to Norfolk Southern. The biggest commodity on this line is lumber as the Home Depot distribution center in Bloomfield is a customer (1/2 million sq. ft. warehouse with room on sidings for 14 cars). Service on this line is "on demand". The Griffin Line used to continue through Massachusetts to Poughkeepsie, NY but there are no tracks there now. The Griffin line operates 5 or 6 days a week (2,400 cars a year) mainly hauling lumber. They have moved transformers for CL&P in the past.

The other, referred to as the "Armory" branch, is 13.5 miles long and runs from East Windsor to Enfield at the Massachusetts state line. The biggest commodity on this line is fertilizer which is delivered to the Fertilizer Plant Crop Production Services company in East Windsor (about 125 cars per year). Service on this line is also "on demand". There are town interchanges: one is in East Windsor Hill in South Windsor. CT Southern crosses the CT River in Hartford. The Armory Branch ends at the Massachusetts state line; it used to connect to CSX in MA but tracks are gone and MA allowed ROW to be used for an interim trail/greenway.

There is potential for new customers on the Griffin Line; one in particular that moved to CT because of its rail potential; but tracks need to be extended along virgin land. The potential new customer, Windsor Sanitation, is a sanitation company located next to Home Depot. Niagara Bottling might be a potential new customer too, as well as future users in the former Hallmark Cards building in Enfield; this is a huge building that is vacant and might have customer in the future that needs rail service. There is no potential for new freight service to Amazon's new warehouse in Windsor.

Asset Management Policies, Goals and Objectives

1. **Does the railroad have any specific goals or objectives related to asset management or state of good repair (SGR)? If so please describe.**

No written or formal policies.

2. **Please describe any specific business plans, strategies or specific processes for assessing or improving asset management practices.**

3. **Has the railroad established any performance measures for summarizing asset management/SGR? If so please describe.**

4. **What specific needs and gaps do you perceive within the railroad regarding asset management?**

Asset Inventory and Condition Assessments

1. **Rail assets, including track, grade crossings, bridges, and other related assets**

Notes on the inventory:

CTDOT owns the rail which CNZR operates on. The rail was rolled in 1896. Most of the rail is jointed, but CNZR is in the process of converting five miles of rail to be continuously welded. The Griffin line is mostly 79 lb. rail; the rail is 4 ¾ inches tall with 4 ¾ inch base. CNZR runs loads up to 140,000 lbs. exceeding its designed capacity by up to 100%. The Armory rail is 78 lb.

Since CNZR took over the lines in 1999, they have installed 25,000 ties. The small rail puts extra wear on the ties. After an early derailment due to heat-kinked rail, they have had zero incidents. The trains run at 5-10 mph for safety reasons.

CTDOT owns all of the bridges on the two lines. On the Griffin line there is one open deck bridge which crosses Wash Brook. There are also concrete arch bridges with ballast decks. On the Armory branch, CNZR operates over two bridges. One is a steel girder, open deck bridge in South Windsor that crosses Dry Brook. The other is a concrete arch bridge over Ketch Brook in East Windsor. CNZR also annually inspects a tall, multispan bridge that crosses the Scantic River in Enfield due to FRA regulations. However, the railroad is not currently operating over that bridge.

CTDOT also owns all of the facilities and leases them to CNZR. The railroad parks their equipment at the northern end of the Griffin line where there are extra tracks. CNZR would like to build a maintenance facility at the northern terminus in Windsor, but requires assistance from CTDOT.

- **What inventory data does the railroad collect on rail assets?**

- **What systems are used for collecting and managing data?**

- **How are data shared between the railroad and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

CNZR receives copies of CTDOT bridge inspection reports.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

2. Systems and Equipment, including signals, communication, etc.

Notes on the inventory:

CNZR operates a manual block signaling system. The Griffin line has six grade crossing with signals, none of which are private. Two non-signalized public crossings are in the process of being converted to signals. Once that work is complete, there will be one crossing remaining with stop signs and crosswalks.

The Armory line has private crossings with no signals.

- **What inventory data does the railroad collect on systems and equipment?**

- **What systems are used for collecting and managing data?**

- **How are data shared between the railroad and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

3. Condition Assessment

- **What approaches are used to measure the condition of state-owned rail assets?**

CNZR performs weekly visual inspections of the track. They are not required to do ultrasonic inspection because they don't haul enough gross tonnage.

CNZR inspects their locomotives on a 92 day cycle.

CTDOT inspects the bridges.

- **What data are available to the railroad regarding asset condition?**

CNZR keeps one years worth of track records in paper files to fulfill FRA requirements.

- **Does the railroad have a process to assess the quality of collected data?**

- **How are data shared between the railroad and CTDOT? Is additional condition data collected but not shared with CTDOT?**

It is unclear what data the DOT has on track condition. CTDOT inspects occasionally.

Life Cycle Management

1. **How do you forecast the useful life of assets as part of life cycle management?**

2. **How does the railroad use available data on asset condition to support decision-making regarding maintenance?**

CNZR is required to maintain the tracks by contract even though CTDOT owns the tracks.

3. **Have the required levels of service and performance delivery been defined for each asset?**

4. **Has the railroad identified which assets are critical to sustained performance delivery?**

Capital Planning & Programming

1. **To what extent does the railroad plan and/or perform capital projects impacting CT-owned infrastructure?**

CNZR submitted a capital plan to CTDOT for the state rail plan a few years ago.

CNZR performs any work that they can afford to perform. They replace ties, ballast, and work on grade crossings. They have a railroad work crew of eight and complete all work in-house. They also lease out some railroad equipment when available.

2. **How does the railroad use available data on asset condition to support decision-making regarding specific capital investments?**

CNZR identifies capital needs by responding to a CTDOT questionnaire.

3. **Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?**

CNZR submitted a capital plan to CTDOT for inclusion in the state rail plan a few years ago.

4. **How is risk management incorporated into developing investment strategies?**

5. **To what extent has the railroad made investments or obtain assistance through any of the following state programs: <u>State Assistance for Freight Rail in Connecticut</u>, <u>Rail Freight Infrastructure Program</u>, <u>State Surplus Materials Donations</u>, or others?**

CNZR has participated in all three of the listed state programs. The railroad has especially benefitted from State Surplus Materials Donations, receiving bolted 131 lb. rail from that program.

Additional Questions

1. **Please describe any reporting requirements the railroad has for reporting asset and financial data to CTDOT.**

CNZR signed a 10-year agreement with CTDOT with an option for another 10 years. Part of the agreement is to maintain the track. There are no reporting requirements.

2. **Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?**

3. **Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?**

4. **Please describe any other issues or relevant factors you feel we should consider in performing the project.**

The agreement with CTDOT is being reworked. The current short term (10 year) agreement leaves no incentive for private investment in the railroad. CNZR were paying a high gross receipts fee. The railroad has performed $8.3 million of work and barely made a profit. CNZR would like to pay a lower fee considering their investment in the track.

Interview Notes: Providence and Worcester Railroad

July 25, 2016

These notes are the result of an interview held in Worcester with Bernie Cartier of Providence & Worcester Railroad on July 25, 2016 as part of the CTDOT Transit Gap Assessment project being performed by Spy Pond Partners and CDM Smith. The notes are organized according to the in-depth interview guide, which was created by the DOT and Spy Pond Partners.

Attendees

Bernie Cartier – Director of Engineering, P&W RR

Sharon Okoye, Eric Dorsey, Carol Belforti – CTDOT

Sandeep Aysola – CDM Smith

Nat Cooper, William Robert – SPP

Notes on the railroad (Summary)

P&W operates freight service in Connecticut, Rhode Island, New York, and Massachusetts. The railroad operates of state-owned track on the Danbury Spur, the Middletown Cluster, and around Plainfield. P&W runs trains four times per week on the Willimantic Line and 2-3 trains per day on the state-owned portion of the Middletown Cluster. P&W also uses four yards, once of which is a state-owned yard in Berlin.

P&W has a long-term trackage use agreement since the 1970's with CT for the Willimantic Line. Because of the agreement, P&W maintains the Willimantic as if they own it at Class II Standards. P&W has a different agreement with the state for the Middletown Cluster and the agreement is expiring in 2017; they are currently renegotiating. Until a new agreement is reached, P&W is maintaining the Middletown Cluster to a standard below FRA Class 1. However, P&W will be responsible for delivering the track to CTDOT at a FRA Class 2 standard if lease were to expire. P&W does not operate 286,000 lb. traffic on the Middletown Cluster.

The track is all jointed rail with spiked wood ties. Signals operate under Northeast Operating Rules Advisory Committee (NORAC) guidelines. P&W is responsible for all maintenance work up to $50k on their system. P&W replaces track in lengths of ¼ or ½ mile at a time. They own two mainline ballast tampers. P&W spends $6 million annually on maintenance. P&W has little to no formal communication with CTDOT regarding maintenance activities.

However, P&W also makes some capital investments in the system independent of CTDOT. For example, P&W replaced the rail on the Willimantic Line in 2007 with new 115lb, 84 inch rail. That project was paid for by the railroad and not reported to CTDOT.

Asset Management Policies, Goals and Objectives

1. **Does the railroad have any specific goals or objectives related to asset management or state of good repair (SGR)? If so please describe.**

P&W does not have specific SGR policies. Railroad assets are maintained to FRA standards. Typically, maintenance currently is defect driven rather than cycle driven.

2. **Please describe any specific business plans, strategies or specific processes for assessing or improving asset management practices.**

3. **Has the railroad established any performance measures for summarizing asset management/SGR? If so please describe.**

P&W maintains records of weekly track inspections and develops defect logs from those inspections. The defect logs are used to create temporary speed restrictions.

4. **What specific needs and gaps do you perceive within the railroad regarding asset management?**

Asset Inventory and Condition Assessments

1. **Rail assets, including track, grade crossings, bridges, and other related assets**

   • **What inventory data does the railroad collect on rail assets?**

The asset inventory is maintained by the accounting department. Asset history and maintenance work records are maintained by the engineering department.

The state inspects the 36 bridges that P&W operates over. CTDOT delivers the bridge inspection reports to P&W in electronic and paper format. P&W and the state also maintain a federal inventory of the 36 grade crossings on the system. The inventory was last updated in March 2016 and is currently maintained by a contractor.

State-owned grade crossings are passively protected.

   • **What systems are used for collecting and managing data?**

Many old files are kept in paper form dating back from 1973, but the tie inventory is kept in a spreadsheet. Bridge work and track walks are kept in paper records. P&W uses Microsoft Dynamics Great Plains software for project tracking.

   • **How are data shared between the railroad and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

P&W only shares some bridge data with the state. Work related to track, ties, or rail is not reported to CTDOT. P&W does not report in-service defects unless major.

There is also a State Owned Yard Facility in Berlin, but no data appears to be collected by CTDOT.

- **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

- **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

P&W feels that they have the inventory data they need.

2. **Systems and Equipment, including signals, communication, etc.**

   - **What inventory data does the railroad collect on systems and equipment?**

   - **What systems are used for collecting and managing data?**

P&W maintains digital records of signal inspections for approximately 3 dozen signals, whose inventory is stored on the FRA website

   - **How are data shared between the railroad and CTDOT? Is additional inventory data collected but not shared with CTDOT?**

P&W does not share data with CTDOT. There is communication with the CTDOT Rail Regulatory Office in New Haven on an as needed basis for grade crossing projects.

   - **What processes have been established for keeping the inventory updated? How often is the inventory updated?**

   - **To the extent that inventory data are available, what issues do you perceive regarding data quality, data gaps, timeliness, and/or other issues?**

3. **Condition Assessment**

   - **What approaches are used to measure the condition of state-owned rail assets?**

CTDOT inspects the bridges on the P&W system.

P&W performs weekly track inspections in accordance with FRA regulations, tracking defects per mile. P&W performs ultrasonic rail testing twice a year on the majority of the system, and once a year on the rest. Most of the track was rolled from the late 1800's to early 1900's, and comprised of very little CWR, rather mostly Jointed Rail with spiked wooden ties.

   - **What data are available to the railroad regarding asset condition?**

   - **Does the railroad have a process to assess the quality of collected data?**

   - **How are data shared between the railroad and CTDOT? Is additional condition data collected but not shared with CTDOT?**

Life Cycle Management

1. **How do you forecast the useful life of assets as part of life cycle management?**

2. **How does the railroad use available data on asset condition to support decision-making regarding maintenance?**

P&W is trying to establish an 8-10 year maintenance cycle. Currently, maintenance work is driven by defects.

P&W is responsible for routine maintenance on the system (anything less than $50,000). Above that value, the state is responsible. If there are major defects or state-mandated maintenance, P&W requests state funding.

3. **Have the required levels of service and performance delivery been defined for each asset?**

P&W estimates 25-30 life for ties and 50 year life for rail.

4. **Has the railroad identified which assets are critical to sustained performance delivery?**

The Middletown swing bridge can be considered a single point of failure for its customer Red Tech. Service on the Middletown Cluster is currently at Class I, but would benefit from improved performance at a Class II. In order to bring the cluster to a Class II, they would first need to upgrade approximately 10,000 ties, and then would have to upgrade the rail itself.

Capital Planning & Programming

1. **To what extent does the railroad plan and/or perform capital projects impacting CT-owned infrastructure?**

P&W has a 5 year capital plan and also submits information to CTDOT for the state rail plan. As stated above, and project over $50,000 is deemed to be a capital project and thus the responsibility of CTDOT. System-wide, P&W invests nearly 6 million a year on all right of way it operates on.

2. **How does the railroad use available data on asset condition to support decision-making regarding specific capital investments?**

3. **Are specific documents (e.g., needs assessments or capital plans) available summarizing asset conditions and planned asset investments?**

4. **How is risk management incorporated into developing investment strategies?**

Weekly Track Inspections are conducted to identify defects more promptly

5. **To what extent has the railroad made investments or obtain assistance through any of the following state programs: <u>State Assistance for Freight Rail in Connecticut</u>, <u>Rail Freight Infrastructure Program</u>, <u>State Surplus Materials Donations</u>, or others?**

P&W applies for any available grants. P&W has participated in the State Surplus Materials Program, receiving 3 miles of rail and a number of ties.

Additional Questions

1. **Please describe any reporting requirements the railroad has for reporting asset and financial data to CTDOT.**

As mentioned, there are none except when the agreement expires on Middletown Cluster and track is turned back over to CTDOT.

2.   **Are any upcoming changes expected to existing data, systems and/or processes related to asset inventory, inspection, condition assessment or other asset management-related processes?**

3.   **Can you provide samples of existing inventory and inspection data and/or forms or sheets used for data collection?**

4.   **Please describe any other issues or relevant factors you feel we should consider in performing the project.**

P&W maintains the Middletown Cluster to a lower standard than the Willimantic Line because of ongoing contracting issues with CTDOT. P&W desires a longer contract that allows them to amortize their costs and offers financial security. If a third freight rail operator were to be involved with the Middletown Cluster, it could potentially make operation more costly and economically unattractive to current and new customers.

Appendix C. Summary of the Review of Existing Materials

C.1 Survey

The following are summaries of the approaches considered most relevant to the CTDOT project, either because they address transit asset management, and/or are noteworthy examples of self-assessment approaches.

C.1.1 Example Assessment Approaches

C.1.1.1 FTA Transit Asset Management Maturity Agency Self Assessment

The FTA Asset Management Guide includes a Transit Asset Management Maturity Agency Self-Assessment. The self-assessment is intended to determine the current level of asset management practice of an agency. The current level of practice can be compared against best practices in transit asset management to discover gaps in an agency's practices.

Asset management maturity is presented in three ways: asset management maturity scores by maturity level, maturity scores by framework area, and maturity scores by asset class.

A maturity score indicates the degree of confidence an agency has in a particular asset management practice. The asset management maturity model has five levels of maturity ranging from one to five. The maturity levels represent thresholds of asset management practice from basic to advanced. For example, level one maturity implies adoption of basic asset management policy while level five entails performance modeling and data-driven funding allocation.

The FTA self-assessment comprises a set of 59 enterprise-level statements and a set of seven asset class-level statements for 15 asset classes. For both sets of statements, the respondent must indicate their level of agreement with the statement on a scale from one to five. One is "totally disagree", two is "mostly disagree", three is "neutral", four is "somewhat agree", and five is "totally agree". These responses are the basis of the maturity scores.

The enterprise-level statements are divided into 16 framework areas. Nine of the framework areas are business processes such as policy, strategy, business plan, inventory, and others. The other seven framework areas are "enablers" including information systems, organization and leadership, skills and training, communications, values and culture, project management, and continuous improvement. In addition, 44 of the 59 enterprise-level statements are linked to a maturity level from one to five. This means that a high-score response on a framework area statement can also influence the score of an agency in a certain maturity level.

The enterprise-level results are presented as both a bar chart and a radar chart. The bar chart shows asset management maturity scores by business process on a scale from 0% to 100%. Each score is calculated by dividing the total possible level of agreement by the level of agreement entered in the tool. For example, the policy framework area has three statements, each scored on a one to five scale (as are all statements in the self-assessment). This means the maximum score possible is 15 for the framework area.

Responding "3 – Neutral" for each statement would yield a raw score of nine for the area. Thus the framework score shown in the bar chart as a percentage would be 60%. The radar chart also shows asset management scores for enablers on a scale from 0% to 100%. The scores for enablers are calculated the same way as scores for business processes. The two charts are a visual representation of asset management maturity by framework area.

Asset management maturity results are also presented by maturity level. 44 of the 59 enterprise-level statements are linked to a maturity level from one to five. The enterprise level statements are grouped by maturity level and presented as maturity scores in a bar chart. The maturity level scores are found by dividing the maximum possible score for any maturity level (the number of statements linked to that maturity level multiplied by the five, the highest possible response for each statement) by the actual score for that maturity level (the total points according to responses). For example, eight statements are linked to maturity level three. This means the maximum possible score is 40. Responding "1 – Totally Disagree" for each statement would yield a raw score of 8 for the maturity level. Thus the maturity level score depicted as a bar chart would be 8/40, or 20%. When the self-assessment is completed, the bar chart will show asset management progress broken down by maturity levels. A score of at least 80% indicates significant progress in the maturity level. Maturity level progress is not necessarily incremental. For example, an agency could report a score of 50% for maturity level 1 and 80% for maturity level 2. Figure C-1 shows the asset management maturity levels as described by FTA.
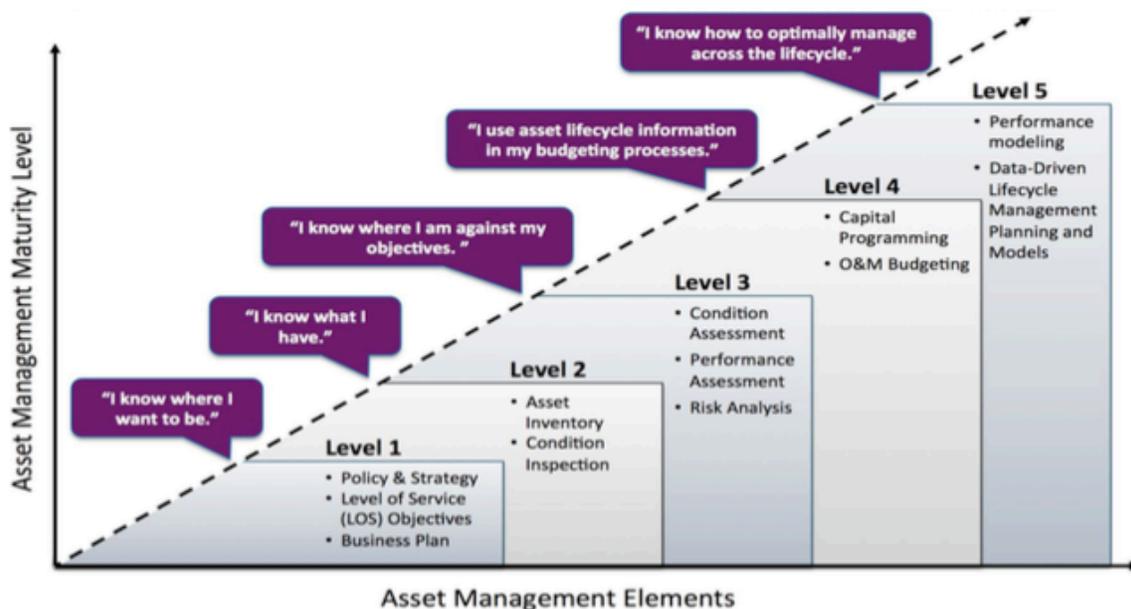
Note: A complete asset management program will have all levels functioning well; however, it is not unusual for an agency to conduct asset management activities that span all of these maturity levels at one time or to have skipped some levels while performing activities at another level. For example, many agencies have one or more asset inventories in place without any asset management policies or strategies.

Figure C-1. FTA Asset Management Maturity Levels

Asset class-level statements are rated on the same scale from one to five and scores

are calculated in the same way as the enterprise-level statements. Each of the 15 asset classes has a maximum possible raw score of 35. The maximum score is divided by the assessment response score to get a percentage. Results are presented in two bar charts. One shows asset management maturity scores by asset class. The other shows asset management maturity scores by asset category, clustering the asset classes into four groups: vehicles; facilities & stations; guideway elements; and systems.

C.1.1.2 ISO 55000

The Institute of Asset Management (IAM) produces a self-assessment[1] meant to support the International Standards Organization (ISO) 55000 asset management standard[2]. The self-assessment comprises 39 questions organized into 27 groups and scored on a scale from zero to three, where zero indicates a low level of maturity and three indicates a high level of maturity. A respondent can also answer "Beyond ISO" for any question, meaning that the organization's asset management practice surpasses the ISO 55000 standard. This rating scale is thus truly a five-point scale from zero to "Beyond ISO". Results are shown organized by group; the tool produces a list of group scores, a radar chart of group scores, and a bar chart of group scores. Figure C-2 shows an example output of the ISO 55000 self-assessment.

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[1] *Self Assessment Methodology Plus*. Institute of Asset Management. 2014.
[2] ISO. *ISO 55000:2014*. International Organization for Standardization, 2014.

4.1	Understanding the organisation and its context
4.2	Understanding the needs and expectations of stakeholders
4.3	Determining the scope of the asset management system
4.4	Asset management objectives
5.1	Asset management plans
5.2	Policy
5.3	Organisational roles, responsibilities and authorities
6.1	Actions to address risks and opportunities for the asset management system
6.2.1	Asset management objectives
6.2.2	Planning to achieve asset management objectives
7.1	Resources
7.2	Competences
7.3	Awareness
7.4	Communication
7.5	Information requirements
7.6.1	Documented information general
7.6.2	Creating and updating documented information
7.6.3	Control of documented information
8.1	Operational planning and control
8.2	Management of change
8.3	Outsourcing
9.1	Monitoring, measurement, analysis and evaluation
9.2	Internal audit
9.3	Management review
10.1	Nonconformity and corrective action
10.2	Preventive action
10.3	Continual improvement

Figure C-2. ISO 55000 Example Radar and Bar Charts

C.1.1.3 Metro-North Railroad Asset Management Gap Assessment

Metro-North Railroad contracted with Parsons Brinckerhoff to conduct an asset management gap assessment[3]. The assessment was completed in 2015. The assessment followed a proprietary Parsons Brinckerhoff model that appears to be largely based on the IAM self-assessment described above.

The model included 42 assessment subjects grouped into seven themes: strategic direction, management system and risk management, planning, lifecycle delivery activities, performance evaluation and improvement, asset knowledge and technology, and people and organization. The model yields 7 assessment area scores as well as a single agency score. The asset management maturity scores can be presented

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[3] Lubliner, A. *Metro-North Asset Management Gap Assessment Observations Report*. Parsons Brinckerhoff, 2015.

numerically or in a radar chart. Figure C-3 shows results from Metro-North's gap assessment.

Assessment Areas Summary Scores:
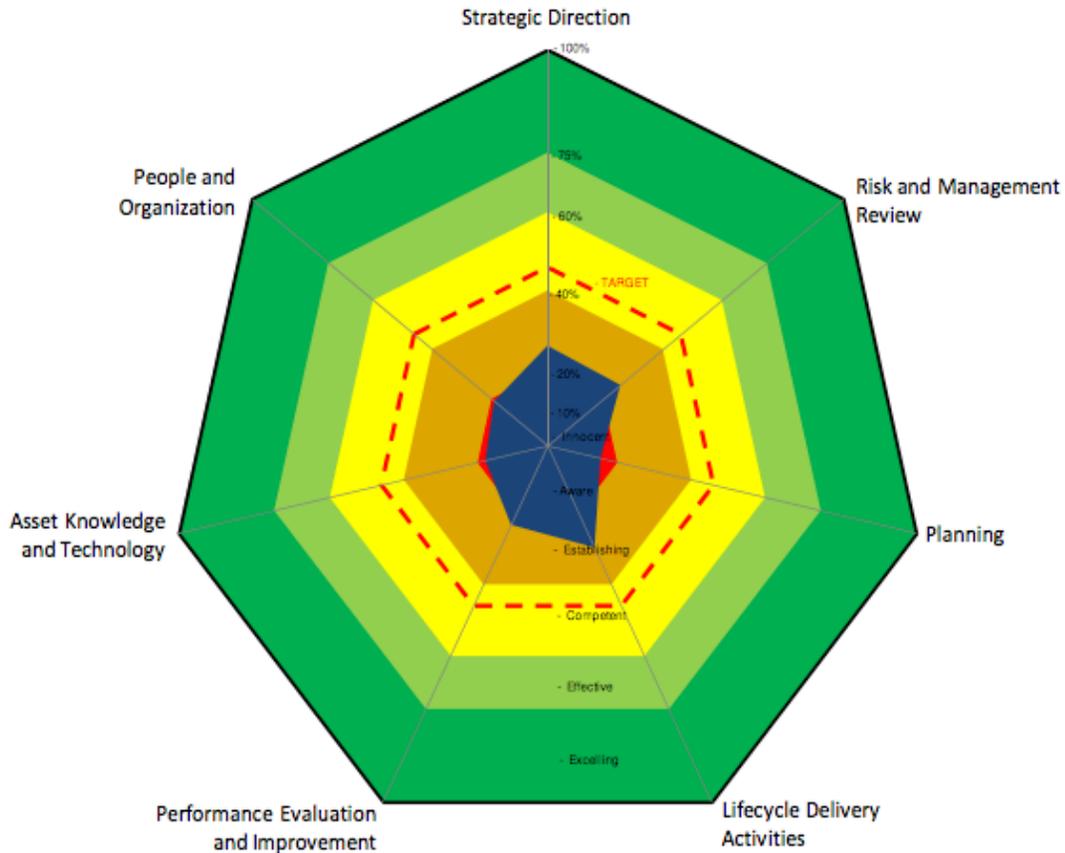
Within the radial chart the shaded bands represent maturity levels; the central blue area represents the MNR assessment; the red dashed line represents the target position.

Figure C-3. Metro-North Asset Management Maturity Scores

C.1.1.4 Seattle DOT Gap Assessment

The paper "Measuring Asset Management Maturity at Seattle Department of Transportation[4]" summarizes the process Seattle DOT used to determine its asset management maturity. Seattle hired consultants to perform a maturity assessment and make recommendations on how to advance asset management practices. The assessment included two days of on-site meetings and document review. The maturity model was divided into 35 asset management practice areas that were developed from the *International Infrastructure Management Manual*. The 35 practice areas were sorted

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[4] Bugas-Schramm, P., Burns, E.,Paschke, E., and J. Roorda. *Measuring Asset Management Maturity at Seattle Department of Transportation*. Presented at 90th Annual Meeting of the Transportation Research Board, Washington, DC., 2011.

into ten groups by theme. Each practice area was broken down into characteristics. Each characteristic was rated by Seattle DOT as never, partially, or always performed. These characteristic ratings were used to create a maturity rating for each practice area. Maturity scores were presented on a one to five scale, with one representing a low level of maturity, and five representing advanced asset management practice. The results were presented as a 35-point radar diagram, each point representing the maturity of an asset management practice area. Figure C-4 shows the results of Seattle DOT's asset management maturity assessment.
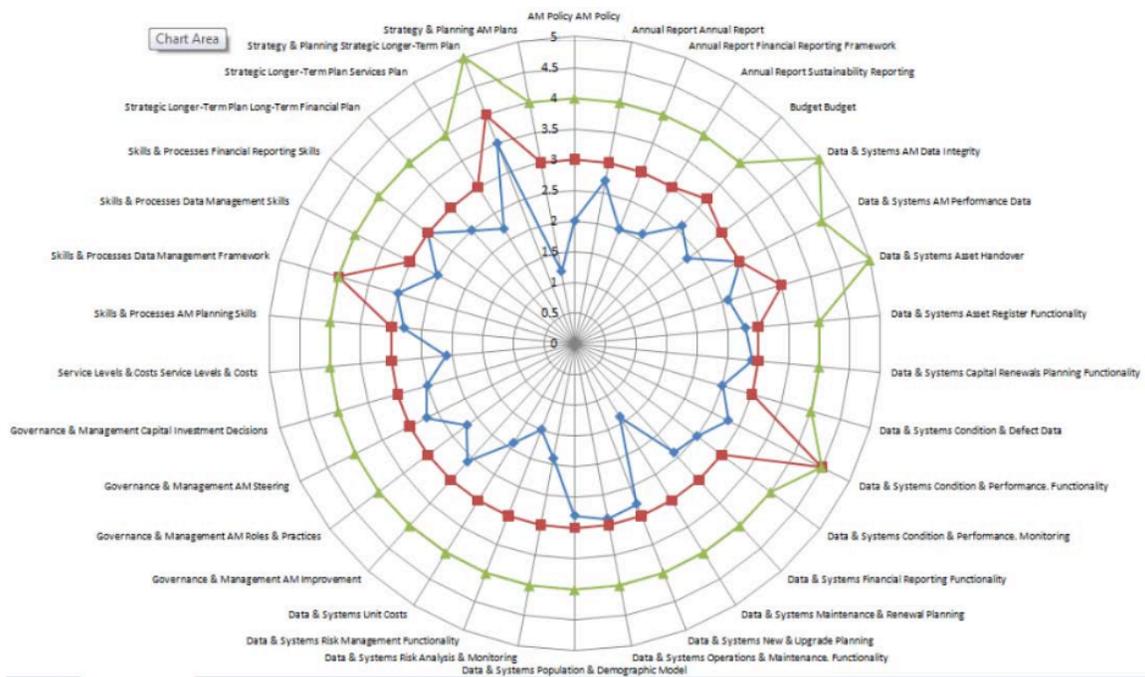
Figure C-4. Seattle DOT: Organizational Asset Management Maturity

C.1.1.5 AASHTO Transportation Asset Management Gap Analysis Tool

National Cooperative Highway Research Program (NCHRP) Project 08-90 updated the Transportation Asset Management Gap Analysis Tool[5] which was originally presented in the American Association of State Highway and Transportation Officials (AASHTO) Transportation Asset Management Guide – A Focus on Implementation. The AASHTO Gap Analysis Tool includes 143 asset management criteria scored on a five-point scale for which one is initial asset management maturity and five is best practice. The criteria are grouped in eight key TAM areas: Policy Guidance, Asset Management Practices, Planning, Programming, and Project Delivery, Data Management, Information Systems, Transparency and Outreach, Results, and Workforce Capacity and Development. Criteria within in TAM areas are grouped into elements and weighted. Aggregated scores for criteria, elements, or areas are found using weighted averages. The tool can produce results by using bar charts showing achieved and target maturities or by

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[5] Zimmerman, K. A., Ram, P., and T. E. Hoerner. *Transportation Asset Management Gap Analysis Tool*. Transportation Research Board of the National Academies, Washington, D.C., 2014.

creating radar charts. Figure C-5 shows an example output of the gap analysis tool.
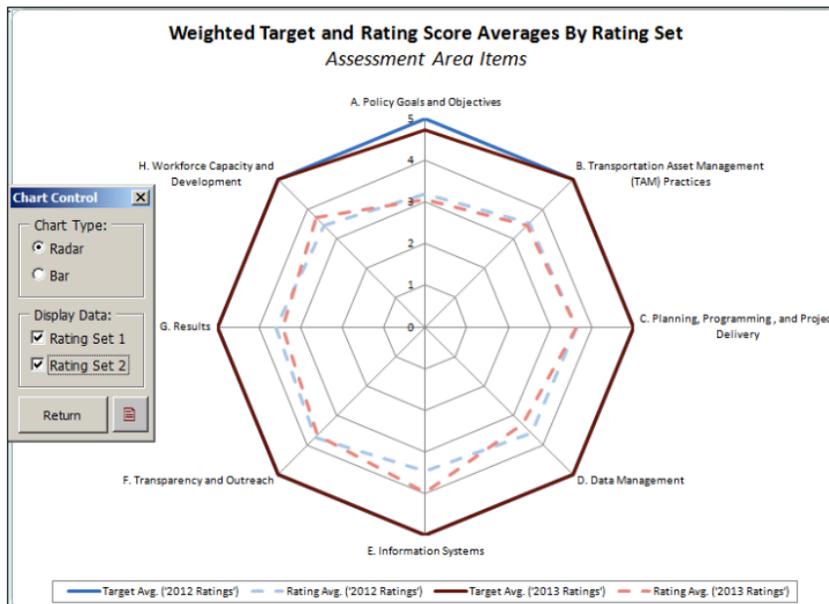
Figure C-5. Transportation Asset Management Gap Analysis Tool Radar Chart

C.1.1.6 Tillamook County Asset Management Readiness Assessment

The Tillamook County Asset Management Readiness Assessment[6] provides another example of a self-assessment. The self-assessment of current practice is a survey consisting of 29 statements organized in six sections which include Policy, Accountability, Resource Allocation, Operational Efficiency, Data Collection and Organization, and Technology. Each statement is answered to indicate the level of agreement the respondent has with the statement. One indicates the respondent strongly disagrees, two indicates disagreement, three indicates agreement, four indicates strong agreement. A score of two or less indicates an area that needs improvement.

C.1.2 CTDOT Transit Asset Management Self-Assessment

The CTDOT Transit Asset Management Self-Assessment was developed based on the review of other assessment approaches. Of these the project team found the FTA Transit Asset Management Self-Assessment to be the most applicable to CTDOT, and most appropriate for implementation as a self-guided survey. The ISO 55000 approach is overly long and complicated for the purposes of this project. It is also not a transit-focused approach. The Metro North gap assessment used both the ISO 55000 approach and the FTA approach. The Seattle DOT approach and the AASHTO approach were also more complex than necessary for CTDOT. The FTA approach offered the best way to achieve the desired outcomes of the project.

The project team used the FTA tool as its starting point, making modifications as needed

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[6] Bugas-Schramm, P. and L. Welch. *Tillamook County Asset Management Readiness Assessment*. PBS Consulting, 2008.

to fit the needs of CTDOT. The CTDOT Self-Assessment was an online survey tool built using SurveyMonkey. The statements/questions in the survey were based on those in the FTA tool, with certain additions, subtractions, and consolidations. The survey was intended to be answered by a wide variety of transit operators throughout Connecticut such as CTDOT, CTtransit, Amtrak, Metro-North, and the transit districts. Each organization was encouraged to have multiple employees submit responses to the survey in order to get a broad spectrum of answers.

The CTDOT self-assessment comprised a set of 27 questions or statements, 6 of which were repeated for every applicable asset class. The respondent answered by indicating their level of agreement with the statement on a scale from one to five. One was "strongly disagree", two was "disagree", three was "neither agree nor disagree", four was "agree", and five was "strongly agree". These responses were the basis of the maturity scores. A sixth available answer was "Not applicable or don't know". The CTDOT survey questions are attached in Appendix D.

The CTDOT survey had six parts: organization type; organization role; policy, goals, & objectives; inventory, condition & lifecycle; capital planning & information systems; and FTA requirements. The first two parts, organization type and role, were original to the survey and were added to help customize the survey by respondent and to help stratify survey results. Depending on the organization type selected, a respondent would see only the survey questions that are pertinent to their organization. For example, a respondent from Metro-North would not see any survey questions about bus assets. The organizational role question helped illuminate any divergence in opinion between maintenance, management, and other groups on transit asset management practices. The third part was added to gauge the responses of transit operators regarding upcoming FTA rulemaking. The final three parts corresponded to areas of the FTA tool.

The first section of the survey contained questions about the draft FTA Transit Asset Management Rule. Only respondents from CTDOT, Metro-North, and transit districts answered these questions. The questions were developed jointly with CTDOT to assess the understanding of and preparedness for the draft rule. The responses helped CTDOT understand how many Tier II providers will want to participate in a group plan and whether transit providers are currently able to calculate the draft measures.

The section Policy, Goals, & Objectives contained the first set of statements about transit asset management practices. These statements were part of the survey for every type of respondent. The three statements were:

- Organization-wide goals and objectives are in place for management of physical assets.

- Your organization's goals and objectives are clearly linked to / explicitly supported by the organization's strategic plan and/or other public-facing documents

- Your organization has established measures for assessing the state of good repair; the measures are calculated periodically, included in plans, and reported to the public.

The first statement is an amalgam of enterprise-level questions 1.1 and 1.2 from the FTA Transit Asset Management Maturity Agency Self-Assessment (FTA tool). The second statement is a slight variant of enterprise-level question 1.3 from the FTA tool. The third statement is not drawn from the FTA tool. Sections 2 and 3 (Strategy and Business Plan) of the FTA tool consisted of ten statements about existing asset management strategies and plans. Because this CTDOT project was conducted in anticipation of an asset management plan, there was minimal value in asking operators about plans that do not yet exist. The single statement above was added instead of the ten statements in sections 2 and 3.

Inventory, Condition & Lifecycle statements constituted the next part of the survey. These statements were drawn both from the enterprise-level and asset-class questions of the FTA tool and thus were asked according to asset class. Depending on what organization (and office in the case of CTDOT) was responding, different asset class statements were shown. The FTA tool lists 15 asset classes; the CTDOT survey had five asset classes: Bus, Rail Vehicles, Passenger Facilities, Maintenance/Administrative Facilities, and Fixed Guideway. These five asset classes were chosen to cover the variety of transit assets in Connecticut without overcomplicating the assessment. The same six statements were given for each asset class:

- Your organization has a complete and accurate centralized inventory or multiple inventories to support key asset management business processes such as capital planning.
- A condition inspection/monitoring program is in place for this asset class.
- Condition and performance targets are established, monitored, and updated for this asset class.
- Data for this asset class are subject to quality assurance / quality control systems and are consistently updated.
- This asset class's lifecycle management plan exists and outlines the investment approach to minimize the total cost of ownership throughout assets' lifecycles. The lifecycle management plan includes consideration for design/procurement, development of the preventive maintenance and capital rehabilitation strategy, and disposal.
- A lifecycle management plan for this asset class is updated regularly with input from staff throughout the organization.

The first statement is a combination of enterprise-level questions 4.1, 4.2, and 4.3 about inventory from the FTA tool. The second statement is drawn from question A1 of the asset-class questions and the third statement is drawn from A3. The fourth statement is derived from enterprise-level question 4.4. The fifth and sixth statements are derived from asset class questions A5 and A4 respectively. Asset class questions A2, A6, and A7 were not included in the CTDOT assessment in part because those questions were asked elsewhere at the enterprise level. Sections 4 (Condition Assessment and Performance Monitoring) and 5 (Lifecycle Management Planning) of the FTA tool were replaced by the asset class-level questions in the CTDOT survey.

Capital Planning and Information Systems statements made up the next section of the survey. Bus Service Contractor and Amtrak respondents did not see these statements. The Capital Planning statements were taken from section 7 of the FTA tool, Capital Planning and Programming.

- The capital planning and programming process incorporates feedback from your organization's leadership regarding capital needs.
- Capital program prioritization is based on quantifiable criteria which are supported by condition and performance data.
- The capital program aligns with assets' lifecycle management plans, resulting in assets being replaced on schedule.

The first statement is a combination of enterprise-level questions 7.1 and 72. The second statement is a combination of enterprise-level questions 7.4 and 7.5. The third statement is derived from enterprise-level question 7.3.

The Information Systems statements were very similar to questions from section 10 Asset Management Information Systems from the FTA tool.

- Your organization has established asset inventory and condition information systems to support reporting, performance monitoring, and asset tracking.
- Your organization has established a maintenance management system to schedule preventive maintenance activities and track maintenance activities.
- Your organization has established information systems to support capital programming and budgeting.
- Integrated data and systems enable the organization to link performance and condition data to capital planning and programming.

The first and second statements were modeled on enterprise-level question 10.1 from the FTA tool. The third and fourth statements were original to the CTDOT survey and connected the capital planning and information systems questions.

The other framework areas in the FTA tool such as Operations and Maintenance Budgeting, Performance Modeling, and six Enablers were not included in the CTDOT survey. The Enablers were ancillary to the business process framework areas and thus were excluded. Operations and Maintenance Budgeting and Performance Modeling were too specific; those topics were covered under broader sections elsewhere. By omitting the enablers and a few business processes and combining other framework areas, the CTDOT survey ended up with four asset management areas (Policy, Goals & Objectives; Inventory, Condition & Lifecycle; Capital Planning; and Information Systems).

The survey responses were compiled, scores calculated, and results presented according to the precedent of the FTA tool. A radar chart showing maturity scores for the four asset management areas (Policy, Goals & Objectives; Inventory, Condition & Lifecycle; Capital Planning; and Information Systems) was developed. A bar chart showing the scores for the five maturity levels was also developed. All results were

sortable by organization and/or organizational role.

Appendix D. List of Survey Questions

CTDOT Transit Asset Management Self-Assessment Questions

#	Question Text	Answer Text
Organization		
	Organization Type	CTDOT Transit Districts Service Contractor for CT Transit Metro-North Amtrak
	What is the name of your organization?	
	What is your role in the organization?	Management Maintenance Other
Policy, Goals, & Objectives		
1	Organization-wide goals and objectives are in place for management of physical assets.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
2	Your organization's goals and objectives are clearly linked to / explicitly supported by the organization's strategic plan and/or other public-facing planning documents.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
3	Your organization has established measures for assessing the state of good repair; the measures are calculated periodically, included in plans, and reported to the public.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
Office		
K	What office do you belong to in the organization?	Capital Services Bus Rail Other
Inventory, Condition, & Lifecycle (by asset class)		

4a-e	Your organization has a complete and accurate centralized inventory or multiple inventories to support key asset management business processes such as capital planning.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
5a-e	A condition inspection/monitoring program is in place for this asset class.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
6a-e	Condition and performance targets are established, monitored, and updated for this asset class.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
7a-e	Data for this asset class are subject to quality assurance / quality control systems and are consistently updated.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
8a-e	This asset class's lifecycle management plan exists and outlines the investment approach to minimize the total cost of ownership throughout assets' lifecycles. The lifecycle management plan includes consideration for design/procurement, development of the preventive maintenance and capital rehabilitation strategy, and disposal.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
9a-e	A lifecycle management plan for this asset class is updated regularly with input from staff throughout the organization.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
Capital Planning		
10	The capital planning and programming process incorporates feedback from your organization's leadership regarding capital needs.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know

11	Capital program prioritization is based on quantifiable criteria which are supported by condition and performance data.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
12	The capital program aligns with assets' lifecycle management plans, resulting in assets being replaced on schedule.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know

Information Systems

13	Your organization has established asset inventory and condition information systems to support reporting, performance monitoring, and asset tracking.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
14	Your organization has established a maintenance management system to schedule preventive maintenance activities and track maintenance activities.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
15	Your organization has established information systems to support capital programming and budgeting.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know
16	Integrated data and systems enable your organization to link performance and condition data to capital planning and programming.	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree Not applicable or don't know

FTA Rules

	Have you reviewed the draft FTA Transit Asset Management Rule? (49 CFR Parts 625 and 630)	Yes No

According to the draft rule, transit providers with 100 revenue vehicles or less in revenue service during peak hour operations will be categorized as Tier II providers. Transit providers with more than 100 revenue vehicles in revenue service during peak hour operations, and operates a fixed-guideway public transportation system will be Tier I providers. Is your organization a Tier I or Tier II Transit Provider?	Tier I Tier II Not Sure
Tier I providers will be required to develop their own Transit Asset Management Plans. Tier II providers will be able to either develop their own TAM plans or participate in a group TAM plan developed by the State or a Direct Recipient. If your organization is a Tier II transit provider, which option would it like to choose?	Develop own TAM Participate in group plan Not Sure
Does your organization have sufficient data to calculate the draft performance measure proposed by FTA for service vehicles? [Draft performance measure proposed by FTA for service vehicles: % of service vehicles that have met or exceeded their useful life benchmark.]	Yes No Not Sure
Does your organization have sufficient data to calculate the draft performance measure proposed by FTA for revenue vehicles? [Draft performance measure proposed by FTA for revenue vehicles: % of revenue vehicles that have met or exceeded their useful life benchmark.]	Yes No Not Sure
Does your organization have sufficient data to calculate the draft performance measure proposed by FTA for fixed guideway? [Draft performance measure proposed by FTA for fixed guideway: % of track segments, signal, and systems with performance restrictions.]	Yes No Not Sure

Does your organization have sufficient data to calculate the draft performance measure proposed by FTA for facilities?

[Draft performance measure proposed by FTA for facilities: % of facilities within an asset class, rated below condition 3 on the TERM scale.]

Yes
No
Not Sure

Appendix E. Workshop Handout

Transit Asset Management Gap Assessment Workshop Agenda

March 1, 2016 9:30AM-12:30PM
CTDOT Conference Room A, Newington, CT

Workshop Purpose

- Present the results of the transit asset management self-assessment
- Discuss best practices in transit asset management
- Determine actions to close the gaps in transit asset management

Welcome

9:30 - 9:40   Introductions

Presentation: Initial Assessment Findings

9:40-10:25   Presentation by the project team summarizing the interviews and survey, the results of the asset management review, the definition of the transit asset management maturity levels, and current gaps.

Discussion: Asset Management Drivers

10:25-10:35   A facilitated discussion of motivations/driving factors for implementing an asset management approach.

Break

10:35-10:45

Exercise 1:   Breakout Groups (Room G328)

10:45 - 11:15   In this part of the workshop, attendees will break into groups to determine a set of actions to move from the current state of transit asset management to the desired state. Each group will discuss current gaps and implementation considerations, identifying short term and long term strategies to move the

agency from its current practices to the desired set of transit asset management practices.

Group Reports

11:15-11:45 Following Exercise 1, attendees will reconvene as one large group. Each breakout group will present the following:

- Any additional gaps identified

- Recommended implementation actions

Exercise 2:   Prioritizing Asset Management Improvements

11:45-12:15 The group will engage in an interactive prioritization activity. All workshop participants will discuss organizational changes needed to improve transit asset management practices at CTDOT.

Workshop Summary

12:15 – 12:30 A brief discussion of major outcomes and next steps. A summary of the recommendations and decisions made during the workshop will be presented and discussed.

Exercise 1: Breakout Groups

In this exercise, you will step through the process of reviewing the gap assessment results and proposing actions to close the gaps. You will report back on what actions your group proposed, and any additional gaps you identified.

To get started, first:

- Appoint a group reporter to take notes and spokesperson to present the group's results.
- Review the gaps listed below. The facilitator will be able to answer any questions you have about the gaps and how they were generated. **Note**: the facilitator will provide guidance on gaps of particular relevance given the composition of the group.
- Note the action categories. These broad types should help the group generate and organize asset management implementation actions.

Once the group has reviewed the gaps, the group should discuss what actions could close the gaps in asset management practice. After discussion, the group should prepare a list of actions considering the categories below. Then you should prepare to present your results. If time permits, you can include an estimated level of effort and/or timeframe for the proposed actions.

1. Gaps

- CTDOT and transit operators have relatively little data regarding inventory and conditions of the following asset classes:
    - Administrative/maintenance facilities.
    - Passenger facilities.
    - CT-owned guideway and related assets, with the notable exception of bridges.
- CTDOT lacks an ability to routinely report measures of asset condition for the following asset classes:
    - Rail vehicles.
    - Fixed assets other than bridges.
- CTDOT relies on the asset management module of Core-CT as its system of record for tracking the asset inventory. However, this system is intended to support financial management and is ill-suited for supporting day-to-day asset management functions.
- Transit operators tend to lack systems for supporting day-to-day management of their facilities, in part because it would be cost-prohibitive to implement such systems for managing individual facilities.
- CTDOT lacks a well-documented, data-driven process for developing its transit capital plan, particularly with respect to plans for facility investments.

- CTDOT develops maintenance plans for new facilities, but appears to lack mechanisms for confirming these plans are followed. Further, many older facilities appear to lack maintenance plans altogether.

- CTDOT lacks a defensible estimate of statewide transit state of good repair needs.

- CTDOT lacks a capability for predicting future changes in statewide transit state of good repair needs for facilities.

- CTDOT lacks sufficient staff time to:

    – Perform extensive review or independent verification of data submitted to CTDOT related to outsourced contracts.

    – Conduct engineering assessments or condition assessments.

2. Potential Improvement Action Categories

- Inventory Data

- Condition Assessment

- Process Improvements

- Information System

- Improved Analysis

- Training/Information Sharing

- Staffing

# CTDOT Transit Asset Management Self-Assessment
Detailed Results

Survey respondents selected their level of agreement with the statements below. Agreement was rated on a five-point scale: "5 – Strongly agree"; "4 – Agree"; "3 – Neither agree nor disagree"; "2 – Disagree"; "1 – "Strongly disagree". These responses were worth points corresponding to the number in the response.

Question Number	Maturity Level	Question Text		# of Responses	Response Mean	Response Range
Policy, Goals, & Objectives						
1	1	Organization-wide goals and objectives are in place for management of physical assets.		34	3.5	2 - 5
2	1	Your organization's goals and objectives are clearly linked to / explicitly supported by the organization's strategic plan and/or other public-facing planning documents.		28	3.5	2 - 5
3	1	Your organization has established measures for assessing the state of good repair; the measures are calculated periodically, included in plans, and reported to the public.		32	2.9	2 - 5
Inventory, Condition, & Lifecycle (by asset class)						
4a-e	2	Your organization has a complete and accurate centralized inventory or multiple inventories to support key asset management business processes such as capital planning.	a – Bus	19	3.9	2 - 5
			b – Rail Vehicles	9	3.8	3 - 5
			c – Pax Fac.	21	3.3	1 - 5
			d – Maint/Admin Fac.	28	3.4	1 - 5
			e – Fixed Guideway	12	3.3	2 - 4
5a-e	3	A condition inspection/monitoring program is in place for this asset class.	a – Bus	19	3.7	2 - 5
			b – Rail Vehicles	10	3.8	3 - 5
			c – Pax Fac.	19	2.9	1 - 4
			d – Maint/Admin Fac.	27	3.2	1 - 4
			e – Fixed Guideway	14	3.7	3 - 4
6a-e	3	Condition and performance targets are established, monitored, and updated for this asset class.	a – Bus	17	3.3	2 - 4
			b – Rail Vehicles	9	3.9	3 - 5
			c – Pax Fac.	20	2.9	1 - 4
			d – Maint/Admin Fac.	26	3.0	1 - 5
			e – Fixed Guideway	13	3.5	3 - 4
7a-e	2	Data for this asset class are	a – Bus	17	3.3	2 - 4

Question Number	Maturity Level	Question Text		# of Responses	Response Mean	Response Range
		subject to quality assurance / quality control systems and are consistently updated.	b – Rail Vehicles	9	3.8	3 - 4
			c – Pax Fac.	20	2.8	1 - 4
			d – Maint/Admin Fac.	27	2.9	1 - 5
			e – Fixed Guideway	12	3.3	3 - 4
8a-e	4	This asset class's lifecycle management plan exists and outlines the investment approach to minimize the total cost of ownership throughout assets' lifecycles…	a – Bus	19	2.8	1 - 4
			b – Rail Vehicles	9	3.1	2 - 4
			c – Pax Fac.	20	2.7	1 - 4
			d – Maint/Admin Fac.	25	2.7	1 - 4
			e – Fixed Guideway	11	3.0	2 - 4
9a-e	3	A lifecycle management plan for this asset class is updated regularly with input from staff throughout the organization.	a – Bus	19	3.2	2 - 4
			b – Rail Vehicles	9	3.1	2 - 5
			c – Pax Fac.	18	2.7	1 - 4
			d – Maint/Admin Fac.	25	2.6	1 - 4
			e – Fixed Guideway	9	2.9	2 - 4
Capital Planning						
10	4	The capital planning and programming process incorporates feedback from your organization's leadership regarding capital needs.		20	3.9	2 - 5
11	4	Capital program prioritization is based on quantifiable criteria which are supported by condition and performance data.		21	3.2	2 - 5
12	4	The capital program aligns with assets' lifecycle management plans, resulting in assets being replaced on schedule.		21	3.0	2 - 4
Information Systems						
13	2	Your organization has established asset inventory and condition information systems to support reporting, performance monitoring, and asset tracking.		17	3.1	1 - 5
14	2	Your organization has established a maintenance management system to schedule preventive maintenance activities and track maintenance activities.		16	3.6	2 - 5
15	3	Your organization has established information systems to support capital programming and budgeting.		15	3.3	2 - 4
16	5	Integrated data and systems enable your organization to link performance and condition data to capital planning and programming.		17	2.5	2 - 4

FTA Asset Management Maturity Levels

The maturity levels represent thresholds of asset management practice from basic (Level 1) to advanced (Level 5). For example, Level 1 maturity implies adoption of basic asset management policy while Level 5 entails performance modeling and data-driven funding allocation. Questions on the self-assessment are linked to a maturity level. Individual question scores are transformed into percentages. These percentages are grouped according to maturity level and averaged to find maturity level scores. A score of 80% represents significant progress towards asset management practices and is the target score for each level.
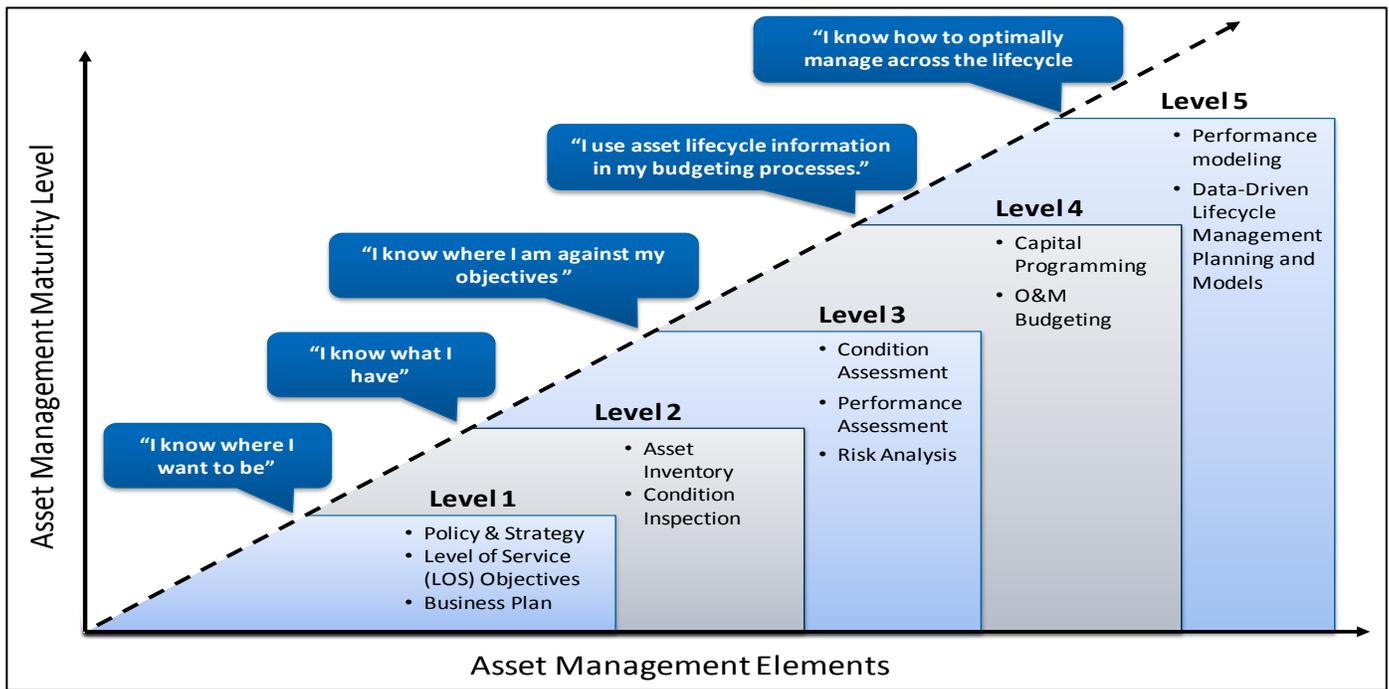
	Label	Focus Areas
Maturity Level: 1	"I know where I want to be"	• Policy & Strategy • Level of Service Objectives • Business Plan
Maturity Level: 2	"I know what I have"	• Asset Inventory • Condition Inspection
Maturity Level: 3	"I know where I am against my objectives"	• Condition Assessment • Performance Assessment • Risk Analysis
Maturity Level: 4	"I use asset lifecycle information in my budgeting processes"	• Capital Programming • O&M budgeting
Maturity Level: 5	"I know how to optimally manage across the lifecycle"	• Performance Modeling • Data-Driven Lifecycle Management Planning and Models

Source: FTA Asset Management Guide, FTA Report 0027, 2012

CTDOT Asset Management Self-Assessment Results

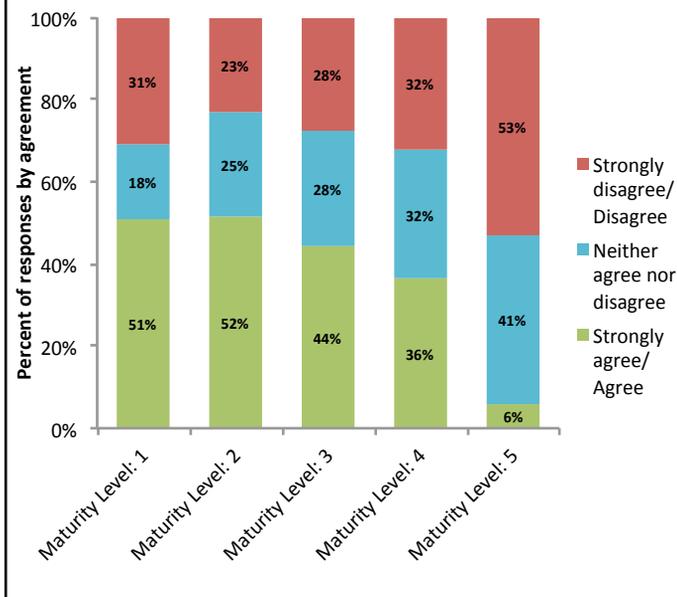Organization: All
Office or Role: All
# of Responses: 34

Responses by Area
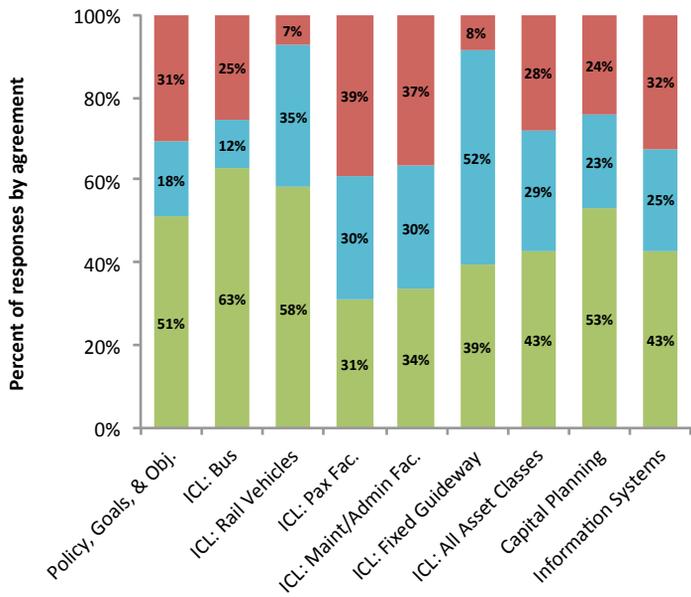
Note: "Inventory, Condition and Lifecycle" is shortened to "ICL"

Responses by Maturity Level

Legend:
- Strongly disagree/ Disagree
- Neither agree nor disagree
- Strongly agree/ Agree

Breakdown of Responses by Area

	5	4	3	2	1
Policy, Goals, & Obj.	8	40	17	29	0
ICL: Bus	3	66	13	26	2
ICL: Rail Vehicles	4	28	19	4	0
ICL: Pax Fac.	1	36	35	40	6
ICL: Maint/Admin Fac.	3	50	47	51	7
ICL: Fixed Guideway	0	28	37	6	0
ICL: All Asset Classes	19	248	168	156	15
Capital Planning	5	28	14	15	0
Information Systems	2	26	16	20	1

Breakdown of Responses by Maturity Level

	5	4	3	2	1
Maturity Level: 1	8	40	17	29	0
Maturity Level: 2	8	99	52	42	6
Maturity Level: 3	5	114	76	68	6
Maturity Level: 4	5	48	46	43	4
Maturity Level: 5	0	1	7	9	0

Key
5 = "5 - Strongly agree"
4 = "4 - Agree"
3 = "3 - Neither agree nor disagree"
2 = "2 - Disagree"
1 = "1 - Strongly disagree"

CTDOT Asset Management Self-Assessment Results

Organization: CTDOT
Office or Role: All
# of Responses: 14
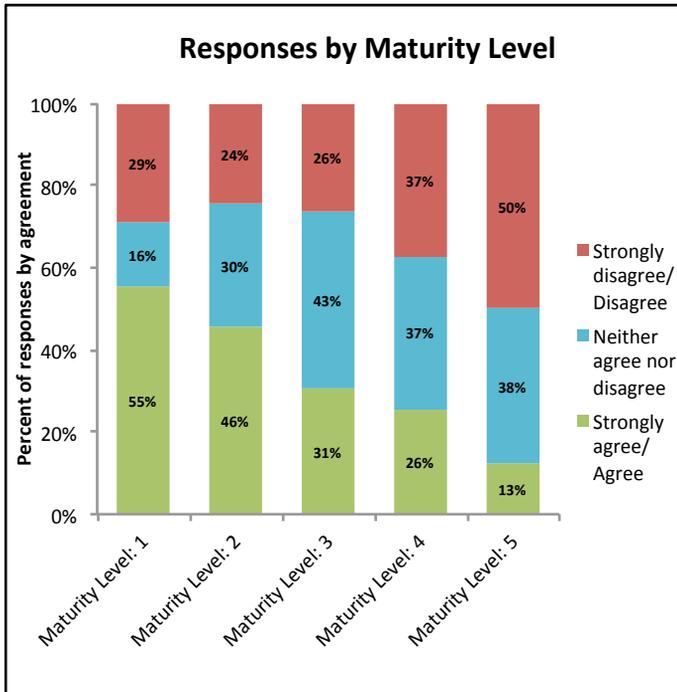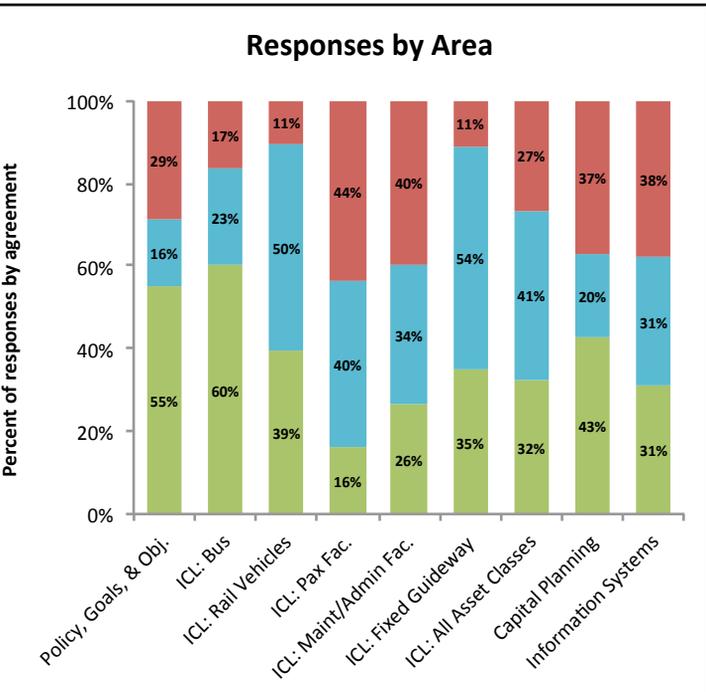
Note: "Inventory, Condition and Lifecycle" is shortened to "ICL"

Breakdown of Responses by Area

	5	4	3	2	1
Policy, Goals, & Obj.	0	21	6	11	0
ICL: Bus	1	17	7	4	1
ICL: Rail Vehicles	3	12	19	4	0
ICL: Pax Fac.	0	9	22	18	6
ICL: Maint/Admin Fac.	3	11	18	15	6
ICL: Fixed Guideway	0	16	25	5	0
ICL: All Asset Classes	7	86	97	57	13
Capital Planning	3	12	7	13	0
Information Systems	2	7	9	11	0

Breakdown of Responses by Maturity Level

	5	4	3	2	1
Maturity Level: 1	0	21	6	11	0
Maturity Level: 2	6	35	27	18	4
Maturity Level: 3	3	33	51	25	6
Maturity Level: 4	3	15	26	23	3
Maturity Level: 5	0	1	3	4	0

Key
5 = "5 - Strongly agree"
4 = "4 - Agree"
3 = "3 - Neither agree nor disagree"
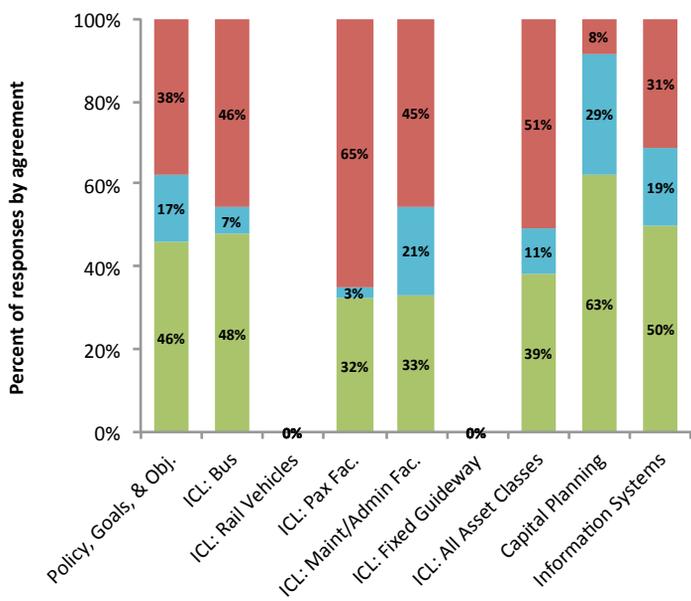2 = "2 - Disagree"
1 = "1 - Strongly disagree"

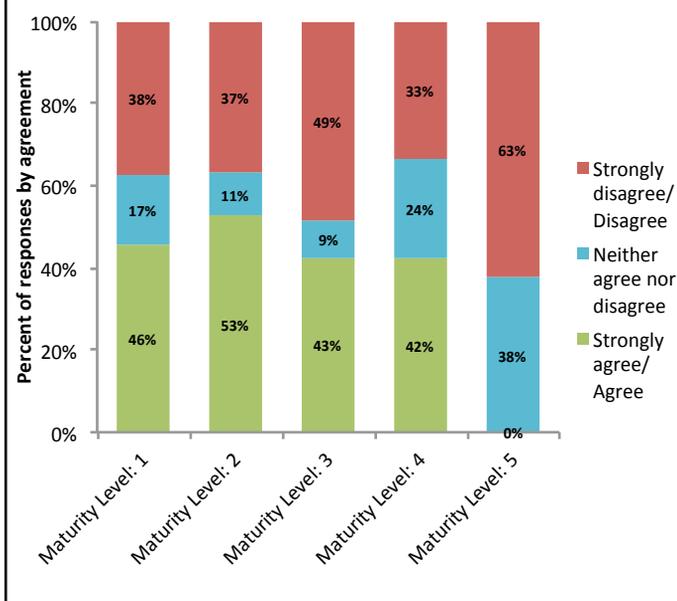# CTDOT Asset Management Self-Assessment Results

Organization: Transit Districts
Office or Role: All
# of Responses: 8

Responses by Area

Note: "Inventory, Condition and Lifecycle" is shortened to "ICL"

Responses by Maturity Level

Breakdown of Responses by Area

	5	4	3	2	1
Policy, Goals, & Obj.	1	10	4	9	0
ICL: Bus	2	20	3	20	1
ICL: Rail Vehicles	0	0	0	0	0
ICL: Pax Fac.	0	11	1	22	0
ICL: Maint/Admin Fac.	0	14	9	19	0
ICL: Fixed Guideway	0	0	0	0	0
ICL: All Asset Classes	3	55	17	70	1
Capital Planning	2	13	7	2	0
Information Systems	0	16	6	9	1

Breakdown of Responses by Maturity Level

	5	4	3	2	1
Maturity Level: 1	1	10	4	9	0
Maturity Level: 2	1	29	6	20	1
Maturity Level: 3	1	28	6	33	0
Maturity Level: 4	2	17	11	14	1
Maturity Level: 5	0	0	3	5	0

Key
5 = "5 - Strongly agree"
4 = "4 - Agree"
3 = "3 - Neither agree nor disagree"
2 = "2 - Disagree"
1 = "1 - Strongly disagree"

CTDOT Asset Management Self-Assessment Results

Organization: Service Contractor for CT Transit
Office or Role: All
# of Responses: 9
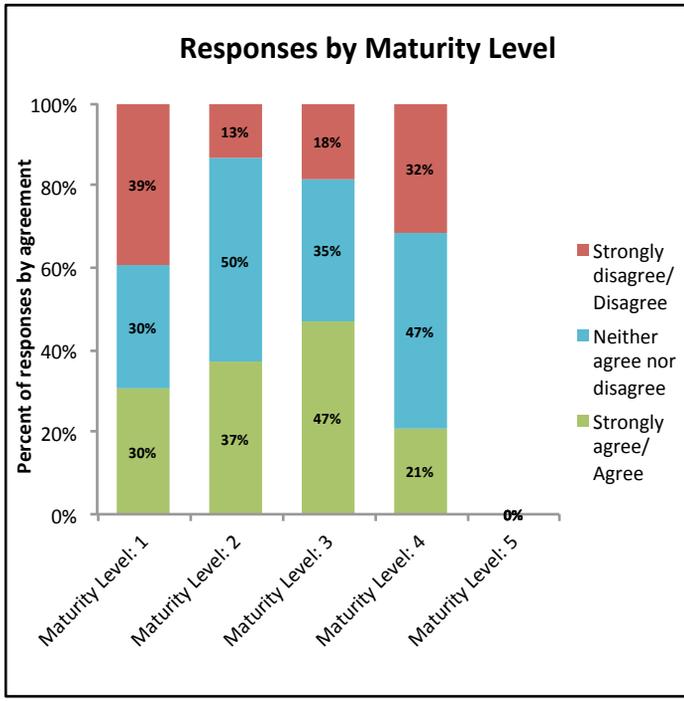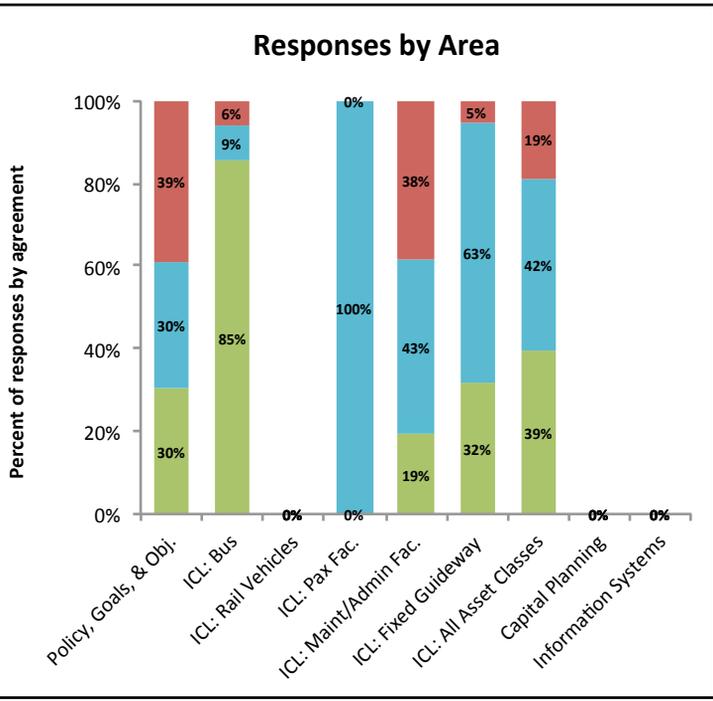
Responses by Area

Responses by Maturity Level

Note: "Inventory, Condition and Lifecycle" is shortened to "ICL"

Breakdown of Responses by Area

	5	4	3	2	1
Policy, Goals, & Obj.	0	7	7	9	0
ICL: Bus	0	29	3	2	0
ICL: Rail Vehicles	0	0	0	0	0
ICL: Pax Fac.	0	0	12	0	0
ICL: Maint/Admin Fac.	0	9	20	17	1
ICL: Fixed Guideway	0	6	12	1	0
ICL: All Asset Classes	0	51	54	29	1
Capital Planning	0	0	0	0	0
Information Systems	0	0	0	0	0

Breakdown of Responses by Maturity Level

	5	4	3	2	1
Maturity Level: 1	0	7	7	9	0
Maturity Level: 2	0	14	19	4	1
Maturity Level: 3	0	26	19	10	0
Maturity Level: 4	0	4	9	6	0
Maturity Level: 5	0	0	0	0	0

Key
5 = "5 - Strongly agree"
4 = "4 - Agree"
3 = "3 - Neither agree nor disagree"
2 = "2 - Disagree"
1 = "1 - Strongly disagree"

CTDOT Asset Management Self-Assessment Results

Organization: Metro-North Railroad
Office or Role: All
# of Responses: 1

Responses by Area

Note: "Inventory, Condition and Lifecycle" is shortened to "ICL"

Responses by Maturity Level

Breakdown of Responses by Area
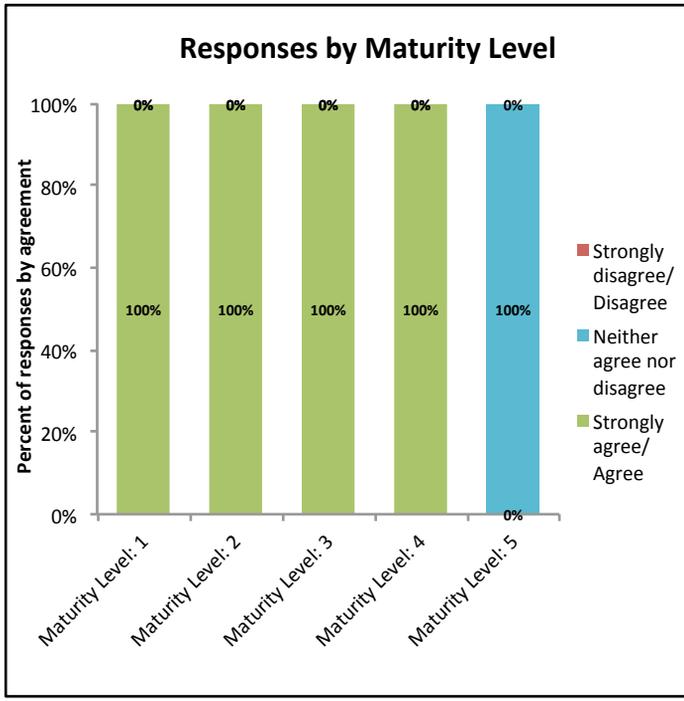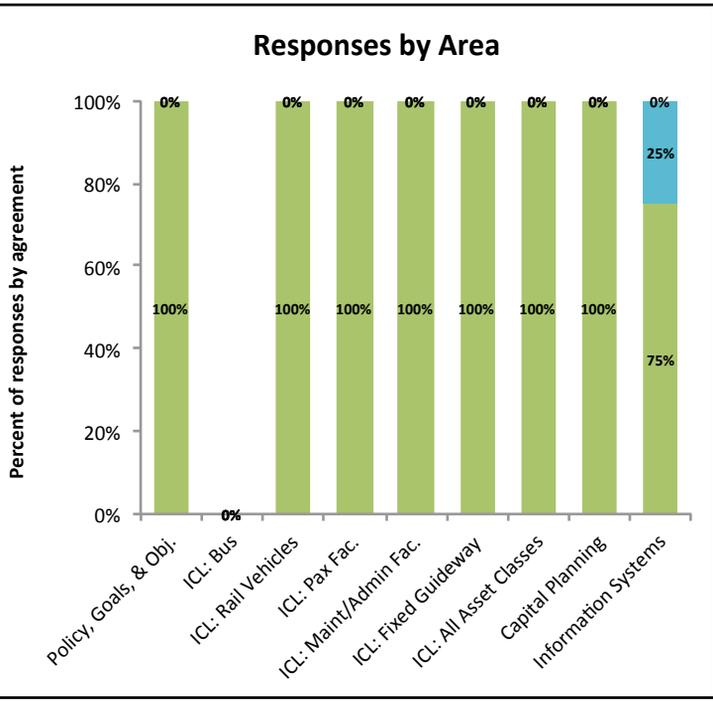
	5	4	3	2	1
Policy, Goals, & Obj.	3	0	0	0	0
ICL: Bus	0	0	0	0	0
ICL: Rail Vehicles	0	6	0	0	0
ICL: Pax Fac.	0	6	0	0	0
ICL: Maint/Admin Fac.	0	6	0	0	0
ICL: Fixed Guideway	0	6	0	0	0
ICL: All Asset Classes	3	24	0	0	0
Capital Planning	0	3	0	0	0
Information Systems	0	3	1	0	0

Breakdown of Responses by Maturity Level

	5	4	3	2	1
Maturity Level: 1	3	0	0	0	0
Maturity Level: 2	0	10	0	0	0
Maturity Level: 3	0	13	0	0	0
Maturity Level: 4	0	7	0	0	0
Maturity Level: 5	0	0	1	0	0

Key
5 = "5 - Strongly agree"
4 = "4 - Agree"
3 = "3 - Neither agree nor disagree"
2 = "2 - Disagree"
1 = "1 - Strongly disagree"

CTDOT Asset Management Self-Assessment Results

Organization: Amtrak
Office or Role: All
# of Responses: 2
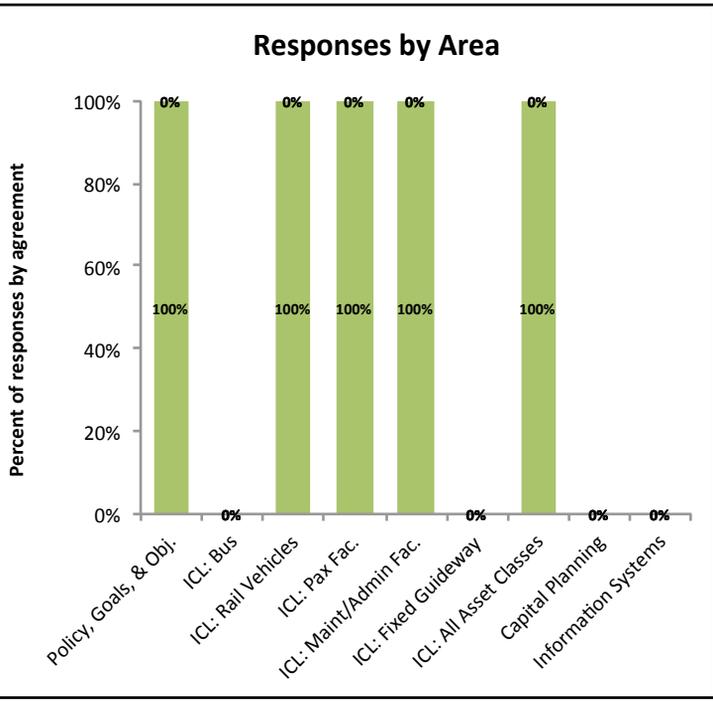
Responses by Area

Note: "Inventory, Condition and Lifecycle" is shortened to "ICL"

Responses by Maturity Level

Legend:
- Strongly disagree/ Disagree
- Neither agree nor disagree
- Strongly agree/ Agree

Breakdown of Responses by Area

	5	4	3	2	1
Policy, Goals, & Obj.	4	2	0	0	0
ICL: Bus	0	0	0	0	0
ICL: Rail Vehicles	1	10	0	0	0
ICL: Pax Fac.	1	10	0	0	0
ICL: Maint/Admin Fac.	0	10	0	0	0
ICL: Fixed Guideway	0	0	0	0	0
ICL: All Asset Classes	6	32	0	0	0
Capital Planning	0	0	0	0	0
Information Systems	0	0	0	0	0

Breakdown of Responses by Maturity Level

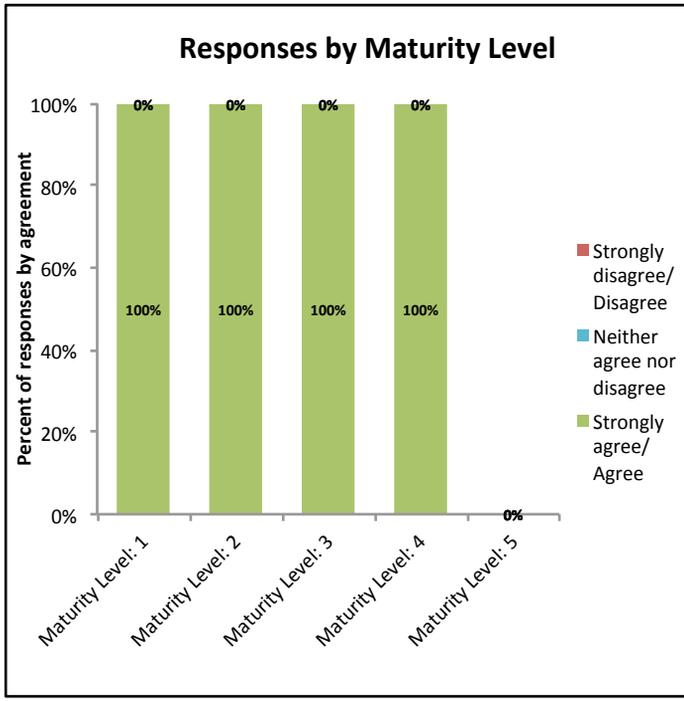|	5	4	3	2	1
Maturity Level: 1	4	2	0	0	0
Maturity Level: 2	1	11	0	0	0
Maturity Level: 3	1	14	0	0	0
Maturity Level: 4	0	5	0	0	0
Maturity Level: 5	0	0	0	0	0

Key
5 = "5 - Strongly agree"
4 = "4 - Agree"
3 = "3 - Neither agree nor disagree"
2 = "2 - Disagree"
1 = "1 - Strongly disagree"

CTDOT Asset Management Self-Assessment Results

Organization: CTDOT
Office or Role: Bus
# of Responses: 3

Responses by Area
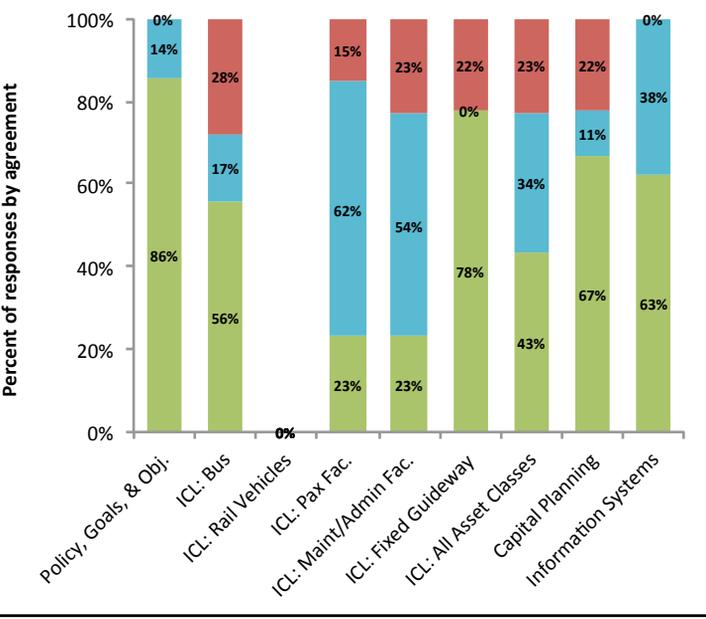
Responses by Maturity Level

Note: "Inventory, Condition and Lifecycle" is shortened to "ICL"

Breakdown of Responses by Area
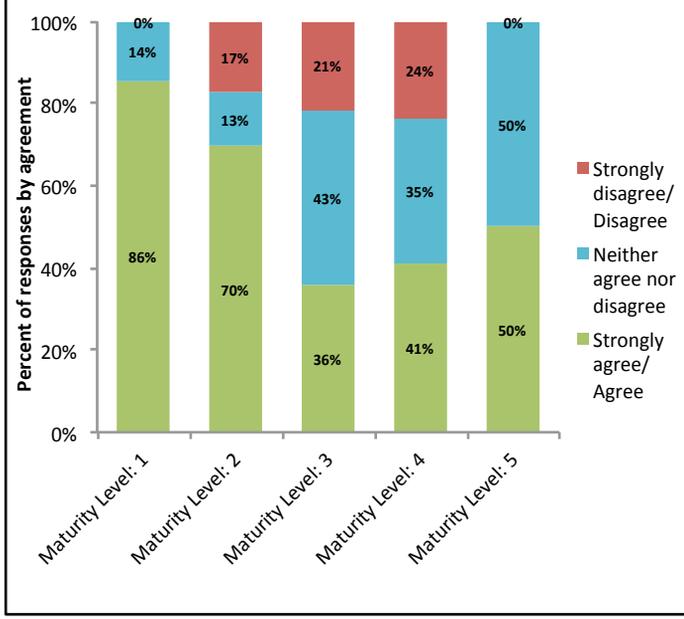
	5	4	3	2	1
Policy, Goals, & Obj.	0	6	1	0	0
ICL: Bus	1	9	3	4	1
ICL: Rail Vehicles	0	0	0	0	0
ICL: Pax Fac.	0	3	8	2	0
ICL: Maint/Admin Fac.	1	2	7	3	0
ICL: Fixed Guideway	0	7	0	2	0
ICL: All Asset Classes	2	27	19	11	1
Capital Planning	3	3	1	2	0
Information Systems	2	3	3	0	0

Breakdown of Responses by Maturity Level

	5	4	3	2	1
Maturity Level: 1	0	6	1	0	0
Maturity Level: 2	4	12	3	4	0
Maturity Level: 3	0	10	12	6	0
Maturity Level: 4	3	4	6	3	1
Maturity Level: 5	0	1	1	0	0

Key
5 = "5 - Strongly agree"
4 = "4 - Agree"
3 = "3 - Neither agree nor disagree"
2 = "2 - Disagree"
1 = "1 - Strongly disagree"

CTDOT Asset Management Self-Assessment Results

Organization: CTDOT
Office or Role: Rail
# of Responses: 5

Responses by Area
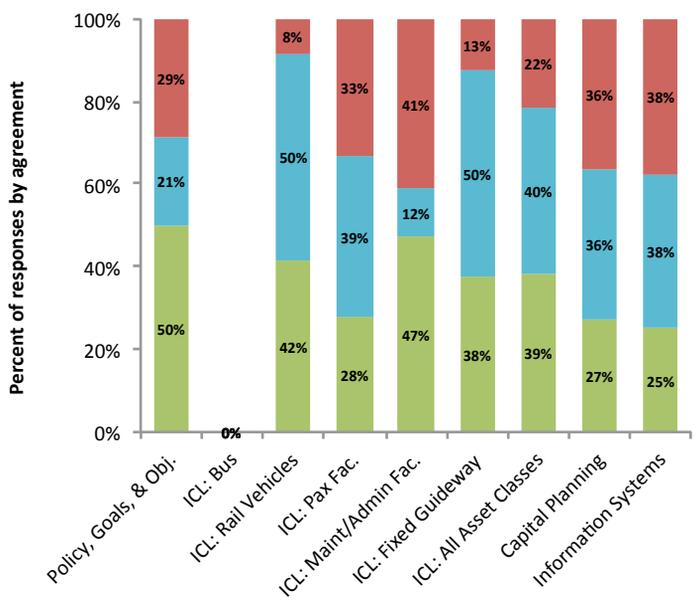
Note: "Inventory, Condition and Lifecycle" is shortened to "ICL"

Responses by Maturity Level

Legend:
- Strongly disagree/ Disagree
- Neither agree nor disagree
- Strongly agree/ Agree

Breakdown of Responses by Area

	5	4	3	2	1
Policy, Goals, & Obj.	0	7	3	4	0
ICL: Bus	0	0	0	0	0
ICL: Rail Vehicles	3	7	12	2	0
ICL: Pax Fac.	0	5	7	6	0
ICL: Maint/Admin Fac.	2	6	2	7	0
ICL: Fixed Guideway	0	9	12	3	0
ICL: All Asset Classes	5	34	36	22	0
Capital Planning	0	3	4	4	0
Information Systems	0	2	3	3	0

Breakdown of Responses by Maturity Level

	5	4	3	2	1
Maturity Level: 1	0	7	3	4	0
Maturity Level: 2	2	15	9	6	0
Maturity Level: 3	3	13	19	9	0
Maturity Level: 4	0	4	11	9	0
Maturity Level: 5	0	0	1	1	0

Key
5 = "5 - Strongly agree"
4 = "4 - Agree"
3 = "3 - Neither agree nor disagree"
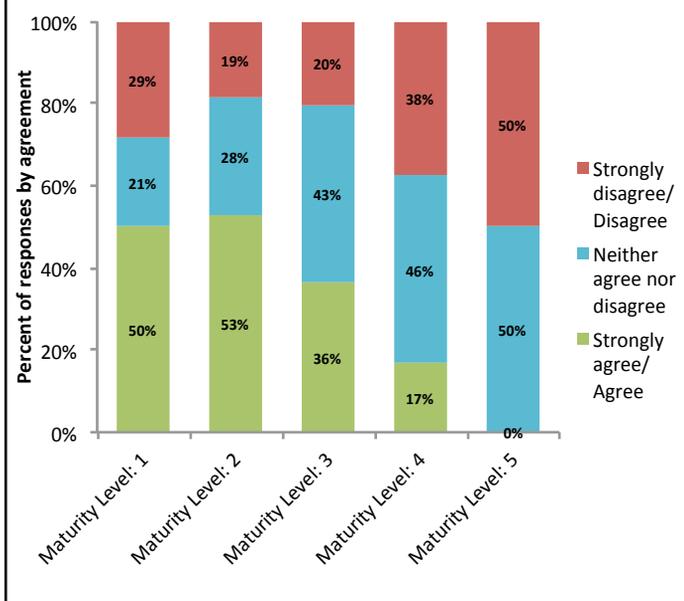2 = "2 - Disagree"
1 = "1 - Strongly disagree"

CTDOT Asset Management Self-Assessment Results

Organization: CTDOT
Office or Role: Other (please specify)
# of Responses: 6
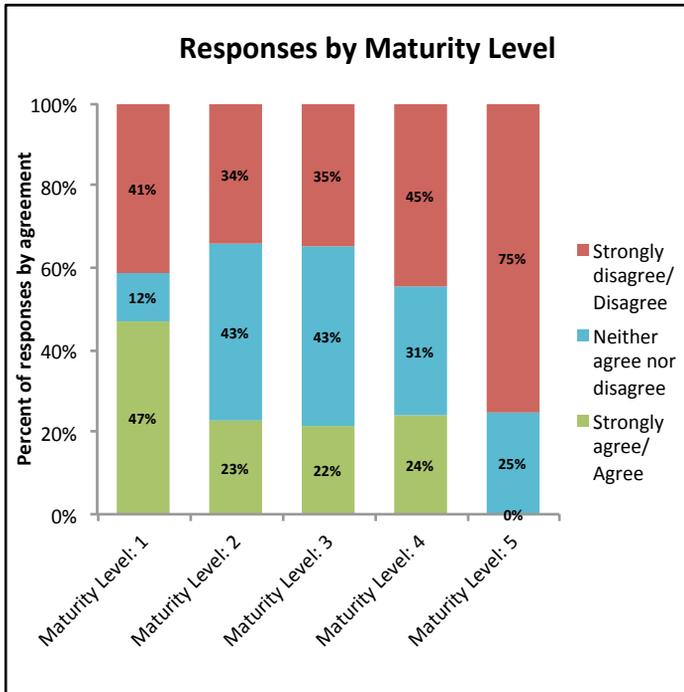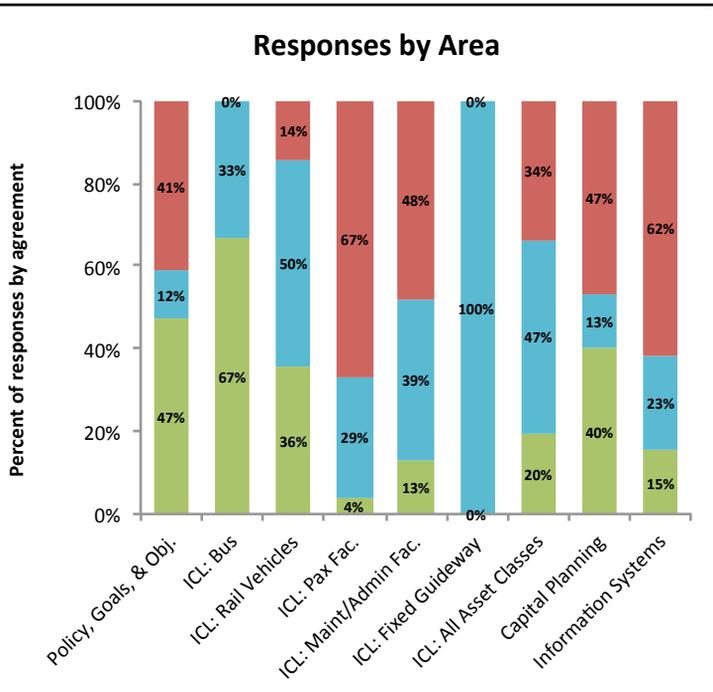
Responses by Area

Responses by Maturity Level

Note: "Inventory, Condition and Lifecycle" is shortened to "ICL"

Breakdown of Responses by Area

	5	4	3	2	1
Policy, Goals, & Obj.	0	8	2	7	0
ICL: Bus	0	8	4	0	0
ICL: Rail Vehicles	0	5	7	2	0
ICL: Pax Fac.	0	1	7	10	6
ICL: Maint/Admin Fac.	0	3	9	5	6
ICL: Fixed Guideway	0	0	13	0	0
ICL: All Asset Classes	0	25	42	24	12
Capital Planning	0	6	2	7	0
Information Systems	0	2	3	8	0

Breakdown of Responses by Maturity Level

	5	4	3	2	1
Maturity Level: 1	0	8	2	7	0
Maturity Level: 2	0	8	15	8	4
Maturity Level: 3	0	10	20	10	6
Maturity Level: 4	0	7	9	11	2
Maturity Level: 5	0	0	1	3	0

Key
5 = "5 - Strongly agree"
4 = "4 - Agree"
3 = "3 - Neither agree nor disagree"
2 = "2 - Disagree"
1 = "1 - Strongly disagree"

Appendix F. Workshop Notes

Transit Asset Management Workshop
Summary

Connecticut Department of Transportation
Transit Asset Management Gap Assessment

March 1, 2016
Newington, Connecticut

Connecticut Department of Transportation

Table of Contents

Introduction

This document outlines the Transit Asset Management Gap Assessment Workshop of March 1, 2016. Its purpose is to:

1. Summarize the key points of the workshop.

Workshop Attendees

Name	Organization	Name	Organization
Ricardo Almeida	CTDOT	Tim Benson	HNS
Rich Andreski	CTDOT	Eric Fetzer	HNS
Anna Barry	CTDOT	Philip Fry	HNS
Carolann Belforti	CTDOT	Krista King	HNS
Eric Dorsey	CTDOT	Casey Klaneski	HNS
David Elder	CTDOT	Frank Kolakowski	HNS
Linda Guild	CTDOT	Stan Kostka	HNS
Sandy Infantino	CTDOT	Heidi Strom	HNS
Maureen Kent	CTDOT	Jacinto Torres	HNS
Sharon Okoye	CTDOT	Adrienne Belanger	Bridgeport Transit
Jacqueline R Henry Rafiq	CTDOT	Doug Holcomb	Bridgeport Transit
Karen Riemer	CTDOT	Joseph Comerford	Estuary Transit
Michael Sanders	CTDOT	Rene LaPointe	GNHTD
Philip Scarrozzo	CTDOT	Lori Richards	GNHTD
Alan Stevens	CTDOT	Rich Schreiner	HART
Edward Stratton	CTDOT	Andrew Chiaravallo	Middletown Transit
Lisa Tilum	CTDOT	Barbara Kalosky	NET
John Bernick	CTDOT/RAIL	Joe Spina	NET
Jacob Booth	CTDOT/RAIL	Peter Vaccarelli	NET
Craig Bordiere	CTDOT/RAIL	Hal Alvord	Norwalk Transit
Hareshkumar Dholakia	CTDOT/RAIL	Michael Carroll	SEAT
Gregory Dorosh	CTDOT/RAIL	Alfred Fritzsche	SEAT
Jon Foster	CTDOT/RAIL	Ellen Grant	Windham Transit
Carl Jackson	CTDOT/RAIL	David Sousa	CDM Smith
Richard Jankovich	CTDOT/RAIL	Nat Cooper	Spy Pond Partners
Yure Kuljis	CTDOT/RAIL	William Robert	Spy Pond Partners
Timothy Sullivan	CTDOT/RAIL		

Part 1: Workshop Summary

On March 1, 2016, Connecticut transit operators and Connecticut Department of Transportation (CTDOT) staff met in Newington for a workshop as part of the transit asset management gap assessment project. The purpose of the workshop was to review the results of the interviews, self-assessment, and the gap assessment, and to brainstorm implementation actions for closing the gaps. The half-day workshop included a presentation from Spy Pond Partners, a discussion of asset management motivations, and two groups exercises for developing implementation actions. Workshop participants were given handouts with the agenda, group exercise instructions, and detailed breakdowns of the self-assessment results.

The workshop began with an opening statement from Sharon Okoye, the project manager from CTDOT. Next, Deputy Commissioner Anna Barry gave introductory remarks in which she called asset management "the right way to do business". Following Anna Barry's remarks, Bill Robert from Spy Pond Partners presented on the progress of the project and the results of the assessment.

Part 2: Asset Management Drivers

Facilitated Discussion and Results

The presentation of initial assessment findings was followed by a group discussion of driving factors for implementing transit asset management practices. Feedback from workshop attendees resulted in the following list of asset management motivations:

- Reduce equipment failures
- Improve fiscal responsibility
- Improve SGR and capital programming
- Be proactive instead of reactive
- Make better maintenance decisions
- Extend asset life through preventive maintenance
- Internal and external customer focus
- FTA requirements

Part 3: Exercise Summaries

Exercise 1: Breakout Groups

Exercise Description

Attendees were sorted into groups in advance of the workshop. Group 1 included all of the rail staff attending, while Groups 2-4 were mixes of CTDOT, CT Transit, and transit district staff. Each group was assigned at least one facilitator from the project team. The facilitator's role was to answer any questions about the project or workshop and to help direct the exercise. The groups are listed below in Table 1.

Table 1. List of Exercise 1 Group Members and Group Facilitators

Group 1	Group 2	Group 3	Group 4
Eric Dorsey	**Bill Robert**	**Carolann Belforti**	**Sharon Okoye** **David Sousa**
Ricardo Almeida	David Elder	Hal Alvord	Tim Benson
John Bernick	Eric Fetzer	Adrienne Belanger	Michael Carroll
Jacob Booth	Alfred Fritzsche	Andrew Chiaravallo	Joseph Comerford
Craig Bordiere	Phil Fry	Linda Guild	Barbara Kalosky
Hareshkumar Dholakia	Ellen Grant	Casey Klaneski	Krista King
Gregory Dorosh	Doug Holcomb	Stan Kostka	Frank Kolakowski
Jon Foster	Maureen Kent	Rene LaPointe	Karen Reimer
Sandy Infantino	Rich Schreiner	Jacqueline R Henry Rafiq	Philip Scarrozzo
Carl Jackson	Alan Stevens	Lori Richards	Joe Spina
Richard Jankovich	Timothy Sullivan	Edward Stratton	Heidi Strom
Yure Kuljis		Jacinto Torres	Lisa Tilum
			Peter Vaccarelli

Note: The group facilitator is bolded in the first row for each of the groups listed above.

Additional Gaps

The groups discussed the gaps, added any additional gaps that may have been omitted, and developed implementation actions to close the gaps. Attendees suggested other gaps including:

- Inventory is known, but not always recorded or documented to FTA standards.
- Changes in technology / vehicles change facility adequacy.
- Dealing with elasticity in fleet size.
- Current organizational structure is not aligned with asset management.
- No standardized architectural assessment exists.

Implementation Actions

The primary output of Exercise 1 was the set of implementation actions developed by each group. The actions are presented below in Table 2.

Connecticut Department of Transportation

Table 2. Recommended Transit Asset Management Implementation Actions

Group 1	Group 2	Group 3	Group 4
• Establish a standalone system for asset management • Better identify asset elements • Collect data on a more consistent basis • Improve reliance on vendors • Further develop a new maintenance of way program to monitor maintenance activities and maintenance plans	• Develop a condition assessment checklist and schedules • Implement a state-funded maintenance management system • Better documentation of existing practices • Establish standards of asset classes and inventory	• Write maintenance plans into facility design process • Have programming upgrade costs • Software system for inventory data • Link financial and maintenance systems • Increase staffing and funding	• Centralize the management of facilities • Proactive digital tools for all facilities • Template for assessments • Examples of good maintenance plans • Funds to follow through on maintenance plans • Additional information exchange between operators

There was a level of agreement across groups. Each group suggested implementing some type of statewide asset management software/system. Other actions suggested by multiple groups include development of condition assessment templates and improving maintenance oversight.

Exercise 2: Prioritizing Asset Management Improvements

Following the development of suggested actions in Exercise 1, the groups reconvened and presented their results. Attendees then prioritized the implementation actions. Voting yielded five implementation actions deemed to be the most important:

- **Implement an asset management / maintenance management system (with vehicles distinct from facilities)**
- **Increase staffing and funding**
- **Standardize condition assessment approach**
- **Improve oversight of maintenance plans**
- Better identify asset elements