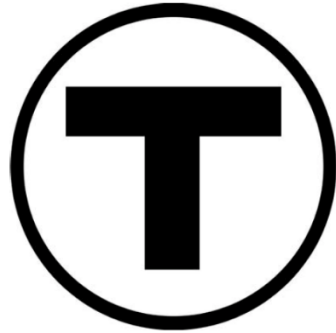Massachusetts Bay Transportation Authority

FTA Safety Management Inspection Update
MBTA Safety, Health & Environment Meeting
December 7, 2023
Meredith Sandberg, Chief of Quality, Compliance & Oversight

　　　　　　　　Draft for Discussion & Policy Purposes Only

Introduction to Workforce Assessment

12/7/2023

Draft for Discussion & Policy Purposes Only

Objectives

- Introduce Workforce Assessment Methodology and approach
- Lay groundwork for future leadership decisions on resource needs
- Begin to describe the complexities that drive the MBTA collective workforce requirements

Workforce Assessment Background

FTA Finding

MBTA's **staffing levels are not commensurate** with the demand for human resources required to carry out current rail transit operations and maintenance in addition to executing capital program activities.

FTA Directive

MBTA must conduct and submit to FTA a workforce assessment and associated workforce planning to include:

1. Required activities that must be performed for rail transit operations, maintenance, and capital projects delivery

2. Required resources to perform mission-critical activities

3. Current staffing capabilities for mission-critical activities

4. Safety risk(s) associated with current staffing shortages and how they are or will be mitigated
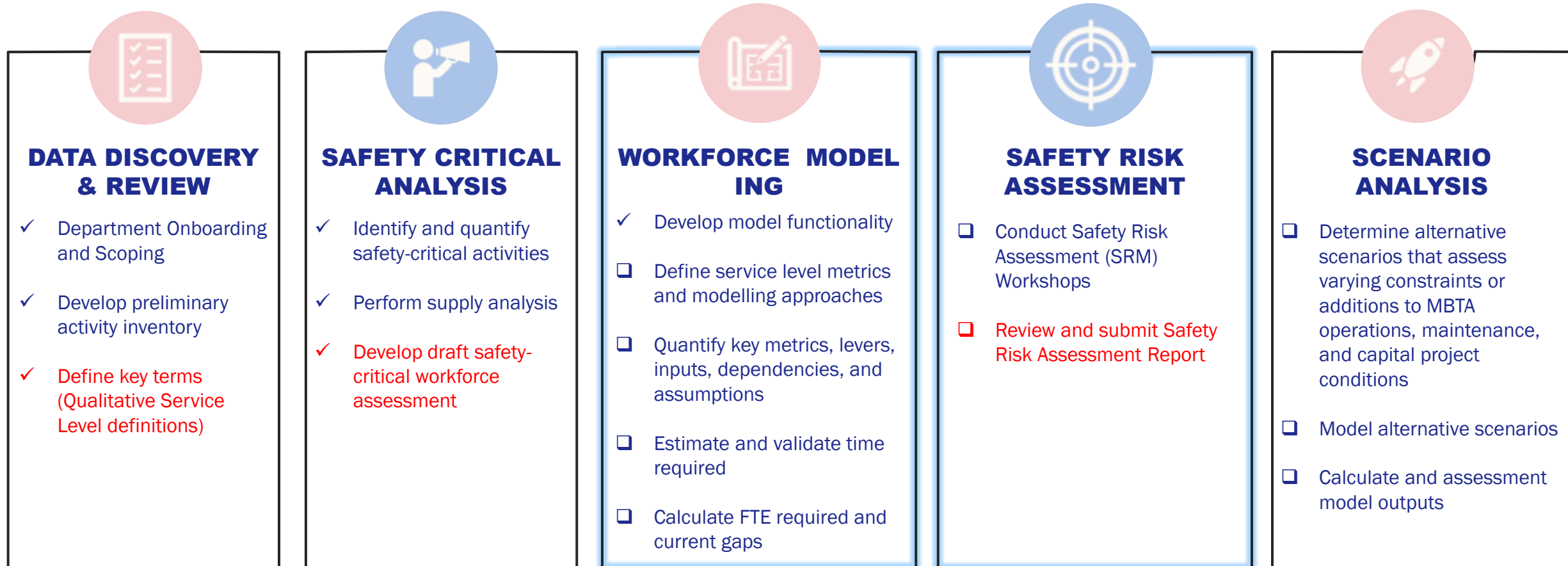
MBTA Response

- Perform an Authority-wide workforce assessment to quantify resources needed to complete mission-critical activities at three service level scenarios (**Workforce Model**)

- Conduct a risk assessment of staffing shortages (**Safety Risk Assessment**)

- Perform workforce assessment of alternative scenarios

- Develop a **5-year hiring plan** as required by FTA in Finding 2

Future-ready workforce model
Capturing and Reflecting Organizational shifts.

Workforce Assessment Approach

DATA DISCOVERY & REVIEW

- ✓ Department Onboarding and Scoping
- ✓ Develop preliminary activity inventory
- ✓ Define key terms (Qualitative Service Level definitions)

SAFETY CRITICAL ANALYSIS

- ✓ Identify and quantify safety-critical activities
- ✓ Perform supply analysis
- ✓ Develop draft safety-critical workforce assessment

WORKFORCE MODELING

- ✓ Develop model functionality
- ❑ Define service level metrics and modelling approaches
- ❑ Quantify key metrics, levers, inputs, dependencies, and assumptions
- ❑ Estimate and validate time required
- ❑ Calculate FTE required and current gaps

SAFETY RISK ASSESSMENT

- ❑ Conduct Safety Risk Assessment (SRM) Workshops
- ❑ Review and submit Safety Risk Assessment Report

SCENARIO ANALYSIS

- ❑ Determine alternative scenarios that assess varying constraints or additions to MBTA operations, maintenance, and capital project conditions
- ❑ Model alternative scenarios
- ❑ Calculate and assessment model outputs

5 YEAR HIRING PLAN

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Workforce Assessment Scope

✓ In Scope

- Activities performed by MBTA employees

- Backlog of state of good repair work

- Historical absenteeism rates (FMLA, vacation, etc.), overtime and fatigue management

- Reflecting reorganizations

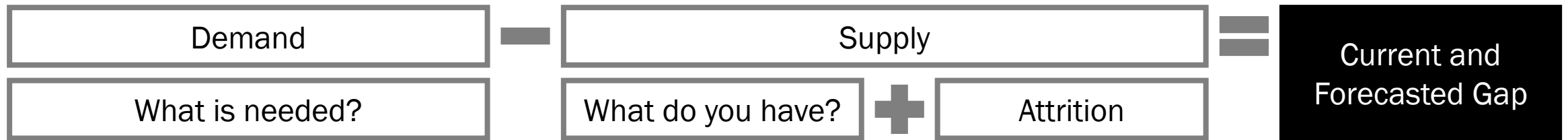- Creating process on maintenance and management of model for Finance and Human Resources

✗ Out of Scope

- Performance/efficiencies*

- Contractors/3rd Party Vendor work

- Revision of job scope and responsibilities

Workforce Assessment Model Methodology

The workforce model uses a "bottoms up" approach to quantify workforce demand across **three service level scenarios**. The model is not an assessment of the MBTA's current state or performance in execution of activities.

Demand	**—**	Supply	**=**	Current and Forecasted Gap
What is needed?		What do you have? **✚** Attrition		

Demand Analysis
Time estimates to measure level of effort required on safety-critical activities and activities at operational service levels

Dependency Modeling
Analytical techniques to identify and model workload drivers and dependencies

Workforce Capacity, Composition, and Distribution
Data to describe and quantify workforce capacity, distribution, and characteristics.

Attrition / Absentee Analysis
Data and assumptions to quantify current and projected attrition (incl. retirements) and absenteeism (how often people are available to work.)

Workforce Model Outputs
Quantitative and qualitative analysis of delta between required and current or projected FTE to deliver desired service levels to inform risk assessments and hiring plans

Workforce Assessment project

Metrics & Data based:

Model is based on underlying data on activities or other drivers of workforce time

Activities
Roles where headcount is best modeled based on the number of employees needed to provide a particular level of service

Ex: Admin positions

Coverage
Roles where headcount is best modeled based on the number of employees needed for a given time or area coverage

Ex: OCC Dispatcher

Defects
Roles where headcount is best modeled based on the number and type of corrective maintenance completed

Ex: Track Laborers, Electricians

Projects
Roles where headcount is best modeled based on the type of project and its associated activities

Ex: Capital Project Managers

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Example Dependencies in Model

| Supervisor to Employee Ratios	Restrictions to ROW Access	Ops & Maintenance Support for Capital Work	Required Support Staff
Adding staff may require additional supervisors to oversee, manage, and inspect the work of their teams. Supervisor to employee ratios vary by team and department. ➢ *Example: Adding more teams to inspect rail cars would require additional supervisors who support and perform inspections.*	Increased or decreased ROW access affects the number of required maintenance staff to perform maintenance work. ➢ *Example: If ROW access decreases, maintenance staff cannot complete as much work in a given shift, requiring a higher number of FTEs to accomplish planned work.*	Depending on the service level, Operations and Maintenance utilize varying amounts of overtime to support capital project work. ➢ *Example: Motorpersons and Track Laborers supporting capital work (equipment operators, flaggers, etc.) are limited by overtime rules intended to minimize fatigue.*	Hiring additional staff will require support from instructors, as well as administrative support staff. ➢ *Example: Training more motorperson operators depends on having enough instructors to deliver the training.*

Modeling Utilization and Retention

- Utilization refers to average working time by position based on historical payroll hours data and **takes into account vacation, sick, FMLA, etc.) and is derived based on historical payroll hours data**
- Retention refers to the average turnover of a position based on historic employee separations data
- Utilization and retention are calculated on a per position and business unit basis to reflect differences across MBTA functions
- *Both retention and utilization assumptions will be based on historic data across multiple years to account for anomalies and year over year fluctuations*

ILLUSTRATIVE Utilization EXAMPLE

Suppose 100 unique Rapid Transit Motorpersons logged a total of 160,160 hours over a year. Assuming each Rapid Transit Motorpersons is expected to log 2,080 hours annually (40 hours every week), the number of hours in the year amounts to 77 FTEs.

Assuming a workforce model output of 100 FTEs required, the MBTA would need to hire 130 FTEs to ensure that all activities associated with the service level output are completed.

| Rapid Transit Motorpersons	
Actual FTE Headcount	100
Collective Annual Hours Worked	160,160
Assumed Annual Hours per FTE	2,080
Assumed FTE based collective hrs	77
Utilization Rate	77%
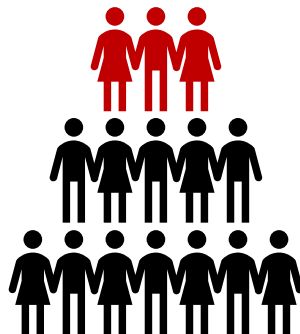
ILLUSTRATIVE Retention EXAMPLE

Suppose current MBTA's headcount for Rapid Transit Motorpersons is 102. The MBTA observed 8 separations, 30 new hires, and 20 promotions to other job classifications in the past year. The prior year, the headcount was 100. We are able to derive an exit rate of 28% and a retention rate of 72% for job classification.

Assuming a workforce model output of 130 FTEs required (after accounting for absenteeism), the MBTA would need to hire 181 FTEs to ensure that all activities associated with the service level output are completed.
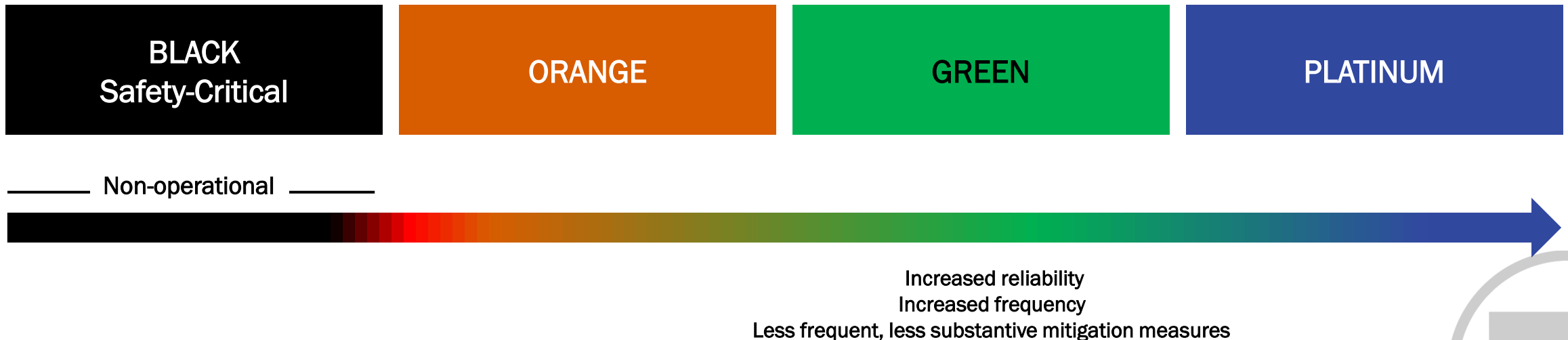
Rapid Transit Motorpersons	
Prior Year FTE Headcount	100
Employee Promotions	-20
Employee Separations	-8
Employee New Hires	30
Current FTE Headcount	102
Retention Rate (Exit Rate)	72% (28%)

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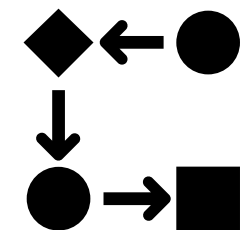
Workforce Assessment models several service level

- The MBTA has developed service levels to inform estimates for labor demand.

- The service levels are scenarios; they do not represent the current state.

- Quantitative metrics to define the service levels are developed on a divisional or departmental basis, where applicable.

- Each service level also identifies the level of use for mitigations (ex: Overtime work)

Modeling our needs at several different service levels enables an output that is "decision agnostic" and also allows us to dynamically understand how different staffing goals at one division impacts other service decisions

BLACK Safety-Critical	ORANGE	GREEN	PLATINUM

——— Non-operational ———

Increased reliability
Increased frequency
Less frequent, less substantive mitigation measures

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Safety Risk Assessment

As workforce gaps in specific roles are identified, we are conducting Safety Risk Management (SRM) Workshops to analyze risks and hazards that a gap could introduce and identifying mitigation strategies to ensure we are operating safely.

Workforce Assessment → Safety Risk Management (SRM) Workshops → Safety Risk Assessment Reporting

Workforce Gaps

Safety Mitigation

SRA Report

Workforce Assessment timeline

- The Workforce Assessment, and its associated Hiring Plan, are for a 5-year timeline.
- The timeline below has been submitted by the MBTA to the FTA; we are pending their approval of this timeline

2024					
January	**February**	**March**	**April**	**May**	**SUMMER**
Mid Dec: Staff receive Safety outputs **Mid Jan:** Staff receive Maintenance outputs	**Mid Feb:** Staff receive Capital outputs		**Early April:** Staff receive Wave 1* dependency outputs	**Early May:** Receive Wave 2 outputs	[Ongoing: Scenario outputs, Training guides, 5-year Hiring Plan] MBTA Staff brings WFA results to Board

*With interdependencies, some later outputs could impact earlier outputs

Looking forward

- Workforce Model is being developed in partnership with MBTA Workforce Department and will be handed over to integrate with our planning processes

- Workforce Department is building out People Analytics capabilities to enable further refinement of our model

- MBTA intends to continue to update the model so that it continually better reflects our operating conditions

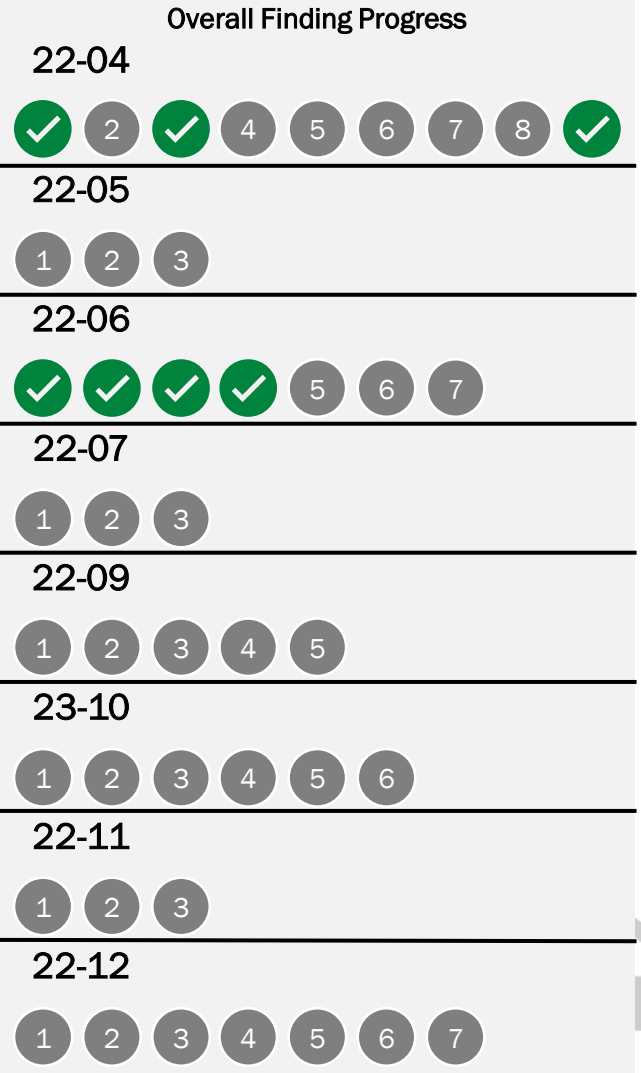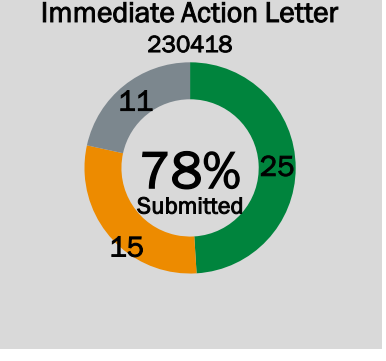- We can also use it to drive better understanding of our workforce patterns and needs
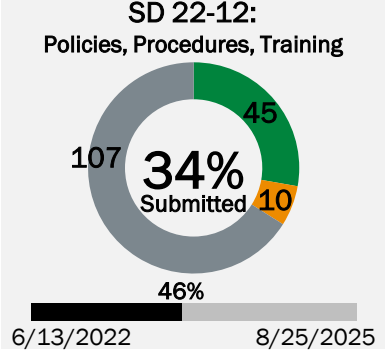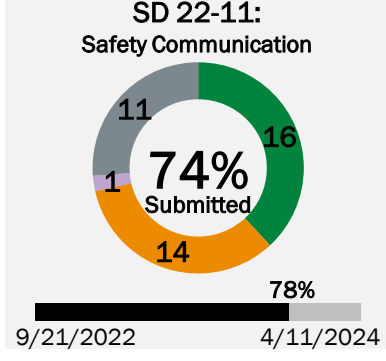
FTA SMI Response Progress Summary

Legend: Submissions Accepted (green) | Under FTA Review (orange) | Resubmittal Required (purple) | Not Yet Submitted (gray)

Overall CAP Progress[1]

Donut chart: **61% Submitted**
- 216 (Submissions Accepted)
- 148 (Under FTA Review)
- 1 (Resubmittal Required)
- 237 (Not Yet Submitted)

Progress bar: 47%
6/1/2022 — 8/25/2025
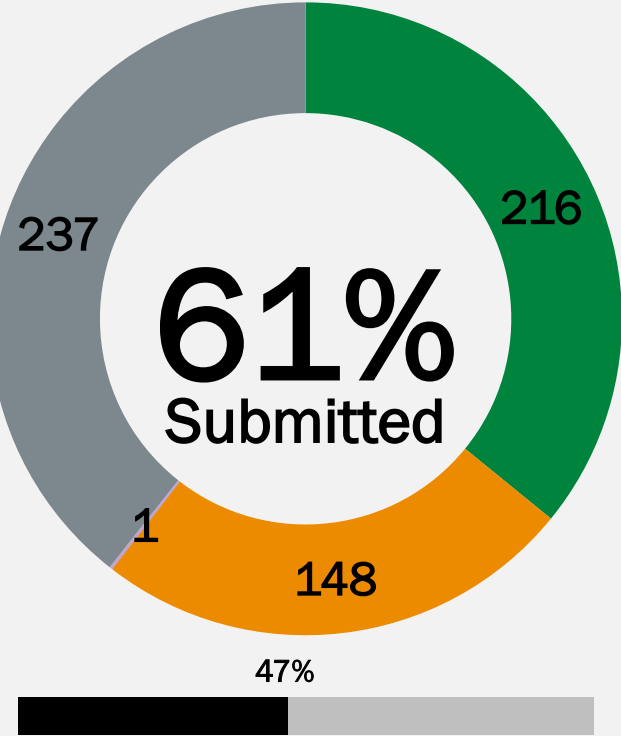
Overall Findings		
Total	42
Closed	7
Ongoing	35

SD 22-04: Track Maintenance & PPE
81% Submitted
- 28, 28, 13
- 65%
- 6/8/2022 — 9/30/2024

SD 22-05: Vehicle Securement
89% Submitted
- 56, 69, 15
- 83%
- 6/1/2022 — 3/29/2024

SD 22-06: Operations Control Center
93% Submitted
- 13, 12, 2
- 73%
- 6/1/2022 — 7/1/2024

SD 22-07: Lapsed Certifications
60% Submitted
- 4, 5, 6
- 64%
- 6/13/2022 — 10/1/2024

SD 22-09: Workforce
65% Submitted
- 25, 5, 16
- 55%
- 10/1/2022 — 11/18/2024

SD 23-10: Safety Information & SMS
34% Submitted
- 29, 5, 67
- 43%
- 10/17/2022 — 6/20/2025

SD 22-11: Safety Communication
74% Submitted
- 16, 14, 1, 11
- 78%
- 9/21/2022 — 4/11/2024

SD 22-12: Policies, Procedures, Training
34% Submitted
- 45, 10, 107
- 46%
- 6/13/2022 — 8/25/2025

Immediate Action Letter 230418
78% Submitted
- 25, 15, 11

Overall Finding Progress

22-04: ✓ | 2 | ✓ | 4 | 5 | 6 | 7 | 8 | ✓

22-05: 1 | 2 | 3

22-06: ✓ | ✓ | ✓ | ✓ | 5 | 6 | 7

22-07: 1 | 2 | 3

22-09: 1 | 2 | 3 | 4 | 5

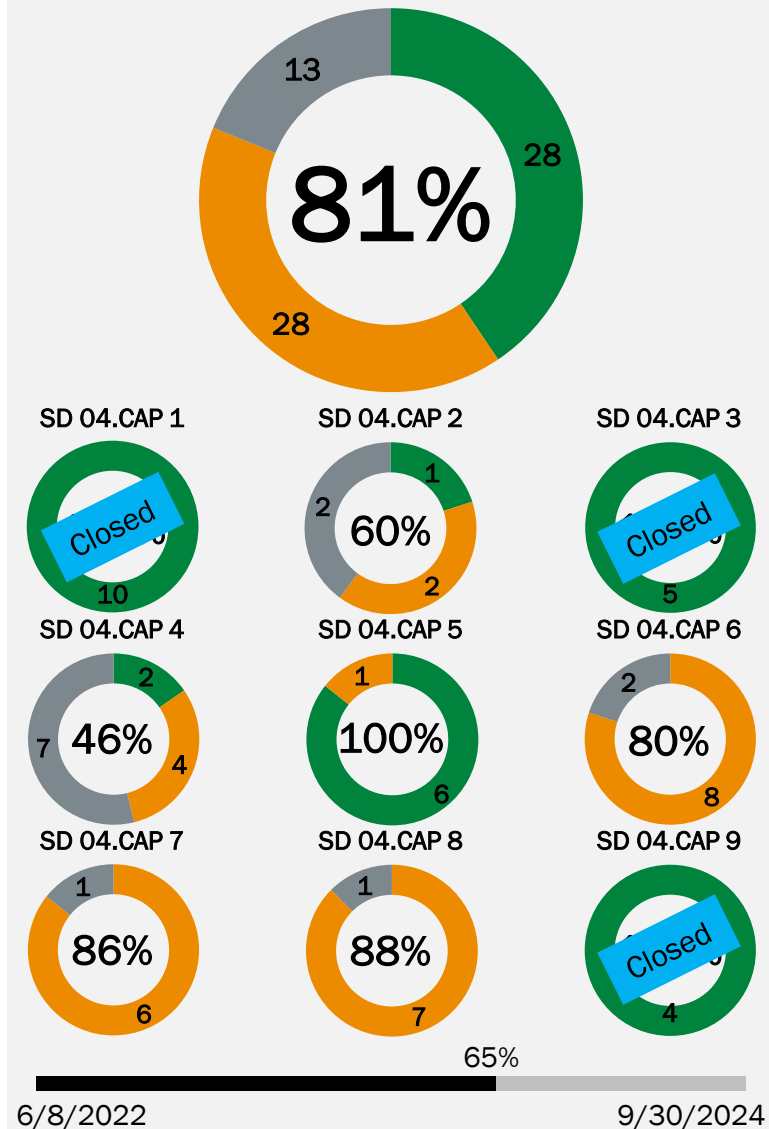**23-10:** 1 | 2 | 3 | 4 | 5 | 6

22-11: 1 | 2 | 3

22-12: 1 | 2 | 3 | 4 | 5 | 6 | 7

✓ Finding Closed

1. Total of 602 actionable items; inclusive of updated 23-10 & 23-12 CAPs, does not include IAL items

Data as of: November 26, 2023

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Questions?

SD 22-4: Track Maintenance & PPE

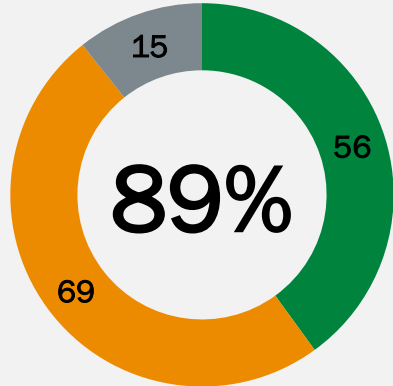**Legend:** Submissions Accepted · Under FTA Review · Resubmittal Required · Not Yet Submitted

- ✓ F1: Published updated Rulebook for Operations Employees incorporating PPE requirements – CAP CLOSED
- F2: Reporting against our PPE compliance program on a monthly basis – all action items completed
- ✓ F3: Raised Tufts Curve Speed Restriction after completing Cologne Egg replacement – CAP CLOSED
- F4: Developed schedule for ROW Access for MOW – Track Improvement Plan (TIP)
- F5: Submitted budget requests for MOW equipment and resource needs – CAP Closure request submitted 8/28
- F6: Developed Capital Funding Request & Plan for Accelerated Implementation of EAM
- F7: Developed and Implemented New Weekly Track Conditions Report for Executives – all action items completed
- F8: Worked with MOW and CT to update SMRP to account for new speed restrictions, submitted our new format to FTA for our quarterly update
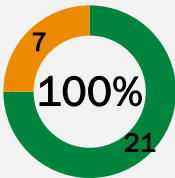- ✓ F9: Restored Green Line Work Train to Working Order – CAP CLOSED

81%

SD 04.CAP 1 — Closed
SD 04.CAP 2 — 60%
SD 04.CAP 3 — Closed
SD 04.CAP 4 — 46%
SD 04.CAP 5 — 100%
SD 04.CAP 6 — 80%
SD 04.CAP 7 — 86%
SD 04.CAP 8 — 88%
SD 04.CAP 9 — Closed

65%

6/8/2022   9/30/2024

Data as of: November 26, 2023   Draft for Discussion & Policy Purposes Only   Note: Percentages in charts represent submission

SD 22-5: Vehicle Securement

89%
- 15
- 56
- 69

SD 05.CAP 1 — 100%
- 7
- 21

SD 05.CAP 2 — 100%
- 8
- 10

SD 05.CAP 3 — 100%
- 10

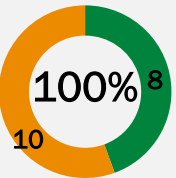**SD 05.CAP 4** — 82%
- 15
- 27
- 42

83%

6/1/2022 — 3/29/2024

- F1: Submitted Supplemental CAP for EV Inspections
- F2: Completed Training of All Heavy and Light Rail Personnel
- F3: Implemented Compliance Program for Safe Movement
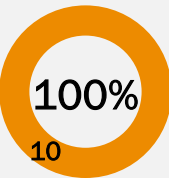- Supplemental: Red Line pilot underway at both Cabot and Caddigan

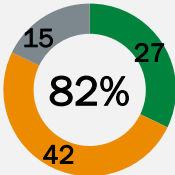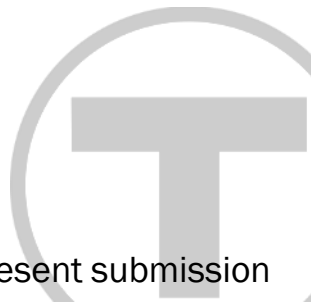Data as of: November 26, 2023   Draft for Discussion & Policy Purposes Only   Note: Percentages in charts represent submission
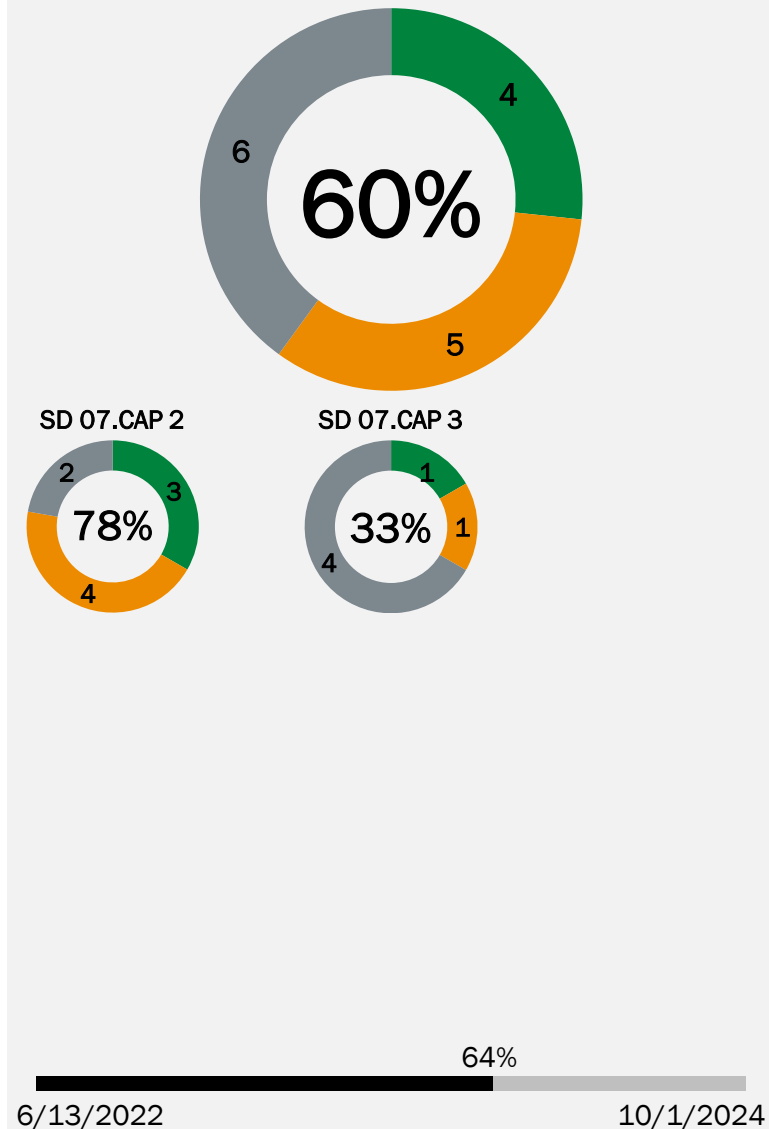
SD 22-6: Operations Control Center

- ✓ F1: Ensured that staff working in OCC are certified – FINDING CLOSED

- ✓ F2: Established policies to ensure OCC staff have sufficient time off between shifts – FINDING CLOSED

- ✓ F3: Established Operating Procedures to Ensure No Staff Performing Dual Roles – FINDING CLOSED

- ✓ F4: Ensured 100% Compliance with Work Hour Restrictions – CAP CLOSED

- • F5: Staffed to 27 RTL Dispatchers Including Supplemental Resources

- • F6: Implementing plan to make OCC role more attractive (OCC renovation in design phase)

- • F7: Submitted Plan Formal tracking and notification system
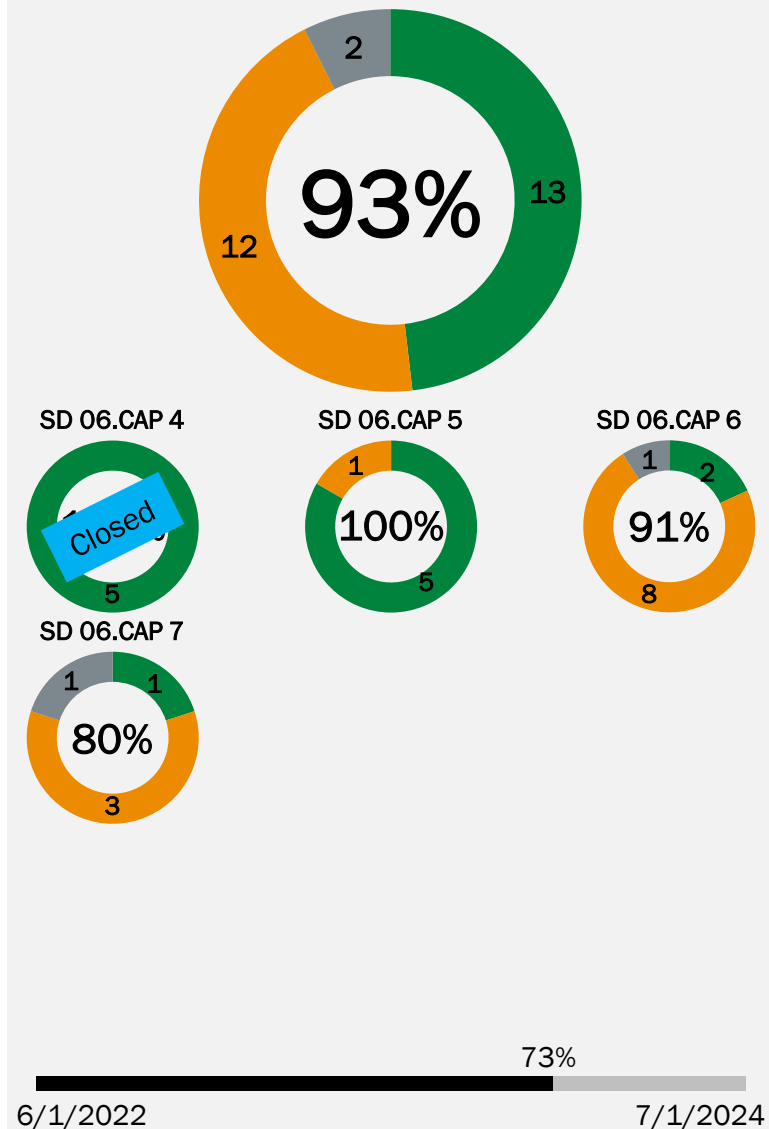
SD 22-7: Lapsed Certification Process

Legend: Submissions Accepted · Under FTA Review · Resubmittal Required · Not Yet Submitted

Large donut chart: **60%** — segments: 4 (green), 5 (orange), 6 (gray)

SD 07.CAP 2: **78%** — segments: 3 (green), 4 (orange), 2 (gray)

SD 07.CAP 3: **33%** — segments: 1 (green), 1 (orange), 4 (gray)

- F1: Ensured 100% of Operating Personnel Are Current in Certifications – Finding Closure Requested

- F2: Ensured 100% of Operating Personnel Are Current in Certifications - Submitted Special Order revision

- F3: Ensured 100% of Operating Personnel Are Current in Certifications; Designing and Implementing Certification Management Procedures
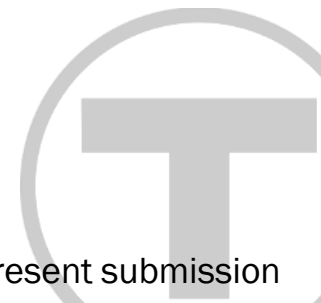
Timeline: 6/13/2022 — **64%** — 10/1/2024
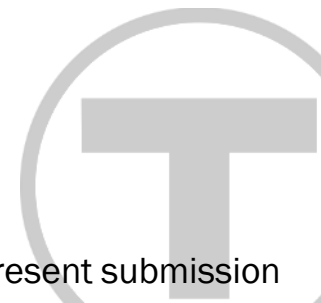
SD 22-9: Workforce

- **F1: Developed sprint model to complete gathering model input and gain concurrence from stakeholders**

- F2: Conducted an industry scan of transit agency recruitment, hiring, and retention practices which will inform potential practices that a transportation agency may choose to implement in efforts to mitigate workforce challenges

- **F3: Updated Safety Certification policy for identified gaps**

- F4: Developing Gap Analysis for Contractor Oversight
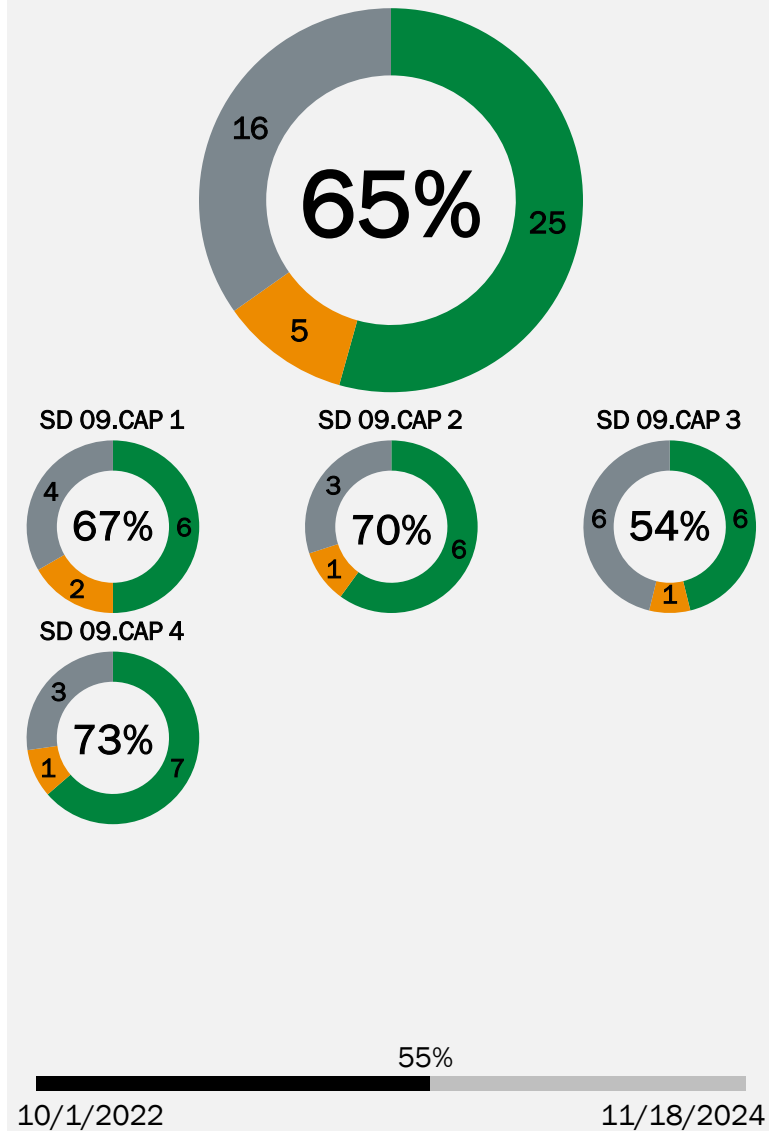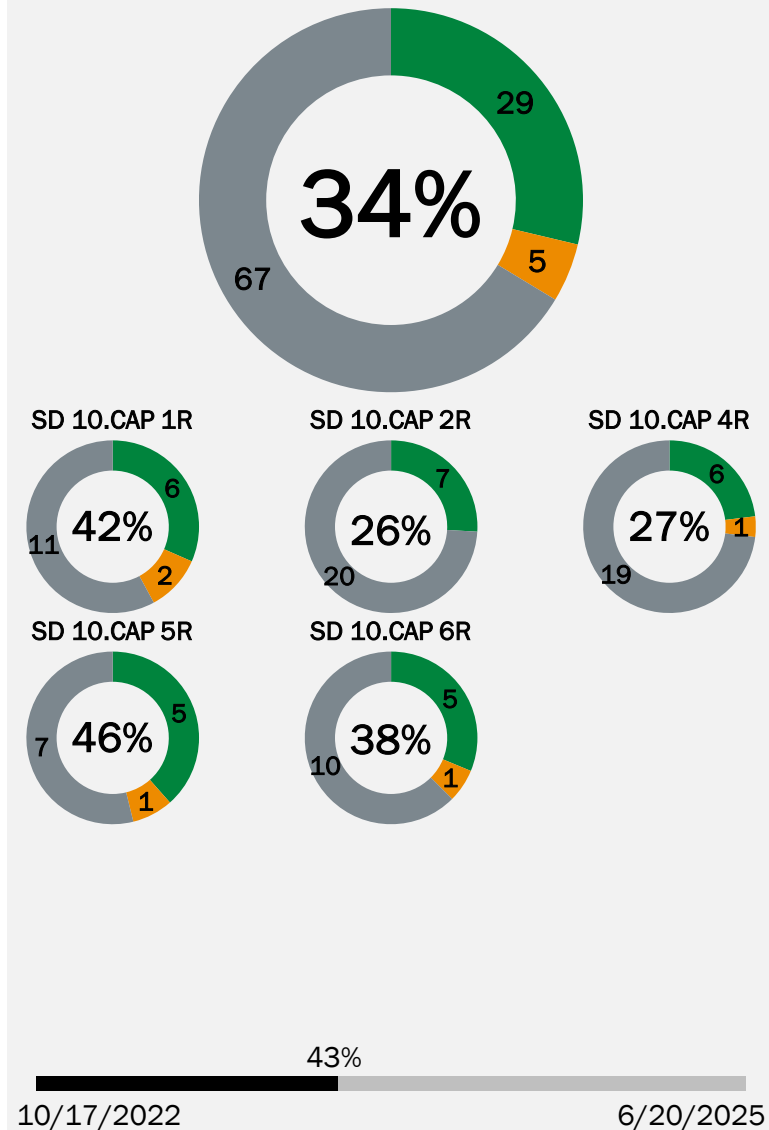
Data as of: November 26, 2023   Draft for Discussion & Policy Purposes Only   Note: Percentages in charts represent submission

SD 23-10: Safety Information & SMS

34%

29
5
67

SD 10.CAP 1R
42%
6
2
11

SD 10.CAP 2R
26%
7
20

SD 10.CAP 4R
27%
6
1
19

SD 10.CAP 5R
46%
5
1
7

SD 10.CAP 6R
38%
5
1
10

- ==F1: Identified interim and permanent SMS Lead==

- F2/F3: Developing safety data flows

- ==F4: Developing plan to completed backlog of reports==

- ==F5: Developed Risk Assessment Schedule==

- F6: Developing Data verification guidelines

- Completed Safety Department Staffing Analysis and submitting weekly hiring updates to FTA, completed Strategic Hiring Plan

43%

10/17/2022   6/20/2025

Data as of: November 26, 2023   Draft for Discussion & Policy Purposes Only   Note: Percentages in charts represent submission

SD 22-11: Safety Communication
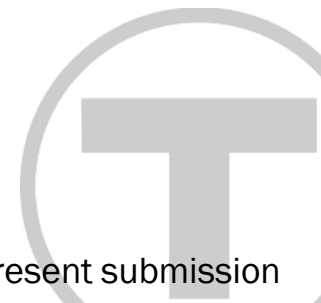
74%

- 11
- 16
- 1
- 14

SD 11.CAP 1 — 72%
- 5
- 9
- 4

SD 11.CAP 2 — 82%
- 2
- 4
- 5

SD 11.CAP 3 — 69%
- 4
- 3
- 1
- 5

- • F1: Submitted safety meeting charters to FTA

- • F2: Scheduled & Published Local Safety Committee Meeting Series

- • F3: Published Employee-Focused Safety Helpline SOP, Submitted Plan for ESRP SRM Integration

78%

9/21/2022   4/11/2024

Data as of: November 26, 2023   Draft for Discussion & Policy Purposes Only   Note: Percentages in charts represent submission
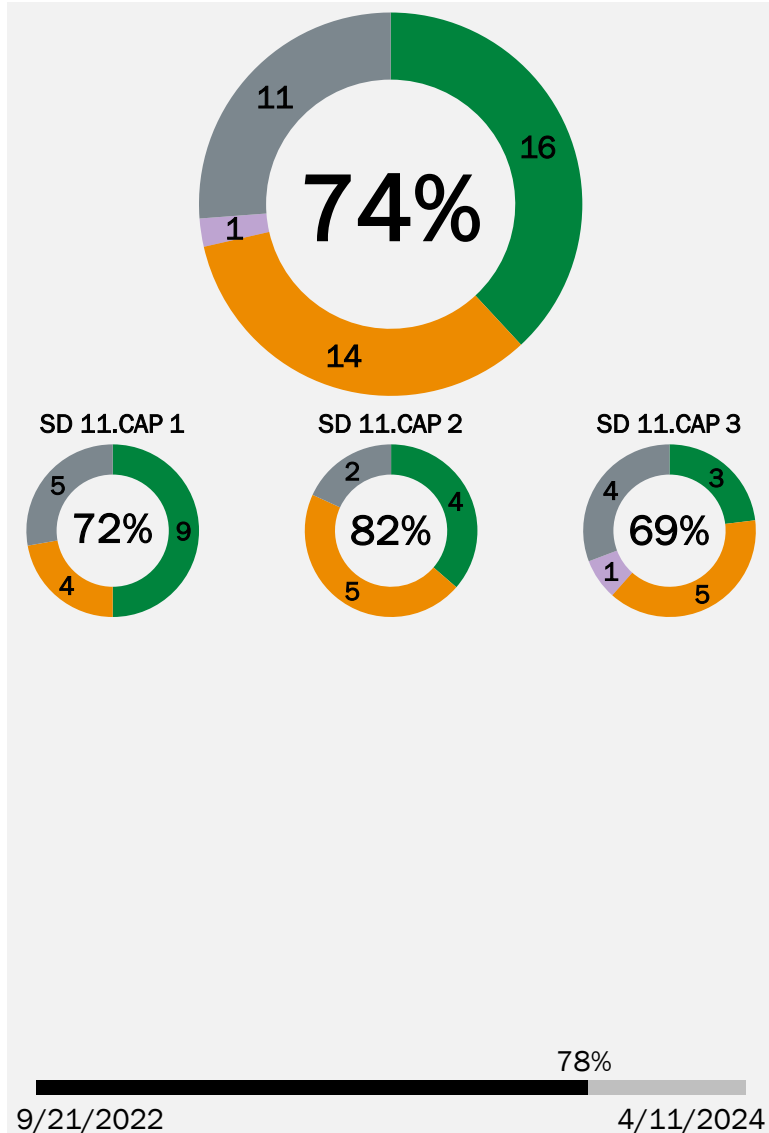
SD 22-12: Policies, Procedures & Training

Legend: 🟩 Submissions Accepted 🟧 Under FTA Review 🟪 Resubmittal Required ⬜ Not Yet Submitted

Large chart: 34% (Accepted 45, Under FTA Review 10, Not Yet Submitted 107)

- SD 12.CAP 1R: 22% (13, 4, 59)
- SD 12.CAP 3: 37% (10, 3, 22)
- SD 12.CAP 4: 47% (7, 1, 9)
- SD 12.CAP 5: 40% (6, 9)
- SD 12.CAP 6: 44% (4, 5)
- SD 12.CAP 7: 70% (5, 2, 3)

Timeline: 46% — 6/13/2022 to 8/25/2025

- **F1/F2: Assessed data sets for PPE Compliance pilot**

- **F3: Submitted CAP 3 rewrite to FTA 11/9/23**

- F4: Assessed Current State Of Training And Developed Recommendations for Training Governance

- F5: Assessed Workforce Technology usage and competency via workshops

- F6: Selected Technical Support for Expanded Mentorship Program

- F7: Completed Repairs on 17 of 18 Radio Weak Spots, Completed SOPs for Systemwide Radio

Data as of: November 26, 2023   Draft for Discussion & Policy Purposes Only   Note: Percentages in charts represent submission