Safety & Security Certification Program Plan

Published by
MBTA Safety Division

Updated
February 27, 2024

Status
Final

Document Control

Rev.	Date.	Prepared By	Description of Changes
1	January 2015	MBTA Safety	• Initial program developed and issued.
2	February 2023	MBTA Safety	• Updated regulatory references.
3	November 2023	MBTA Safety	• Updated responsibilities. • Updated SSC Project Evaluation Criteria. • Updated Category 1 and Category 2 criteria. • Updated requirements and procedures for completing SSC activities. • Updated risk management requirements. • Added security assessment requirements. • Updated documentation requirements. • Updated SSC templates. • Updated SSC contract specification.
4	February 2024	MBTA Safety	• Updated SSCPP to incorporate FTA and internal MBTA comments. • Made Final.

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Abbreviations

AAR	After-Action Report
AHJ	Authority Having Jurisdiction
ATC	Automatic Train Control
BOD	Basis Of Design
CBRN	Chemical, Biological, Radiological, and Nuclear
CDRL	Contract Data Requirement List
CEL	Certifiable Elements List
CFR	Code of Federal Regulations
CIL	Certifiable Items List
COC	Certificate of Conformance
CSCC	Construction Specification Conformance Checklist
DC	Design Consultant
DCCC	Design Criteria Conformance Checklist
DHS	Department of Homeland Security
DPU	Department of Public Utilities
DUI	Driving Under the Influence
DWI	Driving While Intoxicated
E&M	Engineering and Maintenance
FLSC	Fire Life Safety Committee
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HTL	Hazard Tracking Log
HVAC	Heating, Ventilation, and Air Conditioning
ISO	International Organization for Standardization
ITD	Information Technology Department
LRT	Light Rail Transit
MassDOT	Massachusetts Department of Transportation
MBTA	Massachusetts Bay Transportation Authority
MCP	Major Capital Project
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MOV	Means of Verification
NTP	Notice to Proceed
O&M	Operations and Maintenance

OHA	Operational Hazard Analysis
OP	Oversight Procedure
ORC	Operational Readiness Committee
ORCC	Operational Readiness Conformance Checklist
OSHA	Occupational Safety and Health Administration
PAF	Project Assessment Form
PHA	Preliminary Hazard Analysis
PHL	Preliminary Hazard List
PM	Project Manager
PMP	Project Management Plan
PMOC	Project Management Oversight Contractor
PPE	Personal Protective Equipment
PTASP	Public Transportation Agency Safety Plan
QA	Quality Assurance
QC	Quality Control
RFC	Request For Change
RFI	Request For Information
RFP	Request for Proposal
RTA	Regional Transit Authority
SA	Safety Assurance
SCADA	Supervisory Control and Data Acquisition
SCIL	Safety-Critical Items List
SME	Subject Matter Expert
SITT	System Integration Testing Team
SMRC	Safety Management Review Committee
SMS	Safety Management System
SMWG	Safety Management Working Group
SOP	Standard Operating Procedure
SRM	Safety Risk Management
SSC	Safety and Security Certification
SSCP	Safety and Security Certification Plan
SSCPP	Safety and Security Certification Program Plan
SSCVR	Safety and Security Certification Verification Report
SSEPP	System Security Emergency Preparedness Plan
SSI	Security Sensitive Information

SSMP	Safety and Security Management Plan
SSO	State Safety Oversight
SSP	System Safety Program
TOD	Transit Oriented Development
TSI	Transportation Safety Institute
TSSP	Transit Safety and Security Program
TVA	Threat and Vulnerability Assessment
TVCC	Testing Verification Conformance Checklist
TVM	Ticket Vending Machine
USC	United States Code
WMD	Weapon of Mass Destruction

Definitions

Certifiable Element: Project components that can affect the safety and security of transit agency passengers, employees, contractors, emergency responders, or the general public. These elements define the scope of the project's certification program.

Certifiable Elements List (CEL): Compilation of all identified certifiable elements for a project; the CEL also includes sub-elements for each identified element.

Certifiable Item: Individual components of each certifiable element for the project.

Certifiable Items List (CIL): A compilation of all identified certifiable items for all certifiable elements of a project.

Certificate of Conformance (COC): Document verifying that all certifiable items of an element or the project have been verified and all hazards and threats related to that element or project have been sufficiently mitigated.

Construction Specification Conformance Checklist (CSCC): A comprehensive checklist outlining construction and installation specifications associated with each certifiable item. The checklist is used to verify that the project is built or installed in accordance with approved designs, technical specifications, drawings, and contract requirements.

Design Criteria Conformance Checklist (DCCC): A comprehensive checklist identifying design criteria and specifications associated with each certifiable item. The checklist is used to verify that the safety- and security-related technical specifications, drawings, and contract documents for the project are incorporated into the project designs.

Hazard Tracking Logs: The collection of documents used to track identified hazards and risks, such as the Preliminary Hazard Analysis, Operational Hazard Analysis, and Security Assessment.

Interim Certificate: A temporary certificate that allows the system to be placed into service or use with additional safety precautions and protections implemented, as necessary, until all required certification verification is completed.

Maintenance: Regularly scheduled or anticipated work used to restore, inspect, clean, repair, or replace conditions to a State of Good Repair from damage or general wear (e.g., tamping, roof replacements, rail grinding). Repairs or replacements to life-safety critical systems that may be considered maintenance should be reviewed with MBTA Safety to determine certification applicability. Like-in-kind replacement of any kind requires assessment to determine if existing systems are considered code or standard compliant.

Operational Hazard Analysis (OHA): An analysis used to identify, document, analyze, and mitigate operational hazards caused by operating and support (i.e., maintenance) personnel.

Operational Readiness Conformance Checklist (ORCC): A checklist to ensure that the major operational requirements are in place before revenue service, facility occupancy, or system / equipment utilization.

Rehabilitation: A comprehensive process used to restore existing systems or assets to near original or new condition where maintenance is no longer feasible in preserving the State of Good Repair (e.g., station or facility renovations, vehicle overhauls, major track replacements, etc.).

Risk-based Hazard Analysis: The process to identify, analyze, and determine the specific actions a railroad will take to mitigate or eliminate the hazards and the resulting risks. This process is defined in the MassDOT/MBTA Railroad System Safety Program Plan.

Risk-Based Hazard Management: The processes (including documentation) used to identify and analyze hazards, assess, and rank corresponding risks, and eliminate or mitigate the resulting risks. Risk-based hazard management is hazard management process utilized by MBTA's commuter rail operation. This process is defined in the MassDOT/MBTA Railroad System Safety Program Plan.

Preliminary Hazard Analysis: The process to identify and categorize potential hazards associated with the operation of a proposed or early-stage project.

Project: An undertaking to implement or modify a facility, infrastructure, systems, or transit-related program, or procure or overhaul a transit vehicle or equipment.

Safety and Security Certification (SSC): Processes that collectively verify a project's safety and security readiness.

Safety and Security Certification Plan (SSCP): A management tool used to execute the SSC program for individual projects; it establishes roles and responsibilities and defines key activities.

Safety and Security Management Plan (SSMP): A plan describing how the recipient of federal funding will address safety and security in a Major Capital Project, from initial project planning through initiation into revenue service.

Safety and Security Certification Verification Report: A report summarizing the project's safety and security certification activities.

Safety Assurance: The processes within SMS that function to ensure the implementation and effectiveness of safety risk mitigation and the transit agency meets or exceeds its safety objectives through the collection, analysis, and assessment of information.

Safety Critical Items List (SCIL): A compilation of all identified certifiable items associated with an Unacceptable or Undesirable hazard.

Safety Management System: The formal, top-down, organization-wide approach to managing safety risk and assuring the effectiveness of a transit agency's safety risk mitigation. SMS includes systematic procedures, practices, and policies for managing risks and hazards.

Safety Risk Management: The processes to assess the likelihood and severity of the consequences of hazards, and prioritize the hazards based on the safety risk.

Significant Operational Change: Any major change to the system that during initial review is determined to adversely impact safety and/or security if additional mitigations are not implemented

System Integration Testing Team: Team established to manage integration testing, usually for larger or more complex projects.

Testing Verification Conformance Checklist: A comprehensive checklist outlining testing specifications and requirements for each certifiable item. The checklist is used to verify that the components of the project are operational or installed in accordance with approved designs, technical specifications, drawings, and contract requirements; this includes programs for contractual testing, systems integration testing, and pre-revenue operations testing.

Threat and Vulnerability Assessment: Process for identifying, assessing, and mitigating security threats and vulnerabilities.

1.0 Introduction

The Federal Transit Administration (FTA) defines Safety and Security Certification (SSC) as "the series of processes that collectively verify the safety and security readiness for public use." In November 2002, the FTA published the "Handbook for Transit Safety and Security Certification, Final Report" to assist the transit industry in understanding and implementing safety and security certification processes. Transit agencies are responsible for determining the applicability of the concepts conveyed by the Handbook to their projects or developing other workable methods for Safety and Security Certification. Differences in methodology may exist among transit agencies, as well as among projects within a single agency.

The Massachusetts Bay Transportation Authority (MBTA) has developed this Safety and Security Certification Program Plan (SSCPP) to establish the management responsibilities and the technical processes associated with implementing a Safety and Security Certification (SSC) program. The SSCPP incorporates and builds on the methods described in FTA's Handbook for Transit SSC while establishing MBTA's certification procedures based on the Safety Risk Management (SRM) and Safety Assurance requirements defined in the MBTA's Transit Safety Plan, as well as Security Risk Management Processes contained within the agency's System Security and Emergency Preparedness Plan.

1.1 SSC and Safety Management Systems

Initially established in the Moving Ahead for Progress in the 21st Century Act (MAP-21), the FTA adopted the Safety Management System (SMS) model to develop and implement the National Safety Program. Built on the four (4) interconnected components (identified in Figure 1), SMS is intended to advance a comprehensive approach to safety decision-making and progress modern safety principles. FTA's adoption of the SMS framework elevated the national strategy to safety in transit, shifting from a reactive method to a proactive tactic focused on preventing events. SMS builds a safety culture in public transit dedicated to controlling and reducing safety risks through the early detection and correction of hazards.

Figure 1: Safety Management System (SMS) Components

The principles of SMS must be incorporated as early as possible into the MBTA's procurement processes. While each of the four components are interrelated, the following two (2) will be well-engrained in the certification process:

1. Safety Risk Management (SRM)
2. Safety Assurance (SA)

1.2 SSC and System Safety

The Federal Railroad Administration (FRA) requires agencies to implement a System Safety Program through an approved System Safety Program Plan (SSPP). The Program defines proactive processes and procedures for the identification and subsequent mitigation or elimination of hazards on an agencies system. This SSCPP is intended to support the requirements of the Commuter Rail SSPP by prescribing a set of procedures and requirements to identify and mitigate or eliminate the risk presented by new hazards during the implementation of a project.

49 CFR Part 270 requires that each SSPP include requirements for Safety and Security Certification based on the Safety Assurance and Risk-Based Hazard Analysis processes. Similar to SMS, all hazards will be assessed using the Risk-Base Hazard Analysis process to analyze system changes and modifications do not adversely impact safety. Verification of the hazard's mitigations are then done in accordance with the certification program based on the Safety Assurance methodologies.

1.3 Goals and Objectives

Consistent with FTA's Handbook for Transit Safety and Security Certification, the MBTA is a "self-certifying" agency responsible for determining which projects require SSC, the means and methods through which SSC will be carried out, and the process through which SSC requirements and outcomes will be documented and maintained. The MBTA has implemented a Safety Management System (SMS) that establishes Safety Policy, SRM, Safety Assurance (SA), and Safety Promotion activities, including training requirements.

MBTA's SA program requires impacts to safety from any change must be evaluated through the SRM or Risk-Based Hazard Analysis processes to determine if the risk and mitigations are appropriate to eliminate or reduce the risk to an acceptable to MBTA. It is, therefore, the goal of MBTA's SSC process to assure that system extensions and new and rehabilitated facilities, systems, and equipment, including vehicles, are as safe and secure as reasonably possible, within available resources, for use by passengers, employees, contractors, emergency responders, and the general public.

The MBTA aims to help achieve and demonstrate an acceptable level of risk for each project by:

- Implementing a systematic approach to hazard and threat/vulnerability management.
- Complying with safety and security codes, standards, and industry practices.
- Adhering to safety and security design criteria and specification requirements.
- Verifying safety and security requirements are identified, incorporated into, and achieved during project design, construction/installation, testing, and start-up.

Specific SSC Program objectives supporting the above goals include:

- Evaluating and resolving potential safety hazards and security vulnerabilities at the earliest possible phase of the project, with resolutions tracked and documented.

- Ensuring appropriate codes, guidelines, and standards, as determined by MBTA, are reviewed and applied to provide a basis for safety and security considerations in the design criteria.
- Verifying that facilities, vehicles, systems, and equipment are designed, constructed, built, inspected, and tested according to design criteria and specifications.
- Creating new or making necessary changes to existing system safety and security plans, operating and maintenance plans and procedures, rulebooks, and training programs where appropriate.
- Demonstrating and documenting that personnel are trained and certified to operate and maintain the facilities, systems, and equipment.
- Familiarizing and providing initial training to emergency response agencies, including refresher training for the inherent hazards of MBTA operations and response to MBTA emergencies as necessary.

1.4 Scope

The SSCPP applies to projects whose results may affect the safety and security of the MBTA system. This includes, but is not limited to, projects that involve stations, system extensions, rail/bus rolling stock, all new infrastructure directly supporting revenue service, and any equipment addressing a major safety- or security-critical system. MBTA Safety and MassDOT Security and Emergency Management work with Project Managers to evaluate and determine the level of Certification required for each project.

The SSCPP addresses three separate but overlapping functional areas:

1. System Safety and Security
2. Fire Life Safety
3. Occupational Safety

Additionally, this SSCPP scope established an SSC management and administrative mechanism, a framework of project team responsibilities, a detailed SSC 10-step process, documentation requirements, and configuration management covering all MBTA potential projects needing SSC. These projects fall within the following four (4) major categories with the stipulation that the example project types are not all-inclusive:

Table 1: Project Categories

Systems	
• Traction power • Traction Power Substations • Tiebreaker Stations • Emergency and standby power systems • Uninterruptible Power Supply (UPS) • Generators • Automatic Train Control (ATC) systems • AC switchboard rooms • Communications • Signal systems • Supervisory Control and Data Acquisition (SCADA) • SPTO Monitors/Cameras	• Fare Collection • Ticket Vending Machines (TVMs) • Fire Protection and Suppression Systems, • Auxiliary (non-revenue) vehicles • Equipment • Signage • Conventional and Alternate fueling systems • Vehicle lifts • CCTV • Intrusion detection • Controlled entry/access systems • Blue light stations
Facilities and Equipment	
• Stations/terminals • Parking Garages and Parking Lots • Pedestrian Bridges • Maintenance facilities and storage yards • Structures (elevated, ground surface, and sub-terrain) • Track	• Administrative and Operational Control Facilities *(e.g., Kiosk, HVAC, escalators, elevators, lighting, charging equipment for battery-electric buses, and photovoltaic equipment maintenance)* • Equipment installed along the guideway *(e.g., tunnel lighting, emergency access/exits, signage, and pump systems).*
Testing	
• Contractual • Systems Testing • Integrated Testing • Pre-Revenue Testing	
Operations	
• Emergency Preparedness Plan • Snow and Ice Plan • Operations and Maintenance Training Programs • Employee Qualifications • Emergency Responder Training	• Rule Book • Standard Operating Procedures (SOPs) • Quality Assurance/ Quality Control Plans • Maintenance Manuals • Inspection/Maintenance Procedures • Operations and Administrative Procedures

1.5 Purpose

The purpose of this Plan is to meet the requirements of 49 USC Chapter 53 Section 5327, FTA Circular 5800.1, 49 CFR Part 673, 49 CFR Part 670, 49 CFR Part 270, and those of the Massachusetts Department of Public Utilities (DPU) as they pertain to SSC, change management, and SRM. The SSCPP has been developed to ensure that:

- Hazards and security vulnerabilities are identified, evaluated, and adequately controlled or mitigated before the commencement of passenger service, consistent with MBTA's SRM processes.
- Critical system elements are evaluated to comply with identified safety and security requirements during the design, construction/installation, testing, and start-up phases.
- MBTA facilities, vehicles, equipment, and systems are operationally safe and secure for customers, employees, emergency personnel, and the public before entering or re-entering after modification, revenue service, or use by MBTA personnel.
- Project Managers establish and utilize a management system to execute the SSC Program.

Key project team members have a common understanding regarding specific responsibilities and how the SSC program process is executed.

1.6 Applicability

The development and implementation of this Plan applies to all MBTA directly operated and contract activities related to:

- Heavy Rail
- Light Rail
- Bus
- Paratransit Service
- Commuter Rail
- Passenger Ferry

This Plan is intended to provide information on MBTA's Safety and Security Certification Program Plan (SSCPP).

1.7 Authority

The authority for establishing and performing SSC is derived from the following:

- 49 USC Chapter 53 Section 5327
- 49 CFR Part 633: Project Management Oversight
- FTA Circular 5800.1, Safety and Security Management Guidance for Major Capital Projects

These references require developing management plans for Major Capital Projects that document safety and security management requirements, including a safety and security verification process (i.e., safety and security certification). Additionally, 49 CFR Part 673 requires the MBTA to develop, document, and implement processes for managing change. Specifically, 49 CFR Part 673.27(c)(1) requires that the MBTA establish the following processes:

> *A process for identifying and assessing changes that may introduce new hazards or impact the transit agency's safety performance.*

Further, 49 CFR Part 673.27(2) states that:

> *If a transit agency determines that a change may impact its safety performance, then the transit agency must evaluate the proposed change through its Safety Risk Management process.*

Therefore, developing and implementing this SSCPP assists MBTA in meeting these requirements for all modes regulated by the Federal Transit Administration (FTA).

For modes governed by the Federal Railroad Administration (FRA), 49 CFR Part 270 provides the following requirements:

> *270.103 (s)(3) Each passenger rail operation shall establish and set forth a statement in its SSP plan that describes the certification process used to help ensure that safety concerns and hazards are adequately addressed before the initiation of operations or major projects to extend, rehabilitate, or modify an existing system or replace vehicles and equipment.*

Lastly, the Massachusetts Department of Public Utilities (DPU) State Safety Oversight (SSO) Program Standard requires MBTA to adhere to the following requirements:

> *151.03(2(h) A description of the safety certification process required by the Transportation Authority to ensure that safety concerns and hazards are adequately addressed prior to the initiation of major projects to extend, rehabilitate, or modify an existing system or to replace vehicles and equipment.*

1.8 Revisions

The SSCPP is reviewed by MBTA Safety at least every three years and amended or revised as required to reflect process changes. Proposed revisions are reviewed and approved by members of the Safety Management Review Committee (SMRC). [1]

1.9 References

The SSCPP presents a comprehensive approach to ensuring the safety and security of future extensions, capital improvements, and integration of new and rehabilitated facilities, vehicles, systems, and equipment. The following documents were used either in the preparation of the SSCPP or are references for related information:

Source documents:

- FTA Handbook for Transit Safety and Security Certification, November 2002 Final Report
- FTA Circular 5800.1 - Safety and Security Management Guide for Major Capital Projects - Safety and Security Management Plan (SSMP)
- 49 USC Chapter 53 Section 5327, Project Management Oversight
- 49 CFR Part 633 – Project Management Oversight
- Massachusetts DPU State Safety Oversight Program Standard

[1] Even if no changes are made after the SSCPP is reviewed, the date of the document date should be updated, and appropriate parties provide new signatures to show that a review was completed.

- § 673.25 Safety Risk Management and § 673.27 Safety Assurance, Final Rule, July 19, 2018
- MBTA Transit Safety Plan
- MBTA Railroad System Safety Program Plan
- MBTA System Security Emergency Preparedness Plan (SSEPP)
- FTA Public Transportation Security and Emergency Preparedness Planning Guide, January 2003.
- FTA Construction Project Management Handbook, February 2016
- FTA Project and Construction Management Guidelines, March 2016
- FTA Oversight Procedure 22 – Safety and Security Management Review
- 49 CFR Part 270.103 (s) Safety Assurance

2.0 Roles and Responsibilities

Implementation of the MBTA's SSCPP requires a coordinated effort with all MBTA staff. MBTA's Executive Leadership and various departments, staff, consultants, and contractors may be involved with a project requiring SSC. Therefore, it is the responsibility of project staff to become familiar with the requirements of MBTA's SMS, System Safety Program Plan (Commuter Rail only), and this SSCPP.

MBTA Safety also provides an SSC training program for Project Managers (PMs), consultants, contractors, and staff. The training includes information on the SSC program and a summary of their expected responsibilities. MBTA staff's responsibilities to ensure successful SSCPP implementation are described in this section.

Projects may have additional requirements for startup activities in addition to Safety and Security Certification. The responsibilities identified below do not amend or supersede any of those requirements (e.g., permitting, FRA's New Start Program, DPU vehicle certifications, etc.).

2.1 SSC Program Management

General Manager

The MBTA General Manager is responsible for delegating duties and responsibilities to ensure the overall SSCPP goals and objectives are achieved through coordination and integration between the MBTA, PMs, consultants, contractors, and supporting agency staff. Additionally, the General Manager is responsible for ensuring adequate resources are allocated to meet the goals and objectives of the SSC program and monitors its progress.

MBTA Safety

MBTA Safety is responsible for managing and monitoring the implementation of this SSCPP and verifying the completion of tasks that address safety and security-critical certifiable elements, sub-elements, and Certifiable Items List (CILs). Additionally, MBTA Safety will provide SSC support to the project team.

Responsibilities include, but are not limited to, the following:

- Completing the *SSC Project Assessment Form* with each MBTA PM to validate all SSC requirements based on the assigned project certification category.
- Establishing and chairing project Safety Management Working Groups (SMWG).
- Reviewing and assisting MBTA PMs in developing project-specific SSMPs (if required) and directing the development of project-specific SSCPs, Preliminary Hazard Analyses (PHAs), Threat and Vulnerability Analyses (TVA), and CILs.
- Facilitating the development of the Operational Hazard Analysis (OHA), utilizing support from the project team, SMEs, and (if necessary) the Operational Readiness Committee (ORC).
- As necessary, developing CILs and PHAs to facilitate the SSC process under unique project circumstances, such as when the project SSC process starts late in the project life cycle.
- Performing verification on all project CILs covering design, construction/installation, testing, pre-revenue service, and operational requirements.

- Reviewing verification documentation for all project CILs to ensure compliance with the identified safety and security requirements.
- Establishing Open Item Lists and hazard and vulnerability tracking logs for each assigned project to track all identified safety hazards and security vulnerabilities to resolution.
- Providing an SSCVR from the SMWG to the SMRC.
- Issuing and distributing Interim Certificates, as needed, for signature.
- Issuing and distributing Element Certificates of Conformance for signature.
- Issuing and distributing Project Certificates of Conformance for signature.

MassDOT Security and Emergency Management

MassDOT Security and Emergency Management is a shared service with the MBTA and is responsible for all the Authority's planning and infrastructure programs associated with security and emergency management. Specific to the SSC process, Security and Emergency Management will be responsible for coordinating with a project's PMs to ensure:

- Security requirements are incorporated in project contracts, designs, specifications, and operational procedures.
- Security provisions are included in the CILs for each project lifecycle phase.
- Security verification documents that support compliance with MBTA's security requirements are submitted and sufficient for certification.
- The project TVA or Security Assessment has the appropriate security risk index assigned to identified vulnerabilities or security threats based on severity and probability, consistent with this Plan.
- Leading the design, development, and execution of drills and exercises as required by the project.

The Security Assessment results are shared and appropriately addressed with the design PMs through the SMWG meetings for inclusion in the project design criteria. However, all Security Assessments performed for a project will be handled as Security Sensitive Information (SSI) following the MBTA's SSI Policy.

Project Managers, Consultants, and Contractors

All MBTA offices responsible for project planning and management of feasibility studies, design, construction/installation, testing, integration testing, and pre-revenue service phases are principally involved in the SSC process. Depending on the project’s scope, other MBTA departments may be required to participate in the SSC process.

MBTA Project Managers

All MBTA personnel leading projects, regardless of department, may manage projects subject to SSC requirements and the processes described in this SSCPP. While SSC activities will depend on the project’s scope, all MBTA PMs must be familiar with this Plan and its requirements.

The responsibilities identified below are not intended to amend or supersede any contractual requirements or process that the Project Manager, Design Consultant, or contractor must follow. When implemented correctly, the responsibilities to implement the SSC program will supplement current processes to review and verify project submittals such as calculations, drawings, and specifications.

Primary responsibilities include the following:

- Establishing direct communication with MBTA Safety.
- Completing the “Safety and Security Certification Project Assessment Form” in coordination with MBTA Safety, prior to issuance of a Request for Proposal.
- If required, develop a project-specific Safety and Security Management Plan (SSMP) within 60 Days of NTP (required for all Category 1 Projects, may be required for Category 2 projects).
- Establishing and organizing project SMWG in coordination with MBTA Safety.
- Presenting the signed Project Safety and Security Certification Assessment Form at the first project SMWG meeting for review and acceptance.
- Participating in SMWG meetings.
- Ensuring the design, construction/installation contractors designate an SSC representative for the project SMWG meetings.
- Ensuring that the recommended mitigations from the project PHAs and Security Assessments (as required) are reviewed and accepted by the SMWG and the design team to consider inclusion in the project design criteria or Basis of Design (BOD).
- Establishing and maintaining a systematic, documented, comprehensive, and verifiable project submission system.
- Providing project status reports to the SMRC when requested on design, construction or installation, testing, SSC progress status, and any unresolved safety hazards with recommended mitigations.
- Providing design, construction or installation, and testing Request for Information (RFI) and Request for Change (RFC) requests and modification submittal logs to MBTA Safety and SMWG for review.
- Ensuring MBTA and contractor Subject Matter Experts (SMEs) that review and approve submittals attend SMWG meetings as needed.
- Including MBTA Safety and SMEs with the design review process and comment resolution meetings.
- Ensuring that the MBTA Safety team and operational SMEs receive construction safety training from the contractor to conduct site visits.
- Providing support through the SMWG with the finalization and signatures of certificates.

Design Consultant

Key responsibilities for Design Consultants include:

- Supporting and participating in the Project SSC Program process outlined in this SSCPP and participation in project SMWG meetings.
- Designating an SSC representative to manage all SSC activities and requirements.
- Developing a project-specific Safety and Security Certification Plan (SSCP).
- Developing the Preliminary Hazard Analysis.
- Developing the Security Assessment if required.
- Ensuring that PHAs and Security Assessments, if required, are reviewed by the SMWG and considered for the final design.
- Developing the project’s Certifiable Items List (CIL) and ensuring the CIL is linked to the CEL, PHA, and Security Assessment.
- Developing the Design Criteria Conformance Checklist (DCCC) and ensuring it’s linked to the PHA, Security Assessment, and CIL.

- Providing Means of Verification (MOV) to MBTA Safety to ensure verification of items in the DCCC.
- Developing the baseline Construction Specification Conformance Checklist (CSCC).
- Developing the baseline Testing Verification Conformance Checklist (TVCC).
- Ensuring the DCCC is reviewed and approved by the SMWG and SMRC.
- Ensuring that if there are no project design criteria, Basis of Design (BOD), technical specifications, or Contract Data Requirement Lists (CDRLs), that mitigations identified in hazard or security analyses are utilized as the design criteria for DCCC.
- Performing Hazard Analyses as needed to support approved technical design changes for systems, subsystems, and software.

Construction, Installation, and Testing Contractors

Key responsibilities include:

- Supporting and participating in the SSC program as outlined in this SSCPP.
- Participating in SMWG meetings.
- Designating an SSC representative to manage all SSC activities and requirements.
- Ensuring that the CIL, Construction Specification Conformance Checklists (CSCC), and Testing Verification Conformance Checklists (TVCC) are completed, including the specification requirements.
- Identifying and reporting additional hazards and vulnerabilities to the SMWG.
- Updating the CIL as construction/installation and testing submittals are reviewed and approved.
- Provide adequate Means of Verification (MOV) in a timely manner to MBTA Safety to allow for appropriate verification as the project progresses.
- Performing Hazard Analysis, as needed, to support approved technical construction/ installation changes for systems, subsystems, and software.
- Providing access to the project submittal system, document management systems, and RFI/RFC logs.
- Ensuing that any changes or deviations from approved designs, specifications, manufacturer recommendations, or other criteria for construction are reviewed to assess their impacts to safety and security in coordination with the project SMWG.

2.2 MBTA Departments and SSC Support

The following section provides an overview of how departments support the overall SSC process. Specific requirements for project managers within each department listed below can be referenced in Section 2.1 of this Plan.

Engineering and Capital Division

Key responsibilities include:

- Implementing and enforcing this Program with MBTA Safety oversight.
- The procurement, management, and oversight of all design and construction projects for the MBTA, in accordance with internal processes, standards, procedures, and controls as defined in internal project manuals, contract-specific plans and specifications, and applicable codes, standards, and regulations.

- Working collaboratively with all MBTA departments, including MBTA Safety, to ensure that the Safety and Security Certification process is initiated at the onset of the project.
- Establishing a critical path to ensure that all safety-critical elements property verified prior to revenue service.
- Ensuring that all safety-critical issues are documented and resolved through the certification process.
- Ensuring that Safety and Security Certification activities and requirements are considered and included in the project budget and timeline from the beginning.
- Initiating Project Review Committees when projects are being developed to assess the effect on system safety and potential risk of injury to passengers and/or employees.
- Ensuring that MBTA Safety and other key departments/stakeholders such as Operations, System-Wide Accessibility, Engineering and Maintenance, MassDOT Security and Emergency Management, and the MBTA Transit Police Department (TPD) are incorporated into the Safety and Security Certification process.
- Developing and maintaining MBTA Design Criteria and updating it to include lessons learned from previous project experience.
- Ensure CILs conform to MBTA Design Criteria, plans and specifications, and applicable codes, standards, and regulations.
- Coordinate final Safety and Security Certification walkthroughs for acceptance of the certifiable items.
- Ensuring that documents such as the Project Manager's Manual, Construction Field Staff Manual, and the individual contracts specific to a particular project contain all appropriate language to provide a framework that outlines the specific responsibilities of all parties regarding Safety and Security Certification.
- Ensure the timely resolution of all safety-critical elements identified through the Safety and Security Certification process. If, for any reason, critical issues cannot be resolved before the completion of a project or the transfer of a facility to Operations, all outstanding items will be documented and tracked until resolution.
- Maintaining final project documents, including but not limited to as-built drawings, submittals, affidavits, permits, inspection reports, certificates, etc. These documents will be utilized as the baseline for future modifications and changes.

Vehicle Engineering

Vehicle Engineering works with MBTA Safety to ensure that the Safety and Security Certification process is initiated at the onset of the project. The Vehicle Engineering team will also ensure that a process is established to ensure that all elements of the Safety and Security Certification are addressed before the vehicles are entered into revenue service. All safety and security-critical issues identified by MBTA Safety and MassDOT Security and Emergency Management will be resolved using the certification process. As with infrastructure projects, Vehicle Engineering projects involving rolling stock will be certified using the methodologies outlined in this program plan.

Key responsibilities for Vehicle Engineering include, but are not limited to, the following:

- Implementing and enforcing this Program with MBTA Safety oversight.
- New vehicle design and procurement projects, vehicle overhaul projects, and oversight for the MBTA.
- Ensuring that, with collaboration with MBTA Safety, SSC activities and requirements are considered and included in the project budget and timeline from the beginning.

- Initiate project review meetings when vehicle programs are being developed to assess the effect on safety and the potential risk of injury to equipment, passengers, and/or employees.
- Routinely engage with MBTA Safety, key stakeholders such as Operations, System-Wide Accessibility, Engineering and Maintenance, MassDOT Security and Emergency Management, and the TPD to ensure SME involvement in the Safety and Security Certification process.
- Developing, implementing, and effectively overseeing safety management and safety engineering processes, controls, verifications, and assurances.
- Initiating the development of Certifiable Items Lists (CILs) and any other subsequent items, either internally or with the assistance of the contractor and/or Design Consultant.
- Developing and maintaining the Technical Specifications and updates to include lessons learned from previous Safety and Security Certification/project experience, as applicable, ensure CILs conform to the Technical Specifications, applicable codes, and standards and regulations.
- Coordinate final Safety and Security Certification acceptance of the certifiable elements and major sub-elements.
- Working with MBTA Safety to ensure that documents, such as the contract, contain all appropriate language to provide a framework that outlines the specific responsibilities of all parties regarding Safety and Security Certification.
- Ensuring the timely resolution of all safety-critical items identified through the Safety and Security Certification process. If, for any reason, critical issues cannot be resolved prior to the completion of a project or the transfer of a vehicle to Operations, all outstanding items will be documented and tracked until resolution.
- Compiling final project documents, including but not limited to as-built drawings, submittals, affidavits, acceptance reports (such as First Article Inspection reports) and certificates, etc. These documents will be utilized as the baseline of future modifications and changes as part of the Configuration Control and Management program.

Transit Oriented Development (TOD)

MBTA Transit Oriented Development (TOD) is responsible for reviewing development projects that impact the MBTA's operations or infrastructure. As such, certification of TOD projects presents unique challenges to the MBTA. In many circumstances, the MBTA does not have direct control of a TOD project and is constrained in implementing the safety and security certification process. However, TOD has responsibility for implementing the Safety and Security Certification process when a project is identified as having a potential safety or security implication to the MBTA in collaboration with MBTA Safety. The goal is therefore to identify and control safety and security risks introduced into the MBTA's system. Due to the challenges associated with TOD activities, not all projects will undergo certification. Only those that become known to the MBTA will be assessed to determine if certification is required.
Key responsibilities for TOD, include, but are not limited to:

- Implementing and enforcing this Program with MBTA Safety oversight when a project is identified as impacting the MBTA.
- Ensuring that, with collaboration with MBTA Safety, SSC activities and requirements are considered and included in the project budget and timeline from the beginning.
- Ensure the timely resolution of all safety-critical elements affecting the MBTA identified through the Safety and Security Certification process. If, for any reason, critical issues

cannot be resolved before the completion of a project or the transfer of a facility to Operations, all outstanding items will be documented and tracked until resolution.
- Initiating Project Review Committees when projects are being developed to assess the effect on system safety and potential risk of injury to passengers and/or employees.
- Working with MBTA Safety to ensure that documents, such as the contract, contain all appropriate language to provide a framework that outlines the specific responsibilities of all parties regarding Safety and Security Certification.
- Coordinating final Safety and Security Certification acceptance of the certifiable elements and major sub-elements.
- Developing, implementing, and effectively overseeing safety management and safety engineering processes, controls, verifications, and assurances.
- Routinely engage with MBTA Safety, key stakeholders such as Operations, System-Wide Accessibility, Engineering and Maintenance, MassDOT Security and Emergency Management, and TPD to ensure SME involvement in the Safety and Security Certification process.

MBTA Operations (Vehicle Maintenance, E&M, Transportation, Railroad Operations)

MBTA Transportation, Vehicle Maintenance, Engineering and Maintenance (E&M), and Railroad Operations all play an integral role in the Safety and Security Certification process. While these departments are generally not directly responsible for the implementation of Safety and Security Certification, they still hold critical responsibilities to the program's success. MBTA Operations personnel are subject matter experts who provide crucial insight, assisting the project team with performing Safety and Security Certification activities.

Key roles and responsibilities include, but are not limited to, the following:

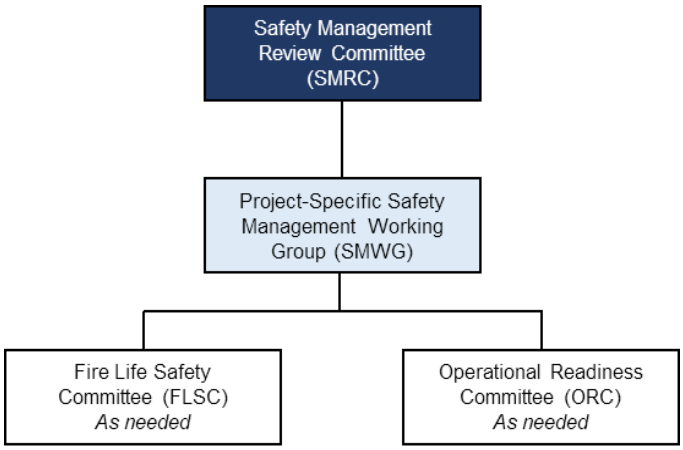
- Participating in this Plan with MBTA Safety oversight.
- Participating in the certification process of new projects, facilities, infrastructure, and equipment.
- The project manager will act as a liaison with MBTA Operations to ensure tasks are being completed and appropriate documentation is in place and reviewed to verify compliance with the Safety and Security Certification.
- Participating, as required, on Safety and Security Certification committees, including the Safety Management Working Group, Operational Readiness Committee, and Fire-Life Safety Committee.
- Participating in Safety and Security Certification Activities such as Pre-Revenue Operational Readiness, Training Emergency Management/Preparedness, and Rule Procedures, etc.
- Reviewing Verification Checklists and accepting safety mitigations.

In some cases, MBTA Operations may be responsible for implementing projects such as major operational changes or equipment procurement. In these cases, MBTA Operations will be responsible for ensuring that the requirements established in this program plan are implemented into the project.

2.3 Safety and Security Certification Committees

MBTA has established a committee structure to oversee Safety and Security Certification activities. The Safety Management Review Committee (SMRC) oversees all SSC activities and provides ultimate authority for approval of the SSC for each project. A project-specific Safety Management Working Group (SMWG) provides direct support and initial review and approval of all SSC activities, and reports certification efforts to the SMRC. Additional committees, such as the Fire Life Safety Committee (FLSC) and the Operational Readiness Committee (ORC) may be activated if determined to be necessary by MBTA Safety and the MBTA PM during the SSC Project Assessment; these committees provide support in specific areas and report their activities to the project SMWG. The committee structure is shown below.

Figure 2: SSC Committee Structure



Safety Management Review Committee (SMRC)

The Safety Management Review Committee (SMRC) is responsible for overseeing the implementation of the SSCPP and for ensuring that certifiable levels of operational safety and security items (i.e., system, subsystem, and programs) are completed and verified before the start of new revenue service or the placement of rehabilitated facilities and systems into service/use.

SMRC membership, as detailed by the MBTA's Transit Safety Plan, is comprised of MBTA executive leadership, and facilitated by the Chief Safety Officer.

Key responsibilities of the SMRC include:

- Reviewing and approving this SSCPP.
- Reviewing and approving project-specific Safety and Security Certification Plans (SSCPs) to ensure they meet project safety and security requirements.
- Ensuring the safety and security certification process begins in the planning and design phases and continues through the testing and start-up phases of the project (as applicable).
- Ensuring that each project's hazard analyses, and risk assessments are consistent with MBTA's Safety Risk Management (SRM) processes.

- Ensuring identified hazards and safety and security risks are documented, tracked, and appropriately eliminated or controlled to acceptable levels consistent with MBTA's SRM and Risk-Based Safety Analysis processes.
- Ensuring CILs are prepared, approved, and completed as necessary.
- Resolving verification documentation discrepancies and incompleteness (evidence of compliance with safety and security requirements).
- Approving mitigation/control measures for open issues based on project staff, consultant/contractor, SMWG, and MBTA Safety recommendations.
- Assigning responsibilities for implementing mitigation/control measures for the open issue(s).
- Defining additional safety/security-related tests and analyses, as required.
- Based on recommendations, determine whether to accept the existence of specific conditions or require corrective actions, including the specific methods to mitigate and control the conditions.
- Evaluating proposed hazard/threat resolution methodologies and evidence of safety/security requirements compliance.
- Reviewing and approving the developed PHA.
- Reviewing and approving the developed Security Assessment.
- Reviewing and approving the developed Certifiable Items List (CIL).
- Reviewing and approving the developed Operational Hazard Analysis (OHA).
- Approving the SSCVR for each project.

Safety Management Working Group

The SMWG reports to the SMRC and is responsible for managing all SSC requirements for a project. At a minimum, each SMWG is led by MBTA Safety in coordination with the MBTA PM. The Design Consultant and the Construction/Installation and Testing PMs are also involved in each SMWG session.

After completing the SSC Project Assessment Form, MBTA Safety and the PM will determine the appropriate SMWG membership for the project. Primary membership includes, at a minimum, the following:

- A representative from MBTA Safety
- MBTA Project Manager
- Representatives from each MBTA department or group determined to be primary stakeholders in the project will also be included in the SMWG as needed to support verification.

All members of the SMWG will have approval authority of certification checklists and plans.

Additionally, representatives from the Design Consultant and Construction, Installation, and/or Testing Contractor may be required to participate in the SMWG. However, these participants will not have approval authority of certification documents.

Since the SMWG members are responsible for providing approval for SSC documentation as well as determining mitigations for identified hazards and threats, SMWG members should be at least at a director level of management. Responsibilities may be delegated to lower-level management or employees so long as the designee has the same decision-making capability as the Director.

MBTA Safety may choose to approve or reject the alternate individuals. Alternates must be documented in the SMWG meeting minutes regardless of if they are temporary or permanent.

Key responsibilities of the SMWG include:

- Reporting directly to and processing all related SSC documents that need SMRC approval.
- Reviewing the MBTA and contractor PM's SSC requirements and responsibilities (i.e., SSMP, SSCP, CILs, PHAs, and TVA).
- Identifying specific MOV for verification purposes for the CILs and design, construction, installation, and testing submittals.
- Validating the safety and security certification documents before submitting to the SMRC for review/approval.
- Reviewing and addressing open items on the CILs as needed and any new safety hazards or security risks on the hazard tracking logs (PHA/OHAs/Security Assessment).
- Updating project schedules based on SSC activities.
- Planning for Interim Certifications, COCs, SSCVR documents.

Fire Life Safety Committee (FLSC)

The Fire Life Safety and Security Committee (FLSC) is a subordinate committee to the SMWG and serves as a liaison between the MBTA, police, fire, EMS, and other emergency response agencies. This committee is activated as needed as the project is developed and designed. The FLSC may be comprised of representatives from:

- Local and state fire and police jurisdictions
- Other local emergency response agencies
- MBTA Operations
- MBTA Safety, including the Fire Life Safety Lead
- MassDOT Security and Emergency Management
- Selected MBTA management, as required by the project

Additionally, representatives from the Design Consultant and Construction, Installation, and/or Testing Contractor may be required to participate in the FLSC. However, these participants will not have approval authority of certification documents. Key responsibilities include:

- Reviewing project designs, construction/installation, and testing specifications to ensure compliance with fire life safety codes, standards, and regulations.
- Reviewing all fire life safety-related hazards in the project PHAs and any new related hazards, ensuring adequate mitigations are addressed.
- Providing the emergency responders project overviews and updates during design, construction/installation, and testing phases. These project updates include addressing the emergency responder issues related to the project.
- Reviewing all issues on the “Open Items List” relating to fire life safety and security.
- Coordinating all emergency responder training and exercise planning requirements to include:
    - Training plans and materials
    - Drills and Exercises
    - After-Action Reports (AARs)
    - An FLSC schedule showing all planned training events and exercises

- Ensuring that all FLSC-related operational requirements on the Operational Readiness Checklist (ORC) can be verified with proper documentation on hand for verification purposes such as:
  - Training Material and Sign-In Sheets
  - Drills and Exercise Evaluations
  - After-Action Reports (AARs)
- Providing updates to the SMWG as needed.

Operational Readiness Committee

The Operational Readiness Committee (ORC) is a subordinate committee to the SMWG. The committee is activated as needed as the project is developed and designed. The ORC membership may be comprised of representatives from:

- MBTA Operations and Maintenance groups (mode specific)
- MBTA Safety
- MassDOT Security and Emergency Management, as necessary
- Additional MBTA management, as required by the project.

Additionally, representatives from the Design Consultant and Construction, Installation, and/or Testing Contractor may be required to participate in the ORC. However, these participants will not have approval authority of certification documents.

Key responsibilities include:

- Planning and coordinating operational training.
- Simulating revenue service conditions.
- Simulating extreme or unusual operational conditions (e.g. “stress testing”).
- Developing pre-revenue plans, rules, and procedures for revenue service.
- Reviewing proposed rules, plans, procedures, and manuals.
- Providing updates to the SMWG as necessary.
- Ensuring adequate staffing is available to support operations.

For certain projects, MBTA will establish a Rail Activation Committee to prepare for operational readiness. Depending on the scope of the project, the PM may decide whether a Rail Activation Committee may perform the functions of the ORC or if a separate ORC is established. For commuter rail projects, the ORC will also manage the required completion of the New Starts Program, as required by the FRA.

3.0 Safety and Security Certification Process

Determination that a new or existing project requires Certification is determined through several internal and external benchmarks as follows:

- Collaboration with PMs to identify those projects that are safety and security critical within a set of selection criteria developed by MBTA Safety
- FTA funded Major Capital Projects (MCP) where 49 CFR Part 633 and FTA Circular 5800.1, "Safety and Security Management Guidance," apply.
- As directed by the Massachusetts DPU
- As directed by MBTA Safety or MassDOT Security and Emergency Management
- As directed by the MBTA Safety Management Review Committee (SMRC)

Before starting the SSC process, the project is assessed by MBTA Safety with the support of the MBTA PM. The results from that evaluation will be documented on the Safety and Security Certification Project Assessment Form (refer to Appendix A).

Requests to assess a project can be sent to MBTA Safety using the following email:

SafetyandSecurityCertification@MBTA.com

Unless otherwise directed by the SMRC, DPU, FTA, or FRA, a project will be considered to require Safety and Security Certification if the project meets any of the following criteria:

- Total cost meets or exceeds $100 million
- New, changed, or rehabilitated public access areas or revenue vehicles
- New, changed, or rehabilitated infrastructure directly supporting revenue service
- New or changed equipment providing a safety-critical function; or
- Significant operational change

Rehabilitation, for the purpose this Plan, is defined as a comprehensive process used to restore existing systems or assets to near original or new condition where maintenance is no longer feasible in preserving the State of Good Repair (e.g., station or facility renovations, vehicle overhauls, major track replacements, etc.).

Conversely, maintenance projects will not require certification. To determine whether a project is considered a rehabilitation or maintenance, maintenance can be defined as:

> *Regularly scheduled or anticipated work used to restore, inspect, clean, repair, or replace conditions to a State of Good Repair from damage or general wear (e.g., tamping, roof replacements, rail grinding).*

Like-in-kind replacement of any kind requires assessment to determine if existing systems are considered code or standard compliant.

Once Certification is confirmed, projects will be separated into two separate categories. Generally, projects larger in scope or greater in complexity will be designated as Category 1 projects and will have more stringent requirements. Projects smaller in scope or less complex will be designated as Category 2. Additional information on each category is included below. Contract language is provided in Appendix M that should be included in any procurement or project involving Safety and Security Certification.

Figure 3: Project Safety and Security Certification Evaluation Criteria

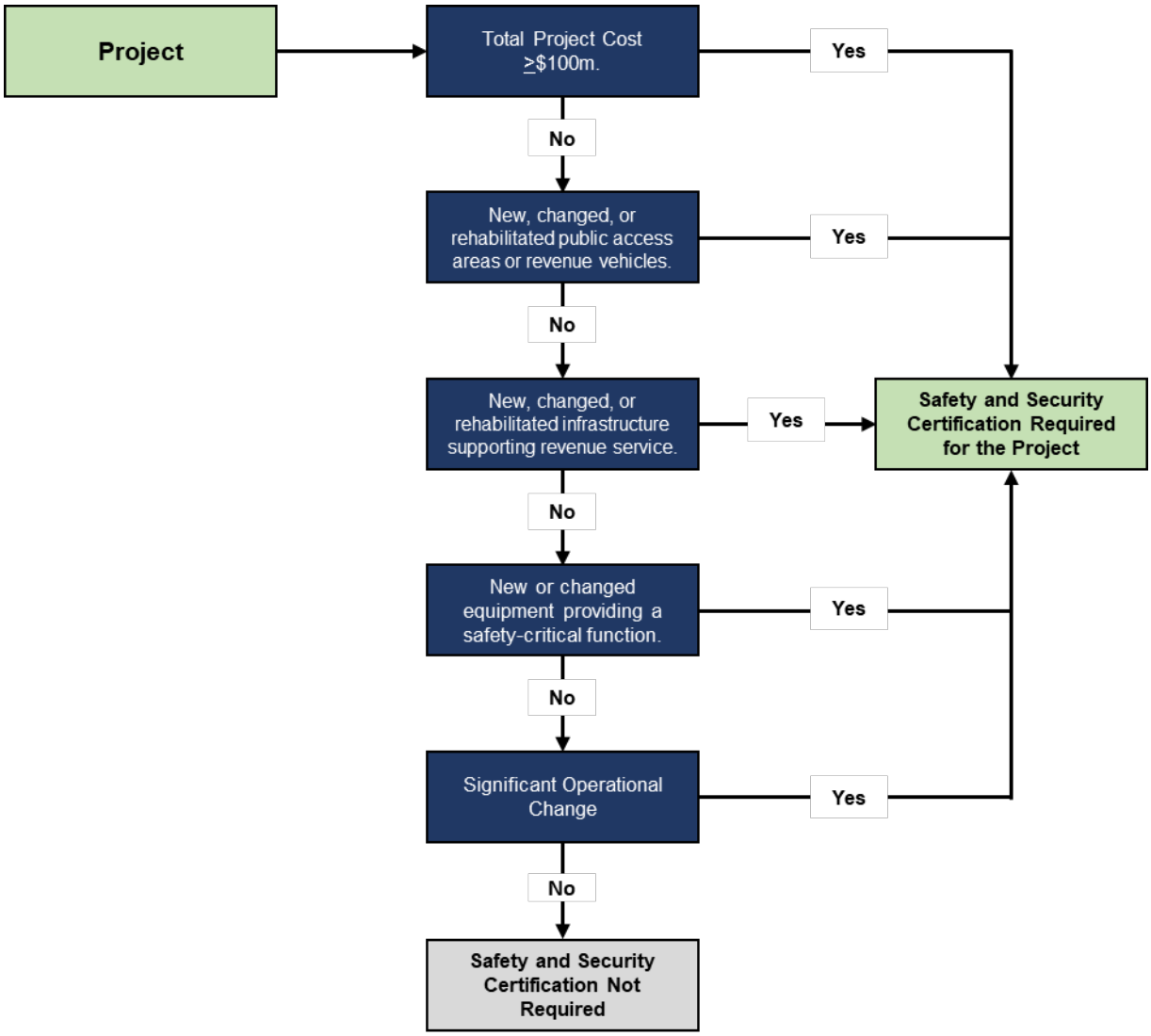


Figure 3 serves as a guide to determine if a project requires Safety and Security Certification. Projects are evaluated jointly by MBTA Safety and the Project Manager and require concurrence with MassDOT Security and Emergency Management. Even when projects do not meet the requirements outlined above, projects may still require Safety and Security Certification if determined necessary by the SMRC, MBTA Safety, MassDOT S&EM, FRA, FTA, or DPU.

3.1 Category 1 Certification

Once it has been determined that a project requires safety and security certification, then the project will be categorized into one of two categories. Projects meeting the following criteria will be designated as Category 1 projects: [2]

1. Involves the construction, expansion, rehabilitation, or modernization of a fixed guideway that:
    - Has a total project cost of $300 million dollars or more and receives Federal funds of $100 million dollars or more; and
    - Is not exclusively for the acquisition, maintenance, or rehabilitation of vehicles or other rolling stock; or
2. Required by the FTA or MBTA Safety due to any of the following project characteristics:
    - Involves a new technology; or
    - Is a unique project for the MBTA

It's important to note that a project should be classified as Category 1 if it meets any of the above criteria at any stage in the project, not only when the SSC Project Assessment Form is completed. If the scope or funding of the project changes during the lifecycle of the project such that any of the above criteria are met, the project will be certified as a Category 1 project. Therefore, when the SSC Project Assessment Form is completed, any expected or reasonably likely increases in scope or funding should be considered.

Requirements for Category 1 Projects

Category 1 projects will generally be of greater scope and complexity; therefore, these projects must follow all processes outlined within this program. Each project must have a project-specific Safety and Security Management Plan (SSMP) and Safety and Security Certification Plan (SSCP); additional details and requirements for these are contained in Section 4. The required SSC activities for each project must be documented on the SSC Project Assessment Form, which is completed jointly by MBTA Safety and the project PM.

3.2 Category 2 Certification

Projects determined to require safety and security certification, but which do not meet any of the criteria for Category 1 will be categorized as Category 2.

Requirements for Category 2 Projects

Category 2 projects will generally be smaller in scope and of less complexity than Category 1 projects. As such, it may not be necessary to perform all SSC activities outlined within this Plan and the process can be tailored to fit the individual project's needs. MBTA Safety will review the project and identify which SSC activities will be required based on the project's scope, complexity, and potential impacts to safety and security. The required SSC activities for each project must be documented on the SSC PAF, which is completed jointly by MBTA Safety and the PM.

[2] The criteria for Category 1 projects are based largely on the requirements contained in 49 CFR § 633. Category 1 requirements should be reviewed for revision anytime 49 CFR § 633 is updated or changed.

Additional Considerations for Category 2 Projects

Procurement of "Off-the-Shelf" Products

When procuring off-the-shelf products, items with adequate documentation to demonstrate acceptable levels of safety may not require design, construction, or testing verification. Instead, the certification of these products will ensure the integration into the system.

Emergency Work

Emergency work may be required to mitigate Unacceptable or Undesirable hazards. Certification should not prevent the timely implementation of a necessary mitigation; however, it may be required to ensure the mitigation remains in revenue service.

Certification of Existing Projects

SSC might not be initiated at the beginning or early stages of a project. In these cases, certification activities may begin at the current project phase. For example, for a project that begins certification activities at the construction phase, it may be impractical to develop design criteria. The project may instead choose to begin certification at Construction Verification and utilize the existing design criteria.

3.3 Safety and Security Certification 10-Step Process

The SSC process begins at the project's inception and continues into the start of revenue service. The SSC process must be completed, and all hazards and safety risks associated with the use of new or rehabilitated systems, facilities, or vehicles are effectively mitigated or accepted in accordance with the established risk management processes before entering into service.

The following process will be followed for all Category 1 projects; Category 2 projects may not necessitate the implementation of all ten steps.

Step 1 Identify Certifiable Elements
Step 2 Develop Safety and Security Design Criteria
Step 3 Develop and Complete Design Criteria Conformance Checklist
Step 4 Perform Construction Specification Conformance
Step 5 Identify Additional Safety and Security Test Requirements
Step 6 Perform Testing and Validation in Support of the SSC Program
Step 7 Manage Integrated Tests for the SSC Program
Step 8 Manage "Open Items"
Step 9 Verify Operational Readiness
Step 10 Conduct Final Determination of Project Readiness and Issue Safety and Security Certification

Table 2: Safety and Security Certification and Project Timelines

<table>
<tr><th rowspan="2">Conception & Planning</th><th colspan="5">Functional Period of Certification (Products & Activities)</th><th rowspan="2">Commissioning & Start of Service</th></tr>
<tr><th>Preliminary Engineering</th><th>Final Design</th><th>Construction</th><th>Testing</th><th>Pre-Rev Operations</th></tr>
<tr><td>20+ Years</td><td>1-2 Years</td><td>1-2 Years</td><td>2-3 Years</td><td>1 Year</td><td>< 1 Year</td><td>As Needed</td></tr>
<tr><td>SSC Language in Contract RFP Bid Documents</td><td colspan="5">1. Establish and Execute a Safety and Security Certification Management Approach
● Assign SSC responsibilities, including requirements per bid documents.
● Write the project SSMP (if applicable) and SSCP.
● Establish Safety Committees as necessary (SMWG, ORC, and FLSC).
● SSC Training for the Project Team.
● Integrate the certification schedule with the Project Master Schedule.
● Provide status reports as needed</td><td rowspan="3">5. Complete Certification
Safety and Security Certification activities continue until all open hazards and vulnerabilities are resolved to an acceptable level.</td></tr>
<tr><td></td><td colspan="5">2. Develop SSC Design Criteria and Establish the Scope of Certification Program
● <u>Step 1</u>: Identify Certifiable Elements
● <u>Step 2</u>: Develop Safety and Security Design Criteria
○ Hazard Analyses – PHA and Security Assessment
● <u>Step 3</u>: Develop and Complete Design Criteria Conformance Checklists
● Conduct Design Reviews and Monitor the Design Change Order Process
● Conduct Engineering Studies
● Create Certification Database</td></tr>
<tr><td></td><td colspan="3"></td><td colspan="2">3. Track and Verify SSC Program Requirements
● <u>Step 4</u>: Perform Construction Specification Conformance
● Monitor Construction Change Order Process
● <u>Steps 5, 6, 7</u>: Identify & Monitor All Test Programs</td></tr>
<tr><td></td><td colspan="4"></td><td colspan="2">4. Prepare Safety & Security Certification Verification Reports
● <u>Step 8</u>: Manage “Open Items”
● <u>Step 9</u>: Verify Operational Readiness
● <u>Step 10</u>: Final Determination of Project Readiness and Issue Project COCs & SSCVR</td></tr>
</table>

Step 1: Identify Certifiable Elements

The certification process begins with identifying individual project elements critical to the safety and security of MBTA customers, employees, emergency responders, and the general public; these are referred to as Certifiable Elements. The Certifiable Elements are derived from the contract scope of work, design criteria, technical specifications, or Contract Data Requirement List (CDRL). These certifiable elements may fall within four major categories, but can vary based on the project:

1. Facilities/Equipment
2. Systems
3. Testing
4. Operational Requirements

Table 3: Sample Certifiable Elements

Facilities/Equipment	Systems
Vehicles	Communications
• Car body • Coupler • Doors, Door Operations, and Controls • Trucks and Suspension • Propulsion • Braking • Operator's Cab and Controls • Communication Equipment • Mobility Lift • Lighting • HVAC • Fire/Flammability/Smoke Emissions	• Radio System • Operations Control Center • SCADA • Fire Department Communications • Security Communications • Fire Systems • Public Address System
Stations / Parking Lots	Signals
• Platforms • ADA Provisions • Elevators and Escalators • Illumination • Electrical Grounding • Catch Basins and Drainage	• Interlocking Circuits/Equipment • Mainline Controls and Indications • Grade Crossing Warning Devices • Yard/Mainline Interface • Track Signals • LRT Signals • Signal Indications • Train Protection
Track and Structure	Traction Power Systems
• Right of Way • Track • Aerial • At-Grade • Underground • Barriers and Warnings	• Enclosures • High Voltage Switch Gear • AC to DC Conversion • DC Switch Gear • Batteries and Accessories • Catenary • Stray Current Protection • Third rail
Testing	**Operational Requirements**
• Acceptance Tests • Integration Tests • Pre-Revenue Tests • Factory Acceptance Tests • Functional Tests • Performance Tests	• Standard Operating Procedures (SOPs) • Emergency Operating Procedures (EOPs) • Manuals and Rulebooks • Training and Certification (if applicable) • Local Responder Training • Emergency Preparedness

Certifiable Elements List

A Certifiable Elements Listing (CEL) and sub-element listings are created, becoming the SSC scope of work, and outlining all the significant certification areas. The items that make up the whole of the certifiable elements and sub-elements that require safety and security verification before the element is considered safe and secure for use are compiled into the Certifiable Items List (CIL). Specific certifiable items on the list are dependent on the project. The safety and security requirements are listed for each of the certifiable items. The CIL and corresponding safety and security requirements are developed by utilizing project design criteria, BOD, technical specifications, CDRLS, PHAs, and TVA results.

The CEL will be developed through the following tasks:

1. The MBTA PM, with the assistance and guidance of MBTA Safety, identifies the project's Certifiable Elements. This should be done by evaluating the project scope of work, feasibility studies, initial design, or technical specifications. Sample CEL is provided below on the following page.
2. The SMWG reviews and validates SSC requirements on the SSC Project Assessment Form and confirms responsibility for the project CEL.
3. Design Consultant (DC), with the assistance of MBTA Safety, develops a detailed CEL with sub-elements.

Preliminary Hazard Analysis

A Preliminary Hazard Analysis (PHA) is developed early in the project lifecycle so identified hazards that need to be mitigated, controlled, or eliminated through design. The PHA is developed utilizing the identified Certifiable Elements and Sub-Elements, which determine the primary functional areas and scope of the project. Mitigations and controls developed through the PHA become Certifiable Items which must be implemented and verified to achieve certification of the project. Although the PHA is developed early in the project life cycle, the PHA should be updated and revised as new hazards are identified as the project progresses or changes. Consequently, any additional mitigations or controls identified become new Certifiable Items.

The identification, mitigation, and resolution of hazards should be conducted in accordance with established risk management processes. For all non-Commuter Rail projects, the PHA will be completed following the SRM processes defined in the *MBTA Transit Safety Plan*. For all Commuter Rail projects, the Risked-Based Hazard Management process will be utilized following the *MassDOT/MBTA Railroad System Safety Program Plan.*

The PHA is developed through the following tasks:

1. The Design Consultant, with the assistance of MBTA Safety, the SMWG, and MBTA SMEs, develops the PHA.
2. The SMWG reviews and approves the PHA.
3. The SMRC reviews and approves the PHA.

Security Assessments

A security Assessment is completed early in the project lifecycle so identified vulnerabilities and security risks can be mitigated, controlled, or eliminated through design. The Security Assessment is developed utilizing the identified Certifiable Elements and Sub-Elements, which determine the primary functional areas and scope of the project. Mitigations and controls developed through the Security Assessment process become certifiable items which must be implemented and verified to achieve certification of the project. Although the Security Assessment is developed early in the project life cycle, the Security Assessment should be updated and revised as new security risks are identified as the project progresses or changes. Consequently, any additional mitigations or controls identified become new certifiable items.

The Security Assessment is developed through the following tasks:

1. Design Consultant, with the assistance of MassDOT Security and Emergency Management, SMWG, and MBTA SMEs, develops the Security Assessment.
2. The SMWG reviews and approves the Security Assessment.
3. The SMRC reviews and approves the Security Assessment.

Certifiable Items List

Certifiable Items are individual components of each Certifiable Element for the project. Certifiable Items are identified through any number of processes including a systems evaluation of the Certifiable Element and by assessing mitigations in each risk assessment. Certifiable Items are then documented individually on a Certifiable Items List (CIL).

The CIL is the primary tool used to manage the certification process throughout the project's life cycle. The list ensures that the criteria and relevant codes are incorporated into each project phase's conformance checklist. This approach enables a single database that assures the continuity link of safety and security requirements as the project moves from the design phase to the specification, construction/installation, testing, and start-up phases.

CIL's general format is broken down into the following components of information:

- Project Information
- Item Number
- Certifiable Element
- Certifiable Sub-Element
- Certifiable Item
- Certifiable Sub-Item
- Safety Hazard Number (Referenced from PHA)
- Security Risk Number (Referenced from TVA)
- Design Criteria or Specification
- Source/Standard
- Description of Requirement
- Design Verification
    - Designer of Record PM Initials and Date
    - Means of Verification (MOV)
    - MBTA Safety Verification with Initials and Date
- Construction Verification

  - Construction/Installation Contractor Initials with Date
  - Means of Verification (MOV)
  - MBTA Safety Verification with Initials and Date
- Testing and Pre-Revenue Verification
  - Testing PM Initials and Date
  - Means of Verification (MOV)
  - MBTA Safety Verification with Initials and Date
- Revision History
- Notes and Restrictions

The CIL is developed through the following tasks:

1. Design Consultant, with the assistance of MBTA Safety and SMWG, develops the CIL.
2. The SMWG reviews and approves the CIL.
3. The SMRC reviews and approves the CIL.

Table 4: Step 1 Anticipated Outputs

Anticipated Outputs
1) Certifiable Elements List (CEL) 2) Preliminary Hazard Analysis (PHA) 3) Security Assessment 4) Certifiable Items List (CIL)

Step 2: Develop Safety and Security Design Criteria

Once the CIL has been developed, guidelines and controls are needed to guide project designs to ensure that safety and security are addressed in each element and item's design. These guidelines and controls form the specific design criteria used to steer project design. Safety and security requirements are identified, and design criteria are developed during the Preliminary Engineering phase of each project requiring SSC.

Safety and security design criteria are generated from many different sources as follows:

- Existing MBTA Design Criteria for maintaining and continued operating facilities and systems, technical specifications, project Basis of Design (BOD), or CDRLS developed for similar MBTA projects.
- Applicable Federal, State, and local safety codes, regulations, ordinances, and standards, including building codes, industry standards, and best practices.
    - Existing federal, state, local, and industry codes, regulations, ordinances, standards, and best practices are reviewed to identify criteria that adequately address hazard mitigation.
    - The latest edition of applicable codes, regulations, ordinances, and standards and the design initiated will be applied and followed when the NTP is given.
    - If a new edition or amendment to a code, ordinance, regulation, or standard is issued before the design is complete, the PM will determine if the latest edition or amendment will be applied.
- Lessons learned from previous projects or operations.
- Hazard mitigations and controls identified through the PHA or Security Assessments are the minimum requirements that must be implemented (e.g., certifiable items).

Safety and security design criteria must be developed for all projects that cannot be completed using existing MBTA design criteria. Design criteria must also be developed to address hazard mitigation(s) if criteria do not already exist or cannot be identified.

The MBTA PM should conduct a design criteria assessment and determine whether the project can be designed and constructed with available design criteria from existing MBTA design criteria, the project basis of design, and technical specifications.

During the Preliminary Engineering phase, the design consultant will develop the project's PHA and Security Assessment. If there are no existing design criteria, the recommended mitigations for the PHA and Security Assessment are utilized as the base safety and security design criteria.

Operational Hazard Analysis

An Operational Hazard Analysis (OHA) is used to identify, document, analyze, and mitigate operational hazards caused by operating and support (i.e., maintenance) personnel. This process includes hazards to which operational and support personnel can be exposed once the system or project is placed into service.

MBTA Safety and the MBTA PM determine if OHAs are needed based on project size and scope or if the PHA has Unacceptable or Undesirable hazards after the design phase.[3] OHAs are performed in preparation for operational readiness. Human factors are evaluated as operating, and support personnel are considered elements of the total system, receiving inputs and initiating outputs. The OHA entails an analytical review of a task's controlling documents and procedures to ensure hazard elimination or control, concentrating on human performance with respect to the hazards within the task. This process includes an analysis of procedures for the following:

- Operations
- Inspection and Maintenance
- Calibration
- Assembly, Installation, and Testing
- Handling and Removal
- Transportation
- Emergency Escape and Egress
- Storage
- Training
- Rescue
- Disposal
- Other operating and support activities

The Operational Hazard Analysis (OHA) is utilized to identify and mitigate, control, or eliminate identified operational hazards which will be present once the project enters service. The OHA is performance by analyzing the tasks required to operate the system. Mitigations and controls developed through the OHA become certifiable items which must be implemented and verified to achieve certification of the project.

The identification, mitigation, and resolution of hazards should be conducted in accordance with established MBTA risk-based management processes and requirements. For all non-commuter rail projects, risk-based management should be conducted in accordance with the Safety Risk Management processes defined in the *MBTA Transit Safety Plan* (see Section 5.1 for additional information). For all projects primarily involving the MBTA Commuter Rail the Risk-Based Hazard Management process will be performed in accordance with the processes and requirements defined in the *MassDOT/MBTA Railroad System Safety Program Plan* (see Section 5.2 for additional information).

The OHA is developed through the following tasks:

1. Design Consultant, with the assistance of MBTA Safety, SMWG, ORC (if established based on project characteristics), and MBTA SMEs, develops the OHA.
2. The SMWG reviews and approves the OHA.
3. The SMRC reviews and approves the OHA.

[3] The Safety and Security Certification Project Assessment Form may need to be updated if it is determined later in the project that an OHA is required.

Hazard Tracking Log

Following the completion of the PHA, Security Assessment, and OHA (if completed), all risks will be transferred to the Hazard Tracking Log (HTL) in the MBTA Certification Workbook. As the project and Safety and Security Certification activities progress, the HTL will be utilized as the central repository for maintaining and updating safety and security risks identified, managed, and tracked throughout the project lifecycle to the completion of certification. The HTL shall also be updated to include additional hazard analyses, if conducted by the project team.

Additional Hazard Analyses

The project team may identify additional types of hazard analyses to be performed, due to the scope or complexity of the project. These hazard analyses may be identified at the beginning of the project or may be identified midway through the project lifecycle. Common types of hazard analyses include, but are not limited to:

- Fault Tree Analysis (FTA)
- System Hazard Analysis (SHA)
- Sub-System Hazard Analysis (SSHA)
- Failure Modes and Effects Analysis (FMEA)
- Job Hazard Analysis (JHA)

As additional hazard analyses are performed, the Hazard Tracking Log shall be updated to include the results.

Table 5: Step 2 Anticipated Outputs

Anticipated Outputs
1) Safety and Security Design Criteria 2) Baseline Operational Hazard Analysis (OHA) 3) Updated Hazard Tracking Log

Step 3: Develop and Complete the Design Criteria Conformance Checklist

The Design Criteria Conformance Checklist (DCCC) is used to verify that safety and security design criteria are incorporated into the design. Once the CIL and appropriate design criteria have been developed, the DCCC is used to document and verify that the project design incorporates the required design criteria to address safety and security risks, threats, and vulnerabilities.

The DCCC and design verification process is intended to:

- Ensure that the project design contains safety and security-related requirements.
- Safety and security design comments were addressed and successfully resolved.

Design criteria are often verified through the design review process. Designs and submittals are reviewed to confirm that safety and security design criteria have been included. During the review process, the SMWG may recommend that:

- Items that are not certifiable be removed from the CIL.
- Items that are not related to safety or security be removed from the CIL.
- Requirements critical to safety or security are incorporated.
- Information to clarify the specific requirement or reference for an item be included.
- Accepted industry best practices are incorporated.

It's not uncommon for design changes to occur as the project proceeds. Such changes are analyzed for their impact on safety and security before being implemented. Engineering change orders, construction/installation and testing deviation requests, and other forms and procedures may be used to document these changes. In each instance, the proposed change must be reviewed by the project team, SMEs, and the project SMWG to ensure the proposed change can be implemented without compromising safety or security and will not diminish performance requirements and operational capabilities. Hazard analyses and additional security assessments may be required to fully evaluate the proposed change. The results of these activities must be incorporated into the CIL and existing project hazard tracking logs and tracked through completion.

The design team members must identify MOV for the DCCC to show that the project design conforms with each design criterion listed on the CIL. Additionally, the Design Consultant must sign off on the DCCC that verification has been provided. Depending on the nature and scope of the project, design verification may also be reviewed by the MBTA Safety and MassDOT Security and Emergency Management.

The DCCC is developed through the following steps:

1. The Design Consultant develops the DCCC.
2. The SMWG reviews and approves the baseline DCCC.
3. The Design Consultant provides MOV within the baseline DCCC and signs off when they believe the criteria is met.
4. MBTA Safety provides 3rd party verification that design criteria is met by reviewing the MOV and signing off if in agreement with the Design Consultant.
5. SMWG monitors DCCC verification efforts and progress through regular SMWG meetings.
6. Once designs for all Certifiable Items are verified by MBTA Safety, the SMWG will approve the design verification process.

Table 6: Step 3 Anticipated Outputs

Anticipated Outputs
1) Design Criteria Conformance Checklist 2) Updated Hazard Tracking Log

Step 4: Perform Construction Verification Checklists

The Construction Specification Conformance Checklist (CSCC) is used to verify that construction and installation conforms to the verified design criteria. The CSCC is developed utilizing the project's specification for construction or installation. Specification compliance is performed to verify that safety and security-related specifications and contract document requirements are satisfied during construction and installation.

As the construction and installation phase begins, the MBTA PM, in coordination with MBTA Safety ensures that the Design Consultant develops the baseline CSCC and updates the CIL. There may be occasions where the contractor is required to modify the CSCC if specifications are added or changed.

As construction specification verification is completed for each Certifiable Item, project staff submit verification documentation to MBTA Safety, which may include:

- Construction/installation and testing submittals for material certifications
- QC Inspection Reports
- Mill Certificates
- Concrete Mix Design and Concrete Strength Reports
- Fire Alarm Design
- Fire Suppression Systems
- Visual Verification Reports and Photos
- Test Plans, Test Procedures, and Test Reports
- Witnessing Safety/Security-Critical Tests
- As-Built Drawings
- Operations and Maintenance (O&M) Manuals
- Training Plans and Training Records

The Contractor is responsible for providing verification that construction specifications identified on the CSCC have been met. If engineering changes are identified that impact safety or security, the Contractor will be required to update the baseline CSCC.

As certification activities advance, MBTA Safety monitors progress on the CSCC to ensure that verification efforts align with the project schedule. This oversight function ensures that verification is completed incrementally throughout the project schedule to avoid. Items that cannot be verified are tracked and discussed in the SMWG meeting and, if needed, elevated to the SMRC for resolution.

If changes occur during construction and installation, those changes must be analyzed for their impacts to safety and security before implementation. The Change Orders process may be used to document these modifications. The proposed change must be reviewed by the project team,

subject matter experts, the project SMWG, and other applicable MBTA departments. This review ensures the proposed change can be implemented without resulting in a degradation of safety or security or the diminishment of performance requirements and operational capabilities. Hazard analyses and additional security assessments may be required to evaluate the proposed change fully by the contractor. The results of these activities must be documented in the Hazard Tracking Logs and CIL.

The CSCC is developed through the following steps:

1. The Design Consultant develops the baseline CSCC.
2. SMWG reviews and approves the baseline CSCC.
3. The Contractor provides MOV within the baseline CSCC document and signs off when they believe the criteria is met.
4. The Contractors may make necessary changes to the baseline CSCC.
5. MBTA Safety provides 3rd party verification that construction specifications have been met by reviewing the MOV and signing off if in agreement with the Contractor.
6. SMWG monitors CSCC verification efforts and progress through regular SMWG meetings.

Visual Inspection Reports

A Visual Inspection Report may be used to verify requirements are met that other documentation cannot verify. The completed and signed Visual Inspection Report form, including comments to demonstrate compliance, is referenced on the CSCC and becomes part of the certification documentation. Items verified by a Visual Inspection Report are specifically identified on the report to document multiple items. Photographic evidence is presented with each Visual Inspection Report unless the item cannot be photographed.

Table 7: Step 4 Anticipated Outputs

Anticipated Outputs
1) Baseline Construction Specification Conformance Checklist 2) Updated Hazard Tracking Log

Step 5: Identify Additional Safety and Security Test Requirements

Many contractual and integrated tests are conducted during the project construction/installation, testing, and start-up phases to verify the proper operation of equipment and systems meet performance requirements to effectively mitigation hazards and vulnerabilities.

Test plans are reviewed prior to the test being performed to ensure all safety and security considerations have been made. The test results are then verified per the test procedures. The test plan, procedures, and results are part of the Safety and Security Certification documentation captured within the Testing Verification Conformance Checklist (TVCC). All applicable test plans and results will be verified as part of the certification process.

The TVCC is developed through the following steps:

1. The Design Consultant develops the baseline TVCC.
2. SMWG reviews and approves the baseline TVCC.
3. The Contractor provides MOV within the baseline TVCC document and signs off when they believe the criteria is met.
4. The Contractors may make necessary changes to the baseline TVCC.
5. MBTA Safety provides 3rd party verification that testing specifications have been met by reviewing the MOV and signing off if in agreement with the Contractor.

SMWG monitors TVCC verification efforts and progress through regular SMWG meetings.

The need for additional tests may arise for various reasons throughout the project. When this occurs, the Safety Management Working Group (SMWG) requests that the additional tests be conducted. The added tests are included in the TVCC, where their results are documented.

MBTA Safety and MassDOT Security and Emergency Management may observe safety and security tests, including but not limited to:

- First-article inspections
- Mock-up reviews
- Qualification tests
- Performance tests
- Acceptance tests

Testing of fire and life safety systems may need to be coordinated with the Authority Having Jurisdiction (AHJ).

Test Required by Technical Specifications

Contractor testing, as required by contract technical specifications, verifies the functionality of the involved system or equipment and is subject to MBTA's certification requirements. Contractor testing is tracked and verified on the project CILs and TVCC that capture the specification testing requirements. Typical specification tests may include:

- Qualification Tests
- Manufacturing Tests
- Performance Tests
- Acceptance tests

Integrated Test and Pre-Operational Testing

MBTA-specified testing may also include integrated and pre-operational demonstration tests. Many of these tests are incorporated in the contract documents. Others are not necessarily required by contract specifications but as part of an overall Test Plan. These tests are developed to verify equipment and systems' compatibility, safety, and security functions. Non-contractual integrated and pre-operational demonstration tests shall also be entered on the TVCC and tracked through completion along with the contractual obligations.

The Design Consultant is responsible for developing and implementing integrated and pre-operational test plans, including test procedures and results. The SMWG reviews the test plans and procedures to ensure the safety and security criteria are adequately addressed and verified through testing. The safety and security requirements depend on the type and nature of the tests performed and the project scope. Additional test procedures may need to be identified by the Contractor.

Table 8: Step 5 Anticipated Outputs

Anticipated Outputs
1) Baseline Testing Verification Conformance Checklist 2) Updated Hazard Tracking Log

Step 6: Performing Testing and Validation in Support of SSC Program

The PM is responsible for notifying the project SMWG when tests will be conducted. MBTA Safety, in collaboration with the PM, will determine the level of verification required to meet the safety and security certification requirements for each item involved in the test.

The PM is responsible for ensuring that all required tests are performed, and that all performance requirements are met to MBTA's satisfaction. The PM also ensures that all test results are documented as part of the project TVCC. Once the checklist is verified by MBTA Safety, the PM submits the checklist to the SMWG for review. The SMWG is responsible for determining the adequacy of the conformance checklists. If approved by the SMWG, the completed checklist is submitted to the SMRC for review and approval.

SMWG continues to monitor testing verification efforts and progress through regular SMWG meetings.

Table 9: Step 6 Anticipated Outputs

Anticipated Outputs
1) Updated Baseline Testing Verification Conformance Checklist 2) Updated Hazard Tracking Logs

Step 7: Manage Integrated Tests for the SSC Program

If necessary, the MBTA and the Contractor will identify a point of contact for all integration testing to ensure that the requirements are established in the test procedure. Before testing begins, test procedures are reviewed and verified by the MBTA to ensure all test procedures are submitted and approved by the SMEs. Other designated safety representatives may witness the tests as needed. The tests are then verified by the MBTA Safety to determine satisfactory performance based on pre-established criteria and adherence to the approved test procedures. The testing verification effort is captured within the updated TVCC that lists all the integrated testing requirements, including Integration Test Plans, test procedures, and test reports.

MBTA Safety may observe testing whenever safety-related activities are integral to the testing programs, including installation verification and acceptance, pre-operational demonstrations, system integration, and start-up tests. MBTA Safety may also participate in system integration and pre-revenue testing activities.

For larger, more complex projects, the project may establish a System Integration Testing Manger or System Integration Testing Team (SITT). This entity will be responsible for reporting testing results of certifiable elements, sub-systems, and items to the SMWG.

Integration Tests required for Certifiable Items will be part of the SSC process.

Table 10: Step 7 Anticipated Outputs

Anticipated Outputs
1) Updated Baseline Testing Verification Conformance Checklist 2) Updated Hazard Tracking Log

Step 8: Manage Open Items

Open items are certifiable items or unique safety and security issues that may not be verified per project requirements before revenue operations or cannot be resolved to meet the safety and security requirements to obtain SSC. During the verification process, open items are identified, noted, and highlighted on the active CIL. In addition, safety and security issues may be identified during site visits or due to design, construction or installation, and testing change orders. Open Items are maintained on the CIL and reviewed by the project team during the SMWG meetings. If an open item cannot be resolved at the SMWG level, it is elevated to the SMRC for resolution.

It is the responsibility of SMWG to identify the appropriate closure alternatives. In those cases where the SMWG cannot specify an option or it is impractical to resolve the open item by meeting the original requirement, the SMRC will develop an acceptable resolution, which may include placing the item into service as-is and providing documentation for resolution and acceptance of the risk.

In accordance with MBTA's risk management processes, open items are analyzed to determine their safety risks. If an item is classified as presenting an Unacceptable or Undesirable risk, it is highlighted on the active CIL or PHA/OHA. All safety-critical items must be resolved or temporarily mitigated before issuing Interim Certifications and Certificates of Compliance before going into revenue service.

Table 11: Step 8 Anticipated Outputs

Anticipated Outputs
1) Open Items List 2) Updated Hazard Tracking Log

Step 9: Verify Operational Readiness

Operational Readiness is a Certifiable Element with multiple sub-elements and certifiable items. These certifiable items are verified to ensure that the major operational requirements are in place before revenue service, facility occupancy, or system/equipment utilization. The verification process is documented either by developing the Operational Readiness Conformance Checklist (ORCC) for large and complex projects or by capturing the operational requirements CIL for smaller-sized projects.

Operational Readiness Conformance Checklist

The need to develop an ORCC is determined based on the project size, scope, and operational requirements outlined in the project or system activation plan. For smaller-sized projects, operational readiness requirements will be captured and verified on in the OHA and CIL. If an ORCC is created, the checklist is developed by MBTA Safety with SMWG and SMRC approval.

Operational readiness covers the following major areas for verification:

- Safety, security, and emergency management plans, rules, procedures, and manuals are developed or updated to meet code and regulatory requirements.
- Operations and maintenance plans, rules, and procedures are developed, updated, reviewed, and implemented.
- Establishing or updating emergency evacuation plans for facilities and stations.
- Systems and equipment O&M manuals showing how to operate and maintain system equipment and facilities are provided, reviewed, approved, and accepted by the agency.
- Training programs are developed and incorporate information regarding safety, security, and emergency management features for normal, abnormal, and emergency conditions.
- Training is performed that adequately addresses the operation and maintenance of the safety and security systems and equipment.
- Emergency responder training with fire, police, and emergency medical services personnel from the appropriate responding jurisdictions.
- MOA/MOUs with emergency responders and other transit agencies.
- Emergency incident drills and exercises and After-Action Reports (AARs).[4]
- Staffing hiring requirements.
- Maintenance service agreements/contracts.
- Project as-built drawings.
- Customer service, communications, and customer notification activities.
- Pre-revenue demonstration testing.

Verifying these activities includes documentation of their completion and approval.

To verify operational readiness, pre-revenue demonstration tests, if required, are performed to verify the system's functional capability and operational readiness before the revenue service start date. During the pre-revenue phase of the system, the procedures and plans are tested for effectiveness under simulated operating conditions for normal, abnormal, and emergencies. In addition, a final "walk-through inspection" of completed facilities and systems is performed. An Interim Certificate may be required to enter pre-revenue demonstrations.

[4] Drills and exercises do not necessarily mandate the use of a full-scale exercise. The level and complexity of the exercise can be determined by the SMWG.

The ORCC is developed through the following steps:

1. MBTA Safety determines Operational Readiness requirements by evaluating the project scope for functional requirements and reviewing PHA, Security Assessment, and OHA for recommended mitigations.
    a. If the ORCC is identified as a requirement on the SSC Project Assessment Form, then the identified requirements become the baseline Operational Readiness Conformance Checklist.
    b. Otherwise, Operational Readiness will be included as an element on the project CIL.
2. The SMWG reviews and approves the ORCC to ensure:
    a. Project's CEL has Operational Readiness as a certifiable element with adequate sub-elements supporting project requirements (see Figure 1 below) and
    b. Pre-Revenue testing requirements are included in the ORCC.
3. MBTA Safety submits the baseline ORCC to the SMRC for review and approval.
4. MBTA PM, Design Consultant, or Contractor provides the MOV for each Certifiable Item.
5. MBTA Safety performs verification of MOV for each operational item on the ORCC or CIL.
6. SMWG monitors verification efforts for the ORCC or CIL Operational Readiness element.

Table 12: Examples of Operational Readiness Sub-Elements

Operational Readiness Sub-Elements, Examples
• Pre-Revenue Operational Testing • Plans, Rules, and Procedures • Internal Training • External Training (Emergency Responders) • Drills and Exercises • Contractor-Provided Training • Staffing Requirements • Customer Outreach Programs

Table 13: Examples of Pre-Revenue Service Test Requirements

Pre-Revenue Service Test Requirements, Examples
• Pre-Revenue Service Test Plan • Pre-Revenue Service Test Procedures • Test Reports • Yard and Carhouse Movements • Adverse Track Movements • Traction Power Isolation • Communication Loss • Emergency Evacuations • Derailment Exercises • Special Event Staging • Inclement Weather Exercises

Drills and Exercises

Before starting revenue service, simulated emergency drills and tabletop exercises may be performed at selected sites and coordinated through the Fire Life Safety Committee, if applicable. These activities are intended to test the effectiveness of emergency response and procedures and ensure that outside emergency response personnel are familiar with and prepared to respond to MBTA emergencies. A drill or exercise will not be required for all projects and will be determined by the SMWG or the FLSC when applicable.

Drills and exercises are designed, developed, and executed by MassDOT Security and Emergency Management.

Table 14: Step 9 Anticipated Outputs

Anticipated Outputs
1) Operational Readiness Conformance Checklist 2) Updated Hazard Tracking Log

Step 10: Conduct Final Determination of Project Readiness

Before final certification can be issued MBTA Safety, through the SMWG, reviews all safety and security certification documentation to identify any outstanding open items and unmitigated hazards. The SMWG determines project readiness by reviewing the SSC documentation to issue the Element and Project Certificates of Conformance. If necessary, Interim Certification will be issued.

Interim Certificate

In cases where all system and sub-system components testing cannot be performed or documented for SSC verification before entering operational or public use, MBTA Safety may identify the need for and issue an Interim Certificate. The Interim Certificate allows the system to be placed into service or use with additional safety mitigations until verification can be complete.

Certifiable Elements and Certifiable Items may remain open for administrative reasons or ongoing project activities. Administratively, an element or item may remain open because verification is ongoing and complete MOVs have not been provided verification. This may be due to the length of time it takes to generate a final report or simply the need to obtain signatures on verification documentation. Elements and Items may also remain open due to ongoing tests and installation activities. Initial tests may show the system is operational, however, punch list items remain open, preventing final verification from occurring. Under any of these conditions, the Interim Certificate will indicate if any temporary mitigations or operational restrictions are necessary to place the asset into service. The process ensures that all safety-critical items of the CIL are identified, reviewed, and conditionally approved by the SMWG before the Interim Certificate is distributed for signatures. Any Operational and testing-related restrictions will be noted on the Interim Certificate.

The general methodology for issuing an Interim Certificate includes the following:

- The project SMWG identifies Interim Certification requirements, by:
  - Reviewing the project's schedule for substantial completion dates and evaluating unique operational requests to utilize assets, equipment, and systems or allow public use before the project contract is fully certified or completed.
  - Assessing items on the ORCC, CIL, Hazard Tracking Logs, or other certification tracking checklists.
- The SMWG identifies safety-critical items that require temporary mitigations or restrictions.
- MBTA Safety drafts the Interim Certificate.
- The Interim Certificate is then reviewed during the SMWG prior distribution for signature.
- The Project Manager distributes the Interim Certificate for signature.
- The SMWG monitors the approved Interim Certificate to ensure compliance.
- The SMWG may update the Interim Certificate by:
  - Re-issuing it with new or modified restrictions, or
  - Providing an extension based on expiration dates.

An Interim Certificate must include, at a minimum, the following information:

1. Name of the Certificate
2. Project Name

3. Contract Number
4. Applicable Certifiable Element(s)
5. Description of all temporary mitigations and operational restrictions
6. Signatures
7. Date of Expiration (not to exceed 6 months)

Element Certificate of Conformance

Approval of Certifiable Elements occurs when work and verification of all Certifiable Items has been completed to validate that risks are permanently mitigated to an acceptable level. Once the CIL for the Element is verified, an Element Certificate of Conformance will be issued.

A Project Safety and Security Certificate of Conformance will be issued using the following process:

1. The SMWG will confirm that all the Element is approved, and verification of associated Certifiable Items is completed.
2. MBTA Safety will prepare the Element Certificate of Conformance.
3. The SMWG will review and approve the Element Certificate of Conformance.
4. MBTA Safety will distribute the Element Certificate of Conformance, and include:
    a. The completed PHA items
    b. The completed OHA items
    c. The completed CIL
    d. Reference to the Security Assessment[5]

Updated SSC contract specification is issued for each element to document that all relevant safety and security requirements are fulfilled.

Project Safety and Security Certificate of Conformance

After Certificates of Conformance are issued for each Certifiable Element, a Project Safety and Security Certificate is issued. This Project Safety and Security Certificate of Conformance provides formal notification that the applicable portion of the operating system is safe and secure for service.

A Project Safety and Security Certificate of Conformance will be issued using the following process:

5. The SMWG will confirm that all Certificates of Conformance for elements are approved.
6. MBTA Safety will prepare the Project Safety and Security Certificate.
7. The SMWG will review and approve the Project Safety and Security Certificate.
8. MBTA Safety will distribute the Project Safety and Security Certificate, and include:
    a. The completed PHA
    b. The completed OHA
    c. The completed CIL
    d. Reference to the Security Assessment[6]

[5] The Security Assessment is considered SSI and should only be incorporated by reference.
[6] The Security Assessment is considered SSI and should only be incorporated by reference.

Safety and Security Certification Verification Report (SSCVR)

The Safety and Security Certification Verification Report (SSCVR) summarizes all the SSC activities and tasks conducted during the project life cycle. The following major components will be included in the SSCVR:

- Approval
- Document Control and Revisions
- Table of Contents
- Executive Summary
- ***Section 1: Introduction***
  - Project Overview
  - Purpose of the Safety and Security Certification Process
  - Authority
- ***Section 2: Safety and Security Certification Activities***
  - Overview of the Safety and Security Management Plan (SSMP), if applicable
  - Overview of the Safety and Security Certification Plan (SSCP), if applicable
  - Hazard Management Process
    - Preliminary Hazard Analysis
    - Security Assessments
    - Operational Hazard Analysis
  - Verification Activities
    - Design Verification
    - Construction Verification
    - Testing Verification
    - Operational Readiness
- ***Section 3: Safety and Security Certification Status***
  - List of Open Certifiable Items if any
  - List of unresolved Hazards if any
- ***Section 4: Summary***
- Appendices
  - Appendix A: Interim Certificates
  - Appendix B: Certificates of Conformance
  - Appendix C: Project Safety and Security Certificate
  - Appendix D: Preliminary Hazard Analysis
  - Appendix E: Operational Hazard Analysis
  - Appendix F: Hazard Tracking Log
  - Appendix G: Certifiable Items List

The SMRC approves the SSCVR to confirm that the project is ready for implementation into revenue service. Approval thus requires the SSCVR to be drafted prior to the project entering service. However, the SMWG may choose to issue the SSCVR when substantial completion of the SSC process is achieved, even after the project enters revenue service. Modification of the timeline may be decided if a significant number of items remain open and the monitoring of certification processes is more effective using existing checklists. Modification of the timeline must be approved by both the SMWG and SMRC.

The SSCVR is developed through the following steps:

1. MBTA Safety reviews SSC documentation through the SMWG to determine any open certifiable items and unmitigated hazards.
2. The SMWG reviews and approves the verified SSC documentation for each element.
3. MBTA Safety drafts the Element Certificate of Conformance (COC) for each verified element.
4. SMWG reviews, approves, and signs each Element COC as prepared by MBTA Safety.
5. After each Element COC has been reviewed and approved by the SMWG, MBTA Safety drafts the System COC.
6. MBTA Safety drafts Safety and Security Certification Verification Report (SSCVR) and submits the SMRC for review.
7. SMRC reviews, approves, and provides signature for the finalized SSCVR.

Table 15: Step 10 Anticipated Outputs

Anticipated Outputs
1) Interim Certificate (as necessary) 2) Signed Element Certificates of Conformance 3) Approved Safety and Security Certification Verification Report 4) Signed Project Safety and Security Certificate of Conformance

4.0 Project-Specific Plans

The requirements to have project-specific SSMPs and SSCPs are determined by the Category level of the project.

- For Category 1 Projects, the following are required:
  - Project Management Plan (PMP)
  - Safety and Security Management Plan (SSMP)
  - Safety and Security Certification Plan (SSCP)
- For Category 2 Projects, the following are required only when determined by the project's size, complexity, or potential impact on safety:
  - Safety and Security Management Plan
  - Safety and Security Certification Plan

For Category 2 projects, MBTA Safety and the project SMWG decide if these management plans are necessary. These requirements will be denoted on the SSC Project Assessment Form.

4.1 Safety and Security Management Plan

The SSMP is the document prepared by the MBTA PM (or designee) as part of the Project Management Plan (PMP) to describe how the recipient will address safety and security in the major capital project from initial project planning through initiation into revenue service. If determined to be required, the MBTA's PM will develop the project-specific SSMP following *FTA Circular 5800.1, Safety and Security Management Guidance* and the *PMOC OP-22, Safety and Security Management Review Checklist*. The SSMP is reviewed and approved through the SMWG, then submitted to the SMRC for final approval.

When applicable, the Project Management Oversight Contractor (PMOC) for the FTA will review the SSMP for compliance with FTA guidance. Additionally, the DPU will determine its involvement in reviewing the SSMP based on the Program Standard,

The SSMP must adhere to the following outline:

Section 1 Management Commitment and Philosophy

- Safety and Security Policy Statement
- Purpose of SSMP
- Applicability and Scope of SSMP
- SSMP Goal

Section 2: Integration of Safety and Security into Project Development Processes

- Safety and Security Activities
- Procedures and Resources
- Interference with Management

Section 3: Assignment of Safety and Security Responsibilities

- Responsibilities and Authority
- Committee Structure

Section 4: Safety and Security Analysis

- Approach to Safety and Security Analysis
- Requirement for Safety and Security

Section 5: Development of Safety and Security Design Criteria

- Approach to Development of Safety and Security Criteria
- Design Reviews
- Deviations and Changes

Section 6: Process for Ensuring Qualified Operations and Maintenance Personnel

- O&M Personnel Requirements
- Plans, Rules, Procedures
- Training Programs
- Emergency Preparedness
- Public Awareness

Section 7: Safety and Security Verification Process

- Design Criteria Verification Process
- Construction Specification Conformance
- Testing/Inspection Verification
- Hazard and Vulnerability Resolution
- Operational Readiness Verification
- Safety and Security Certification Requirements

Section 8: Construction Safety and Security

- Construction Safety and Security Program
- Construction Phase Hazard and Vulnerability
- Safety and Security Incentives

Section 9: Requirements for 49 CFR Part 674, State Safety Oversight

- Activities
- Implementation Schedule
- Coordination Process

Section 10: FRA Coordination

Section 11: DHS Coordination

4.2 Safety and Security Certification Plan

The SSCP describes the SSC process used to verify that safety and security-related requirements are incorporated into a project, thereby demonstrating that it is operationally ready for revenue service and safe and secure for passengers, employees, emergency responders, and the general public. A project-specific SSCP is required for all Category 1 projects. For Category 2 projects, MBTA Safety and the MBTA PM will determine if an SSCP is needed based on project size, complexity, or impact on safety.

The project-specific SSCP is developed per the *FTA's Handbook for Transit Safety and Security Certification*, the Massachusetts DPU Program Standard requirements, and the MBTA SSCPP. The SSCP is reviewed and approved through the SMWG to the MBTA Safety and SMRC for final approval. Massachusetts DPU and the project PMOC (if one is established) may review the SSCP for compliance with FTA guidance. This requirement for a project-specific SSCP is documented on the Safety and Security Certification Project Assessment Form.

The Design Consultant will develop the project-specific SSCP based on the requirements outlined in this Plan. MBTA Safety provides guidance and assists with the SSCP development process.

If an SSCP is required for the project, the plan must follow the below outline:

Section 1: Introduction

- Overview
- Objectives
- Scope
- Authority
- Revisions
- References

Section 2: Project Management

- Project Team Organization Chart
- Project SSC Responsibilities
- MBTA PM
- Design Consultant PM
- Contractor Construction PM
- Testing PM
- MBTA Safety
- Contractor Certification Points of Contact
- Committee Structure
    - Safety Management Working Group (SMWG)
    - Fire Life Safety Committee (FLSC)
    - Operational Readiness Committee (ORC)

Section 3: Hazard and Vulnerability Management

- General
- Responsibility
- Hazard Identification and Analysis
- Preliminary Hazard Analysis (PHA)
- Threat and Vulnerability Assessment (TVA)
- Operational Hazard Analysis (OHA)
- Open Items List (CILs/SCIL)
- Hazard Tracking Log

Section 4: Certification Process and Procedures

- Step 1: Identify Certifiable Elements
  - Certifiable Elements List and Sub-Elements
- Step 2: Develop Safety and Security Design Criteria
  - Design Criteria Source
  - Recommended Mitigations for PHA and TVA
- Step 3: Develop and Complete Design Criteria Conformance Checklist
  - Develop DCCC
  - Verification Process
  - Design Review Process
  - Design Change Order Process
- Step 4: Perform Construction Verification Checklist
  - Develop CSCC
  - Verification Process
  - Construction Change Order Process
- Step 5: Identify Additional Safety and Security Test Requirement
  - Testing Plans
  - Additional Safety and Security Tests
- Step 6: Performing Testing and Validation
  - Develop TVCC
  - Verification Process
- Step 7: Monitor and Verify Integrated Tests
  - Update the TVCC
  - Verification Process
- Step 8: Manage “Open Items”
  - Open Items List
  - Hazard Tracking Log
- Step 9: Verify Operational Readiness
  - Operational Readiness Conformance Checklist (ORCC)
  - Verification Process
- Step 10: Conduct Final Determination of Project Readiness and Issue Safety and Security Certification
  - Interim Certificates
  - Certificates of Conformance
  - Safety and Security Certification Verification Report

Section 5: Certificate of Conformance

- Issuance
- Exceptions/Restrictions

Section 6: Documentation

- Requirements – Certificate Forms
- Responsibilities (Signatory Authority)

Section 7: Reporting Requirements

- Safety Management Working Group (SMWG)
- Safety Management Review Committee (SMRC)
- Fire Life Safety and Security Committee (FLSC)
- Operational Readiness Committee (ORC)
- FTA / PMOC / DPU – Certification Status Reports

5.0 Risk Management

5.1 Safety Risk Management

The following methodology will be applied to projects involving all modes except for Commuter Rail. For all projects primarily excluding MBTA Commuter Rail, the Safety Risk Management process, as defined the MBTA's Transit Safety Plan will be followed. Refer to section 5.2 for information regarding risk management processes for Railroad programs undergoing certification.

MBTA's SRM program includes the SMS principles outlined in the MBTA Transit Safety Plan, Section 5.0 Safety Risk Management. SRM is the formal process used to recognize and systematically identify, evaluate, and resolve hazards and safety risks associated with the project's design, construction/installation, testing, start-up, and operation for customers, employees, and the general public. Recognized hazards are identified and categorized for potential severity and probability of occurrence and analyzed for potential impact. Those hazards are resolved by design, engineering control, procedure, warning device, or other methods to fall within the risk acceptable to MBTA management consistent with MBTA's SRM processes.

SRM is most effective for capital projects when applied during the early stages of the Engineering/Design phase and updated throughout each project phase, including start-up and operations. SRM is also used to evaluate the safety impacts of deviations from the baseline design, construction/installation, testing change orders, operationally approved temporary measures and other modifications made during construction/installation, testing, and project activation.

5.2 Risk-Based Hazard Management

For all projects primarily involving the MBTA Commuter Rail infrastructure, equipment, rolling stock, or operations, the risked-based hazard management process will be performed in accordance with the processes and requirements defined in the MassDOT/MBTA Railroad System Safety Program Plan.

6.0 Security Risk Management

6.1 Physical Security

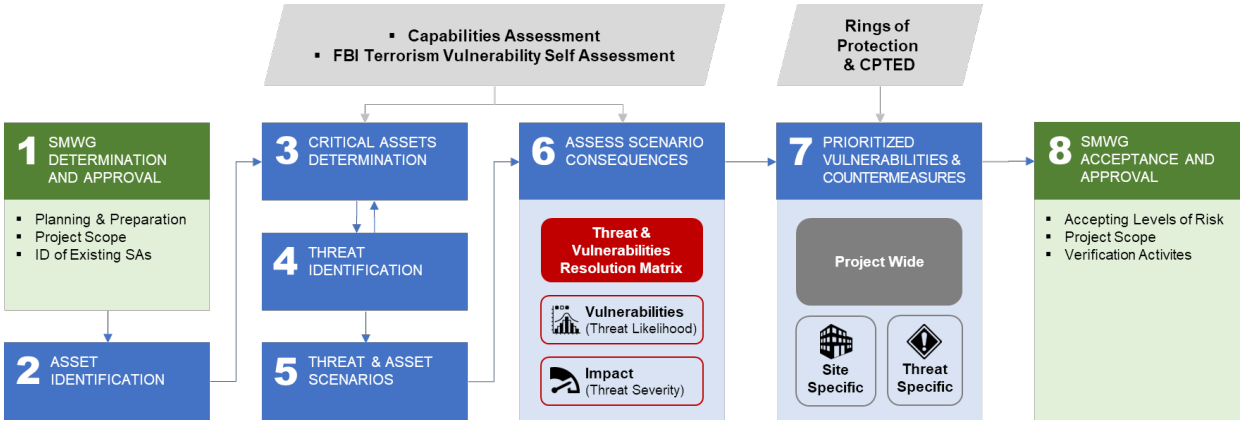
In some instances, hazards may contain an added component of a threat that could potentially compromise the security of a system. These instances would require the completion of a Security Assessment to identify and mitigate vulnerabilities. The Security Assessment process follows similar guidelines as a PHA but uses additional techniques to identify security requirements.

As part of the overall certification program, Security Certification is performed by MassDOT Security and Emergency Management in coordination with MBTA Safety. As such, it is the responsibility of Security and Emergency Management to:

- Implementation of the Security Assessment process, including oversight of the TVA.
- Documentation of the TVA process for the project.
- Establishment of security requirements for the project, including design criteria.
- Verification of implementation of security requirements.
- Documentation and distribution of security rules and requirements.
- Establishment and documentation of security qualifications and training requirements.
- Establishment and documentation of security training as applicable to the project.
- Tracking of open security items to closure.
- Coordination of and participation in emergency drills to support the SSC process.
- Coordination and participation in final verification.

The proceeding section describes the 8-step TVA process, which follows the TVA methodology recommended by the Federal Transit Administration (FTA) in “The Public Transportation System Security and Emergency Preparedness Planning Guide”, Final Report, January 2003; and the Government Accountability Office’s, “Domestic Terrorism, Prevention Efforts in Selected Courts and Transit Systems”, Report # PEMD-88-22, June 1988. If necessary, and as approved by the SMWG, the TVA 8-step methodology may be adapted or modified to meet the needs of the specific project.

Figure 4: TVA 8-Step Methodology



Step 1: SMWG Determination and Approval

In most circumstances, the MBTA may choose to utilize existing TVAs or SAs in lieu of developing a new, project-specific assessment. Determination for the use of existing assessments will be determined by the SMWG. Similarly, modification or the adaptation of the 8-step process may be acceptable to working groups. Such decisions are based on the following factors:

- Scope of Work
- Existing SAs on similar facilities/assets
- Addressing new threats

If a new SA is required, the SMWG will determine which data and information is required and what level of effort will be necessary for the project.

Step 2: Asset Identification

Asset Identification for a project-specific Security Assessment is based on the Scope of Work of the project. In some instances, this may involve MBTA assets not specific to the project, but directly or indirectly affected by the work. Similar to the PHA process, the critical assets can be viewed as Certifiable Elements, which will lead to the identification of certifiable items requiring security certification. Examples include people, information, and property. Examples of certifiable items that a security effort should protect are presented below. Note, this is not an all-inclusive list; the scope of the Security Assessment must be assessed for each project based on the scope of that project.

Table 16: Examples of Typical Transit Assets

Typical Transit Assets	
• Passenger Stations, Stops, and Shelters	• Fuel Farms and Generators
• Tenant Facilities in Passenger Stations	• Alternative Fuel Storage Facilities
• Bus, paratransit	• Revenue Collection Facilities
• Customer and Employee Parking Lots	• Vehicle Storage Facilities
• Vehicle Control Systems	• Operation Control Centers
• Communication Systems	• Ancillary Facilities and Storage
• Heavy Maintenance Facilities	• Employee Parking Lots
• Service and Inspection Facilities	• Administrative Facilities
• Maintenance Vehicles and Equipment	• Security Facilities & Communications
• Back-up Power Systems	• Rolling stock
• Bridges	• Tunnels
• Elevated structures	• Power transmission systems

Step 3: Asset Criticality Determination

The project should prioritize the identified assets from Step 2, granting a higher priority to those assets that would create the most disruption of service or threat to people in the event of an attack. A higher priority may require special protection from an attack. In making this determination, the following are considered:

- The economic value of the asset, including current and replacement value.
- The intrinsic value of the asset to a potential adversary.
- Asset location.
- How, when and by whom an asset is accessed and used.
- The impact, if these assets are lost, on passengers, employees, public safety organizations, the general public, and public transportation operations. Based on current intelligence, the Federal Bureau of Investigation urges transportation systems serving communities with the following characteristics to consider themselves at a higher level of risk:
    - Availability of targets with symbolic meaning for the U.S. Government or the American culture and way of life.
    - Availability of targets with precursor elements for major destruction (chemical, biological, or radiological material).
    - Availability of targets whose destruction would provide potential terrorist elements with visibility and prestige.
    - Availability of targets with the potential to significantly impact not only a single community but also a state, region, and nation.
    - Availability of high-value targets (e.g., high replacement costs, high commercial impacts of delay and destruction, high loss to the U.S. economy).
    - Availability of major targets that provide relative ease of access (for ingress and egress with equipment and personnel required for attack).
    - Availability of targets that would produce mass casualties (in excess of 500 persons).

Tables 17 and 18 show examples of asset criticality and illustrate common critical assets:

Table 17: Example of Asset Criticality

MBTA Assets	Criticality *(level of impact in the event of loss)*	
	People	**System**
Passenger Station	**High** 1	**Medium to High** 3
Bus garage	**High** 1	**Low** 3
Conditions that may be added to the criticality ratings: ● Depends on what time of day the incident occurs. A greater effect would be experienced during rush hour than during non-rush hour. ● Depends on the location in the system where an incident occurs. Also depends on the alternatives available, such as redundancies, rerouting capabilities, and other factors. ● Affects employees only during operational hours		

Table 18: Example of Critical Assets

High Civilian Casualties	High Level of System Disruption
Passengers Stations/Stops	Vehicle Storage Facilities
Transfer Stations	Communications Systems
Intermodal Centers	Operations Control Centers
Parking Lots	Fueling / Charging Facilities
Rolling stock	Administrative Facilities

Step 4: Threat Identification

A threat is any action with the potential to cause harm in the form of destruction, death, injury, disclosure, interruption of operations or denial of services. System facility threats include a number of hostile actions that can be perpetrated by criminals, disgruntled employees, terrorists, and others. Threat analysis defines the level or degree of the threats against a facility by evaluating the intent, motivation, and possible tactics of those who may carry them out. The process involves gathering historical data about hostile events and evaluating which information is relevant in assessing the threats against the facility. Some of the questions to be answered in a threat analysis are displayed below.

- What factors about the system invite potential hostility?
- How conspicuous is the transportation facility or vehicle?
- What political event(s) may generate new hostilities?
- Have facilities like this been targets in the past?

Possible threats against a transit environment are depicted below.

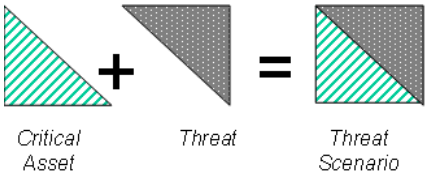
Table 19: Possible Threats Against the MBTA

Terrorism	Part I Crimes	Part II Crimes	Quality of Life Violations
Explosives/Incendiary	Homicide	Other Assaults	Littering
Hijacking/Hostage	Rape (Forcible/Attempted)	Vandalism	Loud Music
Sabotage	Robbery	Sex Offenses	Foul Language
Exterior Attacks	Aggravated Assault	Drug Abuse Violations	Smoking/Eating/Drinking
Standoff Weapons	Burglary	DWI/DUI	Poor Hygiene
Ballistics Attacks	Theft / Larceny	Drunkenness	Public Urination/ Expectoration
Network/Inside Access	Motor Vehicle Theft	Gambling	Vagrancy
Cyber Threat	Arson	Weapons Law Violations	Loitering
WMD Attacks	Hate Crimes	Liquor Laws	Disorderly Conduct
		Trespassing	Soliciting
		Fare Evasion	**Other**
		Criminal Mischief	Attempted Suicides

Step 5: Threat Scenarios

Critical assets and key threats are paired into scenarios to focus on analytical activities. This also provides a range of criminal activity and allows for detailed analysis concerning the likely impacts of threats on critical assets. The following figure illustrates this concept:

Figure 5: Developing Threat Scenarios



Step 6: Assess the Consequences of the Threat Scenario

Scenario analysis requires an interpretive methodology to develop and assess schemes that may be used to attack the system. By matching threats to critical assets, the project can identify the capabilities required to support specific types of attacks. This activity promotes awareness and highlights those activities that can be performed to recognize, prevent, and mitigate the consequences of attacks. Using these assets, personnel should investigate the most likely threats, considering the range of attack objectives and methods that may be used (such as disruption of traffic, destruction of bridges or roadways, airborne contamination, hazardous materials incidents, and threat or attack with explosives intended to disrupt or destroy).

The TVA also considers the range of perpetrators, such as domestic and foreign terrorists, radicals, political extremists, disgruntled employees, disturbed copycats, and others. When conducting the scenario analysis, the system may create chronological scenarios (event horizons) that emphasize the worst credible scenario instead of the worst-case scenario. Results from this analysis are far more likely to produce recommendations appropriate for the size and operation of the system.

Table 20: Threat Severity Categories

Threat Severity Categories		
Severity	**Category**	**Characteristics**
Catastrophic	**I**	Loss of life and/or extensive damage requiring months to repair; long-term interruption.
Critical	**II**	Serious injuries and/or significant damage requiring weeks to repair; long-term interruption.
Marginal	**III**	Minor injuries and/or minor damage (requiring seven or fewer days to repair); short-term interruption.
Negligible	**IV**	No injury and/or no minor property damage; little or no interruption.

The scenario analysis from Step 5 will lead to the determination of actual or potential vulnerabilities. A vulnerability is anything that can be used to a perpetrator's advantage to carry out a threat. This includes vulnerabilities in the design and construction of a facility, in its technological systems, and in the way a facility is operated (e.g., security procedures and practices or administrative and management controls). Vulnerability analysis identifies specific

weaknesses with respect to how they may invite and permit a threat to be accomplished. In addition, when evaluating vulnerabilities in this process, there are common issues that need to be considered. The table below is used to list some of the issues that require threat and vulnerability evaluation.

Table 21: Vulnerability Issues to Consider

Vulnerability Issues to Consider	
Surrounding terrain: natural and manmade	Mail-handling protocols and procedures
Adjacent structures: internal and external	Access controls: service and employees
Site layout and elements: perimeter and parking	Information technology (IT) controls
Location and access to incoming utilities	Blast resistance
Circulation patterns	HVAC protection
Location of higher risk assets: facilities/area	Phone threat procedures and protocols

Similar to the PHA process, the project will then calculate the risk of each threat and vulnerability. To ensure consistency in risk ratings, the MBTA will utilize the same severity table and risk matrix identified in Section 5, but will utilize the following probability ratings:

Table 22: Security Risk Vulnerability / Probability Categories

Vulnerability / Probability Categories		
Description	**Level**	**Specific Event**
Frequent	**A**	Indicates that a **definite** threat exists against the asset and that an adversary has both the capability and intent to attack or commit a criminal act, asset is targeted on a frequently recurring basis.
Probable	**B**	Indicates that a **credible** threat exists against the asset based on knowledge of an adversary's capability and intent to attack or commit a criminal act against the asset, based on related incidents having taken place at similar assets or in similar situations.
Occasional	**C**	Indicates that there is a **possible** threat to the asset based on an adversary's desire to compromise similar assets
Remote	**D**	Indicates that there is a **low** threat against the asset and that few known adversaries would pose a threat to the asset.
Improbable	**E**	Indicates **no credible** evidence of capability or intent and no history of actual or planned threats against the asset.
Eliminated	**F**	Indicates threat has been **eliminated**.

Consequences are assessed both in terms of financial loss (determined by human loss and injury, loss of assets, replacement/recovery costs, and congestion/delay) and using expert guidance to evaluate a series of criteria that determine the probability of failure and effect of loss for a given scenario.

The Criticality Matrix is the mechanism used to categorize the results of the threat scenarios.

Table 23: Security Assessment Criticality Matrix

Criticality Matrix				
	Threat Severity			
Vulnerability	(I) Catastrophic	(II) Critical	(III) Marginal	(IV) Negligible
(A) Frequent	**IA**	**IIA**	**IIIA**	**IVA**
(B) Probably	**IB**	**IIB**	**IIIB**	**IVB**
(C) Occasional	**IC**	**IIC**	**IIIC**	**IVC**
(D) Remote	**ID**	**IID**	**IIID**	**IVD**
(E) Improbable	**IE**	**IIE**	**IIIE**	**IVE**

Table 24: Security Assessment Determination

	Rating	Index	Description
	HIGH	IA, IB, IC, IIA, IIB	Unacceptable; threat must be mitigated
	SERIOUS	ID, IE, IIC, IIIA, IIIB, IVA	Undesirable, with Management Decisions; threat should be mitigated, if possible, and within financial constraints.
	LOW	IID, IIE, IIIC, IIID, IIIE, IVB, IVC, IVD, IVE	Acceptable with Management Review; no additional countermeasures are currently required.

By using this process, the project will be able to gain a quantitative understanding of which scenarios present the most significant effect in terms of consequences. In this way, the MBTA can make appropriate decisions to develop affective design criteria and prioritize the mitigation of key security vulnerabilities.

Step 7: Prioritize Vulnerabilities and Countermeasures

At the completion of the Security Assessment, the project will have contributed to the list of prioritized items based on the assets to include in the Certifiable Items List. Based on the results of assessment, the project can identify countermeasures to reduce vulnerabilities. Effective countermeasures typically integrate mutually supporting elements:

- Physical protective measures are designed to reduce system asset vulnerability to explosives, ballistics attacks, cyber-attacks, and the release of chemical, biological, radiological, or nuclear (CBRN) agents.

- Procedural security measures, including procedures to detect and mitigate an act of terrorism or extreme violence and those measures employed in response to an incident that does occur.

Step 8: SMWG Acceptance and Approval

Acceptance of security measures to mitigate identified scenarios will follow the same process outlined in this Plan.

6.2 Cybersecurity

Cybersecurity is a major factor when assessing a project's risks. As emerging technologies begin to be introduced into the MBTA system or upgrades are made to existing systems, the need for Cybersecurity increases. Systems could be affected by a successful cyber-attack, further illustrating the need for MBTA's Information Technology Department (ITD) to assist with the design, specifications, and manual reviews provided by the manufacturer(s). ITD is primarily responsible for assessing risks with information systems and will be actively engaged throughout any project identified to have a cybersecurity component. For these projects, MBTA ITD will be engaged as a project stakeholder and included as necessary when performing and reviewing Security Assessments and Threat and Vulnerability Assessments.

Cybersecurity risks will be assessed using industry standard practices as determined necessary by the Chief Information Security Officer, or their designer. This may include the use of ISO 27001 standards or other MBTA and industry-approved programs.

7.0 Documentation

Documentation is critical to the success of the SSC Program. Documentation provides a detailed, auditable activity trail that complies with safety and security requirements. The documentation system promotes accountability, timeliness, and accessibility. Accountability ensures that all certificates are completed accurately, signed by appropriate project staff, reviewed, and approved by the SMWG, and maintained securely. Timeliness ensures that each certifiable element is certified safe and secure before use. Accessibility allows quick verification that certificates are in place and provides any other information required to support the certificates.

During the life of a project, it is not unusual for design, construction/installation, and testing changes to be made to the system elements being certified. The impact changes the safety or security requirement, the required documentation, or the safety risk of the certifiable element or project, and the safety and security requirement is reverified.

7.1 Safety and Security Certification Workbook

Each project required to implement any portion of the SSC program will utilize the Safety and Security Certification Workbook. The Workbook is intended to provide a single point of reference for all certifiable items. More importantly, it allows for a seamless connection between Certifiable Items on the CIL and hazards or vulnerabilities identified on the PHA and Security Assessment.

All worksheets may not be required based on required SSC activities identified on the Safety and Security Certification Project Assessment Form. The SMWG should reference the Assessment Form when identifying the required components of the Workbook.

Two (2) Workbooks are provided: One for projects involving subway, bus, ferry, or paratransit services, and a second for Commuter Rail projects.

Both workbooks are comprised of the following certification worksheets:

- Preliminary Hazard Analysis (PHA) or Risk-Based Hazard Analysis for Commuter Rail
- Security Assessment
- Operational Hazard Analysis (OHA)
- Hazard Tracking Log (HTL)
- Certifiable Items List (Design through Pre-Revenue phases)
    - Design Criteria Conformance Checklist (DCCC)
    - Construction Specification Conformance Checklist (CSCC)
    - Testing Verification Conformance Checklist (TVCC)
- Operational Readiness Conformance Checklist (ORCC)

Guidance sheets are also included for both risk classification activities and Means of Verification.

7.2 Documentation Responsibilities

The Project Manager is responsible for obtaining the supporting documentation required due to the changes and ensuring that changes to the design of equipment and facilities are documented.

The MBTA and consultant PMs, with close MBTA Safety coordination, establish an SSC configuration management documentation folder in the project document management system. Table 25 outlines the SSC Document requirements and responsibilities.

Table 25: Example Responsibility Matrix

Legend: P – Primary responsibility for document S – Secondary function or assistance A – Review and Approval Authority C – Comment only N – No activity	MBTA PM	DC PM	Construct. PM	MBTA Safety	MassDOT S&EM	SMEs	SMRC	SMWG	FLSC	ORC
Project Safety and Security Management Plan	P			S	C		A	A		
Project-Specific Safety & Security Certification Plan	C	P		S	C	C	A	A		
Certifiable Elements List, with Sub-Elements	C	P		S	S	C		A		
Preliminary Hazard Analysis (PHA)	S	P		S	C	C	A	A	S	
Security Assessment (SA)	S	P		C	S	C	A	A	S	
Certifiable Items List (CIL)	C	P		S	S	C	A	A	S	S
OHA (Baseline and Verified Document)	C	P		S	S	S	A	A	S	S
Baseline DCCC	C	P		S	S	C		A	C	
100% Verified DCCC	C	P		S	S	C		A		
Baseline CSCC	C	P	S	S	S	C		A	C	
100% Verified CSCC	C	S	P	S	S	C		A		
Baseline TVCC	C	P	S	S	S	C		A	C	
100% Verified TVCC	C	S	P	S	S	C		A		
Closeout Safety and & Design Review Documents	S	P	S	S	S	C		A		
ORCC (Baseline and Verified Document)	C	S	S	P	S	S		A	S	S
Closeout Tracking Log (PHAs, OHAs)	C	S	S	P	S	S		A	C	
Signed Interim Certificates	S	S	S	P				A		
Signed Certificates of Conformance	S	S	S	P				A		
Signed Project System COC	S	S	S	P	C			A		
Project SSC Verification Report (SSCVR)	S	S	S	P	C		A	A		

The responsibilities outlined in Table 25 may be changed, if necessary, based on the individual project needs. However, the changes must be formally documented in the project's SSCP and reviewed and approved by the project SMWG.

7.3 Procedures for Document Acceptance

For the SMWG to approve each SSC document as shown in Table 25, working group members must pass a motion by consensus (requiring all voting members to agree on the resolution). Prior to a vote taking place, all members should have the opportunity to review any supporting documents and provide their perspectives before being asked to vote on any issue. The SMWG can continue to discuss any agenda items without all of the required members in attendance; however, voting cannot take place without a minimum of 50% voting members in attendance. The SMWG Chair may request votes for items outside the required SSC documents, such as meeting minutes, at their discretion.

As the SMWG comes upon the next agenda item, it provides the members with an opportunity to make a motion, at which point the following six steps will take place:

1. A member makes a motion.
2. Another separate member seconds the motion.
3. The Chair restates the motion.
4. SMWG members discuss and debate the motion.
5. The Chair asks members to vote on the motion.
6. The Chair announces the result of the vote, which is recorded in the meeting minutes along with the names of the voting members.

7.4 Control of Safety and Security Certification Documentation

MBTA Safety is responsible for updating and maintaining all Safety and Security Certification Program Plan documents, forms, and templates. MBTA Safety may update the associated forms, documents, and templates without re-issuing the Safety and Security Certification Program Plan. The latest revisions of the program plan, documents, forms, and templates will be stored on and accessed through MBTA's TSTOP portal to ensure the latest revision of each document is utilized. The appendices contained in this document are for informational purposes only and may not reflect the most recent version of each document.

Changes to the Safety and Security Certification Program Plan must be reviewed and approved by the signatories (or equivalent) of the current plan.

Appendix A:
Safety and Security Certification Project Assessment Form

Massachusetts Bay Transportation Authority

Safety and Security Certification (SSC) Project Assessment Form

SECTION 1: GENERAL INFORMATION

Project Title/CIP No. _____

MBTA Project Manager _____

Date Assessed _____

Designer/Contract No. _____

Contractor/Contract No. _____

PM/CM (if applicable)

Project Description

Include scope of work and information that illustrates the level of complexity

Click or tap here to enter text.

SECTION 2: PROJECT FUNDING

☐	FTA Funding	☐	MBTA Funding
☐	Future FTA Funding	☐	Other
☐	State and/or Local Funding		

***Total Estimated Funding:** $ 0.00

Total FTA Funding (If applicable): $ 0.00

*Includes all costs associated with design, construction, admin., field support, and contingency.

SECTION 3: SAFETY AND SECURITY CERTIFICATION CRITERIA

Please select all that apply:

☐	Total cost meets or exceeds $100 million	☐	New, changed, or rehabilitated public access areas or revenue vehicles
☐	New, changed, or rehabilitated infrastructure directly supporting revenue service	☐	New, changed, or rehabilitated equipment providing a safety-critical function
☐	Significant operational change	☐	Project does not require safety and security certification.

Massachusetts Bay Transportation Authority

SECTION 4: CERTIFICATION CATEGORY CRITERIA

Please select all Category 1 criteria for the project below:

1) Involves the construction expansion, rehabilitation, or modernization of a fixed guideway that:

☐ Has a total cost of $300 million or more and receives federal funds of $100 million dollars or more	☐ Is not exclusively for the acquisition, maintenance, or rehabilitation of vehicles or other rolling stock

2) Involves the construction expansion, rehabilitation, or modernization of a fixed guideway that:

☐ Involves new technology	☐ Is not exclusively for the acquisition, maintenance, or rehabilitation of vehicles or other rolling stock

3) Required Category 1 Certification by MBTA Safety for the following reason:

☐ Click or tap here to enter text.

If BOTH boxes from Criteria #1 are selected or any boxes from Criteria #2 and #3, then the project is classified as a Category 1 project. Otherwise, the project is classified as a Category 2 project.

SECTION 5: PROJECT TYPE

☐ Design Bid Build (DBB)	☐ New Start Construction
☐ Design Build (DB)	☐ Rehabilitation
☐ Construction Manager at Risk (CMR)	☐ Modification
☐ Other _____	

SECTION 6: PROJECT PHASE WHEN SSC WAS INITIATED

☐ Conceptual to 30% Design	☐ Testing/System Integration
☐ 31% to 100% Design	☐ Pre-Revenue/Start-Up
☐ Construction/Installation	
☐ Other _____	

SECTION 7: SSC REQUIREMENTS

Note: This section to be filled out by MBTA Safety

- ☐ Project Management Plan (PMP)
- ☐ Safety and Security Management Plan (SSMP)
- ☐ Safety and Security Certification Plan (SSCP)
- ☐ Preliminary Hazard Analysis (PHA)
- ☐ Security Assessment (SA or TVA)
- ☐ Operational Hazard Analysis (OHA)
- ☐ Certifiable Elements List (CEL)
- ☐ Certifiable Items List (CIL)
- ☐ Design Criteria Conformance Checklist (DCCC)
- ☐ Construction Specification Conformance Checklist (CSCC)
- ☐ Testing Verification Conformance Checklist (TVCC)
- ☐ Operational Readiness Conformance Checklist (ORCC)
- ☐ Safety Management Working Group (SMWG)
- ☐ Fire Life Safety Committee (FLSC)
- ☐ Operational Readiness Committee (ORC)
- ☐ Safety & Sec. Cert. Verification Report (SSCVR)

SECTION 8: ADDITIONAL NOTES

Click or tap here to enter text.

CONCURRENCE

MBTA Project Manager

Project Director

MBTA Safety

MassDOT S&EM

Appendix B:
Certifiable Elements List

Certifiable Elements List (CEL)

Safety and Security Certification Worksheet

Project Name: [Enter Project Name]

Contract Number: [Enter Contract Number]

Certifiable Element: [Enter Certifiable Element 1...]

[Enter Sub-Element 1]
[Enter Sub-Element 2]
[Enter Sub-Element 3]

Certifiable Element: [Enter Certifiable Element 2...]

[Enter Sub-Element 1]
[Enter Sub-Element 2]
[Enter Sub-Element 3]

Certifiable Element: [Enter Certifiable Element 3...]

[Enter Sub-Element 1]
[Enter Sub-Element 2]
[Enter Sub-Element 3]

Appendix C:
Preliminary Hazard Analysis (PHA)

Preliminary Hazard Analysis (PHA)

Safety and Security Certification Worksheet

Project Name: [Enter Project Name] **Contract Number:** [Enter Contract Number]	**Design Consultant(s)**	**Contractor(s)**		**SMWG Approval Date**	**SMRC Approval Date**	**Rev. No.**	**Rev Date**	**Document Status**
	[Enter Company Name(s)]	[Enter Company Name(s)]		[Enter Date]	[Enter Date]	[Add No.]	[Add Date]	**DRAFT**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PHA No.	**Hazard Description**				**Initial Risk Rating** *(Pre-Resolution)*			**Proposed Mitigation**	**Residual Risk Rating** *(Post-Resolution)*			**Implemented Mitigation**	**Final Hazard Status**			
	Sub-Element	**Hazard**	**Potential Cause(s)**	**Effect(s)**	**Severity** *(1-5)*	**Probability** *(A-F)*	**Safety Risk Index**		**Severity** *(1-5)*	**Probability** *(A-F)*	**Safety Risk Index**		**Status** *(Open/Closed)*	**Safety Verification**	**Date Closed**	**Comments**
Certifiable Element: [Enter Certifiable Element 1...]																
													Open			
													Open			
													Open			
Certifiable Element: [Enter Certifiable Element 2...]																
													Open			
													Open			
													Open			
Certifiable Element: [Enter Certifiable Element 3...]																
													Open			
													Open			
													Open			

Appendix D:
Risk-Based Hazard Analysis (RBHA)

Risk-Based Hazard Analysis
FRA-Specific Safety and Security Certification Worksheet

Project Name: [Enter Project Name] **Contract Number:** [Enter Contract Number]	**Design Consultant(s)**	**Contractor(s)**		**SMWG Approval Date**	**SMRC Approval Date**	**Rev. No.**	**Rev Date**	**Document Status**
	[Enter Company Name(s)]	[Enter Company Name(s)]		[Enter Date]	[Enter Date]	[Add No.]	[Add Date]	**DRAFT**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Hazard Description				**Initial Risk Rating** *(Pre-Resolution)*				**Residual Risk Rating** *(Post-Resolution)*				**Final Hazard Status**			
PHA No.	**Sub-Element**	**Hazard**	**Potential Cause(s)**	**Effect(s)**	**Severity** *(5 to 1)*	**Probability** *(A-E)*	**Risk Index**	**Proposed Mitigation**	**Severity** *(5 to 1)*	**Probability** *(A-E)*	**Risk Index**	**Implemented Mitigation**	**Status** *(Open/Closed)*	**Safety Verification**	**Date Closed**	**Comments**
Certifiable Element: [Enter Certifiable Element 1...]																
													Open			
													Open			
													Open			
Certifiable Element: [Enter Certifiable Element 2...]																
													Open			
													Open			
													Open			
Certifiable Element: [Enter Certifiable Element 3...]																
													Open			
													Open			
													Open			
Certifiable Element: [Enter Certifiable Element 4...]																
													Open			
													Open			
													Open			

Appendix E:
Security Assessment

Security Assessment (SA)

Safety and Security Certification Worksheet

Project Name: [Enter Project Name]
Contract Number: [Enter Contract Number]

Design Consultant(s)	Contractor(s)		SMWG Approval Date	SMRC Approval Date	Rev. No.	Rev Date	Document Status
[Enter Company Name(s)]	[Enter Company Name(s)]		[Enter Date]	[Enter Date]	[Add No.]	[Add Date]	DRAFT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Hazard Description				Initial Risk Rating *(Pre-Resolution)*				Residual Risk Rating *(Post-Resolution)*				Final Hazard Status			
SA No.	Sub-System	Vulnerability	Potential Cause(s)	Effect(s)	Severity *(1-4)*	Probability *(A-E)*	Safety Risk Index	Proposed Mitigation	Severity *(1-4)*	Probability *(A-E)*	Safety Risk Index	Implemented Mitigation	Status *(Open/Closed)*	Safety Verification	Date Closed	Comments
Certifiable Element: [Enter Certifiable Element 1...]																
													Open			
													Open			
													Open			
Certifiable Element: [Enter Certifiable Element 2...]																
													Open			
													Open			
													Open			
Certifiable Element: [Enter Certifiable Element 3...]																
													Open			
													Open			
													Open			

Appendix F:
Operational Hazard Analysis (OHA)

Operational Hazard Analysis (OHA)
Safety and Security Certification Worksheet

Project Name: [Enter Project Name]
Contract Number: [Enter Contract Number]

Design Consultant(s)	Contractor(s)		SMWG Approval Date	SMRC Approval Date	Rev. No.	Rev Date	Document Status
[Enter Company Name(s)]	[Enter Company Name(s)]		[Enter Date]	[Enter Date]	[Add No.]	[Add Date]	DRAFT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
OHA No.	Hazard Description				Initial Risk Rating *(Pre-Resolution)*			Proposed Mitigation	Residual Risk Rating *(Post-Resolution)*			Implemented Mitigation	Final Hazard Status			
	Sub-System	Hazard	Potential Cause(s)	Effect(s)	Severity *(1-5)*	Probability *(A-F)*	Safety Risk Index		Severity *(1-5)*	Probability *(A-F)*	Safety Risk Index		Status *(Open/Closed)*	Safety Verification	Date Closed	Comments
Certifiable Element: [Enter Certifiable Element 1...]																
													Open			
													Open			
													Open			
Certifiable Element: [Enter Certifiable Element 2...]																
													Open			
													Open			
													Open			
Certifiable Element: [Enter Certifiable Element 3...]																
													Open			
													Open			
													Open			

Appendix G:
Hazard Tracking Log

Hazard Tracking Log (HTL)

Safety and Security Certification Worksheet

Project Name: [Enter Project Name]
Contract Number: [Enter Contract Number]

Design Consultant(s)	Contractor(s)		SMWG Approval Date	SMRC Approval Date	Rev. No.	Rev Date	Document Status
[Enter Company Name(s)]	[Enter Company Name(s)]		[Enter Date]	[Enter Date]	[Add No.]	[Add Date]	**DRAFT**

HTL No.	Hazard Source	Source No.	Hazard Description				Initial Risk Rating *(Pre-Resolution)*			Proposed Mitigation	Residual Risk Rating *(Post-Resolution)*			Implemented Mitigation	Final Hazard Status			
			Element	Hazard	Potential Cause(s)	Effect(s)	Severity *(1-5)*	Probability *(A-F)*	Safety Risk Index		Severity *(1-5)*	Probability *(A-F)*	Safety Risk Index		Status *(Open/Closed)*	Safety Verification	Date Closed	Comments
HTL-##	PHA	PHA-01													Open			
															Open			
															Open			
															Open			
															Open			
															Open			
															Open			
															Open			
															Open			
															Open			
															Open			
															Open			

Appendix H:
Certifiable Items List (CIL)

Certifiable Items List (CIL)
Safety and Security Certification Worksheet

Project Name: [Enter Project Name]
Contract Number: [Enter Contract Number]

Design Consultant(s)	Contractor(s)	SMWG Approval Date	SMRC Approval Date	Rev. No.	Rev Date	Document Status
[Enter Company Name(s)]	[Enter Company Name(s)]	[Enter Date]	[Enter Date]	[Add No.]	[Add Date]	**DRAFT**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
									Design Crtieria Conformance Checklist (DCCC)							Construction Specification Conformance Checklist (CSCC)						Testing Specification Conformance Checklist (TVCC)						
											Design Consultant		MBTA Safety				Contractor		MBTA Safety				Contractor		MBTA Safety			
LEVEL 1: Element	LEVEL 2: Sub-Element	LEVEL 3: Item	LEVEL 4: Requirement	PHA No.	SA No.	SCIL (Yes/No)	Requirement (description from the source)	Source (e.g., standards, design directives / guidelines, codes, etc.)	Means of Verification (ref. to "MOV" tab)	Drawing Page Reference (if applicable)	Initials	Date	Initials	Date	Status	Means of Verification (ref. to "MOV" tab)	Initials	Date	Initials	Date	Status	Means of Verification (ref. to "MOV" tab)	Initials	Date	Initials	Date	Status	Comments / Notes
1																												
1	1																											
1	1	1																										
1	1	1	1												Open						Open						Open	
1	1	1	2												Open						Open						Open	
1	1	1	3												Open						Open						Open	
1	1	1	4												Open						Open						Open	
1	2																											
1	2	1																										
1	2	1	1												Open						Open						Open	
1	2	1	2												Open						Open						Open	
1	2	1	3												Open						Open						Open	
1	2	1	4												Open						Open						Open	
2																												
2	1																											
2	1	1																										
2	1	1	1												Open						Open						Open	
2	1	1	2												Open						Open						Open	
2	1	1	3												Open						Open						Open	
2	1	1	4												Open						Open						Open	
2	2																											
2	2	1																										
2	2	1	1												Open						Open						Open	
2	2	1	2												Open						Open						Open	
2	2	1	3												Open						Open						Open	
2	2	1	4												Open						Open						Open	

Appendix I:
Operational Readiness Conformance Checklist (ORCC)

Operational Readiness Conformance Checklist (ORCC)
Safety and Security Certification Worksheet

Project Name: [Enter Project Name]
Contract Number: [Enter Contract Number]

Design Consultant(s)	Contractor(s)	SMWG Approval Date	Rev. No.	Rev Date	Document Status
[Enter Company Name(s)]	[Enter Company Name(s)]	[Enter Date]	[Add No.]	[Add Date]	**DRAFT**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Operational Requirements										Verification				
ORCC No.	Function or Project Component	Certifiable Sub-Element	PHA No.	OHA No.	SA No.	Reference	Title or Description	Means of Verification	Date Approved	Ownership	Project Verification	Safety Verification	Status *(Open/Closed)*	Date Closed	Comments
Certifiable Element: [Enter Certifiable Element 1...]															
													Open		
													Open		
													Open		
Certifiable Element: [Enter Certifiable Element 2...]															
													Open		
													Open		
													Open		
Certifiable Element: [Enter Certifiable Element 3...]															
													Open		
													Open		
													Open		

Appendix J:
Interim Certificate

Massachusetts Bay Transportation Authority

Interim Certificate

Safety and Security Certification Program

Project Title:	Click or tap here to enter text.	**Certificate No**:	Click to enter Cert #
		Effective Date:	Click or tap to enter a date.
		Expiration Date:	Click or tap to enter a date.

The Interim Certificate will become invalid once the Project Certificate of Conformance is issued or when the expiration date is reached. If the Interim Certificate expires prior to the issuance of the Project COC, or interim operating requirements change, a new Interim Certificate must be issued.

Applicable Certifiable Element(s):

Click or tap here to enter text.

Describe all restrictions from normal operations:

Click or tap here to enter text.

Restrictions from normal operations may be required due to open certifiable items or open hazards. Describe those restrictions which must be implemented for the duration of the Interim Certificate to allow operation.

Project Director	Date	Chief Engineer	Date
Chief Operating Officer	Date	Director, Security & Emergency Management	Date
Chief of Safety Engineering & Construction	Date	Chief Safety Officer	Date

Appendix K:
Element Certificate of Conformance

Massachusetts Bay Transportation Authority

Element Certificate of Conformance

Safety and Security Certification Program

Project Title:	Click or tap here to enter text.	**Certifiable Element**:	Click to enter text

List of Sub-Elements:

Click or tap here to enter text.

Provide Any Additional Information (e.g., remaining hazards)

Click or tap here to enter text.

This Element Certificate of Conformance signifies that all safety and security requirements have been completed and verified for the indicated element.

Project Director	Date	Chief Engineer	Date
Chief Operating Officer	Date	Director, Security & Emergency Management	Date
Chief of Safety Engineering & Construction	Date	Chief Safety Officer	Date

Appendix L:
Project Certificate of Conformance

Massachusetts Bay Transportation Authority

Project Certificate of Conformance

Safety and Security Certification Program

Project Title:	Click or tap here to enter text.	**Certifiable Element**:	Click to enter text

List of Certifiable Elements:

Click or tap here to enter text.

Provide Any Additional Information (e.g., remaining hazards)

Click or tap here to enter text.

This Project Certificate of Conformance signifies that all safety and security requirements have been completed and verified for the project and that each element of the project has been certified with an Element Certificate of Conformance. Once this Certificate has been signed and issued, the project may be placed into service without restriction and any Interim Certificate will be invalidated.

Project Director	Date	Chief Engineer	Date
Chief Operating Officer	Date	Director, Security & Emergency Management	Date
Chief of Safety Engineering & Construction	Date	Chief Safety Officer	Date

Appendix M:
Contract Specification

Safety and Security Certification (SSC)
Contract Language

***Note: While the following format can be modified as needed, the specific language shall be utilized for all project and contract types and shall not be modified unless previously approved by MBTA Safety.*

1.1 DESCRIPTION

A. This Section specifies MBTA Project Safety and Security Certification (SSC) program requirements for Consultants and Contractors during a typical project life cycle's design, construction/installation, testing, and pre-revenue/start-up phases.

B. Per Federal guidance, these activities are required before allowing the agency to commence revenue service or occupancy of stations, facilities, parking lots, rail platforms, rolling stock, and operating new and upgraded systems.

C. As part of this project's SSC process, the Consultant and Contractor shall comply with and implement this certification process to ensure adherence to MBTA's safety goals.

1.2 REFERENCES

A. FTA Handbook for Transit Safety & Security Certification (2002)

B. FTA Guideline 5800.1: Safety and Security Management Guide for Major Capital Projects Safety and Security Management Plan (SSMP)

C. 49 CFR Part 633: Project Management Oversight (PMO)

D. MBTA Safety Plan (latest version)

E. MBTA Safety and Security Certification Program Plan (SSCPP)

F. MBTA System Security Emergency Plan (SSEP) (lasted version), Security Sensitive Information (SSI) document with limited access

1.3 GENERAL SUMMARY

A. The Consultant and Contractor are responsible for supporting MBTA's SSC Program as outlined in the SSCPP. The SSC program's purpose is to ensure that:

1. The design, construction/installation, testing, and commissioning of all critical safety and security elements (civil, facilities, structural, equipment procurements, and systems) have been verified for conformance with set safety and security requirements and to verify their readiness for operational use.

2. MBTA rail, bus, facilities, structures, and systems are operationally safe and secure for customers, employees, Consultants, Contractors, and the general public.

3. Establish and utilize a management system to execute the Safety and Security Certification Program.

4. A common ground of understanding is established among key project team members regarding specific responsibilities and the execution of the SSC program.

B. The overall SSC objectives are to achieve acceptable risk levels through systematic hazard analysis and management approach, criteria adherence, design, construction/installation and testing certification and review, and formal contract acceptance. These objectives are to conform to all Federal and Commonwealth of Massachusetts requirements through documentation and verification that:

1. System safety hazards are identified, assessed, and mitigated to acceptable and manageable risk levels.

2. Security vulnerabilities are identified, assessed, and documented action is taken to resolve identified unwarranted security risks.

3. Appropriate codes, guidelines, and standards have been reviewed to provide a basis for safety and security considerations in the final design documents.

4. Facilities, systems, and equipment have been designed, constructed, inspected, and tested per applicable codes and standards.

C. The Consultant and Contractor shall attend MBTA SSC training at the earliest opportunity.

D. The Consultant and Contractor shall attend all Safety Management Working Group (SMWG) meetings for the project.

E. The Consultant and Contractor shall provide the SMWG access to all design, construction/installation, and testing submittals via the project document management software system for the SSC CIL verification process.

F. The Consultant and Contractor shall annotate the Means of Verification (MOV) on the CILs where the safety/security and emergency management design criteria and construction/installation and testing reports submittals are located for verification purposes.

G. The Consultant and Contractor shall verify and provide supporting documentation for the items listed within the Certifiable Items List (CIL) throughout the design, construction/installation, testing, system integration, and pre-revenue stages of the project to ensure compliance with the identified safety and security requirements.

H. During the CIL verification process, the Consultant and Contractor shall provide updated CILs at least every 30 days, or as determined necessary during the SMWG meeting, to account for new means of verification (MOV) annotated on the CILs by the Consultant and Contractor. The SMWG meetings provide details on these requirements.

I. For all change orders and RFI's, the affected CILs, PHAs, and TVA will be reviewed, updated as needed, and submitted to the SMWG for approval to reflect any change that affects safety and security.

1.4 SUBMITTALS

A. Submit the following documents as required by the MBTA Safety and Security Certification Program Plan (latest revision) and the Safety and Security Certification Project Assessment Form for approval by the SMWG:

1. Project Safety and Security Management Plan (SSMP) within 45 days of NTP
2. Project Specific Safety and Security Certification Plan (SSCP) within 45 days of NTP
3. Certifiable Elements List with Sub-Elements (CEL) within 60 days of NTP
4. Preliminary Hazard Analysis (PHA) within 90 days of NTP
5. Threat and Vulnerability Assessment (TVA) within 90 days of NTP
6. Certifiable Items Lists (CILs) including:
    a. Design Criteria Conformance Checklists (DCCC) within 120 days of NTP
    b. Construction Specification Conformance Checklist (CSCC) within 30 days of completion of the 100% plans and specifications
    c. Testing Verification Conformance Checklists (TVCC) within 30 days of system testing plans and procedures approval dates.
    d. During the CIL verification process, the Consultant and Contractor will provide updates CILs no more than 30 days, or at intervals deemed necessary by the project schedule or SMWG guidance to account for new means of verification (MOV) annotated on the CILs.
7. Design, Construction/Installation, and Testing Change Order Approvals. The affected CILs, PHAs, and TVA will be reviewed, updated as needed, and submitted to the SMWG for approval to reflect any changes that affect safety and security.

1.5 QUALITY

A. The Consultant's and Contractor's SSC representative shall have SSC knowledge either by completing a recognized SSC training course provided by the Federal Transportation Administration (FTA), Transportation Safety Institute (TSI), or past MBTA SSC training. Quality control experience or having SSC exposure on past projects can also apply. To validate this requirement, the contractor shall provide one or more of the following:

1. FTA/TSI Transit Safety and Security Program (TSSP) Certificate.
2. A training certificate from one of the FTA/TSI SSC training courses is listed below in paragraph B.
3. A listing of past SSC project experience.
4. Quality Assurance/Quality Control (QA/QC) experience.
5. Past MBTA SSC training within the last five (5) years.

B. Preferred qualification: a transit safety professional with the FTA/TSI TSSP certificate or who has attended an FTA/TSI SSC-related training course from one of the following courses:

1. TSI, FT00551-V, Safety, Security, and Emergency Management Considerations for Capital Improvements Projects
2. TSI, FT00538, Transit System Safety and Security Design Review
3. TSI, FT00543-V, Rail System Safety
4. TSI, FT00433-V, Transit Bus System Safety
5. TSI, FT00432, Transit System Security

1.6 SAFETY AND SECURITY CERTIFICATION PROCESS

A. The MBTA PMs, Consultant PMs, Contractor PMs, and designated SSC representatives will participate in the MBTA SSC Program per the SSCPP (section 3.0 Safety and Security Certification Process) for the contract duration. They will manage and implement the following SSC 10-steps:

Step 1 Identify Certifiable Elements
Step 2 Develop Safety and Security Design Criteria
Step 3 Develop and Complete Design Criteria Conformance Checklist
Step 4 Perform Construction Specification Conformance
Step 5 Identify Additional Safety and Security Test Requirements
Step 6 Perform Testing and Validation
Step 7 Manage Integrated Tests
Step 8 Manage "Open Items"
Step 9 Verify Operational Readiness
Step 10 Conduct Final Determination of Project Readiness and Issue Safety and Security Certification.

B. MBTA Safety will provide oversight implementation guidance and verify compliance with all SSC requirements outlined in the SSCPP section 2.0 Roles and Responsibilities.

C. MBTA PMs shall manage and oversee compliance with the project SSC program and follow the responsibilities outlined in the SSCPP Section 2.0 Roles and Responsibilities.

D. Consultant and Contractor PMs and their SSC representatives shall follow the following general responsibilities and the more comprehensive duties outlined in the SSCPP section 2.0 Roles and Responsibilities

1. Actively support and participate in the Project SSC Program process as outlined in SSCPP and attend the project SMWG meetings.

2. Attend the MBTA SSC training session at the earliest possible opportunity.

3. Ensure all SSC-related submittals noted in paragraph 1.4 above are submitted, reviewed, and validated by the SMWG approved before final submittal approval.

4. Provide MBTA Safety access to all design, construction/installation, and testing submittals via the project document management software system for the SSC CIL verification process.

5. Annotates the Means of Verification (MOV) on the CILs where the safety/security and emergency management design criteria and construction/installation and testing reports submittals are located for verification purposes.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 SSC PROGRAM REPRESENTATIVE

A. The Consultant and Contractor's PMs shall appoint an SSC Program Representative with the qualifications noted in this specification to lead and coordinate the SSC process and activities.

3.2 SSC TRAINING PROGRAM

A. MBTA, Consultant, and Contractor PMs and support staff must attend the MBTA SSC training program within 60 days after NTP is given to reinforce SSCPP requirements and solidify SSC responsibilities.

3.3 SAFETY AND SECURITY CERTIFICATION MANAGEMENT GROUP (SMWG)

A. SMWG meetings are established by MBTA Safety and held monthly or as needed once the project NTP is issued. Once the project kick-off meeting occurs, the first SMWG meeting is scheduled within two (2) weeks.

B. General guidance, attendees, and SMWG responsibilities and activities are found in the SSCPP section 2.0, “Roles and Responsibilities.”

3.4 SSC DOCUMENT CONFIGURATION MANAGEMENT

A. Prepare, update, and complete all submittal document requirements as listed in paragraph 1.2 throughout the performance of the contract.

B. Establish an SSC documentation configuration management folder in the project document management system. The SSC documents shall be consolidated and become a project closeout requirement and provided by the noted responsible party. See Section 7.0 of the SSCPP for a listing of required documentation and responsible party.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. No separate measurement and payment will be made for work required under this section. All costs in connection therein shall be considered therewith shall be considered incidental to the item or items of work to which they pertain.