Public Transportation Agency Safety Plan

For

The Loop Trolley Transportation Development District
And
The Loop Trolley Company

Loop Trolley Rail Fixed Guideway System

- - -

July 2020
Revision 02.2b

- - -

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Revision History

Revision No.	Revision Date	Comments
Rev. 01 (SSPP)	August 2016	First Draft
Rev 02 (SSPP)	October 2016	Revision 1: Updated organizational details and organizational chart; replaced all references to General Manager or GM with either Director of Operations (DOO) or Executive Director (ED); Added Sample Accident Report (based on Annex A – APTA) and added processes for submitting SSOA Reports and for Multi-jurisdictional accident investigations; added specificity to the Rules Compliance section; clarifications added to Section 7 and Section 17; Replaced Table 17 (SOPs) with an updated table; added additional language in Section 15;
Rev 03 (SSPP)	December 2016	Inserted SSRC Approval page; updated Rules Compliance and Emergency Management sections; added language to the Rules Compliance section per SSOA comments.
Rev 04 (SSPP)	February 2018	Updated organizational staff and responsibilities; added reference to the new proposed MoDOT Program Standard; revised timetables for internal reviews; added new accident (event) reporting requirements; deleted Appendix H – Part 674 accident reporting; revisions to Section 6 – Hazard Management and revisions to Section 10 Accident Investigation to comply with the new Program Standard; revisions to Section 16 – Training & Certification to make this consistent with the LTC Training Plan; Revised Hazard charts for severity & probability in Section 6; added combined Hazard-CAP Tracing lof as Table 7; added specific information about FTA reporting in Section 10; added FTA Guidance as Appendices J & K.
Rev 05 (SSPP)	February 2019	Annual review included no major changes. Addressed verb tense and Table/Exhibit reference discrepancies; updated to identify final ruling, implementation 49 CFR Part 673 (PTASP) and 49 CFR Part 674 outcome (State Safety Oversight Program Standards Manual); updated LTC SOP List (Table 16) ; updated organizational chart (Apdx E)
Rev 01 (PTASP)	February 2020	General grammatical and punctuation changes; conversion of SSPP references to PTASP; updated Org chart (Apdx E); updated SOP List (Table 16)
Rev 02 (PTASP)	July 2020	Reorganized PTASP layout and content to accurately reflect PTASP model; Addressed SSOA comments received April 2020; general grammatical updates and punctuation changes
Rev 02.2a-b (PTASP)	July 2020	Addressed SSOA checklist comments received following LTS' 07/17/20 submittal of PTASP relevant to: "Plan Development, Approval and Updates", "Safety Performance Targets", "Development and Implementation of SMS", "Safety Management Policy", "Safety Assurance", "Safety Promotion", Corrective Action Plans", and "Documentation, Definitions, and Acronyms"; additional general grammatical updates.

APPROVALS

Approval of the PTASP

The individuals below, submitting and signing the Public Transportation Agency Safety Plan (PTASP) verify that it was prepared in accordance with the *appropriate and applicable* requirements and guidelines set forth by the Federal Transportation Administration in 49 CFR Parts 625. 655, 672, 673 674 and others, and as set forth by the State Safety Oversight Agency in 49 CFR Part 673 (PTASP) and 49 CFR Part 674, which grants the SSOA authority for oversight and administration of the State Safety Oversight (SSO) program; that they are authorized representatives of the Loop Trolley System, that their signatures attest that all items and conditions contained in this plan are understood, accepted and approved; and that they are committed to implementing the PTASP and achieving its safety goals and objectives.

APPROVED BY:

_____	_____
LTTDD District Administrator	DATE
_____	_____
LTC Executive Director	DATE

Approval by the Loop Trolley Transportation Development District

Approval by the Loop Trolley Company

Approval by the Loop Trolley Safety & Security Committee (SSC)

Approval by State Safety Oversight Agency

EXECUTIVE SUMMARY

General

Applicability

The Loop Trolley Transportation Development District ("LTTDD") and the Loop Trolley Company ("LTC") are committed to comprehensive safety planning. As an operator of a vintage trolley transportation system that received Federal financial assistance via the Urban Circulator Grant program for its construction and startup, the above entities, comprising the Loop Trolley System ("LTS"), is subject to appropriate and applicable requirements and guidelines set forth by the Federal Transit Administration ("FTA"), and further requirements and guidelines set forth by the State Safety Oversight Agency ("SSOA") via its Missouri-Only State Safety and Security Program Standards Manual For Overseeing the Kansas City Streetcar and the Loop Trolley System ("Program Standard Manual" or "PSM"). This Public Transportation Agency Safety Plan ("PTASP") seeks to address such requirements and assure safe and secure operations of the system.

Safety Policy Statement

The management of safety is one of our core business functions. LTTDD and LTC are committed to developing, implementing, maintaining, and improving processes to ensure that all our transportation agency delivery activities takes place under a balanced allocation of organizational resources, aimed at achieving the highest level of safety performance and meeting established standards.

All levels of management and employees are accountable for the delivery of this highest level of safety performance, starting with the LTTDD District Administrator. The LTTDD and LTC are committed to:

- **Support** the management of safety through appropriate resources that will result in an organizational culture of safety and encourage effective employee safety reporting and communication;
- **Integrate** safety management as a of the primary responsibilities of all managers and employees;
- **Clearly define** for all staff, managers and employees alike, their accountabilities and responsibilities for the delivery of the LTS' safety performance;
- **Establish and operate** hazard identification and analysis, and safety risk evaluation activities, including an employee safety reporting program;
- **Ensure** that no action will be taken against any employee who discloses a safety concern through the employee safety reporting program, unless disclosure indicates, beyond any reasonable doubt, an illegal act, gross negligence, or a deliberate and willful disregard of regulations or procedures was committed by said employee;
- **Comply** with, and wherever possible exceed, legislative and regulatory requirements and standards;
- **Ensure** that all managers and employees are provided with appropriate safety-related training.
- **Establish and measure** our safety performance against realistic and data-driven safety performance indicators and safety performance targets;
- **Continually improve** our safety performance through management processes that ensure that appropriate and effective safety management action is taken; and
- **Ensure** externally supplied systems and services to support our operations are delivered meeting our safety performance standards.

_____ _____

LTTDD District Administrator DATE

_____ _____

LTC Executive Director DATE

Definitions

Term	Definition
Absolute Block	A block that must not be occupied by more than one rail vehicle.
Accident [49 CFR Part 674]	**Referred to as "FTA-Reportable Event." An event that involves any of the following:** **1. A loss of life occurring at the scene or within 30 days following the event;** **2. A report of a serious injury to a person;** **3. A collision involving a rail transit vehicle;** **4. A runaway train;** **5. An evacuation for life safety reasons; or** **6. Any derailment of a rail transit vehicle, at any location, at any time, whatever the cause.**
Accountable Executive	A single, identifiable person who has ultimate responsibility and accountability for the implementation and maintenance of the Safety Management System of a public transportation agency; responsibility for carrying out the agency's Transit Asset Management Plan; and control or direction over the human and capital resources needed to develop and maintain both the agency's Public Transportation Agency Safety Plan, in accordance with 49 U.S.C. 5329(d), and the agency's Transit Asset Management Plan in accordance with 49 U.S.C. 5326
Alignment	The horizontal and vertical location or roadway as described by curves and tangents defining its position with respect to the surrounding area.
Anomaly	Deviation from nominal performance which does not cause a significant effect on system performance but does warrant investigation and / or repair.
Aspect	The combination of color an deposition of a fixed signal, light or lights which provides an indication to the Train Operator
Audit	Formal or official examination or review of procedures and verification of compliance
Authorized Speed	The maximum allowed speed for a section of track
Blue Flag	A portable and clearly distinguishable blue light, flag or marker placed on or near each end of a trolley or rail vehicle to protect it from being moved, energized, or coupled to another LRV or other rail vehicle.
Brake, Dynamic	A braking mode that uses traction motors, operating in reverse (as generators) to provide a controlled braking effort.
Brake, Friction	A braking system which applies stopping forces by the use of the brake discs. The brakes are applied by spring action and released by compressed air.
Brake, Full Service	Friction and dynamic braking used by the Operator to slow and /or stop the trolley.
Brake, Maximum	Maximum braking is attained through the use of controlled combination of dynamic, friction and track brakes, in addition to the use of sand placed between the rail and wheels.
Bumping Post	A structure at the end of track(s) placed to prevent rail vehicles from running off the track
Center Platform	Platform located between two operating tracks where both edges are used for passenger boarding and alighting.

Term	Definition
Checked Redundancy	A characteristic of a system which ensures that the probability of any malfunction is controlled to produce a risk comparable to fail safe.
Chief Safety Officer	An adequately trained individual who has responsibility for safety and reports directly to a transit agency's chief executive officer, general manager, president, or equivalent officer. A Chief Safety Officer may not serve in other operational or maintenance capacities, unless the Chief Safety Officer is employed by a transit agency that is a small public transportation provider as defined in this part, or a public transportation provider that does not operate a rail fixed guideway public transportation system.
Code	A document containing mandatory (shall) requirements on "where or when" an action or feature should be implemented. It may be adopted as law (see "standard")
Collision	A collision is a vehicle or vessel accident in which there is an impact of a [rail] transit vehicle with another vehicle or object, such as (but not limited to) another transit vehicle, a non-transit vehicle, a person, an animal, an object, or a rail vehicle.
Contractor	A person or organization that provides a service for a recipient, sub recipient, employer, or operator consistent with a specific understanding or arrangement. The understanding can be a written contract or an informal arrangement that reflects an ongoing relationship between the parties.
Corrective Action Plan	A plan developed by a Rail Transit Agency that describes the actions the Rail Transit Agency will take to minimize, control, correct, or eliminate risks and hazards, and the schedule for taking those actions. Either a State Safety Oversight Agency or FTA may require a Rail Transit Agency to develop and carry out a corrective action plan.
Corrective Action Plan	A plan that describes the actions it will take to minimize, control, correct, or eliminate hazards, and the schedule for implementing those actions
Critical Defect	A defect that judgment and experience indicate could result in hazardous or unsafe conditions for individuals using or maintaining the product or could result in failure in accomplishment of the ultimate objective.
Critical Function List	A listing of those functions whose failure would cause system degradation below an acceptable level.
Criticality	Assignment of relative importance to hardware or systems.
Crossover	A track structure allowing a train to move from one track to another
Deadman Braking	A retrievable, full-service brake application which occurs upon the release of the deadpan foot-pedal or hand button, or upon depression of the deadpan foot-pedal past the second detent.
Deductive Analysis	Analysis of a specific undesired event to determine possible causes of that event (Top down approach "What can cause a specific event to occur?") See Fault Tree Analysis.
Degradation	falling from an initial level to a lower level in quality or performance
Derailleur	A device used to cause a derailment of rail equipment prior to entry into an unauthorized area
Derailment	A non-collision event that occurs when a train or other rail vehicle unintentionally comes off its rail, causing it to no longer be properly guided on the railway
Design Safety	Safety achieved by the integration of system design characteristics to prevent or minimize the probability to operate in an unsafe manner.
Diverge	A change in train movement from one track to another over switches set in a reverse position.

Term	Definition
Double Track	Two Main tracks - one of which operates trains in the normal westbound direction, identified as westbound track #1; the other in the normal eastbound direction, identified as eastbound track #2.
Dwell Time	The time a train in revenue service spends alighting and discharging passengers at a stop, including opening & closing doors
Emergency	A situation that is life threatening to passengers, employers, or other interested citizens; or that causes damage to any transit vehicle or facility; or results in the significant loss of services & reduces the ability of the system to fulfill its mission;
Emergency Stop	The stopping of a train by an emergency application (mushroom) which, after initiated, cannot be released until the train is stopped.
Employee Station	A place where only employees and other authorized personnel may board and alight trolley vehicles
Evacuation	Organized, phased, and supervised withdrawal, dispersal, or removal of civilians from dangerous or potentially dangerous areas, and their reception and care in safe areas.
Event [49 CFR Part 674]	An Accident, Incident or Occurrence.
Facing Movement	The movement of a trolley over a switch with points facing toward the oncoming movement.
Fail-Safe Design	a design principle in which each of the elements which make up a system is analyzed to determine the potential consequence of failure of the element, alone or in combination with any or all other elements of the system, to ensure that a failure or a combination of failures will not result in an unsafe condition.
Fail-Safe Safety	a characteristic of a system and its elements, the object of which is to ensure that any fault or malfunction will not result in an unsafe condition
Failure Analysis	The logical and systematic examination of a system to identify and analyze the probability, causes, & consequences of potential and real failure.
Failure Management	Decisions, policies, & planning which identify and eliminate or control potential failures and implement corrective or control procedures following real failures.
Failure Mechanism	The process which results in a part or equipment failure
Failure Mode	The description of the manner in which a failure occurs, and the operating condition of the equipment at the time of the failure
Fatality	A transit-caused death, including suicides, that occurs with 30 days of the transit incident.
Fault Tree Analysis	A deductive analysis procedure which graphically presents undesired events to determine possible causes of that event
Fire Life Safety Committee	Designated personnel from the local authorities, and representatives from the transit agency, who are assigned to resolve issues related to Fire-Life Safety, and others as necessary to handle technical and complex design and / or operational issues.
Fixed Signal	A signal at a fixed location that affects the movement of a trolley.
Flag	A device used for relaying hand signals or to indicate conditions on the mainline, ROW or in the yard. Flags may be made of cloth or lights.
Flagging Protection	A procedure used to protect work crews, personnel and equipment from trolley and vehicular movements and any other obstructing activities.

Term	Definition
Flag person	A Qualified Employee assigned to protect work crews, personnel and equipment working on or near the tracks to ensure the safe passage of trolleys or vehicular traffic.
Frog	A track structure used at the intersection of two running rails to provide support for wheels and passageways for flanges, thus permitting wheels on either rail to cross the other.
G & T	The Office Of Grants And Training Is The Department Within DSL That Assists States, Regional, Local And Tribal Entities To Prevent, Deter And Respond To Acts Of Terrorism; formerly ODP
General Order	An order issued in writing by the Director of Operations which affects the movement of trolleys. A General Order may supplement the Rule Book and has the force of a Rule governing train operations.
Grade Crossing	A vehicular or pedestrian crossing over the track at the top-of-rail level.
Guideway	That portion of the transit line included with right-of-way fences, outside lines of curbs or shoulders, underground tunnels, cut or fill slopes, ditches, and other elements.
Hand Signal	A signal given by the motion or position of a person's hand, arm, flag, or light.
Hazard	Any real or potential condition that can cause injury, illness, or death; damage to or loss of the facilities, equipment, rolling stock, or infrastructure of a public transportation system; or damage to the environment.
Hazard Matrix	A quantitative measure, combining the numerical probability of occurrence with a hazard severity
Hazard Resolution	The analysis and subsequent actions taken to reduce, to the lowest level practical, the risk associated with an identified hazard.
Incident	An event that involves any of the following: a personal injury that is not a serious injury; one or more injuries requiring medical transport; or damage to facilities, equipment, rolling stock, or infrastructure that disrupts the operations of a transit agency.
Individual	A passenger, employee, contractor, or other rail transit facility worker, pedestrian, trespasser, or any person on rail transit-controlled property
Injury	Any physical damage or harm to a person requiring medical attention necessitating transport to a medical facility by ambulance or police vehicle for medical treatment
Investigation	The process of determining the causal and contributing factors of an accident, incident, or hazard, for the purpose of preventing recurrence and mitigating risk.
Line	The right-of-way and facilities over which trolley routes operate.
Lock-Out/Tag-Out	A safety warning method, described by an SOP, used to indicate the traction power substations or other electrical equipment have been de-energized (turned off) for maintenance, repair, or other reasons. Locked out equipment (marked with a lock-out tag) must not be re-energized or turned on, unless properly authorized as defined in the applicable SOP.
Mainline	Tracks designated for revenue service extending from yard interlocking) to terminal station's) and governed by the authority of the Controller, signal indication or a combination thereof.

Term	Definition
Maintenance	All actions necessary for retaining an item in or restoring it to an operable condition
Malfunction	any anomaly or failure wherein the system, subsystem, or component fails to function as intended
Management Loss Control	An element of the system safety and security management function that evaluates the effects of potential hazards / threats considering acceptance, control, or elimination with respect to the expenditure of available resources.
Maximum Authorized Speed	The highest speed at which trolley vehicles are permitted to operate, subject to safety, civil, operating environment, and other operational considerations that may warrant a further reduction in speed (e.g.: grade crossings, curves, and signals).
Mean Distance Between Failures (MDBF)	The average distance in miles that a transit vehicle travels before failure of a vital component force removal of the vehicle from service.
National Incident Management System	A Set Of Policies, Rules, Protocols And Common Language That Are To Be Used Nationwide To Plan For, Prepare, Manage & Respond To Critical Incidents
National Public Transportation Safety Plan	The plan to improve the safety of all public transportation systems that receive Federal financial assistance under 49 U.S.C. Chapter 53.
Normal Speed	Maximum authorized speed.
Occurrence [49 CFR Part 674]	An Event without any personal injury in which any damage to facilities, equipment, rolling stock, or infrastructure does not disrupt the operations of a transit agency.
Operating Clearance	A clearance issued daily to each Train Operator providing permission to operate on the mainline, subject to the instructions of the Controller and signal indication. A current Operating Clearance must be in the possession of all trains or track cars operating on the mainline or anyone assigned flag person duties.
Operating Right-Of-Way	The area within twenty (20) feet of the centerline of any track on the mainline or yard.
Operational Hazard Analysis (OHA)	Identifies and evaluates hazards resulting from the implementation of operations or tasks performed by persons, considering: operation, test, maintenance, repair, transportation, handling, emplacement or removal of the system
Operational Phase	The post constructing phase where designed project function is achieved and maintenance requirements begin
Operator	That person having direct and immediate control of the movement of a trolley
Oversight Agency	The entity designated by the state to implement 49 CFR Part 659 (MoDOT in MO)
Pantograph	A device affixed to the top of a trolley used to conduct electric power from overhead contact wire.
Passenger	A person who is on board, boarding, or alighting from a rail transit vehicle for the purpose of travel
Passenger Operations	The period of time when any aspect of LTS's operations are initiated to with the intent to carry passengers
Passenger Service	The transportation of fare paying passengers

Term	Definition
Passenger Station	A location where passengers aboard/alight LRV's.
Performance Criteria	Categories of measures indicating the level of safe performance within a transit agency
Performance Target	A specific level of performance for a given performance measure over a specified timeframe.
Person	A passenger, employee, contractor, pedestrian, trespasser, or any individual on the property of a rail fixed guideway public transportation system.
Program Standard	A written document developed and adopted by the oversight agencies (MoDOT) that describes the policies, objectives, responsibilities, and procedures used to provide rail transit agency safety and security oversight
Public Transportation Agency Safety Plan	The documented comprehensive agency safety plan for a transit agency that is required by 49 U.S.C. 5329 and 49 CFR Part 673
Qualified Employee	An employee who is properly trained and certified, and possesses the necessary licenses on his/her person required for his/her duties.
Rail Fixed Guideway System	Any fixed guideway system that uses rail, is operated for public transportation, is within the jurisdiction of a State, and is not subject to the jurisdiction of the Federal Railroad Administration, or any such system in engineering or construction. Rail fixed guideway public transportation systems include but are not limited to rapid rail, heavy rail, light rail, monorail, trolley, inclined plane, funicular, and automated guideway.
Rail Transit Agency	Any entity that provides services on a rail fixed guideway public transportation system
Revenue service vehicle	A vehicle used to transport passengers, including a bus, van, car, railcar, locomotive, trolley car, trolley bus, ferry boat, or a vehicle used on a fixed guideway or inclined plane.
Right-Of-Way (ROW)	Land, property, and interests therein where the trolleys operate
Risk mitigation	A method or methods to eliminate or reduce the effects of hazards.
Root Cause	The underlying reason for the occurrence of a problem; The real cause or origin of an accident or injury
Root Cause Analysis	A technique used to identify the conditions that initiate the occurrence of an undesired activity or state; to find the "root cause"; the process of evaluating, assigning, and measuring root causes.
Safety	A reasonable degree of freedom from those conditions that can cause injury or death to personnel; damage to or loss of equipment or property; and freedom from danger [Also, in 49 CFR Part 659; Freedom from harm resulting from unintentional acts or circumstances
Safety Assurance	Processes within a transit agency's Safety Management System that functions to ensure the implementation and effectiveness of safety risk mitigation, and to ensure that the transit agency meets or exceeds its safety objectives through the collection, analysis, and assessment of information.
Safety Certification	An element of the System Safety Program that documents the functional working of the System Safety Program, and provides a documented database from which to validate the active processes necessary to produce a safe system, ready for revenue service. Used on new systems, facilities and extensions to operational properties.

Term	Definition
Safety Check List	A designation placed on a system, subsystem, element, component, device, or function denoting that satisfactory operation of such is mandatory to assurance of patron, personnel, equipment or facility safety. Such a designation dictates incorporation of special safety design features
Safety Critical	A designation placed on a system, subsystem, element, component, device, or function denoting that satisfactory operation of such is mandatory to assurance of patron, personnel, equipment or facility safety. Such a designation dictates incorporation of special safety design features
Safety Devices	Protective devices which do not alter the fundamental nature of a hazard but which do control the extent of the hazard in some manner
Safety Management Policy	A transit agency's documented commitment to safety, which defines the transit agency's safety objectives and the accountabilities and responsibilities of its employees in regard to safety.
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 Performance Target	A Performance Target related to safety management activities.
Safety Promotion	A combination of training and communication of safety information to support SMS as applied to the transit agency's public transportation system
Safety Risk	The assessed probability and severity of the potential consequence(s) of a hazard, using as reference the worst foreseeable, but credible, outcome.
Safety Risk Management	A process within a transit agency's Safety Management System for identifying hazards and analyzing, assessing, and mitigating safety risk.
Safety Stop	A brake test that must be made within 10 feet after a change in consist has been made, before operating a LRV or train that has been idle for more than one hour and prior to departing the yard, to ensure the brakes are operating properly.
Safety Verification	An activity of safety certification that assures a specific procedure has been followed or that specifications have been met
Security	Freedom from harm resulting from intentional acts or circumstances
Serious Injury	Any injury which: (1) Requires hospitalization for more than 48 hours, commencing within 7 days from the date of the injury was received; (2) Results in a fracture of any bone (except simple fractures of fingers, toes, or noses); (3) Causes severe hemorrhages, nerve, muscle, or tendon damage; (4) Involves any internal organ; or (5) Involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface.
Side Platform	Platform where only one edge is used for passenger boarding and alighting
Signal	A method or device capable of changing in aspect and conveying visual and /or audible information affecting the movement of a train, track car, or other, on-track equipment.
Signal Aspect	An illuminated train signal display

Term	Definition
Standard	A document or drawing containing mandatory (shall) requirements on "how" an action or feature should be implemented. It may be adopted as law (see code)
State of Good Repair	The condition in which a capital asset is able to operate at a full level of performance.
Substantial Damage (NTD 2018 Safety and Security Policy Manual)	Per NTD, damage to any involved vehicles, facilities, equipment, rolling stock, or infrastructure that (a) disrupts the operations of the rail transit agency, and (b) adversely affects the structural strength, performance, or operating characteristics of the vehicle, facility, equipment, rolling stock, or infrastructure, requires towing, rescue, on-site maintenance, or immediate removal prior to safe operation.
Substation	A power supply station along the right-of-way that converts high voltage AC to the 860 VDC supplied to the overhead catenary for vehicle propulsion
Subsystem	An element of a system that in itself may constitute a system
Subsystem Hazard Analysis (SSHA)	An analysis applied to some element of the system to identify hazards associated with component failures
Switch Indicator	A device on the switch stand or spindle indicating alignment of a hand-throw switch.
Switch Lock	A lock used to secure a switch handle, electric switch lock, route selector box, etc.
Switch Position	The switch alignment allowing for straight or diverging moves.
Switch Stand	A device by which a switch is thrown and locked in position.
System	A composite of people (employees, passengers, others) property (facilities and equipment), environment (physical, social, institutional), and procedures (standard operating, emergency operating, and training) which are integrated to perform a specific operational function in a specific environment
System Hazard Analysis	Inductive and deductive procedures in which hazards are identified and analyzed
System Safety	The application of management, engineering principles and techniques to achieve the optimum degree of safety within the constraints of operational effectiveness, time and cost, throughout all phases of the transit system life cycles, by identifying hazards and reducing associated risks
System Safety Analysis	Inductive and deductive procedures in which hazards are identified and analyzed
System Safety Engineering	The application of scientific and engineering principles, criteria, and techniques to identify, eliminate or control system hazards
System Safety Management	An element of management that establishes system safety program requirements and ensures the planning, implementation and accomplishment of tasks and activities to achieve system safety
System Safety Program Plan	A document developed by the rail transit agency describing its safety policies, objectives, responsibilities, & procedures
System Security	The application of operating, technical, and management techniques and principles to the security aspects of a system throughout its life to reduce threats and vulnerabilities to the most practical level through the most effective use of available resources

Term	Definition
System Security Plan	A document developed by the rail transit agency describing its security policies, objectives, responsibilities, & procedures
Temporary Speed Restriction	A section of track within defined limits through which rail vehicles must operate at a speed indicated on the Operating Clearance, speed sign, or instructions from OCC. This restriction may include work crews operating under Flag Protection.
Temporary Speed Restriction Sign	A sign placed adjacent to the track to indicate the entrance to or exit from a temporary speed restriction.
Test Limits	A section of track designated by the authority of the Dispatcher which allows for system or trolley testing.
Track	The parallel rails of a light rail system
Traction Power Contact Wire	An overhead electrical conductor which provides power to the through direct contact with the pantograph.
Traction Power Off	To turn off electrical power (de-energize) to the catenary, messenger wire, and supporting catenary equipment. This process must be field verified and ground applied by a qualified employee.
Traction Power On	To turn on electrical power (energize) to the catenary, messenger wire, and supporting catenary equipment at which time all devices connected to it must be considered energized and live.
Traction Power System	The substations, feeder cable, contact, messenger, dropper and hanger wires, switch gear, and other equipment interfacing with public utilities or other power sources to provide power for the movement of LRV's and operation of their auxiliary systems.
Traction Power/Catenary	A system of electrified overhead wires in which the contract wire is supported from one or more longitudinal messengers either directly by hangers or by hangers in combination with auxiliary conductors or clamps.
Trailing Movement	The movement of a train over a switch whose points face in the direction the train is moving.
Turn back	The changing of the direction of a train.
Unacceptable Hazardous Condition	A hazardous condition determined to be an unacceptable hazardous condition using the Hazard Resolution Matrix
Unsafe Condition Or Act	Any condition or act that endangers life or property
Warning Devices	Sensors that monitor or detect conditions and provide visible and / or audible alerting signals as desired for selected events.
Wayside	The items that are on or about the track area including tracks, ballast, signals, catenary poles, and other structures or equipment immediately adjacent to the right-of-way
Wheel Stop	A device affixed to the rail at the end of track(s) to prevent rail vehicles from running off the track.
Yard Tracks	Tracks at the Maintenance & Storage Facility used to store, repair, and trolleys or rail mounted equipment.

Safety Plan

General

The LTS has established a Public Transportation Agency Safety Plan that meets or exceeds the General Requirements of both the aforementioned requirements and guidelines, including the following required elements:

- The PTASP, and subsequent updates, will be signed by the LTTDD District Administrator who is the *Accountable Executive*, the LTC ED, the LTS SSC Chair, and approved by the LTTDD and LTC Boards of Directors.
- The PTASP documents the processes and activities related to SMS implementation.
- The PTASP includes performance targets based on the safety performance criteria established under the National Public Transportation Safety Plan ("NSP") and the SSOA Program Standard.
- The LTS will establish a process and timeline for conducting an annual review and update of the PTASP.
- The PTASP includes reference to an Emergency Preparedness Program Plan ("EPPP") and procedures that address the assignment of employee responsibilities during an emergency; and coordination with Federal, State, and Local officials and departments with roles and responsibilities for emergency preparedness and response in the LTS operating area.

Certification of Compliance

The SSOA will review and approve the PTASP developed by the LTS, per 49 CFR 674.9(c) and 49 CFR 673, as identified in the Program Standard.

Safety Management System

The LTS herein established and implements an SMS that is scaled appropriately to the size, scope and complexity of the system, and includes the following four (4) components:

1) Safety Management Policy
2) Safety Risk Management
3) Safety Assurance
4) Safety Promotion

Safety Management Policy

The LTS has a written safety policy statement that includes the LTS safety objectives, fortified within this document via safety performance targets. The LTS safety management policy will be communicated throughout the organization.

Responsibilities

1) *Accountable Executive*: The LTS has identified the LTTDD District Administrator as the Accountable Executive. In this role, the District Administrator is accountable for ensuring that the LTS SMS is effectively implemented throughout the system; and ensuing action is taken, as

necessary, to address substandard performance of same. The District Administrator may delegate specific responsibilities, but ultimately, accountability for the LTS' safety performance cannot be delegated and always rests with the Accountable Executive.

2) *Chief Safety Officer*: The Accountable Executive has identified the position of Safety & Training Specialist for the role of Chief Safety Officer. This position and role has a direct line of reporting to the Accountable Executive. This person must be adequately trained within three years to be in compliance with 49 CFR 672. The mandatory training program for the CSO consists of six (6) required courses made available through the Public Transportation Safety Certification Training Program. In this role, the CSO has the authority and responsibility for day-to-day implementation and operations of the LTS safety management system. Due to the safety-critical nature of this position, the CSO may not serve in other operational or maintenance capacities.

   Within the Safety Management System framework, the CSO has the following responsibilities:
   - Drafts SMS policies and procedures;
   - Implements and operationalizes the SMS;
   - Identifying, Assessing and Mitigating safety concerns/risks, and monitoring both safety performance and documentation processes;
   - Communicates directly with the Accountable Executive and transportation agency leadership on SMS implementation needs; and
   - Recommend technical and staffing resources, as practical, to support effective SMS implementation

3) *Management Staff*: The LTC has identified members of its full-time staff – consisting of its Executive Director, its Director of Operations, and its Maintenance Leader – to implement and operate the LTS SMS.

Relevant to implementing the "four pillars" of the PTASP, the System Safety Task Matrix incorporates the responsibilities of LTC management in performing same. The Accountable Executive, who has ultimate authority for its implementation, has designated the position of Safety & Training Specialist to serve as Chief Safety Officer, through which the elements of the PTASP and the SMS are created, implemented and tracked.

The LTS has also established a process, via its Safety & Security Committee, that allows employees to openly discuss and work to correct safety concerns, or in the event it cannot or should not be resolved in such forum, a process that allows employees to report safety conditions to senior management, with protections for employees who report same.

Safety Risk Management

Safety Risk Management Process

The LTS has developed and implemented a Safety Risk Management process for its system, comprised of the following activities:

1) Identification of safety hazards;
2) Analysis of safety hazards;
3) Safety risk evaluation; and

4) Safety risk mitigation

Safety Hazard Identification and Analysis

The LTS has established a process for hazard identification and analysis (see *Chapter 5 – Hazard Investigation & Analysis*).

Safety Risk Evaluation and Mitigation

The LTS has established the Safety & Security Committee as the lead group in evaluating and prioritizing day-to-day safety risks associated with the potential and consequences of safety hazards. Safety risks are evaluated in terms of likelihood and severity, using an industry-accepted risk management matrix, and take into account mitigations already in place to reduce the likelihood or severity of the potential consequence(s) analyzed.

Safety Assurance

Safety Performance Monitoring and Measurement

The LTS has established activities (see Chapter 7 – Accidents & Investigations) to:

1) Monitor the system for compliance with, and sufficiency of, the LTS procedures for operations and maintenance;
2) Monitor LTS operations to identify hazards not identified through the Safety Risk Management process;
3) Monitor LTS operations to identify any safety risk mitigation that may be ineffective, inappropriate, not implemented as originally intended, or requiring corrective actions due to new federal, state, local or industry regulations.
4) Investigate safety events to identify causal factors; and
5) Monitor information to account for reporting through external/internal safety reporting programs.

Management of Change

The LTS has established a process for identifying and assessing changes that may introduce new hazards or impacts on the system's safety performance. If the LTS determines that a change may impact its safety performance, the SSC will discuss and evaluate proposed changes through its Safety Risk Management process.

Continuous Improvement

The LTS has established a process to assess its safety performance (*see Chapter 10 – Continuous Improvement*). If in this process, the LTS identifies any deficiencies as part of its safety performance assessment, then the LTS will develop and carry out, under the authority of the District Administrator, a plan to address the identified safety deficiencies.

Safety Promotion

Safety Communications

The LTS fosters open communication regarding safety between all levels of the agency (*see Chapter 11 – Safety Communications*). This starts with fully communicating the safety policy and safety processes to all employees, utilizing a variety of tools and materials, such as Training, Memorandums, General Notices, and signage. Employees are required and encouraged to report hazards, take responsibility for safety in their tasks and work areas, educated themselves on safety and with formal training, and attend safety briefings, trainings and events when available and possible.

All levels of the LTS are required, through formal and informal communications, to ensure that safety information is disseminated. The PTASP sets forth these requirements to support the LTS SMS.

Competencies and Training

The LTS has established a safety training program for all agency employees and contractors directly responsible for, or held to adherence to, the management of safety, inclusive of refresher training as necessary.

Safety Plan Documentation and Recordkeeping

Safety Plan Documentation

The LTS strives to maintain documents that set forth and support the PTASP, including those related to the implementation of LTS' SMS, and results from SMS processes and activities. The LTS maintains documents that are included in whole or by reference, that describe the programs, policies, and procedures that the LTS uses to carry out its PTASP.

As identified in 49 CFR Part 673, the LTS will make documentation available to the FTA, SSOA and other industry or non-industry entities, as appropriate.

Safety Plan Records

In addition to any documents or records required elsewhere by 49 CFR Part 673, the LTS maintains records, for a period of three years, the following:

- Safety risk mitigations discussed and implemented through its SSC;
- Results of LTS performance assessments and inspections;
- Employee safety training taken for purposes of understanding and implementing the PTASP, the SMS, and/or day-to-day safety duties and responsibilities as assigned.

Part 1 – SAFETY MANAGEMENT POLICY

Chapter 1 – Safety Policy Statement

General Safety Policy

It is the policy of the LTS to provide a safe and reliable heritage trolley transportation service for the general public, to provide safe and healthy working conditions for LTS employees and contractors, and to comply with applicable occupational and environmental laws and regulations.

Operational and safety training, accident investigation, Standard Operating Procedures ("SOPs"), and scheduled audit and inspection programs are examples of such tools utilized for the LTS, and are documented/referenced in this PTASP. The purpose of the PTASP, among others, is to recognize and correct unsafe acts and conditions, to promote safety awareness, and to assist in the prevention of injuries and illness.

Every LTS employee, and any outside contractor performing work for or on the LTS, has a duty to adhere to the PTASP, and is encouraged to support the identification of, and subsequent mitigative efforts for, system hazards. Employees will work in a safe manner, promote safety awareness through their own actions and interactions, and actively assist in accident prevention.

The LTTDD District Administrator accepts overall responsibility for safety. Management staff for LTC are responsible and accountable for the implementation of the PTASP in each role's respective area of responsibility.

All LTS employees must carry out their assigned duties in a safe and efficient manner. The Safety & Security Committee ("SSC") is responsible for taking a proactive approach to identifying and correcting hazards to ensure a practical degree of safety for LTS employees and passengers. As Accountable Executive, the LTTDD District Administrator has the primary responsibility for coordinating implementation of the PTASP and monitoring compliance.

The signatures of the LTTDD District Administrator and LTC Executive Director included in the Safety Policy Statement attest to the fact that this plan is understood, accepted and approved; and that management is committed to implementing SMS through the PTASP, and in achieving its safety goals and objectives.

Safety Management Policy

Furthermore, the LTS is committed to comprehensive safety planning and, as an operator of a heritage trolley transportation system operating in the State of Missouri, compliance with 49 CFR Part 673 and the Program Standard.

The LTS has adopted the principles and methods of Safety Management Systems (SMS) as the basis for enacting and enhancing its safety program. All rules, regulations, policies, guidance, best practices, and technical assistance administered will, to the extent practical for the system type, follow the principles and methods of SMS.

Communication

The LTS safety policy statement will be communicated throughout the organization through:

- SMS Training for all key employees;
- Communications to LTS employees from the Accountable Executive;
- New hire trainings;
- Safety briefings; and
- General bulletins or signage

The PTASP will be available at all times to all employees by request. It will be maintained in an accessible electronic file and in hard copy form.

Authority

The LTTDD, a political subdivision of the State of Missouri organized under the Missouri Transportation Development District Act, Section 238.200 et seq. RSMo, is the owner and manager of the LTS. The LTTDD was formed to undertake the Transportation Project, including the financing, installation and construction of a trolley car and track system to run east-west along Delmar Boulevard between Kingsland Avenue in the City of University City and DeBaliviere Avenue in the City of St. Louis, and north-south along DeBaliviere Avenue between Delmar Boulevard and Lindell Boulevard in the City of St. Louis and within the boundaries of the District[1]. The LTTDD is governed by a Board of Directors that consists of the presiding officers of the following organizations:

- City of St. Louis, Missouri
- St. Louis County, Missouri
- University City, Missouri
- the CB5421/5975 Transportation Development District
- Bi-State Development Agency of the Missouri-Illinois Metropolitan District, d/b/a Metro.

The LTTDD Board has hired a part-time District Administrator who will serve as the Accountable Executive with respect to safety, security, and asset management on behalf of the LTTDD.

The LTTDD has entered into an Operating & Maintenance agreement with the LTC, a Missouri 501C3 organization. The LTC was formed in 2001 for the purposes of ". . .*the creation, planning funding, implementation, construction, connection and operation of a public not-for-profit trolley line or lines operating in the County of St. Louis and the City of St. Louis, Missouri."* The LTC is governed by a volunteer Board of Directors.

The LTC has hired an Executive Director ("ED") who is responsible for the overall management of the LTC, including safety & security, and a Director of Operations ("DOO") who is responsible for transit operation and maintenance. In its organizational chart, the LTC Board has identified a position for the Safety & Training Specialist ("STS") who serves as the Chief Safety Officer ("CSO"). The Safety &

[1] As described in Exhibit D of that certain Declaratory Judgment, Decree and Order Organizing a Transportation Development District and Approving a Funding Method by the Circuit Court of the County of St. Louis, Missouri in Cause No. 07CC-003451, Division 20 dated July 16, 2008.

Training Specialist will report directly to the LTTDD District Administrator on matters of safety, security, and emergency management and to the ED on day-to-day activities.

Federal Transit Administration

The FTA has the authority to establish substantive and procedural rules for its administration of a comprehensive safety program to improve the safety of public transportation systems. 49 CFR Part 670 provides the framework for FTA to monitor, oversee and enforce transit safety, based on the methods and principles of Safety Management Systems. This includes the authority to issue Safety Directives, Safety Advisories, to investigate events and hazards at transit agencies, and to require reporting by transit agencies and SSO Agencies. The FTA also assesses whether the State has complied with or has made adequate efforts to comply with applicable laws and regulations. If the FTA determines that the State is not in compliance or has not made adequate efforts to comply, it may withhold federal funding apportioned for use in the State or affected urbanized areas under FTA's formula program for urbanized areas. In addition, FTA receives reports from the oversight agency.

MAP-21 – The Moving Ahead for Progress in the 21st Century Act of 2012 (MAP-21), enacted as 49 U.S.C. 5329, set in motion a process whereby SSO Agencies must enhance their standards and practices and become certified by FTA within three years of the effective date of the new SSO Rule, codified as 49 CFR Part 674 in April of 2016. An excerpted copy of the MAP-21 statutory language (49 U.S.C. 5329(e)) is attached as Appendix F; the text of 49 CFR Part 674 is attached as Appendix E to this Manual.

As stated in 49 CFR Part 674.9, after the three-year period the current SSO regulation (Part 659) and Section 5330 will no longer be in effect. 49 CFR Part 670, the Public Transportation Safety Program, further outlines the scope of FTA authority over RFGS and safety oversight activities, including the ability to conduct investigations, inspections, audits and examinations, and test the equipment, facilities, rolling stock, and operations of a covered RFGS.

It is the intent of this document to comply with 49 CFR Part 674 as well as with the MoDOT Program Standards Manual. Reference, where applicable, will be made to 49 CFR Part 670 and to 49 CFR Parts 625 and 630. Additionally, where practical, this plan incorporates concepts and principles of 49 CFR Part 673. This document will be updated, during its annual review, to comply with any other FTA rules and the revised Oversight Standards Manual.

FAST ACT – On December 4, 2015, the President signed the Fixing America's Surface Transportation ("FAST") Act (Pub. L. 114-94) into law, which did not modify the provisions included in MAP-21 that were the subject of the NPRM(s), but did augment FTA's safety authority by appending a new subparagraph (e)(8) "Federal Safety Management" to 49 U.S.C. 5329(e). This section provides additional authority to the FTA and adds additional requirements as follows:

- Temporary federal assumption of SSO programs;
- Explicit authority to issue nationwide safety directives and prohibit/restrict operations;
- Requires the National Public Transportation Safety Plan to include minimum safety standards (other than vehicle performance standards);
- Requires FTA to conduct a review of public transportation safety standards and protocols, and issue a report with recommendations and actions to improve the safety of the public transportation industry;
- Requires a study and report on evidentiary protection for safety program data; and

- Requires a Notice of Proposed Rulemaking (NPRM) on transit driver safety & risk of assault.

State Safety & Security Oversight

In response to the passage of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) which added Section 28 to the Federal Transit Act (codified at 49 U.S.C. Section 5330), the Federal Transit Administration (FTA) published a set of regulations creating the first-ever, state-managed safety and security oversight program for rail transit agencies not regulated by the Federal Railroad Administration (FRA).

This regulation was published as "Rail Fixed Guideway Systems; State Safety Oversight" (SSO) on December 27, 1995 (codified at 49 CFR[2] Part 659) subsequently referred to as the SSO rule or Part 659. The safety requirements for Part 659 went into effect on January 1, 1997, and the security requirements went into effect one year later.

On April 29, 2005, a revised rule, "Rail Fixed Guideway Systems; State Safety Oversight" (codified at 49 CFR Part 659) was published. The FTA issued implementation guidelines for the states and the rail transit agencies on Oct. 10, 2005. The revised rule was effective May 1, 2006.

The state of Missouri designated the Department of Economic Development, Division of Motor Carrier and Railroad Safety as the State Safety Oversight agency and subsequently published its rule for Fixed Guideway Transit Systems beginning with an emergency rule in 1993 and subsequent amendments through Feb. 28, 1999.[3] In 2002, the State of Missouri abolished the Division of Motor Carrier and Railroad Safety and transferred its duties and functions to the Multi-Modal Division of the Missouri Department of Transportation (MoDOT).[4] MoDOT updated the state regulations effective June 30, 2007 to comply with the new FTA rule[5] That Program Standard[6], however, was a joint standard with the Saint Clair County Transportation District (SCCTD). In order to clarify the applicability of the standard, MoDOT entered into a Memorandum of Understanding with the LTTDD on June 2, 2014, stipulating that the joint standard applies to the LTS, but that any reference to Illinois is omitted.

Missouri Revised Statutes, Chapter 389, Sections 998 and 1005 endow MoDOT with SSO Agency responsibilities and enforcement authorities. In these state laws, MoDOT is established as the entity responsible for adoption and enforcement of rules relating to the operation and maintenance of light rail systems within the state. Missouri state code (7 CSR 265 Chapter 9) regulates rail fixed guideway systems operating within the state. This regulation references the MoDOT SSO Program Standards Manual and contains requirements that go beyond the scope of federal regulations, such as those pertaining to hours of service and rail grade crossings.

Subsequently, in December 2017, MoDOT published the proposed “State Safety & Security Oversight Standards Manual For Overseeing the Kansas City Streetcar and the Delmar Loop Trolley”, finalized as rev. 1.2 in May 2018. (*Oversight Standards Manual*). This manual provides standards, procedures, and technical direction to Rail Fixed Guideway Systems (RFGS) within the State of Missouri in order to implement the Missouri Department of Transportation (MoDOT) State Safety and Security Oversight (SSO) Program, Via 49 CFR Part 674, SSOA is granted the authority to oversee and administer the SSO program for the LTS and other Rail Fleet Guideway Systems (RFGS).

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[2] Code of Federal Regulations (as defined in the Proposed National Transportation Safety plan; published by the Federal Transit Agency in 2016)
[3] 7 CSR 265 Mo
[4] RSMo 389.005; RSMo 226.008
[5] 7 CSR 265 Mo
[6] State Safety and Security Oversight Program Standards Manual (July 2007)

Objectives and Performance Targets

The LTS has established Safety Objectives, performance targets and performance measures in compliance with the National Public Transportation Safety Plan. (*see Part III - Safety Assurance*)

Scope

It is the mission of the LTS to establish meaningful and achievable goals for its system safety program. The primary purpose of the PTASP is to set out the department tasks within the organizational structure that will fulfill the mandate to provide a safe and secure transit system, and is intended to cover all current and future LTS operations, services and project. In order to implement its safety policies, goals and objectives, this PTASP:

- Addresses all LTS departments and contractors;
- Applies to all activities which involve planning, design, construction, procurement, installation and testing of equipment or facilities, operations, maintenance, support activities, and the environment in which the heritage trolley transportation system operates;
- Charges each board office, board member, administrator, director, supervisor, and employee with the responsibility for PTASP implementation and success;
- Requires coordination, integration, communication, and cooperation from each board officer, board member, administrator, director, supervisor, and employee;
- Encompasses all system operations including facilities, equipment, vehicles, and employee activities, and applies to all who come in contact with the system;
- Establishes appropriate safety performance measures to ensure continuous safety improvement;
- Accommodates federal and state safety assessments, inspections, investigations, audits, examinations and testing; and
- Fosters a positive safety culture.

Purpose

The LTS has adopted the practices and methods of SMS as described in the NSP. The purpose of this PTASP is to implement the SMS program and introduce safety processes where they are necessary to achieve assurance. The PTASP is reviewed annually to ensure all systems, equipment, facilities, plans, procedures, manuals, and training programs are in compliance with established safety requirements. Specifically, the PTASP:

- Established the safety program on a system-wide basis
- Provides a framework for implementing the LTS' safety management system, policy, goals and objectives.
- Identifies the responsibilities of each LTS department relative to achieving safety goals and objectives;
- Provides a mechanism whereby the LTS can demonstrate its commitment to safety, foster a positive safety culture and meet safety performance goals;
- Provides requirements that, as appropriate, contractors and suppliers meet LTS safety requirements prior to commencing work and/or while working on the system;
- Satisfies federal, state and local requirements;
- Ensures that the system meets or exceeds accepted safety standards for its industry;

- Facilitates FTA and SSOA safety inspections, reporting, corrective actions, and general and special directives and requirements; and
- Implements NSP performance criteria, state of good repair, vehicle safety standards, meet training criteria and all other safety management requirements and goals.

Employee Safety Reporting Program

The LTS encourages employees to self-assess in their day-to-day departmental activities to identify and potential safety hazards and recommend corrections to the SSC. Where possible, these requests will be reviewed through the LTS' established safety risk management process. In the event an employee or contractor would rather address safety risks and/or hazardous conditions outside the established SSC risk management structure – i.e. in a Protected status – they can report their safety concerns to the assigned Safety Department representative. All employees are protected from retaliation from their peers and/or supervisors due to reporting safety conditions.

Examples of items that can be reported include:

- Hazards/Potential Hazards
- Safety issues and concerns
- Accidents and incidents
- Possible physical and/or procedural changes
- Close calls and near misses

Safety Reporting is protected when:

- Reporting safety hazards or potential hazards
- Making suggestions for possible physical and/or procedural changes
- Reporting other employees' unsafe behavior
- Fatigue that presents an unacceptable hazardous condition
- Self-reporting of a close call or near miss

Safety Reporting is not protected for the following:

- Willful safety violations
- Reckless and neglectful acts
- Actions resulting in an accident or incident
- Criminal activities
- Alcohol or drug use
- Making a false report
- Being observed violating LTS safety rules by supervisor

All LTS employees can (anonymously, if the employee wishes) report a safety issue or concern. Likewise, LTS employees can notify directly the assigned Safety Department representative.

The assigned Safety Department representative will investigate each item reported and report the findings to the person who originally filed the issue, should that person report non-anonymously. The safety concerns reported will then be discussed within the safety management process framework within the SSC to identify corrective actions, if any, relevant to the area of concern.

Chapter 2 – Safety Accountability and Responsibility

Management Structure

The LTS has established the necessary authorities, accountabilities, and responsibilities for the management of safety amongst the following LTS individuals, as related to the management of the LTS SMS.

The LTTDD Board has selected a part time District Administrator to act as its "Accountable Executive[7] who is ultimately responsible for risk management, asset management, and safety assurance. The District Administrator oversees the Operating & Maintenance Agreement with the LTC and acts as the LTTDD Board liaison to the FTA, the SSOA, and other regulatory agencies.
The LTTDD entered into an O & M Agreement with the LTC, a Missouri Not-for-Profit company formed in 2001. Its principal corporate purpose is the *"creation, planning, funding, implementation, construction, connection and operation of a public . . . trolley line or lines operating in the County of St. Louis and the City of St. Louis, Missouri".* The LTC hired a competent and experienced O & M staff to carry out its obligations under the O & M Agreement. An organizational chart is included in Appendix O.
The LTC organization is led by an Executive Director (ED) who will report both to the LTC Board and to the LTTDD District Administrator, and a Director of Operations (DOO) who reports to the ED. The ED is responsible for the internal overall management of the LTC organization and for relationships with external organizations. The DOO is directly responsible for the trolley operations and maintenance. In its organizational chart, the LTC has established the position of Safety & Training Specialist, who will serve as the Chief Safety Officer and report directly to the LTTDD District Administrator on matters of safety, security, and emergency management. Additionally, the LTC organizational chart includes the following positions:

- Maintenance Leader
- Dispatcher
- Trolley Operators
- Vehicle Restoration/Repair Specialist
- Maintenance Technician

The basic inspection and preventative maintenance responsibilities for track, OCS, and traction power are performed by the LTS Maintenance Department or under contract with Metro.

The LTC has also established a Safety & Security Committee consisting of the following personnel:

- Safety & Training Specialist (or assigned Safety Department Representative)
- DOO
- Maintenance Leader
- Dispatcher

This committee will meet at least once per month during operations to review and discuss issues related to safety and security. One of the primary purposes of the SSC is to monitor the implementation of the LTS

[7] a single, identifiable person who has ultimate responsibility for carrying out the Safety Management System of a public transportation agency; responsibility for carrying out the agency's Transit Asset Management Plan; and control or direction over the human and capital resources needed to develop and maintain both the agency's Public Transportation Agency Safety Plan, in accordance with 49 U.S.C. 5329(d), and the agency's Transit Asset Management Plan in accordance with 49 U.S.C. 5326.

safety and security goals and objectives and develop corrective actions if these are not being achieved. This committee will also meet:

- To review accidents;
- To review and resolve hazards;
- To review and approve system modifications;
- To plan internal audits; or
- To review configuration management issues

The SSOA, the ED, and the LTTDD District Administrator will serve as ad hoc members of this committee and may attend most, but not all, meetings. Other LTC employees or contractors will be requested to attend meetings as the situation requires. The SSC will meet with the SSOA as required. Conflicts relative to safety and security within the SSC will be resolved first by the LTC Executive Director but may be escalated to the LTTDD District Administrator by any committee member. Minutes of meetings will be kept and sent to committee members, the ED, the LTTDD District Administrator, and the SSOA.

This committee also oversees and approves any remaining safety & security certification tasks as well as any outstanding open issues remaining from the construction and startup phases of the project.

System Overview and History

Loop Trolley Operations

Alignment, General

The details of the alignment, beginning at its western terminus in University City, are as follows:

- A station with tail track is located on the north side of Delmar Boulevard just west of Kingsland Avenue, with an eastbound track crossover through Kingsland Avenue intersection to double track configuration.
- A pair of tracks has been embedded in the east and westbound traffic lanes of Delmar Boulevard east of Kingsland Avenue to just west of the old Wabash Station (above the MetroLink Delmar light rail station).
- A single track, accommodating east and west bound trolleys, runs in a central median on Delmar Boulevard from east of the old Wabash Station to the DeBaliviere Avenue intersection. A passing track is installed in the exclusive trolley area in the median just east of Goodfellow Avenue.
- A single track, accommodating north and southbound trolleys, runs in a dedicated track-way along the eastern side of the DeBaliviere right-of-way). The three traffic lanes on DeBaliviere are to the west of that alignment and a greenway (St. Vincent's) separates the track from the traffic lanes. This segment extends between Delmar Boulevard (north end) and immediately south of Forest Park Parkway (south end). A bicycle path and pedestrian sidewalk are located on the east side of the track.
- The trolley ROW crosses over two existing bridges. One is on DeBaliviere (over the MetroLink ROW) and the other is on Delmar Boulevard at the Old Wabash Station (also over the MetroLink ROW). The DeBaliviere Bridge has been rehabilitated. The substructure has been reinforced as warranted, and the superstructure has been replaced based upon the final

design analysis and adaption of the Juneau report prepared during the Environmental Assessment (EA)[8].

The alignment contains eight (8) switch arrangements shown in Table 1.

Table 1 – Switch Locations

Switches from West to East	Location	Purpose	Description on Drawing
Switch # 1	On Delmar, East of Kingsland	Exit/Entrance to terminal station from single track to double track	# 6 RH Turnout
Switch # 2	East of MetroLink Delmar Station/ Trolley Stop	Double track into station (from the west); diverges to single track on the east end	# 6 LH Turnout
Switch # 3	On Delmar at Hamilton	Entrance to MSF Yard	25m LH Turnout
Switch # 4	Inside MSF Yard	Yard Switch	#6 LH Turnout
Switch # 5	At west end of Delmar passing track just east of Goodfellow	Double track to single track	# 8 LH Turnout
Switch # 6	At east end of Delmar Passing Track west of DeBaliviere	Double track to single track	# 8 LH Turnout
Switch # 7	North end of DeBaliviere passing track just south of Waterman	Double track to single track	# 6 RH Turnout
Switch # 8	South end of DeBaliviere passing track just north of Pershing	Double track to single track	# 6 RH Turnout

Heritage Trolleys

The system will operate a total of three (3) heritage trolleys that have had significant upgrades and refurbishing. One (1) of these trolleys is from the Seattle Waterfront line and is classified as a Melbourne W2 style car[9]. The other two (2) cars are replica Gomaco Council Crest cars, manufactured in 1991, that were acquired from Tri-Met in Portland. Each of these cars has been modified to operate as a bi-directional trolley on a double track configuration. All three (3) cars are equipped with a low voltage distribution system and the high voltage controls have been eliminated. Once the modifications are complete, all of the cars will be ADA compliant. The LTS also has two additional W-2 cars that will remain in storage until funds are available for refurbishment.

Maintenance and Storage Facility (MSF)

[8]"FTA Environmental Assessment Re-evaluation" March 22, 2012

[9] Additionally, the LTTDD will have two additional W2 cars kept in storage until funds are available for future refurbishment.

An historic structure, located at 5875-5891 Delmar Boulevard, St. Louis, MO, has been renovated and is used for the trolley maintenance and storage facility (MSF). The structure is on the National Register of Historic Buildings and was a vacant masonry one- and two-story former high school (later a car dealership) with an unfinished partial basement. The building was originally constructed in 1911, with an addition added in 1951. The first floor measures about 27,000 square feet and the partial second story is about 14,000 square feet. Operations and support functions are located within the MSF along with a traction power substation that provides motive power to the main line and the yard. The MSF has two tracks leading in from the yard and can accommodate up to three trolleys on its storage track. There are also two inspection pits.

The first floor of the MSF contains the following facilities and equipment:

- Administrative Office
- Dispatch Center
- Break Room
- Training Room
- Outdoor car wash area for exterior and interior vehicle cleaning;
- Two running repair tracks for scheduled car servicing inspection, minor repairs, and change-out of minor components;
- Raised track for storage of un-refurbished vehicles;
- Heavy repair area for major repairs and modifications and exchange of trucks;
- Truck shop for repair and overhaul of trucks and change-out of truck components;
- Pantograph shop for testing and repairs;
- Motor shop for testing and repair of motors and components; and
- Brake shop for testing and repair.

The component repair shops support maintenance services for elements of the LTS and include the following:

- Battery shop
- Welding shop
- Electrical room
- Mechanical room
- Electronics shop
-

The second story of the facility will remain unfinished until some later date.

Traction Power Sub-station (TPSS)

The trolley system uses one traction power substation located within the MSF that distributes electricity to the overhead contact wires in order to power the trolleys. The substation electrical supply equipment receives high voltage three-phase alternating current (AC) power from Ameren UE 4160 VAC switchgear to the transformer with an output of 480 volts to the substation. The substation converts the AC power to 600 VDC nominal line voltages, which are capable of delivering in excess of 1,000 Amps.
The electrical power distribution system is constructed using catenary or trolley wire. Power is distributed through the pantograph located on top of the trolley. The wire is not insulated and should be considered live at all times. The overhead power distribution system is continuous. When power is removed, the entire system is de-energized.

During non-operating hours, the LTC de-energizes the OCS by opening switches for the shop, yard and mainline and performing a voltage confirmation via voltage meter. Following power down, a ground strap and flashing strobe light is placed on the Overhead Catenary System (OCS) outside of the MSF to verify that the power is off.

Station Stops

The Loop Trolley System has ten (10) station stops. There are four (4) basic configurations:

- Greenway stations – these are the three (3) stations situated between the Greenway that parallels DeBaliviere Boulevard and the northbound lane of DeBaliviere
- Side stations – the stations in the Loop area where there are a double set of tracks and separate platforms for east and westbound passengers
- Center stations – the stations in the median of Delmar Boulevard between Des Peres and DeBaliviere
- Terminal stations – these are single platform stops at each terminal end of the alignment (one at Kingsland and the other at the Missouri History Museum)

Three (3) of the stations are located in University City, while the other seven (7) are in the City of St. Louis. The Missouri History Museum/Forest Park stop is unique in that it is shorter than the other stations.

Bridges

The trolley alignment utilizes two existing bridges – one on DeBaliviere Avenue near Forest Park Parkway and the other on Delmar Boulevard at the Old Wabash Station. Both of the roadway overpasses cross over the MetroLink double track alignment, each having protections from vehicle intrusion to the MetroLink right-of-way (ROW). These include barrier walls and fencing as appropriate. Bridges have warning signs posted over the MetroLink OCS system warning of the danger.

Radio System

Loop Trolley staff – including the on-duty Dispatcher, Operators, Maintenance person(s), Director or Operations and Executive Director have access to a protected, all-call radio system to support standard operational direction and emergency communication.

State of Good Repair ("SGR") & Transit Asset Management

One of the significant requirements of MAP-21 is that each transit agency develop a Transit Asset Management Plan ("TAMP"). The LTS has developed and finalized its detailed listing of critical assets as of July 2020. The elements of the TAMO include:

- Current asset inventory;
- Asset condition assessment;
- Performance measures;
- Investment prioritization
- Tracking system that factors in Safety

The FTA developed the National Safety Plan, which sets national priorities through performance based requirements, articulates goals for improves safety risk analysis and performance management in future national safety plans; defines the process for collecting improved, standardized industry safety data; establishes clear and consistent definitions/metrics for tracking performance allowing for performance comparisons across similar agencies or system types, and enabling FTA to formulate national trend data and set priorities. As of its July 2020 completion, the LTS consists of the following asset categories:

- Equipment
- Rolling Stock
- Infrastructure
- Facilities

With the above asset categories determined, the LTS TAMP further identifies subclasses of same, and from there, individual assets, to give a complete accounting of critical assets, as identified below:

Asset Category		Asset Class	Individual Asset
	Equipment	Maintenance	Pressure Washer 1 Ton Jib Crane Lifting Jacks (Metro) Maintenance Vehicle
	Rolling Stock	Revenue Vehicles	Council Crest Trolley 001 Council Crest Trolley 002 Melbourne W2 Streetcar 003 (WFSC-518) (WFSC-482)
	Infrastructure	Fixed Guideway	Track Slab (Concrete) Track Rail Segments Track Switches (8)
		Systems	Preemptive Signals
		Power	Traction Power Substation Overhead Catenary System poles, wires, accessories
	Faciliti	Support Facilities	Loop Trolley Maintenance & Storage Facility 5875 Delmar Blvd. | St. Louis, MO 63112

		Passenger Facilities	*Station Stops* University City Library Leland Avenue EB Leland Avenue WB Limit Avenue EB Limit Avenue WB The Pageant EB The Pageant WB Delmar Loop MetroLink Hamilton Avenue Delmar & DeBaliviere Crossroads College Prep Forest Park-DeBaliviere MetroLink Missouri History Museum - Forest Park

Administration

It is the responsibility of LTS board officers, board members, administrators, directors, managers and supervisors to ensure safety throughout the system. Safety responsibilities and tasks are described throughout this section.

Loop Trolley Transportation Development District

The Loop Trolley Transportation Development District (LTTDD), a political subdivision of the State of Missouri organized under the Missouri Transportation Development District Act, Section 238.200 et seq. RSMo, is the owner and manager of the Loop Trolley System (LTS). The LTTDD was formed to undertake the Transportation Project, including the financing, installation and construction of a trolley car and track system to run east-west along Delmar Boulevard between Kingsland Avenue in the City of University City and DeBaliviere Avenue in the City of St. Louis, and north-south along DeBaliviere Avenue between Delmar Boulevard and Lindell Boulevard in the City of St. Louis and within the boundaries of the District[10]. The LTTDD is governed by a Board of Directors that consists of the presiding officers of the following organizations:

- City of St. Louis, Missouri
- St. Louis County, Missouri
- University City, Missouri
- the CB5421/5975 Transportation Development District
- Bi-State Development Agency of the Missouri-Illinois Metropolitan District, d/b/a Metro.

Loop Trolley Company

[10] As described in Exhibit D of that certain Declaratory Judgment, Decree and Order Organizing a Transportation Development District and Approving a Funding Method by the Circuit Court of the County of St. Louis, Missouri in Cause No. 07CC-003451, Division 20 dated July 16, 2008.

The LTTDD has entered into an Operating & Maintenance agreement with the Loop Trolley Company (LTC), a Missouri 501C3 organization. The LTC was formed in 2001 for the purposes of ". . .*the creation, planning funding, implementation, construction, connection and operation of a public not-for-profit trolley line or lines operating in the County of St. Louis and the City of St. Louis, Missouri."* The LTC is governed by a volunteer Board of Directors.

District Administrator

The LTTDD Board has selected a part time District Administrator to act as its "Accountable Executive[11] who is ultimately responsible for risk management, asset management, and safety assurance. The District Administrator oversees the Operating & Maintenance Agreement with the LTC and acts as the LTTDD Board liaison to the FTA, the SSOA, and other regulatory agencies.

Safety & Training Specialist

The LTC Safety and Training Specialist (or designated Safety representative) is responsible for all safety administration and enforcement, as well as developing and executing a comprehensive training program while providing classroom and field instruction. This position reports directly to the ED and the DA. Specific functions include, but are not limited to:

- Developing and coordinating all training activities;
- Providing ROW training course, (i.e. Track Access for necessary trolley employees, contractors and city personnel);
- Recommending procedures and /or guidelines to achieve safety and performance goals;
- Developing and conducting periodic emergency drills and classes for emergency-response personnel, including local, fire and emergency medical technicians;
- Developing and maintaining all training files.

Executive Director

The LTC Executive Director (ED) will lead the LTC organization. This position reports both to the LTC Board of Directors and to the LTTDD District Administrator. The ED is responsible for the internal overall management of the LTC organization and for relationships with external organizations. This includes management of all personnel and contractors. Specific functions include, but are not limited to:

- Supporting operations and maintenance of the LTC;
- Coordinating and supporting LTC events;
- Interfacing with operations, governmental entities and business and community groups as needed;
- Updating and managing the trolley operation budget;

Director of Operations

The LTC Director of Operations (DOO) is directly responsible for the trolley operations and maintenance. This position reports directly to the Executive Director. The DOO is responsible for assuring that the

[11] a single, identifiable person who has ultimate responsibility for carrying out the Safety Management System of a public transportation agency; responsibility for carrying out the agency's Transit Asset Management Plan; and control or direction over the human and capital resources needed to develop and maintain both the agency's Public Transportation Agency Safety Plan, in accordance with 49 U.S.C. 5329(d), and the agency's Transit Asset Management Plan in accordance with 49 U.S.C. 5326.

LTS operation achieves the predetermined performance and safety goals. Specific functions include, but are not limited to:

- Assisting in setting and implementing LTC policies;
- Managing operations and maintenance personnel;
- Assessing personnel requirements;
- Ensuring availability of qualified staff;
- Evaluating employee performance;
- Overseeing disciplinary/grievance procedures;
- Approving and implementing remedial actions resulting from accident/safety investigations;
- Issuing Notices/Bulletins/Operational Procedures and LTC Book of Operating Rules;
- Developing and issuing changes to Standard Operating Procedures;
- Administering oversight and other reporting requirements.

Maintenance Leader

The LTC Maintenance Leader is responsible for LTC maintenance. This position reports directly to the Director of Operations. Rail Maintenance includes all revenue and non-revenue vehicles, trolleys, any additional LTS O&M vehicles, and infrastructure maintenance. Specific functions include, but are not limited to:

- Delegating and training on maintenance and transportation rules and procedures;
- Developing and implementing a curriculum for new LTC trolley mechanics and refresher courses for current personnel;
- Developing and administrating of classroom, field, hands-on and testing to assure proficiency in the applicable training area;
- Maintaining warranties, operations document control, and maintenance quality assurance functions;
- Administering the scheduling process for Maintenance of Way (MOW) work on the Right-of-Way (ROW);
- Documenting and maintaining records for all maintenance training programs, including the course records of trainees;
- Developing training requirements and programs;
- Reviewing vendor training submittals and monitoring/coordinating training courses;
- Documenting and evaluating of training processes.
- LTS inspections, testing and maintenance in accordance with applicable standards and guidelines of Trolley vehicles and all infrastructure including, but not limited to MSF, TPSS, OCS, Track, Switches, Fare Systems and Station Platforms.

Safety and Security Committees

At various points in its design, construction, start-up and operations, the LTS has established committees with specific safety responsibilities, including the review and approval of safety critical documents, tests and other materials, assessment of system safety, review of accidents, events or incidents, and hazard mitigation/resolution.

Safety and Security Review Committee ("SSRC")

For its construction and start-up phase, the LTS had established a Safety & Security Review Committee to review and approve safety critical documents, tests and other materials as required to bring the system into active operations, culminating in the completion and approval of the Safety & Security Certification Verification Report ("SSCVR"). The committee is superseded by the SSC for active operations, but exists as a standing committee for the review and approval of safety critical documents, tests and other materials as required to approve additional heritage trolley vehicles for service, including an updated SSCVR.

Safety and Security Committee ("SSC")

The LTS has established a Safety & Security Committee consisting of the following personnel:

- Safety & Training Specialist (or designated Safety representative)
- Director of Operations
- Maintenance Leader
- Lead Dispatcher

This committee meets at least once per month during operations to review and discuss issues related to safety and security. One of the primary purposes of the SSC is to monitor the implementation of the LTS safety and security goals and objectives and develop corrective actions if these are not being achieved. This committee will also meet:

- To review accidents;
- To review and resolve hazards;
- To review and approve system modifications;
- To plan internal audits;
- To review configuration management issues;

The SSOA, the ED, and the LTTDD District Administrator serve as ad hoc members of this committee and may attend most, but not all, meetings. Other LTC employees or contractors will be requested to attend meetings as the situation requires. The SSC will meet with the SSOA as required. Conflicts relative to safety and security within the SSC will be resolved first by the LTC Executive Director but may be escalated to the LTTDD District Administrator by any committee member.

Minutes of meetings will be kept and sent to committee members, the ED, the LTTDD District Administrator, and the SSOA.

This committee also oversees and approves any remaining safety & security certification tasks as well as any outstanding open issues remaining from the construction and startup phases of the project.

System Safety Task Matrix

The remainder of this section describes in matrix and narrative format the specific activities required to implement the LTS Safety Management program as established in this PTASP.

PTASP Element \ Personnel	LTTDD District Administrator	LTC Executive Director	LTC Director of Operations	LTC Safety & Training Specialist (CSO)	LTC Maintenance Leader	SSC Approval?	Frequency
System Safety Policy Statement	**P**	**P**	**S**	**S**	**S**	✓	**AR**
Develop/Update PTASP	**A**	**R**	**S**	**P**	**S**	✓	**YR**
Hazard Management	**R**	**A**	**R**	**P**	**S**	✓	**AR**
System design reviews	**A**	**S**	**P**	**S**	**S**	✓	**AR**
Safety & Security Certification	**A**	**A**	**S**	**P**	**S**	✓	**AR**
Analyze, document, distribute and review safety data	**R**	**A**	**R**	**P**	**S**		**DL**
Incident Notification, Investigation, & Reporting	**R**	**A**	**S**	**P**	**S**		**AR**
Emergency response program	**S**	**R**	**S**	**P**	**S**		**AR**
Internal Safety & Security Audits	**A**	**P**	**S**	**P**	**S**	✓	**YR**
Training Functions		**S**	**A**	**P**	**S**		**AR**
Configuration Mgmt	**A**	**P**	**R**	**R**	**R**	✓	**AR**
HazMat/Environmental/MSDS/ Occupational Health & Safety		**A**	**S**	**P**	**S**		**AR**
Implement SMS	**P**	**P**	**P**	**P**	**P**		**DL**

Matrix Key: P = Primary Responsibility ; R = Review ; A = Approval ; S = Support ; AR = As Required ; YR = Yearly ; QT = Quarterly ; MT = Monthly ; DL = Daily;

Key SMS Personnel and Responsibilities

The LTS has established roles to carry out specific safety management responsibilities to ensure the protection of passengers, employees, contractors, emergency responders, the public as a whole, and LTS property and assets. Safety management responsibilities by department/function are summarized as follows:

Functional Area	**Specific Position(s) with Safety Management Accountability / Key Departmental SMS Personnel**	**Additional Internal and/or External Support**
Human Resources	Executive Director	LTC Board of Directors
System Safety & Security	Safety & Training Specialist	

Functional Area	Specific Position(s) with Safety Management Accountability / Key Departmental SMS Personnel	Additional Internal and/or External Support
Marketing and Communications, Public Information	Executive Director	
Public Safety	Safety & Training Specialist	
Trolley Operations	Director of Operations	
Operations Training	Director of Operations	Safety & Training Specialist
Scheduling and Service Planning	Director of Operations	
Trolley Vehicle Maintenance	Maintenance Leader	
Traction Power	Maintenance Leader	Metro Traction Power
Right-of-Way Maintenance	Maintenance Leader	
Track Maintenance	Maintenance Leader	Metro Track
Facility Maintenance	Maintenance Leader	
Fare Collection	Executive Director	
Procurement	Executive Director	
IT	Executive Director	

Key SMS personnel are responsible for ensuring their departments are in compliance with the LTS SMS program. They perform Safety Assurance activities including: documentation, internal controls, monitoring and auditing of department PTASP compliance and other supporting programs, plans and procedures. The Safety & Training Specialist (or designated Safety representative) is responsible to support the above functional areas.

Chapter 3 – Integration with Public Safety & Emergency Management

The following sections describe Emergency Response Planning, Coordination and Training

Emergency Management

Emergency Management is a function of the STS (or designated Safety representative) and program responsibilities reside with the STS (or designated Safety representative). All LTS employees may be participants, as the situation requires, in public safety and emergency management.

Meetings with External Agencies

LTS staff attends first responder meetings throughout the year as required to coordinate and plan emergency response and proactive processes. Agencies represented at these meetings may include, but are not limited to, local police, state police, SSOA, fire departments, emergency medical services, and regional emergency management and public utilities.

Emergency Preparedness Planning

LTS emergency management planning and preparation is consistent with the objectives outlined in the Homeland Security Presidential Directives ("HSPDs") requiring implementation of the National Response Plan ("NRP"), the National Incident Management System ("NIMS"), the National Infrastructure Protection Plan ("NIPP"), and the National Preparedness Goal. The SSP provides additional details about the LTS response to terrorist events.

Natural and man-made emergencies occur that endanger life, health, property, and/or impact revenue service. These emergencies require response in accordance with the LTS Emergency Preparedness Program Plan (EPPP). The plan ensures the capability to mitigate and manage those events that cannot be prevented. The plan is reviewed and updated annually. Changes to the plan are coordinated within the LTC by the STS and approved by the SSC. The STS is also responsible for scheduling and managing emergency preparedness activities contained in this section and in the EPPP.

The LTC emergency planning process includes the following categories:

- Flood
- Earthquake
- High velocity winds & tornadoes
- Grade crossing (Intersection) accidents
- Hazardous Materials
- Hijacking or hostage situation
- Terrorist attacks:
    - Chemical/Biological - Inside vehicle
    - Chemical/Biological - Outside vehicle
- Bomb threats or explosives (includes WMD)

Emergency Drills

Emergency Preparedness drills are planned and conducted with police, fire and emergency response personnel. During the startup and testing phases of the LTS project, the LTS conducted one (1) table top drill and two (2) full scale exercises[12]. Once revenue service began, the LTC established a three-year cycle. The first year[13] is a table top drill, year 2 a functional drill, and year 3 a full scale drill. The activities include LTC personnel who would have to respond to emergency situations on the LTS System. In addition, facility drills for fire and tornado are conducted annually at the MSF. Emergency preparedness drills can include evacuation, and severe weather sheltering.[14]

After action reports will be prepared after each exercise or drill in accordance with the Homeland Security Exercise & Evaluation Protocol (HSEEP) and contain the following:

- Identification of problems / successes during the emergency response;
- Analysis of the effectiveness of emergency plan components;
- A plan of action for improvements;
- State of training;
- Feasibility of the emergency plan being implemented;
- Physical issues with respect to engineering capability; and

[12] Two drills were completed using the Council Crest cars and one (1) drill will be completed following conditional acceptance of the Melbourne W2 trolley in 2020.
[13] (after the beginning of revenue service)
[14] After Action Reports and Improvement Plans are discussed in the EPPP

- Communications issues.

The STS (or designated Safety representative) will prepare after action reports and is responsible for the implementation of any corrective actions developed.

Implementation of Findings

After-Action Reports ("AARs") are developed following the completion of emergency drills and exercise scenarios, and incorporates comments from all internal/external participants. The SSC reviews the AARs and develops and implements appropriate corrective actions and corrective action time tables. Discrepancies found as a result of training or drills are subject to correction of existing procedures, or addition of new procedures, as the SSC may determine.

Emergency Familiarization Program

This program provides instruction on the equipment used on the LTS. Training and familiarization is conducted for fire and rescue personnel, local law enforcement, and public works employees in the City of St. Louis and University City. LTS Safety, Operations and Maintenance personnel provides refresher-training as needed, but no less than every two years. Included in the training are:

- Procedures for notification, control, and degree of responsibility on-site;
- Levels of service (equipment, personnel, etc.) to be delivered in response to various types of transit emergencies;
- Appropriate methods for communication and transfers of command;
- Familiarization with LTS equipment and facilities;
- Use of tools, equipment, and LTC personnel to assist as necessary;
- Procedures to remove and restore power; and
- Scheduled drills and exercises.

Emergency Preparedness Training – The LTC incorporates emergency management training through various safety, security, and operations training programs in order to achieve the following objectives:

- Applicable management, operations, and maintenance rules, procedures, and plans are effectively documented and conveyed to those responsible for their implementation;
- Oversight to ensure that LTC employees and contractors are responsible for dispatching and controlling assets to administer, operate, and maintain the system's safety and security equipment and facilities;
- Safety-related rules and procedures for management, operations, and maintenance personnel are documented and effectively implemented by all employees as required;
- Emergency procedures have been developed and documented and are successfully implemented by all personnel as required, including public safety personnel (if appropriate);
- Transportation personnel and local emergency responders understand the hazards of the transportation environment;
- An adequate level of preparation is maintained for a possible emergency.

Additional training typically addresses rules, policies, and procedures, as well as many of the hazards in the transportation environment (e.g., live power, track and roadway safety, hazardous materials and alternate fuels, medical emergencies or blood-borne pathogen awareness, personal safety, and injury prevention). NIMS & Incident Command System (ICS) orientation and training activities are ongoing.

Emergencies Involving Criminal Activity – A more detailed discussion of the response and handling of emergencies involving criminal activities (i.e., terrorism, bomb threats, hijacking, etc.) are found in the LTTDD/LTC System Security Plan (SSP) and are considered Security Sensitive.

Emergency Operations

LTS Emergency Operations Protocol – The LTS may initiate emergency operations protocols in an effort to coordinate, manage and provide mitigation planning in the event of an emergency. All communications between LTS personnel (including field personnel) and first response agencies is coordinated through – and documented by – the Dispatch Department.

Activation Criteria – LTS emergency operations protocols may be activated for any of the following reasons:

- Resources beyond LTS' capability are required to respond to an emergency;
- There is an emergency of a long duration
- Major policy decisions will be needed;
- Local or state emergency declarations are enacted; and
- Activation of LTS emergency operations will be advantageous to the management of an emergency.

Activation of LTS Emergency Operations Protocols – LTS' emergency operations protocols are activated anytime there is a need to handle an event, foreseen or unforeseen. For Level I and Level II events, the Accountable Executive may activate emergency management protocols at his/her discretion. Fore Level III, LTS emergency management protocol may be activated at the discretion of the Director of Operations.

Immediately following the activation of LTS emergency operations protocols, the following people are notified of the activation and asked to report, or send a representative, to a location identified by the Dispatcher:

- Safety & Training Specialist (or designated Safety representative)
- Maintenance Leader
- Executive Director
- Director of Operations
- Metro Contracted Support (Track, OCS)

After activation of LTS emergency operations protocols, LTS staff will notify and coordinate with the following agencies, as applicable:

- State Safety Oversight Agency
- National Transportation Safety Board
- Federal Transit Administration
- St. Louis City & County Police Departments
- St. Louis City & County Fire Departments
- Emergency Medical Services
- Health Services Organizations
- Transportation Security Administration

Functions of the LTS Emergency Operations Protocols – For Level III events, LTS makes all overall strategic management decisions relevant to LTS systems:

- Implements event plans and documents all actions
- Request assistance from emergency response agencies for fire, medical, police and evacuation emergencies;
- Dispatch personnel to the scene or other designated locations;
- Dispatch LTS' Safety & Training Specialist (or designated Safety representative) to assist at the event scene;
- Communicate all movements with Trolley Operators, as required;
- As appropriate, activate/deactivate overhead catenary power;
- Coordinate requirements for supplemental services;
- Perform management notifications, respond to incoming telephone calls, and perform other duties as assigned; and
- Provide timely media information

Levels of Emergency/Special Event

Levels of Emergency

The LTS recognizes three levels of emergency, which are determined by the severity of the emergency. The purpose of this rating system is to provide a standard for determining the magnitude of response to the emergency.

Levels of Emergency	
Level I **Minor Emergency**	An event where LTS property or equipment is damaged, employees or customers are injured and/or service is disrupted. Emergency services may be required, but in general, LTS operating department resources are adequate to conclude the event.
Level II **Major Emergency**	An emergency requiring the close coordination of several LTS departments (Operations, Maintenance, Safety and Executive Staff) and significant mutual aid from community Police, Fire or Medical Services. Examples may include a large fire, severe injury accident, and significant criminal event, emergency in the right-of-way, area-wide power outage, civil disturbance, major hazardous material spill or severe weather. This kind of event has a greater impact upon portions of LTS operations and may halt some of those operations temporarily. LTS operating department resources may be adequate to conclude the event.
Level III **Catastrophic Emergency**	A regional disaster or event requiring a large amount of outside resources to assist LTS or in which LTS is required to assist. Response to this type of emergency requires centralized emergency management of all LTS functions, as well as decentralized on-site management and response. When a Level III disaster is declared, the City of St. Louis directs LTS resources and coordinates with emergency response agencies.

Levels of Special Events

Planned special events are categorized by the expected size of the crowd drawn to the event, and by the potential number of transit customers affected by the event. The purpose of the rating system is to provide a universal standard for determining the level and scope of the response to the event.

Levels of Special Event	
Event I **Minor Event**	An event that has minimum impact on LTS's transit service with few or no response team members required on-scene. In general, LTS's Operation Department resources are adequate to manage the event.
Event II **Major Event**	An event of a large nature that involves a certain part of the service area, including multiple days and/or large crowds. It may involve trolley vehicles, but is general local in nature. Maintenance of the right-of-way, which adversely affects transit service and causes significant delays of over 20 minutes, would typically be suspended within this category. Response team members and crowd management services may be needed to ensure customer service.

Operations Emergency Management Responsibilities

All Personnel

In order to ensure their own personal safety and security, and the safety of their passengers, LTC personnel must understand and adopt their specific roles and responsibilities, as identified in the EPPP, during normal operations and in emergency conditions. To ensure the success of the EPPP, all LTC personnel must:

- Participate in all emergency preparedness and public safety awareness training, including drills, and exercises;
- Become familiar with, and operate within, all emergency preparedness and response procedures for the assigned work activity;
- Accurately complete accident and incident reports as required; and
- Protect life and provide for the health and safety of LTC customers, employees, and visitors.

Operators

In addition to the general responsibilities identified for all personnel, Operators are responsible for exercising maximum care and good judgment in identifying and reporting suspicious activities or packages, in managing security incidents, and in responding to emergencies. Each operator will:

- Take charge of an accident, incident, or emergency scene until the arrival of supervisory or emergency personnel;
- Determine when to call for assistance;
- Maintain control of the vehicle until relieved;
- Report all incidents to the appropriate dispatch;
- Complete all required reports; and
- Support community emergency response activities as directed by LTC policies and procedures.

Supervisors

Supervisors are responsible for communicating the transit agency's emergency management policies to all employees and contractors. For this reason, supervisors must have full knowledge of all emergency management policies and procedures. Supervisors must communicate those policies to LTC operations personnel in a manner that encourages them to incorporate EPPP practices into their everyday work. The specific responsibilities of supervisors include the following:

- Having full knowledge of all standard and emergency operating procedures;
- Ensuring that Operators make safety and emergency preparedness a primary concern when on the job;
- Assume Incident Command from the Operator when they arrive;
- Provide leadership and direction to employees during emergency incidents;
- Determine when to call for assistance;
- Make initial decisions regarding the continuance of operations;
- Take photographs of damage and injuries;
- Pass Incident Command to the appropriate emergency responder; and
- Act as liaison to all outside agencies at incident scenes.

Dispatchers

Dispatch provides a critical role for LTC during any emergency situation. They have the authority and responsibility for implementing incident response requirements. When an incident occurs, the dispatcher will evaluate the facts, determine the type and levels of initial response required, and immediately begin communications, coordination and control functions appropriate for the situation. Specific responsibilities include:

- Receive communication from LTS staff and scene;
- Initiate appropriate internal/external notifications;
- Dispatch appropriate personnel to the scene or other designated locations;
- Implement incident plans;
- Coordinate notification with local responders in the event passengers or others have also called in the incident;
- Request activation of the Emergency Operation Center, if appropriate;
- Receive and communicate site boundary definitions and status of critical operating elements;
- Relay and update status
- Coordinate communication for on-scene management
- Relay all necessary clearances and access authorization for the scene;
- Manage the flow of information between the scene and LTS departments, and use established procedures to direct assignment of LTS personnel to the scene;
- Manage communications with local first responders' communications units
- Manage demobilization and restoration of service;
- Document all activities and actions associated with the incident.

Communications (Marketing/Customer Service/Media & Community Relations

The Executive Director will provide communications and community relations information to the public, news media, and other entities. The ED coordinates the dissemination of accurate instructions and

information to employees regarding communications with the media and public and is the direct respondent to media inquiries.

Public Safety

LTC's public safety detail will be carried out to the degree of public awareness security. LTC does not have a Public Safety or Security Department. The LTS employee on scene assumes the role of Incident Commander when the incident is a potential or actual crime scene until either a more senior employee or first responders arrive. Local law enforcement will assume the role of Incident Commander when the incident is a potential or actual crime scene. Local law enforcement will coordinate crowd control, assist with the evacuation of customers and /or employees, and coordinate traffic control and public safety around and within the incident site.

Safety & Training Specialist

The Safety & Training Specialist (or designated Safety representative) is responsible for training LTS employees about evacuation, sheltering, and accounting for personnel. The STS is the lead investigator for LTC at accident and emergency scenes (except crime scenes) that require investigation. Training includes the movement of persons from hazardous or threatened areas to lower-risk areas. This employee also assists with the identification, and evaluation, cleanup of spills or release of hazardous materials, and the evaluation of the safety of incident response and recovery activities.

Maintenance Leader / Maintenance Technician

The Maintenance Leader, or seniormost on-duty maintenance technician, provides technical support and safety activities for active incidents. The Maintenance Leader also supports the STS in post-incident investigation and inspection of LTS elements. Specific responsibilities include:

- Report to designated location, at direction of Dispatcher;
- Ensure trolley vehicle is in appropriate hold state to protect safety of passengers, personnel and responders;
- Perform LTS power down and ground strap installation, if required;
- Perform on scene visual inspection of trolley vehicle and system elements to assure no safety risk exists for passengers, personnel and responders;
- Stand-by as technical support for Incident Command, as requested;
- Support demobilization and restoration of service;
- Support STS investigation via system element inspection.

Emergency Management Training

Emergency exercises, including tabletops, functional and full-scale exercises are a critical part of the LTS emergency preparedness program. At least once a year, LTS will perform one of the above exercises, inviting fire and rescue personnel, local law enforcement, public works employees in the City of St. Louis and in the City of University City, and other entities or individuals as needed to participate.

Periodic familiarization and refresher training is coordinated between the LTS and local fire and police departments via its Fire Life & Safety Committee. Training topics may include, but are not limited to,

emergency communication procedures, vehicle/system familiarization (dynamic or static), and discussion of threat/hazard mitigation.

All LTS personnel undergo emergency response training to ensure they have a thorough understanding of their role and responsibilities during an emergency. At a minimum, training is provided on LTS SOPs and emergency management plans that an employee may be required to implement, as well as any specialized equipment. The STS will annually review the LTS emergency management program to ensure consistency with training drills and exercises, and to ensure same are up-to-date with federal/state or local recommendations and procedures. As part of new hire training, all LTS employees receive general safety training, a facility tour identifying exits, locations of fire extinguishers and other safety equipment, and emergency procedures.

Chapter 4 – SMS Documentation & Records

Safety Plan Management

The LTS Safety Management program operates under a principle of continuous improvement. In order to ensure continuous improvement, the PTASP must be reviewed annually and revised as needed to reflect changes in LTS organizational structure, procedures, equipment, facilities and operating environment, including (but not limited to):

- Policy changes (mission, goals, objectives);
- Organizational changes;
- Changes to rules and regulations;
- Changes in operating procedures;
- Elimination of equipment or addition of new equipment; and
- Elimination of a facility or addition/acquisition of a new facility

Changes in safety policy, goals or objectives require the approval of the District Administrator. Changes in policy, organization, rules, regulations, or operations necessitating PTASP adjustments are accomplished within the schedule established below.

SSOA Requirements

Submittal Procedure

Per the SSOA Program Standards Manual, the LTS is required to assess its PTASP annually. The LTS must submit its updated PTASP to SSOA by February 1st of each year for review and approval, or if the LTS determines no updates are necessary for that year, submit formal correspondence to the SSOA noting such by February 1st of that year. Any revisions to the PTASP performed between annual updates must also be submitted to SSOA for review and approval.

PTASP versions will use Revision numbers in a "##.#" format with the first two numbers representing the primary version number (i.e. annual version), and the third number reflecting revisions made throughout the SSOA review and approval process. Depending on the nature and purpose of interim updates, the LTS may or may not create a new primary version number.

The table below shows the annual LTS schedule for review initiation, transmittal and final approval(s):

PTASP Annual Review Timetable		
Activity	**Date Completed by**	**Responsibility**
Initiate Review	October 15th	LTTDD District Administrator & LTC Executive Director
Conduct Review	November 1st	Safety & Training Specialist
Complete Revisions	November 15th	Safety & Training Specialist
Review & Approve	January 15th	District Administrator & ED
Submit to SSOA	February 1st	District Administrator
SSOA Approval	March 1st	MoDOT
SSC Approval	March 25th	Safety & Security Committee
Board Approval	March 25th	LTTDD & LTC Boards
Distribute Revised Documents	March 25th	Safety & Training Specialist

Review and Approval Procedure

SSOA reviews any revised PTASP to ensure it is in compliance with the SSOA Program Standard. Following submission of the draft final PTASP, SSOA completes its review within 30 calendar days of receipt of the plan, or notifies the LTS if additional time is needed to complete the review. Should the PTASP comply with the Program Standard, SSOA issues a written approval of the plan and requests that the LTS send a final copy of the PTASP with appropriate approval signatures and endorsements as needed. The SSOA-approved PTASP is considered in effect until another such plan is submitted and approved in accordance with the requirements set forth in the Program Standard.

If SSOA determines the submitted PTASP does not meet the published standards of the Program Standard – as corroborated via the MODOT PTASP Review Checklist – it will send a written notice, along with a description of what changes or additions are necessary to gain approval. The written notice will typically include a completed checklist as well as narrative information. LTS will have 30 calendar days from receipt of the written notice to make such changes, unless otherwise specified in SSOA's correspondence. If the LTS objects to any changes or additions, it may submit written correspondence noting such, along with suggested alternatives, as necessary, and may meet, at either party's recommendation, to clarify any deficiencies or issues.

Internal Safety Plan Review and Approval Process

The Executive Director will instruct the Safety & Training Specialist to initiate the annual review and revision of the PTASP by October 15th of each year, and ensure the necessary activities take place. From that date, the STS and other LTS personnel will have approximately 90 days to perform the review and updates, providing a completed draft final version to SSOA on or before February 1st.

After receipt, review, and approval are completed, the STS has the responsibility to incorporate any required changes into the overall PTASP. The revised plans are then submitted to SSOA for review and approval. Following approval from SSOA, a final version will be circulated for final approval by the LTS SSC, the LTTDD Board of Directors, and the LTC Board of Directors, and a full and final version – with all appropriate approval signatures and endorsements – will be prepared and forwarded to SSOA. A revision cover sheet is included with the distribution of each revision. The revision cover sheet includes the revision number, date, and notations of modified or added content. If no revisions are deemed necessary, a dated revision cover sheet is distributed verifying that no revisions are needed.

Training Records

All employee (or contractor) training records are preserved and securely maintained on site in physical and/or electronic form. It is the responsibility of the managers of departments of Operations, Maintenance, and Safety that department-specific training records are retained and organized, and that recurring training is performed within the appropriate timelines. Records of safety-related training shall be maintained in accordance with the requirements of 49 CFR 673 and 674

PART II – SAFETY RISK MANAGEMENT

Both System Safety and the Safety Management System (SMS) frameworks include the application of hazard management techniques to achieve an optimum level of safety throughout all phases of a system. The methodology provides a systematic means of identifying, analyzing, assessing, and resolving the cause(s) of accidents within the trolley system. The application of hazard identification methods during a trolley system's life-cycle phases and to all system elements will permit the timely identification, elimination, minimization, or control of hazards. The SMS framework includes a similar process called Safety Risk Management.

Hazard management is the formal process to systematically identify, evaluate, and mitigate potential hazards associated with the construction, maintenance, and operation of the LTS for patrons, employees, and general public. Known hazards are categorized as to their potential severity and probability, analyzed for potential impact, and resolved by design, procedure, warning device, or other methods so they fall within a level of risk acceptable to MoDOT, the LTC, and the LTTDD.

This systematic approach provides management and the SSO with appropriate information as to hazard or safety risk. This information includes the identification of hazards and faults, the probable causes and effects, and recommended resolution action(s). By evaluating these causes, conditions, and any combination thereof, together with the resolutions available, informed management decisions could be made. This methodology is the underlying rationale for all hazard determinations and recommended resolution actions, whether formal analyses are conducted or informally performed.

The requirements of Title 49 CFR Part 659 and the Program Standards Manual stipulate that this PTASP contain a description of the process used by the LTS to implement its hazard management program, including activities for: (i) hazard identification; (ii) hazard investigation, evaluation, and analysis; (iii) hazard control and elimination; (iv) hazard tracking; and (v) requirements for on-going reporting to the SSO Agency relating to hazard management activities and status.

Chapter 5 – Hazard Identification & Analysis

Hazard Management Process – Activities and Methodologies

Hazard Management Process

Hazard identification and resolution is the core element of the PTASP, requiring timely correction of unsafe conditions ideally anticipated and reconciled before serious accident, injury or damage occurs.

All LTS personnel and contractors are required to implement hazard management and safety/system assurance throughout the design, construction, testing and operating phases of the LTS. Hazards which cannot be eliminated in the design phase are assessed for mitigitative remedies such as training, warning devices, safety devices and/or written procedures.

Hazard identification and resolution is a safety process managed by the STS (or designated Safety representative), with assistance from the SSC.

Hazard Identification

Hazard identification activities define conditions and failures that have the potential for causing an accident. The Safety & Training Specialist conducts periodic inspections of the MSF, stations, equipment, and trolleys to identify hazards on a proactive basis. He also reviews incident reports, injury and illness reports, and worker's compensation databases. In the investigation of serious accidents, the Safety & Security Committee meets to develop a consensus determination of hazard severity and causal factors. When required, consultants may provide outside assistance to the committee. Independent reviews may also be obtained as to ensure objectivity.

Formal Approach – The STS (or designated Safety representative), with support from the SSC, will determine those hazards for which formal analysis is prepared. Further details are provided below in Hazard Evaluation and Analysis.

To address hazards results from system modifications, operational and other changes, safety analysis included in design and procurement contracts will provide for:

- Identification of potential/existing hazards;
- Assessment of the severity and probability of occurrence of each potential hazard;
- Timely awareness of hazards for those who must resolve them;
- Ability to track and control hazards; and
- Formal Safety and Security Certification where applicable.

Methods of Identification – Hazard identification is derived from the day-to-day operations and maintenance activities of the system. These activities can include the certification of new construction, the review of system modifications, structure inspection activities, equipment modifications, design reviews, testing, analysis, and maintenance inspections. Finally, hazards are often identified as a result of accidents, safety audits, peer reviews, customer complaints, and triennial audits. A summary of sources for hazard identification is as follows:

- Maintenance Audits & Inspections
- Facility & Equipment Inspections
- Training & Certification Programs
- Accident & Injury Investigations
- Contractor, Patron, & Employee Reports
- Safety Data Acquisition & Analysis
- Operating Rules & Procedures
- Near Miss Reporting Program
- System Replacements & Updates
- New Systems & Rolling Stock
- SSO Three Year Reviews

- Internal Safety & Security Audits
- Information and data provided by the FTA
- Information and data provided by the SSOA
- Emergency Drills & Exercises

Hazard Investigation, Evaluation/Classification, and Analysis

LTS Safety Reportable Hazards – Employees are trained on hazard reporting through LTS safety training. Hazards identified by an employee and communicated to his/her supervisor may be resolved by the employee and supervisor. If the supervisor is unable to resolve the identified hazards, he/she will forward the hazard to the STS (or designated Safety representative) for review and investigation, protecting the reporting employee's identity if requested.

Investigations performed by the STS (or designated Safety representative) will be documented and hazards identified will be included in the Corrective Action Plan for completion and monitoring of mitigative actions.

SSOA Reportable Hazards – In accordance with the SSOA Program Standard requirements, if the LTS determines that the final risk assessment of a hazard is identified as "unacceptable risk or high risk" using the criteria and assessment process specified in this PTASP, the LTS will notify the SSOA within 24 hours or by 5:00pm on the next regular working day following the determination of the unsafe condition as "unacceptable risk or high risk'.

The LTS investigates hazards reported to the SSOA as "unacceptable risk or high risk" in accordance with the provisions of the PTASP and maintains a file of all hazards reported to SSOA. The LTS will submit to SSOA electronically its initial investigation report of an "unacceptable risk or high risk" hazard with fourteen (14) calendar days of the hazard being identified. Status reports of hazards are shared with SSOA on a monthly basis by way of its SSC, and tracked through the Corrective Action Plan log.

Upon completing its investigation of an "unacceptable risk or high risk" hazard, the LTS prepares and submits to SSOA for review and approval a final report that includes a description of activities, findings, causal factors, hazard analysis, and a corresponding CAP item as appropriate.

Chapter 6 – Safety Risk Evaluation

Hazard Evaluation and Analysis

The next step in the hazard management process involves classification of each hazard in terms of severity and probability of occurrence in order to determine the risk with which it is associated. This, in turn, provides the basis for determining possible mitigation strategies and allows the LTS to prioritize the hazards. The risk assessment criteria are adapted from the APTA[15] Guidelines, MIL-STD-882E,[16] and

[15] American Public Transportation Association
[16] MIL-STD 882E (11 May 2012) is the Department of Defense document that describes its Standard Practice for System Safety and was widely accepted by the rail transit industry as a best practice in the area of hazard management. The document supersedes MIL-STD-882D (10 February 2000).

from the FRA Collision Hazard Analysis Guide. [17] The classification process is described in the following sections. It should be noted that the categories that follow are uniquely developed for the LTS and do not necessarily follow any prescribed regimen.

Hazard Severity

Hazard Severity is a subjective measure of the most likely credible mishap resulting from personnel error, environmental conditions, design inadequacies, and/or procedural deficiencies for systems, subsystems, or component failure or malfunction. The table below provides a summary of the severity categories, their consequences, and their applicability to the LTS.

Category	Technical Definitional	Human Cost	Property Cost	Other Impacts
I Catastrophic	Could result in death, permanent disability or complete system loss could result from incident cause by hazard.	Death and permanent disability or serious injury to multiple persons	Loss will exceed $500,000	Environmental damage
II Critical	Could result in multiple serious injuries, disability, or minor system loss will result from incident cause by hazard.	Immediate medical care (EMS) away from scene for 2 or more persons	Loss between $25K and $500,000	System interruption greater than 24 hours.
III Marginal	Conditions are such that injury may result to a person – minor system damage.	No immediate medical care	Loss between $1,000K and $25K	No system interruption
IV Negligible	Conditions such that no injury and less than minor system damage would occur from incident caused by hazard.	None	Damage less than $1,000	Often this is not even noticed.

Hazard Probability

Hazard Probability refers to the likelihood a specific hazard will cause a mishap or an incident during the planned life expectancy of a system element or during a fixed period of time. It can be described subjectively as a potential mishap per unit or per event. Other useful measures might include a frequency factor based on service miles or passenger trips. The table below illustrates the range of probabilities adopted by the LTTDD and the LTC.

[17] Collision Hazard Analysis Guide: Commuter & Intercity Passenger Rail Service; Office of Safety, Federal Railroad Administration, Wash. DC. (Oct. 2007)

	Description	Quantitative	Fleet/System
A. Frequent	Likely to occur frequently	1 time out of 10 or more during a 12 month period of time	Continuously experienced
B. Probable	Will occur several times	1 time out of 100 during a 12 month period of time	Occurs frequently
C. Occasional	Likely to occur some time	1 time out of 1000 during a 12 month period of time	Will occur several times multiple locations
D. Remote	Possible to occur	1 time out of 100,000 during a 12 month period of time	Could occur once or twice
E. Improbable	Unlikely but possible to occur	1 time out of 1,000,000 in a 12 month period	Very unlikely but could occur once within lifetime of a fleet or system
F. Eliminated	So unlikely, we assume the occurrence may not be experienced.	Will not occur	This category applies to hazards that have been eliminated by design

Hazard Control and Elimination (Resolution)

The objectives of a Hazard Resolution process are:

- To identify areas where hazard resolution may require a change in the system design or development of special procedures;
- To verify that hazards involving interfaces between two or more systems have been resolved;
- To verify that the resolution of a hazard in one system does not create a new hazard in another system; and
- To verify that required analysis is provided in a timely manner and identify where delinquent analysis is delaying hazard resolution.

Hazard resolution is not synonymous with hazard elimination.[18] In the LTC's operating environment, as in the real world, some hazards may be impossible to eliminate, and it may be highly impractical to eliminate others. Thus, hazard resolution involves the reduction of risk to the lowest practical level. This is accomplished in a variety of ways, from re-design to warnings or administrative controls.

To determine what action to take to correct or to document acceptance of identified hazards, a system of determining the level of risk involved has been adopted. This risk assessment activity is incorporated in formal system safety analyses. In turn, this will enable management to properly understand the amount of risk involved relative to what it will impact (schedule, dollars, operations, etc.) to reduce the hazard to an acceptable level.

The Hazard Classification Matrix is shown in the table below**.** By combining the ratings for hazard severity and hazard probability, it provides a basis for classifying hazards from the highest risk to the lowest.

[18] Although 49 CFR Part 659.19(f)(5) seems to suggest this.

Severity / Probability	Frequent (A)	Probable (B)	Occasional (C)	Remote (D)	Improbable (E)	Eliminated (F)
I Catastrophic	IA	IB	IC	ID	IE	IF
II Critical	IIA	IIB	IIC	IID	IIE	IIF
III Marginal	IIIA	IIIB	IIIC	IIID	IIIE	IIIF
IV Negligible	IVA	IVB	IVC	IVD	IVE	IVF

Hazard Assessment

The LTS applies risk assessment criteria to the identified hazards based on their estimated severity and probability of occurrence to determine acceptance of the risk or the need for corrective action to further reduce the risk. The risk assessment and acceptance criteria assist LTS management in understanding the amount of risk involved by accepting the hazard relative to the costs (schedule, dollars, operations, etc.) to reduce the hazard to an acceptable level. The following table identifies the hazard acceptance criteria

HAZARD ACCEPTANCE CRITERIA				
	Hazard Risk Index	**Decision Authority**	**Special Conditions**	**Responsible Party**
	1A, 1B, 2A, 2B, 3A	Unacceptable	Requires immediate resolution and review, notification to SSO with 24 hours, concurrence from the STS and SSC	STS & SSC
	1C, 1D, 2C, 2D, 3B, 3C	Undesirable	Requires review and approval of mitigation plan(s), or Accept risk from the SSC	STS & SSC
	1E, 2E, 3D, 3E, 4A, 4B	Acceptable with Review	Mitigate risk to as low as reasonably practical or accept risk via the SSC	SSC
	4C, 4D, 4E	Acceptable	Risk is acceptable as is without further mitigation	SSC

Hazard Resolution Precedence

Management will take appropriate actions to reduce the risk associated with the identified hazard to the lowest level that is practical. The methods utilized for eliminating or controlling hazards are listed in their order of precedence, as follows:

Design for Minimum Risk: In other words, incorporate features in the initial design to eliminate hazards. If an identified hazard cannot be eliminated, then the associated risk can be reduced to an acceptable level through design.

Incorporate Safety Devices: If identified hazards cannot be eliminated or their associated risk adequately reduced through design, that risk shall be reduced to an acceptable level through the use of fixed, automatic or other protective safety-designed features or devices. Provisions shall be made for periodic functional checks of safety devices.

Provide Warning Devices: When neither design nor safety devices can effectively eliminate identified hazards or adequately reduce associated risk, devices shall be used to detect the condition and to produce an adequate warning signal to alert personnel of the hazard. Warning signals and their application shall be designed to minimize the probability of incorrect personnel reaction to the signals, and shall be standardized within like types of systems. A public awareness program should be considered to alert the general public and passengers.

Develop Procedures and Training: Where it is impractical to eliminate hazards through design selection or adequately reduce the associated risk with safety and warning devices, procedures and training shall be used. Procedures may include the use of personal protective equipment. Precautionary notations shall be standardized. Tasks and activities judged critical might require certification of personnel proficiency.

Reduce, Replace, Remove, or Do Not Operate – If there is no practical way to reduce the hazard, replacement, removal, or non-operation is indicated.

Accept (with or without varying levels of review)– If a hazard will result in less than minor, illness, injury, or system damage, no further action is necessary.

Procurement/Contractor Requirements

The LTS' procurement of safety-critical systems, processes or products requires that responding contractors or vendors participate in hazard management in accordance with the above list of precedence. Specifications include the requirement for all contractors and vendors who provide systems, subsystems, or equipment that may affect passenger/employee safety or safe operations to adhere to the PTASP. Contractors safety plan and supporting documentation must be approved by the DA/ED in coordination with the SSC. An approved contractor plan must, at minimum, define objectives, tasks, procedures, schedules, and data submittal for the safety activities that will be performed.

Hazard Tracking/Monitoring

The hazard tracking log is maintained by the STS (or designated Safety representative) and tracks all significant hazards that includes the following items:

- Hazard ID#
- Description of Hazard
- Reported by
- Location (if applicable)
- Source
- Probability Level
- Severity Category

- Hazard Classification rating
- Location (if applicable)
- SSO Report Date
- Mitigations
- Status

Hazard Management Documentation and Communication

All departments are responsible to appropriate document the following information on hazards in their respective areas, including:

- How the hazard was recognized and reported;
- A description of the hazard and the immediate corrective action(s) taken;
- An Initial Risk Assessment, based on the probability and severity of the hazards if nothing was done and using the risk assessment matrix;
- Results of the investigation, including the circumstances, events and probable cause(s) leading up to the hazard;
- A Final Risk Assessment, based on the likelihood of the hazard to occur and its likely severity when the proposed corrective action or resolution is in place.

The STS (or designated Safety representative) will request such documentation monthly to review and monitor safety risk management activities. Through independent investigation or SSC process, the STS will ensure any deficiencies or failures are immediately documented, and corrective actions prescribed.

If the initial hazard rating is deemed “unacceptable risk or high risk”, the STS is required to notify the SSOA within 24 hours or by 5:00pm of the next standard business day. For all lower hazards, documentation can be addressed in the monthly SSC meeting and added, as necessary, to the CAP log.

Chapter 7 – Accident & Incident Investigations

Accident & Incident Notification

All accidents & incidents (events) involving LTC personnel or property must be reported to Dispatch or the DOO in accordance with the LTC rules and standard operating procedures. Safety SOPs 600.01 through 600.04 provide guidance as to levels for notification & response. Any LTC employee involved in, or witnessing, an accident or incident, shall immediately notify dispatch. In turn, the Service/Dispatch Supervisor shall notify the Safety Specialist, supervisory and emergency response personnel in accordance with the notification protocol as described in LTC SOP 100.11. Internal notifications shall be made as soon as practical.

LTS employees and contractors responsible for accident investigation must first have completed the ‘Transit Rail Incident Investigation’ coursework available through the Public Transportation Safety Certification Training Program. Within LTS SOP 600.03 (Section 6 – Training & Qualifications), this requirement has been formalized.

Accident Investigation

The STS (or designated Safety representative) has the overall responsibility for accident investigations as defined by the accident investigation procedure in SOP 600.01. In the case of an accident defined as "reportable to State Safety Oversight and the FTA", a formal investigation is undertaken. All formal safety investigations are confidential and include the following steps, as appropriate:

- On-site inspection of the scene;
- Review of statements written by involved persons;
- Interviews with involved persons and witnesses;
- Review of laboratory reports of post-incident substance abuse testing;
- Review of the following physical evidence:
  - System log data
  - Communication tapes
  - Trolley, track, equipment maintenance and inspection reports
  - Dispatch documentation
  - CCTV Tapes
  - On-scene measurements
- Perform system tests;
- Preserve evidence;
- Coordinate incident reconstruction activities; and
- Prepare report for management and the SSO.

The SSOA has approved the LTC investigative process.

Regulatory & Management Reporting

The STS (or designated Safety representative) identifies and coordinates all reports to outside agencies as required.

State Safety Oversight Agency

FTA Reportable Events are reported to MoDOT in accordance with 49 CFR Part 674 and the Program Standards Manual
.
The following FTA Reportable Events require notification to the SSOA [and the FTA] within two (2) hours:

- A loss of life (occurring at the scene or within 30 days following the event);
- A report of a serious injury to a person (serious injury in accordance with the definition in the Glossary of this document; the notification is based on information available to the RFGS at the time);
- A collision involving a rail transit vehicle;
- A runaway train;
- An evacuation for life safety reasons;
- Any derailment of a rail transit vehicle, at any location, at any time, whatever the cause.

The SSOA Program Manager is notified by cell number (573-418-0500) followed immediately by a call to the MoDOT 24-hour emergency phone number (573-751-4291).

The following information is included in the initial notification to the SSOA Program Manager:

- Name and Job Title of person reporting and name of RFGS
- Event Type (fatality, injuries, property damage, evacuation, derailment or other)
- Location, Time, Date
- Number of Fatalities
- Number of Injuries (individuals requiring immediate medical treatment away from the scene)
- Rail transit vehicle(s) involved (including route, vehicle number, direction of travel)
- Other vehicle(s) involved (type, number)
- Property damage estimate
- NTSB reportable
- RFGS primary person (i.e., Chief Investigator) conducting the investigation (name, title, phone number, email address)
- Brief description of the event
- Brief description of investigation activities completed or anticipated in the short term
- Preliminary probable cause, if applicable

The investigation process used by the LTC is discussed in more detail in LTC SOPs 600.01 through 600.04. LTC investigations for the SSO Agency will follow the format outlined in **Annex A** - adopted from APTA **Standard for Rail Transit** Accident/Incident Investigation; RT-SOP-002-02; Revision 2 (March 31, 2012). The above referenced SOPs include templates for investigation reports that include causal and contributing factors, as well as procedural guidance on hazard analysis and risk mitigation via corrective actions. Each LTS investigation report will be forwarded to MoDOT within 30 calendar days following the completion of the investigation. Thereafter, the LTS will provide monthly status reports to MoDOT until such time as all matters related to that investigation are closed and approved by MoDOT.

Upon completing the accident investigation, the LTC will prepare and submit to MoDOT a draft final report that includes a description of activities, findings, identified causal factors, CAP(s) and hazard analysis, as applicable.

Accident reports developed and prepared for the SSOA are reviewed, approved and adopted by the SSOA. The SSOA may request that causal factors or hazards identified during the investigation be addressed or corrected by the LTS, and added to the CAP log.

At times, the SSOA may conduct and/or develop its own independent investigations, following notification of the LTS, which may include, but is not limited to: assessing LTS operating rules and procedures, conducting follow-up interviews, analyzing employee records including post-event drug/alcohol tests, and vehicle/equipment inspections. During the course of, or following, an investigation, the SSOA may develop formal CAPs that require correction or mitigation by the LTS.

At the conclusion of an SSOA investigation, SSOA will transmit a complete investigation report within 45 days following the completion of its investigation. If the LTS does not concur with the SSOA's final investigation report, it may submit – within 15 days of its receipt – a written dissent for inclusion as an attachment (or appendix) to that final report.

NTSB

The LTC notifies the NTSB within 24 hours when there is a rail accident[19] resulting in:

(1) A passenger or employee fatality or serious injury to two or more crewmembers or passengers requiring admission to a hospital;
(2) The emergency evacuation of a passenger train;
(3) A fatality at a grade crossing;
(4) Damage (based on a preliminary gross estimate) of $150,000 or more for repairs, or the current replacement cost, to railroad and non-railroad property; or
(5) Damage of $25,000 or more to a passenger train and railroad and non-railroad property

Title 49 CFR. Part 840 stipulates that the operator of a railroad[20] shall notify the NTSB by telephoning the National Response Center at telephone 800–424–0201 at the earliest practicable time after the occurrence of any one conditions listed above. The SSOA is notified anytime a report is made to the NTSB.

Federal Transit Administration

Title 49 CFR Part 674 requires the state to include notification to the FTA in its program standard. Accordingly, all FTA reportable events are also reported to the FTA within the 2-hour window.

These events are reported to the FTA through the U. S. Department of Transportation Crisis Management Center (CMC) by email (the recommended method) or by phone:

CMC email: TOC-01@dot.gov
CMC Phone: (202) 366-1863
(Send an email copy of FTA notification to the SSOA Program Manager)

The FTA has published guidance on accident (event) reporting in the form of a Quick Reference Checklist and a 2-Hour Notification Guide.

National Transit Database

The LTS also reports annually as a Reduced Reporter to the National Transit Database ("NTD").

The NTD is the means by which the FTA collects and uniform asset, safety and security data for transportation systems. For an incident to be reportable to the NTD, it must involve a transit vehicle or occur on transit property and meet certain criteria. Reporting requirements categorize incidents as major or minor based on thresholds described in the NTD Reporting Manual.

The FTA NTD Reporting Manual mentions the importance of distinguishing between safety incidents and crimes, injuries, or deaths resulting from robbery, assaults, trespassing, arsons, and other crimes and misdemeanors not considered safety items. Such incidents are reported separately.

Missouri Division of Workers' Compensation

[19] [53 FR 49152, Dec. 6, 1988]: Title 49 C.F.R. PART 840—RULES PERTAINING TO NOTIFICATION OF RAILROAD ACCIDENTS

[20] (a) *Railroad* means any system of surface **transportation of persons or property over rails**. It includes, but is not limited to, line-haul freight and passenger-carrying railroads, and **rapid transit**, commuter, scenic, subway, and elevated railways.

Employee injuries must be reported to the Missouri Division of Workers' Compensation within 30 days after receiving notice.

PART III – SAFETY ASSURANCE

Chapter 8 – Safety Performance Monitoring and Measurement

The LTS has established activities to monitor its system for compliance with its procedures and maintenance and exercise activities that evaluate the effectiveness of any corrective actions/mitigations for existing deficiencies.

A robust accident/investigation program has been established for safety events to determine causal factors.

Safety Data Acquisition

Safety Data Acquisition and Analysis

It is the task of the Safety & Training Specialist (or designated Safety representative) to monitor safety performance of LTS operations. Selected data will be accumulated and analyzed, and includes injuries, potentially hazardous equipment failures, structural defects, and rules and procedures violations. This information will be shared quarterly with the SSOA and the DA. The data is used in the tracking of hazard-related data to identify safety-related trends. These trends are further analyzed or investigated with the assistance of the affected department to pinpoint the specific area of concern. This is accomplished by interviews with personnel in the affected department(s) and analysis of pertinent documentation. Identified hazards are submitted to the manager of the department responsible for implementation of the necessary corrective action. Also included in the submittal are any recommendations for corrective action or a request for development of corrective actions.

Data Analysis

Safety data is collected, documented and analyzed from numerous sources by all LTS departments. These sources include, but are not limited to, the following:

- Accident reports
- External Agency reports and publications
- City Official concerns
- Claims reports
- Daily Operations Reports
- Maintenance Reports
- Employee Concerns
- Employee Occupational Injury Reports
- FTA Bulletins and Safety Advisories
- Homeland Security Alerts
- Insurance Inspection Reports
- Internal Audit Reports
- SSOA/FTA Reviews

- Passenger concerns and Customer complaints
- Inspections, Assessments and Observations
- Safety meetings
- Special Occurrence Reports
- Public Safety reports, concerns and investigations
- Social Media posts
- Customer Service Information
- System Reliability
- Rule Compliance Checks

Safety data collection also involves obtaining technical information, data and reports for use in systems development of program elements. Sources for such data include, but are not limited to, the following:

- American National Standards Institute (ANSI)
- American Public Transportation Association (APTA)
- American Society for Testing and Materials (ASTM)
- Department of Homeland Security (DHS)
- Environmental Protection Agency (EPA)
- Federal Transit Administration (FTA)
- State Safety Oversight Agency (SSOA)
- Missouri Statues
- Safety Data Sheets (SDS)
- National Fire Protection Association (NFPA)
- National Transportation Institute (NTI)
- Occupational Safety and Health Administration (OSHA)
- Transportation Security Administration (TSA)
- National Transit Database (NTD)

Data Analysis and Access

Used as part of the hazard management process, data collection and analysis are used to identify hazards before they cause accidents by such techniques as trend analysis.

The LTS collects and tracks safety-related data to identify causal factors and undesirable trends, including those related to hazards. Investigations may include interviews, testing and analysis of related documentation. Identified hazards are tracked and findings requiring corrective action are vetted through the SSC for review, assessment, concurrence and discussion of further appropriate and practical mitigations.

National Public Transportation Safety Plan Safety Performance Measures

The LTS has set targets based on the safety performance criteria established under the National Transportation Safety Plan (“NSP”). FTA’s NSP describes the required safety performance areas public transportation agencies must measure, as outlined below. These performance measures focus on existing data delivered to the NTD.

Each year, the LTS will set performance goals in each area. The goals for each year can be found in Appendix A – National Public Transportation Safety Plan Safety Performance Measures

National Public Transportation Safety Plan Safety Performance Measures			
System Reliability	**Safety Events**	**Fatalities**	**Injuries**
The mean distance between mechanical failures by mode.	The number and rate per total vehicle revenue miles by mode.	The number and rate total vehicle revenue miles by mode.	The number and rate per vehicle revenue miles by mode.

Coordination with East-West Gateway Council of Governments (EWGW) and the State

As a component of 49 CFR Part 673, the LTS will be required to coordinate its performance targets, as required by the National Transportation Safety Plan, with the local Metropolitan Planning Organization (MPO) and the State. These entities are represented by the EWGW and MoDOT.

During the draft stages of the PTASP each year, the LTS will communicate its proposed performance targets to EWGW. The Accountable Executive, or their designee, will communicate this to EWGW by electronic means and/or an actual meeting. At that time, the EWGW will have the opportunity to review such safety targets and performance goals, including the process by which they are created and monitored, and, to the maximum extent practical, recommend updates to same. This will be accomplished each year before the draft PTASP is transmitted to SSOA.

The annual draft PTASP submittal to the SSOA will serve as the requirement of LTS communicating its proposed performance targets with the State. At either party's request, safety performance measures may be communicated and coordinated through established SSOA meetings and/or site visits.

Safety Performance Measures

Performance Indicators

The LTS uses a variety of performance indicators to measure its compliance with, and the sufficiency of, its procedures for operations and maintenance. The LTS uses information obtained from Safety observations and reported safety activities to track and trend events and hazards. Review of performance indicators will occur at least quarterly by the SSC to identify and address trends. If a negative trend is present, the SSC will analyze the trend and discuss or enact potential mitigative measures. A hazard rating will be assigned and an item added to the CAP log for purposes of tracking.

Based on the total anticipated 2020 calendar year vehicle revenue miles, the LTS has established performance measures (see Appendix A)

Operating and Maintenance Rules and Procedures

Operational and maintenance rules and procedures are contained in the Standard Operating Procedures (SOPs), Rule Book, and Operations and Maintenance Manuals. The Facility Maintenance Plan addresses procedures and process for facilities activities, and is supplemented by manufacturer manuals. These manuals cover tool/equipment-specific rules and procedures for the safe operation and repair of individual facility assets. Additionally, the LTS utilized an Employee Handbook and Drug & Alcohol Policy Plan in its system operations.

All findings of non-compliance with rules are evaluated by the Safety & Training Specialist (or designated Safety representative), who may solicit input from the manager of individual departments, as needed.

Rules Compliance

The data obtained from rules compliance reviews is an important part of the LTS SMS process. These rules cover both operational and maintenance types. Data from rule checks are kept in physical form and catalogued in electronic form. Safety securely maintains these record and will review same on at least a quarterly basis for identification of hazards and trends. Hazards and trends discovered are run through the risk mitigation process to generate CAP log items where appropriate.

Monthly safety meetings, via the SSC, may also be used to discuss the effectiveness of supervision relating to the implementation of operating and maintenance rules. If the data, and discussion, reflects an ineffectiveness or a breakdown in process, a different direction may be warranted, including revising existing or creating new operations and maintenance rules.

Loop Trolley Company Rules and Procedures

The Loop Trolley Company, as contracted operator and maintainer of the LTS, has prepared and implemented both a Rulebook and Standard Operating Procedures (SOPs).

Operating and Maintenance Rules

Loop Trolley Company Rulebook – This manual consists of those rules and procedures applicable to LTS employees. Department managers, as required or as needed, may recommend revisions via the SSC. A schedule of reviews has been established whereby system and operational changes are approved prior to implementation. Such changes may include operational rules and procedures, general orders and notices. A new rulebook is published at least every three years.

General Orders – General orders are issued to modify a current operating rule or procedure, or to address an urgent operating requirement. General Orders may be implemented as new rules in future Rulebook versions, as necessary.

Notices – Notices may be issued to all LTS employees or to specific departmental employees providing information which may address a temporary need, support work functions, or provide general safety information.

Maintenance Personnel

The Maintenance Leader enforces rules and procedures by observing and monitoring employee performance in all aspects of LTS maintenance, and communicates outcomes of same to the Director of Operations. This applies to all maintenance areas of work – Trolley Vehicles, OCS, Right-of-Way, TPSS, and Facilities. Areas of observation include, but are not limited to, the following:

- General safety;
- Proper use of tools, equipment and machinery;
- Proper use of personal protective equipment (PPE);

- Right-of-way safety;
- Fire safety;
- Material handling and storage; and
- Quality Assurance inspections and audits of procedures

Preventative maintenance activities are continuously monitored by the ML. inspection tasks are periodically updated to reflect system needs, and to enhance operational efficiency and safety.

Maintenance-of-Way (LTS and Contractors)

The LTS has established rules and procedures which govern safe maintenance activities along the operating right-of-way. These rules also will apply to LTS contractors and other contractors that may perform maintenance or construction activities on, under, above or near the right-of-way. Before any contractor work along the right-of-way is authorized a work permit must be obtained. Before work commences, an LTS representative will brief the lead crewmember on applicable safety measures, and may, as needed, require the lead crewmember or crewmembers to receive Track Access Training. Periodic site visits and communications will occur to ensure the work is being performed safely and as outlined in the work permit.

Facilities and Equipment Inspections

The LTS has established and maintains a list of all LTS facilities, physical equipment, and rolling stock subject to inspections and tests for safety critical elements. The Safety & Training Specialist (or designated Safety representative) performs or monitors safety-related tests and inspections of such elements, in coordination with the Maintenance Leader.

Yard and Shop Inspections

An inspection of the Maintenance & Storage Facility (MSF) and Yard will be conducted by the Safety & Training Specialist (or designated Safety representative) on a semi-annual basis to identify and document compliance with local, state and federal regulations regarding environmental pollution issues relates to air, water, soil contamination, and provide assistance to control or correct hazards. The safety inspection occurs annually and includes a review of the following:

- Reporting findings and recommendations resulting from safety tests and inspections to SSC;
- Performing follow-up inspections to determine compliance with findings and recommendations;
- Evaluating the effectiveness of safety tests and inspections;
- Portable fire extinguishers;
- Fire detection and alarm systems;
- Building construction and maintenance;
- Building facility equipment (i.e. HVAC, electrical, etc.)
- Means of egress and security (access control
- General housekeeping and storage practices;
- Employee awareness of emergency procedures

All inspections are documented and include the following information:

- Date of inspection;

- Listing of items observed;
- Description of observed deficiencies;
- Lists of applicable regulations, SOPs, etc.;
- Suggestions to improve the safety of the facility; and
- Name of inspector

The inspector(s) ensures that personal protective equipment is available at all times; eyewashes and fire extinguishers are operational; and general facility defects are noted and corrected as practical. Serious deficiencies (i.e. life-threatening) are corrected immediately. If a serious deficiency cannot be corrected immediately, it is given priority in the CAP log and preventative measures are taken to mitigate the hazard.

If a corrective action for a serious deficiency is delayed, the STS or DOO may impose temporary measures to protect life and property. Examples of such measures include shutdowns, evacuations, notifications, or signage advising of present conditions.

Inspections are conducted to ensure compliance with local, state and federal environmental regulations. Where inspections bring to light deficiencies in systems or equipment, employees follow the hazard management process. Conformance with this process provides timely resolution of possible hazards along with proper reporting of deficiencies within components of the system.

If an inspection report identifies safety and health defects found during the inspection, the Safety Department is responsible for correcting any hazards related to facilities and the equipment therein, and also prepare a CAP log item identifying the schedule by which time corrections will be completed.

A follow-up inspection and report is made approximately 45 days after the initial inspection. Facility inspections and audits are tracked by the Maintenance Leader. A procedure (SOP 600.09) has been adopted for the annual safety inspection.

Stations Inspections

The Maintenance Department has the primary responsibility for inspections of stations. A visual inspection is performed on each operating day, and an on-foot inspection is performed monthly. All maintenance and operational personnel are tasked with reporting station hazards or defects as noticed.

Rolling Stock Inspections

The Maintenance Department has the primary responsibility for regular inspection and maintenance of the LTS rolling stock. The inspection program includes safety inspections on operating days, mileage/hours-based preventative maintenance inspections and a future overhaul program. The operating day inspections include visual or hands-on inspection of the following:

- Oil & Fluids
- Brakes
- Pantograph
- Lightning Arrestor
- Circuit Breakers
- Air Compressor
- Trucks

- Motors

All maintenance inspection records are maintained by the Maintenance Leader for a period of at least three years.

Scheduled trolley maintenance follows the recommendations of the Trolley Rehabilitation contractor, as follows:

1,000 Mile Preventative Maintenance – Inspect for wear and damage; friction brake systems, resistors, lights, traction motors and auxiliary motors, pantograph shoes, control functions, door operator, liquid levels; perform lubrication; change filters; wash seats, windows and floors and inspect; lubricate and adjust as appropriate: brake actuators, air or hydraulic valves, door mechanisms; inspect wheels for profile and wear.

7,000 Mile Preventative Maintenance – Perform 1,000 mile work; inspect and adjust controls, brake resistors; inspect suspension; detail wash all interior surfaces, clean light fixture lenses or lamps, wash rook, clean underside of trolley vehicle.

14,000 Mile Preventative Maintenance – Perform 1,000 mile and 7,000 mile work; inspect and service communicators, bearings, gearboxes (lubricate), truck connections and journal bearings.

On operating days, the Trolley Operator conducts a daily pre-departure inspection on each Trolley prior to passenger service. These items include:

- Fire protection equipment;
- Emergency communications equipment (PA, Radio)
- Brakes, door operations, horns, bells
- Headlamps, RR lamp, and indicator lamps
- ADA Lifts
- Interior Lighting
- Interior Compartments

Copies of the daily pre-departure inspection forms are retained by the Operations Department for a period of at least two years.

Fire Detection & Suppression Equipment Inspections

The STS (or designated Safety representative) is responsible for the inspection of fire protection equipment while the Maintenance Department is responsible for the maintenance. Inspection items include the following:

- Portable fire extinguishers are inspected monthly by LTS and service annually by a contractor.
- Smoke detectors are inspected monthly by LTS.

Maintenance Audits & Inspections

Safety critical systems, such as substations, OCS, structures, track, and trolley vehicles are inspected and tested and/or serviced on a scheduled, periodic basis. Inspections are done using checklists for each audit. When a system component is found in a failed or out of tolerance condition and in such a manner that

would present a significant hazard, applicable operations will be restricted to maintain safely until an appropriate corrective action has been implemented. Hazards found during audits are also provided to the Safety & Training Specialist (or designated Safety representative) for investigation, reporting, and tracking as required by SSOA regulations. Equipment found in a failed or out of tolerance condition is recorded and tracked by the Maintenance Department, and cannot be closed out until repairs are completed.

The Safety Department performs internal safety audits of maintenance activities for safety critical systems. These audits focus on adherence to schedule, application of standards and procedures, and record keeping. All safety critical hazards discovered during audits or inspections are tracked for correction.

Rail Systems Maintenance

Signal System – The LTS utilizes a simple signal system consisting of a trolley-mounted (and maintenance vehicle-mounted) emitter, and receivers mounted on traffic arms at specific street crossings on the alignment. Inspection of the signal system occurs each day of operations during the maintenance vehicle system sweep, to ensure pole-mounted receivers are performing as expected.

Traction Power & OCS Inspections and Maintenance – The Maintenance Department has the overall responsibility for inspection and maintenance of the OCS and TPSS inspection. Components of the quarterly and annual inspections are performed by Metro Traction Power Division, per agreement. Inspections of the Traction Power and OCS systems will occur as follows:

- TPSS –Visual and equipment readings – weekly
- TPSS – Breakers and batteries – quarterly
- TPSS – Transformers, switchgear, rectifier, breakers – annually
- OCS – Mainline visual – each operating day
- OCS – Section insulators, air break & overlap, fixed tension, lightning arresters, yard inspections, DC No-load switch, Yard door bridge & DC switch (shop/yard) – quarterly
- OCS – Hands-on hardware and support elements, OCS wire gauge -- annual
- Hot sticks and auxiliary PPE/Equipment – annual

Right-of-Way Inspections and Maintenance

Track Inspection and Maintenance – The Maintenance Department is responsible for the inspection and maintenance of LTS track components, consisting of: roadbed, rail, fasteners, switches, and special track work, as well as various other components of the public and semi-exclusive LTS ROW. A number of practices regarding the frequency of inspection and the content of tests have been adopted from APTA's Manual for Standards and Recommended Practices for Rail Transit Systems. Such practices have been adopted as suitable for the LTS due to similarities of equipment in certain applications. Components of the monthly and annual inspections are performed by Metro Track Division, per agreement. Inspection of the Track system will occur as follows:

- Alignment check (riding or walking) – each operating day
- Track Inspection (riding visual) – each operating day
- Mainline Switches – monthly
- Yard Track & Yard Switches – monthly
- Switch Maintenance – annually

- Bumping Post – annually
- Ultrasonic Testing (mainline and special track work) – annually
- Geometry Testing – as needed
- Special inspections (derailment, damaged track, post-earthquake, flooded track) – as needed

Facility Inspections & Maintenance

The Maintenance Department is responsible for the inspection and maintenance of LTS facilities, consisting of the MSF and station stops. Inspection of the Track system will occur as follows:

- MSF Compressor – monthly
- MSF Crane Hoist – monthly
- MSF Mobile Lift – monthly
- MSF Fire Protection – monthly
- MSF HVAC – semi-annually
- MSF Overhead Door – annually
- Station Stop Site Conditions (riding) – each operating day
- Station Stop walking surfaces and tactile strips – monthly

Transit Asset Management/State of Good Repair

The LTS will address the requirements of 49 CFR Parts 625 and 630, Transit Asset Management (TAM) and State of Good Repair (SGR), through the LTS Transit Asset Management Plan (TAMP), which includes TAM and SGR performance measures. The STS (or designated Safety representative) will meet with department managers regularly to determine any potential and existing hazards that need to be monitored and/or mitigated. For both Safety Management and Transit Asset Management, the following flow-through process is utilized:

1) Inventory asset data
2) Analyze asset risks and performance against established targets
3) Develop framework for prioritizing asset needs to deliver performance targets
4) Develop processes to keep asset, risk and performance data up to date in real time
5) Develop processes to optimize these analyses and processes

Hazardous Materials Program

The LTS has a written procedure pertaining to the use, storage and procurement of Hazardous Materials (SOP 600.13 – Hazardous Materials/MSDS). Safety Data Sheets (SDSs) are required for each product, and the LTS requires that the SDSs be available to all employees who may work with a potentially hazardous chemical. The SDS is maintained by the STS and is retained in physical form with the STS and the ML. Updates to the SDS are performed on an as-needed basis.

Federal, State and Local Requirements

Federal Regulations

Although the LTS is not specifically subject to OSHA requirements, it does use OSHA guidelines in establishing a baseline for its safety program. LTS “safety sensitive” employees are subject to all of the

DOT/FTA drug & alcohol requirements discussed further in the LTS Drug & Alcohol Policy Plan. LTS will modify policies, plans and procedures accordingly, resultant of development and rulemaking associated with MAP-21.

State Regulations

The LTS is subject to SSOA regulations promulgated by the State of Missouri.

Local Regulations

The LTS adheres to local regulations impacting all or portions of the system, including (but not limited to) environmental regulations, fire protection, building codes, and agreements with the City of St. Louis and the City of University City.

Drug and Alcohol Program

The LTS is committed to preserving the highest possible safety standards both in the quality of its services and the safety of its passengers, employees, the general public and property. In support of this commitment and its commitment to a drug-free workplace, the respective Boards of Directors of the LTTDD and the LTC have adopted a policy to prohibit the illegal or inappropriate use, possession, manufacture or distribution of drugs and alcohol by LTS employees and contractors. LTS employees, and employees of contractors holding safety-sensitive positions (covered employee) are subject to drug and alcohol testing in accordance with federal and state regulations. The implementation of the LTTDD and LTC Board Policies, as well as the requirements of federal and state regulations, is the responsibility of the DA, who acts as the Drug & Alcohol Program Manager (DAPM). The STS (or designated Safety representative) acts as the Designated Employer Representative (DER)

The Board Policies and associated Drug & Alcohol Program address the following:

- Prohibited substances
- Prohibited conduct
- Test classifications
    - Pre-employment
    - Post-accident
    - Random
    - Reasonable Suspicion
    - Return to Duty
    - Follow Up
    - Probably Cause
- Testing Protocols
- Prescriptions and Medication
- Consequences

Additionally, the Drug and Alcohol Policy Plan provides managers and employees with additional material such as Drug and Alcohol contact, Definitions and Acronyms, and detailed instructions. For special circumstances, such as ‘shy bladder’ or ‘shy lung’, the Plan provides details about employee notification in the event of a confirmed positive test, and contains a detailed list of LTS safety-sensitive job classifications. The Plan also provides employees with descriptions of the consequences of substance abuse as well as a directory of substance abuse professionals who can provide counseling.

In addition, employees are required to report any health or medical condition that may impair his or her ability to perform the assigned duties to the DOO. This rule specifically includes the use of over-the-counter and prescription medicine.

As part of DAPP familiarization training, employees are given information about the LTS-sponsored Employee Assistance Program ("EAP"), a confidential counseling program from which all employees can obtain professional help in treating chemical dependency and substance abuse.

Procurement Process

The STS (or designated Safety representative) and the DOO review all procurement specifications, designs, equipment or systems that may affect the safety of employees and passengers.

Pre-Procurement Reviews

The review is performed to ensure the incorporation of safety requirements in contract documents, and to assess compliance with the safety requirements through the testing and/or inspection of the facility, equipment, or system. Safety aspects of bid documents and specifications include the following:

- Safety requirements for construction or installation
- Tracking and verifying compliance with safety & security requirements in design reviews
- Testing and certification for installations and interfaces
- Maintaining configuration control
- Periodic safety evaluations and audits
- Incorporation of "fail-safe" principles where failure could cause a catastrophic event
- Safety devices, parts and materials that eliminate or mitigate most identified safety hazards

For contracts that exceed $25,000, the LTTDD District Administrator participates in a pre-procurement review with the project manager to identify any unusual or unique safety issues that might be associated with the procurement. For major construction or major upgrades, the LTS Safety & Security Certification procedures are incorporated throughout the procurement process.

Chapter 9 – Management of Change

Managing Safety in System Modifications

System Modification

Any safety-critical change or modification to LTS equipment or the system is controlled to assure hazards are appropriately identified and controlled in the plans and designs of the modified equipment or system. This chapter discusses the LTS process for identifying and assessing changes that may introduce new hazards or that may have an impact on performance.

System Modification Review & Approval

Any safety-critical change or modification to LTS equipment or system is controlled to assure that hazards are appropriately identified and controlled in the plans and designs of the modified equipment or system.

The section describes the processes to ensure safety concerns are addressed in modifications to existing systems, vehicles, equipment, and procedures do not require formal safety certification but which may have an impact on safety. These processes and approvals support and ensure a high level of system safety for passengers, employees, and the general public.

The configuration of the LTS system are those civil systems and subsystems that define the engineering and physical basis of the safety-critical operating and maintenance practice. The initial baseline configuration for the system consist of the design criteria, "as-built" engineering documents such as operating and maintenance practices (including applicable training and qualification requirements). These documents establish the basis for the preparation of the design, construction, and operations and maintenance parameters. Various processes, as described below, have been established to ensure safety review, analysis and approval, where appropriate, of changes to the fleet, facility, and system as a whole, which may have a safety impact.

Any proposed changes described in this section with a safety impact is subject to the risk management process. Hazards discovered in the system modification process will follow the risk management process, and be undertaken by the SSC.

In general, all LTS management roles participate in the development, implementation and management of capital projects and operation projects. The LTS may contract or request additional engineering and technical support in an effort to assure appropriate review and analysis, and ensure safety.

In the life of an active project cycle, the LTS maintains an active role throughout. Once a project concept has been developed and approved, with funding identified, a Request for Proposals (including a Scope of Work) is prepared as needed. Following review and approval of the RFP by the DA, the LTS activates phases which may include design, procurement, construction, testing, and permitting. The STS (or designated Safety representative) actively participates in all phases to ensure safety-critical items are identified, accounted for, and addressed during all phases. This may include design reviews and progress meetings throughout the project's life cycle, as well as site visits and safety audits.

Design Reviews

Through the SSC, design reviews are performed for all major system procurement such as new vehicles, facility construction or modifications to established design criteria and standards. Reviews are performed to evaluate progress and technical adequacy of the design and to identify any necessary interface functional and physical compatibilities.

Design reviews include:

- Conceptual design reviews
- Preliminary design reviews
- Final design review
- Prototype review
- First article or initial product conformance reviews

A design review might, for example, consider compatibility with existing safety features, design and procedures of existing LTS equipment. The reviews address such factors and interfaces as:

- Human factors
- Environmental parameters
- Emergency responses
- Fire sources and protection
- Equipment layout and maintainability
- Operations and maintenance requirements

Configuration Management

This section describes the requirements and methods used to ensure configuration management control. It includes the following:

- The authority to make changes;
- The process for making changes; and
- The notification and assurances to all affected departments regarding control of the LTS design baseline.

The purpose of this section is to ensure that modification to individual subsystems or fleet and inventory-wide changes are recorded on as-built drawings and addressed in training courses, maintenance manuals, and procedures, as applicable.

Configuration items for the LTS system are those civil/subsystems which define the engineering and physical basis of the system, and safety-critical operating and maintenance practices. The initial baseline configuration consists of the original system design (design criteria, standard drawings, and standard specifications) and the project documents associated with the original system.

This section of the PTASP addressed those aspects of these items that are safety-critical. The "baseline" consists of those items whose changes may affect system safety or the physical transportation system. Included in this category are physical component of the facility, system and vehicles, and operational documents such as Rules and SOPs.

Any proposed change described in this section with a safety impact is subject to the risk management process. Hazards discovered in the Configuration Management process follow the risk management processes as undertaken by the SSC.

Baseline Configuration

Design Criteria, Standard Drawings, and Standard Specifications – LTS design criteria and standard drawings/specifications were used for the trolley construction process, and define the principal design requirements in sufficient detail to permit the definition and allocation of requirements to the systems and assemblies that comprise the system. Project documentation includes any exceptions allowed from the design criteria and 'As-Built' drawings that reflect changes made to the standard specification drawings as original to the project. Changes that have an impact on a safety-critical system, subsystem, or operating practice requires review by the SSC. Therefore, it is important that this information be included on any Configuration Change Request. If it is unclear whether or not the change impacts safety-critical systems, the SSC will err on the side of caution, and consider it safety-critical change. For the purpose of determining impacts to safety-critical systems, cost or schedule implications are not considered.

A list of safety-critical systems and/or subsystems include the following

- Systems and Facilities – Signals, Right-of-Way, Structures, Communications, Rolling Stock, Yard & Shop, Electrification, Fare Vending Equipment, Station Stops, Track, Integrated Tests and Procedures
- Policies, Procedures & Training – System Safety & Security, Configuration Management Plan, LTS Rulebook, Emergency Familiarization, Safety SOPS, Training & Certification, Fire-Life-Safety, Security SOPs, Public Awareness
- Integrated Testing – System Integration Test Plan

Engineering Drawings and Associates Specifications – Engineering drawings and specifications were developed during the design phase of the LTS system and consist of the following types:

- Civil Systems (facility architect-engineer drawings and specifications) – These documents are the drawings and specifications required to define, develop, procure, construct, fabricate, and install the basic facilities.
- Rail Systems, Equipment Drawings and Specifications – These document are the drawings and specifications required to define, develop, procure, construct, fabricate, install, and test the specific configuration items or elements that, when integrated, make up the systems installed.

Operations and Maintenance Requirements – Operation and maintenance requirements and specifications consist of the safety-critical operating practices at the time the LTS was certified as revenue-ready. This is primarily expressed in the Operating & Maintenance Plan. Safety-critical operating practices include unusual dispatching patters (i.e. temporary speed restrictions, single-tracking, etc.), operational rules pertaining to signal aspects, and requirements for training/certification of trolley vehicle operators. Non-safety-critical operational items such as trolley vehicle schedules are excluded from this documentation.

Configuration Changes – Approval & Control

Configuration changes are approved by the SSC, the process of which is detailed in an SOP (SOP 100.07 – Configuration & Change Management), and applies to all safety-critical system elements, inclusive of trolley vehicles.

Roles & Responsibilities – The following roles and responsibilities have been established in relation to configuration change processes:

<u>Safety & Training Specialist</u>

- Reviews and identifies potential safety hazards with any proposed change.
- Identifies hazard severity and system risk resulting from single point and common cause failures.
- Participates in the Configuration Management Meetings[21] to review progress and address any relative safety issues.
- Updating changes to rules, procedures and any other item relating to safety and security.

[21] For our purposes the Configuration Management Meeting is the same as a Safety & Security Committee meeting. Configuration issues may be discussed at any regular meeting or a specific meeting may be called by the DOO as needed. The SSC process is discussed in Section 3

- Conducts hazard analysis as required during the evaluation process
- Conducts training that may be needed as a result of a configuration change

Maintenance Leader:

- Controls the Configuration Management baseline for facilities and systems
- Maintains and updates Design Criteria[22]
- Maintains Standard Specs & Drawings

LTC DOO

- Controls all system integration issues
- Updates changes which could impact system and infrastructure changes on operations.
- Responsible for notification and distribution of configuration changes
- Oversees the Document Control System

LTC ED

- Final approval or rejection of configuration changes recommended by the SSC
- Appeals to LTTDD District Administer on configuration changes rejected by the SSC

Safety & Security Certification Program

Safety & Security Certification Program

Safety & Security Certification is the process for monitoring and documenting satisfactory compliance with a formal list of safety and security requirements. The requirements are defined in the LTS' design criteria, contract documents, the PTASP, and applicable codes and industry standards. These safety requirements are adhered to for all construction stages where revenue service will be maintained. For larger projects, a specific Safety Certification Plan was developed. For smaller projects – which primarily involve enhancements or additions to the existing system, this process is handled during the SSC reviews conducted for system changes. The LTS has self-certified the initial phase of the current system, and the results of that process provided the baseline for the configuration management process.

The LTS safety certification process is consistent with FTA's "Handbook for Transit Safety and Security Certification" (FTA-MA-90-5006-02-01; November 2002). The goal of the safety certification process is to verify that identified safety and security requirements have been met and to provide evidence the new operating segments/phases are safe and secure for use in revenue service. Accordingly, the objectives of the safety and security certification program are to document that:

- Facilities and equipment have been constructed, manufactured, inspected, installed, and tested in accordance with safety and security requirements in the design criteria and contract specifications;
- Operations and maintenance procedures and rules have been developed and implemented to ensure safe and secure operations;
- Safety and security procedures have been reviewed and updated if appropriate;

[22] For technical issues or changes this may require hiring a technical expert such as an engineer

- Training documents have been developed for the training of operating personnel and emergency response personnel;
- Operations and maintenance personnel have been trained and qualified or certified;
- Emergency response agency personnel have been prepared to respond to emergency situations in or along the LTS right-of-way; and
- Safety and security-related system integration tests have been conducted.

The LTS maintains documentation to verify compliance with the safety certification process. The documentation may include test reports, quality assurance audits, submittals, visual inspection reports, and warranties. The Safety Certification Process is used formally for major rehabilitation projects[23] and system extensions. In these instances, Certificates of Compliance for all applicable elements are issued for each of the respective elements, and a final Safety & Security Certification Verification Report is prepared.

The LTTDD DA, who has the ultimate responsibility for safety and security, has delegated the authority to implement and monitor the safety certification process to the SSC. Final authority to approve the certification of the LTTDD's extensions and expansions for revenue service rests with the District Administrator.

Certifiable Elements

The LTS has established and maintains a baseline master list of twenty-three (23) system elements that must be reviewed for safety compliance during major construction projects as well as for system enhancements and modifications. All items in this list may not be relevant to a particular project. The master list of certifiable elements includes:

Table 8 – LTTDD Certifiable Elements List

Number	Element	Comments or annotations
1	**Signals**	
2	**Communication**	
3	**Traction Power & Electrification**	
4	**Track**	
5	**Right of Way**	
6	**Rolling Stock (Trolleys)**	
7	**Fare Vending Equipment**	
8	**Emergency Equipment/Service Vehicles**	Removed from CEL List
9	**Structures (Bridges & Tunnels)**	

[23] An FTA requirement for projects in excess of $100,000,000 and for new system or extensions

10	**Yard & Shops**	Maintenance & Storage Facility
11	**Stations & Parking Lots**	
12	**System Safety & Security Documents**	Primary documents include the PTASP, the SSP, & the Safety Certification Plan
13	**Emergency Familiarization**	
14	**Fire Life Safety Plan**	Includes local first responders
15	**Configuration Management**	
16	**Quality Assurance Plan**	
17	**Safety SOPs**	
18	**Security SOPs**	
19	**Operations & Maintenance SOPs**	
20	**Operations Rule Book**	
21	**Training & Certification**	Categories include operators, maintainers, emergency responders, security, and employee safety
22	**Public Awareness**	
23	**Integrated Tests & Procedures**	

Safety & Security Requirements

The next step in this process is to identify the appropriate safety and security requirements applicable to the elements involved in a major construction project or in a system enhancement. These include:

- Bid documents that may have been modified to meet new alignments and/or configurations;
- LTS Design Criteria for Systems & Facilities;
- LTS standard specifications and drawings;
- Lessons learned and experience gained from operating and maintain the LTS system
- Recommendations from fire and law enforcement jurisdictions;
- Results of LTTDD hazard identification & analysis process;[24]
- Threat & vulnerability analyses;[25]
- Rail Transit Industry practices;
- APTA[26] rail standard practices;
- Reports from and experience of other transit agencies on safety and security;
- Internal safety reviews & audits;
- Federal, State, local and industry codes, regulations, guidelines and standards such as NFPA; and
- State Safety Oversight Triennial Review Reports

Safety and Security Review Committee ("SSRC")

[24] As described in Chapter 6
[25] Applicable to security review; discussed in the SSP.
[26] American Public Transportation Association

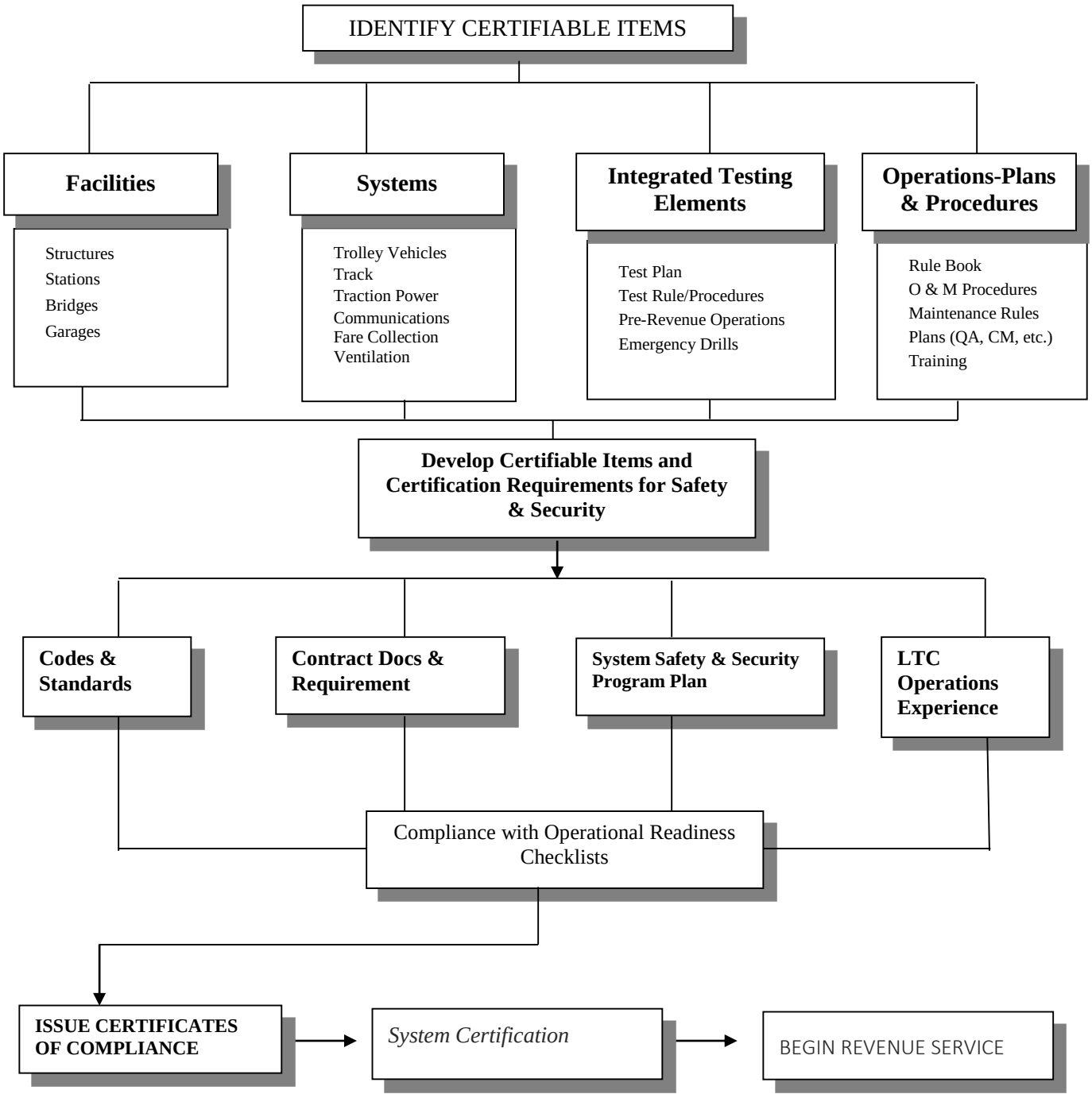
The SSC acts as the SSRC during normal operations. For extensions, the SSRC may reconvene. The SSRC is responsible for safety review, compliance assessment, making recommendations to LTTDD & LTC management regarding safety certification process, and certifying that system extensions and other system enhancements (via the SSC) are safe and secure for revenue service. The following persons may be included on either Committee:

- LTC Director of Operations (voting member)
- LTC Safety & Training Specialist, or designated Safety representative (voting member)
- LTC Maintenance Leader (voting member)
- LTC Dispatcher (voting member)
- LTC ED (ad-hoc, non-voting member)
- LTTDD District Administrator (ad-hoc, non-voting member)
- Design Consultants (technical expertise)
- Test Director (technical guidance)
- Construction Manager (technical guidance)
- MO State Safety Oversight

The SSRC and SSC responsibilities include:

- Review and approve documentation as evidence of conformance to safety and security requirements;
- Identify potential hazards/open issues;
- Require hazard analyses to be performed to determine initial and residual risks;
- Assign responsibilities for open issues and track to closure;
- Conduct site visits and define additional safety-related tests and analysis, as required;
- Subsequent to site installation and commencement of formal testing, review test plans and procedures, and issue test permits with applicable restrictions;
- Determine whether to accept specific conditions or require corrective actions, including the specific method to mitigate the conditions or potential hazard;
- Provide recommendations to the DA regarding certification and noncompliance of system elements;
- Issue Certificates of Compliance for certifiable elements;
- Issue Temporary Use Permits; and
- Issue System Safety and Security Certificate, certifying that system extensions or system enhancements are safe and secure for revenue service operations.

The Safety & Security Certification Process is as follows:



Continuous Improvement

The LTS defines continuous improvement as: a process by which the transportation agency examines safety performance to identify safety deficiencies and carry out a plan to address the identified safety deficiencies. Many areas of the PTASP have already addressed the components of this section.

Safety Department Activities Required to Implement Safety Management Program

To achieve continuous improvement in safety as outlined in this document, the LTS performs the following safety risk management, safety assurance and safety promotion activities via its STS (or designated Safety representative) to support other departments in meeting their obligations under safety management systems:

- Conducts FTA- and SSOA-mandated internal safety audits;
- Conducts inspections of the facility (MSF);
- Performs investigations of major accidents involving employees/equipment;
- Conducts investigations of safety complaints, concerns and reports;
- Prepares reports of significant events;
- Participates on safety committees (SSRC, SSC) and performs follow-up to safety committee issues and approvals;
- Trains maintenance employees on industrial/occupational safety requirements;
- Liaisons with local, state, and federal responders and agencies concerning emergency response to events involving public transportation;
- Supports the development, review and revision of safety-related SOPs in conjunction with managers of the Operations and Maintenance departments; and develops, reviews and revises SOPs for safety department functions;
- Participates on all committees or working groups for construction projects;
- Conducts safety briefings and inspections during construction projects;
- Periodically monitor system operations to identify and address procedural and rule compliance
- Assist LTS management with safety issues;
- Participates in the Safety & Security Certification process for all capital projects;
- Reviews and comments on any changes to safety elements within the LTS system;
- Reviews safety data and trends provided by departments, and provides feedback to ensure departmental compliance with SMS data requirements;
- Participates in development and implementation of system emergency drills;
- Facilitates LTS safety briefings on at least a monthly basis;
- Participates in formal meetings with the ED and DA, as appropriate, on safety issues;
- Provides full support and coordination on SMS implementation system-wide;
- Ensures continuous safety improvement through support activities for all departments; and
- Provides oversight activities for internal SMS assessments by each department.

Corrective Action Plans (CAPs) / Internal Safety Audit Process

Scope and Authority

All LTS departments and contractors are subject to annual audits. The ED and the STS (or designated Safety representative) have the authority and responsibility to conduct or oversee regular internal audits of System Safety support activities and shall provide a formal report of findings to the LTTDD DA, the LTC Board of Directors, and the SSOA annually to ensure effective corrective action is taken to resolve deficiencies. Auditors shall be independent from the first line of supervision responsible for the activity

being audited. Due to the small size of the LTC organization, contractors may be used to assist with the internal audit process.

Internal Safety Audits

Objective – The internal safety audits are essential to System Safety Management and support the LTS SMS processes in the future. Internal safety audits shall be conducted to determine if all organizational elements, equipment, procedures and functions are performing as intended from a safety perspective. The internal audit process must provide top management with a means for measuring how key safety-related activities are performing relative to the PTASP. Internal audits are also conducted to provide an official evaluation of accomplishments, and to determine whether all LTS organizational elements, equipment, procedures and functions in the scope of the PTASP are performing as intended.

The internal safety audit program is intended to provide the LTS with mechanisms for assuring that the PTASP and SSP are being implemented and procedures are being performed in accordance with LTS' own requirements, as well as those of SSOA. The LTS must ensure that internal audits are conducted by individuals independent from the function being audited and free of any conflict of interest and/or the appearance of a conflict of interest. It should be emphasized that the LTS internal audit program is intended to evaluate the implementation of the PTASP and SSP – not the documents themselves.

The key objectives of the internal audit program are as follows:

- Determining if the programs described in LTS' PTASP and SSP are being implemented through audit techniques such as interviews, document reviews, field observations and measurements;
- Determining if hazards and areas of the PTASP and SSP in which the LTS is noncompliant are being identified in a timely manner and appropriately tracked and mitigated using LTS' hazard management process;
- Issuing findings when hazardous conditions or non-compliant practices are discovered, and issue observations when processes or procedures can be improved. Findings will result in a formal recommendation that would require the SSC to develop a CAP log item;
- Working with affected departments to address findings, mitigate deficiencies, or improve business practices through development and tracking of COPs in accordance with LTS' prescribed process;
- Determining whether the PTASP or SSP should be updated;
- Ensuring all elements of the PTASP and SSP are reviewed in an ongoing manner and completed over a three-year cycle, with the intent of completing at least one-third of elements each year.
- Providing top management with a means for measuring how key safety-relates activities are performing relative to the PTASP and SSP. Internal audits are also conducted to provide an official evaluation of accomplishments, and to determine whether all LTS organizational elements, equipment, procedures, and functions in the scope of the PTASP and SSP are performing as intended.

Notifications – LTS must notify the SSOA at least 30 calendar days before conducting scheduled internal audits, and at that time shall submit to the SSOA any checklists or procedures that it will use during these reviews.

Annual Internal Review Reports – No later than February 1st of each year, the LTS shall submit to the SSOA an annual report documenting all internal audit activities from the preceding calendar year, and the status of findings and corrective actions associated with audits conducted.

The LTS annual internal audit reports must be accomplished by a formal certification signed by the ED indicating the LTS is in compliance with its PTASP and SSP. If LTS determines the findings from its internal audits indicate that it is in noncompliance with its PTASP or SSP, the ED must identify the actions LTS will undertake to achieve compliance, such as proposed or in-progress CAPs.

After reviewing the annual internal audit report the SSOA will issue a written response, either approving or rejecting the LTS annual report. The SSOA will also review and approve (or disapprove) the activities proposed to close resultant CAPs. The SSOA will issue its response within 30 calendar days of its receipt of the LTS annual audit report. A meeting to review and discuss the SSOA response may be convened at the request of either party.

If the annual report is approved by the SSOA, then no further actions relative to the annual reports will be required by LTS for that period. If the annual report is rejected, the SSOA may require other information or analysis that relates to the internal audit process. The LTS will be required to respond with this additional information or analysis within 30 calendar days. Alternatively, the SSOA may require LTS to prepare a CAP log item in accordance with the requirements contained in the SSOA Program Standards Manual.

The annual internal audit report may be delivered to the SSOA in a format agreed to by both parties and, once approved, be transmitted in an unalterable format with all required approval signatures and endorsements visible.

Threat and Vulnerability (TVA) – Within a three-year cycle, the LTS is required to perform a new (or review past) Threat & Vulnerability Assessment for any necessary updates. The SSOA will approve the LTS process for threat and vulnerability efforts through the annual review and approval of the SSP. The SSOA will monitor ongoing LTS activities as a part of its internal audit program oversight activities. The LTS is expected to document its methodology for performing TVAs, including how it identifies, manages and assesses vulnerabilities system-wide utilizing an all hazards approach. New threats and vulnerabilities identified will be discussed by the SSC and added to the Cap log for correction, including a schedule by which such corrections should occur.

Audit Scheduling

The STS (or designated Safety representative) is responsible for scheduling the annual audits, subject to SSOA approval. The STS will develop, adopt, and distribute standard procedures for the Internal Safety Audit. Departments to be reviewed will be informed of the audit and will be provided with information regarding the purpose, scope and content of the planned audit. LTC staff will communicate with SSOA officials at least 30 days prior to commencing the audit to review the proposed topics and checklists. The SSOA will review and approve both the topics and the checklists.

The internal safety audit process shall identify the facilities, equipment, procedures, and functions that support the initial safety certification of the system for passenger service operation. In order to ensure the independence of the audit process, the unit conducting the audit must not be the unit in charge of implementing the items being audited.

Audit Process

Audit protocol is developed in accordance with the SSOA Program Standards Manual. Internal procedures and processes are implemented to insure standards are being met. Specific audit guidelines

and written checklists are developed to measure the success of the implementation of safety policies, procedures and requirements. In each case, the audit guidelines are tailored to unique safety responsibilities of each department.

The internal audit process is intended to be a positive force for the organization and a tool by which possible problem areas may be discovered and addressed. It should not be construed to extend beyond the realm of system safety or to alter established transportation agency management structures.

The internal safety audits shall address, at minimum, the following areas during a three-year cycle:

- Safety Policy;
- Safety Goals & Objectives;
- Implementation of the PTASP;
- Authority & Management Structure;
- The hazard management process, including hazard identification, hazard analysis, hazard mitigation, and hazard resolution;
- Configuration Management, including documentation process, storage and retrieval;
- Safety Certification on major projects;
- Data Acquisition and Analysis, including safety event histories, hazard and threat conditions, and distribution;
- Accident notification, investigation, and reporting;
- Emergency Response, including fire and safety-related failure mode scenarios;
- Internal Safety Audits
- Operations Rules and Procedures, including development, maintenance, implementation and enforcement;
- Facilities & Equipment inspections, including rolling stock, structures, station stops and fire protection;
- Maintenance audits including systems and equipment, fire protection equipment, emergency and safety devices;
- Training and Certification, including qualification criteria for operational and maintenance personnel, documentation and contractor safety, including contractor safety training and requirements, maintenance and enforcement;
- Employee Safety including comprehensive programs to manage specific elements;
- Hazardous Materials, including compliance with federal and state EPAs;
- Drug and Alcohol policies and plans, including testing, training, documentation, and procedures;
- Procurement, including procedures, receiving inspections, and safety review;
- Review and Approval of the PTASP

LTS Annual Activity & Audit Reports

By February 1st of each year, the DA must submit a report to SSOA that documents the internal safety & security review activities and the status of subsequent Findings and corrective actions. The annual report will include, at minimum:

- A list of all audits included in the original schedule for the calendar year, indicating dates each audit was completed or identifying the audit as incomplete;
- A summary of significant audit findings;
- A summary of corrective actions generated by each internal safety and security audit;

- The status of each corrective action; an
- A formal letter of certification signed by the LTTDD DA certifying that the LTS is in compliance with its PTASP and SSP. If the LTS determine that Findings from its internal reviews indicate that the LTS is in noncompliance with its PTASP or SSP, the DA must identify the activities the LTS will take to achieve compliance and anticipated dates for completion.

Internal Audit CAP Dispute Process

Any disputes that occur during the SSC CAP development process may be ascended to the ED for additional review, discussion or approval. The DA may also be activated should the ED require additional input on the disputed item(s).

CAP Process

CAPs can be developed resulting from a variety of situations or hazards. Examples which could result in a formal CAP following Program Standard guidelines include: Unacceptable/Undesirable hazard rated items, or as otherwise directed or recommended by the DA, ED, SSC, STS, SSOA or FTA. Outside of a directive from the SSOA or FTA, the SSC will facilitate the development of the CAP. Once a CAP has been generated, the CAP is submitted to SSOA in accordance with its Program Standards Manual. Any internal disputes on CAP development/content will be first brought to the ED for resolution or, if the ED requires additional input, the DA.

All CAPs following the SSOA Programs Standard process will be documented and maintained in a CAP tracking log. The STS (or designated Safety representative) will maintain documentation and updates to the log and communicate updates to the SSOA at least monthly. Internal meetings to discuss CAP progress or the effectiveness of the mitigations are generally done departmentally. Meetings to discuss or approve CAPs can occur on an as-needed basis, outside of the standard monthly schedule.

For any CAP, the SSC will include, at minimum, the following information:
- Identified hazard or deficiency;
- Hazard rating;
- Process, plan, or mechanism to resolve hazard or deficiency;
- LTS personnel responsible for implementing corrective actions;
- Anticipated completion dates for implementation; and
- Other critical information (i.e. interim progress updates)

All immediate or emergency CAP actions will be implemented in concurrence with the SSOA Program Standards Manual section on “Immediate or Emergency CAPs”. An example of a situation that would involve immediate action could involve an Unacceptable Hazard or other situations that could involve immediate harm or danger to the system or transportation agency if quick correction action(s) is not taken. If such a case were to arise, the STS (or designated Safety representative) or the ED would make the decision for emergency action. The STS would ensure the Program Standards procedures are followed in this area, to include notification to the SSOA in writing by 5:00pm on the business day following its decision to take corrective action.

In an effort to minimize, control, correct, or eliminate identified hazards and risks for which a CAP has been created, the LTS will utilize a variety of processes and tools, as applicable, which may include: training or re-training, physical signage, physical changes to the system (inclusive of configuration changes), new rules and/or procedures, and periodic inspections.

PART IV – SAFETY PROMOTION

Chapter 11 – Safety Communication

The LTS will communicate safety and safety performance information throughout the transportation agency, conveying information on hazards and safety risks relevant to employees' roles and responsibilities, and informs employees of safety actions taken in response to reports submitted.

The LTS understands its safety management systems are dependent upon an ongoing management commitment to communication. One of management's most important responsibilities under SMS is to encourage and motivate others to want to communicate openly, authentically and without concern for reprisal.

Employee Safety Reporting Systems

All employees have the responsibility to report any adverse safety conditions, events or acts; any observed or foreseeable hazards; and any safety concerns.

Employees may report via the following methods:

- Reporting directly (in person) to an immediate supervisor;
- Reporting directly to the STS (or designated Safety representative);
- Reporting directly to the ED or DA; and
- When Metro Safety support is in effect, reporting to Metro Safety at safety@metrostlouis.org or 314.982.1638.

Employees have the option of reporting anonymously at any time. Employees who do not report anonymously will receive feedback from the immediate supervisor or safety representative to which the report was filed.

Any person receiving a report of a hazard will immediately notify their supervisor.

All reports will be documented and investigated in a timely fashion. Unacceptable and undesirable hazards will be address immediately, either through mitigation or elimination in the department wherein the hazard(s) exist, or through the SSC CAPs creation process.

Supervisors in each department are responsible to ensure that all reported hazards are properly documented, investigated and reported back as appropriate.

Employee Safety Notification Tools

The LTS will expeditiously provide information relevant to existing or potential safety hazards or risks through a variety of methods and materials. Examples of such notifications include training or familiarization specific to existing or potential safety hazards or risks, departmental and/or agency-wide safety forums, "toolbox" talks, posters, safety bulletins and general notices. Such tools will be used to communicate safety items of importance to the tasks, responsibilities, and inherent environmental hazards of the area(s) in which employees perform their duties.

Chapter 12 – Competencies and Training

Training Program

In accordance with the LTS' Standard Operating Procedures and Rulebook, LTS provides thorough, relevant, and ongoing education and training for all employees to ensure that assigned duties are completed safely and effectively. The LTS requires all employees to be properly trained to perform their jobs safely; to this end, the LTS employs operations and maintenance training with integral safety components to inform employees about job hazards and the appropriate methods for controlling these hazards. LTS' SOP 600.03 contains the training requirements specified herein.

Safety training records are securely maintained by the Safety Training Specialist. Training specific to departmental duties and responsibilities are securely maintained by the subject department manager. Additional information on training records is included in other sections.

Training mechanisms include classroom, written and video communications, field exercises, and drills. There are established training programs for operators and employees involved in maintenance activities. These include training classes, training manuals, and lesson plans. Testing is conducted as necessary to ensure training effectiveness, and all safety training is documented. Tests are given to all new operators to ensure knowledge. Refresher and In-Service training of operators can occur as a result of accident investigations, long-term absences, and observations. General refresher training for all operators is scheduled on an annual cycle. Policies, rules, and procedures are utilized in all aspects of training, as applicable. The frequency and amount of training conducted by the various departments depends upon regulatory requirements and the level of hazard associated with the assigned duty. The managers for departments of Safety, Operations and Maintenance work together to ensure that appropriate safety elements are included in the curricula, and that safety information is disseminated to affected employees.

More specifically, this effort includes:

- Identifying requirements for all LTS training as it impacts safety. This encompasses new employee training and Refresher training related to procedures and equipment including, in some instances, manufacturer training and retraining requirements identified as a result of accident investigations;
- Reviewing all training programs for safety adequacy;
- Assessing the effectiveness of training courses and on-the-job experience;
- Providing specific training with specialized curricula to operators, maintenance personnel, contractors and emergency response entities.

Activities or functions judged to be safety-critical may require special training and/or certification, as established in the six (6) required courses for Chief Safety Officers, which are provided by the Public Transportation Safety Certification Training Program. An example of such training includes the course "Transit Rail Incident Investigation" which is required for an LTS employee to conduct investigations on behalf of the SSOA, in accordance with the Public Transportation Safety Certification Plan. Employees whose duties directly impact the daily safe operation of the system must be formally trained and certified by successfully completing such specialized training courses.

The basic training programs for LTS positions are discussed in this chapter, and enacted by the LTS Training Plan.

The testing programs include performance and/or written examinations designed to determine an employee's knowledge and understanding of job functions as well as the ability to perform such job functions. Any employee who does not complete the training and testing program, or who fails to qualify for subsequent recertification, is not granted certification and is not permitted to perform associated duties until certificate is (re)acquired. Permanent records of safety training are securely maintained by the STS (or designated Safety representative), and permanent records of departmental/positional training are securely maintained by the department manager providing or coordinating such training.

Training and Education Policy

Through its Training Plan, the LTS has established the criteria necessary for thorough, relevant and ongoing training for all employees to ensure that assigned duties are completed safely and effectively. This Plan, and its subsequent revisions, are the baseline by which LTS will deliver a uniform and consistent training program, providing employees a clear understanding of the training requirements and an overall general knowledge of the rules, policies and procedures by which the LTS system is safely operated.

To achieve the required level of efficiency for LTS personnel, the Training Plan is founded on the following training goals, objectives, and principles:

- Effectively develop and maintain lesson plans, informational materials, and presentations for classroom and hands-on training programs;
- Establish appropriate rules, policies and SOPs to ensure a safe and rule-compliant workplace;
- Facilitate basic, recertification, return-to-work, refresher and remedial training;
- Identify and correct training deficiencies and strategies;
- Ensure training stays in compliance with LTS's PTASP and any state regulatory agencies;
- Create training rosters and securely maintain all training records;
- Monitor training conducted by contractors and vendors; and
- Endure proficiency and accountability within the subject departments by conducting efficiency tests as management deems necessary.

LTS Operations Training & Certification

Dispatchers

The training program for Dispatchers is focused on the LTS Rulebook and SOPs, as well as specific administrative and technical responsibilities of these roles. If a Dispatcher seeks training as an in-service backup, he/she is required to complete the entire Trolley Operator training course. If a Dispatcher will not act as backup, he/she will complete only the first two weeks of the Trolley Operator training course.

Following completion of either the entirety of Trolley Operator training (or the first two weeks), Dispatchers receive specialized training through which they will gain practical experience in the following activities:

- Effective radio communication
- Track allocation procedures
- Trolley location and call-point tracking
- De-energizing and energizing traction power

- Trolley and mainline troubleshooting
- Routing trolleys
- Proper notification procedures
- Dispatch functions
- Supervisor responsibilities
- Purpose and Use of Dispatcher forms and documentation
- Use of Microsoft Excel (for tracking/cataloguing operations events)
- Right-of-Way authorization and unusual mainline/yard occurrences
- Completing necessary day-of-operations documents, including track access and clearances

Trolley Operators

The LTS has implemented and maintains a training program for all new Trolley Operators. This program consists of classroom instruction (including the LTS Rulebook and SOPs) and supervised yard/mainline operations. Successful completion of the course requires test scores of 85% or higher, with the exception of the signals and switch test, which requires a 100% score to pass.

The LTS also requires annual Trolley Operator refresher training. This is an eight-hour course designed to serve as a refresher class to update Trolley Operators on changes or new rules and procedures, preemptive signals, signal aspects and indications, defensive driving, and any new information or regulations critical to the performance of the job function. Return-to-work refresher training must occur whenever an employee is out for a period equal to or greater than 90 days. Other training for special events, new configurations, and new procedures are provided on an as-needed basis.

Maintenance Training

LTS maintenance personnel receive specialized training courses to ensure their assigned duties are performed safely and effectively. Within the LTS, maintenance personnel are responsible for inspection, preventative maintenance and repair of all system elements to the extent their training and expertise allows. In order to operate a trolley vehicle on the mainline, maintenance employees must successfully complete the Trolley Operator training course, or, in order to operate a trolley vehicle within the shop/yard (or occasionally on the mainline out-of-service), must complete a Limited Yard & Mainline qualification course. Maintenance employees receive training on applicable rules and SOPs, as well as workplace safety training, as conducted by the STS (or designated Safety representative) for the following topics:

- Lock-out/Tag-out
- Equipment Maintenance Manuals (Safety Information)
- Hazardous Materials & Right-to-Know
- Arc Flash Safety
- Security Awareness
- Fall Protection
- OCS/TPSS Orientation
- Yard Familiarization
- Personal Protective Equipment (PPE)

Specific aspects of maintenance training are detailed in the subsections below.

Traction Power Substation (TPSS) and OCS Maintenance

The TPSS designer/contractor provided an extensive two-day on-site training to LTS management staff, as well as to key support employees from Metro's Traction Power Division in the Train-the-Trainer model. Subsequent on-the-job familiarization and training was performed by that original staff and Metro's Traction Power division.

Familiarization and training on the OCS system – including hands-on training for use of electrical protection equipment, non/emergency de-energization procedures, and visual inspection was performed by Metro's Traction Power division in the Train-the-Trainer model.

Track Inspection Training Program

Familiarization and training on the Track system includes a walking tour of the full LTS alignment, identification of track system elements, and instruction for inspection of track system elements. Aspects of Track Inspection training include:

- Defining various track elements and concepts;
- Determining hazard levels and priority levels
- Identifying and appropriately recording defects;
- Performing remedial repairs on identified defects;
- Understanding designs and practices of track elements; and
- Inspecting and servicing switches.

Recognizing that Track inspection and repair duties may be required while the system is in-service, or in the street-running portion of the alignment, Track Access Training (discussed below) is also a critical component of the Track Inspection program.

Trolley Vehicle Maintenance

The Trolley Vehicle rehabilitator provided extensive hands-on training to LTS management staff, and prepared and submitted a variety of support documents including the Maintenance Manual, the Operating Manual, and original and revised schematics. Familiarization and training is provided to all maintenance employees via combined classroom/on-the-job training. Specific aspects and components of trolley maintenance (electrical, mechanical, detailing) are provided by the Maintenance Leader on an as-needed basis.

Track Access Training

All LTS employees performing work along the LTS right-of-way are required to complete one or more of the Track Access Training programs. In certain circumstances, the STS (or designated Safety representative) may require a lead crewmember or crewmembers for contractor work on the alignment to also complete Level 1 off the Track Access Training programs

All LTS operations and maintenance employees are required to complete all three levels of Track Access Training annually, but have the option to "test out" every other year. The three Track Access Training levels are as follows:

Level 1 – A two-hour training course designed to provide personnel with basic on-track safety guidelines when accessing the right-of-way or MSF. Training is inclusive of a presentation that includes, but is not limited to, the following:

- The shared right-of-way safety requirements for performing any work along the right-of-way;
- The track allocation process and permit submittal in coordination with the City of St. Louis and the City of University City;
- Basic overview of the OCS, potential hazards associated with 600V DC power, and the safety requirements while working in close proximity to the OCS;
- The required PPE needed while working on the shared right-of-way;
- Basic traffic control protocol;
- Radio communications protocol;
- Reporting incidents and injuries; and
- Management and TDC authority and functions.

Level 2 – A one-hour training course aimed toward individuals who will perform duties as lookout or flagperson and whose sole responsibility is to protect work crews, personnel, and equipment within the shared right-of-way while ensuring safe passage of trolley vehicles and/or vehicular traffic. Training is inclusive of a presentation that includes, but is not limited to, the following:

- Safety requirements needed to successfully be qualified as a Flagperson/Lookout;
- Safety requirements for properly setting up a work zone, including the proper position of the flagperson within the work zone;
- How to obtain authorization to access the right-of-way to begin work;
- Identifying the safe area to stand when clearing the right-of-way for a trolley or motor vehicle to safely pass; and
- How to provide safe flagging protection for work crews along the right of way.

Level 3 – A one-hour training course geared toward individuals who will operate on-track equipment on the right-of-way. This training includes, but is not limited to, the following:

- LTS rules and guidelines that govern the movement of on-track equipment on the right-of-way;
- Information on track switches, trolley movements, preemptive signals, and indications;
- Speed restrictions; and
- Yard & Gate procedures.

Record Keeping

Permanent records of departmental/positional training are securely maintained by the department manager responsible for providing or coordinating such training. Training and Recertification Records Review is one of the components of the LTS internal audit program.

Employee Safety & Loss Control Program

The STS (or designated Safety representative) provides specific training in a variety of disciplines. Examples include, but are not limited to: fire extinguisher, occupational safety, first aid, SMS awareness, CPR training, safety onboarding, fork lifts, hazard communication, spill control, blood borne pathogens, evacuations, and accident investigation.

Occupational Safety

LTS SOPs 600.05 through 600.13 specifically address most of the safety issues related to employee safety. All SOPs are included in new hire training, and are subject to periodic review and approval by the SSC. The Employee Safety SOPS include:

- 600.05 – Blood Borne Pathogens
- 600.06 – Employee Injury Investigation & Reporting
- 600.07 – Employee Safety / Near-Miss Reporting
- 600.08 – Hazard Communication
- 600.09 – MSF Facility Inspections
- 600.10 Electrical & Arc-Flash Safety
- 600.11 – Fall Protection Equipment
- 600.12 – Personal Protection Equipment (PPE)
- 600.13 – Hazardous Material / MSDS

System-wide Safety Management System (SMS) Training

All department managers at LTS are responsible for supporting and enacting Safety Management Systems, and ensuring their respective department is compliant with SMS requirements. The STS (or designated Safety representative) will conduct this training via a curriculum based upon PTASP/SMS requirements. The STS, through the SSC, will annually evaluate SMS training for changes or updates and administer retraining for such changes.

APPENDICES

Appendix A – National Public Transportation Safety Plan Safety Performance Measures

The following Safety Performance measures have been established by LTS for calendar year 2020:

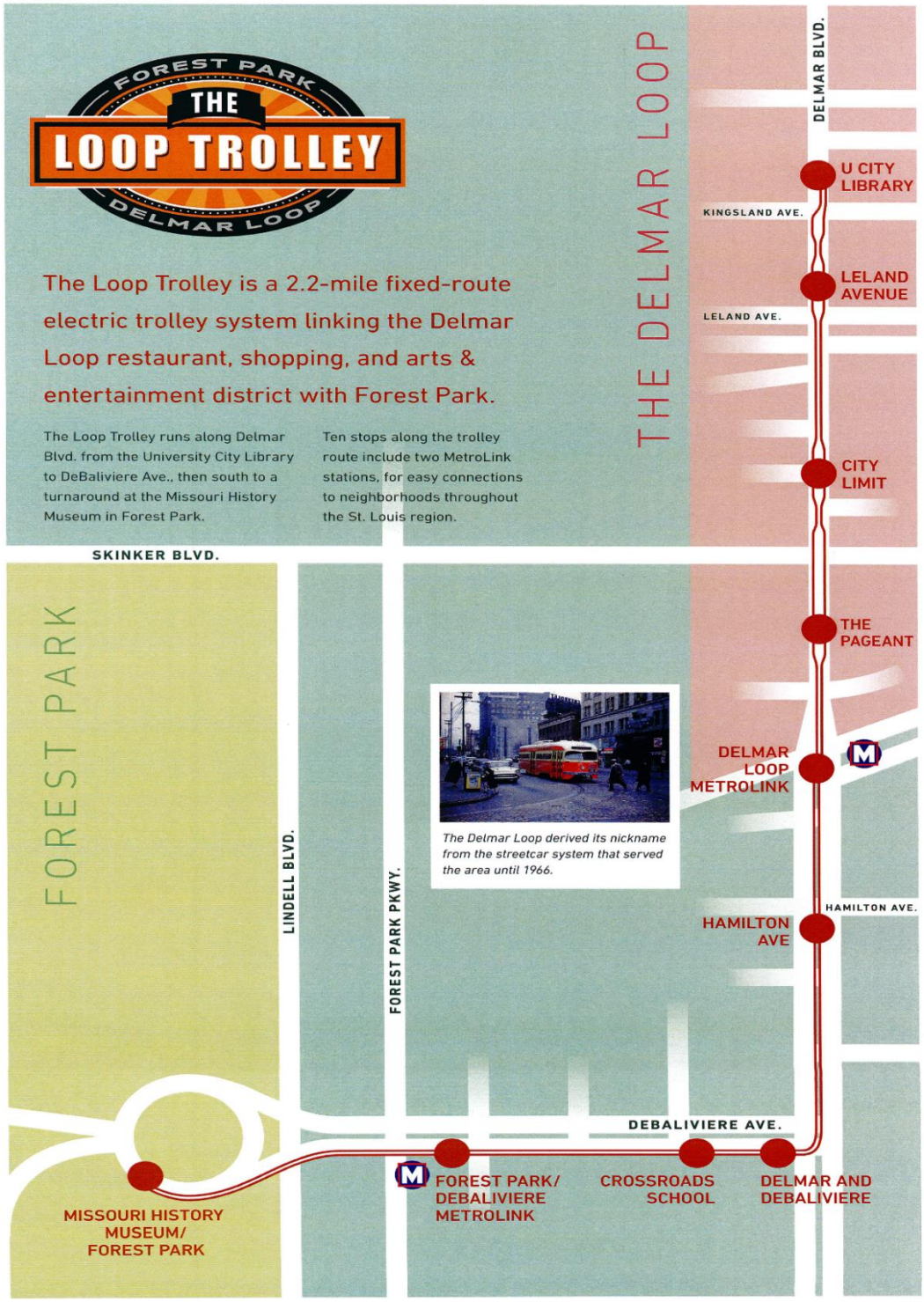
1) Fatalities: 0.01 per 3,500 miles (total number of reportable fatalities and rate per total vehicle revenue miles by mode)
    a. Estimated 2020 revenue vehicle miles is 3,500 under current operating plan. Under above rate, the 2020 calendar year target for total number of fatalities is <1, but for purposes of this section, target is established as **1**.
2) Injuries: 163 per 100,000 miles (total number of reportable[27] injuries and rate per total vehicle miles by mode)
    a. Estimated 2020 revenue vehicle miles is 3,500 under current operating plan. Under above rate, the 2020 calendar year target for total number of reportable injuries is established as **5.71**.
3) Safety Events: 171 per 100,000 miles (total number of reportable events and rate per total vehicle miles by mode); As identified in the National Public Transportation Safety Plan, a Safety Event includes reportable derailments, collisions, fires, and evacuations.
    a. Estimated 2020 revenue vehicle miles is 3,500 under current operating plan. Under above rate, the 2020 calendar year target for total number of Safety Events is established as **6**.
4) System Reliability: (mean distance between major mechanical failure)
    a. Estimated 2020 revenue vehicle miles is 3,500 under current operating plan. For the 2020 calendar year, target for system reliability (mean distance between major mechanical failure is established as **1,250** (approximately one major mechanical failure every two months).

[27] The thresholds for "reportable" fatalities, injuries, and events are defined in the NTD Safety and Security Reporting Manual.

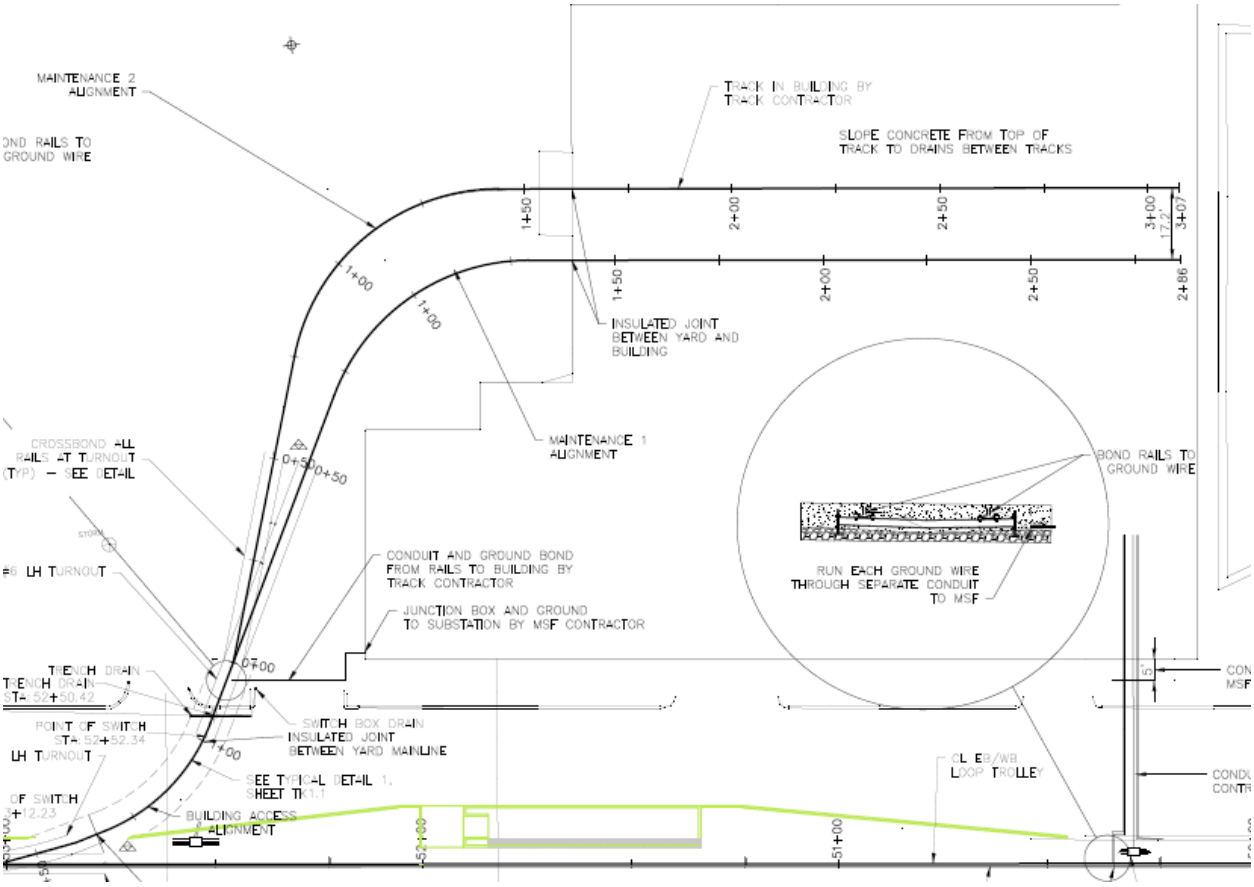
Appendix B – Performance Measures

LTS Safety Performance Measures
Rail: Reportable Accidents
Rail: Yellow Bar Signal Overruns
Rail: Trailed Switches
Rail: Platform Overruns
Rail: Wrong Side Doors
Rail: Work Zone Violations
Rail: Trespassers-locations and frequency
Rail: Near Miss Events-locations and frequency
Rail: Hours of Service Violations
Vehicle Maintenance: Vehicle Inspections
Training: Track Access Training
Training: Safety Training
Safety: Active Safety Campaigns
Safety: Non Vehicular Employee Injuries
Safety: Vehicular Employee Injuries

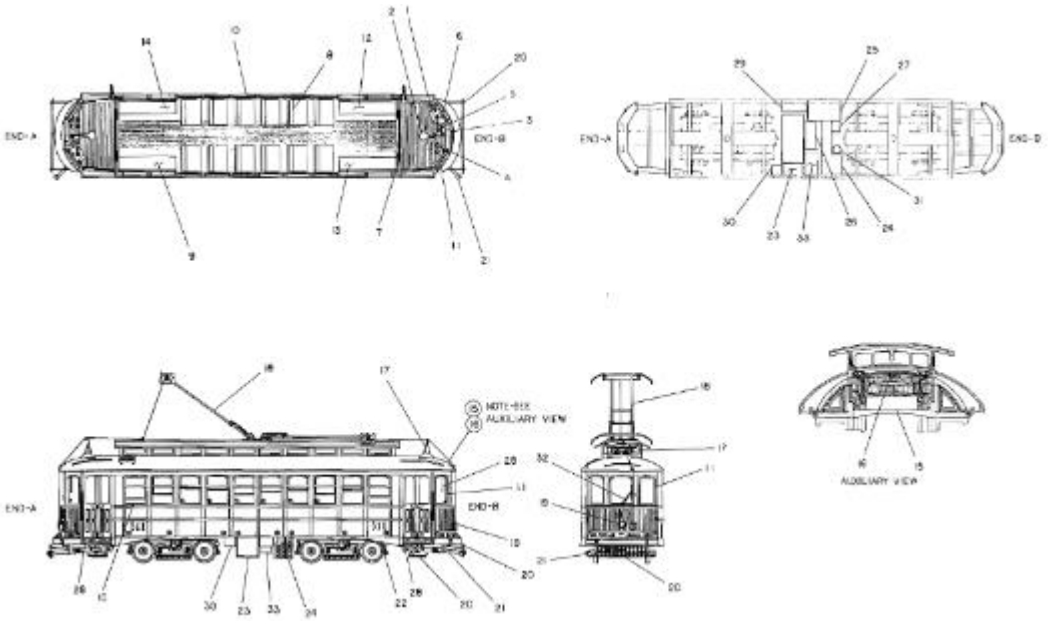
Appendix C – LTS Alignment



Appendix D – LTS Yard & Shop Model



Appendix E – General Council Crest Trolley Vehicle Schematic



REPLICA COUNCIL CREST TROLLEY CAR				1STR041		A
ITEM NO.	DESCRIPTION	GOMACO PART NO.	MANUFACTURER	MANUFACTURER PART NO.	TRI-MET PART NO.	QTY.
1	CONTROLLER BOX ASSEMBLY	1STR001				2
2	OPERATORS SEAT ASSEMBLY	1STR004				2
3	AIR PRESSURE PANEL ASSEMBLY	1STR024				2
4	SANDER PEDAL ASSEMBLY	1STR031				2
5	FOOT GONG ASSEMBLY	1STR029				2
6	EXTERIOR DOOR MECHANISM ASSEMBLY	1STR026				4
7	INTERIOR DOOR OPENER ASSEMBLY	1STR021				2
8	PASSENGER SEAT ASSEMBLY	1STR011				12
9	BATTERY BOX ASSEMBLY	1STR022				1
10	PASSENGER WINDOW HARDWARE ASSEMBLY	1STR037				20
11	PLATFORM WINDOW HARDWARE ASSEMBLY	1STR040				4
12	RELAY PANEL ASSEMBLY	1STR035				1
13	DC CIRCUIT BREAKER PANEL ASSEMBLY	1STR033				1
14	AC CIRCUIT BREAKER PANEL ASSEMBLY	1STR025				1
15	OVERHEAD CONTROL PANEL ASSEMBLY	1STR023				2
16	SIGNAL BELL ASSEMBLY	1STR028				1
17	DESTINATION SIGN ASSEMBLY	1STR017				2
18	BOW COLLECTOR ASSEMBLY	1STR018				1
19	HEADLIGHT ASSEMBLY	1STR036				2
20	COW CATCHER ASSEMBLY	1STR014				2
21	COUPLER TOW BAR ASSEMBLY	1STR027				2
22	TRUCK ASSEMBLY	1STR019				2
23	KNIFE SWITCH BOX ASSEMBLY	1STR039				1
24	MOTOR GENERATOR - AIR COMPRESSOR ASS'Y.	1STR038				1
25	CONTACTOR BOX ASSEMBLY	1STR020				1
26	REVERSER BOX ASSEMBLY	1STR032				1
27	HEATER CONTACTOR BOX ASSEMBLY	1STR034				1
28	WHISTLE AND CORD	TC21-077				2
29	INVERTER	550-47K63	NOVA ELECTRIC	G1K60-600		1
30	LIGHTNING ARRESTOR	TC21-137				1
31	AIR DRYER	730-47M80	BENDIX	AD-4 065089		1
32	WINDSHIELD WIPER	TC21-078				2
33	HIGH SPEED CIRCUIT BREAKER BOX	TC21-135				1
34						
35						

Appendix F – LTS System Elements – Station Configurations

Station Name	Street Addresses	City	State	Zip Code	Station Configuration			
					At Grade	**Below Grade**	**Elevated**	**Subsurface**
University City Library	6701 Delmar Blvd.	University City	MO	62201	**X**			
Leland Ave. EB	6630 Delmar Blvd.	University City	MO	62201	**X**			
Leland Ave. WB	6605 Delmar Blvd.	University City	MO	63102	**X**			
Limit Ave. EB	6308 Delmar Blvd.	University City	MO	63102	**X**			
Limit Ave. WB	6261 Delmar Blvd.	University City	MO	63102	**X**			
The Pageant EB	6144 Delmar Blvd.	St. Louis	MO	63102	**X**			
The Pageant WB	6161 Delmar Blvd.	St. Louis	MO	63103	**X**			
Delmar Loop MetroLink	6005 Delmar Blvd.	St. Louis	MO	63103	**X**			
Hamilton	5875 Delmar Blvd.	St. Louis	MO	63110	**X**			
Delmar & DeBaliviere	540 DeBaliviere Ave.	St. Louis	MO	63110	**X**			
Crossroads College Prep	500 DeBaliviere Ave.	St. Louis	MO	63110	**X**			
Forest Park-DeBaliviere MetroLink	282 DeBaliviere Ave.	St. Louis	MO	63112	**X**			
Missouri History Museum-Forest Park	DeBaliviere Circle Drive	St. Louis	MO	63112	**X**			

Appendix G – LTS System Elements – Bridge Locations

The LTS crosses over two (2) bridges, under which the MetroLink tunnels/operates, as follows:

DeBaliviere Bridge (Latitude 38.6479, Longitude -90.2853)
Delmar Bridge (Latitude 38.6548, Longitude -90.2940)

Appendix H – LTS System Elements – Power Substations

The LTS has one (1) Traction Power Substation located at the MSF, 5875 Delmar Blvd.)

Appendix I – LTS System Elements – Signal Locations

Intersection
Delmar Blvd & Kingsland Ave
Delmar Blvd & Melville Ave
Delmar Blvd & Leland Ave
Delmar Blvd & Westgate Ave
Delmar Blvd & Skinker Blvd
Delmar Blvd & Rosedale Ave
Delmar Blvd & Des Peres Ave
Delmar Blvd & Hamilton Ave
Delmar Blvd & Trolley Ped Signal
Delmar Blvd & Goodfellow Blvd
Delmar Blvd & DeBaliviere Ave
DeBaliviere Ave & Waterman Blvd
DeBaliviere Ave & Pershing Ave
DeBaliviere Ave & Forest Park Pkwy
DeBaliviere Ave & Lindell Blvd (SB Trolley)
DeBaliviere Ave & Lindell Blvd (NB Trolley)

Appendix J – LTS Policies & Procedures Applicable to the LTS and the PTASP/SSP[28]

- LTS Fire-Life-Safety Plan
- LTS Emergency Familiarization Plan
- LTS Safety & Security Certification Plan
- LTS Council Crest Trolley Vehicle Maintenance Manual
- LTS Emergency Preparedness Program Plan
- LTS Standard Operating Procedures
- LTS Rulebook
- LTS Facilities Maintenance Plan
- LTS Station Stop Maintenance Plan
- LTS TPSS-OCS Maintenance Plan
- LTS Track-ROW Maintenance Plan
- LTS As-Builts and Schematics

[28] Some documents are purposely listed without reference to edition date or revision number. This is an intentional omission since many documents change dates and revisions on different frequency cycles and at different times than this Plan.

Appendix K – Abbreviations and Acronyms

Term	Definition
AASHTO	American Association Of State Highway & Transportation Engineers
AC	Alternating Current
ADA	Americans with Disabilities Act
ANPRM	Advanced Notice of Proposed Rulemaking
APTA	American Public Transportation Association
AREMA	American Railway Engineering and Maintenance of Way Association
CAP	Corrective Action Plan
CBRNE	Chemical, Biological, Radiological, Nuclear, Or Explosive
CCTV	Closed-Circuit Television
CFR	Code of Federal Regulations
CIL	Certifiable Items List
CMP	Configuration Management Plan
DAPM	Drug and Alcohol Program Manager
DC	Direct Current
DHS	Department Of Homeland Security
DNR	Department Of Natural Resources
DOO	Director of Operations
DOT	Department of Transportation
EAP	Employee Assistance Program
ED	Executive Director
EMA	Emergency Management Agency
EOC	Emergency Operations Center
EOPs	Emergency Operating Procedures
EPA	The Environmental Protection Agency
EPPP	Emergency Preparedness Program Plan
ERP	Emergency Response Plan
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FLSC	Fire/Life Safety Committee
FOIA	Freedom Of Information Act, 5 U.S.C. Section 552
FRA	Federal Railroad Administration
FSE	Full-scale Exercise
FTA	Federal Transit Administration, An Agency Within The U.S. Department Of Transportation
HAZMAT	Hazardous Materials

Term	Definition
HSEEP	Homeland Security Exercise & Evaluation
HSPD	Homeland Security Presidential Directive
HVAC	Heating Ventilation And Air Conditioning
IC	Incident Commander
ICS	Incident Command System
IED	Improvised Explosive Device
IHA	Interface Hazard Analysis
ISAP	Internal Safety (or Security) Audit Process
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
KV	Kilo-Volt
LTC	Loop Trolley Company
LTS	Loop Trolley System
LTTDD	The Loop Trolley Transit Development District
MAP-21	Moving Ahead for Progress in the 21st Century Act (2012)
Metro	The brand name of Bi-State Development Agency's transit operations
MFS	Maintenance and Storage Facility
MoDOT	Missouri Department Of Transportation
MOU	Memorandum Of Understanding
MPH	Miles Per Hour
MPHPS	Miles Per Hour Per Second (Acceleration/Deceleration)
MSDS	Material Safety Data Sheet
NCHRP	National Cooperative Highway Research Program
NEC	National Electrical Code
NFPA	National Fire Protection Agency
NIMS	National Incident Management System
NIPP	National Infrastructure Protection Plan
NTD	National Transit Database
NTI	National Transit Institute
NTSB	National Transportation Safety Board
OCS	Overhead Contact System (Catenary)
ODP	Office Of Domestic Preparedness (Recently changed - See G & T)
OHA	Operating Hazard Analysis
OPS	Operations
PA	Public Address
PAT	Passenger Assistance Telephone
PHA	Preliminary Hazard Analysis
POC	Point Of Contact
PPE	Personal Protective Equipment

Term	Definition
PTASP	Public Transportation Agency Safety Plan
RAP	Rail Activation Plan
ROW	Right Of Way
RTSS	Regional Transit Security Strategy
Rule	A law or order authoritatively governing conduct or action
SAF	Risk Management & Safety
SAP	Substance Abuse Program
SBD	Safe Breaking Distance
SEC	Security
SGR	State of Good Repair
SHA	System (Interface) Hazard Analysis
SMS	Safety Management System
SOP	Standard Operating Procedures
SSO	State Safety Oversight
SSOA	State Safety Oversight Agency
SSP	System Security Plan
SSPP	System Safety Program Plan
SSRC	Safety and Security Review Committee
STARRS	St. Louis Area Regional Response System
TAM	Transit Asset Management
TCRP	Transportation Cooperative Research Program
TRA	Transportation Research Associates
TRB	Transportation Research Board
TSA	Transportation Security Administration
TSO	Office of Transit Safety and Oversight (FTA)
TSGP	Transit Security Grant Program
UASI	Urban Area Security Initiative
UC	Unified Command
USDOT	United States Department Of Transportation
VDC	Volt Directional Current

Appendix L – Glossary

Term	Definition
Absolute Block	A block that must not be occupied by more than one rail vehicle.
Accident [49 CFR Part 674]	**Referred to as "FTA-Reportable Event." An event that involves any of the following:** **1. A loss of life occurring at the scene or within 30 days following the event;** **2. A report of a serious injury to a person;** **3. A collision involving a rail transit vehicle;** **4. A runaway train;** **5. An evacuation for life safety reasons; or** **6. Any derailment of a rail transit vehicle, at any location, at any time, whatever the cause.**
Accountable Executive	A single, identifiable person who has ultimate responsibility for carrying out the Public Transportation Agency Safety Plan of a public transportation agency; responsibility for carrying out the agency's Transit Asset Management Plan; and control or direction over the human and capital resources needed to develop and maintain both the agency's Public Transportation Agency Safety Plan, in accordance with 49 U.S.C. 5329(d), and the agency's Transit Asset Management Plan in accordance with 49 U.S.C. 5326.
Alignment	The horizontal and vertical location or roadway as described by curves and tangents defining its position with respect to the surrounding area.
Anomaly	Deviation from nominal performance which does not cause a significant effect on system performance but does warrant investigation and / or repair.
Aspect	The combination of color an deposition of a fixed signal, light or lights which provides an indication to the Trolley Operator
Audit	Formal or official examination or review of procedures and verification of compliance
Authorized Speed	The maximum allowed speed for a section of track
Blue Flag	A portable and clearly distinguishable blue light, flag or marker placed on or near each end of a trolley vehicle to protect it from being moved, energized, or coupled to another trolley vehicle.
Brake, Dynamic	A braking mode that uses traction motors, operating in reverse (as generators) to provide a controlled braking effort.
Brake, Friction	A braking system which applies stopping forces by the use of the brake discs. The brakes are applied by spring action and released by compressed air.
Brake, Full Service	Friction and dynamic braking used by the Operator to slow and /or stop the trolley.
Brake, Maximum	Maximum braking is attained through the use of controlled combination of dynamic, friction and track brakes, in addition to the use of sand placed between the rail and wheels.
Bumping Post	A structure at the end of track(s) placed to prevent trolley vehicles from running off the track
Center Platform	Platform located between two operating tracks where both edges are used for passenger boarding and alighting.

Term	Definition
Checked Redundancy	A characteristic of a system which ensures that the probability of any malfunction is controlled to produce a risk comparable to fail safe.
Chief Safety Officer	An adequately trained individual who has responsibility for safety and reports directly to a transit agency's chief executive officer, general manager, president, or equivalent officer. A Chief Safety Officer may not serve in other operational or maintenance capacities, unless the Chief Safety Officer is employed by a transit agency that is a small public transportation provider as defined in this part, or a public transportation provider that does not operate a rail fixed guideway public transportation system.
Code	A document containing mandatory (shall) requirements on "where or when" an action or feature should be implemented. It may be adopted as law (see "standard")
Collision	A collision is a vehicle or vessel accident in which there is an impact of a [rail] transit vehicle with another vehicle or object, such as (but not limited to) another transit vehicle, a non-transit vehicle, a person, an animal, an object, or a rail vehicle.
Contractor	A person or organization that provides a service for a recipient, sub recipient, employer, or operator consistent with a specific understanding or arrangement. The understanding can be a written contract or an informal arrangement that reflects an ongoing relationship between the parties.
Corrective Action Plan	A plan developed by a Rail Transit Agency that describes the actions the Rail Transit Agency will take to minimize, control, correct, or eliminate risks and hazards, and the schedule for taking those actions. Either a State Safety Oversight Agency or FTA may require a Rail Transit Agency to develop and carry out a corrective action plan.
Corrective Action Plan	A plan that describes the actions it will take to minimize, control, correct, or eliminate hazards, and the schedule for implementing those actions
Critical Defect	A defect that judgment and experience indicate could result in hazardous or unsafe conditions for individuals using or maintaining the product or could result in failure in accomplishment of the ultimate objective.
Critical Function List	A listing of those functions whose failure would cause system degradation below an acceptable level.
Criticality	Assignment of relative importance to hardware or systems.
Crossover	A track structure allowing a train to move from one track to another
Deadman Braking	A retrievable, full-service brake application which occurs upon the release of the deadpan foot-pedal or hand button, or upon depression of the deadpan foot-pedal past the second detent.
Deductive Analysis	Analysis of a specific undesired event to determine possible causes of that event (Top down approach "What can cause a specific event to occur?") See Fault Tree Analysis.
Degradation	falling from an initial level to a lower level in quality or performance
Derailleur	A device used to cause a derailment of rail equipment prior to entry into an unauthorized area
Derailment	A non-collision event that occurs when a trolley vehicle unintentionally comes off its rail, causing it to no longer be properly guided on the railway
Design Safety	Safety achieved by the integration of system design characteristics to prevent or minimize the probability to operate in an unsafe manner.
Diverge	A change in trolley movement from one track to another over switches set in a reverse position.

Term	Definition
Double Track	Two Main tracks - one of which operates trains in the normal westbound direction, identified as westbound track #1; the other in the normal eastbound direction, identified as eastbound track #2.
Dwell Time	The time a trolley in revenue service spends alighting and discharging passengers at a stop, including opening & closing doors
Emergency	A situation that is life threatening to passengers, employers, or other interested citizens; or that causes damage to any transit vehicle or facility; or results in the significant loss of services & reduces the ability of the system to fulfill its mission;
Emergency Stop	The stopping of a trolley by an emergency application (mushroom) which, after initiated, cannot be released until the train is stopped.
Employee Station	A place where only employees and other authorized personnel may board and alight trolley vehicles
Equivalent Authority	An entity that carries out duties similar to that of a Board of Directors, for a recipient or subrecipient of FTA funds under 49 U.S.C. Chapter 53, including sufficient authority to review and approve a Start Printed Page 34466recipient or subrecipient's Public Transportation Agency Safety Plan.
Evacuation	Organized, phased, and supervised withdrawal, dispersal, or removal of civilians from dangerous or potentially dangerous areas, and their reception and care in safe areas.
Event [49 CFR Part 674]	Any Accident, Incident or Occurrence.
Facing Movement	The movement of a trolley over a switch with points facing toward the oncoming movement.
Fail-Safe Design	A design principle in which each of the elements which make up a system is analyzed to determine the potential consequence of failure of the element, alone or in combination with any or all other elements of the system, to ensure that a failure or a combination of failures will not result in an unsafe condition.
Fail-Safe Safety	A characteristic of a system and its elements, the object of which is to ensure that any fault or malfunction will not result in an unsafe condition
Failure Analysis	The logical and systematic examination of a system to identify and analyze the probability, causes, & consequences of potential and real failure.
Failure Management	Decisions, policies, & planning which identify and eliminate or control potential failures and implement corrective or control procedures following real failures.
Failure Mechanism	The process which results in a part or equipment failure
Failure Mode	The description of the manner in which a failure occurs, and the operating condition of the equipment at the time of the failure
Fatality	A transit-caused death, including suicides, that occurs with 30 days of the transit incident.
Fault Tree Analysis	A deductive analysis procedure which graphically presents undesired events to determine possible causes of that event
Fire Life Safety Committee	Designated personnel from the local authorities, and representatives from the transit agency, who are assigned to resolve issues related to Fire-Life Safety, and others as necessary to handle technical and complex design and / or operational issues.
Fixed Signal	A signal at a fixed location that affects the movement of a trolley.
Flag	A device used for relaying hand signals or to indicate conditions on the mainline, ROW or in the yard. Flags may be made of cloth or lights.

Term	Definition
Flagging Protection	A procedure used to protect work crews, personnel and equipment from trolley and vehicular movements and any other obstructing activities.
Flag person	A Qualified Employee assigned to protect work crews, personnel and equipment working on or near the tracks to ensure the safe passage of trolleys or vehicular traffic.
Frog	A track structure used at the intersection of two running rails to provide support for wheels and passageways for flanges, thus permitting wheels on either rail to cross the other.
FTA	The Federal Transit Administration, an operating administration within the United States Department of Transportation.
G & T	The Office Of Grants And Training Is The Department Within DSL That Assists States, Regional, Local And Tribal Entities To Prevent, Deter And Respond To Acts Of Terrorism; formerly ODP
General Order	An order issued in writing by the Director of Operations which affects the movement of trolleys. A General Order may supplement the Rule Book and has the force of a Rule governing train operations.
Grade Crossing	A vehicular or pedestrian crossing over the track at the top-of-rail level.
Guideway	That portion of the transit line included with right-of-way fences, outside lines of curbs or shoulders, underground tunnels, cut or fill slopes, ditches, and other elements.
Hand Signal	A signal given by the motion or position of a person's hand, arm, flag, or light.
Hazard	Any real or potential condition that can cause injury, illness, or death; damage to or loss of the facilities, equipment, rolling stock, or infrastructure of a public transportation system; or damage to the environment.
Hazard Matrix	A quantitative measure, combining the numerical probability of occurrence with a hazard severity
Hazard Resolution	The analysis and subsequent actions taken to reduce, to the lowest level practical, the risk associated with an identified hazard.
Incident	An event that involves any of the following: a personal injury that is not a serious injury; one or more injuries requiring medical transport; or damage to facilities, equipment, rolling stock, or infrastructure that disrupts the operations of a transit agency.
Individual	A passenger, employee, contractor, or other rail transit facility worker, pedestrian, trespasser, or any person on rail transit-controlled property
Injury	Any physical damage or harm to a person requiring medical attention necessitating transport to a medical facility by ambulance or police vehicle for medical treatment
Investigation	The process of determining the causal and contributing factors of an accident, incident, or hazard, for the purpose of preventing recurrence and mitigating risk.
Line	The right-of-way and facilities over which trolley routes operate.
Lock-Out/Tag-Out	A safety warning method, described by an SOP, used to indicate the traction power substations or other electrical equipment have been de-energized (turned off) for maintenance, repair, or other reasons. Locked out equipment (marked with a lock-out tag) must not be re-energized or turned on, unless properly authorized as defined in the applicable SOP.

Term	Definition
Mainline	Tracks designated for revenue service extending from yard interlocking) to terminal station's) and governed by the authority of the Controller, signal indication or a combination thereof.
Maintenance	All actions necessary for retaining an item in or restoring it to an operable condition
Malfunction	Any anomaly or failure wherein the system, subsystem, or component fails to function as intended
Management Loss Control	An element of the system safety and security management function that evaluates the effects of potential hazards / threats considering acceptance, control, or elimination with respect to the expenditure of available resources.
Maximum Authorized Speed	The highest speed at which trolley vehicles are permitted to operate, subject to safety, civil, operating environment, and other operational considerations that may warrant a further reduction in speed (e.g.: grade crossings, curves, and signals).
Mean Distance Between Failures (MDBF)	The average distance in miles that a trolley vehicle travels before failure of a vital component force removal of the vehicle from service.
National Incident Management System	A Set Of Policies, Rules, Protocols And Common Language That Are To Be Used Nationwide To Plan For, Prepare, Manage & Respond To Critical Incidents
National Public Transportation Safety Plan	The plan to improve the safety of all public transportation systems that receive Federal financial assistance under 49 U.S.C. Chapter 53.
Normal Speed	Maximum authorized speed.
Occurrence [49 CFR Part 674]	An Event without any personal injury in which any damage to facilities, equipment, rolling stock, or infrastructure does not disrupt the operations of a transit agency.
Operating Clearance	A clearance issued daily to each Trolley Operator providing permission to operate on the mainline, subject to the instructions of the Controller and signal indication. A current Operating Clearance must be in the possession of all trains or track cars operating on the mainline or anyone assigned flag person duties.
Operating Right-Of-Way	The area within twenty (20) feet of the centerline of any track on the mainline or yard.
Operational Hazard Analysis (OHA)	Identifies and evaluates hazards resulting from the implementation of operations or tasks performed by persons, considering: operation, test, maintenance, repair, transportation, handling, emplacement or removal of the system
Operational Phase	The post constructing phase where designed project function is achieved and maintenance requirements begin
Operator	That person having direct and immediate control of the movement of a trolley
Operator of a Public Transportation System	A provider of public transportation as defined under 49 U.S.C. 5302 (14)
Oversight Agency	The entity designated by the state to implement 49 CFR Part 659 (MoDOT in MO)
Pantograph	A device affixed to the top of a trolley used to conduct electric power from overhead contact wire.

Term	Definition
Passenger	A person who is on board, boarding, or alighting from a rail transit vehicle for the purpose of travel
Passenger Operations	The period of time when any aspect of LTS's operations are initiated to with the intent to carry passengers
Passenger Service	The transportation of fare paying passengers
Passenger Station	A location where passengers aboard/alight trolleys.
Performance Criteria	Categories of measures indicating the level of safe performance within a transit agency
Performance Measure	An expression based on a quantifiable indicator of performance or condition that is used to establish targets and to assess progress toward meeting the established targets.
Performance Target	A quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period required by the Federal Transit Administration (FTA).
Person	A passenger, employee, contractor, pedestrian, trespasser, or any individual on the property of a rail fixed guideway public transportation system.
Program Standard	A written document developed and adopted by the oversight agencies (MoDOT) that describes the policies, objectives, responsibilities, and procedures used to provide rail transit agency safety and security oversight
Public Transportation Agency Safety Plan	The documented comprehensive agency safety plan for a transit agency that is required by 49 U.S.C. 5329 and 49 CFR Part 673
Qualified Employee	An employee who is properly trained and certified, and possesses the necessary licenses on his/her person required for his/her duties.
Rail Fixed Guideway Public Transportation System	Any fixed guideway system that uses rail, is operated for public transportation, is within the jurisdiction of a State, and is not subject to the jurisdiction of the Federal Railroad Administration, or any such system in engineering or construction. Rail fixed guideway public transportation systems include but are not limited to rapid rail, heavy rail, light rail, monorail, trolley, inclined plane, funicular, and automated guideway.
Rail Transit Agency	Any entity that provides services on a rail fixed guideway public transportation system
Revenue service vehicle	A vehicle used to transport passengers, including a bus, van, car, railcar, locomotive, trolley car, trolley bus, ferry boat, or a vehicle used on a fixed guideway or inclined plane.
Right-Of-Way (ROW)	Land, property, and interests therein where the trolleys operate
Risk	The composite of predicted severity and likelihood of the potential effect of a hazard.
Risk mitigation	A method or methods to eliminate or reduce the effects of hazards.
Root Cause	The underlying reason for the occurrence of a problem; The real cause or origin of an accident or injury
Root Cause Analysis	A technique used to identify the conditions that initiate the occurrence of an undesired activity or state; to find the "root cause"; the process of evaluating, assigning, and measuring root causes.

Term	Definition
Safety	A reasonable degree of freedom from those conditions that can cause injury or death to personnel; damage to or loss of equipment or property; and freedom from danger [Also, in 49 CFR Part 659; Freedom from harm resulting from unintentional acts or circumstances
Safety Assurance	Processes within a transit agency's Safety Management System that functions to ensure the implementation and effectiveness of safety risk mitigation, and to ensure that the transit agency meets or exceeds its safety objectives through the collection, analysis, and assessment of information.
Safety Certification	An element of the System Safety Program that documents the functional working of the System Safety Program, and provides a documented database from which to validate the active processes necessary to produce a safe system, ready for revenue service. Used on new systems, facilities and extensions to operational properties.
Safety Check List	A designation placed on a system, subsystem, element, component, device, or function denoting that satisfactory operation of such is mandatory to assurance of patron, personnel, equipment or facility safety. Such a designation dictates incorporation of special safety design features
Safety Critical	A designation placed on a system, subsystem, element, component, device, or function denoting that satisfactory operation of such is mandatory to assurance of patron, personnel, equipment or facility safety. Such a designation dictates incorporation of special safety design features
Safety Devices	Protective devices which do not alter the fundamental nature of a hazard but which do control the extent of the hazard in some manner
Safety Management Policy	A transit agency's documented commitment to safety, which defines the transit agency's safety objectives and the accountabilities and responsibilities of its employees in regard to safety.
Safety Management System (SMS)	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 Management System (SMS) Executive	A Chief Safety Officer or an equivalent.
Safety Performance Target	A Performance Target related to safety management activities.
Safety Promotion	A combination of training and communication of safety information to support SMS as applied to the transit agency's public transportation system
Safety Risk	The assessed probability and severity of the potential consequence(s) of a hazard, using as reference the worst foreseeable, but credible, outcome.
Safety Risk Assessment	The formal activity whereby a transit agency determines Safety Risk Management priorities by establishing the significance or value of its safety risks.
Safety Risk Management	A process within a transit agency's Safety Management System for identifying hazards and analyzing, assessing, and mitigating safety risk.
Safety Stop	A brake test that must be made within 10 feet after a change in consist has been made, before operating a trolley that has been idle for more than one hour and prior to departing the yard, to ensure the brakes are operating properly.

Term	Definition
Safety Verification	An activity of safety certification that assures a specific procedure has been followed or that specifications have been met
Security	Freedom from harm resulting from intentional acts or circumstances
Serious Injury	Any injury which: (1) Requires hospitalization for more than 48 hours, commencing within 7 days from the date of the injury was received; (2) Results in a fracture of any bone (except simple fractures of fingers, toes, or noses); (3) Causes severe hemorrhages, nerve, muscle, or tendon damage; (4) Involves any internal organ; or (5) Involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface.
Side Platform	Platform where only one edge is used for passenger boarding and alighting
Signal	A method or device capable of changing in aspect and conveying visual and /or audible information affecting the movement of a trolley, track car, or other, on-track equipment.
Signal Aspect	An illuminated trolley signal display
Small Public Transportation Provider	A recipient or subrecipient of Federal financial assistance under 49 U.S.C. 5307 that has one hundred (100) or fewer vehicles in peak revenue service and does not operate a rail fixed guideway public transportation system.
Standard	A document or drawing containing mandatory (shall) requirements on "how" an action or feature should be implemented. It may be adopted as law (see code)
State	A State of the United States, the District of Columbia, Puerto Rico, the Northern Mariana Islands, Guam, American Samoa, and the Virgin Islands.
State of Good Repair	The condition in which a capital asset is able to operate at a full level of performance.
Substantial Damage (NTD 2018 Safety and Security Policy Manual)	Per NTD, damage to any involved vehicles, facilities, equipment, rolling stock, or infrastructure that (a) disrupts the operations of the rail transit agency, and (b) adversely affects the structural strength, performance, or operating characteristics of the vehicle, facility, equipment, rolling stock, or infrastructure, requires towing, rescue, on-site maintenance, or immediate removal prior to safe operation.
Substation	A power supply station along the right-of-way that converts high voltage AC to the 860 VDC supplied to the overhead catenary for vehicle propulsion
Subsystem	An element of a system that in itself may constitute a system
Subsystem Hazard Analysis (SSHA)	An analysis applied to some element of the system to identify hazards associated with component failures
Switch Indicator	A device on the switch stand or spindle indicating alignment of a hand-throw switch.
Switch Lock	A lock used to secure a switch handle, electric switch lock, route selector box, etc.
Switch Position	The switch alignment allowing for straight or diverging moves.

Term	Definition
Switch Stand	A device by which a switch is thrown and locked in position.
System	A composite of people (employees, passengers, others) property (facilities and equipment), environment (physical, social, institutional), and procedures (standard operating, emergency operating, and training) which are integrated to perform a specific operational function in a specific environment
System Hazard Analysis	Inductive and deductive procedures in which hazards are identified and analyzed
System Safety	The application of management, engineering principles and techniques to achieve the optimum degree of safety within the constraints of operational effectiveness, time and cost, throughout all phases of the transit system life cycles, by identifying hazards and reducing associated risks
System Safety Analysis	Inductive and deductive procedures in which hazards are identified and analyzed
System Safety Engineering	The application of scientific and engineering principles, criteria, and techniques to identify, eliminate or control system hazards
System Safety Management	An element of management that establishes system safety program requirements and ensures the planning, implementation and accomplishment of tasks and activities to achieve system safety
System Safety Program Plan	A document developed by the rail transit agency describing its safety policies, objectives, responsibilities, & procedures
System Security	The application of operating, technical, and management techniques and principles to the security aspects of a system throughout its life to reduce threats and vulnerabilities to the most practical level through the most effective use of available resources
System Security Plan	A document developed by the rail transit agency describing its security policies, objectives, responsibilities, & procedures
State Safety Oversight Agency	An agency established by a State that meets the requirements and performs the functions specified by 49 U.S.C. 5329(e) and the regulations set forth in 49 CFR part 674.
Temporary Speed Restriction	A section of track within defined limits through which rail vehicles must operate at a speed indicated on the Operating Clearance, speed sign, or instructions from OCC. This restriction may include work crews operating under Flag Protection.
Temporary Speed Restriction Sign	A sign placed adjacent to the track to indicate the entrance to or exit from a temporary speed restriction.
Test Limits	A section of track designated by the authority of the Dispatcher which allows for system or trolley testing.
Track	The parallel rails of a trolley system
Traction Power Contact Wire	An overhead electrical conductor which provides power to the through direct contact with the pantograph.
Traction Power Off	To turn off electrical power (de-energize) to the catenary, messenger wire, and supporting catenary equipment. This process must be field verified and ground applied by a qualified employee.
Traction Power On	To turn on electrical power (energize) to the catenary, messenger wire, and supporting catenary equipment at which time all devices connected to it must be considered energized and live.
Traction Power System	The substations, feeder cable, contact, messenger, dropper and hanger wires, switch gear, and other equipment interfacing with public utilities or

Term	Definition
	other power sources to provide power for the movement of trolleys and operation of their auxiliary systems.
Traction Power/Catenary	A system of electrified overhead wires in which the contract wire is supported from one or more longitudinal messengers either directly by hangers or by hangers in combination with auxiliary conductors or clamps.
Trailing Movement	The movement of a trolley over a switch whose points face in the direction the trolley is moving.
Transit Agency	An operator of a public transportation system
Transit Asset Management Plan	the strategic and systematic practice of procuring, operating, inspecting, maintaining, rehabilitating, and replacing transit capital assets to manage their performance, risks, and costs over their life cycles, for the purpose of providing safe, cost-effective, and reliable public transportation, as required by 49 U.S.C. 5326 and 49 CFR part 625.
Turn back	The changing of the direction of a trolley.
Unacceptable Hazardous Condition	A hazardous condition determined to be an unacceptable hazardous condition using the Hazard Resolution Matrix
Unsafe Condition Or Act	Any condition or act that endangers life or property
Warning Devices	Sensors that monitor or detect conditions and provide visible and / or audible alerting signals as desired for selected events.
Wayside	The items that are on or about the track area including tracks, ballast, signals, catenary poles, and other structures or equipment immediately adjacent to the right-of-way
Wheel Stop	A device affixed to the rail at the end of track(s) to prevent rail vehicles from running off the track.
Yard Tracks	Tracks at the Maintenance & Storage Facility used to store, repair, and trolleys or rail mounted equipment.

Appendix M – Reference Documents and Citations

- 49 CFR Part 40 - Procedures for Transportation Workplace Drug and Alcohol Testing Programs
- 49 CFR Part 655 - Prevention of alcohol misuse and prohibited drug use in transit operations
- 49 CFR Part 659 - Rail fixed Guideway systems; State safety oversight
- 49 CFR Part 673 – Public Transportation Agency Safety Plan final rule
- 49 CFR Part 674 - State Safety Oversight
- The Drug Testing Workplace Act of 1988 (Public Law 100-690; Title 41, Chapter 10)
- U.S. Department of Transportation, Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), Millennium Edition
- The Public Transportation System Security and Emergency Preparedness Planning Guide (January 2003); Report Number DOT-FTA-MA-26-5019--03-01; Federal Transportation Administration; Washington DC
- LTS System Security Plan (SSP)
- Title 7 -DEPARTMENT OF TRANSPORTATION Division 265 - Multimodal Division Chapter 9 - Rail Fixed Guideway Systems
- State Safety & Security Oversight Program Standards Manual for Overseeing the Kansas City Streetcar and the Loop Trolley System
- MIL – STD-882E; 11 March 2012; Dept. of Defense; (Standard Practice for System Safety)
- Hazard Management Program Requirements Clarification Letter; Sept. 6, 2007; Office of Safety and Security; Federal Transit Administration
- Collision Hazard Analysis Guide: Commuter and Intercity Passenger Rail Service; October 2007; Office of Safety; Federal Railroad Administration; Washington D.C.

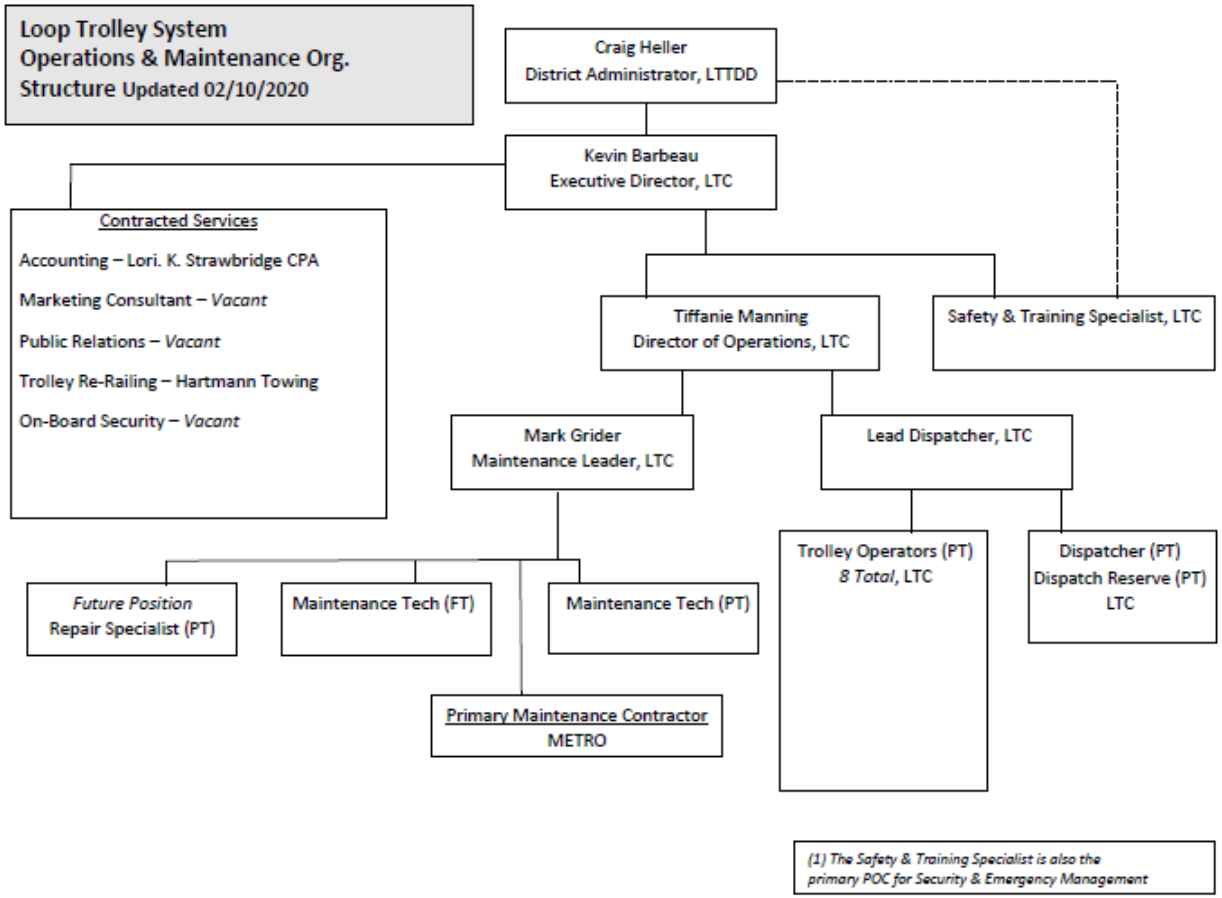
Appendix N – Internal Audit Schedule of PTASP

Audit Elements	PTASP Chapter	Year 1 (2020)	Year 2 (2021)	Year 3 (2022)
Safety Management Policy				
Chapter 1 | Safety Policy Statement	Chapter 1		X	
Chapter 1 | Objectives and Programs	Chapter 1		X	
Chapter 2 | Management Structure	Chapter 2		X	
Chapter 2 | Control Review	Chapter 2		X	
Chapter 3 | Emergency Management	Chapter 3		X	
Chapter 4 | SMS Documentation & Records	Chapter 4		X	
Safety Risk Management				
Chapter 5 | Hazard Identification, General	Chapter 5			X
Chapter 5 | Hazard Identification, Facilities	Chapter 5			X
Chapter 5 | Hazard Investigation, Evaluation, and Classification	Chapter 5			X
Chapter 6 | Hazard Evaluation and Analysis	Chapter 6			X
Chapter 7 | Accident & Incident Investigations	Chapter 7			X
Safety Assurance				
Chapter 8 | Safety Data Acquisition	Chapter 8	X		
Chapter 8 | Safety Performance Monitoring & Measuring	Chapter 8	X		
Chapter 8 | Rules Compliance	Chapter 8			X

Chapter 8 | Facilities & Equipment Inspections	Chapter 8	X		
Chapter 8 | Maintenance Audits & Inspections	Chapter 8	X		
Chapter 8 | Transit Asset Management Program	Chapter 8		X	
Chapter 8 | Hazardous Materials Program	Chapter 8			X
Chapter 8 | Federal, State & Local Requirements	Chapter 8		X	
Chapter 8 | Drug & Alcohol Program	Chapter 8		X	
Chapter 8 | Procurement Process	Chapter 8	X		
Chapter 9 | Management of Change, System Modifications & Configuration Management	Chapter 9			X
Chapter 9 | Safety & Security Certifications	Chapter 9		X	
Chapter 10 | Continuous Improvement	Chapter 10		X	
Safety Promotion				
Chapter 11 | Safety Communication			X	
Chapter 12 | Competencies, Training & Certification				X

Appendix O – Organizational Charts

Loop Trolley System Organizational Chart



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