System Safety Audit Report

for the

TORONTO TRANSIT COMMISSION

Conducted as a service of the

Rail Safety Management Audit Program

Safety Review Background

The **Rail Safety Management Audit Program** (RSMAP) of the American Public Transportation Association is designed to provide participating rail transit systems with a process for development and implementation of a System Safety Program Plan (SSPP) or Public Transportation Agency Safety Plan (PTASP) that is specific to an individual system's needs. The Program also provides for a periodic Safety Review of the level to which a transit system has implemented its SSPP or PTASP. In addition, the program reviews an agency's safety management system (SMS) and its implementation of SMS.

The RSMAP was developed by the APTA Rail Safety Review Board (RSRB) in conjunction with the APTA Rail Safety Committee to ensure that the highest standards for safety are maintained. The RSRB initiated the Safety Accreditation Task Force to review system safety programs and activities within the rail transit industry and to develop the formal program. Under the RSRB's direction, the Task Force recommended the format outlined in APTA's *Manual for the Development of Rail Transit System Safety Program Plans.* After approval, APTA's Executive Committee inaugurated the Rail Safety Management Program on January 1, 1989. The program continues to contribute to the rail industry's ability to maintain effective self-regulatory programs for safety.

What This Safety Review Represents

The Safety Review for Toronto Transit Commission (TTC) was conducted April 16 – 25, 2018 by Safety Auditors Brian Alberts, Jim Brown, Polly Hanson, William Kessler, Dave Geake and peer auditor ViJay Khawani from LACMTA. The Safety Audit was conducted in accordance with provisions of the APTA *Manual for the Development of Rail Transit System Safety Program Plans*. Agency Liaisons coordinated the meetings and interviews were held with representatives from all major departments within TTC.

This preliminary report represents the findings of the Safety Review relative to the Transit System Safety Program Plan and the agency's Safety Management System. All APTA recommendations, unless related to established industry standards, are non-binding and may be accepted or rejected after management review by the Authority. The System Safety Audit Report period extends over the next 45 working days and allows TTC the opportunity to investigate the Safety Review findings and take corrective action to resolve as many findings as possible before the Final Report is issued.

Supplemental forms have been included with this report that provide comments on findings for which the Audit team recommend corrective action to comply with the System Safety Program Plan or suggest enhancements to augment the present SSPP and SMS. The Audit team will receive any additional information from TTC to correct, clarify, or upgrade a finding prior to issuing the Final Safety Review Report.

How to Respond to the Safety Review

The numerical notations on the Safety Review Checklist determine the status of the observation by the Safety Review team and are defined as follows:

"1: Conforms: "Meets Plan Requirements" - Complies with program plan requirements and/or standards set by the industry and requires no additional action by the transit system.

"2: Non-conformance: "Needs Improvement" – This designation indicates documentation appears not to meet program plan requirements and/or standards set by the industry and requires immediate attention by the transit system, detailed in the Safety Improvement Plan.

"3: Compliance with Recommendation" – This designation technically meets the program plan requirements and/or standards set by the industry with an opportunity for continuous improvement proposed.

"4: Unable to Audit": - This designation indicates that there was either insufficient information gathered to assess the item or the item did not apply.

The RSMAP focuses on a rail system's System Safety Program Plan or Agency Safety Plan and the implementation of such a plan. The Safety Review report prepared under the RSAP reviews the System Safety Program Plan or Agency Safety Plan and evaluates the extent to which a system's management processes are complying with the plan. The Safety Review report does not, nor is it intended to represent, an in-depth review or Safety Review of the safety of the rail system itself or of its operations and should not be relied on as such.

TTC must advise APTA's Safety office of any item that may be appealed. Such items will be reviewed and, if not resolved, referred to the Rail Safety Committee for review and disposition. Safety Improvement Plans and Strategic Plans for items noted in the Safety Review findings as "2" are to be filed by TTC for inclusion in the Final Safety Review Report. The Safety Improvement Plans are based upon program guidelines and outline the measures a transit system will take to bring its System Safety Program

into compliance with its written Plan and/or enhancements to strengthen that element. A schedule of proposed implementation dates is part of the Safety Improvement Plan.

SAFETY REVIEW OVERVIEW

The Safety Review encompassed all elements of the TTC System Safety Program Plan and SMS and the means for its implementation. The Safety Review focused on reviewing processes, documents and records, and interviewing managers in each department to verify that all elements of the System Safety Program were developed, implemented, and reviewed on an ongoing basis. In addition, the review looked at the level of implementation and maturity of the agency's Safety Management System.

The important aspect of the program is that it offers a system the benefit of having an outside, independent evaluation of the extent to which its own management processes are tracking all the items necessary to maximize safety in the areas of operations, maintenance, training, inspections, and employee testing. The safety management practices of the participating systems are evaluated to help each system determine if its own System Safety Management Program and Safety Management System is up to the accepted, contemporary standards.

Transit systems participating in the APTA Safety Review Program will be expected to ensure that all the items contained in the "Checklist" portion of this document have been incorporated into their respective System Safety Program Plans (or Agency Safety Plans). However, as it is fully realized that each system is somewhat unique, and that respective System Safety Program Plans or Agency Safety Plans must allow for the characteristics of each system and this document does not prescribe an absolute format for System Safety Program Plans or Agency Safety Plans. Rather, it offers a suggested format along with the type of methodology that will accomplish the purposes of system safety. The final choice of methodology to ensure that these checklist items are accomplished will rest with each respective transit system. The methodology must, however, be demonstrable from a safety compliance assessment perspective and properly documented by the system.

It should be emphasized that the System Safety Program Plan or Agency Safety Plan establishes the Safety philosophy of the entire organization and provides the means for implementation. A System Safety Program Plan or Agency Safety Plan could be implemented to:

- Establish a safety program on a system-wide basis;
- Provide a medium through which a property can display its commitment to safety;
- Provide a framework for the implementation of safety policies and achievement of related goals/objectives;
- Satisfy federal and state requirements;
- Meet accepted industry guidelines and safety compliance assessment provisions; and
- Satisfy self-insurance provisions.

For a Safety Review to be effective the ensuing results must be used for positive, all-encompassing corrective actions. This does not occur if the Safety Review report is not an official document that is automatically provided to all appropriate levels of management. Various techniques such as Safety Review coordination meetings and management briefings can be used to make the process as unobtrusive as possible while still providing valuable input to each respective department being Safety Reviewed, as to areas of concern and possible corrective actions. No matter which method is chosen, it is important to design the process, so it is construed as a positive force in the organization.

It should be emphasized that the Safety Review process is only a management tool that aids in discovering possible problem areas. By itself, it should not be considered an internal regulatory or decision-making process. Final authority for all decisions always rests within the management structure as prescribed by the individual organization.

April 2018

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	FINDINGS AND OBSERVATIONS		**SUPPLEMENTAL FORM**

Executive Summary

In 2014, APTA completed a Rail Safety Management Program audit and review with the Toronto Transit Commission (TTC). As part of the normal audit cycle, the APTA audit team returned from April 16-25, 2018 to address and evaluate the Commission's Safety Management System or SMS. In addition, TTC's Chief Executive Officer requested that APTA review five major components of the system through the 2018 audit, including:

1. Yard and Track Level Safety
2. Traffic Safety
3. Public Safety
4. Security/Cyber-security; and
5. Station Management

Based on multiple interviews with TTC staff and executives, a review of relevant documents, and tours of the system, the audit team was able to gain better knowledge as to where TTC stands in terms of SMS maturity. The team also determined effective practices as well as suggested Action Items for the five areas listed above and other areas throughout the TTC system.

Based on the audit team's findings, TTC was found to have 14 areas in which it is exhibiting Industry Leading Best Practices (listed on pages 61 – 62 of this report). Some of these include:

1. The TTC has established a robust review process for policies and recommendations that are implemented.
2. The TTC's approach to Enterprise Risk Management (ERM) far exceeds the typical risk management principles implemented at transit agencies in North America; and
3. A Work Order Warning (blue light) system is being installed at track level as part of a capital program initiative.

Overall, the TTC has exhibited many advanced safety, risk management and security practices in comparison to other similar-sized transit agencies in North America and throughout the world and should be commended for the hard work and dedication the agency has put in to improving safety.

Further, the SMS maturity model shows that TTC has improved in reaching its goal of progressing its SMS maturity and many areas of the systems have progressed into the "Sustained Data Driven" or "D" category on the SMS maturity scale.

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Finally, although there are Action Items listed in the report, these are not meant to imply that TTC is unsafe by any means. Quite to the contrary, these Action Items should be viewed as areas for continuous improvement as TTC strives to implement a fully mature SMS throughout the TTC. .

COMPONENT 1: Safety Policy & Procedures

Effective Practices

General

Effective Practice

1. TTC has incorporated the basic elements of SMS in their Safety Health & Environment Management System Manual and continues to progress the implementation of SMS throughout the organization. The 2018 Safety, Health, and Environmental Policy that was signed by the TTC CEO and the Senior Executive (SX) Committee is chaired by the CEO with participation from senior management. APTA commends TTC top management for its SMS commitment and active engagement on matters affecting organizational safety. **(1-C)**

Maturity Model Level: C

SH&E Policy and Strategy

Effective Practice

2. The TTC has established a robust review process for policy and recommendations that are implemented. A Stage 1 review will involve all stakeholders in departments and safety committees to provide comments. A Stage 2 review is forwarded for review to each department and embedded safety consultants. All comments are consolidated, and the Stage 3 review is presented to the affected TTC department heads for signoff. The final report is then sent to the Executive Safety Committee for approval before it is submitted to the Chief Executive Officer for signoff and implementation. This process has helped improve line ownership and accountability. This interdepartmental and committee policy review and signoff process is an **Industry Leading Effective Practice. (1-D)**

Maturity Model Level: D

Subway Infrastructure

Effective Practice

3. The Subway Operations Safety Goals & Objectives dated 3/1/18 was reviewed by the APTA audit staff. The document identifies the safety objectives for the department, accountable staff for completion of the objectives, and schedule for completion. The departmental objectives are

aligned Corporate Plan Five Year goals and objectives. APTA acknowledges this safety goals and objectives program. **(1-C)**

Maturity Model Level: **C**

Plant Maintenance

Effective Practice

4. Safety Consultants (SC) responsibilities include the roll out of new programs; work with various JHSCs that interface with Plant Maintenance; conduct Level 2 investigations and assist staff with Level 1 investigations with identifying root cause of incident; track and review all outstanding issues discussed at safety committees; apply risk management principles to near misses which may lead to a full investigation; work closely with frontline staff on safety matters; liaison with Ministry of Labour reportable incidents; audit supervisors and staff on safety matters; arrange for safety talks with each group; check SDS sheets and advise of any change at safety meetings, conduct annual review of safety program results; audit contractors to ensure they meet safety requirements; and provide updates on progress on implementing new programs. Safety Consultants also compile injury stats each month for the department and may call in Corporate specialists (i.e. hygienists, safety engineering) for issues that are identified. APTA commends the role of the Safety Consultant as structured and implemented within the Plant Department. **Industry Leading Effective Practice. (1-D)**

Maturity Model Level: **D**

Vehicle Programs

Effective Practice

5. Vehicle Programs is a new department established to handle Bus Procurement, new Streetcars, WheelTrans bus purchases and the Nova Bus contract. The department prepares the specifications and administers the contracts once the orders are placed. The department is developing a Quality Assurance and RAMs team. The main objective is to standardize processes for the acquisition of TTC vehicles. APTA commends this resource commitment to new vehicle procurements. **(1-C)**

Maturity Model Level: **C**

Safety and Environment

Effective Practice

6. The TTC has taken the initiative to centralize the Safety Consultant staff under the Safety and Environment Department to improve efficiencies associated with the rollout of safety program initiatives and safety priorities in close coordination with agency departmental staff. APTA commends this initiative. **(1-C)**

Maturity Model Level: **C**

COMPONENT 1: Safety Policies & Procedures: Actions Needed

General

Action Needed

1. To continue the progressive transition towards a fully mature SMS, APTA suggest TTC consider the development of an SMS implementation document that incorporates the scope of the four principal elements of SMS and defines the organizational roles and responsibilities for the implementation of the SMS elements. **(3-C)**

Occupational Hygiene and Environment

Action Needed

2. The Environmental Plan was withdrawn and is currently under revision**.** APTA recommend that the Plan be reviewed by affected stakeholders and finalized for implementation. **(3-C)**

RAMS

Action Needed

3. Since the data collected by the RAMS group is indication of the performance of a fleet, it is important to feed this information back into the specifications for future fleet purchases, so lessons learned are captured to improve the performance of new cars.   Because the procurement of new rail vehicles is managed by the RC&S Vehicle Engineering group, the team suggests TTC consider realigning the reporting structure by having the RAMS group report to the RC&S Vehicle Engineering group. **(3-C)**

Stations

Action Needed

4. During the interview process, staff raised some concerns about the station supervisory staffing levels. APTA suggests the TTC assess the adequacy of its station supervisory staffing levels to address line incidents as it progresses through the implementation of its Turn-back, Overcrowding and Evacuation (TOE) policy objectives. **(3-C)**

Bus & WT Transportation

Action Needed

5. Bus Operator ride checks are being scheduled on an annual basis. However, resources sometimes preclude conducting annual ride checks for all Operators. A mitigation measure initiated to address this challenge is to perform the ride check based on risk criteria. APTA encourages Bus Operations and Corporate Safety to assess program scope, effectiveness and the consistency of its desired application and initiate recommendation as applicable. **(3-C)**

Safety and Environment

Action Needed

6. Safety Consultants being embedded with the line areas and reporting to the Department Heads did not work as designed to facilitate the SMS implementation. An organizational change has been initiated to have the Safety Consultants (SC) report to a Coordinator in managing their corporate initiatives being implemented in all line groups. One role of the SC is to be the safety program liaison and resource for the line groups having a strong presence on the floor or in the field in understanding departmental safety needs and challenges. Some reasons for the SC organizational restructuring include: uniform policies and procedures are not implemented in all areas; covering night work is a challenge; and not all SC have the same safety training and qualifications. The TTC does have a good training support program that could be used to bring all SC up to a common level of training and qualification. One department interviewed that has a well-functioning SC role was the Plant Department. APTA encourages Corporate Safety to assess the role of the Plant Department SC and consider sharing any identified effective practices within the scope of the SC organizational-wide roles. **(3-B)**

COMPONENT 2: Safety Risk Management

Effective Practices

Risk Management

Effective Practice

1. TTC's approach to ERM far exceeds the typical risk management principles implemented at transit agencies in North America. Considerable progress has been made since 2014 in advancing the ERM program by establishing an ERM Policy, a Risk Appetite Statement specifically for the seven Strategic Objectives identified in TTC's Five-Year Corporate Plan, and a risk assessment process that engages all stakeholders across the organization. Furthermore, the ERM program also includes a structured governance body to ensure the ERM framework is maintained and a regular reporting process to the Board informing them of TTC's significant risks and priorities. APTA commend the TTC ERM as an **Industry Leading Effective Practice. (1-D)**

2. The annual Safety Risk Profile report is a very comprehensive assessment of TTC's safety risks for 3 primary groups – TTC employees, TTC customers, and members of the public who travel in non-TTC vehicles or who are involved in collisions with TTC vehicles.   The document presents a calculated numerical safety risk index for each group in terms of Fatalities and Weighted Injuries (FWI) modeled after the UK system for assessing risk. There is no doubt that TTC's process for identifying and analyzing safety risks is extremely robust and is superior to any of the processes utilized by US transit agencies. **(1-C) Maturity Model Level: C**

Subway Infrastructure

Effective Practice

3. The Hazard Identification and Risk Assessment (HIRA) was initiated in 2014 and has been increasingly utilized as a tool to identify system hazards and reduce risks. HIRA's that have been performed continue to be reviewed and updated to ensure they effectively address potential job hazards. In addition, new requests to utilize this safety assurance process are ongoing such as Subway Infrastructure initiative to review hazards associated with loading and unloading work cars with the Rail Yard. APTA commends the expanded utilization of HIRA, as HIRAs have been in use at TTC and promoted by Corporate Safety for more than 15 years. **(1-C)**

Maturity Model Level: C

Rail Car and Shops

Effective Practice

4. Key risks in the RC&S were identified as being exposure to high voltage, fall from heights, exposure to mechanical systems, vehicle movements in yards/car houses interfacing with contractors, and an aging work force more prone to ergonomic injuries. Mitigation measures have been established to address these concerns. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: **C**

RC&S Vehicle Engineering

Effective Practice

5. The inclusion of an on-board fire mist system in future rail cars is deemed to be an **industry leading effective practice** to mitigate the risk of fire. APTA commends this safety design initiative. **(1-D)**

Maturity Model Level: **D**

Plant Maintenance

Effective Practice

6. Many of the current injuries relate to muscle strains, slips/trips/falls. SCs are implementing a corporate program on musculoskeletal injuries. In addition, The Plant Department monitors daily delay reports to flag any safety hazards identified to initiate corrective action. APTA acknowledges these initiatives. **(1-C)**

7. Plant Department field staff are trained to identify potential hazards and take appropriate measures to manage them. If a minor hazard is identified, they fix it. If more significant, staff will report it to a supervisor. Any injury is reported to the supervisor and appropriate forms filled out to report incident. Staff have the options of calling a confidential hotline, talking directly to an SC, calling the Ministry of Labour, or reporting to their union steward or any JHSC member. If work is unsafe, employees have the right to refuse to do the work and need to report it. Staff encouraged to report hazards and safety issues so corrective action can be taken. APTA acknowledges this hazard reporting initiative. **(1-C)**

Maturity Model Level: **C**

Signals

Effective Practice

8. With the installation of new equipment throughout the system, a hazard assessment is performed by the Construction Safety Officer to identify any new hazards and appropriate develop mitigation measures. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: **C**

Subway Transportation

Effective Practice

9. Measures such as the point and acknowledge procedure to reduce wrong side door openings, the establishment of a signal violation task force, and additional training has been implemented. APTA acknowledges these initiatives. **(1-C)**

Maturity Model Level: **C**

Engineering & Construction

Effective Practice

10. Risk assessments must be prepared for each project and are signed off by the stakeholders. Risks cover both the construction aspects as well as the public aspects. The risks are reviewed periodically during the life of the project. APTA acknowledges these project risk management processes. **(1-C)**

11. The contract documents set out the Safety requirements for each project. All contractors must be COR certified. They must assess the safety hazards associated with the project and ensure a proper safety program is implemented for each project. A pre-construction meeting is held to review the safety requirements, hazards and procedures that will be implemented on that project. APTA commends this project hazard management safety initiative. **(1-C)**

Maturity Model Level: **C**

Bus & WT Transportation

Effective Practice

12. Bus Transportation has a risk registry that assesses driver collisions, on-boards, preventability and non-preventability, and attendance. The risk score is not a disciplinary tool, but rather for remedial training. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: **C**

COMPONENT 2: Safety Risk Management: Actions Needed

Risk Management

Action Needed

1. While a key component of SMS is to identify and analyze safety risks, an even more important element is the identification and implementation of effective interventions to mitigate or better yet, eliminate those identified risks. While TTC's efforts are certainly commendable for the initial effort, the audit team did not find any evidence of mitigation strategies planned to address the risk indicators that are being experienced in the day-to-day operations of TTC's service. For example, through interviews we learned of safety risks involving operators using cell phones while operating TTC vehicles, violating red signals, opening doors on the wrong side of a station, and becoming complacent about track level safety. These significant hazardous events should be incorporated within the TTC's risk register, but more importantly, the organization must develop strategies, preferably by deploying available technology, to mitigate such risks. Other than providing additional training and revamping rules/procedures/practices to address these issues, the audit team is not aware of any dedicated funding allocated to 'design out' such hazards. Like the ongoing implementation of ATC and the planned implementation of an on-board fire mist system on its future railcar fleet to mitigate the risk of fire, TTC should continue to assess measures employed suitable for its system to reduce such risks to an ALARP level. **(3-C)**

Subway Transportation

Action Needed

2. While 'soft' measures such as enhanced training, task forces, and ride-alongs have been implemented, the group recognizes that the ultimate countermeasures must involve technology to deter and reverse the trends for the safety risks. APTA encourages TTC to pursue measures and expanded application of technology such as in-cab cameras, ATP, CBTC, and other systems already deployed on other TTC lines (e.g., such as the correct side door opening system). In addition, APTA is aware TTC has projects currently in process to install ATC on the balance of Line 1 and 2 and install ATP on the workcars (and is suggesting the expansion of other technologies as well). **(3-C)**

Bus & WT Transportation

Action Needed

3. Bus Operator ride checks are being scheduled on an annual basis. However, resources sometimes preclude conducting annual ride checks for all Operators. A mitigation measure initiated to address this challenge is to perform the ride check based on risk criteria. APTA encourages Bus Operations and Corporate Safety to assess program scope, effectiveness and the consistency of its desired application and initiate recommendation as applicable. **(3-B)**

4. TTC's Enterprise Risk Management group evaluated a high-risk hazard associated with a grade crossing signal timing issue (Timing for an arm strike for a rail-crossings addressed 30-foot buses but didn't allow for 60 footers). ERM set up a team with representatives from the Railroad and City to identify and implement a solution. While the TTC has been proactive in addressing this hazard with an engineering solution, other mitigations (e.g., training, supervisory compliance checks) should continue to be considered until such time the engineering solution has been fully implemented and tested. **(3-C)**

Corporate Safety

Action Needed

5. The current primary hazards and risks at TTC involve: collisions/pedestrian contact; roadway worker access; and red signal overruns. Although mitigation initiatives are being applied, APTA recommends the TTC should continue to examine additional opportunities to mitigate these known hazards including the application of technology where applicable. **(3-C)**

COMPONENT 3: SAFETY ASSURANCE

Effective Practices

Occupational Hygiene and Environment

Effective Practice

1. The TTC had a previous incident with Carbon Monoxide and Nitrous Dioxide in the underground section when pressure washing. The work task included the use gasoline powered portable units that created the hazard. The TTC has now converted to diesel units. Additionally, OH&E conducts ongoing field-testing services in response to issues raised and lessons learned and OH&E has implemented the iNet Portable Gas Monitoring system which allows real-time work area monitoring of hazardous gases APTA acknowledges the application of these lessons learned mitigation measures. **(1-D)**

2. Older facilities have water infiltration issues and the group developed a procedure to deal with working with the mold that was present. The OH&E developed and implemented a Mold Management procedure to address this hazard. APTA acknowledges this initiative. **(1-C)**

3. Develop and administer an Asbestos Management program. The TTC developed procedures for staff working in facilities and equipment that have asbestos. Older facilities have asbestos fire-retardant coating sprayed on the structure. If the work requires performing maintenance or renovation work, asbestos needs to be removed. The TTC maintains a register of asbestos in facilities and are working on putting it online and linked to drawings to show exactly where it is in each facility. This is an **Industry Leading Effective Practice**. **(1-D)**

4. OH&E provides input to the specifications for new vehicles to ensure hazardous materials are not supplied. The TTC does allow isocyanate paints on streetcars and buses. They have the paint booths and fresh air respirators to safely perform the work. Subway cars are stainless steel and aluminum and paints are not an issue. APTA acknowledges this hazardous materials review process. **(1-C)**

5. Outside contractors may use restricted products. OH&E staff will review their use and ensure its safe application within the TTC system. APTA acknowledges this review process. **(1-C)**

6. The TTC has established a subsurface contamination program focused on bus garages and diesel storage tanks. OH&S coordinated a legal compliance audit program that started with bus garages

and that is now is being expanded to the streetcar and subway shops. OH&E will also review leased sites, or space that TTC is leasing as well as any land purchases. APTA commends this initiative. **(1-D)**

7. A concern on SDS is the regulations have recently changed removing the responsibility of suppliers to issue updated SDS every three years. The onus will shift to the industry to update SDS information as required. TTC plans to request updated SDS every three years. APTA acknowledges this initiative. **(1-C)**

8. The TTC has established procurement policies in place to ensure products are reviewed by OH&S before the product is brought into the workplace. Unapproved products do find their way into the workplace occasionally. A major reason for this exception was for items purchased with small purchase credit cards. The TTC has now established review processes on credit card purchases as well as bans on the purchase of restricted products using credit cards. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: D

Safety Engineering Services

Effective Practice

9. The TTC has established a robust project safety certification program. APTA reviewed the Toronto-York Spadina Subway Extension Safety Certification Audit Report dated 12/6/17 as an example of the application of this program and found it to address the provisions of the TTC safety certification requirements. APTA acknowledges this safety assurance initiative. **(1C)**

10. Safety checks are performed on high risk areas such as on-track safety procedural compliance. Corrective action plans must be performed for all exceptions noted from the safety checks. APTA acknowledges this safety assurance process. **(1-C)**

11. TTC is investing in a new software application that will more effectively support SES in tracking departmental corrective action plans and assigned departmental accountability for their timely implementation. APTA commends this safety information management initiative. **(1-C)**

Maturity Model Level: C

Fire Safety and Emergency Planning

Effective Practice

12. The Corporate Fire Safety Program consists of monthly and annual audits at each facility to verify compliance with the maintenance standards of the Ontario Fire Code for the various fire detection and suppression systems. The results of these audits are tracked in a report, which is provided monthly for the SX Committee's review, for both maintenance of equipment and fire code violations over a 5-year period that shows the trends for each facility. The monthly fire safety inspections are conducted by station 'Landlords' who have been trained in the details of conducting inspections, while the annual audits, which are more comprehensive, are conducted by trained fire protection engineers. All fire equipment (detectors, valves, etc.) is bar-coded making it easier for the maintenance staff to capture and document the maintenance in real time via a hand-held device. APTA commends these fire prevention initiatives. **(1-C)**

Maturity Model Level: **C**

Internal Audit

Effective Practice

13. An audit was performed on subway cars HVAC equipment as this equipment did not perform to TTC expectations during the very hot temperatures last summer. The process was focused on identifying the root cause of this poor performance that could impact customer safety. The process included a review of the events and equipment faults reported leading up to the unit failures and a review of the tenders and consultant reports regarding the purchase of the vehicles. The root cause was identified, and equipment modification made to address the HVAC reliability issues. APTA acknowledges this initiative. **(1-C)**

14. The current audit plan includes an audit of the new corporate plan and how well the strategic objectives of the organization are supported. This plan will be developed in coordination with Risk Management and Board members. APTA acknowledges this initiative. **(1-C)**

15. Internal Audit recently completing an audit on Track Access particularly related to night time workers and higher risks associated with the work. Some of the topics reviewed included the short work windows that could result in staff rushing to complete jobs; effectiveness of scheduling and planning of the work to maximize the time window; effectiveness of controls in minimizing risks experienced in the field related to the work tasks. Exceptions identified include: job briefings not properly conducted and documented (wrong site and hazards identified, persons attending the

briefing not recorded, PPE required not listed). Exceptions notes result in the issuance of corrective action plans assigned to accountable staff. APTA acknowledges this safety assurance process. **(1-C)**

16. The TTC is working on development of a computerized system to identify work areas; work to be performed; PPE required; who is on the crew; identifying if a power shutdown is needed; work cars required; shared work areas; and the designated Work Coordinator for the area. The proposed system is expected to generate a visual plan of all work areas that can be issued to crews. APTA commends this information management initiative. **(1-C)**

Maturity Model Level: C

Subway Infrastructure

Effective Practice

17. TTC has established a Subway Infrastructure Asset Management Plan that incorporates a risk and condition-based maintenance focus. Condition based maintenance requires up to date and accurate information to effectively support its application. A maintenance information analytics initiative is being assessed by TTC to further support infrastructure maintenance objectives. APTA commends this initiative. **(1-C)**

18. It has been noted through staff interviews that several rail cracks have been identified throughout the system. New inspection equipment being procured will provide for efficiencies in the maintenance inspection process. In the interim, the TTC has initiated an independent assessment of its track condition and maintenance practices to identify additional opportunities to address this concern. APTA acknowledges this initiative. **(1-C)**

19. New Subway Infrastructure procedures have been developed designed to provide clear guidance on the application of safety critical procedures such as those involving track access work. For this procedure, safety tasks and responsibilities have been clearly defined for the positions of Track Access Coordinator (TAC), Work Area Coordinator (WAC), and the Person In Charge (PIC). APTA commends this TTC procedures initiative. **(1-D)**

Maturity Model Level: C

Rail Car and Shops

Effective Practice

20. The RC&S performs preventive maintenance in accordance with a Fleet Maintenance Plan developed in 2015. The team reviewed sample TR Trains Standard Inspection Report forms and found them to be generally in conformance with industry standards in terms of major components that are checked during the PM cycles. Inclusion of the calibration expiration dates for the various tools (torque wrenches, gauges) that require periodic calibration on the forms under the various components is deemed to be a best practice and an effective method to minimize the use of out-of-calibration tools. Further independent verification by the Corporate Safety staff via tool and calibration audits conducted about 2-3 times/year supplements the assurance of use of calibrated tools. APTA acknowledges these equipment calibration practices. **(1-C)**

21. KPIs established by the RC&S centers around PM compliance with the OEM requirements for the 2 primary types of fleet – the T1 cars and the TR cars. Although there are no formal safety goals or targets for injuries as a KPI, trends of injuries at each car shop and overall department wide trends are reviewed for the type of injuries that occur. Based on this data, the RC&S develops safety alerts or safety bulletins to share and communicate the incidents and lessons learned. This data is also used to evaluate infrastructure improvements that might mitigate the types of injuries being experienced. APTA commends this safety communications initiative. **(1-C)**

22. The mid-life overhaul for the T1 fleet was completed as planned, which should continue to maintain this fleet in a state of good repair**.** APTA acknowledges this asset management initiative. **(1-C)**

Maturity Model Level: **C**

RAMS

Effective Practice

23. A Reliability, Availability, Maintainability, Safety (RAMS) group within the RC&S gathers and reviews in service component-level failure trends and MTBFs with the goal of transitioning to a reliability centered maintenance approach. An example of the value of such an approach was described to address the door reliability of the TR trains, which has improved by making design modifications because of the collection of failure data by this group. APTA acknowledges this initiative. **(1-C)**

24. The RAMS group is also responsible for developing maintenance plans, work instructions, and procedures used by the maintenance teams to conduct their PM inspections. APTA acknowledges these maintenance practices. **(1-C)**

25. Although currently the group does not track mean time to repair (MTTR) trends, a new system, Maximo, which will be implemented next year, will have the capability to track this metric for the rail mode. APTA acknowledges this maintenance information management system investment. **(1-C)**

Maturity Model Level: C

RC&S Vehicle Engineering

Effective Practice

26. During a contract, proposed changes are distributed to the safety team and other affected departments for their review and input. APTA acknowledges this initiative. **(1-C)**

27. Multiple vendors are identified during the procurement stage to guard against parts obsolescence. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: C

Plant Maintenance

Effective Practice

28. Plant Department has a training coordinator to ensure that required training and recertification takes place as scheduled. The Department has established a KPI to track progress on completing this training. APTA commends this training initiative. **(1-C)**

Maturity Model Level: C

Communications Engineering

Effective Practice

29. Fire alarm systems are checked and tested at a frequency required by the Fire Code. All smoke and fire detection devices and sprinkler system heads are on a computerized asset list for each facility. Reports are filed monthly with the Executive Safety Committee on the status of inspections as part of their KPI Report. APTA commends this initiative. **(1-C)**

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30. The Department is working on bar coding field elements and using handheld devices for recording inspections and work done in the field. Assets are being input into MAXIMO asset management program. MAXIMO logs all inspections and repairs. APTA commends this asset management initiative. **(1-C)**

31. There is an emergency channel in place for radios, and as a backup there's a phone every 500 feet along the tunnels. Redundancies are built into the system including for communications (radios) and antennas. APTA acknowledges this communication initiative. **(1-C)**

Maturity Model Level: C

Electrical

Effective Practice

32. An asset assessment of the TTC electrical infrastructure was completed in partnership with Engineering. APTA acknowledges this initiative. (1-C)

Maturity Model Level: C

ATC

Effective Practice

33. The ATC project group is working on fully implementing ATC Phases I (Dupont to Yorkdale) and II (Wilson to Vaughan). Benefits of ATC include improvement of safety, operational performance, and system state of good repair enhancements. APTA commends this TTC project initiative. **(1-C)**

34. The ATC project will include the TTC safety certification requirements. Both Alstom and TTC have developed project Safety Management Plans. The base safety document for the system design, software development, installation, testing, verification and acceptance is Alstom's Safety Case that includes applicable project safety assurance processes and hazard log. TTC is active in monitoring all tests and coordinating detailed test plans to certify the system. The Safety Engineering group performs a safety audit on the overall system before it goes into operations. APTA commends the TTC project safety certification process. (1-C)

35. TTC will be adding three crossovers under the ATC project scope and will also completing the signal work at Wilson Yard which will enable two-yard entrances/exits to be utilized.   This initiative is expected to help with getting revenue equipment offline and maintenance equipment

online, thus possibly increasing maintenance access time. APTA acknowledges this design initiative. (1-C)

36. Alstom and Bombardier worked through the vehicle interface requirements and modifications and jointly signed off on them. This coordination is also focused on equipping work cars with the new ATC signal technology. APTA acknowledges this project initiative. **(1-C)**

37. APTA commends the TTC for its diligence in addressing its concerns on the state of good repair of its system. TTC initiatives includes focus on improving maintenance efficiencies within the current window of time allowed to perform these critical tasks as well as performing weekend shutdowns for designated maintenance tasks. Creating additional opportunities for system maintenance to be performed becomes more critical with an aging infrastructure. The application of ATC will provide an additional measure for TTC to consider for increasing its maintenance time frame in the future as the new system will allow for safe and efficient single rail operations. **(1-C)**

38. Standards have been applied when implementing ATC on the system, including EN50126 APTA reviewed a sample of incident reports for both TTC staff and contractors. Level 1 reports were for more minor incidents. Level 2 were for more serious incidents (injuries or damage to equipment). Reports were fully completed, and root causes identified. APTA acknowledges this incident investigation program, as well as ATC for effectively implementing the corporate Level 1 and Level 2 incident investigation program. **(1-C)**

Maturity Model Level: C

Work Cars

Effective Practice

39. The work cars group uses a unique approach by utilizing retired revenue cars as a means of propulsion for the work cars. APTA acknowledges this initiative. **(1-C)**

40. The work cars group coordinates closely with the SI group through its quarterly meetings and with front line representatives through monthly meetings to discuss proposed modification requests. The team was provided with examples of some of the modifications made – the installation of AEDs, a HEPA filtration system, and showers on work cars used for asbestos abatement. APTA commends these system modification communication processes. **(1-C)**

41. A tribrid work car is currently (3rd rail, Diesel, and Battery) being considered by the group as an innovative approach for maintenance. APTA commends the TTC for exploring new technology to improve maintenance efficiencies. **(1-C)**

42. A detailed graphical inventory with specifications of all work cars is maintained by the group and is an **Industry Leading Effective Practice. (1-D)**

43. The Work Cars Group also plans to retrofit the work cars with an ATP system so they can interface with the CBTC system expansion**.** This too is viewed to be an **Industry Leading Effective Practice. (1-C)**

44. The work cars group is responsible for procurement of the non-revenue fleet and for providing engineering support during operations, primarily for the Subway Infrastructure (SI) group (their end user). The requirement for vendors to conduct hazard analyses and provide O&M training (train-the-trainer philosophy) on new equipment is included in the contract specifications. APTA acknowledges the inclusion of these vendor safety requirements. **(1-C)**

45. Work Car Availability is one of the KPIs measured by this group. A schedule of the availability of each work car is provided to the SI group in advance so work can be planned efficiently which is extremely important given the limited maintenance windows available to the SI group. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: D

Subway Transportation

Effective Practice

46. The group performs efficiency tests for operators, guards, and controllers to monitor compliance with rules/SOPs. In addition, ride slip discussions to remind operators to stay alert, and audits (spot checks) are conducted reinforcing rules that have been developed to manage safety risks. This is in addition to the independent tests conducted by the safety staff. APTA commends these safety assurance processes. **(1-C)**

Maturity Model Level: C

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Plant- Elevator & Escalator

Effective Practice

47. TTC receives approximately 300 calls per month on escalator issues. Most of issues are trips of safety sensors and use of the stop button. If the stop button is activated, staff are trained to be able to restart the unit. If it is a safety sensor, the mechanic must be called to restart the unit. Typical response time to an incident would be within an hour for escalators. Elevators have a response time of 40 minutes for a failure. If the contractor fails to respond within the required time, penalties are assessed under the contract. APTA acknowledges these maintenance response protocols. **(1-C)**

48. TTC specifies controllers and special features like a handrail limit switch for their escalators. Standardization helps ensure parts availability and easier to maintain. APTA commends this initiative. **(1-C)**

Maturity Model Level: D

SCADA

Effective Practice

49. The group looks after the Traction Power control system, Control Center, Subway Ventilation System, and Security Alarms. As the older systems are replaced, they will be connected onto a new digital network. The Traction Power controllers are trained substation electricians. They provide support for all the servers and systems in Control. Most of the PMs are conducted on nightshift (12 hours). KPIs include tracking trouble calls and completion of PMs are established. APTA acknowledges these practices. **(1-C)**

50. Traction power systems display the power status for each power section and substation single line diagram on the system. It allows for remote control of breakers in substations. It also monitors various alarms and trips and logs them in control. If there is a mismatch between the commanded power state and the reported state from the field, an alarm is generated, and technicians dispatched to investigate. The system also monitors rail to ground potential. If it reaches an unacceptable level, grounding switches are applied. The yard areas are grounded, and the system controls the operation of a ground switch as a train moves from the yard to/from the mainline. All substations have dual feeds from the utility to improve reliability. APTA acknowledges these traction power safety capabilities. **(1-C)**

51. The Ventilation system controls the ventilation flow in the subway areas. All fans are tested weekly. Any units not in service are flagged. Fan controls are tested using both the remote and local controls as part of the PM program. A KPI is in place to document the operational status of the system. The control system is in the process of being replaced by a new fiber node system with PLCs controlling the fans and ventilation louvers. The replacement project should be complete within a year. The new extension is already on the digital system. APTA acknowledges this new ventilation system upgrades and system monitoring and testing procedures. **(1-C)**

52. TTC is automating the ventilation fan control system to perform tests and log all faults. Various fan activation scenarios will be programmed into the system so that the Controller can quickly activate the correct combination of fans and vents based on where the incident is in the tunnel area. This is currently done manually by the controller based on the Fire Ventilation Procedure Manual. APTA commends this safety initiative. **(1-C)**

Maturity Model Level: C

Human Resources

Effective Practice

53. Human Resources projects a 20% of the TTC staff will be eligible to retire over the next five years. Key organizational positions have been identified and guidelines and criteria have been established to support succession planning objectives. APTA commends this succession planning initiative. **(1-D)**

Maturity Model Level: D

Revenue Security Equipment Maintenance

Effective Practice

54. Revenue Security Equipment Maintenance Supervisors conduct SAFEWORK Observations on every employee (2 per year) to make sure procedures are being followed by barricading work areas off to patrons when working in stations. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: C

Engineering & Construction

Effective Practice

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55. The Engineering, Construction and Expansion Department has a comprehensive set of policies and procedures to govern their activities and the activities of contractors working on projects on the TTC system. All contractors are required to be COR certified to be awarded a contract. APTA commends this initiative. **(1-C)**

56. All capital projects have a business case prepared and are priority listed. Safety projects are assigned the highest priority. The capital budget is approved by the Commission. APTA commends the project safety prioritization process. **(1-C)**

57. Staff conduct construction site audits. These audits are coordinated with the Corporate Safety program. APTA acknowledges this safety assurance process. **(1-C)**

58. TTC's EC&E department is moving towards becoming Certificate of Recognition (COR) certified. This is a government program mainly for contracting and construction purposes. All EC&E contractors will need to be COR certified by January 1, 2019 and TTC itself (EC&E division) is moving towards becoming fully COR certified by Q1 of 2020. APTA commends this certification initiative. **(1-C)**

59. A detailed list and schedule are prepared for each project. Monthly progress reports (cost, schedule, burn rate) are prepared and quarterly reports submitted to senior management. If it is a high-profile project, more frequent updates will be provided to senior management. Financial reports for the projects are provided quarterly. APTA acknowledges this project scheduling and review process. **(1-C)**

60. There is a condition assessment program in place. E&C responds to requests for performing the assessments and assists with developing the business case for the project. MAXIMO asset management program is currently being implemented. The owners of the assets are the Operations and Maintenance Departments. APTA acknowledges this asset management initiative. **(1-C)**

61. Contractor performance is monitored by site inspections done by Construction Section staff. All violations, incidents and near misses are tracked. A contractor may be banned from bidding on projects for up to 3 years if their performance is not satisfactory. APTA acknowledges this contractor safety oversight. **(1-C)**

Maturity Model Level: C

Bus & WT Transportation

Effective Practice

62. Bus Transportation has developed a hot spot map as an awareness tool for operators and field supervisor staff. APTA acknowledges this safety awareness initiative. **(1-C)**

63. There was passenger fatality that occurred in July 2017.. The incident involved a passenger exiting the bus, who fell down as the operator pulled away, and was then struck by the bus. A new "stay behind the white line" initiative was implemented to increase awareness for customer to not distract the operator or block the operators view while operating the bus. Relevant training was also reinforced for operating staff. APTA acknowledges these lessons learned mitigation measure. **(1-C)**

64. Operator rules compliance checks are performed, and target designate highest risk activities (6 areas). APTA acknowledges this risk-based safety assurance process. **(1-C)**

Maturity Model Level: C

Bus Maintenance and Shops

Effective Practice

65. The Bus Maintenance Department if currently focusing on several safety initiatives resulting from lesson learned incidents and identified high risk tasks. These initiatives include Yard safety, reverse movement of buses, PPE compliance, overhead cranes, chains, slings, and safety awareness. APTA acknowledges these safety initiatives. **(1-C)**

66. Bus Maintenance is concerned about the risks associated with operating buses in the Yard. Bus Yard speed compliance efforts are underway including posting of speed limit signs, speed observations, and cameras. APTA acknowledges these safety mitigation initiatives. **(1-C)**

Maturity Model Level: C

Track Engineering

Effective Practice

67. Track Engineering inspects the track annually using a portable ultrasound tool. A policy has been developed and implemented for track inspection (action item from last audit). The TTC has challenges with getting a contractor to support these inspections because the gauge is wider than

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standard gauge and their equipment needs to be modified to run on the line. The TTC is working on having an NDT Geometry car acquired by 2020. APTA acknowledges this investment in track inspection equipment.. **(1-C)**

68. A special committee has been established to coordinate track access. An online request form is submitted 10 days before access is needed. Special needs requests like a power shutdown are noted for the work being done and the area the work is in. All the approved work is put onto a runsheet. The request will be accepted or rejected by the day after the request was submitted. The STARS system checks for conflicts between work areas. Work car requirements and preparatory work needed to support the planned work should be identified on the STARS request. A weekly meeting is held to coordinate work zone allocation and issues Once the work is approved and the worker is ready to implement the access, the worker calls control to request permission to enter the track area. During the day, a blue light is deployed to alert Operators that they are approaching a work area. APTA acknowledges this track access planning process. **(1-D)**

69. TTC is considering the installation of hard wired blue lights at strategic locations in the tunnel. The lights will be able to be activated at either end of the work zone as the worker enters/leaves the area. APTA commends this track access safety initiative. **(1-C)**

70. Shared work zones can be created. Each crew would have a Person-in-Charge to manage the work in a specific area. Multiple crews can be in a work area and the work would be managed by a designated Work Area Coordinator. The rulebook outlines the duties of each and staff taking on those roles are trained. Key responsibilities for the WAC are to coordinate work between crews and ensure that any train movements through the work area are done safely. Each crew working around operating trains will have a designated flagman to watch for trains and ensure crews are clear before a train can pass through the area. APTA acknowledges these track access safety procedural protocols. **(1-D)**

71. To protect workers in a work zone, or impassable track situation, a trip stop is deployed to stop the train before it enters the work zone. APTA acknowledges this track access safety measure. **(1-C)**

72. The maintenance window when the system is shutdown is limited as comparable to most major rail transit systems. With major work having to be done, partly due to the age of the infrastructure, weekend shutdowns of sections of the lines are being utilized. The STARS program has helped to plan to maximize the use of the limited maintenance time. This process is an excellent tool that has been introduced in the last couple of years, and APTA commends TTC for developing the process. APTA commends this program initiative. **(1-C)**

73. The TTC is developing a web-based App to show track areas in 3D. All work areas will be able to be plotted and measurements taken using the App. APTA acknowledges this initiative. **(1-D)**

Maturity Model Level: D

Track Maintenance

Effective Practice

74. With retrofits and expansion of the system, more work is going to have to be done along with the routine inspection and maintenance. Some programs like tunnel washing and cleaning of third rail insulators have been deferred. Coverboards in the open sections of the guideway are being changed out from wood to fiberglass. APTA acknowledges this safety initiative. (**1-C**)

Maturity Model Level: C

Streetcar Engineering and Maintenance

Effective Practice

75. Streetcar Operations have developed a new rulebook that is just being published and issued. It will incorporate traction power areas as applicable to the Streetcar Engineering & Maintenance responsibilities. APTA acknowledges this initiative. **(1-C)**

76. Maintenance facilities are equipped with pits and mezzanines to perform the inspections and repairs. There is a gated lockout system in place to enter the mezzanine areas due to live overhead wire being run through the shop for traction power. There are warning lights to indicate when power is on. APTA acknowledges these facility safety measures. **(1-C)**

77. Streetcar Engineering & Maintenance regular meetings are held with to discuss maintenance reliability issues including those that create safety concerns. When needed, design modifications are performed in partnership with the equipment manufacturer to address these concerns. APTA acknowledges this maintenance initiative. **(1-C)**

Maturity Model Level: C

Way Maintenance

Effective Practice

78. The Way Maintenance Department is responsible for the capital rehabilitation program and maintenance of infrastructure (track, switches, and platforms) for TTC's legacy streetcar network consisting of 11 routes and 178 km of track. Over the last 15 years, TTC has reinvested in its streetcar infrastructure by implementing an accelerated program to bring the system into a state of good repair. Since much of the track is in City streets, the group coordinated closely with them to replace/rehabilitate approximately 90% of the track. APTA recognizes this important achievement by TTC, which is a testament to its focus not only on capital expansion programs, but more importantly on making sure its capital assets are also getting the needed attention. **(1-D)**

79. As part of its capital upgrade program, the group plans on converting more of the manual switches to electric making operations more efficient. APTA acknowledges this initiative.**(1-C)**

80. TTC has a rail bending facility which is used by the Way Maintenance group when installing new track in curves. APTA acknowledges the TTC for supporting this capability in-house. **(1-C)**

81. Because of a serious injury in 2009 involving a Way Maintenance employee and a streetcar, the work zone set up rules and rules for Streetcar Operators were revised to improve on track safety. APTA acknowledges the TTC for utilizing lessons learned to improve future safety performance. **(1-C)**

82. TTC has committed to the installation of forward facing cameras on streetcars and buses, which can be used to extract valuable information not only when incidents occur but also to monitor compliance with rules/SOPs. APTA commends this initiative. **(1-C)**

Maturity Model Level: C

Overhead Maintenance

Effective Practice

83. The Overhead Maintenance staff maintains the OCS for the streetcar network and manages capital upgrade projects such as transitioning from a pole contactor to a pantograph system. This transition is viewed as an effective practice since it will result in reduced maintenance requirements and a corresponding reduction in maintenance costs. **(1-D)**

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84. The group conducts line inspections of the OCS and its appurtenances, with each line being inspected in an annual cycle. More frequent inspections are conducted of certain components, such as electrified switches. APTA acknowledges these inspection processes. **(1-C)**

Maturity Model Level: D

Vehicle Maintenance Engineering

Effective Practice

85. Regular fleet inspections are performed to ensure defects such as this does not surface in the future. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: C

Way Engineering

Effective Practice

86. Light Rail switches can freeze up especially if they are not adequately drained. Way Engineering utilizes a de-icer on the switches as needed to prevent in part, damaging the flangeways if the snow and ice becomes packed into them. The TTC usually runs storm trains to keep the overhead lines clear of ice if have freezing rain. APTA acknowledges these winter preparation mitigation measures. **(1-C)**

87. Excessive streetcar / track interface noise is one issue that TTC is working on reducing. One initiative being applied involves testing sound absorption rings attached to the wheels to reduce squeal in curves. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: C

Leslie Barns Tour

Effective Practice

88. Leslie Barns is a new streetcar operating, maintenance and storage facility. It is built to a LEEDS environmental standard and was designed to minimize the impact on the community around it. APTA commends the TTC for its investment in this new operating and maintenance facility. **(1-D)**

89. Elevators are located at the ends of the raised mezzanine areas and are used to access the roof equipment and facilitate the moving of tools and equipment up/down from the Leslie Barns facility mezzanine area. APTA acknowledges this design feature. **(1-C)**

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90. At the Leslie Barns facility, the auditors reviewed a sample of inspections conducted on a couple of vehicles. Inspections were completed and signed off by the staff performing the work as well as the Foreman. Any repairs that were required had separate repair work orders generated and all work orders signed off when the work was complete. The vehicle was then released for a return to service. APTA acknowledges this maintenance practice. **(1-C)**

Maturity Model Level: D

ITS

Effective Practice

91. The ITS Department has implemented an enterprise data platform to collect data from key systems. APTA acknowledges this data management initiative. **(1-D)**

Maturity Model Level: D

PfMO

Effective Practice

92. The Portfolio Management Office (PfMO) was created to support the development and implementation of standardized tools and processes for capital project delivery across the organization and to provide a mechanism for improved project oversight. Since the establishment of this office, TTC now has introduced a governance structure and put in place a category-based approach based on capital project costs. APTA acknowledges this initiative. **(1-C)**

93. The PfMO provides a consistent mechanism for tracking the progress of capital projects which were being tracked by various independent ways by each Project Manager. APTA acknowledges this initiative. **(1-C)**

94. The PfMO also provides a process to develop business cases and prioritize capital projects by following a very detailed project 'stage gate' process where the sponsors of capital projects must successfully pass through before moving on to the next phase of their project. For each 'gate' or step, sponsors are provided clear objectives and expected deliverables from the initial proposal through closeout of their project. APTA commends this project management initiative. **(1-D)**

95. A governance body, which is usually a project steering committee that is involved at every gate, reviews the deliverables and makes informed decisions on whether to proceed to the next gate,

request clarification/additional information, or abandon the project. APTA commends this management process. **(1-C)**

96. A review by KMPG of the PfMO's program delivery maturity conducted in 2015 resulted in 41 recommendations to enhance the PfMO. TTC has developed a plan and schedule to address the recommendations and is actively working on implementing them. APTA commends this continuous improvement initiative. **(1-C)**

97. The PfMO structured approach provides an opportunity to provide early intervention strategies to overcome cost escalation, scope changes, and/or schedule drift on capital projects. Considering the significant size of TTC's capital portfolio, this office serves a critical role in managing these issues effectively. APTA commends this early intervention strategy initiative. **(1-D)**

Maturity Model Level: **D**

Service Planning

Effective Practice

98. The Service Planning group developed schedules for all TTC's modes including rail, bus and streetcar. When putting together these schedules, safety is taken highly into account and this group does not feel as though the schedules are "rushed" so that operators get appropriate breaks to mitigate fatigue concerns. APTA acknowledges this initiative. **(1-C)**

99. Operators may not operate more than six hours at one given time, and a spread is 12.5. hours max per day. Operators will typically get 15-30-minute breaks between shifts. APTA acknowledges this fatigue management scheduling initiative. **(1-C)**

100. Gap trains have been added at strategic locations, if needed in case of an emergency and to mitigate platform crowding during service delays. APTA acknowledges this service planning initiative. **(1-C)**

Maturity Model Level: **C**

Vehicle Programs

Effective Practice

101. The hazard log for the new streetcars is being maintained and is a joint effort with Bombardier. Issues may arise in manufacturing or in operation. Vehicle Program staff track all issues and ensure they are addressed including modifications made that require recertification. APTA acknowledges these safety oversight initiatives. **(1-C)**

102. Vehicle Programs is implementing an eBus program to assess suitable buses for future purchases. The plan to buy 30 buses total from 3 manufacturers and are planning accessible stops, recharging stations, develop performance specifications, and a certification program. APTA commends this new vehicle technology initiative. **(1-D)**

103. The TTC is assessing challenges with track safety, worker safety, pedestrian/bus/streetcar collisions, and fatalities and suicides at platforms. Vehicle Program will explore new technology to provide auto braking and warning systems, platform doors at stations. APTA commends this proactive approach to utilize technology in mitigating existing safety hazards. **(1-D)**

Maturity Model Level: **D**

Safety and Environment

Effective Practice

104. Safety and Environment Department has a scope designed in part to capture and manage incident information through a new SH&E enterprise software program. This enterprise SH&E software solution will manage all safety and environment processes including incident reporting and investigation, hazard reporting, inspections, and risk assessments. APTA acknowledges this data management initiative. **(1-C)**

105. APTA reviewed a sample of incident reports for both TTC staff and contractors. Level 1 reports were for more minor incidents. Level 2 were for more serious incidents (injuries or damage to equipment). Reports were fully completed, and root causes identified. APTA acknowledges this incident investigation program. **(1-C)**

106. Safety and Environment Department oversees the closeout of the 2014 APTA Safety Audit recommendations. The TTC has made great progress with the implementation of the 2014 audit recommendations. APTA commends the TTC for its commitment to its safety continuous improvement process. **(1-C)**

107.   Safety consultant coverage was assessed, and more coverage is being allocated to night and weekend work activities. APTA commends this management initiative to reinforce the consistent application of safety critical procedures across all work shifts. (1-C)

Maturity Model Level: C

COMPONENT 3: Safety Assurance - Actions Needed

Safety Engineering Services

Action Needed

1. Corporate Safety performs periodic safety compliance checks on high risk procedures. Some TTC departments also perform quality control checks to verify procedural compliance. APTA suggests that Corporate Safety consider allocating its resources more as an oversight role in verifying TTC departmental safety assurance processes are being performed as prescribed and the quality of these departmental practices meets TTC expectations. **(3-C)**

2. APTA reviewed several PPE audits that were conducted. Non-compliance exceptions were noted on some of the audits reviewed. APTA supports this audit compliance process and encourages the TTC to continue to focus its audits on its identified high-risk activities (e.g., on-track work) across all shifts. **(3-C)**

Subway Infrastructure

Action Needed

3. Staff identified that on the work site there can be a lot of last minute scrambling to get the right equipment ready for the work and frequent calls to modify the work program at the last moment. This may reflect a lack of effective worksite planning. APTA noted that Senior Managers have been more visible onsite to monitor the on-track access process and the work being performed. APTA recommends the TTC assess its current worksite planning process and initiate appropriate changes to mitigate any onsite confusion and last second changes to the approved work plans. **(2-B)**

4. The Subway Infrastructure database systems use to generate work orders for the Structures and Maintenance of Way departments (MAXIMO & MOWIS), are inadequate for reporting on the infrastructure's State of Good Repair. This maintenance information management system constraint was noted in the 2014 APTA review. APTA recommends the TTC evaluate the feasibility of updating its maintenance management information systems to more effectively support its asset management processes. **(2-B)**

5. TTC has been proactive in establishing several employee safety communications processes to reinforce safe work practices. One critical safety communications process that has been emphasized throughout the industry and continually reinforced from lessons learned is the

importance of a thorough job safety briefings. APTA encourages the TTC to perform quality checks of the job briefings being conducted for staff to ensure they are being performed as intended. The pre-work job briefings should include a discussion of worksite JHA hazards and mitigations applicable to the work to be performed as well as reinforcing the importance of PPE compliance. Department management / supervisory staff should also periodically participate in these job briefings to reinforce the importance of the safety message. **(3-C)**

6. With the age of the current assets (particularly tunnel structures and other assets approaching the end of their design life), the TTC will have increasing amounts of work required to be able to sustain service. APTA commends the TTC for its diligence in addressing its concerns on the state of good repair of its system.   TTC initiatives includes focus on improving maintenance efficiencies within the current window of time allowed to perform these critical tasks as well as performing weekend shutdowns for designated maintenance tasks.   Creating additional opportunities for system maintenance to be performed becomes more critical with an aging infrastructure. APTA proposes the TTC also consider single rail service as an additional measure for TTC to consider in the future such as once ATC has been implemented to allow for safe and efficient single rail operations. **(3-C)**

Rail Car and Shops

Action Needed

7. Employee injuries were not included as a KPI for the department. The audit team recommends that in addition to PM compliance rates, employee injuries should also be included as a KPI for each rail car and shop, with established targets/goals for this KPI. This KPI should be tracked and reported at the SX Committee along with the status of the other KPIs. **(2-C)**

Greenwood Yard Tour

Action Needed

8. APTA noted that the third rail wooded coverboards in need of replacement and recommends this replacement initiative be expedited. **(2-B)**

Engineering & Construction

Action Needed

9. Although the COR program is an Ontario government program that is mainly only applicable to the construction industry, APTA suggests that TTC consider the EC&E Department becoming COR certified. **(3-C)**

10. It was not evident that there is one TTC group that is dedicated and accountable for asset management. APTA recommends that clear accountability for progressing the TTC asset management program is established. **(2-B)**

11. The ECE Department has a solid database for tracking incidents and safety issues. APTA recommends that the TTC consider expanding this program for other departmental applications. Also, the new SH&E software solution will be used to manage SH&E incidents and issues in the future, which should be helpful. **(3-C)**

Track Engineering

Action Needed

12. Not all as-built drawings are updated for everything that is installed in the guideway areas. Major projects generally have the requirement for drawings to be updated, but smaller modifications may not be recorded. APTA recommends that TTC initiate controls to ensure all system modification are documented to include updated as-built documents. **(3-C)**

Track Maintenance

Action Needed

13. APTA conducted a review of the Track Level Field Guide. APTA recommends that the Track Level Field Guide Section 7 be expanded to include warnings about the inswing /outswing of vehicles and the safe clearances to be maintained. **(3-C)**

14. Night shift work can often develop its safety culture if communications and oversight are limited in practice. APTA encourages TTC assess the night shift practices and initiate appropriate measure to prevent any practical drift from desired safety practices. APTA encourages participation from representative Unions as a partner in this assessment and recommendation process. **(3-C)**

Structure Engineering

Action Needed

15. There were inconsistencies noted when discussing the cell phone usage policy application. Some workers indicated that they will use cell phones on platforms and engineers will use phones to take pictures. APTA encourages the TTC want to re-visit the cell phone and electronic device usage policy and its current application to ensure desired safety measures are consistently being applied. Training and compliance inspections should be conducted as applicable. **(2-B)**

Corporate Safety

Action Needed

16. Post incident debriefings are not being conducted on a consistent basis. APTA recommends that post incident de-briefings be conducted after each incident as an opportunity to identify lessons learned and opportunities for improvement. **(3-B)**

17. The current safety data management system does not effectively support organizational-wide SMS initiatives. APTA encourages the TTC to expedite the proposed implementation of a new system. **(3-B)**

Human Resources

18. There is currently no vehicle in-cab video system installed at the TTC. APTA recommends TTC explore the feasibility of installing in-cab cameras to support the gathering of facts associated with accident and incident investigations. **(3-C)**

COMPONENT 4: Safety Promotion – Effective Practices

Occupational Hygiene & Environment

Effective Practice

1. OH&E provides hygiene services for chemical, physical, biological, and ergonomic hazards. In addition, they provide specialized training for hearing loss prevention, spills, asbestos awareness, and new supervisor training. APTA acknowledges this safety awareness training. **(1-C)**

2. OH&S is working to expand safety knowledge down to line staff to fully implement the SMS. One method to support this objective is the use of online training modules targeted for supervisory level staff. OH&S can track who has completed training and results. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: D

Safety Engineering Services

Effective Practice

Maturity Model Level: D

Fire Safety & Emergency Planning

Effective Practice

3. TTC has established a fire extinguisher training and refresher training program for all subway operators who typically use the extinguishers to put out small wayside fires about 30-40 times per year. APTA acknowledges this initiative. **(1-C)**

4. During the audit, the team had an opportunity to witness a fire department training scenario with the Vaughan fire department involving a TTC employee who was injured in a track welding incident at the Highway 407 subway station. The training exercise was well planned with the use of cold smoke and a pretense of a non-functioning ventilation system. The fire department staff performed well in the circumstance and was to locate the injured employee (a mannequin was used in the exercise) and extricate it from the smoky tunnel.   The audit team also had an opportunity to witness the performance of the ventilation system after the rescue operation and was impressed with the very quick dispersion of smoke once the ventilation fans were activated. A post scenario debriefing was held with the crew to discuss their performance with minor

recommendations to seek clarification by the first incoming responders, and faster donning of PPE to begin rescue operations (with the understanding that everyone was aware that this was not a real event). APTA commends this fire / life safety initiative. **(1-C)**

5. SES has established nuclear contingency plan in case there is a release of radiation gases. APTA commends this initiative. **(1-C)**

Maturity Model Level: C

Subway Infrastructure

Effective Practice

6. TTC has currently performs several safety communications processes that includes Monthly Safety Talks and Joint Health & Safety Committee meetings. Organizational safety goals, objectives and initiatives are discussed as well as system hazards and mitigations. APTA acknowledges these safety communications processes. **(1-C)**

7. Automated External Defibrillators (AEDs) have been made available at TTC worksites. APTA commends this workplace safety initiative. **(1-C)**

Maturity Model Level: C

Rail Car & Shops

Effective Practice

8. A new initiative in 2019 will be introduced establishing a one-year training program for heavy repairs for both subway cars and streetcars. Successful candidates in this program will transition to becoming a Rail Transit Car Mechanic. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: C

RC&S Vehicle Engineering

Effective Practice

A System Safety Review process has been established by RC&S to seek feedback from all affected stakeholders (customer requirements) which are then translated into the performance-based specifications for the new fleet. APTA acknowledges this stakeholder communications process. **(1-D)Maturity Model Level: D**

Plant Maintenance

Effective Practice

9. The Plant Department has a comprehensive set of KPIs that address OH&S issues as well as Reliability and Performance measures for all aspects of the department's areas of responsibility. Department Head reviews and publicizes the measures. APTA commends this initiative. **(1-D)**

10. A Work Area Warning system being installed at track level as part of a capital program initiative. A blue light is displayed at track level to warn operators they are approaching a track level work zone. TTC is exploring remote activation/deactivation of the lights. This is an **Industry Leading Effective Practice. (1-D)**

11. The TTC is actively working on a platform / train gap mitigation program. At some TTC stations there are issues with varying platform to vehicle floor heights and varying width in the gap between the vehicle doors and the platform edge. This hazard results in patrons using mobility aids and getting caught in the gap. The TTC designed custom warning edge tiles that will be tilted to adjust for the vertical variations in platform height and be close the gap in wide areas along the edge of the platform. This is currently a pilot project. APTA commends the TTC for this safety mitigation initiative. **(1-C)**

12. The Ontario Accessibilities Act requires all facilities to be accessible by 2025. There is an active program to install elevators in each station and provide a second elevator in heavily used stations. To assist patrons, there is a hotline that they can call to learn of all elevators that are out of service that day. Platform signs also provide escalator and elevator out of service notices. Planned outages are advertised in advance. Should a patron be stranded on a platform, TTC staff can arrange for WheelTrans service and assist in getting the person to a facility that has a working elevator. TTC plans to provide monitoring capabilities to detect real time operability of escalators and display real time status. APTA commends this initiative. **(1-C)**

13. Injury data, KPIs and other statistics are published in the main conference room for the Plant Department group monthly so that all employees can see this information. This seems to be a very effective practice and this information is physically posted in the room by the head of the Plant Department (this information is pushed out and disseminated from the "top down", which is important in an effective Safety Management System). APTA acknowledges this information sharing initiative. **(1-C)**

Maturity Model Level: D

Asbestos Management

Effective Practice

14. The TTC has established a robust Asbestos Management Program for both planned and unplanned disturbance of asbestos in accordance with OHSA standards. Air quality monitoring and respiratory training is performed on an ongoing basis to support safety compliance. An online inventory of asbestos conditions throughout the system is maintained from system-wide studies and inspections performed and procedural protocols are well established for work related activities at identified hazardous locations. APTA commends the TTC for its exemplary efforts in managing asbestos related conditions. **(1-D)**

15. As part of the TTC planned work activities at identified asbestos locations, two asbestos decontamination work trains have been made available for staff tasked with the removal and containment of asbestos. These trains are currently supporting asbestos removal for the ATC project. One of these trains has been set up to be gender neutral in supporting the onsite decontamination process. APTA commends this initiative as an **Industry Leading Effective Practice.** (**1-D**)

16. Fire department personnel (emergency services) have been trained on entry to known asbestos tunnel and station locations. Fire Department staff for 13 Divisions supporting TTC emergency response needs have been trained. APTA commends this training initiative. **(1-D)**

Maturity Model Level: D

Signals

Effective Practice

17. Slip, trip, and falls represent the number one injury type for the Signals Department. When an injury occurs, safety alerts are issued to staff to increase safety awareness from lessons learned. At the time of the audit, the Signal Department had worked 3.1 million hours without a lost time injury. APTA commends this safety achievement. **(1-C)**

18. The Signal Department has an established apprentice program that secures apprentice participants for a four-year period. APTA acknowledges this initiative. **(1-C)**

Maturity Model Level: C

Electrical

Effective Practice

19. The Arc-Flash study was completed that targeted areas / tasks expected to be of the greatest risk. The study resulted in the development of procedures that specify the PPE requirements. APTA commends this initiative. **(1-D)**

Maturity Model Level: D

Subway Transportation

Effective Practice

20. One of the areas the audit team was asked to review was Station Management, primarily from a perspective of addressing crowded conditions during peak hours. The Transportation Department explained their strategy which has proven to be effective which involves introducing spare empty trains at high patronage stations as part of the regular M-F morning peak schedule. The Control Center coordinates with Station Managers to determine the optimum time to put these extra trains in service. APTA acknowledges this initiative. **(1-C)**

21. Most of the injuries being sustained in this group are not serious in nature with rolled ankles, sprains/strains and emotional distress being common. A transitional duty program and an EAP program are in place to assist employees recover from such injuries. APTA acknowledges these programs. **(1-C)**

22. Subway Transportation Department Blue Top (rulebook changes) and Red Top (safety alerts) safety notices are reviewed and signed off by staff. Safety Bulletins are communicated to staff. APTA acknowledges this safety communications process. **(1-C)**

Maturity Model Level: C

Plant- Elevator & Escalator

Effective Practice

23. Under the Ontario Disabilities Act, all stations will need to be fully accessible by 2025. There is an accelerated program to install 16 elevators per year. This will meet the basic requirement for at

least one elevator per station and redundant elevators at critical locations. TTC currently has 334 escalators and 130 elevators on the system. APTA acknowledges this initiative. **(1-C)**

24. Space is very tight in many of the older stations to fit in new elevators. Work is closely coordinated with the Engineering & Construction and Operations to design suitable locations and work out how to complete the work safely. Construction areas are assessed to ensure there is adequate space to facilitate safe movement of the public by the construction zone. Construction group handles the installation and Plant perform the commissioning for new units. APTA acknowledges this interdepartmental coordination. **(1-C)**

25. Monthly and annual preventative maintenance programs are carried out as per code requirements. Escalators are maintained by internal staff and elevator maintenance is contracted. Escalators are overhauled after 25 years of operation. Maintenance practices allow for only 1 or 2 to be down at any time on the system for overhauls. If an elevator is out of service and a passenger requires it to exit the station, the contractor is expected to put the unit back into service to accommodate the patron if possible. Escalator maintenance is done on evenings and nights to reduce impact for patrons. Elevator maintenance is scheduled during lower demand times of the day. APTA acknowledges these maintenance practices designed to support customer safety. **(1-C)**

26. Response times are prioritized for incidents. Escalators in high passenger traffic stations have priority over escalators in stations with lower passenger flow. Accident response is the top priority. All accidents must be investigated.. Response time is tracked and reported on each month along with downtime for escalators and elevators. TTC is working on real time online elevator/escalator out-of-service application initiative to provide information to patrons. There is currently have a hotline that patrons can contact to get status of known outages. APTA commends these initiatives. **(1-D)**

27. TTC has created an apprenticeship program for escalator mechanics. APTA acknowledges this training initiative. **(1-C)**

28. TTC acquired the right to a series of escalator safety videos. They modified and customized the videos to shorten them and display them on their platform signs to promote customer safety. APTA commends this escalator safety awareness program. **(1-D)**

Maturity Model Level: **D**

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SCADA

Effective Practice

29. TTC is reviewing cyber security aspects as they cutover to network-based systems. For system updates and contractor support, are using external supplier connections. TTC is also expanding internal access to the network to allow staff the ability to log on the various systems. Access will be limited to view only and is allowed only to authorized employees. APTA acknowledges this IT initiative. **(1-C)**

30. Training is being conducted with all Fire Departments that respond to the new extension. Various scenarios are set up to orientate the responders and ensure they are aware of special hazards and systems (e.g. traction power, ventilation systems). The training remains ongoing with Toronto Fire Department. APTA acknowledges this training initiative. **(1-C)**

Maturity Model Level: C

Stations

Effective Practice

31. TTC has a total of 78 stations. Current Stations staff includes 83 Supervisors, 12 Duty Station Managers, 7 Group Station Managers, 200 Station Service Janitors (public washrooms are contracted), 421 Fare Collectors, and 64 Customer Service Agents. The new extension stations are staffed with Customer Service Agents which is the new service model being deployed because of the PRESTO Fare Card being introduced across the region. Full implementation is planned for Q2 2019. This will remove the risk of robberies in stations and processing cash. It also improves the accessibility of fare media for patrons as they can purchase from vending machines and upload cards in stations and purchase online from home. APTA acknowledges this initiative. **(1-C)**

32. In developing the new TTC station service model, the TTC reviewed London and Boston service models. To improve customer service, Customer Service Agents (CSA) will provide information to customers, assist with elevator access, respond to emergencies, patrol the station, perform minor maintenance (keeping entrances clear and safe, resetting gates), assist with PRESTO cards, report system outages and control crowds. CSAs are equipped with radios and can contact Control directly if issues arise. Fare Collectors are being retrained to take on the CSA role and feedback on the training provided has been very positive. APTA commends this initiative. **(1-D)**

33. A comprehensive Turn-back, Overcrowding and Evacuation policy and procedure has been developed to handle overcrowding on station platforms and line transfer stations. It establishes minimum staffing for situations, where to deploy staff for various conditions, when to shut off escalators and request trains not be stopped at the station and even closing off entrances to the station in extreme load situations. It establishes the need for a paramedic to be on the system during AM peak times, how to handle injuries and suicides, sequestering staff and witnesses if there is an incident, and deploying signage to provide guidance to the public. The Station Coordinator in Control regulates the distribution of staff. About half the staff are trained currently, and once all are trained and the procedures fully implemented, the procedures will be reviewed and adjusted based on experience. APTA commends this initiative as an **Industry Leading Effective Practice. (1-D)**

34. All staff will be Rulebook Qualified and know how to cut power if there is a person at track level. Staff are not permitted to go to track level if something is dropped there. They would request the assistance of a Supervisor to retrieve the article. APTA acknowledges these safety procedural measures. **(1-C)**

35. Supervisors and Station Managers are trained to access track level. They also have an insulated retrieval grabber that can be used to pick up articles that land in the track area closest to the platform (opposite where the traction power rail is run). The grabbers are mounted on the inside of the fire cabinet doors. Stations are also equipped with AED devices. APTA commends these initiatives. **(1-D)**

36. The number of slips, trips and falls has decreased as of late, due to the frequent station walks that take place to remove any potential slip hazards. Crowd control has also improved as of late which also helps with deterring slips, trips and falls. APTA acknowledges this accomplishment. **(1-C)**

Maturity Model Level: D

Toronto York Spadina Subway Extension

Effective Practice

37. Extensive work was done with all partners on the design and service implementation on the line extension to York to establish who was responsible for what (contractors, maintenance, response to issues, coordination of transfers between systems, access to developments, parking and traffic flow, wayfinding signage, training and orientation, etc.). This involved numerous developers,

neighboring municipalities, other transit authorities and first responders. An excellent job was done on this critical aspect of the project. APTA acknowledges this effort. **(1-D)**

Maturity Model Level: **D**

Greenwood Yard Tour

Effective Practice

38. While touring the Greenwood Yard, APTA auditors noted all TTC personnel wearing appropriate personal protective equipment (PPE) including high visibility vests, leg bands, hard hats, safety glasses, and safety boots. **(1-C)**

Maturity Model Level: **C**

Human Resources

Effective Practice

39. The TTC continues to be proactive with its fitness for duty program that includes reasonable cause, post-incident, and random testing. Supervisory personnel have been trained on their responsibilities for supporting fitness for duty. In addition, new hires filling "designated positions" receive a sleep apnea protocol evaluation that assesses five risk factors. APTA acknowledges these fitness for duty initiatives.

40. Random Testing for substance abuse for safety sensitive positions has been introduced. The target is to randomly test 20% of the designated staff. Most line and shop staff are covered as well as designated management and executive staff. About the only employees not covered are administrative staff. TTC does pre-employment drug testing as well as after incident testing. **This is an Industry Leading Effective Practice (1-D)**

Maturity Model Level: **D**

Training

Effective Practice

41. The TTC has robust training programs established that are designed to reinforce safe operating practices. Retraining programs provide an opportunity to focus on Operator awareness and

compliance to key procedures essential in mitigating accidents and injuries as may have been noted from lessons learned by TTC or within the industry. APTA acknowledges the TTC training programs. **(1-C)**

42. The Person-In-Charge (PIC) and Work Area Coordinator (WAC) positions requires candidates successfully perform five and three on-track protection setups respectively with an experienced employee within a six-month period to be qualified for the position. APTA commends this on-track safety OJT requirements. **(1-D)**

43. ATC training materials provided by the vendor was assessed by TTC Training as was determined to be inadequate in address training needs. The TTC took the initiative to update the training materials in coordination with the vendor to meet the TTC training standards. APTA acknowledges this initiative. **(1-C)**

44. An ATC job aide "Pocket Guide" has been developed to increase staff awareness and understanding of their ATC system respective responsibilities. **(1-C)**

45. Track access is coordinated with the Track Access Level Committee in terms of planning when and where the work can be done. Contractors complete the TTC track access training so that they know how about the hazards and procedures to access the track area. APTA acknowledges the contractor track access safety training. **(1-C)**

Maturity Model Level: **C**

Revenue Operations

Effective Practice

46. Injuries being experienced in this group are muscular skeleton, strains, and sprains. There were 8 lost time injuries that occurred last year. To reduce injuries, employees are provided initial training and safety SOPs are reviewed during safety talk sessions with staff post an incident. Supervisors also conduct random but routine monitoring (SAFEWORK observations) to evaluate compliance with training protocols and SOPs. APTA acknowledges these Revenue Operations departmental safety initiatives. **(1-D)**

47. A Joint Health and Safety Committee meets every two months to review the Employee Action Investigation Reports (EARS). APTA acknowledges this safety communications process. **(1-C)**

48. Because of the nature of work and exposure of this group, employees are provided special robbery prevention training. APTA acknowledges this training program. **(1-C)**

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49. Routine fire drills are conducted at the facility to test the loss prevention strategies. APTA commends this emergency preparedness program. **(1-C)**

Maturity Model Level: **D**

Fare Collection

Effective Practice

50. Fare Collection employees are trained in de-escalation tactics, but when elevated incidents occur with customers, they request the assistance of special constables as needed. APTA acknowledges this training. **(1-C)**

Maturity Model Level: **C**

Engineering & Construction

Effective Practice

51. Any expansion of the network that TTC operates is required to meet TTC standards which includes several projects where Metrolinx is the owner and TTC the operator (e.g. Finch Line, Eglinton Line). Extensive liaison with the contractors and Metrolinx is required. APTA acknowledges this interagency coordination. **(1-C)**

52. A significant project is underway to make all stations accessible by 2025. The TTC is ramping up construction to 17 stations each year to meet the target which is significantly higher than the current level of construction. APTA commends this system accessibility initiative. **(1-D)**

Maturity Model Level: **D**

Bus & WT Transportation

Effective Practice

53. Bus Transportation has an established an Awards Recognition Program (quarterly and annual) that include recognizing a "driver of the year", Employee Appreciation Day", and issuing "Spot on Cards" for recognized good performance." APTA acknowledges these positive recognition programs. **(1-C)**

Maturity Model Level: **C**

Bus Maintenance & Shops

Effective Practice

54. Bus Maintenance provides new employees with a Welcome Package that includes an orientation of the facility, review of facility hazards, evacuation procedures, and safety procedures. APTA acknowledges this safety orientation initiative. **(1-C)**

Maturity Model Level: **C**

Track Engineering

Effective Practice

55. A Track Level Field Guide was developed and issued in 2017 to provide guidance for accessing track, track level hazards, setting up work zones, areas of safe refuge, sightlines, ATO operation, as applicable to each of the four rail lines, streetcar operations, yard areas, and specific hazardous substances. This is an excellent resource and TTC is to be commended for preparing it to support the safety of contractors and staff. **Industry Leading Effective Practice. (1-D)**

Maturity Model Level: **D**

Track Maintenance

Effective Practice

56. Robust job briefings are being conducted by Track Maintenance. These briefings include the foreperson/supervisor going through what task are being performed during the work shift, determines tools that are needed, reviewing hazards and required safety practices, and taking roll call of those present. APTA acknowledges this safety briefing communications process. **(1-C)**

57. The Track Maintenance Department conducts monthly Safety Talks with its employees. These meetings are an effective means to discuss safety issues and concerns. **(1-C)**

Maturity Model Level: **C**

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Structure Engineering

Effective Practice

58. Structure Engineering Department staff interviewed indicated that that the new safety program initiatives are getting down to the worker level and that there has been a positive shift in the attitudes of the crews. APTA acknowledges this safety culture progression. **(1-C)**

59. Safety Talks with Structure Engineering Department staff takes place once a month and are an effective method for discussion and to bring up safety concerns. There's also a form made available for staff to fill out to pass on their safety concerns to be addressed. APTA acknowledges this safety communications initiative. **(1-C)**

Maturity Model Level: C

Streetcar Engineering & Maintenance

Effective Practice

60. Training for Streetcar Engineering & Maintenance staff includes General Orientation, Occupational Health and Safety, Rulebook, WHMIS, forklift, equipment re-railing, and a track walkthrough. Training also covers towing one car with another in the event of an emergency. APTA acknowledges this training program. **(1-C)**

Maturity Model Level: C

Way Maintenance

Effective Practice

61. The major challenges the group faces are the city has become very congested and has limited maintenance windows when working in City streets. However, Way Maintenance works closely with the City on securing optimum maintenance windows to complete scheduled work. APTA acknowledges this inter-agency coordination. **(1-C)**

62. The type of work performed by the employees in this group exposes them to vehicular traffic and potential injuries related to operation of heavy construction/maintenance equipment. Typical injuries experienced are due to pinches, struck by, and bumps. To mitigate such incidents, the group conducts on site crew briefings, identifies hazards, and periodic monitoring of crews for compliance with rules and protocols. Regular safety meetings with the crews are used as forums

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to reinforce safe working practices and share lessons learned from incidents. APTA commends this safety communications and compliance oversight initiative. **(1-C)**

Maturity Model Level: **C**

Overhead Maintenance

Effective Practice

63. Considering employees in this group are exposed to significant risk because of their work with live voltage, the group has developed a comprehensive 4-year program that employees must complete before being considered fully qualified on all aspects of their tasks. APTA commends this training program. **(1-C)**

64. Overhead Maintenance has development an in-house apprentice trade training program (207S) in conjunction with the MOL with the objective of providing learning opportunities and to teach key work-related skills and knowledge about a complex power distribution system. APTA commends this initiative. **(1-D)**

65. Like the Way Maintenance group, much of the work is conducted in city streets that requires work zones to be set up to protect the crews from auto traffic that shares the lanes. The work zones are set up in accordance with MOL rules (Book 7), with a detailed traffic assessment plan, written tail board meetings, and regular oversight of crews by forepersons to assure compliance with safety rules.   APTA commends this safety planning and communications process to protect workers from vehicular traffic conditions. **(1-C)**

66. Injuries are tracked, and trends and incidents are discussed with employees and communicated via safety bulletins. An example of an incident that was discussed with staff related to an arc flash incident which occurred in 2014/15 that triggered an investigation by MOL. APTA commends this safety communications initiative. **(1-C)**

Maturity Model Level: **C**

Customer Communication (Corporate)

Effective Practice

67. To engage the community, the Customer Communications Department conducts monthly "Meet the Manager" sessions at various stations across the system. At these informal meet and greet sessions, which typically last for about an hour, customers get an opportunity to ask questions of the station team comprised of the head of stations, stations staff, and executive staff. Passengers can share their experience on the system, share their ideas, and express any concerns they have. The sessions are advertised to the public through social media, on TTC's website, and on platform information screens. APTA commends this public outreach program. **(1-D)**

68. The team observed several passenger safety messages to encourage safe behaviors on platforms and on-board trains. Messages such as "Stand Back", "Mind the Gap", "Designated Waiting Areas" and Emergency Evacuation signage is prominently displayed. APTA acknowledges these safety awareness messages. **(1-C)**

69. Other customer facing outreach efforts to educate the public and to mitigate streetcar collisions include distribution of safety pamphlets, safety message bookmarks, and streetcar wraps. The current wraps that compare the weight of streetcars to large animals such as elephants and hippos are an excellent way to capture the attention of the public and educate them about the consequences of their unsafe behaviors. The safety materials are distributed at public meetings in the downtown core, based on where accidents are occurring, and to targeted audience. Additional methods of public safety education include advertisements in the transit Metro paper, on social media, on TTC's website, and on the platform screens. APTA commends these public safety outreach programs. **(1-D)**

70. Corporate communications staff participates in the safety committee meetings where incident trends are discussed, and campaigns are then developed based on data /issues that are prevalent on the system. Previous campaigns have included messages on slips, trips, falls, escalator safety, see something say something, and during times of adverse weather conditions. APTA commends these structured interdepartmental safety communications meetings. **(1-D)**

Maturity Model Level: D

Vehicle Maintenance Engineering

Effective Practice

71. Regular Joint Health and Safety Committee meetings are being held. These are effective opportunities to discuss safety and issues on the system. APTA acknowledges this safety communications process. **(1-C)**

72. APTA reviewed samples of streetcar and subway car maintenance inspection and repair work orders. Inspections identified staff performing the work. Deficiencies were noted and any repairs that were needed were identified and a separate work order generated for the repair. The Foreman signed off on all work orders and inspections before the cars were returned to service. APTA acknowledges this well-established and mature inspection and repair program. **(1-C)**

Maturity Model Level: **C**

Leslie Barns Tour

Effective Practice

73. A standard visitor/contractor briefing form was developed (an outstanding item from the last audit) and the briefing conducted when the APTA auditors entered the Leslie Barns facility. APTA acknowledges this safety communications initiative. **(1-C)**

Maturity Model Level: **C**

Community Relations

Effective Practice

74. Daily Safety Walks are conducted, which is an effective practice. Through these safety walks, community relations employees walk around to see what the safety issues may be in the community or at specific project sites. APTA acknowledges this safety initiative. **(1-D)**

75. Community Relations staff is working closely with Safety to target "hot spots" on the system. APTA acknowledges this interdepartmental coordination. **(1-C)**

76. The Community Relations department works to ensure information is translated into other languages for the communities for which TTC serves, including Chinese, Tamil, Portuguese, Spanish and other languages. This is very important for safety outreach. APTA commends this initiative. **(1-D)**

77. The Community Relations group is working diligently to ensure TTC is compliant with AODA by 2025, including all stations becoming accessible by that date (this includes reaching out to businesses and residences regarding the construction of new elevators at key stations). APTA acknowledges this initiative. **(1-C)**

78. Community Relations initiated a Good Neighbor Policy that establishes how TTC will transparently and proactively works with the various communities. **Industry Leading Effective Practice. (1-D)**

79. The Community Relations department prepares notices related to service changes and closures (subway shutdowns). Notices are posted, and businesses advised of any service changes. APTA acknowledges this community outreach initiative. **(1-C)**

Maturity Model Level: D

ITS

Effective Practice

80. ITS staff participate in quarterly meetings with transit agency CIOs. APTA acknowledges this interdepartmental communications processes. **(1-C)**

Maturity Model Level: C

PfMO

Effective Practice

81. The Board is kept apprised of risks and issues through regular reporting on the capital projects. APTA commends this Board level communications on capital projects risks. **(1-D)**

Maturity Model Level: D

Fire Training Exercise

Effective Practice

82. APTA auditors participated in a "Fire Training Exercise" that was conducted during non-revenue hours. This exercise was part of training and orientation for the fire departments along the alignment. The scenario was set up as a welding incident in the tunnel area that resulted in an explosion and smoke, one of a team of 4 is missing, and the ventilation system inoperable. Smoke generators were used to fill area that reduced visibility. Fire Fighters responded with breathing

gear and were directed to the scene by a TTC employee as they entered the station. APTA commends this emergency exercise program to familiarize emergency responders to the rail system characteristics and potential hazards. **(1-C)**

Maturity Model Level: C

Safety Health and Environment Policy & Strategy

83. Annual Safety, Health and Environment Management System Review dated 4/10/18 was reviewed by the APTA team. This document provided a comprehensive summary of the TTC safety risks, safety performance, safety goals and objectives, audits and assessments, safety initiatives, and industry lessons learned. APTA commends this safety reporting initiative. Annual Safety, Health and Environment Management System Review dated 4/10/18 was reviewed by the APTA team. This document provided a comprehensive summary of the TTC safety risks, safety performance, safety goals and objectives, audits and assessments, safety initiatives, and industry lessons learned. APTA commends this safety reporting initiative. **(1-D)**

84. The TTC is working on developing a TTC App so that all staff can get real time information about safety programs and environmental issues. As an example, the App will allow staff to be able to view departmental KPIs, and SDS information and will be able to link jobs, associated hazards to applicable safety procedures and training. This internal communications and safety awareness initiative is an **Industry Leading Effective Practice. (1-D)**

85. A matrix has been established as it pertains to Safety Consultant competency standards. APTA acknowledges the development of competency requirements for this safety position. **(1-D)**

Maturity Model Level: D

COMPONENT 4: Safety Promotion: Actions Needed

Fire Safety & Emergency Planning

Action Needed

1. While the Fire Department training exercise witnessed by the APTA staff was commendable, the audit team encourages the TTC to explore the feasibility to perform training exercises with Fire Department staff on a pre-established schedule on all subway lines to account for turnover within the fire department stations and maintain familiarity with the different station layouts. **(3-C)**

2. TTC has not used hot smoke to test ventilation scenarios and verify design models to date. Other systems such as Montreal and Edmonton have performed hot smoke testing and made some adjustments to their scenarios as a result. APTA suggests that hot smoke testing be incorporated into the design and training of controllers and first responders in dealing with subway fire and ventilation scenarios. **(3-C)**

Rail Car & Shops

Action Needed

3. The success of new departmental initiatives requires the input and buy in of affected stakeholders. APTA encourages RC&S to continue working with the bargaining units to launch the core multimodal training program to realize efficiencies in maintenance practices and resources. **(3-C)**

4. Formal training programs have been established for vehicle repair persons, subway vehicle technicians for the TR trains. For the T1 trains, a formal training program does not exist, and technicians work under the guidance of mentors who provide on-the-job training, followed by feedback by forepersons. APTA recommends that a staff training program for the T1 trains is documented and utilized to support the consistent application of desired maintenance practices. **(2-C)**

Greenwood Yard Tour

Action Needed

5. APTA noted that the safe walking areas throughout the Yard were not clearly designated. APTA recommends that safe walk areas and work zones be clearly established for all areas in the yard and this safety provision be incorporated within the next revision of the Track Level Field Guide manual. **(3-B)**

Human Resources

6. TTC contractors are not required to have the same fitness for duty standards as TTC has established internally. APTA recommends that the TTC evaluate the feasibility of incorporating the same fitness for duty provisions applied internally to the contract requirements for contractors who may be performing safety critical tasks as defined with the contract scope of work. **(3-C)**

Training

Action Needed

7. TTC Plant staff indicated that recertification training is not specific to the position requirements. APTA encourages TTC assess its current recertification training modules and update the training as required to support job specific requirements. **(3-C)**

8. TTC Communications staff suggested that subway rulebook training could be improved, including for those who work on the track and in the tunnels, who could take the training once a year instead of once every two years. Also, staff indicated that they would prefer more "hands on training" including how to use radios, flag being held when in possession of track, and how to call for a work zone. APTA recommends the TTC reassess its recertification training program to ensure it effectively addresses departmental needs. **(3-C)**

9. Fatigue management concerns continue to be a focus area throughout the industry. APTA suggests the biannual recertification training program be reviewed for inclusion of modules that address fatigue management topics including how to avoid disturbed sleep patterns. **(3-C)**

10. APTA acknowledges the TTC risk-based approach to allocating its training resources in this area. Unfortunate lessons learned from right of way fatalities can generate opportunities for improvement. Accident / incident mitigation areas of focus often include procedural changes and increased training for these high risk on-track activities. To reinforce an understanding and support consistent compliance to the on-track safety rules, some transit agencies have adopted an

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annual recertification. It should be noted that annual on-track safety rules training certification is performed annually for FRA-regulated properties. Although FRA commuter rail regulations do not apply to transit, some of its best practices are transferable to a transit application and should be considered. APTA encourages the TTC to assess the feasibility of adopting an annual on-track safety re-training module for all its on-track designated positions. **(3-C)**

11. The Subway Rulebook training scope has been effective in supporting training needs. However, APTA recommends the TTC consider that all staff that are required to access the track should be given subway rulebook training once a year regardless of their years of experience. **(3-C)**

Bus Maintenance & Shops

Action Needed

12. Bus Maintenance lost work days due to injury has been trending up in 2017 and 2018. Several safety mitigation initiatives have been implemented to reverse this negative trend. APTA recommends that Corporate Safety increases its focus on workplace higher incident locations and perform quarterly reviews in partnership with the Department staff of the effectiveness of the safety program initiatives and results achieved. **(3-C)**

13. A safety briefing is performed at the beginning of each Bus Maintenance work shift. APTA encourages Bus Maintenance management staff to periodically participate in these safety briefings to reinforce the safety message being provided. **(3-C)**

Track Maintenance

Action Needed

14. The Track Maintainers learn their trade through on the job training. These employees are typical entry level positions and as a result there is a higher turnover of staff as they ultimately move to other positions within TTC. APTA recommends that the TTC assess the training provided to these employees and update the program as appropriate. In addition, APTA encourages TTC examine succession planning opportunities for the Track Maintenance Department due to the high turnover to minimize increased vacancy rates. **(3-C)**

15. The Track Maintenance Department has been conducting Safety Talks with its crews. The department is working at improving the documentation of issues raised by staff and tracking their resolution. Staff interviewed indicated that some employees tend to hold the issues back until they

are in a safety meeting or union meeting. APTA recommends that Corporate Safety assess this concern in partnership with the Track Maintenance Department and develop recommendations to facilitate and improves staff communications on issues affecting safety. **(3-C)**

Customer Communication (Corporate)

Action Needed

16. The team observed the link to safety and security information on the current website is not obvious at the bottom of the page and difficult to find. APTA recommends that this information be prominently displayed in the top header of the new website currently under construction. **(3-C)**

17. As an opportunity to further enhance communication with its customers, APTA encourages the TTC to explore opportunities to increase TTC twitter followers for both the TTC and Corporate Communications sites. **(3-C)**

Community Relations

Action Needed

18. Community Relations would be an asset in participating more in the rollout of public safety campaigns. APTA recommends that Corporate Safety include Community Relations in future public safety outreach initiatives. **(3-C)**

Industry Leading Effective Practices

PILLAR SAFETY ELEMENT	DESCRIPTION
Component 1 Item #2	The TTC has established a robust review process for policy and recommendations that are implemented. A Stage 1 review will involve all stakeholders in departments and safety committees to provide comments. A Stage 2 review is forwarded for review to each department and embedded safety consultants. All comments are consolidated, and the Stage 3 review is presented to the affected TTC department heads for signoff. The final report is then sent to the Executive Safety Committee for approval before it is submitted to the Chief Executive Officer for signoff and implementation. This process has helped improve line ownership and accountability. This interdepartmental and committee policy review and signoff process is an **Industry Leading Effective Practice.**
Component 1 Item #4	Safety Consultants (SC) responsibilities include the roll out of new programs; work with various JWSHSC that interface with Plant; conduct Level 2 investigations and assist staff with Level 1 investigations with identifying root cause of incident; track and review all outstanding issues discussed at safety committees; apply risk management principles to near misses which may lead to a full investigation; work closely with frontline staff on safety matters; liaison with Ministry of Labour reportable incidents; audit supervisors and staff on safety matters; arrange for safety talks with each group; check SDS sheets and advise of any change at safety meetings, conduct annual review of safety program results; audit contractors to ensure they meet safety requirements; and provide updates on progress on implementing new programs. Safety Consultants also, compile injury stats each month for the department and may call in Corporate specialists (i.e. hygienists, safety engineering) for issues that are identified. APTA commends the role of the Safety Consultant as structured and implemented within the Plant Department. **Industry Leading Effective Practice.**
Component 2 Item #1	TTC's approach to ERM far exceeds the typical risk management principles implemented at transit agencies in North America. Considerable progress has been made since 2014 in advancing the ERM program by establishing an ERM Policy, a Risk Appetite Statement specifically for the seven Strategic Objectives identified in TTC's Five-Year Corporate Plan, and a risk assessment process that engages all stakeholders across the organization. Furthermore, the ERM program also includes a structured governance body to ensure the ERM framework is maintained and a regular reporting process to the Board informing them of TTC's significant risks and priorities. APTA commend the TTC ERM as an **Industry Leading Effective Practice.**
Component 2 Item #5	The inclusion of an on-board fire mist system in future rail cars is deemed to be an **industry leading effective practice** to mitigate the risk of fire. APTA commends this safety design initiative.
Component 3 Item #3	Develop and administer an Asbestos Management program. The TTC developed procedures for staff working in facilities and equipment that have asbestos. Older facilities have asbestos fire-retardant coating sprayed on the structure. If the work requires performing maintenance or renovation work, asbestos needs to be removed. The TTC maintains a register of asbestos in facilities and are working on putting it online and linked to drawings to show exactly where it is in each facility. This is an **Industry Leading Effective Practice**.
Component 3 Item #42	A detailed graphical inventory with specifications of all work cars is maintained by the group and is an **Industry Leading Effective Practice.**

Industry Leading Effective Practices (cont'd)

Pillar Safety Element	Description
Component 3 Item #43	The Work Cars Group also plans to retrofit the work cars with an ATP system so they can interface with the CBTC system expansion. This too is viewed to be an **Industry Leading Effective Practice.**
Component 4 Item #10	A Work Area Warning system being installed at track level as part of a capital program initiative. A blue light is displayed at track level to warn operators they are approaching a track level work zone. TTC is exploring remote activation/deactivation of the lights. This is an **Industry Leading Effective Practice.**
Component 4 Item #15	As part of the TTC planned work activities at identified asbestos locations, two asbestos decontamination work trains have been made available for staff tasked with the removal and containment of asbestos. These trains are currently supporting asbestos removal for the ATC project. One of these trains has been set up to be gender neutral in supporting the onsite decontamination process. APTA commends this initiative as an **Industry Leading Effective Practice.**
Component 4 Item #33	A comprehensive Turn-back, Overcrowding and Evacuation policy and procedure has been developed to handle overcrowding on station platforms and line transfer stations. It establishes minimum staffing for situations, where to deploy staff for various conditions, when to shut off escalators and request trains not be stopped at the station and even closing off entrances to the station in extreme load situations. It establishes the need for a paramedic to be on the system during AM peak times, how to handle injuries and suicides, sequestering staff and witnesses if there is an incident, and deploying signage to provide guidance to the public. The Station Coordinator in Control regulates the distribution of staff. About half the staff are trained currently, and once all are trained and the procedures fully implemented, the procedures will be reviewed and adjusted based on experience. APTA commends this initiative as an **Industry Leading Effective Practice.**
Component 4 Item #40	Random Testing for substance abuse for safety sensitive positions has been introduced. The target is to randomly test 20% of the designated staff. Most line and shop staff are covered as well as designated management and executive staff. About the only employees not covered are administrative staff. TTC does pre-employment drug testing as well as after incident testing. This is an **Industry Leading Effective Practice.**
Component 4 Item #55	A Track Level Field Guide was developed and issued in 2017 to provide guidance for accessing track, track level hazards, setting up work zones, areas of safe refuge, sightlines, ATO operation, as applicable to each of the four rail lines, streetcar operations, yard areas, and specific hazardous substances. This is an excellent resource and TTC is to be commended for preparing it to support the safety of contractors and staff. **Industry Leading Effective Practice**.
Component 4 Item #78	Community Relations initiated a Good Neighbor Policy that establishes how TTC will transparently and proactively works with the various communities. **Industry Leading Effective Practice.**
Component 4 Item #84	The TTC is working on developing a TTC App so that all staff can get real time information about safety programs and environmental issues. As an example, the App will allow staff to be able to view departmental KPIs, and SDS information and will be able to link jobs, associated hazards to applicable safety procedures and training. This internal communications and safety awareness initiative is an **Industry Leading Effective Practice.**

APTA RAIL SAFETY MANAGEMENT PROGRAM SMS REVIEW	CONTROL: 775-817	DATE OF REVIEW April 16 – 25, 2018

	1.0 System Safety Program Plan Development & Communication 2.0 Policy Statement & Authority 3.0 System Safety Program Plan Purpose & Scope	COMPONENT 1: SAFETY POLICY & PROCEDURES	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
1.1	System Safety Program Plan developed • Approved and signed by CEO/GM/Board • Represents updates to the Strategic Safety Plan and current Mission, Vision, Values	1	D	Pg. 3, #1 Pg. 3, #2 **Leading Industry Practice** Pg.55, #84
1.2	System Safety Program Plan reviewed and updated	1	C	
1.3	System Safety Program Plan communicated to entire organization	1	C	
2.1	Safety Policy clearly stated, disseminated, and applied • Reviewed periodically • Incorporated in training • Communicated throughout the organization • Safety department the primary plan author	1	C	
2.2	Authority outlined for the development of the System Safety Program Plan and Department Safety Plans • Supported by legal, financial, political and regulatory resources to meet plan objectives • Meets regulatory requirements	1	C	
2.3	Authority for implementing Safety Plan defined • Interface between Agency and contract services defined • Any external Operating/Maintenance Agreements or MOUs establish safety and security roles	1	C	
3.1	SSPP purpose: • Identifies organizational safety philosophy • Meets regulatory requirements • Meets industry standards/audit provisions • Employee involvement at all levels with safety plan development and implementation • Initiates a risk-based systems approach to safety management and safety engineering • Working towards a positive safety culture	1	C	
3.2	SSPP scope establishes: • Safety policies needed in the organization • Framework for implementation of safety policies and related goals and objectives • A commitment to continuous improvement in safety • Implementation of a process, achieving a positive safety culture and ongoing assessment of effectiveness of safety culture	1	C	Pg. 51, #60
3.3	Relationship of system safety process to operational risk defined • Departments aware of responsibilities for the implementation of SSPP • Safety definitions included and/or referenced where applicable • Plan disseminated to all departments	1	C	

APTA	4.0 Goals 5.0 Identifiable & Obtainable Objectives 6.0 Strategic Planning	COMPONENT 1: SAFETY POLICY & PROCEDURES	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
4.1	Safety Program goals and objectives are clearly stated • Long-term, with broad and continued relevance • Meaningful with specific/desired results identified • Achievable • Integrated with corporate mission, vision and values • Are properly specific and endorsed by management	1	C	
4.2	Role of each department/division identified in the attainment and support of overall goals and objectives	3	C	Pg. 3, #3; Pg. 6, #2; Pg. 7, #5; Pg. 15, #12
5.1	Objectives of Plan are clearly stated and include performance measurements • Quantifiable, using proper scales or values as KPIs • Performance appraisal systems evaluate safety performance • Policies disseminated to all employees	1	C	
5.2	Roles, responsibilities and authorities are defined • Implementation of internal and external safety communications/feedback on effectiveness and implementation of necessary changes • Status reports to top management as part of regular meetings	1	D	Pg. 4, #4 Pg. 5, #6
6.1	Policies/procedures for implementation of Safety Plan objectives and accountability • Updates established and tracked • Policies disseminated to all employees	3	C	Pg. 6, #1
6.2	Roles, responsibilities and authorities are defined • Key positions at senior management level • Committee membership • Independent authority in reporting to GM/CEO • Relationship of transit system to local/outside jurisdictions	1	C	
6.3	Documented strategic planning/review process for updating, correcting and modifying System Safety Program Plan based on feedback on effectiveness of processes	1	C	

APTA RAIL SAFETY MANAGEMENT PROGRAM SMS REVIEW	CONTROL: 775-817	DATE OF REVIEW April 16 – 25, 2018	

	7.0 Hazard Management Program	COMPONENT 2: SAFETY RISK MANAGEMENT	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
7.1	Hazard Management SOP/documented process in place: • Hazard identification/analysis/resolution methods established • Specialized areas of Hazard Management practiced (fire, security, collision, JHA/JSA, PPE, health, environmental etc.) • Mitigation process (Hazard Precedence) applied throughout system lifecycle • Scheduled program reviews conducted to determine effectiveness of procedures and to detect changes in frequency or severity ratios • Coordination with all safety processes established, including inspections, audits, customer reports, post-accident investigations, loss control reports, etc. • Method established to analyze and perform trend analysis of information gathered (lessons learned, KPIs, regional crime data, state of good repair, etc.) • Training provided on hazard management • Human factors included in analysis of hazards to identify safe behaviors and potential areas for human error occurrences • Training provided on hazard identification, analysis, and controls	1	C	Pg. 6, #3 Pg. 8, #3 Pg. 9, #7 Pg. 10, #10, #11 Pg. 12, #1 Pg. 13, #5 Pg. 26, #65 Pg. 26, #67 Pg. 30, #83
7.2	Procedures on Corrective Action Plans developed and documented: • Method for tracking "open" items to closure • Open items are ranked, prioritized, and scheduled for actions toward resolution • Person assigned responsibility for mitigations and performance reviewed • Completion is formally accepted • Historical files on "closed" hazards maintained • Routine evaluations performed to determine status of hazards	1	C	
7.3	Applying Risk Based Analysis solutions to engineering, management process, and human error prevention: • Risk based processes are used effectively • Re-evaluation performed (new equipment, new procedures, post-accident, etc.) • Risk analysis embedded in the safety culture to target high consequence events • Controls are appropriate for hazards and established with measurable safety margins (alert when drifting toward failure)	1	D	Pg. 8, #1, **Industry Leading Practice** Pg. 8, #2; Pg. 9, #4, Pg. 10, #8; Pg. 11, #13 Pg. 12 #2; Pg. 13, #4 Pg. 26 #68; Pg. 34, #105 Pg. 41, #15
7.4	Hazard Identification • Process established to identify, report, and document hazards • Method established to perform trend analysis of information gathered	1	C	Pg. 9, #6

	7.0 Hazard Management Program (continued)	COMPONENT 2: SAFETY RISK MANAGEMENT	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
7.5	Hazard Evaluation and Categorization • Formal/Informal analysis methods established and documented • Hazard severity and probability assessed through a predetermined matrix • Risk mitigation process defined and applied throughout the system lifecycle	1	C	
7.6	Hazard Tracking and Resolution • Resolution methods documented and reviewed • Use of consolidated hazard log • Routine evaluations performed to determine the status of documented hazards • Historical files on "closed" hazards maintained	1	C	Pg. 15, #10 Pg. 34, #103
7.7	Tracking Open Items List • Method established to track open items to closure do not allow duplicates or loss of data • Open items are ranked, prioritized, and scheduled for actions leading to resolution • Responsibility assigned for mitigation actions • Status reviewed to ensure appropriate closure and schedule adherence • Completion is formally accepted with or without residual risk	1	D	Pg. 14, #1 Pg. 15, #11

	8.0 Accident/Incident Reporting & Investigation				
APTA		COMPONENT 2: SAFETY RISK MANAGEMENT			Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
8.1	Documented policy/process in place for investigating accidents • Accident investigation criteria established for employees, contractors and passengers • Occupational and Operational accidents are covered • Significant Event (Near-miss) policy documented • Post-accident critique conducted • Post-accident drug and alcohol testing procedures applied • Field reports prepared and verified with proper sign-off • Supervisor report on cause and corrective action reviewed by management • Hazard analysis performed based on accident cause(s)	1	D	Pg. 4, #4 **Industry Leading Practice** Pg. 21, #39 Pg. 34, #107 Pg. 42, #17 Pg. 43 #21
8.2	Training provided on basic accident investigation procedures/techniques • General training provided to all employees on occupational accidents • Specialized training provided for operational accidents • Advanced training provided for designated investigators Retraining and refresher training offered	1	C	
8.3	Internal/External notification procedures established • Documented with SOPs/PIs • Protocol clearly defined for reporting to government agencies and internally	1	C	

APTA	9.0 Safety Data Acquisition & Analysis 10.0 Configuration Management	COMPONENT 3: SAFETY ASSURANCE	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
9.1	Responsibilities defined for providing, receiving, processing, analyzing, reporting and disseminating safety data • Employee/contractor/customer accidents • Vehicle/rail accidents • Regulatory/safety hazard reports generated and maintained internally and externally	1	C	
9.2	Safety data collection and reporting (tracking/trend analysis and data interpretation) • Corrective actions documented • Trend analysis performed • Process in place for evaluating effectiveness • Information Systems/Technology support functions defined	2	C	Pg. 26, #64; Pg. 33, #99 Pg. 34, #106; Pg. 35, #4 Pg. 36, #8; pg. 37 #12
9.3	Key Performance Indicators for Safety and Security identified • Safety performance targets and metrics are taken and disseminated appropriately • Appropriate units of measure (leading vs. lagging) • Measurement tied to departmental objectives and performance appraisal system • Corrective action assessed for effectiveness • Top management using data to lead organization & in decision making	2	C	Pg. 36, #7 Pg. 39, #5 Pg. 41, #13
9.4	Risk Management Plans/Procedures adopted for Loss Prevention and Control • Business Continuity of Operations Plan • Disaster Recovery Plan • Integration and collaboration with other departments to manage organizational risk • Means of mitigating operational risk to as low as reasonably practicable	1	C	Pg. 55, #83
10.1	Change management process is documented and utilized • Identifies all stakeholders, including safety, in decisions affecting safety critical elements • Tied to the hazard management process	1	C	
10.2	Change Control Process • Change review and control procedure established • Authority for making configuration changes and process to incorporate changes defined • Schedule for implementation of changes • Incorporated into Document Control	1	C	

APTA	10.0 Configuration Management (continued) 11.0 Safety & Security Certification	COMPONENT 3: SAFETY ASSURANCE	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
10.3	System Modification Process • Policy documents scope and responsibilities • Control authority established for procedures, practices, facility, equipment, systems, manuals, rules, etc. • Procedures for making configuration changes to the components, processes and practices found on the safety critical items list • Demonstration or pilot projects managed • Acceptance and sign-off/approval includes safety/security • Incorporated into Document Control	3	C	Pg. 37, #13
10.4	Quality Assurance/Quality Control Process • Quality Policy documented • Authority and responsibility for QA/QC defined • Quality management standard adopted (ISO or other) • Inter-department coordination identified • Process controls established • Training and qualifications of staff documented • Inspection, test, and non-conformance procedures followed	1	C	Pg. 4, #5
10.5	Document Control Program • Document life cycle management policy/procedure • List established of safety critical documents to be controlled • Established procedure for review, approval, and issuance of new and revised controlled documents • Identification of changes and revisions (change page) • Identification and control of external documents, e.g. vendor supplied documents, technical change bulletins. • Prevent unintended use of obsolete documents • Access controls for viewing, copy, distribution, removal • Digital content management • Document retention/destruction procedures	1	C	
11.1	Safety & Security Cert. Plan documented and reviewed by management • Safety & security committees (SSRC, FLSSC, etc.) established for all new starts and extensions • Certifiable elements identified (SCIL) • Design and construction conformance • Test and verification plan • Hazard tracking in place • Formal certification steps documented with sign-off • Open items reviewed	1	C	
11.2	Safety & Security Cert. applied to new starts, extensions, and major system modifications	1	C	

ITEM	ITEM DESCRIPTION	S	M	REMARKS
12.1	Safety audit program established and documented to ensure all organizational elements, equipment, procedures, and functions are performing as intended from a system safety perspective • Safety programs developed/implemented • Audit schedules established/followed • Checklists prepared and distributed to operating units • Effective Practices identified • Program deficiencies/potential hazards and weaknesses identified • Corrective actions identified/tracked for closure • Improvement recommendations made to system safety program	1	C	Pg. 16, # 15 Pg. 35, #2 Pg. 37, #15 Pg. 59, #12
12.2	Key elements of the organization are identified by top management for achievement, recognition, or awards • Internal programs • Industry recognition	1	C	Pg. 24, #55
12.3	Management Review Process • Top level management/corporate commitment and structure to oversee inputs and outputs • Formal documented review process • Assess internal and external audit findings/key performance indicators to organizational goals • Action plans used to track and verify status of improvements identified in assessment reports • Follow-up meetings held between management staff to discuss individual audit findings • Review organizational philosophy (mission, vision, values) and adjust strategic plan for safety improvement	1	C	Pg. 16, #14: #16 Pg. 34, #108 Pg. 35, #1
12.4	Document control established for internal audit program, including recommendations and follow-up actions	1	C	

	13.0 Infrastructure Maintenance	COMPONENT 3: SAFETY ASSURANCE	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
13.1	Inspections conducted on a regular basis • Checklist of items to document inspection • Tools and equipment included in inspection process • Frequency of inspections detailed	1	C	Pg. 17, #19; Pg. 20, #31 Pg. 23, #50; Pg. 25, #60 Pg. 28, #76; pg. 31, #88
13.2	Inspections tracked, including work orders and findings/recommendations (quality assurance) • Supervisor spot checks of inspections (quality control) • Tracking performed on repairs with trends/follow-up established	1	C	
13.3	Systems Maintenance Plan • State of good repair identified • Deferred Maintenance policy documented • Formalized process for controlling workarounds • Shift turn-over process documents safety status • Calibration program • Other system processes defined	1	C	Pg. 20, #33 Pg. 21, #38 Pg. 28, #74 Pg. 51, #64
13.4	SOPs, PIs and/or Directives developed for employee tasks • Integrated with JHA/JSA • Based on industry standards • Job safety briefings conducted	1	D	Pg. 17, #20 Pg. 23, #51
13.5	Formalized training for employee tasks documented • Licenses/certifications obtained • System in place to track employee training • Vendor training documentation reviewed/approved	1	C	
13.6	Safety meetings conducted/audited • Attendance sheets maintained/frequency noted • Minutes/summaries prepared • Status reports sent to senior management	1	C	Pg. 51, #61, #62
13.7	Procurement and System Maintenance inspections (Scheduled QA/warrantee inspections/surveillance): • In-house/contracted overhauls, maintenance, and repairs • Reports generated/document control established, including sign-off authority • Corrective actions documented and tracked to closure • Guidelines for OEM/after-market parts & equipment • Protocols for procurement, warrantee, and system maintenance	1	C	
13.8	SOPs/PIs or directives for testing repaired equipment (quality assurance): • System established to identify items that need repair (safety critical) • Supervisor spot checks of repaired items • References made to supporting documentation	1	D	Pg. 44, #28, #29

ITEM	ITEM DESCRIPTION	S	M	REMARKS
13.9	Change control/system modification process utilized • Safety certification • Quality Assurance/Quality Control • Configuration management	1	C	Pg. 15, #9; Pg. 20, #35 Pg. 21, #37; Pg. 31, #89
13.10	Contractors used for repairs • SOPs/training provided on railroad safety critical procedures • Method in place to monitor contractor work • Inspection/acceptance program documented (QA)	1	C	
13.11	Asset Management System in place • Infrastructure assets with safety critical function identified in plan • Frequency of determining service condition • Method of determining acceptable ranges of service condition that support levels of state of good repair	1	C	Pg. 17, #18; Pg. 20, #34 Pg. 22, #42; Pg. 24, #52, #53 Pg. 25, #62; Pg. 26, #69 Pg. 28, #74; Pg. 30, #80, #81, #82
14.1	Maintenance Program established and documented • Safety, Engineering & Procurement coordination for replacement/substitute parts • Life-cycle/overhaul/PM/Fleet Management program plans in place	1	D	Pg. 18, #24; Pg. 19, #26 Pg. 22, #43: #44 **Industry Leading Practices**; Pg. 22, #46; Pg. 30, #85 Pg. 31, #86
14.2	Formalized documentation established for: • Work order system • Key performance indicators • Supervisor spot checks • Deferred Maintenance program • Testing and verification program on safety critical procedures/components • Formal work around procedures • Shift turn-over process documents' safety status • Industry standards • Reports prepared; recommendations tracked	1	C	Pg. 18, #22 Pg. 19, #25 Pg. 32, #92 Pg. 54, #75
14.3	Checklist and schedule for conducting inspections of: • Vehicles (revenue/non-revenue) • Tools & equipment (forklifts, safety equipment) • Plant equipment (in ground lifts/fire suppression systems)	1	C	Pg. 19, #30
14.4	Calibration program in place • Precision instruments identified within program • Tools and instruments tagged/marked • Calibration tests documented • Expiration date tracking process used • Formal procedure to remove/destroy out of spec tools	1	C	Pg. 18, #21
14.5	Formalized training program / policy for employee tasks • Licenses/certifications • System to track employee training • Notification established for training/re-training needs • On-the-Job training (OJT) documented • Evaluations conducted for students and instructors	1	C	

	14.0 Vehicle Maintenance & Repair (continued)	COMPONENT 3: SAFETY ASSURANCE	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
14.6	Written work instructions or verbal task assignments include job safety briefing • JSA/JHA conducted for routine assignments • Employees assigned are trained and competent	1	C	
14.7	Procurement and System Maintenance Inspections (Scheduled QA/warrantee inspections/surveillance) • In-house/contracted overhauls, maintenance, and repairs • Reports generated/document control established, including sign-off authority • Corrective actions documented and tracked to closure • Guidelines for OEM/after-market parts & equipment • Protocols for procurement, warrantee, and system maintenance	1	D	Pg. 18, #23 Pg. 19, #27 Pg. 22, #45 Pg. 34, #104
14.8	SOPs/PIs or directives for testing repaired equipment (quality assurance) • System established to identify items that need repair (safety critical) • Supervisor spot checks of repaired items • References made to supporting documentation	1	C	
14.9	System modification review and approval process documented on new or modified/updated equipment • Training for maintenance staff • Maintenance manuals provided • Safety critical documents/elements identified • Exception monitoring in place • Approval/sign-off obtained • Engineering coordination established	1	C	Pg. 31, #87
14.10	Change control/documentation process utilized • Safety certification • Quality Assurance/Quality Control • Configuration management	1	C	Pg. 21, #41
14.11	Safety meetings conducted • Attendance sheets maintained/frequency noted • Minutes/summaries prepared • Status reports sent to senior management	1	C	
14.12	Contractors used for maintenance repair • SOPs and training on railroad safety sensitive items • Method in place to monitor contract work • Inspections/acceptance program (QA)	1	C	Pg. 25, #58
14.13	Asset Management System in place • Vehicle assets with safety critical function identified in plan • Frequency of determining service condition • Method of determining acceptable ranges of service condition that support levels of state of good repair	1	C	Pg. 20, #36 Pg. 21, #40

	15.0 Rules & Procedures Review	COMPONENT 4: SAFETY PROMOTION	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
15.1	Rules and procedures reviewed and kept current • Process/schedule established for reviews/updates • Results documented/distributed • Safety and security critical rules and procedures identified • Authority for issuing rules/policies defined • All rules/procedures in effect are held in a central location as controlled documents with copies maintained in each department as needed • Document controls for safety and security critical rules, procedures are incorporated within Configuration Management	1	C	Pg. 29, #77
15.2	Administrative procedures in place to assure that safety and security critical rules, procedures, practices are given special recognition and/or precedence over others that may conflict • Awareness or promotion programs (posters, bulletins, rule of the day/week, monthly theme, etc.) • Formal method established to allow safety rules or procedures to be challenged and corrected before work begins • "Whistle Blower" provisions extended to safety and security issues outside normal chain of command	1	C	
15.3	Safety and Security involved in the approval/review of policies, rules & procedures affecting safety, health, fire, environment or security (as appropriate)			
15.4	Competency in following safety critical rules and procedures evaluated on an established frequency • Training and post-training Ride Checks/Ghost Rider programs for Operating employees • Efficiency/proficiency testing programs in place for safety sensitive duties; evaluations documented and maintained • Failures require additional investigation for root cause and reinstruction or retest to establish correction in knowledge or behavior • Trend analysis performed to monitor program effectiveness	2	C	Pg. 7, #6 Pg. 13, #3 Pg. 22, #47 Pg. 24, #55 Pg. 26, #66 Pg. 30, #84 Pg. 42, #16
15.5	Safety critical functions governed by polices, rules or procedures incorporated into hiring, promotion, and succession planning practices • Job descriptions • Performance Appraisals • Background checks • Drug/alcohol testing • New employees/Contractors • Transferred and/or promoted employees • Criteria established for physical demands, medical conditions	1	D	Pg. 10, #12 Pg. 24, #54 Pg. 24, #56 Pg. 40, #7

APTA	15.0 Rules & Procedures Review (continued) 16.0 Training & Certification	COMPONENT 4: SAFETY PROMOTION	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
15.6	Documented guidelines establish required knowledge and skills needed for adherence to rules, procedures and safe work practices • Competency evaluated in formal employee or contractor performance reviews • Information from JSA/JHAs reviewed and revised as needed • Procedural effectiveness systematically analyzed and reviewed for human factor impacts	1	C	Pg. 25, #57
16.1	Documented formal program in place for training employees • Training policy established • New hires/Contractors/Vendors • On-the-Job Training • Training simulation and/or computer-based training applications	1	C	Pg. 39, #1, #2: Pg. 41, #12 Pg. 43, #22; Pg.45, #30 Pg. 48, #43; Pg. 48, #44; Pg. 48, #46; Pg. 49, #51 Pg. 50, #56; Pg. 51, #63; Pg. 52, #66, #67; Pg. 60, #15
16.2	Safety critical training is identified and documented • Pass/fail criteria established • Safety critical questions reviewed/verification process established	1	C	Pg. 40, #8
16.3	Re-training program • Return to work after long-term absence • Post-accident/multiple accidents • Reclassification of employee • Safety, security & emergency response refresher training	3	C	Pg. 57, #4 Pg. 58, #5, #7 Pg. 59, #11 Pg. 60, #14
16.4	Trainers/Training program evaluated and periodically reviewed for effectiveness and course content (quality control) • Qualification procedures for trainers • Testing program validation established • Test administration controls in place	2	C	Pg. 57, #2, #3 Pg. 58, #6
16.5	Tracking system to determine when training is due and which training is required for each job class at appropriate levels • Annual and re-cert. training identified and tracked • Amount of training budgeted/completed • Training records centralized, and program management established	1	C	
16.6	Vendor training programs established and evaluated for learning objectives and content • Training requirements specified in contract documents • Program can be replicated in-house (train the trainer) • Student/instructor manuals, visual aids, mock-ups, etc. provided	1	C	Pg. 48, #45
16.7	Inter-departmental coordination of safety training documented, including a common training policy adopted to ensure consistency and continuity of effort	1	C	

APTA	16.0 Training & Certification (continued) 17.0 Emergency Planning & Response	COMPONENT 4: SAFETY PROMOTION	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
16.8	Training and certification of employees performing safety critical functions consider policies, rules or procedures at time of hire, promotions, and in succession planning • Job descriptions • Performance appraisals • Background checks • Drug/alcohol testing • Criteria established for physical demands and medical conditions	1	D	Pg. 46, #37; #38
17.1	Emergency Management Plans developed and implemented • Documented review and update process for Emergency Management Plans • All hazards (Severe weather operations, Mass casualty, pandemic event, Security event, etc.) • Notification procedures established • Emergency response guidelines established • Training program developed & implemented • Defined role(s) of each employee and department in support of Emergency Management Plans • Public awareness programs implemented • Operations recovery/Continuity of Operations (COOP)	1	C	Pg. 40, #6 Pg. 45, #33
17.2	Emergency response, planning, and coordination documented • Within organization and with outside agencies • Roles & responsibilities defined between departments • Media relations guidelines documented • Passenger safety/customer assistance • Family notification/critical event counseling	1	D	Pg. 43, #20
17.3	Emergency drills conducted either live or tabletop • Post-drill meetings/critique conducted • Corrective action areas & follow-up noted • Procedural revisions/updates generated as needed	1	C	Pg. 40, #9; Pg. 49, #50 Pg. 55, #85; Pg. 57, #1; pg. 58, #8
17.4	Fire/life safety analysis & programs established • Vehicles/Tunnels/Facilities/Operating Procedures • Applicable Fire/Life Safety Regulations • Documented annual review process and implementation for emergency procedures, safety rules, all hazards training and preparedness	1	C	Pg. 16, #13 Pg. 20, #32

ITEM	ITEM DESCRIPTION	S	M	REMARKS
18.1	Employee Safety Programs • Occupational/Industrial safety programs developed and implemented (PPE, HAZCOM, Fall, Forklift, confined space, etc.) • Employee accident investigation, role, reporting, and analysis process • Proficiency testing/audits, assessments conducted by supervisors • Occupational hazard prevention (employee injury reduction, human factors/human error prevention, behavior-based safety programs in place) • Safety awareness, recognition and promotion programs • Wellness programs/off-the-job programs established	1	C	Pg. 14, #2, Pg. 14, #3 **Industry Leading Practice** Pg. 29, #78; Pg. 32, #91; Pg. 37, #9 Pg. 39, #3 **Industry Leading Practice** Pg. 41, #11; Pg. 42, #17 Pg. 42, #18; #19 **Industry Leading Practice**; #20; Pg. 44, #25 Pg. 47, #41; Pg. 48, #47; Pg. 49 #49 Pg. 51, #65, #68;
18.2	Workplace safety coordination • Documented labor/management participation, including joint inspections • Safety meetings/communication • Employee safety programs document systematic control of potential occupational hazards to health and safety, emergency procedures, medical surveillance, training, and record keeping	1	C	Pg. 27, #71; Pg. 29, #79 Pg. 36, #5: Pg. 40, #10 Pg. 48, #48; Pg. 50, #58, #59 Pg. 52, #69; Pg. 54, #74, #76 Pg. 59, #13; Pg. 60, #16
18.3	Contractor compliance with railroad safety requirements documented • Contractor/agency safety unit coordination established • Hazardous materials programs awareness • Site safety plan documented and reviewed • Site audits/inspections conducted and documented • Process/contact person established for immediate correction of unsafe acts/conditions	1	C	Pg. 14, #4, #5 #6
18.4	Fitness for Duty • Drug & Alcohol program • Audits of contractors and outside agencies that conduct the tests • Policy for over-the-counter drug use • Medical surveillance monitoring program • Fatigue awareness program • Employee Assistance Programs (EAP) • Critical Incident de-briefing – Post traumatic stress	1	C	Pg. 33, #100 Pg. 33, #101 Pg. 39, #4 **Industry Leading Practice** Pg. 47, #42
18.5	Job Hazard Analysis/Job Safety Analysis established • Training provided to conduct JHA/JSA • Re-evaluation performed (new equipment, new procedure(s), post-accident, etc.) • Scheduled reviews performed to determine if there are any changes in frequency/severity	1	C	Pg. 17, #17 Pg. 43, #23
18.6	Cognitive Distraction Programs • Policies established on workplace distraction and use of personal electronic devices • Programs or technologies in effect to identify or reduce potential for attentiveness disorders	1	C	

APTA RAIL SAFETY MANAGEMENT PROGRAM SMS REVIEW	CONTROL: 775-817	DATE OF REVIEW April 16 – 25, 2018
APTA 19.0 Contractor Requirements for Safety 20.0 Procurement & Stores	COMPONENT 4: SAFETY PROMOTION	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
19.1	Contracting for Services • Safety plan reviewed as a contract deliverable • Safety personnel qualifications established • Specifications reviewed for safety/security requirements, roles, and responsibilities • Reports provided on safety performance and cite frequency • Contractor evaluations documented	1	C	Pg. 32, #94 Pg. 59, #10
19.2	Contracting for Infrastructure, Equipment/Materials • Safety, QA, support documents reviewed • Controlled storage/waste disposal; Emergency spill control • SDS sheet updates and distribution control • Safety department involved in procurement process, when required (i.e., chemicals, safety equipment, etc.) • Procurement process policy/procedure referenced where applicable • Safety specification review of special/substitute/replacement parts and/or equipment • Shelf-life policy coordination	1	C	Pg. 15, #7, #8
19.3	Construction Management • Construction safety plan includes railroad operational hazards such as RWP and safety certification process • Construction safety manual developed, and construction safety training required for management • Written stop work policy established for safety critical tasks that pose immediate danger to life or health • Scheduled work site safety/security reviews	1	D	Pg. 25, #61 Pg. 25, #63 Pg. 32, #95, #96, #97, #98 Pg. 49, #52
20.1	Safety department involved in the procurement process when required (i.e. chemicals, safety equipment) • Procurement policies and procedures address items identified as safety critical • Quality Assurance is in place for safety critical items • Items evaluated for HS&E compliance with regulations & industry standards	1	D	Pg. 31, #90
20.2	Procured materials • Safety critical items identified and QA policies, procedures established • Proper storage and shelf life • Hazardous materials are properly stored, labeled and handled • Obsolescence planning performed to remove or relocate equipment or acquire new technology	1	C	Pg. 19, #28

ITEM	ITEM DESCRIPTION	S	M	REMARKS
21.1	Passenger Safety and Security Programs • Awareness & orientation to hazards • Trespass and suicide prevention • Communication/hazard reporting • Incident/"near miss" reporting • Corrective Action Plans applied to customer and public safety • Customer safety and security data analysis and trending • Public outreach programs • Passenger emergency preparedness • Suspicious package/person reporting • Passenger behavior analysis and controls	1	D	Pg. 45, #31; Pg. 46, #36 **Industry Leading Practice** Pg. 53, #70, #71, #72, #73 Pg. 54, #77, #78, #79 Pg. 55, #81 **Industry Leading Practice** Pg. 60, #17, #18
21.2	Operational Environment and Passenger Interface • Elevator Escalator safety • Emergency Alarms & Instructions • Ingress/Egress & crowd controls • Medical response capability • Platform Gap and Edge safety • 2nd Train hazard mitigation • Door procedures • Hazard signage • Facility/platform maintenance and housekeeping	1	C	Pg. 23, #48; #49 Pg. 33, #102 Pg. 42, #16 Pg. 44, #24, #26 Pg. 46, #34; #35 Pg. 47, #39, Pg. 55, #82
21.3	Design of Passenger Operational Environment • Walking surfaces • Adequate lighting and visibility • Elderly and disabled passenger applications • Crime prevention through environmental design (CPTED) • Passenger Life Safety controls (e.g. Emergency Alarms, Telephones/Intercoms, ventilation systems) • Parking lot vehicle/pedestrian controls • Pedestrian crossings • Vehicle design, construction, maintenance • Audio Visual communication	1	D	Pg. 44, #27 Pg. 49, #53 Pg. 55, #80
21.4	Passenger Security Programs • Criminal data analysis and trending • Public outreach programs	1	C	
21.5	Secure Passenger Environment • Surveillance and crowd control equipment and procedures • Monitored lots, waiting areas and platforms; patrols • Emergency phones/alarms • Lighting and visibility	1	C	

APTA RAIL SAFETY MANAGEMENT PROGRAM SMS REVIEW	CONTROL: 775-817	DATE OF REVIEW April 16 – 25, 2018	
22.0 Rail Corridor Operational Safety	COMPONENT 4: SAFETY PROMOTION		Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
22.1	Joint Railroad Operations, if applicable • Scope and extent of joint railroad operations described • Safety plans from participating railroads reviewed • Audits of operations performed and documented	4	-	N/A
22.2	Highway Grade Crossing Management • Highway traffic signal interface • Grade crossing awareness/education programs in place for vehicles and pedestrians • Safety inspections performed, and hazard analysis developed for grade crossing areas • Process in place for review and resolution of hazards/safety concerns • Interface/interaction developed with local and state highway officials • Maintenance schedule developed with checklists, work orders, and follow-up tracking	1	C	
22.3	On-Track Safety Programs • Procedures established for planning and managing work on or near right-of-way, including allocation of ROW access, protection, tracking and documentation of ROW access, etc. • Documented Site-Specific Work Plans (SSWP) which include at a minimum: description of work, means to identify and protect work zone, methods to account for approved access, and supervision (EIC) • Comprehensive Roadway Worker Protection (RWP) program including adherence to rules/SOPs, training, certification & retraining, on-track safety briefings, on-track maintenance equipment provisions, and monitoring of compliance	1	C	Pg. 27, #71; #72; Pg. 28 #73 Pg. 37, #14; Pg. 41, #14 **Industry Leading Practice** Pg. 49, #54; Pg. 50, #57 **Industry Leading Practice**
22.4	Trespassing & Intrusion Programs • Awareness/education programs in place • Security program for right-of-way documented • Safety inspections and trespass hazard analysis • Joint security operations to inhibit trespass activity with sanctions for violations and reporting process	1	C	
22.5	Suicide Prevention Programs • Engineered inhibitors: refuge areas, intrusion detection and surveillance • Community outreach, hotlines, media protocols • Employee awareness training • Employee/customer/1st responder PTSD assistance programs	1	C	
22.6	Guideway Evacuations • Procedures established for evacuation from each type of guideway including: elevated, at-grade exclusive, at-grade shared lane, or underground • Drills and exercises performed and documented	1	C	

APTA MATURITY MODEL KEY w/ LEVEL OF EFFORT EVALUATION GUIDE (COLUMN "M")

A –
Planning/Initiating/Under Development

- No systematic approach is evident; information is anecdotal.
- Little or no deployment of any plans, process, or systematic procedures.
- No organizational alignment, authority or accountability for the initiative.
- No organizational performance standards or metrics and/or priorities attached to performance measures in the areas reported.
- Trend data are either not reported or show mainly exception reporting.
- Frequency of reporting adverse trends does not allow for timely management response.
- Plans or activities are not in writing; may not align with mission, vision, and values.

B –
Initial Implementation / Developmental. In Place and Documented.

- The beginning of a systemic approach to the basic requirements is evident.
- The approach is in the early stages of alignment with organizational needs and goals.
- Progress in achieving the basic requirements of the initiative are inhibited by time, cost, management coordination or will.
- A few organization performance results are regularly reported and acted upon.
- The beginning of a systematic approach to evaluation and improvement of KPIs is evident; some trend data reported with some adverse trends evident.
- Results are reported for a few areas of importance to the accomplishment of the organization's mission.

C –
Full Implementation / Goals & Performance Measures Established & Disseminated with Roles and Responsibilities

- There is an effective systematic approach responsive to the basic requirements.
- The approach is embedded within the organization and utilized by several departments, leveraging value to their own departmental needs.
- Fact-based, systematic evaluation and improvement process, coupled with a desire to surface and investigate small failures, anomalies, and near miss events to learn from mistakes are in place for improving the reliability and resilience of key processes.
- Good organizational performance targets are reported for most if not all areas of importance to the initiative requirements.
- Efforts to obtain comparative information and use of data driven performance are evident.
- Results are reported for many areas of importance to the accomplishment of the organization's mission, vision and values.

Sustained Data Driven Managing & Measuring. Continuous Improvement Cycle & Focus on Risk Reduction

- Program or process incorporates a strong systematic approach that is responsive to all corporate and department goals and objectives.
- Organizational learning and innovation are supported for improving the efficiency and effectiveness of key processes.
- Key Performance Indicators have been evaluated against relevant comparisons and/or industry benchmarks and have obtained a high level of accomplishment.
- The approach is valued as a contributor to success of the agency's mission.
- The success of the approach is quantifiable and has meaningful contribution to the agency goals.
- The approach exploits new technology or unique perspectives that advance safety improvements.
- The approach has a visible, positive impact on the safety culture of the organization.

Performance Above and Beyond Industry Expectations (Industry Leading Effective Practice)

Exhibits all characteristics in "d" plus:

- The program or process exhibits a sustainable risk-based approach which values continuous improvement and is responsive to input from external stakeholders as well as those throughout the organization.
- The approach is robust and pervasive within all areas of the agency and reviewed on an on-going basis. The method or technique utilized has consistently shown results superior to those achieved with other means.

Appendix

Note: *The General Recommendations are intended to provide basic guidelines and a summary of findings as may apply to several areas of* **Toronto Transit Commission**. *Please refer to the Departmental Supplemental Forms for specific details that are applicable to specific areas of responsibility.*

SECURITY

Effective Practices

Transit Control Center

Effective Practice

1. TTC had conducted a Threat & Vulnerability Assessment (TVA) on a limited scale for the backup data center and control and a more comprehensive TVA is currently being planned. APTA acknowledges this security initiative. **(1-C)**

Maturity Model Level: C

SCADA

Effective Practice

2. The Security system monitors door contacts. Alarms are generated whenever the door is opened and displayed in Control. If the entry was legal, the person must contact control and verify that they entered. If there is no verification, Control will dispatch someone to investigate. APTA acknowledges these security measure. **(1-C)**

Communications Engineering

Effective Practice

3. CCTV cameras are inspected and adjusted once a year. The camera is cleaned, and the view confirmed. Any camera reported as down by Control will initiate a repair activity. There is a register of all cameras and their viewing coverage. All images are stored for only 3 days. If an image is requested for legal or Police purposes due to an incident, there is a policy governing how that review and retrieval of the images is conducted. Operations check cameras daily to ensure they are functioning correctly. The TTC is targeting to have 90% of public areas covered by CCTV. APTA acknowledges this CCTV program. **(1-C)**

Maturity Model Level: C

Customer Communication (Corporate)

Effective Practice

4. Currently the TTC is working on a fare evasion campaign and on revamping the corporate website. APTA acknowledges these ongoing initiatives. **(1-C)**

Maturity Model Level: **C**

Transit Enforcement Unit (EU)

Effective Practices

5. The TEU has created a System Security Plan to guide the security functions at TTC. APTA acknowledges the development of this TTC System Security Plan. **(1-C)**

6. The TEU department is in the infancy stages of reviewing intrusion detection systems and is also evaluating a vulnerable sector screening process to mitigate internal threats. APTA commends the TTC for its commitment to assess new technology design to improve security efficiencies. **(1-C)**

7. Crimes against patrons and employees are discussed weekly at the SX meetings. Most recent data indicate a decline in assaults primarily because of changes in fare enforcement by operators. Data for assaults against guards indicates they are flat. APTA commends this security data assessment process. **(1-D)**

8. The TEU department recently launched a new mobile application – Safe TTC – where customers can discretely report safety/security concerns, harassment, suspicious activity, or summon fire/police/medical assistance. Incidents reported through the App are being tracked to determine trends and direct resources to targeted areas. Concurrently with launching this App, a sexual assault campaign was also rolled out. APTA commends the TEU for these security initiatives. **(1-D)**

9. The TEU is committed to working in partnership with the Toronto Police Service (TPS) and has training reviewed and approved by TPS on an annual basis. APTA acknowledges this interagency coordination. **(1-C)**

10. Fare evasion is one of the concerns system-wide, and to address the issue TTC plans on hiring additional fare inspectors and developing more robust public awareness/education campaigns.

APTA acknowledges this effective practice, particularly since the Presto proof-of-payment system is being expanded across all lines. **(1-C)**

11. The development of a Records Management System (RMS) is currently underway which will provide enhanced search and intelligence capabilities and increase the security awareness for TEU, particularly if it integrates with data in the TPS system. APTA acknowledges this initiative. **(1-D)**

12. Mental health awareness training is conducted for both fare inspectors and special constables. TEU has created an Outreach officer position who has gone through the Mobile Crisis Intervention Team special training and performed ride-alongs with a mental health professional. APTA acknowledges this practice and commitment to security. **(1-C)**

13. Periodic background checks are done routinely on an ongoing basis for TEU staff, which is being considered for expansion at an agency-wide level. APTA acknowledges this initiative. **(1-C)**

14. In the fourth quarter of 2017, a Transit Enforcement Officer (TEO) was dedicated to the Community Engagement Unit as a pilot initiative. This officer develops partnerships within the community, with schools, City Councilors and other stakeholders to discuss issues of mutual concern and explore solutions to problems. APTA commends this initiative and consideration of expansion of this role should be assessed. **(1-D)**

Maturity Model Level: D

Protective Services/Industrial Security

Effective Practices

15. The Protective Services group manages the System Security aspects for TTC dealing with issues such as access control, locks/keys, parking, etc. The unit consists of 2 sergeants and 9 protective services guards (PSG) who provide protection for the revenue service facility and conduct random perimeter patrols in the yards and divisions looking for breaches in fences, lighting conditions, access controls, etc. To be qualified as a PSG, participants must successfully go through a 40-hour training course. APTA acknowledges the TTC for its commitment and investment in system security. **(1-C)**

16. The group participates in bi-monthly meetings with fire life safety, communications, and engineering to discuss various security enhancement projects based on security data collected. One such project was implementation of an intrusion detection system for the Greenwood Yard.

APTA commends this interdepartmental communications process to review security data and develop system hardening initiatives. **(1-C)**

17. Security attendants and contract security staff who supplement the security attendants provide fixed-post security services at various TTC facilities. These staff members are also part of the Protective Services team. APTA acknowledges this system security resource allocation. **(1-C)**

18. TTC is investing in a more robust access control system (Medco XT) like a car fob "key" on a pilot basis with the goal of implementing it system-wide. APTA acknowledges this as an effective practice. **(1-C)**

Maturity Model Level: C

ITS

Effective Practices

19. To address the growing concerns about cyber security, TTC retained an outside consultant to perform a cyber threat analysis. This analysis provided a roadmap on how best to proceed to protect the integrity of networks, programs, and data from unauthorized access. APTA commends this security initiative. **(1-C)**

20. TTC plans on issuing a separate contract to evaluate the vulnerability of its SCADA system from being attached. Considering this is a system that monitors and controls the key systems of the subway system, this is a prudent and necessary approach. APTA supports this initiative. **(1-C)**

21. The ITS department conducts routine penetration tests, the results of which are used to enhance the security of its systems. APTA acknowledges this initiative. **(1-C)**

22. TTC provides security training for Developers and conducts phishing campaigns and training for all employees as part of initial new employee training and annual refresher training. APTA commends this training initiative. **(1-C)**

Maturity Model Level: C

Security Actions Needed

General

Action Needed

1. Enterprise Risk Management (ERM) is a well-established discipline. While TTC may have a robust ERM program, cybersecurity risk does not appear to be a dimension in the framework. Given the current landscape, TTC should develop a high-level cybersecurity risk framework that identifies cyber risks, develops mitigation strategies, and provides a straightforward way to respond to these cybersecurity risks. **(2-C)**

SCADA

Action Needed

2. Given the broader access to the various control networks by staff and outside vendors, a full review of cyber threats and control processes is recommended. **(3-C)**

Communications Engineering

Actions Needed

3. As the fiber network expands, Wi-Fi access for the public is introduce and legacy systems are replaced. APTA recommends that TTC to assess its cyber security requirements and initiate hardening as required. **(3-B)**

ATC

Actions Needed

4. The introduction of the new Alstom ATC train control system will be operating in the 5.2 GHz range. APTA encourages the TTC to assess the vulnerability of the system to potential hacking and initiate hardening measures as required. **(3-B)**

Fire Safety and Emergency Planning

Actions Needed

5. Although post incident critiques are periodically performed by TTC, there did not appear to be any formalized guidance as to when or what type of incidents that these critiques are to be performed. The audit team encourages the Emergency Planning staff to facilitate post incident critiques to evaluate the effects and effectiveness of actions of TTC personnel and first responders on the outcome of the operations for major service disruptions. **(3-C)**

6. Several TTC staff interviewed indicated there is a need to improve on site incident command protocols. The audit staff recommends that TTC reevaluate its use of the Incident Command System (ICS) to confirm that the appropriate structure to facilitate incident management activities is employed as well as to ensure that the foundations of ICS management are in place during major service disruptions. **(3-C)**

Transit Enforcement Unit (EU)

Actions Needed

7. A system as large as the TTC that includes underground stations and tunnels is susceptible to unauthorized trespassing. The team suggests that the TTC evaluate technology measures designed to detect intrusions from the platform into the tunnel areas and other ancillary spaces which can be easily breached by trespassers which could result in accidents or service delays. **(3-C)**

8. Although TTC's infrastructure includes video cameras throughout the system, it was not clear to the audit team whether design criteria exist for placement of the cameras. APTA recommends that agency-wide security design criteria should be developed with input from the TEU, to guide consistent and effective practices throughout the system. **(2-B)**

9. All requests for video data from external entities has not consistently been coordinated through the TEU. A policy/procedure should be developed that clearly outlines the process that will be followed for such requests. **(3-C)**

Protective Services/Industrial Security

Actions Needed

10. In discussions with the Revenue Operations and Protective Services groups there appeared to be some overlap in functional responsibilities. TTC is encouraged to evaluate the reporting relationships and segregation of functions between the Revenue Operations team and Protective Services unit to determine whether a consolidation of similar functions can yield a more cost effective and efficient operation. **(3-C)**

11. Several contract guard service agreements are used by different departments (Protective Services and Revenue Operations). As contracts expire, consideration should be given to consolidating contracts to align qualifications, improve efficiencies and for economy of scale. **(3-C)**

12. The TTC does not currently have established systems security design standards. APTA encourages TTC to develop agency wide security design criterion, based on the principles of Crime Prevention through Environmental Design (CPTED). This initiative should be coordinated with input from the TEU/Industrial Security, to guide consistent and effective practices. **(2-B)**

People Group

Actions Needed

13. The camera video retrieval program is housed in the People Group, but different departments procure and install cameras and camera video can't always be easily accessed. The audit team recommends that TTC perform a system-wide camera inventory, establish camera and video standards, develop a camera and video system strategy that includes camera and recorder performance specifications, design criteria and placement consistent with CPTED principles. **(2-B)**

14. Currently one person manages the camera video retrieval program as an auxiliary task. The audit team suggests that consideration be given to having that responsibility assigned to a designated person or person(s) to meet the requests and to ensure that personnel are available to retrieve camera video footage during subway operating hours. The audit team also encourages that TTC explore an enterprise cloud WIFI solution for uploading video. **(3-C)**

RC&S Vehicle Engineering

Action Needed

15. Cybersecurity vulnerabilities represents a concern for all data and information type systems. The audit team recommends that RC&S explore incorporating minimum cybersecurity requirements in to future solicitations. **(3-B)**

APTA RAIL SAFETY MANAGEMENT PROGRAM SMS REVIEW		CONTROL: 775-817	DATE OF REVIEW April 16 – 25, 2018
	1.0 System Security Plan Development & Commitment 2.0 Policy Statement & Authority 3.0 Purpose & Scope		Security Checklist v1.0

ITEM	ITEM DESCRIPTION	S	M	REMARKS
1.1	System Security Plan developed • Security activities documented • Security procedures defined • Types of security equipment used/maintained • Security personnel equipment issued • Security awareness (internal) • Security training • Public awareness/education • Revenue security • Disaster preparedness • Security emergency procedures • Communication procedures • Interaction with local/state/federal law enforcement • Facilities security and access control established • Security Sensitive Information identified and controlled • Security audit program established/implemented	1	C	Pg. 87, #3 Pg. 88, #4, #5, #9 Pg. 89, #12, #13, #15 Pg. 90, #17
1.2	System Security Plan reviewed and updated periodically and represents updates to the Strategic Plan, current Mission, Vision, and Values	1	C	
1.3	System Security Plan communicated to the entire organization	1	C	
2.1	Security Policy clearly stated, disseminated throughout the organization, and applied	1	C	
2.2	Authority outlined for the development of the System Security Plan; Supported by legal, financial, political and regulatory resources to meet plan objectives	1	C	
2.3	Authority for implementing System Security Plan defined • Interface between Agency and contract services defined • Any external Operating/Maintenance Agreements or MOUs establish safety and security roles	1	C	
3.1	SSP purpose: • Identifies organizational security philosophy • Meets industry standards/audit provisions • Employee involvement at all levels • Risk-based systems approach to security management	2	C	Pg. 92, #1
3.2	SSP scope establishes: • A commitment to the management of security • Identifies some of the security policies needed in the organization • Framework for implementation of security policies and related goals and objectives	3	C	Pg. 93, #10, #11

ITEM	ITEM DESCRIPTION	S	M	REMARKS
	APTA RAIL SAFETY MANAGEMENT PROGRAM SMS REVIEW		**CONTROL: 775-817**	**DATE OF REVIEW** April 16 – 25, 2018
	4.0 Goals 5.0 Identifiable & Obtainable Objectives 6.0 Strategic Planning			Checklist
4.1	Security Program goals are clearly stated • Long-term with broad and continued relevance • Meaningful with specific/desired results identified • Achievable • Integrated with corporate mission, vision and values	1	C	
4.2	Security Program goals are properly specific and endorsed by management with the role of each department/division identified	1	C	
5.1	Objectives of SSP are clearly stated and include performance measurements • Quantifiable, using proper scales or values as KPIs • Status reports to top management as part of regular top management meetings	1	C	
5.2	Roles, responsibilities and authorities are defined • Implementation of internal and external safety communications/feedback on effectiveness and implementation of necessary changes • Status reports to top management as part of regular meetings	3	C	Pg. 92, #9 Pg. 93, #14
6.1	Policies/procedures for implementation of SSP objectives and accountability • Updates established and tracked • Policies disseminated to all employees	3	C	Pg. 92, #9 Pg. 93, #14
6.2	Roles, responsibilities and authorities are defined • Key positions at senior management level • Committee membership • Relationship of transit system to local/outside jurisdictions	1	C	
6.3	Documented strategic planning/review process for updating, correcting and modifying SSP based on feedback on effectiveness of processes	1	C	

APTA	7.0 Threat & Vulnerability Program 8.0 Security Data Acquisition & Analysis	SECURITY ELEMENTS **Auditors: Polly Hanson, APTA and Vijay Khawani, LA Metro**		Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
7.1	Threat & Vulnerability SOP • Threat and vulnerability identification/analysis/resolution methods established • Mitigation process (Threat & Vulnerability Precedence) applied for new start or extension projects • Development of procedures for coordination with all safety & security processes established including inspections, audits, customer reports, post-accident investigations, loss control reports, etc. • Implementation of method to analyze and perform trend analysis of information gathered (lessons learned, KPIs, regional crime data, etc.) • Training provided on threat & vulnerability identification, analysis, and controls • Program reviews conducted as severe threats and vulnerabilities are identified to determine effectiveness of procedures and to detect changes in frequency or severity ratios • Cyber security threats assessed	1	C	Pg. 88, #6 Pg. 90, #19, #20 Pg. 91, #1, #2, #3, #4 Pg. 94, #15
7.2	Threat & Vulnerability Evaluation and Categorization • Formal/Informal analysis methods established and documented • Threat and vulnerability severity and probability assessed through a predetermined matrix	1	C	
7.3	Threat & Vulnerability Tracking and Resolution • Open items are ranked, prioritized and scheduled for actions leading to resolution • Resolution methods documented and reviewed • Routine evaluations performed to determine the status of documented threats & vulnerabilities • Historical files on "closed" threats & vulnerabilities maintained • Method established to track open items to closure does not allow duplicates or loss of data • Responsibility assigned for mitigation actions • Status reviewed to ensure appropriate closure and schedule adherence	1	C	Pg. 87, #1
8.1	Responsibilities defined for providing, receiving, processing, analyzing, reporting of security data • Crime data reports • Benchmarking process in place; lessons learned programs used effectively	1	D	Pg. 88, #7 Pg. 89. #11
8.2	Security data collection and reporting (tracking/trend analysis and data interpretation) • Corrective actions documented, trend analysis performed • Process for evaluating effectiveness	1	D	Pg. 88, #7 Pg. 89. #11
8.3	Key Performance Indicators for safety and security identified and used by management to lead organization • Performance targets and metrics • Measurement tied to dept. objectives and performance appraisal	1	C	

ITEM	ITEM DESCRIPTION	S	M	REMARKS

<table>
<tr><td colspan="5">APTA RAIL SAFETY MANAGEMENT PROGRAM SMS REVIEW   CONTROL: 775-817   DATE OF REVIEW April 16 – 25, 2018</td></tr>
<tr><td colspan="5">9.0   Configuration Management
10.0 Safety & Security Certification   SECURITY ELEMENTS
Auditors: Polly Hanson, APTA and Vijay Khawani, LA Metro   Checklist</td></tr>
</table>

ITEM	ITEM DESCRIPTION	S	M	REMARKS
9.1	Change management process is documented and utilized • Identifies all stakeholders, including safety, in decisions affecting safety critical elements • Tied to the hazard management process	4	-	Information was not gathered
9.2	Change Control Process • Change review and control procedure established • Authority for making configuration changes and process to incorporate changes defined • Schedule for implementation of changes • Incorporated into Document Control	4	-	Information was not gathered
9.3	Safety and Security Design Criteria manual developed and utilized	2	B	Pg.92, #8 Pg.93, #12
9.4	System Modification Process • Policy documents scope and responsibilities • Control authority under development for procedures, practices, facility, equipment, systems, manuals, rules, etc. • Procedures for making configuration changes to the components, processes and practices found on the safety critical items list under development • Acceptance and sign-off/approval includes safety/security • Incorporated into Document Control	1	C	
9.5	Document Control Program • Established procedure for review, approval, and issuance of new and revised controlled documents • Identification and control of external documents, e.g. vendor supplied documents, technical change bulletins. • Prevent unintended use of obsolete documents • Access controls for viewing, copy, distribution, removal • Digital content management • Document retention/destruction procedures	1	C	
10.1	Safety/Security Cert. Plan documented and reviewed by management • Safety & security committees (SSRC, FLSSC, etc.) established for all phases of project development • Certifiable elements identified (SCIL) • Design and construction conformance • Test and verification plan • Formal certification steps documented with sign-off • Open items reviewed	1	C	
10.2	Safety & Security Cert. applied to new starts, extensions, and major system modifications	1	C	

APTA	11.0 Security Assessment 12.0 Rules & Procedures Review	SECURITY ELEMENTS **Auditors:** Polly Hanson, APTA and Vijay Khawani, LA Metro	Checklist

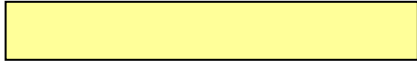| ITEM	ITEM DESCRIPTION	S	M	REMARKS
11.1	Security audit established and documented to ensure all organizational elements, equipment, procedures, and functions are performing as intended from a system perspective • Security programs developed/implemented • Audit schedules established/followed • Checklists prepared • Program deficiencies/potential hazards and weaknesses identified • Corrective actions identified/tracked for closure • Improvement recommendations made to system security program	1	C	
11.2	Management Review Process • Security department manages audit findings and corrective actions • Formal documented review process • Action plans used to track and verify status of improvements identified in assessment reports • Follow-up meetings held between management staff to discuss individual audit findings	1	C	
11.3	Document control established for internal audit program, including recommendations and follow-up actions	1	C	
12.1	Rules and procedures reviewed and kept current • Process/schedule established for reviews/updates • Results documented/distributed • Regulations and standards adopted and applied • Safety and security critical rules and procedures identified • Authority for issuing rules/policies defined • All rules/procedures in effect are held in a central location as controlled documents with copies maintained in each department as needed • Process in place for updating/removing old materials • Incorporated within Configuration Management	1	C	
12.2	Administrative procedures in place to assure that safety and security critical rules, procedures, practices are given special recognition and/or precedence over others that may conflict • Awareness or promotion programs (posters, bulletins, rule of the day/week, monthly theme, etc.) • Rules and procedures enforced • Formal method established to allow security rules or procedures to be challenged and corrected before work begins • "Whistle Blower" provisions extended to safety and security issues outside normal chain of command	1	C	
12.3	Detailed PIs, SOPS, or WIS in place that address person security of: • Passengers • Employees • Police and emergency responders	1	C	

ITEM	ITEM DESCRIPTION	S	M	REMARKS
13.1	Documented formal program in place for training employees, supervisors and management • New hires/Contractors/Vendors • On-the-Job Training (OJT) • Coordination of inter-departmental security-related training • Computer-based training and simulation applications	1	C	Pg. 90, #22
13.2	Re-training program • Return to work after long-term absence • Reclassification of employee • Safety, security & emergency response refresher training	1	C	
13.3	Method in place to determine when training is due and which training is required for each job class at appropriate levels • Annual training identified; Re-certification tracked • Amount of training budgeted/completed • Training records centralized, and program management established	1	C	
13.4	Trainers/Training program evaluated and periodically reviewed for effectiveness and course content (quality control) • Qualification procedures for trainers • Testing program validation and test administration controls in place	1	C	
13.5	Security coordination with Transportation, Engineering, Maintenance and Safety training documented, incl. common training policy adopted to ensure consistency and continuity of effort	1	C	
14.1	Emergency Management Plans developed and implemented • Documented review and update process for Emergency Management Plans • Notification procedures established • Defined roles of each employee and department in support of Emergency Management • Emergency response guidelines established; training conducted • Public awareness programs • Operations recovery/Continuity of Operations	1 3	C C	Pg.16, #13 Pg.92, #5, #6
14.2	Contingency SOPs developed, and drills conducted for extraordinary circumstances, incl. terrorism, riots/domestic unrest, catastrophic events, system-wide communications failure, etc.	3	C	Pg. 92, #5, #6
14.3	Emergency response, planning, and coordination documented • Within organization and with outside agencies • Plans and Protocols established for threat level escalation (DHS Homeland Security) • Roles & responsibilities defined between departments • Media relations guidelines documented • Passenger security/customer assistance • Family notification/critical event counseling	3 1	C C	Pg. 92, #5, #6 Pg. 40, #8, #9 Pg. 43, #20

	APTA RAIL SAFETY MANAGEMENT PROGRAM SMS REVIEW	CONTROL: 775-817	DATE OF REVIEW April 16 – 25, 2018	
APTA	14.0 Emergency Planning & Response (continued) 15.0 Contractor Requirements for Security 16.0 Passenger & Public Safety	SECURITY ELEMENTS **Auditors:** Polly Hanson, APTA and Vijay Khawani, LA Metro		Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
14.4	Emergency drills conducted either live or tabletop • Post-drill meetings conducted; corrective action & follow-up noted • Procedural revisions/updates generated as needed	1	C	Pg. 90, #21
14.5	Documented annual review process and implementation for emergency procedures, safety rules, all hazards training and preparedness	1	C	
15.1	Contracting for Services • Security plan reviewed as a contract deliverable • Security personnel qualifications established • Specifications reviewed for security requirements, roles, and responsibilities • Reports provided on security performance and cite frequency (monthly, quarterly) • Contractor evaluations documented	3	C	Pg.93, #11
15.2	Construction Management • Construction security plan includes railroad operational threats and vulnerabilities and safety/security certification process • Construction security manual developed • Security design standards developed • Informal work site security reviews • Security is part of regular construction progress reviews	2	B	Pg. 92, #8 Pg. 93, #12, #13
16.1	Passenger Safety and Security Programs. • Communication/threat and vulnerability reporting • Corrective Action Plans applied to customer and public security reports • Public outreach programs under development • Suspicious package/person reporting • Awareness & orientation to hazards • Trespass prevention • Suicide prevention • Communication/hazard reporting • Incident/"near miss" reporting • Customer security data analysis and trending • Public outreach programs • Passenger emergency preparedness • Passenger behavior analysis and controls	1	C	Pg. 88, #8, #10 Pg. 89, #14 Pg. 92, #5, #6
16.2	Operational Environment and Passenger Interface • Emergency Alarms & Instructions • Ingress/Egress & crowd controls • Hazard signage • Facility/platform maintenance and housekeeping	1	C	Pg. 87, #2 Pg. 89, #16 Pg. 90, #18

APTA	16.0 Passenger & Public Safety (continued) 17.0 Rail Corridor Operational Safety	SECURITY ELEMENTS **Auditors: Polly Hanson, APTA and Vijay Khawani, LA Metro**	Checklist

ITEM	ITEM DESCRIPTION	S	M	REMARKS
16.3	Design of Passenger Operational Environment for Security Considerations • Walking surfaces • Adequate lighting and visibility • Elderly and disabled passenger applications • Crime Prevention Through Environmental Design (CPTED) • Passenger Life Safety controls (e.g. Emergency Alarms, Telephones / Intercoms, ventilation systems) • Parking lot vehicle/pedestrian controls • Vehicle design, construction, maintenance • Crowd control equipment and procedures • Monitored lots, waiting areas and platforms; Security presence/patrols • Audio Visual communication	2	B	Pg. 93, #12
16.4	Passenger Security Programs • Criminal data analysis and trending • Public outreach programs	1	D	Pg. 88, #8
17.1	Trespassing & Intrusion Programs • Awareness/education programs in place • Security program for right-of-way documented • Security inspections and trespass hazard analysis • Joint security operations to inhibit trespass activity with sanctions for violations and reporting process	3	C	Pg. 92, #7
17.2	Suicide Prevention Programs • Engineered inhibitors, platform edge doors, refuge areas, intrusion detection and surveillance • Community outreach, hotlines, media protocols • Employee awareness training • Employee/customer/1st responder PTSD assistance programs	1	C	Pg. 89, #12
17.3	Guideway Evacuations • Procedures established for evacuation from each type of guideway including: elevated, at-grade exclusive, at-grade shared lane, or underground • Drills and exercises performed and documented	1	C	
17.4	Joint Railroad Operations • Scope and extent of joint railroad operations described • Security plans from participating railroads reviewed • Audits of operations performed and documented	4	-	NA

APTA MATURITY MODEL KEY w/ LEVEL OF EFFORT EVALUATION GUIDE (COLUMN "M")

A –

Planning/Initiating/Development

- No systematic approach is evident; information is anecdotal.
- Little or no deployment of any plans, process, or systematic procedures is evident.
- No organizational alignment, authority or accountability for the initiative is evident.
- There are no organizational performance standards or metrics and/or priorities attached to performance measures in reported areas.
- Trend data are either not reported or show mainly exception reporting.
- Frequency of reporting adverse trends doesn't allow for timely management response.
- Plans or activities are not in writing and may not align with mission, vision, and values.

B –

Initial Implementation/Developmental. In Place and Documented

- The beginning of a systemic approach to the basic requirements is evident.
- The approach is in the early stages of alignment with organizational needs and goals.
- Progress in achieving the basic requirements of the initiative are inhibited by time, cost, management coordination or will.
- A few organization performance results are being reported regularly and acted upon.
- The beginning of a systematic approach to evaluation and improvement of KPIs is evident; some trend data are reported with some adverse trends evident.
- Results are reported for a few areas of importance to the accomplishment of the organization's mission.

C –

Full Implementation/Goals & Performance Measures Established & Disseminated with Roles and Responsibilities.

- An effective systematic approach, responsive to the basic requirements, is evident.
- The approach is embedded within the organization and utilized by several departments leveraging value to their own departmental needs.
- Fact-based, systematic evaluation and improvement process coupled with a desire to surface and investigate small failures, anomalies, and near miss events to learn from mistakes. These are in place to improve the reliability and resilience of key processes.
- Good organizational performance targets are reported for most, if not all, areas of importance to the initiative requirements.

- Efforts to obtain comparative information and use of data-driven performance are evident.
- Results are reported for many areas of importance to the accomplishment of the organization's mission, vision and values.

D –

Sustained Data Driven Managing & Monitoring. Continuous Improvement Cycle & Focus on Risk Reduction

- Program or process incorporates a strong systematic approach. Responsiveness to all corporate and department goals and objectives is evident.
- Organizational learning and innovation are supported for improving the efficiency and effectiveness of key processes.
- Key Performance Indicators have been evaluated against relevant comparisons and/or industry benchmarks and have obtained a high level of accomplishment.
- The approach is valued as a contributor to success of the agency's mission.
- The success of the approach is quantifiable and has a meaningful contribution to the agency goals.
- The approach exploits new technology or unique perspectives that advance safety improvements.
- The approach has a visible, positive impact on the safety culture of the organization.

Performance Above and Beyond Industry Expectations (Industry Leading Effective Practice)

Exhibits all characteristics in "d" plus:

- The program or process exhibits a sustainable risk-based approach which values continuous improvement and is responsive to input from external stakeholders as well as members throughout the organization.
- The approach is robust and pervasive within all areas of the agency and reviewed on an on-going basis.
- Method or technique that has consistently shown results is superior to those otherwise achieved with other means.

TTC ORGANIZATION MATURITY MODEL LEVELS

TTC Function	Component 1 Safety Management Policy	Component 2 Safety Risk Management	Component 3 Safety Assurance	Component 4 Safety Promotion
General	C	C		
Risk Management				
Occupational Hygiene and Environment	D		D	D
Safety Engineering Services			C	D
Fire Safety & Emergency Planning			C	C
Internal Audit			C	
Subway Infrastructure	C	C	C	D
Rail Car & Shops			C	C
RAMS			C	
RC&S Vehicle Engineering		D		
Plant	D	C	C	C
Communications Engineering			C	
Asbestos Management				D
Signals		C		C
Electrical			C	D
ATC			C	
Work Cars RC&S			D	
Subway Transportation		C	C	C
Plant- Elevator & Escalator			D	D
SCADA			C	
Transit Control Center	Security	Security	Security	Security
Stations				D
Toronto York Spadina Subway Extension	N/A	N/A	N/A	N/A
Greenwood Yard Tour	N/A	N/A	N/A	N/A
People Group	Security	Security	Security	Security

Human Resources			D	D
Training				C
Revenue Operations				D
Revenue Security Equipment Maintenance			D	
Fare Collection				D
Engineering & Construction		C	C	D
Bus & WT Transportation		C	C	D
Bus Maintenance & Shops			C	C
Transit Enforcement	Security	Security	Security	Security
Protective Services	Security	Security	Security	Security
Track Engineering			C	C
Track Maintenance			C	C
Structure Engineering				C
Safety Health and Environment Policy & Strategy	D			D