The Washington Metrorail Safety Commission

1-6

Safety Audit

WMSC

of the Washington Metropolitan Area Transit Authority

Audit of Track Maintenance and Training

Final Report: December 14, 2022

WMSC

Table of Contents

Background and Scope History Current Organizational Structure Audit Work What the WMSC Found Positive Practices Findings and Minimum Corrective Actions 1 Recommendations 2 Other Observations 2 Appendices 2 Appendix A: Personnel Interviewed 2 Appendix B: Site Visits 2 Appendix C: Documents Reviewed 2 Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan (SSPP) Elements Reviewed	Executive Summary	
Current Organizational Structure Audit Work What the WMSC Found Positive Practices Findings and Minimum Corrective Actions Findings and Minimum Corrective Actions Recommendations Other Observations Other Observations 2 Next Steps Appendices Appendices Appendix A: Personnel Interviewed Appendix B: Site Visits Appendix B: Site Visits Appendix C: Documents Reviewed Appendix C: Documents Reviewed Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	Background and Scope	
Audit Work What the WMSC Found Positive Practices Findings and Minimum Corrective Actions 1 Recommendations 2 Other Observations 2 Next Steps 2 Appendices 2 Appendix A: Personnel Interviewed 2 Appendix B: Site Visits 2 Appendix C: Documents Reviewed 2 Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	History	
What the WMSC Found Positive Practices Findings and Minimum Corrective Actions 1 Recommendations 2 Other Observations 2 Next Steps 2 Appendices 2 Appendix A: Personnel Interviewed 2 Appendix B: Site Visits 2 Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	Current Organizational Structure	
Positive Practices 1 Findings and Minimum Corrective Actions 1 Recommendations 2 Other Observations 2 Next Steps 2 Appendices 2 Appendix A: Personnel Interviewed 2 Appendix B: Site Visits 2 Appendix C: Documents Reviewed 2 Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	Audit Work	7
Findings and Minimum Corrective Actions 1 Recommendations 2 Other Observations 2 Next Steps 2 Appendices 2 Appendix A: Personnel Interviewed 2 Appendix B: Site Visits 2 Appendix C: Documents Reviewed 2 Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	What the WMSC Found	
Recommendations 2 Other Observations 2 Next Steps 2 Appendices 2 Appendix A: Personnel Interviewed 2 Appendix B: Site Visits 2 Appendix C: Documents Reviewed 2 Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	Positive Practices	9
Other Observations 2 Next Steps 2 Appendices 2 Appendix A: Personnel Interviewed 2 Appendix B: Site Visits 2 Appendix B: Site Visits 2 Appendix C: Documents Reviewed 2 Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	Findings and Minimum Corrective Actions	
Next Steps 2 Appendices 2 Appendix A: Personnel Interviewed 2 Appendix B: Site Visits 2 Appendix B: Site Visits 2 Appendix C: Documents Reviewed 2 Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	Recommendations	
Appendices 2 Appendix A: Personnel Interviewed 2 Appendix B: Site Visits 2 Appendix C: Documents Reviewed 2 Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	Other Observations	
Appendix A: Personnel Interviewed 2 Appendix B: Site Visits 2 Appendix C: Documents Reviewed 2 Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	Next Steps	
Appendix B: Site Visits	Appendices	
Appendix C: Documents Reviewed 2 Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	Appendix A: Personnel Interviewed	
Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan	Appendix B: Site Visits	
(PTASP) and System Safety Program Plan	Appendix C: Documents Reviewed	
	(PTASP) and System Safety Prog	ram Plan

Prepared under the authority of the Washington Metrorail Safety Commission

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Executive Summary

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The Washington Metrorail Safety Commission (WMSC) performed this audit of Washington Metropolitan Area Transit Authority (WMATA) track maintenance and training practices for Metrorail through in-depth interviews, site visits, and document and data reviews conducted in 2022. The scope of this audit includes the assessment of track inspection,

maintenance, engineering, operational practices and procedures, and associated training for purposes of compliance with applicable plans, policies, regulations, and industry best practices. Track maintenance includes components and physical assets such as running rails, ballast, ties, yard switches, equipment used to maintain track and third rail. The WMSC appreciates the cooperation of Metrorail personnel during this audit.

Effectively maintaining the track infrastructure of the Metrorail system through proactive and ongoing maintenance, using competently trained employees with strong supervisory oversight and adequate resources, helps to ensure the safety of employees, contractors and riders.

The audit demonstrates that Metrorail is not effectively

ensuring that its tracks are maintained in a state of good repair as specified by its own policies. As a result, the WMSC is issuing 8 findings requiring Metrorail to develop corrective action plans (CAPs). The WMSC is also issuing 2 recommendations that Metrorail must address.

These findings include:

 Metrorail's organizational structure prevents Metrorail from effectively ensuring that its track is maintained in a state of good repair as specified by Metrorail policies, procedures and standards. Effectively maintaining the track infrastructure helps to ensure the safety of employees, contractors and riders.

- Metrorail is not maintaining track infrastructure in rail yards in accordance with TRST-1000 requirements and related standards.
- Metrorail is not meeting its training requirements and there are inconsistencies in on-the-job training documentation for TRST personnel.
 - WMATA is not ensuring that personnel wear the proper personal protective equipment as required by its Hot Work Program Manual.
 - Metrorail lacks the capability to complete required rail grinding activities across the system to ensure safe operations.

The recommendations in this audit relate to opportunities for Metrorail to improve the condition of track infrastructure by proactively maintaining ballast through an ongoing ballast renewal program and to ensure the safety of the system and quality of materials installed on the roadway by conducting lifecycle monitoring of reserve rail components stored in maintenance yards.

The WMSC also found that Metrorail is no longer meeting the CAP requirements of a finding previously issued as part of the



WMSC's 2020 track maintenance and training audit regarding the overgrowth of vegetation on and surrounding the tracks, which causes risk to personnel and assets (see Finding 7 of the 2020 audit). APTA Standard for Rail Transit Track Inspection and Maintenance (APTA RT-FS-S-002-02) calls for scheduled weed spraying and vegetation cutting to prevent track structure damage. Therefore, the WMSC is reissuing the finding as part of this audit.

WMATA is required to propose a CAP for each finding and to respond to each

recommendation no later than 30 days after the issuance of this report.



Background and Scope

Background and Scope

The scope of this audit includes the assessment of track inspection, maintenance, engineering, operational practices and procedures, and associated training for purposes of compliance with applicable plans, policies, regulations, and industry best practices. Track maintenance includes components and physical assets such as running rails, fasteners, ballast, ties, floating slab, grout pads, yard switches, equipment used to maintain track (but this audit excludes roadway maintenance machines), and third rail. Third rail includes physical condition, gauge, insulators, and coverboards. The audit also focuses on the systems, including systems of record used to manage personnel, work and assets.

Among other areas, the audit focuses on elements of WMATA's Public Transportation Agency Safety Plan (PTASP), titled the WMATA Transit Agency Safety Plan, Revision 2.0. Revision 2.0 became effective on December 31, 2021. The specific elements of the PTASP covered in this audit are listed in Appendix D.



History

Prior to the WMSC beginning its oversight of the Washington Metropolitan Area Transit Authority's (WMATA) Metrorail system in March 2019, external reviews of or investigations relating to Metrorail's track maintenance program were conducted by the Federal Transit Administration (FTA) WMATA has also conducted internal reviews as required by federal regulation and now, the WMSC Program Standard.

The Federal Transit Administration (FTA) conducted a track integrity investigation of the Metrorail System that was completed in 2016. The investigation included an August 6, 2015, derailment near Smithsonian Station and the July 29, 2016, derailment near East Falls Church Station. The 12 findings included:

WMATA does not apply the same quality control testing program to its force account installed fasteners that it would apply to those installed by a contractor while building a new line segment.



Track maintenance includes components and physical assets such as running rails, fasteners, ballast, ties, floating slab, grout pads, yard switches, equipment used to maintain track (but this audit excludes roadway maintenance machines), and third rail. On February 13, 2020, the Washington Metrorail Safety Commission issued its first audit report of WMATA's Track Maintenance and Training. That audit resulted in 16 findings.

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- Excessive wear and deficient crosstie conditions in special track work is not being identified and addressed.
- WMATA does not have a clear process in place for track inspectors and supervisors to impose and remove speed restrictions.
- There is insufficient time for track inspection.
- Track inspectors receive inadequate training.

WMATA developed and later completed the associated corrective action plans.

In June 2022, WMATA's Quality Assurance, Internal Compliance and Oversight Department (QICO) published its QICO 2022 CY22 Q1 Reviews. This included an assessment of track maintenance and inspections and of restraining rail installation and maintenance. The internal safety review of track maintenance and inspection identified eight areas requiring improvement including following track repair work instructions, reviewing and updating governing documents within the required frequency and verifying safety equipment certification before use. The review also noted the need to complete exception forms for heat-ride inspections in adherence with governing documentation. The WMSC's 2020 audit, which is discussed in further detail in the next section, found that in 2019 heat-ride inspections were only conducted on 11 of the 85 days when outside air temperatures reached the point at which WMATA's protocols require such inspections (Finding 3 of that audit). Further, the audit found that WMATA disseminated inconsistent instructions to personnel on whether heat-ride inspections and monitoring begin at 90 degrees Fahrenheit or above 90 degrees Fahrenheit. SOP 208-06 TRST Heat Ride Inspection Procedure, Section 6.2 now clarifies that heat-ride inspections must be completed when "ambient temperatures reach 90°F."

WMATA's internal review of restraining rail installation and maintenance identified four areas for improvement, including adherence to restraining rail installation requirements and aligning design criteria, processes, procedures and governing documents. As a result of these two internal safety reviews, Metrorail developed eight internal corrective action plans (iCAPAs).

WMSC Audit, Inspections, Investigations and Other Oversight

On February 13, 2020, the Washington Metrorail Safety Commission issued its first audit report of WMATA's Track Maintenance and Training. That audit resulted in 16 findings. The audit assessed track maintenance and associated training.

As of October 25, 2022, the only open corrective action plan (CAP) addressing a finding from the 2020 audit is CAP C-0026. This CAP addresses Finding 6, that WMATA does not conduct annual culvert inspections as specified by Section 105.2 of the TRST-1000. Metrorail's scheduled completion date is April 14, 2023. As described further later in this report, the WMSC is reissuing one finding related to the 2020 audit based on work conducted as part of this audit.

2020 WMSC Audit of Track Maintenance and Training findings and CAP status

2020 WMSC Audit of Track Maintenance and Training findings and CAP status			
Finding	WMATA Required Action(s)	Status	
	WMATA must make the necessary document updates and	Closed	
set of current protocols governing maintenance	revisions to create a complete set of protocols for track		
practices for track and structures.	inspections and maintenance.	Classed	
Finding 2: WMATA personnel responsible for conducting track maintenance activities follow	WMATA must finalize and issue all relevant procedure manuals, along with any supplementary instructions and/or refresher	Closed	
no formal protocols to govern their repair and	training to ensure that personnel have and follow proper		
installation work.	procedures. WMATA must ensure that this includes complete		
	instructions for tasks such as thermite welding, rail distressing		
	and continuous welded rail installation, in accordance with		
	Section 10.4 of the APTA Standard RT-FS-S-00-202		
Finding 3: In 2019 WMATA conducted heat-ride	WMATA must assign a specific person (and an alternate) to	Closed	
inspections on thirteen percent, or 11 of 85, days	record actual ambient temperatures every day of the late spring,		
when the outside air temperature reached the point at which WMATA's protocols require such inspections	summer, and early fall to ensure that the agency conducts and documents heat-ride inspections.		
be conducted.	documents near nue inspections.		
Finding 4: WMATA has disseminated inconsistent	WMATA must clarify its written temperature threshold for heat-	Closed	
instructions to TRST and other personnel on whether	ride inspections and monitoring.		
heat-ride inspections and monitoring begin at 90			
degrees Fahrenheit or above 90 degrees Fahrenheit.			
Finding 5: WMATA had no records to indicate that	TRST will develop a written rail lubricators process to include	Closed	
TRST personnel are refilling rail lubricators consistent	Maximo schedule for lubricators consistent with the TRST-1000.		
with the TRST-1000. Finding 6: WMATA does not conduct annual culvert	WMATA must add culverts as an assessment in Maximo and	Open – Expected	
inspections as specified in Section 105.1 of the	begin scheduling anyone sections as specified in Section 105.1	Date of Completion:	
TRST-1000.	of the TRST 1000.	4/14/2023	
Finding 7: WMATA does not have a weed spraying	TRST must conduct vegetation cutting and weed spraying using	Closed on 3/10/2021.	
program consistent with industry standards.	an acceptable chemical product.	Reissued through this	
		audit.	
Finding 8: WMATA has disseminated conflicting	RTRA and TRST must work together to ensure SOP #30,	Closed	
directions to TRST personnel about what procedures	MSRPH Chapter 5, and the TRST-1000 and any other		
are appropriate for purposes of verifying speed	governing documents are consistent regarding who verifies a		
restrictions. Finding 9: WMATA has not provided to all TRST	speed restriction and by what method(s). WMATA must update the list of forms and Section 102.11 of the	Closed	
personnel the documents that govern quality control	TRST-1000 and add examples (of blank and completed forms)	Closed	
activities. The documents that guide quality control	to the manual.		
activities are absent from the current version of the			
TRST-1000.			
	TRST must institute version control on these and other forms in	Closed	
of the Secondary Yard Inspection Form guiding	accordance with its TRST-2000. TRST should also ensure that		
storage track inspections.	the field for preventative maintenance (PM) work order number		
Finding 11: Quality control checks by TRST	and any other missing fields is used on all these forms. TRST must institute a step for regular management review of	Closed	
supervisors occur infrequently and inconsistently with	the supervisor quality control checks to ensure they are being	0.0000	
TRST's protocols.	completed as required.		
Finding 12: WMATA cannot confirm whether	TRST must require that a new work order number be noted on	Closed*	
new work orders are opened as a result of defects	the hard-copy and/or electronic inspection form when a defect		
identified during TRST inspections.	is referred for corrective maintenance. A field for the new work		
	order number should be created on the inspection form.	Olassal	
Finding 13: WMATA cannot verify that defects	WMATA must adjust TGV data spreadsheets and/or Maximo to	Closed	
identified during track geometry vehicle inspections are repaired.	log their repair of any defected defects and open work orders for any outstanding defects that need to be repaired or monitored.		
Finding 14: TRST lacks job-specific training for	WMATA must institute training for duty specific to TRST	Closed	
newly hired or promoted supervisors.	supervisors, including how to conduct and document quality		
	control checks, ensuring assignment of work to qualified		
	inspectors/equipment operators, and use of Maximo to prioritize		
	and plan work.		
Finding 15: WMATA does not have written training	TRST and TSMT must create written training requirements for	Closed*	
requirements for the various TRST positions, as	each position and ensure that such requirements correspond		
required by the SSPP.	with any course registration requirements through the electronic learning management system.		
	iourning management system.		

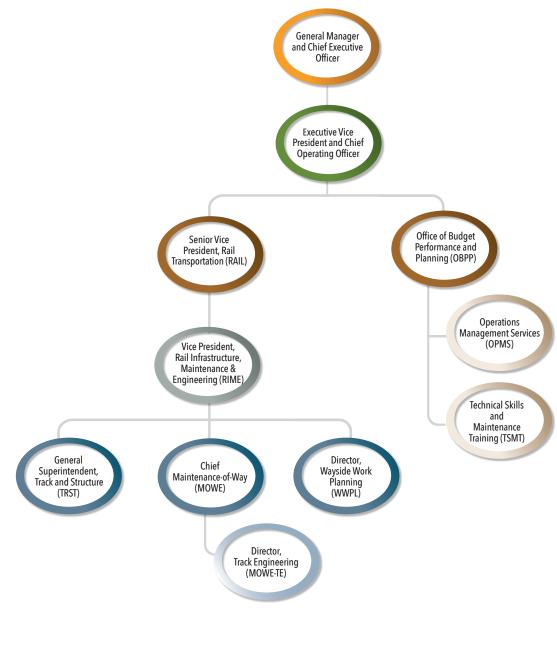
(*) Notates finding closed based on subsequent Metrorail submissions demonstrating that WMATA had addressed the finding prior to Metrorail developing an approved CAP.



The WMSC continues to monitor the implementation and effectiveness of Metrorail CAPs on an ongoing basis through our robust oversight program which includes inspections and record reviews.

The WMSC's recent inspections have also identified deficiencies related to track conditions both on mainline tracks and in rail yards. This includes inspections on April 19, 2022 of West Falls Church Rail Yard. These issues are further reflected in Finding 2 below related to deficiencies in maintenance of rail yards.

Current Organizational Structure



Track and Structures (TRST) is Metrorail's organizational unit with primary responsibility for conducting inspections and maintenance of track conditions. TRST is led by a General Superintendent who reports to the Vice President of Rail Infrastructure Maintenance & Engineering (RIME), under the Senior Vice President of Rail Transportation (RAIL), who reports to the Executive Vice President and Chief Operating Officer. Under the TRST General Superintendent there are three divisions, each led by an Assistant General Superintendent. Divisions have personnel that serve as superintendents, assistant superintendents, managers, project coordinators, supervisors, equipment operators, track repairers, track walkers, structural repairers, welders and laborers.

Track maintenance standards and engineering concepts regarding functional requirements of the track infrastructure are the responsibility of Maintenance-of-Way Engineering Track Engineering (MOWE-TE). MOWE-TE is led by a director who reports to the Chief of MOWE, who reports to the Vice President of RIME. MOWE-TE has one group that utilizes and reports findings from the Track Geometry Vehicle (TGV) that is used to conduct semi-automated track inspections and testing, another group called maintenance engineering with responsibilities including providing division-level engineering support and the rail grinding program, and a third group called capital projects engineering that is responsible for those projects and for track standards. Track standards and procedures documents include TRST track work instructions, TRST-1000 Volume 1, Track Inspection and Safety Standards and TRST-1000, Volume 2. The TRST-1000 is a manual used by WMATA employees and contractors pertaining to track inspections and maintenance. Volume 2 of the TRST-1000 supplements Volume 1 and is further segmented into three volumes, Track Inspection and Safety Standards, Track Maintenance Standards and Supplemental Track Concepts Manuals.

Training for TRST personnel is conducted by a separate department, Technical Skills and Maintenance Training (TMST) that is a part of Operations Management Services (OPMS). TMST is comprised of a director, program coordinators, operations training managers, technical skills training supervisors and training instructors.

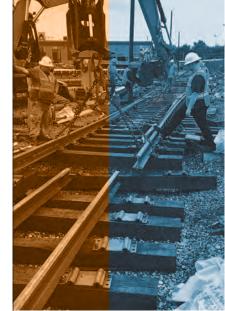
Wayside Work Planning (WWPL), led by a director who reports to the Vice President of RIME, manages track access requests for planned work, prepares schedules for planned single-tracking or shutdowns, and provides project management support for the capital rehabilitation program.

Audit Work

The WMSC received initial documents related to this audit from WMATA in May 2022, conducted an entrance conference in June, followed by extensive interviews with personnel and site visits in June and July and an exit conference in August.

Lists of documents reviewed, site visit locations and personnel interviewed for this audit are provided in the appendices.

The WMSC later provided a draft of this report to WMATA for technical review and incorporated any technical corrections as appropriate.







What the **WMSC** Found



What the WMSC Found

Positive Practices

WMATA has implemented and made systemic improvements resulting from corrective action plans (CAPs) created to address findings from the WMSC's 2020 audit.

WMATA has implemented and made systemic improvements resulting from corrective action plans (CAPs) created to address findings from the WMSC's 2020 audit. Personnel interviewed during this audit provided positive feedback on the track inspection and supervisor fundamental training courses. The supervisory course was created in response to the WMSC's finding in the previous audit that TRST lacks job-specific training for newly hired or promoted supervisors. The course is now a requirement of every TRST supervisor.



Findings and Minimum Corrective Actions

Metrorail's organizational structure prevents Metrorail from effectively ensuring that its track is maintained in a state of good repair as specified by Metrorail policies, procedures and standards.

Silos among departments with overlapping responsibilities impede effective planning and execution of required track-related work.

Multiple groups have responsibility for track maintenance conditions, standards, planning and training. Interviews and documents reviewed as part of this audit demonstrate that, in practice, the distribution of duties and a siloed approach have led to individual organizational units working toward their own purposes, rather than collectively and jointly focusing on identifying and addressing items required to continuously improve safety as Metrorail has committed to in its PTASP.

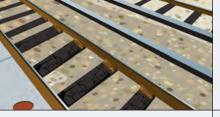
For example, local safety committee meeting minutes provided as part of this audit demonstrate non-attendance of track personnel and track-related deficiencies, such as vegetation in the Shady Grove Rail Yard, that were closed before final action was taken to address the hazard. In addition, although Metrorail provided local safety committee meeting information for three yards (Alexandria, Branch Ave and Shady Grove) for February and March 2022 in response to a request for all systemwide local safety committee meeting minutes related to track maintenance for those months, Metrorail initially provided no records of any departmental safety committee meeting related to track maintenance from January 1, 2021 through March 31, 2022. In response to the draft of this report, Metrorail provided minutes of a January 2022 RIME-SMNT Joint Departmental Safety Committee, and agendas and attendance lists for December 2021 and March 2022 meetings that included a review of reported incidents and accidents involving employees. Metrorail's PTASP states that Metrorail has a Rail Departmental Safety Committee, which is a technical management-level safety committee that serves as the intermediary between local safety committees and the executive safety committee. Regarding local safety committees, which Metrorail has established at each major facility, document review and interviews indicate that track personnel do not generally see the local safety committees as intended for them.

In addition, those responsible for setting maintenance requirements, MOWE, do not consistently provide support and guidance on executing those items in the field until after issues are identified. This limits the effectiveness of any collaboration among organizational units and creates barriers to communication. Inconsistent direct interaction across departments and levels of the organization prevents proper planning and reduce the opportunity for Metrorail to obtain and act upon the entirety of available data, information and prioritized hazards or risks as required under the safety management system approach embodied in the PTASP.

This siloed approach that prevents effective information sharing and planning, and inhibits the ability to effectively prioritize hazards and risks is reinforced by Metrorail's hazard log provided as part of this audit that does not list entities such as TRST as an "impacted division" for track-related items such as rail breaks or relevant roadway worker safety items.

Metrorail provided no records of any departmental safety committee meeting related to track maintenance from January 1, 2021, through March 31, 2022.





As further described in the subsections below, this audit identified other safety issues that, together, indicate systemic challenges under Metrorail's current structure that impede Metrorail's ability to allocate resources effectively based on data to manage risk. This includes addressing risks identified and prioritized for action at lower levels or in individual departments.

Inconsistent processes example: ultrasonic testing

Workflow processes are undefined, leading to confusion, a lack of standardization and the inability to properly evaluate the effectiveness of current practices.

For example, WMATA does not consistently verify that ultrasonic testing is conducted within the required time period following the completion of thermite welding. As documented below, this lack of follow through on and lack of effective supervisory and managerial oversight of Metrorail procedures means that weld testing is not being completed in a timely manner and welds are being conducted without the proper materials. Two separate groups conduct ultrasonic testing, however neither group knows whether the other has or has not done such testing. This testing is required within 72 hours of welding activities, however, employees interviewed did not know when Ultrasonic Testing (UT) is actually completed following thermite welding. SOP 208-03: Ultrasonic Testing Procedure does not mention ultrasonic testing for thermite welded rail. There are several thermite welding running rail work Instruction (WITK – 700-5.1) forms that are routinely not completely filled out. A review of the forms provided by Metrorail demonstrated that:

- Expired welding kits are used
- Testing is not performed in the required 72-hour period, and no "Ultrasonic Record of Testing" is completed
- · Forms are not consistently signed as required

Metrorail written processes require ultrasonic testing (UT) within 72 hours for all completed track welds. There are currently only three TRST employees certified to do this testing. MOWE also has personnel who are certified to conduct this testing. However, no procedure specifies which group conducts the testing. According to interviews conducted for this audit, a member of TRST management receives emails from each division listing the welds performed overnight and then a UT certified person conducts the testing. There are no work orders entered into Maximo or any other Metrorail maintenance system of record for this required testing, and the work order associated with the thermite weld is not included on the completed UT form. Those interviewed stated records are kept only on a local drive. Additionally, the quality checks performed only consist of an undocumented visual inspection of the weld.

Missing or incomplete track inspection forms

Metrorail's Track Inspections and Safety Standards manual, the TRST-1000, states that an accurate record must be kept of all track inspections by using standard forms or electronic records. Records are created in Optram and are stored in Maximo. The manual also requires each person performing track inspections to prepare, date, and sign the appropriate form on the day the inspection is performed. The WMSC audit team sampled inspection forms provided



WMATA does not have a process to verify that ultrasonic testing is conducted within the required time period following the completion of thermite welding. by WMATA during this audit and found many instances where this requirement was not met, including:

- WMATA Track Inspection Reports: Spring Hill Station to the K&N Junction, West Falls Church VT Station, Vienna Station to West Falls Church VT Station
 - April 13, 2022
 - 3 out of 7 inspections were not completed, yet did not include the "Out of Compliance" form required by the TRST-1000 manual
- West Falls Church Daily Track Inspection Report
 - February 26, 2022
 - 8 out of 8 had no superintendent signature

West Falls Church Quarterly Turnout Inspection Report

- February 26, 2022
 - 8 out of 12 forms had no superintendent signatures
 - 3 out of 8 forms with Yellow Conditions had no reinspection date

New Carrollton Yard Quarterly Turnout Inspection Report

- August 7, 2021
 - 15 out of 15 forms had no superintendent signature
 - 5 out of 8 forms with Yellow Conditions had no reinspection date

Track geometry vehicle calibration allowed to lapse

Metrorail's organizational structure and coordination challenges related to track maintenance and inspection also extend to other departments, processes and planning. Metrorail allowed a calibration contract to expire in July 2021 that was necessary for calibration of the track geometry vehicle (TGV) track geometry measurement system. At the time Metrorail provided the initial documents for this audit in May 2022, the track geometry measurement system had been out of calibration since November 2021 (the separate ultrasonic testing system on the vehicle was calibrated by a contractor, and was in use) as there was no current contract. MOWE-TE personnel stated that they initiated the process to request a new contract with Metrorail's procurement team in January 2021. Metrorail had been unable to use the track geometry measurement system for an extended period.

Coordination progress

After the conclusion of on-site work for this audit, Metrorail established a vehicle-track working group as part of its 7000 Series Return to Service Plan following comments by the WMSC suggesting that such a group could be a productive way to identify and address engineering and safety issues including by breaking down barriers among departments. This group, which had not collaborated in this fashion before, includes management-level personnel from departments including TRST and MOWE-TE.





The inspection also identified drainage issues, contaminated ballast, and track ties nearing or at a state of failure. Minimum Corrective Action: Metrorail must revise and implement organizational alignment, planning and coordination processes to ensure that prioritized track-related hazards and risks are effectively prioritized and progressed through to completion in a timely fashion, including effective, direct collaboration among leadership and managers in all relevant departments. Metrorail must ensure that there is appropriate supervisory oversight and managerial support for track inspection and maintenance activities as part of its implementation of the safety management system for track-related groups such as TRST, MOWE and WWPL. Metrorail must develop and implement a formal, integrated process for Ultrasonic Testing of welds that specifies who is responsible for carrying out this task, the process for ensuring this testing occurs, and the documentation and tracking of this process in a Metrorail system of record such as Maximo.

Metrorail is not maintaining track infrastructure in rail yards in accordance with TRST-1000 requirements and related standards. This has introduced operational hazards.

WMATA's Asset Management Lifecycle Plan (TRST-TMI-AMLP-Rev 1.1) lists WMATA's goal of maintaining its track assets in the highest possible state of good repair through its maintenance program; however, Metrorail rail yards are not properly maintained, resulting in hazardous conditions and degradation. Document reviews and interviews demonstrate that WMATA is not following TRST-1000, Section 102.8 Special Trackwork Inspection requirements to reinspect "Yellow" conditions within 30 days of previous inspection, has not properly addressed vegetation issues identified during the WMSC's 2020 audit (see reissuing of this finding below, Finding 9), and TRST personnel report encountering challenges with obtaining track rights for the time needed to inspect and maintain the tracks in the yard. Site visits for this audit and other WMSC inspections demonstrate that Metrorail has allowed track in its rail yards to deteriorate.



TRST personnel stated during interviews with the WMSC that there are recurring issues accessing switches due to yard configurations that may require half the yard and, in some cases, a station platform to be deenergized until the work is completed. This creates tension between the need to work in that area and the need to move vehicles for other tasks including moving railcars to provide passenger service. This was reinforced during an on-site observation at Glenmont Rail Yard where WMATA personnel stated it is difficult to obtain track rights coming out of the portal. During this site visit, a right-hand switch point was delivered instead of the left-hand switch point that was scheduled to be replaced, resulting in the scheduled replacement not being completed in an area where it is difficult to obtain track rights. As a result, track rights would have to be requested again at a later date, which includes coordination with other activities so that power can be deenergized in the yard.

In addition, document review demonstrates that Maximo work order numbers are frequently not included on forms used for yard inspections (see Finding 1). Track and Structures Maintenance Bulletin (MB # 20210720-40), Recording Switch Inspection Defects in OPTRAM / Maximo, Section 11.6.2, references TRST-2000: Maintenance Control Program (MCP), which requires TRST inspectors or personnel finding conditions that exceed the standards outlined in the bulletin to generate a defect identification number (Maximo WO number or OPTRAM ID number) and ensure it is recorded on the inspection report and in the proper system of record.

As noted in the bulletin, it was created because an audit of switch inspections revealed that the defects found in the inspections were not being recorded in OPTRAM or Maximo.

The WMSC has communicated safety deficiencies that WMSC staff have observed while conducting ongoing oversight activities at WMATA rail yards. For example, the WMSC communicated to WMATA on April 20, 2022, that during a yard inspection on April 19, 2022, WMSC personnel identified excessive vegetation overgrowth on the wall and track bed at West Falls Church Rail Yard. The inspection also identified drainage issues, contaminated ballast, and track ties nearing or at a state of failure. Ballast contamination often leads to premature deterioration of other track materials and causes the track bed to become unstable.



Metrorail has also identified yard maintenance deficiencies at other locations. This includes January 2022 inspections at Brentwood Rail Yard that identified switches with multiple loose screw spikes, defective ties, missing cotter pins and associated issues.

January 2022 Brentwood Yard Deficiencies

- Switch 141 A
- 3 bad ties
- 18 loose screw spikes
- 2 missing cotter pins on 1st heel block bolt
- Switch 141 B
 - Wrong Nuts
 - 4 missing cotter pins on the housetop
 - 10 loose screw spikes
 - 3 defective ties
- Switch 143
 - Cover board missing at frog point
 - Heel block #2 bolt loose
 - 4 missing cotter pins at house top

• Switch 155

- 6 deteriorating ties in frog area
- 3-wheel burn spots on turnout side right rail, curved closer rail
- 4 cotter pins missing in housetop
- 12 broken bolts missing, housetop
- Broken bolts
- Warped/worked* housetop brackets

(*) Notates decreased legibility in documentation

- Switch 149
 - 20 screw spikes loose, frog area
 - 6 bad ties
 - 4 cotter pins missing house top bolt
 - 1 cotter pin missing heel block bolt
- Switch 151
 - 10 defective ties in switch area
 - 1 missing housetop bolt,
 1 missing nut for bolt*
 - 4 missing cotter pins
 - In between switches 16 and 15, 15 deteriorating ties*



The WMSC also found that inspection forms documented multiple defective ties that were incorrectly categorized as a green condition despite meeting WMATA's standard for a yellow condition.



The WMSC's review of yard inspection forms submitted for this audit demonstrated that 30day reinspections for yellow conditions are not being consistently performed.

WMATA is not following its own maintenance standards related to the color rating system in rail yards

Metrorail's April 2022 inspection of Brentwood Rail Yard demonstrated that conditions had worsened further since the January 2022 inspection of the same switches, showing that the identified issues had not been addressed. The WMSC also found that inspection forms documented multiple defective ties that were incorrectly categorized as a green condition despite meeting WMATA's standard for a yellow condition. The TRST-1000 Track and Safety Inspection Standards, Section 107.3A – Wood Tie Guidelines, states that a yellow condition rating should be used when the "Field end of the tie are splitting, but the split has not reached the tie plate. There is some decay, but none that leads to greater than 1" of penetration into the tie. The tie plate does not move under train load. The cut spikes or lag screws are firmly set in the tie with no movement."

The WMSC raised this concern during this audit process. The WMSC's communication of this concern led to WMATA providing documentation on June 14, 2022 of mitigations that Metrorail had begun to implement.

WMATA's color-coding system is used to rate the condition of track components based on level of severity to determine health and replacement priority. TRST 1000 – Track Inspection and Safety Standards – Vol 1 describes the color-codes as the following:

Green – minimal wear: The track structure is maintained well within the limits of track tolerances. Such a condition implies that the majority of all components are intact, and wear is minimal.

Yellow – damage and/or wear: Damage or wear exists such that one or more of the components of a section of track have broken down or worn to the point of rapidly approaching tolerance or is at tolerance but does not exceed tolerance. This condition necessitates the correction or replacement of those components, which are near or at tolerance. This condition is not to be considered as immediately dangerous or threatening and does not lead to loss of revenue, loss of life, injury or property damage if it is rectified before an out of tolerance condition develops.

Red – severe damage/wear, exceeds tolerance: A severely worn component or a given condition that has exceeded tolerance to an extent that serviceability is possible with failure expected in the near future. Restricted speeds may need to be implemented based on the nature of the defect or the discretion of the qualified person inspecting.

Black – failing/failed: The track structure could lead to instantaneous service interruptions, derailment, loss of life, injury, or property damage. When such a condition is discovered, the qualified person inspecting must make every effort to correct condition immediately and must decide whether to allow operations to continue under supervision or to remove the track from service.

TRST 1000 – Track Inspection and Safety Standards – Vol 1 (Yard Switch Inspections) requires that when a "Yellow" condition is reported, the switch or turnout be re-inspected as the conditions warrant, but within a timeframe not to exceed 30 days to detect changes in condition from the previous inspection. The WMSC's review of yard inspection forms submitted



for this audit demonstrated that 30-day reinspections for yellow conditions are not being consistently performed. There were also no dates listed in the "Reinspect by" section on any of the forms reviewed that notated yellow conditions as required and no corrective maintenance work orders from Maximo or Optram listed in the defect narrative on forms where defects were found during preventative maintenance inspections.

Personnel interviewed stated that they sometimes write in color codes on yard inspection sheets because they are not aware of the dedicated space for the rating on some forms, even though they do fill in the color rating for mainline inspections using the electronic MaxTrax system. A review of forms submitted as part of this audit demonstrates that ratings are not documented for some items including instances on the sampled forms of rail corrugation and a wheel burn, and other ratings are recorded in varying locations on other forms. This increases the risk that the defects will not be properly acted upon.

Minimum Corrective Action: WMATA must develop and implement an electronic solution to record yard defects. WMATA must demonstrate through safety promotion, training and documentation adherence to policies requiring yellow conditions to be addressed within 30 days of previous inspection. TRST must create a process to ensure coordination with WWPL and other departments to prioritize yard maintenance and ensure the necessary track rights are granted to support this work.

Metrorail is not meeting its training requirements and there are inconsistencies in on-the-job training documentation for TRST personnel.

TRST management has not ensured Track Repairers receive key recertification training as required by the TRST Training Matrix.

Based on the Enterprise Learning Management (ELM) system transcript provided in response to the WMSC's initial document request to WMATA for this audit, Track Repairers have not taken basic rigging on the required schedule. Metrorail's Training Matrix requires this training every two years. At the time of this audit, there were 51 individuals past due for this training. Their training would have been due between 2003 (19 years before this audit) and 2017 (approximately 5 years before this audit).

In response to a draft of this audit, WMATA stated that there is no rigging certification or re-certification, however, Metrorail's Training Matrix dated April 2022 requires this course, as well as Basic Training for Vehicle Flagpersons and Track Repairer 1, to be completed every two years.

There are 61 individuals who are due for but have not completed recurring training on the required schedule for Track Repairer 1. Metrorail's Training Matrix requires this training every two years. At the time of this audit, there were 51 individuals past due for this training. Their training would have been due between 2003 (19 years before this audit) and 2017 (approximately 5 years before this audit). This course is required to be completed every two years. There are also 78 employees listed as Track Repairers who have not taken their required Basic Training for Vehicle Flagpersons, which is required on a two-year cycle as

There are 61 individuals who are due for but have not received recertification training for Track Repairer 1. This course is required to be completed every two years.





While reviewing documents WMATA provided for this audit, the WMSC identified inconsistencies with on-the-job training (OJT) documentation. well. In response to the draft of this report, Metrorail provided records that showed many people took this training after the beginning of this audit, and after the WMSC inquired about this issue. The recertifications between June and November 2022 brought the number of individuals who had not taken the required vehicle flag person recertification training within the past two years down to 7 according to Metrorail. This number Metrorail provided in response to the draft did not include another individual whose certification expired in September 2022 that had not completed recertification, making the total number 8 as of December 1, 2022.

While reviewing documents WMATA provided for this audit, the WMSC also identified inconsistencies with on-the-job training (OJT) documentation, including records with differing dates, and in some cases no dates at all. These discrepancies demonstrate a lack of consistency regarding assessments and documentation.

For example, documents submitted by WMATA on August 11, 2022, in response to information presented by the WMSC during the exit conference on August 4, 2022, included TRST Inspections OJT Score Cards with dates of completion not consistent with ELM transcript records, and in some cases there were no dates of completion listed at all.

In the August 11, 2022, communication with the WMSC, WMATA also stated that all track repair personnel had attended the Initial Track Repair Training, that all track inspectors completed the Initial Track Inspection Training and all active staff had completed the Track Inspection 2-day refresher training, other than personnel on medical leave. In response to the draft of this report, WMATA made several statements that contradicted the information earlier provided to the WMSC. For example, WMATA stated that Track Repairers do not receive any certification or refresher training, despite Metrorail's training matrix provided during this audit requiring it. WMATA also stated that no Track Repairer refresher training exists, and that the required courses on the training matrix are not all conducted, or are not yet conducted. For example, Metrorail stated it plans to create Advanced Track Repairer courses in 2023.

ELM transcript records provided by WMATA in spreadsheet form have differing dates of completion than the TRST Track Inspector OJT Performance Logs that were also submitted. ELM is WMATA's system of record for training of all personnel. This calls into question the accuracy of the dates listed in that system.

For example, a Track Walker AA received the official document recording the progress of competency completion dated December 15, 2021, but there is no record of this class on the ELM transcript. The same employee's ELM transcripts show that they took Track Walker Refresher 1 on August 12, 2016, but no Track Inspection Recertification class is listed. In response to the draft of this report, Metrorail acknowledged inconsistencies in OJT records.

The additional documentation provided by WMATA also indicated that 41 track inspectors completed on-the-job training, however only records for 20 of those track inspectors were found in WMATA's ELM system transcripts initially submitted to the WMSC.

Minimum Corrective Action: WMATA must develop and implement a plan to meet its training, certification and recertification requirements, and to ensure that recertification and refresher training are conducted as required by Metrorail on an ongoing basis. Training must be documented, and a process must be developed to ensure ELM is kept up-to-date and accurately reflects training required and completed by TRST personnel. Additionally, WMATA must develop quality control processes with supervisory oversight to ensure assessments and corresponding documents are filled out properly.

WMATA is not ensuring that personnel wear the proper personal protective equipment as required by its Hot Work Program Manual.

While conducting on-site audit work, WMSC personnel observed WMATA track repair personnel conducting thermite welding, a hot work activity, near Minnesota Ave Station without wearing the proper personal protective equipment (PPE). One welder initially had on welding gloves but removed them while completing welding activities, despite being at stages in the welding process when such protective equipment is required. Three other employees conducting welding activities in the same work crew were observed donning nitrile or plastic gloves, which are not flame or heat resistant and do not protect against burns. When welding, appropriate PPE is needed to protect against eye and respiratory damage and burns due to metal splatter or contact with hot surfaces and devices. Hot Work activities have the potential to produce flames, sparks and heat and require a Hot Work Permit. The Hot Work Permit process evaluates the risk potential to reduce or remove the hazards associated with the work task.

WMATA's Hot Work Program Manual, Revision 2, Section 6.1 Personal Protective Equipment (PPE) Requirements, dated April 2021, states that the required PPE must be determined in a Job Hazard Analysis (JHA). PPE requirements listed in WMATA's Thermite Welding Running Rail Work Instruction No. WITK-700.5.1, effective May 26, 2020, include:

- Approved Safety Vest
- Hand-held radio on the appropriate radio frequency
- Safety Glasses

Hard Hat

- Welding gloves and goggles
- Suggested PPE include:
 - Leather gloves
- Respiratory protection

• Third rail warning device

- Hearing protection
- Knee pads

Minimum Corrective Action: Metrorail must ensure that all personnel are wearing proper personal protective equipment. This must include safety promotion activities to ensure personnel understand the importance and safety benefits of PPE and must include routine compliance checks.

WMSC personnel observed WMATA track repair personnel conducting thermite welding, a hot work activity, near Minnesota Ave Station without wearing the proper personal protective equipment (PPE).



4

Metrorail risks key maintenance work performed on rail lubricators coming to a halt due to insufficient succession planning and training for personnel responsible for ensuring they are properly maintained in accordance with its written procedures.



Although Metrorail has made progress over the last three years,

WMATA has not developed standardized training for new lubricator maintenance personnel or developed succession planning in the event the current two positions become vacant. Currently there are only two employees responsible for maintaining all the wayside lubricators throughout the Metrorail system. There are no contingencies to ensure the system's approximately 100 lubricators are serviced as required in the event both dedicated technicians are unavailable.

Lubricators are installed to reduce the lateral forces transmitted to the higher rail in a curve by taking some of the wheel load off the higher rail, thus reducing the likelihood of derailment and wear on both the high rail as well as the wheel flanges, and the restraining rail itself is subject to wear from abrasion with the back-of-flange of passing wheels.

At the time of the WMSC's first track audit, issued in February 2020, inspection of lubricators and lubricant was part of track inspector duties. However, the WMSC issued a finding that WMATA could not provide records that the tasks were being completed. As part of Metrorail's corrective action plan to address the WMSC's finding, WMATA created a new recurring work order in Maximo for lubricators to be refilled on a fixed schedule and designated two mechanics to implement the new schedule.

Despite the dedication of staff, there has been no training course or curriculum developed for the job. The current lubricator maintainers rely on their mechanical background and familiarity with similar more complex mechanical components to complete the required tasks. The performance of the personnel currently assigned to maintain the lubricators is not a concern, however Metrorail currently has no process to train other personnel to carry out the role to ensure that this task is completed regularly in the absence of the two maintainers and continued permanently. Training department personnel stated they had not been made aware of the role. Another person interviewed acknowledged that no succession plan is currently in place but stated that it is not an urgent concern.

A single point of failure is highly probable with only two lubricators responsible for the entire system and no other personnel trained to complete the work.

Minimum Corrective Action: WMATA must develop a training program that includes on-thejob training (OJT) to train personnel to maintain the system's lubricators. WMATA must also conduct an analysis to determine the necessary number of fully trained personnel to properly maintain rail lubricators in accordance with procedure. Based on that analysis and through succession planning, WMATA must train, certify and maintain the number of personnel required to carry out lubrication duties.



A single point of failure is highly probable with only two lubricators responsible for the entire system and no other personnel trained to complete the work.

Metrorail lacks the capability to complete required rail grinding activities across the system to ensure safe operations.

Rail grinding is an important process used to maintain the integrity and to extend the useful life of the running rails. Grinding removes small amounts of metal from the top of the rail (rail head), which removes irregularities and defects. This also reduces wear on and risk to railcars. The TRST-1000 Track Maintenance Standards, Section 202.6.8 Rail Grinding requires rail grinding to be performed at regular intervals both to maintain the safety of the system and to ensure efficient use of resources as required under a safety management system. Metrorail cites an estimate that in a curve a rail that is not ground as required would last 8 years, while a rail that was properly ground and maintained would last 26 years, more than three times as long. In tangent (straight) track, Metrorail cites an estimate that unground rail lasts approximately 20 years, and properly ground and maintained rail lasts 40 years.

Metrorail is currently carrying out this work in only a limited fashion, and one that is not focused on the areas of highest need as determined by current conditions. Instead, Metrorail has only one rail grinder and is conducting its limited work on a line-by-line basis. In response to the draft of this report, Metrorail stated that the line-by-line grinding leads to a cycle of approximately every 18 months. Consequently, Metrorail is not meeting its maintenance needs.

Two WMATA personnel interviewed for this audit stated that there are no specific intervals or long-term planning schedules for rail grinding. Personnel cited difficulty keeping up with demand as a contributing factor and stated that work "appears to be more reactive than proactive." They stated that ad hoc Optram queries of when a line or location was last ground are used to help determine where to conduct grinding.

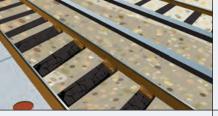
Metrorail cannot complete required rail grinding activities with its current resources, even before the opening of Silver Line Phase 2, which will add additional trackage to the grinding program. Following discussion at the exit conference, WMATA provided documentation that further supported the finding that Metrorail is not completing and lacks the capability to complete the required grinding activities. Among the documentation provided was Track Engineering Technical Report (TETR) 0005: Rail Grinding, Revision 0 dated June 1, 2022 (during this audit). This document was created as part of MOWE's request for Metrorail to obtain use of a second rail grinder and states that "Base[d] off industry recommendations and WMATA requirements, one grinder cannot accomplish a sufficient interval for approximately 240 mainline miles of track [that Metrorail has in total] (not inclusive of Silver Line Phase II)."

Metrorail currently utilizes one rail grinder under a contract, however even that rail grinder is not being efficiently utilized due to what personnel described as Metrorail not providing a support supervisor for certain scheduled work, and due to insufficient planning and coordination across Metrorail to ensure work occurs as planned and work zones are coordinated. Individuals interviewed for this audit also stated that there may be opportunities to improve efficiency by expanding the number of hours that grinding is conducted during each shift.

Based on recommendations from a 2019 APTA Peer Review of Metrorail, MOWE's report determined that Metrorail should be grinding 416 track miles per year (excluding Silver Line

Metrorail has only one rail grinder and is conducting its limited work on a line-by-line basis. Consequently, Metrorail is not meeting its maintenance needs.





The WMSC reviewed the Safety Data Sheet (SDS) for Spikefast ES50 RM Resin, which indicated that the resin is a hazardous material. Phase 2). According to TETR 0005, Metrorail's current use of a single contracted rail grinder would only allow WMATA to meet approximately half of that need, even if scheduled activities and emergency grinding were done consistently 5 nights per week.

This does not include routine grinding of interlockings, which could reduce the severity and likelihood of defects requiring the intensive work to replace these areas.

MOWE's analysis stated that contracting for a second rail grinder would nearly meet Metrorail's needs, if the crews, including supervisors, are sometimes scheduled for overtime shifts. Metrorail expects to update its current rail grinding contract in summer 2023.

The rail grinding program is currently focusing on one line at a time where they can obtain track support and track rights before moving to the line with the next highest need. WMATA indicated that this practice will continue until a defined schedule becomes feasible; however, WMATA agreed that grinding rail segments with the greatest need is a better practice than grinding an entire line at a time.

In addition to the rail grinding activities necessary to keep installed active track in a state of good repair, WMATA must also use its rail grinder to bring newly installed rails into specification. When rail is delivered to WMATA, grinding is required to bring the rail into compliance with WMATA's profile to prevent rail mismatch.

Minimum Corrective Action: WMATA must develop and implement a plan to conduct rail grinding at the required level. WMATA must also develop a long-term schedule for rail grinding activities with set intervals and demonstrate the ability to adhere to that schedule.

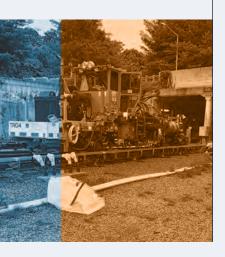
WMATA does not ensure excess hazardous materials are properly labeled, stored and disposed of.

While conducting an on-site visit at the TRST Maintenance Material Control Yard in Suitland, Maryland, on July 11, 2021, the WMSC audit team observed more than 20 unlabeled drums of resin,



one with its lid ajar causing rainwater to collect in it. According to Metrorail personnel on site, the drums had been there for several months awaiting retrieval and disposal by Metrorail waste disposal. Resin is a sealant used by track repairers to fill voids and anchor cut spikes in wooden railroad ties that have failed because of tie damage or vibration from tie plates along the track.

The WMSC reviewed the Safety Data Sheet (SDS) for Spikefast ES50 RM Resin, which indicated that the resin is a hazardous material. SDS NO. 15240 listed skin and serious eye irritation as hazards and stated that breathing in vapors or mist should be avoided. Additionally, the SDS requires the resin to be stored in closed and properly labeled containers. The environmental statement section of the SDS states that the Safety Department's Office of Environmental Management and Industrial Hygiene (EMIH) should be contacted for disposal of bulk, unused product for proper disposal.



Minimum Corrective Action: WMATA must assess hazardous material storage and disposal processes, act on the assessment for any necessary changes and take steps to ensure compliance. WMATA must have the drums of resin currently stored at the Suitland Maintenance Control Yard removed and ensure they are disposed of in accordance with policy and provide evidence of their proper disposal.

WMATA does not have a weed spraying program consistent with industry standards.



During this audit and other WMSC oversight activities, the WMSC identified that Metrorail is no longer meeting the requirements of CAP C-0027. This CAP addresses Finding 7 of the WMSC track maintenance and training audit that was issued in 2020 and was closed when Metrorail established a weed spraying program consistent with industry standards (APTA RT-FS-S-002-02). However,

after awarding a contract for weed spraying to carry out that program, and after the CAP was closed based on that documentation, the contractor has subsequently not carried out the contract activities to address vegetation growth around the right of way. Metrorail stated that the contractor went out of business, leaving spraying of vegetation unaddressed. Personnel interviewed for this audit stated that occasional vegetation cutting is taking place, but that this reduces the number of personnel available to complete other track maintenance tasks. Consequently, the WMSC is once again requiring Metrorail to develop and implement an effective vegetation cutting and spraying program.

Failure to address and control vegetation overgrowth can be detrimental to the tracks and to personnel working on them. The ability for personnel to safely clear the track due to inadequate visibility can be impeded by vegetation and result in a safety event. Excessive vegetation also prevents proper water drainage which causes ballast contamination and leads to issues such as premature deterioration of other key track components, creating unsafe track conditions.

Minimum Corrective Action: Metrorail must develop and implement processes to ensure that scheduled vegetation cutting and weed spraying with an acceptable product occurs in accordance with industry standards. WMATA must evaluate current interim mitigations for effectiveness, develop new interim mitigations, if warranted, and continue those mitigations until such time that an effective weed cutting, and spraying program is implemented.

RECOMMENDATIONS

 Creating and implementing a planned, proactive, ongoing ballast renewal program would improve the condition of track infrastructure.



Metrorail is not proactively maintaining ballast throughout the system, and is instead working reactively to reported problems, or adjusting

Failure to address and control vegetation overgrowth can be detrimental to the tracks and to personnel working on them.



Proactively maintaining and renewing ballast, which supports safe operation by supporting proper track geometry and drainage among other things, keeps the system in a state of good repair, reduces the risk of hazards, and ensures the most efficient use of resources.



ballast as part of other long-term work that happens to be scheduled. For example, WMSC personnel identified ballast contamination at Shady Grove Rail Yard during onsite audit work on July 9, 2022, where dirt, mud and vegetation were visible between rail ties.

Ballast, which is used for drainage and to distribute the load from the track to the track bed, is adversely affected by dirt, mud and water. Proactively maintaining and renewing ballast, which supports safe operation by supporting proper track geometry and drainage among other things, keeps the system in a state of good repair, reduces the risk of hazards, and ensures the most efficient use of resources as required under a safety management system approach embodied in the PTASP.

Possible Corrective Action: Metrorail may develop and implement an ongoing, proactive, systemwide ballast renewal program to ensure the safety of track infrastructure.

Metrorail can ensure the safety of the system and quality of materials installed on the roadway by conducting lifecycle monitoring of reserve rail components stored in maintenance yards.



WMATA has no documented process to ensure track-related parts and components that are available for use in the Metrorail system are kept in good working condition, or to prevent their use if they do not meet Metrorail's needs.

During an on-site visit to the Springfield Maintenance Control

Yard as part of this audit, the WMSC audit team observed materials, including rail ties, that were visibly rotting and rusting. The yard was filled with unused materials that have also been stored for extended periods and there do not appear to be any precautions in place to ensure materials beyond or nearing the end of their useful life are not being sent from the yard for installation in the system. A #15 frog observed during the visit had a label dated 10/02, indicating it is nearly twenty years old.

The WMSC also observed and notified on-site WMATA personnel of a frog that was available for use that appeared to have been damaged during manufacturing or delivery and a track panel with ties that appeared to have rotted out. These items were considered new and available for installation in the Metrorail system.



Having spare parts is important, but so is maintaining

the condition of those spare parts. The WMSC noted that a materials manager is attempting to become more involved in procurement and related activities. Metrorail



can further improve safety by formalizing and ensuring the continuity of this and similar processes.

There are currently some items that Metrorail requires shelf-life monitoring of, but those materials are kept in storerooms instead of yards. WMATA should consider evaluating the inventory in its maintenance yards to determine standards for optimal inventory levels and useful life of materials.

Possible Corrective Actions: WMATA should ensure procurement of materiel aligns with demand to lessen the accumulation of excess materials and to prevent materials from being stored or used beyond their useful life by developing a process that includes personnel who are responsible for maintenance yards and storage facilities in the procurement process. WMATA should also review and revise its Asset Management Lifecycle Plan to include assets stored in maintenance yards.

Other Observations

During a site visit at Shady Grove Yard on July 9, 2022, WMSC personnel observed rainwater pooling in two open third rail junction boxes. This concern was reported to TRST personnel on-site at the time of observation, which was during heavy rainfall. The junction boxes house electrical wires and components and are designed to

protect them from moisture and interference. When water intrusion occurs, the switch to manually disconnect or shutdown third rail power is not accessible. This would prevent the manual removal of third rail power during an emergency or for track work, if it could not be done remotely. Water accumulation in the junction box also increases the risk of electrocution.





Next Steps

WMATA is required to propose CAPs for each finding and to respond to each recommendation no later than 30 days after the issuance of this report. Each proposed CAP must include specific and achievable planned actions to remediate the deficiency, the person responsible for implementation, and the estimated date of completion. Each proposed CAP must be approved by the WMSC prior to WMATA implementation. For each recommendation, WMATA must either propose a CAP or submit a hazard analysis and associated documentation as required by the WMSC Program Standard.



Appendices

Appendices A, B, C and D

Appendix A: Personnel Interviewed

> MOWE

- Chief
- **Director Track Engineering** •
- **Division Engineer**
- Engineering Data Analyst TGV
- Manager Division Engineering
- Manager TGV Operations
- Specialist TGV Operations & Inspections
- Sr. Track Engineer
- Strategic Constructability & Access Planning (SCAP)
 - Project Coordinator
- > TRST
 - General Superintendent
 - Assistant General Superintendent (3)
 - Division Superintendent (3)
 - Equipment Operator AA

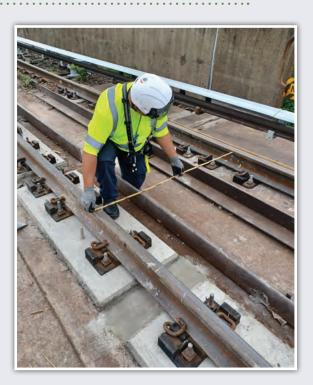
Appendix B: Site Visits

- TRST Maintenance Control Yard Observations
 - July 12, 2022, Springfield
 - July 11, 2022, Suitland
- > Thermite Welding Observation
 - June 22, 2022, near Minnesota Ave Station and the D&G Junction
- Training Observation
 - June 16, 2022, Kiewit Training
- Yard Observations
 - June 11, 2022, Glenmont Yard
 - July 9, 2022, Shady Grove Yard
 - June 25, 2022, Alexandria Yard
- Optram Demonstration
 - June 24, 2022

- Manager, Incident Investigations
- Mechanic AA CTEM
- Supervisor (2)
- Track Repairer (3)
- Track Walker (3)
- Welder AA
- TSMT
 - Technical Skills Training
 - Training Instructor

> WWPL

- Contractor
- Director •
- Manager, Scheduling
- Manager, Wayside Access & Support



Laborer

Appendix C: Documents Reviewed

ORGANIZATIONAL CHARTS:

- WWPL (2/2022)
- WWPL (3/9/2022)
- TRST (4/18/2022)
- TSMT (4/15/2022)
- MOWE (November 2021)
- WWPL Roles and Responsibilities (no date)
- TRST Roles and Responsibilities (no date)
- MOWE Roles and Responsibilities (no date)
- WWPL Personnel and Budgeted Positions (4/1/2022)
- TRST Division 1-2 Budgeted Personnel

JOB DESCRIPTIONS

- Track Walker (1/30/20)
- Track Repairer (1/28/20)
- Welder (1/30/20)
- Mechanic (1/30/20)
- Laborer (1/30/20)
- Track Access Coordinator (6/9/21)
- Division Superintendent (1/30/20)
- Track Geometry Vehicle Operations Manager (8/31/16)
- TRST Division Breakdown List (no date)

PROCEDURES/POLICIES/MANUALS

- Metro Asset Management Lifecycle Plan, TRST TMI AMLP Rev. 1.1 (7/15/21)
- MOWE SOP 114-01: Track Geometry Vehicle Operations (9/16/20)
- MOWE SOP 121-05: Track Geometry Vehicle Data Management (9/12/19)
- MOWE SOP 121-11: Rail Grinding Procedure (5/11/21)
- OAP 123-01: Rail Infrastructure Asset Maintenance and Engineering Roles and Responsibilities (7/14/2021)
- RIME SOP 121-13: Tamping and Surfacing Needs (10/1/21)
- Track Engineering & Maintenance OAP 121-01, Track Asset Condition Data Management (7/16/18)
- TRST 1000, Supplemental Track Concepts Manual TRST-1000, Vol. 3 (6/18/20)

- TRST 1000, Track Inspection & Safety Standards, Vol. 1, Rev. 1 (3/25/21)
- TRST 1000, Track Maintenance Standards, Vol. 2, Rev. 1 (3/2022)
- TRST Maintenance Bulletin #20190909-26, Immediate Removal of Discarded Banding Straps Mandatory (9/12/19)
- TRST Maintenance Bulletin #20191002-27, Procedure for Gauging a Contact Rail End Approach (10/8/19)
- TRST Maintenance Bulletin #20191031-28, Separate Safety Briefing is Required for Continuously Welded Rail (CWR) Renewal Work (10/31/19)
- TRST Maintenance Bulletin #20201117-38, Approved Nuts and Studs (11/18/20)
- TRST Maintenance Bulletin #20210720-40, Recording Switch Inspection Defects in OPTRAM/Maximo (7/26/21)
- TRST Maintenance Bulletin #20220323-47, Drilling into the Invert When Relocating Anchor Studs (3/24/22)
- TRST Maintenance Bulletin #20220323-49, Proper Tool Use (3/24/22)
- > TRST SOP 208-03, Ultrasonic Testing (5/12/2020)
- TRST SOP 208-04, TRST Track Inspection Procedures (1/16/20)
- TRST SOP 208-06, TRST Heat Ride Inspection Procedures (1/12/21)
- TRST SOP 208-09, TRST Rail Lubricator Preventive Maintenance (PMI) and Inspection Procedures (9/15/20)



PROCEDURES/POLICIES/MANUALS (CONTINUED)



- TRST SOP 208-15, Quality Control Procedure (12/8/20)
- TRST/MOWE Maintenance Bulletin #20180427-18, New Policies Affecting UT Defects and NT Rail (4/27/18)
- TRST/MOWE Maintenance Bulletin #20190315-24, Assigning Severity Levels to Missing Contact Rail Coverboard and Insulators (3/18/19)
- TRST/MOWE Maintenance Bulletin #20191107-29, Identifying Rail Base Corroded Rail (11/18/19)
- TRST/MOWE Maintenance Bulletin #20191107-30, Identifying Rolling Contact Fatigue on Running Rail (11/18/19)
- TRST/MOWE Maintenance Bulletin #20200909-35, Broken Joint Bar (9/10/20)
- TRST/MOWE Maintenance Bulletin #20210803-41, Joint Bar Defects (8/5/21)
- TRST/MOWE Maintenance Bulletin #20210914-42, Proper Application of Joint Bars (9/20/21)
- TRST/MOWE Maintenance Bulletin #20211201-43, Updated Speed Restrictions in TRST 1000 Vol. 1: Table 106.4A: Track Service Conditions (12/1/21)
- TRST/MOWE-TE Maintenance Bulletin #20160929-05, Gauge Rod Installation (9/29/16)
- TRST/MOWE-TE Maintenance Bulletin #20171103-15, Discontinued Use of Rail Joint Bonds (C-bond) (no date)
- TRST/MOWE-TE Maintenance Bulletin #20181107-23.1, Heat Tape in Web of Running Rails at (F09) Naylor Road Track 1 (11/14/18)

- TRST/MOWE-TE Maintenance Bulletin #20200310-32, Metal Debris Not Removed from Base of Running Rail (7/13/20)
- TRST/MOWE-TE Maintenance Bulletin #20211130-45, New Standards for Restraining Rail Flangeway Width Dimensions (12/1/21)
- TRST/MOWE-TE Maintenance Bulletin #220220329-50, Verification Procedures for New Track Geometry Vehicle Conditions (3/30/22)
- TRST/MOWE-TPOE Maintenance Bulletin #20211027-44, Heat Tape Installed on Track 1 and 2 in the Web of Running Rails at: (A13) Twinbrook, (F08) Southern Ave, (F09) Naylor Road and (J02) Van Dorn (10/27/21)
- TRST-2000, Maintenance Control Program, Rev. 7.0 (1/21/21)
- WITK-700.3.1, CWR Rail Installation Direct Fixation Track (5/22/20)
- WITK-700.4.1, CWR Rail Installation on Ballasted Track (5/21/20)
- WITK-700.4.3, Distressing of Existing CWR (5/15/20)
- WITK-700.4.5, Destressing Procedures for 3-Inch or Greater Pull-Aparts or In-Track Rail Break Gaps – Thermite Welds (4/20/20)
- WITK-700.4.7, Destressing Procedures for 3-Inches or Less Pull-Aparts or In-Track Rail Break Gaps – Thermite Welds (4/10/20)
- WITK-700.4.8, Vertical Restraining Rail Replacement (5/15/20)
- WITK-700.5.1, Thermite Welding of Running Rail (5/26/20)
- WITK-701.1, Torque Studs and Clip Bolts on Direct Fixation Track (2/26/20)
- WITK-701.2.1, Stud Replacement Core Drilling and Setting of New Anchor Studs on Direct Fixation Track (2/11/22)
- WITK-701.3.2, New Anchor Stud Rock Drilling (2/11/22)
- WITK-701.4.1, Fastener Replacement on Direct Fixation Track-Anchor Studs or Concrete Inserts (6/12/20)
- WITK-701.5, Replacement of Grout Pads top down construction (5/22/20)
- WITK-702.2, Spot Wood Crosstie renewal (6/9/20)
- WITK-702.3, Handling of Concrete Ties (6/9/20)
- WITK-702.4, Repairing of Concrete Ties (6/9/20)

PROCEDURES/POLICIES/MANUALS (CONTINUED)

- WITK-703.1, Replacement/Installation of Third Rail Coverboards and Brackets (5/28/20)
- WITK-703.4, Replacement/Installation of Contact Rail Fiberglass Insulators Direct Fixation or Wood Crossties (6/2/20)
- WITK-703.6, Cadweld 150 LB. Contact Rail Splices on Direct Fixation Track or Wood Ties (5/28/20)
- WITK-703.7, Spot Contact Rail Replacement (5/28/20)
- WITK-703.8, Temporary and Final Repairs of 150 LB. Contact Rail Weld Breaks (5/28/20)
- WITK-703.9, Replacement/Installation of Contact Rail End Approach (5/28/20)
- WITK-704.2.1, Stock Rail Installation Ballasted Track (6/9/20)
- WITK-704.3, Complete Turnout Replacement/Installation on Ballast (6/12/20)
- WITK-704.4, Complete Turnout Replacement/Installation on Direct Fixation (6/9/20)
- WITK-704.5, Guidelines and Procedures for Repairing Worn RBM Frogs (5/25/21)
- WITK-704.6, Frog Replacement/Installation Ballast Standard Joints (6/9/20)
- WITK-704.7, Replacement/Installation Switch Point Rail Ballasted Track (6/9/20)
- WITK-704.8, Switch Point and Stock Rail Installation Ballasted Track (6/9/20)
- > WITK-705.1, Spot Line and Surface Ballast (5/21/20)
- WITK-705.3, Line Surface and Ballast Regulating (2/26/20)
- WITK-705.4, Correction of Ballast Mud Spot Conditions Ballasted Track (5/14/20)
- WITK-707.1, Emergency Guard Rail Replacement Ballasted Track (6/9/20)
- WITK-707.2, Emergency Guard Rail Replacement Direct Fixation Track (5/26/20)
- WITK-707.3, Sliding Derail Replacement Ballast Track (6/9/20)
- WITK-707.4, Sliding/Hinge Derail Replacement Direct Fixation Track (5/6/20)
- WITK-708, TGV Defect Review (1/4/22)

- WITK-709, Track Parts Review Process (2/7/22)
- WMATA Manual of Design Criteria (11/2016)
- WMATA Manual of Design Criteria, Release 9, Revision 3 (11/16)
- WMATA Manual of Design Criteria, Section 27 Communications, Release 9, Rev. 3 (2/18/20)
- WWPL OAP 200.33-01, Site Specific Work Plan Policy (4/6/2022)

TRAINING

- TRST Training Matrix, spreadsheet (4/2022)
- MOWE list of Required Trainings (2022)
- > MOWE ELM record of completed trainings, spreadsheet
- > TRST ELM record of completed trainings, spreadsheet
- Initial Track Inspection course curriculum materials
- > Track Inspection Refresher course curriculum materials
- Track Laborer course curriculum materials
- Initial Track Repair course curriculum materials
- Vehicle Flag Person course curriculum materials
- Basic Rigging course curriculum materials
- Hot Work Program Manual (April 2021)
- TRST Training Calendar: August December 2020, Version 6.0 (no date)
- TRST Training Calendar: August December 2020, Version 6.0 (no date)
- TRST Training Calendar: February June 2021, Version 8.0 (no date)
- TRST Training Calendar: January April 2020, Version 4.0 (no date)



TRAINING (CONTINUED)



- TRST Training Calendar: January April 2021, Version 7.0 (no date)
- TRST Training Calendar: June September 2022, Version 11 (no date)
- TRST Training Calendar: March June 2020, Version 5.0 (no date)
- TRST Training Calendar: July October 2020, Version 5.0 (no date)
- TRST Training Calendar: May October 2021, Version 9.0 (no date)
- TRST Training Calendar: October February 2019, Version 3.0 (no date)
- TRST Training Calendar: September December 2019, Version 2.0 (no date)
- TRST Training Calendar: September December 2019, Version 2.0 (no date)
- Supervisor Fundamental Course Assessment, Rev. 1 (11/20)
- Supervisor Fundamental Course Syllabus, Rev. 1 (6/20)
- Supervisor Fundamental Course Presentation, Rev. 1 (2/20)
- Supervisor Fundamental Course Student Guide, Rev. 1 (2/20)
- Supervisor Fundamental Certification, Rev. 1 (6/20)
- Initial Track Inspector Training Records (no date)
- Initial Track Repairer Training Records (no date)
- Track Inspection Recertification Training Records (no date)

- > OJT Training Records for 41 Track Inspection Personnel.
- Initial Track Inspector Training: Participant Manual Introduction (February 18, 2017)
- Rail Bender Training Records (April 2022)
- Thermite Welding Training Records (September 2020)
- Track Inspection OJT Records (8/4/2022)

WORK ORDERS

- CY21 TRAK PMI Work Orders and Status (4/1/2022)
- CY21 TRAK PMI Work Orders and PMPASS Reasoning (no date)
- TRAK Corrective Maintenance work orders CY21, spreadsheet (no date)
- TRAK Corrective Maintenance work orders Still Open as of 4-1-22 Created Before CY21, spreadsheet (no date)
- List of Lubricator Work Orders 2/1/2021 through 2/26/2021
- Work Order #16142305 restraining rail lubricator details (2/26/21)
- Work Order #16425783 restraining rail lubricator details (8/19/21)
- Work Order #16556134 restraining rail lubricator details (9/16/21)

INSPECTION REPORTS

- Yard Track Inspection Reports for West Falls Church (K99), Brentwood (B99), and New Carrollton (D99) yards
 - B99 Switches Monthly Turnout Inspection Forms (1/19/2022)
 - B99 Shop Track Daily Track Inspection Reports (3/10/2022)
 - B99 Storage Track Daily Track Inspection Reports (1/22/2022)
 - B99 Switches Monthly Turnout Inspection Forms (7/7/2021)
 - B99 Shop Track Daily Track Inspection Reports (7/28/2021)
 - B99 Storage Track Daily Track Inspection Reports (7/23/2021)
 - D99 Yard Switches Monthly Turnout Inspection Form (8/7/2021)

INSPECTION REPORTS (CONTINUED)

- D99 Yard Tracks Daily Track Inspection Report (9/24/2021)
- D99 Yard Lead Daily Track Inspection Report (9/25/2021)
- D99 Yard Outer Loop Daily Track Inspection Report (9/25/2021)
- D99 Yard Lead Daily Track Inspection Report (9/28/2021)
- D99 Yard Lead Daily Track Inspection Report (9/28/2021)
- D99 Inner Loop Daily Track Inspection Report (9/25/2021)
- D99 Yard Switches Daily Track Inspection Report (8/5/2021)
- D99 Yard Tracks Daily Track Inspection Report (9/4/2021)
- D99 Yard Switches Daily Track Inspection Report (8/21/2021)
- D99 Yard Tracks Monthly Turnout Inspection Form (1/27/2022)
- D99 Yard Leads Daily Track Inspection Report (3/3/2022)
- D99 Yard Tracks Daily Track Inspection Report (1/27/22)
- D99 Yard Tracks Daily Track Inspection Report (no date)
- D99 Yard Tracks Monthly Turnout Inspection Form (1/27/2022)
- D99 Yard Tracks Daily Track Inspection Report (9/4/2021)
- D99 Yard Tracks Yard Tracks Daily Track Inspection Report (1/20/22)
- D99 Storage and Shop Tracks Daily Track Inspection Report (1/20/22)
- D99 Yard Tracks Yard Tracks Daily Track Inspection Report (1/20/22)
 - K99 TRST Monthly Turnout Inspection Form (1/18/2022)
 - K99 TRST Monthly Turnout Inspection Form (1/11/2022)
 - K99 Daily Track Inspection Report (3/24/2022)

- K99 Daily Track Inspection Report (3/22/2022)
- K99 TRST Monthly Turnout Inspection Form (1/8/2022)
- K99 Daily Track Inspection Report (3/12/2022)
- K99 TRST Monthly Turnout Inspection Form (1/12/2022)
- K99 TRST Monthly Turnout Inspection Form (2/25/2022)
- K99 TRST Monthly Turnout Inspection Form (2/26/2022)
- K99 TRST Monthly Turnout Inspection Form (2/26/2022)
- K99 Daily Track Inspection Report (2/24/2022)
- K99 Daily Track Inspection Report (2/22/2022)
- K99 TRST Monthly Turnout Inspection Form (2/17/2022)
- K99 TRST Monthly Turnout Inspection Form (2/18/2022)
- K99 TRST Monthly Turnout Inspection Form (2/19/2022)
- K99 TRST Monthly Turnout Inspection Form (2/11/2022)
- K99 TRST Monthly Turnout Inspection Form (2/12/2022)
- K99 TRST Monthly Turnout Inspection Form (2/15/2022)
- K99 TRST Monthly Turnout Inspection Form (2/10/2022)
- K99 TRST Monthly Turnout Inspection Form (2/8/2022)



INSPECTION REPORTS (CONTINUED)



- K99 TRST Monthly Turnout Inspection Form (2/5/2022)
- K99 TRST Monthly Turnout Inspection Form (2/3/2022)
- K99 TRST Monthly Turnout Inspection Form (2/1/2022)
- K99 Daily Track Inspection Report (8/30/2021)
- K99 Daily Track Inspection Report (9/27/2021)
- K99 Daily Track Inspection Report (6/16/2021)
- K99 Daily Track Inspection Report (8/5/2021)
- K99 Daily Track Inspection Report (9/27/2021)
- K99 Daily Track Inspection Report (9/16/2021)
- K99 Daily Track Inspection Report (9/1/2021)
- K99 Daily Track Inspection Report (8/3/2021)
- K99 Daily Track Inspection Report (6/28/2021)
- K99 Daily Track Inspection Report (4/2/2021)
- K99 Daily Track Inspection Report (6/10/2021)
- K99 TRST Monthly Turnout Inspection Form (5/21/2021)
- K99 Daily Track Inspection Report (9/30/2021)
- K99 Daily Track Inspection Report (8/18/2021)
- K99 Daily Track Inspection Report (9/15/2021)
- K99 TRST Monthly Turnout Inspection Form (4/20/2021)
- K99 Daily Track Inspection Report (5/29/2021)
- K99 Daily Track Inspection Report (5/21/2021)

- K99 TRST Monthly Turnout Inspection Form (9/9/2021)
- K99 TRST Monthly Turnout Inspection Form (5/28/2021)
- K99 TRST Monthly Turnout Inspection Form (8/21/2021)
- K99 TRST Monthly Turnout Inspection Form (4/16/2021)
- K99 TRST Monthly Turnout Inspection Form (4/10/2021)
- K99 TRST Monthly Turnout Inspection Form (4/6/2021)
- K99 Daily Track Inspection Report (7/1/2021)
- K99 Daily Track Inspection Report (9/24/2021)
- K99 Daily Track Inspection Report (9/17/2021)
- K99 TRST Monthly Turnout Inspection Form (7/4/2021)
- Mainline and Switch Track Inspection Reports for A, B, K, and N Lines from 2/1/2022 through 5/1/2022 (including switch inspection reports)

EQUIPMENT

- List of TRST Equipment, spreadsheet (no date)
- TGV Certification of Calibration (1/20/2022)
- Sitescann 150s, Sonatest, Digital Flaw Detector, Certificate of Calibration (10/4/2021)
- Sitescann 150s, Sonatest, Digital Flaw Detector, Certificate of Calibration (9/12/2021)
- USM GO+, GE Inspection Technologies, Digital Flaw Detector, Certificate of Calibration (10/1/2021)
- WMATA Annual Calibration GV-01, ENSCO Rail, 3dm/ gage software calibration (4/28/2022)
- USM GO, GE Inspection Technologies, Digital Flaw Detector, Certificate of Calibration (9/13/2021)

QA/QC CHECKS

- > List of Track supervisor QC Checks, spreadsheet (no date)
- QA Checklist, WITK-700.3.1, CWR Rail Installation on DFF (2/3/21)
- QA Checklist, WITK-700.3.1, CWR Rail Installation on DFF (3/1/21)
- QA Checklist, WITK-700.3.1, CWR Rail Installation on DFF (4/19/21)

- QA Checklist, WITK-700.3.1, CWR Rail Installation on DFF (3/9/21)
- QA Checklist, WITK-700.3.1, CWR Rail Installation on DFF (2/8/21)
- QA Checklist, WITK-700.3.1, CWR Rail Installation on DFF (2/4/21)
- QA Checklist, WITK-700.3.1, CWR Rail Installation on DFF (2/9/21)
- QA Checklist, WITK-700.3.1, CWR Rail Installation on DFF (3/22/21)
- QA Checklist, WITK-700.3.1, CWR Rail Installation on DFF (2/8/21)
- QA Checklist, WITK-703.4, Replacement/Installation of Fiberglass Insulators – DF (5/3/21)
- Track Maintenance & Infrastructure Quality Control and Inspection Forms
 - B1 QA Checklist (10/21/21)
 - L2 QA Checklist (10/16/21)
 - L1 QA Checklist (10/16/21)
 - C2 QA Checklist (11/14/21)
 - C1 QA Checklist (11/1/21)
 - C2 QA Checklist (10/26/21)
 - C2 QA Checklist (10/28/21)
 - E2 QA Checklist (9/23/21)
 - E1 QA Checklist (10/3/21)
 - E2 Thermite Welding Record (7/27/2021)
 - F1 QA Checklist (7/23/21)
 - E2 QA Checklist (8/16/21)
 - Orgo-Thermit Field Audit Form (8/5/21)
 - F1 QA Checklist (9/3/21)
 - E1 QA Checklist (9/15/21)
 - F1 & 2 QA Checklist (10/1/21)
 - F1 QA Checklist (10/10/21)
 - F1 QA Checklist (10/12/21)
 - F1 QA Checklist (10/13/21)
 - F2 QA Checklist (10/18/21)
 - E2 QA Checklist (7/18/21)

- E1 QA Checklist (10/31/21)
- E1 QA Checklist (11/16/21)
- E2 QA Checklist (11/15/21)
- Work Report #2201 (8/24/21)
- E1 QA Checklist (8/4/21)
- E2 QA Checklist (9/13/21)
- J1 QA Checklist (10/4/21)
- K2 QA Checklist (9/12/21)
- K2 QA Checklist (10/18/21)
- K1 Incident Analysis Report (11/23/21)
- E1 QA Checklist (9/2/21)
- A99 Yard QA Checklist (9/22/21)
- A99 Yard QA Checklist (10/20/21)
- A99 Yard QA Checklist (11/10/21)
- A99 Yard QA Checklist (11/6/21)
- A99 Yard QA Checklist (11/10/21)
- N1 QA Checklist (11/29/21)
- A99 Yard QA Checklist (11/12/21)
- A2 QA Checklist (12/3/21)
- A99 Yard QA Checklist (11/30/21)
- A2 QA Checklist (11/30/21)
- A99 Yard QA Checklist (10/29/21)





- A1 QA Checklist (10/29/21)
- A1 QA Checklist (10/29/21)
- A99 Yard QA Checklist (9/23/21)
- A99 Yard QA Checklist (11/5/21)
- F1 QA Checklist (10/6/21)
- E1 QA Checklist (10/21/21)
- F2 QA Checklist (10/26/21)
- E2 QA Checklist (9/15/21)
- F1 QA Checklist (10/29/21)
- E2 QA Checklist (9/15/21)
- F1 QA Checklist (11/5/21)
- E2 QA Checklist (11/9/21)
- Installation Form Line E (11/19/21)
- D1 QA Checklist (8/29/21)
- K99 Yard QA Checklist (09/2/21)
- C1 QA Checklist (7/9/21)
- K1 QA Checklist (9/8/21)
- D2 QA Checklist (10/9/21)
- D1 QA Checklist (9/14/21)
- B2 QA Checklist (9/24/21)
- D2 QA Checklist (11/14/21)
- B2 QA Checklist (9/22/21)
- D1 QA Checklist (11/3/21)
- B2 QA Checklist (9/23/21)
- C2 QA Checklist (11/10/21)

- D2 QA Checklist (10/31/21)
- D2 QA Checklist (10/30/21)
- A2 QA Checklist (9/25/21)
- D1 QA Checklist (9/3/21)
- C2 QA Checklist (10/13/21)
- D2 QA Checklist (10/19/21)
- D2 QA Checklist (10/7/21)
- D1 QA Checklist (11/2/21)
- D1 QA Checklist (10/20/21)
- D1 QA Checklist (11/2/21)
- D1 QA Checklist (10/20/21)
- C1 QA Checklist (11/30/21)
- B1 QA Checklist (11/19/21)
- D2 QA Checklist (11/16/21)
- B1 QA Checklist (11/10/21)
- B1 QA Checklist (11/11/21)
- D2 QA Checklist (11/5/21)
- D2 QA Checklist (11/14/21)
- D2 QA Checklist (11/15/21)
- E1 QA Checklist (8/25/21)
- E1 QA Checklist (9/14/21)
- A1 QA Checklist (10/23/21)
- E2 QA Checklist (9/18/21)
- E2 QA Checklist (9/20/21)
- F1 QA Checklist (9/27/21)
- F2 QA Checklist (9/30/21)
- E1 QA Checklist (10/28/21)
- E1 QA Checklist (10/25/21)
- E1 QA Checklist (10/4/21)
- E1 QA Checklist (10/5/21)
- F2 QA Checklist (1/18/22)
- F2 QA Checklist (10/9/21)
- F2 QA Checklist (9/27/21)
- E1 QA Checklist (10/8/21)
- F1 QA Checklist (10/18/21)
- F1 QA Checklist (10/20/21)
- F1 QA Checklist (11/4/21)

- F1 QA Checklist (10/21/21)
- F2 QA Checklist (11/23/21)
- F1 QA Checklist (11/17/21)
- E1 QA Checklist (9/3/21)
- F1 QA Checklist (11/17/21)
- E1 QA Checklist (9/3/21)
- E2 QA Checklist (11/20/21)
- E2 QA Checklist (9/3/21)
- F2 QA Checklist (9/6/21)
- F2 QA Checklist (9/8/21)
- Thermite Welding Report E Line (8/7/20)
- Thermite Welding Report E2 (9/29/21)
- List of Switch Replacements, 4/1/2019 through 4/1/2022 (no date)
- FY2023-FY2028 Proposed Capital Improvement Program & 10-Year Plan (12/21)
- List of Capital Improvement Projects Related to Track & Infrastructure (no date)
- Current Contract/NTP in Place for Weed Spraying/Mowing (no date)
- Alexandria Local Safety Committee Action Items (2/15/22)
- > Alexandria Local Safety Committee Action Items (3/15/22)
- Alexandria Local Safety Committee Attendance Sheet (2/15/22)
- Branch Ave Local Safety Committee Closed Items (2/15/22)
- Alexandria Local Safety Committee Member Attendance Log (3/15/22)
- Shady Grove Local Safety Committee Open Items (2/1/22)
- Shady Grove Local Safety Committee Attendance Sheet (2022)
- List of Locations Outside of Tolerances, Under Elevated Curves, spreadsheet (1/11/22)
- List of Locations Outside of Tolerances, Over Elevated Curves, spreadsheet (4/20/22)
- RSA Schedule by Department (5/9/22)
- GOTRS Track Rights Table (5/26/22)

- ACS from WWPL Weekly RSA Work Coordination Meeting (5/31/22)
- > D99 Yard Shutdown Scope of Work (5/28/22)
- WWPL Draft Work Package B11-B98 Yard Lead 1 Out of Service (6/4/22)
- WWPL Updated Final Work Package D98-D99 Extended Shutdown (5/28/22)
- WMATA TRST Monthly Turnout Inspection Form (12/6/19)
- SMS Incident Log Summary Table, 1/1/19 through 6/5/22
- Spikefast ES50 RM Resin for CRTRDG, SDS No. 15240 (8/12/16)
- WMATA Memorandum, regarding 2022 WMSC Track Audit [Preliminary] Finding 8, Rail Grinding (8/26/2022)
- TRST Investigation Reports
 - 3/15/22, Non-Revenue Vehicle Accident
 - 3/29/22, Preventable Accident with Non-Revenue Vehicle #22558
 - 4/3/22, RWP Violation
 - 4/12/22, Accident with BR01
 - 5/24/22, RWP Violations
 - 5/25/22, Non-Revenue Vehicle Accident
 - 5/26/22, Hi-Rail Vehicle Accident
 - 5/26/22, Accident with Hi-Rail Vehicle 21587
 - 5/26/22, Toolbox Striking Electrical Box near D06
 - 6/2/22, PM40 Colliding with PM26 at B09
- TRST Incident and Failure Analysis Reports January 2020–April 2022



- REAM Track and Structures Performance Report, March 2022
- REAM Track and Structures Performance Report, February 2022
- REAM Track and Structures Performance Report, January 2022
- REAM Track and Structures Performance Report, December 2021
- REAM Track and Structures Performance Report, November 2021
- REAM Track and Structures Performance Report, October 2021
- REAM Track and Structures Performance Report, September 2021
- REAM Track and Structures Performance Report, July 2021
- REAM Track and Structures Performance Report, June 2021
- REAM Track and Structures Performance Report, August 2021
- REAM Track and Structures Performance Report, April 2021
- REAM Track and Structures Performance Report, May 2021
- REAM Track and Structures Performance Report, March 2021
- REAM Track and Structures Performance Report, February 2021
- REAM Track and Structures Performance Report, January 2021
- REAM Track and Structures Performance Report, December 2020

- REAM Track and Structures Performance Report, November 2020
- REAM Track and Structures Performance Report, October 2020
- REAM Track and Structures Performance Report, September 2020
- REAM Track and Structures Performance Report, July 2020
- REAM Track and Structures Performance Report, June 2020
- REAM Track and Structures Performance Report, August 2020
- REAM Track and Structures Performance Report, April 2020
- REAM Track and Structures Performance Report, May 2020
- REAM Track and Structures Performance Report, March 2020
- REAM Track and Structures Performance Report, February 2020
- REAM Track and Structures Performance Report, January 2020
- WMATA Performance Report FY 2022, Q2 July December 2021 (2/10/2022)
- Contract FQ18033 A/E Services for Wayside Work Planning Support Scope of Work (11/2021)
- Track Maintenance and Inspection Internal Safety Review Summary (February 2022)
- > TRST Hazard Log (4/28/2022)
- List of Required PPE (no date)
- TRAK [sic] PMI List (no date)



Appendix D: Public Transportation Agency Safety Plan (PTASP) and System Safety Program Plan (SSPP) Elements Reviewed

1. Safety Management Policy

a. Safety performance targets

Organizational SMS Accountabilities and Responsibilities

d. SMS documentation

2. Safety Risk Management

- a. Safety Risk Management (SRM) process
- b. Risk Assessment Process
- c. Risk assessment methodology
- d. Hazard identification
- e. Hazard investigation
- f. Hazard analysis and evaluation of safety risk
- g. Hazard resolution (mitigation, elimination)
- h. Hazard tracking

3. Safety Assurance

- a. Systematic, integrated data monitoring and recording of safety performance
- b. Real-time assessment with timely information
- d. Departmental controls
- e. Compliance and sufficiency monitoring (i.e., quality management system plan (QMSP))
- f. Document assurance activities
- g. Preventive, Predictive, and Corrective Maintenance
- i. Change management
- j. Safety and Security Certification
- k. Corrective action plans

4. Safety Promotion

- a. Training
- b. Contractor Safety
- c. Safety Communications
- d. Hazard and safety risk information
- e. Safety committees
- f. Hazardous materials and environmental management







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