

Structure Oversight Audit

Report #: 2022-02

Internal Audit

Audit Report



Sound Transit Audit Division

April 27, 2022

Sound Transit's Title VI notice of rights

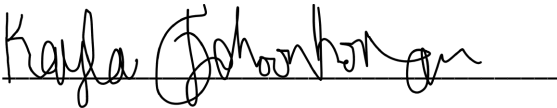
Sound Transit conducts Title VI equity analyses for service and fare decisions to ensure they are made as equitably as possible.

More information on Sound Transit's Title VI notice of rights and the procedures to file a complaint may be obtained by:

- Phone: 888-889-6368; TTY Relay 711;
- Email: stdiscriminationcomplaint@soundtransit.org;
- Mailing to Sound Transit, Attn: Customer Service, 401 S. Jackson St. Seattle, Washington 98104-2826; or
- Visiting our offices located at 401 S. Jackson St. Seattle, Washington 98104.

A complaint may be filed directly with the Federal Transit Administration Office of Civil Rights, Attention: Complaint Team, East Building, 5th Floor – TCR, 1200 New Jersey Avenue, SE, Washington, DC 20590 or call 888-446-4511.

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Executive Summary

Why did we audit?

Sound Transit, as the regional transit authority (RTA), is committed to the safety of our passengers, employees, contractors and the public. This commitment is the same when it comes to the infrastructure we design, build, operate, maintain, and dispose of throughout its' lifecycle.

By ensuring our structures are inspected and maintained according to industry standards, Sound Transit can reasonably affirm that we are mindful of the investment made for public transit and we can continue providing safe, reliable service to the public.

As part of the annual audit risk assessment, Structure Oversight was rated as a significant potential risk in categories including Service Delivery, Financial and Safety. As part of our risk-based audit methodology, some of the risks considered in this assessment included:

- A large number of structural assets currently owned by the agency;
- The significant number of structural assets entering revenue service over the next four years, and;
- The State of Good Repair status for older assets currently owned by the agency.

Additionally, structure oversight is part of the agency Strategic Goal 5.3 to "Implement and maintain a "best-in-class" asset management system that ensures physical assets, including all facilities and equipment, are maintained in a state of good repair. "

Our audit of this area will assist the agency in assessing the degree to which this strategic goal has been achieved. We noted that there has not been previous coverage in this area by the Audit Division.

What we found

Overall, we found that key processes, roles, responsibilities, and accountability lack appropriate definition to ensure that structural assets are maintained in a consistently objective and transparent manner. There are multiple opportunities to enhance and strengthen internal oversight processes and further align with industry best practices.

We also found that despite these opportunities to improve, structure inspections are consistently performed, and assets are adequately maintained on a regular basis.

The Audit Division is Sound Transit's independent assurance function that improves how the agency is operated and managed, ensuring public funds are managed transparently, and ultimately keeping employees, contractors and our riding public safe.

Audit Process

Our audit involved reviewing policies, procedures and records relating to the structure oversight program including:

- External regulations (e.g., Federal Transit Administration - State of Good Repair)
- Internal procedures (e.g., Standard Operating Procedures (SOPs))
- Best practices (e.g., American Public Transportation Association (APTA) standards)
- Inventories and past inspection reports for bridges, garages, stations and tunnels

Through our analysis, we identified areas where Sound Transit complies with existing requirements and is moving beyond compliance toward optimization. We also identified areas with significant opportunity for improvement.

Conclusion

Our results indicate that although structural inspections are routinely performed, and assets are currently in sound condition; there are key processes, roles, responsibilities and accountability that lack appropriate definition to ensure that structural assets are maintained in a consistent, objective and transparent manner.

Overall, our audit revealed **two (2) findings** related to the lack of alignment in current processes and missing or incomplete portions of processes currently in place.

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1. Findings Summary

The audit team completed its review and identified two (2) findings, which are explained in further detail below.

We also found that key processes, roles, responsibilities and accountability lack appropriate definition to ensure that structural assets are maintained in a consistent, objective and transparent manner. There are multiple opportunities to strengthen internal processes, which include:

- Defining accountability for maintenance of assets including during the post-construction/pre-transition to Operations phase.
- Creation of processes to transition assets that are acquired (and do not go through the capital assets process) into Operations in a safe and financially responsible manner.
- Establishment of a centralized or single source of structural asset inventory, utilizing a consistent rating methodology to ensure the agency's limited resources are allocated to the most severe inspection findings at the right time.
- Improved collaboration and communication between teams who currently oversee different portions of the agency's structural assets.

Finding 1: Current oversight processes are not aligned.

Audit Risk Rating: 3C (Serious)

Our field work demonstrated that although a Standard Maintenance Procedure (SMP) for Link Maintenance, Standard Operating Procedure (SOP) for Asset Planning and Sounder Commuter Rail Plan (Sounder) exist to guide the various groups in their oversight processes, these processes don't align with each other or with the APTA Standard for Inspections and Maintenance. The primary lack of alignment is in the rating scales utilized to inspect structures which are different for each division and/or consultant performing the inspections, which makes comparison of similar assets across the agency less clear.

Additionally, it was noted that accountability for the different groups of assets was not well-defined. Although each division maintains its own asset inventory and reporting, one single source for all structural assets does not exist. It is also unclear if any assets are being overlooked or inspection efforts are duplicated by multiple groups.

Potential impacts of not mitigating this risk include:

- Inefficiencies in agency-wide reporting (internal and external)
- Duplicated or missed assessments or inspections
- Lack of transparency and accountability to the public for repair/replacement decisions
- Inappropriate allocation of resources (e.g., high costs allocated to a low priority item),

- Resources (e.g., funding or maintenance) not available when needed,
- Unconsciously biased or inequitable decisions to repair or replace assets are made
- Potential for any safety issues to remain ignored which could have significant financial impacts including disruption to service or shortening the useful life of the asset.

Finding 2: Some processes are missing or incomplete

Audit Risk Rating: 5B (Medium)

It was also found that processes for transitioning assets that are acquired from other organizations and are not procured by Sound Transit (and hence go through the processes for capital assets) currently do not exist. In some cases, accountability for appropriate maintenance of assets transitioned to Operations is unclear and may be left unnoticed or not maintained until the asset is in revenue service.

There are two potential impacts of not mitigating this risk, which include:

- The acquired assets may not be in a State of Good Repair (SOGR) and could have immediate financial impacts that may disrupt operations and/or cause unfavorable media coverage, etc., and;
- The assets that are built are not maintained properly and may have undue costs incurred for repairs or maintenance before the asset is safe for revenue service which may significantly delay or disrupt service.

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2. Approach to this audit

To comprehensively evaluate structure oversight we looked at regulations, standards and best practices and compared them to the current state including internal policies, procedures and records. ST Performance Auditors progressed through the following phases to arrive at this final report:

Phase 1: Planning, Scope and Objectives

During the Planning process, the audit team met with key stakeholders, reviewed documents and performed research to better understand the area under consideration. Through a risk-based analysis, we identified where risks were appropriately mitigated with controls and where risks were not adequately mitigated. Ultimately, we focused on how safe, effective, and efficient the current program practices are and how we can go even further to be 'best in class'. This informed the audit scope and objectives which guided the focus areas for the field work phase.

Our audit scope included bridges, garages, stations, and tunnels along with their respective inspections and reports from January 1, 2017 to March 1, 2022, in alignment with FTA and APTA requirements. We also took into consideration policies, procedures, and standards (internal and external) from 2013 to present (most recent versions of each) to better understand the evolution of how the agency oversaw structures.

The objective of the audit was to determine whether the agency's structure oversight processes align with requirements and best practices including initiation of operations, inspection frequency, format, and resolution of deficiencies.

Phase 2: Field Work & Reporting

During field work, auditors performed a number of assessments, also known as 'tests' where expectations, based on policies, procedures, and standards are compared to the current state in order to determine how current conditions measured up to the ideal conditions. The results of these assessments informed the audit conclusion and the associated findings and observations.

Based on the details of the testing obtained during field work, we can show where risks were not adequately mitigated or where risks were found to be mitigated but could potentially benefit from additional improvements. Please refer to Section 4, "Analysis" for further details.

Audit Division Standards

The Audit Division conducted this work under the framework outlined in its charter. It governed itself adhering to the mandatory elements of The Institute of Internal Auditors' (IIA) International Professional Practices Framework (IPPF or "Red Book"), including the Core Principles for the Professional Practice of Internal Auditing, the Code of Ethics, the International Standards for the Professional Practice of Internal Auditing (the Standards), and the Definition of Internal Auditing.

Internal Audit of Structure Oversight

The division conducts audits in accordance with Generally Accepted Government Auditing Standards (GAGAS or “Yellow Book”) promulgated by the United States Government Accountability Office (GAO).

Additionally, the Audit Division is also committed to following safety oversight standards set forth by the Federal Transit Administration (FTA), Federal Railroad Administration (FRA); as well as all other relevant requirements or standards for auditing.

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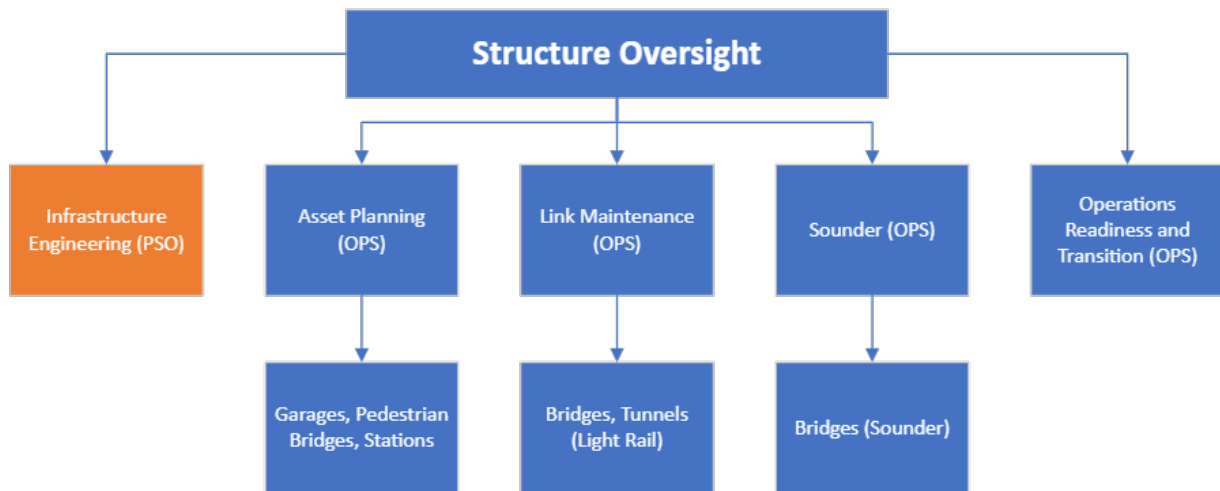
3. Background

At Sound Transit, structure oversight is a de-centralized process where different groups are responsible for all of the various types of assets that collectively help ensure that critical assets are maintained in a State of Good Repair (SOGR).

Consistent with FTA standards and annual reporting, the structure oversight program helps ensure structures remain safe, sound, and maintained in a fiscally responsible way over the lifetime of the asset.

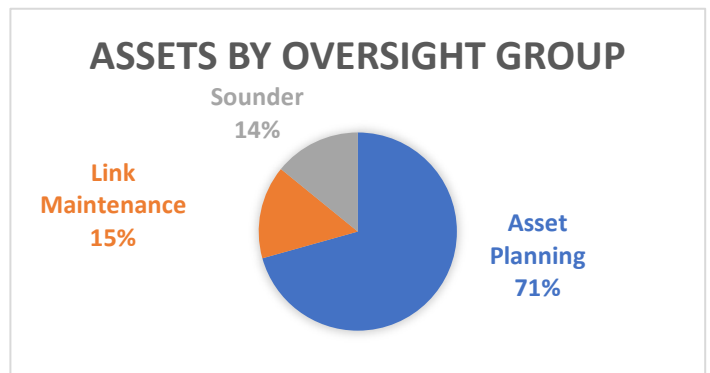
This is achieved through a revolving schedule of inspections and observations. Some inspections are performed by internal staff, and some performed by contractors that provide specialized or industry expertise. Beyond the minimum regulatory requirements, the agency also strives to meet or exceed industry best practices such as those published by APTA and ISO for inspections, maintenance, and asset management.

The program structure is primarily delegation of inspections and oversight among the Asset Planning, Link Maintenance and Sounder Ops divisions from the Operations Department. Staff from the Operations Readiness & Transition Division and Infrastructure Engineering Division from the Portfolio Services Office (PSO) supplement the oversight function and advise on different portions of the program, as shown below.



At the time of our audit, we identified approximately 92 structural assets, overseen by the three (3) primary groups:

- 71% - (65) Asset Planning in Operations
- 15% - (14) Light Rail Maintenance in Operations and
- 14% - Sounder in Operations (13)



4. Analysis

Our testing objectives focused on determining whether Sound Transit’s inspection frequency and deficiency resolution processes align with industry standards and recommended best practices.

The following table summarizes the testing procedures performed:

#	Testing Description	Sample	Conclusion*
1	Determine how ST processes align to APTA recommended practices and each other	3 internal processes (SOP, SMP, SCR-PLN)	<input checked="" type="checkbox"/> Processes did not align.
2	Determine whether processes for initiating operations exist and are working as intended	Internal transition processes from OPS & PSO	<input checked="" type="checkbox"/> Transition processes for ST capially constructed assets are adequate. <input checked="" type="checkbox"/> Processes do not currently exist for acquired assets.
3	Determine whether inspections are performed at prescribed/required frequencies (as determined by FTA, FRA, etc.)	148 inspection reports from 2019-2021 (refer to chart below)	<input checked="" type="checkbox"/> Inspection frequency meets or exceeds requirements.
4	Determine inspection formats and rating systems are consistent across divisions	3 reports, one from each division	<input checked="" type="checkbox"/> Report format is consistent. <input checked="" type="checkbox"/> Rating scales are different for each department/division.
5	Determine whether issues, concerns or deficiencies are resolved in a timely and effective manner	5 interviews with stakeholders across various divisions	<input checked="" type="checkbox"/> Stakeholders assert that any issues are addressed adequately and in a timely manner.

*A indicates the expected conditions were met and indicates the expected conditions were not met.

Testing 1: Process Alignment

Overall, it was found that the three internal processes currently used don’t align with each other or with the APTA Standard for Inspections and Maintenance. For example, APTA guidelines recommend that each agency keep an inventory and prepare a set of “post-seismic event operation guidelines” for their structural assets however, the Sounder SCR-PLN standard was the only internal procedure to make references to such guidelines. Refer to **Finding One** for additional details.

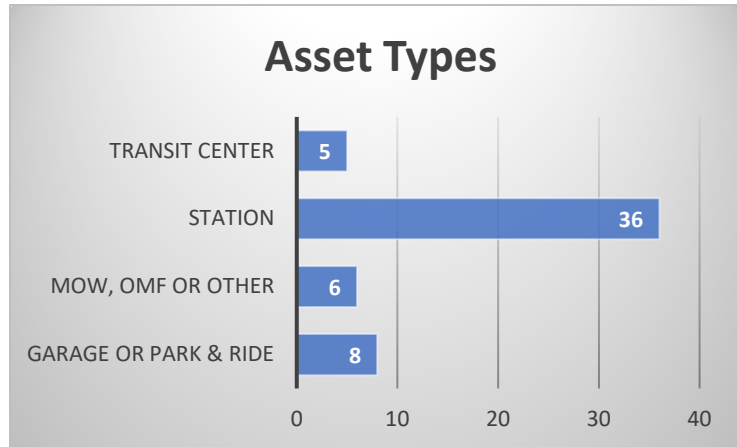
Testing 2: Initiation of Operations

Processes for assets that are procured and constructed under the oversight of Sound Transit are in place and working as intended. However, processes are currently not in place for assets that are acquired by other means. For example, Sound Transit recently acquired the Downtown Seattle Transit Tunnel and prior inspection records were not available. The agency is now performing its own inspections for the asset. Refer to **Finding Two** for additional details.

Internal Audit of Structure Oversight

Testing 3: Inspection Frequency

The chart (right) demonstrates the types of structural assets captured within the 148 reports noted in the third testing. These assets are observed on a rotational basis, overseen by the Asset Planning division of Operations. Per Sound Transit's internal SOP 10002 overseen by Asset Planning, all assets are observed at least once every three years.



Testing 4: Inspection Format & Ratings

A sample of reports were observed and found that they all contained similar attributes (e.g., who performed the inspection, current condition, recommendations for improvement, etc.) as part of the reporting format. However, the rating scales used to evaluate the condition varied depending on the ST oversight group. For example, Sounder assets receive a rating of "P1" through "P4", Link assets receive a rating between 1-4 and Asset Planning assets are rated using a 1-5 scale. Refer to **Finding One** for additional details.

Testing 5: Deficiency Resolution

To ensure that structures are not only inspected but maintained as well, interviews were conducted with a variety of stakeholders with oversight roles. It was confirmed that overall, there are few to no delays for necessary maintenance and that the urgency with which deficiencies that need immediate attention are treated is appropriate relative to the concern.

The results of these tests have informed our audit findings, and our overall conclusion.

5. Diversity, Equity, and Inclusion Review

Throughout our audit, we utilized a diversity, equity, and inclusion lens to consider the context of how maintenance and repairs to structures are being completed; asking the question; 'Are we (Sound Transit) maintaining or inspecting structures in our system equitably across all locations?'

Through the course of our interviews, staff acknowledged that resources (e.g., funding, staff time, etc.) are finite and even with unlimited budgets and people, not all repairs would be made as they are discovered. As such, it is necessary to have a system, information repository and/or methodology to capture structural asset conditions in order to prioritize maintenance and allocate these limited resources more appropriately.

This repository would help ensure the most severe or urgent safety concerns are addressed at the right time and that the resources are available to do so, to ensure no service delays or interruptions are necessary.

With the structure oversight program de-centralized, no such system or collection of information exists at this time. Therefore, nullifying the current opportunity to evaluate whether funds have been equitably distributed across the transit system or are equally distributed in an objective manner; although as the current process allows, maintenance and inspections are done on an as needed basis.

We recognize that there is opportunity to reduce the potential for implicit bias in these determinations, and recommend the agency continue these efforts as we expand the transit system and strive to be more transparent with the public.

6. Conclusion & Recommendations

Overall, we conclude that although structural inspections are routinely performed and assets are currently in sound condition; the agency lacks a systematic repository that captures all assets, their conditions and prioritizes repairs based on safety and financial considerations.

The current average condition rating for structural assets is as follows:

Overseeing Group	Current Avg. Condition	Scope
Asset Planning	3.75 (out of 5)	2019-2021
Sounder	P3 "Fair" (out of P4)	2021
Link Maintenance	Condition State 1 "Good" (out of 4 potential states)	2019-2021

Assets overseen by Asset Planning exceeds the Sound Transit minimum rating of 3.0 (per internal Operations SOP 10002) and the FTA minimum rating of 2.5. For Link, an average condition rating was not available; however, it was noted that for assets observed in 2019 and 2020, conditions were noted as "performing and aging well" by the contractor with some recommendations for short-term and long-term maintenance.

With the de-centralized management of these assets (as shown above), accountability for each asset is not transparent program. This exposes the agency to the risk that assets needing significant repairs may not have the resources (e.g., time, funding, staff, etc.) to be fixed when needed which may cause service disruptions, additional damage and/or safety events in the meantime.

Additionally, we found that the nature of current processes leaves the potential for missed or duplicative work as well as inefficiencies when gathering all information for reporting (e.g., FTA annual reporting).

Audit requires that management address the two (2) findings, and recommends management consider the following actions to mitigate these risks:

- Consolidating and aligning internal processes with each other and best practices, specifically the rating scales used to classify the current state of structural assets. All assets observed currently fall under Operations but are guided by three different internal processes owned by three different divisions.
- Consider the use of a single repository for structural asset information that more accurately captures the state of the agency's assets as a whole portfolio. This information may also be used to provide additional advice and accountability for repair or replacement decisions made.
- Revise current processes or create new processes that capture the procedures for transitioning a purchased or acquired asset into Operational service. Clarify responsibility for necessary maintenance and/or inspections to be performed prior to an asset's transition for both capially constructed and acquired assets.

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Management Response

Prepared by: Paul Denison
Date: 6/10/2022
Audit: Structure Oversight (AUD-PA-2022-02)

Finding 1: Current oversight processes are not aligned. (Rating: 3C)

Management Response:

Management partially agrees¹ with the audit report finding²

Action Plan:

Operations management partially agrees with this finding. Operations disagrees with the classification of the finding as a 3C. This disagreement is supported by your audit report, page 11, Section 4, Analysis, sub-section 3, states; *"Inspection frequency meets or exceeds requirements"*. Since structures are in fact being inspected, a lower rating would therefore be presumed.

Management will commit to examine the requirements for FHWA, FRA, APTA and 'Bridge Works' inspection ratings, then, ensuring that there are no conflicts, we will amend the appropriate inspection document(s) to harmonize the ratings. We will also commit to ensuring that within the Operations Asset Management inventory, structures belonging to Operations are grouped into similar assets types, as appropriate.

Timeline for corrective action:

First quarter of 2024.

Finding 2: Some processes are missing or incomplete. (Rating: 5B)

Management Response:

Management agrees with the audit report finding.

¹ If the responsible party **agrees** with the finding, an estimate timeline for corrective action are strongly suggested to be part of the response. If the responsible party **disagrees** with the finding, a statement of reason for the disagreement should be part of the response. If the disagreement represents unreasonable risk acceptance, the Audit Director will communicate the risk to Deputy CEO. If the Deputy CEO accepts the unreasonable risk acceptance by the auditee, the Director will communicate such acceptance to the Finance & Reporting Committee.

² Each audit finding must have a management response.

Action Plan:

Operations management agrees with this finding. Far too many assets that were not built or commissioned by Sound Transit, have or will be transitioned to Operations without the current required inspection(s), documentation, training, and or asset condition assessments. Management commits to ensuring that the Transfer to Operations process includes these steps and the asset being transferred using a commissioning process prior to ownership transfer. This includes developing and more robust operational transition requirements to the contract, ensuring operation and maintenance strategies are part of the deliverable and identifying other aspects of the delivered assets necessary to maintain reliability and performance.

Timeline for corrective action:

First quarter of 2024.

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Appendix A: Audit Finding Risk Rating Process

To aid process owners in prioritization of the audit findings resulting from the audit, a level of audit risk will be assigned by assessing two factors: 1.) the probability that the associated problem will occur at some point in the future, and 2.) the impact or severity of that problem in relation to the overall business process.

Using the same Risk Assessment Matrix already in used throughout the agency and based on the MIL-STD-882-E; audit findings are qualitatively assessed based on the worst credible case that is anticipated from the result of human error, design inadequacies, component failure or a malfunction.

Risk Rating Scale						
	Severity	Catastrophic (1)	Critical (2)	Major (3)	Marginal (4)	Negligible (5)
Probability	Frequent (A)	High (1A)	High (2A)	High (3A)	Serious (4A)	Medium (5A)
	Probable (B)	High (1B)	High (2B)	Serious (3B)	Serious (4B)	Medium (5B)
	Occasional (C)	High (1C)	Serious (2C)	Serious (3C)	Medium (4C)	Low (5C)
	Remote (D)	Serious (1D)	Medium (2D)	Medium (3D)	Low (4D)	Low (5D)
	Improbable (E)	Medium (1E)	Medium (2E)	Low (3E)	Low (4E)	Low (5E)
	Eliminated (F)	Eliminated				

Resolution Requirements

Risk Score	Risk Level	Risk Rating	Minimum Actions	Risk Acceptance / Responsibility
1A, 1B, 1C, 2A, 2B, 3A	High	Unacceptable	Stop work & immediate correction required to reduce risk.	Not Acceptable. Executive Team is informed.
1D, 2C, 3B, 3C, 4A, 4B	Serious	Undesirable	Mitigation strategy required to reduce risk within 30 days of identification of risk.	Acceptable with risk controls and monitoring. Director-level committee review and approval.
1E, 2D, 2E, 3D, 4C, 5A, 5B	Medium	Acceptable w/ review	Monitor and consider actions to further reduce risks.	Acceptable with risk controls and monitoring. Technical Level committee review and approval.
3E, 4D, 4E, 5C, 5D, 5E	Low	Acceptable	Acceptable without further mitigation. May be accepted by the business unit in coordination with Audit and Safety.	Acceptable without further mitigation. May be acceptable by the business unit with coordination with Audit and Safety.
N/A	Eliminated	Eliminated	No actions needed.	N/A

Risk Matrices

Severity	Catastrophic (1)	Critical (2)	Major (3)	Marginal (4)	Negligible (5)
System Disruption / Operations	> 24 hrs Substantial or total loss of operations	12 – 24 hrs Partial shutdown of operation	4 – 12 hrs Prolonged disruption of operations	1 – 4 hrs Brief disruption of operations	<1 hour Minor to No disruption
Financial	>\$5,000,000	\$1,000,000 – 4,999,999	\$249,999 – 999,999	\$10,000 – 249,999	< \$10,000
Reputational	Prolonged negative media coverage for >30 days and / or irreparable reputational damage, resulting in government intervention	Ongoing negative media coverage for >14 days but ≤ 30 days causing serious reputational damage, resulting in government intervention.	Ongoing negative media coverage >7 days but ≤14, causing major reputational damage and possible government intervention	Ongoing negative media coverage for ≥ 24 hours but ≤ 7 days, causing some reputational damage	Negative media coverage for ≤ 24 hours, causing minor reputational damage
Injury	Several deaths (≥3) and / or numerous (≥3) serious injuries (excluding suicides or by natural causes)	1 -2 deaths and/or 2 or more serious injuries	Multiple minor injuries and possible serious injury (Ambulance transport)	Minor injury such as bruising, abrasions, bleeding; possible medical services required	No injuries
Equipment	Total loss of equipment or system interruption requiring more than 30 days to repair.	Significant loss of equipment or system interruption requiring more than 14 days but less than 30 days to repair.	Some loss of equipment or system interruption requiring more than 24 hours but less than 14 days to repair.	Minor system loss of equipment or system interruption requiring less than 24 hours to repair.	Minor damage to equipment or minor system interruption with no immediate repair necessary.
Regulatory	Cease and desist orders are delivered by regulators. Critical assets and facilities are forced by regulators to be shut down.	Governmental, regulator investigations, and enforcement actions, lasting longer than a year. Violations that result in multiple large non-financial sanctions; OR Regulators force the removal and replacement of management positions. Regulators begin agency monitoring activities.	Violations that result in significant fines or penalties above and beyond what is codified or a regulator enforces non-financial sanctions; OR Significant new and updated regulations are enacted as a result of an event.	Violations that result in fines or penalties	Self-reported or regulator identified violations with no fines or penalties

Probability Level	Likelihood of event in specific item	MTBE in Operating Hours **	Occurrence in time
Frequent (A)	Will occur frequently.	<1,000 oh	1 per week, likely to occur several times per month
Probable (B)	Will occur several times.	1,000 – 100,000 oh	1 per month, likely to occur several times per year
Occasional (C)	Likely to occur sometime.	100,000 – 1,000,000 oh	Once per year, likely to occur several times within 10 years
Remote (D)	Unlikely but possible to occur.	1,000,000 – 100,000,000 oh	1 per 10 years or likely to occur several times within 100 years
Improbable (E)	So unlikely, occur may not be experienced.	> 100,000,000 oh	1 per 100 years
Eliminated (F)	Risk removed / eliminated	Never	N/A