Metrolinx Asset Information Standard

MX-ALM-STD-001

Revision 02
December 2024

Metrolinx Asset Information Standard

MX-ALM-STD-001

Publication Date: April 2019

Revision Date: October 2020, March 2023, December 2024

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Preface

This is the second revision to Metrolinx's Asset Data and Information Standards, which was originally approved in April 2019. The original version focused on a subset of Asset Data and Information that HxGN EAM (formerly Infor EAM) was tracking at that point, primarily corridor maintenance assets. This revision corrects some aspects attributed to those asset classes as well as broadens the scope to a much more fulsome perspective. Inventory Management, Document Control and Reliability Engineering were consulted to provide additional standards that weren't included in the original version.

This document was developed by The Asset Lifecycle Management team, Engineering and Asset Management, Metrolinx.

These standards apply to all Metrolinx-owned, operated or maintained assets, regardless of the commercial arrangement for design, build, operate, or maintaining assets. Groups and individuals that are responsible for asset ownership, asset maintenance, inventory management, document control, asset handover, and reliability engineering need to implement the standards.

Suggestions for revision or improvements can be sent to the Metrolinx Asset Lifecycle Management Office, Attention: Director of Asset Lifecycle Management. The Director of Asset Lifecycle Management ultimately authorizes the changes. A description of the proposed change shall be included, along with information on the background of the application and any other useful rationale or justification. Proposals for revisions or improvements shall also include your name, e-mail address, and phone number.

December 2024

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TABLE 0-1 REFERENCES

Reference	Title
MX-ALM-STD-002 (Formerly MX-SEA-STD-001)	Metrolinx FRACAS (Failure Reporting, Analysis, and Corrective Action System) Process
MX-ALM-STD-003 (Formerly MX-SEA-STD-002)	Metrolinx FMECA (Failure Modes, Effects, and Criticality Analysis)
MX-ALM-STD-004	Metrolinx CADD/BIM Standards Manual
MX-ALM-STD-005 (Formerly MX-SEA-STD-004)	Metrolinx RCA (Root Cause Analysis) Process
MX-ALM-TMP-002	Master Information Delivery Plan Template
MX-ALM-TMP-003 (Formerly CKH-ASMT-FRM-002)	Asset Document Control List Template
MX-ALM-DIC-001(Formerly MX-ALM-STD-002)	Civil Asset Information and Data Dictionary
MX-ALM-DIC-002 (Formerly MX-ALM-STD-005)	Signals Asset Information and Data Dictionary
MX-ALM-DIC-003 (Formerly MX-ALM-STD-006)	Track Asset Information and Data Dictionary
MX-ALM-DIC-004 (Formerly MX-ALM-STD-003)	Station Facilities Asset Information and Data Dictionary
MX-ALM-DIC-005 (Formerly MX-ALM-STD-008)	Bus Facilities Asset Information and Data Dictionary
MX-ALM-DIC-006 (Formerly MX-ALM-STD-007)	Rail Facilities Asset Information and Data Dictionary
MX-AM-Policy	Metrolinx Asset Management Policy
MX-SEA-STD-003	Metrolinx RAM (Reliability, Availability, Maintainability) Plan Process
MX-SEA-STD-005	Metrolinx RAM V&V (Verification and Validation) Process
MX-SEA-STD-006	Metrolinx RAMS Risk Assessment Process
GIS Data Dictionary	Metrolinx GIS Data Schema
CKH-QMA-FRM-003	Capital Projects Group Terms Glossary
CKH-DMC-GDE-007	Capital Projects Group ISO 19650 Compliant Drawing/Document Numbering Guide

Acronyms and Abbreviations

TABLE 0-2 ACRONYMS AND ABBREVIATIONS

Acronym and Abbreviation	Full Name
AIS	Asset Information Systems
ALM	Asset Lifecycle Management
AM	Asset Management
AMS	Asset Management System
ARO	Asset Retirement Obligation
BIM	Building Information Modeling
CADD	Computer-Aided Design and Drafting
CLOS	Customer Level of Service
CPG	Capital Projects Group
CME	Corridor Maintenance and Expansion
EDRMS	Electronic Document and Records Management Solution
EGIS	Enterprise Geographical Information System
EMMS	Enterprise Maintenance Management System
FMECA	Failure Modes and Impact Criticality Analysis
FRACAS	Failure Reporting, Analysis and Corrective Action System
I&IT	Information & Information Technology
MTBF	Mean Time Between Failure
MTTR	Mean Time To Restore
OEM	Original Equipment Manufacturer
RAMS	Reliability, Availability, Maintainability
RCA	Root Cause Analysis
SEA	Systems Engineering Assurance
SKU	Stock Keeping Unit
SOGR	State of Good Repair
UNSPSC	United Nations Standard Products and Service Code
UOP	Unit of Price
VMRS	Vehicle Maintenance Reporting Standards
WO	Work Orders

Definitions

TABLE 0-3 DEFINITIONS

Term	Definition
Asset Class Team	Asset Class Team owns and/or operates and/or maintains the asset. Asset Class Team is made up of the Director and Lead(s).
Asset Hierarchy	Hierarchical grouping of Metrolinx assets organized within parent-child relationships.
Asset Information	Combined set of data (physical asset data, location and spatial links, work management, performance, condition, and cost data, etc.) and documents (drawings, manuals, certificates, etc.) required to support the management of Metrolinx Assets over the whole life cycle. Asset Information is monitored and controlled in Asset Information Systems.
Asset Information Systems (AIS)	The suite of systems used to manage Metrolinx asset information throughout its life cycle. These systems can include maintenance management systems, asset registers, document repositories, predictive SCADA tools, and geographic information systems.
Assets	Any physical or tangible item that has potential or actual value to Metrolinx (excluding intellectual property, human resources, and financial instruments), as well as IT systems and software.
Asset Category	Asset Categories - are subsets of an Asset Class that share the same preventative maintenance tasks and provide further differentiation within an Asset Class to enable more refined analysis of historical failure data.
Asset Class /Equipment Class	Asset Class – groupings of Assets/Equipment used to make lifecycle decisions, organized maintenance activities and share failure modes.
Repairable Spare	Parts in inventory that can be reused or remanufactured.
Core	A part in inventory that maintains a credit value from the supplier (e.g. engine, gearbox, fuel pump, battery)
Data Dictionary	A centralized repository of information about asset data, such as its meaning, attributes, relationships to other data, origin, usage, and format.
Electronic Document and Records Management System (EDRMS)	This system is used to manage Metrolinx documents and records, including asset-related documentation.
Enterprise Geographical Information System (EGIS)	This system is used to manage spatial data of assets, whether linear (for example, track) or discrete (for example, bus maintenance facilities, HVAC units, and related items).
Fixed Assets	Assets that are primarily in a single location (i.e. switches, shelters, bungalows, etc.

TABLE 0-3 DEFINITIONS

Term	Definition
Enterprise Maintenance Management System (EMMS)	A system used to capture the maintenance of assets and work history. Metrolinx EMMS includes but is not limited to HxGN EAM, Maximo and ServiceNow. Beyond its function as an enterprise asset registry, other key capabilities include: • Work Planning and Scheduling • Level 1 - 3 Maintenance • Failure Analysis • Work Order Estimates and Actuals • Materials and Inventory Management
FRACAS	The FRACAS process is a closed-loop system in which failures and faults are formally reported, analysis is performed to the extent that the failure cause is understood, and positive corrective actions are identified, implemented, and validated to prevent further recurrence of the failure.
Level 1 Maintenance - Preventative and Predictive	A type of Maintenance Service that is planned and aimed at preserving the condition and availability of an Asset or Asset Component, including: • preventive maintenance activities (including cleaning, lubricating, setting torque levels; topping up fluids, and replacing consumables such as fluids, filters, seals and wear items) at a minimum per the maintenance standards and original equipment manufacturer recommendations. • predictive maintenance activities, including monitoring, recording, measuring and assessing condition either physically or remotely intrusive and non-intrusive physical inspection; measuring such as gauge, height or depth of wear, viscosity, pressure, and cycle times; and recording and assessing activities; and • all inspection and testing required to return an Asset or Asset Component to regular operation at a minimum in accordance with applicable Maintenance Standards and applicable original equipment manufacturer recommendations.
Level 2 Maintenance - Corrective	A type of Maintenance Service that is reactive to repair or replace a failed Asset or Asset Component and restore the Asset or Asset Component to normal operating conditions, per the minimum applicable maintenance standards and the original equipment manufacturer recommendations. This includes: • all corrective maintenance activities to rectify a condition that does not meet the applicable maintenance standards or asset condition standards;

TABLE 0-3 DEFINITIONS

Term	Definition
	• repair of an Asset or Asset Component to correct a failure that is either detected or experienced or that is predicted as a result of Level 1 maintenance; and • repair of an Asset or Asset Component to correct a random or systemic failure detected during regular operation.
Level 3 Maintenance – Lifecycle Renewal	A type of Maintenance Service where planned replacement or renewal of an Asset or Asset Component is implemented.
Linear Asset	Assets that are defined by length to accurately depict such things as tracks, pipelines, or power lines with their length directly impacting their maintenance.
Line Replaceable Unit (LRU)	An item that is removed and replaced at an operating location in a relatively short time in order to restore the system to an operational-ready condition.
Lot	Reference/ID supplied by manufacturer to identify batches
MTBF	Mean Time Between Failures is the predicted elapsed time between failures of an asset during normal system operation.
MTTR	Mean Time to Restore, the average time required to restore a failed component or device. Expressed mathematically, it is the total corrective maintenance time for failures divided by the total number of corrective maintenance actions for failures during a given period.
Non-fixed Assets	Assets that physically move frequently (i.e. buses, trains, non-revenue vehicles)
On-hand quantity	Available balance of parts for use
RCA	A systematic approach for identifying and addressing the root cause of asset failures and non-compliance with CLOS targets and/or RAMS requirements. (Including Customer Satisfaction and On Time Performance)
Regular Parts	Parts that are purchased to support repairs and maintenance on assets or in Operations.
Serialized Parts	A part that is given a unique serial number Enables tracking of the individual item throughout its lifetime.
Stock	Inventory of all parts available and their physical locations.
Supplier	Source from which parts and/or services are procured
Supplier Parts	Product ID referenced by the supplier
Tools	Device used to carry out maintenance work
Task Plans	A predefined template that includes all work planning information such as documents, instructions, checklists, labour and part estimates, etc.

For a list of other terms and definitions, please refer to the *Capital Projects Group (CPG) Terms Glossary (CKH-QMA-FRM-003).*

1.   Introduction

1.1   Purpose

1.1.1   The purpose of this document is to define standards for Metrolinx Asset Information.

1.1.2   As mandated by the Metrolinx Asset Management Policy, "Metrolinx shall be a knowledgeable owner and maintain up-to-date information and data on assets agnostic of insourcing/outsourcing arrangements." Asset information for all Metrolinx-owned assets must adhere to the same standards. Consistency and accuracy in defining, capturing and maintaining asset data and information ensures it can be easily retrieved and utilized for decision-making and reporting purposes across the enterprise, in particular asset reliability analysis and asset investment planning.

1.1.3   These standards apply to all Metrolinx-owned, operated, or maintained assets, regardless of the commercial arrangement for design, build, operate, or maintaining assets.

1.2   Scope

1.2.1   The scope of Asset Information to which this standard applies includes:

   i.   Asset registry Information includes but is not limited to;

   a) Asset identification and description;

   b) Asset classification;

   c) Asset hierarchical groupings;

   d) Asset condition/performance;

   e) Asset criticality;

   f) Asset failure modes by asset class;

   g) Asset meters;

   h) Asset warranties;

   i) Asset parts/bill of materials;

   j) Asset replacement value; and

   k) Asset retirement obligation (ARO) value (if applicable)

   ii.   Asset maintenance information, including but not limited to;

   a) Level 1 Maintenance - preventative maintenance work orders;

   b) Level 2 Maintenance - corrective maintenance work orders; and

   c) Level 3 Maintenance – lifecycle renewal work orders.

   iii.   Asset geospatial information; and

   iv.   Asset documentation and its metadata/attributes.

1.3   Asset Information Systems

1.3.1   Metrolinx Asset Information Systems are the suite of systems used to manage Metrolinx asset information throughout their life cycle. As new Asset ownership and maintenance models arise, Metrolinx's AIS will evolve to meet the changing requirements.

1.3.2   In accordance with the Metrolinx Asset Management Policy, all Metrolinx Asset Information must be captured and maintained in Metrolinx Asset Information Systems.

1.3.3   Metrolinx Asset Information Systems include but is not limited to:

    i.   Enterprise Maintenance Management Systems (HxGN EAM, Maximo, ServiceNow);

    ii.   Electronic Document and Records Management Systems (EDRMS, Aconex, SharePoint); and

    iii.   Enterprise Geographical Information System (EGIS)

1.3.4   These Asset Information Systems are integrated. They enable business users to view asset details, condition, location, work history, and associated documents. All information within or that feeds the Asset Information Systems is owned and/or maintained by Metrolinx.

2.   Asset Information Governance

2.1   Asset Information Responsibilities

2.1.1   Asset Lifecycle Management Team – This team is responsible for the governance of Metrolinx Asset Information. As part of that mandate, this function develops and maintains:

   i.   Asset Information Standards;

   ii.   Enhancements and upgrades to EMMS Asset Information Systems (HxGN EAM), interfacing with the I&IT team;

   iii. Asset Information Handover Specifications/Requirements, which can be leveraged for project contracts;

   iv.   Supporting tools and templates for obtaining asset information;

   v.   Ensuring asset register data is applied to the Asset Information Systems;

   vi.   Ensuring the data dictionary has the latest list of values corresponding to an EMMS Asset Information Systems;

   vii. Ensuring that process and definitions outlined in the standard are in line with BS EN 50126-1:2017 "Railway applications – The specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS)";

   viii. Maintaining a set of internal standards and processes to ensure a consistent and integrated asset performance management through the use of asset data and information;

   ix.   Building the consistency around maintenance information provided for all asset classes to allow for efficient RAMS evaluation and analysis of all Metrolinx assets; and

   x.   Validating that the standard has all the fields and capabilities to house RAMS-related information and data for all Metrolinx assets.

2.1.2   Asset Class Teams - Each team is responsible for:

   i.   Identifying, obtaining and maintaining required asset-related data and documentation for their asset classes;

   ii.   Validating Asset Information provided as an output from capital projects or maintenance work;

   iii. Collecting and maintaining asset information for SOGR projects; and

   iv.   Ensuring the integrity of Asset Information in the Asset Information Systems is complete, accurate, current, and in compliance with all applicable data and information standards. Leading asset improvement initiatives.

2.1.3   Project Delivery Team – This team is responsible for:

i.   Ensuring that asset information is gathered for Capital Projects according to this Standard and related business handover protocols, timelines are met, asset information deliverables are provided; and

ii.   Providing the necessary tools, documents, and templates to project stakeholders so that Asset Information can be extracted into Metrolinx's AIS.

3. Asset Registry

3.1 Asset Definition

3.1.1   Metrolinx defines an asset to be any physical or tangible item that has potential or actual value to Metrolinx (excluding intellectual property, human resources, and financial instruments), as well as IT systems and software and one or more of the following are true:

    i.   Asset requires a maintenance plan approved for its care;

    ii.   Asset requires tracking for reliability and performance benchmarking; and

    iii.   Asset requires tracking by regulation or legislation or by legal/contractual or licensing requirements.

3.1.2   An Asset record shall be created and maintained in Metrolinx Asset Information Systems if it is either owned, operated, or maintained by Metrolinx.

3.1.3   An Asset shall be defined at the line replaceable unit (LRU) or at a level deemed appropriate by Asset Class Team.

3.2 Asset Hierarchy and Nomenclature

3.2.1   All Metrolinx Assets and their hierarchical structure shall be stored in Metrolinx's AIS in accordance with corresponding data dictionaries.

3.2.2   Asset Information shall follow Metrolinx Asset Hierarchy and Nomenclature wherever possible to maintain consistency.

3.2.3   The purpose of the Asset Hierarchy is to record assets into logical and functional groupings and sub-groupings.

3.2.4   The Functional Asset Hierarchy defines the functional parent-child relationships between Systems, Positions and Assets.

3.2.5   The Functional Asset Hierarchy is used to help identify related assets within a system, as well as to help identify ownership, responsibility, criticality, risk, performance, and lifecycle costing information.

3.2.6   Functional Hierarchy Structures are defined in section 4.0 of the Metrolinx Asset Information & Data Dictionary.

3.3 Asset Classification

3.3.1   All Assets shall be assigned an Asset Class and, where required, an Asset Category. The Asset Class Teams (e.g. Signals and Communications, Stations services) manage a set of Asset Classes.

3.4 Asset Tagging

3.4.1   The purpose of physical tags is to enable maintenance personnel to easily identify and scan an asset in the field. Each Asset Class Team is responsible for developing guidelines indicating if a tag is necessary and where to place the tag on the asset. In general, the tag should be affixed to the asset in a convenient place for scanning and not where the tag would be exposed to

weather and friction. There are various types of materials from which tags can be made, such as foil aluminum, polyester, and metal photo aluminum. The appropriate tag material should be chosen depending on the environment in which the asset resides. The location of asset tags visible to members of the public have further restrictions.

Asset Class Teams can also choose different tagging types where applicable (i.e. NFC, Bluetooth) and are responsible to establish processes to enable their usage and usability.

For a list of common Asset Classes and their suggested asset tag locations, reference *Asset Tagging Locations (Appendix 9.1)*.

3.5   Asset Registry

3.5.1   If applicable, all asset records shall have the following descriptive data elements recorded against them:

  i.   Status – indicates whether the Asset is, for example - 'Installed,' 'Decommissioned,' 'Withdrawn,' 'Awaiting purchase,' 'Instore;'

  ii.   Asset ID – unique identifier;

  iii.   Asset Description – typically describes the asset with additional supportive Information such as asset class, location, type, and tag;

  iv.   Operational Status – Indicates whether the Asset is, for example, 'In service,' 'Not in service,' or 'Standby;'

  v.   Department;

  vi.   Cost Centre;

  vii.   Condition;

  viii.   Service Life;

  ix.   Applicable Asset Specific fields;

  x.   Manufacturer – stores the manufacturer name of the Asset. Manufacturer names are standardized as a list of values and are defined in Section 5.1 of the Metrolinx Asset Information & Data Dictionary. If the manufacturer Information is not available, the value of 'Not Applicable' is selected;

  xi.   Model – Stores the model's name of the Asset; in the event there is no model name, enter Not Applicable;

  xii.   Serial Number – Stores the serial number of the asset; in the event there is no serial number, enter Not Applicable;

  xiii.   Commission Date – Indicates date the asset was commissioned or put into service;

  xiv.   Expected Service Life – Indicates the anticipated life of the asset in years;

  xv.   Replacement Value – Indicates the cost of replacing an existing asset with another asset having equivalent utility using current costs, standards and specifications for material, labour, engineering, installation, and overhead. In most situations, it represents the cost of constructing or acquiring an asset that delivers the same utility or capacity (i.e., incorporates new

technology), expressed in current dollars. The estimate shall be, at minimum, a Class Level 4 estimate based on AACE (Associated for the Advancement of Cost Engineering) International Guidelines;

     xvi.   Currency Year - Indicates the currency year used in the Replacement Value calculation; and

    xvii.   Asset Retirement Obligation - Liability Value.

3.6   Asset Condition Ratings

    3.6.1   Industry-accepted condition rating methodology shall be used for an asset class where applicable.

    3.6.2   Asset Condition Rating should be actively updated by the Asset Owner.

    3.6.3   In the absence of an industry-accepted condition rating table, the standard condition rating in Table 3-2 shall be assigned to the asset.

    3.6.4   If required, industry-accepted condition rating may be translated to the standard condition rating in Table 3-2.

TABLE 3-2 STANDARD CONDITION RATING TABLE

	Rating	Definition
5	Very Good (Fit for the future)	As new condition. Operable and well-maintained. Asset likely to perform adequately with routine maintenance. No additional work required.
4	Good (Adequate for now)	Acceptable physical condition, showing minor wear. Deterioration has minimal impact on asset performance. Only minor maintenance work required.
3	Fair (Requires attention)	Asset showing some wear. Minor components or isolated section of the asset need replacement or repair.
2	Poor (At risk)	Asset shows considerable wear and deterioration. Minor and major components need repair or replacement.
1	Very Poor (Unfit for sustained service)	Asset unserviceable. Asset not fit for use.

3.7   Asset Criticality

    3.7.1   Criticality is a measure of the importance of an Asset to the delivery of Metrolinx's strategic objectives. It is the consequence/impact resulting from a functional failure of an Asset.

    3.7.2   Assets shall be assigned a criticality rating on a five-point (5) scale, where a rating of five corresponds to highest impact and a rating of one being the lowest impact.

    3.7.3   Criticality ratings are based on the Metrolinx Risk Scoring Criteria Impact table. Should an Asset have multiple impact ratings (e.g. safety and operations), the most conservative (highest value) shall be used.

3.8   Asset Performance

    3.8.1   All assets with a defined or assigned RAMS target(s) such as MTBF, MTTR, and asset availability shall have this Information captured in Asset Information

Systems, ready to be used in asset performance monitoring and management processes such as FRACAS and RCA.

3.8.2   RAMS target(s) can be defined as part of the contractual obligations of an OEM/Supplier or can be assigned by the Asset Class Team and/or Engineering Reliability and Performance team as a performance goal, in order to attain compliance with business objectives and customer level of service requirements. Please refer to the SEA standards.

3.8.3   RAMS target Information shall also capture the source of the requirement, if applicable, such as the contract number for contractually binding requirements.

3.9   Linear Asset

3.9.1   All linear assets must contain from and to points (and length data points for the segmentation.

3.9.2   Every linear asset shall be segmented as required by the Asset Class Team.

3.10   Location

3.10.1   Location provides the whereabouts of the asset/system so that users can locate the asset/system. It can also provide additional cost rollup functionality.

3.10.2   The Location is one of the methods used to identify the geographical and physical location of Assets within the asset registry, independent of the functional hierarchy.

3.10.3   Assets may be assigned to a Location Hierarchy in addition to the Functional Asset Hierarchy.

3.11   Custom Asset Fields

3.11.1   All asset classes have custom fields associated with the asset and shall be populated with Information applicable to the class.

3.11.2   All custom field data element values shall comply with the code sets and values defined in section 6 of the Metrolinx Asset Information & Data Dictionary.

3.12   Asset Meter Data

3.12.1   Meters can be used to track asset utilization, consumption, usage, degradation, trigger maintenance, update condition rating and assist in decision making. Examples of meters include odometer for a bus, fuel consumption for a generator, amperage reading for a switch, runtime for a generator, number of door cycles for an overhead door and number of throws for a switch.

3.12.2   All Assets that have sensors or measuring devices may either have a meter record associated with it or be integrated with the AIS. Metrolinx shall own all data related to asset meters.

3.12.3   The Meters shall include the following attributes:

i.   Meter Unit ID – Stores the ID associated to the Meter;

ii.   Organization;

iii.   Meter Reading - Reading on the Meter;

       iv.   UOM (Meter) - Unit of Measure the Meter records; and

       v.   Type of Meter

3.13 Asset Warranties and Attributes

3.13.1   All Assets, Parts and Systems that have warranty coverage in effect shall have a warranty record associated with it.

3.13.2   All Assets, Parts and Systems that have warranty coverage shall have the following mandatory data elements:

       i.   Date of Warranty Commencing;

       ii.   Date of Warranty Expiration;

       iii.   Warranty Provider (ex. Contractor, Manufacturer etc.);

       iv.   Warranty Certificate;

       v.   Associated Warranty Claims;

       vi.   Asset Registry Documents (Documents such as Images, Drawings, and supporting Information can be attached to the Asset record);

       vii.   Parts Association; and

       viii. Assign consumable parts to individual assets where applicable.

4.   Asset Maintenance

4.1   Work Orders

4.1.1   Work Orders (WO) authorize maintenance work on assets that need to be assigned to a technician for completion.

4.1.2   Data collected through WOs enable reliability analysis and whole-life cost analysis.

4.1.3   Work orders shall be used to capture Information for all levels of maintenance (Level 1, Level 2, Level 3).

4.1.4   Work orders shall be assigned to an asset or system.

4.1.5   Work orders shall capture the asset or system downtime if applicable, being the time an asset was unavailable outside of agreed maintenance windows.

4.1.6   Applicable corrective and emergency work orders shall record the event ID from the Network Operations Control Centre linking the asset failure to operational impact.

4.1.7   Work order activities shall record:

   i.   Trade labor hours;

   ii.   Vendor labour;

   iii.   Purchase orders;

   iv.   Documents;

   v.   Inspection information;

   vi.   Parts material costs; and

   vii.   Technician trade tools to enable Cost of Maintenance calculations.

4.1.8   All State of Good Repair work completed shall be captured in a work order.

4.1.9   Work Order Types help categorize a WO to enable reporting on the kind of work being performed. Every WO Type shall belong to one of the three levels of maintenance as illustrated in figure below.

FIGURE 4-1 WORK ORDER TYPES
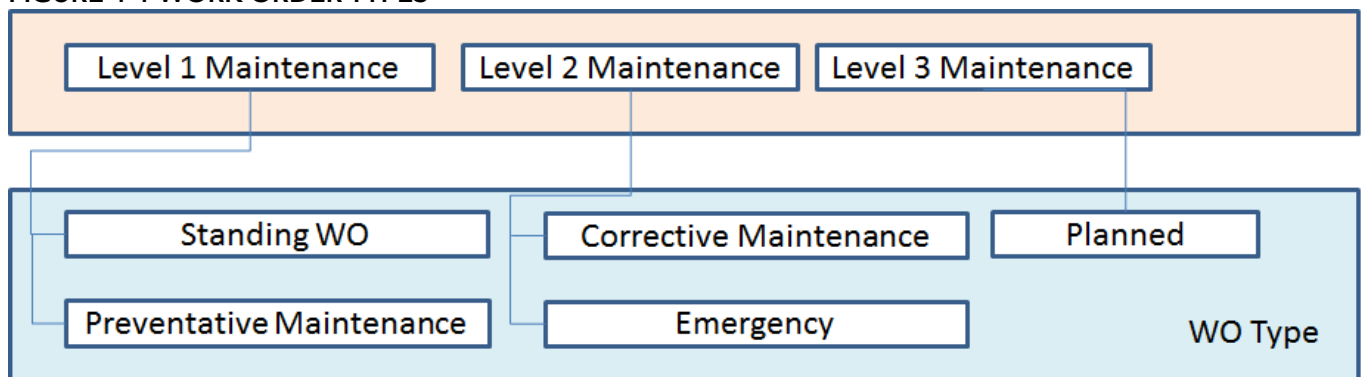
4.1.10   All WOs shall capture the following mandatory data elements:

  i.   Work Order Description – General Description of the Work Order;

  ii.   Asset – Identifies the Asset ID;

  iii. Organization – Asset Class Team Responsible for the WO;

  iv.   Date Created – Date and time the WO was created;

  v.   Date Started – Date and time the WO was started by the technician;

  vi.   Date Completed – Date and time the WO was completed by the Technician;

  vii. Department – Asset Class Team Responsible for the WO;

  viii. WO Type– Level 1, Level 2 or Level 3;

  ix.   Network Operations Control (NOC) Centre– Incidents if applicable;

  x.   Status – defines the status of a work order, such as Open, Closed or Cancelled; and

  xi.   WO Priority – Asset Class Team defines the urgency with which a WO should be treated.

TABLE 4-1 WORK ORDER PRIORITY

Priority	Description	Applicability
P1	1 – Urgent	The highest priority, indicating that the WO should be prioritized first in the queue
P2	2 – High	Indicates that there is a high degree of urgency for the WO
P3	3 – Medium	Indicates the Medium degree of urgency
P4	4 – Low	Indicates the Low degree of urgency
P5	5 – Routine	Indicates that the Work Order is routine work

4.2   Level 1 Maintenance – Preventative and Predictive

4.2.1   All Preventative and Predictive Work Orders shall be created in an EMMS and include the following:

  i.   Duration and Frequency;

  ii.   Release Window – percentage of time elapsed between cycles that the next WO for that PM gets released;

  iii. Task Plan including checklist, procedures, labour estimates, and part estimates; and

  iv.   Applicable documents.

4.3   Level 2 Maintenance - Corrective

4.3.1   All Corrective Work Orders shall be created in an EMMS and include the following:

 i.   Labour costs;

 ii.   Parts costs;

 iii.   Downtime (if applicable);

 iv.   Failure start datetime;

 v.   Failure end datetime; and

 vi.   Applicable attachments (i.e. Pictures)

4.3.2   Closing Codes:

 i.   Every Corrective or Emergency work order shall be assigned the appropriate closing codes to enable reliability analysis. All Asset Classes shall have a set of defined closing codes that are specific to the Asset Class;

 ii.   All closing codes shall be created in an EMMS using the code sets and values defined in Section 8 of the Metrolinx Asset Information and Data Dictionary; and

 iii.   Closing codes are defined by the Asset Class Team as a list or hierarchal tree comprising of, at minimum, the following three types (levels) of codes:

 a) Problem Code - a unique identifier for the way the Physical Asset fails to perform its intended function, such as "leaking," "seized," or "excessive vibration."

 b) Failure Code - a unique identifier that defines the specific component that failed and the type of failure, such as "gasket leaking."

 c) Action Code - sometimes called "remedy codes," identifies the action taken to rectify the asset issue, such as "replaced."

4.4   Level 3 Maintenance – Lifecycle Renewal

4.4.1   All Planned Work Orders shall be created in an EMMS and include the following:

 i.   Asset status changes (i.e., Installed, withdrawn vs decommissioned);

 ii.   Asset condition; and

 iii.   Applicable parts and service costs.

5.　Inventory Management

5.1　Parts

5.1.1　Metrolinx defines a Part (or SKU) as an item/material that is Purchased/Expensed for Inventory Management in order to operate and maintain an asset.

5.1.2　Parts descriptions are used to identify parts in detail.

5.1.3　The following naming convention for a SKU, in accordance with UNSPSC, shall be used:

FIGURE 5-1 METROLINX S DESCRIPTION NAMING CONVENTION
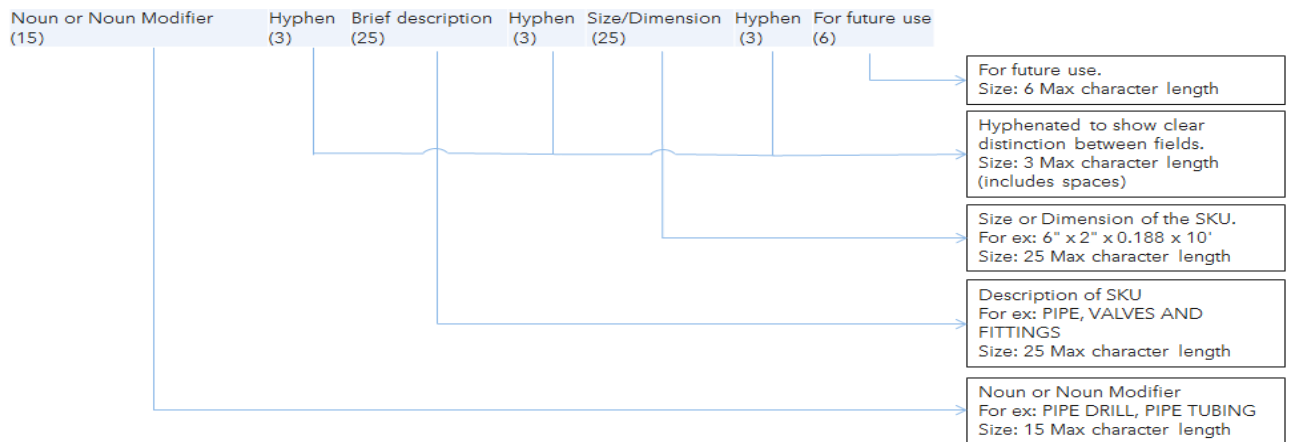
5.1.4　All parts shall have the following mandatory data elements recorded against them:

    i.　Part Number – Metrolinx generated part number;

    ii.　Part Description – Description based on Figure 5-1;

    iii.　Part Class – indicates the part is to be included in Item Master to be sent to Oracle EBS;

    iv.　Part Category - indicates which category the part belongs to (Core, Serialized, Regular, or Tool);

    v.　UOM – Unit of Measure of the parts usage quantity;

    vi.　Accounting Treatment- Indicates whether the part is expensed or inventory while indicating inventory account; and

    vii.　Tracking Method – indicates the method used to track the part (Stock, Non-Stock, Expense).

5.2   Parts Tracked as Assets/Serialized/Core

5.2.1   Tracked by Assets or Serialized Parts are pieces of Equipment that are tracked by Asset ID or Serial number.

5.2.2   Core Parts are tracked on Equipment that can be repaired internally through work orders or externally through purchase orders using the supplier credit process.

5.2.3   In order to receive and identify parts tracked as asset/serialized/core, the relevant part record shall first be created to identify the associated Part # and Bin#.

5.3   Stores

5.3.1   Stores are physical locations (fixed, roaming) where inventory is housed. All stock parts shall be assigned to a store.

5.3.2   Store Nomenclature for Fixed Stores shall be identified as follows:

[Org Structure] - [Store Name]

5.3.3   All Stores, at minimum, shall have the following mandatory recorded data elements:

i.   Store Code – Unique identifier of the store;

ii.   Description – Gives the description of the store;

iii.   Store Org – Organization or business unit to which the store belongs;

iv.   Class – List of Values used to specify a class to which the store belongs (Fixed, Roaming, Third Party, etc.);

v.   Auto Requisition Status – A status of the auto-generated requisition based on stocking policies. When generating a requisition to replenish stocked items, the requisition will go through a technical approval if the status is unfinished; this will allow for adjustments made to the requisition prior to sending to Oracle EBS; and

vi.   Delivery Location – list of values used to identify location of delivery for the parts maintained in Oracle by Metrolinx.

5.4   Bins

5.4.1   Bins are receptacles in a store for storing parts in a systematic way.

5.4.2   Each store has a default Bin identified as a "*Bin," and additional Bins can be created as required.

5.4.3   Bin Code Nomenclature shall be composed of the following:

[Shelf No.][AISLE No.][Shelf Row No.][Shelf Column No.]

5.4.4   All Bins shall have the following data elements recorded against them:

i.   Bin – unique code;

ii.   Description – describes the bin; and

iii.   Bin Status –indicates if the bin is active or inactive.

5.5   Parts Stocks

5.5.1   Parts Stocks are inventory records of on-hand quantities per store.

For uploading parts stock data into the system, the store, bin, lot, and on-hand quantity must be provided.

5.6   Supplier Parts Catalogues

5.6.1   Documents that provide Information on products offered by Vendor. Supplier parts catalogue records are generated from the Oracle system and include the supplier, supplier part, gross price, UOP, and quantity per UOP.

5.7   Parts Manufacturers

5.7.1   All Parts Manufacturers shall have the following mandatory data elements recorded against them:

    i.   Manufacturer – identify manufacturer of the part;

    ii.   Manufacturer part – part number that manufacturer uses;

    iii.   Part Condition - Specifies the physical state of the part; and

    iv.   Status – Indicates if the manufacturer is active or inactive.

5.8   Parts Prices

5.8.1   All Parts Prices shall have the following mandatory data elements recorded against them:

    i.   Organization – specify the Business Unit responsible for the part;

    ii.   Price Type – there are three types;

        a.   Average price - is the default;

        b.   Standard price – is selected if the condition value is "Dirty" (applies only to cores); and

        c.   Last Price – Currently not in use.

    i.   Price – there are three types; and

        a.   Average price - mean price over a period

        b.   Standard price – a uniform price that is pre-established

        c.   Last Price – last purchase price

5.9   Parts Substitutes

5.9.1   All Parts Substitutes shall have the following data elements recorded against them:

i.   Manufacturer – identify manufacturer of the part;

ii.   Manufacturer part – part number that is being substituted;

iii.   Substitute Part – specifies the alternate part;

iv.   Organization – specify the Business Unit responsible for the substitute part;

v.   Price Type – there are three types;

      a.   Average price - is the default;

      b.   Standard price – is selected if the condition value is "Dirty" (applies only to cores); and

      c.   Last Price – Currently not in use.

vi.   Price – there are three types; and

      a.   Average price - mean price over a period;

      b.   Standard price – a uniform price that is pre-established; and

      c.   Last Price – last purchase price.

vii. Compatibility – specifies if the alternate part is fully compatible.

6.   Geospatial Data

All fixed assets shall have corresponding geospatial data that adheres to the minimum mapping standards.

TABLE 6-1 MINIMUM STANDARD FOR GEOSPATIAL DATA	
Standard Type	**Standard**
Data Format	Metrolinx Assets' Geospatial Information is stored in the ESRI (Environmental Systems Research Institute) Geodatabase, and data is to be supplied to Metrolinx as File Geodatabase(s). Spatial data for assets to be derived from CAD Survey As-Built Drawings in compliance with the Metrolinx CADD/BIM Standards Manual, converted and transformed as required.

Data Sets	The spatial data for each asset type should be delivered in the form of a Geodatabase feature class. Contact the Metrolinx Enterprise GIS Team for the latest Geodatabase design report for data model and schema details about specific datasets. GDB Components include:
	
	    i. Feature Dataset;
	    ii. Feature Class;
	    iii. Geometry Type;
	          a. Point/Discrete
	          b. Line/Linear
	          c. Polygon/Area
	    iv. Tables;
	    v. Relationships between GDB objects; and
	    vi. Domains.

Vertical Reference Datum	If the collection of accurate elevation data is required as part of a project, it will be referenced to the Canadian Geodetic Vertical Datum (CGVD) 1928 Orthometric Elevation: CGVD1928:78 Adjustment.
Connectivity	All linear features must be connected with endpoints coincident (for example, all track elements must be connected). Point features which split linear features should be snapped and connected (for example, switch which splits 3 track segments). Point features that do not split linear features must not be connected to linear features (for example, Signals features that are adjacent to track segments).
Accuracy	Submeter (mapping grade) accuracy is required for visible assets. 10 cm accuracy is required for buried assets.
Datum/Projection	All data must be submitted in NAD_1983_CSRS_MTM_10 in compliance with the Metrolinx CADD/BIM Standard.

TABLE 6-1 MINIMUM STANDARD FOR GEOSPATIAL DATA	
Standard Type	**Standard**
Data Quality	Common identifier is required to associate asset location in GIS with asset attributes in EAM and asset related documents in EDRMS. This is required for database synchronization.

7.   Asset Documents

7.1.1   Asset information provided in the form of 2D and 3D imagery must adhere to latest version of the Metrolinx CADD/BIM Standards Manual (MX-ALM-STD-004).

7.1.2   Asset-relevant documentation includes, but is not limited to:

    i.   Issued for Construction (IFC);

    ii.   As-built drawings;

    iii.   Record drawings;

    iv.   As installed drawings;

    v.   Operations and maintenance manuals;

    vi.   Maintenance procedures;

    vii.   Troubleshooting manuals;

    viii.   Reports (e.g. test/inspection);

    ix.   Illustrated parts catalogue (IPC);

    x.   Original equipment manufacturer (OEM) documentation;

    xi.   Warranty documents;

    xii.   Shop drawings;

    xiii.   Bill of Materials;

    xiv.   Geospatial information;

    xv.   Asset Data (e.g. serial number manufacturer);

    xvi.   Agreement Documents; and

    xvii.   Applicable photography.

7.1.3   Metadata/attributes for asset documents, if applicable, shall include but not be limited to:

    i.   Asset Class;

    ii.   Document Type;

    iii.   Set/Collection Name;

    iv.   Document Name;

    v.   Format;

    vi.   Version;

    vii.   Content-Type;

    viii.   Sub Content-Type;

    ix.   Mileage/Distance;

    x.   Reference field; and

    xi.   File Geodatabase Reference.

7.1.4   If applicable, the document file naming conventions are to be followed as indicated in the Capital Projects Group ISO 19650 Compliant Drawing/Document Numbering Guide (CKH-DMC-GDE-007).

8. Metrolinx Asset Information Data Dictionary

8.1.1 The Metrolinx Asset Information and Data Dictionary has the function of providing an explicit standard list of asset class specific values and their definitions for the following:

    i.   Organization and Department codes;

    ii.   Overall asset hierarchy, location hierarchy and associated mnemonics;

    iii.   All asset classes and their categories and manufactures;

    iv.   Asset descriptive data and their list of values;

    v.   Asset specific custom fields and list of values;

    vi.   Work order classes, types and closing codes; and

    vii.   Master asset list.

8.1.2 The Metrolinx Asset Information and Data Dictionary is managed in separate repositories respective to the organizational department as follows:

    i.   Civil Asset Information and Data Dictionary (MX-ALM-DIC-001);

    ii.   Signals Asset Information and Data Dictionary (MX-ALM-DIC-002);

    iii.   Track Asset Information and Data Dictionary (MX-ALM-DIC-003);

    iv.   Station Facilities Asset Information and Data Dictionary (MX-ALM-DIC-004);

    v.   Bus Facilities Asset Information and Data Dictionary (MX-ALM-DIC-005); and

    vi.   Rail Facilities Asset Information and Data Dictionary (MX-ALM-DIC-006);

8.1.3 Metrolinx Data Dictionaries are regularly created and/or updated to reflect on the most current asset class data structure. Currently, data dictionaries are being developed for asset classes that are not identified in the dictionaries listed above.

9.   Appendix

9.1   Asset Tagging Locations

ASSET CLASS	TAG LOCATION	ASSET CLASS TEAM
Access Ladder	Left Side Upright at Bottom	Stations
Access Platform	Left Side Upright	Stations
Air Compressor	Top Right Corner of Panel	Rail Facilities
Air Compressor	Near Nameplate	Stations
Air Conditioning	Front of Panel	Signals
Air Handling Unit	Top Right Corner of Disconnect Switch	Rail Facilities
Air Handling Unit	Near Nameplate	Stations
Air-Conditioning - Condenser	Near Nameplate	Stations
Air-Conditioning - Indoor Evaporator	Near Nameplate	Stations
ATCS / BCP Base Comm. Package.	Front of Panel	Signals
ATCS / MCP Mobile Comm. Package.	Front of Panel	Signals
Backflow Prevention	Next to Manufacture Label	Rail Facilities
Backflow Prevention	Near Nameplate	Stations
BASE Station Radio	Front of Panel	Signals
Battery Powered Emergency Lighting and Exit Lighting	Next to Manufacture Label	Rail Facilities
Battery Powered Emergency Lighting and Exit Lighting	Near Nameplate	Stations
Boiler	Next to Manufacture Label	Rail Facilities
Boiler	Near Nameplate	Stations
Building Automation Controls	On Control Panel	Stations
Bus Exhaust System	Top Right Corner of Panel	Rail Facilities
Bus Wash System	Top Right Corner of Panel	Rail Facilities
Capacitor	Near Nameplate	Stations
Capacitor (Bank)	Top Right Corner of Panel	Rail Facilities
Chargers	Front of Unit	Signals
Chargers	Next to Manufacture Label	Rail Facilities
Check Valve (>100mm)	Next to Manufacture Label	Rail Facilities
Chemical Distribution System	Pot Feeder	Rail Facilities
Chiller	Top Right Corner of Panel	Rail Facilities
Chiller	Near Nameplate	Stations
Chiller - Cooling Tower	Near Nameplate	Stations
Chubb Security	Top Right Corner of Panel (System ID)	Rail Facilities
Circuit Breaker Enclosure	Top Right Corner of Panel	Rail Facilities
Circuit Breaker Enclosure	Top Left of Enclosure	Stations

Cleaning Solution Dispenser	Next to Manufacture Label	Rail Facilities
Code Unit	Front or Side	Signals
Cogn/Trigen	Top Right Corner of Panel	Rail Facilities
Comms Manager	Front of Unit	Signals
Control Panel	Below Panel Name	Stations
Control Panel (HVAC)	Below Label	Stations
Control Systems	Front or Side	Signals
Coolant Fluid System	On Wall in Front of Pumps	Rail Facilities
CPU2 MOD	Front of Panel	Signals
Crane	Top Right of Disconnect Switch	Rail Facilities
CWD CPU	Front of Panel	Signals
CWD Input/Output Card	Front of Panel	Signals
CWD Power Supply	Front of Panel	Signals
CWD Track Cards	Front of Panel	Signals
CWS Power Supply Card	Front of Panel	Signals
DC/DC converter	Front of Panel	Signals
DEF Dispenser	On Tank Front	Rail Facilities
Dehumidifier	Top Right Corner of Unit	Rail Facilities
Diesel Dispenser	Top Right Corner of Display	Rail Facilities
Diesel Storage Tank	Fill Portal Lid	Rail Facilities
Dome Structure	Inside Right Entrance	Rail Facilities
Domestic Water Distribution System (TANK)	Next to Manufacture Label	Rail Facilities
Door	Top Left Corner	Rail Facilities
Door	Top of Hinge Side on the Narrow Edge	Stations
Door Air Curtain	Top Right Corner of Disconnect Switch	Rail Facilities
Door Air Curtain	Near Nameplate	Stations
Draw-Out breaker	Top Left Corner	Stations
Dryer - Air Compressor	Top Right Control Panel	Rail Facilities
DTMF Base	Front of Unit	Signals
Duct Heater	Near Nameplate	Stations
Dust Collector	Top Right Corner of Disconnect Switch	Rail Facilities
Electric Heat Trace System	Next to Manufacture Label	Rail Facilities
Electric Heat Trace System	On System Control Panel	Stations
Electric Panels	Top Right Corner of Panel	Rail Facilities
Electrical/ Surge protection	Front of Unit	Signals
Elevator	Top Right Corner of Control Panel	Rail Facilities
Emergency Control Systems	Front of Unit	Signals
Emergency Defibrillator	Top Right of Box	Rail Facilities
Emergency Defibrillator	Hinge Side of the Cabinet on Cover Exterior	Stations
Emergency Generator	Top Right of Control Panel	Rail Facilities

Emergency Generator	Near System Nameplate, not Nameplate of Alternator	Stations
Emergency Plumbing Fixture	Front of Bowl	Rail Facilities
Emergency Plumbing Fixture	Below Sink of Eye Wash Station	Stations
Energy Management	On the Board	Signals
Engine Oil Fluid System	On Wall in Front of Pumps	Rail Facilities
Equipment House	On Wall by Door Internal/External	Signals
Event Recording	Front of Unit	Signals
Expansion Tank	Next to Manufacture Label	Rail Facilities
Expansion Tank	Near Nameplate	Stations
Fall Arrest System	Next to Manufacture Label	Rail Facilities
Fall Arrest System	On the Base	Stations
Fan	Control Panel	Rail Facilities
Fan	Near Nameplate	Stations
Fan Coil	Near Nameplate	Stations
Fire Extinguisher	Top of Fire Extinguisher	Rail Facilities
Fire Extinguisher	Near Nameplate of Extinguisher	Stations
Fire Hose and Cabinet	Front Right Cabinet	Rail Facilities
Fire Hose and Cabinet	Hinge Side of Cabinet Door Top Corner	Stations
Fire Panels	Control Panel	Rail Facilities
Fire Protection System	Sprinkler Room	Rail Facilities
Fire Pump	Near Nameplate	Stations
Fire Shutter	Control Panel	Rail Facilities
Fire Suppression Units	On Tank	Rail Facilities
First Aid Kit	Front Right Cabinet	Rail Facilities
First Aid Kit	Left Hand Side of Box	Stations
Fixed Furniture	On Frame of Bench or Bike Rack on the Left Side	Stations
Fixed Furniture (Platform)	On Frame of Bench or Bike Rack, Above Floor Level	Stations
Fixed Garbage Bin	On Frame on the Left Side	Stations
Flagpole	On Flagpole	Rail Facilities
Floor Heating/ Snow Melting System	Mechanical Room Pumps	Rail Facilities
Floor Heating/ Snow Melting System	On Control Panel	Stations
Fuel Distribution System - DEF	Front of Dispenser/Front of Pump	Rail Facilities
Fuel Distribution System - Diesel	Control Panel	Rail Facilities
Fuel Distribution System - Diesel	On Fuel Panel	Stations
Furnace	Near Nameplate	Stations
Fuse Disconnect	Top Right Corner of Panel	Rail Facilities
Gas Detection System	Top Right Corner of Panel	Rail Facilities
Gas Detection System	On Gas Detection Panel	Stations
Gas Distribution - Main Valve	On Shutoff Handle	Stations
Gas Distribution Piping System	On Piping Outside	Rail Facilities

Gas Distribution System	On Meter	Rail Facilities
Gate	Top Right Corner of Panel	Rail Facilities
Gate Mechanism	Inside Clam Shell	Signals
Gates	Control Panel	Rail Facilities
Generator Tank	Close to Refueling	Signals
Generators	Control Panel	Rail Facilities
Glycol Make-Up System	Top Right Corner of Panel	Rail Facilities
Ground Fault Detector	Front of Panel	Signals
Hand Dryer	Near Nameplate	Stations
Heat Exchanger	Top Right Corner of Panel	Rail Facilities
Heat Exchanger	Near Nameplate	Stations
Heat Recovery Unit	Top Right Corner of Panel	Rail Facilities
Heat Recovery Unit	Near Nameplate	Stations
Heat Trace System	Top Right Corner of Panel	Rail Facilities
Heating Unit	Front of Panel	Signals
High water detector	In Bungalow	Signals
Hold Clear	On Coil or Metal Frame	Signals
Hot Water Heater	Top Right Corner of Panel	Rail Facilities
Hot Water Heater	Near Nameplate	Stations
Humidifier	Top Right Corner of Panel	Rail Facilities
Humidifier	Near Nameplate	Stations
HVAC	Front of Unit	Signals
HVAC	Top Right Corner of Disconnect Switch	Rail Facilities
HVAC	Top Right Corner of Disconnect Switch	Rail Facilities
HVAC Air Distribution System	Top Right Corner of Panel	Rail Facilities
HVAC Air Distribution System	Near Nameplate	Stations
HVAC Piping System	Top Right Corner of Panel	Rail Facilities
Hydronic Pumps and Fixtures	On Manufactures Label	Rail Facilities
Hydronic System Water Treatment	Top Right Corner of Panel	Rail Facilities
Hydronic System Water Treatment	Near Nameplate	Stations
IDLOOP	On Control Box	Signals
In Ground Hoists	Top Right Corner of Panel	Rail Facilities
Interceptors	Closest Wall	Rail Facilities
Light Standard	On Pole	Rail Facilities
Light Standard	Below Handhole	Stations
Lighting	Next to Manufacture Label	Rail Facilities
Lighting	On Fixture	Rail Facilities
Lighting Control System	Top Right Corner of Panel	Rail Facilities
Lighting Control System	Below Control Panel Name	Stations
Load Bank	On Manufactures Label	Rail Facilities
Load Bank	Near Nameplate	Stations
Loading Dock Levelers	Top Right Corner of Panel	Rail Facilities
Low Voltage Distribution System	Top Right Corner of Panel	Rail Facilities

Low Voltage Distribution System	Below Panel Name	Stations
Low Voltage Panel Board	On Manufactures Label	Rail Facilities
Low Voltage Panel Board	Below Panel Name	Stations
Low Voltage Transformer	On Manufactures Label	Rail Facilities
Low Voltage Transformer	Near Nameplate	Stations
Medium/ High Voltage Distribution System	On Manufactures Label	Rail Facilities
Medium/ High Voltage Transformer	On Manufactures Label	Rail Facilities
Medium/High Voltage Transformer	On Manufactures Label	Rail Facilities
Medium/High Voltage Transformer	Near Nameplate	Stations
Metering Systems	Front of Panel	Signals
Modem Paradyne / LTE	Front Top Side	Signals
Modems	Front Top Side	Signals
Motor Control Centers (MCC)	On Manufactures Label	Rail Facilities
Motor Control Centers (MCC)	Near Nameplate or Tag	Stations
Motor Operated Valve and Actuator	On Valve	Rail Facilities
Motor Operated Valve and Actuator	On Valve	Rail Facilities
Motor Operated Valve and Actuator	Near Nameplate	Stations
Overhead Door	Top Right Corner of Panel	Rail Facilities
Overhead Door	Near Nameplate	Stations
Parts Washer	Top Right Corner of Panel	Rail Facilities
Petrovend	Top Right Corner of Panel	Rail Facilities
Photovoltaic Panels	Bottom Right Corner of Panel	Rail Facilities
Photovoltaic System	Top Right Corner of Panel	Rail Facilities
Photovoltaic System	By Nameplate on Disconnect Switch of PV System	Stations
Pit Jacks	On Manufactures Label	Rail Facilities
Plumbing Fixture	Above Fixture	Rail Facilities
Plumbing Fixture - Fountains	Above Fixture	Rail Facilities
Plumbing Fixture - Fountains	Near Nameplate	Stations
Portable Column Lift	On Manufactures Label	Rail Facilities
Portable Emergency Eyewash	On Manufactures Label	Rail Facilities
Portable Emergency Eyewash	Top Left-Hand Corner	Stations
Power Conversion	Front of Panel/Unit	Signals
Pressure Tank - Air Compressor	On Manufactures Label	Rail Facilities
Pressure Washer	Top Right Corner of Panel	Rail Facilities
Pump	On Manufactures Label	Rail Facilities
Pump	Near Nameplate	Stations
Radio	Front of Panel/Unit	Signals
Radios	Front of Panel/Unit	Signals
Rectifier	On Manufactures Label	Rail Facilities
Rectifier	Near Nameplate	Stations
Relays	Front of Panel/Unit	Signals
SCADA	Front of Panel/Unit	Signals
SCD Module	Front of Panel/Unit	Signals

SCD SCADA	Front of Panel/Unit	Signals
Septic Tank	Top Right Corner of Panel	Rail Facilities
Shed	Inside Right Entrance	Rail Facilities
Shelter	Inside Above Door	Rail Facilities
Shelter	Near Nameplate	Stations
Signs - Facility ID	On Manufactures Label	Rail Facilities
Snow Clearing Device	Internal Location	Signals
Solid State Crossing Controller	Front of Panel/Unit	Signals
Spill Kits Station	Top of Spill Station	Rail Facilities
Spill Kits Station	Left Hand Side of Box	Stations
Sprinkler System	Inside Right Entrance	Rail Facilities
Sprinklers/Valves	On Manufactures Label	Rail Facilities
Starters/MCC	Front of Panel/Unit	Signals
Storage Tank	On Manufactures Label	Rail Facilities
Storage Tank	Near Nameplate	Stations
Switchboard	On Manufactures Label	Rail Facilities
Switchboard	Near Nameplate	Stations
Switches	Front of Panel/Unit	Signals
Switchgear	On Manufactures Label	Rail Facilities
Switchgear	Near Nameplate or Tag	Stations
Terminal Heater	Near Nameplate	Stations
Tower Interlocker System	Access Panel Doorway	Signals
Train Fluids Distribution System	On Control Display Panel	Stations
Transfer Switch	Front of Panel/Unit	Signals
Transfer Switch	On Manufactures Label	Rail Facilities
Transfer Switch	Near Nameplate	Stations
Transformers	Front of Panel/Unit	Signals
Transformers	Top Right Corner Facing Technician	Rail Facilities
Transmission Fluid System	Mechanical Room Pumps	Rail Facilities
Uninterruptable Power Supply	On Manufactures Label	Rail Facilities
Uninterruptable Power Supply	Near Nameplate	Stations
UPS	Front of Panel/Unit	Signals
Utility Meters	On Meter	Rail Facilities
Utility Meters	Near Nameplate	Stations
Utility Pole	3ft Above Ground Level	Stations
UV Water Sterilization	On Manufactures Label	Rail Facilities
UV Water Sterilization	Near Nameplate	Stations
Variable Air Volume Unit	Near Nameplate	Stations
Veederoot	Top Right Control Panel	Rail Facilities
Vehicle Charging Unit	On Manufactures Label	Rail Facilities
Vehicle Charging Unit	Near Nameplate	Stations
VMICS	Front of Panel/Unit	Signals
VMICS CPU	Front of Panel/Unit	Signals
VMICS Input/Output Card	Front of Panel/Unit	Signals
VMICS Power Supply	Front of Panel/Unit	Signals

VMICS Track Cards	Front of Panel/Unit	Signals
Warning Device (Constant)	Side of Chassis Holding Cards	Signals
Warning Device (Crossing Lights)	Inside Close to Terminals	Signals
Waste Antifreeze Recovery System	Mechanical Room Pumps	Rail Facilities
Waste Coolant System	Mechanical Room Pumps	Rail Facilities
Waste Oil System	Mechanical Room Pumps	Rail Facilities
Waste Water Lift Station	Near Nameplate of Disconnect Switch	Stations
Water Softener	On Manufactures Label	Rail Facilities
Water Softener	Near Nameplate	Stations
Water Well	Outside at Pipe	Rail Facilities
Windshield Washer	Mechanical Pumps	Rail Facilities