



UNIVERSITY OF  
CALGARY

# BIM / VDC

## Contractor Requirement

December 2024, Ver 3.0

Developed by Facilities Development

**Table of Contents**

|  |   |           |
|--|---|-----------|
| <b>1.</b>  | <b>Executive Summary</b> .....                | <b>3</b>  |
| <b>2.</b>  | <b>BIM Deliverables</b> .....                 | <b>4</b>  |
| 2.1  | Construction BIM Execution Plan (BxP-C) ..... | 4         |
| 2.2  | BIM Model.....                                | 5         |
| 2.3  | Equipment Barcode.....                        | 7         |
| 2.4  | Facility Asset Data .....                     | 7         |
| 2.5  | O&M Manual & Report .....                     | 7         |
| 2.6  | Reality Capture.....                          | 8         |
| <b>3.</b>  | <b>BIM Processes</b> .....                    | <b>9</b>  |
| 3.1  | Meeting Procedure .....                       | 9         |
| 3.2  | Facility Asset Data Collection .....          | 9         |
| <b>4.</b>  | <b>Technology</b> .....                       | <b>10</b> |
| 4.1  | Authoring Software .....                      | 10        |
| 4.2  | Coordination Software.....                    | 10        |
| 4.3  | Field Asset Management Tool (FAMT).....       | 10        |
| 4.4  | Additional Tools.....                         | 10        |
| <b>5.</b>  | <b>Revit Models</b> .....                     | <b>11</b> |
| 5.1  | Geo-referencing and Origin Point .....        | 11        |
| 5.2  | Project North.....                            | 11        |
| 5.3  | Tolerances .....                              | 12        |
| <b>6.</b>  | <b>Facility Asset Data</b> .....              | <b>13</b> |
| 6.1  | Facility Asset Data Structure in IWMS.....    | 13        |
| 6.2  | Facility Asset Data Matrix.....               | 13        |
| 6.3  | Equipment Barcode.....                        | 14        |
| 6.4  | Space Asset Fields .....                      | 15        |
| 6.5  | Building Asset Fields.....                    | 15        |
| 6.6  | Equipment and FF&E Asset Fields.....          | 16        |
| <b>Appendix A. Barcode Placement Standard Operating Procedures</b> |   |           |

## 1. Executive Summary

University of Calgary (UCalgary) Facilities recognizes the value of Building Information Modeling (BIM), and Virtual Design and Construction (VDC) to improve our capital facility projects, and our internal building management program. We are committed to adopting BIM as a tool for project documentation and development, record documentation and to support the Integrated Workplace Management System (IWMS).

In addition to the [Design Standard](#) section 8.0 *Project Digital Delivery*, the BIM / VDC Contractor Requirement is a guide to assist the construction team in planning service for creating a VDC to IWMS vision. It provides guidance around the scope of BIM/VDC modeling and metadata required by UCalgary.

Related Design Standard sections:

- Section 8.2.2 Drawing Standard Appendix 2 - Asset Naming Convention
- Section 8.2.3 Drawing Standard Appendix 3 - Equipment Standard
- Section 9.7 Room Naming Convention

Throughout the construction, the following UCalgary departments will review the BIM/VDC, project metadata and associated documentation for verification, accuracy and delivery.

- Campus Architecture (CA), Facilities Development (FD)
- Campus Engineering (CE) & Capital Renewal, FD
- Operations & Maintenance, Facilities Management (FM)
- Caretaking, FM
- Archibus, FM
- Energy Planning & Innovation, Office of Sustainability (OS)
- Information Technology

If you have any questions about the BIM/VDC Contractor Requirement, please contact Campus Architecture.

## 2. BIM Deliverables

The Construction Manager (CM) shall ensure that all major trades' models are coordinated and clash free.

| Project Phase           | BIM/VDC Deliverable                              | File Format         |
|-------------------------|--|---------------------|
| <b>Contract Award</b>   | Outline Construction BIM Execution Plan (BxP-C)  | Word or PDF         |
| <b>Construction</b>     | Detailed Construction BIM Execution Plan (BxP-C) | Word or PDF         |
|                         | Equipment barcodes                               | Photos of equipment |
|                         | Facility asset data                              |                     |
|                         | O&M manual & report of each tagged equipment     | PDF                 |
|                         | Reality capture                                  |                     |
| <b>Project Closeout</b> | Federated as-built model                         | Navisworks (NWD)    |

### 2.1 Construction BIM Execution Plan (BxP-C)

The BIM Project Execution Plan (BxP) establishes a basis for better communication between BIM parties, and a schedule for BIM development. The UCalgary BIM/VDC Contractor Requirement should serve as a road map for helping create the BxP-C. The Construction Manager (CM) will create a BxP-C outlining the strategy and schedule for utilizing BIM and VDC technology to execute construction related activities and project coordination, and to comply with the requirements set out there. This should be presented in outline form as part of the proposal and upon award should be developed into a complete BxP-C. BxP-C is a live tool for the construction team. Keep UCalgary up to date with any deviations or changes. Required information to be addressed in BxP-C<sup>1</sup>:

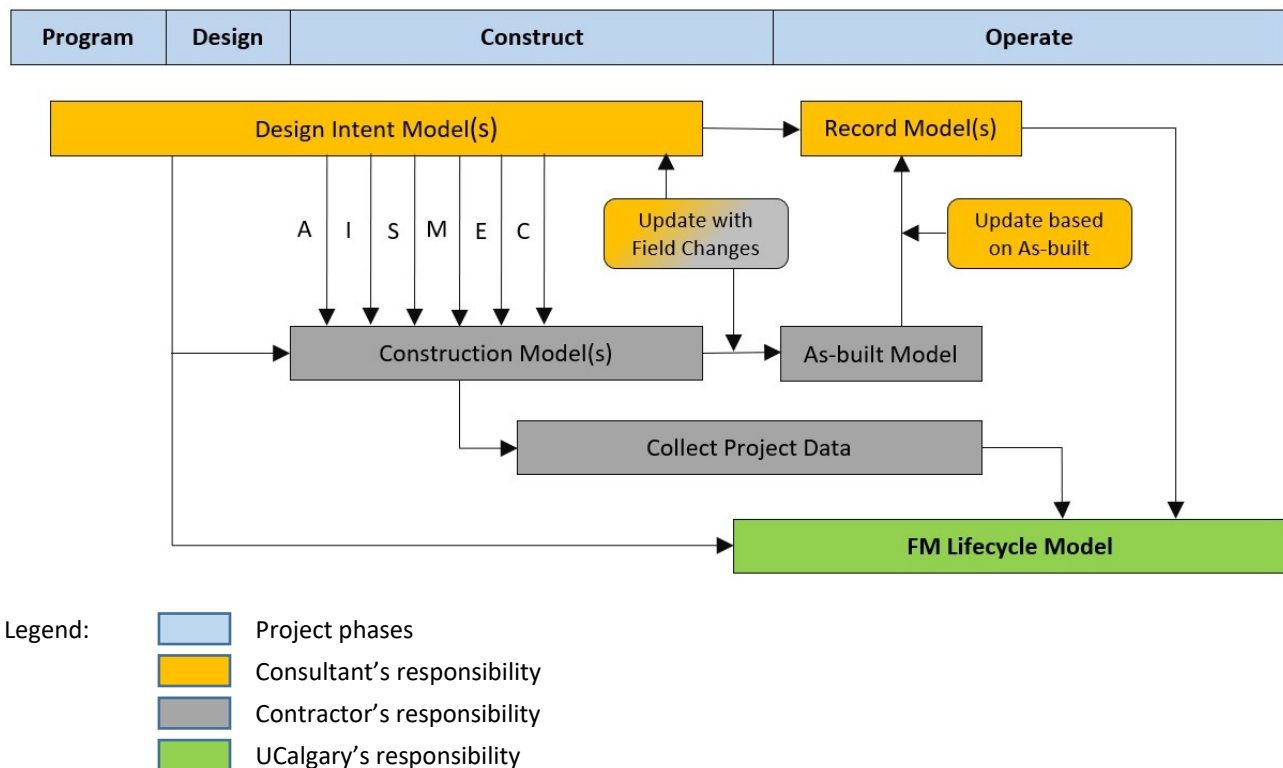
- **Overview Information:** Document the reason for creating the BxP.
- **Project Information:** Include project number, project location, project description, and critical schedule dates for future reference.
- **Key Project Personnel Contacts**
- **Project Goals / BIM Objectives:** Document the strategic value and specific uses for BIM on the project as defined by the project team in the initial step of the planning procedure.
- **Organizational Roles and Staffing:** Define the project coordinator(s) of the BIM planning and execution process throughout the various stages of the project. Identify the organization(s) who will initiate the development of the BIM Plan, as well as the required staff to successfully implement the plan.
- **BIM Process Design:** Clearly illustrate the execution process through the use of process maps.
- **BIM Information Exchanges:** The model elements and level of detail required to implement each BIM Use should be clearly defined in the information exchanges requirements.
- **BIM and Facility Data Requirements:** The owner's requirements for BIM must be documented and understood.
- **Collaboration Procedures:** Develop electronic and collaboration activity procedures. This includes the definition of model management procedures (e.g. file structures and file permissions) as well as typical meeting schedules and agendas.

<sup>1</sup> UCalgary references The Pennsylvania State University BIM Project Execution Planning Guide - Version 2.2.

- **Model Quality Control Procedures:** Ensure and monitor the project participants to meet the defined requirements throughout the project.
- **Technology Infrastructure Needs:** Define the hardware, software (version) and network infrastructure
- **Model Structure:** Document items such as model structure, file naming structure, coordinate system, workset structure, phase description and modelling standards.
- **Project Deliverables:** Document deliverables required by UCalgary.
- **Delivery Strategy / Contracts:** Define the delivery strategy which will be used on the project. The delivery strategy, e.g. design-build vs. design-bid-build, will impact implementation and it will also impact the language which should be incorporated into the contracts to ensure successful BIM implementation.

## 2.2 BIM Model

UCalgary needs to own, reuse and manage building data throughout the facility lifecycle. Consequently, UCalgary places significant importance on the accurate creation, management and stewardship of building information during model creation, and UCalgary expects that data created during design and construction will be reused throughout construction and into facility management. The construction models are to be developed during construction by the CM, contractor and/or sub-trades. As-built model(s) shall be provided by the CM at the end of construction for consultant to complete the record model(s).



*Figure 2.2 Lifecycle Model Process*

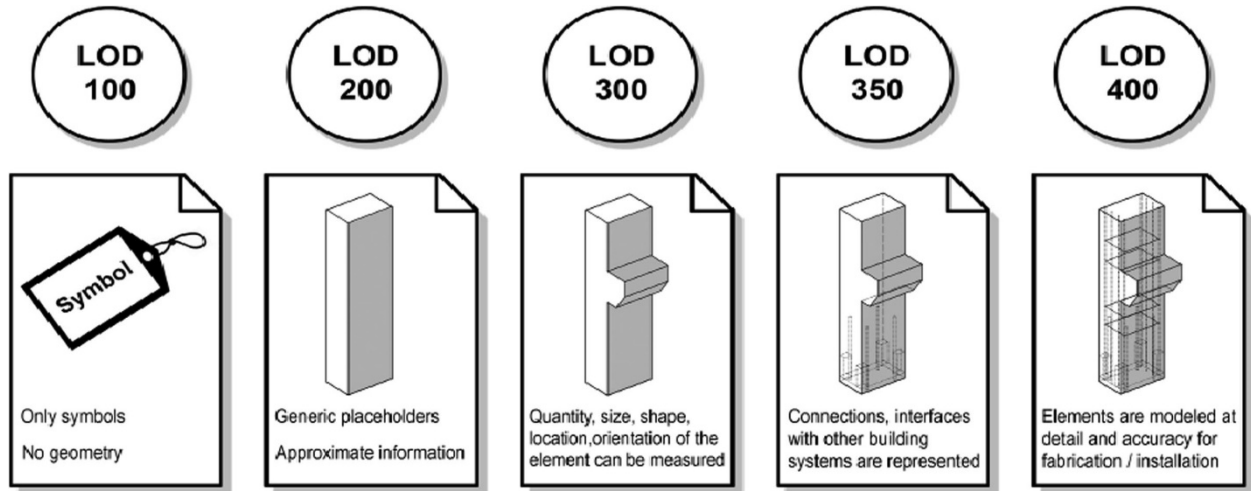
**2.2.1 BIM Model Level of Development (LOD)**


Figure 2.2.1 LOD Infographic

LOD is an important planning tool for setting goals and managing the team’s expectations. LOD is the maximum amount of information and geometry authorized for use by others and addresses the information, geometry, and organization needed to complete specific BIM uses in the given timeframe. UCalgary provides LOD guidelines for the model. Figure 2.2 legend applies to the following table. The LOD will be further addressed and developed using a Model Development Specification (MDS) once the project is awarded. The initial MDS shall be developed by the prime consultant and UCalgary after project kick-off. The CM shall continue to develop once the contract is awarded, and submit with the BxP-C.

| Phase         | SD  | DD      | CD  | Construction | As-built | Record |
|---------------|-----|---------|-----|--------------|----------|--------|
| LOD Guideline | 200 | 200/300 | 300 | 350          | 300/350  | 300    |

**2.2.2 Federated Coordination Model**

All construction modeling should reflect the exact geometric properties of the materials and/or systems being submitted. These models may include fabrication, shop drawing and other models for coordination. Once federated with all the design, construction, sub-trade, etc. models, this is to be referred to as the coordination model.

The CM will work with the design team and sub-trades to respond the RFIs and submittals, and will adjust the construction models accordingly while also using it for constructability analysis. If so determined in the BXP-C, the CM’s construction model may replace the design model during construction and within the coordination model. Sub-trade models are to be analyzed based on the design and be incorporated into the coordination model.

**2.2.3 Federated Construction Model**

Models based on submittals, RFI’s, or owner-directed changes; maintaining the model during construction based on construction activities and developed to reflect the actual fabrication of the building. These models are to include fabrication, shop drawing and other models developed during coordination and constructability reviews. The model is to always reflect the revised contract documents and can be used for scheduling analysis, construction sequencing if so desired.

The consultants will respond to the RFIs and submittals, and adjust the design models accordingly. The contractor will update this model throughout construction with supplier and sub-trade models.

#### 2.2.4 Federated As-built Model

The federated as-built model serves the final model based on updated coordination models including all field changes and data requirements, and it represents the actual assembly of the building. The CM will work with all consultants and sub-trades to finalize this construction model into an as-built model.

### 2.3 Equipment Barcode

The contractor is responsible for assigning equipment barcode and placing the equipment plate on the equipment on-site following the Appendix A “Barcode Placement Standard Operating Procedures.” UCalgary Facilities Management (FM) provides the contractor with a series of ‘peel and stick’ barcode numbers, metal plates and cable ties. UCalgary requires the contractor to submit photos of equipment with the installed barcodes.

If the project upgrades or replaces existing equipment, submit a list of the old barcodes, together with data (like the plate information of vessels) when these are removed or replaced.

### 2.4 Facility Asset Data

UCalgary intends to integrate the final deliverables, including the record models, into their lifecycle management solution. To meet this objective, it is important that the data requirements presented in section 6 are followed so they can be validated by the UCalgary’s IWMS. The integration of the as-built data into the IWMS is critical to O&M procedures. Electronic data from the model and as-built conditions allows the FM team to start planning for building startup and tracking building operations; instead of spending time “catching-up” with data entry after taking control of the building.

UCalgary does not attempt to track more metadata than can be practically used or maintained. These assets consist of the physical building, systems, surrounding environment, and equipment. Asset data specifications have indicated how to format design data so it can be consumed downstream into IWMS. UCalgary bi-directionally links asset in the FM lifecycle model to IWMS, and utilizes the data contained in the model to populate IWMS.

### 2.5 O&M Manual & Report

Contractors must submit the O&M manual & report of individual equipment items, floor and roof finish types in a combined PDF. The PDF file naming convention is

[UCalgary Building Code]-[Equipment Tag or Floor/Roof Finish Type].pdf

One document can cover multiple equipment units. The file name can be altered to follow these examples:

- ABC-AHU-1.pdf (AHU #1 in building ABC)
- ABC- P-DOWA-2\_4.pdf (Domestic water pump #2 to #4 in building ABC)

Record the file name in the field asset management software. The document must contain the following information:

- Commissioning functional tests
- Field test reports

- Job, resource & spare information
- Manufacture certificates
- Manufacture installation instructions
- Manufacturer test reports
- Material test reports
- Materials certificates
- Operations & maintenance manual
- Product certificates
- Product data
- Product test reports
- Shop drawings
- Spare parts list
- Start-up report
- As-built finish schedule
- Warranty

## 2.6 Reality Capture

The contractor is required to deliver the following reality capture. The data format and the data storage medium shall be defined in the BxP-C for acceptability.

### 2.6.1 Laser Scanning

At a minimum, scan all mechanical rooms, electrical rooms and washrooms. Where required by the project, scan additional spaces such as laboratories, surgery spaces, imaging rooms, etc. that have a significant amount of concealed services above the ceiling and/or behind walls.

- Scan at two project phases: prior to being enclosed (pre-board) and project close-out.
- Capture all equipment or rough-in details with installed barcodes and lamacoid plates
- Legible nameplates of all barcoded equipment where visible in the laser scan (otherwise please include in the 360-degree photo)
- Align the scan point cloud to match project coordinates
- RCP scan file format is required.

### 2.6.2 360-degree photos

The contractor shall provide digital 360-degree photographs of the spaces/rooms/equipment not included in the laser scanning (2.6.1 above).

- Photograph at two project phases: prior to being enclosed (pre-board) and project close-out.
- Space photographs need to capture all walls, ceilings, floors or slabs in the concealed spaces.
- Capture equipment or rough-in details with installed barcodes and lamacoid plates
- Legible nameplates of all barcoded equipment

The file naming convention of equipment photo is:

[UCalgary Building Code]-[Equipment Tag]\_[Sequence of photos if multiple files for one equipment]

- Equipment tag examples: AHU-1, SPU-1
- The sequence number is 1, 2, 3, etc.



### 3. BIM Processes

#### 3.1 Meeting Procedure

Design and Construct teams are responsible for defining the required meetings, frequency and needed participants to support the project BIM deliverables. UCalgary requires at least the following meetings.

##### 3.1.1 Construction BIM Kickoff Meeting

After award of the project, the contractor shall facilitate a project BIM kickoff meeting, which will review UCalgary BIM/VDC Requirements and the Construction BIM Execution Plan (BxP-C).

##### 3.1.2 Barcode Orientation Meeting

Prior to installation of the first barcode, the contractor shall facilitate a barcode orientation meeting. UCalgary FM representative will review barcode installation requirements and answer questions from the construction team.

##### 3.1.3 Contractor's VDC Meeting

Consultants should attend all relevant VDC meetings during construction.

#### 3.2 Facility Asset Data Collection

UCalgary intends to integrate the final deliverables, including the record models, into their lifecycle management solution. To meet this objective, it is important that the data requirements presented in this document be followed so they can be validated by the UCalgary's IWMS. The integration of the as-built data into the IWMS is critical to UCalgary's O&M procedures. Electronic data from the model and as-built conditions allows the FM team to start planning for building startup and tracking building operations; instead of spending time "catching-up" with data entry after taking control of the building.

UCalgary's data specifications have indicated how to format design and construction data so it can be consumed downstream into the facility software. The data sets include information necessary to building operation, all of which is integrated into this BIM/VDC workflow.

Quarterly, at a minimum, the CM shall include UCalgary and all BIM managers in a meeting for the purpose of assessing and/or executing FM data reviews and/or transfers from the construction process. The CM will be responsible for coordinating with UCalgary to ensure all custom metadata fields and documentation needed for facilities O&M are produced and filed correctly. It will be the UCalgary's responsibility to integrate systems so that metadata and documentation is transferred to the IWMS.

Many data identified in *BIM/VDC Requirement* are collected by the contractors once the equipment are installed. The contractors submit individual equipment data in an agreed format, and identify equipment parent and child relationship. The contractors will also verify the required design data with the actual equipment on site.

## 4. Technology

### 4.1 Authoring Software

All contractors are required to use the following design authoring software. Projects will remain on the same software release throughout the life of the project unless approved by the entire team.

- Autodesk Revit (Acceptable version up to Revit 2025)

### 4.2 Coordination Software

The construction teams are required to provide a platform for collaboration and live model review. Coordination software shall be used for assembling the various design models to electronically identify, collectively coordinate resolutions, and track and publish interference reports between all disciplines. The trades shall be responsible for updating their models to reflect the coordinated resolution.

### 4.3 Field Asset Management Tool (FAMT)

A secure, cloud-based, web or mobile Field Asset Management application that delivers a complete field management solution shall be used. This system will electronically enable workflows for quality, commissioning and document management processes in the field and in the office; proven to reduce rework, delays and eliminate paper.

- Autodesk BIM 360 Field, or agreed software

### 4.4 Additional Tools

The construction teams are encouraged to explore options to use the BIM and other electronic tools to enhance the project quality and delivery times. UCalgary is interested in fostering and supporting innovation, and encourages bold steps toward trying new ways to improve business process efficiency, design, and project outcomes.

## 5. Revit Models

The following requirements apply to both design intent models and construction models.

### 5.1 Geo-referencing and Origin Point

In addition to the geometric data and information specific to the project, project teams shall also capture the full extent of the assets on campus that extends beyond the exterior walls of the building. While the spatial and asset information about a building may be seen at a micro-level of BIM, the larger geospatial and site information/context should be seen at the macro-level. The information to be captured by the design and construction team will be in accordance with survey requirements for use in UCalgary's GIS applications. This mutual integration of building, site and GIS data will bring a holistic BIM approach to the operation and planning phases.

To align with the City of Calgary spatial data standard, UCalgary uses the following reference system:

- Horizontal datum: North American Datum (NAD) 1983 CSRS
- Coordinate system: 3TM 114 (EPSG:3780)
- Vertical datum: CGVD2013
- Geoid model: CGG2013

UCalgary requires models to be correctly placed in 3D space using the real-world coordinate system for the building. The prime consultant's BIM manager shall establish the project shared coordinate system across all BIM data files allowing them to be referenced without modification. Once established, spatial coordinates shall only be changed by approval from UCalgary. Any model(s) of existing buildings relevant to the project shall be converted into the coordinate system used for each designed building. The location of the building at real-world coordinates, true heights, and shared coordinate systems are established by the BIM Manager in the site model.

These requirements form the basis of defining the projects' relative building coordinate system and need to be coordinated between the civil, architectural and structural disciplines at the beginning of the project and be listed in the BxP-D (Design BIM Execution Plan). The project origin (intersection of structural grid A and 1) shall be aligned with the project base point.

All models must be in the correct location in 3D space (x, y and z coordinates). Models should be inserted by auto-origin to origin. The correct insertion point is critical, and each model should align properly without modification when linking and coordinating. All models should contain their own grids and levels to ensure the correct location.

### 5.2 Project North

For the purpose of specifying horizontal locations and orientations of objects in models and drawings, the following definitions apply:

**True north:** Orientation of objects in a model or a drawing in accordance with the geographical north orientation. Locations have the correct coordinates in accordance with the coordinate system of Calgary.

**Project north:** Objects in a model are oriented for the convenience of the modelling and drafting process. The orientation and location of the building are defined by the prime consultant and followed by all other disciplines. Project north must be defined in terms of its rotation angle relative to true north to at least 8 decimal places. All models and documents shall follow the project north orientation.

### 5.3 Tolerances

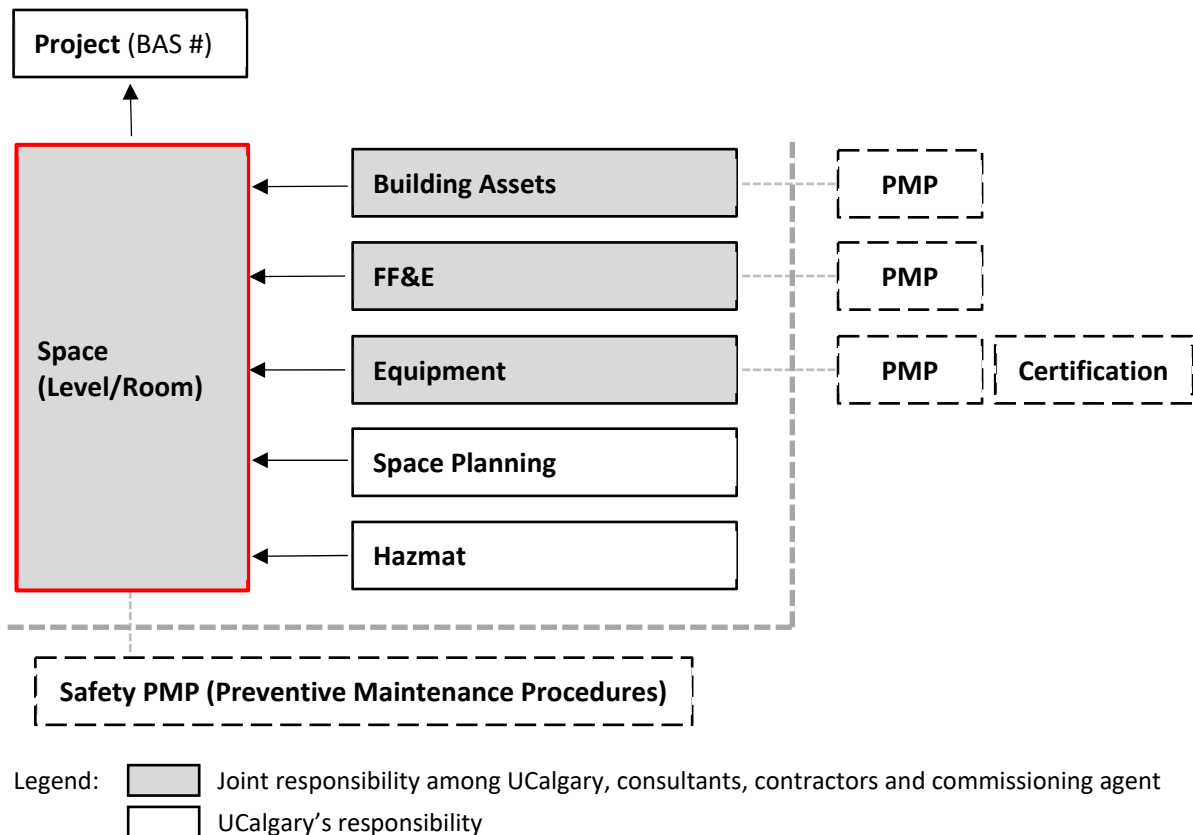
According to State of Minnesota BIM GUIDELINE (2014), “‘Model Tolerance’ is different from ‘Field Tolerance’ that will vary for different trades based on their specifications. This model tolerance is a measure of accuracy of the model objects as they are placed in the 3D BIM. Even if the objects in the model are placed to an accuracy of 1/256” in the model but the dimensioned drawings from the model contain dimensions to the level of accuracy of 1/8” of an inch, 1/8” of an inch will be treated as the ‘Model Tolerance’. Model Tolerance will vary based on objects and existing conditions modeled. The model tolerances shall be discussed and agreed upon by all BIM team members” (p. 28).

| <b>BIM Deliverable</b>    | <b>Discipline</b>                                       | <b>Tolerance</b>  |
|---------------------------|---|---|
| Existing Condition Models | Civil   | Accurate to +/- 50mm of existing size<br>Accurate to +/- 300mm of existing location         |
| Existing Condition Models | Architectural<br>Structural<br>Mechanical<br>Electrical | Accurate to +/- 5mm of existing size<br>Accurate to +/- 50mm of existing location           |
| Design Intent Models      | All disciplines   | Accurate to +/- 5mm of design intent size<br>Accurate to +/- 50mm of design intent location |
| Trade Coordination Models | All disciplines   | Accurate to +/- 1.5mm of actual size<br>Accurate to +/- 25mm of actual location             |
| Shop Drawing Models       | All disciplines   | Accurate to +/- 1.5mm of actual size<br>Accurate to +/- 25mm of actual location             |
| As-built Models           | All disciplines   | Accurate to +/- 1.5mm of actual size<br>Accurate to +/- 25mm of actual location             |
| Record Models             | All disciplines   | Accurate to +/- 1.5mm of actual size<br>Accurate to +/- 25mm of actual location             |

## 6. Facility Asset Data

### 6.1 Facility Asset Data Structure in IWMS

The space assets are the core in the Facilities' IWMS, and "accommodate" other physical assets, e.g. FF&E and equipment. Preventive Maintenance Procedures (PMP) will then be assigned to space assets, building assets, equipment, and furniture, fixture & equipment (FF&E).



### 6.2 Facility Asset Data Matrix

BIM and associated metadata will serve as the "live" data source throughout the life of the project, starting with design. Data collection of any asset is not limited to a single discipline of a specific category. It can be a collaborative effort among UCalgary, consultants, contractors and commissioning agent. It is important that there is a balance of structured information to support both design and constructability as well as building maintenance and operations information. Further review and explanations of the process can be reviewed and evaluated at the project BIM kick-off meeting.

The facility assets are categorized as space, building, equipment and FF&E. Some equipment assets contain the "common" components (e.g. motor) with metadata, which are gathered as child equipment group. To clarify some headings in the following matrix:

- **AEC Parameter:** UCalgary requires the use of Revit default parameters with the custom shared parameters\* identified in the following matrix for all asset fields.
- **Data Format:** Required units of measurement or data input options

- **Data Owner:** If a Data Owner is listed as Architect or Engineer, this data is entered in the design intent model by the consultant, and is required to be verified against the installed equipment by the contractor. Any deficiency should be reported back to the consultant. The Contractor’s fields of responsibility must be complete upon installation of all equipment on site.
- **Authoring Software:** Refer to section 4.1 Authoring Software and section 4.3 Field Asset Management Tool (FAMT).

Clarification of fields used in this section:

- **UC\_Equipment Barcode:** The consultant team creates this shared parameter in Revit as a placeholder and leave the value blank. The contractor will install the barcode and populate the data in the construction model.
- **UC\_Equipment Standard:** The consultant team creates this shared parameter in Revit as a placeholder and leave the value blank. UCalgary inventories assets by using a universally applied Equipment Standard, which naming convention is described in [Design Standards](#) section 8.2.3 *Equipment Standard*. The possible data are listed for the contractors to understand which asset UCalgary tracks in IWMS. UCalgary FM team will populate the data in the Field Asset Management Tool (FAMT).
- **UC\_Equipment Tag:** Refers to the alpha numeric code on the equipment lamacoids and [Design Standards](#) Section 8.2.2 - *Equipment Asset Naming Convention*.
- **UC\_Area/System Served:** Require detailed description to help FM service calls. Examples:

| Example of Equipment      | Example of Area/System Served Values       |
|---------------------------|--|
| Supply Fan Wall           | Level 1 – 6: NE corners                    |
| Stair Pressurization Unit | Stairwell [Room no.]                       |
| Booster Pump              | Domestic cold water (Feeding LEVEL 7 - 15) |
| Grey Water Pump           | Level 1 -7: toilets, urinals               |
| Heat Exchanger            | Primary chilled water for building cooling |

- **Require IP Address:** Field value is Yes, No, N/A. Contractor coordinates with UCalgary Central IT and inputs whether the equipment has an IP address or not. If an equipment with IP address is decommissioned or replaced, the trade will have to coordinate with Central IT.
- **Warranty Start Date:** If the warranty start date is unknown, the date of substantial performance shall be used.

Further requirements:

- **Format of date:** is YYYY-MM-DD. It is not acceptable to only fill in the year.
- **Unit of measurement:** Include unit of measurement with an equipment field value, which should be taken from the manufacture plate or manual.

### 6.3 Equipment Barcode

Refer to Appendix A “Barcode Placement Standard Operating Procedures”, UCalgary barcodes equipment based on building (e.g., distribution breaker), system (e.g., piping), or unit (e.g., AHU).

When physical barcodes are impossible to be installed to some equipment, the barcode number will still be used and logged in the UCalgary IWMS. The physical barcode tag shall not be used for other equipment, and needs to be returned to the Facilities Maintenance Planning team. For example, AHU fan wall system will be physically barcoded, and each single fan unit shall be “virtually” barcoded.

The “common” equipment components (e.g. motor) in child equipment group are not barcoded.

#### 6.4 Space Asset Fields

Contractor will verify room number, finishes of wall, ceiling and wall base on site, and report any deficiency on the drawing to the consultant.

#### 6.5 Building Asset Fields

| AEC Parameter          | Parameter Type | Data Format  | Data Owner                     | Authoring Software |
|------------------------|----------------|--|--------------------------------|--------------------|
| <b>Floor Finish</b>    |                |  |                                |                    |
| UC_Equipment Barcode*  | Text           | Up to 8 characters   | UCalgary                       | FAMT               |
| UC_Equipment Standard* | Text           | FLOOR-FINI-XXXXX   | Architect                      | FAMT               |
| UC_Building Code*      | Text           | Up to 8 characters   | Architect                      | Revit              |
| Level                  | Text           | Up to 4 characters   | Architect                      | Revit              |
| Rooms: Number          | Text           | Up to 8 characters   | Architect                      | Revit              |
| Floor Finish: Type     | Text           | Carpet; Laminate; LVT; Metal; Polished Concrete; Quarry; RSF; Rubber; Stone; Terrazzo; Tile; VCT; Wood | Architect or Interior Designer | Revit              |
| Manufacturer           | Text           | Up to 32 characters  | Contractor                     | FAMT               |
| Model Number           | Text           | Up to 32 characters  | Contractor                     | FAMT               |
| Date of Manufacture    | Date           | yyyy-mm-dd   | Contractor                     | FAMT               |
| Warranty Start Date    | Date           | yyyy-mm-dd   | Contractor                     | FAMT               |
| Warranty Duration      | Number         | year   | Contractor                     | FAMT               |
| O&M Manual             | Text           | Up to 32 characters  | Contractor                     | FAMT               |
|                        |                |  |                                |                    |
| <b>Roof Finish</b>     |                |  |                                |                    |
| UC_Equipment Barcode*  | Text           | Up to 8 characters   | UCalgary                       | FAMT               |
| UC_Equipment Standard* | Text           | ROOFX-XXXX-XXXXX   | Architect                      | FAMT               |
| UC_Building Code*      | Text           | Up to 8 characters   | Architect                      | Revit              |
| Level                  | Text           | Up to 4 characters   | Architect                      | Revit              |
| Rooms: Number          | Text           | Up to 8 characters   | Architect                      | Revit              |
| Roof Finish Type       | Text           | Up to 32 characters  | Architect                      | Revit              |
| Manufacturer           | Text           | Up to 32 characters  | Contractor                     | FAMT               |

| AEC Parameter       | Parameter Type | Data Format         | Data Owner | Authoring Software |
|---------------------|----------------|---------------------|------------|--------------------|
| Model Number        | Text           | Up to 32 characters | Contractor | FAMT               |
| Date of Manufacture | Date           | yyyy-mm-dd          | Contractor | FAMT               |
| Install Date        | Date           | yyyy-mm-dd          | Contractor | FAMT               |
| Warranty Start Date | Date           | yyyy-mm-dd          | Contractor | FAMT               |
| Warranty Duration   | Number         | year                | Contractor | FAMT               |
| O&M Manual          | Text           | Up to 32 characters | Contractor | FAMT               |

## 6.6 Equipment and FF&E Asset Fields

### 6.6.1 Equipment and FF&E Asset Fields for All

All equipment and FF&E asset need to include the fields in this section.

| AEC Parameter                     | Parameter Type | Data Format         | Data Owner | Authoring Software | Remark  |
|-----------------------------------|----------------|---------------------|------------|--------------------|---|
| UC_Equipment Barcode*             | Text           | Up to 8 characters  | Contractor | Revit              |   |
| UC_Equipment Standard*            | Text           | Up to 16 characters | Engineer   | FAMT               | Refer to section 6.2                              |
| UC_Building Code*                 | Text           | Up to 8 characters  | Architect  | Revit              | Refer to <a href="#">Facilities Building List</a> |
| Level                             | Text           | Up to 4 characters  | Architect  | Revit              | UC provides info                                  |
| Rooms: Number                     | Text           | Up to 8 characters  | Architect  | Revit              | Refer to <a href="#">DS</a> 8.6.2.4               |
| UC_Equipment Tag*                 | Text           | Up to 32 characters | Engineer   | Revit              | Refer to section 6.2                              |
| UC_Area/System Served*            | Text           | Up to 64 characters | Engineer   | Revit              | Refer to section 6.2                              |
| Require IP Address                | Text           | Yes, No, N/A        | Contractor | FAMT               | Refer to section 6.2                              |
| MAC Address                       | Text           | Up to 32 characters | Contractor | FAMT               |   |
| Manufacturer                      | Text           | Up to 32 characters | Contractor | FAMT               |   |
| Model Number                      | Text           | Up to 32 characters | Contractor | FAMT               |   |
| Serial Number                     | Text           | Up to 32 characters | Contractor | FAMT               |   |
| Date of Manufacture               | Date           | yyyy-mm-dd          | Contractor | FAMT               | Refer to section 6.2                              |
| Install Date                      | Date           | yyyy-mm-dd          | Contractor | FAMT               | Refer to section 6.2                              |
| Warranty Start Date               | Date           | yyyy-mm-dd          | Contractor | FAMT               | Refer to section 6.2                              |
| Warranty Duration                 | Number         | year                | Contractor | FAMT               |   |
| Recommended Maintenance Frequency | Text           | Up to 16 characters | Contractor | FAMT               |   |
| O&M Manual                        | Text           | Up to 32 characters | Contractor | FAMT               | Refer to section 2.7                              |



**6.6.2 FF&E Asset Specifics**

| AEC Parameter          | Parameter Type | Data Format                          |                         | Data Owner | Authoring Software |
|------------------------|----------------|--------------------------------------|-------------------------|------------|--------------------|
| <b>Dock Leveler</b>    |                |                                      |                         |            |                    |
| UC_Equipment Standard* | Text           | DOCKL-HYDR-XXXXX<br>DOCKL-MECH-XXXXX | Hydraulic<br>Mechanical | Engineer   | FAMT               |
| <b>Fume Hood</b>       |                |                                      |                         |            |                    |
| UC_Equipment Standard* | Text           | FHOOD-XXXX-XXXXX                     |                         | Engineer   | FAMT               |
| UC_Type*               | Text           | Canopy; Fume Hood; Snorkel           |                         | Engineer   | Revit              |
| UC_Width*              | Text           | ft                                   |                         | Engineer   | Revit              |
| UC_Duty*               | Text           | Chemical; Radioisotope; Other        |                         | Engineer   | Revit              |
| UC_Control*            | Text           | Constant Volume; Variable Volume     |                         | Engineer   | Revit              |
| Hood Volume            | Text           | CFM                                  |                         | Contractor | FAMT               |

**6.6.3 Mechanical Equipment Asset Specifics**

| AEC Parameter   | Parameter Type | Data Format  |  | Data Owner | Authoring Software |
|---|----------------|--|--|------------|--------------------|
| <b>Air Conditioning Unit / Air Conditioning Condenser</b> |                |  |  |            |                    |
| UC_Equipment Standard*                                    | Text           | ACUXX-XXXX-XXXXX   |  | Engineer   | FAMT               |
| Capacity  | Text           | KW; Tons   |  | Contractor | FAMT               |
| Motor   | Text           | Yes; No  |  | Contractor | FAMT               |
| Compressor Type   | Text           | Centrifugal; Heat Pump; Magnetic; Screw                  |  | Contractor | FAMT               |
| Number of Compressors                                     | Text           |  |  | Contractor | FAMT               |
| R-Type  | Text           |  |  | Contractor | FAMT               |
| Full Factory Refrigerant Charged                          | Text           | Kg; LBS/OZ   |  | Contractor | FAMT               |
| Motor Group (Multiple)                                    |                |  |  |            |                    |
| <b>Air Handling Unit</b>                                  |                |  |  |            |                    |
| UC_Equipment Standard*                                    | Text           | AHUXX-XXXX-XXXXX<br>AHUXX-RETX-XXXXX<br>AHUXX-SUPX-XXXXX | AHU system<br>AHU - return fan<br>AHU - supply fan | Engineer   | FAMT               |
| Coil Type   | Text           | Chilled Water; Glycol; Hot Water                         |  | Engineer   | Revit              |
| Capacity  | Text           | KW; Tons; BTU  |  | Contractor | FAMT               |
| Variable Speed Drive                                      | Text           |  |  | Contractor | FAMT               |
| Fan Volume  | Text           | CFM  |  | Contractor | FAMT               |
| Total Static Pressure                                     | Text           | kPa; inch-w/c  |  | Contractor | FAMT               |
| Type of Control   | Text           | DDC; Pneumatic   |  | Contractor | FAMT               |

| AEC Parameter                       | Parameter Type | Data Format                             |                              | Data Owner | Authoring Software |
|-------------------------------------|----------------|---|------------------------------|------------|--------------------|
| Energy Recovery                     | Text           | Energy Wheel; Heat Pipe; Runaround Coil |                              | Contractor | FAMT               |
| Motor Group (Multiple)              |                |   |                              |            |                    |
| Coil Group (Multiple)               |                |   |                              |            |                    |
|                                     |                |   |                              |            |                    |
| <b>Air Handling Condenser</b>       |                |   |                              |            |                    |
| UC_Equipment Standard*              | Text           | AHUXX-CUXX-XXXXX                        |                              | Engineer   | FAMT               |
| Capacity                            | Text           | KW; Tons                                |                              | Contractor | FAMT               |
| Motor                               | Text           | Yes; No                                 |                              | Contractor | FAMT               |
| Compressor Type                     | Text           | Centrifugal; Heat Pump; Magnetic; Screw |                              | Contractor | FAMT               |
| Number of Compressors               | Text           |   |                              | Contractor | FAMT               |
| R-Type                              | Text           |   |                              | Contractor | FAMT               |
| Full Factory Refrigerant Charged    | Text           | Kg; LBS/OZ                              |                              | Contractor | FAMT               |
| Motor Group (Multiple)              |                |   |                              |            |                    |
|                                     |                |   |                              |            |                    |
| <b>Air Handling Energy Wheel</b>    |                |   |                              |            |                    |
| UC_Equipment Standard*              | Text           | AHUXX-HRWX-XXXXX                        |                              | Engineer   | FAMT               |
| Motor Group (Multiple)              |                |   |                              |            |                    |
|                                     |                |   |                              |            |                    |
| <b>Backflow Prevention Assembly</b> |                |   |                              |            |                    |
| UC_Equipment Standard*              | Text           | BFPXX-XXXX-XXXXX                        |                              | Engineer   | FAMT               |
| Size                                | Text           | in                                      |                              | Contractor | FAMT               |
|                                     |                |   |                              |            |                    |
| <b>Barrier</b>                      |                |   |                              |            |                    |
| UC_Equipment Standard*              | Text           | BARRX-AIRX-XXXXX<br>BARRX-H2OX-XXXXX    | Air curtain<br>Water curtain | Engineer   | FAMT               |
| Capacity                            | Text           | BTU/Hr                                  |                              | Contractor | FAMT               |
| Transmission                        | Text           | Belt Drive; Direct Drive                |                              | Contractor | FAMT               |
| Motor Capacity                      | Text           | KW; HP                                  |                              | Contractor | FAMT               |
| Motor Voltage                       | Text           | V                                       |                              | Contractor | FAMT               |
| Motor Amperage                      | Text           | A                                       |                              | Contractor | FAMT               |
| Motor Speed                         | Text           | RPM                                     |                              | Contractor | FAMT               |
| Fan Model Number                    | Text           |   |                              | Contractor | FAMT               |
| Fan Number                          | Text           |   |                              | Contractor | FAMT               |
|                                     |                |   |                              |            |                    |

| AEC Parameter                           | Parameter Type | Data Format   |   | Data Owner | Authoring Software |
|---|----------------|---|---|------------|--------------------|
| <b>Building Management System (BMS)</b> |                |   |   |            |                    |
| UC_Equipment Standard*                  | Text           | BMSXX-FLRX-XXXXX<br>BMSXX-MGMT-XXXXX<br>BMSXX-MODU-XXXXX  | Floor level network<br>Mgmt level network<br>Modular building control | Engineer   | FAMT               |
| Software Version (network)              | Text           |   |   | Contractor | FAMT               |
| Firmware Version (Building)             | Text           |   |   | Contractor | FAMT               |
| Application Number (FLN)                | Text           |   |   | Contractor | FAMT               |
|   |                |   |   |            |                    |
| <b>Chillers</b>                         |                |   |   |            |                    |
| UC_Equipment Standard*                  | Text           | CHLLR-XXXX-XXXXX  |   | Engineer   | FAMT               |
| Capacity                                | Text           | KW; Tons  |   | Contractor | FAMT               |
| Variable Speed Drive                    | Text           | Yes; No   |   | Contractor | FAMT               |
| Compressor Type                         | Text           | Centrifugal; Heat Pump; Magnetic;<br>Reciprocating; Screw |   | Contractor | FAMT               |
| Number of Compressors                   | Text           |   |   | Contractor | FAMT               |
| R-Type                                  | Text           |   |   | Contractor | FAMT               |
| Full Factory Refrigerant Charged        | Text           | Kg; LBS/OZ  |   | Contractor | FAMT               |
| Evaporator Flow Rate                    | Text           | LPS; GPM  |   | Contractor | FAMT               |
| Evaporator Fluid Type                   | Text           |   |   | Contractor | FAMT               |
| Condenser Flow Rate                     | Text           | LPS; GPM  |   | Contractor | FAMT               |
| Motor Group (Multiple)                  |                |   |   |            |                    |
|   |                |   |   |            |                    |
| <b>Compressors</b>                      |                |   |   |            |                    |
| UC_Equipment Standard*                  | Text           | COMPX-AIRX-XXXXX<br>COMPX-GASX-XXXXX<br>COMPX-REFR-XXXXX  | Air compressor<br>Gas compressor<br>Packaged refrigeration            | Engineer   | FAMT               |
| Type                                    | Text           | Centrifugal; Heat Pump; Magnetic; Screw                   |   | Contractor | FAMT               |
| Number of Compressors                   | Text           |   |   | Contractor | FAMT               |
| R-Type                                  | Text           |   |   | Contractor | FAMT               |
| Full Factory Refrigerant Charged        | Text           | Kg; LBS/OZ  |   | Contractor | FAMT               |
| Motor Group (Multiple)                  |                |   |   |            |                    |
|   |                |   |   |            |                    |
| <b>Cooling Tower</b>                    |                |   |   |            |                    |
| UC_Equipment Standard*                  | Text           | COOLX-TOWR-XXXXX<br>COOLX-EVAP-XXXXX                      | Chilled water cooling<br>Evaporative cooling                          | Engineer   | FAMT               |
| Capacity                                | Text           | KW; Tons  |   | Contractor | FAMT               |

| AEC Parameter                | Parameter Type | Data Format  | Data Owner                                | Authoring Software |
|------------------------------|----------------|--|---|--------------------|
| Variable Speed Drive         | Text           | Yes; No  | Contractor                                | FAMT               |
| Nominal Evaporator Flow Rate | Text           | LPS; GPM   | Contractor                                | FAMT               |
| Water Treatment              | Text           |  | Contractor                                | FAMT               |
| Package Unit                 | Text           | Yes; No  | Contractor                                | FAMT               |
| Motor Group                  |                |  |   |                    |
|                              |                |  |   |                    |
| <b>Dampers</b>               |                |  |   |                    |
| UC_Equipment Standard*       | Text           | DAMPR-FIRE-XXXXX<br>DAMPR-HVAC-XXXXX                           | Fire/Smoke damper<br>HVAC damper          | Engineer<br>FAMT   |
| UC_Duty*                     | Text           | Fire; Smoke<br>Back Draft; Exhaust; Fresh Air; Mix Air; Relief |   | Engineer<br>Revit  |
| Damper Model Number          | Text           |  |   | Contractor<br>FAMT |
| Blade Type                   | Text           | OB; PB   |   | Contractor<br>FAMT |
| Drive Position               | Text           | Left; Right; Both  |   | Contractor<br>FAMT |
| Install Type                 | Text           | IN; FL; EF   |   | Contractor<br>FAMT |
| Actuator Model Number        | Text           |  |   | Contractor<br>FAMT |
| Actuator Type                | Text           | Electronic; Pneumatic  |   | Contractor<br>FAMT |
|                              |                |  |   |                    |
| <b>Elevators</b>             |                |  |   |                    |
| UC_Equipment Standard*       | Text           | ELEVA-XXXX-XXXXX   |   | Engineer<br>FAMT   |
| UC_Type*                     | Text           | Hydraulic; Traction  |   | Engineer<br>Revit  |
| AEDARSA Number               | Text           |  |   | Contractor<br>FAMT |
| Lifting Capacity             | Text           | KG   |   | Contractor<br>FAMT |
| Pump Manufacturer            | Text           |  |   | Contractor<br>FAMT |
| Pump Model Number            | Text           |  |   | Contractor<br>FAMT |
| Pump Serial Number           | Text           |  |   | Contractor<br>FAMT |
| Elevator Capture             | Text           | Yes; No  |   | Contractor<br>FAMT |
| Elevator Alternative Floor   | Text           | Yes; No  |   | Contractor<br>FAMT |
| Motor Group                  |                |  |   |                    |
|                              |                |  |   |                    |
| <b>Emergency Shower</b>      |                |  |   |                    |
| UC_Equipment Standard*       | Text           | EMESH-UNIT-XXXXX<br>EMESH-XXXX-XXXXX                           | Shower, eye, sink<br>Shower, eye, dr hose | Engineer<br>FAMT   |

| AEC Parameter          | Parameter Type | Data Format   | Data Owner | Authoring Software |
|------------------------|----------------|---|------------|--------------------|
| UC_Duty*               | Text           | Emergency Body; Emergency Eyewash; Hand Deluge; Portable; Residential Body; Unit - Hand, Eye and Body   | Engineer   | Revit              |
| <b>Fan Coils</b>       |                |   |            |                    |
| UC_Equipment Standard* | Text           | FCOIL-XXXX-XXXXX  | Engineer   | FAMT               |
| UC_Duty*               | Text           | Unit Heater; Wall Heater  | Engineer   | Revit              |
| Capacity               | Text           | BTU/Hr  | Contractor | FAMT               |
| Transmission           | Text           | Belt Drive; Direct Drive  | Contractor | FAMT               |
| Motor Capacity         | Text           | KW; HP  | Contractor | FAMT               |
| Motor Voltage          | Text           | V   | Contractor | FAMT               |
| Motor Amperage         | Text           | A   | Contractor | FAMT               |
| Motor Speed            | Text           | RPM   | Contractor | FAMT               |
| Fan Model Number       | Text           |   | Contractor | FAMT               |
| Fan Number             | Text           |   | Contractor | FAMT               |
| <b>Fan System</b>      |                |   |            |                    |
| UC_Equipment Standard* | Text           | FANSY-DUST-XXXXX Fan - duct collection<br>FANSY-EXHX-XXXXX Fan - exhaust<br>FANSY-FUME-XXXXX Fan - fume hood<br>FANSY-GENX-XXXXX Fan - general exhaust<br>FANSY-KITC-XXXXX Fan - kitchen exhaust<br>FANSY-LABX-XXXXX Fan - lab exhaust<br>FANSY-RETX-XXXXX Fan - return air<br>FANSY-SPUX-XXXXX Stair pressurization unit<br>FANSY-SUPX-XXXXX Fan - supply air<br>FANSY-TRAN-XXXXX Fan - transfer | Engineer   | FAMT               |
| Fan Type               | Text           | Axial; Centrifugal; Plenum  | Engineer   | Revit              |
| Fan Group              |                |   |            |                    |
| Motor Group            |                |   |            |                    |
| <b>Fire Hoses</b>      |                |   |            |                    |

| AEC Parameter                  | Parameter Type | Data Format   | Data Owner | Authoring Software |
|--------------------------------|----------------|---|------------|--------------------|
| UC_Equipment Standard*         | Text           | FIREX-HOSE-XXXXX  | Engineer   | FAMT               |
| Connection Size                | Number         | mm; in  | Contractor | FAMT               |
| Length                         | Number         | m; ft   | Contractor | FAMT               |
| Forestry Fire Fighting Hose    | Text           | Yes; No   | Contractor | FAMT               |
|                                |                |   |            |                    |
| <b>Fire Suppression System</b> |                |   |            |                    |
| UC_Equipment Standard*         | Text           | FSSYS-XXXX-XXXXX  | Engineer   | FAMT               |
| UC_Duty*                       | Text           | Computer Room; Fire; Kitchen  | Engineer   | Revit              |
| Number of Tanks Required       | Text           |   | Contractor | FAMT               |
| Type of Chemical               | Text           | CO; Inergen; Kitchen Agent; Sapphire  | Contractor | FAMT               |
| Capacity                       | Text           |   | Contractor | FAMT               |
|                                |                |   |            |                    |
| <b>Gas Fired Appliance</b>     |                |   |            |                    |
| UC_Equipment Standard*         | Text           | GFAXX-XXXX-XXXXX  | Engineer   | FAMT               |
| UC_Duty*                       | Text           | Furnace; Humidifier; Kiln; MUA-Makeup Air Unit; RTU-Direct; RTU-Indirect; Unit Heater | Engineer   | Revit              |
| CFM                            | Text           | LPS; CFM  | Contractor | FAMT               |
| Capacity                       | Text           | KW; BTU   | Contractor | FAMT               |
| Type of Control                | Text           | DDC; Electric; Pneumatic  | Contractor | FAMT               |
| Fuel Type                      | Text           | Natural Gas; Petroleum; Propane   | Contractor | FAMT               |
| Package Unit                   | Text           | Yes; No   | Contractor | FAMT               |
| Motor Group                    |                |   |            |                    |
|                                |                |   |            |                    |
| <b>Humidifier</b>              |                |   |            |                    |
| UC_Equipment Standard*         | Text           | HUMID-XXXX-XXXXX  | Engineer   | FAMT               |
| Capacity                       | Text           | LB/Hr; GPM  | Contractor | FAMT               |
| Medium                         | Text           | Steam; Water  | Contractor | FAMT               |
| Fan                            | Text           | Yes; No   | Contractor | FAMT               |
| <b>Dehumidifier</b>            |                |   |            |                    |
| UC_Equipment Standard*         | Text           | HUMID-DEHU-XXXXX  | Engineer   | FAMT               |
| Fan Type                       | Text           | Axial; Centrifugal; Plenum  | Engineer   | Revit              |
| Capacity                       | Text           | Tons  | Contractor | FAMT               |
| Compressor Type                | Text           | Centrifugal; Heat Pump; Magnetic; Screw   | Contractor | FAMT               |
| Number of Compressors          | Text           |   | Contractor | FAMT               |

| AEC Parameter                    | Parameter Type | Data Format   |  | Data Owner | Authoring Software |
|----------------------------------|----------------|---|--|------------|--------------------|
| R-Type                           | Text           |   |  | Contractor | FAMT               |
| Full Factory Refrigerant Charged | Text           | Kg; LBS/OZ  |  | Contractor | FAMT               |
| Fan Group                        |                |   |  |            |                    |
| Motor Group (Multiple)           |                |   |  |            |                    |
|                                  |                |   |  |            |                    |
| <b>Lifts and Cranes</b>          |                |   |  |            |                    |
| UC_Equipment Standard*           | Text           | LIFTS-AUTO-XXXXX<br>LIFTS-SCIS-XXXXX<br>CRANE-XXXX-XXXXX  | Automotive lift/hoist<br>Scissor lift<br>Crane   | Engineer   | FAMT               |
| Capacity                         | Text           | Kg  |  | Contractor | FAMT               |
| Motor Manufacturer               | Text           |   |  | Contractor | FAMT               |
| Motor Model                      | Text           |   |  | Contractor | FAMT               |
| Motor Serial Number              | Text           |   |  | Contractor | FAMT               |
| Motor Cat No.                    | Text           |   |  | Contractor | FAMT               |
| Motor Capacity                   | Text           | KW; HP  |  | Contractor | FAMT               |
|                                  |                |   |  |            |                    |
| <b>Meter-Mechanical</b>          |                |   |  |            |                    |
| UC_Equipment Standard*           | Text           | METER-CHWX-XXXXX<br>METER-COND-XXXXX<br>METER-DION-XXXXX<br>METER-DOWA-COLDX<br>METER-DOWA-HOTXX<br>METER-HTGX-XXXXX<br>METER-MWAT-XXXXX<br>METER-NGAS-XXXXX<br>METER-RIVE-XXXXX<br>METER-STEAM-XXXXX | Chilled water<br>Condensate<br>Deionized water<br>Domestic cold water<br>Domestic hot water<br>Heating water<br>Makeup water<br>Natural gas<br>River water<br>Steam supply | Engineer   | FAMT               |
| Flow Range Minimum               | Text           | LPS; GPM  |  | Contractor | FAMT               |
| Flow Range Maximum               | Text           | LPS; GPM  |  | Contractor | FAMT               |
| Pipe Size                        | Text           | In  |  | Contractor | FAMT               |
| Pipe Schedule                    | Text           | 20; 40; 80; 120; 140; 160   |  | Contractor | FAMT               |
| Pipe Material                    | Text           | Cast-iron; Copper; PVC  |  | Contractor | FAMT               |
| Flange to Flange                 | Text           | mm; in  |  | Contractor | FAMT               |
| Pressure                         | Text           | High; Low   |  | Contractor | FAMT               |
| Rotor Size (Steam Meter)         | Text           |   |  | Contractor | FAMT               |
|                                  |                |   |  |            |                    |
| <b>Piping System</b>             |                |   |  |            |                    |

| AEC Parameter               | Parameter Type | Data Format  |  | Data Owner | Authoring Software |
|-----------------------------|----------------|--|--|------------|--------------------|
| UC_Equipment Standard*      | Text           | PIPSY-CAIR-XXXXX<br>PIPSY-CHWX-XXXXX<br>PIPSY-DEWA-XXXXX<br>PIPSY-DOWA-TREA<br>PIPSY-DOWA-XXXXX<br>PIPSY-FUEL-XXXXX<br>PIPSY-GLYX-XXXXX<br>PIPSY-GREY-XXXXX<br>PIPSY-HTGX-XXXXX<br>PIPSY-LAIR-XXXXX<br>PIPSY-LPGX-SITEX<br>PIPSY-MGAS-XXXXX<br>PIPSY-NGXX-XXXXX<br>PIPSY-NPOT-XXXXX<br>PIPSY-RAWT-XXXXX<br>PIPSY-RAWX-XXXXX<br>PIPSY-SANI-BIOSW<br>PIPSY-SANI-LEV2X<br>PIPSY-SANI-XXXXX<br>PIPSY-STEAM-XXXXX<br>PIPSY-STRM-XXXXX<br>PIPSY-VACU-XXXXX | Compressed air<br>Chilled water<br>Demineralized water<br>Domestic water<br>Domestic water<br>Fuel transfer<br>Glycol heating system<br>Grey water system<br>Hot water heating sys<br>Lab compressed air<br>Liquefied petrol gas<br>Medical gas<br>Natural gas<br>Non potable water<br>Raw water treatment<br>Raw water<br>Storm water bioswale<br>Sanitary level 2 sys<br>Sanitary dwv<br>Steam supply<br>Storm water<br>Vacuum | Engineer   | FAMT               |
| System Volume               | Text           | L  |  | Contractor | FAMT               |
| Pipe Schedule               | Text           | 20; 40; 80; 120; 140; 160  |  | Contractor | FAMT               |
| Stainless Steel Type        | Text           | 304; 316; 409; 410; 430  |  | Contractor | FAMT               |
|                             |                |  |  |            |                    |
| <b>Piping System - Fire</b> |                |  |  |            |                    |
| UC_Equipment Standard*      | Text           | PIPSY-SPRK-XXXXX<br>PIPSY-STND-XXXXX   | Fire sprinkler<br>Fire standpipe   | Engineer   | FAMT               |
| UC_Type*                    | Text           | Dry Pipe; Preaction; Sprinkler   |  | Engineer   | Revit              |
| UC_Location*                | Text           | Branch Isolation; Floor Isolation; Riser Isolation; Sprinkler Tree   |  | Engineer   | Revit              |
| Pipe Schedule               | Text           | 20; 40; 80; 120; 140; 160  |  | Contractor | FAMT               |
| Stainless Steel Type        | Text           | 304; 316; 409; 410; 430  |  | Contractor | FAMT               |
| System Volume               | Text           | L  |  | Contractor | FAMT               |
| System Pressure             | Text           | kPa ; PSI  |  | Contractor | FAMT               |
| Glycol Level/Strength       | Text           | DEG C; DEG F   |  | Contractor | FAMT               |
| Water Flow                  | Text           | Supervised; Timing   |  | Contractor | FAMT               |
| Isolation Valve Supervisory | Text           | Yes; No  |  | Contractor | FAMT               |
|                             |                |  |  |            |                    |
| <b>Pumps</b>                |                |  |  |            |                    |



| AEC Parameter                             | Parameter Type | Data Format  |   | Data Owner | Authoring Software |
|---|----------------|--|---|------------|--------------------|
| UC_Equipment Standard*                    | Text           | PUMPX-CHWX-XXXXX<br>PUMPX-COND-XXXXX<br>PUMPX-DOWA-BOOST<br>PUMPX-DOWA-XXXXX<br>PUMPX-FIRE-XXXXX<br>PUMPX-FUEL-XXXXX<br>PUMPX-GLYX-XXXXX<br>PUMPX-GREY-XXXXX<br>PUMPX-HTGX-XXXXX<br>PUMPX-RECR-XXXXX<br>PUMPX-RIVE-XXXXX<br>PUMPX-SANI-XXXXX<br>PUMPX-STRM-XXXXX<br>PUMPX-VACU-XXXXX<br>PUMPX-WELL-XXXXX<br>PUMPX-XXXX-XXXXX | Pump - chilled water<br>Pump - condensate<br>Domestic water booster<br>Domestic Water<br>Pump - fire system<br>Pump - fuel transfer<br>Pump - glycol system<br>Pump - grey water<br>Pump - heating<br>Pump - recirculating<br>Pump - river water<br>Pump - sump-sanitary<br>Pump - sump-storm<br>Pump - vacuum<br>Pump - well<br>Pump - general | Engineer   | FAMT               |
| Volume Flow Rate                          | Text           | LPS; GPM   |   | Contractor | FAMT               |
| Head Pressure                             | Text           | kPa ; PSI  |   | Contractor | FAMT               |
| Motor Group                               |                |  |   |            |                    |
| <b>Pressure Vessels</b>                   |                |  |   |            |                    |
| UC_Equipment Standard*                    | Text           | PVARX-XXXX-XXXXX<br>PVCEX-XXXX-XXXXX<br>PVEXT-XXXX-XXXXX<br>PVJVX-XXXX-XXXXX<br>PVSTX-DOWA-XXXXX<br>PVSTX-XXXX-XXXXX<br>PVVTX-XXXX-XXXXX<br>PVXXX-DGTX-XXXXX<br>PVXXX-STER-XXXXX<br>PVXXX-TEST-XXXXX<br>PVXXX-XXXX-XXXXX   | PV - air receiver<br>Convertor/exchanger<br>PV - expansion tank<br>PV - steam kettle<br>PV - DHW storage tank<br>PV - storage tank<br>PV - vacuum tank<br>PV - biodigester<br>PV - sterilizer<br>PV - Lab test vessel<br>Pressure vessel  | Engineer   | FAMT               |
| CRN Number                                | Text           |  |   | Contractor | FAMT               |
| ABSA Number                               | Text           |  |   | Contractor | FAMT               |
| NB Number                                 | Text           |  |   | Contractor | FAMT               |
| MAWP (Max Allowable Working Pressure)     | Text           | kPa ; PSI  |   | Contractor | FAMT               |
| MDMT (Min Design Material Temperature)    | Text           | DEG F; DEG C   |   | Contractor | FAMT               |
| Minimum Design Material pressure          | Text           | mm; in   |   | Contractor | FAMT               |
| <b>Pressure Vessel - Hot Water Boiler</b> |                |  |   |            |                    |

| AEC Parameter                              | Parameter Type | Data Format                                  | Data Owner | Authoring Software |
|--|----------------|--|------------|--------------------|
| UC_Equipment Standard*                     | Text           | PVBXX-XXXX-XXXXX                             | Engineer   | FAMT               |
| UC_Type*                                   | Text           | Fire Tube; Water Tube                        | Engineer   | Revit              |
| UC_Fuel Type*                              | Text           | Diesel Oil; Electric; Fuel; LPG; Natural Gas | Engineer   | Revit              |
| UC_Induction Burner Fan*                   | Text           | Yes; No                                      | Engineer   | Revit              |
| Capacity                                   | Text           | KW; BTU                                      | Contractor | FAMT               |
| Maximum Operating Pressure                 | Text           | kPa ; PSI                                    | Contractor | FAMT               |
| Normal Operating Pressure                  | Text           | kPa ; PSI                                    | Contractor | FAMT               |
| Temperature Pressure Relief Valve Size     | Text           | kPa ; PSI                                    | Contractor | FAMT               |
| Temperature Pressure Relief Discharge Rate | Text           | BTU/Hr                                       | Contractor | FAMT               |
| Fan Manufacture                            | Text           |  | Contractor | FAMT               |
| Fan Model Number                           | Text           |  | Contractor | FAMT               |
| Fan Serial Number                          | Text           |  | Contractor | FAMT               |
| CRN Number                                 | Text           |  | Contractor | FAMT               |
| ABSA Number                                | Text           |  | Contractor | FAMT               |
| NB Number                                  | Text           |  | Contractor | FAMT               |
| MAWP (Max Allowable Working Pressure)      | Text           | kPa ; PSI                                    | Contractor | FAMT               |
| MDMT (Min Design Material Temperature)     | Text           | DEG F; DEG C                                 | Contractor | FAMT               |
| Minimum Design Material pressure           | Text           | mm; in                                       | Contractor | FAMT               |
|  |                |  |            |                    |
| <b>Pressure Vessel - Steam Boiler</b>      |                |  |            |                    |
| UC_Equipment Standard*                     | Text           | PVBXX-STE-XXXXX                              | Engineer   | FAMT               |
| UC_Fuel Type*                              | Text           | Diesel Oil; Electric; Fuel; LPG; Natural Gas | Engineer   | Revit              |
| Capacity                                   | Text           | KW; LBS/Hr                                   | Contractor | FAMT               |
| Heating Surface Area                       | Text           | Ft <sup>2</sup>                              | Contractor | FAMT               |
| Maximum Operating Pressure                 | Text           | kPa ; PSI                                    | Contractor | FAMT               |
| Normal Operating Pressure                  | Text           | kPa ; PSI                                    | Contractor | FAMT               |
| Number of Sections                         | Text           |  | Contractor | FAMT               |
| Pressure Relief Valve                      | Text           | kPa ; PSI                                    | Contractor | FAMT               |
| Temperature Pressure Relief Discharge Rate | Text           | BTU/Hr                                       | Contractor | FAMT               |
| Induction Burner Fan                       | Text           | Yes; No                                      | Contractor | FAMT               |

| AEC Parameter                          | Parameter Type | Data Format  |  | Data Owner | Authoring Software |
|--|----------------|--|--|------------|--------------------|
| Fan Manufacture                        | Text           |  |  | Contractor | FAMT               |
| Fan Model Number                       | Text           |  |  | Contractor | FAMT               |
| Fan Serial Number                      | Text           |  |  | Contractor | FAMT               |
| CRN Number                             | Text           |  |  | Contractor | FAMT               |
| ABSA Number                            | Text           |  |  | Contractor | FAMT               |
| NB Number                              | Text           |  |  | Contractor | FAMT               |
| MAWP (Max Allowable Working Pressure)  | Text           | kPa ; PSI  |  | Contractor | FAMT               |
| MDMT (Min Design Material Temperature) | Text           | DEG F; DEG C   |  | Contractor | FAMT               |
| Minimum Design Material pressure       | Text           | mm; in   |  | Contractor | FAMT               |
|  |                |  |  |            |                    |
| <b>Tank</b>                            |                |  |  |            |                    |
| UC_Equipment Standard*                 | Text           | TANKX-ADTK-XXXXX<br>TANKX-COND-XXXXX<br>TANKX-DAYX-XXXXX<br>TANKX-DOWA-HOTXX<br>TANKX-FUEL-XXXXX<br>TANKX-GREY-XXXXX<br>TANKX-OILX-XXXXX<br>TANKX-RAWX-XXXXX<br>TANKX-RIVE-XXXXX<br>TANKX-SEDI-XXXXX<br>TANKX-SEPT-XXXXX<br>TANKX-VACU-XXXXX<br>TANKX-WATR-XXXXX | Tank - acid dilution<br>Steam condensate<br>Tank - glycol fill day<br>Tank -domestic water<br>Tank - fuel storage<br>Tank - grey water<br>Tank -used oil storage<br>Tank - raw water<br>Tank - river water<br>Tank - sediment<br>Tank - sanitary septic<br>Tank - vacuum<br>Tank - water storage | Engineer   | FAMT               |
|  |                |  |  |            |                    |
| <b>Water Cooler / Bottle Filler</b>    |                |  |  |            |                    |
| UC_Equipment Standard*                 | Text           | WTCLR- XXXX-XXXXX  |  | UCalgary   | FAMT               |
|  |                |  |  |            |                    |
| <b>Water Treatment System</b>          |                |  |  |            |                    |
| UC_Equipment Standard*                 | Text           | WATER-FLTR-XXXXX<br>WATER-RECY-XXXXX<br>WATER-SOFT-XXXXX<br>WATER-TRSY-DIXXX<br>WATER-TRSY-CHEMX<br>WATER-TRSY-GLYXX<br>WATER-TRSY-ROXXX   | Water filtration<br>Grey water recycle<br>Water softener<br>Deionized water<br>Chemical/heating wt<br>Glycol treatment<br>Reverse osmosis  | Engineer   | FAMT               |
| Size                                   | Text           | L; GAL   |  | Contractor | FAMT               |
| UV Conditioning                        | Text           | Yes; No  |  | Contractor | FAMT               |

| AEC Parameter      | Parameter Type | Data Format | Data Owner | Authoring Software |
|--------------------|----------------|-------------|------------|--------------------|
| Chemical Injection | Text           | Yes; No     | Contractor | FAMT               |
|                    |                |             |            |                    |

#### 6.6.4 Electrical Equipment Asset Specifics

| AEC Parameter   | Parameter Type | Data Format  | Data Owner  | Authoring Software |
|---|----------------|--|---|--------------------|
| <b>Additional Equipment Asset Fields for All Electrical</b> |                |  |   |                    |
| UC_Electrical Panel Name*                                   | Text           |  | Engineer  | Revit              |
| UC_Electrical Panel Circuit*                                | Text           | Circuit Name/Number                                      | Engineer  | Revit              |
| Voltage   | Text           | V  | Contractor  | FAMT               |
| Phase   | Text           | 1; 3   | Contractor  | FAMT               |
| Hertz   | Text           | HZ   | Contractor  | FAMT               |
| Ampacity  | Text           | A  | Contractor  | FAMT               |
| Maximum Overload Protection                                 | Text           | FLA  | Contractor  | FAMT               |
|   |                |  |   |                    |
|   |                |  |   |                    |
|   |                |  |   |                    |
|   |                |  |   |                    |
|   |                |  |   |                    |
|   |                |  |   |                    |
|   |                |  |   |                    |
|   |                |  |   |                    |
|   |                |  |   |                    |
|   |                |  |   |                    |
| <b>Clock System</b>   |                |  |   |                    |
| UC_Equipment Standard*                                      | Text           | CLOCK-FMXX-XXXXX<br>CLOCK-TIME-XXXXX                     | Clock - FM Correction<br>Clock - time clock               | Engineer<br>FAMT   |
|   |                |  |   |                    |
| <b>Controllers</b>  |                |  |   |                    |
| UC_Equipment Standard*                                      | Text           | DSXXX-XXXX-XXXXX<br>FPCXX-XXXX-XXXXX<br>MOTOR-CNTL-XXXXX | Access ctrl hardware<br>Fire pump<br>Motor control center | Engineer<br>FAMT   |
|   |                |  |   |                    |
| <b>Dryers</b>   |                |  |   |                    |
| UC_Equipment Standard*                                      | Text           | DRYER-CAIR-XXXXX<br>DRYER-HAND-XXXXX<br>DRYER-LINT-XXXXX | Compressed air dryer<br>Hand dryer<br>Clothes             | Engineer<br>FAMT   |
|   |                |  |   |                    |
| <b>Electric Heaters</b>                                     |                |  |   |                    |

| AEC Parameter                                      | Parameter Type | Data Format   | Data Owner  | Authoring Software |
|--|----------------|---|---|--------------------|
| UC_Equipment Standard*                             | Text           | ELECT-HEAT-XXXXX  | Engineer  | FAMT               |
| Capacity   | Text           | KW  | Contractor  | FAMT               |
|  |                |   |   |                    |
| <b>Fire Alarm System</b>                           |                |   |   |                    |
| UC_Equipment Standard*                             | Text           | FASXX-SMOK-XXXXX<br>FASYS-XXXX-XXXXX  | Smoke alarm<br>Fire alarm system  | Engineer<br>FAMT   |
| UC_Duty *  | Text           | Beam Smoke Detector; Bell; Duct Smoke Detector; Fire Alarm Panel; Flow Switch; Heat Detector; Horn; Pull Station; Smoke Detector; Speakers; Strobes | Engineer  | Revit              |
|  |                |   |   |                    |
| <b>Fixed Gas Detection System</b>                  |                |   |   |                    |
| UC_Equipment Standard*                             | Text           | FGDSX-XXXX-XXXXX  | Engineer  | FAMT               |
| UC_Type*   | Text           | CH4; CL3; CO; NH3; NH4; O2; R134A   | Engineer  | Revit              |
| Span Level   | Text           | %; ppm  | Contractor  | FAMT               |
| Warning Level                                      | Text           | %; ppm  | Contractor  | FAMT               |
| Alarm Level  | Text           | %; ppm  | Contractor  | FAMT               |
| Date of the Sensor Installation                    | Text           | yyyy-mm-dd  | Contractor  | FAMT               |
|  |                |   |   |                    |
| <b>Emergency Power Generator System</b>            |                |   |   |                    |
| UC_Equipment Standard*                             | Text           | EMPOW-CNTR-XXXXX<br>EMPOW-GENX-STDBY<br>EMPOW-GENX-XXXXX<br>EMPOW-TRAN-XXXXX  | Emerg power control<br>Standby generator<br>Emergency generator<br>Emerg transfer switch  | Engineer<br>FAMT   |
| Capacity   | Text           | KW  | Contractor  | FAMT               |
| Fuel Type  | Text           | Diesel; Natural Gas; Propane; Biofuel   | Contractor  | FAMT               |
| KVA Rating   | Text           | KVA   | Contractor  | FAMT               |
|  |                |   |   |                    |
|  |                |   |   |                    |
|  |                |   |   |                    |
| <b>High Voltage Distribution (Main Switchgear)</b> |                |   |   |                    |
| UC_Equipment Standard*                             | Text           | GROUN-DIST-XXXXX<br>HVOLT-CAPS-XXXXX<br>HVOLT-DBRK-XXXXX<br>HVOLT-DISC-XXXXX<br>HVOLT-DIST-XXXXX<br>HVOLT-DUCT-XXXXX<br>HVOLT-GEAR-XXXXX            | Grounding<br>Power fac capacitor<br>Distribution breaker<br>Disconnect switch<br>Distribution cable<br>Dist'n duct bank<br>Switchgear | Engineer<br>FAMT   |

| AEC Parameter                                     | Parameter Type | Data Format  |  | Data Owner | Authoring Software |
|---|----------------|--|--|------------|--------------------|
|   |                | HVOLT-MANH-XXXXX<br>HVOLT-MTRX-XXXXX<br>HVOLT-NGRX-XXXXX<br>HVOLT-TBRK-XXXXX   | Distribution manhole<br>Metering<br>Neutral grnd resistor<br>Tie breaker   |            |                    |
| Wire Size   | Text           | AWG  |  | Contractor | FAMT               |
| Cable Percentage                                  | Text           | %  |  | Contractor | FAMT               |
| Primary Voltage                                   | Text           | V  |  | Contractor | FAMT               |
| Secondary Voltage                                 | Text           | V  |  | Contractor | FAMT               |
| Switchgear Type                                   | Text           | Air; Gas; Vacuum   |  | Contractor | FAMT               |
| Nema Rating                                       | Text           |  |  | Contractor | FAMT               |
| <b>Lighting System</b>                            |                |  |  |            |                    |
| UC_Equipment Standard*                            | Text           | LIGHT-CONT-XXXXX<br>LIGHT-EMCT-XXXXX<br>LIGHT-EMPK-XXXXX<br>LIGHT-EXIT-XXXXX<br>LIGHT-EXTB-XXXXX<br>LIGHT-EXTS-XXXXX<br>LIGHT-INTX-XXXXX<br>LIGHT-PLOT-XXXXX | Control equip dimmer<br>Emerg sys centralized<br>Emerg battery pack<br>Emerg exit lighting<br>Exterior bldg lighting<br>Exterior site lighting<br>Interior bldg lighting<br>Parking lot lighting | Engineer   | FAMT               |
| Lamp Type   | Text           | Fluorescent; HID; HPS; LED; Metal Halide   |  | Engineer   | Revit              |
| Fixture Type                                      | Text           | Recessed; Surface Mount; Suspended   |  | Engineer   | Revit              |
| Ballast/Driver Model                              | Text           |  |  | Contractor | FAMT               |
| <b>Low Voltage Distribution (Main Switchgear)</b> |                |  |  |            |                    |
| UC_Equipment Standard*                            | Text           | LVOLT-BORD-XXXXX<br>LVOLT-BRAN-XXXXX<br>LVOLT-CABL-XXXXX<br>LVOLT-DBRK-XXXXX<br>LVOLT-FEED-XXXXX<br>LVOLT-PANL-XXXXX<br>LVOLT-TBRK-XXXXX<br>LVOLT-TVSS-XXXXX | Distribution board<br>Branch wiring&device<br>Cable busduct<br>Distribution breaker<br>Board feeder<br>Panel, breaker, disc<br>Tie breaker<br>TVSS   | Engineer   | FAMT               |
| Wire Size   | Text           | AWG  |  | Contractor | FAMT               |
| Cable Percentage                                  | Text           | %  |  | Contractor | FAMT               |
| Primary Voltage                                   | Text           | V  |  | Contractor | FAMT               |
| Secondary Voltage                                 | Text           | V  |  | Contractor | FAMT               |
| Switchgear Type                                   | Text           | Air; Gas; Vacuum   |  | Contractor | FAMT               |

| AEC Parameter                     | Parameter Type | Data Format   |   | Data Owner | Authoring Software |
|-----------------------------------|----------------|---|---|------------|--------------------|
| Nema Rating                       | Text           |   |   | Contractor | FAMT               |
|                                   |                |   |   |            |                    |
| <b>Meter - Electrical Utility</b> |                |   |   |            |                    |
| UC_Equipment Standard*            | Text           | METER-ELEC-XXXXX  |   | Engineer   | FAMT               |
| Primary Voltage                   | Text           | V   |   | Contractor | FAMT               |
| Secondary Voltage                 | Text           | V   |   | Contractor | FAMT               |
| Current Transformer (CT)          | Text           | A   |   | Contractor | FAMT               |
| Power Transformer (PT)            | Text           | KW; KVA   |   | Contractor | FAMT               |
| Short Circuit                     | Text           |   |   | Contractor | FAMT               |
|                                   |                |   |   |            |                    |
| <b>Motor Starter</b>              |                |   |   |            |                    |
| UC_Equipment Standard*            | Text           | MOTOR-STRX-XXXXX  |   | Engineer   | FAMT               |
|                                   |                |   |   |            |                    |
| <b>Power System Conditioners</b>  |                |   |   |            |                    |
| UC_Equipment Standard*            | Text           | HARMO-MITI-XXXXX<br>POWER-QUAL-XXXXX                            | Harmonic mit reactor<br>Power sys conditioner       | Engineer   | FAMT               |
|                                   |                |   |   |            |                    |
| <b>Relay</b>                      |                |   |   |            |                    |
| UC_Equipment Standard*            | Text           | RELAY-PROT-XXXXX  |   | Engineer   | FAMT               |
| Primary Voltage                   | Text           | V   |   | Contractor | FAMT               |
| Secondary Voltage                 | Text           | V   |   | Contractor | FAMT               |
|                                   |                |   |   |            |                    |
| <b>Solar System</b>               |                |   |   |            |                    |
| UC_Equipment Standard*            | Text           | SOLAR-COLL-XXXXX  |   | Engineer   | FAMT               |
| Component                         | Text           | Batteries; Photovoltaic Inverter; Photovoltaic Solar Collectors |   | Engineer   | Revit              |
| Capacity                          | Text           | KW  |   | Contractor | FAMT               |
|                                   |                |   |   |            |                    |
|                                   |                |   |   |            |                    |
| <b>Transformer</b>                |                |   |   |            |                    |
| UC_Equipment Standard*            | Text           | HVOLT-DRYT-XXXXX<br>HVOLT-LIQT-XXXXX<br>LVOLT-TRAN-XXXXX        | HV - dry type<br>HV - liquid type<br>LV transformer | Engineer   | FAMT               |
| Insulating Fluid                  | Text           | PCB; Silicone   |   | Engineer   | Revit              |
| Primary Voltage                   | Text           | V   |   | Contractor | FAMT               |

| AEC Parameter                              | Parameter Type | Data Format  | Data Owner  | Authoring Software |
|--|----------------|--|---|--------------------|
| Secondary Voltage                          | Text           | V  | Contractor  | FAMT               |
| KVA Rating                                 | Text           | KVA  | Contractor  | FAMT               |
| <b>UPS System</b>                          |                |  |   |                    |
| UC_Equipment Standard*                     | Text           | LVOLT-UPSC-XXXXX<br>LVOLT-UPST-XXXXX<br>LVOLT-UPSX-XXXXX<br>SWGRX-BATT-XXXXX | BMS power backup<br>Telecom backup<br>UPS system<br>Switchgear backup | Engineer<br>FAMT   |
| Wattage                                    | Text           | W  | Contractor  | FAMT               |
| Battery Voltage                            | Text           | V  | Contractor  | FAMT               |
| Battery Type                               | Text           | VRLA; VLA  | Contractor  | FAMT               |
| <b>Electrical Variable Frequency Drive</b> |                |  |   |                    |
| UC_Equipment Standard*                     | Text           | VFDXX-XXXX-XXXXX   | Engineer  | FAMT               |
| Motor Capacity                             | Text           | KW; HP   | Contractor  | FAMT               |
| Input Hertz                                | Text           | Hz   | Contractor  | FAMT               |
| Output Hertz Maximum                       | Text           | Hz   | Contractor  | FAMT               |

### 6.6.5 Child Equipment Asset Group Specifics

| AEC Parameter              | Parameter Type | Data Format  | Data Owner | Authoring Software |
|----------------------------|----------------|--------------|------------|--------------------|
| <b>Coil</b>                |                |              |            |                    |
| Length                     | Text           | m; ft        | Contractor | FAMT               |
| Width                      | Text           | mm; in       | Contractor | FAMT               |
| Height                     | Text           | m; ft        | Contractor | FAMT               |
| Number of Passes           | Text           |              | Contractor | FAMT               |
| Tube Diameter              | Text           | mm; in       | Contractor | FAMT               |
| Fin Spacing                | Text           | mm; in       | Contractor | FAMT               |
| Maximum Temperature Rating | Text           | DEG C; DEG F | Contractor | FAMT               |
| Maximum Pressure Rating    | Text           | kPa ; PSI    | Contractor | FAMT               |
| Delta T                    | Text           | DEG C; DEG F | Contractor | FAMT               |
| Connection Size            | Text           | In; mm       | Contractor | FAMT               |
| <b>Fan</b>                 |                |              |            |                    |



| AEC Parameter       | Parameter Type | Data Format                | Data Owner | Authoring Software |
|---------------------|----------------|----------------------------|------------|--------------------|
| Fan Volume          | Text           | CMPS; CFM                  | Contractor | FAMT               |
| Static Pressure     | Text           | kPa; inch-w/c              | Contractor | FAMT               |
| Sheave              | Text           |                            | Contractor | FAMT               |
| Bearing             | Text           | DE; ODE                    | Contractor | FAMT               |
| Transmission        | Text           | Belt Drive; Direct Drive   | Contractor | FAMT               |
| Type of Control     | Text           | Pneumatic; DDC             | Contractor | FAMT               |
|                     |                |                            |            |                    |
| <b>Motor</b>        |                |                            |            |                    |
| Motor Manufacturer  | Text           |                            | Contractor | FAMT               |
| Motor Model         | Text           |                            | Contractor | FAMT               |
| Motor Serial Number | Text           |                            | Contractor | FAMT               |
| Motor Cat No.       | Text           |                            | Contractor | FAMT               |
| Motor Capacity      | Text           | KW; HP                     | Contractor | FAMT               |
| Motor Voltage       | Text           | V                          | Contractor | FAMT               |
| Phase               | Text           | 1; 3                       | Contractor | FAMT               |
| Hertz               | Text           | HZ                         | Contractor | FAMT               |
| Motor Amperage      | Text           | A                          | Contractor | FAMT               |
| Motor Speed         | Text           | RPM                        | Contractor | FAMT               |
| Motor Frame         | Text           |                            | Contractor | FAMT               |
| Motor Enclosure     | Text           | Explosion Proof; ODP; TEFC | Contractor | FAMT               |
| Motor Sheave        | Text           |                            | Contractor | FAMT               |
| Motor Bearing       | Text           | DE / ODE                   | Contractor | FAMT               |
| Belt Size           | Text           |                            | Contractor | FAMT               |
| Quantity of Belts   | Number         |                            | Contractor | FAMT               |
| NEMA Efficiency     | Percentage     | %                          | Contractor | FAMT               |
| Motor Class         | Text           |                            | Contractor | FAMT               |
|                     |                |                            |            |                    |

**Revision History**

| <b>Revision Date</b> | <b>Version</b> | <b>Description</b>   |
|----------------------|----------------|--|
| March 2023           | 1.0            | Baseline version   |
| August 10, 2023      | 1.0            | Added Revision History table to end of document and reset to Version 1.0.  |
| October 16, 2023     | 2.0            | Revised BIM Deliverables - BIM Model LOD Guideline<br>Added Revit Model Requirement - Tolerances<br>Added Appendix A "Barcode Placement Standard Operating Procedures" |
| November xx, 2024    | 2.1            | Revised data owner of Facility Asset Data "UC_Equipment Standard"<br>Added and deleted various mechanical and electrical equipment in Section 6.6.3 and 6.6.4          |
|                      |                |  |

## APPENDIX A

### Barcode Placement Standard Operating Procedures

The University of Calgary Facilities Maintenance Planning team supplies all self-adhesive barcode labels, plates and seal wires.

When multiple barcodes all placed close together as shown in example photo 42, the equipment standard must be displayed with each barcode for clarification purpose.

## Mechanical Equipment Barcode Placement

Air Handling Units (AHUXX-XXXX-XXXXX, AHUXX-SUPX-XXXXX, AHUXX-RETX-XXXXX) (Unit based)

The self-adhesive barcode label will be applied as close as practical to the air handling unit # and equipment data plate, and directly to the fan body. (See example 1 and 2)

Air Conditioning Units (ACUXX-XXXX-XXXXX) (Unit based)

The self-adhesive barcode label will be applied as close as practical to the air conditioning unit # and equipment data plate, and directly to the fan body.

Backflow Preventers (BFPXX-XXXX-XXXXX) (Unit based)

The self adhesive barcode label will be applied to a 2-1/2" x 3-1/2" aluminum plate (supplied by the university) and fastened to the backflow preventer with a stain less wire c/w compressible seal to a location on the backflow device so as not to be removable but easily visible. (See example 3)

Chillers (CHLLR-XXXX-XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit's control panel in a visible location and/or as near to the manufacturer's data rating plate as possible. (See example 4)

Cooling Tower (COOLX- TOWR-XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible.

Compactors (WBINS-CPACT- XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible.

Compressed Air Dryer (DRYER- CAIR-XXXXX) (Unit based)

Hand Dryer (DRYER-HAND-XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible.

Air Compressors (COMPX-XXXX-XXXXX) (Unit based)

The self-adhesive barcode label will be applied to the compressor housing near the manufacturer's name and data rating plate or on a 2-1/2" x 3-1/2" aluminum plate (supplied by the university) and fastened to an easily visible portion of the compressor. (Note: smaller compressors do not usually have a containment housing and the barcode plate can be secured to a portion of the frame in a visible location.) (See example 5)

Cranes (CRANE-XXXX-XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit's name plate and/or in a visible location where the motor or power supply is located and/or as near to the manufacturer's data rating plate as possible. In the case of chain falls, the self-adhesive barcode label will be applied directly to the unit.

Electrically Operated Overhead Doors (DOORX-OHEL-XXXXX) (Unit based)

Fire Egress Doors (DOORX-FIRE-XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible on the drive unit.

Emergency Showers (EMESH-XXXX-XXXXX) (Unit based)

The self-adhesive barcode label may be applied directly to the units panel activation handle, directly to the shower head bowl, or on the newer cabinet models directly to the unit in a visible location. Older models of showers may require a 2-1/2" 3-1/2" aluminum plate (supplied by the university) and will be fastened to the unit with a stainless wire c/w compressible seal to a visible location on the unit.

Dust Collection Fan System (FANSY-DUST-XXXXX) (System based)

Exhaust Fan System (FANSY-EXHX-XXXXX) (System based)

Fume Hood Exhaust System (FANSY-FUME-XXXXX) (System based)

Pressurization Fan System (FANSY-PRES-XXXXX) (System based)

Return Fan System (FANSY-RETX-XXXXX) (System based)

Supply Fan System (FANSY-SUPX-XXXXX) (System based)

In the case of fan units that serve multiple purposes i.e. heating coils, cooling coils, and/or serve more than one level or area, where there are several maintenance procedures applied to the unit, the self-adhesive barcode label will be applied directly to the unit's name plate in a visible location, and/or as near to the manufacturer's data rating plate as possible. It may be used for multiple levels of maintenance expertise procedures, an example would be an exhaust fan that is serving laboratory snorkel exhausts where the fan is barcoded individually and the snorkels are barcoded by unit. (See example 6)

Ceiling Fans (FANXX-XXXX-XXXXX) (Unit based)

Portable Fans (FANXX-PORT-XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit.

Smoke Fans (FANXX-XXXX-XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible.

Fan coils (FCOIL-XXXX-XXXXX) (Unit based)

Fan coils such as unit heaters, recessed wall mounted force flow units will be barcoded by the self-adhesive barcode label being applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible on the drive unit.

Washroom Fixtures (FIXTX-WASH-XXXXX) (Building based)

Laboratory Fixtures (FIXTX-LABX-XXXXX) (Building based)

Kitchen Fixtures (FIXTX-KITC-XXXXX) (Building based)

Plumbing fixtures are a building based entity. A self-adhesive barcode label will be placed in a building/system electronic binder that resides in the Maintenance Planning office and will also be available online.

Gas Fired Appliances (GFAXX-XXXX-XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit. (See example 7 and 8)

Grease Interceptors (GRTRA-XXXX-XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit. (See example 9)

Humidifiers (HUMID-XXXX-XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit and will require a 2-1/2" x 3-1/2" aluminum plate (supplied by the university) and fastened to the unit with a stainless wire c/w compressible seal to a visible location on the unit.

Automobile Hoist (LIFTS-AUTO-XXXXX) (Unit based)

Scissor Lift (LIFTS-SCIS-XXXXX) (Unit based)

The self-adhesive barcode label will be applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible.

Compressed Air Piping System Control AIR (PIPSY-CAIR-XXXXX) (System based)

Chilled Water Piping System (PIPSY-CHWX-XXXXX) (System based)

Demineralized Water Piping System (PIPSY-DEWA-XXXXX) (System based)

Domestic Water Piping System (PIPSY-DOWA-XXXXX) (System based)

Glycol Heating Water Piping System (PIPSY-GLYX-XXXXX) (System based)

Heating Water Piping System (PIPSY-HTGX-XXXXX) (System based)

Compressed Air Piping System Lab Air (PIPSY-LAIR-XXXXX) (System based)

Liquid Petroleum Gas Piping System (PIPSY-LPGX-XXXXX) (System based)

Natural Gas Piping System (PIPSY-NGXX-XXXXX) (System based)

|                                    |                     |                |
|------------------------------------|---------------------|----------------|
| Non Potable Water System           | (PIPSY-NPOT-XXXXX)  | (System based) |
| RO Treated Water Piping System     | (PIPSY-ROWA-XXXXX)  | (System based) |
| Sanitary Drainage Piping System    | (PIPSY-SANI-XXXXX)  | (System based) |
| Steam Piping System                | (PIPSY-STEAM-XXXXX) | (System based) |
| Storm Water Drainage Piping System | (PIPSY-STRM-XXXXX)  | (System based) |

Piping Systems are a system based entity. A self-adhesive barcode label will be placed in a building/system electronic binder that resides in the Maintenance Planning office and will also be available online.

|  |                    |              |
|--|--------------------|--------------|
| Domestic Booster Pump                      | (PUMPX-DOBO-XXXXX) | (Unit based) |
| Fire Sprinkler System Excess Pressure Pump | (PUMPX-EPXX-XXXXX) | (Unit based) |
| Fire Pump                                  | (PUMPX-FIRE-XXXXX) | (Unit based) |

|                             |                    |              |
|-----------------------------|--------------------|--------------|
| Portable Fuel Transfer Pump | (PUMPX-FUEL-XXXXX) | (Unit based) |
| Heating Water Pump          | (PUMPX-HTGX-XXXXX) | (Unit based) |
| Make up Heating Water Pump  | (PUMPX-MAKW-XXXXX) | (Unit based) |
| Pool Pump                   | (PUMPX-POOL-XXXXX) | (Unit based) |
| Gas Engine Portable Pumps   | (PUMPX-PORT-XXXXX) | (Unit based) |
| Re-Circulation Pump         | (PUMPX-RECR-XXXXX) | (Unit based) |
| Sanitary Sump Pump          | (PUMPX-SANI-XXXXX) | (Unit based) |
| Storm Water Sump Pump       | (PUMPX-STRM-XXXXX) | (Unit based) |
| Vacuum Pump                 | (PUMPX-VACU-XXXXX) | (Unit based) |

The self-adhesive barcode label will be applied directly to the unit and will require a 2-1/2" x 3-1/2" aluminum plate (supplied by the university) and fastened to the unit with a stainless wire c/w compressible seal to a visible location on the unit, on base mounted pumps to the power supply or on inline pumps to pump housing flange bolt. (See example 10)

|                                |                    |              |
|--------------------------------|--------------------|--------------|
| Pressure Vessel Air Receiver   | (PVARX-XXXX-XXXXX) | (Unit based) |
| Pressure Vessel Boiler         | (PVBXX-XXXX-XXXXX) | (Unit based) |
| Pressure Vessel Expansion Tank | (PVEXT-XXXX-XXXXX) | (Unit based) |
| Pressure Vessel Storage Tank   | (PVSTX-XXXX-XXXXX) | (Unit based) |
| Pressure Vessel Digester       | (PVXXX-DIGE-XXXXX) | (Unit based) |
| Pressure Vessel Sterilizers    | (PVXXX-STER-XXXXX) | (Unit based) |

The self-adhesive barcode label will be applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible.

|                                     |                    |              |
|-------------------------------------|--------------------|--------------|
| Pressure Vessel Convertor Exchanger | (PVCEX-XXXX-XXXXX) | (Unit based) |
|-------------------------------------|--------------------|--------------|

The self-adhesive barcode label will be applied directly to the unit and will require a 2-1/2" x 3-1/2" aluminum plate (supplied by the university) and fastened to the unit with a stainless wire c/w compressible seal to a visible location on the exchanger usually the tube sheet head plate studs. (See example 11)

|                         |                    |              |
|-------------------------|--------------------|--------------|
| Acid Neutralizing Tanks | (TANKX-ADTK-XXXXX) | (Unit based) |
| Glycol Feed Tanks       | (TANKX-DAYX-XXXXX) | (Unit based) |
| Water Storage Tank      | (TANKX-WATR-XXXXX) | (Unit based) |
| Expansion Tanks         | (PVEXT-XXXX-XXXXX) | (Unit based) |
| Storage Tanks           | (PVSTX-XXXX-XXXXX) | (Unit based) |

The self-adhesive barcode label will be applied directly to the storage tank or expansion tank or neutralizing tank next to or directly under the manufacturer's name plate or manufacturer's data rating plate and/or in the most visible possible location. (See example 12 to 16)

|                |                    |                  |
|----------------|--------------------|------------------|
| Sediment Tanks | (TANKX-SEDI-XXXXX) | (Building based) |
|----------------|--------------------|------------------|

Sediment tanks are building based entity. A self-adhesive barcode label will be placed in a building/system binder that resides in the Maintenance Planning office and will also be available online.

|              |                    |                |
|--------------|--------------------|----------------|
| Septic Tanks | (TANKX-SEPT-XXXXX) | (System based) |
|--------------|--------------------|----------------|

Septic Tanks are a system based entity. A self-adhesive barcode label will be placed in a building/system binder that resides in the Maintenance Planning office and will also be available online.

|                                 |                    |                |
|---------------------------------|--------------------|----------------|
| Domestic Water Treatment System | (TREAT-DOWA-XXXXX) | (System based) |
|---------------------------------|--------------------|----------------|

The self-adhesive barcode label will be applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible.

|               |                    |              |
|---------------|--------------------|--------------|
| Swamp Coolers | (SWAMP-XXXX-XXXXX) | (Unit based) |
|---------------|--------------------|--------------|

The self-adhesive barcode label will be applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible.

|                |                    |              |
|----------------|--------------------|--------------|
| Water Softener | (WATER-SOFT-XXXXX) | (Unit based) |
|----------------|--------------------|--------------|

The self-adhesive barcode label will be applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible.

|               |                    |              |
|---------------|--------------------|--------------|
| Water Coolers | (WTCLR-XXXX-XXXXX) | (Unit based) |
|---------------|--------------------|--------------|

The self-adhesive barcode label will be applied directly to the unit's name plate in a visible location and/or as near to the manufacturer's data rating plate as possible.



## Life Safety Equipment Barcode Placement

Main Fire Panel (FASYS-XXXX-XXXXX) (Unit based)  
Apply the barcode to the front top right corner of the fire panel. (See example 21)

Nodes and Extenders (FASYS-XXXX-XXXXX) (System based)  
Apply barcode to the front top right corner of cabinets.

Fire Pump and Transfer Switch Controller (FASYS-XXXX-XXXXX) (Unit based)  
Apply barcode below main disconnect for both

Pre-Action System (PIPSY-SPRK-XXXXX) (System Based)  
Use barcode applied to metal plate and hang on piping system in a visible location. (See example 22)

## Electrical Equipment Barcode Placement

Wireless Clock System (CLOCK-FMXX-XXXXX) (Building based)  
Assigned by the university and located in binders. One barcode for building.

Door Security (DSXXX-XXXX-XXXXX) (Unit based)  
Apply barcode to doors of the control panels along with the access label. Barcode preferred location is the top right hand corner of main power control cabinet. Bottom left is acceptable as a secondary location. One barcode per power supply. Place additional signage to all control cabinets for entry. (See example 31)

Electric Heaters (ELECT-HEAT-XXXXX) (Unit based)  
Locate on front of unit at top right hand corner of heater.

Generators (EMPOW-GENX-XXXXX) (Unit based)  
Apply barcode above/below motor manufacturer's data rating plate. (See example 32 and 33)

Emergency Transfer Switches (EMPOW-TRAN-XXXXX) (Unit based)  
Apply barcode on front of door, near manufacturer's data rating plate, where room is available. (See example 34)

Main Distribution Grounding Plate (GROUN-DSYS-XXXXX) (Building based)  
Apply barcode to metal plate and using tie wrap affix to ground bar support rod. (See example 35)

Line Filters and Reactors (HARMO-MITI-XXXXX) (Unit based)  
Apply barcode to front top right hand corner if cover is solid metal, if ventilated cover apply to top of device where visible.

High Voltage Disconnects (HVOLT-DISC-XXXXX) (Unit based)  
Apply barcode below widow and centered if possible or near data rating plate for switchgear. (See example 36)

Main Distribution Transformers (HVOLT-DRYT-XXXXX) (Unit based)  
Apply barcode centered on front of transformer beside manufacturer's data rating plate.

Lighting Control (LIGHT-CNTL-XXXXX) (Unit based)  
Locate on control unit where visible.

Emergency Lighting Centralized (LIGHT-EMCT-XXXXX) (Unit based)  
Apply barcode near manufacturer's rating plate or on front of unit where visible.

Emergency Lighting Battery Packs (LIGHT-EMPK-XXXXX) (Unit based)  
Apply barcode to unit where visible. Preferred location to be on the front of the unit, at the top right hand corner of the battery pack. (See example 37)

Emergency Remote Heads (LIGHT-EMPK-XXXXX) (Unit based)  
Locate on base plate. Barcode sized to fit base plate.

Exit Lighting (LIGHT-EXIT-XXXXX) (Building based)  
Assigned by the university and located in binders. One barcode for building.

Exterior Building Lighting (LIGHT-EXTX-XXXXX) (Building based)  
Assigned by the university and located in binders. One barcode for building.

Interior Building Lighting (LIGHT-INTX-XXXXX) (Building based)  
Assigned by the university and located in binders. One barcode for entire building.

Lightning Protection (LITNG-PROT-XXXXX) (Building based)  
Assigned by the university and located in binders. One barcode for building.

Wiring Devices (LVOLT-BRAN-XXXXX) (Building based)  
Assigned by the university and located in binders. One barcode for building.

Cabling/Bus Duct (LVOLT-CABL-XXXXX) (Building based)  
Assigned by the university and located in binders. One barcode for building.

Main Distribution Breakers (LVOLT-DBRK-XXXXX) (Unit based)  
Apply barcode beside or below manufacturer's data rating plate or centered below breaker.

Current Distribution Panel Boards (LVOLT-PANL-XXXXX) (Unit based)  
Apply barcode to front top right hand corner.

Disconnects (LVOLT-PANL-XXXXX) (Unit based)  
Apply barcode to front top right hand corner of disconnect or door where adequate room is available.

Panel Boards (LVOLT-PANL-XXXXX) (Unit based)  
Apply barcode to the front top right hand corner of panel board. (See example 38)

Transformers (LVOLT-TRAN-XXXXX) (Unit based)  
Apply barcode to front top right hand corner of front cover or below manufacturer's data rating plate.  
(See example 39)

Uninterruptible Power Supplies (LVOLT-UPSC-XXXXX) (Unit based)  
For BMS Control panels. Locate on unit where visible, top or Side of UPS. Apply barcode to side of UPS where location is at a higher level and top is not visible. Preferred location is beside the manufacturer's data label. (See example 40 and 41)

Metering (METER-ELEC-XXXXX) (Unit based)  
Apply barcode below or beside metering where visible and room is available. (See example 42)

Motor Control Centers (MOTOR-CNTL-XXXXX) (Unit based)  
Apply barcode to the front top of motor control center and beside manufacturer's data rating plate.  
(See example 43)

Motor Starters Stand Alone (MOTOR-STRX-XXXXX) (Unit based)  
Apply barcode to front top right hand corner of starter where adequate room is available.

Surge Protection Devices (POWER-QUAL-XXXXX) (Unit based)  
Apply barcode centered above display. Optional is to locate below or beside display. (See example 44)

Pump Controller (PUMPX-SANI-XXXXX) (Unit based)  
The self-adhesive barcode label will be applied directly to the unit's nameplate in a visible location and/or as near to the manufacturer's data rating plate as possible. (See example 45)

Pump Controller (PUMPX-STRM-XXXXX) (Unit based)  
The self-adhesive barcode label will be applied directly to the unit's nameplate in a visible location and/or as near to the manufacturer's data rating plate as possible. (See example 46)

Building Illuminated Signage (SIGNX-ILLB-XXXXX) (Unit based)  
Locate barcode where visible on sign.

Solar Collectors (SOLAR-COLL-XXXXX) (Building based)  
Assigned by the university and located in binders. One barcode for building.

Variable Frequency Drives (VFDXX-XXXX-XXXXX) (Unit based)  
Apply barcode to front of drive below display. (See example 47 to 49)

## Architectural and Structural Equipment

|  |                    |                  |
|--|--------------------|------------------|
| Barrier Free Components                  | (BARRI-XXXX-XXXXX) | (Building based) |
| Casework                                 | (CASEX-XXXX-XXXXX) | (Building based) |
| Ceilings                                 | (CEILX-XXXX-XXXXX) | (Building based) |
| Ceiling Finishes                         | (CEILX-FINI-XXXXX) | (Building based) |
| Exterior Doors                           | (DOORX-EXTX-XXXXX) | (Building based) |
| Fire Doors                               | (DOORX-FIRE-XXXXX) | (Building based) |
| Interior Doors                           | (DOORX-INTX-XXXXX) | (Building based) |
| Expansion Joints and Seals               | (EXPAN-XXXX-XXXXX) | (Building based) |
| Interior Partition Fire Stopping         | (FIPRO-INTX-XXXXX) | (Building based) |
| Structural framing of Floors             | (FLOOR-STFR-XXXXX) | (Building based) |
| Floor Finishes                           | (FLOOR-FINI-XXXXX) | (Building based) |
| Foundations Footings Slabs Piles Columns | (FOUND-XXXX-XXXXX) | (Building based) |
| Insulation                               | (INSUL-XXXX-XXXXX) | (Building based) |
| Ramps                                    | (RAMPS-XXXX-XXXXX) | (Building based) |
| Roofing                                  | (ROOFX-XXXX-XXXXX) | (Unit based)     |



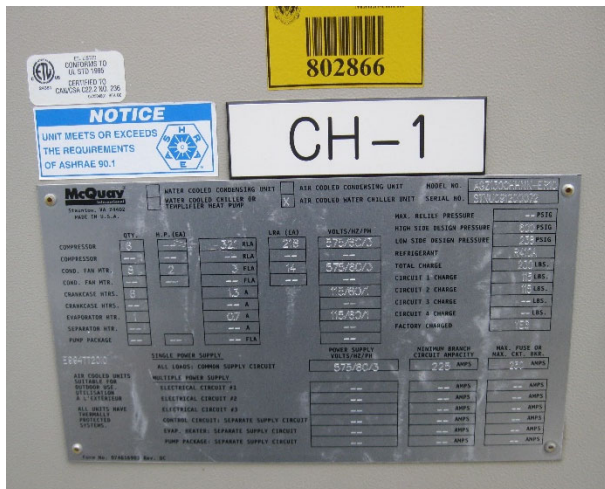
Example 1. Air Handling Unit



Example 2. Makeup Air Unit



Example 3. Backflow Preventors



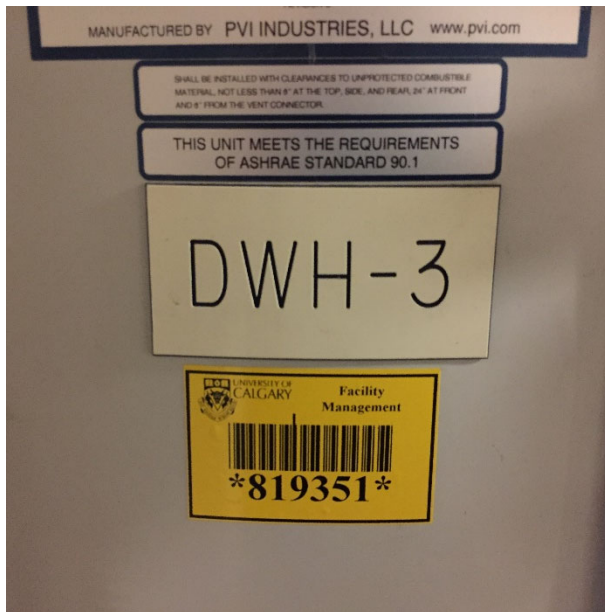
Example 4. Chiller



Example 5. Air Compressor



Example 6. Exhaust Fan



Example 7. Domestic Water Heater



Example 8. Domestic Water Heater



Example 9. Grease Interceptor



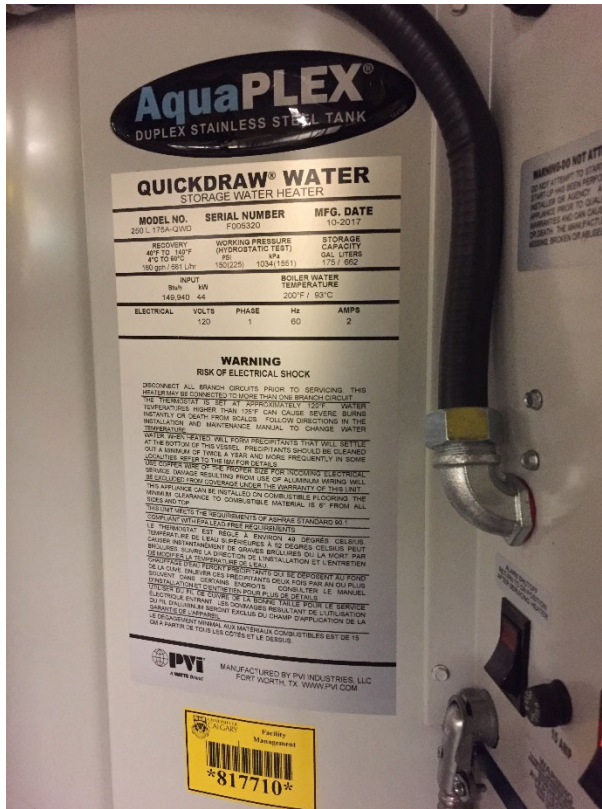
Example 10. Vacuum Pump



Example 11. Plate Heat Exchanger



Example 12. Glycol Feed Tank



Example 13. Water Storage Tank



Example 14. Water Storage Tank



Example 15. Expansion Tank



Example 16. Expansion Tank





Example 21. Fire Alarm Panel



Example 22. Sprinkler



Example 31. Door Access Panels



Example 32. Generator



Example 33. Indoor Generator



Example 34. Transfer Switch



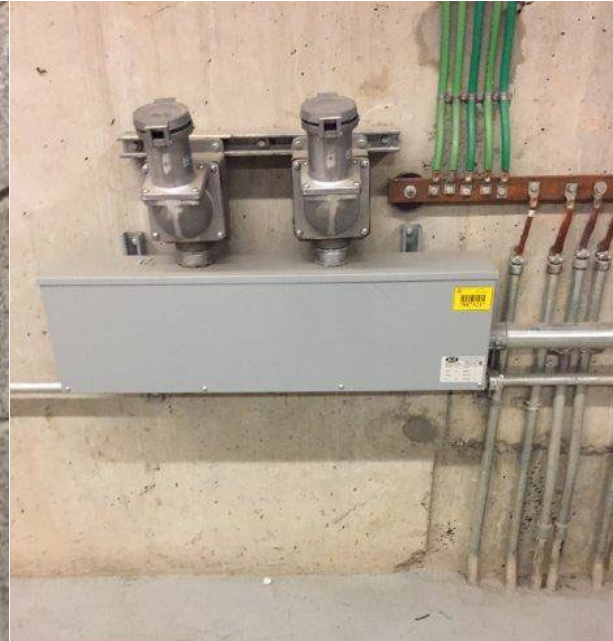
Example 35. Main Electrical Distribution Ground Bar



Example 36. Disconnect



Example 37. Emergency Lighting Battery Pack



Example 38. Splitter



Example 39. Low Voltage Transformer



Example 40. Controls UPS



Example 41. Controls UPS



Example 42. Electrical Utilities Metering



Example 43. Motor Control Center



Example 44. Surge Protection Device



Example 45. Pump Controller



Example 46. Sump Pump Controller



Example 47. Danfoss VFD



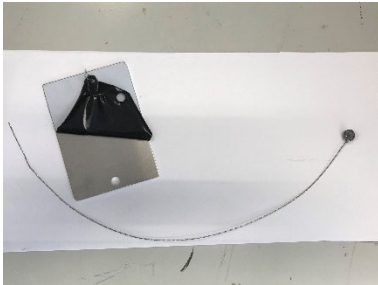
Example 48. Danfoss VFD



Example 49. ABB VFD

## Barcode Placement on Metal Plate

1. 2-1/2" x 3-1/2" aluminum plate and a stainless wire c/w compressible seal



2. Apply self-adhesive barcode label to metal plate.



3. Loop the wire.



4. Fasten the wire seal.

