

University of Illinois

Building Information Modeling (BIM) Requirements

For Professional Services Consultants

Version 1.1 December 2012

This document is intended to be used for University of Illinois Projects on all campuses state-wide.

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Acknowledgements

The University of Illinois would like to thank all who contributed prior research, knowledge, and effort in the development of BIM guidelines and standards. Particularly, Indiana University's BIM Guidelines and Standards for Architects, Engineers, and Contractors informed the organization and content of this document.

For guidance on the use of open standards, the following documents served as excellent sources:

- General Services Administration (GSA) – BIM Guide Series available at www.gsa.gov/bim
- LACCD Building Information Modeling Standards for Design-Bid-Build Projects: Version 3.0
- Statsbygg BIM Manual: Version 1.2 - October 24, 2011
- The Veteran Administration (VA) BIM Guide: Version 1.0 - April 2010
- State of Wisconsin Department of Administration Building Information Modeling (BIM) Guidelines and Standards for Architects and Engineers: July 2012

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1. Overview

The intent of this document is to provide guidance on the development and implementation of the Building Information Model (BIM) throughout the Design Phase for University of Illinois projects. In addition, this document also includes requirements for the As-Built BIM. Currently, no Construction Phase BIM requirements are being implemented, but over time, these requirements will be extended into the Construction Phase.

These BIM Requirements shall be used by the Professional Services Consultant for all BIM related services. All references to the Professional Services Consultant shall include the architect and all consulting engineers identified as project team members.

The U of I expects to achieve the following goals through the implementation of Design Phase BIM Requirements:

- Better coordinated drawings
- Better coordinated building systems
- Fewer design errors
- Improved project understanding by all stakeholders through immediate visualization
- More rapid response to client-initiated changes
- Reduced change orders and schedule delays during construction

The goals of these BIM Requirements represent a first step toward more comprehensive BIM standards that will be developed in the future.

2. General Requirements for Professional Services Firms

A. The Professional Services Consultant shall use parametric BIM Authoring software for all U of I projects. The BIM authoring software used for the design process is open to the preference of the Professional Services Consultant with the following requirements:

1. The authoring software for all disciplines except Civil shall be able to export to Industry Foundation Class (IFC) format. The authoring software used for Civil work shall be able to export to DWG. All modeling content except Civil must be submitted in IFC format. Civil modeling content shall be submitted in DWG format. The DWG and IFC versions shall be identified in the BIM Execution Plan.

2. The authoring software used by the Professional Services Consultant and all other Consulting Team members (except Civil) must support IFC import and export.
- B. All disciplines shall use intelligent 3D, modeling, or Building Information Modeling (BIM). Good BIM practices may include, but are not limited to:
1. Use of element and component objects that embed the best practices of the firm(s).
 2. Maintenance of parametric linkages within the model at all times
 3. Use of the U of I's Campus or Facility defined naming standards for spaces and equipment. Standards for equipment only include naming for items for which preventative maintenance work orders are issued. All other equipment naming conventions should be based on industry standards.
 4. Use appropriate and interoperable viewing, checking, and output file formats
- C. Disciplines required to produce BIMs include: Architecture, Structure, Mechanical, Electrical, Plumbing and Fire Protection, Civil, and any Specialty Consultant whose work will impact any of the previously mentioned disciplines.
- D. All plans, building and wall sections, interior and exterior elevations, and schedules shall be direct extractions from the model(s). Details shall have their base elements extracted from the model unless the Professional Services Consultant has standard details or diagrams. Details shall be consistent with U of I Campus Facilities Standards. In case of conflict, the Campus Facility Standards take precedence.
- E. Lead Professional Services Firm must indentify a qualified BIM Manager acceptable to the U of I. This shall be documented in the BIM Execution Plan.
- F. All design disciplines and specialty consultants, whether internal or external to lead firm, shall identify a BIM Coordinator. This shall be documented in the BIM Execution Plan.
- G. The Professional Services Consultant shall produce a BIM Execution Plan (BEP) during the fee negotiation. The BEP shall identify the entire Professional Services team. The BEP should also include roles and responsibilities of each participant even if the particular team member has not been identified. The BEP will be updated during the project phase milestones listed in section 4. The BEP shall also be included with the final construction documents.

- H. The Professional Services Consultant Team shall use a BIM Collaboration environment.
1. Shared File Server – Prior to start of design, the Professional Services Consultant shall establish a single shared project server for the upload and exchange of digital models, and the collection of project deliverables at pre-determined milestones. The same shared server shall continue to be used for the same purposes during Construction. Models on this shared server shall be fully accessible web based to all team members via assigned site user names and passwords. Details of this requirement shall be documented in the BEP.
- I. The Professional Services Consultant shall geo-reference site plans and all disciplines' building models to a single, common reference point. This reference shall be maintained throughout the entire life of the project. The following geo-references shall be applied to the model based on project location:
1. U of I Urbana-Champaign (UIUC): Horizontal Datum shall be based upon Illinois State Coordinate System East Zone North American Datum of 1983 (1986) "NAD 1983 ILLINOIS STATE PLANE, EAST ZONE" and North American Vertical Datum 1988, "NAVD 1988"
 2. U of I Chicago (UIC): To be provided by UIC project manager once project is awarded to Professional Services Consultant.
 3. U of I Springfield (UIS): To be provided by UIS project manager once project is awarded to Professional Services Consultant.

Prior to the start of design, the BIM Manager shall work with the project team to coordinate this geo-referenced point.

- J. All other project and deliverable requirements are specified in the following documents and should be reviewed by the Professional Services Consultant :
- U of I Campus Facilities Standards
 - U of I Project Submittal Requirements
 - Professional Services Consultant Agreement

3. Required BIM Applications

3.1. Visualization

The Professional services consultant shall provide 3D Navigable models in IFC format at each required design phase milestone.

3.2. Spatial Program Validation

The space validation shall be based on the requirements set forth in the *U of I Project Submittal Requirements Part 3: Space Inventory – Room Number Assignment Standards*. The number system and naming classification identified in this document mentioned shall be applied to all rooms. Each room shall be defined in the model and contain the properties noted in *Appendix A: Space Properties, Equipment Parameters and Attributes*.

Space definition capabilities of the BIM authoring tool shall be used to automatically generate area and volume of those spaces. For all submittals, a space inventory shall be generated from the model and compared to the University's space program.

3.3. Energy Modeling Requirements

The Professional Services Consultant shall reference the *UIUC Facilities Standards – I. General Requirements – Energy Conservation* document for energy modeling compliance requirements. The Professional Services Consultant shall also establish an energy modeling methodology that will be included within the BEP. The methodology will detail how energy modeling will be accomplished for the project. Energy modeling tools integrated with the BIM Authoring software or other industry standard energy modeling software packages may be used for energy analysis. The program(s) used must be identified in the BEP. The eere.energy.gov website contains a comprehensive list of software packages that can assist in Comparative Energy Analysis

3.4. Quantity Take-offs for Cost Estimating

The measurements and element quantities contained in the BIM shall be encouraged to be the basis for all required cost estimates. At different phases during design, cost estimates may be based on overall area and building type or on detailed quantities of building products and materials.

3.5. Interference Checking

The Professional Services Consultant shall use automated interference checking software. The software package and interference checks to be performed shall be described in the BEP. The software package identified in the BEP shall be used starting in design development and reports shall be submitted with *each* milestone submission deliverable starting in design development identified in the Phased BIM Deliverables section. The interference report should identify all coordination issues between the Professional Services Consultant disciplines based on the following interference checks:

Critical Interferences

- Mechanical Ductwork and Piping vs. Structure
- Mechanical Ductwork and Piping vs. Rated Walls
- Mechanical Ductwork and Piping vs. Ceilings
- All Equipment and their Applicable Clearances vs. Structure
- Mechanical Equipment and Fixtures vs. Electrical Equipment and Fixtures
- Mechanical Ductwork and Piping vs. Plumbing Piping
- Fire Protection Piping vs. Mechanical Ductwork
- Fire Protection Piping vs. Ceilings
- Fire Protection Piping vs. Structure

Other Interferences

- Casework vs. Electrical Fixtures and Devices
- Furnishings vs. Electrical Fixtures and Devices
- Structure (Primary Structural System) vs. Specialty Equipment
- Structure (Primary Structural System) vs. Electrical Equipment, Fixtures and Devices
- Ductwork and Piping vs. Electrical Equipment, Fixtures, and Devices
- Ductwork vs. Floors
- Casework vs. Walls
- Casework vs. Ceilings
- Plumbing Piping vs. Electrical Equipment, Fixtures, and Devices
- Plumbing Piping vs. Mechanical Equipment, Fixtures, and Devices
- ADA Clear Space Requirements vs. Doors, Fixtures, Walls, Structure

Based on the building type and presence of special systems, other interference checks may be appropriate.

3.6. Other Analysis Tools

The Professional Services Consultant is encouraged to utilize other software analysis tools that interact with the BIM to help enhance and refine the design.

4. Phased BIM Deliverables

The table below identifies the high level BIM related submittals at each design phase milestone. Refer to the detailed requirements that follow for more information on the exact contents of each BIM deliverable. All content shall be confirmed by the Professional Services Consultant in the BEP.

4.1. BIM Deliverables Table

Milestone	Deliverable
Conceptualization Phase	Shall be indentified in the BEP
Schematic Design	BIM divided by discipline and floor in IFC format only Schematic Design Cost Estimate Space Inventory Report Energy Model Report
Design Development	BIM divided by discipline and floor in IFC format only Design Development Cost Estimate Energy Model Report Interference Report Space Inventory Report As Required: Design COBie worksheets: Contact , Facility, Floor, Space, Type, Component, and Attribute
Construction Documents: 50 & 95%	BIM divided by discipline and floor in IFC format only. Construction Documents Cost Estimate Energy Model Report Interference Report Space Inventory Report As Required: Design COBie worksheets: Contact , Facility, Floor, Space, Type, Component, and Attribute
Construction Documents: 100%	BIM divided by discipline and floor in both IFC and native formats; and One (1) Composite Model in IFC format Construction Documents Cost Estimate As Required: Design COBie worksheets: Contact , Facility, Floor, Space, Type, Component, and Attribute 2-D CAD files extracted from the 100% Construction Documents BIM in the following formats: .DWG (In conformance with U of I CAD Standards) and .PDF (2D CAD files are required for review at other stages as stated in the U of I Project Submittal Requirements)

As-Built Documents	BIM divided by discipline and floor in both IFC and native formats; and One (1) Composite Model in IFC format
	Space Inventory Report
	2-D CAD files extracted from the As-Built BIM in the following formats: .DWG (In conformance with U of I CAD Standards) and .PDF
	As Required: As-built / Record COBie Worksheets – Update all COBie worksheets submitted at the end of the design phase with construction phase information. Worksheets to include are: Contact , Facility, Floor, Space, Type, Component, and Attribute
<i>NOTE: Refer to U of I Project Submittal Requirements Document for a complete list of Design and Construction Phase deliverable requirements.</i>	

4.2. Conceptualization Phase

4.2.1. General

The Professional Services Consultant is encouraged to use electronic programming and planning tools that integrate into their BIM Authoring software to capture early cost, schedule and program information during this phase. Specific deliverable requirements for the conceptualization phase shall be confirmed with the U of I and identified in the BEP.

4.3. Schematic Design

4.3.1. General

The Professional Services Consultant may use any method to begin the design process, but shall be using a BIM authored model(s) by completion of this phase. All information needed to describe the schematic design shall be graphically or alphanumerically included in and derived from these models.

4.3.2. Schematic Design Cost Estimate

The Professional Services consultant shall utilize the Schematic Design BIM to create a preliminary cost estimate based on the anticipated building type ,area, volume and any other unit cost identified during this phase.

4.4. Design Development

4.4.1. General

The Professional Services Consultant shall continue development of the BIMs during this phase. Parametric links shall be maintained within the model to ensure that automatic extractions of views (Plans, Sections, Elevations, Details, Schedules, and 3D) can be generated. All extractions must be representations of the BIM. Model quality shall reflect the requirements in the General Requirements for Professional Services section above and include the elements indicated below at this phase of design:

4.4.1.1. Civil / Landscape

- Topography – 3D terrain of all site work as designed, including retaining walls.
- Landscaping Elements: planting areas such as raised planting beds and berms, parking islands, onsite water features (pools, ponds, fountains, etc.), terraces
- Stormwater management structures, pump stations, fueling systems, manholes, and any other major item that could have an impact on the overall design
- Must be geo-referenced as stated previously.

The party responsible for completing the civil and landscape modeling requirements must be identified in the BEP.

4.4.1.2. Architectural

- Architectural Site Plan
 - Paving, grades, sidewalks, curbs, gutters, site amenities and other elements typically included on enlarged scale site drawings in building vicinity.
- Existing Conditions – To the extent required to explain the current project
- Demolished Items – To the extent required to explain the current project
- Walls (Interior and Exterior) – All finishes should be included with wall type regardless of thickness of the finish.

- Doors, Windows, and other Openings
- Overhangs, Sun Control/Shading Devices, Screening Devices, and Interior & Exterior Soffits.
- Parapets
- Architectural Precast
- Floor, Ceiling, and Roof Systems
- Elevators, Stairs, and Ramps (Including Railing)
- Casework, Shelving, and other interior architectural elements
- Furnishing, fixtures, and equipment – As required by the PSC Agreement
 - Furniture (Fixed and Loose)
 - Furniture Systems
 - Specialty Equipment
 - Mechanical, Electrical, and Plumbing Items that require architectural space (toilets, sinks, etc), require color/finish selection (louvers, diffusers, etc.) or affect 3D visualization (lighting fixtures) unless provided by engineers.
- Clearance Zones for access, door swings, handicap accessibility, service space requirements, gauge reading, and other operational clearance must be modeled as a part of all space and equipment and checked for conflicts with other elements. The party responsible for completing the Architectural modeling requirements must be identified in the BEP.

4.4.1.3. Structural

- Foundations
 - Spread
 - Caisson
 - Pile
 - Mat
 - Load-Bearing Wall
- Framing
 - Steel Columns (actual dimensions)
 - Steel Floor C-Joists
 - Open Web Joists
 - Joist Girders
 - Steel Beams (actual dimensions)
 - Precast Concrete Elements
 - Cast-in-Place Concrete Elements
 - Floors including overall extents and openings

- Model overall thickness of wood floor systems
- Wood Posts/Column
- All other Joists
- Wood Trusses
- Solid Wood or Laminated Beams
- Walls
 - Load Bearing Walls (Masonry, Concrete, Cold-Formed Steel, and Wood)
 - Overall thickness of Cold-Formed Steel and Wood Stud Walls (individual members may be modeled at the Design Team's Option)
 - Structural Foundation walls including brick ledges
- Optional Structural Items to be Modeled
 - Steel Reinforcing in Concrete
 - Embeds in Concrete
 - Miscellaneous Steel – Angles for openings, deck bearing, etc.; Channels for mechanical units needed for coordination reviews between structural and mechanical; Lintels (if not considered a major member)

The party responsible for completing the Structural modeling requirements must be identified in the BEP.

4.4.1.4. Mechanical

- Equipment
 - Fans, VAV's, terminal units, pumps, compressors, chillers, cooling towers, air handlers, etc.
- Distribution
 - Supply, return, exhaust, relief and outside air ductwork modeled to outside face dimension or duct insulation (whichever is greater)
 - Duct Joints
 - Diffusers, grilles, louvers, hoods, radiant panels, perimeter units, and wall units
- Pipes larger than 2" diameter except ¾" for fire protection pipe; include any insulation in model as well.
- Clearance Zones for access, door swings, service space requirements, gauge reading, valve reading, and other operational clearance must be modeled as a part of all Mechanical equipment and checked for conflicts with other elements. Clearance zones should be modeled as invisible solids within the object.

The party responsible for completing the HVAC modeling requirements must be identified in the BEP.

4.4.1.5. Electrical

- Power and Telecommunications
 - Interior and exterior transformers, emergency generators, and other equipment
 - Main and distribution panels and switchgear including access clearances
 - Main IDF's
- Feeders and conduit larger than 2" diameter.
 - Outlets, switches, junction boxes.
- Lighting
 - Permanently mounted lighting fixtures
 - Lighting Controls
 - Switches
 - Junction Boxes
 - Break Panels
 - Switchgear
 - Transformers
- Fire Alarm and Security Systems
 - Input devices
 - Notification devices
 - Associated equipment and access clearances
- Building Controls
- Clearance Zones for access, door swings, service space requirements, gauge reading, and other operational clearance must be modeled as a part of all electrical equipment and checked for conflicts with other elements.

The party responsible for completing the Electrical modeling requirements must be identified in the BEP.

4.4.1.6. Plumbing and Fire Protection

- Waste and Vent Piping sized at and over 2" diameter, including insulation.
- Roof drains, Floor drains, leaders, sumps, grease interceptors, tanks, water treatments and other major items.
- Supply Piping larger than 2" diameter, including insulation.
- Domestic Booster Pumps
- Fixtures: Sinks, Toilets, Water Tanks, Floor Sinks
- Fire Protection

- Sprinkler lines larger than 3/4" diameter
- Sprinkler heads
- Fire protection pipes larger than 3/4" diameter
- Fire protection pumps
- Stand pipes, wall hydrants, fire department connections, risers, including valve clearances
- Clearance Zones for access, service space requirements, gauge reading, valve clearances and other operational clearance must be modeled as a part of all plumbing and fire protection equipment and checked for conflicts with other elements. Clearance zones should be modeled as invisible solids within the object.

The party responsible for completing the Plumbing and Fire Protection modeling requirements must be identified in the BEP.

4.4.1.7. Specialty Consultants

When specialty consultants are involved in the project, the model should include elements from their discipline shown in the correct sizes and locations to ensure proper coordination.

- Equipment provided or specified by said consultant
- Rough-in connection points for power, data, communications, water service and waste, gas, steam, or other needed utilities
- Extent of specialty consultant modeling shall be coordinated with the Professional Services Consultant and described in the BIM Execution Plan.
- Clearance zones for access, door swings, service space requirements, controls, gauge reading, and other operational clearance must be modeled as part of the equipment and checked for conflicts with other elements.

All specialty consultants must be identified in the BEP.

4.4.2. Design Development Cost Estimate

The Professional Services Consultant shall utilize systems and assemblies information for construction categories in the BIM to develop the Design Development Phase Cost Estimate. Quantity takeoffs of building components should be extracted from the BIM schedules to a spreadsheet format and submitted with the design submission at the end of the Design Development Phase.

4.5. Construction Documents

4.5.1. General

The Professional Services Consultant shall continue development of the model(s) created in the Design Development phase. All elements and building system required in prior phases shall be required in this phase as well.

4.5.2. Construction Documents Cost Estimate

The Professional Services Consultant shall utilize quantity takeoff information to develop detailed Construction Cost Estimates during the Construction Documents phase. Quantity take-offs of building components, systems, and/or materials should be organized by bidding division and extracted from the BIM schedules to spreadsheet format and submitted with the 50% & 95% Construction Documents design submissions.

4.5.3. Design Phase COBie Data (As Required)

All named products and equipment noted in Appendix A that appear in the design schedules shall be listed in the COBie Components Table. The Professional Services Consultant shall ensure that the list of equipment provided in the COBie "Component" Worksheet includes all equipment specifically identified on the design drawings or BIM model. The table below lists worksheets and information that shall be provided:

COBie Worksheet	Required Content
Contact	One row for the designer's BIM manager shall be provided.
Facility	One facility per COBie file.
Floor	One row for each vertical level to include foundations, floors, roofs, and site.
Space	One row per functional space, per room. Multiple spaces in a room are possible.
Type	One row for each scheduled product type found on design drawings.
Component	One row for each individual scheduled product found on design drawings.

Attribute	One row for each required COBie.Space Attribute. One row for each required COBie.Type Attribute. One row for each required COBie.Component Attribute.
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4.5.4. Provisioning of Design BIM to Contractor

At the Contractor's request, the U of I will provide the Design BIM to the Contractor. The U of I will notify the Professional Services Consultant that the Design BIM is being utilized by the Contractor.

4.6. Professional Services Consultant As-Built Documents

4.6.1. Model Partitioning and Formats

The Professional Services Consultant shall update their respective discipline models with the contractor's recorded changes throughout the construction process. Once all required updates have been made to the model(s), the Professional services consultant shall provide the BIM(s) divided by discipline and floor in both IFC and native formats. A Composite Model in IFC format shall also be provided.

4.6.2. Record Drawings 2-D Requirements

The Professional Services Consultant shall extract the 2-D As-built Record drawings from the models. Refer to the *U of I Project Submittal Requirements* Document for additional details.

4.6.3. Record Drawings COBie Data (As Required)

Based on the final model, the Professional Services Consultant shall:

1. Provide an As-Built Space Inventory Report
2. Provide an Asset Group for all installed equipment noted in *Appendix A: Space Properties, Equipment Parameters and Attributes*
3. Update the COBie worksheets started during the Design phase to reflect As-Built information applicable to elevators and compressors as identified in *Appendix A: Space Properties, Equipment Parameters and Attributes*. The Professional Services Consultant shall utilize the As-Built information provided by the Contractor.

See the table in section 4.4.3 Design Phase COBie Data for the list of COBie worksheets required.

5. Ownership and Rights of Data

The University of Illinois will have ownership of all CAD files, Building Information Models, and Facility Data developed for all University Projects. The U of I may make use of all data received following any deliverable.

**APPENDIX A: Space Properties, Equipment
Parameters and Attributes**
(When Required by COBie deliverables)

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All room elements in the model shall contain specific properties to identify information required by the University of Illinois. The table below provides the property names and allowed values related to rooms:

Rooms/Spaces		
	Required Properties	Allowed Values
1.	ROOM NUMBER	Refer to <i>U of I Project Submittal Requirements Part 3: Space Inventory – Room Number Assignment Standards</i> for Room Numbering Requirements
2.	ROOM NAME	<i>Not Specified</i>
3.	ACTUAL ROOM USE NAME	Refer to <i>U of I Project Submittal Requirements Part 3: Space Inventory – Room Number Assignment Standards</i> for a table of Actual Room Use Names
4.	ACTUAL ROOM USE CODE	Refer to <i>U of I Project Submittal Requirements Part 3: Space Inventory – Room Number Assignment Standards</i> for a table of Actual Room Use Codes
5.	BUILDING NUMBER	<i>Not Specified</i>
6.	FLOOR	<i>Not Specified</i>
7.	SEATING CAPACITY	<i>This value should be entered for classrooms only.</i>
8.	DEPARTMENT	<i>This value will be added by U of I Facilities & Services at a later date</i>
9.	SPLIT USE/SHARED OCCUPANCY	<i>This value will be added by U of I Facilities & Services at a later date</i>
10.	ROOM AREA	<i>Not specified</i>

Parameters 5 – 10 above are not required to be visible in plan views, but shall be associated with the room and visible in schedule views. Refer to *U of I Project Submittal Requirements Part 3: Space Inventory – Room Number Assignment Standards* for more information on the arrangement of room information on floor plans.

In the building model, an additional object family property called "Asset_Group" shall be added to the equipment types listed in the following table. For each of the listed equipment types, the property must be set to the value given. The Asset_Group property will appear in the COBie spreadsheet generated from an IFC export of the BIM as a row on the Attribute Tab linked to the individual equipment object row on the Component Tab.

EQUIPMENT DESCRIPTION	ASSET_GROUP
AIR DRYER	AD
AIR HANDLING UNIT	AHU
ALARM	ALARM
BACKFLOW PREVENTER	BFP
BATTERY	BAT
BOILER	BLR
BUILDING	BLDG
CHAIR LIFT	CLIFT
CHILL WATER COOLING UNIT	CHCU
CHILLED WATER SYSTEM	CHW
CHILLER	CH
CLOCK	CLOCK
COMPRESSOR	COMPR
CONDENSER WATER SYSTEM	CW
CONTROLLER	CONT
COOLER/COLDROOM	CLR
COOLING TOWER	CT
DOCK LIFT	DLIFT
DOCK PLATE	DPLATE
DOORS - EXTERIOR	DOORSEXT
DOORS - OVERHEAD	DOORSOH
DOWN SPOUTS & WINDOW WELLS	DSWW
DRAIN	DRAIN
DRINKING FOUNTAIN	DF
DRY COOLER	DRY
DX SPLIT	DX
ELECTRIC WATER COOLERS	EWC
ELEVATOR	ELEV
EMERGENCY SHOWER AND EYEWASH STATION	EMSHOWR
ENERGY RECOVERY UNIT	ERU
EVAPORATOR	EVAP
FAN	FAN
FAN COIL UNIT	FCU

FIN TUBE RADIATOR	FTR
FREEZER	FRZ
FURNACE	FURN
GENERATOR	GENERATOR
HEATING SYSTEM	HEAT
HUMIDIFIER	HMDFR
LIFT	LIFT
LIGHTING DISTRIBUTION SYSTEM	LDS
LIGHTS	LT
MATERIAL LIFT	MATLIFT
MOTOR	M
POOL SYSTEM	POOL
PUMP	PUMP
REFRIGERATOR	RFRG
ROOF	ROOF
SAND BLASTER	SANDBL
SENSOR	SNSR
SILCOCK	SC
TIMECLOCKS - CAMPUS LIGHTING	CLOCK
TRAP	TRAP
UNIT HEATER	UH
VENTILATION SYSTEM	VENT
WATER FEATURE	WFEAT
WATER FILTER/STRAINER	WFLTR
WATER HEATER	WH
WATER SOFTENER	WS
WINDOW AIR CONDITIONER	WAC
WINDOWS EXTERIOR	WINDEX

In addition to the above Asset_Group property, the following properties shall be added to the object families for **Elevators only**. Note that values for line items 4 – 49 have not been identified. The values will be added at a later date by the U of I.

Elevator(s)		
	Required Properties	Allowed Values
1.	ASSET_GROUP	ELEV
2.	DESCRIPTION	ELEVATOR
3.	ASSET_TYPE	FACILITY-ASSET
4.	STATE ID	<i>Not specified</i>
5.	MACHINE ROOM	<i>Not specified</i>
6.	DRIVE TYPE	<i>Not specified</i>
7.	CAPACITY (POUNDS)	<i>Not specified</i>
8.	SPEED (FEET PER MINUTE)	<i>Not specified</i>
9.	NUMBER OF STOPS	<i>Not specified</i>
10.	REAR OPENINGS	<i>Not specified</i>
11.	LOADING CLASS	<i>Not specified</i>
12.	CONTROLLER MANUFACTURER	<i>Not specified</i>
13.	VOLTAGE	<i>Not specified</i>
14.	MACHINE SIZE (TRACTION)	<i>Not specified</i>
15.	MOTOR HORSEPOWER (TRACTION)	<i>Not specified</i>
16.	FIRE SERVICE	<i>Not specified</i>
17.	FIRE SERVICE PHASE	<i>Not specified</i>
18.	FIXTURES (MAKE)	<i>Not specified</i>
19.	FIRE SERVICE KEY	<i>Not specified</i>
20.	STOP SWITCH KEY	<i>Not specified</i>
21.	INDEPENDENT KEY	<i>Not specified</i>
22.	INSPECTION KEY	<i>Not specified</i>
23.	LIGHT KEY	<i>Not specified</i>
24.	FAN KEY	<i>Not specified</i>
25.	SECURITY KEY	<i>Not specified</i>
26.	HATCH ACCESS KEY	<i>Not specified</i>
27.	DOOR KEY	<i>Not specified</i>
28.	CABLE LENGTH	<i>Not specified</i>
29.	CABLE SIZE	<i>Not specified</i>
30.	CABLE NUMBER	<i>Not specified</i>
31.	GOVERNOR ROPE SIZE	<i>Not specified</i>
32.	GOVERNOR ROPE LENGTH	<i>Not specified</i>
33.	COUNTER WEIGHT ROLLER GUIDES	<i>Not specified</i>
34.	CAR ROLLER GUIDES	<i>Not specified</i>
35.	SAFETY TYPES	<i>Not specified</i>
36.	GENERATOR BRUSHES	<i>Not specified</i>
37.	MOTOR BRUSHES	<i>Not specified</i>
38.	DOOR TYPES	<i>Not specified</i>
39.	DOOR OPERATOR TYPE	<i>Not specified</i>
40.	DOOR MOTOR (VOLTAGE/HP)	<i>Not specified</i>
41.	DOOR OPERATOR BELT	<i>Not specified</i>
42.	HATCH DOOR ROLLERS	<i>Not specified</i>
43.	CAR DOOR ROLLERS	<i>Not specified</i>

44.	PUMPING UNIT (HYDRAULIC)	<i>Not specified</i>
45.	PUMP MOTOR (HYDRAULIC)	<i>Not specified</i>
46.	VALVE TYPE	<i>Not specified</i>
47.	PACKINGS	<i>Not specified</i>
48.	PUMP BELTS	<i>Not specified</i>
49.	EMERGENCY GENERATOR	<i>Not specified</i>

In addition to the above Asset_Group property, the following properties shall be added to the object families for **Compressors only**. Note that values for line items 4 – 32 have not been identified. The values will be added at a later date by the U of I.

Compressors		
	Required Properties	Allowed Values
1.	ASSET_GROUP	COMPR
2.	DESCRIPTION	COMPRESSOR
3.	ASSET_TYPE	FACILITY-ASSET
4.	FUNCTION	<i>Not specified</i>
5.	TYPE	<i>Not specified</i>
6.	DUPLEX/SIMPLEX	<i>Not specified</i>
7.	HORSE POWER	<i>Not specified</i>
8.	PUMP 1 SERIAL #	<i>Not specified</i>
9.	PUMP 2 SERIAL #	<i>Not specified</i>
10.	VOLTAGE	<i>Not specified</i>
11.	PHASES	<i>Not specified</i>
12.	# OF TANKS	<i>Not specified</i>
13.	WET TANK SIZE	<i>Not specified</i>
14.	DRY TANK	<i>Not specified</i>
15.	TANK DRAIN TYPE	<i>Not specified</i>
16.	BELT SIZE	<i>Not specified</i>
17.	# OF BELTS	<i>Not specified</i>
18.	OIL TYPE	<i>Not specified</i>
19.	AIR INTAKE FILTER ASSEMBLY	<i>Not specified</i>
20.	REPLACEMENT ELEMENT	<i>Not specified</i>
21.	NUMBER OF AIR INTAKE ELEMENTS	<i>Not specified</i>
22.	DRYER MAKE	<i>Not specified</i>
23.	DRYER SIZE (CFM)	<i>Not specified</i>
24.	DRYER VOLTAGE	<i>Not specified</i>
25.	DRYER TYPE	<i>Not specified</i>
26.	DRYER SERIAL #	<i>Not specified</i>
27.	DRYER MODEL #	<i>Not specified</i>
28.	DRYER PRE FILTER	<i>Not specified</i>
29.	DRYER MISC INFO	<i>Not specified</i>
30.	DRYER AIR FILTER	<i>Not specified</i>
31.	DRYER DRAIN TYPE	<i>Not specified</i>
32.	DRYER DRAIN #	<i>Not specified</i>

APPENDIX B: U OF I BIM Execution Plan
Template v 1.0 (Optional)

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