BIM Standards for Project Records

Updated 9/30/2024

A. Overview

1. Intent

The intention of this guide is to represent all the standards Xavier University has adopted for BIM. All architect and engineers developing BIM for XU should follow the standards within. XU has adopted BIM as a tool for project development as well as record documentation and facility management. Strict adherence to these standards will allow for the integration of BIM with Physical Plant facility management tools.

2. Building Information Modeling (BIM)

BIM is a process involving the generation and management of digital representations of physical and functional characteristics of buildings. XU has adopted Revit as the primary tool for BIM generation. Revit files contain mass amounts of building data that can be integrated with other FM tools to support management of a building asset.

At the initiation of a project, the University Project Manager will collaborate with the project A/E firms to establish a BIM execution plan with defined document deliverables. Project documentation required for assessment, review, bidding, construction, and as-built turnover is required to use Revit as the base model. Any exceptions to this rule require advanced approval by the XU project manager.

3. Getting Started

Existing Buildings

Revit current condition models exist for most of Xavier University's buildings and site plans. Before developing a new model, consultants should request a building's base file from the University Architect. New construction plans should be developed in this base model. For buildings that do not have an existing Revit base file, a new one should be created.

New Buildings

All new buildings should follow the BIM requirements referenced in this document.

4. Version and Quality Control

Current required Revit version is 2024. In order for the models to be compatible with internal systems, Xavier requires a specific version year. Any exceptions to this rule require advanced approval by the XU project manager.

Entire building should be fully modeled (not just part under construction). Exceptions to this rule may be accepted but will require advanced approval by the XU project manager.

Base file models received from the University Architects should be field verified.
These models will also include the following floorplan type (FAMIS) that should NOT be modified.

B. BIM File Types

1. Architectural Models – Autodesk® Revit® Architecture .rvt

Models are Revit Architecture project files with Worksets enabled in order to create a central file. The Revit Architecture Model file (.rvt) contains all architectural features for a building including but are not limited to:

- Exterior Wall Systems
- Interior Wall Systems
- Fire Rated Walls
- Architectural Floor Slabs
- Roofing Systems
- Equipment Including Owner Provided Equipment
- Reflected Ceiling Plans
- Vertical Circulation – including elevators, stairs, escalators, ramps and railings
- Doors and Door Frames
- Glazing – Windows, Interior Glazing, Curtain Wall, and Storefront
- Millwork and Casework
- Furniture
- Finishes – Including all room paint codes, flooring codes, and other finish items
- Toilets and Accessories
- Toilet Partitions
- Specialties

2. Structural Model – Autodesk® Revit® Structure .rvt

Models are Revit Structure project files with Worksets enabled in order to create a central file. The Revit Structure Model file (.rvt) contains all structural features for a building including but are not limited to:

- Foundations
- Columns, Beams, and Joists
- Column Grid
- Brace Frames and Shear Walls
- Structural Slab
- Specialties

3. Mechanical, Electrical, and Plumbing Model – Autodesk® Revit® MEP .rvt

Models are Revit MEP project files with Worksets enabled in order to create a central file. The Revit MEP Model file (.rvt) contains all mechanical, electrical, and plumbing features for a building including but are not limited to:

- Rain Leader with slope
- Roof Sumps (Roof Drains and Overflow Drains with slope)
- Vent with slope
- Waste Water with slope
- Domestic Cold Water

- Domestic Hot Water
- Gases
- Mechanical Ductwork
- Insulation required for MEP systems
- Duct Fittings
- Hangers
- Manual Volume Dampers and Schedules
- Motorized Dampers and Schedules
- Grilles, Registers & Diffusers
- VAV boxes with access zones and connection points
- Mechanical HVAC equipment including but not limited to AHU's, MUA's, RTU's, FCU's, EF's, Sound Attenuators, Roof curbs and their access zones.
- Backflow Preventers and Schedules
- Supply Fans, Returns Fans, and Exhaust Fans and Schedules
- Humidifiers, Thermostats, Remote Static Pressures Sensors, Humidity Sensors, Carbon Dioxide Sensors and Schedules
- Heating, Cooling and Steam Coils and Schedules
- Steam Traps (all types) and Schedules
- Condensate Receivers and Schedules
- Controls Valves (all types) and Schedules
- Steam PRVs and Schedules
- Meters (all types) and Schedules
- Boilers and Schedules
- Triple Duty Valves (all types) and Schedules
- Relief Valves (all types) and Schedules
- Air Separator (all types) and Schedules
- Expansion Tanks and Schedules
- Side Stream Filters (all types) and Schedules
- Buffer Tanks (all types) and Schedules
- Storage Tanks (all types) and Schedules
- DW Isolation Valves and Schedules
- Condensing Units and Schedules
- Valves with Valve Tags and Schedules
- Fire/Smoke Dampers
- Electrical Conduit (1" and larger)
- Raceways
- Light fixtures with space requirements
- Electrical equipment including but not limited to switch gear, power feeds, transformers, pull stations and junction boxes and their access zones.
- Generator Service Entrances
- Lighting Controls Panels and Schedules
- Major Equipment Service Disconnects and Schedules
- Occupancy Sensors and Schedules
- Lighting Timers and Schedules
- Light Contactors and Schedules
- Variable Speed Drives and Schedules

- Electrical Panels and Schedules
- Specialties
- Equipment clearances for access, service space requirements, gauge reading, valve clearances, and other operational clearances and access panels. These clearance zones should be modeled as invisible solids within the object.

4. Life Safety and Fire Protection – Autodesk® Revit® MEP .rvt

Models are Revit MEP project files with Worksets enabled in order to create a central file. The Revit MEP Model file (.rvt) contains all life safety and fire protection features for a building including but are not limited to:

- Electrical Low Voltage Systems and Devices
    - AV, Telecom, Cable Trays
- Fire protection
    - Sprinkler lines larger than ¾" diameter
    - Sprinkler heads, Fire Protection Pumps
    - Stand pipes, wall hydrants, fire department connections, risers, tamper and flow switches, including valve clearances
- Fire Alarm and Security Systems
    - Input devices
    - Notification devices
    - Associated equipment and access clearances
    - Permanently mounted fixtures
- Energy Management System
    - Building Automation Control Panels and Schedules
- Equipment clearances for access, service space requirements, and other operational clearances and access panels. These clearance zones should be modeled as translucent solids within the object. Clearances should not only extend outwards, but also downwards through the ceilings to ensure good coordination and future maintainability.

C. Model Structure

1. File Naming Structure

All Revit Central files will be named in accordance to Xavier University's naming convention.

'XAVIER BUILDING NAME DICIPLINE PROJECT NAME (central V24)'

Example: XAVIER ALBERS ARCH RENOVATION (central V24).

2. Model Information Requirements

The following is a summary of the items required for BIM document information. These basic guidelines have been established to create a custom plan for each individual project. The intent is for the project team to review and adapt this list for projects of all sizes, and assure consistent outcomes regardless of the complexity of the systems. Each BIM component as listed below should include the following information:

SPACE IDENTIFICATION – Rooms (To be completed by AE during design phase)

- IDENTITY
  - NUMBER – must follow Xavier Room Numbering Standards and match actual room number in built environment.
  - NAME – space type (i.e. Office, Classroom, Restroom, etc)

- MATERIALS & FINISHES: FLOORING, BASE, PAINT, WALL COVERINGS, CEILING TYPE, DOOR TYPE, RAILINGS, WINDOW TREATEMENTS
  - VOLUME (sqft or each)
  - FINISH DESCRIPTION/TYPE
  - MANUFACTURER
  - DATE OF INSTALLATION/PURCHASE
  - WARRANTY EXPIRATION (IF APPLICABLE)

- APPLIANCES
  - DESCRIPTION
  - DATE OF INSTALLATION/PURCHASE
  - WARRANTY EXPIRATION (IF APPLICABLE)

SYSTEMS & EQUIPMENT

- LOCATION
  - LEVEL - Must match format: 'LEVEL- BUILDING ABBR' (example: 01-HUB)
  - NUMBER – match actual room number in built environment

- CUSTOM PARAMETERS
  - EQ_TYPE_CODE – Equipment Type Code: Must match format in Appendix A
  - EQ_TYPE_Desc – Equipment Type Description: Must match format in Appendix A
  - DATE_PURCH – Date of Purchase
  - MFG– Manufacturer Name
  - MODEL_NO – Model Number

- SERIAL_NO – Serial Number
- TAG_NO – Asset Tag Number
    - Must match format: 3-DIGIT BUILDING ABBR_ EQUIPMENT TYPE CODE_ROOM NUMBER (If there are more than one type in the same room, add number 01, 02, 03… to the end of the Equipment Type Abbr)
    - Example: HUB-AHU01-013
- VEN_FK – Vendor Name
- WARRANT_EXP – Warranty Expiration Date

APPENDIX A

EQUIPMENT TYPE AND SUB TYPE CODES

Type Name	*Type Code*
Air Compressor	ACOMP
Air Conditioner	ACU
Air Conditioner - Ceiling Mounted	ACU
Air Conditioner - Mini Split	ACU
Air Conditioner - Split System	ACU
Air Conditioner - Window/Wall	ACU
Air Conditioner / Heating Unit	ACU
Air Conditioner Condenser	ACON
Air Cooled Condensing Unit	ACON
Air Handler - Energy Recovery Unit	ERU
Air Handler - General	AHU
Air Handler - Make Up Air Unit	AHU
Air Handler - Roof Top	AHU
Appliance - Cardboard Compactor	COMP
Appliance - Conveyor	CONV
Appliance - Dishwasher	DISH
Appliance - Disposal	DISP
Appliance - Dust Collector	DUST
Appliance - Food Dehydrator	DEHY
Appliance - Freezer	FZR
Appliance - Fryer	FRY
Appliance - Grill/Griddle	GRL
Appliance - Ice Cream Machine	ICM
Appliance - Ice Machine	ICE
Appliance - Oven	OVEN
Appliance - Pot Washier	WASH
Appliance - Reach in Cooler	RIC
Appliance - Reach in Freezer	FZR
Appliance - Refrigerator	REF
Appliance - Spray Booth	SB
Appliance - Steamer	STEAM
Appliance - Stove	STOVE
Appliance - Toaster	TOS
Appliance - Warmer	WARM
Appliance - Water Filter	FILT
Backflow Preventer	BFP
Backflow Preventer - Irrigation	BFP
Backflow Preventer - Isolation	BFP
Baseball Outfield Net	NET
Battery Back Up System	BAT
Bicycle	BYC
Boiler - Domestic Hot Water	BLR
Building Management System	BMS
Cabinet Unit Heater	CUH
Cabinet Unit Heater - Electric	CUH

Cabinet Unit Heater - Gas Fired	CUH
Cabinet Unit Heater - Hot Water	CUH
Cell Tower	CT
Chiller - Air Cooled	CHLR
Chiller - Centrifugal	CHLR
Clock Tower	CLK
Compressed Air Dryer	ADRY
Conveyer	CONV
Cooling Tower - Chemical Feed Controller	CT
Cooling Tower - Evap	CT
Cooling Tower - Std	CT
Dehumidifier	DEH
Designated Outside Air System	DOAS
Door - ADA & Card Access	DOOR
Door - ADA Operator	DOOR
Door - Card Access	DOOR
Door - Garage	DOOR
Door - Rolling Fire	DOOR
Door - Std Man	DOOR
Drinking Fountain - wall or floor mounted	DF
Electric - Disconnect	DISC
Electric - Lighting Panel	LP
Electric - Outdoor Lighting	ODL
Electric - Switchgear	SWG
Electric - Transfer Switch	TS
Electric - Transformer	TRANS
Electrical Distribution Panels	EP
Elevator - Handicap	ELEV
Elevator - Hydraulic	ELEV
Elevator - Traction	ELEV
Emergency - Defibrillator	DFIB
Emergency - Exit Signs	EXIT
Emergency - Eye Wash Station	FEYE
Emergency - Fire Alarm System	FA
Emergency - Fire Extinguisher	FSE
Emergency - Fire Hydrant	FH
Emergency - Fire System Monitor	FSM
Emergency - Fire System Pump	FPUMP
Emergency - Fire System Sprinkler	FSS
Emergency - Fire System Suppression	FSUP
Emergency - Generator	GEN
Emergency - Life Safety Equipment	LSFTY
Emergency - Lighting	EMERGL
EV Charger	EV
Exhaust Fan	EF
Exhaust Fan - Area	EF
Exhaust Fan - Dryer	EF
Exhaust Fan - Elevator	EF
Exhaust Fan - Kitchen Fume Hood	EF
Exhaust Fan - Lab Fume Hood	LFH

Exhaust Fan - Laundry Room	EF
Exhaust Fan - Loading Dock	EF
Exhaust Fan - Plunge Pool	EF
Exhaust Fan - Rest Room	EF
Exhaust Fan - Smoke Evacuation	EF
Exhaust Fan - Tunnel	EF
Expansion Tank	EXT
Fan - Return	RF
Fan - Supply	SF
Fan Coil Unit	FCU
Fan Coil Unit - Ceiling Mount	FCU
Fan Coil Unit - Wall Mount	FCU
Fin Tube Radiation	FTR
Fireplace - Gas	FP
Flags & Banners	FLAG
Fountain	FNT
Furnace - Ceiling Mounted	FNC
Furnace - High Velocity	FNC
Furnace - Residential Standard	FNC
Furniture	FURN
Gate - Rolling Security	GATE
Heat Exchanger - Plate / Frame	HEX
Heat Pump	HP
Heat Pump - Water Source	HP
Hoists & Cranes	HOIST
Humidifier	HUM
Induction Unit	IDU
KIOSK	KIOSK
Laundry Lint Trap	LTRAP
Lift - Scissor	LIFT
Lighting - High Mast Pole	POLE
Meter	MTR
Meter - Electric	MTR
Meter - Gas	MTR
Meter - Water	MTR
Motorized Curtains	CURT
Petroleum Fuel Tank	FUEL
Pipe Rack	PIPE
Plumbing - Trap	TRAP
Pool	PL
Pool - Pump circulating	PLP
Pool - Sand Filter	PLSF
Pump	PUMP
Pump - Chilled Water	CWP
Pump - Cooling Tower	CTP
Pump - Domestic Hot Water	CWP
Pump - Glycol	GFP
Pump - Heat Exchanger	HEP
Pump - Heating & Cooling	HCP
Pump - Hot Water	HWP

Pump - Re-heat	RHP
Pump - Sump	SSP
Pump - Water Fountain	WFP
Pump Loop - Geothermal	GLP
Rack System - Low Temperature	RACK
Refrigerant Recovery Maching	RRM
Security - Surveillance System	SS
Separator	SEP
Sign	SIGN
Sink	SINK
Statue	STAT
Thermostat	TSTAT
Two Way Radio Repeater	RADIO
Valve	VLV
Variable Air Volume	VAV
VAV - Electric Reheat	VAV
VAV - Fan Powered	VAV
Vehicle	VEH
VFD	VFD
VFD - Air Handler	VFD
VFD - Chiller	VFD
VFD - Cooling Tower	VFD
VFD - ERU	VFD
VFD - Exhaust Fan	VFD
VFD - Fan	VFD
VFD - FCU	VFD
VFD - Pump	VFD
VFD - Return Fan	VFD
VFD - Supply Fan	VFD
Walk In Cooler	WIC
Walk In Freezer	WIF
Water Cooler	WC
Water Dispenser - Hot / Cold Water	WD
Water Heater - Electric	WHE
Water Heater - Gas	WHG
Water Treatment System	WTS