University of Northern Iowa

BIM Standards

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UNI BIM Procedures and Processes

BIM (Building Information Modeling):

Goals:
The overarching goal of BIM is to create a more seamless design process that brings collaboration to all producers of a building through all phases of design, construction and occupancy of the building. When seamless design, construction and occupancy are achieved, cost is reduced in fewer clashes between trades, shorter schedule for design/construction and the accuracy of as-built drawings and O&M information. BIM can be used to achieve many goals (but is not limited to the following): space management and tracking, record modeling, 3D coordination, engineering analysis, sustainability evaluation, code validation, programming, design review, phase planning, cost estimation and existing conditions modeling.

University Responsibilities:
Facilities Planning: Will provide direction and standards for the use of BIM for projects. Standards include but are not limited to; software guidelines, COBie data and modeling requirements. Facilities Planning will also verify that BIM documentation follows the standards set forth in this document.
AFTS: Administration and Finance Technology Services is responsible for the upkeep of the server where BIM files are shared with the owner on UNI's construction document management software, Panther Projects (Microsoft SharePoint).

Design Team Requirements and Deliverables:
BIM Execution Plan
BIM Model – design/construction phases
Navisworks clash detection
Information Database (COBie)

Constructor Requirements and Deliverables:
BIM Execution Plan
BIM Model – as built
Information Database (COBie) – All equipment when installed should be labeled and correct O&M information attached.

Software Requirements:
Design Consultants must use Revit (Architecture and MEP) for the project. Civil and Structural consultants may use Revit or other 3D software such as AutoCad Civil 3D. Civil software must be compatible with ArcGIS. Please discuss other software needs with owner for approval. The initial design is to begin in the most current version of Revit. As the project progresses and new versions of Revit are released, it is the design team's decision to update to a newer version of the software, but at the completion of the project, as-built drawings must be received in the current version of Revit.

Other Software needs:
NavisWorks must be used for clash detection.

Model Errors:

Revise all model errors prior to turning Revit model over to owner at all phases of the project (Schematic Design, Design Development, GMP Bid packages, Construction Documents, as-built model).

Other Revit Model Requirements:

All models given to the owner should be the Central Model – local files are not acceptable.
Remove unnecessary views from the model.
Provide all files that are linked to the Revit Model.
Logos in the title blocks should be vector based and not an attached image.

Site Coordinates:

It is the Architect's responsibility to coordinate model coordinates between various consultants (location of 0,0). It is suggested that two grid lines meet at 0,0. When MEP and Architectural Revit models are linked together and in the correct spot, click manage, coordinates, publish and click on linked model to lock locations of models.

The consultant is to use the Iowa State Plane, NAD 83 coordinate system to locate the building on the site (x, y, z coordinates) and all new or verified utility x, y and z coordinates are to be supplied to the owner.

The consultant may choose the initial software, but the final information is to be supplied in ArcMap 10.2.1 format for the location of the building and all utilities.

In the MEP Revit model, MEP systems are to extend 5' beyond the building. Additional MEP information will continue on the Civil drawings/model.

Design Requirements (Consultant)

Schematic Design
Renovation of Existing Building:
Revit Model of Existing Conditions is required. The use of a 3D scan point cloud used to generate a model is highly recommended.
The existing conditions model must include all:
- o Walls – interior and exterior (including exterior retaining walls)
- o Roof
- o Fenestration
- o Doors
- o Floors and ceilings
- o Stairs
- o Major structural elements
- o Major mechanical runs/chases
- o Major electrical feeders and other electrical equipment
- o Major plumbing lines
- o MEP units in mechanical spaces
- o Steam tunnels entering the building
- o Fire alarm, Siemens, telecom, etc.
- o Components that will affect new construction

Schematic Design Model:
The Schematic Design Model is to include "overall building massing indicative of area, height, volume, location and orientation may be modeled in three dimensions" (AIA Document G202 - 2013) if the design consultant chooses to provide a Revit model at this stage of design. The model should include, but is not limited to exterior and interior walls, fenestration, doors, roofs, floors and stairs/elevators, area calculations (net and gross). A Revit model is not required for schematic design.

Design Development
- o LOD 200: "Model elements are modeled as generalized systems or assemblies with approximate quantities, size, shape, location and orientation. Non geometric information may also be attached to model elements." AIA G202 - 2013
- o Complete the AIA G202 - 2013 Model Elements Table and submit to owner as to level of detail provided at DD stage.
- o Provide COBie information: Contact, Facility, Floor, Space, Zone and Type
- o Clash Detection: Run a clash detection report in Autodesk Navisworks and document or fix any collisions that appear
- o Space Usage: Net and Gross
- o Provide basic floor plan in CAD to owner for room numbering by owner.

Construction Documents

- o LOD 300: "Model elements are modeled as specific assemblies that are accurate in terms of quantity, size, shape, location and orientation. Non geometric information may also be attached to model elements." AIA G202 - 2013
- o Complete the AIA G202 - 2013 Model Elements Table and submit to owner for approve as to the level of detail provided at CD stage.
- o Provide COBie information: Contact, Facility, Floor, Space, Zone, Type and Component. (See attached list of specific components needed)
- o Clash Detection: Run a clash detection report in Autodesk Navisworks. All clashes must be resolved prior to turning construction phase documents over to owner.
- o Space Usage: Net and Gross

Design Development and Construction Document Modeling Requirements

Items listed must be shown in LOD 200 in Design Development and LOD 300 in Construction Documents.

- o Architectural Requirements
  - o All interior and exterior walls
  - o Roof – including parapets, floor and ceiling, including any slopes, changes in elevation and terminations
  - o Soffits, openings and accessories
  - o Elevators, stairs and ramps including railing systems – if consultant has concerns about modeling stair railings in 3D, consult owner.
  - o Casework and shelving
  - o Furnishings, fixtures and equipment.
  - o Furniture and furniture systems – provide standard layout in 3D for each type of space, other spaces may be in 2D.
  - o Mechanical, electrical and plumbing equipment that require architectural space
  - o Clearance zones
- o Mechanical and Plumbing Requirements
  - o Air handling units and fans
  - o Air Terminals, inlets and outlets
  - o Thermostats
  - o Duct and duct fittings (include insulation)
  - o Duct and pipe hangers
  - o Pipe and pipe fittings 2" (including insulation) in diameter and larger
  - o Small pipe routing pathways larger than 6"x4"
  - o Plumbing fixtures
  - o Pumps
  - o Heat exchangers
  - o Tanks
  - o Equipment access zones (model as a solid)

- o Valves and cleanout including required access
- o Electrical
  - o Conduits 2" diameter or greater
  - o Conduits 2" diameter or smaller if in ganged runs or racked
  - o Cable tray, access zones and equipment.
  - o Light fixtures
  - o All power feeds to equipment and all switch gear.
  - o Model outlets where coordination is required between other disciplines.
  - o Duct bank
  - o Fire detection devices
  - o Panels – electrical and fire alarm
  - o Receptacles and switches
  - o Switch boards
  - o Transformers
  - o Generators
- o Technology
  - o AV devices
  - o Cable tray
  - o Security devices
  - o Telecommunications devices
  - o Telecommunication racks
- o Fire Protection Sprinkler
  - o Entrance
  - o Main Risers
- o Structural
  - o Cast in place concrete and pre-cast concrete
  - o Edges of all slabs and penetrations of structural systems
  - o All primary and secondary structural members (include standard steel member sizes, gussets plates, braces and kickers)
  - o Metal, wood and concrete deck as well as the overall thickness of the slab.
- o Civil (not required in Revit – can be modeled in an alternative 3D software)
  - o Topography (3D terrain)
  - o Landscaping elements
  - o Stormwater management
  - o Utilities – provide x, y, z coordinates
- o Special Equipment
  - o All food service equipment modeled with the necessary mechanical, electrical, plumbing and required clearances.

Construction Phase

During the construction phase both the constructor and consultant will be working with BIM models. The design professional will be responsible for updating the BIM model to reflect any ASI, RFI, CDR or change orders. The constructor will be responsible for updating the design model with the information that will be exported to a spreadsheet in COBie format from Revit for mechanical, electrical, plumbing and fire safety equipment.

COBie Data to be updated in the Revit model as submittals are approved and equipment is installed.

- o COBie data will be up to date at the time of commissioning and provided to the commissioning agent.
- o COBie data will be updated at the completion of the commissioning.
- o COBie data will be given to the owner in an Excel spread sheet that is exported from Revit when the owner takes occupancy and with the As-Built drawings.

Models and COBie data are to be given to the owner via Panther Projects, Facilities Planning's construction document management tool.

As-Built Model

The constructor will provide the As-Built Revit model(s) with all information attached and any modifications that were made during construction. The consultant is responsible to review and approve the Revit model(s) before turning them over to the owner.

BIM Execution Plan

Owner (name, address, email, phone, fax)

Design Firm (name, address, email, phone, fax)

Project Name (address/location)

Contract Information (type of contract, date signed, etc)

Brief Project Description

Additional Project Information (relating to BIM if different or in addition to the preceding document)

Project Information from University:
Building Name:
Building Number:
Building Code:
UNI Drawing Number:

COBie Requirements

The consultant and constructor are to submit COBie spreadsheets to the owner at the various times as indicated below. This information can be gathered in Revit using the Autodesk Add-Ins for COBie data collection.

Design Development	Design Consultant Responsibility
Contact (people and companies)	Email, Category, Company, Phone, Given Name, Family Name, Street, Postal Box, Town, State/Region, Postal Code, Country
Facility (project, site and facility)	Name, Category, Project Name, Site Name, Linear Units, Area Units, Volume Units, Phase
Floor (vertical levels and exterior areas)	Name, Category, Description, Elevation, Height
Space (spaces)	Name, Category (Classified using Post-Secondary Education Facilities Inventory and Classification Manual (FICM)), Floor Name, Description, Room Tag – as assigned by UNI, Usable Height, Net Area
Type (types of equipment, products and materials)	Name, Category, Description, Asset Type, Manufacturer (design), Model Number (design), Nominal Length, Nominal Width, Nominal height, and any other information known at this time This information is to be filled out over time and is not required at this point

Construction Documents	Design Consultant Responsibility
Contact (people and companies)	Email, Category, Company, Phone, Given Name, Family Name, Street, Postal Box, Town, State/Region, Postal Code, Country
Facility (project, site and facility)	Name, Category, Project Name, Site Name, Linear Units, Area Units, Volume Units, Phase
Floor (vertical levels and exterior areas)	Name, Category, Description, Elevation, Height
Space (spaces)	Name, Category (Classified using Post-Secondary Education Facilities Inventory and Classification Manual (FICM)), Floor Name, Description, Room Tag – as assigned by UNI, Usable Height, Net Area
Zone (sets of spaces sharing a specific attribute)	*Use as needed – not required*
Type (types of equipment, products and materials)	Name, Category, Description, Asset Type, Manufacturer (design), Model Number (design), Nominal Length, Nominal Width, Nominal height and any other information known at this time (See list of items to include on page 11)
Component (individually named or schedule items)	Name, Space (see list of items to include on page 11)

Construction Phase	Constructor's Responsibility
Contact (people and companies)	Email, Category, Company, Phone, Given Name, Family Name, Street, Postal Box, Town, State/Region, Postal Code, Country
Facility (project, site and facility)	Name, Category, Project Name, Site Name, Linear Units, Area Units, Volume Units, Phase *Update consultant provided information as needed.*
Floor (vertical levels and exterior areas)	Name, Category, Description, Elevation, Height *Update consultant provided information as needed*
Space (spaces)	Name, Category (Classified using Post-Secondary Education Facilities Inventory and Classification Manual (FICM)), Floor Name, Description, Room Tag – as assigned by UNI, Usable Height, Net Area *Update consultant provided information as needed.*
Type (types of equipment, products and materials)	Name, Category, Description, Asset Type, Manufacturer, Model Number, Warranty Guarantor Parts, Warranty Duration parts, Warranty Guarantor Labor, Warranty Duration Labor, Warranty Duration Unit, Warranty Description, Nominal Length, Nominal Width, Nominal height, Shape, Size, Color Finish, Grade Material, Constituents, Features, Accessibility Performance, Code Performance, Sustainability Performance *Provide information pertinent to the items shown in the attached list and as requested by the owner.**
Component (individually named or schedule items)	Name, Floor, Space, Description, Serial Number, Installation Date, Warranty Start Date, Tag Number, Specific Information as required by the owner *Provide information pertinent to the items shown in the attached list and as requested by the owner.**
Spare (Onsite and replacement parts)	Name, Category, Type Name, Supplies, Description, Set Number, Part Number, Location of Spare Part

* On the following page, a list of the required Types and Components can be found. Additional information will be required for the Types and Components listed, which can be obtained from the owner.

The constructor is to provide the COBie spreadsheet to the Cx at commissioning, an update to the owner at building occupancy and a final report when the As-Built models are turned in.

Items to be included in the COBie spreadsheets. A detailed list of the information required (in addition to COBie) for each type and component is available on the Facilities Planning website on the Design Guidelines page titled Equipment Forms.

Air Compressor & Maintenance Motor
Air Dryer
Back Flow Preventers
Boiler
Central Air Conditioner, Heat Pumps & their Motors
Circuit Breaker Panel
Clothes Dryer
Clothes Washer
Dust Collector & Motor
Elevator Lift
Emergency Lighting
Fan Coils, Univents & their Motors
Fire Alarm System
Fire Suppression
Furnace & Motor
Generators
Heat Exchanger
Humidifier
Light Fixtures
Maintenance Motor
Paint Booth Filter
Plate-Frame Sheet
Pumps for all Mechanical Equipment
Service Entrance Panel
Street-Walk Lights
Supply Fan and Motor
Swamp Cooler & their Motors
VFD's
Water Softeners

Postsecondary Education Facilities Inventory and Classification Manual (FICM) 2006 Edition

Table of Room Standards

050	Inactive Area		620	Exhibition
060	Alteration/Conversion Area		625	Exhibition Service
070	Unfinished Area		630	Food Facility
110	Classroom		635	Food Facility Service
111	Classroom - PLS		640	Day Care
115	Classroom Service		645	Day Care Service
116	Classroom Service - PLS		650	Lounge
210	Class Laboratory		655	Lounge Service
211	Class Laboratory - PLS		660	Merchandising
212	Class Laboratory - DPT		665	Merchandising Service
215	Class Laboratory Service		670	Recreation
216	Class Lab Service - PLS		675	Recreation Service
220	Open Laboratory		680	Meeting Room
225	Open Laboratory Service		685	Meeting Room Service
250	Research/Nonclass Lab		710	Central Computer/Telecom
255	Research/Nonclass Lab Service		715	Central Computer/Telecom Service
310	Office		720	Shop
315	Office Service		725	Shop Service
350	Conference Room		730	Central Storage
355	Conference Room Service		735	Central Storage Service
410	Study Room		740	Vehicle Storage
420	Stack		745	Vehicle Storage Service
430	Open-Stack Study Room		750	Central Service
440	Processing Room		755	Central Service Support
455	Study Service		760	Hazardous Materials
520	Athletic Or Physical Education		765	Hazardous Materials Service
523	Athletic Facilities Spectator		810	Patient Bedroom
525	Athlete Or Physical Education Service		815	Patient Bedroom Service
530	Media Production		820	Patient Bath
535	Media Production Service		830	Nurse Station
540	Clinic		835	Nurse Station Service
545	Clinic Service		840	Surgery
550	Demonstration		845	Surgery Service
555	Demonstration Service		850	Treatment/Examination
560	Field Building		855	Treatment/Examination Service
570	Animal Quarters		860	Diagnostic Service Laboratory
580	Greenhouse		865	Diagnostic Service Lab Support
585	Greenhouse Service		870	Central Supplies
590	Other		880	Public Waiting
610	Assembly		890	Staff on-call facility
615	Assembly Service		910	Sleep/Study no Bath or Toilet

919	Toilet or Bath	WWW	Circulation area
920	Sleep/Study w/Toilet or Bath	XXX	Building Service Area
935	Sleep/Study Service	XXX-M	Restroom Men
950	Apartment	XXX-U	Restroom Unisex
955	Apartment Service	XXX-W	Restroom Women
970	House	YYY	Mechanical Area