

BIM Execution Plan: XXX - Layton Construction

Master Section

This section outlines Layton BIM standards and processes. The [second section](#) contains project specific details.

A. Intent

Efficiently and effectively use appropriate BIM tools and processes for maximum benefit to the project and the owner and to all parties involved. All participants are accountable for their models and coordination process. Un-modeled elements cannot be coordinated utilizing BIM processes. Provide owner with a complete, accurate model for use in facility management.

Duplicate and redundant modeling will be minimized. Geometry and information is to be additive whenever possible.

B. Scope

Potential model based or enabled activities / processes:

- Spatial coordination
- Schedule linking and visualization (4D)
- Lift Drawings: Concrete pour breaks, details
- Layout: Survey points in drawings, models
- QA/QC: Points from field brought back into model for placement verification
- Phasing and Logistics: Planning, management and visualization
- Equipment and room data management and export for FM use
- Virtual mock-ups, constructability
- Quantification

BIM scope will be determined during internal project kick off and described in the [Project Specific Section](#).

C. Standard Model Requirements

1. Level of Development: LOD 300 - 350 as described in the [AGC LOD Specification](#).
2. System colors are not dictated unless owner required or determined to be necessary for clarity.
3. Models must be full scale, comprised of solid geometry (not wireframe), in imperial units.
4. Align all trade models to background file provided, typically the architecture or structure Revit model.
5. Any modeling specifics, including specified colors, file naming, LOD, etc. that deviates from standards outlined here will be detailed in the [Project Specific Section](#) of this BIM Execution Plan.
6. Acceptable native file types:
 - a. Revit (.rvt)
 - b. AutoCAD (3D .dwg)

7. Model intelligence

- a. Hangers, clear/access zones, insulation should be easily searchable for use of search sets or unique character strings or contained on one obvious layer.
- b. Model elements should be the actual product whenever possible and not generic.

8. File Naming

- a. The intent is to keep the file names short but adequately descriptive, avoiding acronyms if possible.

TRADE_AREA_PROJECT-ABBREVIATION

- b. File Naming Examples:

DUCT_AREA-01_MS-CITY-STATE
PLBG_UG_MS-AMARILLO-TX

9. Discipline / trade abbreviations (to be determined at kickoff meeting):

Architecture	ARCH
Structure	STRU
General Contractor	CONTR
Miscellaneous Steel	ST
HVAC Dry Side / Duct	HV
Plumbing	PL
Electrical	EL
Hydronic / Mechanical Piping / HVAC Wet Side	MP
Medical Gas (Med Gas)	MG
Fire Protection	FP
Low Voltage: Tele-data / Audio / Video / Controls	LV

D. Coordination Process

- 1. Kick-off Meeting – Attendance required for all knowledgeable subcontractors / detailers / PMs / etc. This meeting will review BIM requirements and project specifics. BIM 360 Glue and BIM 360 Field will be set up and reviewed.
- 2. Uploads – All models will be uploaded using BIM 360 Glue as the central repository / file transfer site.
- 3. Clash coordination – Specific clash tests may be assigned to each trade, who will be solely responsible for clearing the tests and for creating their own tests to be cleared. Trade to trade coordination must take place outside of the all trades coordination meetings. This is not a passive process. Accountability is mandatory. All trade meetings are not for reviewing one to one clashes, but for the larger multi system issues and for status updates / accountability checks. All trade meetings may be held weekly, twice weekly, alternating weeks, daily – schedule will conform to what the project demands to meet the schedule. Non-performance contract clauses will be in effect for BIM coordination participation.
- 4. Coordination meetings – A recurring meeting with the knowledgeable subcontractor team members to bring up and resolve design and large coordination issues. Frequency and date specifics to be determined but can change. Attendance and participation is mandatory.

5. Coordination Hierarchies / Priorities

a. Architecture and Structure vs. Others

Architecture and Structural will be coordinated first and take precedence over other disciplines. This includes ceiling, walls, soffit framing, king studs at doors etc. Changes to Architecture and Structure will only be considered when all other alternatives have been exhausted and design is in conflict, with the following notes:

- Requesting to lower ceilings is a last resort.
- Some architectural elements may have lower priority in mechanical / service areas.
- Structure takes precedence over MEPF in all cases with exception of sleeves conflicting with structure.
- Design modification must be requested and confirmed via RFI, ASI, etc.

b. P-tube vs. Others:

- P-tube services set locations and takes minimum bends into account when determining routes. Usually takes precedence over other systems closer to stations.

c. Plumbing – Sloped Lines and Large Mains vs. Others:

- Vent stack, storm drains, waste and other large pipes (6" and up) that depend on location of fixture or minimum slopes typically take precedence over Mech., Elec, and intermediate P. Tube
- Plumbing has high priority in mechanical rooms.

d. Mechanical (Duct) vs. Others:

- Large ducts have priority over others and run high in the ceiling cavity if possible (below steel and PT). However, it is often possible to run piping over the top of the duct. A hierarchy of zones is to be established, dictating the general location of the systems in the corridors and other tight areas.
- Small ducts (feeders to vents, returns) have priority only as far as the path is not difficult to reach from main duct to return vents per design.
- Conflict with electrical trays or conduit banks are examined on a case by case basis.
- Do not allow ducts to run parallel to and directly above walls or immediately adjacent or crossing perpendicular to walls at door frame edge.

e. Electrical vs. Others - fairly flexible with the following exceptions:

- Light fixture location/size is not flexible, may RFI only after all other options are exhausted.
- Electrical conduit racks should be relocated if conflicting with major ducts, but take priority over small ducts and other disciplines.
- Conduits at electrical rooms have priority, typically.

f. Mechanical Pipe vs. Others:

- Small MP lines can have flexible routing
- Mechanical pipe has high priority in mechanical rooms.

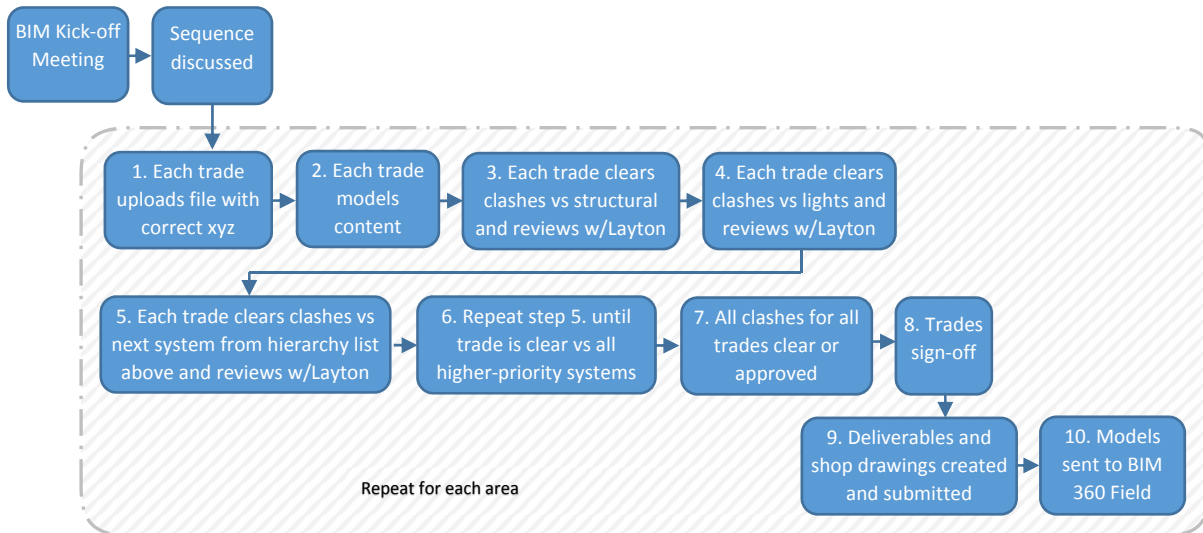
g. Domestic Water & Med Gas vs. Others:

- Small water supply lines (cold, hot) and Medical Gas lines routing can be flexible

h. Fire Protection vs. Others - fairly flexible with the following exceptions:

- Sprinkler head is usually required to be centered on ceiling tile and must be spaced to allow sufficient coverage per design.
- Mains that are running through beam sleeves should not be interrupted by any other disciplines if possible. Run mains high whenever possible.
- Control valve locations might be flexible but access to this area must be blocked out.

6. Coordination Workflow:



7. Meeting Preparation – It is expected that models and clash resolutions will be ready to review in the meetings. Upload timing will be established by project. See Site Specific BIM Plan.
8. Coordination schedule will be derived from the master schedule. Milestones/areas will be determined on a project level, by area and will be added into the master schedule. Progress will be measured and tracked to ensure timely completion and there will be consequences for non-performance.
9. Models to the field: Coordinated models will be shared with BIM 360 Field users at key milestones.
10. Sign Off: Upon completion of coordination of an area, subcontractors will be required to attest to the following terms:

- a. Subcontractor has fully participated in the coordination process for the project and area listed above as outlined in this plan and the models listed are substantially coordinated. Any remaining clashes are the responsibility of the trade subcontractor to field coordinate at no additional expense or delay.
- b. Shop drawings have been generated from the coordinated trade model(s) listed. Models listed reflect the design as indicated in all contract documents and any modifications as a result of coordination. Major impacts to the design have been documented with RFI's.
- c. Any un-modeled or uncoordinated trade geometry is the responsibility of the subcontractor listed to field coordinate with other trades at no additional expense or delay.
- d. Installation that deviates from the models and shop drawings are the full responsibility of the subcontractor to correct and / or field coordinate and then update record models accordingly in a timely manner. Subcontractor's shop and field personnel will always work from the latest approved shop drawings / models.

11. Deliverables

- a. Coordinated Models
- b. Native Revit files - Linked
- c. Shop drawings as required by contract
- d. Equipment/asset data as required by contract (In Revit families and exported to Excel)

E. Coordination Tools

1. BIM 360 Glue is a powerful cloud based collaboration and coordination tool. Anyone invited to the project can create merged models, views, markups and clash tests and easily collaborate with the rest of the team.
 - a. BIM team members will be added to the project in BIM 360 Glue. A link for downloading the desktop version of Glue will be included in that email.
 - b. Discipline and trade models will be Glued (posted) directly from Revit, AutoCAD or Navisworks, using the BIM 360 Glue plug-ins or via drag and drop method. There is a download link for the plug-ins within the desktop version of Glue.
 - c. There will be a folder structure created in Glue – each trade will have a folder for uploads. Trade files will always have the same name (no date field) and are to be overwritten each time. Glue provides versioning; any previous model can be accessed at any time. Dummy models will be created by Layton within trade folders to be replaced upon initial upload from trade detailer.
 - d. Models are to be exported to NWC's (or NWD's) to be posted to Glue. Gluing from Revit, AutoCAD or Navisworks will automatically convert models to NWC. Native files are to be made available upon request. Models are to be updated as work is completed, daily if possible.
 - e. <http://knowledge.autodesk.com/support/bim-360-glue>
2. BIM 360 Field is management software that combines mobile technologies with cloud-based collaboration and reporting.
 - a. Uses the same log-in info as Glue.
 - b. Checklists, issues and tasks will come from, and be tracked in, Field. These will be assigned to a particular individual and tracked by the team. A running history of these items continues with the project and the same system is used by the construction team.
 - c. Checklists will be used for things like model content completeness.
 - d. Tasks will be used for things like clearing clash tests.
 - e. Issues will be used things like design changes.

3. Navisworks Manage will be also be used for clash detection, view creation, markup and model review in meetings. All models can be opened in Navisworks directly from Glue using the Glue plug-in for Navisworks. Milestone NWD's will be published as record models. Navisworks Manage is not a required purchase for BIM coordination on this project, but is encouraged.
4. Box.com: If another solution is not required by the owner, there will be a project BIM folder on Box.com with subcontractor access to all reference documents, design models, and archive NWD's.
5. GoToMeeting: A few key meetings may occur on site, or at another central location, in person. Most meetings will be via GoToMeeting.

END OF MASTER SECTION. SEE SITE SPECIFIC INFORMATION BELOW.

BIM Execution Plan: XXX - Layton Construction

Project / Site Specific Information

Project Info

Project Name
Size
Date

Project BIM Milestones

Coordination Areas: Per Architectural Key Plans

Recurring BIM Coordination GoToMeeting info:

<https://global.gotomeeting.com/join/000000000>

Dial +1 (000) 000-0000
Access Code: 000-000-000

Meeting ID: 000-000-000

BIM Coordination Team Info

Contractor	Layton Construction	Contact, Title	contact@company.com	000.000.0000
Contractor	Layton Construction	Contact, Title	contact@company.com	000.000.0000
Architect	Company	Contact, Title	contact@company.com	000.000.0000
Struct. Engineer	Company	Contact, Title	contact@company.com	000.000.0000
Mech. Engineer	Company	Contact, Title	contact@company.com	000.000.0000
Plumbing Engineer	Company	Contact, Title	contact@company.com	000.000.0000
Elec. Engineer	Company	Contact, Title	contact@company.com	000.000.0000
Modelers				
Mechanical	Company	Contact, Title	contact@company.com	000.000.0000
Plumbing	Company	Contact, Title	contact@company.com	000.000.0000
Electrical	Company	Contact, Title	contact@company.com	000.000.0000
Fire Protection	Company	Contact, Title	contact@company.com	000.000.0000
Steel Detailer	Company	Contact, Title	contact@company.com	000.000.0000
Pre-Fab	Company	Contact, Title	contact@company.com	000.000.0000
Trade	Company	Contact, Title	contact@company.com	000.000.0000
Trade	Company	Contact, Title	contact@company.com	000.000.0000

Project Specific Model Requirements

Required Content by System

Structural and Miscellaneous Steel – The fabrication level detailed model shall include, but is not limited to, major structural members, secondary structural members, and miscellaneous steel connections including all of the following:

- Columns, beams, trusses, gusset plates, bracing, kickers, angles, knife plates, slab edges, framing for penetrations / openings, equipment support assemblies, equipment hoist beams, elevator hoist beams, rails and rail supports, stair steel.

Light Gauge Steel Framing – Model all of the following:

- All studs, top track, bottom track, framing around wall penetrations, king studs, top of wall kickers.
- All framing members of each rating are to be of colors other than non-rated walls and/or must all have searchable properties such that all framing members of each rating can be easily isolated.

MEPF Common Elements – model all of the following:

- Concrete equipment pads and inertia pads - correct size and thickness
- Access doors and all access and clearance zones – easily isolatable through searchable fields or distinct layers.
- Hard clear zones are to be easily isolatable, either through a distinct layers or searchable fields. Model zone to floor below.
- Hangers, supports and seismic bracing – easily isolatable through searchable fields or distinct layers.

Duct – Model common required components (see above) and all of the following:

- All ductwork as actual duct size, in the correct location in space
- All external insulation on piping and ductwork, to scale; internal duct lining can be noted
- All grilles, registers, louvers and diffusers
- All fire and smoke dampers and indicate service access requirements (i.e. access panels) if not readily accessible
- Identify duct balance dampers and model service access requirements as solid objects.
- Coil pull clear areas
- All mechanical equipment: Fans, AHUs, Built-Up AHUs, pumps, tanks, valves, controls, heat exchangers,
- All valves (including valve stems and handles), gauges & control valves, high & low point drains, and starters, etc.

Plumbing – Model common required components (see above) and all of the following:

- All piping including insulated piping with insulation as a separate model element
- All valves, gauges and control valves and service access
- External insulation on piping must be modeled to scale
- All drip legs, drain pipes, blow down valves, and cleanouts
- All underground / below-slab piping
- All plumbing equipment: domestic water, chilled water, steam, storm/roof leaders, pumps, tanks, water heaters, in wall carriers, in wall plumbing equipment

Fire Protection – Model common required components (see above) and all of the following:

- All fire protection equipment: pre-action system, dry system, and main fire protection systems, hangers & seismic bracing, valve assemblies, drain valves, fire department valves, fire pump, etc.
- Mains are to be easily isolatable - on a distinct layer or easily searchable.
- All sprinkler head locations and sprinkler head types
- Any tanks not included in the architectural models.
- All fittings, drains and test connections

High & Low Voltage Electrical: Fire Alarm, Tele-Data, A/V, Nurse Call – Model common required components (see above) and all of the following:

- All conduit 1.25" and larger
- All grouped conduit racks and raceways with 2 or more conduits
- All cable trays and/or hook locations
- All light fixtures (including neon) and switching devices
- All door security junction boxes
- All fire alarm devices
- All phone/data ports
- All security devices (cameras, card readers, motion sensors, auto door locks, etc.)
- All audio speakers, audio and video equipment racks
- All electrical equipment: panels, transformers, switch/paralleling gear, ATS's, generators, data racks, starters, VFD's, exit signs, AV equipment, recessed electrical devices and access doors, arc flash jackets & hoods, etc.

Controls – Model common required components (see above) and all of the following:

- All panels
- All individual conduits 1" and larger
- All racks carrying more than 2 conduits
- All controls equipment: panels, transformers, controls, cable tray, data racks, starters, VFDs, etc.

Special Construction:

- To be determined and modeled on an "as-needed" basis

END of BIM EXECUTION PLAN