BIM Execution Plan

ServerFarm ARK 1-4

Aerial View or Rendering of Project

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GENERAL

Project Information:

Project Owner	
Project Name	
Project Location	
Project Description	
Type of Project	
Size of Project in Acres and Square Feet	
Project Start Date	
Project Completion Date	

VDC Objectives

The intent of this BIM Execution Plan (BxP) is to establish a framework for the project team to use VDC (*Virtual Design and Construction*) tools and processes for improved overall understanding of the design intent, better communication amongst the project team and stakeholders, and more efficient collaboration during the design, construction and Turnover phases of the Project.

The following sections and appendices outline the essential procedures that aid in the management and exchange of information between parties during the BIM (*Building Information Modeling*) and VDC process. These standards are an agreement of basic services and outlined practices upon which model development, information exchange, and coordination is performed. This plan may be supplemented, amended, or modified during the project by mutual agreement and consent of the project team.

Using BIM and VDC, the project team will strive to:

- Communicate and work together in a highly collaborative environment.
- Share data electronically in an efficient manner to allow all team members access to the most current information.
- Utilize visualization to increase communication and understanding of the project for all stakeholders, team members, end users, and the public.
- Minimize duplication of data used during design and construction, utilizing a common data environment (CDE).
- Provide a structured BIM deliverable to the owner that allows easy retrieval and use of information.

Potential VDC/BIM Uses

POTENTIAL BIM USE	BIM USE DESCRIPTION	CHAMPION
Big Room Environment	Using design/build, the team members for this project endeavor to work in a highly collaborative "Big Room" method.	Team
Visualization	Enhance project communication using 3D models and images, and making models accessible to project team members	Team
4D Scheduling	A 4D model, tied to the construction schedule, will be used to visualize the sequence of construction	Yates
5D Cost Estimating	Model-based quantity takeoff (QTO): Yates to identify scopes to be quantified from model. Starting in SD (??) we will use model for QTO, where possible, at specified milestones. Scopes to quantify may include: - Concrete - Steel members	Design Team/Yates
3D Design coordination	Perform design coordination early in the project	Design Team/Yates
Constructible documents at 80% progress sets	Complete, coordinated shop drawing level documents at 80% CD. As design changes making sure the model is current with design revisions, RFI's, etc. Trade partners onboard early in design-assist and design/build roles. Models updated typically on a weekly basis. -	Design Team/Yates/ Trade Partners
Space Planning	Room numbering/space inventory: ensure room numbers are locked down ASAP. Show SF, use of room	Design Team
Site Utilities Plan	Electronic drawing of project with utilities (PSE, communications, sewer, etc.)	Civil Engineer
Site Utilization Planning	Develop 3D logistics plans using 3D design and construction models. Including fencing, access routes, etc.	Yates
Safety	Modeling safe access for MEP equipment and facilities management (Operational Safely of the Built Environment)	Yates
3D Trade Coordination	MEP coordination	Yates/Trade Partners
Laser Scanning	Laser scanning may be beneficial or necessary in the following areas: - As-built conditions (structure, MEP systems) - Pre and/or post pour deck/slab scanning	Trade Partners (as needed)
Trade shop drawings	Using 3D models for creating trade contractor shop drawings	Trades
Digital Layout	Using 3D models for layout using robotic total stations	Trades
Production Tracking	360 photos for in-wall as-built conditions, MEP production tracking, and future use in facilities management	Yates
Virtual Reality	Utilize VR for coordination, owner walk-throughs, identifying safe access to equipment	Design Team/Yates
Augmented Reality	Utilize AR for verification of systems, structure	Yates
Record Modeling	Per BIM Execution Plan/MEP Coordination Specifications	Design Team/Yates
VDC Trainings	Provide team with VDC training/overview for use on campus – provide early and at closeout (ACC, Navisworks, other)	Yates

PROJECT INFORMATION

KEY VDC Contacts

The following people will be involved in the VDC processes, and should be invited to all cloud-based common data environments on this project:

SCOPE	COMPANY	NAME	EMAIL	TELEPHONE
DESIGNERS:				
Architecture:				
Structure:				
Mech Design:				
Electrical Design:				
AV Design:				
Lab Design:				
Civil:				
Landscape:				
TRADE CONTRACTORS:				
Mechanical:				
Plumbing:				
Electrical:				
Fire Protection:				
Lab Equipment				
Framing/Drywall				
Glazing				
Steel/Misc Steel??				
CONSTRUCTION:				
	Yates			
	Yates			
	Yates			
	Yates			
OWNER:				
Project Manager				
Coordination				

Software, Versions, File Naming

The following table lists the responsible party, the software version used, and the file name of their model(s). We are utilizing Revit on this project. When using Revit, the entire team must use the same version of Revit throughout the project. Any update to Revit version MUST be a team decision and all team members will update at the same time (if models are updated to a newer version of Revit). (We have Revit specified for all team members. Some may be utilizing other software. We will update during VDC kickoff meeting with trade contractors). Design Naming Convention will be dictated by the Design Team (Unless otherwise noted). Construction model file naming will be dictated by the project size, type, buildings, etc. but in general will use the following format:

Project_Building_Company_Scope_Level Revit version.extension

Example: PROJ_BLDG_COMPA_ARCH_L01_R24.rvt

File Name	Phase	Description	Company	Ext	Software /Version
	Design	Architectural		.rvt	
		Structural		.rvt	
		Mechanical Plumbing		.rvt	
		Electrical		.rvt	
	Construction	Mechanical		.rvt	
		Plumbing		.rvt	
				.rvt	
				.rvt	
				.rvt	
	Design and Construction	Fire		.rvt	
	Construction	Civil Utilities		.rvt	
	Construction	Coordination	Yates	.nwd	Navisworks 202x

The coordination schedule will be determined during the VDC kickoff meeting and will be included in the overall construction schedule.

Coordination Meetings to be on: DAY_____TIME_____

Model Uploads Required before: DAY_____TIME_____

Origin Point, Units, Tolerances

- All trade models will be located using the Architectural model as the reference point. IF project has multiple buildings, the project team will determine the model files to use as a starting point.

Building/Area:	Model to be used as a starting point:

- All performed scope of work shall be in 3D format except as noted in the trade specific description.
    - All models should include separate 3D representations of required clearances and/or access requirements for equipment access, light clearances, overhead cable tray access, etc. These clearance/access models should be in a separate layer(s) for each trade clearly labeled as such.
    - Modeled insulation should be in a separate layer from other model elements and labeled as such.
    - All 3D model files submitted for clash detection must be "clean" meaning that any extraneous 2D references and/or 3D elements are stripped from the models.
    - Riser and penetration drawings should be included as required for coordination.
    - Refer to Appendix C: Model Coordination Specifications for detailed coordination specifications.

- Units/Tolerance:
    - Units: Feet & Inches
    - Model Precision/Tolerance: 0"

Level of Development (LOD) Description

The specific scopes of work to be modeled will be determined by the project team.

The construction trade contractor models should have elements at a default Level of Development of 350 to 400 per BIM Forum 2023 LOD Spec. This is the standard of care necessary for construction documents (Note: non-graphic information may or may not be in the models). Items/scopes designed to less than LOD 350 need to be identified and the associated specifications need to call for shop models/coordination models from the trades. Drawings and details should be created from the models, in the native software (derived), and edits to the 2D details should enhance but not change the model geometry.
Contractors shall use field installation drawings created from signed off (fully coordinated) models to install work. Any variation must be documented in the model and shown to be coordinated with other trade models and listed on the Coordination Sign Off Sheet including future trade's work (if modeled) – **prior** to beginning that work.

Generally, LOD is referred to as:

Level of Development (LOD)	Definitions
100	Conceptual
200	Approximate geometry
300	Precise design geometry
350	Precise geometry for coordination
400	Precise geometry for fabrication, pre-fabrication and assembly
500	As-Built model(s)

Model Maintenance

The coordination model is maintained throughout construction by updating the respective construction models using the current design models as a background. This coordination model shall include all pertinent RFIs where the building background is affected, as well as document the as-built condition of the project. At the completion of the project, the coordination model for the project will be provided to the owner and can be used for post- construction maintenance and operational requirements.

Contractors are required to maintain the accuracy of their construction models throughout construction, even after detailing coordination is largely complete. This includes owner directed changes, RFI responses, submittal comments and "cascading effects" from other changes or conditions that require coordination.

File Format Compatibility

All software programs used to create the design and construction models shall be capable of being exported in an .nwc format. Models will be federated in Autodesk Construction Cloud and/or Navisworks. The VDC Coordinator will produce the Federated/Coordination Model by consolidating these models and publishing them as an .nwd file using Navisworks.

COLLABORATION AND ACCOUNTABILITY

Collaboration

Each VDC Specialist/Detailer, VDC Coordinator, and VDC Manager is required to be **collaborative**.

Collaboration brings the combined knowledge and interests of all of team members to achieve mutually agreed upon resolutions with everyone's participation.

Accountability

Each VDC Specialist/Detailer, VDC Coordinator, and VDC Manager is required to be **accountable**.

The interrelatedness of the coordination effort requires each team member to provide timely information, problem-solving, corrections, and updates for the coordination effort to proceed smoothly. The dereliction of any one element compromises the integrity of the entire coordination effort. To that end, each subcontractor and its representatives are required to:

- Produce timely, reliable, and accurate updated 3D model(s)
- Attend coordination meetings as scheduled.
- Participate in issue resolution, including adjusting their model to resolve conflicts.
- Implement corrective actions and update deliverables to meet the coordination and construction schedule.
- When necessary, attend meetings or work collaboratively onsite.

Although Yates will manage the VDC Coordination effort and check the accountability of the models, the participants are encouraged to raise any concerns about the process with the VDC Coordinator or VDC Manager to ensure that the process runs smoothly. This is a team effort. It is vital that team members identify and vocalize any construction issues, whether in their scope or not.

MODEL MANAGEMENT

Common Data Environment(s)

As part of VDC kickoff, the project team will establish the standard method and location in which stakeholders will upload their content. All models, drawings, data, and other information shall be shared via a common data environment (CDE). Project team members will have access to the latest information from all stakeholders.

All Models and VDC content are centralized in **Autodesk Construction Cloud (ACC)** for real-time collaboration and accessibility. The most current models are actively maintained in ACC and versioned, while older models are archived in Procore to serve as a historical record.

Concurrently, all other project documentation, excluding models and VDC content, is stored in **Procore.** For seamless collaboration, trades are directed to post and download relevant content from ACC, which functions as the primary hub for trade-related activities. This approach ensures an organized and efficient system, distinguishing between real-time collaborative work in ACC and archival storage in Procore, while offering a streamlined process for trade engagement.

Models are uploaded in their native format, and other agreed upon formats necessary for use by project team members. The software version, file naming, model coordinates, and other project specific information is specified in section 2.2 of this document. Any future software version upgrades will need to be reviewed and agreed upon by the team collectively. When the decision is made to upgrade, the newer version(s) will have to be deployed concurrently across all disciplines.

Reference Drawings and Models

Model participants will generate two-dimensional reference drawings, generally plan and elevation views, to convey information to other project members to facilitate coordination, offer value added alternate solutions, assist in resolution of clashes, or to serve as the basis of submittals and shop drawings. For example, subcontractors may be required to provide 2D .dwg files showing deck penetrations or beam penetrations so that the VDC Coordinator can create a composite drawing.

The critical function of the two-dimensional reference drawings provided by the subcontractors is to convey revisions, improvements, enhancements, and corrections to the design team that must be incorporated into the two- dimensional contract documents. It is the responsibility of the Design Team to ensure that modifications to the contract documents, produced as a result of the VDC process, are incorporated into the contract documents, and made consistent with the model.

Changes to Models

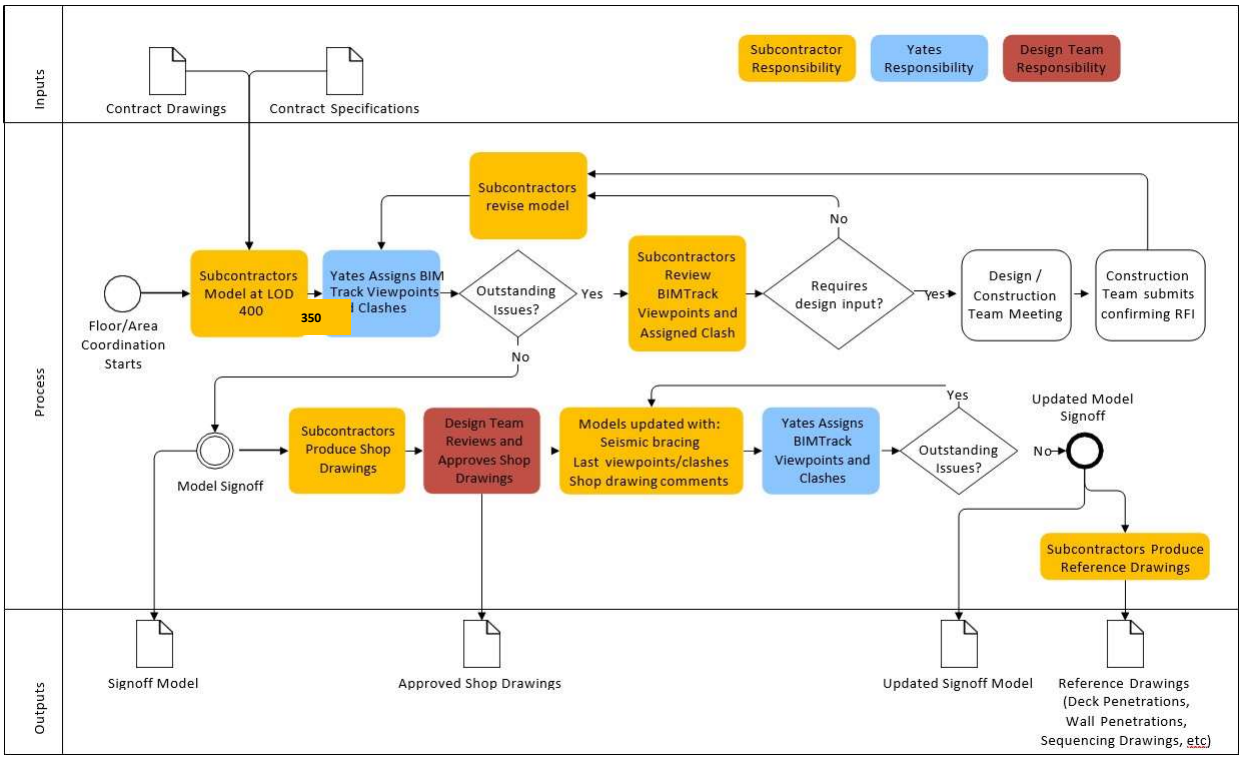
- Each party shall be responsible to provide revised content based on formal direction from the owner or project leadership.
- Design model changes made in RFIs, ASIs, and bulletins will be updated in the design models by the appropriate designer as needed for the project team.
- When subcontractor model changes or modifications are necessary due to constructability, sequencing or installation, the subcontractors shall submit a new RFI and proper documentation to Yates for review and direction from the Architect and Owner.
- It is each party's responsibility to communicate and track costs associated with directed changes that fall outside of the scope defined in their contract.

Model QA/QC

QA/QC should be continuous throughout the design and construction process. To ensure the integrity of the BIM data the following model checks should occur by all team members at the major project milestones:

- Visual – Verify that there are no extraneous or out of place model components.
- Clash Detection (hard and soft) – Using the model to detect instances where two or more building components are occupying the same space.
- Standards – Review model to ensure that all prescribed BIM standards have been adhered to.
- Model Data – Verify that all model data is complete and accurate to the relative project stage.

Model Coordination and Signoff Process



After having a project VDC kickoff meeting, the trade contractors will model their geometry based on the stratification as detailed in Appendix C: Model Coordination Specifications. Once their modeling is complete and published to the ACC site, the Yates VDC Coordinator will review the models and assign Navisworks viewpoints and clashes to each trade in a published federated model. The trade contractor detailers will review their assigned viewpoints and clashes independently and come up with a short list of issues they need to discuss during the weekly construction coordination meetings. Trade contractors need to resolve their remaining assigned issues independently each week.

Once the bulk of the issues associated with the floors are resolved, the VDC Coordinator will publish a signoff model showing each trade's coordinated model, as well as any remaining viewpoints and issues. The purpose of the signoff model is to archive the status of the models that were issued for shop drawings.

POST CONSTRUCTION

Project Close-Out and Final Deliverables

Requirements for all data turned over to the owner upon project close-out is outlined in Appendix F: "Owner Deliverables/Facility Management Requirements".

At the conclusion of coordination, the project deliverables are the as-built Coordination Model and its component models comprising a coordinated 3D representation of the major project systems including all major drawing revisions. These models shall include the incorporation of all RFIs, as well as reflecting the as-constructed condition of the project.

At the conclusion of each project, the model manager for each discipline's model(s), shall:

- Prior to the sharing of any models, they shall be purged of CAD imports or extraneous families.
- Floating, random or misplaced objects shall be corrected or deleted.
- Dependent and/or central files shall be disassociated prior to upload.
- File naming conventions shall be followed and checked before the file is placed in the CDE.
- Include only published sheets/views to eliminate clutter and confusion, providing a lean model for other members of the project team to work from.
- Any linked files are to be purged/removed. This is to remove mappings to outdated/incorrect/local file locations.
- All objects in the default view are set to be visible.
- Verify that 2D details and views have been drawn from the model. Linked files and views will become disassociated in the file transfer.
- If multiple design options have been incorporated a record copy of the model shall be saved containing all options, and the official shared model shall contain only the desired option(s) going forward.

APPENDIX A - BIM/VDC Definitions

Terminology

3D Coordination Model (Coordination Model), Federated Model: Electronic 3D geometric representation combining all trades involved in the coordination process into a "federated" model. Typically generated using Autodesk Navisworks Manage. (*.NWD)

3D trade contractor Model: Electronic 3D geometric representation of the trade specific building elements to be installed for a specific contractor's scope of work. Format must be compatible with Autodesk Navisworks Manage.

Autodesk Construction Cloud (ACC) – The cloud service used to store project files and support automated file sharing and collaboration.

Building Information Model (BIM) – A digital representation of the physical and functional characteristics of the project, also referred to as Model(s).

Building Model: Electronic 3D geometric representation of the architectural and structural building elements within which model coordination is performed.

Clash Detection Software: Latest version of Autodesk Navisworks Manage

Compliance Model: Electronic 3D model of a coordination area (as determined by the VDC Facilitator) combining all trades, that has been fully coordinated and agreed upon by the model coordination team. These models shall be the basis for the shop drawings. There should be no deviation between the compliance model and the shop drawings.

Construction Models – Produced by trade subcontractors for the creation of coordinated shop drawings. These models contain the elements used for fabrication.

Coordination Team: Yates, Designers, Trade contractors. See table below for Project Implementation plan for defined roles. If the project has a detailed Project Implementation Plan the most current information will be contained there.

Design Models – Produced by the designers (architects and engineers of record) and used in the creation of contract documents. These models are the background for coordination.

Fabrication Model – Coordinated Virtual Trade subcontractor models that include all specified building systems coordinated to 100% level with respect to elevation and clash detection. The Model includes all manufacturer specific equipment, fittings etc. to LOD 350.

Federated Model – The general term for a single consolidated model consisting of linked design, construction and/or supplemental models.

Level of Development (LOD) – Based on Level of Development Specification, LOD describes the level of completeness to which a Model Element is developed at a given point in time. BIM Forum 2023 LOD Spec.

Object Enablers: Each contractor using software containing object enabling libraries must provide a method for all other project participants to view these libraries to aid in the coordination and viewing of their scope.

Procore – The project management service used to store project documents and collaboration.

Shop Drawings: Contract required shop drawings that shall be submitted to the AE for review. Shop drawings will be generated from the 3D Trade contractor model after the coordination process is completed. These drawings shall be a 2D representation of the installation intent published on industry standard title block sheet format.

Supplemental Model – Modeled items needed for the coordination effort not necessarily covered in the scope of the modeling team.

Trade Contractor Model Manager: Trade contractor personnel responsible for working with the model and for

interpreting the information provided within the model.

VDC Coordinator – Person responsible for managing the BIM detailing and coordination process and leading the design and construction team in conflict resolution and best practices for detailing their work.

VDC Facilitator (VF) – The individual and company responsible for hosting and facilitating the BIM effort.

VDC Manager – The individual within each contributing organization assigned to manage their contribution to the modeling effort.

VDC Specialist/ Detailer – The individual who creates 3D models including parametric families and professional quality drawings to support the BIM process.

Virtual Design and Construction (VDC) – Virtual design and construction (VDC) is an industry management practice that combines digital models with traditional project planning and management techniques. VDC helps to improve collaboration, communication, quality, efficiency, safety, and sustainability.

APPENDIX B – Designer BIM Specifications

GENERAL

1.1 SUMMARY

A. **Purpose**: This specification has been prepared to communicate to the project design team the BIM standards that are required from them throughout the design process, and to give the design team a better understanding of how Yates will leverage the design model throughout the design and preconstruction process. By adhering to these specifications, the team stands to gain in several ways. It enables us to dynamically provide swift and precise quantity take-offs as design changes occur. It aids in identifying and resolving coordination issues, thereby reducing future RFIs. It facilitates the integration of owner-related changes and ensures the timely delivery of accurate as-built drawings. This comprehensive approach ultimately enhances our efficiency and productivity.

1.2 3D BUILDING MODELS

A. **Design Software**: It is understood that the team will use Revit (or other approved) software. Upgrading to a newer version during the design or construction phase will only happen if the entire team is ready and able to upgrade. Trade contractor/sub consultant to obtain Design/GC Team permission to use any other BIM software.

B. **True Representation**: All elements must be modeled to scale and shall be a true representation of what is to be installed in the field in all three dimensions and shall be correct and coordinated with all disciplines.

C. **Model Origin Point**: Prior to modeling, team to identify and document common model origin point to be used for the project. All models must be aligned to the common model origin point to allow for federation of design and trade models. Internal Origin Point to be set at building grid intersection, such as A/1, or, generally, at the lower left or southeast corner of the project. Revit survey point, if necessary to move from internal origin point, to be set at known, real world coordinate, such as a survey monument in the street. Project Base Point to be set at Internal Origin Point unless specified otherwise.

D. **Object Parameters / Attributes:** Intelligence/information, “model data”, shall be associated with geometric objects.

E. **Units and tolerance**: Working units, unless otherwise specified, shall be in feet and inches. Model tolerance is 0. In Revit, typically the tightest model tolerance is specified as 1/264”.

F. **Sheets/Views**: the integrity of the authored Revit models should be preserved. All sheets and views in the design models should remain in the model and available to all team members.

G. **Sole Authorship**: Each designer and trade contractor/sub consultant will maintain their own model design files as sole author. Collaborative projects may allow multiple people from different entities to edit and update models. For these projects, a clearly documented Model Responsibility Matrix needs to be included. Software should support change management or tracking of changes by person making the edits.

H. **Duplicate Model Objects**: Models should not contain duplicate objects. Prior to publishing or uploading models, model authors shall check their models for duplicate geometry and delete as necessary.

QUANTIFICATION

Yates personnel will utilize the 3D Revit model(s) to quantify the following specific elements:

I. **General**

1. **Gross Square Footage of floor plate:** Area (SF) to be measured is outside-to-outside of walls and no take-outs for stairwells, shafts, etc., with the exception of large atrium areas. In Revit, separate Area Plan sheets, by level, should be developed along with an Area Plan schedule by the design team. Each area plan sheet shall contain the area plan view for each level with all areas being shaded and labeled that constitute the quantified gross building area.

2. **Room Areas and Perimeters:** Measured inside-of-wall to inside-of-wall. Area (SF) quantity will be scheduled, along with perimeter of each room area. Room Area plan sheets to be developed along with Room Area schedule by the design team. Each room area shall be shaded and labeled. Yates recognizes that, in some cases, the perimeter will need to be derived using other methods. Rooms in large, open spaces will produce inaccurate perimeter information for wall finish and base finish quantities.

J. Structure

1. **Structural Foundations:** Spread foundations will be quantified by type and volume. Continuous footings will be quantified by length (LF) and by type. All Structural Foundations to be created with the Structural Foundations family and labeled to match the structural plans.

2. **Concrete Basement Wall:** Basement walls are defined as any below grade concrete wall that has earth or forming against one side. Basement walls shall be modeled floor to floor and be identified by type, as these are quantified separately from other walls. Quantified by type, by volume (CY), by surface contact area (SF) and by level.

3. **Slab on Grade:** Quantified by type, by volume (CY), by surface contact area (SF), and by level.

4. **Concrete Wall:** Concrete walls shall be modeled floor to floor and be identified by type. Quantified by type, by volume (CY), by surface contact area (SF) and by level.

5. **Structural Concrete Columns:** Quantified by type, by volume (CY), by surface contact area, and by level. Structural Columns shall be broken at floor levels.

6. **Structural Concrete Framing:** Quantified by type, by volume (CY), by surface contact area (SF), and by level.

7. **Elevated Concrete Decks:** Quantified by type, by volume (CY), by surface contact area (SF), and by level.

8. **Structural Steel Columns:** Quantified by type, by height (LF), and by level. Steel columns shall be broken at splice locations.

9. **Structural Steel Framing:** Quantified by length (LF), by type, and by level.

10. **Slab on Metal Deck:** Quantified by type, by volume (CY), by surface contact area (SF), and by level.

K. Envelope

1. **Exterior Wall Area:** Each exterior wall element should be modeled separately to allow an area (SF) quantity to be scheduled including parapet, mechanical penthouse, and any other exterior cladding elements. Primary quantities to schedule are (1) Area of glass, by type, and (2) Area of major materials, by type (curtainwall, glazing, brick, metal panel, other).

    a. **Curtain Wall:** For the cases where glass type changes in a curtain wall system, model curtain panels with type name appropriate to the material type. Curtain wall quantities cannot be obtained from the wall object if mixed panel materials are used in the same curtain wall. In the cases of mixed panel types, use a project parameter to indicate quantities to be derived from the curtain panels rather than the wall object (e.g. Parameter name = “CW-QTO”, Parameter Value = “Panel QTO”). Mullions on mixed panel curtain walls shall also contain the same parameter name and value indicating

quantification of mullion contribution to curtain wall area is required. Adequate dimensions on mullions for mixed panels shall be scheduled representing the exposed surface area of the mullion visible from an elevation view (typically width and height).

b. **Exterior Walls:** Create new wall objects where materials change (e.g. stone or brick transitions to glazing or storefront).

c. **Parapets:** Need to establish both a length (LF) quantity and parapet height (LF) (used for additional roof area quantities). In Revit, a wall sweep can be used to represent and schedule the parapet for quantification purposes.

2. **Roof Area:** Area (SF) scheduled by roof construction/roof type. If roof objects are not to be used for all or part of the roofing scope, designer shall provide notice of modeling approach being used to Yates and verify if exposed surface area of objects representing roof elements can be quantified. Yates to verify if roof object has openings or other subtracted roof material that may affect quantity of roofing. Parapets need to be modeled separately for roof area (see parapet requirements).

L. Interiors

1. **Interior Partitions:** Interior partitions will be quantified by length (LF), by type and by level. Multi-level partitions should be avoided unless they are used in multi-story spaces. Wall height will be derived from walls in the Revit model as defined by the designer. Gross square footage will be determined by calculated linear length (from Revit) by wall height as shown in the Revit wall schedule or wall type details. Revit wall type name should be defined in a way that easily identifies the wall type. Fascia to be a separate wall type from wall types used to represent partitions. At each deliverable (SD, DD, CD), a parameter should be added to all walls identifying the level or floor if the base constraint level does not match the level in which the majority of the wall area is found.

2. **Interior Glazing:** Area (SF) scheduled by type. At each deliverable (SD, DD, CD), a parameter should be added to all walls identifying the level or floor if the base constraint level does not match the level in which the majority of the wall area is found.

3. **Doors:** Interior and exterior doors will be quantified by type and by level.

4. **Ceilings:** Interior ceilings will be quantified by area (SF), by type and by level.

5. **Floor Finishes:** Floor finishes will be included in room definitions beginning at DD and will be quantified by area and type.

6. **Wall Finishes:** Wall finishes will be included in room definitions beginning at DD and will be quantified by area and type.

REVIT MODEL STANDARDS

1.3 GENERAL: This section is intended to set modeling criteria that will facilitate estimating and constructability processes prior to construction. Any deviation from these standards must be approved by Yates. Each subsequent design phase will require the preceding design phase criteria plus all additional criteria listed for that design phase (e.g. Construction Documents (CD) BIM Models require all criteria established in SD and DD phases as well as the additional criteria identified under the CD standards).

1.4 CONSTRUCTION DOCUMENTS (CD)

A. General Comments

1. Design is 100% complete, typically LOD 300 or higher.

2. All items identified for Design Development submittal with more detail and clarification where additional information is available.
3. Design-Build and Design-Assist sub-consultants and trade contractors will be required to collaborate during the CD design process in order to complete shop drawings and submittals during the CD phase.

B. Architectural

1. Casework and Equipment

    a. All casework and equipment should be located
    b. The name of the item should be listed under "Type"
    c. Any finish information should be listed under "Finish"
    d. Any additional information should be listed under "Description"

2. Interior Partitions

    a. Specify CMU vs GWB wall construction under "Type" field. (e.g. 12" CMU Shaft Wall" vs. "GWB Standard Partition")
    b. Specify fire rating under the "fire rating" field.
    c. If a partition schedule has been created, identify this in the "Type Mark" field (e.g. "Type 2A"). This is the preferred way to differentiate stud thickness, type of GWB, etc.
    d. Partition assemblies should be drawn correctly under Properties -> Structure. Wrapping should be modified as appropriate
    e. Partitions should be drawn to the proper height (to deck or to ceiling etc.). Note that it is highly preferable to have the partitions drawn to the correct height instead of having a height simply be assigned in a partition schedule which may not be consistent with the way the partitions are actually drawn.
    f. Shaft walls/shear walls should be drawn one level only and copied per level as appropriate rather than drawn as one element from the first level to the roof.

3. Exterior Partitions

    a. Specify wall construction BRIEFLY under "Type" field. (e.g. "Brick on CMU" or "Metal Panel on Studs")
    b. If a partition schedule has been created, identify this in the "Type Mark" field (e.g. "Type 2A"). This is the preferred way to differentiate stud thickness, etc.
    c. Partition assemblies to be modeled correctly under Properties -> Edit Type -> Structure. Include all insulation, air barriers etc. as appropriate. Wrapping should be modified as appropriate.
    d. All walls shall be drawn one level only and copied per level as appropriate rather than drawn as one element from the first level to the roof.

4. Doors

    a. Specify door material in a separate field under "Door Material" (e.g. Wood, Glass, Hollow Metal)
    b. Specify frame material in a separate field under "Frame Material" (e.g. Hollow Metal)
    c. Specify the frame type in a separate field under "Frame Type" (e.g. Type A)
    d. Mark the level that the door is on in the "level" field
    e. Any special hardware requirements should be noted under "Comments"
    f. Door "type" can be used at your discretion. Given that the pieces of information above should be in separate fields and that the height and width of the door will be automatically generated under those categories, a simple title like "Interior - Single Door" or "Interior Double Door" may be sufficient.
    g. Specialty doors - denote any specialty doors (overhead doors, etc.) under "Type" (e.g. Overhead Coiling Door)
    h. Specify any glass lites under "glass style"
    i. Specify hardware under "hardware set"

5. Roofing

    a. Specify roof material in a separate field under "Type" (EG: EPDM Roof)
    b. Any roof screens should be drawn and the screen should be identified
    c. Show roof drains, scuppers etc., and roof slope if applicable

6. Ceilings

a. Lighting fixtures, speakers, etc. are located
b. Soffits and bulkheads are drawn
    i. See guidelines for partitions
c. All Ceilings Drawn
    i. Material Description under the "type" field (e.g. "GWB on Metal Stud")
    ii. Ceiling assemblies to be modeled using the Revit ceiling tools, and not using floor tools.
    iii. Ceilings to be modeled to reflect their true configuration in Properties -> Edit Type -> Structure
d. Areas with exposed structure indicated
e. Ceilings drawn into the model for the RCP's should be coordinated with the ceiling finishes listed in the finish schedule.
f. Ceilings drawn into the model for the RCP's should be coordinated with the ceiling finishes listed in the finish schedule.

7. Punched Windows

    a. Specify any special energy performance information (if applicable) in a separate field under "description" (e.g. U Value = ...)
    b. Specify glass type in a separate field under "glass type" (e.g. fritted, frosted, fire rated, etched, etc.)
    c. Specify frame material in a separate field under "material" (e.g. aluminum)
    d. Window "type" can be used at your discretion. Given that the pieces of information above should be in separate fields and that the height and width of the window will be automatically under those categories, a simple title like "Interior Window" or "Exterior Window" may be sufficient.

8. Curtainwall Systems

    a. Specify Panel Type under "Type" (e.g. Metal Panel Curtainwall System, Glass Curtainwall)
    b. Specify any special energy performance information (if applicable) in a separate field under "description" (e.g. U Value = ...)
    c. Specify glass type in a separate field under "Comments" (e.g. fritted, frosted, fire rated, etched, etc.)

9. Rooms

    a. Rooms should be tagged and numbered in Revit

10. Finishes

    a. A finish schedule should be created listing all floor, ceiling and wall finishes
    b. A finish material (or "No Finish") should be assigned in the finish schedule to each room (no room should be left blank).
    c. No rooms should be listed on the schedule as "not placed" or "not enclosed"
    d. Interior elevations of significant interior spaces should be shown from the Revit Model and not drawn in 2D to ensure all specialty finishes are accounted for.
    e. All finishes, but particularly ceiling finishes, should be coordinated between what is drawn in the model (for RCP's, for example) and what is listed in the finish schedule.
    f. All finishes, but particularly ceiling finishes, should be coordinated between what is drawn in the model (for RCP's, for example) and what is listed in the finish schedule.

C. Structural

1. Structural Framing

    a. For steel members, identify the section under "Type"
    b. Identify the level under the field "Level"

2. Structural Columns

    a. For steel members, identify the section under "Type"
    b. Draw columns per appropriate fabrication height
    c. Identify the level under the field "Level"
    d. Do not draw columns that intersect with other elements (foundations, foundation walls, floors, etc.).

3. Foundations

a. Identify the type of foundation element under "Type" (e.g. "mat foundation" or "continuous footing").
b. If a footing schedule is being used, coordinate this with the "Type Mark" field.
c. Reinforcing may be listed under a custom field or under "comments".

4. Floors

a. Identify the floor type and thickness under "Type" (e.g. "3" Slab on Grade" or "4" Slab on Metal Deck")
b. Identify the level under the "Level" field.
c. All major penetrations should be located (slab openings, pits, tunnels, ramps)
d. Expansion joints should be indicated

APPENDIX C - Model Coordination Specifications

System Priority

The Systems will be divided into 3 priorities:

- High – These are the largest elements, the most critical, the hardest to move.
- Medium – These are the elements that are connected to the highest priority elements that have already been placed and signed off on.
- Low – These are the smallest, least critical items that can be moved easily.

Model Colors

DISCIPLINE	COLOR
Architectural Backgrounds	White
Structure - Concrete	Grey
Steel	Dark Red
Fire Sprinkling	Red
HVAC/Sheetmetal	Cyan
Mechanical Pipe	Magenta
Plumbing	Green
Electrical / Data / Lighting	Yellow
Access Zones	Purple (50% Transparent)

Stratification

The Systems will be divided into 3 priorities:

1. Assigned Work Zones: When practical, each trade will be assigned specific work zone elevations (top and bottom) to run racks and mains. The contract drawings generally define the zones for services. All trades shall proceed using these plans as a guideline for systems modeling.
2. Resolution of Conflicts: The VDC Facilitator shall label individual conflicts that are identified. Trade contractor model managers are required to assist in conflict identification and seek resolution in a proactive and harmonious fashion.
3. In the event of a conflict, the following list establishes which discipline takes precedence. Anything modeled takes precedence over any object/item that isn't modeled:
    a. Structure
    b. Graded Piping
    c. Pneumatic Tube
    d. Racked piping (four or more)
    e. Duct mains (larger than 14")
    f. Large bore piping (4" and larger)
    g. Electrical main feeder conduit
    h. Cable tray
    i. Fire protection mains (non-graded)
    j. HVAC terminal units
    k. Duct (smaller than 14")
    l. Small-Bore piping (non-graded, non-racked)
    m. Electrical-Distribution conduit

Model Development

The Project teams will be responsible for the submission of modeled content at the predetermined times defined in the Coordination Schedule. The model content shall be developed concurrently with 2D documentation and shall be developed with the intent to guide field installation.

Trade contractors shall develop and maintain model content to their full and complete scope and to the satisfaction of Yates, the Architect, and the Owner. Yates reserves the right to supplement and/or generate necessary model content for coordination, after giving notice, at the trade contractor's expense, if the trade contractor is not proceeding with diligence and completing the modeling work within the time outlined in the Coordination Schedule.

Content

Proposed model elements are the building components and systems that have the greatest impact on organization, coordination, access, and maintenance of the facility. Generally, the model elements consist of fixed architectural and structural elements (frame, walls, floors, ceilings) and major components of MEP equipment (air handlers, VAV boxes, switchgear, pumps) and distribution (ductwork, hydronic piping, gravity and pressure piping systems, electrical panels and branch conduit, lighting, registers). These models also include small diameter piping and conduit, ceiling devices and seismic bracing developed in detailed design submittals by individual subcontractors.

As the project documents evolve and equipment is procured, model representations of the **actual** pieces of equipment that have been submitted and approved will be inserted into the model. These actual equipment selections may differ from the basis of design in size, locations of connections, weights, and other characteristics. These differences will affect the coordinated model, and require some re-examination to confirm that systems fit, and are coordinated.

Wherever possible, model elements shall be derived from approved actual manufacturing modeling elements if available. Custom created model elements shall be used where manufacturer created elements are not available. All modeling elements shall contain parameters and all other data necessary to support the analytic process.

The model elements shall be parametric objects that contain all pertinent parameters associated with that model element for the level of development the model is coordinated to. For example, some projects may require the turnover of BIM data to a facilities management team. Facilities managers may require subcontractors to supplement the model with additional data for their purposes.

Geometry

Objects shall be modeled as solids; no wire frames, or lines, no 2D polygons combined to form 3D objects.

Layers should indicate objects included within that layer. Subset descriptions should also be indicated (type, etc.). Maintain consistency with file, layer, and object naming conventions for all project models.

Objects that are not physically and substantially connected should not be grouped, placed in a single AutoCAD block, or placed within a single Revit family. For example, a single light fixture can be a single block in AutoCAD, but multiple light fixtures located across a floor, room, or project should not be grouped or placed in a single block. This allows Navisworks to isolate clashes to a single object, rather than flagging all objects for review.

Construction Models and their layer structure should correspond to how the systems, their components and materials are designed and built in the field.

For example, if a shaft riser in the HVAC system is spliced 4'-0" above the floor, and runs floor to floor, then the riser should be built that way in the model. If the duct shaft is part of the general exhaust system, the components and materials would be structured under the general exhaust high pressure exhaust air layer.

Coordination Schedule

Yates will establish and maintain a Coordination Schedule throughout the duration of Model Coordination. This schedule may be broken down by levels, zones, or areas as dictated by the Construction Schedule. Items or areas that have long-lead times or critical sequencing may be reviewed and coordinated outside of their scheduled periods. These items need to be communicated to the VDC Facilitator so that they can be included in the schedule or so that additional coordination meetings can be scheduled for these items.

Coordination Meetings

Models will be prepared by each individual trade contractor for the 3D coordination process. The VDC Coordinator will assemble the individual models into a composite model in clash detection software to identify conflicts and generate solutions. Coordination meetings will be held at intervals appropriate to the project as outlined in the general contract and Coordination Schedule. Trade contractors shall have at least one representative in person or by conference call at the meetings. Yates will facilitate meetings to review and update trade contractors on coordination items. Items addressed will not be based on individual model clashes but will be areas identified to have conflicts. Meeting agendas and minutes will be tracked and distributed by Yates. Trade contractors are responsible for the review and approval of meeting minutes.

Trade contractors will notify Yates of any incorrect or mis-stated items in the meeting minutes. At the conclusion of each model review process, or coordination meeting, the VDC Facilitator will produce a static Navisworks model (.nwd). It is assumed that these files are:

- The "compliant models"
- Are the most current coordination files
- Represent the correct orientation and dimensional information necessary for fabrication
- Each trade has verified their model data against other models and design information

Model Exchange, Software

As part of Model Coordination kickoff, Yates will establish the standard method in which trade contractors will upload models, according to dates specified in the Model Coordination schedule. Trade contractors will upload model content in their original model authoring software compatible with Autodesk Navisworks. In addition to the required original format, trade contractors may be required to upload separate Navisworks cache (.nwc) files for systems, assemblies or zones as established in the kickoff meeting. Yates will provide trade contractors with access to file sharing sites (ACC), folders, and reports as established in the Model Coordination kickoff meeting. Software, file locations, and file naming to be determined during the Model Coordination kickoff meeting and documented in the BIM Execution Plan.

Model Review/Clash Detection

Yates will perform model review and clash detection at appropriate intervals necessary to evaluate and observe potential project issues and coordination items that need to be addressed. These items discussed at Model Coordination meetings will be prioritized and distributed based on the agreed method in the Model Coordination Kick-Off meeting.

Issue Resolution

Trade contractors are responsible for the coordination of their own model content and will resolve any internal model conflicts. Trade contractors will work to follow the basis of design and will notify the project team of any deviation necessary to resolve conflicts outside of a trade contractor's own scope of design. Initial issues assigned to a trade contractor do not relieve any other trade contractor of the responsibility in determining a resolution. Trade contractors will contact other subcontractors outside of Coordination Meeting times to resolve assigned items or other issues that are identified. Any new conflicts that may arise as the result of outside coordination will be brought to the attention of Yates.

Changes to the Contract Documents

Trade contractors shall be responsible for providing revised content based on formal direction from the owner/architect. During coordination if it is determined that changes or modifications need to be made due to constructability,

sequencing, or installation the subcontractors shall submit an RFI and proper documentation to Yates for review and direction from the Architect and Owner. It is the subcontractor's responsibility to track costs associated with directed changes that fall outside of the design scope defined in their subcontract and to address those costs as outlined in the subcontract.

Coordination Sign-Off

As designated levels, zones, or areas of the project complete coordination all parties will be issued a sign off document. Yates will keep a record of sign off documentation along with a Navisworks Document file (.nwd) that shows the state of coordination at the time of sign off. Any known coordination items that have not been addressed prior to Coordination Sign Off will be noted in the sign off document. Any minor or unknown coordination items may be addressed past the level, zone or area sign off date.

It is each trade contractor representative's responsibility to affirm that their model reflects the latest coordination items and that those responsible for the management of the project and the on-site supervision have reviewed and acknowledge the modifications made during coordination.

Any field installation deviating from the signed off "compliance model" or done prior to Model Coordination will be at the risk of the trade contractor. Non-compliant parties bear all costs for rework, re-coordination, or schedule impact required to accommodate components not shown on, or not installed in accordance with, the "compliance model" including impacts to other parties affected by their lack of compliance.

Shop Drawings

Shop drawings will be generated from the model used for coordination and will coincide with the coordinated model unless otherwise approved by the owner, architect, or Yates. Shop drawings will be submitted after the Coordination of a corresponding level, zone, or area has been completed and signed off.

Model Based Installation and QA/QC

Yates field installation will be based on and match the signed off "compliance model". Any field installations done before the sign-off of a level, zone or area is done at the subcontractor's risk. In the event of a conflict arising during field installation the signed-off compliance model will be consulted. If a subcontractor's installation does not conform to the coordinated model, they will be responsible for moving the elements out of conformance at no additional cost.

If during installation a subcontractor encounters a condition that interferes with the intended installation, the subcontractor will notify Yates. Any alternate field routing will need to be reviewed and approved by Yates before proceeding with the installation.

Submittals

A. **Contract Required Submittals**: Provide all specified submittals outlined in the contract documents. The Model Coordination process does not replace any contract required submittals.
B. **Record and As-Built Deliverables:** At project completion, each modeling trade contractor shall:
   I. Incorporate "As-Built" conditions affecting their work into the electronic CAD/BIM files and provide a record set of drawings in PDF format.
   II. Provide printed hard copies of the PDF files in quantities if required by project specifications.
   III. Provide electronic CAD/BIM files in 3D format electronic media (CD, DVD, collaboration site) and other means as required by the project specifications.
   IV. Each trade contractor will be required to provide a 2D isolated deck and wall sleeve penetrations in .dwg format for their respective work. These files will be used for model coordination and coordination with the Structural Engineer. This file will be required at the time an area (as distinguished by the Team) is signed off.
   V. At the conclusion of the project, provide Navisworks-compatible As-Built models, along with models in the original authoring software format, for inclusion in a comprehensive "Record Model" assembled by the VDC Manager.

VI. All model files, drawings, and any other information pertinent to the Model coordination process are property of the owner and will be turned over to the owner, in an organized manner, at the conclusion of the project.

VII. Export each sheet of the record set of drawings individually as an AutoCad (.dwg) file using “AutoCAD DWG Files” format. Files to use the latest National CAD Standards layer naming convention.

COORDINATION TEAM RESPONSIBILITIES

Core Leadership

Yates will function as the VDC Facilitator and will be responsible for overall management of the VDC process. Each party (Architects, Engineers, Contractor, etc.) that is responsible for contributing model content will assign a VDC Manager for the project. The VDC Manager from each organization has several responsibilities. They include, but are not limited to:

- Participate in the development of early standards, data exchange and coordination processes to optimize the use of BIM during all phases of the project.
- Review and confirm models are clean, accurate and complete with respect to the design.
- Ensure the geometry is error free and presented in an efficient manner.
- Validate the Level of Development and controls as defined for each project phase.
- Validate modeling content during each phase.
- Combine or link multiple models.
- Participating in design review, constructability review, and model coordination sessions.
- Communicating issues back to the internal and cross-company teams.
- Ensure file and layer naming remain consistent and accurate.
- Managing version control.
- Facilitate the exchange and coordination of the 3D model through the collaborative file sharing site.

Participating Trade Contractors

- Attend all coordination meetings. Representative shall be able to negotiate on behalf of company to successfully participate in coordination process. Trade contractor's failure to attend and be represented at the scheduled Coordination Meetings and failure to provide trade contractor's comments on coordination drawings or documents shall represent trade contractor's agreement to waive their rights to offer objections or comments and to be bound to all established routing indicated in the Compliance Model.
- Obtain composite models from file transfer site and review VDC Facilitator's clash summary report. Identify your own clashes. Resolve clashes and suggest alternate routes to VDC Facilitator.
- When equipment information is not available, trade contractors will establish access and installation zones to insert in the coordination drawings.
- Indicate all sleeving / embed requirements. Provide wall penetrations for coordination with the block or skin trade contractor. Drawings should show required penetration sizes, not duct sizes. It is required to provide a 2D .dwg file, or 3D model, depending on team requirements, isolating the sleeves in your respective scope of work. All trade contractor embeds are to be modeled in 3D and included in the respective trade contractor's model file.
- Trade contractors are responsible for installing systems per the coordinated Compliance Model. Where systems are not installed per the Compliance Model, the offending trade contractor will be responsible for any costs associated with rerouting of their systems should a conflict occur with other systems.

Design Team

- The Design Team is strongly encouraged to participate in the coordination meetings to resolve spatial issues that may require design consideration.
- Upon submission of an RFI, the Design Team must formally document and transfer to the Construction Manager any design changes that occur during the model spatial coordination process.

DESIGNER/TRADE CONTRACTOR MODELING STANDARDS

General Standards

- At a minimum, models shall have the following object attributes:
  a. Component ID/Name (correspond to contract documents)
  b. Manufacturer Information
  c. Model (if applicable)
  d. Serial Number (if applicable)
  e. Component Type
  f. Component Location
  g. Input/Output Specifications
- Drawing units shall be in feet and inches.
- Model object tolerances shall be 0" unless noted otherwise. Revit project units shall be set to 1/16".
- Project Internal or Shared coordinates and grids shall be established and distributed to all team members.
- Hangers will be modeled unless otherwise specified.
- All structural supports, utility racks, catwalks, and structure, including strong back angles and unistrut supports must be modeled at full scale.
- Access zones and access panels shall be modeled for all elements requiring access including but not limited to equipment, fixtures, dampers, VAV boxes, diffusers, fan coil units, panels, etc.
- All equipment shall be modeled to its overall height, width, and depth.
- If seismic bracing for suspended elements is required by code, such bracing shall be included in the model.

HVAC Sheet Metal Standards

(PLEASE NOTE: Comments relating to access, hangers, and seismic apply to all scopes)

- All ducts, related accessories (including but not limited to standard dampers, fire dampers, VAV boxes, diffusers, turning vanes, etc.) and HVAC equipment shall be modeled.
- If item appears on a schedule and has a schedule name (AHU-1, VAV3-1, etc.) the corresponding model element shall have the same name in the model element data.
- Ducts shall be modeled to the outside face dimension of duct or duct insulation.
- Insulation shall be modeled where required.
- Hangers must be modeled, along with representation of the zone of influence of the load at each hanger. Hanger loads will be coordinated with the Structural Engineer. All coring and/or sleeving locations shall be included in the model.
- All structural supports including angles and Unistrut supports shall be modeled at full scale.
- Access zones shall be modeled for all elements requiring access including but not limited to equipment, fixtures, standard dampers, fire dampers, VAV boxes, diffusers, turning vanes, etc.
- All equipment shall be modeled to its overall height, width, and depth. All required housekeeping pads and equipment anchorage requirements shall be included in the model.
- All access panels shall be modeled, including 3D access zones above and below.
- If seismic bracing for suspended elements is required by code, such bracing shall be included in the model.
- All seismic restraints for all systems shall be designed and coordinated at the same time and included in the model during coordination, with the assistance of a common seismic anchorage consultant.

HVAC Piping Standards

- All piping, related accessories (valves, air vents, drain valves, flow meters, etc.) and HVAC equipment shall be modeled. All coring and/or sleeving locations shall be included in the model.
- Pipes shall be modeled to the outside diameter of the pipe or pipe insulation. Hangers must be modeled, along with representation of the zone of influence of the load at each hanger. Hanger loads shall be coordinated with the Structural Engineer.
- Equipment shall be modeled to its overall height, width, and depth. All required housekeeping pads and

equipment anchorage requirements shall be included in the model.

- Access zones shall be modeled for all elements requiring access including but not limited to equipment, fixtures and valves.
- All access panels shall be modeled, including 3D access zones above and below.
- If seismic bracing for suspended elements is required by code, such bracing shall be included in the model.
- All seismic restraints for all systems shall be designed and coordinated at the same time and included in the model during coordination, with the assistance of a common seismic anchorage consultant.

Plumbing and Specialty Piping Standards

- All plumbing, specialty piping, related accessories (valves, air vents, drain valves, flow meters etc.) and equipment shall be modeled.
- Pipes shall be modeled to the outside diameter of the pipe or the pipe insulation. Pipe slope shall be incorporated in the model. Hangers must be modeled, along with representation of the zone of influence of the load at each hanger. Hanger loads shall be coordinated with the Structural Engineer.
- Equipment shall be modeled to its overall height, width, and depth. All required housekeeping pads and equipment anchorage requirements are to be included in the model.
- In-wall medical gas pipe routing and terminations, medical gas panels, plumbing appliances and fixtures with domestic water, drain and vent piping shall be included in the model.
- Access zones shall be modeled for all elements requiring access including but not limited to equipment, fixtures, valves, and cleanouts.
- All access panels shall be modeled, including 3D access zones above and below.
- If seismic bracing for suspended elements is required by code, such bracing shall be included in the model.
- All seismic restraints for all systems shall be designed and coordinated at the same time and included in the model during coordination, with the assistance of a common seismic anchorage consultant.

Electrical Standards

- All conduit/MC cabling (1 1/2” dia. and larger), power feeds to equipment, switch gear, panels, junction box and pull station locations shall be modeled. Where groups of smaller conduits totaling 1-1/2” diameter or larger are located, a graphic representation of the overall dimension of the grouped conduit shall be substituted. All coring and/or sleeving locations shall be included in the model.
- For in wall coordination, electrical outlets and switch devices with conduit stub-ups indicated shall be included in the model, regardless of conduit size.
- Light fixtures with above-ceiling space requirements shall be included in the model and coordinated with reflected ceiling plan. All access zones or clearances to maintain light fixtures shall also be modeled.
- Equipment and cable tray with access zones to be included in the model. Equipment shall be modeled to its overall height, width, and depth.
- Hangers shall be modeled, along with representation of the zone of influence of the load at each hanger. Hanger loads shall be coordinated with the Structural Engineer.
- All required housekeeping pads and equipment anchorage requirements shall be included in the model.
- Equipment and junction box access zones per specification and code (whichever is greater) shall be modeled.
- All access panels shall be modeled, including access zones above and below.
- If seismic bracing for suspended elements is required by code, such bracing shall be included in the model.
- All seismic restraints for all systems shall be designed and coordinated at the same time and included in the model during coordination, with the assistance of a common seismic anchorage consultant.

Fire Protection (Sprinkler, Fire Alarm)

- All components of the fire protection system shall be modeled. All required housekeeping pads and equipment anchorage requirements are to be included in the model.
- Access zones shall be modeled for all elements requiring access including but not limited to equipment, fixtures, valves, and controllers.
- Locate all piping, valves, fire pump, and sprinkler heads. All coring and/or sleeving locations shall be included in

the model.

- All access panels shall be modeled, including 3D access zones above and below.
- Hangers will be modeled, along with representation of the zone of influence of the load at each hanger. Hanger loads will be coordinated with the Structural Engineer.
- If seismic bracing for suspended elements is required by code, such bracing shall be included in the model.
- All seismic restraints for all systems shall be designed and coordinated at the same time and included in the model during coordination, with the assistance of a common seismic anchorage consultant.

Architectural Standards/Metal Studs and Drywall

- All exterior walls, doors, windows, steps, railings, and roofs shall be modeled.
- All interior walls, including nonrated walls separating rooms, shall be modeled to finished wall.
- The trade contractor generated model shall easily differentiate rated and non-rated partitions, critical studs, horizontal framing, and backing elements with object name descriptors and/or color.
- Risers and sloped floors shall be modeled. Interior doors will be modeled to the extent that the walls that they are associated with are included in the model.
- All interior ceilings, soffits, stairs, and railings shall be modeled.
- Studs and individual layers of drywall shall be modeled. Studs may be installed in the field with changes as necessary, but stud layout for in-wall coordination objects is required.
- Doors, window leaves, and frames shall be modeled.
- The overall extent of stairs and loading docks shall be modeled; intermediate railing members shall not be modeled.
- Elevator shaft clear space shall be modeled as to the clear width, depth and height only; elevator cabs, equipment, etc. will not be modeled.
- Nominal elevator cab size and overrun shall be modeled, including hoist beam.
- Casework and blocking, including upper and lower cabinets shall be modeled.
- In the event that seismic bracing for suspended elements is required by code, such bracing shall be included in the model
- Head-of-wall conditions, king studs at doors and interior glazing, headers for all openings in partitions, corner studs, hard lid ceiling framing, acoustic ceiling framing systems, backing for casework and other partition-mounted items, won door framing and angle supports, soffit framing and lateral supports, exterior wall angles are to be included in the model
- Bracing for any metal stud system not mentioned above, but required by Code and project conditions, is to be included in the model (compression posts)
- Priority/Interference walls shall be coordinated with all trades to identify those partitions that require installation prior to MODEL systems.

Structural Standards

- All cast in place concrete, including all penetrations and openings identified in the construction documents, shall be modeled. Rebar and/or post tension cables to be modeled when necessary for the success of the project.
- All precast concrete shall be modeled to their correct geometry including structural supports, steel embeds, and leave outs for connections.
- All structural steel shall be modeled including web attachments and stiffeners.

Building Management Systems

- All controllers, actuators, valves, fixtures, conduits equipment and components shall be modeled.
- All access zones required for the maintenance of BMS system shall be included.

Owner Furnished Equipment

- Supplemental steel, Unistrut, blocking and special floor attachments shall be included in the model for coordination by the mechanical and electrical trade contractors. If a steel trade contractor is erecting the

support structure as part of their scope, then they shall be responsible for generating the initial structure model for use of the mechanical trade contractor to incorporate into the model. The accuracy and level of detail of these structures shall be to the level required for coordination only.

Design Models

Architectural Models – Provided by the Design team for reference only.

- All exterior walls systems (curtainwall, masonry, metal panels, stucco or precast), doors, frames, steps, railings and roofs shall be modeled.
- All interior walls, ceilings, and finishes, including non-rated walls separating rooms, shall be modeled to finished wall. Risers and sloped floors shall be modeled. Interior doors shall be modeled to the extent that the walls that they are associated with are included in the model.
- Infill studs and individual layers of drywall will not be modeled.
- The overall extent of stairs and loading docks shall be modeled.
- Casework representations, including upper and lower cabinets shall be modeled.
- If seismic bracing for suspended elements is required by code, such bracing shall be included in the model.

Structural Models

- All cast-in-place concrete, including all penetrations and openings identified in the construction documents, will be modeled.
- All structural precast concrete shall be modeled to their correct geometry including leave outs.
- All structural steel shall be modeled not including web attachments and stiffeners.
- Trade to model rebar and / or post tensioned cables when necessary for the success of the project.

Installation

All work shall be installed in accordance with the final coordinated 3D model.

APPENDIX D - Coordination Signoff

Coordination Signoff Agreement

Each party signing this document agrees that the referenced models are coordinated for this project and are ready for fabrication and installation.

All contractual obligations remain per the governing contracts, the BIM Addendum and BXP. The indicated areas have been coordinated as a team and all participants are expected to physically install per these coordinated models within set industry tolerances. Any deviation from the coordination models/documents will require the physical work to be removed and placed per the coordination.

SHOP DRAWINGS: All shop drawings are to be a result (derivative) of the model coordination and should match completely. Any shop drawings that were produced outside of the models are secondary and expected to be brought into conformance with the models.

ADHERENCE: If a conflict results in the field, the model/field installation drawings will be consulted and reviewed for conformance. If the conflict is a result of a trade not installing their system in the coordinated location or from information that was not modeled, it will be the responsibility of the trade at fault to move their work to the coordinated location at that trades sole cost. If this rework impacts the work of any other trade, then the party at fault will be responsible for any/all costs related to the necessary rework of other trades. Yates Construction will direct the appropriate action to be taken resulting from such a variance, in accordance with the Coordination Guidelines.

UNFORESEEN CONDITIONS: Any unforeseen conditions or changes will need to be addressed quickly, via the coordination team and the model to find the solution virtually. No field changes are allowed.

OMISSIONS: If items have been omitted from a model, were not intended to be modeled (field routed), then it is the responsibility of the installing trade to work those issues out during installation while avoiding model coordinated work. Work that is not model coordinated is to be installed after the coordinated work.

ARCHIVES: An archive copy of this model will reside onsite for all field personnel to review as needed. Any clashes remaining in the archived model are to be coordinated between the respective trades at no cost to Yates Construction or the client.

Building:_____

Project Level:_____

Area:_____

Federated Model Name/Dates: Model Name and Date*

*File continues to be modified with other levels. File is available at locked dates in Model Archive

Coordination Signoff Form

File Attachments

Author Company	Name	File Date

Known Outstanding Issues

Number	Location	Description	Trades
1.			
2.			
3.			
4.			
5.			

Sign Off

COMPANY	NAME	SIGNATURE	DATE

APPENDIX E - Owner Deliverables/Facility Management Requirements

FINAL DELIVERABLES

Record and As-Built Deliverables

Upon project completion:

- "As-Built" conditions shall be incorporated into the model files by each participant from which a "Record Set" of drawings will be created in PDF format.
- Printed copies will be made of PDF files as required by project specification.
- 3D models will also be provided in their native file format, including a model viewer if not usable in Navisworks Freedom or Autodesk BIM 360/ACC.
- Provide NavisWorks-compatible models for inclusion in a comprehensive "Record Model" assembled by Yates VDC Coordinator.

Facilities Management/Asset Management Electronic Data

If an owner contractual requirement, the specific list of assets and data associated with each asset will be defined at the beginning of the project. Throughout the lifecycle of the project, from design through construction, this data will be developed by each team member having the responsibility to do so. The owner will receive periodic reports and data deliverables to ensure what is being collected matches their needs to operate the facility. Some of the attributes collected may include:

Key Attributes:

Type	Make	Sequence of Operations
Asset ID	Manufacturer	Serial Number
ID # unique to owner	Model	Submittal Data
Floor	Notes	Validation
Room Number	O&M Hyperlink	Warranty Date
Panel Location	Parts List	Warranty Duration
Installer Contact Info	Parts Manual	Panel Source and Circuit
Installation Date	Repair Manual	

APPENDIX F - BIM Addendum (Consensus Docs 301) (TBD)

APPENDIX G - Design Team BIM Execution Plan (TBD)