

A blue-tinted photograph of a park scene. In the foreground, there is a wooden picnic table. In the background, a large tree stands next to a fountain with multiple water jets. The sky is visible through the tree branches.

Client Name Here  
Project Name Here  
Beck Project Number Here

**Building Information Modeling Execution Strategy  
Design and Construction Model Procurement and Coordination Practices  
July 25, 2013**

(Project Image Here)

## Table of Contents

<b>I.</b>	<b>Parties of the agreement.....</b>	<b>4</b>
<b>II.</b>	<b>Mission .....</b>	<b>5</b>
<b>III.</b>	<b>Overview .....</b>	<b>5</b>
<b>IV.</b>	<b>Past Precedents.....</b>	<b>5</b>
<b>V.</b>	<b>General Provisions.....</b>	<b>6</b>
<b>VI.</b>	<b>Glossary of Terms .....</b>	<b>7</b>
<b>VII.</b>	<b>Design Model Protocol .....</b>	<b>9</b>
<b>VIII.</b>	<b>Construction Model Protocol.....</b>	<b>10</b>
<b>IX.</b>	<b>Design Team Contact Information .....</b>	<b>12</b>
A.	Primary Discipline Project Contacts for each Discipline.....	12
B.	Building Information Model Manager for each Discipline .....	13
<b>X.</b>	<b>Design Model Collaboration- .....</b>	<b>14</b>
<b>XI.</b>	<b>Construction Model Collaboration.....</b>	<b>17</b>
<b>XII.</b>	<b>Project Timeline and Design Consultant Engagement.....</b>	<b>21</b>
<b>XIII.</b>	<b>Design Consultant Model Designations, and Dependencies .....</b>	<b>22</b>
<b>XIV.</b>	<b>Construction Model Designations .....</b>	<b>23</b>
<b>XV.</b>	<b>Software Platforms for use in Design Project .....</b>	<b>24</b>
<b>XVI.</b>	<b>Design Consultant Model Set Up Worksheet .....</b>	<b>25</b>
<b>XVII.</b>	<b>Design Model Dependencies .....</b>	<b>26</b>
<b>XVIII.</b>	<b>Design Model Origins and Base Points .....</b>	<b>27</b>
<b>XIX.</b>	<b>Level of Detail 100.....</b>	<b>28</b>
A.	Authorized Uses and Expectations .....	28
B.	General Modeling.....	29
C.	Civil Model .....	30
D.	Architecture.....	31
E.	Structure- .....	33
F.	Mechanical-.....	34
G.	Plumbing-.....	35
H.	Electrical .....	36
I.	Fire Protection.....	37
<b>XX.</b>	<b>Level of Detail 200.....</b>	<b>38</b>
A.	Authorized Uses and Expectations .....	38
B.	General Modeling.....	39
C.	Civil Model .....	40
D.	Architecture.....	41
E.	Structure- .....	44
F.	Mechanical-.....	47
G.	Plumbing-.....	48
H.	Electrical .....	49
I.	Fire Protection.....	50
<b>XXI.</b>	<b>Level of Detail 300.....</b>	<b>51</b>
A.	Authorized Uses and Expectations .....	51
B.	General Modeling.....	52
C.	Civil Model .....	53
D.	Architecture.....	54
E.	Structure- .....	58
F.	Mechanical-.....	61
G.	Plumbing-.....	62

H.	Electrical .....	63
I.	Fire Protection.....	64
<b>XXII.</b>	<b>Level of Detail 400.....</b>	<b>65</b>
A.	Authorized Uses and Expectations .....	65
<b>XXIII.</b>	<b>Level of Detail 500 .....</b>	<b>65</b>
A.	Authorized Uses and Expectations .....	65
B.	General Modeling (LOD 400/500) .....	66
C.	Curtain Wall and Storefront (modify).....	67
D.	Interior Partitions / Drywall (Modify) .....	68
E.	Structural Steel .....	68
F.	HVAC/Mechanical .....	69
G.	Plumbing .....	70
H.	Electrical .....	71
I.	Fire Protection.....	72
J.	Miscellaneous Systems (modify).....	73
<b>XXIV.</b>	<b>Model Element Level of Detail per Project Phase.....</b>	<b>74</b>

## Table of Contents- Information Tables

Table VIII-1- Construction Model File Formats.....	10
Table IX-1- Design Team- Discipline Primary Contacts .....	12
Table IX-2- Design Team- Discipline BIM Managers .....	13
Table X-1- Design Collaboration Manager .....	14
Table X-2- Design Collaboration Site and Frequency .....	14
Table X-3- Design Dependency Deadlines .....	14
Table XI-1- Construction Collaboration Manager .....	17
Table XI-2- Construction Collaboration Site and Frequency .....	17
Table XII-1- Design Consultant Engagement Timeline .....	21
Table XII-2- Base Model Expectations .....	21
Table XIII-1- Design Model Designations.....	22
Table XIV-1- Construction Model Designations .....	23
Table XVI-1- Design Model Set-Up Worksheet.....	25
Table XVII-1- Design Model Dependencies .....	26
Table XVIII-1- Design Model Origins and Base Point Relationships .....	27
Table XXIV-1- Model Element LOD Abbreviation List and Table .....	74

## I. Parties of the agreement

This Exhibit is incorporated into the accompanying agreement(s), dated YYYY-MM-DD:

### AGREEMENT BETWEEN:

**(Arch) Beck Architecture LLC**  
 1807 Ross Avenue  
 Suite 500  
 Dallas, TX 75201-8006

### AND ALL FOLLOWING PARTIES:

<b>(Str) Party</b> Address Line 1 Address Line 2 City, State, Zip Code	<b>(EQ) Party</b> Address Line 1 Address Line 2 City, State, Zip Code	<b>(Sub3) Party</b> Address Line 1 Address Line 2 City, State, Zip Code
<b>(M) Party</b> Address Line 1 Address Line 2 City, State, Zip Code	<b>(Code) Party</b> Address Line 1 Address Line 2 City, State, Zip Code	<b>(Sub4) Party</b> Address Line 1 Address Line 2 City, State, Zip Code
<b>(E) Party</b> Address Line 1 Address Line 2 City, State, Zip Code	<b>(Con) Party</b> Address Line 1 Address Line 2 City, State, Zip Code	<b>(Sub5) Party</b> Address Line 1 Address Line 2 City, State, Zip Code
<b>(P) Party</b> Address Line 1 Address Line 2 City, State, Zip Code	<b>(Own) Party</b> Address Line 1 Address Line 2 City, State, Zip Code	<b>(Sub5) Party</b> Address Line 1 Address Line 2 City, State, Zip Code
<b>(FP) Party</b> Address Line 1 Address Line 2 City, State, Zip Code	<b>(Sub1) Party</b> Address Line 1 Address Line 2 City, State, Zip Code	<b>(Sub6) Party</b> Address Line 1 Address Line 2 City, State, Zip Code
<b>(Civ) Party</b> Address Line 1 Address Line 2 City, State, Zip Code	<b>(Sub2) Party</b> Address Line 1 Address Line 2	<b>(Sub7) Party</b> Address Line 1 Address Line 2 City, State, Zip Code
<b>(AV) Party</b> Address Line 1 Address Line 2 City, State, Zip Code		

## II. Mission

- A. As intelligent object oriented modeling permeates the AEC industry, with it comes a myriad of tools, software's, and workflows for the various parties involved in the completion of a project. As these tools and workflows mature, additional levels of complexity are born from them: each requiring their parties to work in specific ways to leverage the power and capabilities of the Building Information Models that they are creating. When the parties come together in a collaborative environment, their workflows and standard practices must as well, so that the resulting Building Information Model can be a highly integrated, cohesive solution of consistent performance, detail, and intelligence. It is the mission of this Execution Strategy to align the standards and practices of all parties, so that the project team as a whole can leverage the full potential of the Building Information Model, minimizing on-the-fly stop-gap solution creation, and maximizing performance and return on investment for the project.

## III. Overview

- A. The Execution Strategy serves as a roadmap for all parties involved in the development of the Building Information Model for the duration of the project. It encompasses the best practices for creation of the various models, the level of detail required and the content which is necessary in those models, the parties whom are responsible for those models, and the timelines by which those models shall be procured. This Strategy also delineates the standards and collaboration techniques by which the project shall proceed, as well as the communication strategies and points of contact for all consultants on the project team.

## IV. Past Precedents

- A. The methodologies set forth in this document are the product of the team's prior experience working in the collaborative model environment, and this living document is constantly in evolution as workflows are amended and procedures are updated. In its current form, the document takes a proactive approach to delineating standards for questions that often arise during the information exchanges between parties in the team:
1. All of our models aligned, broken out, and compiled in the same coordinate system
  2. All of our models built to the appropriate prerequisites for each phase of the project
  3. All of our models are started and completed and the appropriate time
  4. All of our expectations of one another's Models are clearly defined
  5. These is no ambiguity about responsibilities in the collaborative model

## V. Objectives

- A. The Building Information Model can serve a wide variety of uses over the duration of the project, as well as the lifecycle of the built environment. The purpose of this section is to delineate expected uses for the BIM on this project, to help facilitate reasonable expectations of the model for the various uses.

**Table V-1- Objectives and Respective Model LOD**

Objective	Model LOD
<b>Concept Design / Conceptualization Phase</b>	
Design Intent Communication	100
<b>Schematic Design / Criteria Design Phase</b>	
Design Intent Communication	200
LEED Prelim Energy Analysis	200
<b>Design Development / Detailed Design Phase</b>	
Design Intent Communication	300
Coordination between Disciplines (Design)	300
LEED Prelim Energy Analysis	300
<b>Fabrication and Construction / Implementation Documents Phase</b>	
Design Intent Communication	300
Coordination between Disciplines (Design(where not superseded), Subcontractors)	400
Field Layout (Model Based- Foundations, Structure, Penetrations)	300/400
Construction Logistics and Sequencing	300
Virtual Mock Up (Prefabricated Elements)	400
<b>Facilities Operation and Maintenance</b>	
Asset Ident, Asset Properties for O+M connection to CMMS database	400
As-Built Model Turnover for O+M visualization (RVT, NWC, IFC)	400
COBie data table Turnover for O+M database connection	400

## VI. General Provisions

- A. This Exhibit establishes the protocols for Development, expected levels of detail, 3D Coordination (and the 3D coordination process), as well as authorized uses of Building Information Models on this project and assigns specific responsibility for the development of each Model Element to a defined Level of Detail at each project phase. Where a provision in this Exhibit conflicts with a provision in the Agreement into which this Exhibit is incorporated, the provision in this Exhibit will prevail.
- B. The participating parties agree to incorporate this Exhibit into any other agreement for services or construction for the project.

## VII. Glossary of Terms

- A. **Building Information Model(s)-** A Building Information Model is a digital representation of the physical and functional characteristics of the Project which encompasses building geometry, spatial relationships, geographic information, and quantities and properties of building components and is referred to in this Exhibit as the "Model(s)", which term may be used herein to describe a Model Element, a single Model, or multiple Models used in the aggregate. "Building Information Modeling" (BIM) refers to the methodology and technology used to create the Model. The following types of models will be used during the coordination effort:
  - B. **Record Model(s)-** A Record Model is a Model that reflects the As-Built condition of the Project. This Model type will be used following coordination to represent the installed condition of the Model Elements. It will include the Base Model and all Consultant/Subcontractor Model Elements.
  - C. **Design Model(s)-** The Design Model(s) are the Model's created by the Architects, Engineers, and All Consultants for the Design portion of the Project, through Construction Documentation. They incorporate and derive- the documentation of the design elements.
  - D. **Base Model(s)-** The Base Model is the Model(s) that is provided by Beck Architecture, LLC to the Consultants that includes the Architectural elements of the Design and the base coordinate system per Table X-1 in this Exhibit. The "Base Model" is the compilation listed under Arch in Table V-B-1.
  - E. **Base Construction Model(s)-** The Base Construction Model is the Model that is provided by The Beck Group to the Subcontractors that includes both the Architectural and Structural elements of the Design. This Model may be created by either The Beck Group or the Architect and Engineers of Record.
  - F. **Consultant Model(s)-** The Consultant Model is the Model containing elements pertaining to the consultant's scope of work. This Model will be linked with the Base Model and share the base model's coordinate system. The Consultants Model's shall be as listed in Table V-B-1.
  - G. **Coordination Model(s)-** The Coordination Model is the Model that is currently being reviewed by The Beck Group and the Subcontractors to resolve coordination issues. This Model will include the Base Model and all Subcontractor Model Elements.
  - H. **Master Model(s)-** The Master Model is the final Coordination Model which becomes the basis for construction on which shop drawings and field drawings are to be produced. This Model may consist of the entire Project or only an area or level of the Project.



- I. Clash Detection-** Clash Detection defines the process of effective identification, inspection, and reporting of interference clashes in a Coordination Model.
- J. Level of Detail-** The Level of Detail (LOD) describes the particular level of completeness to which a Model Element is developed by the appropriate Consultant or Subcontractor at a particular phase of the Project.
- K. Model Element-** A Model Element is a portion of the Building Information Model representing a component, system or assembly within a building or building site. For the purposes of this Exhibit, Model Elements are represented by the Construction Specifications Institute (CSI) Unifomat<sup>tm</sup> classification system in the “Table XXIV-1- Model Element LOD Abbreviation List and Table,” or by the different systems included in each Subcontractors Scope of Work.
- L. Model Element Author-** The Model Element Author (MEA) is the party responsible for developing the content of a specific Model Element to the LOD required for a particular phase of the project. Model Element Authors are identified in the “Table XXIV-1- Model Element LOD Abbreviation List and Table.”
- M. Model User-** The Model User refers to any individual or entity authorized to use the Model on the Project, such as for analysis, estimating or scheduling.
- N. Consultant-** The Consultant refers to an individual or entity with particular knowledge, expertise or experience that provides the services set forth on Exhibit “\_” attached hereto and incorporated herein by reference.
- O. NavisWorks® Freedom-** Autodesk® NavisWorks® Freedom software is the free viewer for files in the NavisWorks® NWD and 3D DWF formats. NavisWorks® Freedom is to be utilized by the Model Element Author to review clashes between Model Elements.
- P. NavisWorks® Manage-** Autodesk® NavisWorks® Manage software will be used to create a single Model of the Project from the individual Model Elements developed by the Model Element Authors to provide a real-time project view for effective 3D Coordination and 4D planning. NavisWorks® Manage provides the tools to optimize interoperability between all types of models, regardless of format or file size, and perform Clash Detection for coordination review.
- Q. COBie (Construction Operations Building Information Exchange)-** Standardized data fields, structure, and format for Asset and Building Component information to be provided within the Building Information Model for potential use in Operations and Maintenance.
- R. CMMS (Computerized Maintenance Management System)-** Operations and Maintenance Management software used for Facilities management in tracking Assets and Work/Task Orders.



## VIII. Design Model Protocol

- A. Coordination and Conflicts-** Where conflicts are found in the Model, regardless of the phase of the Project or LOD, the discovering party shall promptly notify the Model Element Author(s) and the Architect. Upon such notification, upon instruction from the Architect the Model Element Author(s) shall act promptly to mitigate the conflict.
- B. Model Ownership-** In contributing content to the Model, the Model Element Author does not convey any ownership right in the content provided or in the software used to generate the content. Unless otherwise granted in a separate license, any subsequent Model Element Author's and Model User's right to use, modify, or further transmit the Model is specifically limited to the design and construction of the Project, and nothing contained in this Exhibit conveys any other right to use the Model for another purpose.
- C. Consultant Model Requirements-** The Model shall be developed in accordance with the following:
- 1. File Formats-** The Consultant or Subcontractor shall provide Beck Architecture, LLC with a Model(s) of the formatted listed, and as named in "Table XIV-1- Design Model Designations."
  - 2. Model Congruence-** Beck Architecture, LLC will provide Consultant with the Base Model (including structural grid and architectural elements) in the format listed, and as named, in "Table XIV-1- Design Model Designations." Consultant Model shall be congruent with the Base Model.
  - 3. Level of Detail-** The Consultant's Model Elements shall include, at a minimum: systems and components modeled to a Level of Detail required for specific Scopes of Work as shown in "Table XXIV-1- Model Element LOD Abbreviation List and Table."
  - 4. Coordination-** The Consultant's Model Elements are to be coordinated with the current Base Model prior to submitting to Beck Architecture, LLC, which shall include without limitation resolution of all clashes within the Consultant's modeled elements. Consultant's coordination shall require accommodating all Consultant model elements to the model elements of the Base Model, as well as all other Consultant model elements.
  - 5. Conflict Corrections-** The Model Element Authors will be responsible for promptly correcting all Model Element conflicts.
  - 6. Model Delivery-** The Consultant is responsible for updating the Consultant Model using the Collaboration methods and frequency defined in "Table XI-2- Design Collaboration Site and Frequency" of this Exhibit. Consultant is responsible for providing a completed model by the Dependency Deadline (Table XI-3- Design **Dependency Deadlines**) with the modeled items as they will appear at the milestone deadline.
  - 7. Model Archives-** The Consultant is responsible for maintaining a record copy of each file sent to Beck Architecture, LLC.

## IX. Construction Model Protocol

- A. Kick-Off Meeting-** After award of Contract, Beck will call a meeting to discuss 3D Coordination protocol. All MEP Subcontractors will be required to attend. Attendees should include at least one member of the 3D modeling team from each Subcontractor. This meeting will review coordination requirements as well define the coordination process.
- B. Trainings-** Beck will provide basic NavisWorks® training for all coordination teams. This training will occur approximately 2 – 3 weeks prior to the first coordination meeting and will be held at Beck's job trailer located at the project jobsite.
- C. Subcontractor Model Requirements-** The Subcontractor will deliver a Model that is complete. Any elements not included will become the Subcontractor's responsibility to coordinate in the field at no additional cost.
- D. File Formats-** The Subcontractor shall provide Beck with a Model in a format acceptable to NavisWorks®. Beck would prefer to receive a DWG when possible, however all file types mentioned in "Table IX-1- Construction Model File Formats" are acceptable.

**Table IX-1- Construction Model File Formats**

Format	Extension
NavisWorks	.nwd .nwf .nwc
AutoCAD	dwg, .dxf, .sat
MicroStation (SE & J)	.dgn .prp .prw
3D Studio	.3ds .prj
ASCII Laser File	.asc .txt
ACIS SAT	.sat
DWF	.dwf
Faro	.fls .fws .iQscan .iQmod .iQwsp
IFC	.ifc
IGES	.igs .iges
Informatix	.man .cv7
Inventor	.ipt .iam. ipj
Leica	.pts .ptx
PDS Design Review	.dri
Riegl	.3dd
RVM	.rvm
SketchUp	.skp
STEP	.stp .step
STL	.stl
VRML	.wrl .wrz
Z+F	.zfc .zfs

- E. Model Origin-** Beck will provide Subcontractor with the Base Construction Model (including structural and architectural elements) in DWG and NWD formats. Subcontractor will be responsible for modeling their scope Model Elements on the base coordinate system set by Beck in the Base Construction Model.
- F. Model Element Clearances-** Subcontractor to provide a list of minimum typical clearances for all Model Elements by completing the Coordination Clearance Sheet appended to this Exhibit.
- G. Object Enablers-** Subcontractor to provide all Object Enablers (OE) required for custom objects to be displayed correctly outside of the Subcontractor's authoring application software. The OE will be installed on Beck and other coordination team member's machines in order to read the Subcontractor's DWG output file correctly. The OE 'translates' the custom objects into a language that other software applications understand.
- H. Level of Detail-** The Subcontractor's Model Elements shall include, at a minimum: all systems and components modeled to a Level of Detail consistent with objects represented by a 1/8" plan/elevation/section drawing. For additional information on the Level of Detail required for specific Scopes of Work see "Table XXIV-1- Model Element LOD Abbreviation List and Table."
- I. Internal Coordination-** The Subcontractor's Model Elements shall be internally coordinated prior to submitting to Beck. Internal Coordination should include all elements of the Base Construction Model as well as all Subcontractors' Scope of Work.
- J. Conflict Corrections-** The Model Element Authors is responsible for promptly correcting all Model Element conflicts discovered during Weekly Coordination meetings.
- K. Record Model Elements-** Upon completion of Coordination, the Subcontractor is to provide a Record Model on a monthly basis throughout the installation of the Work. Model Elements shall be updated to include changes made by 1) Requests for Information, 2) design changes by Architect / Engineer, 3) Submittal comments and revisions on approved shop drawings, and 4) As-Built field modifications.

## X. Design Team Contact Information

### A. Primary Discipline Project Contacts for each Discipline-

1. The party listed below for each trade is the Primary Contact for all discipline related decision making and participation for the Project. They should be in constant communication with the disciplines project team, and aware of the goings on of the project at all times.
2. If more than one listed, put Primary at top of list per Discipline, etc.
3. Decision maker for Discipline pertaining to Disciplines responsibilities
4. Decision maker for Contractual issues for that Discipline
5. Party responsible for Disciplines Contract Documents
6. Party Responsible for all Requests for Information
7. Party responsible for assuring Disciplines Content has accomplished the appropriate Level of Specificity and Detail for each Project Phase
8. Contact for Discipline Specific information when needed from other Consultants
9. Contact for questions regarding Product Specifications
10. Party responsible to resolve Coordination Issues

**Table X-1- Design Team- Discipline Primary Contacts**

Disc.	Company	Contact Name	Role / Position	Email	Telephone
Arch					
Str					
M					
E					
P					
FP					
Civ					
AV					
EQ					
Code					
Con					
Own					

## B. Building Information Model Manager for each Discipline

1. If more than one listed, put Primary at top of list per Discipline, etc.
2. Contact for obtaining updated Models for the Discipline
3. Contact for troubleshooting Model specific issues (Visibility, improper worksets, erroneous modeled objects, Model settings, etc)
4. Party responsible for maintaining all BIM standards throughout the Model
5. Party responsible for assuring Disciplines Content has been modeled to the appropriate Level of Detail according to the Level of Detail Matrix, per Project Phase
6. Party responsible for submitting Models to the team at the appropriate milestones
7. Party responsible for obtaining other Disciplines Models and incorporating them locally, at the appropriate milestones
8. Party responsible for handling all Software upgrades, Model Upgrades, and hardware upgrades over the Project Duration
9. Party responsible for maintaining the integrity of the BIM, including: Warnings, Workset validation, File and Link Structure

**Table X-2- Design Team- Discipline BIM Managers**

Disc.	Company	Contact Name	Role / Position	Email	Telephone
Arch	The Beck Group	Aaron Maller	BIM Manager	aaronmaller@beckgroup.com	315-416-5692
Str					
M					
E					
P					
FP					
Civ					
AV					
EQ					
Con					

## XI. Design Model Collaboration-

- A. Design Collaboration Manager-** The Design Collaboration Manager shall oversee and maintain the Collaboration Tools and Sites being used for Model Transfers between Consultants, including Federating the model for transmittal to the Owner. In the event the Collaboration/Transfer Mechanisms are not available, the Collaboration Manager should be immediately notified.

**Table XI-1- Design Collaboration Manager**

Disc.	Company	Contact Name	Role / Position	Email	Telephone
Arch	The Beck Group	TBD	TBD		

- B. Collaboration Method-** The Project team shall use the Collaboration Site listed below, with the Credentials provided by the Collaboration Manager listed in "Table XI-1- Design Collaboration Manager," for transferring Consultant Models and all other documents to the Project Team.

- C. Collaboration Notifications-** Consultants shall send a notification to the BIM Managers in "Table X-2- Design Team- Discipline BIM Managers" when they have uploaded their Consultant Model to the Collaboration Site. They shall include the attached Collaboration Transmittal Exhibit, delineating major change notifications. Consultants should use this form to make the Project Team aware of areas they anticipate major rework in, so Consultants may avoid Progress in that area, resulting in further rework.

**Table XI-2- Design Collaboration Site and Frequency**

Collaboration Site	Days of Week	Time
www.box.net	M, W, F	Noon

**D. Collaboration Submissions-**

1. Native Consultant Authoring Model (Revit, Civil3D, AutoCAD)
2. Document Set in Document File
  - a. Single DWF / PDF File for each Trade
3. Collaboration Transfer Transmittal

**Table XI-3- Design Dependency Deadlines**

Submission Name	Date	Dependency Deadline
SD / Crit Des	TBD	(3 Business days Prior)
DD / Det Des- 50%	TBD	(3 Business days Prior)
DD / Det Des-100%	TBD	(3 Business days Prior)
CD / Imp Doc-75%	TBD	(5 Business days Prior)
CD / Imp Doc-100%	TBD	(5 Business days Prior)

- E. Bi-Weekly Coordination Meetings-** The Design Consultants shall be prepared to accommodate Bi-Weekly Coordination meetings to resolve model conflicts. The bi-weekly meetings will take place at the University of Tampa. Attendees should include at least one Model Element Author from each Subcontractor who clearly understands the defined Scope of Work. During each meeting the current Coordination Model will be reviewed by virtually walking the Project.
- F. Model Coordination Strategy-** The Design Coordination process will occur as a 3D navigation of the occupiable spaces (and selected non-occupiable spaces), in a combined NWF format of the compiled submitted NWC files. Meeting minutes shall be kept, delineating each issue identified which requires an alteration, and the party required to make the alteration. Element level Collision Detection will not be performed until the Subcontractor Models have succeeded the Design Models (see Construction Model Collaboration for a full detailing of this process). **Note: Element Level Collision detection may be performed for identifying Issues and Issue Locations efficiently, but Clash Reports will not be tracked at the element level until Subcontractor Models are present and pre-subcontractor models have been relieved.**
- G.** Where possible, the NWC Files should reference “Table XII-3- Coordination Zone Matrix.” Otherwise, one NWC per Discipline should be provided.
- H.** Meeting minutes are to be posted to the Collaboration site, for all parties to download, review and make the required changes. See “Table XI-4- Design Model Collaboration- Meeting Minute Sheet Format.”
- I.** Meeting minutes will include (in table format): Location, Issue, Issue View, party responsible for alteration, and proposed alteration (if any).
- J.** Meeting minutes shall be a progressing living document, being updating in each meeting to review past issues, and new issues encountered during the Virtual Walkthrough.
- K. “Issue” Views-** Viewpoints are to be saved in the Navisworks file, at any requested area where parties are identified as needing to perform alterations. An NWD file is to be published at the end of each Bi-Weekly Coordination Meeting, and to be published to the Collaboration site with the Meeting Minutes.



**Table XI-4- Design Model Collaboration- Meeting Minute Sheet Format**

## Design Collaboration Meeting

**Project Name:**

**Project Number:**

**Date / Time:**

**Attendees:**

[illegible]

## XII. Construction Model Collaboration

**A. Construction Collaboration Manager-** The Construction Collaboration Manager shall manage the Coordination Model and Coordination Process throughout the duration of the Project. Responsibilities include- but are not limited to:

1. Provide a Typical Plenum Hierarchy Diagram
2. Provide a detailed schedule for 3D coordination, aligned with the Project Schedule (will be issued at the time of the NavisWorks coordination meeting.)
3. Collect Incoming Models from the Collaboration Site
4. Coordinate the submission and exchange of Models
5. Validate that files are complete and useable in compliance with the applicable protocols
6. Maintain a Record Copy of each file received
7. Create and Publish the Coordination Model for the Project teams viewing
8. Manage Weekly Coordination Meetings
9. Perform Clash Detection between Trades
10. Maintain the Coordination Model, Master Model, and Record Model through the Project Duration

**Table XII-1- Construction Collaboration Manager**

Disc.	Company	Contact Name	Role / Position	Email	Telephone
Con.	The Beck Group	TBD	Project Administrator	TBD	TBD

**B. Collaboration Method-** The Project team shall use the Collaboration Site listed below, with the Credentials provided by the Construction Collaboration Manager listed in "Table XII-1- Construction Collaboration Manager," for transferring Consultant Models and all other documents to the Project Team.

**C. Coordination Submissions-** The Subcontractor is to issue weekly Models on the day specified in "Table XII-2- Construction Collaboration Site and Frequency." (Subcontractor will be required to issue a test model to Beck four weeks prior to the first coordination meeting to confirm that the coordination requirements are being met.) Beck will combine all Subcontractor Models to create the Coordination Model.

**Table XII-2- Construction Collaboration Site and Frequency**

Collaboration Site	Days of Week	Time
<a href="http://www.box.net">www.box.net</a>	M	Noon

**D. Weekly Coordination Meetings-** The Subcontractor shall be prepared to accommodate Weekly Coordination meetings to resolve model conflicts. The weekly meetings will take place on the jobsite at a location and time to be determined after award of Contract. Attendees should include at least one Model Element Author from each Subcontractor who clearly understands the defined Scope of Work. During each meeting the current Coordination Model will be reviewed by virtually walking the Project, conflicts between Subcontractors will be found and given a clash number, and each conflict will be discussed with all parties in order to determine the best solution. (Weekly Coordination Meetings may be conducted via LiveMeeting depending on the location and accessibility of the jobsite by the Subcontractors. This will be determined by Beck on a weekly basis and will be based on the productivity of past online meetings.)

- E. Model Coordination Strategy-** The Coordination Models will be segregated in to Levels and Zones (see "Table XV-1- Construction Model Designations"), and coordinated according to "Table XII-3- Coordination Zone Matrix" provided in this Section. The Matrices will define Zones based on the Critical Path of the project, to ensure efficient progress on the jobsite. Within each Zone, Coordination will proceed according to "Table XII-4- Coordination Discipline Priority Matrix." For each Pair of Disciplines to coordinate, priority will be given to the Discipline listed as Discipline 1. Once a Discipline has completed its coordination as "Discipline 1," they are to sign off that their model in that zone is finalized. Once a Zone is finalized, all parties will sign off, for Installation work to begin. Only when the Critical Path of the project is affected will coordination deviate from the Zone and Priority Order.

**Table XII-3- Coordination Zone Matrix**

Zone	Desired Date of Completion
Level 3- Zone 1	6/14/2012

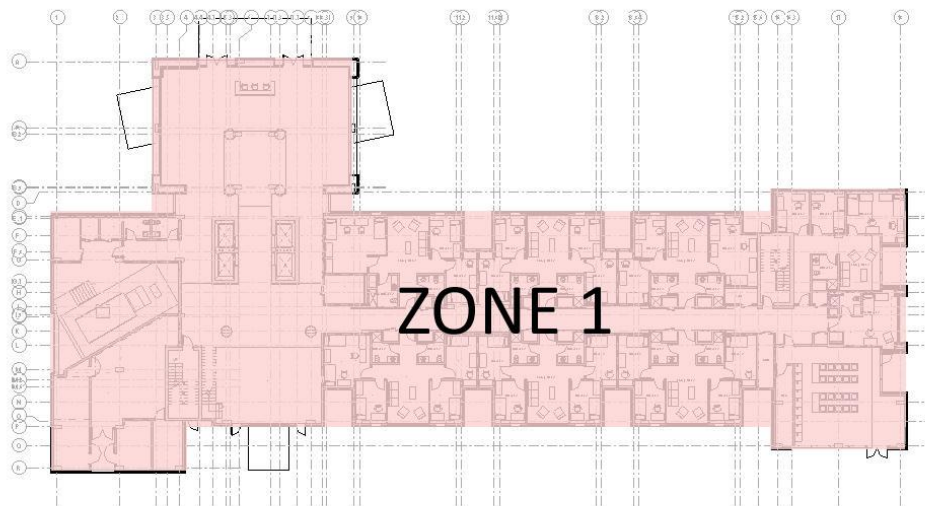


Table XII-4- Coordination Discipline Priority Matrix

Discipline 1 (priority)	Discipline 2	Notes
Structure	Civil / Utility	(Level 1 only)
Civil/Utility	Hardscape	(Level 1 only)
Structure	M/E/P/FP	
Drain Lines / Gravity Sloped (P)	M/E/P/FP	
Mechanical	E/P/FP	
FP	P/E	
P	E	
Arch (Fire/Smoke)	M/E/P/FP	For Reference

- F.** Clash Views- Viewpoints will be set up in NavisWorks to illustrate all conflicts between trades. These Clash Views will be noted and marked-up to define the responsibilities of each Subcontractor involved.
- G.** Clash Detection- During or immediately following the Weekly Coordination meetings, Beck will perform Clash Detection tests using NavisWorks to find any and all conflicts that were not found while virtually walking the Project. These conflicts will be given Clash numbers and will be added to the Clash Views to be corrected by the Subcontractors. As mentioned previously, the Subcontractor is responsible for performing his own internal coordination between their scope and the Base Model.
- H.** Model Distribution- After reviewing the Coordination Model and performing Clash Detection tests, Beck will provide the Coordination Model to each Subcontractor for their review and use to make updates to their Model Elements. This model will be distributed in the NavisWorks® NWD file type. This file type is compatible with NavisWorks® Freedom, the free viewer provided by Autodesk®. All Clash Views and mark-ups can be viewed using this software.
- I.** Master Model- After all conflicts have been corrected and/or Beck and the Subcontractors agree that the area defined by the Coordination Model has been sufficiently coordinated, all parties will sign-off on the defined area using the attached 3D Coordination Sign-Off Sheet. This final Coordination Model then becomes the Master Model for the defined area. The Subcontractor agrees to be responsible for locating their respective systems based on the Master Model. Any variation to this Master Model must be coordinated with Beck. Components that are installed in conflict with the Master Model layout and create obstacles or additional work for other disciplines shall require one of the following: a) removal and reinstallation per model, or b) monetary compensation to the affected party.
- J.** Shop Drawing Submittal- Shop Drawing submittals to the engineer/architect shall be provided as required by the specifications and are to be based on the approved Master Model. These submittals are to be issued following the completion and sign-off of the Coordination Model for the designated area.
- K.** Record Model- Upon completion of Coordination, the Subcontractor is to provide a Record Model per the requirements in "K." Beck will continue to run Clash Detection tests on the Record Model conditions to insure proper installation of systems in relation to the Base Model and other Subcontractor systems. If conflicts are found, the Subcontractor will be notified immediately.
- L.** Model Ownership- Unless given specific permission to use for other purposes, the Model is to be used specifically for the design, coordination, fabrication, and construction of the Project, and nothing contained in



this Exhibit grants permission to use the Model for any other purpose. By submitting content for the Model, Beck and the Subcontractor does not grant any ownership right in the content provided or in the software used to produce content.

### XIII. Project Timeline and Design Consultant Engagement

- A. "Table XIII-1- Design Consultant Engagement Timeline" demonstrates what Phase of the Project each consultant will be engaged at, and what platform they will be working in during that phase. Phases marked with "D" mean that work in that phase may be Drafted, or may be represented by One-Line Diagrams, Zone Diagrams, Spreadsheets, or other non-model and pre-model data.

**Table XIII-1- Design Consultant Engagement Timeline**

Disc.	Prog / Concept	Sd / Crit Des	DD / Det Des	CD / Imp Doc	CA / Const
Arch	RAC 2013	RAC 2013	RAC 2013	RAC 2013	RAC 2013
Str	---	RAM / RST 2013	RST 2013	RST 2013	RST 2013
M	---	D	RME 2013	RME 2013	RME 2013
E	---	D	RME 2013	RME 2013	RME 2013
P	---	D	RME 2013	RME 2013	RME 2013
FP	---	D	RME 2013	RME 2013	RME 2013
Civ	---	D	Civil 3D 2013	Civil 3D 2013	Civil 3D 2013
AV	---	---	---	AutoCAD 3D	AutoCAD 3D
EQ	---	---	---	AutoCAD 3D	AutoCAD 3D
Code	---	D	D	D	RAC 2013
Con	---	---	Navis / Horiz	Navis / Horiz	Navis / Horiz

- B. "Table XIII-2- Base Model Expectations" demonstrates what each Consultants expectations are for a Base Model, prior to their engagement in the Project. Failure of the Responsible Party to provide the appropriate Base Model by the Date Expected may result in a delay for the Consultant to procure their work by an expected deadline.

**Table XIII-2- Base Model Expectations**

Disc.	Requirement to Start	Level of Detail	Responsible Party	Date Expected
Arch	BIM Execution	Complete	All	TBD
Str	Prelim Shell and Column Layout	100	Arch	TBD
M	Shell, Floor Plans, RCP's	200	Arch	TBD
FP	Prelim Shell and Space Plan	200	Arch	TBD
Civ	Shell, Floor Plans	200	Arch	TBD
AV	Shell, Floor Plans, RCP's	300	Arch	TBD
Civ	Building Envelope	300	Arch	TBD
Code	Interior Spaces	200	Arch	TBD
Con	Interior Spaces	200	Arch, Str, M, E, P, FP, Civ	TBD
Code	Floor Plans	200	Arch	TBD
Con	DD Models	200	Arch, Str, M, E, P, FP, Civ	TBD

## XIV. Design Consultant Model Designations, and Dependencies

- A.** "Table XIV-1- Design Model Designations" delineates the Consultant Models that each party will produce for the project, and each Platform used in the production.
- B.** Deliverable Dependencies list all Consultants that are Live Linked / Live Referenced in to that Consultants Model. These models must be provided (in their final form) to the Consultant at the Dependency Deadline, prior to each Project Milestone Deadline, allowing for minor reconciliations prior to each Consultant submitting their Milestone Submission. Changes affecting Consultants shall not occur between the Dependency Deadline and the Milestone deadline.

**Table XIV-1- Design Model Designations**

Disc.	Model(s)	Software	Deliverable Dependencies
Arch	Project-Arch-Base-RAC2013.rvt Project-Arch-Area 2-RAC2013.rvt Project-Arch-Site-RAC2013.rvt	RAC 2013 RAC 2013 RAC 2013	Str, M, E, P, FP, AV, C
Str	Project-Str-Base-RST2013.rvt Project-Str-Area 2-RST2013.rvt	RST 2013 RST 2013	Arch
M	Project-M-Base-RME2013.rvt Project-M-Area 2-RME2013.rvt	RME 2013 RME 2013	Arch
E	Project-E-Base-RME2013.rvt Project-E-Area 2-RME2013.rvt	RME 2013 RME 2013	Arch
P	Project-P-Base-RME2013.rvt Project-P-Area 2-RME2013.rvt	RME 2013 RME 2013	Arch
FP	Project-FP-Base-RME2013.rvt Project-FP-Area 2-RME2013.rvt	RME 2013 RME 2013	Arch
Civ	Project-Civ-Site-C3D2013.dwg	Civil 3D 2013	Arch
AV	Project-AV-Base-ACAD2013.dwg Project-AV-Area 2-ACAD2013.dwg	AutoCAD 2013 AutoCAD 2013	Arch
EQ	Project-EQ-Base-ACAD2013.dwg	AutoCAD 2013	Arch
Code	(PDF)	---	Arch
Con	Project-Con-Base-Nav2013.nwf	Navisworks 2013	Arch, Str, M, E, P, FP, Civ



## XV. Construction Model Designations

- A. "Table XV-1- Construction Model Designations" delineates the Construction Models that each party will produce for the project, and each Platform used in the production.

**Table XV-1- Construction Model Designations**

Disc.	Model(s)	Software
Arch (Design)	Project-Arch-Base-RAC2013.nwc Project-Arch-Area 2-RAC2013.nwc Project-Arch-Site-RAC2013.nwc	RAC 2013 RAC 2013 RAC 2013
Con- Curtain Wall	Project-Con-CWall.dwg	AutoCAD 2013
Con- Partitions	Project-Con-IntPartitions.nwc	RAC 2013
Str (Design)	Project -Str-Base-RST2013.rvt	RST 2013
Con- Steel Detailing	Project-Str-Base-RST2013.rvt Project-Str-Area 2-RST2013.rvt	RST 2013 RST 2013
Con- Steel Detailing	Project-Con-SteelFab.sat	RME 2013
Con- Mech Ducts	Project-M-Base-RME2013.rvt Project-M-Area 2-RME2013.rvt	RME 2013 RME 2013
Con- Electrical Serv	Project-Con-DuctModel.dwg	AutoCAD 2013
Con- Plumbing	Project-E-Base-RME2013.rvt Project-E-Area 2-RME2013.rvt	RME 2013 RME 2013
Con- Electrical Serv	Project-Con-Electrical.dwg	AutoCAD 2013
P (Design)	Project-P-Base-RME2013.rvt Project-P-Area 2-RME2013.rvt	RME 2013 RME 2013
Con- Plumbing	Project-Con-Plumbing.dwg	Civil 3D 2013
FP (Design)	Project-FP-Base-RME2013.rvt Project-FP-Area 2-RME2013.rvt	RME 2013 RME 2013
Con- Sprinkler Shop	Project-Con-SprinklerModel.dwg	AutoSprink
Civ (Design)	Project-Civ-Site-C3D2013.dwg	Civil 3D 2013
AV (Design)	Project-AV-Base-ACAD2013.dwg Project-AV-Area 2-ACAD2013.dwg	AutoCAD 2013 AutoCAD 2013
EQ (Design)	Project-EQ-Base-ACAD2013.dwg	AutoCAD 2013

## XVI. Software Platforms for use in Design Project

**A.** All Consultant Models are to be created in the Software Platform Build Versions Listed below:

**1. Autodesk Revit Platforms**

- a. Autodesk Revit Architecture 2013 (Update Release 1)- 20120716\_1115(x64)
- b. Autodesk Revit Structure 2013 (Update Release 1)- 20120716\_1115(x64)
- c. Autodesk Revit MEP 2013 (Update Release 1)- 20120716\_1115(x64)

**2. Autodesk AutoCAD Platforms**

- a. Autodesk Civil 3D 2013
- b. Autodesk AutoCAD Architecture 2013

**3. Collaboration Platforms**

- a. Autodesk Design Review 2013
- b. Autodesk Navisworks Manage 2013

**B.** No consultant shall proceed to a new version, new service pack, new build, or new update, without following the procedure outlined herein:

- 1. Notifying ALL Building Information Model managers in "Table X-2- Design Team- Discipline BIM Managers" about the potential to upgrade
- 2. Receiving a Consensus from ALL Building Information Model managers in "Table X-2- Design Team- Discipline BIM Managers" that proceeding with upgrade is acceptable
- 3. Notifying ALL Building Information Model managers in "Table X-2- Design Team- Discipline BIM Managers" of the date of upgrade
- 4. Archive all Models PRIOR to Archive
- 5. Complete FULL Project Team Model Exchange per Model Transfer Guidelines, immediately following upgrade
- 6. Receive confirmation from ALL Building Information Model managers in "Table X-2- Design Team- Discipline BIM Managers" that there have been no adverse effects from the Model Upgrade.

**C.** Consultants upgrading or using Platforms not listed above without following the procedures outlined above will be responsible for the time costs incurred to each Consultant as a result of the upgrade, or will be required to return to a model from pre-upgrade to continue working with, at no cost to the Project Budget.

## XVII. Design Consultant Model Set Up Worksheet

- A. All Consultants shall fill out worksheet denoting internal Modeling Strategy, and submit it to the Collaboration Manager, who will distribute them to the entire team, for Model Sharing.

Table XVII-1- Design Model Set-Up Worksheet

General Model Data	
Discipline	Architectural Model
Model Name	Fill in
Workshared	Y/N
Model Phasing (For Phase Mapping)	
Annotation 1	<i>Internal use- Consultants disregard</i>
Annotation 2	<i>Internal use- Consultants disregard</i>
Annotation Demo	<i>Internal use- Consultants disregard</i>
Existing	Existing Conditions as Documented
Phase 1	Bid package 1
Phase 2	Bid Package 2
Workset Name	Content
Arch-Bldg-Shell	Exterior Building Envelope elements, including Roof
Arch-Bldg-Podium-Interior	Interior Floor Specific Elements on Floors 1-5
Arch-Bldg-Worship-Interior	Interior Worship Room specific Elements (Floors 2-4)
Arch-Bldg-Worship-Seating	<i>Interior Worship Seating- Consultants Disregard</i>
Arch-Bldg-Tower-Interior	Interior Floor Specific Elements on Floors 6-14
Arch-Bldg-Vertical Circ	Interior Vertical Circulation Elements (All Floors)
Link-Structure	<i>Linked Model- Structure- Consultants Disregard</i>
Link-M	<i>Linked Model- Mechanical- Consultants Disregard</i>
Link-E	<i>Linked Model- Electrical- Consultants Disregard</i>
Link-P	<i>Linked Model- Plumbing- Consultants Disregard</i>
Link-FP	<i>Linked Model- Fire Protection- Consultants Disregard</i>
Link-AV	<i>Linked model - Audio and Video Equipment- Consultants Disregard</i>
Link-EQ	<i>Linked Model- Equipment Manufacturer- Consultants Disregard</i>
Link-Arch-Site	<i>Linked Model- Topography by Architecture- Consultants Disregard</i>

## XVIII. Design Model Dependencies

- A.** Model Objects defined in the "Elements" column are items that occur in multiple disciplines Building Information Models.
- B.** Consultant listed as "1st party- Dim Control" is responsible for declaring the location of the Element in their model, for 2nd Parties to Reference in their models. Coordination issues or Conflicts with the Dimensional Location of the objects should be brought to the First party so they shall work with the Consultants to form a solution and relocate the elements.
- C.** Consultants listed as "2nd party- Dim Control" are parties referencing the Dimensional Locations from the 1st party model, and as such **shall be notified by 1st party whenever a change to these items occurs. Copy / Monitor shall not be used as a substitute for proper correspondence and notification, but as a supplement.**
- D.** Consultant listed as "1st Party- Spec" is responsible for declaring the Specifications and Selections of the Elements. If no party is listed as "1st Party- Spec" the 1st Party Spec shall be the same as the 1st Party listed for "1st Party- Dim Control."
- E.** Consultants listed as "2nd party- Spec" are parties referencing the Specified Models from the 1st party model, and as such **shall be notified by 1st party whenever a change to these items occurs. Copy / Monitor shall not be used as a substitute for proper correspondence and notification, but as a supplement.**
- F. Reference Types:**
- 1. Ref- Referenced / Linked from Consultant Model only** - Shall be used where possible
  - 2. CM- Copy / Monitored, or Monitored-** Shall be used where alterations of copies or Live instances are necessary in the Consultant Model
  - 3. C- Copied, Pasted, Unmonitored-** Shall be used only where necessary due to Collaboration limitations

**Table XVIII-1- Design Model Dependencies**

Elements	1st party- Dim Control	2nd Party- Dim Control	Ref.	1st party- Spec	2nd party- Spec	Ref
<b>Levels</b>	Arch	Str, M, E, P, FP, Civ	CM	---	---	---
<b>Grids</b>	Arch	Str, M, E, P, FP, Civ	CM	---	---	---
<b>Walls</b>	Arch	Str, M, E, P, FP, Civ	Ref	---	---	---
<b>Struct. Slabs/Roofs</b>	Arch	Str	CM	Str	Arch	Ref
<b>Struct. Walls</b>	Arch	Str	CM	Str	Arch	Ref
<b>Light Fixtures</b>	Arch	E	C			
<b>Elect. Receptacles</b>	Arch	E	Ref			
<b>Plumbing Fixtures</b>	Arch	P	C	P	Arch	Ref
<b>Mechanical Diff / Grilles</b>	Arch	M	CM	M	Arch	Ref
<b>Sidewalks</b>	Civ	Arch	C			
<b>Parking</b>	Civ	Arch	C			

## XIX. Design Model Origins and Base Points

Table XIX-1- Design Model Origins and Base Point Relationships

Disc.	Model(s)	Origin Type	Acquire From
<b>Arch</b>	Project-Project-Arch-Base-RAC2013.rvt Project-Arch-Area 2-RAC2013.rvt Project-Arch-Site-RAC2013.rvt	Shared Shared Shared (Master)	Project-Arch-Site-RAC2013.rvt Project-Arch-Site-RAC2013.rvt ---
<b>Str</b>	Project-Str-Base-RST2013.rvt Project-Str-Area 2-RST2013.rvt	Shared Shared	Project-Arch-Base-RAC2013.rvt Project-Arch-Area 2-RAC2013.rvt
<b>M</b>	Project-M-Base-RME2013.rvt Project-M-Area 2-RME2013.rvt	Shared Shared	Project-Arch-Base-RAC2013.rvt Project-Arch-Area 2-RAC2013.rvt
<b>E</b>	Project-E-Base-RME2013.rvt Project-E-Area 2-RME2013.rvt	Shared Shared	Project-Arch-Base-RAC2013.rvt Project-Arch-Area 2-RAC2013.rvt
<b>P</b>	Project-P-Base-RME2013.rvt Project-P-Area 2-RME2013.rvt	Shared Shared	Project-Arch-Base-RAC2013.rvt Project-Arch-Area 2-RAC2013.rvt
<b>FP</b>	Project-FP-Base-RME2013.rvt Project-FP-Area 2-RME2013.rvt	Shared Shared	Project-Arch-Base-RAC2013.rvt Project-Arch-Area 2-RAC2013.rvt
<b>Civ</b>	Project-Civ-Site-C3D2013.dwg	State Plane	---
<b>AV</b>	Project-AV-Base-ACAD2013.dwg Project-AV-Area 2-ACAD2013.dwg	(OTO) (origin)	Exports
<b>EQ</b>	Project-EQ-Base-ACAD2013.dwg	Project	Project-Arch-Base-RAC2013.rvt
<b>Code</b>	(PDF)	200	Arch
<b>Con</b>	Project-Con-Base-Nav2013.nwf	Project Shared	Exports Project-Arch-Site-RAC2013.rvt

**Master Site Origin Point:**

**Survey Point (0,0,0)**

**Base Point (0,0,0)**

## XX. Level of Detail 100

### A. Authorized Uses and Expectations

1. **Construction-** Model shows basic Design Intent for Major Modeled Elements. Model shall not be used to represent Constructed Elements.
2. **Coordination-** Items in the model represent the systems and items to be used as the Design Develops, and may vary in dimensions, precise locations, and quantities. Coordination shall consist of basic area and space protection only.
3. **Analysis-** The Model may be analyzed for performance of selected systems based on approximate Area calculations from the model, as well as performance criteria.
4. **Cost Estimating and Quantities-** The Model may be used to develop Quantity Takes Offs and Cost Estimates based on approximate Area calculations and system quantities (Walls in length), although specifications and sub-system quantities (Specific Wall Types) will change throughout the Project.
5. **Schedule and Sequence-** The models submitted by the Design Teams will have the Packages of the Design Documents determined, but elements in the Model may not yet be sequenced on the correct Package.
6. **Other Authorized Uses** (reserved)

## B. General Modeling

1. **Detail Items-** Detail lines, Filled Regions, and Detail Components shall not be used for any object in the model. Symbolic Lines within Component Families may be used (as components report counts and data). 3D generic geometry may be used in some locations, but shall always occupy the maximum dimensions of the object it's representing. (They shall be used for Object detailing, I.E. objects covered under "Shall not be modeled")
2. **Native Object Components-** Model Components shall be Native to the Revit platform. Components shall not consist of .dwg, .skp, .obj, .sat imports, within Revit Components, as this requires further management under "Imports in Families"
3. **Categories-** In general, Model Object Categories shall be respected (Not using floor categories for walls, etc). Any exceptions needed should be outlined in the "Category Exceptions" table, to make all parties aware.
4. **Dimensional Standards and Accuracy-** Project Units and Dimension Styles shall all be set to a 1/256" Level of Accuracy. Dimensions are not to be overridden with Dimensional Values, and overrides shall be limited to use in situations requiring notes to reference other areas, or existing. Where notes to "verify existing" or "verify measurements" are used, updated Design Models may be requested (with correct dimensional control) after verification on site, for coordination purposes.



## C. Civil Model

### 1. Civil (General)

- a) **Civil Model scope** to include all Site Utilities, terminating at boundary of 5 foot zone around perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) **Non Utility Civil Model** Scope to terminate directly at perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum), including:
  - i. Hardscape Elements
  - ii. Planting features (Generically)
  - iii. bollards, site signage, site lighting (Generically)
  - iv. Site Fencing
  - v. Property Lines
  - vi. Parking and Drive Lane striping (Generically)
- c) Site Utilities-
  - vii. Site utilities may be shown generically

## D. Architecture

### 1. Architecture (General)

- a) Architectural Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) Where Roof overhangs, eaves, architecturally treated site coverings, shelters, canopies, walkways, or elements are present, perimeter to include these items plus 5 foot zone around perimeter of farthest reaching extents of elements on the site plan.

### 2. Walls-

- a) Walls may be Generic in Type, but shall still distinguish between Interior and Exterior Partitions.
- b) Curtain Walls / Storefronts shall be set to Automatically Embed
- c) Curtain Walls, Storefronts, Interiors HM Storefronts to have different "Types" defined (as different systems) for Basis of Design.

### 3. Ceilings-

- a) All ceilings to be modeled with accurate slopes/tapers.
- b) All interior ceilings/exterior soffits shall be modeled.

### 4. Floors-

- a) Floors and Slabs may be Generic in Type, but shall still distinguish between On Grade and On Deck.
- b) Shaft Openings shall be used for openings spanning more than a Single Floor.

### 5. Fenestration-

- a) All Doors, Windows, Storefronts, Curtain Walls, and Glazing to be modeled such that Wall Openings reflect Rough Wall Openings. Shim spacing and joint thicknesses to be included in dimension for the Fenestration System.

### 6. Electrical Devices-

- a) Where included by Architects, Electrical Devices may be Generic in nature

### 7. Elevators and Escalators-

- a) Elevators and Escalators may be Generic in nature, or modeled as clear spaces. If Elevators are not modeled, include a Room Object or Generic Object indicating the presence of an Elevator or Escalator.

**8. Equipment-**

- a) Equipment may be generic in nature.

**9. Stairs and Railings-**

- a) Stairs and Railings shall be included in the Model. Where a design criterion is known, they shall represent the correct width and run.
- b) Stair and Railing Types may be generic in nature,

**10. Furnishings and Furniture Systems-**

- a) Furnishings may be generic in nature.

**11. Lighting Fixtures-**

- a) Light fixtures may be generic in nature.
- b) Light fixtures in areas opened to structure shall be unhosted or Work Plane Based (no ceiling type "none" or hidden ceilings)

**12. Plumbing Fixtures-**

- a) Plumbing Fixtures shall be modeled (at minimum) to the maximum dimensions of the occupied and required space for the Basis of Design, and as much as is necessary to communicate code requirements and Design intent (Style and Configuration of Fixture)

**13. Roofs-**

- a) Roofs may be generic in nature, but shall denote different types for different intended assemblies
- b) Roofs shall be modeled to show accurate slope

**14. Site and Topography-**

- a) Site and Topography elements (if modeled by architects, at architect's discretion) shall be modeled in a separate Model File, with the appropriate coordinates.

## **E. Structure-**

### **1. Structure (General)**

- a) Structural Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) Where Roof overhangs, eaves, architecturally treated site coverings, shelters, canopies, walkways, or elements are present, perimeter to include these items plus 5 foot zone around perimeter of farthest reaching extents of elements on the site plan

### **2. Structural Walls-**

- a) Structural Walls may be modeled generically, but shall denote purpose in the generic wall type (Shear, Foundation, etc)
- b) All walls to be modeled with accurate slopes / tapers.

### **3. Structural Columns-**

- a) Super Structure columns shall be modeled to convey Design Intent.
- b) Columns shall denote differences in Type (W-flange, HSS, Concrete) but may be generic in Size

### **4. Structural Foundations-**

- a) Structural Foundation Walls shall be modeled, but may be generic dimensions

### **5. Structural Floors / Slabs / Roofs-**

- a) Structural Slabs may be generic in nature
- b) Separate Floor types shall be used for Slabs on metal deck and Slabs on grade (modeled as constructed)
- c) Shaft Openings shall be used for openings spanning more than a Single Floor.

### **6. Structural Framing-**

- a) Super Structure Framing shall be modeled
- b) Framing shall denote differences in Type (W-flange, HSS, K-series) but may be generic in Size

## **F. Mechanical-**

### **1. Mechanical (General)**

- a) Mechanical Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) Mechanical Systems may be shown as Generic Model Elements, indicating zones and systems, and equipment / piping runs as generic elements

### **2. Mechanical Ducts and Equipment-**

- a) Mechanical Equipment Units may be modeled generically
- b) Spaces shall use Room Name and Room Number Tags to correspond with rooms from Architectural Model

## **G. Plumbing-**

### **1. Plumbing (General)**

- a) Plumbing Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) Plumbing Systems may be shown as Generic Model Elements, indicating zones and systems, and equipment / piping runs as generic elements

### **2. Piping-**

- a) All Drains shall be modeled; their dimensions may be shown generically

### **3. Plumbing Equipment and Fixtures-**

- a) Plumbing Equipment and Fixtures may be modeled generically, but shall denote different Types for varying fixtures and elements
- b) Spaces shall use Room Name and Room Number Tags to correspond with rooms from Architectural Model

## H. Electrical

### 1. Electrical (General)

- a) Electrical Model scope to include all Buildings, plus 5 foot zone around perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) Electrical Systems may be shown as Generic Model Elements, indicating zones and systems, and equipment / piping runs as generic elements

### 2. Electrical Equipment and Fixtures-

- a) Electrical Equipment and Fixtures may be modeled generically, but shall denote different Types for varying fixtures and elements
- b) Spaces shall use Room Name and Room Number Tags to correspond with rooms from Architectural Model
- c) Cable trays and Conduits shall be modeled; they may be shown as Generic Elements of approximate width and thickness

### 3. Lighting Fixtures-

- a) Light fixtures may be generic in nature.
- b) Light fixtures in areas opened to structure shall be unhosted or Work Plane Based (no ceiling type "none" or hidden ceilings)



## **I. Fire Protection**

### **1. Fire Protection (General)**

- a) Fire Protection Model scope to include all Buildings, plus 5 foot zone around perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)

### **2. Piping-**

- a) Sprinkler Mains shall be modeled; they may be generic in size

### **3. FP Equipment and Fixtures-**

- a) Fire Protection and Fixtures may be modeled generically, but shall denote different Types for varying fixtures and elements
- b) Spaces shall use Room Name and Room Number Tags to correspond with rooms from Architectural Model

## XXI. Level of Detail 200

### A. Authorized Uses and Expectations

1. **Construction-** Model shows developed Design Intent for all Modeled Elements. Detailing necessary for Construction may not be present in the Model.
2. **Coordination-** Items in the models are expected to be of the right quantity, dimensions, and locations, respective of the designs development.
3. **Analysis-** The Model may be analyzed for performance of selected systems by application of specific performance criteria assigned to the representative Model Elements.
4. **Cost Estimating and Quantities-** The Model may be used to develop Quantity Takes Offs and Cost Estimates based on the individual elements, element counts, and specific data provided in each trades specific models, according to the responsibility matrix. **Element counts and Quantities should include tolerances factoring in variations in item counts and types as the Design proceeds to the following LOD.**
5. **Schedule and Sequence-** The models submitted by the Design Teams will have all elements sequenced for each Package of the Design Documents. Sequencing within the Package timeframes can be done by the Construction Team after receipt of the Design Models.
6. Other Authorized Uses (reserved)

## B. General Modeling

1. **Assembly Codes-** Assign to all Component Types in the Model, values based on Uniformat.. (Or allow for colocation so Beck may input Assembly Codes in to Trade's Design Model, pre-transmittal)
2. **Phasing and Packaging-** Confirm that Phasing is consistent across Project team. Additional non-construction-phase project breakout to be done by Shared Parameter (provided) and Filter (Specify which)- All trades will be expected to Input this Parameter value for all objects in their model.
3. **NOT IN SCOPE-** Please Input the value "**NOT IN SCOPE**" in the Comments Field (Instance) of all Objects that are for reference only, and not in the Scope of Services provided
4. **Detail Items-** Detail lines, Filled Regions, and Detail Components shall not be used for any object in the model. Symbolic Lines within Component Families may be used (as components report counts and data). 3D generic geometry may be used in some locations, but shall always occupy the maximum dimensions of the object it's representing. (They shall be used for Object detailing, I.E. objects covered under "Shall not be modeled")
5. **Native Object Components-** Model Components shall be Native to the Revit platform. Components shall not consist of .dwg, .skp, .obj, .sat imports, within Revit Components, as this requires further management under "Imports in Families"
6. **Categories-** In general, Model Object Categories shall be respected (Not using floor categories for walls, etc). Any exceptions needed should be outlined in the "Category Exceptions" table, to make all parties aware.
7. **Drafted Imports-** Detailing and Documentation shall be derived from the Building Information Model. Non-intelligent Drafted Details and imports shall be limited to scopes not affected dimensionally by the BIM.
8. **Dimensional Standards and Accuracy-** Project Units and Dimension Styles shall all be set to a 1/256" Level of Accuracy. Dimensions are not to be overridden with Dimensional Values, and overrides shall be limited to use in situations requiring notes to reference other areas, or existing. Where notes to "verify existing" or "verify measurements" are used, updated Design Models may be requested (with correct dimensional control) after verification on site, for coordination purposes.
9. **Nested Components-** When used, Nested Components shall be set to Shared if there is an expectation that they will be quantified individually. Otherwise they will be counted as parts of the larger Component, with only those components accounted for (please specify which)

## C. Civil Model

### 1. Civil (General)

- a) **Civil Model scope** to include all Site Utilities, terminating at boundary of 5 foot zone around perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) **Non Utility Civil Model** Scope to terminate directly at perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum), including:
  - i. All Topography
  - ii. Hardscape Elements
  - iii. Planting features
  - iv. groundcover, including undisturbed remaining terrain
  - v. bollards, site signage, site lighting
  - vi. Site Fencing
  - vii. Property Lines
  - viii. Pads of Existing Structures to remain
  - ix. Site Furnishings (if included in Scope)
  - x. Parking and Drive Lane striping
- c) **Site Utilities-**
  - i. All piping requiring gravity slope shall be modeled to the outside diameter of the pipe and should include fittings, connections, and slope. Piping smaller than 1" that does not require gravity slope may be excluded from the model.
  - ii. All manholes and Utility Access Structures shall be modeled
  - iii. All Vaults and Underground Structures shall be modeled
- d) **Civil Exports-**
  - i. Civil Engineer to provide Points file of Topography to Architects, in addition to full Model Export to Coordination software. Points file (.csv or .txt). File to be "NEZ" format. (PNEZD will be accepted)

## D. Architecture

### 1. Architecture (General)

- a) Architectural Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) Where Roof overhangs, eaves, architecturally treated site coverings, shelters, canopies, walkways, or elements are present, perimeter to include these items plus 5 foot zone around perimeter of farthest reaching extents of elements on the site plan.

### 2. Walls-

- a) Backup walls will be modeled as separate entities from applied finishes (Tile, Wainscot) and veneers (Brick / Stone). Substrate is to be included in the Backup Structural Wall.
- b) Individual studs shall not be modeled. Studs shall be modeled as thickness of Stud depth, continuously.
- c) Height of Substrate on partitions to be declared through parameters or wall types, unless modeled accurately (please specify which).
- d) All walls to be modeled to Actual Dimensions
- e) Fire and Smoke Rated Partitions to be denoted as wall types or with parameters indicating Rating. (Please specify which)
- f) Walls shall not overlap Slab geometry. Conditions at slabs / Shafts / Ceilings / Roofs to be modeled as constructed.
- g) Sills / Caps / Finishes applied as sweeps shall not be included in wall types, but applied as independent Wall Sweeps.
- h) All walls to be modeled with accurate slopes / tapers.
- i) Curtain Walls / Storefronts shall be set to Automatically Embed
- j) Curtain Walls, Storefronts, Interiors HM Storefronts to have different "Types" defined (as different systems) for Basis of Design.

### 3. Ceilings-

- a) All ceilings to be modeled with accurate slopes/tapers.
- b) All interior ceilings/exterior soffits shall be modeled.

#### **4. Floors-**

- a) Structural Floors and Floor Finishes to be modeled as separate entities, with appropriate offsets.
- b) Structural Decking shall be modeled to the overall thickness of Deck Profile. Deck ribs shall not be modeled.
- c) Separate Floor types shall be used for Slabs on metal deck and Slabs on grade (modeled as constructed)
- d) Slabs shall not overlap Foundations where Foundations are present at Top of Slab level.
- e) Shaft Openings shall be used for openings spanning more than a Single Floor.
- f) All floors (including finishes) to be modeled with accurate slopes, and drains.
- g) Raised Floor Systems to be modeled as Components (for Structure), with the option of Raised floor as part of component or as System Floor (please specify which).

#### **5. Fenestration-**

- a) All Doors, Windows, Storefronts, Curtain Walls, and Glazing to be modeled such that Wall Openings reflect Rough Wall Openings. Shim spacing and joint thicknesses to be included in dimension for the Fenestration System.
- b) Fenestration Frame Systems shall reflect accurate dimensions of systems

#### **6. Electrical Devices-**

- a) Where included by Architects, Electrical Devices shall be modeled accurately and at the correct location

#### **7. Elevators and Escalators-**

- a) Elevators and Escalators shall be modeled (at minimum) to the maximum dimensions of occupied and required space for: Systems, Clear Shaft, Cabs, Machine Rooms, Overruns, Pits, Hydraulics, and service spaces. (May be several components and objects)

#### **8. Equipment-**

- a) Equipment shall be modeled (at minimum) to the maximum dimensions of the occupied and required space
- b) Equipment shall be modeled with the appropriate connectors for trades to connect (Power, Data, plumbing), unless subsequent model provided by Design Consultant
- c) Equipment modeled with generic geometry shall utilize Type Names to denote actual Equipment for project.

## **9. Stairs and Railings-**

- a) Stairs and Railings shall be included in the Model.
- b) Railing Systems shall be modeled (at minimum) to the maximum dimensions of rails and balusters, as dictated by the Basis of Design manufacturer.

## **10. Furnishings and Furniture Systems-**

- a) Furnishings shall be modeled (at minimum) to the maximum dimensions of the occupied and required space for the Basis of Design

## **11. Lighting Fixtures-**

- a) Light fixtures shall be modeled (at minimum) to the maximum dimensions of the fixtures in the Basis of Design.
- b) Light fixtures in areas opened to structure shall be unhosted or Work Plane Based (no ceiling type "none" or hidden ceilings)
- c) Lighting shall be modeled with the appropriate connectors for trades to connect (Power, Data, plumbing), unless subsequent model provided by Design Consultant

## **12. Plumbing Fixtures-**

- a) Plumbing Fixtures shall be modeled (at minimum) to the maximum dimensions of the occupied and required space for the Basis of Design, and as much as is necessary to communicate code requirements and Design intent (Style and Configuration of Fixture)
- b) Plumbing Fixtures shall be modeled with the appropriate connectors for trades to connect (Power, Data, plumbing), unless subsequent model provided by Design Consultant

## **13. Roofs-**

- a) Structural Decking shall be modeled to the overall thickness of Deck Profile. Deck ribs shall not be modeled.
- b) Roofs shall be modeled to show accurate slope and drains, including tapering insulation (separate components if necessary)
- c) Roof Structure Thickness may (but not required) include thickness for Structural Elements (Trusses, Framing, Steel) (please specify if included)

## **14. Site and Topography-**

- a) Site and Topography elements (if modeled by architects, at architect's discretion) shall be modeled in a separate Model File, with the appropriate coordinates.

## **E. Structure-**

### **1. Structure (General)**

- a) Structural Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) Where Roof overhangs, eaves, architecturally treated site coverings, shelters, canopies, walkways, or elements are present, perimeter to include these items plus 5 foot zone around perimeter of farthest reaching extents of elements on the site plan

### **2. Cast in Place Concrete (General)**

- a) All cast-in-place concrete, including all penetrations and openings and chamfers at corners shall be modeled.
- b) Gusset plates, bolts, clip angles and fasteners shall not be modeled.
- c) Edges of all slabs and penetrations of structural systems shall be accurately modeled.

### **3. Precast Concrete (General)**

- a) All precast concrete shall be modeled, including all penetrations, openings and chamfers at corners.
- b) Embeds shall be modeled
- c) Deck camber shall not be modeled
- d) Structural Steel (General)
- e) All primary and secondary structural steel members, relief angles and fixed / loose lintels shall be modeled.

### **4. Miscellaneous Steel (reserved)**

### **5. Structural Walls-**

- a) Individual Structural Studs shall not be modeled unless Structural Consultant is responsible for Metal Framing Shop Drawings. Studs shall be modeled as thickness of Stud cavity, continuously.
- b) All walls to be modeled to Actual Dimensions
- c) Structural Walls to be modeled with appropriate offsets from Datum's to create as-detailed relationships between Foundations and Walls
- d) Walls shall not overlap Slab geometry. Conditions at slabs / Shafts / Ceilings / Roofs to be modeled as constructed.



- e) All walls to be modeled with accurate slopes / tapers.

## **6. Structural Columns-**

- a) Structural columns shall be modeled Level to Level, or Splice to Splice. They should not run continuous for the height of the building unless erected on site that way
- b) Structural Column Base Plates shall be modeled. Nested Components may be used (set to Shared for Scheduling)
- c) Structural Column Foundations may be Nested Components (set to Shared for Scheduling)
- d) Structural Columns shall use appropriate Top Offsets to accurately represent Slope and Level of entities above

## **7. Structural Foundations-**

- a) Structural Foundation Walls shall be modeled as Structural Walls and Wall Foundations
- b) Step Down Foundations shall be Structural Foundation Components (Component Files or In-Place as required to demonstrate accurate dimensions and properties)

## **8. Structural Floors / Slabs-**

- a) Structural Floors to be modeled accurately, including Turn Down edges (Slab Edges), Thickened areas (Separate components of necessary), and Slab Depressions
- b) Leave Outs to be modeled as separate Floor/Slab Entities.
- c) Structural Decking shall be modeled to the overall thickness of Deck Profile. Deck ribs shall not be modeled but shall be depicted in proper direction in definition of Deck.
- d) Separate Floor types shall be used for Slabs on metal deck and Slabs on grade (modeled as constructed)
- e) Slabs shall not overlap Foundations or Bearing Walls where Foundations are present at Top of Slab level.
- f) Shaft Openings shall be used for openings spanning more than a Single Floor.
- g) All floors to be modeled with accurate slopes, and drains.

## **9. Structural Framing-**

- a) Structural Framing shall correspond to a Level Datum denoted for that Storey of the building (all steel shall not be set with Offsets from level 1)
- b) Structural Framing shall use appropriate Start level Offsets and End Level offsets to Slope framing per design intent
- c) Structural Beam Systems- Where used to define Structure, it is encouraged the "Pick Support" method is used for ease of Sloping framing members during design modifications

#### **10. Structural Trusses-**

- a) Trusses for Design intent only should be Named/declared as such, for coordination purposes (Consider modeling generically)

#### **11. Structural Roofs-**

- a) Structural Decking shall be modeled to the overall thickness of Deck Profile. Deck ribs shall not be modeled but shall be depicted in proper direction in definition of Deck.
- b) Roofs shall be modeled to show accurate slope and drains

## **F. Mechanical-**

### **1. Mechanical (General)**

- a) Mechanical Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)

### **2. Mechanical Ducts and Equipment-**

- a) All ducts, smoke dampers, and fire dampers are to be modeled to (at minimum) their maximum dimension and accurately placed for construction
- b) Insulation to be Modeled using System Insulation tools: Ducts specified as Duct size, with Insulation thickness specified.
- c) Hangers and Supports shall not be modeled.
- d) Mechanical Equipment Units to be modeled to (at minimum) their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material).
- e) Mechanical Equipment shall be modeled, including supports greater than 2", with the appropriate connectors for trades to connect (Power, Data, plumbing), unless subsequent model provided by Design Consultant
- f) All Mains 2" and great shall be modeled.
- g) Spaces shall use Room Name and Room Number Tags to correspond with rooms from Architectural Model

### **3. Piping-**

- a) All piping requiring gravity slope, such as condensate piping, and all other piping 1" diameter and larger, associated with the mechanical equipment shall be modeled.
- b) Penetrations / Sleeves shall be modeled where penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve.
- c) Insulation to be Modeled using System Insulation tools: Pipes specified as Pipe size, with Insulation thickness specified

## **G. Plumbing-**

### **1. Plumbing (General)**

- a) Plumbing Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)

### **2. Piping-**

- a) All piping requiring gravity slope shall be modeled to the outside diameter of the pipe and should include fittings, connections, and slope. Piping smaller than 1" that does not require gravity slope may be excluded from the model.
- b) Insulation to be Modeled using System Insulation tools: Pipes specified as Pipe size, with Insulation thickness specified
- c) All Mains shall be modeled accurately
- d) All Drains shall be modeled to (at minimum) their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material)

### **3. Plumbing Equipment and Fixtures-**

- a) All plumbing equipment and fixtures shall be modeled to (at minimum) their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material).
- b) All Equipment and Fixtures shall represent Connections in accurate locations (Floor versus Wall) for coordination purposes
- c) All P-traps shall be modeled
- d) Penetrations / Sleeves. Sleeves shall be modeled if penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve per the Specifications.
- e) All Main Valves shall be modeled to (at minimum) their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material). They shall be specifically called out for Coordination in Plans.

## H. Electrical

### 1. Electrical (General)

- a) Electrical Model scope to include all Buildings, plus 5 foot zone around perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)

### 2. Electrical Equipment and Fixtures-

- a) All electrical equipment (including, but not limited to switch gear, transformers, UPS and battery systems, generators, panels, etc) and fixtures shall be modeled to (at minimum) their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material).
- b) All support mechanisms larger than 2" shall be modeled.
- c) All power feeds to equipment shall be modeled.
- d) Cable tray and gangs of conduit greater than 2" shall be modeled as well as individual conduits 1" or larger. Flexible systems smaller than 2" are not required to be modeled

### 3. Lighting Fixtures-

- a) Light fixtures shall be modeled (at minimum) to the maximum dimensions of the fixtures in the Basis of Design, including required access and clear space (Modeled as "Space Protect" Material).
- b) Light fixtures in areas opened to structure shall be unhosted or Work Plane Based (no ceiling type "none" or hidden ceilings)
- c) Lighting shall be modeled with the appropriate connectors for trades to connect (Power, Data, plumbing), unless subsequent model provided by Design Consultant

### 4. Switches and Outlets-

- a) All wall switches, power outlets, data outlets, and wall mounted controls shall be modeled and located accurately for coordination. (Face Based Recommended)
- b) Sleeves shall be modeled if penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve per the Specifications.

## I. Fire Protection

### 1. Fire Protection (General)

- a) Fire Protection Model scope to include all Buildings, plus 5 foot zone around perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)

### 2. Piping-

- a) All piping requiring gravity slope shall be modeled to the outside diameter of the pipe and should include fittings, connections, and slope. Piping smaller than 1" that does not require gravity slope may be excluded from the model.
- b) Insulation to be Modeled using System Insulation tools: Pipes specified as Pipe size, with Insulation thickness specified
- c) All valves and clean outs shall be modeled.
- d) Penetrations / Sleeves shall be modeled where penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve.

### 3. FP Equipment-

- a) FP Equipment (including Sprinkler Heads, Pumps, Valves) shall be modeled (at minimum) to their maximum dimensions, , including required access and clear space (Modeled as "Space Protect" Material).
- b) Main Valves shall be modeled and denoted clearly for Documentation.
- c) Fire Alarm Control Panels, Monitoring systems, Data systems, Integrated Call Systems, and other Fire Suppression and Alert related Electrical and Data Devices shall adhere to guidelines for Both Fire Protection and the Electrical Discipline. (Please specify which category will be used)

## XXII. Level of Detail 300

### A. Authorized Uses and Expectations

1. **Construction-** Model is suitable for the generation of traditional construction documents by the Design Teams. Model is suitable for hand off to Subcontractors for Shop Model production.
2. **Coordination-** Items in the models are expected to be of the right quantity, dimensions, and locations. Object Types are expected to denote specific uses and requirements for Systems.
3. **Analysis-** The Model may be analyzed for performance of selected systems by application of specific performance criteria assigned to the representative Model Elements.
4. **Cost Estimating and Quantities-** The Model may be used to develop Quantity Takes Offs and Cost Estimates based on the individual elements, element counts, and specific data provided in each trades specific models, according to the responsibility matrix.
5. **Schedule and Sequence-** The models submitted by the Design Teams will have all elements sequenced for each Package of the Design Documents. Sequencing within the Package timeframes can be done by the Construction Team after receipt of the Design Models.
6. Other Authorized Uses (reserved)

## B. General Modeling

1. **Assembly Codes-** Assign to all Component Types in the Model, values based on Uniformat.. (Or allow for colocation so Beck may input Assembly Codes in to Trade's Design Model, pre-transmittal)
2. **Phasing and Packaging-** Confirm that Phasing is consistent across Project team. Additional non-construction-phase project breakout to be done by Shared Parameter (provided) and Filter (Specify which)- All trades will be expected to Input this Parameter value for all objects in their model.
3. **NOT IN SCOPE-** Please Input the value "**NOT IN SCOPE**" in the Comments Field (Instance) of all Objects that are for reference only, and not in the Scope of Services provided
4. **Detail Items-** Detail lines, Filled Regions, and Detail Components shall not be used for any object in the model. Symbolic Lines within Component Families may be used (as components report counts and data). 3D generic geometry may be used in some locations, but shall always occupy the maximum dimensions of the object it's representing. (They shall be used for Object detailing, I.E. objects covered under "Shall not be modeled")
5. **Native Object Components-** Model Components shall be Native to the Revit platform. Components shall not consist of .dwg, .skp, .obj, .sat imports, within Revit Components, as this requires further management under "Imports in Families"
6. **Categories-** In general, Model Object Categories shall be respected (Not using floor categories for walls, etc). Any exceptions needed should be outlined in the "Category Exceptions" table, to make all parties aware.
7. **Drafted Imports-** Detailing and Documentation shall be derived from the Building Information Model. Non-intelligent Drafted Details and imports shall be limited to scopes not affected dimensionally by the BIM.
8. **Dimensional Standards and Accuracy-** Project Units and Dimension Styles shall all be set to a 1/256" Level of Accuracy. Dimensions are not to be overridden with Dimensional Values, and overrides shall be limited to use in situations requiring notes to reference other areas, or existing. Where notes to "verify existing" or "verify measurements" are used, updated Design Models may be requested (with correct dimensional control) after verification on site, for coordination purposes.
9. **Nested Components-** When used, Nested Components shall be set to Shared if there is an expectation that they will be quantified individually. Otherwise they will be counted as parts of the larger Component, with only those components accounted for (please specify which)



## C. Civil Model

### 1. Civil (General)

- a) **Civil Model scope** to include all Site Utilities, terminating at boundary of 5 foot zone around perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) **Non Utility Civil Model** Scope to terminate directly at perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum), including:
  - i. All Topography
  - ii. Hardscape Elements
  - iii. Planting features
  - iv. groundcover, including undisturbed remaining terrain
  - v. bollards, site signage, site lighting
  - vi. Site Fencing
  - vii. Property Lines
  - viii. Pads of Existing Structures to remain
  - ix. Site Furnishings (if included in Scope)
  - x. Parking and Drive Lane striping
- c) Civil Model to include Dimensional Control for all Structures included in project relating to Plot, as identified in Architectural Model as " Site Dimensional Control Points"
- d) Site Utilities-
  - i. All piping requiring gravity slope shall be modeled to the outside diameter of the pipe and should include fittings, connections, and slope. Piping smaller than 1" that does not require gravity slope may be excluded from the model.
  - ii. Fittings and connections shall be modeled (at minimum) to their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material).
  - iii. All manholes and Utility Access Structures shall be modeled
  - iv. All Vaults and Underground Structures shall be modeled
- e) Civil Exports-
  - i. Civil Engineer to provide Points file of Topography to Architects, in addition to full Model Export to Coordination software. Points file (.csv or .txt). File to be "NEZ" format. (PNEZD will be accepted)

## D. Architecture

### 1. Architecture (General)

- a) Architectural Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) Where Roof overhangs, eaves, architecturally treated site coverings, shelters, canopies, walkways, or elements are present, perimeter to include these items plus 5 foot zone around perimeter of farthest reaching extents of elements on the site plan.

### 2. Walls-

- a) Backup walls will be modeled as separate entities from applied finishes (Tile, Wainscot) and veneers (Brick / Stone). Substrate is to be included in the Backup Structural Wall.
- b) Individual studs shall not be modeled. Studs shall be modeled as thickness of Stud depth, continuously.
- c) Height of Substrate on partitions to be declared through parameters or wall types, unless modeled accurately (please specify which).
- d) All walls to be modeled to Actual Dimensions
- e) Fire and Smoke Rated Partitions to be denoted as wall types or with parameters indicating Rating. (Please specify which)
- f) Sound Attenuation and Insulation to be denoted as wall types or with parameters indicating Insulation or Attenuation. (Please specify which)
- g) Walls shall not overlap Slab geometry. Conditions at slabs / Shafts / Ceilings / Roofs to be modeled as constructed.
- h) Sills / Caps / Finishes applied as sweeps shall not be included in wall types, but applied as independent Wall Sweeps.
- i) All walls to be modeled with accurate slopes / tapers.
- j) Curtain Walls / Storefronts shall be set to Automatically Embed
- k) Curtain Walls, Storefronts, Interiors HM Storefronts to have different "Types" defined (as different systems) for Basis of Design.

### 3. Ceilings-

- a) All ceilings to be modeled with accurate slopes/tapers.
- b) All interior ceilings/exterior soffits shall be modeled.

- c) All access hatches and panels to be included in model. Access hatch clear space shall be modeled as Material "Space Protect" for coordination.

#### **4. Floors-**

- a) Structural Floors and Floor Finishes to be modeled as separate entities, with appropriate offsets.
- b) Floor Finishes shall not extend underneath walls where Finishes are not applied.
- c) Structural Decking shall be modeled to the overall thickness of Deck Profile. Deck ribs shall not be modeled.
- d) Separate Floor types shall be used for Slabs on metal deck and Slabs on grade (modeled as constructed)
- e) Slabs shall not overlap Foundations where Foundations are present at Top of Slab level.
- f) Shaft Openings shall be used for openings spanning more than a Single Floor.
- g) All floors (including finishes) to be modeled with accurate slopes, and drains.
- h) All access hatches and panels to be included in model. Access hatch required clear space shall be modeled as Material "Space Protect" for Coordination.
- i) Raised Floor Systems to be modeled as Components (for Structure), with the option of Raised floor as part of component or as System Floor (please specify which).

#### **5. Fenestration-**

- a) All Doors, Windows, Storefronts, Curtain Walls, and Glazing to be modeled such that Wall Openings reflect Rough Wall Openings. Shim spacing and joint thicknesses to be included in dimension for the Fenestration System.
- b) Fenestration Frame Systems shall reflect accurate dimensions of systems

#### **6. Electrical Devices-**

- a) Where included by Architects, Electrical Devices shall be modeled accurately and at the correct location

#### **7. Elevators and Escalators-**

- a) Elevators and Escalators shall be modeled (at minimum) to the maximum dimensions of occupied and required space for: Systems, Clear Shaft, Cabs, Machine Rooms, Overruns, Pits, Hydraulics, and service spaces. (May be several components and objects)

## **8. Equipment-**

- a) Equipment shall be modeled (at minimum) to the maximum dimensions of the occupied and required space
- b) Access and clear space shall be modeled as Material "Space Protect" for coordination.
- c) Equipment shall be modeled with the appropriate connectors for trades to connect (Power, Data, plumbing), unless subsequent model provided by Design Consultant
- d) Equipment modeled with generic geometry shall utilize Type Names to denote actual Equipment for project.

## **9. Stairs and Railings-**

- a) Stairs and Railings shall be included in the Model.
- b) Useable space shall be modeled as Solid Material "Space Protect" for coordination. (Separate Stair entity or Rail / Component may be used- please specify which)
- c) Railing Systems shall be modeled (at minimum) to the maximum dimensions of rails and balusters, as dictated by the Basis of Design manufacturer.

## **10. Furnishings and Furniture Systems-**

- a) Furnishings shall be modeled (at minimum) to the maximum dimensions of the occupied and required space for the Basis of Design

## **11. Lighting Fixtures-**

- a) Light fixtures shall be modeled (at minimum) to the maximum dimensions of the fixtures in the Basis of Design.
- b) Light fixtures in areas opened to structure shall be unhosted or Work Plane Based (no ceiling type "none" or hidden ceilings)
- c) Lighting shall be modeled with the appropriate connectors for trades to connect (Power, Data, plumbing), unless subsequent model provided by Design Consultant

## **12. Plumbing Fixtures-**

- a) Plumbing Fixtures shall be modeled (at minimum) to the maximum dimensions of the occupied and required space for the Basis of Design, and as much as is necessary to communicate code requirements and Design intent (Style and Configuration of Fixture)
- b) Plumbing Fixtures shall be modeled with the appropriate connectors for trades to connect (Power, Data, plumbing), unless subsequent model provided by Design Consultant

### **13. Roofs-**

- a) Structural Decking shall be modeled to the overall thickness of Deck Profile. Deck ribs shall not be modeled.
- b) Roofs shall be modeled to show accurate slope and drains, including tapering insulation (separate components if necessary)
- c) Roof Structure Thickness may (but not required) include thickness for Structural Elements (Trusses, Framing, Steel) (please specify if included)

### **14. Site and Topography-**

- a) Site and Topography elements (if modeled by architects, at architect's discretion) shall be modeled in a separate Model File, with the appropriate coordinates.

## **E. Structure-**

### **1. Structure (General)**

- a) Structural Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)
- b) Where Roof overhangs, eaves, architecturally treated site coverings, shelters, canopies, walkways, or elements are present, perimeter to include these items plus 5 foot zone around perimeter of farthest reaching extents of elements on the site plan

### **2. Cast in Place Concrete (General)**

- a) All cast-in-place concrete, including all penetrations and openings and chamfers at corners shall be modeled.
- b) Reinforcing steel and embeds shall be modeled.
- c) Gusset plates, bolts, clip angles and fasteners shall not be modeled.
- d) Edges of all slabs and penetrations of structural systems shall be accurately modeled.
- e) Post Pour Cut Joints to be modeled as components or Model Lines (not detail lines)

### **3. Precast Concrete (General)**

- a) All precast concrete shall be modeled, including all penetrations and openings and chamfers at corners.
- b) Embeds shall be modeled
- c) Deck camber shall not be modeled

### **4. Structural Steel (General)**

- a) All primary and secondary structural steel members, relief angles and fixed / loose lintels shall be modeled.

### **5. Miscellaneous Steel (reserved)**

### **6. Structural Walls-**

- a) Individual Structural Studs shall not be modeled unless Structural Consultant is responsible for Metal Framing Shop Drawings. Studs shall be modeled as thickness of Stud cavity, continuously.
- b) All walls to be modeled to Actual Dimensions
- c) Structural Walls to be modeled with appropriate offsets from Datum's to create as-detailed relationships between Foundations and Walls

- d) Walls shall not overlap Slab geometry. Conditions at slabs / Shafts / Ceilings / Roofs to be modeled as constructed.
- e) All walls to be modeled with accurate slopes / tapers.
- f) Wall reinforcing to be modeled for Concrete Walls. Identify reinforcing and penetration-prohibited zones using "Space Protect" material.

#### **7. Structural Columns-**

- a) Structural columns shall be modeled Level to Level, or Splice to Splice. They should not run continuous for the height of the building unless erected on site that way
- b) Structural Column Base Plates shall be modeled. Nested Components may be used (set to Shared for Scheduling)
- c) Structural Column Foundations may be Nested Components (set to Shared for Scheduling)
- d) Structural Columns shall use appropriate Top Offsets to accurately represent Slope and Level of entities above

#### **8. Structural Foundations-**

- a) Structural Foundation Walls shall be modeled as Structural Walls and Wall Foundations
- b) Step Down Foundations shall be Structural Foundation Components (Component Files or In-Place as required to demonstrate accurate dimensions and properties)

#### **9. Structural Floors / Slabs-**

- a) Structural Floors to be modeled accurately, including Turn Down edges (Slab Edges), Thickened areas (Separate components of necessary), and Slab Depressions
- b) Leave Outs to be modeled as separate Floor/Slab Entities.
- c) Structural Decking shall be modeled to the overall thickness of Deck Profile. Deck ribs shall not be modeled but shall be depicted in proper direction in definition of Deck.
- d) Separate Floor types shall be used for Slabs on metal deck and Slabs on grade (modeled as constructed)
- e) Slabs shall not overlap Foundations or Bearing Walls where Foundations are present at Top of Slab level.
- f) Shaft Openings shall be used for openings spanning more than a Single Floor.
- g) All floors to be modeled with accurate slopes, and drains.

**10. Structural Framing-**

- a) Structural Framing shall correspond to a Level Datum denoted for that Storey of the building (all steel shall not be set with Offsets from level 1)
- b) Structural Framing shall use appropriate Start level Offsets and End Level offsets to Slope framing per design intent
- c) Structural Beam Systems- Where used to define Structure, it is encouraged the "Pick Support" method is used for ease of Sloping framing members during design modifications

**11. Structural Trusses-**

- a) Trusses for Design intent only should be Named/declared as such, for coordination purposes (Consider modeling generically)

**12. Structural Roofs-**

- a) Structural Decking shall be modeled to the overall thickness of Deck Profile. Deck ribs shall not be modeled but shall be depicted in proper direction in definition of Deck.
- b) Roofs shall be modeled to show accurate slope and drains



## **F. Mechanical-**

### **1. Mechanical (General)**

- a) Mechanical Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)

### **2. Mechanical Ducts and Equipment-**

- a) All ducts, smoke dampers, and fire dampers are to be modeled to (at minimum) their maximum dimension and accurately placed for construction
- b) Insulation to be Modeled using System Insulation tools: Ducts specified as Duct size, with Insulation thickness specified.
- c) Hangers and Supports shall not be modeled.
- d) Mechanical Equipment Units to be modeled to (at minimum) their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material).
- e) Mechanical Equipment shall be modeled, including supports greater than 2", with the appropriate connectors for trades to connect (Power, Data, plumbing), unless subsequent model provided by Design Consultant
- f) Sound Attenuators shall be modeled.
- g) All Mains 2" and great shall be modeled.
- h) Valves on mains shall be modeled to (at minimum) their maximum dimensions, to coordinate access points
- i) Spaces shall use Room Name and Room Number Tags to correspond with rooms from Architectural Model

### **3. Piping-**

- a) All piping requiring gravity slope, such as condensate piping, and all other piping 1" diameter and larger, associated with the mechanical equipment shall be modeled
- b) Fittings and connections (including valves and clean outs) shall be modeled (at minimum) to their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material).
- c) Penetrations / Sleeves shall be modeled where penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve.
- d) Insulation to be Modeled using System Insulation tools: Pipes specified as Pipe size, with Insulation thickness specified

## **G. Plumbing-**

### **1. Plumbing (General)**

- a) Plumbing Model scope to include all Buildings, plus 5 foot zone around perimeter of buildings (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)

### **2. Piping-**

- a) All piping requiring gravity slope shall be modeled to the outside diameter of the pipe and should include fittings, connections, and slope. Piping smaller than 1" that does not require gravity slope may be excluded from the model.
- b) Insulation to be Modeled using System Insulation tools: Pipes specified as Pipe size, with Insulation thickness specified
- c) All valves and clean-outs are to be modeled and are to be specifically identified to allow them to be readily found.
- d) All Mains shall be modeled accurately
- e) All Drains shall be modeled to (at minimum) their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material)

### **3. Plumbing Equipment and Fixtures-**

- a) All plumbing equipment and fixtures shall be modeled to (at minimum) their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material).
- b) All Equipment and Fixtures shall represent Connections in accurate locations (Floor versus Wall) for coordination purposes
- c) All P-traps shall be modeled
- d) Penetrations / Sleeves. Sleeves shall be modeled if penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve per the Specifications.
- e) All Main Valves shall be modeled to (at minimum) their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material). They shall be specifically called out for Coordination in Plans.

## H. Electrical

### 4. Electrical (General)

- a) Electrical Model scope to include all Buildings, plus 5 foot zone around perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)

### 5. Electrical Equipment and Fixtures-

- a) All electrical equipment (including, but not limited to switch gear, transformers, UPS and battery systems, generators, panels, etc) and fixtures shall be modeled to (at minimum) their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material).
- b) All support mechanisms larger than 2" shall be modeled.
- c) All power feeds to equipment shall be modeled.
- d) Cable tray and gangs of conduit greater than 2" shall be modeled as well as individual conduits 1" or larger. Flexible systems smaller than 2" are not required to be modeled

### 6. Lighting Fixtures-

- a) Light fixtures shall be modeled (at minimum) to the maximum dimensions of the fixtures in the Basis of Design, including required access and clear space (Modeled as "Space Protect" Material).
- b) Light fixtures in areas opened to structure shall be unhosted or Work Plane Based (no ceiling type "none" or hidden ceilings)
- c) Lighting shall be modeled with the appropriate connectors for trades to connect (Power, Data, plumbing), unless subsequent model provided by Design Consultant

### 7. Switches and Outlets-

- a) All wall switches, power outlets, data outlets, and wall mounted controls shall be modeled and located accurately for coordination. (Face Based Recommended)
- b) Sleeves shall be modeled if penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve per the Specifications.

## **I. Fire Protection**

### **1. Fire Protection (General)**

- a) Fire Protection Model scope to include all Buildings, plus 5 foot zone around perimeter of building (perimeter defined as Exterior Face of Architectural Finish wall at 4'-6" above Ground level Datum)

### **2. Piping-**

- a) All piping requiring gravity slope shall be modeled to the outside diameter of the pipe and should include fittings, connections, and slope. Piping smaller than 1" that does not require gravity slope may be excluded from the model.
- b) Insulation to be Modeled using System Insulation tools: Pipes specified as Pipe size, with Insulation thickness specified
- c) Fittings and connections shall be modeled (at minimum) to their maximum dimensions, including required access and clear space (Modeled as "Space Protect" Material).
- d) All valves and clean outs shall be modeled.
- e) Penetrations / Sleeves shall be modeled where penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve.

### **3. FP Equipment-**

- a) FP Equipment (including Sprinkler Heads, Pumps, Valves) shall be modeled (at minimum) to their maximum dimensions, , including required access and clear space (Modeled as "Space Protect" Material).
- b) Main Valves shall be modeled and denoted clearly for Documentation.
- c) Fire Alarm Control Panels, Monitoring systems, Data systems, Integrated Call Systems, and other Fire Suppression and Alert related Electrical and Data Devices shall adhere to guidelines for Both Fire Protection and the Electrical Discipline. (Please specify which category will be used)

## XXIII. Level of Detail 400

### A. Authorized Uses and Expectations

1. **Construction-** Model is suitable for construction in the built environment. All Model Elements are accurate in size, location, placement, and systemic requirements. Specific Detailing for Project conditions shall be present in the Model.
2. **Coordination Model 400-** Model Elements are modeled as specific assemblies that are accurate in terms of size, shape, location, quantity, and orientation with complete fabrication, assembly, and detailing information. Non-geometric information may also be attached to Model Elements
3. **Other Authorized Uses** (reserved)

## XXIV. Level of Detail 500

### A. Authorized Uses and Expectations

1. **Construction-** Model is representative of the As Built environment.
2. **Record Model 500-** Record Model Elements are modeled as constructed assemblies actual and accurate in terms of size, shape, location, quantity, and orientation. Non-geometric information may also be attached to Model Elements
3. **Other Authorized Uses** (reserved)

## B. General Modeling (LOD 400/500)

1. **Extent of Model-** The Model Elements provided by the Subcontractor shall extend to five feet beyond the exterior walls of the building. Vertically, the Model Elements shall extend from the lowest extent of the foundations up through (and including) the roof of the top most floor. To the extent that the Scope of Work includes building systems, those systems will be included to the full horizontal and vertical extents of the model including all systems in the soffits and roof-top mounted items.
2. Where Roof overhangs, eaves, architecturally treated site coverings, shelters, canopies, walkways, or elements are present, perimeter to include these items plus 5 foot zone around perimeter of farthest reaching extents of elements on the site plan.
3. **Model Phasing and Packaging-** Confirm that Phasing is consistent across Project team. Additional non-construction-phase project breakout to be specified by Construction Collaboration Manager in Kick-Off meeting
4. **Dimensional Standards and Accuracy-** Project Units and Dimension Styles shall all be set to a 1/256" Level of Accuracy, and models shall be accurate to the field conditions. Dimensions are not to be overridden with Dimensional Values, and overrides shall be limited to use in situations requiring notes to reference other areas, or existing. Where notes to "verify existing" or "verify measurements" are used, updated Design Models may be requested (with correct dimensional control) after verification on site, for coordination purposes.

## C. Curtain Wall and Storefront (modify)

### 1. Curtain Wall / Storefront (General)-

- a) Specific dimensional locations of Curtain Wall and Storefront items may not be included in the Construction Documents; to the extent that location can be determined from the Construction Documents, the Model Elements are to reflect that location.
- b) Dimensions / Rough Openings / Shim Spacing / Joints
- c) Mullions-
- d) Glazing-

## D. Interior Partitions / Drywall (Modify)

### 1. Interior Partitions / Drywall (General)-

- a) Partition types and Sheathing types shall refer to the Architectural Construction Documents. Discrepancies between the Base Model and the Construction Documents shall be brought to the Architects attention at the time of discovery, so a revised Base model can be issued.
- b) Dimensions / Rough Openings / Shim Spacing / Joints?
- c) Partition Framing

## E. Structural Steel

### 1. Steel (General)

- a) Specific dimensional locations of Structural System items may not be included in the Construction Documents; to the extent that location can be determined from the Construction Documents, the Model Elements are to reflect that location.
- b) The structural steel fabricator will be expected to provide a 3D model of their Scope of Work, including all structural and miscellaneous steel in detail. This includes:
  - i. Columns (including Base Plates)
  - ii. Beams
  - iii. Bracing
  - iv. Bolted connections
  - v. Gusset plates
  - vi. Stairs
  - vii. Equipment supports
  - viii. Embeds
  - ix. Miscellaneous supports



## F. HVAC/Mechanical

### 1. HVAC / Mechanical (General)-

- a) Specific dimensional locations of HVAC/Mechanical Systems may not be included in the Construction Documents; to the extent that location can be determined from the Construction Documents, the Model Elements are to reflect that location.

### 2. Duct and Associated Equipment-

- a) All ducts, including joints and hangers, smoke dampers, fire dampers, diffusers, registers, grilles, air handling equipment, etc. are to be included. Ducts will be modeled to the outside face dimension. Flexible systems smaller than 1' are not required to be modeled; however it is encouraged.

### 3. Mechanical Equipment-

- a) Equipment should be modeled to its overall height, width, and depth. All support mechanisms larger than 2" are to be modeled.

### 4. Piping-

- a) All piping requiring gravity slope, such as condensate piping, and all other piping, 1" and larger, associated with the mechanical equipment will be modeled and should include fittings and connections. All valves and clean-outs are to be modeled and are to be specially identified to allow them to be readily found.

### 5. Electrical Requirements-

- a) Any electrical associated with HVAC will be modeled to the line side of disconnect.
- b) Maintenance / Clearance Access-
- c) Maintenance access areas and all other code required clearance areas associated with Model Elements are to be modeled; this is to include all access doors in walls and ceilings.

### 6. Penetrations / Sleeves-

- a) Sleeves are to be modeled if penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve per the Specifications.

## **G. Plumbing**

### **1. Plumbing (General)-**

- a) Specific dimensional locations of Plumbing Systems may not be included in the Construction Documents; to the extent that location can be determined from the Construction Documents, the Model Elements are to reflect that location.

### **2. Piping-**

- a) All plumbing piping requiring gravity slope as well as all specialty piping (i.e. medical gas) is to be modeled to the outside diameter of the pipe with any pipe insulation clearly defined and should include fittings, connections, and slope. Piping smaller than 1" that does not require gravity slope may be excluded from the model. All valves and clean-outs are to be modeled and are to be specially identified to allow them to be readily found.

### **3. Plumbing Equipment-**

- a) All plumbing equipment will be modeled to its overall height, width and depth.
- b) Maintenance / Clearance Access-
- c) Maintenance access areas and all other code required clearance areas associated with Model Elements are to be modeled; this is to include all access doors in walls and ceilings.

### **4. Penetrations / Sleeves-**

- a) Sleeves are to be modeled if penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve per the Specifications.

## H. Electrical

### 1. Electrical (General)-

- a) Specific dimensional locations of Electrical Systems may not be included in the Construction Documents; to the extent that location can be determined from the Construction Documents, the Model Elements are to reflect that location.

### 2. Cable Tray and Conduit-

- a) Cable tray and gangs of conduit greater than 2" will be modeled as well as individual conduits 1" or larger. Electrician will be responsible for modeling all electrical associated with HVAC from the point the Mechanical Subcontractor stops (line side of disconnect). Flexible systems smaller than 2" are not required to be modeled.

### 3. Light Fixtures-

- a) All light fixtures are to be modeled to the overall height, width, and depth as specified.

### 4. Maintenance / Clearance Access-

- a) Maintenance access areas and all other code required clearance areas (including Light Fixtures) associated with Model Elements are to be modeled; this is to include all access doors in walls and ceilings.

### 5. Penetrations / Sleeves-

- a) Sleeves are to be modeled if penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve per the Specifications.

## **I. Fire Protection**

### **1. Equipment-**

- a) All equipment, such as the fire pump, associated with the Fire Protection system will be modeled.

### **2. Piping-**

- a) All Fire Protection piping, including fittings, connections, slopes, valves, and sprinkler heads is to be modeled. Temporary standpipe is also to be included as a Model Element.

### **3. Maintenance / Clearance Access-**

- a) Maintenance access areas and all other code required clearance areas associated with Model Elements are to be modeled; this is to include all access doors in walls and ceilings.

### **4. Penetrations / Sleeves-**

- a) Sleeves are to be modeled if penetrations through building systems such as cast-in-place concrete and CMU walls require a sleeve per the Specifications.

## **J. Miscellaneous Systems (modify)**

- 5. AV Equipment
- 6. Glazing

## XXV. Model Element Level of Detail per Project Phase

**Table XXIV-1- Model Element LOD Abbreviation List and Table**

<b>SD</b>	Schematic Design
<b>DD</b>	Design Development
<b>CD</b>	Contract Documents
<b>LOD</b>	Level Of Detail
<b>MEA</b>	Model Element Author
<b>-</b>	Not Required
<b>D</b>	2D Representation / Single Line Diag.
<b>DA</b>	Design Architect
<b>AR</b>	Architect
<b>SC</b>	Structural Consultant
<b>MC</b>	Mechanical Consultant
<b>EC</b>	Electrical Consultant
<b>PC</b>	Plumbing Consultant
<b>FPC</b>	Fire Protection Consultant
<b>CC</b>	Civil Consultant
<b>AVC</b>	Audio/Visual Consultant
<b>SeC</b>	Security Consultant
<b>MeC</b>	Medical Equipment Consultant
<b>LC</b>	Landscaping Consultant
<b>SS</b>	Structural Subcontractor
<b>MS</b>	Mechanical Subcontractor
<b>ES</b>	Electrical Subcontractor
<b>PS</b>	Plumbing Subcontractor
<b>CS</b>	Civil Subcontractor
<b>AVS</b>	Audio/Visual Subcontractor
<b>SeS</b>	Security Subcontractor
<b>LS</b>	Landscaping Subcontractor
<b>GS</b>	Glazing Subcontractor
<b>FPS</b>	Fire Protection Subcontractor
<b>O</b>	Owner
<b>C</b>	Contractor

Model Element Table			SD / Crit		DD / Det		CD / Imp		Construction		
			LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	
A. SUBSTRUCTURE											
Foundations	Standard Foundations	Piers	D	SC	100	SC	300	SC	400	SS	
		Grade Beams	100	SC	200	SC	300	SC	400	SS	
		Slabs on Grade	100	SC	200	SC	300	SC	400	SS	
		Structured Slabs	100	SC	200	SC	300	SC	400	SS	
		Vapor Barrier	D	SC	D	AR	D	AR	D	AR	
		Foundation Drainage	-	-	100	PC	300	PC	400	PS	
Basement	Special Foundations	D	SC	200	SC	300	SC	400	SS		
	Excavations	D	AR	100	AR	300	AR	400	AR		
	Basement walls	100	AR	200	SC	300	SC	400	SS		
	Subsurface drainage	D	AR	200	AR	300	PC	400	PS		
B. SHELL											
Superstructure	Floor Construction	Columns	100	SC	200	SC	300	SC	400	SS	
		Structure	100	SC	200	SC	300	SC	400	SS	
		Slab	100	SC	200	SC	300	SC	400	SS	
		Roof Construction	Structure	100	SC	200	SC	300	SC	400	SS
		Decking	100	AR	200	SC	300	SC	400	SS	
		Insulation	D	AR	200	AR	300	AR	300	AR	
Enclosure	Exterior walls	Framing/Substrate	100	AR	200	AR	300	AR	300	AR	
		Sheathing	-	AR	200	AR	300	AR	300	AR	
		Vapor Barrier	-	AR	200	AR	300	AR	300	AR	
		Rain Shield, Veneer	100	AR	200	AR	300	AR	300	AR	
		Louvers	100	AR	200	AR	300	AR	400	CR	
		Exterior windows	100	AR	200	AR	300	AR	400	GS	
Roofing	Roof coverings	Curtain walls/storefronts	100	AR	200	AR	300	AR	400	GS	
		Exterior doors	100	AR	200	AR	300	AR	300	AR	
		Membrane	-	AR	200	AR	300	AR	300	AR	
		Enclosure	100	AR	200	AR	300	AR	300	AR	
	Roof openings	Flashing	-	AR	D	AR	D	AR	D	AR	
		Hatches	-		200	AR	300	AR	300	AR	
		Smoke Vents	100	AR	200	AR	300	AR	400	CR	
		Skylights	100	AR	200	AR	300	AR	400	GS	

Model Element Table			SD / Crit		DD / Det		CD / Imp		Construction	
			LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA
C. INTERIORS										
Interior Const.	Partitions	Studs	100	AR	200	AR	300	AR	300	AR
		Substrate - Gyp, Sheathing	100	AR	200	AR	300	AR	300	AR
		Insulation	100	AR	200	AR	300	AR	300	AR
		Fire stopping	-		200	AR	300	AR	300	AR
	Interior Doors	Panels	100	AR	200	AR	300	AR	300	AR
		Frames	100	AR	200	AR	300	AR	300	AR
		Hardware	-		D	AR	200	AR	300	AR
	Fittings	Bases	100	AR	200	AR	300	AR	300	AR
		Trim/Moldings	100	AR	200	AR	300	AR	300	AR
		Wall Protection	100	AR	200	AR	300	AR	300	AR
		Paneling/Wainscots	100	AR	200	AR	300	AR	300	AR
Stairs	Stair construction	Stringers	100	AR	200	AR	300	AR	400	SS
		Landings	100	AR	200	AR	300	AR	400	SS
		Pans	100	AR	200	AR	300	AR	400	SS
	Stair finishes		100	AR	200	AR	300	AR	300	AR
	Railings		100	AR	200	AR	300	AR	400	AR
Interior Finishes	Wall finishes		100	AR	200	AR	300	AR	300	AR
	Floor finishes		100	AR	200	AR	300	AR	300	AR
	Ceiling finishes		100	AR	200	AR	300	AR	300	AR
D. SERVICES										
Conveying	Elevators		100	AR	200	AR	300	AR	300	AR
	Escalators		100	AR	200	AR	300	AR	300	AR
	Other		-		-		-		-	
Plumbing	Plumbing fixtures		100	AR	200	AR	300	PC	400	PS
	Domestic water	Supply piping	D	PC	200	PC	300	PC	400	PS
		Hot & cold water	D	PC	200	PC	300	PC	400	PS
		Hose bibbs	-		D	PC	300	PC	400	PS
	Sanitary waste	Drain lines	D	PC	200	PC	300	PC	400	PS
		Vent lines	D	PC	200	PC	300	PC	400	PS
		P-traps	D	PC	200	PC	300	PC	400	PS
		Trap primers	-		D	PC	300	PC	400	PS
	Rain water drainage	Gutters	100	AR	200	AR	300	AR	400	PS
		Roof drains	100	AR	200	AR	300	PC	400	PS
		Roof drain piping	-		200	PC	300	PC	400	PS
		Overflow Daylights	100	AR	200	PC	300	PC	400	PS
	Other									
		Medical Gas	D		D	MEC	300	MEC	400	PS
HVAC	Energy supply		-		D	MC	300	MC	400	MS
	Heat generating systems		-		D	MC	300	MC	400	MS
	Cooling generating systems		-		D	MC	300	MC	400	MS
	Distribution systems	High pressure ducts	100	MC	200	MC	300	MC	400	MS
		Low pressure ducts	-		200	MC	300	MC	400	MS
		Flex ducts	-		D	MC	300	MC	400	MS
		Supports and hangers	-		-		D	MC	400	MS
		F/S Dampers	-		D	MC	300	MC	400	MS



Model Element Table			SD / Crit		DD / Det		CD / Imp		Construction	
			LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA
<b>D. SERVICES (continued)</b>										
		Hydronic Piping	-		D	MC	300	MC	400	MS
		Sound Attenuators	-		D	MC	300	MC	400	MS
		Air grilles, registers, outlets, inlets	100	AR	200	MC	300	MC	400	MS
	Terminal & package units		-		200	MC	300	MC	400	MS
	Controls & instrumentation		-		-		100	MC	400	MS
	Other HVAC		100		200		300		400	
Fire Protection	Sprinkler heads		-		200	AR	300	PC	400	FPS
	Sprinkler lines		-		200	PC	300	PC	400	FPS
	Standpipes		-		200	PC	300	PC	400	FPS
	Fire Protection specialties		-		D		300	PC	400	FPS
	Other systems		-		200		300	PC	400	FPS
Electrical	Electrical Service	Transformers	D	EC	200	EC	300	EC	400	ES
		Service lines	D	EC	200	EC	300	EC	400	ES
		Panels	D	EC	200	EC	300	EC	400	ES
		UPS Systems	D	EC	200	EC	300	EC	400	ES
		Emergency generators	D	EC	200	EC	300	EC	400	ES
	Distribution systems	Home Runs	-		100	EC	300	EC	400	ES
		Branch Conduits	-		D	EC	300	EC	400	ES
	Lighting and Branch Wiring	Junction Boxes	-		D	EC	300	EC	400	ES
		Rigid conduits	-		D	EC	300	EC	400	ES
		Light fixtures	100	AR	200	EC	300	EC	400	ES
	Communications	Main panel	-		-		300	EC	D	ES
		Intercom components	-		200	EC	300	EC	D	ES
		Speakers	-		200	TBD	300	EC	D	ES
	Security	Main panel	-		-		300	SEC	D	SES
		Card readers	-		200	TBD	300	SEC	D	SES
		Door hardware	-		200	TBD	300	SEC	D	SES
	Audio/Visual	Projectors	-	-	200	TBD	300	AVC	D	AVS
		Overhead screens	-	-	200	TBD	300	AVC	400	AVS
		Window shades	-	-	D	TBD	300	AVC	300	AVS
		Speakers	100	TBD	200	TBD	300	AVC	400	AVS
		Floor & wall boxes	D	TBD	200	AVC	300	AVC	400	AVS
		AV panels, controls	-	TBD	100	AVC	300	AVC	300	AVS
	PV Solar Array		100	AR	200	AR	300	EC	400	ES
<b>E. FF&amp;E</b>										
Equipment	Commercial Equipment		100	AR	200	AR	300	AR	400	
	Institutional Equipment		100	AR	200	AR	300	AR	400	
	Vehicular Equipment		100	AR	200	AR	300	AR	400	
	Other		100	AR	200	AR	300	AR	400	
Furnishings	Fixed Furnishings		100	AR	200	AR	300	AR	400	
		Bookcases	100	AR	200	AR	300	AR	400	
		Desks	100	AR	200	AR	300	AR	400	
		Cabinets	100	AR	200	AR	300	AR	400	
		Display cases	100	AR	200	AR	300	AR	400	
	Moveable Furnishings		100	AR	200	AR	-	O	-	O

Model Element Table		SD		DD		CD		Construction	
		LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA
<b>F. SPECIAL CONST &amp; DEMO</b>									
Special Const.	Special Structures	100		200		300		400	
	Integrated Construction	-		D		D		D	
	Special Systems Construction	-		D		D		D	
	Special Facilities	-		D		D		D	
	Special Controls & Instrumentation	-		D		D		D	
Selective Demo	Building Elements Demolition	100	AR	200	AR	300	AR	300	
	Hazardous Components Abatement	-		D		D		D	
	Building System Demolition	-		100	AR	300	AR	400	
	Site Demolition	-		D		D		D	
<b>G. BUILDING SITE WORK</b>									
Site Preparation	Site Clearing	-		D		D		D	
	Site Demolition & Relocations	D		100		300		400	
	Site Earthwork	-		100		300		400	
	Hazardous Waste Remediation	-		100		300		400	
Site Improvements	Roadways	100	AR	200	CC	300	CC	100	
	Parking Lots	100	AR	200	CC	300	CC	100	
	Pedestrian Paving	100	AR	200	CC	300	CC	400	
	Site Development	D		100		100		200	
	Landscaping	D	AR	D		D		D	
Site Civil/Mech. Utilities	Water Supply & Distribution	D		D		D		D	
	Sanitary Sewer Systems	D		D		D		D	
	Storm Sewer Systems	D		D		D		D	
	Heating Distribution	D		D		D		D	
	Cooling Distribution	D		D		D		D	
	Fuel Distribution	D		D		D		D	
	Other Civil	D		D		D		D	
Site Electrical	Electrical Distribution	D		D		D		D	
	Site Lighting	D		D		D		D	
	Site Communications & Security	D		D		D		D	
	Other Electrical Utilities	D		D		D		D	
Other Site Con.	Service Tunnels	D		D		D		D	
	Other Site Systems & Equipment	D		D		D		D	