

Building Information Modeling Guidelines and Standards for Architects and Engineers

Acknowledgement

At this time, the NYC School Construction Authority (SCA) would like to acknowledge all SCA Architectural and Engineering staff and *Consultant Firms* that dedicated their Architectural and Engineering staff to assist the SCA in its efforts to develop its “*Building Information Modeling (BIM) Guidelines and Standards for Architects and Engineers*.”

The SCA believes that the integrated developmental approach that was followed, which combined the knowledge and experience of design professionals from within the SCA and Firms that do business with the SCA, has assured the SCA that its efforts have been both a practical and measured step into a relatively new project delivery approach (BIM), where its initial goal is to enhance the quality of design and enhance the coordination of *Contract Documents*.

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Design Resource Group Architects
DVL Consulting Engineer, Inc.
Goshow Architects
Gruzen Samton LLP
JR Loring & Associates Consulting Engineers, Inc
Michael Feldman Architects
Microdesk
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STV Incorporated
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The SCA believe that the time, efforts and professionalism that were provided by all participants in this effort were and are key components to the future success of BIM as a project delivery system for the NYC School Construction Authority.

~ **Thank You**

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1.0 SECTION 1 – BIM GUIDELINES

1.1 GENERAL REQUIREMENTS

In general, the New York City School Construction Authority's Building Information Model (BIM) Guidelines and Standards for Architects and Engineers, which shall be followed by all *Consultants*¹ engaged by the SCA to provide a *Project's* design in BIM, describes the processes, procedures, and requirements that shall be followed for the preparation and submission of BIM Models for SCA Capacity (Line) Projects (new building and additions), as well as to produce, release, and receive data in a consistent format so to maintain an efficient exchange of data between disciplines and the compatibility of each disciplines' *Model(s)*. In order to achieve this goal, the SCA has chosen to utilize several "Autodesk" products. Therefore, terminology and references that are unique to the "Autodesk" based software applications are utilized throughout these Guidelines and Standards. This information and requirements are additionally described in **Section 2 – Revit Guidelines and Standards**.

1.1.1 Introduction

The **immediate goal** of the New York City School Construction Authority (SCA) is to use *Building Information Modeling* (BIM) and related software products as a tool, which would, amongst other things, assist in the development of coordinated *Contract Documents* for "Capacity" construction *Projects*. Hence, the *Design Team* shall use BIM in its efforts to design a *Project* that meets the needs and requirements of a *Project* and assist the SCA, DOE and other participants in the design process so to:

- improve the decision making process
- produce better designs
- reduce costs
- reduce requests for information
- reduce change orders
- improve overall construction quality and schedule

At this time, in addition to providing *Contract Documents* that are as coordinated as possible through the use of BIM, the quality of each *Model* shall be developed by the *Design Team* to facilitate the following kinds of analysis:

- Program Validation
- Visualization
- Cost Estimating²

1.1.2 Design

Although a *Building Information Model* that facilitates the design process and analysis of a *Project* will be the *Design Team's* building block for the development of *Contract Documents* (*Drawings*), **at this time** a *Building Information Model* is **not** intended for construction purposes.

1. The *Building Information Model* shall be referred to throughout the design phase and construction phase of a *Project* as a *Design Intent Building Information Model*.
2. In order to ensure that portions of the *Contract Documents* (*Drawings*) that are derived from a *Design Intent Building Information Model* are correct, all *Extracted Drawings* shall contain the necessary *Level of Detail*; data and information required for the development of the *Contract Documents* (*Drawings*) and required analyses.
3. Being that the *Design Intent Building Information Model* is not meant for construction purposes, it shall **not** be made a part of the *Contract Documents*.

¹ In addition to the definitions provided for *Consultant* and *Sub-consultant* as per the SCA Architectural and Engineering Contract for Consultant Services, the terms *Consultants* and *Sub-consultants* shall mean Architect of Record (*Consultant*) and other licensed professionals such as, but not limited to, Structural, Mechanical and Electrical Engineers (*Sub-Consultants*) for *Projects* designed by licensed design professionals that are under the employ of the SCA. The directions provided also apply to in-house design staff.

² See Section 1.6 - Cost Estimating

1.1.3 Construction

As indicated above, the *Design Intent Building Information Model* is **not** meant for construction purposes. In addition, it is **not** meant to imply means and methods of construction, and will **not** be made part of the *Contract Documents*. However, the *Design Intent Building Information Model* **may** be shared by the SCA with a *Contractor* that is awarded a *Contract* for the construction of a *Project* for their convenience so that they may, if they so elect, utilize the *Design Intent Building Information Model* to develop a *Building Information Model* **of their own**, which they may choose to use for:

- Estimating
- Scheduling Analysis
- Fabrication
- Trade Coordination.
- Construction Sequencing
- Etc.

Although it shall be understood by all parties that the *Contract Document* are complete, the *Contractor* will be required to agree that the *Design Intent Building Information Model*, which may be shared by the SCA with the *Contractor* for their convenience, is **not** complete and shall **not** be relied upon by a *Contractor* for the execution of the *Work*.

1.1.3.1 Contractor's Use of Digital Data

All BIM Models and other BIM related electronic files and data that are to be provided for the convenience of a *Contractor* shall always be through the SCA, and shall never be directly between the *Consultant* and a *Contractor* and/or *Sub-contractor*. The SCA will only provide a *Design Intent Building Information Model* and BIM related electronic files and data to a *Contractor* after the *Contractor* has requested such, in writing, from and as required by the SCA.

When a *BIM Model* and/or other BIM related electronic files and data are requested by a *Contractor* from the SCA and the SCA agrees to provide such *model*, the *Contractor* shall be required to sign a "Release and Indemnity" document that has been prepared by the SCA, which amongst other things, establishes as fact that the BIM Models and other BIM electronic files are **not** intended as an end product and do **not** constitute a part of the *Contract Documents*. [See Exhibit – 1]

In light of the fact that BIM Models and other BIM related electronic files are **not** to be relied upon by a *Contractor* [See Exhibit – 1] and are **not** part of a set of *Contract Documents*:

1. The *Design Team* shall **not** respond to any questions specifically related to the content within a BIM Model or other BIM related electronic files from any entity that pertains to the execution of the *Work* described within a set of *Contract Documents*, which are the basis of a *Contract* between the SCA and a *Contractor*.
2. Notwithstanding the above, the *Design Team* shall respond to any and all questions, from the SCA Department of Architecture & Engineering, which pertain to the *Services* required by these Guidelines and Standards.

1.1.4 Ownership

The *Consultant* and its *Sub-consultants* shall assign to the SCA all of their rights, title and interest, including all copyrights, copyright registrations, copyright applications, renewals, extensions and all other proprietary or ownership rights, in all *Drawings* and *Building Information Models*. This includes, but shall not be limited to, information, electronic files, data provided by the SCA, "Revit" Families (system-based and/or component-based) and any other content submitted as part of the *BIM Model*.

All of the above shall become the property of the SCA at the conclusion of the *Project*, or termination of the services of the *Consultant*, whichever is earlier, and when requested by the SCA in writing shall be delivered to the SCA clearly marked, identified, and in good order.

1.1.5 Model Requirements

All BIM Models shall be developed in accordance with the most current version of the SCA BIM Guidelines and Standards and shall be compatible with the current version of the *BIM* application currently in use by the SCA at the time an agreement had been reached and agreed upon, in writing, between the *Consultant* and the SCA. In addition, all Models shall be provided to the Authority as per the latest version of "Revit".

1.2 PROCESS AND QUALITY OF DELIVERABLES

1.2.1 BIM Implementation Plan

The information contained within these Guidelines and Standards are the basis for the implementation of Building Information Management design by the SCA. The implementation of policies and protocols **not** provided by the SCA for the implementation of a successful design through *Building Information Modeling*, such as, but not limited to; Electronic Communication Protocols, BIM Information/Data Exchange, Permission Files and the roles, responsibilities and staffing requirements for each member of the *Design Team*, is the responsibility of the *Consultant*.

1.2.2 Model Managers/Model Leaders

1. The *Consultant* shall assign a **Project Model Manager**³ throughout the design and construction phase of a *Project*. The *Consultant's* Project Model Manager shall be responsible for the following amongst the *Design Team*:
 - Communicating the BIM vision to the *Design Team*
 - Transferring modeling content from one party to another
 - Validating the *Level of Detail* and controls as defined for each *Project* phase and/or Sub-Phase
 - Validating modeling content during each phase
 - Combining or linking (integration) of multiple *Models* and validating the integration of multiple *Models*
 - Participating in design review and *Model* coordination sessions
 - Communicating issues amongst the *Design Team* such as, but not limited to, the elimination of redundant objects
 - Keeping file naming accurate⁴
 - Managing version control
 - Properly storing the *Models* in a collaborative project management system
2. The *Consultant's* Sub-consultants shall each assign a **Project Model Leader**, for each design discipline, throughout the design and construction phase of a *Project*. In addition to fulfilling the responsibilities described above, each Project Model Leader, including the Project Model Manager, shall be responsible for the following amongst its team (discipline) members:
 - Quality Control⁵
 - Communicating the BIM vision
 - Organizing training
 - Being the main point of contact
 - Managing the implementation of BIM
 - Scheduling weekly meetings
 - Facilitating the exchange of information and data
 - Generating Interference Checks ("Revit") as well as Coordination and Clash Detection Reports ("NavisWorks") and the resolution of coordination errors and clashes (conflicts) within *Models* and *Contract Documents* (*Drawings*)

1.2.3 Intergraded Project Delivery (IPD)

1. Integrated Project Delivery (IPD) is a *Project* delivery approach that has always been practiced within the SCA Design Management Approach for a *Project's* design. However, although it is an approach that integrates people, systems, and practices to optimize efficiency through all phases of a *Project's* design, it does **not** and **cannot** involve the *Contractor* and/or its *Subcontractors* that would be responsible for the construction⁶ of a project during a *Project's* design process. Therefore, as indicated in Section 1.1 – General Requirements, the *Design Intent Building Information Model* may be shared by the SCA with the *Contractor* that is awarded a *Contract* for the construction of a *Project* for their convenience only, so that they may, if they so elect, utilize the *Design Intent Building Information Model* to develop a *Building Information Model* **of their own**.

³ The **Project Model Manager** shall be the Architect of Record.

⁴ See Section 2.2.3 - Naming Conventions

⁵ See Section 1.2.4 - Model Quality

⁶ The delivery method for SCA construction projects is design/bid/build, which are required to be publicly bid and awarded to the lowest responsible bidder. Therefore, Contractors are not involved in the IPD process.

2. As per the *SCA Architectural and Engineering Contract for Consultant Services*, the *Design Team* shall meet with various key participants within the *SCA* and the *DOE* throughout the entire design process so to facilitate the proactive involvement of all key participants (designers, construction managers⁷, owners, and users) so to capitalize on their knowledge and experience to ensure the quality of a project's design and constructability.

The *Consultant* shall provide, to the *SCA*, a contact list that identifies all key participants within the *Design Team* such as, but not limited to, Project Model Managers and Project Model Leaders.

1.2.4 Model Quality

In addition to adhering to *SCA* Standards, each member of the *Design Team* shall establish their own modeling quality control guidelines and exchange protocols. Good BIM practices include, but are not limited to the:

- Use of elements and component objects that embed the best practices of the firm
- Maintenance of parametric linkages within the *Model* at all times
- In the absence of *SCA* Standards, use Industry Standard nomenclature for objects and spaces
- Use appropriate and interoperable viewing, checking, and output file formats

The *SCA* requires that all Revit Models shall be developed using object-based elements only, such as Columns, Beams, Walls, Doors, Windows, etc. along with their associated parametric information. This will stream down the Revit processes from Design all the way down to Construction and then Operations.

It is essential that the *Design Team* tailor its "Quality Control Program", which is required by the *SCA Architectural and Engineering Contract for Consultant Services*, to ensure the overall quality of the *Contract Documents* and *BIM Model(s)*.

The required BIM "Quality Control Program" shall, at a minimum, include the following checks to ensure quality:

- | | |
|-----------------------------------|--|
| ▪ Collaboration Procedures | - Ensure coordination, communication and exchange protocols |
| ▪ Visual Check | - Ensure that there are no unintended model components |
| ▪ Interference Check ⁸ | - Detect conflicts in the model and/or models where building elements are clashing |
| ▪ Standards Check | - Ensure that <i>SCA</i> BIM Standards have been followed (fonts, dimensions, content, etc.) |
| ▪ Element Validation Check | - Ensure that the data set has no undefined or incorrectly defined elements |

The *Design Team* is encouraged to use electronic project collaboration tools such as document management and file sharing sites, reviewing tools, project communication websites, web meetings, and videoconferencing.

1.2.4.1 Quality Assessment Report (Revised 4/28/2014)

Upon completion of the Services required by [Section 1.3.4 Bidding and Award \(Phase IIC\)](#), the *SCA* will perform an assessment of a project's BIM/Revit Model(s) so that it may assess the *Design Team's* compliance with the *SCA's* "*BIM Guidelines and Standards for Architects and Engineers*" and the effectiveness of the *Design Team's* required "Quality Control Program"..

The focus of the *SCA's* "Quality Assessment Report" will include, but will not be limited to, the following:

Section 1

- Required *Models* have been provided, including appropriate level of detail and content of *Models*.
- Schedules are populated from *Models*
- Interferences and conflicts (clashes) between building elements have been mitigated

⁷ Construction Managers are NYCSCA employees.

⁸ See Section 1.4 - Coordination and Clash Detection

Section 2

- Compliance with technical criteria
- Adherence to predetermined standards
- Proper utilization of parametric data exchange between disciplines

Upon the SCA's completion of a BIM/Revit Model's quality assessment, the SCA will provide the *Design Team* with a copy of the "Quality Assessment Report" for appropriate action which shall include, but not be limited to, bringing a project's BIM/Revit Model(s) into full compliance with the SCA's "*BIM Guidelines and Standards for Architects and Engineers*".

1.2.5 Contract Document Quality

As described previously, the *Design Intent Building Information Model* will **not** be made part of the *Contract Documents*. The *Contract Documents (Drawings)* shall be the 2-dimensional (2-D) *Drawings*, as required by the New York City School Construction Authority's Architectural and Engineering *Contract* with a *Consultant*.

1. The aforementioned 2-D *Drawings* shall be the basis for the Bid and Award of a *Contract* for the execution of the *Work*.
2. Unless specified otherwise herein, all required *Drawings*, including, but not limited to; plans, details, sections, elevations, schedules, diagrams, as described by the *SCA Architectural and Engineering Contract* for Consultant Services, shall be provided in 2-D and the *Level of Detail* and information provided shall be sufficient for the execution of the *Work*.
 - 2-D *Drawings* may be *Extracted* from a *BIM Model* and/or *Models* and made a part of the *Contract Documents (Drawings)*, provided that each 2-D *Extraction* of a referenced *BIM Model* provides the *Level of Detail* and information that is necessary for the execution of the *Work*.
3. *Building Elements* that are **not** included in a *Model* and are necessary for the execution of the *Work* shall be included in the *Contract Documents (Drawings)*.

1.2.6 Submission Schedules and Required Deliverables

1. The *Level of Detail* required of a *Model* shall reflect the data and information required by each Design Phase and as described within this Section and Section 1.3 - BIM Models, so to illustrate all *Building Elements* that are required to be modeled and/or that are necessary for the performance of required reports, analyses and so to illustrate the design intent of the *Work*.
2. In addition to the hardcopy and electronic deliverables that are required by the *SCA Architectural and Engineering Contract* for Consultant Services, the following shall be submitted to the *SCA* for each Design Submission Phase and/or Sub-Phase:
 - Electronic copies⁹ of all *Models*¹⁰
 - Hardcopy and electronic copy of all required analyses, estimates and reports

PHASE I¹¹

Pre-Schematic Design Intent Models (Phase IA)

- | | |
|---------------------------------|--|
| □ Architectural Massing Model | □ Exterior Fly-Thru and Interior Walk-Thru |
| □ Cost Estimating ¹² | |

Schematic Design Intent Models (Phase IB)

- | | |
|-------------------------------|-------------------------|
| □ Architectural Massing Model | □ Zoning Envelope Model |
|-------------------------------|-------------------------|

⁹ See Section 2.1.3- File Formats

¹⁰ The Model provided by each member of the *Design Team* shall be additionally known as a *Component Model*.

¹¹ See Section 1.3.3 - Design Phases

¹² See Section 1.6 - Cost Estimating

- ❑ MEP (HVAC only) Model or Models
- ❑ Program Validation Report

- ❑ Exterior Fly- Thru and Interior Walk-Thru

Design Development Design Intent Models (Phase IC)

- ❑ Architectural Model
- ❑ Structural Model
- ❑ MEP Model or Models

- ❑ Program Validation Report
- ❑ Zoning Envelope Model
- ❑ Exterior Fly-Thru and Interior Walk-Thru

PHASE II¹³

▪ **Contract Document Design Intent Models (Phase IIA)**

- ❑ Architectural Model
- ❑ Structural Model

- ❑ MEP Model or Models
- ❑ Exterior Fly-Thru and Interior Walk-Thru

▪ **Contract Document Design Intent Models (Phase IIB)**

- ❑ Architectural Model
- ❑ Structural Model
- ❑ MEP Model or Models

- ❑ Coordination and Clash Detection Report¹⁴
- ❑ Exterior Fly-Thru and Interior Walk-Thru

▪ **Bidding and Award (Phase) IIC**¹⁵

¹³See Section 1.3.3 - Design Phases

¹⁴See Section 1.4.1 –Coordination/Clash Detection

¹⁵See Section 1.3.4- Bidding and Award (Phase IIC)

1.3 BIM MODELS

1.3.1 General

BIM *Models* are required for all Phases of design and certain *Building Elements/Systems* are required to be modeled for the successful execution of a *Design Intent BIM Model*.

1. Section 1.3.3 identifies *Models* that are required, at a minimum, for Architectural, Structural, HVAC Systems, Electrical Systems; and Plumbing/Drainage and Fire Protection Systems.
 - a. In order to facilitate the development of *Building Elements* that need to be modeled, the SCA has developed a library of standard *SCA Families* for the use of Architects and Engineers that are preparing *Contract Documents (Drawings)* for the SCA. These pre-defined *Building Elements* can be found in the “SCA Standard Library of BIM Families”¹⁶.
 - b. The *Design Team* **shall** use *Building Elements* that are available in the “SCA Standard Library of BIM Families”.
 - c. The *Design Team* **may** use modeled *Building Elements* that are **not** available in the “SCA Standard Library of BIM Families” such as those that are provided by Content Provider’s (i.e.: “Revit”), Manufacturers and/or created by the *Design Team*, provided that the amount of data and/or parameters of such models do not incorporate unnecessary information, data and/or graphics.

1.3.2 Level of Detail/Model Content

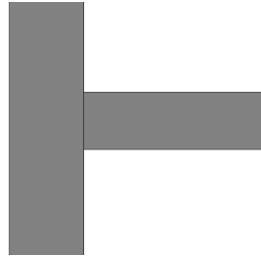
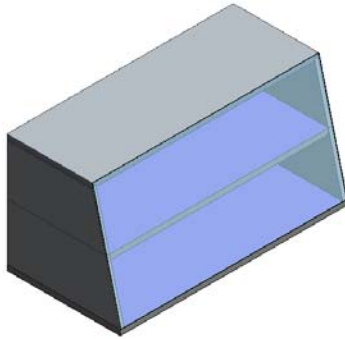
The Model Level of Detail describes the level of completeness to which a Model is developed and their minimum requirements. The Level of Detail is accumulative and should progress from Level to Level.

1. At a minimum, all required Models shall be detailed to the *Level of Detail* required by each Design Phase and/or Sub-Phase.
2. BIM *Models* shall be created that include all geometry, physical characteristics, information and data necessary so to describe and facilitate the design, intended construction, and cost estimating of a project as necessary to meet the requirements, as described herein, for each Design Phase and/or Sub-Phase of a project. In addition, all *Drawings*, simulations, and services required for, analysis, and review shall be *Extractions* from the *Model(s)*.
3. Required *Modeled Building Elements* need not illustrate/depict individual parts that are required for the assembly and/or the manufacture of the *Modeled Building Element*. The intent of a required *Modeled Building Element* is to provide overall size, shape, clearances, information, data, and the orientation of a *Modeled Building Element* for its installation and coordination with other required Work, as well as for the population of required Schedules¹⁷.
4. Although *Building Elements* that may be found in the “SCA Standard Library of BIM Families” shall be used when required by the following *Levels of Detail*, the *Design Team* may elect to use these *Building Element Models* when a *Model* is required, at a level of lesser detail, during any Design Phase and/or Sub-Phase.
5. The following “Level of Detail Key” shall be followed by the Design Team when providing Models for the different phases. Note that the following images illustrate the expected amount of graphical information to comply with the indicated level of detail, with a wall slab-assembly used as an example. The tables illustrate the amount of data/information to be included if one were to extract a schedule or perform an analysis at the indicated level of detail.

¹⁶ Go to SCA Website.

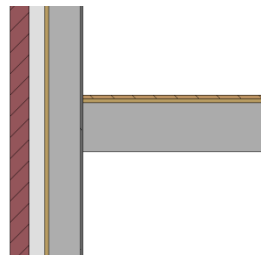
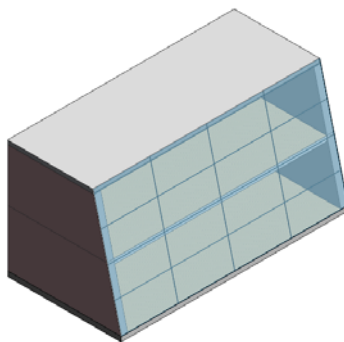
¹⁷ Schedules shall include all Schedules and Tables that are required, either by SCA Standards and/or Industry Standards within a set of Construct Documents for the proper execution of the Work.

- L1:** Basic shapes with approximate/conceptual sizes, shape, and orientations (*Conceptual design*). Analysis based on Overall Systems can be performed. L1 Models will include elements as Generic Components. Quantities based on specific Elements can be obtained, allowing quick takeoffs.



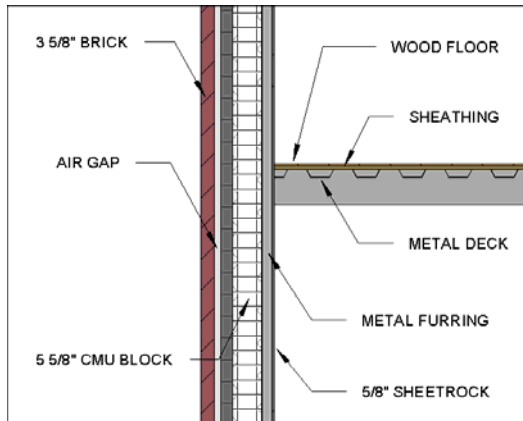
Wall Schedule (L1)					
Family	Type	Width	Length	Area	Volume
Basic Wall	Generic - 6"	6"	63' - 2"	1263.33 SF	631.67 CF
Basic Wall	Generic - 8"	8"	55' - 0"	1100.00 SF	733.33 CF
Basic Wall	Generic - 12"	1' - 0"	43' - 5"	868.33 SF	868.33 CF

- L2:** *Modeled Building Elements* shall be basic 3-D geometric *Models* with **approximate** size, shape, clearances, information, data, and orientation. *Building Elements* and Systems that require Schedules shall have the required data and information to populate such Schedules (*Building Element Models may be generic Model elements*). Analysis based on Specific Systems can be performed, and quantities based on Materials can be obtained, allowing a more specific takeoff to be performed.



Wall Material Takeoff (L2)	
Material: Name	Material: Volume
Gypsum Wall Board	65.80 CF
Gypsum Wall Board	180.90 CF
Insulation / Thermal Barriers - Rigid insulation	315.83 CF
Masonry - Brick	381.63 CF
Masonry - Concrete Masonry Units	592.19 CF
Metal - Furring	263.19 CF
Metal - Stud Layer	262.31 CF
Misc. Air Layers - Air Space	177.66 CF
Misc. membrane Layer	6.58 CF

- L3:** *Modeled Building Elements* shall be detailed 3-D geometric *Models* with **actual** size and shape, clearances, information, data, and orientation. *Building Elements* that require Schedules shall be provided with the required data and information needed to populate such Schedules (*Building Element Models shall reflect the basis of design*¹⁸). At this Level, the Model may also have non-geometric (2D) information such as text, dimensions, notes, 2D details, etc.



Note for the L3 example that a table is not indicated, as an actual schedule to be provided on the Contract Documents would be generated from the model.

1.3.3 Design Phases

The *Design Team* shall *Model* required *Building Elements* and provide all analyses and reports required by the following Sections for each Design Phase and/or Sub-Phase of a project.

- The *Model* shall provide a 3D reference point for the coordination of each design concept.

1.3.3.1 Pre-Schematic Design Intent Models (Phase IA)

The objective of the Pre-Schematic Design Model(s) is to establish conceptual design parameters. In general, the *Model(s)* shall depict the visual concept and general layout of the project including all space requirements.

1. The *Design Team* shall provide an Architectural Massing Model(s) that incorporates all information required to demonstrate the overall concept of each design scheme.
2. The *Consultant* shall provide an exterior “Fly-Thru” of each Architectural Massing Model so that the architectural massing of each proposed building design scheme can be visualized from all angles in context with adjacent properties and structures so that key participants within the *SCA* and the *DOE* may quickly comprehend, proposed building features (windows, doors, etc.), a building’s massing, and spatial conditions. In addition, the *Consultant* shall provide an interior “Walk-Thru” of the Main Entrance and Entrance Lobby so that these building elements/spaces may be visualized by key participants within the *SCA* and the *DOE*.
3. See Section 1.6 – Cost Estimating

¹⁸ SCA construction projects are required to be publicly bid. Hence, a Contractor may elect to install products and/or materials provided by various manufacturers. Therefore, the basis of design shall reflect a manufacturer’s product and/or material that has been approved by the SCA (See SCA Standard Specifications)

1.3.3.2 Schematic Design Intent Models (Phase IB)

The objective of the Schematic Design Model(s) is to provide spatial design(s) based on input from the Pre-Schematic Design Phase and establish the initial design of architectural, structural and major mechanical (HVAC Equipment) *Building Elements*. Therefore, the architectural model(s) shall depict the general design and layout of the building structure, be coordinated with major mechanical *Building Elements*, and act as the baseline for the further development of all Structural and MEP *Models*.

1. The *Design Team* shall provide Architectural Massing *Models* that incorporates all information required to demonstrate the overall conceptual design of each design scheme. In addition to the above, the Architectural Massing *Model* shall be conducive to conceptual cost estimating.
2. See Section 1.3.3.1, Paragraph 2.
3. See Section 1.5 – Program and Space Validation
4. See Section 1.6 – Cost Estimating
5. See Section 1.7 – Zoning Envelope Model

1.3.3.3 Model Progression Tables and Notes

The following “Model Progression Tables” identify required models, per discipline per Design Phase and/or Sub-phase and defines the minimum *Level of Detail* to be provided for each modeled Building Element. In addition, immediately after each discipline’s “Model Progression Table”, “Notes” are provided for each required building element that is to be modeled.

1.3.3.3.1 Architectural

The following “Table” defines the minimum *Level of Detail* to be provided by each modeled *Building Element*. See “Model Progression Table Notes” for additional information and requirements, which follow these Tables.

Architectural Model Progression Table - 3.1								
Description of Building Elements to be Modeled	Level of Detail (Phase IA)				Level of Detail (Phase IB)			
Category/Building Element	L1	L2	L3		L1	L2	L3	
Architectural Massing Model								
00000 - Architectural Model	●	---	---	---	●	---	---	---
00000 - Building Elevations	●	---	---	---	●	---	---	---
00000 - Building Sections	●	---	---	---	●	---	---	---
Sitework								
00000 - Site Plans	●	---	---	---	●	---	---	---
Other								
00000 - Zoning Envelope	●	---	---	---	●	---	---	---
See Section 1.3.2 – Level of Detail/Model Content, “Level of Detail Key” for the <i>Level of Detail</i> required by each Design Phase and/or Sub-Phase of a <i>Project</i> .								

Architectural Model Progression Table - 3.1 - Notes

General Notes:

- 1) Modeled *Building Elements* that are developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all intrinsic default data, parameters and information provided by such *Models* that are necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
 - a) All intrinsic default data, parameters and information contained within a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall be checked and revised, as necessary, to comply with all requirements, guides, standards, etc. that are identified within the *Contract* (Appendix A/Scope of Services).
- 2) Modeled *Building Elements* that are **not** developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all data, parameters and information that is necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Document* for the execution of the *Work*.
- 3) Schedules shall include all Schedules and Tables that are required for Program Validation and Zoning Analyses.
- 4) The *Model* shall include spaces defining accurate net square footage and net volume, and holding data for the room finish schedules; including room names and numbers. Include programmatic information provided by the *SCA* to verify design space against programmed space, using this information to validate area quantities.
- 5) Spaces required for equipment, utilities and services such as, but not limited to the following, shall be coordinated with other disciplines and modeled accordingly:

Note: During the **Pre-Schematic Design Phase (IA)**, spaces are not required to be individually modeled and may be grouped together where appropriate.

- | | |
|--|--|
| <ul style="list-style-type: none"> ■ Central Acid Neutralization Tank Room (if required) ■ Fire Pump Room ■ Fuel Tank Room (if required) ■ Gas Meter Room (or) Gas Rig Location ■ Local RPZ Room ■ Mechanical (HVAC) Equipment Rooms ■ Sewerage Ejector Room (if required) ■ Elevator Machine Room (if required) | <ul style="list-style-type: none"> ■ Water Meter Room ■ Electric Service Room ■ Telecommunication (MDF)Room ■ Telecommunication (IDF) Closets ■ Electrical Closets ■ Automatic Transfer Switch (ATS) Room ■ Transformer Vault/Property Line Box |
|--|--|
- 6) During the **Schematic Design Phase (IB)**, mechanical equipment such as, Condensing Boilers, Roof-top Package Chillers, DOAS RTU's, Non-DOAS RTU's, and major shafts shall be coordinated with other disciplines and modeled at "**Level of Detail**" – **L1**.

Architectural Massing Model

00000 - Architectural Model

- 1) The massing *Model* shall illustrate the building's exterior and key features (windows, doors, etc.). The massing *Model* shall identify scale of the building exterior.
 - The massing *Model* for an addition to an existing school building shall include a massing *Model* of the existing school building.
- 2) See Sitework, Section 00000 – Site Plans.

00000 - Building Elevations

- 1) Building Elevations for new buildings, additions and existing buildings shall include *Models* of all fenestrations (windows, curtain walls, etc.). In addition, all significant *Building Elements* (overhangs, sun shades, roof monitors, etc.) shall be modeled.
 - During the Pre-Schematic Design Phase (IA), Building Elevations may exclude all fenestrations (windows, curtain walls, etc.) and significant *Building Elements* (overhangs, sun shades, roof monitors, etc.).

00000 - Building Sections

- 1) Building Sections of new buildings, additions and existing buildings¹⁹ shall, at a minimum, include all foundation walls, exterior walls, parapets, floors, roofs, floor to floor heights, ceiling heights and overall building heights.

Sitework

00000 -Site Plans

- 1) The Site Plan *Model* shall be developed to the fullest extent possible using surveys provided by the SCA, or if a survey is not available, information that has been researched and obtained from local governing public agencies and/or utilities.
 - During the Pre-Schematic Design Phase (IA) and Schematic Design Phase (IB), existing conditions as well as existing and proposed new site improvements shall be *Modeled* by the Architect and/or Civil Engineer.

Other

00000 -Zoning Envelope

- 1) See Section 1.7 – Zoning Envelope Model.

¹⁹ When new constructions is adjacent to and/or abuts existing construction, the building section, at a minimum, shall include adjacent and/or abutting foundation walls, exterior walls, parapets, floors, roofs and ceiling so to depict conditions that are relevant to the design of the proposed new constructions.

1.3.3.4 Design Development Design Intent Models (Phase IC)

The objective of the Design Development *Model* is to provide spatial design, based on the Schematic Design *Model* that has been approved by the SCA, and establish the initial design for building systems and attributes including architectural, structural, and MEP so to identify initial coordination issues between all building systems. Therefore, the architectural *Model* shall show the general design and layout of the building and act as the baseline for all other subsystem designs, such as MEP and Structural *Models*. The subsystem designs shall be used to demonstrate the initial selection and layout of building components.

All information needed to describe the Schematic Design shall be graphically or alphanumerically included in and derived from these *Models*.

1. At a minimum, the *Building Elements* described within this Section for Architectural, Structural, HVAC, Electrical, Plumbing and Fire Protection Systems, etc. shall be modeled by the *Design Team* so to describe and facilitate the design, intended construction, and cost estimating.
2. The *Consultant* shall provide an exterior “Fly-Thru” of the Architectural Massing Model so that the architectural massing of the proposed building design scheme can be visualized from all angles in context with adjacent properties and structures so that key participants within the SCA and the DOE may quickly comprehend, proposed building features (windows, doors, etc.), a building’s massing, and spatial conditions.

In addition to an exterior “Fly-Thru”, the *Consultant* shall provide an interior “Walk-Thru” of the Architectural Model so that, at a minimum, the following key interior spaces, building elements and proposed finishes can be visualized by key participants within the SCA and the DOE:

- Main Entrance Lobby and Corridors
 - Places of Assembly (Gymnasiums, Auditoriums, Cafeterias, Etc.)
 - Library
 - Typical Classroom
3. See Section 1.4 – Coordination/Clash Detection
 4. See Section 1.5 – Program and Space Validation
 5. See Section 1.6 – Cost Estimating
 6. See Section 1.7 – Zoning Envelope Model

1.3.3.5 Contract Document Design Intent Models (Phases IIA and IIB)

The *Design Team* shall continue development of their *Building Information Model*. Parametric links shall be maintained within the *Models* to enable automatic generation of all plans, sections, elevations, schedules and 3D views.

All information needed to describe the detailed design shall be graphically or alphanumerically included in and derived from these *Models*.

1. At a minimum, the *Building Elements* described within this Section for Architectural, Structural, HVAC, Electrical, Plumbing/Drainage and Fire Protection Systems, etc. shall be modeled by the *Design Team* so to describe and facilitate the design, intended construction, and cost estimating.
2. See Section 1.3.3.4, Paragraph 2.
3. See Section 1.4 – Coordination/Clash Detection
4. See Section 1.6 – Cost Estimating
5. See Section 1.7 – Zoning Envelope Model

1.3.3.6 Model Progression Tables and Notes

The following “Model Progression Tables” identify required models, per discipline per Design Phase and/or Sub-phase and defines the minimum Level of Detail to be provided for each modeled Building Element. In addition, immediately after each discipline’s “Model Progression Table”, “Notes” are provided for each required building element that is to be modeled.

1.3.3.6.1 Architectural²⁰

The following “Table” defines the minimum Level of Detail to be provided by each *modeled Building Element*. See “Model Progression Table Notes” for additional information and requirements, which follow these Tables.

Architectural Model Progression Table - 6.1												
Description of Building Elements to be Modeled	Level of Detail (Phase IC)				Level of Detail (Phase IIA)				Level of Detail (Phase IIB)			
Category/Building Element	L1	L2	L3		L1	L2	L3		L1	L2	L3	
Sitework²¹												
00000 - Site Plans	●	---	---	---	---	●	---	---	---	---	●	---
02200- Earthwork	See Notes				See Notes				See Notes			
02200a - Earthwork (Flow-Through Turf AF)												
02200b - Earthwork (Float Drain Turf or Natural Grass AF)												
02215 - Controlled Low Strength Material												
02511 - Asphaltic Concrete Paving	●	---	---	---	---	●	---	---	---	---	●	---
02512 - Porous Asphalt Paving and Aggregate Base	●	---	---	---	---	●	---	---	---	---	●	---
02513 - Sidewalk and Street Paving	●	---	---	---	---	●	---	---	---	---	●	---
02515 - Unit Pavers	●	---	---	---	---	●	---	---	---	---	●	---
02516 - Exposed Porous Asphalt Paving and Aggregate Base	●	---	---	---	---	●	---	---	---	---	●	---
02531 - Resilient Surfacing	See Notes				See Notes				See Notes			
02532 - Resilient Surfacing - Porous Base												
02533 - Colored Athletic Wearing Surface												
02541 - Synthetic Turf - TPE Infill	●	---	---	---	---	●	---	---	---	---	●	---
02580 - Track/Court/Playground Markings	See Notes				See Notes				See Notes			
02711 - Wall Subdrainage Systems	●	---	---	---	---	●	---	---	---	---	●	---
02721 - Trench Drains	●	---	---	---	---	●	---	---	---	---	●	---
02722 - Precast Concrete Basins and Manholes	●	---	---	---	---	●	---	---	---	---	●	---
02723 - Storm Drainage Systems	●	---	---	---	---	●	---	---	---	---	●	---
02724 - Underdrain System for Porous Asphalt Paving	●	---	---	---	---	●	---	---	---	---	●	---
02725 - Underdrain System for Skinned Areas	●	---	---	---	---	●	---	---	---	---	●	---
02831 - Chain Link Fences and Gates	●	---	---	---	---	●	---	---	---	●	---	---
02860 - Early Childhood Playground Equipment	●	---	---	---	---	●	---	---	---	---	●	---
02862 - Outdoor Game Equipment	●	---	---	---	---	●	---	---	---	---	●	---
02870 - Site and Street Furnishings	●	---	---	---	---	●	---	---	---	---	●	---
02900 - Landscaping	●	---	---	---	---	●	---	---	---	---	●	---
10350 - Flagpole (Site)	●	---	---	---	---	●	---	---	---	---	●	---
16420 - Transformer Vaults	●	---	---	---	---	●	---	---	---	---	●	---

²⁰ Parametric links shall be maintained within all modeled building elements so to enable automatic generation of all plans, sections, elevations, custom details and schedules as well as 3D views.

²¹ Although various site related building elements and component elements that require structural engineering may be modeled by an Architect, Civil Engineer, or Structural Engineer, the modeled site related building element or component element shall incorporate and depict the engineering developed by the responsible design professional.

Please note that although these Guidelines and Standards itemize required site related building elements and/or component elements that require structural engineering within this Section and Section 1.3.3.6.2 – Structural/Sitework, it by no means obligates the Structural Engineer to model these site related building elements and/or components. It is the *Consultant’s* responsibility to assume or assign the required design and modeling of site related building elements and/or component elements that require structural engineering within its *Design Team* so to provide all required models.

**Architectural
Model Progression Table - 6.1**

Description of Building Elements to be Modeled	Level of Detail (Phase IC)				Level of Detail (Phase IIA)				Level of Detail (Phase IIB)			
	L1	L2	L3		L1	L2	L3		L1	L2	L3	
Category/Building Element												
Building Envelope/Foundation & Superstructure												
00000 - Canopies, Overhangs and Exterior Sun Control Elements	●	---	---	---	---	●	---	---	---	---	●	---
04200 - Exterior Unit Masonry Walls and Parapets	●	---	---	---	---	●	---	---	---	---	●	---
04270 - Glass Unit Masonry	●	---	---	---	---	●	---	---	---	---	●	---
04420 - Exterior Cut Stone	●	---	---	---	---	●	---	---	---	---	●	---
04435 - Cast Stone	●	---	---	---	---	●	---	---	---	---	●	---
04700 - Simulated Masonry	●	---	---	---	---	●	---	---	---	---	●	---
07115 - Sheet Membrane Waterproofing for Foundations	See Notes				See Notes				See Notes			
07120 - Fluid-Applied Waterproofing for Plaza Decks												
07147 - Crystalline Waterproofing												
07150 - Chemical Resin Injection Grouting												
07160 - Bituminous Dampproofing	See Notes				See Notes				See Notes			
07211 - Perimeter Foundation Insulation												
07212 - Miscellaneous Building Insulation												
07272 - Fluid-Applied Membrane Air Barrier, Vapor Retarding												
07314 - Slate Shingles	●	---	---	---	---	●	---	---	---	---	●	---
07321 - Clay Tile Roofing	●	---	---	---	---	●	---	---	---	---	●	---
07553 - Hybrid Built-Up/SBS Modified Bituminous Roofing	●	---	---	---	---	●	---	---	---	---	●	---
07560 - Fluid-Applied Protected Membrane Roofing	●	---	---	---	---	●	---	---	---	---	●	---
07561 - Fluid-Applied Protected Membrane Roofing	●	---	---	---	---	●	---	---	---	---	●	---
07600 - Flashing and Sheet Metal	See Notes				See Notes				See Notes			
07610 - Sheet Metal Roofing												
07720 - Roof Accessories												
08110 - Steel Doors and Frames												
08220 - Fiberglass Reinforced Polyester Doors	●	---	---	---	---	●	---	---	---	---	●	---
08330 - Coiling Doors, Grilles and Shutters	●	---	---	---	---	●	---	---	---	---	●	---
08510 - Steel Windows - Projected, Casement, Pivoted, Hung	●	---	---	---	---	●	---	---	---	---	●	---
08522 - Aluminum Double-Hung Windows	●	---	---	---	---	●	---	---	---	---	●	---
08524 - Aluminum Projected Windows	●	---	---	---	---	●	---	---	---	---	●	---
08621 - Fiberglass Sandwich Panel Skylights	●	---	---	---	---	●	---	---	---	---	●	---
08662 - Security Screens and Barriers	●	---	---	---	---	●	---	---	---	---	●	---
08730 - Thresholds, Weatherstripping and Seals	See Notes				See Notes				See Notes			
08920 - Aluminum Curtain Walls												
Interior Walls, Partitions, Finishes and Other Assemblies												
00000 - Sun Control Building Elements	●	---	---	---	---	●	---	---	---	---	●	---
04200 - Unit Masonry Partitions and Walls	●	---	---	---	---	●	---	---	---	---	●	---
05170 - Support System for Suspended Ceilings	See Notes				See Notes				See Notes			
07110 - Sheet Membrane Waterproofing												
07212 - Miscellaneous Building Insulation												
08110 - Steel Doors and Frames												
08210 - Wood Doors	●	---	---	---	---	●	---	---	---	---	●	---
08305 - Access Doors	●	---	---	---	---	●	---	---	---	---	●	---
08330 - Coiling Doors, Grilles and Shutters	●	---	---	---	---	●	---	---	---	---	●	---
08800 - Miscellaneous Glazing	See Notes				See Notes				See Notes			
09205 - Furring and Lathing												
09210 - Plaster												
09260 - Gypsum Board Assemblies (interior metal stud partitions)												
09310 - Ceramic Tile	See Notes				See Notes				See Notes			
09410 - Terrazzo Floors												
09510 - Acoustical Ceilings and Soffits												
09590 - Wood Flooring												
09626 - Resilient Athletic Flooring	●	---	---	---	---	●	---	---	---	---	●	---
09650 - Resilient Flooring	●	---	---	---	---	●	---	---	---	---	●	---
09670 - Vinyl Sheet Athletic Flooring	●	---	---	---	---	●	---	---	---	---	●	---
09675 - Fluid-Applied Equipment Room Flooring	●	---	---	---	---	●	---	---	---	---	●	---
09680 - Carpet	●	---	---	---	---	●	---	---	---	---	●	---

**Architectural
Model Progression Table - 6.1**

Description of Building Elements to be Modeled	Level of Detail (Phase IC)				Level of Detail (Phase IIA)				Level of Detail (Phase IIB)			
	L1	L2	L3		L1	L2	L3		L1	L2	L3	
Category/Building Element												
Interior Walls, Partitions, Finishes and Other Assemblies (con't)												
09685 – Tile Carpet	●	---	---	---	---	●	---	---	---	---	●	---
09705 - Resinous Flooring	●	---	---	---	---	●	---	---	---	---	●	---
Specialties/Equipment/Furnishings & Special Construction												
06410 - Custom Casework	●	---	---	---	---	●	---	---	---	---	●	---
10100 - Visual Display Boards	●	---	---	---	---	●	---	---	---	---	●	---
10151 - Toilet Compartments	●	---	---	---	---	●	---	---	---	---	●	---
10160 - Factory Painted Steel Toilet partitions	●	---	---	---	---	●	---	---	---	---	●	---
10185 - Plastic Shower and Dressing Compartments	●	---	---	---	---	●	---	---	---	---	●	---
10214 - Stationary Metal Wall Louvers	●	---	---	---	---	●	---	---	---	---	●	---
10270 - Access Flooring	●	---	---	---	---	●	---	---	---	---	●	---
10350 - Flagpole (Building)	●	---	---	---	---	●	---	---	---	---	●	---
10400 - Identifying Devices	●	---	---	---	---	●	---	---	---	---	●	---
10415 - Bulletin and Display Boards, Display Cases and Cabinets	●	---	---	---	---	●	---	---	---	---	●	---
10505 - Metal Lockers	●	---	---	---	---	●	---	---	---	---	●	---
10522 - Fire Extinguishers and Cabinets	●	---	---	---	---	●	---	---	---	---	●	---
10605 - Wire Mesh Work	●	---	---	---	---	●	---	---	---	●	---	---
10652 - Electrically Operated Folding Panel Partitions	●	---	---	---	---	●	---	---	---	●	---	---
10653 - Manually Operated Folding Panel Partitions	●	---	---	---	---	●	---	---	---	●	---	---
10655 - Accordion Folding Partitions	●	---	---	---	---	●	---	---	---	●	---	---
10675 - Metal Storage Shelving	●	---	---	---	---	●	---	---	---	●	---	---
10720 - Window Guards (Interior and Exterior)	●	---	---	---	---	●	---	---	---	●	---	---
10810 - Toilet and Bath Accessories	●	---	---	---	---	●	---	---	---	●	---	---
10830 - Mirrors	●	---	---	---	---	●	---	---	---	●	---	---
10840 - Grab Bars	●	---	---	---	---	●	---	---	---	●	---	---
11050 - Library Equipment	●	---	---	---	---	●	---	---	---	---	●	---
11061 - Auditorium Curtains and Projection Screens	●	---	---	---	---	●	---	---	---	---	●	---
11172 - Waste Handling Equipment	●	---	---	---	---	●	---	---	---	---	●	---
11400 - Food Service Equipment	●	---	---	---	---	●	---	---	---	---	●	---
11450 - Domestic Type Equipment	●	---	---	---	---	●	---	---	---	---	●	---
11452 - Culinary Arts Lab Equipment	●	---	---	---	---	●	---	---	---	---	●	---
11460 - Unit Kitchens	●	---	---	---	---	●	---	---	---	---	●	---
11480 - Gymnasium Equipment	●	---	---	---	---	●	---	---	---	---	●	---
11500 - Shop Equipment	●	---	---	---	---	●	---	---	---	---	●	---
11600 - Laboratory Equipment	●	---	---	---	---	●	---	---	---	---	●	---
12302 - Manufactured Wood Casework	●	---	---	---	---	●	---	---	---	---	●	---
12345 - Soapstone	●	---	---	---	---	●	---	---	---	---	●	---
12485 - Foot Grilles	●	---	---	---	---	●	---	---	---	---	●	---
12501 - Chain and Clutch Operated Window Shades	●	---	---	---	---	●	---	---	---	●	---	---
12545 - Draperies	●	---	---	---	---	●	---	---	---	●	---	---
12710 - Fixed Audience Seating	●	---	---	---	---	●	---	---	---	---	●	---
12761 - Wood Bleachers	●	---	---	---	---	●	---	---	---	---	●	---
13031 - Walk-in Trash Refrigerators	●	---	---	---	---	●	---	---	---	---	●	---
13120 - Steel Bleachers	●	---	---	---	---	●	---	---	---	---	●	---

**Architectural
Model Progression Table - 6.1**

Description of Building Elements to be Modeled	Level of Detail (Phase IC)				Level of Detail (Phase IIA)				Level of Detail (Phase IIB)			
Category/Building Element	L1	L2	L3		L1	L2	L3		L1	L2	L3	
Conveying Systems												
14120 - Electric Dumbwaiters	●	---	---	---	---	●	---	---	---	---	●	---
14210 – MRL Traction Passenger Elevators	●	---	---	---	---	●	---	---	---	---	●	---
14211 - Geared Traction Passenger Elevators	●	---	---	---	---	●	---	---	---	---	●	---
14240 - Direct-Acting Hydraulic Passenger Elevators	●	---	---	---	---	●	---	---	---	---	●	---
14241 – Holeless Direct-Acting Hydraulic Passenger Elevators	●	---	---	---	---	●	---	---	---	---	●	---
14250 - Dual-Jack Roped Hydraulic Passenger Elevators	●	---	---	---	---	●	---	---	---	---	●	---
14315 - Hydraulic Sidewalk Elevators	●	---	---	---	---	●	---	---	---	---	●	---
14316 - Geared Traction Sidewalk Elevators	●	---	---	---	---	●	---	---	---	---	●	---
14420 - Hydraulic Vertical Wheelchair Lifts	●	---	---	---	---	●	---	---	---	---	●	---
14421 – Indoor Inclined Wheelchair Lifts	●	---	---	---	---	●	---	---	---	---	●	---
14510 - Escalators	●	---	---	---	---	●	---	---	---	---	●	---
Other												
02221 - Sub-Slab Depressurization System	See Notes				See Notes				See Notes			
03300 - Ramps	●	---	---	---	---	●	---	---	---	---	●	---
05500 - Metal Fabrications	●	---	---	---	---	●	---	---	---	---	●	---
05580 - Sheet Metal Fabrications	●	---	---	---	---	●	---	---	---	---	●	---
05700 - Ornamental Metal	●	---	---	---	---	●	---	---	---	---	●	---
05710 - Steel Stairs	●	---	---	---	---	●	---	---	---	---	●	---
05810 - Prefabricated Expansion Joint Covers	See Notes				See Notes				See Notes			
07270 - Firestopping/Smoke Seals												
07900 - Joint Sealers												
08710 - Finish Hardware												
See Section 1.3.2 – Level of Detail/Model Content, “Level of Detail Key” for the <i>Level of Detail</i> required by each Design Phase and/or Sub-Phase of a <i>Project</i> .												

Architectural Model Progression Table - 6.1 - Notes

General Notes:

- 1) Modeled *Building Elements* that are developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all intrinsic default data, parameters and information provided by such *Models* that are necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
 - a) All intrinsic default data, parameters and information contained within a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall be checked and revised, as necessary, to comply with all requirements, guides, standards, etc. that are identified within the *Contract* (Appendix A/Scope of Services).
- 2) Modeled *Building Elements* that are **not** developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all data, parameters and information that is necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Document* for the execution of the *Work*.
- 3) All "types" of required *Building Elements* shall be modeled. For example, there are numerous "types" and "shapes" of windows and doors. Therefore, each "type" and "shape" shall be modeled with the necessary intelligence for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Document* for the execution of the *Work*.
- 4) All component elements of an associated *Building Element/System* that are **not** individually modeled shall be indicated as an *object property* within a data set of the associated *Building Element/System*.
- 5) The Architect shall coordinate the locations of all Architectural *Building Elements* that require electrical, data, plumbing or other mechanical system with the responsible Engineer.
- 6) Column grids shall be modeled by the Architect.
- 7) The Architect shall **set** all building elevations; roof elevations and pitch, top of parapet elevations, slab elevations, foundation wall brick shelf elevations, and slab depressions. In addition, the Architect shall locate, dimension and set all slab edges and slab openings.

Although all slab openings shall be modeled, slab openings for multiple pipes and/or conduits that have a single outside dimension less than 12-inches are **not** required to be modeled.
- 8) The Architect and/or Civil Engineer shall **locate** all *Building Elements* that are to be *Modeled* by a Structural Engineer and **set** all required elevations for the proper design of such *Models*.
- 9) During the **Design Development Phase (IC)**, the locations and size of all shafts and chases for the coordination and installation of ductwork, pipes and conduits shall be coordinated with other disciplines and modeled at "**Level of Detail" – L2**."
- 10) Schedules shall include all Schedules and Tables that are required, either by SCA Standards and/or Industry Standards within a set of *Contract Documents* for the execution of the *Work*.
- 11) Provide door, window, hardware, flooring, wall finishes, ceiling, and signage schedules, which are extracted from the *Model*, that indicate the type, materials and finishes used for such building elements.
- 12) Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be modeled as part of all equipment and checked for conflicts with other elements. These clearance zones shall be modeled as invisible solids within the object.
- 13) Although all expansion joints and control joints shall be in the model, they need **not** be modeled.
- 14) All spaces shall be modeled and all Floor Plans shall include interior partitions/walls and exterior walls. The *Model* shall include spaces defining accurate net square footage and net volume, and holding data for the room finish schedule; including room names and numbers. Include Programmatic Information provided by the SCA to verify design space against programmed space, using this information to validate area quantities.
- 15) Spaces required for equipment, utilities and services such as, but not limited to the following, shall be coordinated with other disciplines and modeled accordingly:

<ul style="list-style-type: none"> ■ Central Acid Neutralization Tank Room ■ Fire Pump Room ■ Fuel Tank Room ■ Gas Meter Room (or) Gas Rig Location ■ Local RPZ Room 	<ul style="list-style-type: none"> ■ Mechanical (HVAC) Equipment Rooms ■ Sewerage Ejector Room ■ Elevator Machine Room ■ Water Meter Room ■ Electric Service Room 	<ul style="list-style-type: none"> ■ Telecommunication (MDF) Room ■ Telecommunication (IDF) Closets ■ Electrical Closets ■ Automatic Transfer Switch (ATS) Room ■ Transformer Vault/Property Line Box
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Sitework

00000 - Site Plan

- 1) The Site Plan *Model*, which shall be a *Composite Model* of all Architectural/Civil, Structural, and MEP Models that are necessary for the coordination of all sitework shall include, but shall not be limited to, all paving, grades, landscaping, contours, swales, sidewalks, streets, roadbeds, sidewalk vaults, curbs, retaining walls, pavements, stairs, steps, ramps, playground furnishing, equipment and structures (i.e.: handball walls), sidewalk furnishings, fences and gates, manholes, hydrants, underground structures, site lighting, piping, drains, steam lines, conduits for required utilities and services and other new and/or existing physical improvements to the property as well as other adjacent structures within 50-feet of the property shall be modeled.

02200 - Earthwork

- 1) Earthwork, which is required by this specification section, is **not** required to be modeled.

02200a - Earthwork (Flow-Through Turf AF)

- 1) Earthwork, which is required by this specification section, is **not** required to be modeled.

02200b - Earthwork (Float Drain Turf or Natural Grass AF)

- 1) Earthwork, which is required by this specification section, is **not** required to be modeled.

02215 - Controlled Low Strength Material

- 1) Controlled low strength material work, which is required by this specification section, is **not** required to be modeled.

02511 - Asphaltic Concrete Paving

- 1) All asphaltic concrete paving and sub-surface component elements shall be modeled as a single *Building Element/System*.

02512 - Porous Asphalt Paving and Aggregate Base

- 1) All porous asphalt paving and sub-surface component elements shall be modeled as a single *Building Element/System*.

02513 - Sidewalk and Street Paving

- 1) All sidewalks, and street paving and sub-surface component elements shall be modeled as a single *Building Element/System*.

02515 - Unit Pavers

- 1) All unit pavers and sub-surface component elements shall be modeled as a single *Building Element/System*.

02516 - Exposed Porous Asphalt Paving and Aggregate Base

- 1) All exposed porous asphalt paving and sub-surface component elements shall be modeled as a single *Building Element/System*.

02531 - Resilient Surfacing

- 1) All resilient surfaces shall be a component element that is indicated as an *object property* within a data set of the associated *Building Element/System*, (i.e.: asphaltic concrete paving).

02532 - Resilient Surfacing - Porous Base

- 1) All resilient surfaces shall be a component element that is indicated as an *object property* within a data set of the associated *Building Element/System*, (i.e.: porous asphalt paving).

02533 - Colored Athletic Wearing Surface

- 1) All colored athletic wearing surfaces shall be a component element that is indicated as an *object property* within a data set of the associated *Building Element/System*, (i.e.: asphaltic concrete paving).

02541 - Synthetic Turf - TPE Infill

- 1) All synthetic turf – TPE infill and sub-surface component elements shall be modeled as a single *Building Element/System*.

02580 - Track/Court/Playground Markings

- 1) Although all track, court and playground markings shall be in the model, they need **not** be modeled.

02711 - Wall Subdrainage Systems

- 1) Irregardless of size, all perforated piping, non-perforated piping, and fittings shall be modeled.
- 2) All prefabricated drainage panels shall be a component element that is indicated as an *object property* within a data set of the associated *Building Element/System*, (i.e.: foundation walls).

02721 - Trench Drains

- 1) All trench drains, catch basin units and grates shall be modeled.

02722 - Precast Concrete Catch Basins, Detention Basins, and Manholes

- 1) All precast concrete catch basin, detention basin, manholes, frames and covers shall be modeled.

02723 - Storm Drainage Systems

- 1) All storm drainage piping and fittings, irregardless of size, shall be modeled.

02724 - Underdrain System for Porous Asphalt Paving

- 1) All perforated under drain piping and non-perforated collector piping and fittings, irregardless of size, shall be modeled.

02725 - Underdrain System for Skinned Areas

- 1) All piping and fittings, irregardless of size, shall be modeled.

02831 - Chain Link Fences and Gates

- 1) All chain link fences posts, rails, pipes, shall be modeled. (All fence fabric shall modeled as a generic assembly.)

02860 - Early Childhood Playground Equipment

- 1) All early childhood playground equipment shall be modeled.
- 2) Safety surfacing shall be a component element that is indicated as an *object property* within a data set of the associated *Building Element/System*, (i.e.: asphaltic concrete paving).

02862 - Outdoor Game Equipment

- 1) All outdoor game equipment shall be modeled.

02870 - Site and Street Furnishings

- 1) All benches and bicycle racks shall be modeled.

02900 - Landscaping

- 1) All trees with a 3.5-inch caliper or greater and tree pits shall be modeled. (Trees models shall include root balls and burlap.)
- 2) All shrubs, ground cover, sod, grass, etc, shall be modeled. (Shrub models shall include root balls and burlap.)

10350 - Flagpole (Site)

- 1) All flagpoles shall be modeled.

16420 - Transformer Vaults

- 1) All Transformer vaults shall be modeled.

Building Envelope/Foundation & Superstructure

00000 - Canopies, Overhangs and Exterior Sun Control Building Elements

- 1) All canopies, overhangs and exterior sun control building elements shall be modeled as a single *Building Element/System*.

04200 - Exterior Unit Masonry Walls

- 1) All exterior masonry wall types shall be modeled shall be modeled as a single *Building Element/System*.
- 2) All characteristics such as to thermal, acoustical and fire ratings; and component elements such as typical masonry units, interior gypsum board assemblies, rigid insulation, and cavities shall be indicated as an *object property* within a data set for each wall type.
- 3) All bond beams shall be modeled.

04270 - Glass Unit Masonry

- 1) All glass unit masonry that is **not** a component element, which is indicated as an *object property* within a data set of an associated *Building Element/System*, shall be modeled to the same *Level of Detail* of a similar *Building Element/System*.

04420 - Exterior Cut Stone

- 1) All exterior cut stone that is **not** a component element, which is indicated as an *object property* within a data set of an associated *Building Element/System*, shall be modeled to the same *Level of Detail* of a similar *Building Element/System*.

04435 - Cast Stone

- 1) All cut stone that is **not** a component element, which is indicated as an *object property* within a data set of an associated *Building Element/System*, shall be modeled to the same *Level of Detail* of a similar *Building Element/System*.

04700 - Simulated Masonry

- 1) All simulated masonry that is **not** a component element, which is indicated as an *object property* within a data set of an associated *Building Element/System*, shall be modeled to the same *Level of Detail* of a similar *Building Element/System*.

07115 - Sheet Membrane Waterproofing for Foundations

- 1) All sheet membrane waterproofing for foundations shall be indicated as an *object property* within a data set of the associated *Building Element/System*.

07120 - Fluid-Applied Waterproofing for Plaza Decks

- 1) All fluid-applied waterproofing for plaza decks shall be indicated as an *object property* within a data set of the associated *Building Element/System*.

07147 - Crystalline Waterproofing

- 1) All crystalline waterproofing shall be indicated as an *object property* within a data set of the associated *Building Element/System*.

07150 - Chemical Resin Injection Grouting

- 1) Chemical resin injection grouting, which is required by this specification section, is **not** required to be modeled.

07160 - Bituminous Dampproofing

- 1) All bituminous dampproofing shall be indicated as an *object property* within a data set of the associated *Building Element/System*.

07211 - Perimeter Foundation Insulation

- 1) All perimeter foundation insulation that that is **not** a component element, which is indicated as an *object property* within a data set of an associated *Building Element/System*, shall be modeled to the same *Level of Detail* of a similar *Building Element/System*.

07212 - Miscellaneous Building Insulation

- 1) All miscellaneous building insulation that is **not** a component element, which is indicated as an *object property* within a data set of an associated *Building Element/System*, shall be modeled to the same *Level of Detail* of a similar *Building Element/System*.

07272 - Fluid-Applied Membrane Air Barrier, Vapor Retarding

- 1) All fluid-applied membrane air barriers and vapor retarding shall be indicated as an *object property* within a data set of the associated *Building Element/System*.

07314 - Slate Shingles

- 1) All slate shingles that are **not** a component element, which is indicated as an *object property* within a data set of an associated *Building Element/System*, shall be modeled to the same *Level of Detail* of a similar *Building Element/System*.

07321 - Clay Tile Roofing

- 1) All clay tile roofing that is **not** a component element, which is indicated as an *object property* within a data set of an associated *Building Element/System*, shall be modeled to the same *Level of Detail* of a similar *Building Element/System*.

07553 - Hybrid Built-Up/SBS Modified Bituminous Roofing

- 1) All hybrid built-up/SBS modified bituminous roofing systems shall be modeled as a single *Building Element/System*.
- 2) All component elements that are **not** modeled shall be indicated as an *object property* within a data set of an associated *Building Element/System*.

07560 - Fluid-Applied Protected Membrane Roofing

- 1) All fluid-applied protected membrane roofing systems shall be modeled as a single *Building Element/System*.
- 2) All component elements that are **not** modeled shall be indicated as an *object property* within a data set of an associated *Building Element/System*.

07561 - Fluid-Applied Protected Membrane Roofing (Planted Type I)

- 1) All fluid-applied protected membrane roofing (planted type I) systems shall be modeled as a single *Building Element/System*.
- 2) All component elements that are **not** modeled shall be indicated as an *object property* within a data set of an associated *Building Element/System*.

07600 - Flashing and Sheet Metal

- 1) Although all flashing and sheet metal shall be in the model, they need **not** be modeled.

07610 - Sheet Metal Roofing

- 1) All sheet metal roofs shall be modeled.

07720 - Roof Accessories

- 1) All roof accessories such as hatches and vents shall be modeled.

08110 - Steel Doors and Frames

- 1) All steel doors and door frames shall be modeled.

08220 - Fiberglass Reinforced Polyester Doors

- 1) All fiberglass reinforced polyester doors and steel door frames shall be modeled.

08330 - Coiling Doors, Grilles and Shutters

- 1) All coiling doors, grilles and shutters shall be modeled.

08510 - Steel Windows - Projected, Casement, Pivoted, Hung

- 1) All steel windows shall be modeled.

08522 - Aluminum Double-Hung Windows

- 1) All aluminum double-hung windows shall be modeled.

08524 - Aluminum Projected Windows

- 1) All aluminum projected windows shall be modeled.

08621 – Fiberglass Sandwich Panel Skylights

- 1) All fiberglass sandwich panel skylights shall be modeled.

08662 - Security Screens and Barriers

- 1) All security screens and security barriers shall be modeled.

08730 - Thresholds, Weatherstripping and Seals

- 1) All thresholds shall be indicated as an *object property* within a data set of the associated *Building Element/System*.

08920 - Aluminum Curtain Walls

- 1) All aluminum curtain wall type models shall include glazing and profiles of vertical and horizontal extrusions.
- 2) All characteristics such as, but not limited to thermal, acoustical and fire ratings shall be indicated as an *object property* within a data set for each curtain wall type.

Interior Walls, Partitions, Finishes and Other Assemblies

00000 - Sun Control Building Elements

- 1) All sun control building elements shall be modeled as a single *Building Element/System*.

04200 - Unit Masonry Partitions and Walls

- 1) All interior masonry wall types shall be modeled shall be modeled as a single *Building Element/System*.
- 2) All characteristics such as to thermal, acoustical and fire ratings; and component elements such as typical masonry units, interior gypsum board assemblies, rigid insulation, and cavities shall be indicated as an *object property* within a data set for each wall type.
- 3) All bond beams shall be modeled.

05170 - Support System for Suspended Ceilings

- 1) Support systems for suspended ceiling work, which is required by this specification section, is **not** required to be modeled.

07110 - Sheet Membrane Waterproofing

- 1) All sheet membrane waterproofing shall be indicated as an *object property* within a data set of the associated *Building Element/System*.

07212 - Miscellaneous Building Insulation

- 1) All miscellaneous building insulation that is **not** a component element, which is indicated as an *object property* within a data set of an associated *Building Element/System*, shall be modeled to the same *Level of Detail* of a similar *Building Element/System*.

08110 - Steel Doors and Frames

- 1) All steel doors and door frames shall be modeled.

08210 - Wood Doors

- 1) All wood doors and steel door frames shall be modeled.

08305 - Access Doors

- 1) All access doors shall be modeled.

08330 - Coiling Doors, Grilles and Shutters

- 1) All coiling doors, grilles and shutters shall be modeled.

08800 - Miscellaneous Glazing

- 1) All miscellaneous glazing types shall be indicated as an *object property* within a data set of the associated *Building Element/System*.

09205 - Furring and Lathing

- 1) All furring and lathing shall be indicated as an *object property* within a data set of the associated *Building Element/System*.

09210 - Plaster

- 1) All plaster shall be indicated as an *object property* within a data set of the associated *Building Element/System*.

09260 - Gypsum Board Assemblies (interior metal stud partitions)

- 1) All gypsum board assemblies (interior metal stud partitions) shall be modeled as a single *Building Element/System*.
- 2) All characteristics such as, but not limited to thermal, acoustical and fire ratings; and component elements such as metal studs, insulation, gypsum board, and finish materials (i.e.: paint, tile, soapstone, wall bases, integral cove bases, etc.) shall be indicated as *object properties* within the data set of each gypsum board assembly type.

09310 - Ceramic Tile

- 1) All ceramic tiles shall be indicated as an *object property* within a data set of the associated *Building Element/System*.

09410 - Terrazzo Floors

- 1) All terrazzo floors shall be modeled as a single *Building Element/System*.
- 2) All component elements such as flooring material, underbed material and isolation membranes shall be indicated as an *object property* within each model. (Although all divider strips and control joints shall be in the model, they need **not** be modeled.)

09510 - Acoustical Ceilings and Soffits

- 1) All acoustical ceilings, soffits, fascias and window pockets shall be modeled.

09590 - Wood Flooring

- 1) All wood floors shall be modeled as a single *Building Element/System*.
- 2) All component elements such as flooring material, vapor barrier, resilient underlayment, and subfloor panels shall be indicated as an *object property* within each model.

09626 - Resilient Athletic Flooring

- 1) All resilient athletic floors shall be modeled as a single *Building Element/System*.
- 2) All component elements such as flooring material and base mats shall be indicated as an *object property* within each model.

09650 - Resilient Flooring

- 1) All vinyl composition tile flooring, solid vinyl sheet flooring, and slip retardant vinyl sheet flooring shall each be modeled as a single *Building Element/System*.
- 2) All component elements such as flooring material and underlayment materials shall be indicated as an *object property* within each model.

09670 – Vinyl Sheet Athletic Flooring

- 1) All vinyl sheet athletic floors shall be modeled as a single *Building Element/System*.
- 2) All component elements such as flooring material and base mats shall be indicated as an *object property* within each model.

09675 – Fluid –Applied Equipment Room Flooring

- 1) All fluid-applied equipment room flooring shall be modeled as a single *Building Element/System*.

09680 - Carpet

- 1) All carpet models shall be modeled as a single *Building Element/System*.
- 2) All component elements such as flooring material and underlayment materials shall be indicated as an *object property* within each model.

09685 – Tile Carpet

- 3) All carpet models shall be modeled as a single *Building Element/System*.
- 4) All component elements such as flooring material and underlayment materials shall be indicated as an *object property* within each model.

09705 - Resinous Flooring

- 1) All resinous floors shall be modeled.

Specialties/Equipment/Furnishings and Special Construction

06410 - Custom Casework

- 1) All custom casework shall be modeled.

10100 - Visual Display Boards

- 1) All chalkboard, markerboard and tackboards shall be modeled.
- 2) All horizontal sliding marker boards shall be modeled.

10151 - Toilet Compartments

- 1) All floor-mounted solid phenolic toilet compartments and privacy screens shall be modeled.
- 2) All overhead bracing and pilasters shall be modeled.

10160 - Factory Painted Steel Toilet Partitions

- 1) All floor-mounted factory-painted steel toilet partitions shall be modeled.
- 2) All overhead bracing and pilasters shall be modeled.

10185 - Plastic Shower and Dressing Compartments

- 1) All floor-mounted plastic shower and shower compartment shall be modeled.
- 2) All overhead bracing and pilasters shall be modeled.

10214 - Stationary Metal Wall Louvers

- 1) All stationary metal louvers shall be modeled.

10270 - Access Flooring

- 1) All access floor system shall be modeled as a single *Building Element/System*.
- 2) All component elements such as flooring material and modular panels shall be indicated as an *object property* within each model.

10350 - Flagpole (Building)

- 1) All flagpoles shall be modeled.

10400 - Identifying Devices

- 1) All identifying devices such as tablets, plaques, seals, and signage shall be modeled as a single *Building Element/System*.
- 2) All characteristics such as, but not limited to, sign type, materials, finishes, color, and dimensions shall be indicated as *object properties* within the data set of each identifying device.

10415 - Bulletin Boards, Display Boards, Display Cases and Display Cabinets

- 1) All bulletin board, display board; display cabinet and display cases shall be modeled.

10505 - Metal Lockers

- 1) All metal lockers, bases and sloping tops (where applicable), shall be modeled.
- 2) All locker room bench models shall include bench planks and pedestals.

10522 - Fire Extinguishers and Cabinets

- 1) All fire extinguishers, fire blankets, and cabinets shall be modeled.
- 2) All characteristics such as fire extinguisher type (i.e.: water, dry chemical, etc.), cabinet type (i.e.: fire rated, etc.), and blanket shall be indicated as *object properties* within the data set of each model

10605 –Wire Mesh Work

- 1) All wire mesh work shall be modeled as a generic assembly.

10652 –Electrically Operated Folding Panel Partitions

- 1) All electrically operated folding panel partitions shall be modeled as a generic assembly.

10653–Manually Operated Folding Panel Partitions

- 1) All manually operated folding panel partitions shall be modeled as a generic assembly.

10655 - Accordion Folding Partitions

- 1) All accordion folding partitions shall be modeled as a generic assembly.

10675 - Metal Storage Shelving

- 1) All metal storage shelving shall be modeled as a generic assembly.

10720 - Window Guards

- 1) All interior and exterior wire or expanded metal window guards shall be modeled as a generic assembly.

10810 - Toilet and Bath Accessories

- 1) All toilet and bath accessories shall be modeled as a generic assembly.

10830 - Mirrors

- 1) All mirrors shall be modeled as a generic assembly.

10840 - Grab Bars

- 1) All grab bars shall be modeled as a generic assembly.

11050 - Library Equipment

- 1) All fixed equipment and auxiliary devices that require electrical power shall be modeled.

11061 - Auditorium Window Curtains/Platform Curtains and Projection Screens

- 1) All proscenium curtains, platform curtains (cycloramas, border and act curtains), valances, auditorium window curtains, and projection screens shall be modeled.
- 2) All characteristics such as flame resistance ratings and required certifications shall be indicated as *object properties* within the data set of each fire safety proscenium curtain model.

11172 - Waste Handling Equipment

- 1) All vertical trash compactor units and self-contained horizontal compactor units shall be modeled.

11400 - Food Service Equipment

- 1) All food service equipment shall be modeled.

11450 - Domestic Type Equipment

- 1) All domestic type equipment and appliances shall be modeled.

11452 - Culinary Arts Lab Equipment

- 1) All culinary arts lab equipment shall be modeled.

11460 - Unit Kitchens

- 1) All unit kitchens and components (cabinets, microwaves and range hoods) shall be modeled.

11480 - Gymnasium Equipment

- 1) All fixed gymnasium equipment shall be modeled.
- 2) All component elements for the installation of temporary gymnasium equipment such as floor sleeves shall be modeled.

11500 - Shop Equipment

- 1) All Shop Equipment shall be modeled.

11600 - Laboratory Equipment

- 1) All tables, cabinets, tops, shelving, fixtures and equipment in science laboratories, science demonstration rooms and science preparation rooms shall be modeled.

12302 - Manufactured Wood Casework

- 1) All manufactured casework shall be modeled.

12345 - Soapstone

- 1) All soapstone that is **not** a component element, which is indicated as an *object property* within a data set of an associated *Building Element/System*, shall be modeled to the same *Level of Detail* of a similar *Building Element/System*.

12485 - Foot Grilles

- 1) All foot grilles shall be modeled.

12501 - Chain and Clutch Operated Window Shades

- 1) All chain and clutch operated window shall be modeled as a generic assembly.

12545 - Draperies

- 1) All drapery models shall be modeled as a generic assembly.

12710 - Fixed Audience Seating

- 1) All fixed audience seating (opera chairs) and aisle standards shall be modeled.

12761 - Wood Bleachers

- 1) All telescoping and fixed bleachers shall be modeled.

13031 - Walk-in Trash Refrigerators

- 1) All prefabricated walk-in refrigerator units and refrigeration units shall be modeled.

13120 - Steel Bleachers

- 1) All steel bleachers shall be modeled.
- 2) All press boxes shall be modeled.

Conveying Systems

14120 - Electric Dumbwaiters

- 1) All electric dumbwaiters shall be modeled.

14210 – MRL Traction Passenger Elevators

- 1) All MRL traction elevators shall be modeled.

14211 – Geared Traction Passenger Elevators

- 1) All geared traction elevators shall be modeled.

14240 - Direct-Acting Hydraulic Passenger Elevators

- 1) All direct-acting hydraulic passenger elevators shall be modeled.

14241 – Holeless Direct-Acting Hydraulic Passenger Elevators

- 1) All holeless direct-acting hydraulic passenger elevators shall be modeled.

14250 - Dual-Jack Roped Hydraulic Passenger Elevators

- 1) All dual-jack roped hydraulic passenger elevators shall be modeled.

14315 - Hydraulic Sidewalk Elevators

- 1) All hydraulic sidewalk elevators shall be modeled.

14316 - Geared Traction Sidewalk Elevators

- 1) All geared traction sidewalk elevators shall be modeled.

14420 - Hydraulic Vertical Wheelchair Lifts

- 1) All hydraulic vertical wheelchair lifts shall be modeled.

14421 – Indoor Inclined Wheelchair Lift

- 1) All indoor inclined wheelchair lifts shall be modeled.

14510 – Escalators

- 1) All escalators shall be modeled.

Other

02221 – Sub-Slab Depressurization System

- 1) Sub-Slab Depressurization System *Work* that is required by this specification section is **not** required to be modeled.

05500 - Metal Fabrications

- 1) Fabricated and miscellaneous metal models shall include:

- | | |
|------------------------------------|--|
| ▪ Interior and exterior lintels | ▪ Steel pipe railings and handrails |
| ▪ Proscenium opening smoke pockets | ▪ Valve operation platforms |
| ▪ Steel ladders | ▪ Fuel oil tank chamber platforms and ladders |
| ▪ Ladder rungs | ▪ Rooftop equipment service access platforms and ladders |
| ▪ Ladder safety cages | ▪ Chimney connection frames |

05580 - Sheet Metal Fabrications

- 1) Shed metal fabrication models shall include chase bucks, metal closure pieces at window mullions where partitions butt against mullions, expansion joints, and metal window stools.

05700 - Ornamental Metal

- 1) Ornamental metal models shall include:

- | | |
|----------------------------|----------------------------------|
| ▪ Trap Pit Doors | ▪ Auditorium Loudspeaker Grilles |
| ▪ Subway Type Grating | ▪ Aluminum Railings |
| ▪ Iron Fences and Railings | ▪ Bicycle Racks |

05710 - Steel Stairs

- 1) All steel stairs, landings, platforms and handrails shall be modeled.

05810 - Prefabricated Expansion Joint Covers

- 1) Although all interior and exterior prefabricated expansion joint covers for roofs, ceilings, walls, floors, soffits, and fascias shall be in the model, they need **not** be modeled.

07270 - Firestopping/Smoke Seals

- 1) Firestopping and smoke seal work, which is required by this specification section, is **not** required to be modeled.

07900 - Joint Sealers

- 1) Joint sealant work, which is required by this specification section, is **not** required to be modeled.

08710 - Finish Hardware

All finish hardware shall be indicated as an *object property* within a data set of the associated *Building Element/System*, (i.e.: doors, etc.)

1.3.3.6.2 Structural²²

The following “Table” defines the minimum *Level of Detail* to be provided by each *modeled Building Element*. See “Model Progression Table Notes” for additional information and requirements, which follow these Tables.

Structural Model Progression Table - 6.2												
Description of Building Elements to be Modeled	Level of Detail (Phase IC)				Level of Detail (Phase IIA)				Level of Detail (Phase IIB)			
Category/Building Element	L1	L2	L3		L1	L2	L3		L1	L2	L3	
Foundation Systems												
02360 - Piles	●	---	---	---	---	●	---	---	---	---	●	---
03300 - Caissons	●	---	---	---	---	●	---	---	---	---	●	---
03300 - Footings	●	---	---	---	---	●	---	---	---	---	●	---
03300 - Grade Beams	---	---	---	---	---	●	---	---	---	---	●	---
03300 - Piers	●	---	---	---	---	●	---	---	---	---	●	---
03300 - Pile/Caisson Caps	●	---	---	---	---	●	---	---	---	---	●	---
03300 - Slabs	●	---	---	---	---	●	---	---	---	---	●	---
03300 - Strap Beams and Tie Beams	---	---	---	---	---	●	---	---	---	---	●	---
03300 - Pits and Property Line Boxes	---	---	---	---	---	●	---	---	---	---	●	---
03300 - Underground Tanks	●	---	---	---	---	●	---	---	---	---	●	---
03300 - Walls	●	---	---	---	---	●	---	---	---	---	●	---
Framing Systems												
03300 - Concrete Parapets	---	---	---	---	---	●	---	---	---	---	●	---
05120 - Beams	●	---	---	---	---	●	---	---	---	---	●	---
05120 - Built-up Girders	●	---	---	---	---	●	---	---	---	---	●	---
05120 - Columns	●	---	---	---	---	●	---	---	---	---	●	---
05120 - Gusset Plates	---	---	---	---	---	●	---	---	---	●	---	---
05120 - Lateral Bracing	●	---	---	---	---	●	---	---	---	---	●	---
05120 - Trusses	●	---	---	---	---	●	---	---	---	---	●	---
05230 - Steel Joists Girders	●	---	---	---	---	●	---	---	---	---	●	---
05300 - Superstructure Slabs (metal deck)	●	---	---	---	---	●	---	---	---	---	●	---
Miscellaneous												
03300 - Concrete Curbs	---	---	---	---	---	●	---	---	---	---	●	---
03300 - Concrete Stairs	---	---	---	---	---	●	---	---	---	---	●	---
05120 - Dunnage	---	---	---	---	---	●	---	---	---	---	●	---
07250 - Sprayed Fire-Resistive Materials	---	---	---	---	---	●	---	---	---	---	●	---
07260 - Intumescent Fireproofing	---	---	---	---	---	●	---	---	---	---	●	---
08920 - Aluminum Curtain Walls	●	---	---	---	---	●	---	---	---	---	●	---
Sitework²³												
03300 - Footings	●	---	---	---	---	●	---	---	---	---	●	---
03300 - Retaining Walls	●	---	---	---	---	●	---	---	---	---	●	---
03300 - Handball Walls	●	---	---	---	---	●	---	---	---	---	●	---
03300 - Stairs and Ramps	●	---	---	---	---	●	---	---	---	---	●	---
00000 - Other	●	---	---	---	---	●	---	---	---	---	●	---

See Section 1.3.2 – Level of Detail/Model Content, “Level of Detail Key” for the *Level of Detail* required by each Design Phase and/or Sub-Phase of a *Project*

²² Parametric links shall be maintained within all modeled building elements so to enable automatic generation of all plans, schedules, and 3D views.

²³ Although various site related building elements and component elements that require structural engineering may be modeled by an Architect, Civil Engineer, or Structural Engineer, the modeled site related building element or component element shall incorporate and depict the engineering developed by the responsible design professional.

Please note that although these Guidelines and Standards itemize required site related building elements and/or component elements that require structural engineering within this Section and Section 1.3.3.6.2 – Structural/Sitework, it by no means obligates the Structural Engineer to model these site related building elements and/or components. It is the *Consultant's* responsibility to assume or assign the required design and modeling of site related building elements and/or component elements that require structural engineering within its *Design Team* so to provide all required models.

Structural Model Progression Table - 6.2 - Notes

General Notes:

- 1) Modeled *Building Elements* that are developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all intrinsic default data, parameters and information provided by such *Models* that are necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
 - a) All intrinsic default data, parameters and information contained within a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall be checked and revised, as necessary, to comply with all requirements, guides, standards, etc. that are identified within the *Contract* (Appendix A/Scope of Services).
- 2) Modeled *Building Elements* that are **not** developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all data, parameters and information that is necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
- 3) Schedules shall include all Schedules and Tables that are required, either by SCA Standards and/or Industry Standards within a set of *Contract Documents* for the execution of the *Work*.
- 4) All "types" of required *Building Elements* shall be modeled. For example, there are numerous "types" of structural steel and "shapes". Therefore, each type ("beams, columns, piles, etc.") and shape ("wide flange, tube, etc.") shall be modeled with the necessary intelligence for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
- 5) Unless otherwise indicated reinforcement such as, but not limited to, rebar, inserts, dowels and anchors are **not** required to be modeled.
- 6) Unless otherwise indicated pour stops and slab/deck edge angles are **not** required to be modeled.
- 7) Unless otherwise indicated stiffeners and stabilizers are **not** required to be modeled.
- 8) Unless otherwise indicated miscellaneous isolated kickers and top of wall/partition braces are **not** required to be modeled.
- 9) Unless otherwise indicated bar joist bridging is **not** required to be modeled.
- 10) Unless otherwise indicated structural steel bolts and welds are **not** required to be modeled.
- 11) Unless otherwise indicated structural support angles less than 3-feet in length are **not** required to be modeled.

Foundation Systems

02360 - Piles

- 1) All piles shall be modeled to a depth of 5-feet below the bottom of the pile cap for information purposes only.

03300 -Strap Beams and Tie Beams

- 1) All strap beams and tie beams shall be modeled.

03300 - Caissons

- 1) All caissons shall be modeled to a depth of 5-feet below the bottom of the pile cap for information purposes only.

03300 - Footings

- 1) All footings such as mat and spread footings shall be modeled.

03300 - Grade Beams

- 1) All grade beams shall be modeled.

03300 - Piers

- 1) All piers shall be modeled.

03300 - Pile/Caisson Caps

- 1) All pile and caisson caps shall be modeled.

03300 - Slabs

- 1) All framed slabs and slabs on grade shall be modeled.

03300 – Pits and Property Line Boxes

- 1) All property line boxes, pits, and sub-slab pits for sub-slab depressurization systems shall be modeled.

03300 –Underground Tanks

- 1) All underground tanks shall be modeled.

03300 - Walls

- 1) All foundation walls shall be modeled.
- 2) All foundation wall corbels shall be modeled.
- 3) All foundation wall penetrations that have a single outside dimension of 12-inches or greater shall be modeled.

Framing Systems

05120 - Beams

- 1) All beams shall be modeled.

05120 - Gusset Plates

- 1) All gusset plates shall be modeled.
- 2) All gusset plates shall always be modeled at “Level of Detail” – L2.

05120 - Built-up Girders

- 1) All built-up girders shall be modeled.

05120 - Columns

- 1) All columns shall be modeled with the correct orientation.
- 2) Columns shall be modeled to both actual top and bottom elevations.

05120 - Lateral Bracing

- 1) All lateral braces shall be modeled.

05120 - Trusses

- 1) All trusses shall be modeled.

05230 - Steel Joists Girders

- 1) All steel joist girders shall be modeled.

05300 - Superstructure Slab (metal deck)

- 1) All superstructure slabs shall be modeled.

Miscellaneous

03300 - Concrete Parapets

- 1) All concrete parapets shall be modeled.

03300 - Concrete Curbs

- 1) All concrete curbs that support major mechanical equipment such as Chillers, DOAS RTU Units, Non-DOAS RTU Units shall be modeled.
- 2) All concrete curbs on roofs that support equipment such as, but not limited to, play equipment and outdoor game equipment shall be modeled.

03300 - Concrete Stairs

- 1) All concrete stairs shall be modeled.

05120 - Dunnage

- 1) All steel dunnage that supports and/or provides access to major mechanical equipment such as Chillers, DOAS RTU Units, Non-DOAS RTU Units shall be modeled.

07250 - Sprayed Fire-Resistive Materials

- 1) All sprayed fire-resistive materials shall be modeled.

07260 - Intumescent Fireproofing

- 1) All intumescent fireproofing shall be modeled.

08920 - Aluminum Curtain Walls

- 1) All structural steel support framing for curtain wall installations shall be modeled.

Sitework

03300 - Footings

- 1) All concrete footings for site related installations such as, but not limited to, bleachers, flagpoles, chain link fences and gates, early childhood playground equipment, outdoor game equipment, handball walls, site furnishings and street furnishings shall be modeled.

03300 - Stairs and Ramps

- 1) All concrete stairs and ramps shall be modeled.



03300 - Retaining Walls

- 1) All retaining walls shall be modeled.

03300 - Handball Walls

- 1) All handball walls shall be modeled.

00000 - Other

- 1) In addition to the *Models* referenced herein, any *Building Element* that requires its design to be performed by a Structural Engineer shall be *Modeled*.

1.3.3.6.3 HVAC ²⁴

The following “Table” defines the minimum *Level of Detail* to be provided by each *modeled Building Element*. See “Model Progression Table Notes” for additional information and requirements, which follow these Tables.

HVAC Model Progression Table - 6.3												
Description of Building Elements to be Modeled	Level of Detail (Phase IC)				Level of Detail (Phase IIA)				Level of Detail (Phase IIB)			
Category/Building Element	L1	L2	L3		L1	L2	L3		L1	L2	L3	
Ductwork												
15514 - Duct Insulation	---	---	---	---	---	---	●	---	---	---	●	---
15575 - Boiler Flue (Chimney)	---	---	---	---	---	---	●	---	---	---	●	---
15891 - Duct Silencers	---	---	---	---	---	---	●	---	---	---	●	---
15891 - Ductwork (Supply, Exhaust and Return)	---	---	---	---	---	---	●	---	---	---	●	---
15910 – Duct Access Doors and Accessories	---	---	---	---	---	---	●	---	---	---	●	---
15915 - Dampers, Actuators and Ductwork Components	---	---	---	---	---	---	●	---	---	---	●	---
15940 – Duct Air Outlet/Inlets	---	●	---	---	---	---	●	---	---	---	●	---
Equipment and Temperature Control Systems												
15513 - Equipment Insulation	---	---	---	---	---	---	●	---	---	---	●	---
15515 - Air Separators	---	---	---	---	---	---	●	---	---	---	●	---
15515 - Expansion Tanks	---	---	---	---	---	---	●	---	---	---	●	---
15517 - Chemical Feed Units	---	---	---	---	---	---	●	---	---	---	●	---
15540 - Chilled Water Pumps	---	●	---	---	---	---	●	---	---	---	●	---
15540 - Condensate Pumps	---	---	---	---	---	---	●	---	---	---	●	---
15540 - Hot Water Pumps	---	●	---	---	---	---	●	---	---	---	●	---
15565 - Hot Water Condensing Boilers	---	●	---	---	---	---	●	---	---	---	●	---
15590 - Fuel Oil Duplex Pumps	---	●	---	---	---	---	●	---	---	---	●	---
15590 - Fuel Oil Storage Tanks	---	●	---	---	---	---	●	---	---	---	●	---
15590 - Emergency Generator Systems (Fill Boxes)	---	●	---	---	---	---	●	---	---	---	●	---
15590 - Fuel Storage Equipment (Fill Boxes)	---	●	---	---	---	---	●	---	---	---	●	---
15660 - Roof-top Package Chillers	---	●	---	---	---	---	●	---	---	---	●	---
15670 - Heat Exchangers	---	●	---	---	---	---	●	---	---	---	●	---
15783 - Split AC/HP Indoor and Outdoor Units	---	●	---	---	---	---	●	---	---	---	●	---
15835 - Convectors	---	●	---	---	---	---	●	---	---	---	●	---
15835 - Fin Tube Radiation with Enclosure	---	---	---	---	---	---	●	---	---	---	●	---
15836 - Cabinet Heaters	---	●	---	---	---	---	●	---	---	---	●	---
15836 - Unit Heaters	---	●	---	---	---	---	●	---	---	---	●	---
15838 - Fan Coil Units	---	●	---	---	---	---	●	---	---	---	●	---
15852 - Air handling Units Located within Interior of the Building	---	●	---	---	---	---	●	---	---	---	●	---
15853 - Custom Packaged Rooftop Heating and Cooling Units	---	●	---	---	---	---	●	---	---	---	●	---
15854 - Custom Packaged Rooftop Heating and Cooling Units	---	●	---	---	---	---	●	---	---	---	●	---
15860 - Centrifugal Fans	---	●	---	---	---	---	●	---	---	---	●	---
15880 - Sub-Slab Depressurization System	See Notes				See Notes				See Notes			
15930 - VAV Boxes	---	●	---	---	---	---	●	---	---	---	●	---
15931 - Fan Powered Variable Air Volume (VAV) Terminal Units	---	●	---	---	---	---	●	---	---	---	●	---
15932 - Chilled Beam Units	---	●	---	---	---	---	●	---	---	---	●	---
15933 - DOAS RTU's	---	●	---	---	---	---	●	---	---	---	●	---
15934 - Non-DOAS RTU's	---	●	---	---	---	---	●	---	---	---	●	---
15970 - Temperature Controls	---	●	---	---	---	---	●	---	---	---	●	---

²⁴ Parametric links shall be maintained within all modeled building elements so to enable automatic generation of all plans, sections, elevations, schedules and 3D views.

HVAC Model Progression Table - 6.3												
Description of Building Elements to be Modeled	Level of Detail (Phase IC)				Level of Detail (Phase IIA)				Level of Detail (Phase IIB)			
Category/Building Element	L1	L2	L3		L1	L2	L3		L1	L2	L3	
Piping												
15510 - Chilled Water	---	---	---	---	---	---	●	---	---	---	●	---
15510 - Condensate Drain	---	---	---	---	---	---	●	---	---	---	●	---
15510 - Fuel Oil Fill, Vent, Supply and Return	---	---	---	---	---	---	●	---	---	---	●	---
15510 - Hot Water	---	---	---	---	---	---	●	---	---	---	●	---
15510 - Refrigerant	---	---	---	---	---	---	●	---	---	---	●	---
15511 - Isolation and Balancing Valves	---	---	---	---	---	---	●	---	---	---	●	---
15512 - Piping Insulation	---	---	---	---	---	---	●	---	---	---	●	---
15970 - Control Valves	---	---	---	---	---	---	●	---	---	---	●	---
See Section 1.3.2 – Level of Detail/Model Content, “Level of Detail Key” for the <i>Level of Detail</i> required by each Design Phase and/or Sub-Phase of a <i>Project</i> .												

HVAC Model Progression Table - 6.3 - Notes

General Notes:

- 1) Modeled *Building Elements* that are developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all intrinsic default data, parameters and information provided by such *Models* that are necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
 - a) All intrinsic default data, parameters and information contained within a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall be checked and revised, as necessary, to comply with all requirements, guides, standards, etc. that are identified within the *Contract* (Appendix A/Scope of Services).
- 2) Modeled *Building Elements* that are **not** developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all data, parameters and information that is necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
- 3) The HVAC Engineer shall coordinate the locations of all modeled building elements that require power or low voltage with the Electrical Engineer.

The HVAC Engineer shall coordinate the locations of all smoke detectors for ductwork and dampers with the Electrical Engineer.
- 4) Schedules shall include all Schedules and Tables that are required, either by SCA Standards and/or Industry Standards within a set of *Contract Documents* for the execution of the *Work*.
- 5) Existing underground steam lines that are within or adjacent to the property shall be modeled to the same *Level of Detail* of a similar *Building Element/System*.
- 6) All "types" of required *Building Elements* shall be modeled. For example, there are numerous types of "pumps". Therefore, each type of "pump" shall be modeled with the necessary intelligence for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
- 7) Although connections to all equipment shall be made, hook-up detailing for all equipment is **not** required to be modeled.
- 8) Hangers and supports are **not** required to be modeled.
- 9) *Building Elements* shall **not** be modeled as 3-D Solids.
- 10) Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be modeled as part of all equipment and checked for conflicts with other elements during Design Phases IIA and IIB. These clearance zones shall be modeled as invisible solids within the object.

Ductwork

15514-Duct Insulation

- 1) All ductwork insulation shall be modeled.

15575 - Boiler Flue (Chimney)

- 1) All flues shall be modeled.

15891 - Duct Silencers

- 1) All duct silencers shall be modeled.

15891 -Ductwork (Supply, Exhaust and Return)

- 1) All exhaust, return and supply ducts shall be modeled.

15910 - Duct Access Doors

- 1) All access doors for dampers, specialty service valves and cleanouts shall be modeled.
- 2) All ductwork accessories such as turning vanes, and duct liners shall be modeled.

15915 - Dampers

- 1) All dampers such as Combination Fire Smoke (purge and non-purge types) dampers, combustion air intake dampers, fire dampers, multi-blade dampers, smoke dampers, volume dampers, and damper actuators shall be modeled.

15940 - Duct Air Outlet/Inlets

- 1) All ductwork air outlets and inlets such as diffusers, registers, and grilles shall be modeled.
- 2) All ductwork connections to architectural louvers shall be modeled.

Equipment and Temperature Control Systems

15514-Equipment Insulation

- 1) All equipment insulation shall be modeled.

15515 - Air Separators

- 1) All air separators shall be modeled.

15515 - Expansion Tanks

- 1) All expansion tanks shall be modeled.

15517 - Chemical Feed Units

- 1) All chemical feed units shall be modeled.

15540 - Chilled Water Pumps

- 1) All chilled water pumps shall be modeled.

15540 - Condensate Pumps

- 1) All condensate pumps shall be modeled.

15540 - Hot Water Pumps

- 1) All hot water pumps shall be modeled.

15565 - Hot Water Condensing Boilers

- 1) All boiler accessories such as dampers, control panels, gas leak detection panels and sensors, break glass stations shall be modeled.

15590 - Fuel Oil Duplex Pumps

- 1) All fuel oil duplex pumps shall be modeled.

15590 - Fuel Oil Storage Tanks

- 1) All fuel oil storage tanks shall be modeled.

15590-Emergency Generator System (Fill Boxes)

- 1) All fill boxes shall be modeled.

15594-Fuel Storage Equipment (Fill Boxes)

- 1) All fill boxes shall be modeled

15660 - Roof-top Package Chillers

- 1) All roof-top package chillers shall be modeled.

15670 - Heat Exchangers

- 1) All heat exchangers shall be modeled.

15783 - Split AC/HP Indoor and Outdoor Units

- 1) All split AC/HP indoor and outdoor units shall be modeled.

15835 - Convectors

- 1) All convectors shall be modeled.

15835 - Fin Tube Radiation with Enclosure

- 1) All fin tube radiation and enclosures shall be modeled.

15836 - Cabinet Heaters

- 1) All cabinet heaters shall be modeled.

15836 - Unit Heaters

- 1) All unit heaters shall be modeled.

15838 - Fan Coil Units

- 1) All fan coil units, outside air intake boxes and ductwork connections shall be modeled.

15852 - Air Handling Units Located within Interior of the Building

- 1) All air handling units located within interior of the building and ductwork connections shall be modeled.

15853-Custom Packaged Rooftop Heating and Cooling Units

- 1) All rooftop heating and cooling units and ductwork connections shall be modeled.

15854-Custom Packaged Rooftop Heating and Cooling Units

- 1) All rooftop heating and cooling units and ductwork connections shall be modeled.

15860 - Centrifugal Fans

- 1) All centrifugal fans shall be modeled.

15880 - Sub-Slab Depressurization System

- 1) All fans that are required by this specification section are **not** required to be modeled.

15930 - VAV Boxes

- 1) All VAV boxes and control boxes shall be modeled.

15931 – Fan Powered Variable Air Volume (VA) Terminal Units

- 1) All fan powered variable air volume (VA) terminal units and control boxes shall be modeled.

15932 - Chilled Beam Units

- 1) All chilled beam units shall be modeled.

15933 - DOAS RTU's

- 1) All DOAS RTU units shall be modeled.

15934 - Non-DOAS RTU's

- 1) All Non-DOAS RTU units shall be modeled.

15970 - Temperature Controls

- 1) All temperature control components such as sensors, thermostats, routers, and panels that are necessary for coordination, installation and operation shall be modeled.

Piping²⁵

15510 - Chilled Water

- 1) Chilled water piping and fittings shall be modeled.

15510 - Condensate Drain

- 1) Condensate drain piping and fittings shall be modeled.

15510 - Fuel Oil Fill, Vent, Supply and Return

- 1) Fuel oil fill and vent, supply and return piping and fittings shall be modeled.

15510 - Hot Water

- 1) Hot water piping and fittings shall be modeled.

15510 - Refrigerant

- 1) Refrigerant piping and fittings shall be modeled.

15511 -Isolation and Balancing Valves

- 1) All balancing valves and isolation valves 4-inches in outside diameter or greater, connecting piping and fittings shall be modeled.

15512-Piping Insulation

- 1) Piping insulation shall be modeled when a modeled pipe requires insulation.

15970-Control Valves

- 1) All balancing valves and isolation valves 4-inches in outside diameter or greater, connecting piping and fittings shall be modeled.

²⁵ All piping and fittings that have an outside diameter of **2-inches** or greater shall be modeled.

1.3.3.6.4 Electrical Systems²⁶

The following “Table” defines the minimum *Level of Detail* to be provided by each *modeled Building Element*. See “Model Progression Table Notes” for additional information and requirements, which follow these Tables.

Electrical Model Progression Table - 6.4												
Description of Building Elements to be Modeled	Level of Detail (Phase IC)				Level of Detail (Phase IIA)				Level of Detail (Phase IIB)			
Category/Building Element	L1	L2	L3		L1	L2	L3		L1	L2	L3	
Lighting												
16140 - Wiring Devices/Lighting Switching	---	●	---	---	---	---	●	---	---	---	●	---
16145 - Lighting Control Devices	---	●	---	---	---	---	●	---	---	---	●	---
16470 - Panelboards/Emergency Lighting Panel	---	●	---	---	---	---	●	---	---	---	●	---
16500 - Interior Building Lighting	---	●	---	---	---	---	●	---	---	---	●	---
16520 - Emergency Exit Lighting	---	●	---	---	---	---	●	---	---	---	●	---
Low Voltage and Data Systems												
16471 - Auditorium and Television Studio Dimming Systems	---	●	---	---	---	---	●	---	---	---	●	---
16670 - Lightning Protection System	---	●	---	---	---	---	●	---	---	---	●	---
16701 - Auxiliary Signal System	---	●	---	---	---	---	●	---	---	---	●	---
16720 - Fire Detection & Alarm System w/Central Office Connection	---	●	---	---	---	---	●	---	---	---	●	---
16721 - City Fire Alarm System	---	●	---	---	---	---	●	---	---	---	●	---
16723 - Fire Detection and Alarm Systems	---	●	---	---	---	---	●	---	---	---	●	---
16724 - Intrusion Alarm System	---	●	---	---	---	---	●	---	---	---	●	---
16725 - Telephone Cabling System	---	●	---	---	---	---	●	---	---	---	●	---
16727 - Data Cabling Systems	---	●	---	---	---	---	●	---	---	---	●	---
16728 - Fiber Optic Cabling System	---	●	---	---	---	---	●	---	---	---	●	---
16770 - Sound, Intercom and Teacher Activated Security System	---	●	---	---	---	---	●	---	---	---	●	---
16771 - Projection and Interactive Whiteboard Systems	---	●	---	---	---	---	●	---	---	---	●	---
16780 - Television Cabling System	---	●	---	---	---	---	●	---	---	---	●	---
16783 - Internet Protocol Digital Video Surveillance Cabling System	---	●	---	---	---	---	●	---	---	---	●	---
16791 - Self-Corrective Clock System	---	●	---	---	---	---	●	---	---	---	●	---
16792 - Wireless Clock System	---	●	---	---	---	---	●	---	---	---	●	---
16726 - Intercom System for Holding Areas and Elevators	---	●	---	---	---	---	●	---	---	---	●	---
Power, Conduits and Pipes												
16130 - Conduits and Piping	---	---	---	---	---	---	●	---	---	---	●	---
16140 - Wiring Devices/Receptacles	---	●	---	---	---	---	●	---	---	---	●	---
16231 - Emergency Generator	---	●	---	---	---	---	●	---	---	---	●	---
16420 - Service Switch	---	●	---	---	---	---	●	---	---	---	●	---
16425 - Switchboards	---	●	---	---	---	---	●	---	---	---	●	---
16441 - Enclosed Switches	---	●	---	---	---	---	●	---	---	---	●	---
16450 - Grounding Bus Bars	---	●	---	---	---	---	●	---	---	---	●	---
16470 - Power Panels	---	●	---	---	---	---	●	---	---	---	●	---
16472 - Science Laboratory Power Units	---	●	---	---	---	---	●	---	---	---	●	---
16480 - Motors, Motor Control Centers, Starters & Control Equip.	---	●	---	---	---	---	●	---	---	---	●	---
Sitework												
16420 - Property Line Box	---	●	---	---	---	---	●	---	---	---	●	---
16530 - Site/Security Lighting	---	●	---	---	---	---	●	---	---	---	●	---
See Section 1.3.2 – Level of Detail/Model Content, “Level of Detail Key” for the <i>Level of Detail</i> required by each Design Phase and/or Sub-Phase of a <i>Project</i> .												

²⁶ Parametric links shall be maintained within all modeled building elements so to enable automatic generation of all plans, sections, elevations, custom details and schedules as well as 3D views.

Electrical Model Progression Table - 6.4 - Notes

General Notes:

- 1) Modeled *Building Elements* that are developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all intrinsic default data, parameters and information provided by such *Models* that are necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
 - a) All intrinsic default data, parameters and information contained within a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall be checked and revised, as necessary, to comply with all requirements, guides, standards, etc. that are identified within the *Contract* (Appendix A/Scope of Services).
- 2) Modeled *Building Elements* that are **not** developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all data, parameters and information that is necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
- 3) Schedules shall include all Schedules and Tables that are required, either by SCA Standards and/or Industry Standards within a set of *Contract Documents* for the execution of the *Work*.
- 4) All "types" of required *Building Elements* shall be modeled. For example, there are numerous types of "lighting fixtures". Therefore, each type of "lighting fixture" shall be modeled with the necessary intelligence for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
- 5) Unless otherwise indicated, all electrical and low voltage *Building Elements* that are necessary for the operation of any equipment and/or system shall be modeled.
- 6) Wiring shall be **excluded** from all models.
- 7) Hangers and supports are **not** required to be modeled.
- 8) *Building Elements* shall **not** be modeled as 3-D Solids.
- 9) All feeders, conduits and pipes that have an outside diameter that is **less than** 2-inches are **not** required to be modeled.
- 10) Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be modeled as part of all equipment and checked for conflicts with other elements during Design Phases IIA and IIB. These clearance zones shall be modeled as invisible solids within the object.

Lighting

16140 - Wiring Devices/Light Switching

- 1) All light switch boxes and wall plates shall be modeled.
 - During the Design Development Phase (IC), whenever light switching is required, only one room and/or space for each room type/name require lighting switching Models.

16145 - Lighting Control Devices

- 1) All control panels and sensors shall be modeled.
 - During the Design Development Phase (IC), whenever lighting control devices are required, only one room and/or space for each room type/name require lighting control device Models.

16470 -Panelboards/Emergency Lighting Panel

- 1) All emergency lighting panels shall be modeled.
 - During the Design Development Phase (IC), whenever emergency lighting panels are required, only one room and/or space for each room type/name require emergency lighting panel Models.

16500 - Interior Building Lighting

- 1) All interior building lighting models shall include all lighting fixture types, frames, and trim rings shall be modeled.
 - During the Design Development Phase (IC), whenever lighting is required, only one room and/or space for each room type/name require lighting Models.

16520 -Emergency Exit Lighting

- 1) All emergency exit lighting and lighting fixtures shall be modeled.
 - During the Design Development Phase (IC), whenever exit lighting is required, only one room and/or space for each room type/name require exit lighting Models.

Low Voltage and Data Systems

16471 -Auditorium and Television Studio Dimming Systems

- 1) All auditorium and television studio dimming system models shall include dimmer racks, control consoles, remote control receptacles, stage manager panels (SMP), and pipe grids.
 - During the Design Development Phase (IC), all Auditorium and Television Studio Dimming Systems shall be modeled.

16670 - Lightning Protection System

- 1) All lightning protection system models shall include all air terminals, roof penetrations, grounding and grounding terminations, and surge protection devices.

16701 - Auxiliary Signal System

- 1) All auxiliary signal system models shall include monitors (indicating panels), pushbuttons, pushbutton stations and bells.
 - During the Design Development Phase (IC), whenever an Auxiliary Signal System is required, only one room and/or space for each room type/name require Auxiliary Signal System Models.

16720 - Fire Detection and Alarm System with Central Office Connection

- 1) All fire alarm detection system models shall include control panels, pull stations, detectors, switch boxes, notification devices, electromagnetic control devices, and alarms.
 - During the Design Development Phase (IC), whenever a Fire Alarm Detection System is required, only one room and/or space for each room type/name require Fire Alarm Detection System Models.

16721 - City Fire Alarm System

- 1) All city fire alarm detection system models shall include service entrance junction box, pull box, city fire alarm signal box that are within the building.
 - During the Design Development Phase (IC), whenever a City Fire Alarm Detection System is required, only one room and/or space for each room type/name require City Fire Alarm Detection System Models.
- 2) All city fire alarm detection system models shall include ducts, manholes, poles, terminal blocks that are outside the building.

16723 - Fire Detection and Alarm Systems

- 1) All fire alarm detection and alarm system models shall include control panels, pull stations, detectors, switch boxes, notification devices, electromagnetic control devices, and alarms.
 - During the Design Development Phase (IC), whenever a Fire Alarm Detection and Alarm System is required, only one room and/or space for each room type/name require City Fire Alarm Detection and Alarm System Models.

16724 - Intrusion Alarm System

- 1) All intrusion alarm system models shall include control panels, backboxes, sirens, strobes, detectors, door contacts, switches, and alarms.
 - During the Design Development Phase (IC), whenever an Intrusion Alarm System is required, only one room and/or space for each room type/name require Intrusion Alarm System Models.

16725 - Telephone Cabling System

- 1) All telephone cabling system models shall include lock boxes, intermediate distribution frames (IDF), main distribution frames (MDF), jack boxes, and cable trays.
 - During the Design Development Phase (IC), whenever a Telephone Cabling System is required, only one room and/or space for each room type/name require Telephone Cabling System Models.

16727 - Data Cabling Systems

- 1) All data cabling system models shall include all local distribution frame (LDF) data racks, data racks, and cable trays.
 - During the Design Development Phase (IC), whenever a Data Cabling System is required, only one room and/or space for each room type/name require Data Cabling System Models.

16728 - Fiber Optic Cabling System

- 1) See 16727 - Data Cabling Systems.

16770 - Sound, Intercom and Teacher Activated Security System

- 1) All sound, intercom and teacher activated security system models shall include all central and local control sound racks; administrative control stations (ACS), loudspeakers, privacy call-in switch boxes and conduits.
 - During the Design Development Phase (IC), whenever a Sound, Intercom and Teacher Activated Security System is required, only one room and/or space for each room type/name require Sound, Intercom and Teacher Activated Security System Models.

16771 - Projection and Interactive Whiteboard Systems

- 1) All projection and interactive whiteboard system models shall be modeled.
 - During the Design Development Phase (IC), whenever a Projection and Interactive Whiteboard System is required, only one room and/or space for each room type/name require Projection and Interactive Whiteboard System Models.

16780 - Television Cabling System

- 1) Television Cabling System models shall include all outlet boxes, and cable trays.
 - During the Design Development Phase (IC), whenever a Television Cabling System is required, only one room and/or space for each room type/name require Television Cabling System Models.

16783 - Internet Protocol Digital Video Surveillance Cabling System

- 1) All internet protocol digital video surveillance cabling system models shall include all internal and external cameras, viewing station consoles, equipment racks, cabinets, and cable trays.
 - During the Design Development Phase (IC), whenever an Internet Protocol Digital Video Surveillance Cabling System is required, only one room and/or space for each room type/name require Internet Protocol Digital Video Surveillance Cabling System Models.

16791 - Self-Corrective Clock System

- 1) All self-corrective clock system models shall include all master program clocks (where applicable), secondary clocks, and conduits.
 - During the Design Development Phase (IC), whenever a Self-Corrective Clock System is required, only one room and/or space for each room type/name require Self-Corrective Clock System Models.

16792 - Wireless Clock System

- 1) All wireless clock system models shall include all global positioning system (GPS) receivers and analog clocks.
 - During the Design Development Phase (IC), whenever a Wireless Clock System is required, only one room and/or space for each room type/name require Wireless Clock System Models.

16726 - Intercom System for Holding Areas and Elevators

- 1) All holding areas and elevators intercom systems models shall include all master and staff stations, audible and visual signaling devices, and intercom cabinets.
 - During the Design Development Phase (IC), whenever a Holding Areas and/or Elevator Intercom System model is required, all holding areas and elevators that require an intercom system shall be modeled.

Power, Conduits and Piping

16130 – Conduits and Piping

- 1) Feeders, conduits, pipes and fittings with an outside diameter of 2-inches or greater shall be modeled.

16140 –Wiring Devices/Receptacles

- 1) All receptacle boxes and wall plates shall be modeled.
 - During the Design Development Phase (IC), whenever Receptacles are required, only one room and/or space for each room type/name require Receptacles shall be modeled.

16231 - Emergency Generator

- 1) All emergency generators shall include automatic transfer switches.

16420 - Service Switch

- 1) All service switches, cabinets, service end boxes, property line splice boxes, end boxes, meter pans, meter blocks, current transformer cabinets and other equipment in connection with service entrance shall be modeled.

16425 - Switchboards

- 1) All switchboards pull boxes, meters, and overcurrent protection devices shall be modeled.

16441 – Enclosed Switches

- 1) All service switches and enclosures shall be modeled.

16450 - Grounding Bus Bars

- 1) Grounding bus bar models shall include building bus bars, and telecommunication room bus bars.

16470 - Panel boards

- 1) All panel boards, boxes and cabinets shall be modeled.



16472 - Science Laboratory Power Units

- 1) All demonstration units, power units, and meter units shall be modeled.

16480 - Motors Motor Control Centers, Starters and Control Equipment

- 1) All motors, motor control centers, switch boxes, and starters shall be modeled.

Sitework

16420 - Property Line Box

- 1) All property line boxes shall be modeled.

16530 - Site/Security Lighting

- 1) All security lighting shall be modeled.

1.3.3.6.5 Plumbing/Drainage and Fire Protection Systems²⁷

The following “Table” defines the minimum Level of Detail to be provided by each modeled Building Element. See “Model Progression Table Notes” for additional information and requirements, which follow these Tables.

Plumbing/Drainage and Fire Protection Systems Model Progression Table - 6.5												
Description of Building Elements to be Modeled	Level of Detail (Phase IC)				Level of Detail (Phase IIA)				Level of Detail (Phase IIB)			
Category/Building Element	L1	L2	L3		L1	L2	L3		L1	L2	L3	
Equipment												
15415 - Centralized Acid Neutralization System	---	●	---	---	---	---	●	---	---	---	●	---
15415 - Grease Interceptors	●	---	---	---	---	---	●	---	---	---	●	---
15415 - Individual Acid Neutralization System	---	---	---	---	---	---	●	---	---	---	●	---
15416 - Gas Booster Pumps	---	●	---	---	---	---	●	---	---	---	●	---
15416 - Gas Meters and Sub-meters	●	---	---	---	---	---	●	---	---	---	●	---
15417 - Backflow Prevention Devices	●	---	---	---	---	---	●	---	---	---	●	---
15417 - Water Meters and Remote Readers	●	---	---	---	---	---	●	---	---	---	●	---
15451 - Water Heater	---	●	---	---	---	---	●	---	---	---	●	---
15453 - Compressed Air Pumps	---	●	---	---	---	---	●	---	---	---	●	---
15453 - Control Panels	---	●	---	---	---	---	●	---	---	---	●	---
15453 - Domestic Water Booster Pumps	---	●	---	---	---	---	●	---	---	---	●	---
15453 - Sewer Ejector Pumps	---	●	---	---	---	---	●	---	---	---	●	---
15453 - Sump Pumps	---	●	---	---	---	---	●	---	---	---	●	---
15453 - Tanks	---	●	---	---	---	---	●	---	---	---	●	---
15453 - Vacuum Pumps	---	●	---	---	---	---	●	---	---	---	●	---
15453 - Hot Water Circulating Pumps	---	●	---	---	---	---	●	---	---	---	●	---
15453 - Tanks	---	●	---	---	---	---	●	---	---	---	●	---
15453 - Vacuum Pumps	---	●	---	---	---	---	●	---	---	---	●	---
15453 - Hot Water Circulating Pumps	---	●	---	---	---	---	●	---	---	---	●	---
Fixtures												
15415 - Drains	---	●	---	---	---	---	●	---	---	---	●	---
15415 - Roof Drains	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Bath Tubs	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Cuspidors	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Drinking Fountains	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Electric Water Coolers	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Lavatories	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Mop Sink Basins	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Showers	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Sinks	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Urinals	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Wash Fountains	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Water Closets	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Mixing Valves	---	●	---	---	---	---	●	---	---	---	●	---
15440 - Sediment Traps	---	●	---	---	---	---	●	---	---	---	●	---
Fire Protection Systems												
15330 - Sprinkler System	---	---	---	---	---	●	---	---	---	---	●	---
15332 - Combination Wet Standpipe/Sprinkler System	---	---	---	---	---	●	---	---	---	---	●	---
15333 - Fire Pumps	●	---	---	---	---	●	---	---	---	---	●	---

²⁷ Parametric links shall be maintained within all modeled building elements so to enable automatic generation of all plans, sections, elevations, custom details and schedules as well as 3D views.

Plumbing/Drainage and Fire Protection Systems
Model Progression Table - 6.5

Description of Building Elements to be Modeled	Level of Detail (Phase IC)				Level of Detail (Phase IIA)				Level of Detail (Phase IIB)			
	L1	L2	L3		L1	L2	L3		L1	L2	L3	
Piping												
15410 - Acid Vent and Waste Piping	---	---	---	---	---	●	---	---	---	---	●	---
15410 - Clean-outs	---	---	---	---	---	●	---	---	---	---	●	---
15410 - Compressed Air/Vacuum Piping	---	---	---	---	---	●	---	---	---	---	●	---
15410 - Sanitary, Waste and Soil Vent Stacks and Vent Lines	---	---	---	---	---	●	---	---	---	---	●	---
15410 - Soil, Waste and Vent Lines	---	---	---	---	---	●	---	---	---	---	●	---
15410 - Storm Water	---	---	---	---	---	●	---	---	---	---	●	---
15412 - Service Head Valves	---	---	---	---	---	●	---	---	---	---	●	---
15412 - Fire/Sprinkler Service Head Valves	---	---	---	---	---	●	---	---	---	---	●	---
15412 - Valves	---	---	---	---	---	●	---	---	---	---	●	---
15413 - Insulation	---	---	---	---	---	●	---	---	---	---	●	---
15415 - Backwater Valves	---	---	---	---	---	●	---	---	---	---	●	---
15415 - House Traps	●	---	---	---	---	●	---	---	---	---	●	---
15416 - Gas Piping System	---	---	---	---	---	●	---	---	---	---	●	---
15417 - Cold Water Piping	---	---	---	---	---	●	---	---	---	---	●	---
15417 - Wall Hydrants	---	---	---	---	---	●	---	---	---	---	●	---
15418 - Hot Water Piping	---	---	---	---	---	●	---	---	---	---	●	---
15440 - Mixing Valves	---	---	---	---	---	●	---	---	---	---	●	---
15440 - Sediment Traps	---	---	---	---	---	●	---	---	---	---	●	---
See Section 1.3.2 – Level of Detail/Model Content, “Level of Detail Key” for the <i>Level of Detail</i> required by each Design Phase and/or Sub-Phase of a <i>Project</i> .												

Plumbing/Drainage and Fire Protection Systems
Model Progression Table - 6.5 - Notes

General Notes:

- 1) Modeled *Building Elements* that are developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all intrinsic default data, parameters and information provided by such *Models* that are necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
 - a) All intrinsic default data, parameters and information contained within a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall be checked and revised, as necessary, to comply with all requirements, guides, standards, etc. that are identified within the *Contract* (Appendix A/Scope of Services).
- 2) Modeled *Building Elements* that are **not** developed from the use of a Content Provider's (i.e.: "Revit"), Manufacturer's or a *SCA Model* shall include all data, parameters and information that is necessary for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
- 3) The Plumbing/Drainage and Fire Protection Engineer shall coordinate the locations of all modeled *Building Elements* that require power or low voltage with the Electrical Engineer.
- 4) Schedules shall include all Schedules and Tables that are required, either by SCA Standards and/or Industry Standards within a set of *Contract Documents* for the execution of the *Work*.
- 5) All "types" of required *Building Elements* shall be modeled. For example, there are numerous types of "sinks". Therefore, each type of "sink" shall be modeled with the necessary intelligence for the proper coordination of the *Design Intent BIM Model* and the development of *Contract Documents* for the execution of the *Work*.
- 6) Although connections to all equipment shall be made, hook-up detailing for all equipment is **not** required to be modeled.
- 7) Hangers and supports are **not** required to be modeled.
- 8) *Building Elements* shall **not** be modeled as 3-D Solids.
- 9) Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be modeled as part of all equipment and checked for conflicts with other elements during Design Phases IIA and IIB. These clearance zones shall be modeled as invisible solids within the object.

Equipment

15415 - Centralized Acid Neutralization System

- 1) All tanks shall be modeled.
 - During the Design Development Phase (IC), acid neutralizing tubes for boilers may be **excluded** from the Model.

15415 - Grease Interceptors

- 1) All grease interceptors shall be modeled.

15415 - Individual Acid Neutralization System

- 1) All tanks shall be modeled.

15416 - Gas Booster Pumps

- 1) All gas booster pumps shall be modeled.

15416 - Gas Meters and Sub-meters

- 1) All gas meters and sub-meters shall be modeled.
 - During the Design Development Phase (IC), sub-meter models may be **excluded** from the Model.

15417 - Backflow Prevention Devices

- 1) All backflow prevention devices such as, but not limited to, RPZ, DCV, DDCV devices shall be modeled.

15417 - Water Meters and Remote Readers

- 1) All water meters and remote meters shall be modeled.
 - During the Design Development Phase (IC), remote meters may be **excluded** from the Model.

15451 - Water Heater

- 1) All water heaters shall be modeled.

15453 - Compressed Air Pumps

- 1) All compressed air pumps shall be modeled.
 - Portable compressed air pumps may be **excluded** from the Model.

15453 - Control Panels

- 1) Control panel models shall be provided for all equipment and/or systems that require such panels.

15453 - Domestic Water Booster Pumps

- 1) All domestic water booster pumps shall be modeled.

15453 - Sewer Ejector Pumps

- 1) All sewer ejector pumps shall be modeled.

15453 - Sump Pumps

- 1) All sump pumps shall be modeled.

15453 - Tanks

- 1) All tanks shall be modeled.

15453 - Vacuum Pumps

- 1) All vacuum pumps shall be modeled.
 - Portable vacuum pumps may be **excluded** from the Model.

15453 - Hot Water Circulating Pumps

- 1) All hot water circulating pumps shall be modeled.

Fixtures

15415 - Drains

- 1) All drains shall be modeled.
- 2) When required, primers for drains shall be modeled.
 - During the Design Development Phase (IC), primers may be **excluded** from the Model.

15415 - Roof Drains

- 1) All roof drains shall be modeled.

15440 - Bath Tubs

- 1) All bath tubs shall be modeled.

15440 - Cuspidors

- 1) All cuspidors shall be modeled.

15440 - Drinking Fountains

- 1) All drinking fountains shall be modeled.

15440 - Electric Water Coolers

- 1) All electric water coolers shall be modeled.

15440 - Lavatories

- 1) All lavatories shall be modeled.

15440 - Mop Sink Basins

- 1) All mop sink basins shall be modeled.

15440 - Showers

- 1) All showers shall be modeled.

15440 - Sinks

- 1) All sinks shall be modeled.

15440 - Urinals

- 1) All urinals shall be modeled.

15440 - Wash Fountains

- 1) All wash fountains shall be modeled.

15440 - Water Closets

- 1) All water closets shall be modeled.
- 2) When required, chair carriers shall be modeled with water closets.

15440 - Mixing Valves

- 1) Regardless of size, all mixing valves for house tempering, safety showers and eyewashes shall be modeled.

15440 - Sediment Traps

- 1) All sediment traps shall be modeled.

Fire Protection Systems

15330 - Sprinkler System

- 1) Sprinkler System models shall include all piping (regardless of size), branches, sprinkler heads, fittings, flow switches, and valves.

15332 - Combination Wet Standpipe/Sprinkler System

- 1) Combination Wet Standpipe/Sprinkler System models shall include all piping (regardless of size), branches, sprinkler heads, fittings, valves, flow switches control panels, siamese connections, roof manifolds, hose valves and caps, hose valve cabinets, fire hose and nozzles and lobby hose cabinets.

15333 - Fire Pumps

- 1) Fire pump models shall include the fire pump, jockey pump, controller, test header, and flow meter.

Piping²⁸

15410 - Acid Vent and Waste Piping

- 1) Acid vent and waste piping and fittings shall be modeled.

15410 - Clean-outs

- 1) Clean-outs shall be modeled with access panels, plugs and caps.

15410 - Compressed Air/Vacuum Piping

- 1) Compressed air/vacuum piping and fittings shall be modeled.

15410 - Sanitary, Waste and Soil Vent Stacks and Vent Lines

- 1) Sanitary, waste and soil vent stacks and fittings shall be modeled.

15410 - Storm Water

- 1) Storm water piping and fittings shall be modeled.

15410 - Water Risers

- 1) Water piping and fittings shall be modeled.

15412 –Valves

- 1) Unless otherwise indicated, all valves with an outside diameter of 4-inches or greater shall be modeled.

15413 - Insulation

- 1) Piping insulation shall be modeled when a modeled pipe requires insulation.

²⁸ Unless otherwise indicated (e.g.: Fire Protection Systems), all piping and fittings that have an outside diameter of **2-inches** or greater shall be modeled.

15415 - Backwater Valves

- 1) Irregardless of size, all backwater valves shall be modeled.

15415 - House Traps

- 1) All house traps shall be modeled.

15416 - Gas Piping System

- 1) Gas piping, vent piping, connecting fittings, safety shut-off valves, service head valves, master gas control valves, plug valves, and control panels shall be modeled.
- 2) All double-pipe conditions (piping conditions where a pipe is inside another pipe) shall be modeled as a single *Building Element/System*. (Characteristics of the inner pipe shall be indicated as an *object property* within a data set of all such models.)

15417 - Cold Water Piping

- 1) All cold water piping and fittings shall be modeled.

15417 - Wall Hydrants

- 1) All wall hydrants shall be modeled.

15418 - Hot Water Piping

- 1) All hot water piping and fittings shall be modeled.

1.3.4 Bidding and Award (Phase IIC)

Upon the conclusion of the Bidding and Award Phase, the *Consultant* shall ensure that all *Addenda* to the *Contract Documents (Drawings)* that affect the *Design Intent BIM Model(s)* are incorporated into the *Design Intent BIM Model(s)* before they are provided to the SCA for its information and use.

1. The *Design Intent BIM Model(s)* shall **not** be combined into a *Composite Model*, but instead remain as distinct *Component Models*, as provided by each member of the *Design Team*.
2. The *Consultant* shall ensure that all *Models*, which are affected by *Addenda* to the *Drawings*, have been quality controlled, coordinated and executed as per these Guidelines and Standards.²⁹
3. Upon receipt of written notification from the SCA, the *Consultant* shall submit electronic files, to the SCA, as per Section 2.1.3 – Digital Submittal Requirements within **twenty-one (21) calendar days**

²⁹ See Section 1.4 - Coordination/Clash Detection

1.4 COORDINATION/CLASH DETECTION

1.4.1 General

1. Upon receipt of the NYC School Construction Authority's written notification of acceptance of the Phase IIB Contract Documents (100% *Contract Documents*), the *Consultant* shall submit an electronic copy of the required *Coordination/Clash Detection Report* ("NavisWorks") to the SCA with the final submission of *Contract Documents* for Bid and Award.
2. All conflicts and interferences identified within the *Model* and/or *Models*, which would adversely affect the *Work* described within the *Contract Documents (Drawings)*, shall be rectified prior to the final submission of *Contract Documents* to the SCA for Bid and Award.
 - a. At a minimum, the *Design Team* shall use automated conflict checking software ("NavisWorks") to identify coordination issues within and between the *Models* that would adversely affect the execution of the *Work* required by the *Contract Documents*³⁰ (*Drawings*) during and at the conclusion of Design Phase IIB - *Contract Documents* (100%).
 - b. The *Design Team* shall, at a minimum, use the "Interference Check Tool" within "Revit" on a routine basis during and at the conclusion of each Design Phase and/or Sub-Phase³¹, and as per their approved "Quality Control Program"³².

NOTE: At this time, the SCA understands that the 3-D modeling of certain building elements (e.g.: multiple horizontal pipes and conduits that for coordination purposes would be vertically stacked) does not facilitate the SCA's need for the printing of *Contract Documents* in 2-D. Hence, coordination conflicts and interferences created by the need to organize *Models* to facilitate 2-D printing will be accepted within *Models* provided that each conflict and/or interference that has been created within a *Model*, to facilitate 2-D printing, is appropriately noted and documented within the required *Coordination/Clash Detection Report* ("NavisWorks") that is to be submitted to the SCA

1.4.2 Coordination/Clash Detection

1. In order to assist a *Design Team* in their efforts to provide the SCA with coordinated *Contract Documents*, the SCA has developed a series of "Tables" that identify typical *Modeled Building Elements/Systems* that can conflict with one another and create a condition that would adversely affect the execution of the *Work* required by the *Contract Documents*.
2. The *Design Team* is encouraged to use these "Tables" as a guide for the development of their coordinated *Contract Documents* and as a reference for the development and implementation of automated conflict checking software (i.e.: "NavisWorks", "Revit", etc.).

³⁰The use of automated conflict checking software to facilitate the coordination of *Work*, which is described by the *Contract Documents (Drawings)*, shall **not** relieve the *Design Team* from their responsibility to ensure the correctness and completeness of a set of *Contract Documents*.

³¹Automated conflict checking software that automatically generates reports, other than "NavisWorks", are **not** a required deliverable to the SCA.

³²See Section 1.2.4 – Model Quality.

**ARCHITECTURAL versus ARCHITECTURAL
Coordination and Clash Detection
Section 1.4.2/Table – 1(a)**

Building Element/System	Versus	Architectural														
		10350 - Flagpole (Site)	02722 - Precast Concrete Basins and Manholes	02723 - Storm Drainage Systems	02860 - Early Childhood Playground Equipment	02900 - Landscaping	04200 - Exterior Masonry Walls and Parapets	05710 - Steel Stairs	06410 - Custom Casework	07720 - Roof Accessories	08110 - Steel Doors and Frames	08305 - Access Doors	08330 - Coiling Doors, Grilles and Shutters	08522 - Aluminum Double-Hung Windows	08524 - Aluminum Projected Windows	08621 - Fiberglass Sandwich Panel Skylights
Architectural³³																
10350 - Flagpole (Site)		---	●	●	●	●	---	---	---	---	---	---	---	---	---	---
02722 - Precast Concrete Basins and Manholes		---	---	●	●	●	---	---	---	---	---	---	---	---	---	---
02723 - Storm Drainage Systems		---	---	---	●	●	---	---	---	---	---	---	---	---	---	---
02860 - Early Childhood Playground Equipment		---	---	---	---	●	---	---	---	---	---	---	---	---	---	---
02900 - Landscaping		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
04200 - Interior & Exterior Masonry Walls, & Parapets		---	---	---	---	---	---	●	●	●	●	●	●	●	●	●
05710 - Steel Stairs		---	---	---	---	---	---	---	---	●	●	●	●	●	●	●
06410 - Custom Casework		---	---	---	---	---	---	---	---	---	●	●	---	●	●	---
07720 - Roof Accessories		---	---	---	---	---	---	---	---	---	●	●	---	---	---	●
08110 - Steel Doors and Frames		---	---	---	---	---	---	---	---	---	---	●	●	●	●	---
08305 - Access Doors		---	---	---	---	---	---	---	---	---	---	---	●	●	●	---
08330 - Coiling Doors, Grilles and Shutters		---	---	---	---	---	---	---	---	---	---	---	---	●	●	---
08522 - Aluminum Double-Hung Windows		---	---	---	---	---	---	---	---	---	---	---	---	---	●	---
08524 - Aluminum Projected Windows		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
08621 - Fiberglass Sandwich Panel Skylights		---	---	---	---	---	---	---	---	---	●	●	---	---	---	---
08920 - Aluminum Curtain Walls		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
09260 - Gypsum Board Assemblies		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
09510 - Acoustical Ceilings and Soffits		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10151 - Toilet Compartments		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10400 - Identifying Devices		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10415 - Bulletin and Display Boards, etc.		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10652 - Electrically Operated Folding Panel Partitions		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10653 - Manually Operated Folding Panel Partitions		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11400 - Food Service Equipment		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11600 - Laboratory Equipment		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12302 - Manufactured Wood Casework		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

³³ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

**ARCHITECTURAL versus ARCHITECTURAL
Coordination and Clash Detection
Section 1.4.2/Table – 1(b)**

Building Element/System	Versus	Architectural													
		08920 - Aluminum Curtain Walls	09260 - Gypsum Board Assemblies	09510 - Acoustical Ceilings and Soffits	10151 - Toilet Compartments	10400 - Identifying Devices	10415 - Bulletin and Display Boards, etc.	10652 - Folding Panel Partitions	10653 – Manually Operated Folding Panel Partitions	11400 - Food Service Equipment	11600 - Laboratory Equipment	12302 - Manufactured Wood Casework			
Architectural ³⁴															
10350 - Flagpole (Site)		---	---	---	---	---	---	---	---	---	---	---	---	---	---
02722 - Precast Concrete Basins and Manholes		---	---	---	---	---	---	---	---	---	---	---	---	---	---
02723 - Storm Drainage Systems		---	---	---	---	---	---	---	---	---	---	---	---	---	---
02860 - Early Childhood Playground Equipment		---	---	---	---	---	---	---	---	---	---	---	---	---	---
02900 - Landscaping		---	---	---	---	---	---	---	---	---	---	---	---	---	---
04200 - Interior & Exterior Masonry Walls, & Parapets		●	●	●	●	---	---	●	●	●	●	●	---	---	---
05710 - Steel Stairs		●	●	●	---	---	---	---	---	---	---	---	---	---	---
06410 - Custom Casework		●	●	---	---	---	●	●	●	---	●	●	---	---	---
07720 - Roof Accessories		---	●	●	---	---	---	---	---	---	---	---	---	---	---
08110 - Steel Doors and Frames		●	●	●	---	●	●	●	●	●	●	●	---	---	---
08305 - Access Doors		●	●	●	●	---	●	●	●	●	●	●	---	---	---
08330 - Coiling Doors, Grilles and Shutters		●	●	●	---	---	---	---	---	●	---	---	---	---	---
08522 - Aluminum Double-Hung Windows		●	●	●	●	---	●	●	●	●	●	●	---	---	---
08524 - Aluminum Projected Windows		●	●	●	●	---	●	●	●	●	●	●	---	---	---
08621 – Fiberglass Sandwich Panel Skylights		---	●	●	---	---	---	---	---	---	---	---	---	---	---
08920 - Aluminum Curtain Walls		---	●	●	●	---	●	●	●	●	●	●	---	---	---
09260 - Gypsum Board Assemblies		---	---	●	●	---	---	●	●	●	●	●	---	---	---
09510 - Acoustical Ceilings and Soffits		---	---	---	●	---	●	●	●	●	●	---	---	---	---
10151 - Toilet Compartments		---	---	---	---	---	---	---	---	---	---	---	---	---	---
10400 - Identifying Devices		---	---	---	---	---	●	●	●	●	●	●	---	---	---
10415 - Bulletin and Display Boards, etc.		---	---	---	---	---	---	●	●	●	●	●	---	---	---
10652 – Electrically Operated Folding Panel Partitions		---	---	---	---	---	---	---	---	●	●	●	---	---	---
10653 – Manually Operated Folding Panel Partitions		---	---	---	---	---	---	---	---	●	●	●	---	---	---
11400 - Food Service Equipment		---	---	---	---	---	---	---	---	---	---	---	---	---	---
11600 - Laboratory Equipment		---	---	---	---	---	---	---	---	---	---	●	---	---	---
12302 - Manufactured Wood Casework		---	---	---	---	---	---	---	---	---	---	---	---	---	---

³⁴ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

**STRUCTURAL versus ARCHITECTURAL
Coordination and Clash Detection
Section 1.4.2/Table – 2(a)**

Building Element/System	Versus	Architectural														
		10350 - Flagpole (Site)	02722 - Precast Concrete Basins and Manholes	02723 - Storm Drainage Systems	02860 - Early Childhood Playground Equipment	02900 - Landscaping	04200 - Interior & Exterior Masonry Walls, & Parapets	05710 - Steel Stairs	06410 - Custom Casework	07720 - Roof Accessories	08110 - Steel Doors and Frames	08305 - Access Doors	08330 - Coiling Doors, Grilles and Shutters	08522 - Aluminum Double-Hung Windows	08524 - Aluminum Projected Windows	08621 - Fiberglass Sandwich Panel Skylights
Structural ³⁵																
02360 - Piles		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Caissons		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Curbs (roof)		---	---	---	---	---	---	---	●	●	---	---	---	---	---	●
03300 - Concrete Parapets		---	---	---	---	---	---	---	●	●	---	---	---	---	---	●
03300 - Concrete Stairs (all)		●	●	●	●	●	---	---	---	---	---	---	---	---	---	---
03300 - Footings		●	●	●	●	●	---	---	---	---	---	---	---	---	---	---
03300 - Grade Beams		●	●	●	●	●	---	---	---	---	---	---	---	---	---	---
03300 - Piers		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Pile/Caisson Caps		●	●	●	●	●	---	---	---	---	---	---	---	---	---	---
03300 - Slabs		---	---	---	---	---	●	●	---	●	---	---	---	---	●	●
03300 - Strap Beams and Tie Beams		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Pits and Property Line Boxes		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
03300 - Underground Storage Tanks		●	●	●	●	●	---	---	---	---	---	---	---	---	---	---
03300 - Walls (foundations, retaining and handball)		●	●	●	●	●	●	●	---	●	●	●	●	●	●	---
05120 - Beams		---	---	---	---	---	●	●	---	●	●	●	●	●	●	●
05120 - Built-up Girders		---	---	---	---	---	●	●	---	●	●	●	●	●	●	●
05120 - Columns		---	---	---	---	---	●	●	●	●	●	●	●	●	●	●
05120 - Dunnage		---	---	---	---	---	●	---	---	●	●	---	---	---	---	●
05120 - Gusset Plates		---	---	---	---	---	●	●	---	●	●	●	●	●	●	●
05120 - Lateral Bracing		---	---	---	---	---	●	●	---	●	●	●	●	●	●	●
05120 - Trusses		---	---	---	---	---	●	●	---	●	●	●	●	●	●	●
05230 - Steel Joists Girders		---	---	---	---	---	●	●	---	●	●	●	●	●	●	●
05300 -Superstructure Slabs (metal deck)		---	---	---	---	---	●	●	---	●	●	●	---	---	---	●
07250 - Sprayed Fire-Resistive Materials		---	---	---	---	---	---	●	---	---	---	---	---	---	---	---
08920 - Aluminum Curtain Walls		---	---	---	---	---	●	●	●	●	●	---	●	●	●	●

³⁵ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

STRUCTURAL versus ARCHITECTURAL Coordination and Clash Detection Section 1.4.2/Table – 2(b)															
Building Element/System	Versus	Architectural													
		08920 - Aluminum Curtain Walls	09260 - Gypsum Board Assemblies	09510 - Acoustical Ceilings and Soffits	10151 - Toilet Compartment	10400 - Identifying Devices	10415 - Bulletin and Display Boards, etc.	10652 - Folding Panel Partitions	10653 – Manually Operated Folding Panel Partitions	11400 - Food Service Equipment	11600 - Laboratory Equipment	12302 - Manufactured Wood Casework			
Structural ³⁶															
02360 - Piles		---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Caissons		---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Curbs (roof)		---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Parapets		●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Stairs (all)		---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Footings		---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Grade Beams		---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Piers		---	●	●	●	---	●	●	●	●	---	---	---	---	---
03300 - Pile/Caisson Caps		---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Slabs		---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Strap Beams and Tie Beams		---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Pits and Property Line Boxes		---	●	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Underground Storage Tanks		---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Walls (foundations, retaining and handball)		●	●	●	●	---	---	●	●	●	---	●	---	---	---
05120 - Beams		●	●	●	---	---	---	●	●	---	---	---	---	---	---
05120 - Built-up Girders		●	●	●	---	---	---	●	●	---	---	---	---	---	---
05120 - Columns		●	●	●	●	---	●	●	●	●	●	●	---	---	---
05120 - Dunnage		---	---	---	---	---	---	---	---	---	---	---	---	---	---
05120 - Gusset Plates		●	●	●	---	---	---	●	●	---	---	---	---	---	---
05120 - Lateral Bracing		●	●	●	---	---	---	●	●	---	---	---	---	---	---
05120 - Trusses		●	●	●	---	---	---	●	●	---	---	---	---	---	---
05230 - Steel Joists Girders		●	●	●	---	---	---	●	●	---	---	---	---	---	---
05300 - Superstructure Slabs (metal deck)		●	●	---	---	---	---	●	●	---	---	---	---	---	---
07250 - Sprayed Fire-Resistive Materials		●	●	---	---	---	---	---	---	---	---	---	---	---	---
08920 - Aluminum Curtain Walls		●	●	●	---	---	---	●	●	---	---	●	---	---	---

³⁶ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

**HVAC versus ARCHITECTURAL
Coordination and Clash Detection
Section 1.4.2/Table – 3**

Building Element/System	Versus	Architectural														
		02722 - Precast Concrete Basins and Manholes	02900 - Landscaping	04200 - Interior & Exterior Masonry Walls, & Parapets	05710 - Steel Stairs	06410 - Custom Casework	07720 - Roof Accessories	08110 - Steel Doors and Frames	08621 – Fiberglass Sandwich Panel Skylights	08920 - Aluminum Curtain Walls	09260 - Gypsum Board Assemblies	09510 - Acoustical Ceilings and Soffits	10652 – Electrically Operated Folding Panel Partitions	10653 – Manually Operated Folding Panel Partitions	11400 - Food Service Equipment	12302 - Manufactured Wood Casework
HVAC ³⁷																
Piping		●	●	●	●	●	---	---	---	●	●	●	●	●	---	●
Equipment and Temperature Control Systems		---	---	●	---	---	●	●	●	---	●	●	---	---	---	---
15575 - Boiler Flue		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15891 - Ductwork		---	---	●	---	---	---	---	---	---	●	●	●	●	●	---
15910 - Duct Access Doors		---	---	●	---	---	---	---	---	---	●	●	---	---	●	---
15940 - Duct Air Outlets and Inlets		---	---	---	---	---	---	---	---	---	---	---	●	●	---	---

³⁷ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

**ELECTRICAL versus ARCHITECTURAL
Coordination and Clash Detection
Section 1.4.2/Table – 4**

Building Element/System	Versus	Architectural														
		02722 - Precast Concrete Basins and Manholes	02900 - Landscaping	04200 - Interior & Exterior Masonry Walls, & Parapets	05710 - Steel Stairs	06410 - Custom Casework	07720 - Roof Accessories	08110 - Steel Doors and Frames	08522 - Aluminum Double-Hung Windows	08621 - Fiberglass Sandwich Panel Skylights	09260 - Gypsum Board Assemblies	09510 - Acoustical Ceilings and Soffits	10652 – Electrically Operated Folding Panel Partitions	10653 – Manually Operated Folding Panel Partitions	11400 - Food Service Equipment	12302 - Manufactured Wood Casework
Electrical ³⁸																
Cable Trays		---	---	●	---	---	---	---	---	---	●	●	---	---	---	---
16120 - Conduits and Piping		●	●	●	---	---	---	---	---	---	●	●	●	●	●	---
16231 - Emergency Generator		●	---	●	---	---	●	---	---	---	●	---	---	---	---	---
16420 - Con Ed Transformer Vault		●	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16420 - Service Switch		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16450 - Grounding Bus Bars		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16470 - Panelboards		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16470 - Power Panels		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16500 - Interior Building Lighting		---	---	●	---	---	---	---	---	---	●	---	●	●	---	---
16520 - Emergency Exit Lighting		---	---	●	---	---	---	---	---	---	●	---	●	●	---	---

³⁸ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

PLUMBING DRAINAGE AND FIRE PROTECTION SYSTEMS versus ARCHITECTURAL
Coordination and Clash Detection
Section 1.4.2/Table – 5

Building Element/System	Versus	Architectural														
		02722 - Precast Concrete Basins and Manholes	02900 - Landscaping	04200 - Interior & Exterior Masonry Walls, & Parapets	05710 - Steel Stairs	06410 - Custom Casework	07720 - Roof Accessories	08110 - Steel Doors and Frames	08522 - Aluminum Double-Hung Windows	08621 - Fiberglass Sandwich Panel Skylights	09260 - Gypsum Board Assemblies	09510 - Acoustical Ceilings and Soffits	10652 – Electrically Operated Folding Panel Partitions	10653 – Manually Operated Folding Panel Partitions	11400 - Food Service Equipment	12302 - Manufactured Wood Casework
Plumbing Drainage and Fire Protection ³⁹		—		—	—		—					—		—		
Equipment		---	---	---	---	---	---	●	---		●	---	---	---	---	---
Fixtures		---	---	●	---	---	---	---	---		●	---	●	●	●	---
15330 - Sprinkler System		---	---	●	●	---	---	---	---		●	---	●	●	---	---
15332 - Combination Standpipe and Sprinkler Systems		---	---	●	●	---	---	●	---		●	---	●	●	---	---
15333 - Fire Pumps		---	---	●	---	---	---	●	---		●	---	---	---	---	---
15000 - Piping		●	---	●	---	---	---	●	---		●	---	●	●	●	---

³⁹ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

STRUCTURAL versus STRUCTURAL Coordination and Clash Detection Section 1.4.2/Table – 6(a)																
Building Element/System	Versus	Structural														
		02360 - Piles	03300 - Caissons	03300 - Concrete Curbs	03300 - Concrete Parapets	03300 - Concrete Stairs	03300 - Footings	03300 - Grade Beams	03300 - Piers	03300 - Pile/Caisson Caps	03300 - Slabs	03300 - Strap Beams and Tie Beams	03300 - Pits and Property line Boxes	03300 - Underground Storage Tanks	03300 - Walls	05120 - Beams
Structural ⁴⁰	—															
02360 - Piles		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Caissons		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Curbs		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Parapets		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Stairs		---	---	---	---	---	●	●	●	●	●	●	●	---	●	---
03300 - Footings		---	---	---	---	---	---	●	●	●	●	●	●	●	●	---
03300 - Grade Beams		---	---	---	---	---	---	---	●	●	●	●	●	●	●	---
03300 - Piers		---	---	---	---	---	---	---	---	●	---	---	●	●	●	●
03300 - Pile/Caisson Caps		---	---	---	---	---	---	---	---	---	●	●	●	●	●	---
03300 - Slabs		---	---	---	---	---	---	---	---	---	---	●	●	●	●	---
03300 - Strap Beams and Tie Beams		---	---	---	---	---	---	---	---	---	---	---	●	●	●	---
03300 - Pits and Property Line Boxes		---	---	---	---	---	---	---	---	---	---	---	---	●	●	---
03300 - Underground Storage Tanks		---	---	---	---	---	---	---	---	---	---	---	---	---	●	---
03300 - Walls		---	---	---	---	---	---	---	---	---	---	---	---	---	---	●
05120 - Beams		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
05120 - Built-up Girders		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
05120 - Columns		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
05120 - Dunnage		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
05120 - Gusset Plates		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
05120 - Lateral Bracing		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
05120 - Trusses		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
05230 - Steel Joists Girders		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
05300 - Superstructure Slabs (metal deck)		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
07250 - Sprayed Fire-Resistive Materials		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
08920 - Aluminum Curtain Walls		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

⁴⁰ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

STRUCTURAL versus STRUCTURAL Coordination and Clash Detection Section 1.4.2/Table – 6(b)																
Building Element/System	Versus	Structural														
		05120 - Built-up Girders	05120 - Columns	05120 - Dunnage	05120 - Gusset Plates	05120 - Lateral Bracing	05120 - Trusses	05230 - Steel Joists Girders	05300 - Superstructure Slabs (metal deck)	07250 - Sprayed Fire-Resistive Materials	08920 - Aluminum Curtain Walls					
Structural ⁴¹																
02360 - Piles		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Caissons		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Curbs		---	---	●	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Parapets		---	---	●	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Stairs		---	●	---	---	●	---	---	---	---	---	---	---	---	---	---
03300 - Footings		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Grade Beams		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Piers		---	●	---	●	●	●	---	●	---	---	---	---	---	---	---
03300 - Pile/Caisson Caps		---	●	---	●	●	---	---	---	---	---	---	---	---	---	---
03300 - Slabs		---	●	---	●	●	---	---	---	---	---	---	---	---	---	---
03300 - Strap Beams and Tie Beams		---	●	---	●	●	---	---	---	---	---	---	---	---	---	---
03300 - Pits and Property Line Boxes		---	●	---	●	●	---	---	---	---	---	---	---	---	---	---
03300 - Underground Storage Tanks		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Walls		●	●	---	●	●	●	---	●	---	---	---	---	---	---	---
05120 - Beams		●	●	●	●	●	●	●	●	---	●	---	---	---	---	---
05120 - Built-up Girders		---	●	●	●	●	●	●	●	---	●	---	---	---	---	---
05120 - Columns		---	●	●	●	●	●	●	●	---	●	---	---	---	---	---
05120 - Dunnage		---	---	---	---	●	●	●	●	---	---	---	---	---	---	---
05120 - Gusset Plates		---	---	---	---	●	---	---	●	---	●	---	---	---	---	---
05120 - Lateral Bracing		---	---	---	---	---	●	●	●	---	●	---	---	---	---	---
05120 - Trusses		---	---	---	---	---	---	●	●	---	●	---	---	---	---	---
05230 - Steel Joists Girders		---	---	---	---	---	---	---	●	---	●	---	---	---	---	---
05300 - Superstructure Slabs (metal deck)		---	---	---	---	---	---	---	---	---	●	---	---	---	---	---
07250 - Sprayed Fire-Resistive Materials		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
08920 - Aluminum Curtain Walls		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

⁴¹ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

STRUCTURAL versus ELECTRICAL Coordination and Clash Detection Section 1.4.2/Table – 7																
Building Element/System	Versus	Electrical														
		16130 - Cable Trays	16130 - Conduits and Piping	16231 - Emergency Generator	16420 - Con Ed Transformer Vault	16420 - Service Switch	16450 - Grounding Bus Bars	16470 - Panelboards	16470 - Power Panels	16500 - Interior Building Lighting	16520 - Emergency Exit Lighting					
Structural ⁴²																
02360 - Piles		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Caissons		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Curbs		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Parapets		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Stairs		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Footings		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Grade Beams		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Piers		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Pile/Caisson Caps		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Slabs		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Strap Beams and Tie Beams		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Pits and Property Line Boxes		---	●	---	●	---	---	---	---	---	---	---	---	---	---	---
03300 - Underground Storage Tanks		---	●	●	●	---	---	---	---	---	---	---	---	---	---	---
03300 - Walls		●	●	●	●	---	---	---	---	---	---	---	---	---	---	---
05120 - Beams		●	●	---	---	---	---	---	---	●	●	---	---	---	---	---
05120 - Built-up Girders		●	●	---	---	---	---	---	---	●	●	---	---	---	---	---
05120 - Columns		●	●	---	---	---	---	●	●	●	●	---	---	---	---	---
05120 - Dunnage		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
05120 - Gusset Plates		●	●	---	---	---	---	---	---	---	---	---	---	---	---	---
05120 - Lateral Bracing		●	●	---	---	---	---	●	●	●	●	---	---	---	---	---
05120 - Trusses		●	●	---	---	---	---	●	●	●	●	---	---	---	---	---
05230 - Steel Joists Girders		●	●	---	---	---	---	●	●	●	●	---	---	---	---	---
05300 - Superstructure Slabs (metal deck)		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
07250 - Sprayed Fire-Resistive Materials		●	●	---	---	---	---	---	---	---	---	---	---	---	---	---
08920 - Aluminum Curtain Walls		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

⁴² Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

**STRUCTURAL versus HVAC
Coordination and Clash Detection
Section 1.4.2/Table – 8**

Building Element/System	Versus	HVAC														
		15510 - Piping	Equipment and Temperature Control Systems	15575 - Boiler Flue	15891 - Ductwork	15910 - Duct Access Doors	15940 - Duct Air Outlets and Inlets									
Structural ⁴³																
02360 - Piles		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Caissons		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Curbs		●	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Parapets		●	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Stairs		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Footings		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Grade Beams		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Piers		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Pile/Caisson Caps		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Slabs		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Strap Beams and Tie Beams		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Pits and Property Line Boxes		●	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Underground Storage Tanks		●	---	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Walls		●	---	---	---	---	---	---	---	---	---	---	---	---	---	---
05120 - Beams		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
05120 - Built-up Girders		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
05120 - Columns		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
05120 - Dunnage		---	●	---	●	---	---	---	---	---	---	---	---	---	---	---
05120 - Gusset Plates		●	●	●	●	●	---	---	---	---	---	---	---	---	---	---
05120 - Lateral Bracing		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
05120 - Trusses		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
05230 - Steel Joists Girders		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
05300 - Superstructure Slabs (metal deck)		●	●	●	●	---	---	---	---	---	---	---	---	---	---	---
07250 - Sprayed Fire-Resistive Materials		●	---	●	●	---	---	---	---	---	---	---	---	---	---	---
08920 - Aluminum Curtain Walls		●	---	---	---	---	---	---	---	---	---	---	---	---	---	---

⁴³ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

STRUCTURAL versus PLUMBING DRAINAGE AND FIRE PROTECTION SYSTEMS

Coordination and Clash Detection

Section 1.4.2/Table – 9

Building Element/System	Versus	Plumbing Drainage and Fire Protection Systems														
		Equipment	Fixtures	15330 - Sprinkler System	15332 - Combination Standpipe and Sprinkler Systems	15333 - Fire Pumps	Piping									
Structural ⁴⁴																
02360 - Piles		---	---	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Caissons		---	---	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Concrete Curbs		●	●	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Concrete Parapets		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
03300 - Concrete Stairs		●	●	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Footings		---	●	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Grade Beams		---	●	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Piers		---	●	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Pile/Caisson Caps		---	●	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Slabs		---	●	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Strap Beams and Tie Beams		---	●	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Pits and Property Line Boxes		---	---	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Underground Storage Tanks		---	---	---	---	---	●	---	---	---	---	---	---	---	---	---
03300 - Walls		●	---	---	---	---	●	---	---	---	---	---	---	---	---	---
05120 - Beams		---	●	●	●	---	●	---	---	---	---	---	---	---	---	---
05120 - Built-up Girders		---	●	●	●	---	●	---	---	---	---	---	---	---	---	---
05120 - Columns		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
05120 - Dunnage		●	●	---	---	---	●	---	---	---	---	---	---	---	---	---
05120 - Gusset Plates		---	●	●	●	---	●	---	---	---	---	---	---	---	---	---
05120 - Lateral Bracing		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
05120 - Trusses		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
05230 - Steel Joists Girders		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
05300 - Superstructure Slabs (metal deck)		---	●	●	●	---	●	---	---	---	---	---	---	---	---	---
07250 - Sprayed Fire-Resistive Materials		●	●	●	●	---	●	---	---	---	---	---	---	---	---	---
08920 - Aluminum Curtain Walls		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

⁴⁴ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

**ELECTRICAL versus ELECTRICAL
Coordination and Clash Detection
Section 1.4.2/Table – 10**

Building Element/System	Versus	Electrical													
		16130 - Cable Trays	16130 - Conduits and Piping	16231 - Emergency Generator	16420 - Con Ed Transformer Vault	16420 - Service Switch	16450 - Grounding Bus Bars	16470 - Panelboards	16470 - Power Panels	16500 - Interior Building Lighting	16520 - Emergency Exit Lighting				
Electrical ⁴⁵															
16130 - Cable Trays		●	●	---	---	---	---	---	---	●	---	---	---	---	---
16130 - Conduits and Piping		---	●	---	---	---	---	---	---	●	---	---	---	---	---
16231 - Emergency Generator		---	---	---	---	---	---	---	---	---	---	---	---	---	---
16420 - Con Ed Transformer Vault		---	---	---	---	---	---	---	---	---	---	---	---	---	---
16420 - Service Switch		---	---	---	---	●	---	---	---	---	---	---	---	---	---
16450 - Grounding Bus Bars		---	---	---	---	---	---	---	---	---	---	---	---	---	---
16470 - Panelboards		---	---	---	---	---	---	●	●	---	---	---	---	---	---
16470 - Power Panels		---	---	---	---	---	---	---	●	---	---	---	---	---	---
16500 - Interior Building Lighting		---	---	---	---	---	---	---	---	●	●	---	---	---	---
16520 - Emergency Exit Lighting		---	---	---	---	---	---	---	---	---	●	---	---	---	---

⁴⁵ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

ELECTRICAL versus HVAC Coordination and Clash Detection Section 1.4.2/Table – 11																
Building Element/System	Versus	HVAC														
		15510 - Piping	Equipment and Temperature Control Systems	15575 - Boiler Flue	15891 - Ductwork	15910 - Duct Access Doors	15940 - Duct Air Outlets and Inlets									
Electrical ⁴⁶																
16130 - Cable Trays		●	●	---	●	●	●	---	---	---	---	---	---	---	---	---
16130 - Conduits and Piping		●	●	●	●	●	●	---	---	---	---	---	---	---	---	---
16231 - Emergency Generator		●	●	---	●	●	---	---	---	---	---	---	---	---	---	---
16420 - Con Ed Transformer Vault		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16420 - Service Switch		●	●	---	●	---	---	---	---	---	---	---	---	---	---	---
16450 - Grounding Bus Bars		---	●	---	---	---	---	---	---	---	---	---	---	---	---	---
16470 - Panelboards		●	●	●	---	---	---	---	---	---	---	---	---	---	---	---
16470 - Power Panels		●	●	---	---	---	---	---	---	---	---	---	---	---	---	---
16500 - Interior Building Lighting		●	●	---	●	●	●	---	---	---	---	---	---	---	---	---
16520 - Emergency Exit Lighting		●	●	---	●	●	●	---	---	---	---	---	---	---	---	---

⁴⁶ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

ELECTRICAL versus PLUMBING DRAINAGE AND FIRE PROTECTION SYSTEMS
Coordination and Clash Detection
Section 1.4.2/Table – 12

Building Element/System	Versus	Plumbing Drainage and Fire Protection Systems													
		Equipment	Fixtures	15330 - Sprinkler System	15332 - Combination Standpipe and Sprinkler Systems	15333 - Fire Pumps	Piping								
Electrical⁴⁷															
16130 - Cable Trays		---	---	●	●	---	●	---	---	---	---	---	---	---	---
16130 - Conduits and Piping		---	●	●	●	---	●	---	---	---	---	---	---	---	---
16231 - Emergency Generator		●	●	●	●	●	●	---	---	---	---	---	---	---	---
16420 - Con Ed Transformer Vault		---	---	---	---	---	---	---	---	---	---	---	---	---	---
16420 - Service Switch		---	---	---	---	---	---	---	---	---	---	---	---	---	---
16450 - Grounding Bus Bars		---	---	---	---	---	---	---	---	---	---	---	---	---	---
16470 - Panelboards		●	●	---	---	●	---	---	---	---	---	---	---	---	---
16470 - Power Panels		●	●	---	---	●	---	---	---	---	---	---	---	---	---
16500 - Interior Building Lighting		---	---	●	●	---	●	---	---	---	---	---	---	---	---
16520 - Emergency Exit Lighting		---	---	---	---	---	---	---	---	---	---	---	---	---	---

⁴⁷ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

**HVAC versus HVAC
Coordination and Clash Detection
Section 1.4.2/Table – 13**

Building Element/System	Versus	HVAC													
		Piping	Equipment and Temperature Control Systems	15575 - Boiler Flue	15891 - Ductwork	15910 - Duct Access Doors	15940 - Duct Air Outlets and Inlets								
HVAC⁴⁸															
Piping		●	●	●	●	●	●	---	---	---	---	---	---	---	---
Equipment and Temperature Control Systems		---	●	●	●	●	●	---	---	---	---	---	---	---	---
15575 - Boiler Flue		---	---	●	●	●	●	---	---	---	---	---	---	---	---
15891 - Ductwork		---	---	---	●	●	●	---	---	---	---	---	---	---	---
15910 - Duct Access Doors		---	---	---	---	●	●	---	---	---	---	---	---	---	---
15940 - Duct Air Outlets and Inlets		---	---	---	---	---	●	---	---	---	---	---	---	---	---

⁴⁸ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

HVAC versus PLUMBING DRAINAGE AND FIRE PROTECTION SYSTEMS

Coordination and Clash Detection

Section 1.4.2/Table – 14

Building Element/System	Versus	Plumbing Drainage and Fire Protection Systems													
		Equipment	Fixtures	15330 - Sprinkler System	15332 - Combination Standpipe and Sprinkler Systems	15333 - Fire Pumps	Piping								
HVAC⁴⁹															
Piping		●	●	●	●	●	●	---	---	---	---	---	---	---	---
Equipment		●	●	●	●	●	●	---	---	---	---	---	---	---	---
15575 - Boiler Flue		●	---	●	●	---	●	---	---	---	---	---	---	---	---
15891 - Ductwork		●	---	●	●	---	●	---	---	---	---	---	---	---	---
15910 - Duct Access Doors		●	●	●	●	---	●	---	---	---	---	---	---	---	---
15940 - Duct Air Outlets and Inlets		●	---	●	●	---	●	---	---	---	---	---	---	---	---

⁴⁹ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

PLUMBING DRAINAGE AND FIRE PROTECTION SYSTEMS versus PLUMBING DRAINAGE AND FIRE PROTECTION SYSTEMS
Coordination and Clash Detection
Section 1.4.2/Table – 15

Building Element/System	Versus	Plumbing Drainage and Fire Protection Systems													
		Equipment	Fixtures	15330 - Sprinkler System	15332 - Combination Standpipe and Sprinkler Systems	15333 - Fire Pumps	Piping								
Plumbing Drainage and Fire Protection ⁵⁰															
Equipment		●	●	●	●	●	●	---	---	---	---	---	---	---	---
Fixtures		---	●	●	●	---	●	---	---	---	---	---	---	---	---
15330 - Sprinkler System		---	---	●	---	●	●	---	---	---	---	---	---	---	---
15332 - Combination Standpipe and Sprinkler Systems		---	---	---	●	●	●	---	---	---	---	---	---	---	---
15333 - Fire Pumps		---	---	---	---	●	●	---	---	---	---	---	---	---	---
15000 - Piping		---	---	---	---	---	●	---	---	---	---	---	---	---	---

⁵⁰ Clearance Zones for access areas, door swings, service space requirements, gauge reading, and other operational clearances shall be checked for conflicts with other elements.

1.5 PROGRAM AND SPACE VALIDATION REPORT

1.5.1 General

The *Consultant* shall use BIM Authoring software or other analysis tools to compare and validate the approved Educational Program of Requirements with each design scheme when required by a Design Phase and/or Sub-Phase.

- When determining and calculating square footage, for a *Project*, the *Consultant* shall follow the criteria set forth within SCA Design Requirement 1.3.1.3 Square footage Calculations – Building Efficiency.

1.6 COST ESTIMATING

1.6.1 General

Cost Estimates shall be provided as per the SCA Architectural and Engineering Contract for Consultant Services.

1.6.2 Cost Estimating for Design Phases IA and IB

The *Design Team* shall extract square foot information using BIM Authoring Software and other BIM integrated tools to support comparative costs analysis of each design scheme. Outputs shall be converted to spreadsheets and submitted as part of the design solution justification at the end of each Design Phase and/or Sub-Phase.

1.6.3 Quantity Takeoffs and Cost Estimating for Design Phases IC thru IIB

When and where appropriate, the *Design Team* is encouraged to extract quantity takeoff information and data using BIM Authoring Software and other BIM integrated tools to support and validate required Cost Estimates.⁵¹

1.7 ZONING ENVELOPE MODEL

1.7.1 General

The *Consultant* shall provide an independent 3-D *Model* for each design scheme, when required by a Design Phase and/or Sub-Phase, so that the architectural massing of a proposed building can be visualized in context with adjacent properties and structures so that key participants within the SCA and the DOE may quickly comprehend complex spatial conditions as well as zoning setbacks and height requirements. In addition, the 3-D *Model* shall demonstrate whether or not a building's design (bulk, volume and massing), for each design scheme, complies with NYC Zoning Regulations.

- All 3-D Zoning Models shall depict proposed conditions as well as as-of-right conditions.

1.8 EXISTING BUILDINGS/ADDITIONS

1.8.1 General

These Guidelines and Standards were specifically developed for the design and construction of new buildings and/or additions to existing buildings (new construction). Hence, unless otherwise required herein and/or by the Authority, the *Consultant* and/or their *Sub-consultants* are not required to *Model* any *Work* that would be required to be performed within an existing building.

⁵¹See Section 2.3.1- Best Practices/Exporting Revit for Cost Estimate and Quantity Takeoff

2.0 SECTION 2 – REVIT STANDARDS

2.1 GENERAL

This Section of the SCA BIM Guidelines and Standards for Architects and Engineers (BIM Manual) establishes the technical criteria required to develop a project using Revit for the SCA.

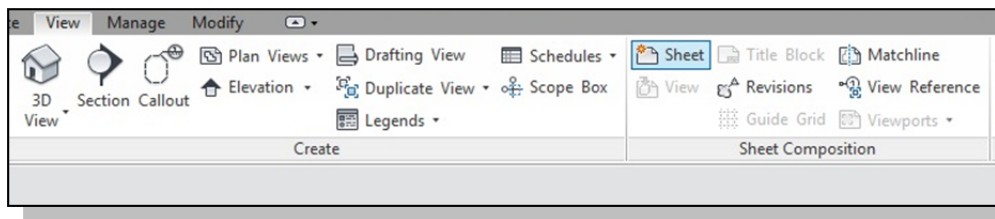
2.1.1 How to Use Section II – Revit Standards

To ensure that the SCA Revit Standards are clearly understood, the following nomenclature is used throughout this document:

- When referring to tools launched from the Ribbon Tab, **BOLD-FACEUPPER CASE** text is used to describe the Ribbon Tab, and ***Bold-Faced Title Case Italicized*** text to describe the Ribbon Panel and *Title Case Italicized* text is used to describe the Tool.

Example:

To make the required modifications, go to the **VIEW** Ribbon Tab, ***Sheet Composition*** Panel and click on the ***Sheet*** tool.



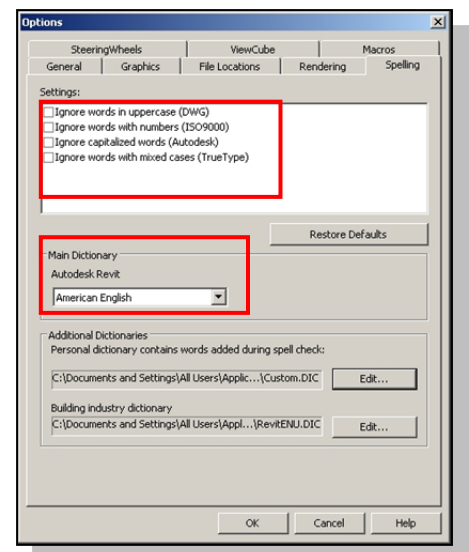
- When referring to Dialog Boxes, UPPER CASE text is used. For Tabs within a Dialog Box, *Title Case Italicized* text is used. Any references to a Pull-Down Menu, a Check Box, an Option Button, a Text Box, or a Drop Down list within a Dialog Box will be marked with a red rectangle. Referenced titles will be identified between quotes (" ") using "*Title Case Italicized*" text and followed by a brief explanation.

Example:

Within the OPTIONS Dialog Box, select the *Spelling* tab and make the necessary changes as shown in the image to the right

Under "*Settings*", ensure that none of the boxes are checked.

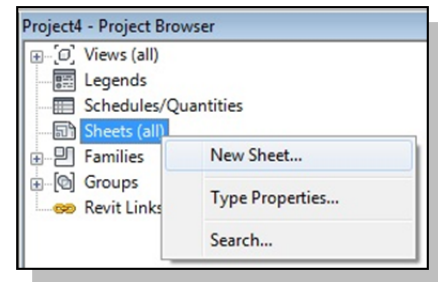
Under "*Main Dictionary*", ensure that the "*American English*" option is selected.



- When referring to tools launched from the Project Browser, *UPPER CASE ITALICIZED* text is used to describe the View Type and *Title Case Italicized* text is used to describe the command.

Example:

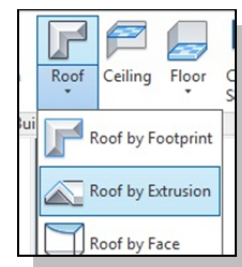
In the Project Browser, right-click on top of *SHEETS* header and select *New Sheet*.



- When referring to pull-down menus, *UPPER CASE ITALICIZED* text is used to describe the menu option and *Title Case Italicized* text is used to describe the command.

Example:

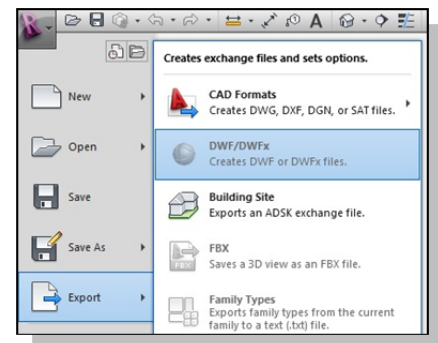
Go to the *ROOF* pull-down menu and select *Roof By Extrusion*



- When referring to tools launched from the Application Menu, they will be referred to as buttons and *Title Case Italicized* text is used to describe them.

Example:

To export files as DWF go to the APPLICATION Menu in the upper left hand corner of your screen and select the *Export* button followed by the *DWF/DWFX* button.



- When referring to folders, **bolded** text is used to describe the folder location, and *italicized bolded* text refers to user/firm defined folder location.

Example:

The local version of the Revit central file is saved on the user's workstation under the following folder:

Firm_designated_Local_Path\LOCAL\PID_LOCAL_username.rvt

2.1.2 SCA Revit Standards Version

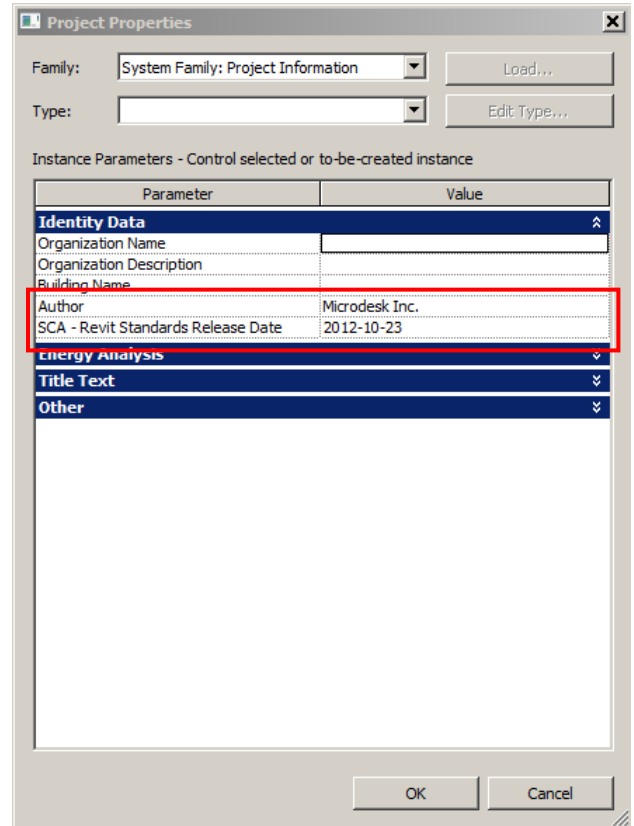
The SCA will be constantly looking for ways to improve their Revit practice; therefore, the SCA Revit Standards along with the Support Files will be reviewed on a regular basis.

To that extent, there is included a parameter named **SCA – Revit Standards Release Date** as shown in the image to the right that can be found within the Project Information.

Every time the SCA reviews and/or modifies information within their different discipline's templates, this parameter will be updated to reflect the new date, the updated information will be posted on the SCA WEB Site and the designers will be notified via email so they can download its content.

NOTE

We strongly encourage Consultants to check the SCA WEB Site on the regular basis to see if updates have been posted.



Parameter	Value
Identity Data	
Organization Name	
Organization Description	
Building Name	
Author	Microdesk Inc.
SCA - Revit Standards Release Date	2012-10-23
Energy Analysis	
Title Text	
Other	

2.1.3 Software Requirements

The SCA has adopted Autodesk Revit as its standard BIM software. The Autodesk Revit products currently in use by the SCA are:

1. Autodesk Revit Architecture
2. Autodesk Revit MEP
3. Autodesk Revit Structure

NOTE

Based on the non-backwards compatibility of the Revit-based applications, verify which version and point release of the application is currently being used by the SCA for the duration of the project.

In addition to the Revit-based applications, the SCA has adopted the following software for its BIM effort:

- Autodesk NavisWorks Manage
- Autodesk Quantity Takeoff
- Autodesk Ecotect Analysis
- Autodesk 3D MAX Design
- Autodesk Design Review

2.1.4 Digital Submittal Requirements

All submitted electronic files must be compatible with the version of the Autodesk Revit software currently being used by the SCA and must conform and comply with the latest version of these SCA BIM Guidelines and Standards.

2.1.4.1 File Formats

The following formats are required on every submission:

- RVT : Autodesk Revit files
- NWF : Autodesk NavisWorks Master files
- NWC : Autodesk NavisWorks Cache files
- DWF : Autodesk Design WEB Format files
- ATO : Autodesk Quantity Takeoff files
- LandXML : Autodesk Civil 3D Data files

2.1.4.2 File Submissions

Consultants are required to submit their version of the Central File when exchanging information with the SCA.

The frequency with which this information will be shared between in-house staff and outside designers may vary from project to project. Please coordinate with the Project's Model Manager.

2.1.4.3 Coordinate Systems

In an effort to organize, consolidate, and standardize the information generated and consumed by all divisions within the SCA, all SCA Revit projects shall use NAD83 (North American Datum 1983) New York State Planes, Long Island, US Footas the Coordinate System:

2.1.4.4 Media and Identification

All project-related files must be submitted on media CDs/DVDs, delivered virus free, and labeled with the following information:

- Company Name and Address
- Contact Name
- E-mail Address
- Phone Number
- Facility Name
- Project Identification (PID) Number (SCA LLW#/D#, see Revit Projects Workflow)
- Project Name
- Discipline
- Submission Phase
- Submittal Date

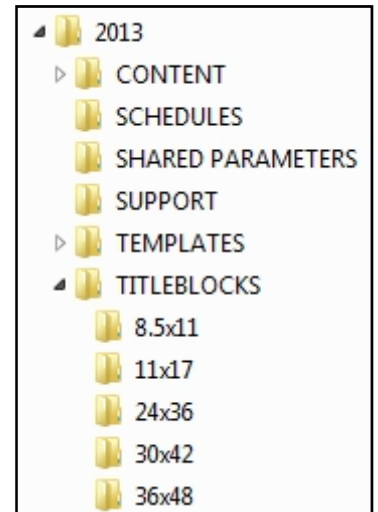
2.1.5 Accessing the SCA Revit Support Files

The SCA Revit Standards Library includes a series of support files that are stored in a folder named “*Version of Revit*”, i.e. “2013”. They are located on the SCA website under “Working with Us”, “Performing the Work”.

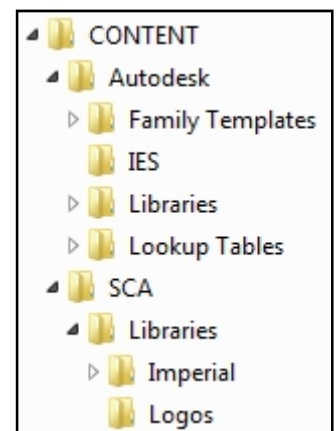
2.1.5.1 Understanding the Support Files

All cross-discipline support files used by all the Revit-based applications and have been divided into various folders as shown in the image to the right. All SCA workstations have already been configured to access these files.

Outside consultants should copy these files to the appropriate directories. Contact your System Administrator or CAD\BIM Manager for proper configuration and use.



The “CONTENT” folder includes product-specific (Architecture, MEP and Structure) libraries, along with the approved SCA content as shown in the image to the right.



NOTE

It is strongly recommended that the folder structure shown above be duplicated.

2.1.5.2 Using the Support Files

Following is a brief description of the contents of each sub-folder within the All Disciplines folder:

FOLDER	DESCRIPTION
Content	Contains SCA agency specific content that has not been already loaded within the different Discipline Templates.
Shared Parameters	Includes the SCA custom Shared Parameters file.
Support	Includes support files for importing and exporting AutoCAD files to and from Revit, a CTB used when plotting AutoCAD files created from Revit, and an XML file for importing NavisWorks settings into Revit.
Templates	Includes the discipline-specific template files for the Architectural, Electrical, Mechanical, Plumbing (Drainage and Fire Protection), and Structural disciplines.
Title blocks	Includes Standard Title Sheets and Title Blocks for projects for sizes 24x36, 30x42 and 36x48.

2.1.6 Environment Setup

This section describes the process of setting up the Autodesk Revit products to ensure proper use of the application under the SCA requirements.

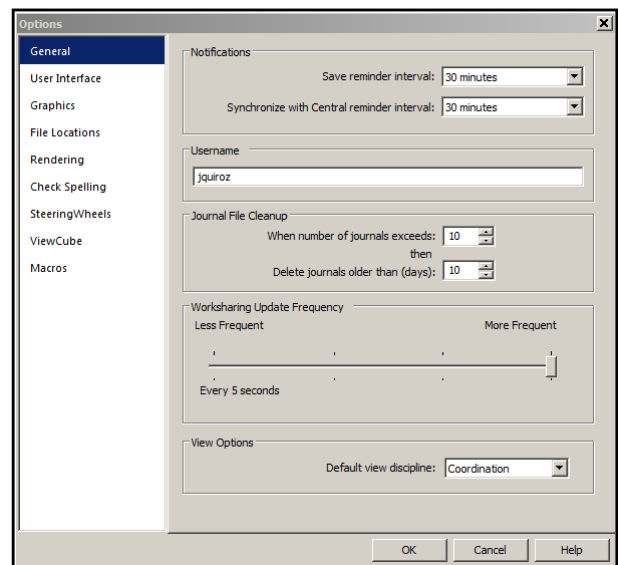
2.1.6.1 Options

To make the required modifications, go to the APPLICATION menu and select the *Options* button. This will open the OPTIONS Dialog Box as shown in following images.

Select the *General* option and make the necessary changes as shown in the image to the right.

Unlike AutoCAD, the Revit-based applications do not have an auto-save feature. The “Notifications” settings will only remind users to save the local and central versions of their 3D Models.

The “*Username*” should match your “login name” and should never be changed. Worksets rights are set upon this value.

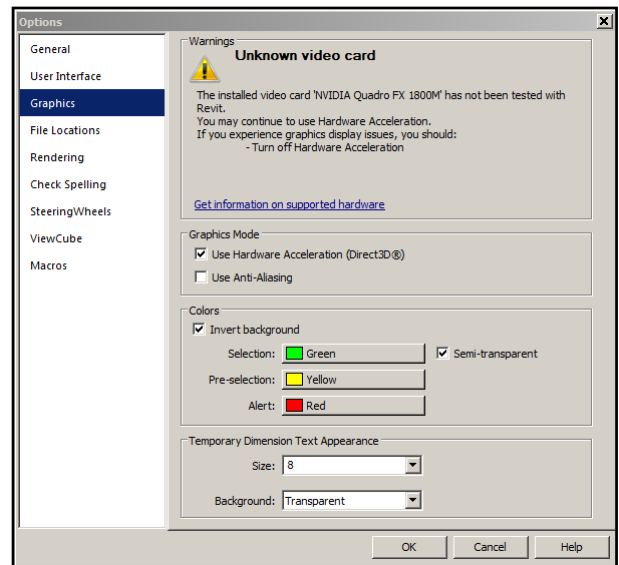


NOTE

Changing the username in the middle of the project will break the synchronization established between the Central File and the Local File, restricting the user’s access to the Worksets and increasing the chances of corrupting the Project.

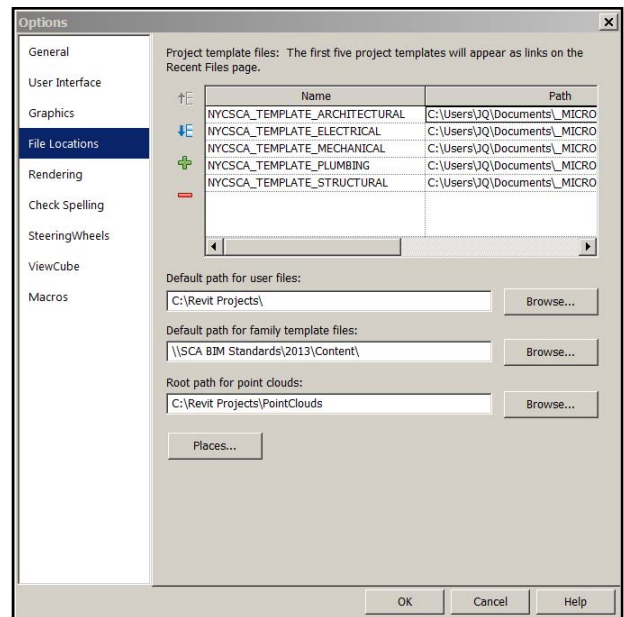
Select the *Graphics* option and make the necessary changes as shown in the image to the right.

To promote consistency across all users, the “*Selection Color*,” the “*Highlight Color*,” and the “*Alert Color*” shall be set to Green, Yellow, and Red, respectively.



Select the *File Locations* tab and verify that under the “*Default Template File*” the discipline-specific template is selected; that under the “*Default Path for User Files*” the appropriate folder as designated by the System Administrator or CAD/BIM Manager is selected; and that under the “*Default Path for Family Template Files*” the appropriate folder where the SCA Revit Library has been downloaded and shared is selected.

All SCA workstations have already been configured to access these files as indicated.



NOTE

Consultants should copy these files to the appropriate directories. Contact your System Administrator or CAD/BIM Manager for proper use.

2.1.6.2 Shared Parameters

The Revit-based applications enable the creation of custom fields to be shared within a project through a function named “Shared Parameters”.

To make the required modifications, go to the **MANAGE** Ribbon Tab and select **Shared Parameters**. This will open the EDIT SHARED PARAMETERS Dialog Box as shown in the image to the right.

To select the file, click on the “Browse” button and navigate to the following folder:

*Firm_designated_Path\”Version of Revit\”\Shared Parameters\
(Please note that the SCA Revit Support Files needs to be downloaded, extracted and placed on the network)*

Then select “NYCSCA_Shared Parameters.txt” and click on the “OK” button.

The SCA Shared Parameters file only addresses information within the Titleblocks (Standard Title Sheets) and some Mechanical and Electrical components at this point.

NOTE

The Autodesk Revit Products can reference only one shared parameter file at a time, so make sure this is the default file when working on SCA projects.

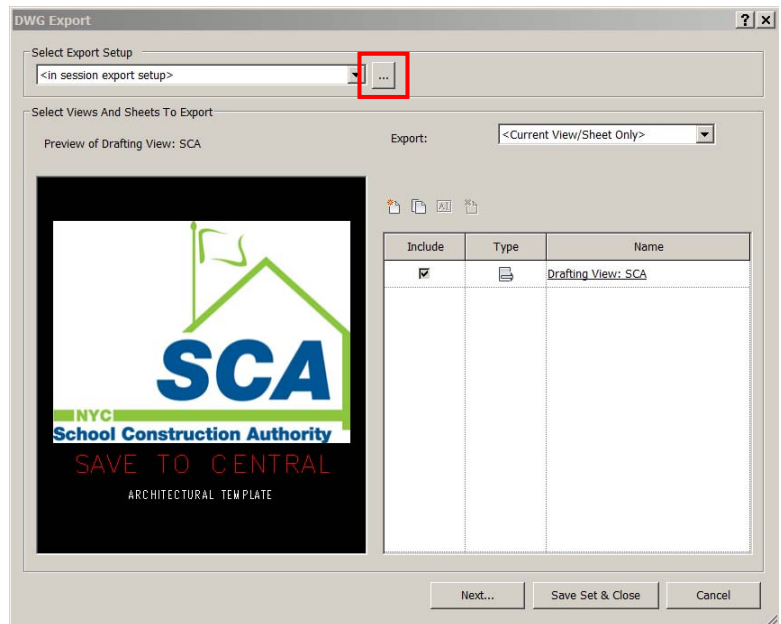
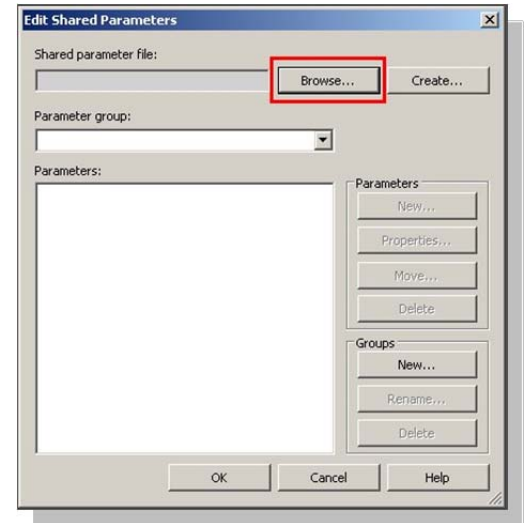
2.1.6.3 Import/Export Settings

The Revit-based applications have the ability to import and export AutoCAD files into and from the 3D Model, respectively.

2.1.6.3.1 Export Layers DWG/DXF

To make the required modifications, go to the APPLICATION menu and select **Export**, then **Options**, and then **Export Layers DWG/DXF** option.

This will launch the DWG Export Dialog Box as shown in the image to the right. Click on the “Load” button.

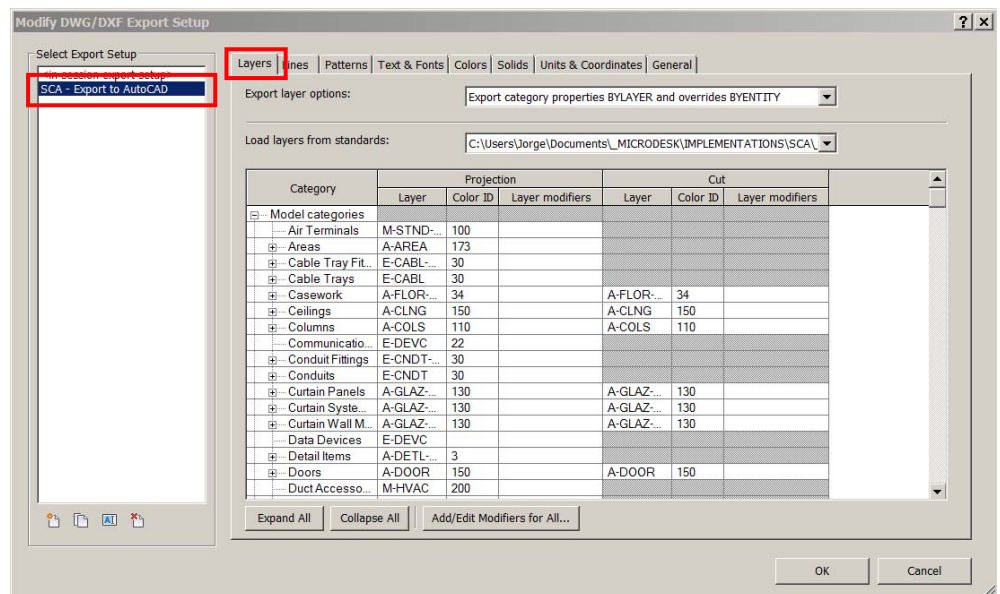


This will launch the Modify DWG/DXF Export Setup Dialog Box as shown in the image to the right.

Select the **SCA - Export to AutoCAD** Option and make sure under the **Layers** tab the **NYCSCA_Export_Layers_To_AutoCAD.txt** file is selected.

This file can be found under:

Firm_designated_Path\Version of Revit\Support
(Please note that the SCA Revit Standards Library needs to be downloaded, extracted and placed on the network)



NOTE

Two color-dependent plot style table files (CTBs) have been provided with the SCA Revit Standards Library to plot from AutoCAD in either full size or half size.

- SCA_FULL.ctb
- SCA_HALF.ctb

These files can be found under:

Firm_designated_Path\Version of Revit\Support

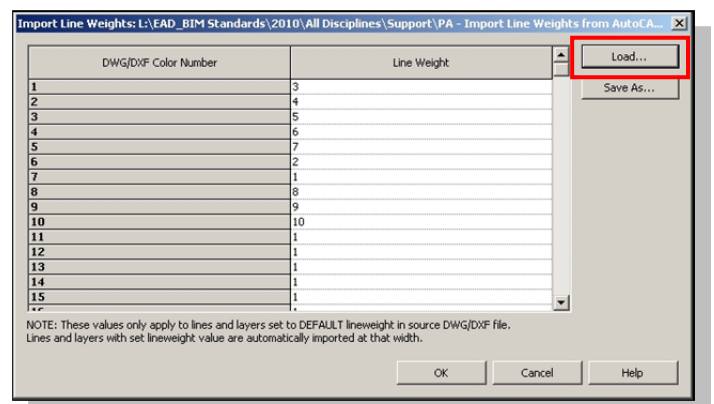
2.1.6.3.2 Import Line Weights DWG/DXF

To make the required modifications, go to the **INSERT** Ribbon Tab and expand the arrow under the **Import** Panel.

This will launch the IMPORT LINE WEIGHTS Dialog Box as shown in the image to the right. Click on the “Load” button to select the **NYCSCA_Import_Lineweights_From_AutoCAD.txt** file.

These files can be found under:

Firm_designated_Path\Version of Revit\Support
(Please note that the SCA Revit Standards Library needs to be downloaded, extracted and placed on the network)



2.2 FILE USAGE AND TYPES

2.2.1 Templates

All Revit projects must be created using one of the templates provided with the SCA Revit Standards, which are:

- ☐ NYCSCA_TEMPLATE_ARCHITECTURAL
- ☐ NYCSCA_TEMPLATE_ELECTRICAL
- ☐ NYCSCA_TEMPLATE_MECHANICAL
- ☐ NYCSCA_TEMPLATE_PLUMBING
- ☐ NYCSCA_TEMPLATE_STRUCTURAL

To promote consistency in the Contract Set as well as to prevent the use of un-licensed fonts, all SCA Text Styles, Dimension Styles, Leaders, Tags and Content have been defined using the RomanS.TTF font.

NOTE

Settings within the Template Files shall not be modified or altered in any way or form.

2.2.1.1 Text Styles

Six Text Styles have been defined within the Templates as follows:

- ☐ SCA_3/16"
- ☐ SCA_3/32"

2.2.1.2 Dimensions Styles

Three Dimension Styles have been defined within the Templates as follows:

- ☐ SCA_DIM_ANGULAR
- ☐ SCA_DIM_DIAMETER
- ☐ SCA_DIM_LINEAR
- ☐ SCA_DIM_RADIAL

2.2.1.3 Grids

Two Standard Grids have been provided as follows:

- ☐ SCA_GRID_HEAD_EXISTING
- ☐ SCA_GRID_HEAD_NEW

2.2.1.4 Line Weights

Line Weights have been provided for Model, Annotation and Perspective Objects as follows:

2.2.1.4.1 Model and Annotation Line Weights

Ten Line Weights have been provided for Annotation Objects and for Model Objects, which have been defined at the 1/8"=1' Scale and increases and decreases in 25% increments and decrements from the previous scale.

MODEL AND ANNOTATION LINEWEIGHTS	
PEN #	WIDTH
1	0.0020"
2	0.0050"
3	0.0080"
4	0.0100"
5	0.0130"
6	0.0150"
7	0.0170"
8	0.0200"
9	0.0240"
10	0.0260"
11	0.0050"
12	0.0050"
13	0.0050"
14	0.0050"
15	0.0050"
16	0.0050"

2.2.1.4.2 Perspective Line Weights

All Perspective Line Weights have been set to 0.0050"

2.2.1.5 Line Styles

Sixteen Line Styles that match the sixteen Line Weights have been provided as follows:

LINE STYLES		
NAME	PEN # (WIDTH)	LINE PATTERN
SCA - Pen#1	1 (0.0040")	Solid
SCA - Pen#2	2 (0.0080")	Solid
SCA - Pen#3	3 (0.0100")	Solid
SCA - Pen#4	4 (0.0120")	Solid
SCA - Pen#5	5 (0.0140")	Solid
SCA - Pen#6	6 (0.0160")	Solid
SCA - Pen#7	7 (0.0180")	Solid
SCA - Pen#8	8 (0.0200")	Solid
SCA - Pen#9	9 (0.0240")	Solid
SCA - Pen#10	10 (0.0280")	Solid
SCA - Pen#11	11 (0.0320")	Solid
SCA - Pen#12	12 (0.0360")	Solid
SCA - Pen#13	13 (0.0400")	Solid
SCA - Pen#14	14 (0.0440")	Solid
SCA - Pen#15	15 (0.0480")	Solid
SCA - Pen#16	16 (0.0720")	Solid

2.2.1.6 Line Styles Screening

Five screened Line Styles have been provided as follows:

LINE STYLES			
NAME	PEN # (WIDTH)	RGB	RGB COLOR
SCA - Black 100%	1 (0.0040")	000-000-000	
SCA - Black 80%	3 (0.0100")	050-050-050	
SCA - Black 60%	5 (0.0140")	100-100-100	
SCA - Black 40%	7 (0.0180")	150-150-150	
SCA - Black 20%	9 (0.0240")	200-200-200	

NOTE

The lighter the Screening of the Line Style, the thicker it has been set; this is to ensure that screened Line Styles reproduce in the copies of the Mylars.

2.2.1.7 Fill Patterns

Fill Patterns have been imported from AutoCAD as follows:

LINE PATTERNS		
SCA - ANSI31	SCA - Brick-02	SCA - Gravel
SCA - ANSI32	SCA - Brick-03	SCA - Hexagons
SCA - ANSI33	SCA - Brick-04	SCA - Honey
SCA - ANSI34	SCA - Clay	SCA - Hound
SCA - ANSI35	SCA - Cork	SCA - Mudst
SCA - ANSI36	SCA - Cross	SCA - Parquet-01
SCA - ANSI37	SCA - Dash	SCA - Parquet-02
SCA - ANSI38	SCA - Dolmit	SCA - Sacncr
SCA - Brass	SCA - Dots	SCA - Siding
SCA - Brick-01	SCA - Grate	SCA - Trans

2.2.1.8 Fill Regions

Fill Regions (opaque and transparent) have been provided as follows:

SCREENING		
FILLED REGION NAME	RGB VALUE	RGB COLOR
SCA - Solid Black 100%	000-000-000	
SCA - Solid Black 80%	050-050-050	
SCA - Solid Black 60%	100-100-100	
SCA - Solid Black 40%	150-150-150	
SCA - Solid Black 20%	200-200-200	

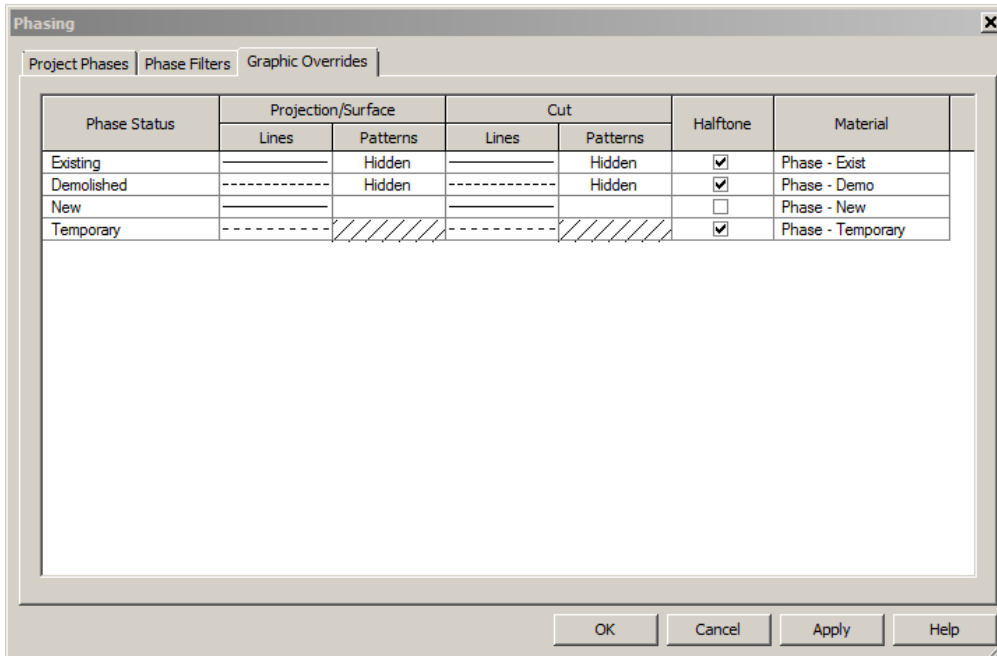
2.2.1.9 Halftone

Halftone has been set to 50%.

2.2.1.10 Phases

Phases can be created to match the Project Phases as necessary. The Project Lead is responsible for coordinating how many Phases the Project might have.

Phase Status for Existing, Demolished, New and Temporary have been set as shown in the image below.



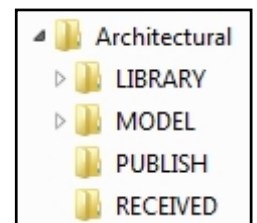
2.2.2 Setting Up Central and Local Files

The SCA CAD\BIM Support Group is responsible for setting up all Revit Models; this includes all Disciplines' Central Model Files along with each user Local Files

2.2.2.1 Central File

Each discipline's Central File folder has a series of standardized sub-folders that will contain various groups of design data.

The image to the right illustrates the Central File standardized sub-folders using the Architectural Folder as an example. The Central File will be saved on the Discipline's MODEL Folder.

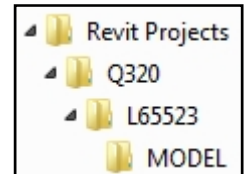


2.2.2.2 Local File

The Local version of the Central File described above should be saved on the user's local machine in a folder named as follows:

Firm_designated_local_Path\Revit Projects

The image to the right illustrates the Local File standardized sub-folders using the Architectural folder as an example.



NOTE

The contents of the sub-folders within the Local File folder, with the exception of the MODEL folder that is automatically synchronized with the Central File through Revit, should be manually copied back to their respective folders in the server.

2.2.3 Naming Conventions

All electronic project information should be named following the SCA Revit Standards naming conventions.

2.2.3.1 Folder Naming Convention

If sub-folders are needed and permitted by the folder's rules, they can be created under the predefined Project Folder Structure and they should follow the Folder Naming Convention.

The folders should be named beginning with a four-digit year, a two-digit month, and a two-digit day followed by an optional User Description.

The folder should take the form of:



YYYY_MM_DD_Description

FOLDER NAMING CONVENTION	
ITEM	DESCRIPTION
YYYY	Four-digit Year
MM	Two-digit Month
DD	Two-digit Day
Description (optional)	<p>Brief User Description (up to 12 characters)</p> <p>The following characters should not be used as part of the description</p> <p>@ \$ % ^ & < > / \ " ' : ; ? * , ' ,</p>

NOTE

Refer to Section - Discipline Folder for each discipline's folder rules before creating a sub-folder.

2.2.3.2 File Naming Convention

All electronic files should be named following the File Naming Convention, including Revit files (RVT), Plotsheet files (DWF), Revit Family files (RFA), AutoCAD files (DWG), Image files (JPG), Animation files (AVI), Microsoft Office files (DOC, XLS, HTML), NavisWorks files (NWF, NWC), and Analysis files (multiple formats).

2.2.3.3 Discipline Codes

There are six disciplines within the SCA as described in Section - [Discipline Folder](#). All electronic files should be named with the appropriate prefix Discipline Code based on the following table. Refer to the SCA Design Requirement DR 1.1.2 Drawing Naming Convention, for additional Discipline Codes used when naming Sheet Views in the Model File.

DISCIPLINE CODES	
CODE	NAME
A	Architectural
C	Civil
E	Electrical
M	Mechanical
P	Plumbing/Drainage and Fire Protection
S	Structural

2.2.3.4 PID – SCA Project Identification

The PID is assigned at the start of the project. If the Consultant does not already have it, they are required to get this number from the Project Design Manager (PDM) at the project kickoff.

The PID Number is a unique identifier assigned by the SCA for all SCA projects. Every Facility Folder within the SCA network server has been divided into project folders using the following convention:

- Line Projects use a prefix “L” to denote LLW# followed by a six to seven digit PID Number
Example: L56789

2.2.3.5 Revit Central File

The Central file should be named with the prefix Discipline Code, followed by the PID Number, a Model Type, and the word CENTRAL. Once defined, the Central File name should not change through the life of the project.

The filename should take the form of:



DPID_MT_CENTRAL.rvt

REVIT CENTRAL FILE	
ITEM	DESCRIPTION
D	Discipline Code (Refer to Section 2.2.3.3 - Discipline Codes)
PID	PID Number (Refer to Section 2.2.3.4 - PID)
MT	Model Type Code Refer to chart below
CENTRAL	This shall stay as is

MODEL TYPES	
CODE	DESCRIPTION
3D	3D Model
EC	Existing Conditions Model
SM	Site Model

As an example, the Architectural Group is saving their Revit Model as a Central File to a network drive.

The file should be named as follows:

AL56789_3D_CENTRAL.rvt

NOTE

After saving the Central File, Revit creates two folders: one named “YOUR FILE NAME_backup” and another folder named “Revit_temp”. Neither the folders nor the files contained within it should be moved, renamed, or deleted.

2.2.3.6 Revit Local File

The Local File should be a copy of the Central File, which is done through the application, and should be named with the prefix Discipline Code and followed by the PID Number and a Model Type. As the Central File, once defined, the Local File name shall not change through the life of the project.

The Local File does not have the word CENTRAL appended at the end of the file name.

The filename should take the form of:



DPID_MT.rvt

REVIT LOCAL FILE	
ITEM	DESCRIPTION
D	Discipline Code (Refer to Section 2.2.3.3 - Discipline Codes)
PID	PID Number (Refer to Section 2.2.3.4 - PID)
MT	Model Type (Refer to chart below)

MODEL TYPES	
CODE	DESCRIPTION
3D	3D Model
EC	Existing Conditions Model
SM	Site Model

As an example, the Architectural Group is saving their Revit Model as a Local File to their local drives.

The file should be named as follows:

AL56789_3D.rvt

NOTE

After saving the Local File, Revit creates a folder named “YOUR FILE NAME_backup”. Neither this folder nor the files contained within it should be moved, renamed, or deleted.

2.2.3.7 Publish Files

Publish files in DWF format should be named with the prefix Discipline Code, followed by the PID Number, the Drawing Type, and the Sheet Number range.

The filename should take the form of:



DPID_DT_001_###.dwf

PUBLISH FILES	
ITEM	DESCRIPTION
D	Discipline Code (Refer to Section 2.2.3.3 - Discipline Codes)
PID	PID Number (Refer to Section 2.2.3.4 - PID)
DT	Drawing Type (Refer to SCA Design Requirement 1.1.1.2 Drawing Naming Convention)
001_###	First Sheet Number to Last Sheet Number (Refer to SCA Design Requirement 1.1.1.2 Drawing Naming Convention)

Example

The Architectural Group is creating a set of drawings which include the General drawings (1 through 7), Architectural drawings (1 through 37), and Landscape drawings (1 through 11).

AL56789_G001_G007.dwf

AL56789_A001_A037.dwf

2.2.3.8 Family Files

Family files should be named beginning with the Functional Type followed by the Subtype, the Manufacturer Name, and two optional User Description fields.

The filename should take the form of:



<Functional Type>_<Subtype>_<Manufacturer>_<Description1>_<Description2>.rfa

FAMILY FILES	
ITEM	DESCRIPTION
Functional Type	Names the element that the family creates
Subtype	Names the part type
Manufacturer	Manufacturer Name or Generic Primary Characteristic or Shape
Description1/ Description2 (Optional)	Brief User Description (up to 12 characters) The following characters should not be used as part of the description @ \$ % ^ & < > / \ " ' ; : ? * , ' ,

NOTE

- Capitalize the leading letters in each portion of the family name.
- Keep file names as short as possible because they need to display in the Type Selector.
- Do not use spaces between words in the file names. To separate words, use the underscore “_” character.
- Create a Type Catalog for Family files that contain five or more types. Refer to Section - [Type Catalog Convention](#).

Examples:

- Window_Double_Hung-Andersen_400_Series_Archtop.rfa
- Sink_Oval_Generic_Undercounter.rfa
- Air_Handling_Unit_Vertical_Packaged_Sierra_Roof_Top.rfa
- Framing_Wood_Lumber.rfa
- Foundation_Concrete_Rectangular.rfa

2.2.3.9 Family Types

Types within a Family file should indicate the key differences or variations between the different Family options. Depending on the Family Component, the Type names might take one of the following forms:

<Model> or <Series Number>

<Value> or <Capacity>

<Width>x<Depth>x<Height>

NOTE

- Do not include the Family Name in the Type Name.
- Type Names should mirror actual usage.
- Capitalize the leading letters in each portion of the Type Name (when applicable).
- When Types are named by size, use dimensions only.
- Keep file names as short as possible because they need to display the Type Selector.
- Do not use spaces between words in the Type Names. To separate words, use the underscore “_” character.
- Create a Type Catalog for Family files that contain five or more types. Refer to [Section 2.2.3.10 - Type Catalog Convention](#).

Examples:

- Window_Double_Hung-Andersen_400_Series_Archtop.rfa
WA1832
WA2032
- Sink_Oval_Generic_Undercounter.rfa
Standard_Height
ADA_Height
- Air_Handling_Unit_Vertical_Packaged_Sierra_Roof_Top.rfa
2400_CFM
3000_CFM
- Framing_Wood_Lumber.rfa
6"x8"
6"x10"
- Foundation_Concrete_Rectangular.rfa
16"x32"x8"
20"x36"x10"

2.2.3.10 Type Catalog Convention

Create a Type Catalog for Family files that contain five or more types or when the Family file exceeds 500 Kb of memory.

Name the Type Catalog file (.TXT) with the same name as the Family file (.RFA) that it supports.

NOTE

- If a Type Catalog is used, no predefined Types should exist in the Family file.
- Do not include the Family Name in the Type Name.
- Type Names should mirror actual usage.
- Capitalize the leading letters in each portion of the Type Name (when applicable).
- When Types are named by size, use dimensions only.
- Keep file names as short as possible because they need to display in the Type Selector.
- Do not use spaces between words in the Type names. To separate words, use the underscore “_” character.

Examples:

- Window_Double_Hung_Andersen_400_Series_Archtop.rfa
- Window_Double_Hung_Andersen_400_Series_Archtop.txt

- Sink_Oval_Generic_Undercounter.rfa
- Sink_Oval_Generic_Undercounter.txt

- Air_Handling_Unit_Vertical_Packaged_Sierra_Roof_Top.rfa
- Air_Handling_Unit_Vertical_Packaged_Sierra_Roof_Top.txt

- Framing_Wood_Lumber.rfa
- Framing_Wood_Lumber.txt

- Foundation_Concrete_Rectangular.rfa
- Foundation_Concrete_Rectangular.txt

2.2.3.11 Material Names

Materials should be named beginning with the Finish Material followed by the Manufacturer Name, the Finish Code, and an optional User Description.

The filename should take the form of:

<Finish>_<Manufacturer>_<Finish Code>_<User Description>

MATERIAL NAMES	
ITEM	DESCRIPTION
Finish	Finish Material
Manufacturer	Manufacturer Name or Generic Primary Characteristic or Shape
Finish Code	Finish Code or Model Number
User Description (Optional)	Brief description (up to 24 characters) The following characters should not be used as part of the description @ \$ % ^ & < > / \ " ' ; : ? * , ' ,

NOTE

- Capitalize the leading letters in each portion of the Material Name.
- Do not use spaces between words in the file names. To separate words, use the underscore “_” character.

Examples:

- Paint_Sherwin_Williams_SW6034_Arresting_Auburn
- Glass_Pilkington_Evergreen_3/16”_Uncoated_Insulated

2.2.3.12 Bitmap Files

Bitmap files used to define Materials within Revit should match the corresponding Materials they represent and should be in .JPG format.

Examples

- Paint_Sherwin_Williams_SW6034_Arresting_Auburn
Paint_Sherwin_Williams_SW6034_Arresting_Auburn.jpg
- Glass_Pilkington_Evergreen_3/16”_Uncoated_Insulated
Glass_Pilkington_Evergreen_3/16”_Uncoated_Insulated.jpg

2.2.3.13 AutoCAD Files

AutoCAD files linked to the Revit Model should be named beginning with the Discipline Code, followed by the PID Number, an optional Sequence Number, and an optional User Description. Once defined, the AutoCAD file name should not change for the life of the project.

The filename should take the form of:



DPID_SN_Description.dwg

AUTOCAD FILES	
ITEM	DESCRIPTION
D	Discipline Code (Refer to Section 2.2.3.3 - Discipline Codes)
PID	PID Number (Refer to Section 2.2.3.4 - PID)
SN (Optional)	Sequence Number (Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 12 characters) The following characters should not be used as part of the description @ \$ % ^ & < > / \ " ' : ; ? * , ' ,

Example:

The Structural Group is linking three AutoCAD files into their Revit Model.

The files should be named as follows:

SL56789_01_FirstFloor.dwg
 SL56789_02_SecondFloor.dwg
 SL56789_03_Roof.dwg

NOTE

Only AutoCAD files in DWG format should be linked into the Revit Model.

2.2.3.14 Image Files

Image files linked to or created from the Revit Model should be named beginning with the Discipline Code, followed by the PID Number, an optional Sequence Number, and an optional User Description. If Image files are referenced into the Revit Model, once defined, the Image file name should not change through the life of the project.

The filename should take the form of:



DPID_SN_Description.jpg

IMAGE FILES	
ITEM	DESCRIPTION
D	Discipline Code (Refer to Section 2.2.3.3 - Discipline Codes)
PID	PID Number (Refer to Section 2.2.3.4 - PID)
SN (Optional)	Sequence Number (Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 12 characters) The following characters should not be used as part of the description @ \$ % ^ & < > / \ " ' : ; ? * , ' ,

Example:

The Architectural Group is linking two image files into their Revit Model.

The files should be named as follows:

AL56789_01_SignageA1.jpg

AL56789_02_SignageA2.jpg

NOTE

Only Image files in JPG format should be linked into, or created from, the Revit Model.

2.2.3.15 Animation Files

Animation files created from the Revit Model should be named beginning with the Discipline Code, followed by the PID Number, an optional Sequence Number, and an optional User Description.

The filename should take the form of:



DPID_SN_Description.avi

ANIMATION FILES	
ITEM	DESCRIPTION
D	Discipline Code (Refer to Section 2.2.3.3 - Discipline Codes)
PID	PID Number (Refer to Section 2.2.3.4 - PID)
SN (Optional)	Sequence Number (Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 12 characters) The following characters should not be used as part of the description @ \$ % ^ & < > / \ " ' : ; ? * , ' ,

Example:

The Architectural Group is creating an animation file out of their Revit Model.

The file should be named as follows:

AL56789_01_WalkthroughExterior.avi

NOTE

Only Image files in AVI format should be created from the Revit Model.

2.2.3.16 Microsoft Office Files

Microsoft Office files created from the Revit Model should be named beginning with the Discipline Code, followed by the six-digit PID Number, an optional Sequence Number, and an optional User Description.

The filename should take the form of:

DPID_SN_Description.format

MICROSOFT OFFICE FILES	
ITEM	DESCRIPTION
D	Discipline Code (Refer to Section 2.2.3.3 - Discipline Codes)
PID	PID Number (Refer to Section 2.2.3.4 - PID)
SN (Optional)	Sequence Number (Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 12 characters) The following characters should not be used as part of the description @ \$ % ^ & < > / \ " ' : ; ? * , ' ,

Example:

The Mechanical Group is exporting two schedules out of their Revit Model into Excel.

The files should be named as follows:

ML56789_01_EquipmentList.xls
ML56789_02_Loads.xls

NOTE

Only Microsoft Office Word, Excel and Hyper Text Markup Language files, in DOC, XLS and HTML format, respectively, shall be created from the Revit Model.

2.2.3.17 3D DWF Files

3D DWF Files created from the Revit Model should be named beginning with the Discipline Code, followed by the PID Number and the characters “3D”.

The filename should take the form of:



DPID_3D.dwf

3D DWF FILES	
ITEM	DESCRIPTION
D	Discipline Code (Refer to Section 2.2.3.3 - Discipline Codes)
PID	PID Number (Refer to Section 2.2.3.4 - PID)
3D	3D Model (this may remain as is)

Example:

The Electrical Group is exporting their Revit Model as a 3D DWF.

The file should be named as follows:

E156789_3D.dwf

NOTE

The 3D DWF files will be used for cost estimate, quantity takeoff, and visualization purposes.

2.2.3.18 NavisWorks Cache Files

NavisWorks Cache files created from the Revit Model should be named beginning with the Discipline Code, followed by the PID Number, and the characters “3D”.

The filename should take the form of:



DPID_3D.nwc

NAVISWORKS CACHE FILES	
ITEM	DESCRIPTION
D	Discipline Code (Refer to Section 2.2.3.3 - Discipline Codes)
PID	PID Number (Refer to Section 2.2.3.4 - PID)
3D	3D Model (this may remain as is)

Example:

The Architectural Group is exporting their Revit Model as a NavisWorks Cache file.

The file should be named as follows:

AL56789_3D.nwc

NOTE

NavisWorks Cache Files in NWC format stores the project model geometry.

2.2.3.19 NavisWorks Master File

NavisWorks Master Files created by assembling the Discipline specific NavisWorks Cache files from NavisWorks Manage should be named beginning with the PID Number and the characters “3D”.

The filename should take the form of:



PID_3D.nwf

NAVISWORKS MASTER FILES	
ITEM	DESCRIPTION
PID	PID Number (Refer to Section 2.2.3.4 - PID)
3D	3D Model (this may remain as is)

Example:

The Model Manager has assembled all discipline’s NavisWorks Cache files into a NavisWorks Master file.

The file should be named as follows:

L56789_3D.nwf

NOTE

The Model Manager and Model Leaders are responsible for assembling all discipline’s NavisWorks Cache files into a NavisWorks Master file.

NavisWorks Master files in NWF format stores the links to the appended NWC files, but no project model geometry.

2.2.3.20 Analysis Files

Multiple applications will be used to perform different types of analysis within the different Revit Models.

Analysis files should be named beginning with the Discipline Code, followed by the PID Number, an optional Sequence Number, and an optional User Description.

The filename should take the form of:

DPID_SN_Description.format

ANALYSIS FILES	
ITEM	DESCRIPTION
D	Discipline Code (Refer to Section 2.2.3.3 - Discipline Codes)
PID	PID Number (Refer to Section 2.2.3.4 - PID)
SN (Optional)	Sequence Number (Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 12 characters) The following characters should not be used as part of the description @ \$ % ^ & < > / \ " ' : ; ? * , ' ,

NOTE

Regardless of the application used to perform the analysis within the Revit-based applications, the results of such applications shall be brought back into the Revit 3D Model. This will ensure that the Revit 3D Model has the latest and most current information.

2.2.4 Drawing Type Convention

Drawing Types are categories used to organize the *Contract Documents* and refer to either one or two letters that appear before the Sheet Number in the lower right hand corner of each sheet. Refer to SCA Design Requirement 1.1.1.2 Drawing Naming Convention.

2.2.5 Sheet Number Convention

The Sheet Number Convention refers to the numbers that appear right after the Drawing Type and are used to organize the Contract Drawings in order. Refer to SCA Design Requirement 1.1.1.2 Drawing Naming Convention.

2.2.6 Views Naming Convention

Views within the Project Browser shall be named beginning with the View Type Code followed by an optional Level/Sequence Number and an optional User Description.

The Views should take the form of:

<View><Level/Sequence>_<Description>

VIEWS NAMING CONVENTION	
ITEM	DESCRIPTION
View	View Type Code (Refer to charts below)
Level/Sequence (Optional)	Level Number or Sequence Number (Two-digit number)
Description (Optional)	Brief User Description (up to 12 characters) The following characters should not be used as part of the description @ \$ % ^ & < > / \ " ' : ; ? * , ' ,

2.2.6.1 All Disciplines

ALL DISCIPLINES	
VIEW TYPE CODE	VIEW TYPE NAME
3D	3D Views
AP	Area Plans
BS	Building Sections
CP	Ceiling Plans
CS	Construction Staging or Sequence
DL	Drawing List
DR	Drafting Views
DS	Detail Sections
DV	Detail Views
EE	Exterior Elevations
QP	Equipment Plan
FE	Framing Elevation
FP	Floor Plans
IE	Interior Elevations
KL	Keynote Legend
L	Landscape Plan
LG	Legends
LP	Location Plan
LS	Life Safety
ON	One Line Diagram Plan
NB	Note Block
MT	Material Takeoff
RD	Riser Diagram
RP	Reports
RO	Roof Plan
SC	Sections
SD	Schedules
SP	Site Plan
VL	View List
WT	Walkthroughs
X	Other

2.2.6.2 Architectural

ARCHITECTURAL	
VIEW TYPE CODE	VIEW TYPE NAME
FU	Furniture Plan
SG	Signage Plan

2.2.6.3 Electrical

ELECTRICAL	
VIEW TYPE CODE	VIEW TYPE NAME
AX	Auxiliary Power Plan
CM	Communication Plan
CO	Corrosion Protection Plan
EC	Energy Code Compliance
GP	Grounding Plan
LI	Lighting Plan
LT	Lighting Protection Plan
PP	Power Plan
WD	Wiring Diagram Plan

2.2.6.4 Mechanical

MECHANICAL	
VIEW TYPE CODE	VIEW TYPE NAME
CD	Communication System Plan
CN	Control Plan
CC	Control Schematic Plan
FS	Fire Suppression Plan
HP	HVAC Ductwork Plan
MD	Machine Design Plan
MH	Material Handling Plan

2.2.6.5 Plumbing

PLUMBING	
VIEW TYPE CODE	VIEW TYPE NAME
FPP	Fire Protection Plan
FS	Fire Suppression Plan
PI	Piping Plan
PL	Plumbing Plan
SP	Sprinkler Plan
SD	Standpipe Plan
SI	Specialty Piping Plan

2.2.6.6 Structural

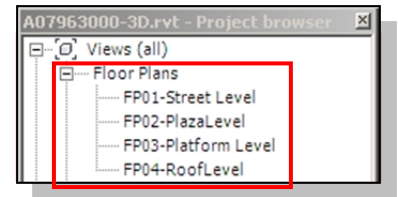
STRUCTURAL	
VIEW TYPE CODE	VIEW TYPE NAME
CF	Concrete Framing Plan
DP	Decking Plan
FD	Foundation Plan
FR	Framing Plan
GC	Graphical Column Schedule
JL	Joist Girder Load Diagram
PP	Precast Panel Plan
RE	Reinforcement Plan
SF	Stair Framing Plan
ST	Steel Framing Plan
TB	Truss Bracing Plan
XB	X Bracing Plan
WG	Wind Girt Plan

The image to the right shows the Floor Plans Views within the Project Browser organized by its View Type Code followed by a Sequence Number and a Description.

Example 1:

Architectural Floor Plans should be named as follows if the optional Level/Sequence Number is not used:

- FP_First Floor
- FP_Second Floor
- FP_Third Floor



Example 2:

Mechanical Ceiling Plans should be named as follows if the optional Level/Sequence Number is used but the optional Description is not used:

- CP03
- CP04
- CP05

Example 3:

Structural Analytical Plans should be named as follows if both the optional Level/Sequence Number is used and the optional Description is used:

- FP07_Level 260
- FP08_Level 275
- FP09_Level 290

2.3 BEST PRACTICES AND PROCEDURES

2.3.1 Best Practices

The following sections describe application-specific best practices as well as procedures used on all SCA Revit projects. The following characteristics of a Revit Model can affect performance:

- Complex Geometry
- Multiple Parametric Relations
- Multiple Constraints
- Linked Files

2.3.1.1 Restarting Revit

The Revit-based applications maintain model data in memory and hard disk caches to increase performance against repeated data access. Revit platform performance may benefit from a workstation restart once or twice a day, and especially before triggering the following memory-intensive tasks:

- Printing
- Rendering
- Exporting

2.3.1.2 Compacting Central and Local Files

Compacting the Central and Local files reduces file sizes when saving Workset-enabled files. During a normal save, Revit-based applications only write new and changed elements to the existing files. This can cause files to become large, but it increases the speed of the save operation. The compacting process rewrites the entire file and removes obsolete parts to save space. Because it takes more time than a normal save, use the compact option when the workflow can be interrupted.

2.3.1.3 Design Options

- Preserve Design Options only as long as they are useful to the project. Even though options may not be active and visible, when changes are made within the main model all Design Options will update to maintain the model's consistency.
- Consider whether options should be preserved long-term in separate models that can be linked as needed.

2.3.1.4 AutoCAD Files

- Minimize the number of linked or imported DWG files.
- Avoid importing unnecessary data like hatching or line-work such as construction lines. Delete unnecessary parts and layers of the DWG file within AutoCAD and import only the cleaned, smaller DWG.
- Avoid exploding the geometry imported from DWG files. The exploding operation within a Revit-based application can change a DWG from a single-managed element to hundreds or thousands of additional elements depending on the number of entities in the imported DWG.
- Only link essential DWG files into necessary views.
- DWG files shall be saved using the World Coordinates System (WCS) before they are linked into Revit in order to be correctly aligned.
- Linked files should not contain External References.
- Elements within the DWG cannot be more than 2 miles apart from each other.
- In order to control the AutoCAD Lineweight from Revit, the Lineweight column within the Layer Properties Manager Dialog Box should be set to Default.

2.3.1.5 Importing and Linking Files

- Unload links of all types if not used.
- Temporarily unload links if not needed in the view and reload them as required to limit memory resources necessary to open a project file.

2.3.1.6 Views

- Use “Wireframe” or “Shading” display modes when working in linked file environment. “Wireframe” and “Shading” modes can be three times faster than “Hidden Line” or “Shading with Edges” modes.
- Zoom in to speed up drawing and snapping.
- Clear the “Snap to Remote Objects” setting in the snap dialog if you have a very dense view and snap lines appear to be shooting off in all directions.
- Close unnecessary windows.
- Turn off shadows in views where they are unnecessary.

2.3.1.7 Modeling

- Until component types are determined, use the generic version of elements such as walls, doors, windows, slabs and roofs, which incorporate less geometry.
- Break up large models into 150MB-200MB each.
- Regularly review and fix warnings by going to the MODIFY Ribbon Tab and clicking on the Warnings option located under the INQUIRY Panel.

2.3.1.8 Saving

- Before closing a file, keep only a simple Drafting View open to accelerate saving and subsequent opening of the file.
- It is recommended that 3D views should be closed when saving to Central, since the Revit-based applications will regenerate this complex view as part of the save process.
- Save to Central several times a day.
- Reload Latest several times a day.
- Relinquish your Workset(s) at the end of the day.

2.3.1.9 Third-Party Applications

The SCA recognizes that there are multiple third-party applications currently available on the market that are able to run simulations and/or analysis within the Revit-based applications.

However, regardless of the software used to run simulations and/or analysis within the Revit-based applications, the results must be brought back into the Revit 3D Model.

This will ensure that the Revit 3D Model has the latest and most current information.

2.3.1.10 Worksets

When working with Worksets, users must follow these steps to ensure changes are saved to both the Local and the Central versions of the Revit 3D Model file, as well as relinquishing previously owned Worksets.

- Synchronize with Central
- Save to Local
- Relinquish All Mine

NOTE

Users can add new elements to Worksets that they do not own but they cannot modify elements on those Worksets.

2.3.1.11 Working with Other Discipline Models

- **Internal Projects**

For SCA In-house projects, a Site Model (SM) file is created for each Revit project. This Site Model file has a linked CAD files from which the coordinates have been loaded. This file holds the Project Coordinate System and controls the location, rotation, and elevation of all Revit-based Models linked to it.

NOTE

The SCA CAD/BIM Support is responsible for creating and maintaining all files related to the Site Model.

- **External Projects**

When a project is being executed by Consultants, they will decide which method to use to align their models to the Project's Coordinate System to ensure proper coordination across the different Discipline Models.

- **Combined Projects**

When a project is being executed with a combination of in-house staff and outside consultants, the project's Model Manager (MM) will decide at the project kick-off which of the two options mentioned above will be used.

2.3.1.12 Project Templates

Project Templates provide initial conditions and predefined settings for a project, such as generic project information, unit settings, predefined views, and plotting settings.

2.3.1.13 Using the SCA Templates

All Revit projects must be created using one of the templates provided in the SCA RevitSupport Files, which are:

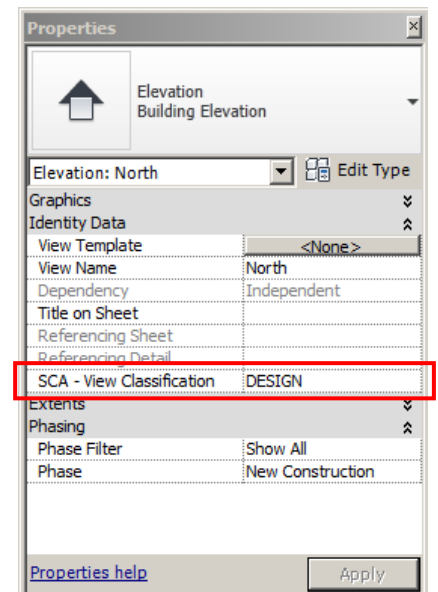
- NYCSCA_TEMPLATE_ARCHITECTURAL.rte
- NYCSCA_TEMPLATE_ELECTRICAL.rte
- NYCSCA_TEMPLATE_MECHANICAL.rte
- NYCSCA_TEMPLATE_PLUMBING.rte
- NYCSCA_TEMPLATE_STRUCTURAL.rte

2.3.2 Project Browser

A customized Revit Project Browser has been included within the different Discipline Templates in which Views and Sheets within the Project Browser will be grouped based on the SCA - View Classification as follows:

PROJECT BROWSER	
SCA - VIEW CLASSIFICATION	DESCRIPTION
CAD/BIM Support	Views intended to maintain the coordination across disciplines. (Views within this Category are managed by the CAD/BIM Support Group)
DESIGN	Views intended to be included in the Contract Set.
EXPORT	Views intended to be exported to Third Party Applications.
PRESENTATION	Views intended for presentation purposes only to be included in the Stage I - Report Book.
SCHEMES	Views including Design Options. Once a Scheme View has been approved, it should be moved to the Design Views Category.
WORKING	These types of Views are for working purposes only and not intended to be included in the Contract Set.

Views will need to be manually associated to their corresponding Category by going to the Properties Panel of that particular View and typing the category name right next to the SCA - View Classification Parameter located under the Identity Data Group.



2.3.2.1 CAD/BIM Support View Classification

These Views are intended to maintain the coordination across the different Discipline Revit Models as well as for coordination purposes only. These types of Views include the first set of Floor Plans and Ceiling Plans created from the different Levels of the Model.

As an example, the Structural Group is the Lead Discipline on a Project that has 3 Levels, named Level 230', Level 242' and Level 254'. The System Views should be named as follows:

Floor Plans

Level 230'

Level 242'

Level 254'

Ceiling Plans

Level 230'

Level 242'

Level 254'

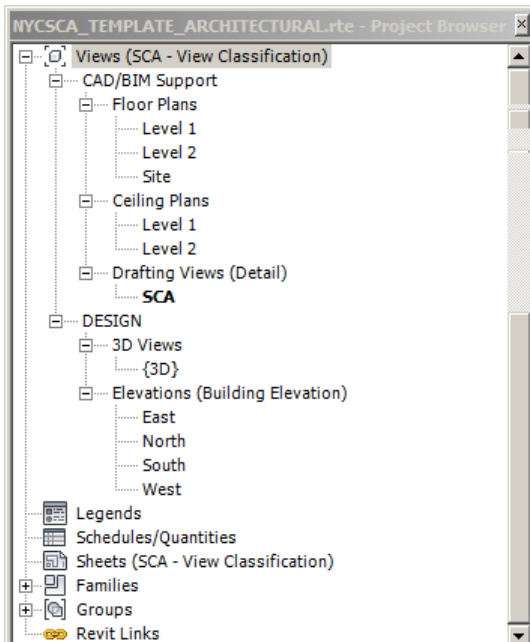
NOTE

All other Floor Plans and/or Reflected Ceiling Plans in the Model should be created based on a copy of the views within the CAD/BIM Support Views category and then should be moved to the appropriated category.

2.3.2.2 Architectural and Structural View Classification

The Architectural and Structural Disciplines will organize their Views within the Project Browser based on the following structure:

- ☐ SCA - View Classification
- ☐ Family and Type
- ☐ View Name



The image to the left shows the SCA - Project Browser for Views, of either an Architectural or a Structural project.

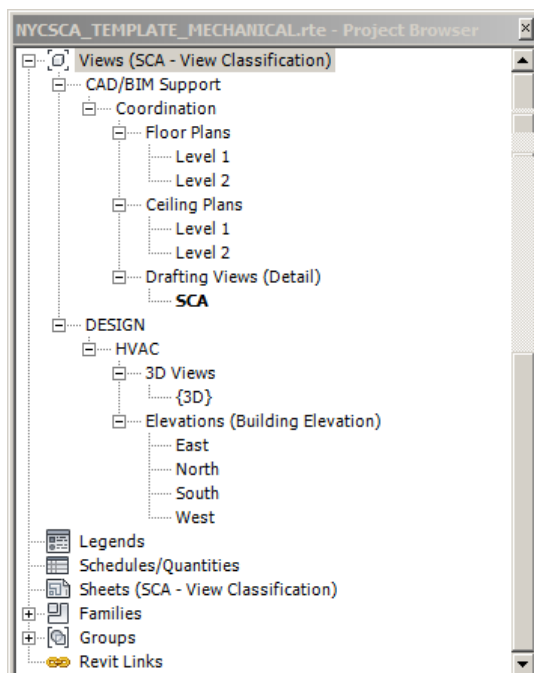
2.3.2.3 Mechanical, Electrical and Plumbing View Classification

The Mechanical, Electrical and Plumbing Disciplines will organize their Views within the Project Browser based on the following structure:

- ☐ SCA - View Classification
- ☐ Sub-Discipline
- ☐ Family and Type
- ☐ View Name

The Sub-Discipline Category is required due to the fact that different sub-groups exist within the Mechanical, Electrical and Plumbing Disciplines.

SUB-DISCIPLINE VIEW CLASSIFICATION		
MECHANICAL	ELECTRICAL	PLUMBING
Equipment	Power	Fire Protection
HVAC	Telecommunications	Plumbing

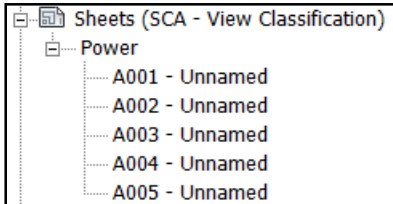


The image to the left shows the SCA - Project Browser for Views of either a Mechanical, Electrical or Plumbing project.

2.3.3 Sheets View Classification

All Disciplines will organize their Sheets within the Project Browser based on the following structure:

- ☐ SCA - View Classification
- ☐ Sheet Number



The image to the left shows the SCA - Project Browser for Sheets, of any of the Disciplines.

2.3.4 Systems

Categories in Revit tend to be very general and do not distinguish between similar objects made of different material or that have different uses. For example, Revit doesn't graphically distinguish between a pipe used for domestic cold water and one used for liquid refrigerant without the use of Systems. Therefore, Systems are being provided within the Mechanical and Plumbing Templates to address this issue. Systems have been defined within the SCA Templates for objects such as Ducts and Pipes and will address the issue described above for the following sub-disciplines:

- Mechanical Equipment
- HVAC
- Plumbing
- Fire Protection

All SCA Systems have been associated to work with the View Templates, therefore different systems will show different colors once the View Templates is applied.

2.3.4.1 HVAC

HVAC SYSTEMS		
SYSTEM NAME	ABBREVIATION	COLOR
SCA_Exhaust	Exhaust	Magenta(255-000-255)
SCA_Return	Return	Blue(000-000-255)
SCA_Supply	Supply	Green(000-255-000)
SCA_Boiler_Blow_Down	BBD	Purple(128-064-128)
SCA_Chilled_Glycol_Solution_Drain	CHGD	Orange(255-128-000)
SCA_Chilled_Glycol_Solution_Makeup	CHGM	Yellow(255-255-000)
SCA_Chilled_Glycol_Solution_Return	CHGR	Green(000-255-000)
SCA_Chilled_Glycol_Solution_Supply	CHGS	Green(000-255-000)
SCA_Chilled_Water_Drain	CHWD	Green(000-255-000)
SCA_Chilled_Water_Makeup	CHWM	Yellow(255-255-000)
SCA_Chilled_Water_Return	CHWR	Green(000-255-000)
SCA_Chilled_Water_Supply	CHWS	Green(000-255-000)
SCA_Condenser_Water_Drain	CWD	Green(000-255-000)
SCA_Condenser_Water_Makeup	CWM	Yellow(255-255-000)
SCA_Condenser_Water_Return	CWR	Green(000-255-000)
SCA_Condenser_Water_Supply	CWS	Green(000-255-000)
SCA_Hot_Glycol_Solution_Drain	HGD	Green(000-255-000)
SCA_Hot_Glycol_Solution_Makeup	HGM	Yellow(255-255-000)
SCA_Hot_Glycol_Solution_Return	HGR	Green(000-255-000)
SCA_Hot_Glycol_Solution_Supply	HGS	Green(000-255-000)
SCA_Hot_Water_Drain	HWD	Orange(255-128-000)
SCA_Hot_Water_Makeup	HWM	Yellow(255-255-000)
SCA_Hot_Water_Return	HWR	Magenta(255-000-255)
SCA_Hot_Water_Supply	HWDS	Magenta(255-000-255)

SCA_Refrigerant_Discharge	RD	Green(000-255-000)
SCA_Refrigerant_Drain	RD	Magenta(255-000-255)
SCA_Refrigerant_Liquid	RL	Magenta(255-000-255)
SCA_Refrigerant_Suction	RS	Magenta(255-000-255)

2.3.4.2 Plumbing

PLUMBING SYSTEMS		
SYSTEM NAME	ABBREVIATION	COLOR
SCA_PB_Acid_Vent	AV	Brown(128-064-064)
SCA_PB_Acid_Waste	AW	Brown(128-064-064)
SCA_PB_Cold_Water	CW	Blue(000-000-255)
SCA_PB_Combined_Water	COM	Blue(000-000-255)
SCA_PB_Fire_Service	F	Blue(000-000-255)
SCA_PB_Gas_7	G7	Yellow(255-255-000)
SCA_PB_Gas_14	G14	Yellow(255-255-000)
SCA_PB_Gas_Pipe_Vent	GPV	Yellow(255-255-000)
SCA_PB_Hot_Water_105	HW105	Orange(255-128-000)
SCA_PB_Hot_Water_140	HW140	Red(255-000-000)
SCA_PB_Hot_Water_Circulating_105	HWC105	Orange(255-128-000)
SCA_PB_Hot_Water_Circulating_140	HWC140	Red(255-000-000)
SCA_Sanitary_Vent	V	Green(000-255-000)
SCA_Sanitary_Waste	S	Green(000-255-000)
SCA_Sanitary_Waste_Underground	S	Green(000-255-000)
SCA_Storm_Drainage	ST	Gray(192-192-192)
SCA_Storm_Drainage_Underground	ST	Gray(192-192-192)

2.3.4.3 Fire Protection

FIRE PROTECTION SYSTEMS		
SYSTEM NAME	ABBREVIATION	COLOR
SCA_FP_Deluge	SPDL	Red (255-000-000)
SCA_FP_Drainage	SPDR	Cyan (000-255-255)
SCA_FP_Dry_Stand_Pipe	FSPD	Red (255-000-000)
SCA_FP_Wet_Sprinkler	SP	Green (000-255-000)
SCA_FP_Wet_Stand_Pipe	FSPW	Red (255-000-000)

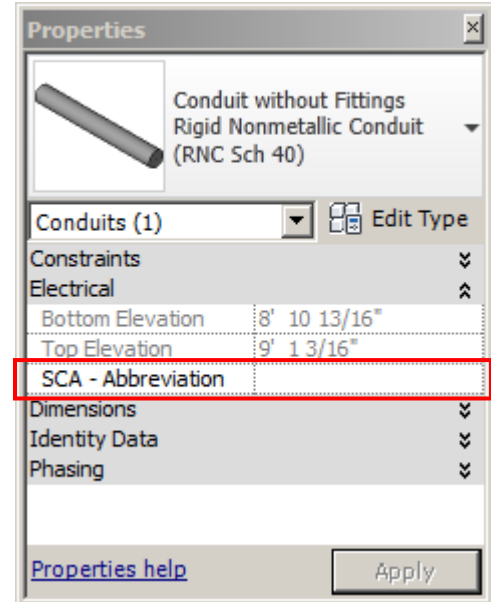
2.3.5 Filters

Similar to Systems, Filters provide help to graphically distinguish objects made of different material or that have different uses, but does not support Systems. For example, Revit doesn't graphically distinguish between a conduit used for power and one used for Fiber Optic without the use of Filters. Therefore, Filters are being provided within the Electrical Template to address this issue. Filters have been defined within the SCA Templates for objects such as Conduits and will address the issue described above for the following sub-disciplines:

- Power
- Telecommunications

A custom parameters named **SCA - Abbreviation** has been created and associated with all the Electrical elements to allow user input.

Filters are case-sensitive, which means that the Parameter need to match exactly with the Tables provided below in order to work.



2.3.5.1 Power

POWER SYSTEMS		
FILTER NAME	ABBREVIATION	COLOR
Power - Emergency Lighting Cable	EL	Orange(255-128-000)
Power - Emergency Lighting Conduit/Cable Tray	EL	Orange(255-128-000)
Power - Emergency Lighting Equipment	EL	Brown(128-064-064)
Power - Grounding Cable	G	Orange(255-128-000)
Power - Grounding Conduit/Cable Tray	G	Orange(255-128-000)
Power - Grounding Equipment	G	Brown(128-064-064)
Power - Lighting Cable	L	Cyan(000-255-255)
Power - Lighting Conduit/Cable Tray	L	Cyan(000-255-255)
Power - Lighting Fixtures	L	Cyan(000-255-255)
Power - Lightning Cable	LN	Cyan(000-255-255)
Power - Lightning Conduit/Cable Tray	LN	Cyan(000-255-255)
Power - Lightning Equipment	LN	Cyan(000-255-255)
Power - Power Cable	P	Orange(255-128-000)
Power - Power Conduit/Cable Tray	P	Orange(255-128-000)
Power - Power Equipment	P	Orange(255-128-000)

2.3.5.2 Telecommunications

TELECOMMUNICATIONS SYSTEMS		
FILTER NAME	ABBREVIATION	COLOR
Telecommunications - Cable TV Cable	TV	Orange(255-128-000)
Telecommunications - Cable TV Conduit/Cable Tray	TV	Orange(255-128-000)
Telecommunications - Cable TV Equipment	TV	Brown(128-064-064)
Telecommunications - Data Cable	D	Orange(255-128-000)
Telecommunications - Data Conduit/Cable Tray	D	Orange(255-128-000)
Telecommunications - Data Equipment	D	Brown (128-064-064)
Telecommunications - Fire Alarm Cable	FA	Orange(255-128-000)
Telecommunications - Fire Alarm Conduit/Cable Tray	FA	Orange(255-128-000)
Telecommunications - Fire Alarm Equipment	FA	Brown(128-064-064)
Telecommunications - IPDVS Cable	IPDVS	Orange(255-128-000)
Telecommunications - IPDVS Conduit/Cable Tray	IPDVS	Orange(255-128-000)
Telecommunications - IPDVS Equipment	IPDVS	Brown(128-064-064)
Telecommunications - Phone Cable	P	Orange(255-128-000)
Telecommunications - Phone Conduit/Cable Tray	P	Orange(255-128-000)
Telecommunications - Phone Equipment	P	Brown(128-064-064)
Telecommunications - Projection Cable	PR	Orange(255-128-000)
Telecommunications - Projection Conduit/Cable Tray	PR	Orange(255-128-000)
Telecommunications - Projection Equipment	PR	Brown(128-064-064)
Telecommunications - Public Address & Clock Cable	PA	Orange(255-128-000)
Telecommunications - Public Address & Clock Conduit/Cable Tray	PA	Orange(255-128-000)
Telecommunications - Public Address & Clock Equipment	PA	Brown(128-064-064)
Telecommunications - Rescue Intercom Cable	RI	Orange(255-128-000)
Telecommunications - Rescue Intercom Conduit/Cable Tray	RI	Orange(255-128-000)
Telecommunications - Rescue Intercom Equipment	RI	Brown(128-064-064)
Telecommunications - Security Cable	S	Orange(255-128-000)
Telecommunications - Security Conduit/Cable Tray	S	Orange(255-128-000)
Telecommunications - Security Equipment	S	Brown(128-064-064)

2.3.6 View Templates

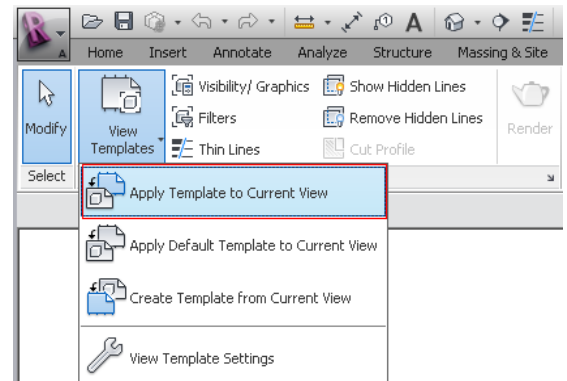
View Templates are a collection of View Properties, such as the Discipline, the Sub-Discipline, the View Scale, the Detail Level, and Overrides of Model and Annotation Objects that are common for a View Type, such as a Plan View, an Elevation View a 3D View, etc.

View Templates have been provided within the MEP Templates to address the issued described within the Systems and Filters Sections.

NOTE

View Templates have been associated with their respective Project Browser Category, so when applying a View Template to a specific View this will automatically move to the right Category.

To apply a View Template to a View, go to the *VIEW* Ribbon and under the *GRAPHICS* Panel click on the *View Templates* Pull Down Menu and select the *Apply Template to Current View* Tool.



2.3.6.1 Mechanical Equipment View Templates

- ☐ EQ - 2D_B&W
- ☐ EQ - 2D_RGB
- ☐ EQ - 3D_B&W
- ☐ EQ - 3D_RGB
- ☐ EQ - Equipment Plan_B&W
- ☐ EQ - Equipment Plan_RGB

2.3.6.2 HVAC View Templates

- ☐ HVAC - 2D_B&W
- ☐ HVAC - 2D_RGB
- ☐ HVAC - 3D_B&W
- ☐ HVAC - 3D_RGB
- ☐ HVAC - Boiler Blow Down Plan_B&W
- ☐ HVAC - Boiler Blow Down Plan_RGB
- ☐ HVAC - Chilled Glycol Solution Plan_B&W
- ☐ HVAC - Chilled Glycol Solution Plan_RGB
- ☐ HVAC - Chilled Water Plan_B&W

- ☐ HVAC - Chilled Water Plan_RGB
- ☐ HVAC - Condenser Water Plan_B&W
- ☐ HVAC - Condenser Water Plan_RGB
- ☐ HVAC - Duct Plan_B&W
- ☐ HVAC - Duct Plan_RGB
- ☐ HVAC - Hot Glycol Solution Plan_B&W
- ☐ HVAC - Hot Glycol Solution Plan_RGB
- ☐ HVAC - Hot Water Plan_B&W
- ☐ HVAC - Hot Water Plan_RGB
- ☐ HVAC - Refrigerant Plan_B&W
- ☐ HVAC - Refrigerant Plan_RGB

2.3.6.3 Fire Protection View Templates

- ☐ FP - 2D_B&W
- ☐ FP - 2D_RGB
- ☐ FP - 3D_B&W
- ☐ FP - 3D_RGB
- ☐ FP - Fire protection Plan_B&W
- ☐ FP - Fire protection Plan _RGB

2.3.6.4 Plumbing View Templates

- ☐ PB - 2D_B&W
- ☐ PB - 2D_RGB
- ☐ PB - 3D_B&W
- ☐ PB - 3D_RGB
- ☐ PB - Acid Plan_B&W
- ☐ PB - Acid Plan_RGB
- ☐ PB - Cold Water Plan_B&W
- ☐ PB - Cold Water Plan_RGB
- ☐ PB - Combined Plan_B&W
- ☐ PB - Combined Plan_RGB
- ☐ PB - Fire Service Plan_B&W
- ☐ PB - Fire Service Plan_RGB
- ☐ PB - Gas Plan_B&W
- ☐ PB - Gas Plan_RGB
- ☐ PB - Hot Water Plan_B&W

- ☐ PB - Hot Water Plan_RGB
- ☐ PB - Sanitary Plan_B&W
- ☐ PB - Sanitary Plan_RGB
- ☐ PB - Storm Plan_B&W
- ☐ PB - Storm Plan_RGB

2.3.6.5 Power View Templates

- ☐ PW - 2D_B&W
- ☐ PW - 2D_RGB
- ☐ PW - 3D_B&W
- ☐ PW - 3D_RGB
- ☐ PW - Emergency Lighting Plan_B&W
- ☐ PW - Emergency Lighting Plan_RGB
- ☐ PW - Grounding Plan_B&W
- ☐ PW - Grounding Plan_RGB
- ☐ PW - Lighting Plan_B&W
- ☐ PW - Lighting Plan_RGB
- ☐ PW - Lightning Plan_B&W
- ☐ PW - Lightning Plan_RGB
- ☐ PW - Power Plan_B&W
- ☐ PW - Power Plan_RGB

2.3.6.6 Telecommunications View Templates

- ☐ TC - 2D_B&W
- ☐ TC - 2D_RGB
- ☐ TC - 3D_B&W
- ☐ TC - 3D_RGB
- ☐ TC - Cable TV Plan_B&W
- ☐ TC - Cable TV Plan_RGB
- ☐ TC - Data Plan_B&W
- ☐ TC - Data Plan_RGB
- ☐ TC - Fire Alarm Plan_B&W
- ☐ TC - Fire Alarm Plan_RGB
- ☐ TC - IPDVS_B&W
- ☐ TC - IPDVS_RGB
- ☐ TC - Phone Plan_B&W

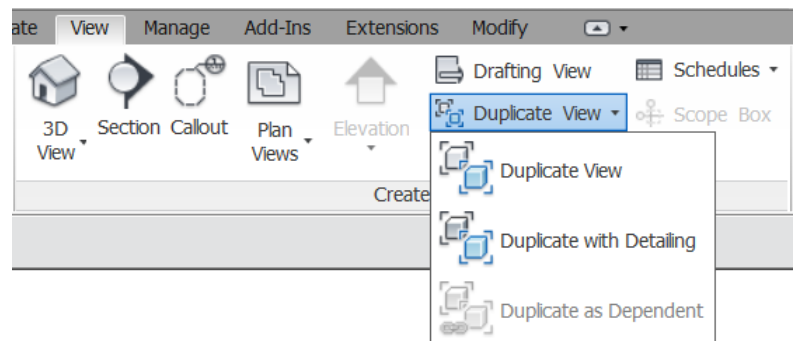
- ☐ TC - Phone Plan_RGB
- ☐ TC - Projection Plan_B&W
- ☐ TC - Projection Plan_RGB
- ☐ TC - Public Address & Clock Plan_B&W
- ☐ TC - Public Address & Clock Plan_RGB
- ☐ TC - Rescue Intercom Plan_B&W
- ☐ TC - Rescue Intercom Plan_RGB
- ☐ TC - Security Plan_B&W
- ☐ TC - Security Plan_RGB

2.3.7 Levels and Plan Views

The Revit-based applications create a relationship between the Level and the first Floor Plan and Ceiling Plan, so when the Level Name is changed, the associated name for the Floor Plan and the Ceiling Plan updates automatically.

Users will be giving the option to rename the corresponding Level Views (Floor Plan and Ceiling Plan) if the Level Name is changed. If so, the relationship between both will be broken. It is crucial to maintain this name relationship between the Level and the Floor Plans on a multi-disciplinary practice as ours for coordination purposes.

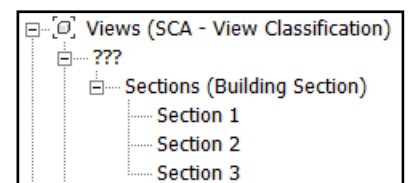
Plan Views should be created by making a copy of any of the existing Floor Plans and/or Reflected Ceiling Plans under the CAD/BIM Support Views Category by using the tools on the View Ribbon. Under the Create Panel, expand the Duplicate View Pull Down Menu to select the Duplicate View Option as shown in the image to the right.



By default, the new Floor Plan and/or Ceiling Plan will be placed under a Category named “???”. To associate the new View to the right Category, either change the Properties of the View or apply a View Template.

2.3.8 Views

Views, such as Elevations, Sections, Callouts, 3D, etc. will be created within the Revit Models as the project evolves. By default, all these types of Views will be placed under a Category named “???”, as shown in the image to the right.

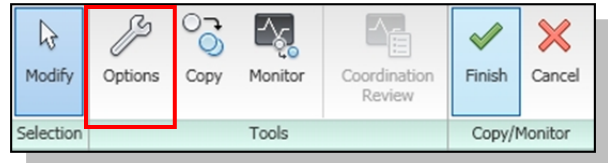


2.3.9 Copy/Monitor

The Copy/Monitor tool helps to monitor and coordinate changes between teams from different disciplines, which reduce mistakes and expensive rework.

The copy functionality copies grids, levels, columns, walls, and floors from a linked project into a host project. You can modify these copied elements, which are automatically related to the original elements. The monitoring functionality sets and maintains relationships for those elements in the host or linked project.

To start the Copy/Monitor Tool, go to the **COLLABORATE** Ribbon Tab and click on the *Copy/Monitor* located under the *Coordinate* Panel and then select the *Select Link* option.



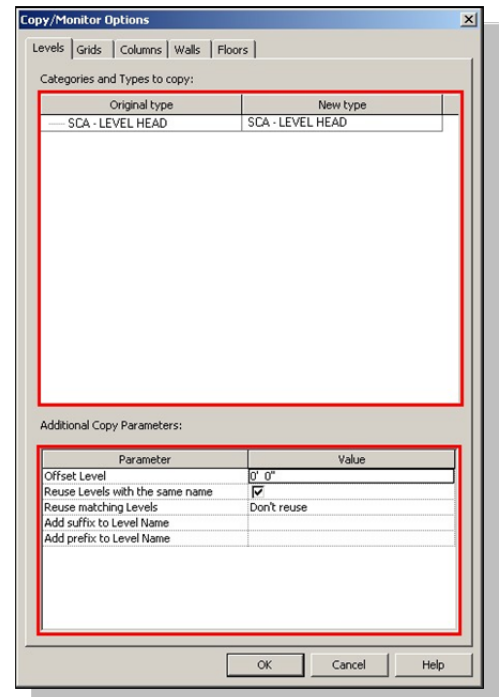
The first step when using the Copy/Monitor Tool is to select *Options* as shown in the image to the right.

This will open the COPY/MONITOR OPTIONS Dialog Box as shown in the images below.

2.3.9.1 Levels

Under “*Categories and Types to Copy*”, the “*New Type*” column should be set to SCA - LEVEL HEAD.

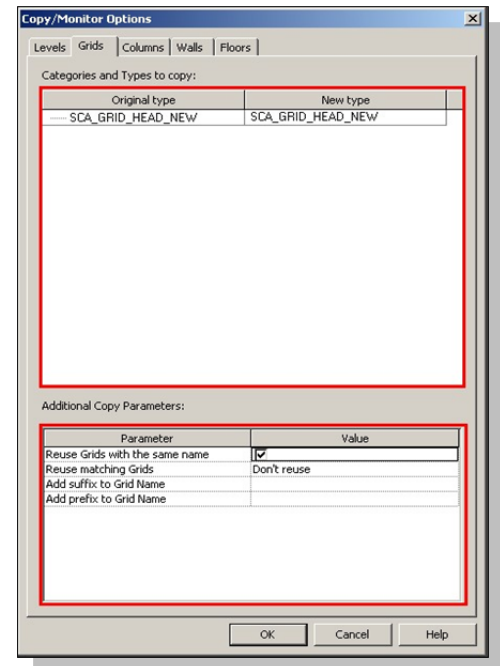
Under “*Additional Copy Parameters*”, “*Parameter*”, the “*Offset Level*” parameter should be set to “0' 0”” and the “*Reuse Levels with the same name*” parameter should be checked.



2.3.9.2 Grids

Under “Categories and Types to Copy”, the “New Type” column should be set to either “SCA_GRID_HEAD_NEW” or “SCA_GRID_HEAD_EXST”.

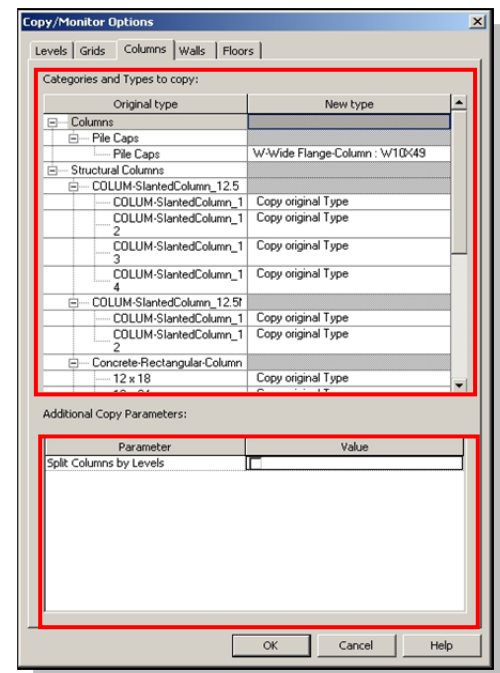
Under “Additional Copy Parameters”, “Parameter”, the “Reuse Grids with the same name” parameter should be checked and the “Reuse matching Grids” parameter should be set to “Don’t reuse”.



2.3.9.3 Columns

Under “Categories and Types to copy”, make every attempt to match the “New type” with the “Original type”. When this is not possible, try to select one that best resembles the original.

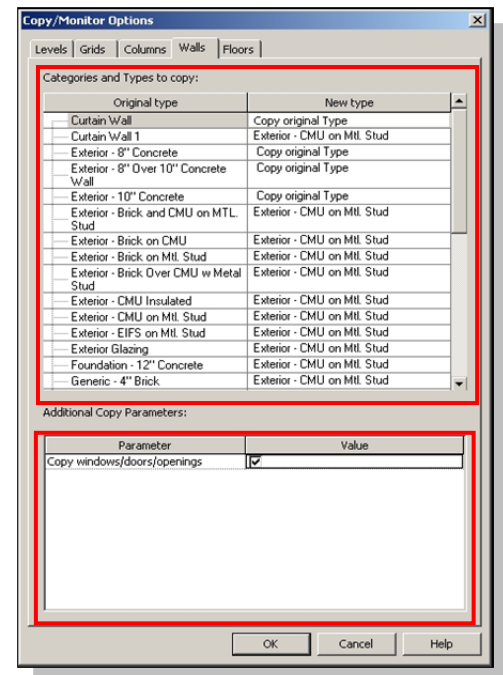
Under “Additional Copy Parameters”, “Parameter”, the “Split Columns by Levels” parameter should be left unchecked.



2.3.9.4 Walls

Under “*Categories and Types to copy*”, make every attempt to match the “*New type*” with the “*Original type*”. When this is not possible, try to select one that best resembles the original.

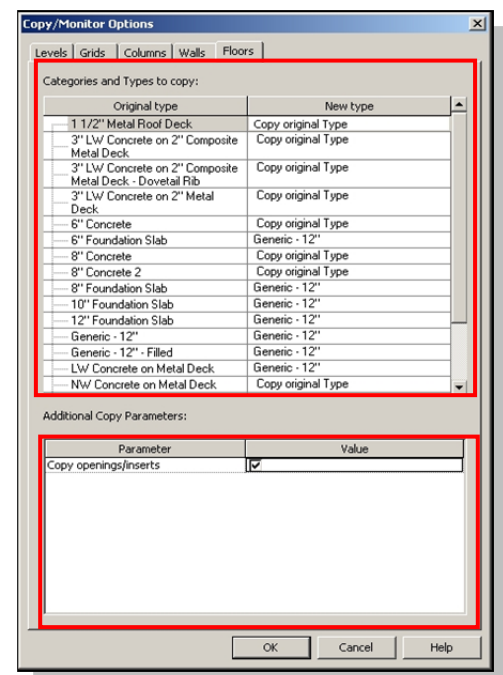
Under “*Additional Copy Parameters*”, “*Parameter*”, the “*Copy windows/doors/openings*” parameter should be checked.



2.3.9.5 Floors

Under “*Categories and Types to copy*”, make every attempt to match the “*New type*” with the “*Original type*”. When this is not possible, try to select one that best resembles the original.

Under the “*Additional Copy Parameters*”, “*Parameter*”, the “*Copy openings/inserts*” parameter shall be checked.



2.3.10 Coordination Review

Whenever users modify monitored elements, a coordination monitor warning displays. Users can review these warnings using the Coordination Review Tool and decide what action to take.

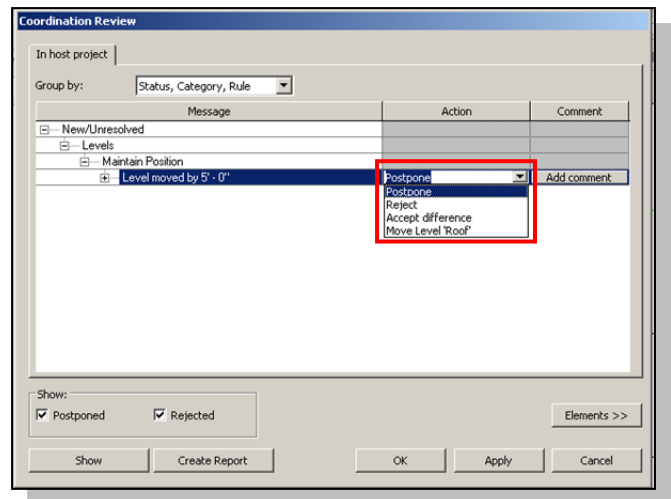
To start the Coordination Review Tool, go to the COLLABORATE Ribbon Tab and click on the Coordination Review tool located under the COORDINATE Panel, and then select the Select Link option.

Warnings can occur because of these violations:

- An original monitored element from the linked project has changed.
- A copied monitored element in the host project has changed.
- Both the original monitored element and the copied element have changed.
- The original element in the linked file was deleted.
- The copied element in the host file was deleted.

By default, changes in the Revit-linked model will not change in the user's model. Revit wants to ensure that the user is aware of the change before taking any action.

The image to the right shows the COORDINATION REVIEW Dialog Box showing a level in the linked model that has moved by 5'-0".



There are four actions that can be performed in a Coordination Review:

COORDINATION REVIEW	
ACTION	DESCRIPTION
Postpone	Take no action on the element. Changes the message status so that it can be filtered out or considered later.
Reject	There is a difference between an element in the host file and its associated monitored element. The change made to the element in the host file is incorrect, and a change must be made to the associated monitored element.
Accept Difference	Accepts the change made to the element and updates the relationship. For example, if a pair of grids was 20" apart and one was moved to 30" away, the change would be accepted, and the relationship would now be set to 30".
Rename/Move/Modify	The command name changes based on the action. If the name of the monitored element has changed, the command reads Rename. If a column or level is moved, the command is Move. If a grid is changed or moved, the command is Modify.

If desired, click "Add Comment" to enter comments on your action. Enter comments into the "Edit Comment" line and click OK. This is your form of communication to the other cross-functional team members.

NOTE

If you select one of these commands, you are changing the element in the current project, not the linked project.

2.3.11 Creating Sheets

Creating a Contract Documents in “Revit” is accomplished through sheets, in which Views have been added. Sheets have been preconfigured to work in conjunction with the discipline Templates file and with the Shared Parameters file.

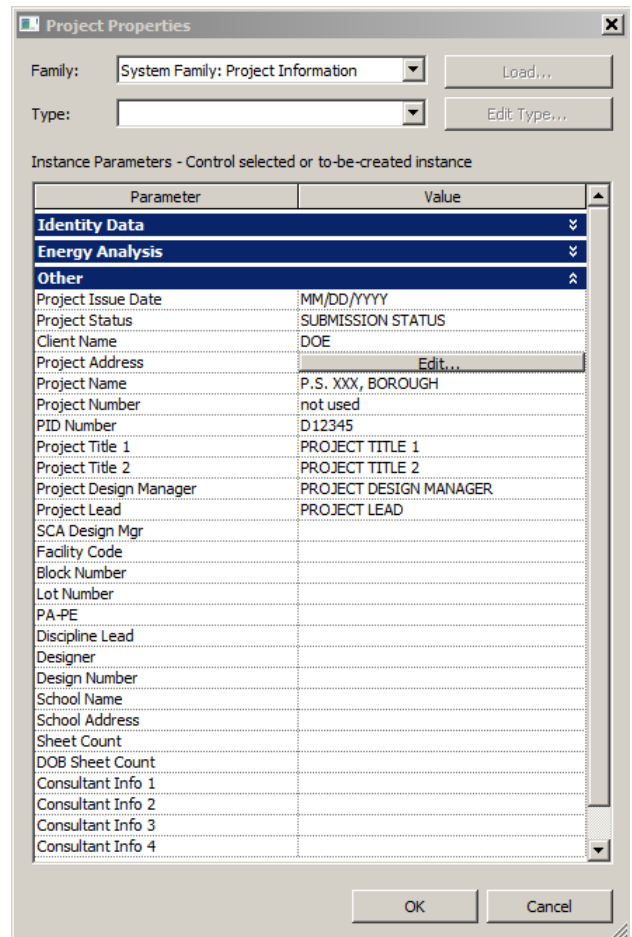
2.3.11.1 Project Information

Project Information is data that remains the same on all sheets of a project, such as the Facility Code, Project Name, SCA Design Manager, PID Number, Project Lead, Project Design Manager, Total Sheet Number, Project Address, Project Issue Date, Submission Status, etc.

To make the required modifications, go to the **MANAGE** Ribbon Tab and click on the *Project Information* Tool located under the **Project Settings** Panel. The image on the right illustrates the Project Information Dialog Box.

All the available Project Information fields are listed under the “*Other*” parameter category.

Another option to enter the Project Information is by typing it directly on a sheet by clicking on the text placeholder and updating the text as desired.



Parameter	Value
Identity Data	
Energy Analysis	
Other	
Project Issue Date	MM/DD/YYYY
Project Status	SUBMISSION STATUS
Client Name	DOE
Project Address	Edit...
Project Name	P.S. XXX, BOROUGH
Project Number	not used
PID Number	D 12345
Project Title 1	PROJECT TITLE 1
Project Title 2	PROJECT TITLE 2
Project Design Manager	PROJECT DESIGN MANAGER
Project Lead	PROJECT LEAD
SCA Design Mgr	
Facility Code	
Block Number	
Lot Number	
PA-PE	
Discipline Lead	
Designer	
Design Number	
School Name	
School Address	
Sheet Count	
DOB Sheet Count	
Consultant Info 1	
Consultant Info 2	
Consultant Info 3	
Consultant Info 4	

NOTE

The Revit-based applications will update all sheet views based on the information provided here.

2.3.11.2 Loading the Cover Sheet and Title Sheets

The SCA Cover Sheets and Border Sheets sizes are 24x36, 30x42 and 36x48. Verify the sheet size with the project requirements for any deviation at project kick-off.

The Cover Sheet and Title Sheets can be loaded using one of the following methods:

- In the **VIEW** Ribbon Tab, select the *New Sheet* Tool located under the *Sheet Composition* Panel.
- In the Project Browser, right-click on top of *SHEETS* and then select *New Sheet*.

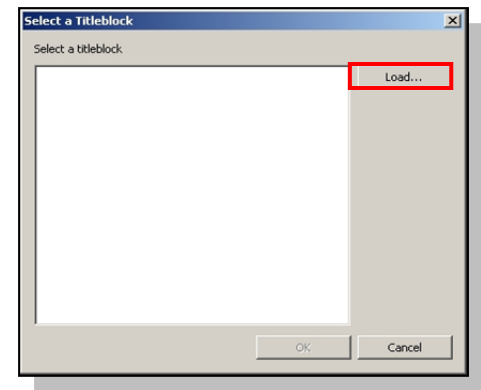
Either of these methods will display the SELECT A TITLEBLOCK Dialog Box as shown in the image on the right.

Click on the “Load” button to import the title blocks provided with the SCA Revit Standards and then click “OK.”

The titleblocks can be found under:

Firm_designated_Path\”Version of Revit\”Titleblocks

(Please note that the SCA Revit Standards Library needs to be downloaded, extracted and placed on the network)



NOTE

Once the Cover Sheet and Title Sheets are loaded, they will get populated with the Project Information provided in [Section 2.3.11.1 - Project Information](#).

2.3.11.3 Drawing Information

Drawing Information is data relating to an individual sheet of the Border Sheets in a project. All the available Cover Sheet Information fields are listed under the Identity Data and Title Text Parameter columns.

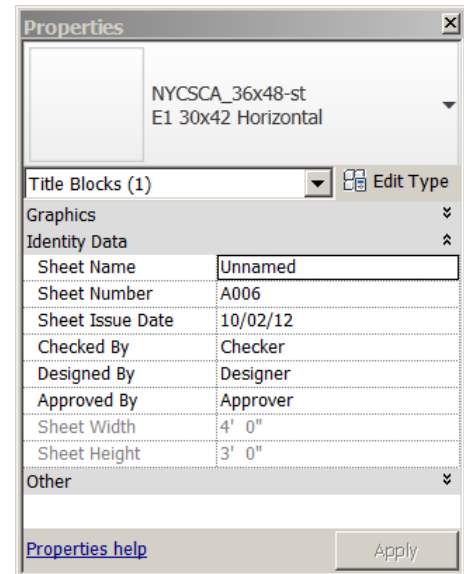
To update the Drawing Information of a sheet, use either one of the following methods:

- Enter the information directly on a sheet by clicking on the text placeholder within the sheet and update the text as desired.
- Click in an empty space in a sheet view and this will open the Sheet INSTANCE PROPERTIES Dialog Box. Change the values as desired.

2.3.11.4 Border Sheets

Values within the Border Sheets are the Sheet Name and Number, along with Sheet Issue Date and the Design By, Drawn By and Checked By lines.

The image on the right illustrates the Border Sheet information.



To promote consistency and easy identification of the people involved in the project, the “Designer”, “Drawn By”, and “Checked By” fields should use their (3) initials as shown in the image on the right.

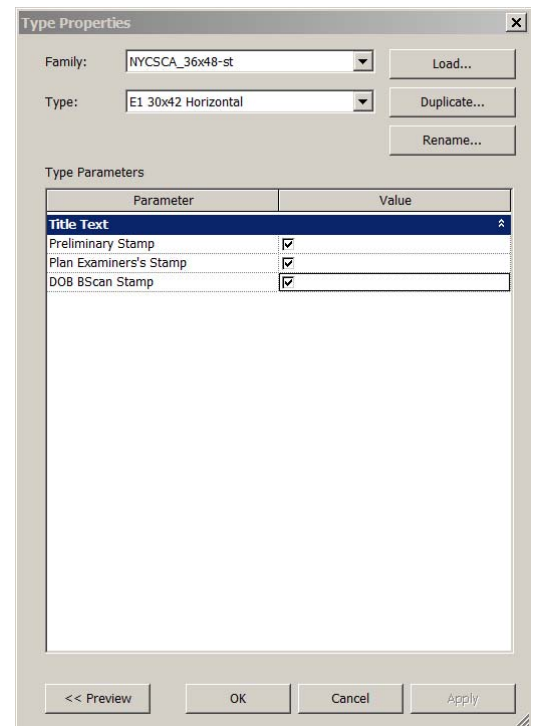
The “Date” field should be filled out as a two-digit month, a two-digit day, and a four-digit year format separated by the slash “/” character as shown in the image on the right.

There are three sheet-specific fields within the Border Sheets, which are:

- Designer
- Drawn By
- Checked By

SCA Design Manager:		
Project Architect/Engineer:		
Discipline Lead:		
Designer:	DSN	
Drawn By:	DRW	
Checked By:	CHK	
Design No or LLW No.:	Facility Code:	Date:
D12345	XXXX	MM/DD/YYYY

All SCA Title Blocks have been created with a specific area for Stamps which are controlled at the Project level by selecting the Title Block and enabling their Property Types which will open the Type Properties Dialog Box as shown in the image to the right.



Type Properties

Family: NYSCA_36x48-st Load...

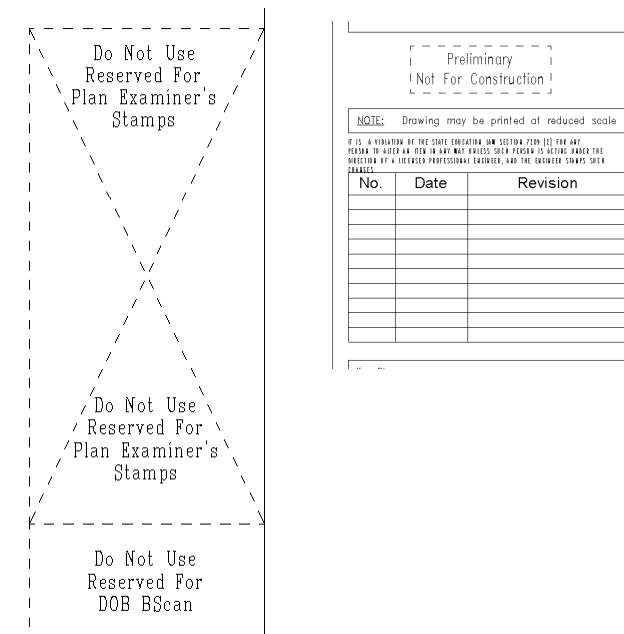
Type: E1 30x42 Horizontal Duplicate... Rename...

Type Parameters

Parameter	Value
Title Text	
Preliminary Stamp	<input checked="" type="checkbox"/>
Plan Examiners's Stamp	<input checked="" type="checkbox"/>
DOB BScan Stamp	<input checked="" type="checkbox"/>

<< Preview OK Cancel Apply

The following two images illustrate the parameters just described.



Do Not Use
Reserved For
Plan Examiner's
Stamps

Do Not Use
Reserved For
Plan Examiner's
Stamps

Do Not Use
Reserved For
DOB BScan

Preliminary
Not For Construction

NOTE: Drawing may be printed at reduced scale

IT IS A VIOLATION OF THE STATE EDUCATION LAW SECTION 1201 (3) FOR ANY PERSON TO ALTER AN NEW YORK STATE DESIGN OR DRAWING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, AND THE DESIGNER SHALL SIGN THE DRAWING.

No.	Date	Revision

2.3.12 Making Revisions

Revision tracking is the process of recording changes made to a model after sheets have been issued. In Revit-based applications, revisions are displayed and tracked using revision clouds, tags, and schedules.

The revision process should be managed as follows:

- Enter information about the revision in the SHEETS ISSUES/REVISIONS Dialog Box.
- Update the Revit project to implement the change.
- In one or more project views, draw revision clouds to indicate the areas that changed.
- Assign a revision to each cloud.
- Tag the revision clouds to identify the assigned revisions.
- Check sheets to make sure that the revision schedules show the desired information.
- Issue the revisions.

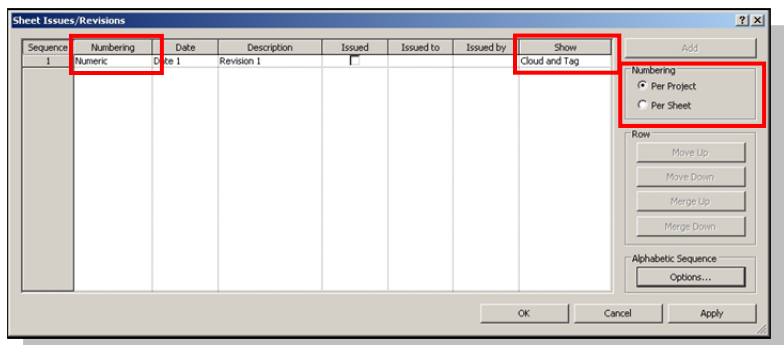
The Revit-based application provides flexibility in how it displays the sequence of revisions in a project, the numbers used, what is shown, and the system used.

To set up the Revisions, go to the VIEW Ribbon Tab and expand the SHEET COMPOSITION Panel.

The image on the right illustrates the preferences used within the SCA Revit Standards.

Revisions are project based, shall use Numbers and shall show the Cloud and Tag.

The revision schedule displays information about revisions that have been issued in the project. All Borders provided with the SCA Revit Standards Library have been preset with the SCA_REVISION SCHEDULE.



When issuing a revision within the Revit-based applications, the following applies:

- On the SHEETS ISSUES/REVISIONS Dialog Box, you can no longer change information for that revision.
- In project views, you can no longer assign the issued revision to additional (new) revision clouds.
- You cannot edit revision clouds to which the issued revision is assigned.

The image on the right illustrates the Revision Schedule format.

NOTE: Drawing may be printed at reduced scale

IT IS A VIOLATION OF THE STATE EDUCATION LAW SECTION 7209 (2) FOR ANY PERSON TO ALTER AN ITEM IN ANY WAY UNLESS SUCH PERSON IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, AND THE ENGINEER STAMPS SUCH CHANGES

No.	Date	Revision

2.3.13 Printing

The SCA Revit Standards Library adopts both the DWF and PDF format as the standard to be used when creating sheets for printing purposes.

Printing from the Revit-based application is accomplished by exporting the sheets as a DWF file and by printing to a DWF file respectively. All Revit-based templates provided with the SCA Revit Standards Library have been preconfigured with these settings.

DWF and PDF files shall always be created as multi-sheet files, in full size (24x36, 30x42 or 36x48), in black and white, and grouped together by Drawing Type and by Series (if used).

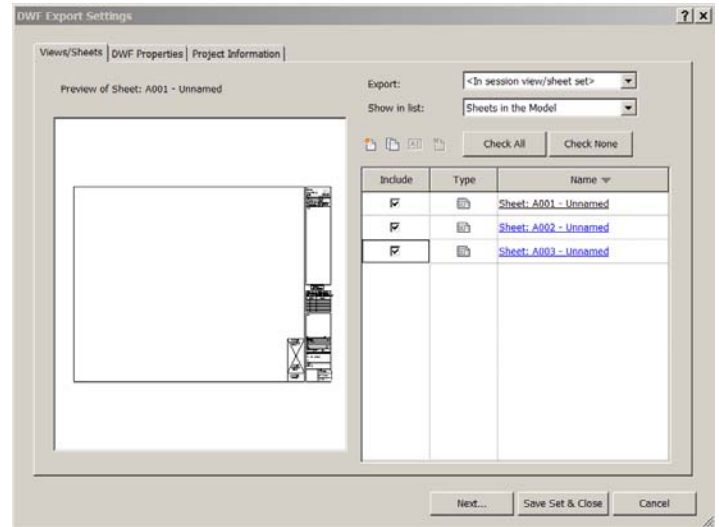
2.3.13.1 Printing DWF

The DWF files are the electronic version of the Turnover Set. In order to print, the first step is to Export the file as a DWF.

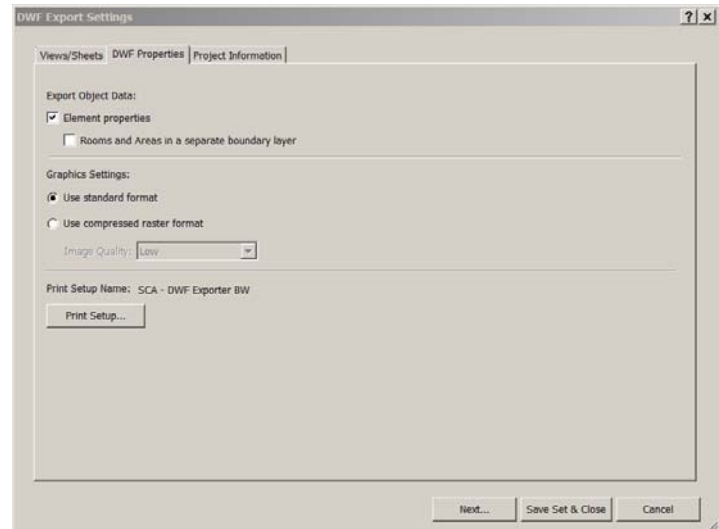
In order to Export Sheets to DWF, go to the APPLICATION menu and select the “Export” button followed by the “DWF” option.

This will open the DWF EXPORT SETTINGS Dialog Box showing the Views/Sheets tab as shown in the image on the right.

In the “Export” drop-down list, select the “In session view/sheet set”. This will enable the “Show in List” drop-down list from which to select the “Sheets in the Model” option to select which sheets to export.



Switch to the “DWF Properties” tab and select the “print Setup” button.

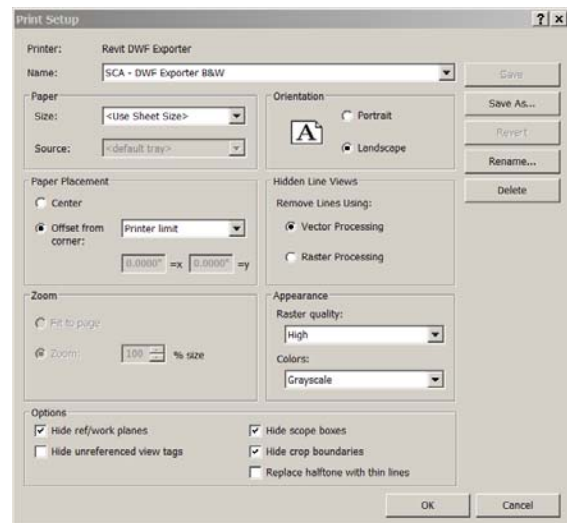


This will enable the “Print Setup” Dialog Box as shown in the image to the right.

This Dialog Box includes two DWF configurations:

- SCA – DWF Exporter B&W
- SCA – DWF Exporter Color

Pick one and click the “OK” button

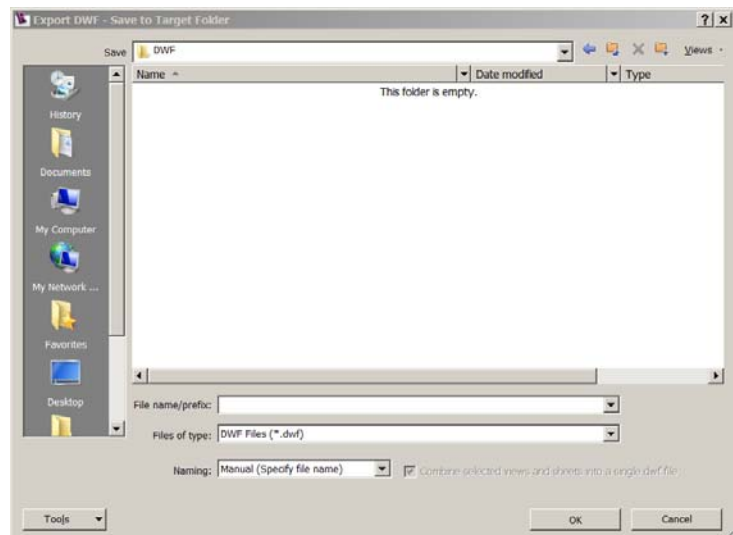


This will open the EXPORT DWF Dialog Box as shown in the image on the right.

Browse to the designated folder as specified by Model Manager/System Administrator by selecting the drop-down button.

Under the “File name/prefix” option, type the desired name of the DWF file and under the “Files of type” option, select “DWF Files (*.dwf)”

Under the “Naming” option, select “Automatic - Long (Specify Prefix)”. This option will append the selected sheet at the end of the file name. Rename this file or files as describe in Section - Publish Files.



The image to the right shows the settings needed to be set when printing DWF files from Autodesk Design Review to ensure the hardcopy output matches the SCA requirements

Under “Color Setting”, select “Grayscale” from the drop-down list; under “Page Handling”, select the check-box right next to “Choose Paper Source by DWF Page Size”; under the “scale” option, select “100%” followed by the “Clip Pages” options and from the drop-down list select the “Center on Paper” option.

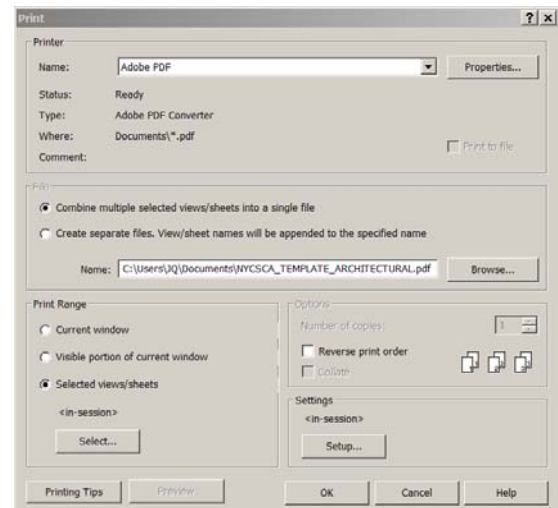


2.3.13.2 Printing as a PDF

In order to print as a PDF, go to the APPLICATION menu and select the “Print” button followed by the “Print” option.

This will open the PRINT Dialog Box shown in the image on the right.

Select the Setup button in the lower right-hand corner of the Dialog Box.

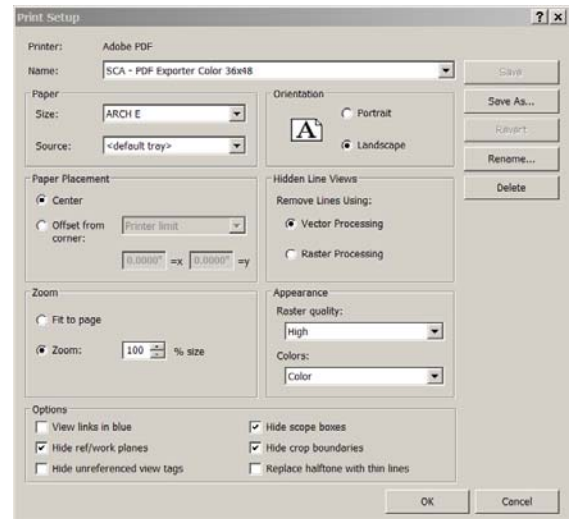


This will enable the “Print Setup” Dialog Box as shown in the image to the right.

This Dialog Box includes eight PDF configurations:

- SCA - PDF Exporter B&W 11x17
- SCA - PDF Exporter B&W 24x36
- SCA - PDF Exporter B&W 30x42
- SCA - PDF Exporter B&W 36x48
- SCA - PDF Exporter Color 11x17
- SCA - PDF Exporter Color 24x36
- SCA - PDF Exporter Color 30x42
- SCA - PDF Exporter Color 36x48

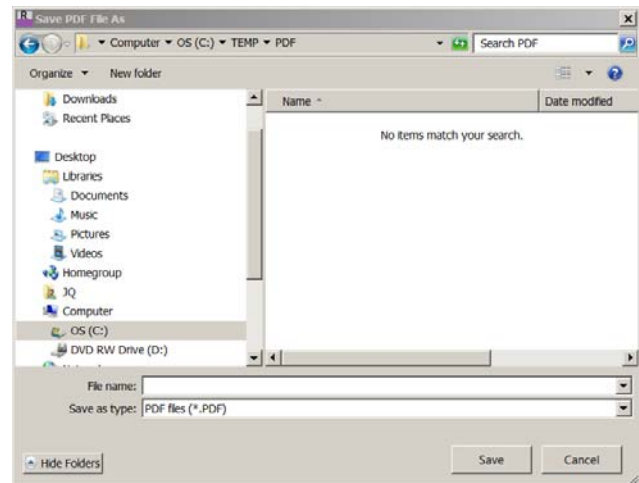
Pick one and click the “OK” button



This will open the SAVE PDF FILE AS Dialog Box as shown in the image on the right.

Browse to the designated folder as specified by Model Manager/System Administrator by selecting the drop-down button.

Under the “File name” option, type the desired name of the PDF file and hit the “Save” button.

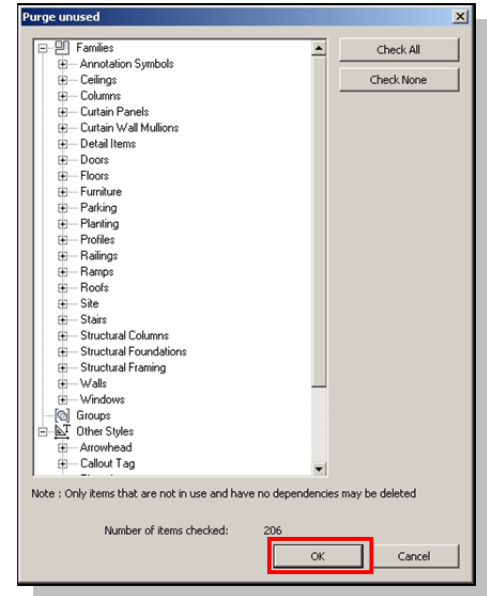


2.3.14 Purge Unused

The Purge Unused command unloads any unused Families and Family Types along with Groups and Styles, reducing the file size of the Revit Model file.

To purge the Revit Model, go to the **MANAGE** Ribbon Tab and click on the Purge Unused Tool located under the PROJECT SETTINGS Panel. This will open the PURGE UNUSED Dialog Box as shown in the image on the right.

Expand the desired category and click on the “OK” button.



NOTE

The Model Manager (MM) and Model Leader (ML) are responsible for purging their discipline’s Revit Model before each Submittal milestone.

2.3.15 Submissions

Before every Submission, the Model Manager (MM) and Model Leaders (ML) are responsible for having all their team members save their changes to the Central File and to release any Workset ownership.

At the completion of every milestone, each Model Leader (ML) shall copy their discipline’s BIM, MANAGEMENTDOCS, MODEL, and PUBLISH folders into the appropriate milestone sub-folder within SUBMISSIONS.

Once the folders have been copied, each Model Leader (ML) shall notify the Model Manager (MM).

Upon notification, the CADD Unit shall move the files to the Archive Server, mapped internally as the X:\ drive, leaving behind a text file named ARCHIVED YYYY-MM-DD.txt and containing the exact location where the files can be found.

Projects received from a Consultant should be sent directly to the CADD Unit per Procedural Guideline PG 1.3.2.

NOTE

Before every submission, Revit Models should be purged of all unused information as described in Section - [Purge Unused](#).

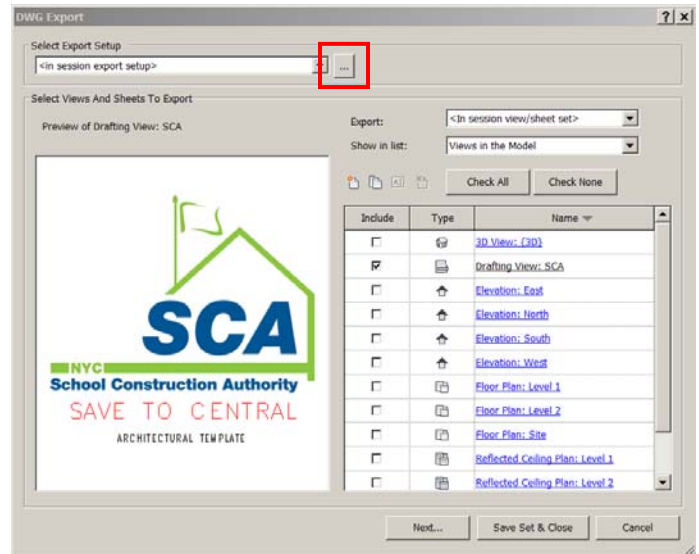
2.3.16 Exporting Revit Views to AutoCAD

This section describes the steps required to export Revit Views to AutoCAD preserving the predefined Coordinates System (NAD83) used on all Revit projects so other disciplines using Civil 3D can use these files as backgrounds.

In order to export Revit Views to AutoCAD, go to the *APPLICATION* menu and select the “Export” button followed by the “CAD Formats” option and then “DWG”. This will open the *DWG EXPORT* Dialog Box as shown in the image below.

In the “Export” drop-down list, select the “In session view/sheet set”. This will enable the “Show in List” drop-down list from which to select the “Views in the Model” option to select which views to export

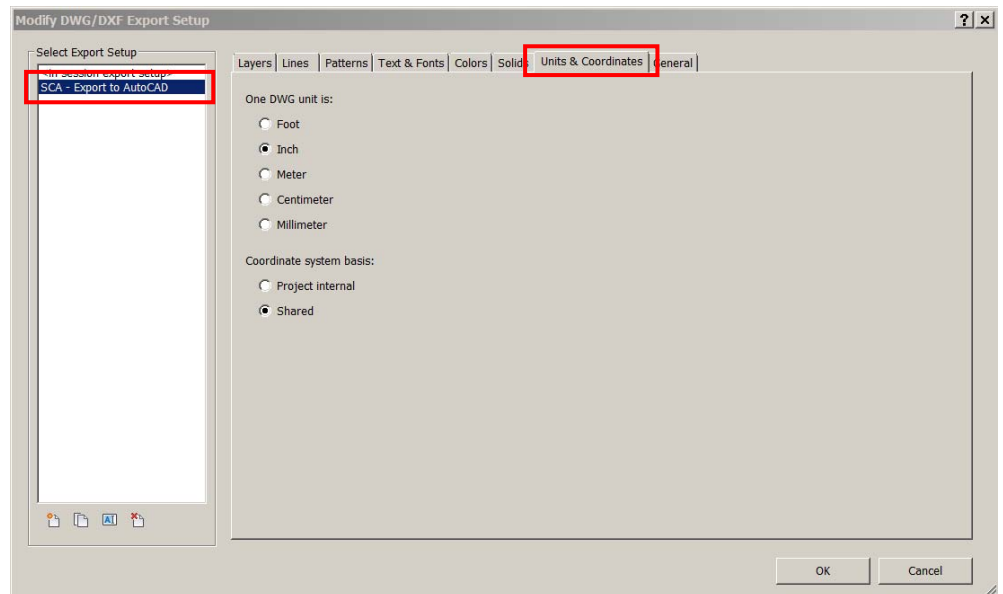
Make sure you click on the on the “Load” button.



This will launch the Modify DWG/DXF Export Setup Dialog Box as shown in the image to the right.

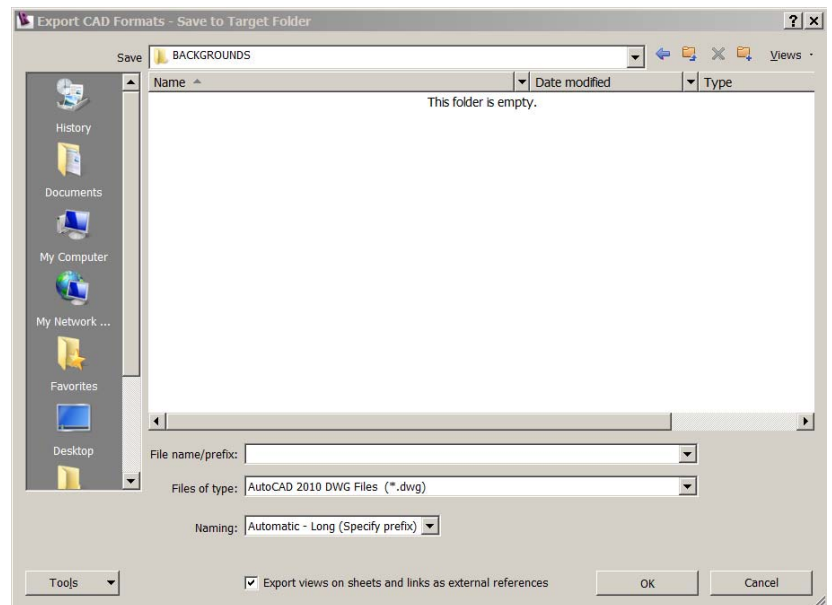
Select the **SCA - Export to AutoCAD** Option. This will ensure that the DWG units will be set to inches along with the Coordinate System set within Revit, as shown in the Units and Coordinates tab.

Click on the “OK” button and then on the “Next” button.



This will open the EXPORT CAD FORMATS Dialog Box as shown in the image to the right, and browse to the designated folder as specified by Model Manager/System Administrator.

Make sure you select the appropriate CAD format before the export.



NOTE

Two color-dependent plot style table files (CTBs) have been provided with the SCA BIM Manual to plot from AutoCAD, refer to Section - Export Layers DWG/DXF for proper use.

2.3.17 Interference Check

The Interference Check Tool can be used during the design process to coordinate major building elements and systems allowing the identification of interferences earlier in the design process.

This tool can be used to find single-discipline or cross-discipline interferences, enabling effective identification, inspection and/or reporting of any interference.

2.3.17.1 Single-Discipline Interference Check

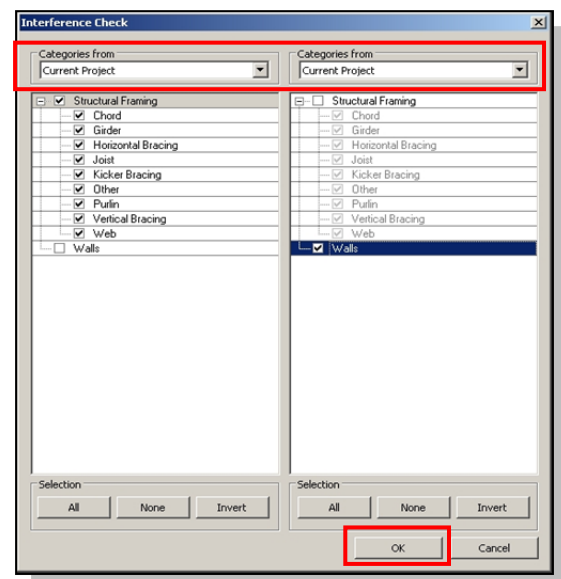
The Single-Discipline Interference Check will be performed by each Model Leaders using the Interference Check tool within Revit.

To start the Interference Check Tool, go to the COLLABORATE Ribbon Tab and click on the Interference Check located under the COORDINATE Panel and then select the Run Interference Check option.

This will open the INTERFERENCE CHECK Dialog Box as shown in the image on the right, in which Structural Framing is being checked against Walls.

For Single-Discipline Interference Check, the “Categories From” option in the upper portion of both panes should be set to “Current Project.”

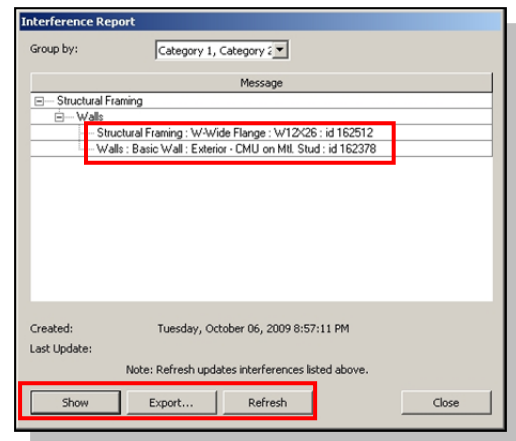
The INTERFERENCE CHECK Dialog Box is divided into two panes. On the left pane select the Primary element category or system you want to check, followed by the Secondary element category or system you want to check the primary selection against. Then click the “OK” button.



If there are no interferences to report, a Dialog Box displays informing you of this. If there are interferences to report, the INTERFERENCE REPORT Dialog Box, as shown in the image on the right, displays a list of all elements that are in conflict with one another.

Interferences are grouped according to the way you generated the check. By default, they are grouped as Primary Selection (left pane/first line) and Secondary Selection (right pane/second line).

To see one of the elements that are intersected, select its name in the INTERFERENCE REPORT Dialog Box and click the “Show” button. A view opens that displays the problem. To correct a conflict, click in the view and modify the overlapping elements. The INTERFERENCE REPORT Dialog Box remains visible.



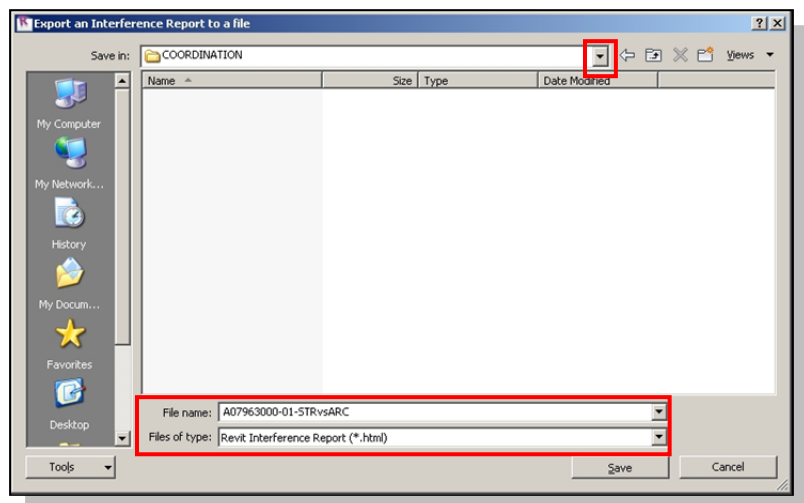
When the problem intersection has been fixed, within the INTERFERENCE REPORT Dialog Box click the “Refresh” button, if the problem has been resolved, the problem elements are removed from the list of conflicts. Additional/subsequent conflicts can be resolved in this manner.

If the conflicts cannot be resolved without additional input from team members, generate an HTML version of the report by clicking on the “Export” button within the INTERFERENCE REPORT Dialog Box.

This will open the EXPORT AN INTERFERENCE REPORT TO A FILE Dialog Box as shown in the image on the right. Browse to the designated folder as specified by Model Manager/System Administrator by selecting the drop-down button.

Under the “File name” option, type the name of the Report as described in Section - Microsoft Office Files and under the “Files of type” options select “Revit Interference Report (*.html.)”

Click the “Save” button. This will take you back to the INTERFERENCE REPORT Dialog Box. Click the “Close” button to finish using the Interference Check Tool.



NOTE

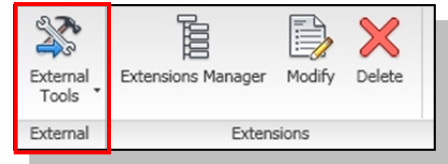
Disciplines are encouraged to run cross-discipline Interference Checks before the Inter-Disciplinary Interference Check Sessions using the Interference Check Tool within Revit. This can be accomplished by selecting the other discipline’s Linked Files from the pull-down menu under the “Category From” option.

2.3.17.2 Cross-Discipline Interference Check

The Model Manager is responsible for setting up Inter-Disciplinary Interference Check Sessions as often as the project requires.

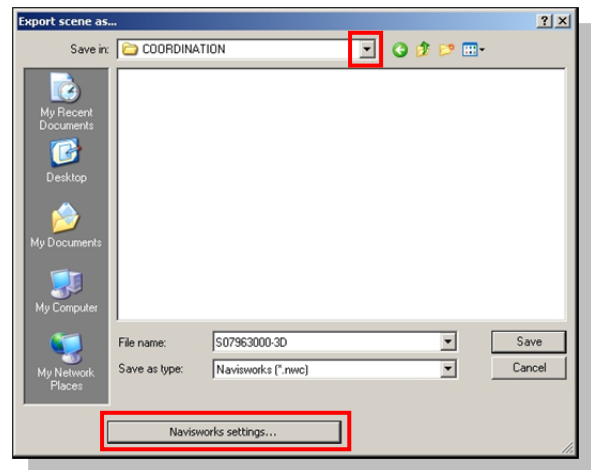
The Cross-Discipline Interference Check will be performed by the Model Manager using Autodesk NavisWorks. Each Model Leader is responsible for creating a NavisWorks file out of their Revit Models.

To create a NavisWorks file out of the Revit Model; go to the *ADD-INS* Ribbon Tab and click on the *External Tools* located under the *EXTERNAL* Panel as shown in the image to the right, and then select the *NavisWorks 2013* Link.



This will open the *EXPORT SCENE AS* Dialog Box, as shown in the image to the right. Browse to the designated folder as specified by Model Manager/System Administrator by selecting the drop-down button.

Under the “File Name” option, type the name of the NavisWorks file as described in Section - [NavisWorks Cache File](#).



Select the “NavisWorks Settings” button to open the NAVISWORKS OPTIONS EDITOR - REVIT Dialog Box as shown in the image to the right.

Click on the “Import” button to import the pre-defined settings provided in XML format with the SCA Revit Standards and then click “OK.”

The configuration files can be found under:

Firm_designated_Path\Version of Revit\Support
(Please note that the SCA Revit Support Files need to be downloaded, extracted and placed on the network)

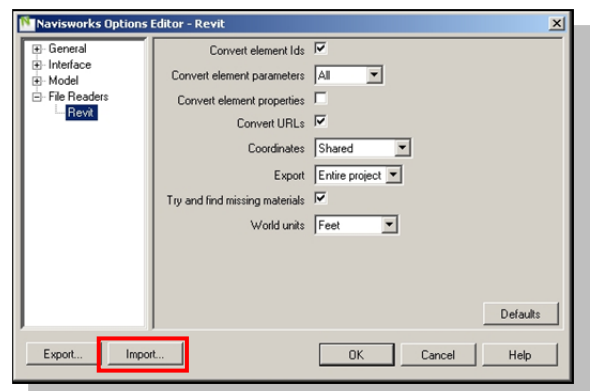
Three configuration files have been provided as follow:

- NYCSCA_Export_to_NavisWorks_Project
- NYCSCA_Export_to_NavisWorks_Selection
- NYCSCA_Export_to_NavisWorks_View

Once picked the desire option, click the “OK” button. This will take you back to the *EXPORT SCENE AS* Dialog Box. Click the “Save” button to save the NavisWorks file.

NOTE

When exporting the Revit Model using the *External Tools*, only the current Discipline Model gets exported. Therefore, all links attached are discarded.



2.3.17.2.1 NavisWorks Clash Report Settings

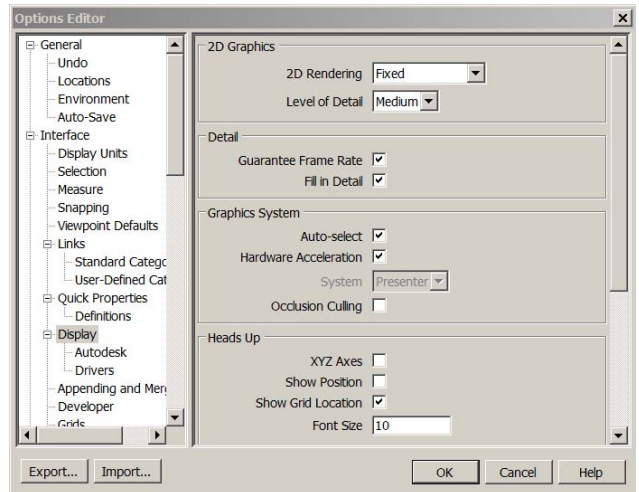
Before generating a NavisWorks Clash Report, import the pre-defined settings provided in XML format with the SCA Revit Standards

The configuration files can be found under:

Firm_designated_Path\Version of Revit\Support

(Please note that the SCA Revit Support Files need to be downloaded, extracted and placed on the network)

To configure NavisWorks Manage, go to the APPLICATION menu and select *Options*, this will open the OPTIONS EDITOR Dialog Box as shown in the image to the right.



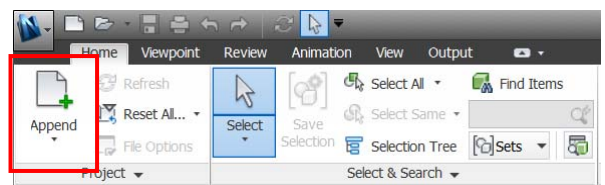
Select the “Import” and browse to the folder described above.

The following configuration file has been provided:

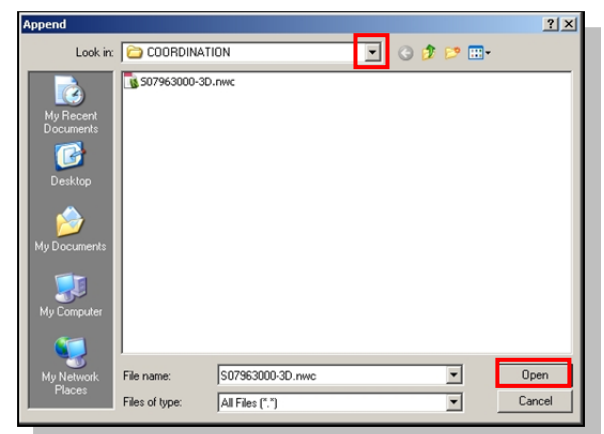
- NYCSCA_NavisWorks_Manage_Configuration.xml

The Model Manager (ML) is responsible for compiling all the discipline-specific NavisWorks Cache files (NWC) into a single Master NavisWorks file (NWF) for coordination purposes.

After launching NavisWorks Manage, the Model Manager (MM) should open his/her discipline NWC file and link other disciplines NWC files by going to the *HOME* ribbon and under the Project tab select *Append* as shown in the image on the right.



This will open the *APPEND* Dialog Box as shown in the image on the right. Browse to the designated folder as specified by Model Manager/System Administrator and select all the Discipline’s NWC files, one at a time and select the “Open” button.



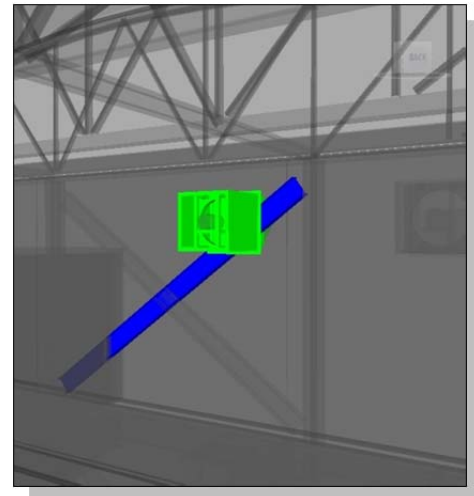
After loading all disciplines NWC files, the Project A/E shall save this file in his/her own COORDINATION folder as a NWF file as described in Section -[NavisWorks Master File](#). The NavisWorks Master File (NWF) contains links to the original NWC files generated by each discipline. No model geometry is saved with this file format, so the next time the disciplines update their NWC files the Master files will automatically be updated. If links are not found, you will be prompted with the *RESOLVE* Dialog Box to re-path the location of the NWC files.

2.3.17.2.2 NavisWorks Clash Report Color Schemes

The following color scheme is used to promote consistency and easy identification across all users when generating Clash Reports.

NAVISWORKS CLASH REPORT COLOR SCHEMES	
DISCIPLINE	COLOR
Architectural	Cyan
Electrical	Yellow
Fire Protection	Red
Mechanical	Green
Plumbing	Magenta
Structural	Blue

The image on the right illustrates which Structural Bracing (color blue) and Mechanical Exhaust Fan (color green) are clashing.



NOTE

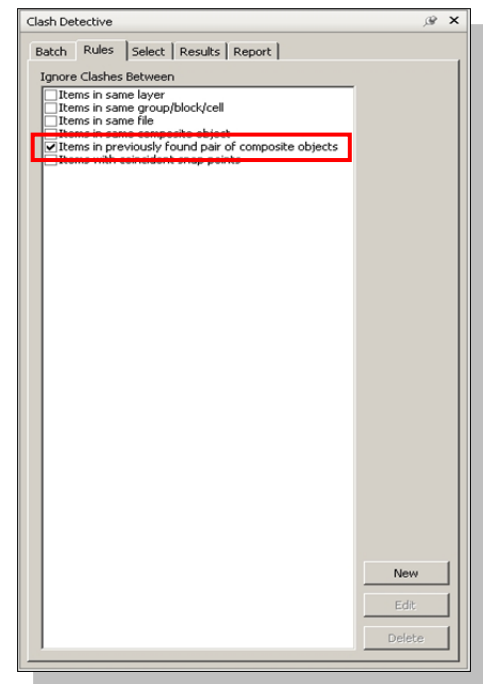
This can be accomplished by selecting each Discipline Model and overriding its color with the above settings.

2.3.17.3 Clash Detective

Go to the Tools pull-down menu and select Clash Detective. This will open the CLASH DETECTIVE dockable window.

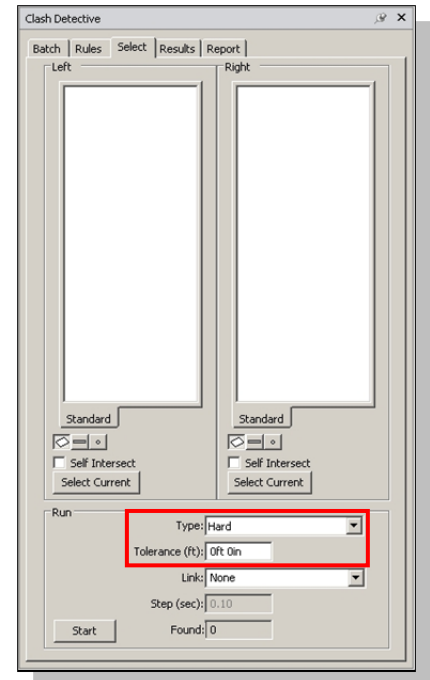
Switch to the Rules Tab and make sure of the following:

- The “Items in previously found pair of composite objects” option should be checked.



Switch to the Select Tab and make sure of the following:

- Under “Type”, select “Hard”.
- Under “Tolerance”, select “0 ft 0 in”.



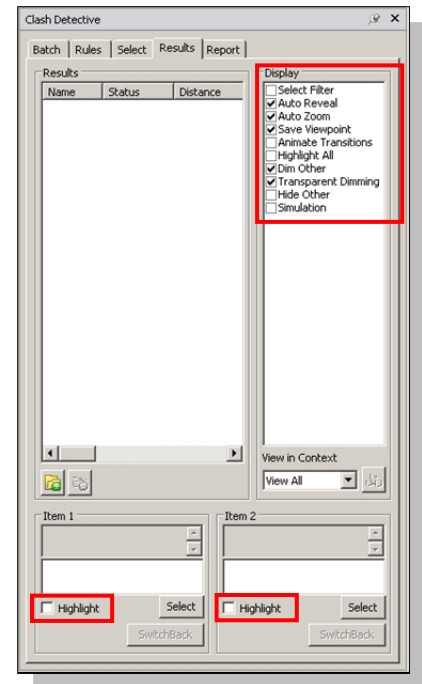
Switch to the Results Tab and make sure of the following:

Under the “Display” category:

- The “Auto Reveal” option should be checked.
- The “Auto Zoom” option should be checked.
- The “Save Viewpoint” option should be checked.
- The “Dim Other” option should be checked.
- The “Transparent Dimming” option should be checked.

Under the “Item 1” and “Item 2” category:

The “Highlight” options should be un-checked on both.



Switch to the Report Tab and make sure of the following:

Under the “Contents” category:

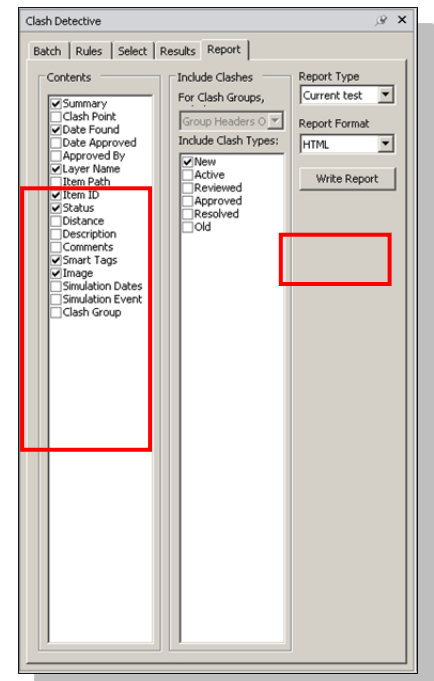
- The “Summary” option should be checked.
- The “Date Found” option should be checked.
- The “Layer Name” option should be checked.
- The “Item ID” option should be checked.
- The “Status” option should be checked.
- The “Smart Tags” option should be checked.
- The “Image” option should be checked.

Under the “Report Format” category:

- Select “HTML” from the pull-down menu.

NOTE

Depending on the type of Report needed to be generated, make sure to check the appropriate Clash Type under the “Include Clashes” category.



2.3.18 Updates and Revisions

The dynamic nature of BIM technology dictates that this document will change over time. Changes to this document will be made by following strict procedures and guidelines.

Changes may be made based on errors and omissions, as well as to enhance or update the standard based on changes in the Revit environment. When changes are approved by the VP of the A&E Department, it will be incorporated into the next version of this document and all support files will be modified.

Updates to this document and the related support files will be made as required and will be posted on www.nycsca.org

3.0 GLOSSARY OF TERMS AND ACRONYMS

Definitions and Acronyms that cannot be found in the following “Glossary of Terms” may be found in the SCA “Contract for Consultant Services, Appendix-A”.

Building Element/System	Shall mean individual components and/or systems of a building such as, but not limited to, doors, windows, walls, partitions, roofs, floor slabs, beams, columns, pipes, ducts, conduits, equipment and fixtures.
Building Information Model (BIM)	Shall mean the digital representation of physical and functional characteristics of a Project.
CADD Unit	Shall mean the System Administrator for all CAD & Revit projects, in this case the CADD Unit.
Central File	Shall mean the Master Project File that is saved to a network drive and acts as the distribution point for publishing work to the rest of the team. The Central File stores the current ownership information for all the elements of the project
Component Element	Shall mean an individual <i>Building Element</i> whose geometry, size, shape, information, and data may be provided within another Building Element/System.
Component Model(s)	Shall mean the single and distinct Model that is provided by each member of the Design Team for, but not limited to, architectural/civil, structural, electrical, plumbing/drainage and fire protection, and mechanical (HVAC).
Composite Model	Shall mean a Model that is the result of the merging of all Component Models and data provided by the Design Team for a Project.
C3D	Civil 3D
Design Intent Building Information Model	Shall mean the Model (Composite Model) and/or Models (Component Models) provided by the Design Team to communicate the design intent of a Project.
Design Team	Shall mean the Consultant and its Sub-consultants. For in-house projects, shall mean personnel from each discipline.
Drawings	Shall mean, amongst other things, plans, details, sections, elevations, schedules, and diagrams as described herein, and by the SCA Architectural and Engineering Contract for Consultant Services.
DOE	Shall mean the New York City Department of Education, its agents, officers, trustees, employees, representatives or designees, as the case may be.
DSF	Shall mean the New York City Department of School Facilities, its agents, officers, trustees, employees, representatives or designees, as the case may be.
DWF	Design Web Format
Design Web Format	Shall mean a highly compressed non-editable vector file format created out of CAD/BIM applications. A DWF file can represent sheets for plotting purposes (2D DWF) or the entire 3D Model (3D DWF) for visualization or estimating purposes.

GLOSSARY OF TERMS AND ACRONYMS (continued)

Element Borrowing	Shall mean the ability to edit an element located in a Workset owned by another user. If no one owns the Workset, permission to borrow the element is automatically granted.
Entourage	Items related to the Site work, such as bike racks, benches, flagpoles, etc.
Extracted/Extraction	Shall mean a Drawing, information or data that is obtained from a Model.
Level of Detail	Shall mean the degree of information that is provided within a model (building) element at a given time (Design Phase). This "information richness" grows as the project advances throughout the development of the Drawings.
Line Project	Shall mean Capacity Projects.
Local File	The copy of the Central File located directly on the user's workstation. The main purpose of the Local File is faster data access. The Workset processes establish a link between the Central File and the Local File for data sharing
Model(s)/3D Model(s)	Shall mean the digital representation of physical and functional characteristics of a building element and/or system within a Project generated from a CAD and/or Revit application.
Point Cloud	Shall mean a set of vertices in a three-dimensional (X, Y, Z) coordinate system
Project Information Model	Shall mean the finalized Revit-based and Civil 3D-based models as a record of a completed project
Revit Families	Shall mean groups of elements with a common set of parameters, identical use, and similar graphical representation
SCA	School Construction Authority
SCA Families	Shall mean a group of three dimensional (3D) Building Elements, which have a common set of parameters, identical uses, and similar graphical representation that have been derived from SCA Design Standards.
Shared Parameters	Shall mean parameters that can be added to projects and then shared with other families or projects. They give the ability to add specific data that is not already predefined in the Revit-based applications.
Site Model (SM)	Shall mean the centralized Revit-based file where all models share coordinates with each other and at the same time will control true north, project north, and elevations.
Sub-contractor	Shall mean a person, persons, firm, partnership, corporation, joint venture, business association, or any entity under contract with the Contractor or any Subcontractor of any tier, to perform any portion of the Work.
WCS	World Coordinates System
Worksets	Worksets create the ability to divide the project in functional areas allowing the propagation and coordination of changes between designers, enabling multiple members of a team the ability to simultaneously work on different portions of a project.



4.0 CONTACT INFORMATION

Questions regarding the SCA “BIM Guidelines and Standards for Architects and Engineers” should be forwarded via email to caddunit@nycsca.org.



5.0 APPENDIX A – SCA IN-HOUSE PROJECT DIRECTORY STRUCTURE

5.1 SCA IN-HOUSE REVIT WORKFLOW

The SCA BIM Guidelines and Standards provide a structure for the organization of Revit projects within the A&E Department.

The primary goals of this structure are to improve coordination among all functional groups within the A&E Department and their Consultants, as well as to develop projects in a way that will facilitate the future use of Revit Models and other related data and information.

5.1.1 Revit Project Workflow

1. The Architectural Group will start a project by creating the Levels and Grid. The group will then create their model, which might contain Structural elements such as columns. Once the Design gets to the appropriate Milestone and/or Level of Design, the Architectural Group will share their Model with the Structural Group.
2. The Structural Group will link the Architectural Model and take ownership of the Levels and Grid. The group will determine the Structural elements by making changes to the Levels and Grid based on the Architectural Design if appropriate. Once the Design gets to an appropriate Milestone and/or Level of Design, the Structural Group will share their Model with the Architectural Group.
3. The Architectural Group will link the Structural Model and will monitor the Structural Levels, Grid and Structural elements, and will erase any instance of the Levels, Grid and Structural elements they originally created. The Architectural Group will continue their design effort by adding Lighting and Plumbing Fixtures intended as placeholders. Once the Design gets to an appropriate Milestone and/or Level of Design, the Architectural Group will share their Model with the Electrical and Mechanical Groups.
4. The Electrical Group will link the Architectural and Structural Models and Copy/Monitor at least the Structural Levels & Grid and the Architectural Walls if needed. The Electrical Group will start their design effort by laying out their Corrosion Protection, Electrical and/or Electronics components based on the placeholders determined by the Architectural Group. Once the Design gets to an appropriate Milestone and/or Level of Design, the Electrical Group will share their Model with the Team.
5. The Mechanical Group will link the Architectural and Structural Models and Copy/Monitor the Structural Levels & Grids and the Architectural Walls if needed. The Mechanical Group will start their design effort by laying their Fire Protection, HVAC and Plumbing components based on the placeholders determined by the Architectural Group. Once the Design gets to an appropriate Milestone and/or Level of Design, the Mechanical Group will share their Model with the Team.
6. The Architectural Group will link the Electrical and Mechanical Models and erase any instances of Lighting and Plumbing Fixtures they originally placed.

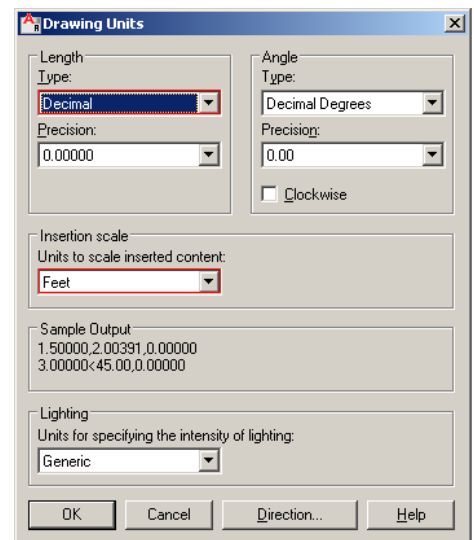
5.1.2 The Site Model

A Site Model (SM) file is created for each Revit project. This Site Model includes a CAD files based on the project's Coordinate System and controls the location, rotation, and elevation of all Revit-based Models (Architectural, Electrical, Mechanical and Structural) linked to it.

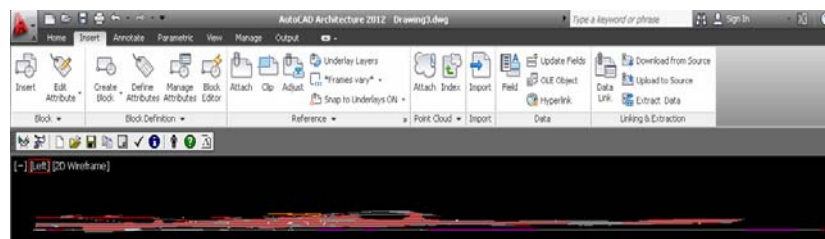
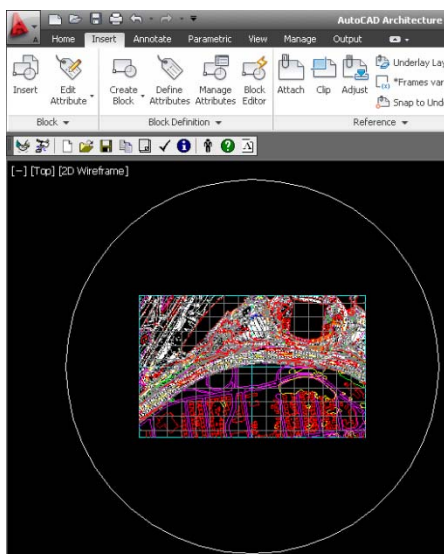
The process of shared coordinates allows importing an AutoCAD drawing into Revit project and acquiring the coordinates from the imported file so that the Revit coordinate system aligns with AutoCAD drawing coordinates.

5.1.2.1 The Site Model AutoCAD Background

The Site Model AutoCAD background is made using the Survey drawing as a base from which we will obtain the coordinates for the project. Make sure the file provided is oriented to True North and is set to decimal feet units as shown in the image to the right and that the System Variable PROXYGRAPHICS is set to 1.



Revit requires the drawing to be contained in a 1-mile sphere. To check this in AutoCAD, draw a circle in plan view to check the drawing is within a 1 mile circle. Since there might be information in the Z coordinate, switch to a elevation view to check there are no outlying points and/or lines, as shown in the images below.

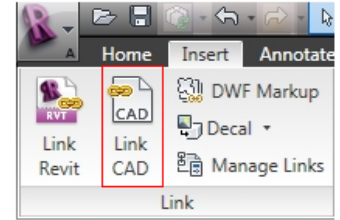


5.1.2.2 The Revit Site Model

The next step is to prepare the Revit Site Model by using the template, which can be found as described on [Section 2.2.1 - Templates](#):

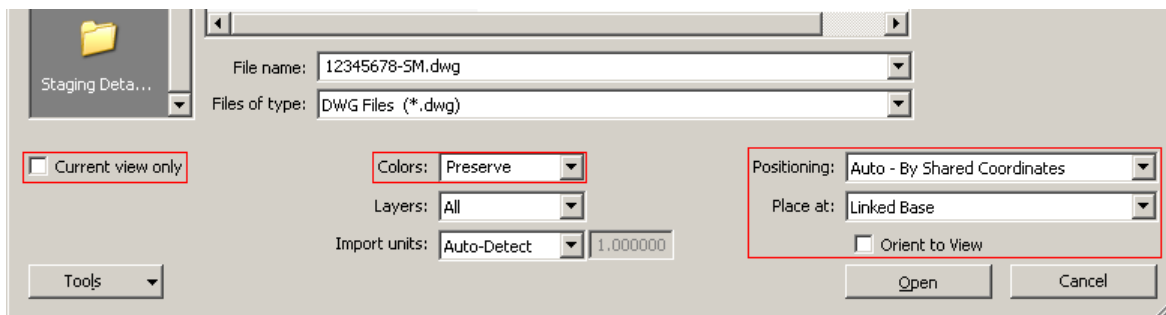
NYCSCA_TEMPLATE_SITE_MODEL.rte

From the Project Browser, switch to the SITE plan. From the INSERT Ribbon, under the LINK Panel, select the Link CAD tool as shown in the image on the right.

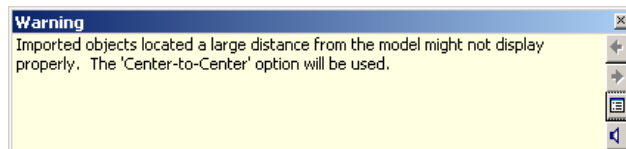
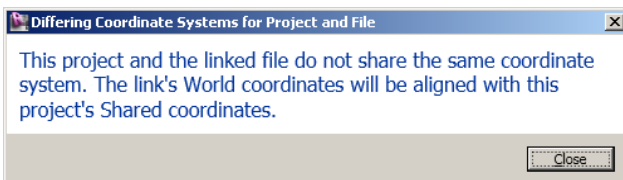


Browse to the _SM folder where the Site Model AutoCAD Background file was saved.

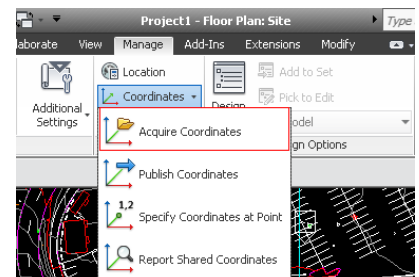
Make sure that the following settings are as below:



Revit will alert with the following two warnings that can be ignored.



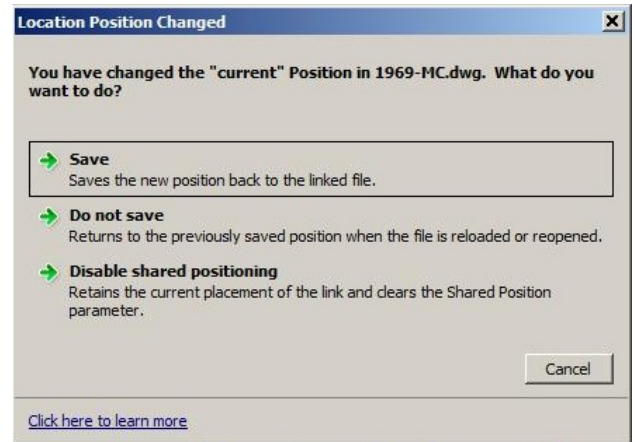
At this point, the user can Acquire Coordinates from the Site Model AutoCAD Background file. This step is key because it will define the NE coordinates as well as the Elevation Coordinates.



Check that the coordinates are correct by using the Spot Coordinate tool under the Annotate Ribbon. Revit will not snap to the inserted CAD drawing, so first draw a detail line and then use the Spot Coordinate tool.

After this has been completed, save the Revit Site Model file in the _SM folder following the File Naming convention as described in Section 2 of this Manual.

Revit will alert with the Dialog Box shown in the image to the right, in which the user will need to accept in order to establish a relation between the Site Model AutoCAD Background file and the Revit Site Model file. Click on the Save option to proceed.



5.1.2.3 Creating a Central File for each Discipline

The CAD/BIM Support Group is responsible of creating all the Revit Model files for all disciplines involved in the project, starting by using each discipline's template and saving them in the appropriate discipline MODEL folder and naming them accordingly.

The CAD/BIM Support Group will provide the basic Workset already as part the Central files.

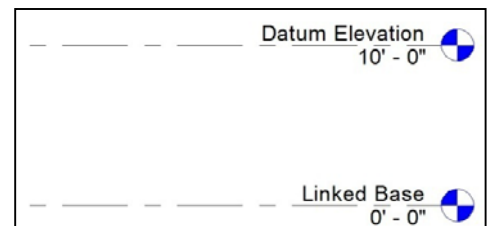
5.1.2.4 Using the Revit Site Model to Share Coordinates across Disciplines

The process of sharing coordinates across Disciplines will allow all Models to be fully coordinated. First open the Revit Site Model and link every single Discipline's Central file created in the previous step using the Auto – By Shared Coordinates Option.

When selecting the Open button, the following alert will appear

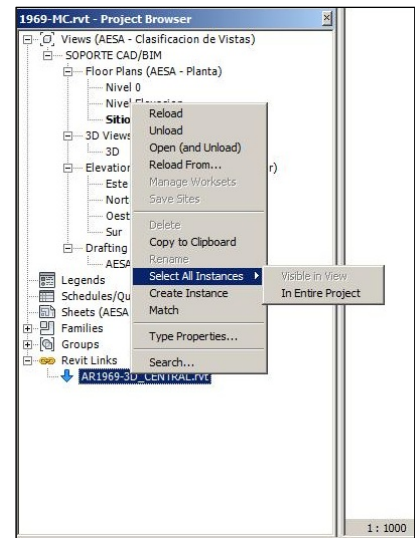


Switch to an elevation view. The user will see the Revit Site Model includes two levels; the Linked Base (Sea Level) and the Datum Elevation, which is the Project Elevation, as shown in the image to the right. Make sure to set the Datum Elevation level to where the Project elevation should be.

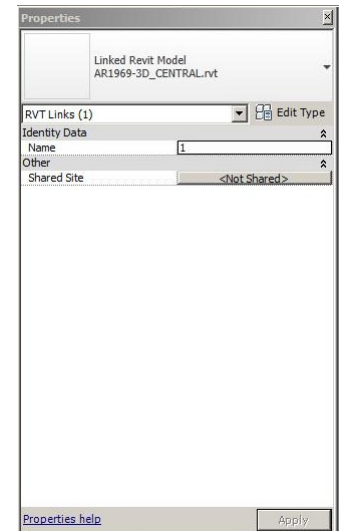


The next step is to align the Level 0' - 0" of all linked discipline Models to the Datum Elevation Level defined within the Revit Site Model.

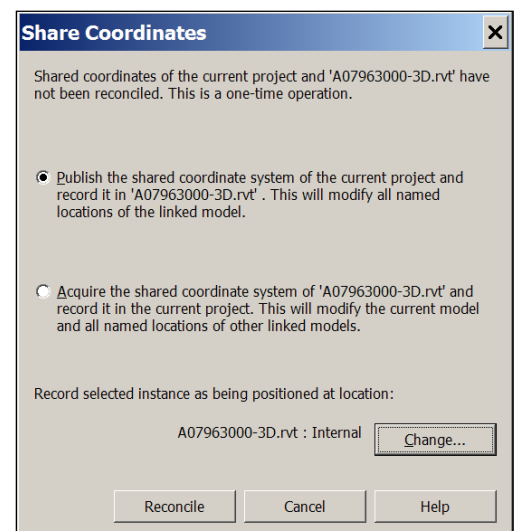
Select each individual linked model from the Revit Links tree under the PROJECT BROWSER. With the link selected, right click and pick the *Select All Instances* option followed by the *In Entire Project* option as shown in the image to the right.



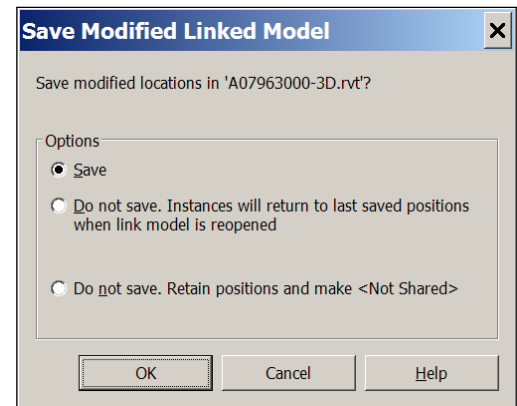
Once the link has been selected, from within the type selector click on the *Element Properties* button and under *Shared Location*, click on top of the *Not Shared* button.



The coordinates from current model (the Revit Site Model) will be shared into each of the discipline model file by selecting the *Reconcile* button as shown in the image to the right. At that point the Share Location will switch to Internal.



Repeat this process with every single Discipline Model linked to the Revit Site Model to share the coordinates. When saving the Revit Site Model, the user will be prompted to save the references Models. Make sure to select the *Save* option and click *OK* as shown in the image to the right.








5.1.2.5 Defining Project North

Chances are that the orientation of each Discipline Model is not appropriate since the Revit Site Model has been defined using True North. At this point, each discipline will be able to adjust their Models using the Rotate Project North tool at their own discretion without affecting the coordinates of the project.

5.1.3 Borough Folders

All SCA Revit projects are stored on a central server, which has internally been mapped using the drive letter “J:”. The (J:\Drive) is divided into Borough Folders using the following codes based on geographical location.

BOROUGH FOLDER	
BOROUGH CODE	BOROUGH NAME
 K	Brooklyn
 M	Manhattan
 Q	Queens
 R	Staten Island/Richmond
 X	Bronx

5.1.4 Facility Folders

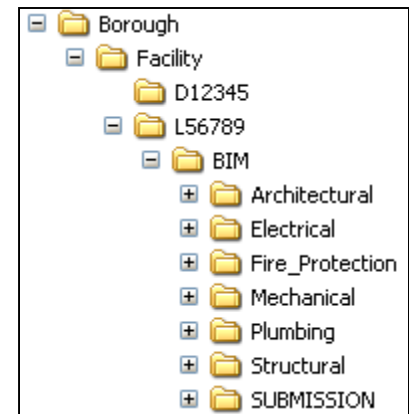
Each Borough Folder contains sub-folders named after each DOE Facility (SCA Building ID) within that geographical location. Each of these sub-folders store the facility-specific data as it relates to existing conditions and current SCA Revit projects on that facility. The Facility Code is a unique identifier assigned by the SCA.

The folders should be named beginning with the Borough Code, followed by a three-digit number.

- Abraham Lincoln High School, Brooklyn
Example: K410
- Academy of Collaborative Education, Manhattan
Example: M344

5.1.5 PID (Project Identification Number) Folder

Refer to [Section 2.2.3.4 - PID](#) – SCA Project Identification. The image to the right illustrates the project folder concept using a Line project with the PID Number of L56789. For Internal purposes, there are other project related folders that reside here, but they are not Revit related and therefore are addressed in a separate internal SCA document.



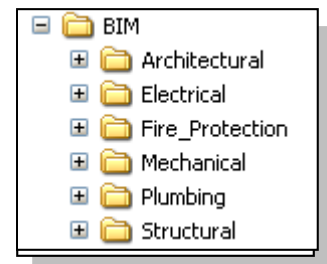
5.1.5.1 BIM Folder

This folder is to be used for storing Revit-related information files that do not need to be shared outside each discipline.

The image to the right illustrates the standardized sub-folders provided within BIM.

Rules of the BIM folder:

- Sub-folders should not be created at the root level of the BIM folder.
- The BIM folder allows read-write access to the owning discipline.
- No other discipline has access to the BIM folder.
- The BIM folder will be archived with the project.



5.1.5.2 DISCIPLINE Folder

This folder is used to share files among the five disciplines:

- Architectural
 - Note: Project specific Civil Engineer associated information/model to be filed here
- Electrical
- Fire Protection
- Mechanical
- Plumbing
- Structural

Every discipline is provided with a folder in the Project Directory. Each Discipline folder has a series of standardized sub-folders in which all design related data is to be stored.

The image to the right illustrates these standardized sub-folders using the Architectural folder as an example.



Rules of the DISCIPLINE folder:

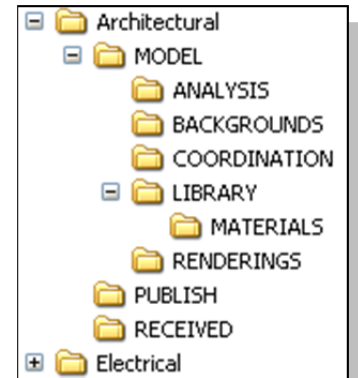
- Sub-folders should not be created in the Discipline folder.
- The Discipline folder has read-write permissions assigned to that owning discipline only.
- Other disciplines have read access to the Discipline folder.
- No other discipline has write access to the Discipline folder.

5.1.5.3 MODEL Folder

This folder stores the Revit Model file.

Each Model folder has a series of standardized subfolders in which all design related data is stored.

The image on the right illustrates these standardized sub-folder using the Architectural folder as an example.



Rules of the MODEL folder:

- Sub-folders should not be created in the MODEL folder.
- The MODEL folder allows read-write access to the owning discipline.
- The MODEL folder allows read-only access to all other disciplines.
- The MODEL folder will be archived with the project.

5.1.5.4 ANALYSIS Folder

This folder stores results of the different types of analysis performed in the Revit Model.

Rules of the ANALYSIS Folder:

- Sub-folders may be created in the Analysis folder. Refer to Section - [Folder Naming Convention](#).

5.1.5.5 BACKGROUNDS Folder

This folder stores AutoCAD and/or Image files that will be referenced into the Revit Model and will become part of the Contract Set.

Rules of the BACKGROUNDS folder:

- Sub-folders should not be created in the BACKGROUNDS folder.
- AutoCAD files and Image files should be named accordingly. Refer to Section - [AutoCAD Files](#) and to Section - [Image Files](#).

5.1.5.6 COORDINATION Folder

This folder stores documents and reports for multi-discipline coordination purposes only.

Rules of the COORDINATION folder:

- Sub-folders may be created in the COORDINATION folder. Refer to Section - [Folder Naming Convention](#).

5.1.5.7 LIBRARY Folder

This folder stores project-specific Revit Family files. Included is a sub-folder for Materials.

Rules of the LIBRARY folder:

- Sub-folders may be created in the LIBRARY folder. If this is decided by the Design Team, a folder structure similar to the one provided by the Revit product in use should be created.

This folder structure can be found under:

D:\Documents and Settings\All Users\ Application Data\Autodesk\REVIT PRODUCT\Imperial Library

5.1.5.8 MATERIALS Folder

This folder stores custom and/or project-specific materials (.MLIB files) along with the associated bitmaps used within the Revit Model.

Rules of the MATERIALS folder:

- Sub-folders may be created in the MATERIALS folder. If this is decided by the Design Team, a folder structure similar to the one provided by the Revit product in use should be created.

This folder structure can be found under:

D:\Program Files\REVIT PRODUCT\ Data\Rendering\assetlibrary_base.fbm\ Materials

5.1.5.9 RENDERINGS Folder

This folder stores data such as images, walkthroughs and animations generated from the Revit Model.

Rules of the RENDERINGS folder:

- Sub-folders may be created in the RENDERINGS folder. Refer to Section - [Folder Naming Convention](#).

5.1.5.10 PUBLISH Folder

This folder is used as a sharing mechanism between disciplines using the Revit-based applications and Civil 3D. Revit Models will be exported as DWG files and saved within this folder.

Rules of the PUBLISH folder:

- Sub-folders should not be created in the PUBLISH folder.
- The PUBLISH folder allows read-write access to the owning discipline.
- The PUBLISH folder allows read-only access to all other disciplines.
- The PUBLISH folder will be archived with the project.

5.1.5.11 RECEIVED Folder

This folder contains a dated archive of design information received from outside sources.

This folder is a record intended to identify exactly when and what information was provided by a consultant.

Rules of the RECEIVED folder:

- Sub-folders may be created in the RECEIVED folder. Refer to Section - [Folder Naming Convention](#).
- The RECEIVED folder provides read-write access to the owning discipline.
- No other discipline has access to the RECEIVED folder.
- The RECEIVED folder will not be archived with the project.

5.1.5.12 SUBMISSIONS Folder

This folder is to be used for storing project information as it appears at each milestone of the project.

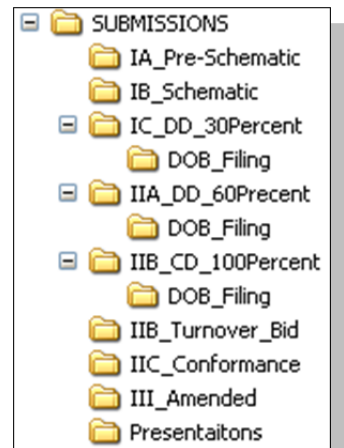
The image to the right illustrates the standardized sub-folders provided within SUBMISSIONS.

While the BIM Folder, and sub-folders MODEL and PUBLISH, contain working information that changes throughout the life of project, the SUBMISSIONS folder preserves the state of those files at the moment of each milestone.

Note: Before every submission, Revit Models should be purged of all unused information. Refer to Section - [Purge Unused](#).

Rules of the SUBMISSIONS folder:

- Sub-folders should not be created at the root level of the SUBMISSIONS folder.
- All sub-folders under the SUBMISSIONS folder will be archived with the project.



5.1.5.13 IA_PRE-SCHEMATIC Folder

The Pre-Schematic folder is necessary for some projects to compare alternatives before proceeding with Schematic Design.

Rules of the Pre-Schematic folder:

- Only the MODEL and PUBLISH folders should be copied into this folder.
- Sub-folders should not be created in the Pre-Schematic folder.

5.1.5.14 IB_SCHEMATIC Folder

Schematic is necessary for some projects to develop design concepts, determine anticipated construction costs and schedules, and to compare alternatives before proceeding with Design Development or Contract Documents phases.

Rules of the Schematic folder:

- Only the MODEL and PUBLISH folders should be copied into this folder.
- Sub-folders should not be created in the Schematic folder.

5.1.5.15 IC_DD_30PERCENT Folder

DD_30Percent (Design Development) is necessary to develop the chosen design concept, further refine anticipated construction costs and schedules before proceeding with contract documents. Sub-folder DOB_Filing has been provided; see below.

Rules of the DD_30Percent folder:

- Only the MODEL and PUBLISH folders should be copied into this folder.
- Additional sub-folders should not be created in the IC_DD_30Percent folder.

Rules of the DOB_Filing folder:

- Only the PUBLISH folders should be copied into this folder.
- At this phase the Zoning and Egress Filing occurs, and thus all appropriate submissions to DOB are to be copied here.

5.1.5.16 IIA_DD_60PERCENT Folder

DD_60Percent (Design Development) effort includes preparation of contract documents that will be used for construction. Sub-folder DOB_Filing has been provided; see below.

Rules of the DD_60Percent folder:

- Only the MODEL and PUBLISH folders should be copied into this folder.
- Additional sub-folders should not be created in the IIA_DD_60Percent folder.

Rules of the DOB_Filing folder:

- Only the PUBLISH folders should be copied into this folder.
- At this phase the Preliminary DOB Filing occurs, and thus all appropriate submissions to DOB are to be copied here.

5.1.5.17 IIB_CD_100PERCENT Folder

The CD_100Percent Set is when the project reaches 100% design and submitted for review. Sub-folder DOB_Filing has been provided; see below.

Before the CD_100Percent submission, all Design Options within the RevitModels should be converted into the Primary Option.

Rules of the CD_100Percent folder:

- Only the MODEL and PUBLISH folders should be copied into this folder.
- Additional sub-folders should not be created in the IIB_CD_100Percent folder.

Rules of the DOB_Filing folder:

- Only the PUBLISH folders should be copied into this folder.
- At this phase the final DOB Filing has taken place, and thus all DOB objections need to be incorporated/addressed as part of the Contract Documents (Bid Set). All appropriate submissions to DOB are to be copied here.

5.1.5.18 IIB_TURNOVER_BID Folder

The Bid Set contains drawings that have been modified/updated to include all review comments and have been accepted by SCA Construction Management prior to bid.

Rules of the Turnover_Bid folder:

- Only the, MODEL and PUBLISH folders should be copied into this folder.
- Additional sub-folders should not be created in the IIB_Turnover_Bid folder.

5.1.5.19 IIC_CONFORMANCE Folder

The Conformance Set contains drawings that have been modified or new drawings that have been issued during Bid prior to award. It contains all addenda.

Addenda happen after the Turnover Set is plotted and put out to bid. Not all the addenda might contain drawings; some might only contain specifications. For that reason, the Bid Set might contain non-consecutive addenda sub-folders.

Rules of the Conformance folder:

- A default sub-folder is provided named Addendum_XX.
- XX should be replaced by a two-digit number representing the addendum number.
- Sub-folders may be created in the Bid folder as long as they follow the naming convention noted above.
- Only the MODEL and PUBLISH folders should be copied into this folder.
- A set of PDF files should be created including only the drawings that have changed and/or drawings that have been added.

5.1.5.20 III_AMENDED Folder

The Amended Set contains drawings that have been modified as a result of Bulletins, Change Orders, and other revisions during construction.

Rules of the Amended folder:

- A default sub-folder is provided named Bulletin_XX.
- XX should be replaced by a two-digit number representing the Bulletin number.
- Sub-folders may be created in the Bid folder as long as they follow the naming convention noted above.
- Only the MODEL and PUBLISH folders should be copied into this folder.
- A set of PDF files should be created including only the drawings that have changed.

5.1.5.21 PRESENTATIONS Folder

The Presentations folder might contain different file formats used for presentation purposes only.

Rules of the Presentations folder:

Sub-folders may be created in the Presentations folder. Refer to Section - [Folder Naming Convention](#).

5.1.6 Sample Folder Structure

The Sample Folder Structure, defined in this section, should be used to simplify the exchange of information among the SCA departments, divisions, and functional groups as well as between the SCA and outside resources (consultants and contractors).

Every discipline is provided with a folder in the project directory in which all design-related data is to be stored.

Two Sample Folder Structures have been provided with the SCA Revit Standards Library to address both the Central File as well as the Local File.

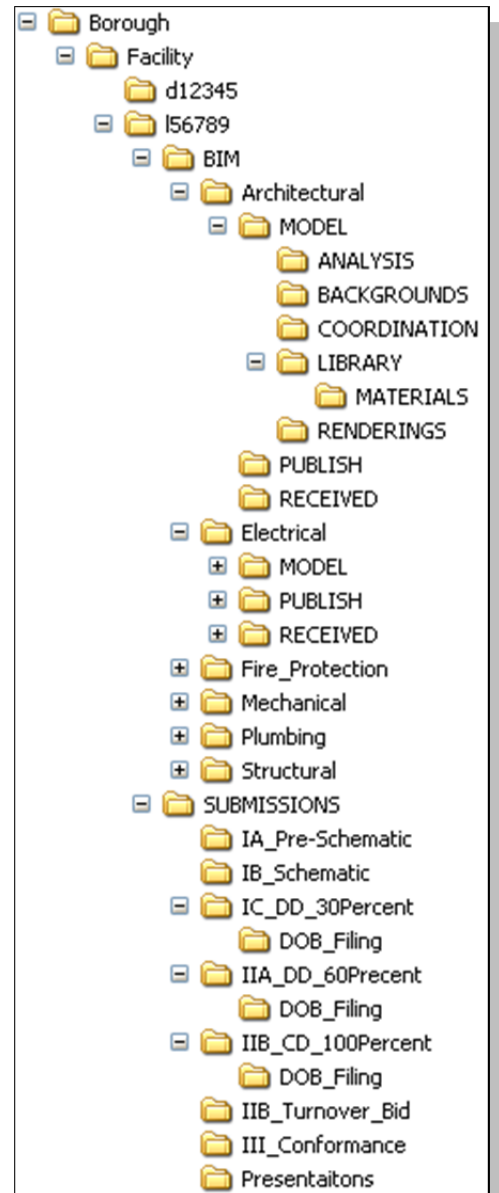
Central File folder The word “Borough” should be replaced with the Borough Code provided in Section - [Borough Folder](#). The word “Facility” should be replaced with the Facility Code provided by the Project Lead. The letters “PID” should be replaced with the PID Number provided by the Project Lead or by the Project Design Manager at the project kick-off meeting.

Local File folder The word “Borough” should be replaced with the Borough Code provided in Section - [Borough Folder](#). The word “Facility” should be replaced with the Facility Code provided by the Project Lead. The letters “PID” should be replaced with the PID Number provided by either the Project Lead or by the Project Design Manager at the project kick-off meeting and the word “Discipline” with one of the six disciplines within the SCA A&E Department provided in Section - Discipline Folder.

A copy of both Sample Folder Structures can be found under:

S:\share\Autodesk\“Version of Revit”\Sample Project\

Note: The Project Lead is responsible for setting up all Revit Models.



5.1.7 Creating the Central and Local Files

The CADD Unit is responsible for setting up the project on the Server as well as creating each user’s Local File.

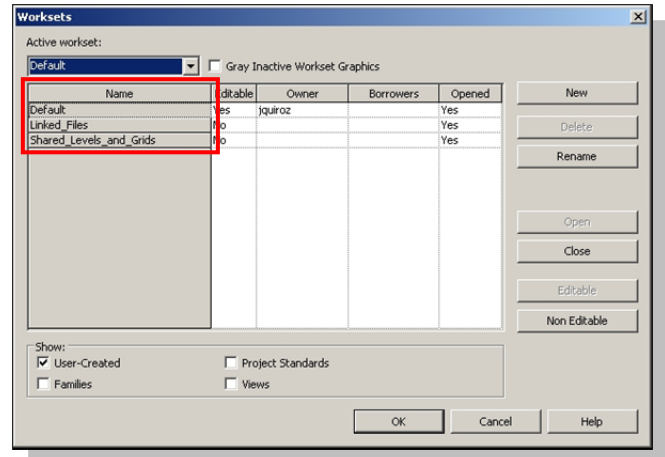
5.1.8 Worksets Naming Convention

When naming Worksets, the SCA Revit Standards adopts two different approaches based on the size and complexity of the project.

Each discipline shall determine which of the two approaches better fits their design needs. The Worksets naming convention is discipline specific, not project specific; therefore, these two formats will be able to co-exist within the same project.

The image on the right illustrates the default Worksets supported by both approaches, which are:

- Default
- Linked_Files
- Shared_Levels_and_Grids



5.1.8.1 Worksets Based on Location

Worksets based on location should be named according to where the elements are spatially located within the project.

The Workset should take the form of:

<Location>_<Description>

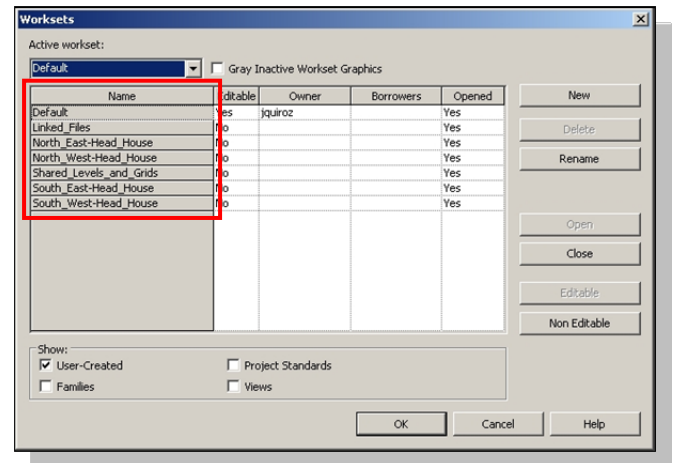
WORKSET BASED ON LOCATION	
ITEM	DESCRIPTION
Location	Location within the project.
Description	<p>Brief User Description (up to 12 characters)</p> <p>The following characters should not be used as part of the description @ \$ % ^ & < > / \ " ' : ; ? * , ' ,</p>

Note:

- This approach is most suitable for small-to-medium size projects in which a small team is part of the project.
- Capitalize the leading letters in each portion of the Workset name.
- Keep file names as short as possible.
- Do not use spaces between words in the file names. To separate words, use the underscore “_” character.

The image on the right illustrates the Worksets for a project done by the Architectural Group in which they are proposing (4) Worksets named as follows:

- North_East_Head_House
- North_West_Head_House
- South_East_Head_House
- South_West_Head_House



5.1.8.2 Worksets Based on Element

Worksets based on Element should be named according to what each Element and Component represent within the project.

The Workset should take the form of:

<Element>_<Component>

WORKSETS BASED ON ELEMENT	
ITEM	DESCRIPTION
Element	Elements within the project. (Refer to chart below.)
Component (Optional)	Components within the project. (Refer to chart below.)

Note:

- This approach is most suitable for medium-to-large size projects in which a large team is part of the project.
- Capitalize the leading letters in each portion of the Workset name.
- Keep file names as short as possible.
- Do not use spaces between words in the file names. To separate words, use the underscore “_” character.

5.1.8.2.1 *Revit Architecture*

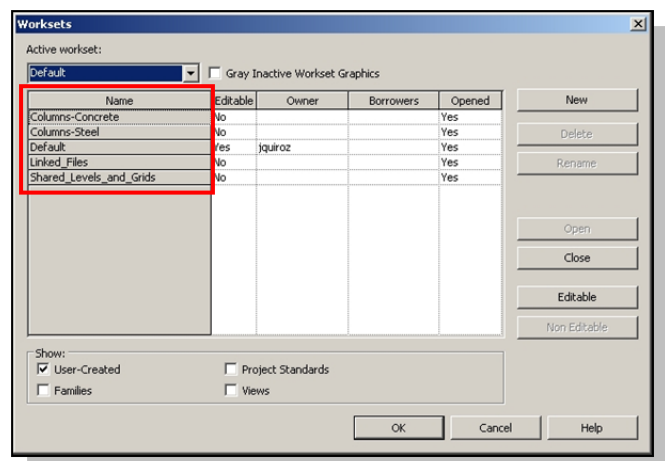
REVIT ARCHITECTURE	
ELEMENT TYPE	COMPONENT TYPE
Building_Exterior	Entourage
	Landscape
	Roof
	Walls
Building_Interior	Ceilings
	Equipment
	Furniture
	Lighting
	Slabs
	Vertical_Circulation
	Walls

5.1.8.2.2 *Revit Structure*

REVIT STRUCTURE	
ELEMENT TYPE	COMPONENT TYPE
Foundation	Concrete
	Steel
Columns	Concrete
	Steel
Slabs	Concrete
	Steel
Framing	Concrete
	Steel

The image on the right illustrates the Worksets for a project done by the Structural Group in which they are proposing (2) Worksets named as follows:

- Columns_Concrete
- Columns_Steel



5.1.8.2.3 Revit MEP

REVIT MEP	
ELEMENT TYPE	COMPONENT TYPE
HVAC	Chill_Water
	Controls
	Ductwork
	Equipment
	Hot_Water
	Steam
Plumbing	Compress_Air
	Domestic_Cold_Water
	Domestic_Hot_Water
	Domestic_Hot_Water_Return
	Sanitary_Sewer
	Sanitary_Ventilation
	Storm
Fire_Protection	Foam
	FM200
	Stand_Pipe
	Sprinkler
Electrical	Fire_Alarm
	Lighting
	Power
Low Voltage & Data Communicaion	Network
	Public_Address
	Security
	Telecommunications
Corrosion_Protection	Above_Grade
	Below_Grade



6.0 EXHIBITS

6.1 EXHIBIT 1 - Release and Indemnity Regarding BIM and CADD-Related Materials

The following is a sample of the SCA's "Release and Indemnity Regarding BIM and CADD-Related Materials". It shall be completed and submitted to the CADD Unit by the *Contractor*.



Contract Number: _____

RELEASE AND INDEMNITY REGARDING BIM and CADD-RELATED MATERIALS

Contractor acknowledges and agrees that all SCA-provided BIM Models and other BIM- and CADD-related electronic files provided by the SCA to Contractor (the "SCA BIM/CADD Materials") are provided for the convenience of Contractor and for informational purposes only. Contractor acknowledges and agrees that SCA BIM/CADD Materials are NOT intended as an end-product and do not constitute a part of the Contract Documents.

The SCA BIM/CADD Materials are provided on an "as is" and "as available" basis without warranties of any kind, express or implied. The SCA expressly disclaims any representations and warranties, including without limitation, the implied warranties of TITLE, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE or NON-INFRINGEMENT, or any warranty arising from a course of dealing, usage of trade, or trade practice.

Contractor acknowledges that SCA BIM/CADD Materials may be subject to undetectable alteration, either intentional or unintentional due to, among other things, transmission, conversion, media degradation, software error, or human alteration. Contractor agrees and recognizes that information in the SCA BIM/CADD Materials may contain technical inaccuracies or typographical errors, and that information may be changed or updated without notice.

Contractor agrees that the SCA shall not be responsible for the completeness, correctness or accuracy of the SCA BIM/CADD Materials, and that the SCA makes absolutely no warranties with respect to the completeness, correctness or accuracy of the SCA BIM/CADD Materials. The SCA makes no warranty, representation or guarantee as to the content, sequence, accuracy, timeliness or completeness of the SCA BIM/CADD Materials or that the SCA BIM/CADD Materials may be relied upon for any reason.

The Contractor acknowledges and agrees that since all SCA BIM/CADD Materials are NOT an end-product and do NOT constitute a part of the Contract Documents that neither the Contractor nor any entity doing business with a Contractor shall submit to the SCA any requests for information or any other form of correspondence which is specifically related to the content within any SCA BIM/CADD Materials.

Contractor hereby acknowledges and agrees that the SCA has no duty or responsibility to update, add to, correct or revise the SCA BIM/CADD Materials, and the SCA expressly refuses to accept any duty or responsibility to update, add to, correct or review the SCA BIM/CADD Materials.

Limitation of Liability.

The SCA shall have no liability for: (a) any losses, injuries, or damages whatsoever, whether in contract, tort or otherwise, from the use of, or reliance on, the SCA BIM/CADD Materials, (b) any errors, omissions, or inaccuracies in the SCA BIM/CADD Materials regardless of how caused, or (c) any decision made or action taken or not taken in reliance upon the SCA BIM/CADD Materials.

Contractor agrees that the SCA shall have absolutely no liability in connection with the SCA BIM/CADD Materials, including without limitation: (a) any liability for damage to Contractor's or any sub-contractor's computer hardware, data, information, or business resulting from the SCA BIM/CADD Materials, (b) any liability that results from viruses, errors, or defects, resulting from the SCA BIM/CADD Materials; or (c) any liability arising out of the content, sequence, accuracy, timeliness or completeness of the SCA BIM/CADD Materials.



Contract Number: _____

Release of Liability and Indemnity.

No liability is accepted by the SCA for SCA BIM/CADD Materials. By signing below, Contractor agrees that it will not hold the SCA liable, and that Contractor fully RELEASES AND FOREVER DISCHARGES the SCA from any and all liability, claims, causes of action, debts, dues, fees, expenses, and obligations of every kind and nature that Contractor has or may have in the future against the SCA arising out of its use of the SCA BIM/CADD Materials, or arising out of the use of the SCA BIM/CADD Materials by any other person or entity who obtains the SCA BIM/CADD Materials from Contractor or from the SCA at Contractor's request.

IT IS THE INTENTION OF THE PARTIES HERETO THAT THIS IS A COMPLETE AND UNCONDITIONAL RELEASE OF ALL LIABILITY TO THE GREATEST EXTENT ALLOWED BY LAW.

To the fullest extent permitted by law, Contractor agrees to indemnify, defend and hold harmless the SCA, the DOE, and the City of New York, their officers, directors, agents, employees and partners from any and all claims, suits, judgments, damages, settlements, liabilities, fees, including attorneys' fees, costs, court costs, expenses, and disbursements to the extent arising out of or in connection with or as a result of, or consequence of, the Contractor's or its sub-contractor's use of the SCA BIM/CADD Materials.

Use of Information and Other Materials

Contractor may not rely upon, reproduce, republish, post, publicly exhibit, transmit or distribute any SCA BIM/CADD Materials unless expressly directed to do so by the SCA.

Contractor's Name: _____

Contractor's Address: _____

City: _____ State: _____ Zip Code: _____

Signature: _____ Title: _____

Name [print]: _____ Date: _____

State of _____)
City of _____) ss:
County of _____)

On the _____ day of _____, 20____, before me personally came _____ to me known or proved to me with satisfactory evidence, who, being by me duly sworn, did depose and say s/he is the _____, of _____ the entity described in and which executed the above instrument; and that s/he signed her/his name thereto by order of the governing body of said entity.

NOTARY PUBLIC

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