APPENDIX

USC's Project Revit Record Requirement Execution Plan (PRxP) TEMPLATE

FOR

[PROJECT TITLE]

DEVELOPED BY

[AUTHOR COMPAN(IES)]

DATE:

(DATE EXECUTED)

Note: This template is a tool that is provided to assist in the development of USC's Project Project Revit Record Requirement Execution Plan (PRxP) as required per contract. It was adapted from the United States Army Core of Engineers (USACE) BIM"©) Project Execution Plan Template (PxP) Version 2.0., dated 9-13-2012.

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NOTE: All text that is grey is for illustrative purposes only and should not be construed as a formalized response to this execution plan.

Architects – Initial _____
General Contractor – Initial _____
USC – Initial _____

SECTION A: PROJECT INFORMATION

This Project Revit Record Requirement Execution Plan PRxP defines uses for Revit Record Model Requirement for this project along with a detailed description of the process for executing Revit record model documents throughout the project lifecycle.

[INSERT ADDITIONAL INFORMATION HERE IF APPLICABLE]. Additional detailed information can be included as an attachment to this document

This section defines basic project reference information and determined project milestones.

1. **FACILITY OWNER:**
2. **PROJECT NAME:**
3. **PROJECT LOCATION:**
4. **CONTRACT TYPE/DELIVERY METHOD:**
5. **FACILITY TYPE:**
6. **BRIEF PROJECT DESCRIPTION:**
7. **ADDITIONAL PROJECT INFORMATION: [UNIQUE REVIT RECORD MODEL REQUIREMENT PROJECT CHARACTERISTICS AND REQUIREMENTS]**
8. **PROJECT INFORMATION** (PROVIDED BY USC)

PROJECT INFORMATION	NUMBER
USC BUILDING NAME	
USC BUILDING NUMBER:	
USC BUILDING ID (3 LETTERS)	
USC CAMPUS	
USC PROJECT NUMBER	

SECTION B: KEY PROJECT CONTACTS

List of lead Revit record model development contacts for each organization on the project. Additional contacts can be included later in the document.

ROLE	ORGANIZATION	NAME	E-BUILDER ACCESS REQUIRED ?	LOCATION/TIME ZONE	E-MAIL	PHONE
CCD Project Manager	USC					
CCD VDC Architect	USC					
Project Manager(s)						
Team PRxP Point of Contact						
Architecture Lead						
Structural Lead						
Furnishings Lead						
Equipment Lead						
Landscape Architect Lead						
Civil Lead						
Fire Protection Lead						
Mechanical Lead						
Plumbing Lead						
Electrical/Telecom Lead						
Other Project Roles						

SECTION C: RECORD REVIT MODEL USES

The REVIT RECORD MODEL USES chart currently highlighted/shaded and checked with an (X) are required by USC. The Contractor is to identify with a (C) additional Revit record model uses selected as Contractor Electives for the project. The Design Team and Contractor are to identify with (company initials) required Revit record model uses and additional Revit record model uses selected as Design Team Electives for the project. Include additional Revit record model uses as applicable in empty cells of Design and Construct columns. Do not complete Plan and Operate Columns.

PLAN (NIC)	DESIGN	CONSTRUCT	OPERATE (NIC)
PROGRAMMING	DESIGN AUTHORING (X)	SITE UTILIZATION PLANNING	BUILDING SYSTEM ANALYSIS
SITE ANALYSIS	PROGRESS REVIEWS (X)	CONSTRUCTION SYSTEM DESIGN	ASSET MANAGEMENT
	INTERFERENCE MANAGEMENT (3D COORDINATION) (X)	INTERFERENCE MANAGEMENT (3D COORDINATION)(X)	SPACE MANAGEMENT / TRACKING
	STRUCTURAL ANALYSIS	DIGITAL FABRICATION (X)	DISASTER PLANNING
	LIGHTING ANALYSIS	3D CONTROL AND PLANNING	
	ENERGY ANALYSIS	RECORD MODELING (X)	OPERATION & MAINTENANCE RECORD MODELING
	PROGRAM VALIDATION	FIELD / MATERIAL TRACKING	
	MECHANICAL ANALYSIS	DIGITAL LAYOUT	
	OTHER ENG. ANALYSIS		
	SUSTAINABILITY (LEED) EVALUATION		
	CODE VALIDATION		
PHASE PLANNING (4D)	PRELIMINARY CONSTRUCTION SCHEDULING (4D)	CONSTRUCTION SCHEDULING (4D)	BUILDING MAINTENANCE SCHEDULING (4D)
COST ESTIMATION (5D)	COST ESTIMATION (5D)	COST ESTIMATION (5D)	COST ESTIMATION (5D)
EXISTING CONDITIONS MODELING	EXISTING CONDITIONS MODELING	EXISTING CONDITIONS MODELING	EXISTING CONDITIONS MODELING
USC Shared Parameters	USC Shared Parameters & Values (X)	USC Shared Parameters & Values (X)	USC Shared Parameters

SECTION D: ORGANIZATIONAL ROLES / STAFFING

For each Revit record model use required and contractor selected, identify the team within the organization (or organizations) who will staff and perform that use. Staff members may fill multiple project roles.

DESIGN PHASE REVIT RECORD MODEL USES LINKED	ORGANIZATION	LOCATION(S)	LEAD CONTACT
DESIGN AUTHORING			
PROGRESS REVIEWS WITH USC			
DESIGN 3D COORDINATION			
USC Shared Parameters & Values Data Collection			
ARCHITECTURAL SCHEDULED DATA ENTRY (REVIT)			
MEP SCHEDULED DATA ENTRY (REVIT)			
SysQue Revit library 200-400 exchange			

CONSTRUCTION PHASE REVIT WITH LINKED AUTOCAD USE	ORGANIZATION	LOCATION(S)	LEAD CONTACT
CONSTRUCTION 3D COORDINATION (Alternately SysQue Revit Library)			
RECORD MODELING – ADD ROWS FOR DIFFERENT MODEL TYPES			
RECORD DATA ENTRY – ADD ROWS FOR DIFFERENT DATA TYPES			
MODEL BULLETINS – ADD ROWS FOR DIFFERENT MODEL TYPES			
SysQue Revit library 200-400 exchange			

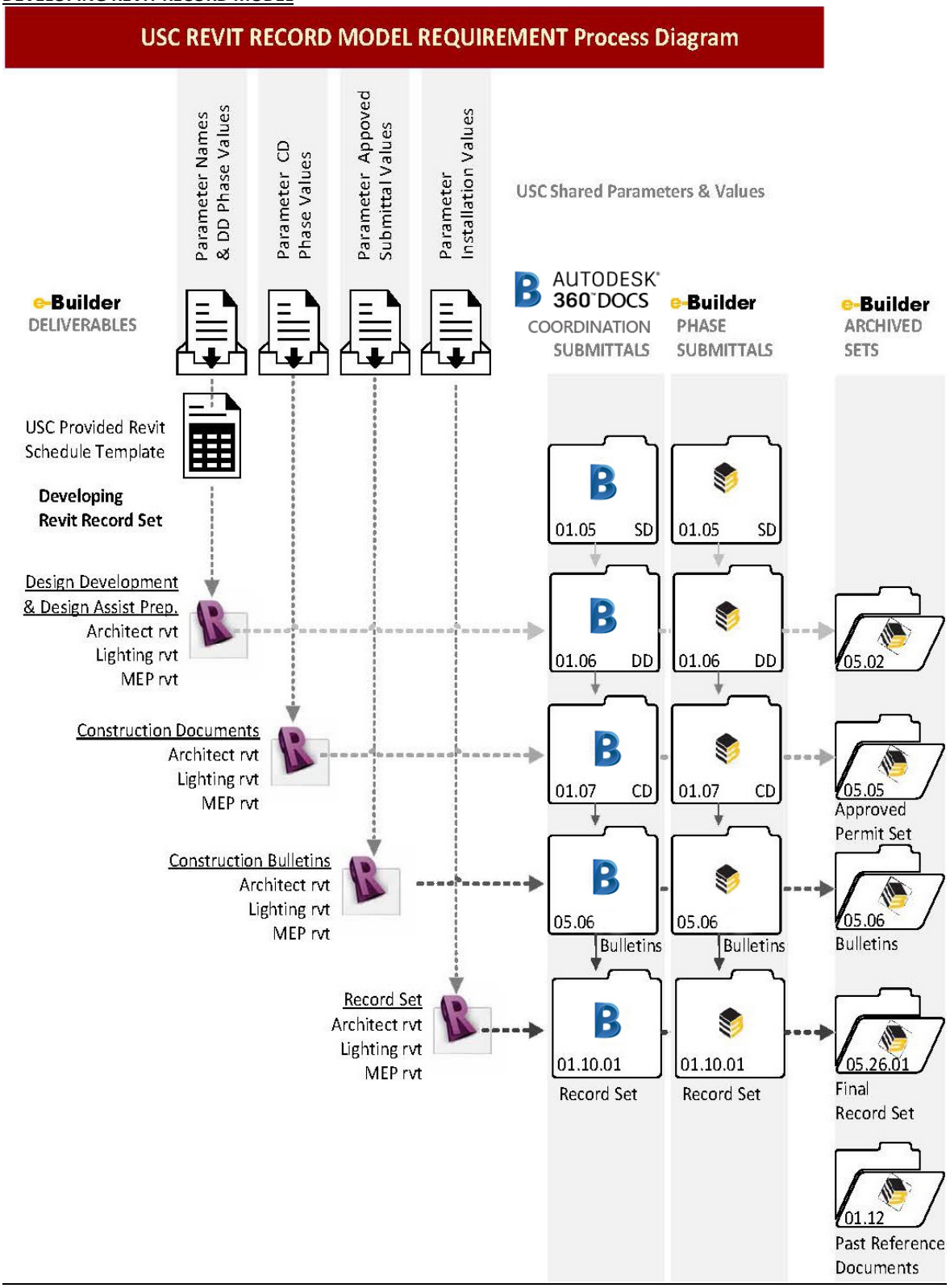
1. COLLABORATION ACTIVITIES

The following are examples of activities that should be considered

ACTIVITY TYPE	REQUIRED	PROJECT STAGE	FREQUENCY	PARTICIPANTS	LOCATION
PRxP REQUIREMENTS KICK-OFF	YES		ONCE	w/ USC PROJECT MANAGER	WEB MEETING OR AGREED LOCATION
PRxP EXECUTION PLAN DEMONSTRATION	YES		ONCE	W/ USC PROJECT MANAGER	WEB MEETING OR AGREED LOCATION
DESIGN COORDINATION	YES				

SECTION E: REVIT RECORD MODEL PROCESS DESIGN

DEVELOPING REVIT RECORD MODEL



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SECTION F: COLLABORATION PROCESSES AND PROCEDURES

2. DESIGN TEAM/CONSTRUCTION TEAM COLLABORATION STRATEGIES

The following is a description of how the Project Team will collaborate in the development and execution of modeling and data collection for the project. Collaboration strategies and detailed processes used for developing, coordinating and leveraging the Revit with linked AutoCAD files are defined for the following purposes.

3. **FILE UPLOAD AND FILE SHARING STANDARDS and PROTOCOLS**

All model content authors should agree to basic rules at the onset of the project so that the sharing of electronic models is efficient and benefits the entire team. **Milestone and Progress Design Models** are to be uploaded into the current background folder; additionally Milestone Models are to be uploaded to e-Builder and 360DOCS. Navisworks models for Revit with linked AutoCAD Coordination are to be uploaded into a coordination folder including CADD/AutoCAD files with UCS to Shared coordinate instructions per file.

4. **FOR ALL REVIT MODEL FILES:**

- All Revit models should be saved as a new central file. Updates are to be posted prior to construction.
- All Revit system and component elements should include delimiting clearance geometry (distinct from the element's component geometry, to include insulation) for code or USC B.O.D. required clearances.
- Revit model line representing the O&M Path of Travel of equipment to be shown with Height & Width.
- Prior to upload the Revit models should be audited, unused objects purged, unnecessary views removed, and all warning substantially addressed.
- All Revit model components should be assigned to the correct category and properly located in their respective workset as defined by the team.
- All unnecessary linked files should be removed from the Revit model. All necessary linked files will remain linked and shall be included as part of the Revit file upload.
- All Revit models should share the USC survey point (the original origin point), shared coordinates, and localized project base point coordinates, so models align correctly when linking the project specified.
- All schedules that appear on Revit sheets should be native Revit schedules derived from model content and parameters.
- All USC Shared Revit Parameters to be loaded in the Revit project file with values correctly populated.
- Model and Detail lines should not replace 3D information in the Revit model. (Except: Detail values and components, Detail drafting views, Room/Area separation lines, 1/2" or smaller joints in panels, etc.)

5. **REVIT MODELING DEVELOPMENT REQUIREMENTS AND WARNINGS RESOLUTION:**

- The design development and construction document Revit elements should include delimiting geometry for element insulation, required clearance/access, and clear space for bracing/framing.
- Mechanical and Plumbing lines to show dimensionally accurate centerline location and dimensioning.
- Bulletins of the Revit Record Set shall remain updated by incorporating RFI, ASI, approved submittals and Change Orders in a timely fashion and in all cases prior to construction.
- All 2D DWG files should share the same project coordinates.
- Use only AutoCAD fonts in the model space; do not use true type fonts or custom AutoCAD fonts.
- XREF's are not to be bound or inserted.
- Correct overlapping of design elements (especially walls and room boundaries).
- All floors are subdivided by room.
- Space enclosures are required. All spaces must be bounded by walls and floors.
- Every space has a name and a room number, including all shafts and stairs.
- There is only one space instance per space, no duplicates. Resolve all orphans (resulting from using "copy/paste").
- All walls are connected to the top of slab at bottom and bottom of slab at top (if full height).All mechanical spaces are defined floor to floor, unless there is a plenum. Plenums are defined as a separate space.
- All mechanical systems are defined (every element belongs to a system). This can be verified using the Revit MEP system browser. All system components should reside within a correct workset.
- Sidewall diffusers are placed in defined spaces and attached to corresponding walls.

- Ensure that the Revit MEP file is linked to the Revit architectural file. (This can be checked by using the Revit System Browse and verifying that the space name and number columns are populated).
- Ensuring that all mechanical zones are defined. Ensure that there are no unassigned components (View/User Interface/System Browser).
- Mapping MEP Space names to architectural room names.

6. **FOR ALL AUTODCAD DWG FILES:**
   - All 2D DWG files should share the same project coordinates.
   - Use only AutoCAD fonts in the model space; do not use true type fonts or custom AutoCAD fonts.
   - XREF's are not to be bound or inserted.
   - Borders and titles blocks are not transmitted with the drawings.
   - No models will have anything on layer zero (0) or Defpoints.
   - Drawings are to be purged (AutoCAD purge command) and audited (AutoCAD audit command) prior to being uploaded to get rid of any errors in the drawing file.
   - Text is on separate layers from the modeled objects so that text can be turned off without turning off objects.
   - All layers are to be turned on and thawed. Nothing is drawn in paper space.
   - All entities are to be delivered with colors, line types, and line weights set to by layer.

7. **RECORD MODELING:**
   Record modeling will be completed by the design team to be delivered to USC via E-Builder. Updates by design team are to be posted to e-Builder prior to approving related submittals for design conformance.
   Record Revit modeling of the project shall incorporate:
   - The Revit Design Model items defined by the Architect of record for Major Architecture Elements Revit Categories and defined by the Engineers of Record for the Major Equipment Revit Categories which will include the USC Shared Parameters and Values in addition to COBie Data values. The GC will not remodel any assets within the architect and engineer of records design files unless there is a specific need to replace or supersede the information in the design files.
   - Any additional GC authored items for Major Architecture Elements Revit Categories and Major Equipment Revit Categories must be in a Revit file with USC Shared Parameters and Values in addition to COBie Data values. Any additional GC authored items for Major Architecture Elements Revit Categories and Major Equipment Revit Categories must link to with the Revit design files containing categories/worksets that clearly define elements of the GC model that supersede the design file elements for specified categories. The GC will not remodel any Major Equipment Revit Category assets within the architect and engineer of records background design files unless there is a specific need to replace or supersede information which will ultimately be incorporated by the architect and engineer of records into the record Revit design files.
   - Sub-contractor Fabrication models to be organized by scope. Sub-contract models that include Major Architecture Elements Revit Categories and Major Equipment Revit Categories must use design model backgrounds. Any additional Sub-contractor authored items for Major Architecture Elements Revit Categories and Major Equipment Revit Categories must link to with the Revit design files containing categories/worksets that clearly define elements of the Sub-contractor model that supersede the design file elements for specified categories. The Sub-contractor will not remodel any Major Equipment Revit Category assets within the architect and engineer of records background design files unless there is a specific need to replace or supersede information which will ultimately be incorporated by the architect and engineer of records into the record design files

8. **AS-BUILT MODELING**:
   As-built model will be completed by the construction team to be delivered to USC via E-Builder at the end of construction. The As-built models are complimentary to contractor 's complete As-built mark-up of the construction documents. The **As-built files include all of the categories not included in the USC Shared Parameter Categories,** as the USC Shared Parameters are instead part of the Record Revit models.

9. **RECORD DATA COLLECTION:**
   Record data collection will be performed during the Design & Construction Phase directly into the Revit models thru Google Sheets or Office 365 Excel. The MEPF data will then be completed after installation during construction phase per Major Equipment Revit Categories by the GC and subcontractors.

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10. 3D TRADE MODEL NATIVE FILES:

- Trade models should only contain information pertinent to the trade and discipline it was created in. Any background and extraneous information should be removed from the model before sharing it with the Design Team and other Trades.
- Architect will generate a 2D DWG file for Level-01 and share it with GC for Trades to specify origin point and insertion point accordingly. (coordination instructions must be maintained)
- If an Object Enabler is required for other team members to view model content, Trades to provide plugin and installation instructions to all team members.
- If a font or shape file is required for drawing specific items, please include for proper loading.
- Dimensioned trade models should be broken down by floors and correlate with Navisworks Coordination models.
- See AutoCAD DWG file instructions before posting models to the Design Team and other team members. Include UCS/Shared Coordinates instructions with upload/transmittals
- Trade Model content should be specific to the project and in conformance with products being installed onsite. When a team member query's the model all model content properties should read correctly. Alternately the USC SysQue Revit library may be used for 200-400 exchange of MEP data.

11. 3D COORDINATION MODEL FILES:

3D Coordination models should always reflect the most current Native source document model development and Backgrounds with dimensions for changes with design documents.

12. SHOP DRAWING FILES:

- Shop Drawing Files should be generated from the dimensioned Trade Model files and match approved coordination information.
- Dimensioned shop drawings shall be submitted as PDF's properly annotated, so that to be installed MEPF systems are easily identifiable in terms of its geometry, size and location.

13. AS-BUILT MODEL NATIVE FILES:

- As-Built Models should reflect as-constructed condition in terms of its size, shape and location in the building.
- For Modelled items included under Major Architecture Element Revit Categories and Major Equipment Revit Categories, all collected COBie data is to reside in the Record Revit files. The Record Revit files for these categories must include the sheets and the views of the design record set.
- The As-built models are complimentary to Contractor's complete As-built mark-up of the construction documents. Alternately the USC SysQue Revit library may be used for 200-400 exchange of MEP data.

14. GENERAL DESIGN ASSIST AND 3D COORDINATION STRATEGIES:

- 3D-Design coordination will consist of clash detection procedures carried out on a scheduled basis. The goal of clash detection is to eliminate building system interferences and reduce RFIs.
- The overall clash procedure will include:
  a. Clashing between pre-defined systems for optimal efficiency (i.e. Structural vs. Architectural systems).
  b. Development and use of a Clash/Issue Matrix, with accompanying Model Views, to illustrate conflicts and aid in their resolution.
  c. Setting tolerance standards
- Coordination to be reviewed and approved for each floor for the MEPF trades carried out by general contractor & subcontractors.
- **It is considered unacceptable for issues to remain perpetually unresolved though multiple coordination meetings.**

DESIGN PHASE COORDINATION

Each Design Team firm will have an assigned Coordinator. It is the responsibility of each Coordinator to create a NWC from Revit for the purpose of integrating consultant models for conformance. During design, the frequency of coordination will follow schedule stated below. Architect will lead this effort through design as an internal design team coordination tool to find and address clashes and clearance issues. During construction, the GC will perform their own 3D Coordination to ensure modeled elements develop in

conformance to the design. The Subcontractors 3D modelled elements information is integrated through RFI responses and subcontractor submittals which all are incorporated into to the construction documents.

Project Leaders will:

- Provide accurate and complete model content representative of their discipline requirements.
- Review report & take appropriate action to resolve identified clashes within the time frame specified.

CONSTRUCTION PHASE COORDINATION

All trade contractors participating in coordination shall provide their latest models to the team on an as-needed basis depending on the current demands of the project activities. The latest models should always be uploaded to the designated folder and utilize the naming conventions in this PRxP.

The coordination facilitator will update the composite model with the latest information available. System interferences will be found and reported via clash/interference and dimensioned sections for main runs moved from x,y,z of Revit design models. This effort will identify space constraints and system conflicts. These will require each participant to relocate its systems to coordinate with the design, engineering, or work by other participants. It is anticipated that each participant will have to relocate at least some of its systems. At the close of each coordination session, a composite model (with clear description for linking UCS to Revit shared coordinates for each file) will be published and uploaded to the project's folder.

Coordination Signoff

Coordination of system interference relates to the logical (x,y,z, & invert) dimensioned location of system runs, not solely adjusting overlapping of clashed objects. When the contractor/subcontractor team has reached a consensus that the dimensioned building systems are resolved and have provided written dimensioned guidance of changes to the AE team, then the contractor coordination facilitator will compile a contractor sign-off. The sign-off will include the composite Revit and AutoCAD subcontractor models that validate that these coordination models match with the design model dimensions, either shown in the currently coordinated set or that changes have been agreed to by the AE team for inclusion in the immediately forthcoming CD bulletin. The sign-off composite model will consist of all the current, coordinated models, which match subcontractor submittals – include the sign-off date in the file name and upload the coordinated model(s) (unless otherwise specified, in Navisworks Document, NWD format and native Revit with linked AutoCAD to the project file sharing site as an archive. A contractor Coordination Sign-Off Agreement will be completed and executed following the completion of coordination for each area, zone, or floor to acknowledge that the coordination conforms to the design shown in the developing Revit record set and has been incorporated as a bulletin into the construction documents.

15. MODEL DELIVERY SCHEDULE, APPLICATION AND FILE EXCHANGE TYPE

Document the information exchanges and file transfers that will occur on the project.

DISCIPLINE	"REVIT" WITH LINKED "AUTOCAD") USE	ONE-TIME or FREQUENCY	DUE DATE or START DATE	MODEL FILE	MODEL SOFTWARE	NATIVE FILE TYPE	VERSION	FILE EXCHANGE TYPE
ARCHITECTURE	DESIGN AUTHORING	WEEKLY	20__-__-__	ARCH	Revit	.RVT		.RVT .DWG .NWC
ARCHITECTURE	3D COORDINATION	WEEKLY		COORD	Navisworks	.NWD .NWF		.NWD
STRUCTURE		WEEKLY	[DATE]	STRUCT	DESIGN APP	.XYZ		.XYZ .ABC
MECHANICAL		WEEKLY	[DATE]	MECH	DESIGN APP	.XYZ		.XYZ .ABC

SECTION G: QUALITY CONTROL

1. OVERALL STRATEGY FOR QUALITY CONTROL

The design and construction team will continuously review the design, construction, and coordination models for completeness and quality for the intended purpose. If a model is found to be insufficient, the model author will be notified and requested to revise the model accordingly. Documented reviews will be planned for at specific phases of the project. The schedule of these reviews is included in the matrix below.

2. QUALITY CONTROL CHECKS

The following reviews and checks should be performed to assure quality.

CHECKS	DESCRIPTION	RESPONSIBLE PARTY	SOFTWARE PROGRAM(S)	FREQUENCY
VISUAL CHECK	Describe how to ensure there are no unintended model components and the design intent has been followed			
INTERFERENCE CHECK	Describe how you will conduct interference checking where two building components are clashing including soft and hard			
STANDARDS CHECK	Describe how to ensure that the Revit with linked AutoCAD Standards have been followed (levels/layers, colors, etc.)			
MODEL INTEGRITY CHECKS	Describe the QC validation process used to ensure that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements and the reporting process on non-compliant elements and corrective action plans			
REVIT WARNING CHECKS				
REVIT SysQue Library 200-400 EXCHANGE CHECKS	Describe how to ensure that the Revit us of SysQue library with populated USC Shared Parameters is providing effect 200-400 Revit model exchanges.			

SECTION H: TECHNOLOGICAL INFRASTRUCTURE NEEDS

1. SOFTWARE:

List software used to deliver REVIT RECORD MODEL REQUIREMENT. Remove software that is not applicable. Describe procedure for changing the software version during project execution.

REVIT with linked AutoCAD USE	USER	SOFTWARE	VERSION
DESIGN AUTHORING	ARCHITECTURAL	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	STRUCTURAL	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	MECHANICAL	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	ELECTRICAL/TELECOM	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	PLUMBING	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	FIRE PROTECTION	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	CIVIL	XYZ DESIGN APPLICATION	
DESIGN AUTHORING	INTERIOR	XYZ DESIGN APPLICATION	
SCHEDULING (4D)		SCHEDULING (4D) MODELING SOFTWARE	
COST ESTIMATION (5D)		COST ESTIMATION (5D) SOFTWARE	
EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING SOFTWARE	
3D COORDINATION		3D COORDINATION SOFTWARE	
DESIGN REVIEWS		DESIGN REVIEWS SOFTWARE	
STRUCTURAL ANALYSIS		STRUCTURAL ANALYSIS SOFTWARE	
LIGHTING ANALYSIS		LIGHTING ANALYSIS SOFTWARE	
ENERGY ANALYSIS		ENERGY ANALYSIS SOFTWARE	
CODE VALIDATION		CODE VALIDATION	
PROGRAMMING		PROGRAMMING	
SITE ANALYSIS		SITE ANALYSIS	

2. INTERACTIVE WORKSPACE AND COMMUNICATION TECHNOLOGY

The Project Team should consider the physical environment it will need throughout the lifecycle of the project to accommodate the necessary collaboration, communication, and reviews that will improve the Revit Record Model Requirement decision making process. What communication technology (Webex, Gotomeeting, etc.) will be implemented?

SECTION I: MODEL ORGANIZATION

1. FILE NAMING STANDARD:

List examples of file names by discipline.

FILE NAMES FOR MODELS SHOULD BE FORMATTED AS:	
BUILDING ACRONYM _CONSTRUCTION (CON) OR DESIGN PHASE_LEVEL_DISCIPLINE _ ORGANIZATION _DATE (YEAR-MONTH-DAY)	
ARCHITECTURAL MODEL	XYZ _ LXX_ARCH_ ZXY_????-??-??
CIVIL MODEL	XYZ _ LXX_CIV_ ZXY_????-??-??
MECHANICAL (HVAC) MODEL*	XYZ_ LXX_HVAC_ ZXY_????-??-??
MECHANICAL (PIPE) MODEL*	XYZ _ LXX_MECH_ ZXY_????-??-??
PLUMBING MODEL*	XYZ _ LXX_PLBG_ ZXY_????-??-??
FIRE SPRINKLER*	XYZ _ LXX_FIRE_ ZXY_????-??-??
ELECTRICAL MODEL*	XYZ_ LXX_ELEC_ ZXY_????-??-??
STRUCTURAL MODEL (STEEL)*	XYZ _ LXX_STEEL_ ZXY_????-??-??
STRUCTURAL MODEL (CONCRETE)*	XYZ _ LXX_CONC_ ZXY_????-??-??
STRUCTURAL MODEL (REBAR)	XYZ _ LXX_REBAR_ ZXY_????-??-??
COORDINATION MODEL	XYZ _ LXX_COORD _ ZXY_????-??-??
OTHER MODEL	

*file versions are defined by e-Builder folders within which new files automatically append old files
For example: ANN_L01_HVAC_ GFC_2012-03-15

ANN _ ALL_ARCH _ABC_2012-03-15
In this case, the architectural model has not been split up by floor, hence “ALL”

2. MODEL STRUCTURE:

Describe and diagram how the Model will be divided up by each discipline and trade contractor. For example, by building, by floors, by zone, by areas.

3. MEASUREMENT AND COORDINATE SYSTEMS:

Describe the measurement system (Imperial or Metric) and coordinate system (geo-referenced) used.

4. MODEL ACCURACY AND TOLERANCES:

PHASE	DISCIPLINE	TOLERANCE
DESIGN DOCUMENTS	ARCH	ACCURATE TO +/- [#] OF ACTUAL SIZE AND LOCATION
SHOP DRAWINGS	MECH CONTRACTOR	ACCURATE TO +/- [#] OF ACTUAL SIZE AND LOCATION

DEFINED USC TYPE, INSTANCE (COMPONENTS), SYSTEMS AND ZONES NAMING REQUIREMENTS:

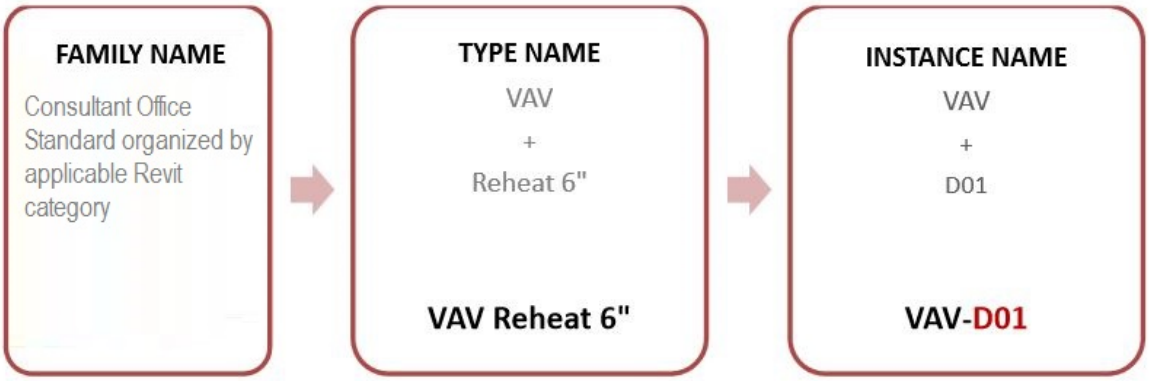
Use provided spreadsheet for element specifying codes to include USC Omniclass Title, USC Omniclass Number, USC Masterformat, USC Uniformat Number, USC Nomenclature NCS for type and instance naming.

Omniclass Table 23 Products are used to digitally code and classify Equipment Families
*for example, 23-27 2111 is the digital code for equipment Axial Flow Compressors

OmniClass Table 21 Elements are used to digitally code and classify Equipment Systems and Zones
*for example, 21-51 31 11 17 is the digital code for equipment system named Domestic Water Distribution

EQUIPMENT TYPE AND INSTANCES (COMPONENTS) NOMENCLATURE[1]
Naming conventions for equipment types should be succinct, useful and descriptive. The names provided should allow for easy identification and be easily understood in order to facilitate the operation, repair and maintenance of USC equipment. USC uses a combination of Industry Standard nomenclature - OmniClass Table 23 Products, the U.S. National CAD Standards (NCS) 3.1 Module 5: Terms and Abbreviations and an Equipment Operation Description to name equipment types and instances as illustrated below. Please follow this guide accordingly:

For example: Variable Air Volume (VAV) Box with ID D01, the Type and Instance Names:



[1] If the abbreviation for a piece of equipment is not listed in the National CAD Standards, use the abbreviation used in your equipment/component schedules instead. For example, a “Fan Powered Box” would be abbreviate as “FPB”. Use abbreviations as universally understood in the industry

Execution of Equipment Type and Instances (Components) Nomenclature Details on how to populate the nomenclature in Autodesk® Revit describing the parameters to use, where to place them, and relevant examples, can be found in the documents entitled "USC Naming Requirements.pptx" and "USC Revit Parameters List.xlsx" in the “Project Documentation” folder in e-Builder.
An Autodesk® Revit shared parameters file is also available in e-Builder to populate
Autodesk® Revit files with the USC required parameters and/or with the creation of Revit families

SECTION J: PROJECT DELIVERABLES

In this section, list the project deliverables and the format in which the information will be delivered.

REVIT RECORD MODEL SUBMITTAL ITEM	STAGE/PROJECT MILESTONE	FORMAT	APPROXIMATE DUE DATE	RESPONSIBLE PARTY
PRxP	PRECON	.DOC		
Design Coordination Report	100%DD 50%CD 100%CD	.XLS		
Construction Coordination Report	CONSTRUCTION (ONGOING)	.XLS		
Progress Design Models	DESIGN & CONSTRUCTION	.RVT		
100%CD DESIGN MODEL CORE & SHELL	DESIGN	.RVT		
100%CD DESIGN MODEL INTERIORS	DESIGN	.RVT		
USC SHARED PARAMETERS & VALUES	DESIGN & DESIGN ASSIST	.RVT		
USC SHARED PARAMETERS & VALUES	DESIGN BULLETINS & CONSTRUCTION	.RVT		
AS-BUILT MODELS	COMPLETION	.RVT .DWG NATIVE FORMAT		
RECORD MODELS	COMPLETION	.RVT		

RECORD DATA COLLECTION: USC SHARED PARAMETERS
Architect, Engineers, & Contractor will work with USC to obtain needed USC Shared Parameter and Values to complete USC's Record Revit Model Requirement.

USC MASTER ATTRIBUTES Spreadsheet (object attributes)

		REVIT PARAMETER NAME	DESCRIPTION	FORMAT/EXAMPLE	INSTANCE	REVIT GROUP	SELECTED REVIT CATEGORIES
USC MASTER ATTRIBUTES (object attributes)	1	USCDesignManufacturer	Corresponding product's Manufacturer's Name represented by Design Team	Trane	Instance	Identity Data	Major Equipment & Element Categories *
	2	USCDesignModelName	Corresponding product's Model Name represented by Design Team	Office	Instance	Identity Data	Major Equipment & Element Categories *
	3	USCDesignModelNumber	Corresponding product's Model Number represented by Design Team	104B	Instance	Identity Data	Major Equipment & Element Categories *
	4	USCEMSId	Unique EMS I.D. assigned by Revit as element unique identifier ID	1055569	Instance	Identity Data	Major Equipment Categories * & Rooms
	5	USCFMSBarcode	Unique FMS I.D. auto-generated by FAMIS - Obtain I.D. from USC	39048509	Instance	Identity Data	Major Equipment & Element Categories *
	6	USCGUID	Unique G.U.I.D. assigned by Revit as globally unique identifier ID	4328975120123708	Instance	Identity Data	Major Equipment & Element Categories *
	7	USCHWLId	Unique Honeywell I.D. auto-generated by Honeywell - Obtain I.D. from USC	34099584	Instance	Identity Data	Major Equipment & Element Categories *
	8	USCInstallContractor	Corresponding product's contracted or subcontracted provider	CSLB-C20/Name	Instance	Identity Data	Major Equipment & Element Categories *
	9	USCInstallManufacturer	Corresponding product's Manufacturer's name installed by Contractor	Trane	Instance	Identity Data	Major Equipment & Element Categories *
	10	USCInstallModelName	Corresponding product's Model Name installed by Contractor	HE Terminal AHU	Instance	Identity Data	Major Equipment & Element Categories *
	11	USCInstallModelNumber	Corresponding product's Model Number installed by Contractor	UNIT_SLB030	Instance	Identity Data	Major Equipment & Element Categories *
	12	USCInstallPartName	Discrete product's Part Name, representing one Part of a Model assembly	MOT10999	Instance	Identity Data	Major Equipment & Element Categories *
	13	USCInstallPartNumber	Discrete product's Part Number, representing one Part of a Model assembly	SLB030 Fan Motor	Instance	Identity Data	Major Equipment & Element Categories *
	14	USCInstallWarrantyDescription	Corresponding product's Warranty Description, Including PDF Documentation Name	Whole Unit Ax_HiPro.pdf	Instance	Identity Data	Major Equipment & Element Categories *
	15	USCInstallWarrantyDuration	Corresponding product's Warranty Duration, Including Warranty Period Start & End	2 yr 10/21/15-10/21/17	Instance	Identity Data	Major Equipment & Element Categories *
	16	USCMasterFormatNumber	Corresponding product's MasterFormat number	25.13.00	Type	Identity Data	Major Equipment & Element Categories *
	17	USCOmniclassNumber	Corresponding OmniClass number from Table 23	23.33.33.11.00	Type	Identity Data	Major Equipment & Element Categories *
	18	USCOmniclassTitle	Corresponding OmniClass description to the OmniClass number from Table 23	Fan Coil Units	Type	Identity Data	Major Equipment & Element Categories *
	19	USCSerialNumber	Unique SerialNumber obtained from Device, Fixture, or Equipment	21340000	Instance	Identity Data	Major Equipment & Element Categories *
	20	USCTagNumber	Corresponding product's FMS tag number	21	Instance	Identity Data	Major Equipment & Element Categories *
	21	USCUniformatNumber	Corresponding product's UniFormat number	D3060	Type	Identity Data	Major Equipment & Element Categories *

USC MASTER ATTRIBUTES (object attributes):

1. **USCDesignManufacturer** – Corresponding product's Manufacturer's Name represented by Design Team
2. **USCDesignModelName** – Corresponding product's Model Name represented by Design Team
3. **USCDesignModelNumber** – Corresponding product's Model Name represented by Design Team
4. **USCEMSId** – Unique EMS I.D. assigned by Revit as element unique identifier ID
5. **USCFMSBarcode** – Unique FMS Barcode auto-generated by FAMIS - Obtain FAMIS Barcode from USC
6. **USCGUID** – Unique G.U.I.D. assigned by Revit as globally unique identifier ID

Architects – Initial _____
General Contractor – Initial _____
USC – Initial _____

7. **USCHWLId** – Unique FMS I.D. auto-generated by Honeywell - Obtain I.D. from USC
8. **USCInstallContractor** – Corresponding product's contracted or subcontracted provider
9. **USCInstallManufacturer** – Corresponding product's Manufacturer's name installed by Contractor
10. **USCInstallModelName** – Corresponding product's Manufacturer's name installed by Contractor
11. **USCInstallModelNumber** – Corresponding product's Manufacturer's name installed by Contractor
12. **USCInstallPartName** – Discrete product's Part Name, representing one Part of a Model assembly
13. **USCInstallPartNumber** – Discrete product's Part Number, representing one Part of a Model assembly
14. **USCInstallWarrantyDescription** – Corresponding product's Warranty Description, Incl. PDF doc name
15. **USCInstallWarrantyDuration** – Corresponding product's Warranty Duration, Incl. Period Start & End
16. **USCMasterFormatNumber** – Corresponding product's MasterFormat number, see USC provided table
17. **USCOmniClassNumber** – Corresponding OmniClass number, see USC provided table
18. **USCOmniClassTitle** – Corresponding OmniClass description, see USC provided table
19. **USCSerialNumber** – Unique SerialNumber obtained from Device, Fixture, or Equipment
20. **USTagNumber** – Corresponding product's FMS tag number
21. **USCUniFormatNumber** – Corresponding product's UniFormat number, see USC provided table

USC MASTER ATTRIBUTES Spreadsheet (project attributes)

		REVIT PARAMETER NAME	DESCRIPTION	FORMAT/EXAMPLE	INSTANCE	REVIT GROUP	SELECTED REVIT CATEGORIES
USC MASTER ATTRIBUTES (project attributes)	22	USCSiteCode	USC Site Code Designation - Obtain official code from USC e-Builder details tab	UPC1	Instance	Identity Data	Project Information
	23	USCBuildingNumber	USC Building Number Designation - Obtain official number from USC e-Builder details tab	10	Instance	Identity Data	Project Information
	24	USCFloorNumber	USC Floor Number Designation	N/A , or 1, 2, 3, M, B	Instance	Identity Data	Rooms, Spaces
	25	USCRoomName	USC Room Name Designation	Office	Instance	Identity Data	Rooms, Spaces
	26	USCRoomNumber	USC Room Number Designation	104B	Instance	Identity Data	Rooms, Spaces

USC MASTER ATTRIBUTES (project attributes):

22. **USCSiteCode** – USC Site Code Designation - Obtain official code from USC e-Builder details tab
23. **USCBuildingNumber** – USC Building Number Designation - Obtain official # from USC e-Builder details tab
24. **USCFloorNumber** – USC Floor Number Designation
25. **USCRoorName** – USC Room Name Designation
26. **USCRoomNumber** – USC Room Number Designation

USC NOMENCLATURE Spreadsheets

		REVIT PARAMETER NAME	DESCRIPTION	FORMAT/EXAMPLE	INSTANCE	REVIT GROUP	SELECTED REVIT CATEGORIES
USC NOMENCLATURE	27	USCInstanceDescription	Instance Descriptions according to Exhibit 5: USC Nomenclature Guidelines	VAV Reheat 6" D01	Instance	Identity Data	Major Equipment & Element Categories *
	28	USCInstanceName	Instance Names according to Exhibit 5: USC Nomenclature Guidelines	VAV-D01	Instance	Identity Data	Major Equipment & Element Categories *
	29	USCTypeDescription	Type Descriptions according to Exhibit 5: USC Nomenclature Guidelines	SDV 6"	Type	Identity Data	Major Equipment & Element Categories *
	30	USCTypeName	Type Names according to the Exhibit 5: USC Nomenclature Guidelines	VAV Reheat 6"	Type	Identity Data	Major Equipment & Element Categories *

USC NOMENCLATURE:

27. **USCInstanceDescription** – Instance Descriptions according to USC's PRxP Section I: Model Organization.
28. **USCInstanceName** – Instance Names according to USC's PRxP Section I: Model Organization.
29. **USCTypeDescription** – Type Descriptions according to USC's PRxP Section I: Model Organization.
30. **USCTypeName** – Type Names according to USC's PRxP Section I: Model Organization.

USC MASTER ATTRIBUTES (only Revit Mechanical Equipment Category)

		REVIT PARAMETER NAME	DESCRIPTION	FORMAT/EXAMPLE	INSTANCE	REVIT GROUP	SELECTED REVIT CATEGORIES
USC HVAC ATTRIBUTES	31	USC.Design.Return.CFM	Corresponding HVAC Equipment's Design Team selected Return Air CFM	6600	Instance	Identity Data	Mechanical Equipment Category
	32	USC.Design.Supply.CFM	Corresponding HVAC Equipment's Design Team selected Supply Air CFM	7500	Instance	Identity Data	Mechanical Equipment Category
	33	USC.Design.System	Corresponding HVAC Equipment's Design Team selected HVAC System	AHU 1	Instance	Identity Data	Mechanical Equipment Category
	34	USC.Design.Zone	Corresponding HVAC Equipment's Design Team selected HVAC Zone	23	Instance	Identity Data	Mechanical Equipment Category
	35	USC.Install.Belts.Quantity	Corresponding HVAC Equipment's Design Team selected Quantity of Belts	2 (AX) 2 (BX)	Instance	Identity Data	Mechanical Equipment Category
	36	USC.Install.Belts.Types	Corresponding HVAC Equipment's Design Team selected Type of Belts	AX150 BX150	Instance	Identity Data	Mechanical Equipment Category
	37	USC.Install.Filters.Quantity	Corresponding HVAC Equipment's Design Team selected Quantity of Filters	2	Instance	Identity Data	Mechanical Equipment Category
	38	USC.Install.Filters.Size	Corresponding HVAC Equipment's Design Team selected Size of Filters	nom. 20x20x20	Instance	Identity Data	Mechanical Equipment Category
	39	USC.Install.Filters.Types	Corresponding HVAC Equipment's Design Team selected Type of Filters	act. 19.5x19.5x1.75	Instance	Identity Data	Mechanical Equipment Category
	40	USC.Install.ReturnFan.HorsePower	Corresponding HVAC Equipment's Design Team selected Return Fan Horsepower	3	Instance	Identity Data	Mechanical Equipment Category
	41	USC.Install.ReturnFan.ModelNumber	Corresponding HVAC Equipment's Design Team selected Return Fan Model Number	MOT10999	Instance	Identity Data	Mechanical Equipment Category
	42	USC.Install.SupplyFan.HorsePower	Corresponding HVAC Equipment's Design Team selected Supply Fan Horsepower	10	Instance	Identity Data	Mechanical Equipment Category
	43	USC.Install.SupplyFan.ModelNumber	Corresponding HVAC Equipment's Design Team selected Supply Fan Model Number	MOT10999	Instance	Identity Data	Mechanical Equipment Category
	44	USC.Install.VSD.HorsePower	Corresponding HVAC Equipment's Design Team selected VSD Horsepower	3	Instance	Identity Data	Mechanical Equipment Category
	45	USC.Install.VSD.ModelNumber	Corresponding HVAC Equipment's Design Team selected VSD Model Number	W7759a2005	Instance	Identity Data	Mechanical Equipment Category

USC MASTER ATTRIBUTES (only Revit Mechanical Equipment Category):

31. **USC.Design.Return.CFM** – Corresponding HVAC Equipment's selected Return Air CFM
32. **USC.Design.Supply.CFM** – Corresponding HVAC Equipment's selected Supply Air CFM
33. **USC.Design.System** – Corresponding HVAC Equipment's selected HVAC System

34. **USC.Design.Zone** – Corresponding HVAC Equipment's selected HVAC Zone
35. **USC.Install.Belts.Quantity** – Corresponding HVAC Equipment's selected Quantity of Belts
36. **USC.Install.Belts.Types** – Corresponding HVAC Equipment's selected Type of Belts
37. **USC.Install.Filters.Quantity** - Corresponding HVAC Equipment's selected Quantity of Filters
38. **USC.Install.Filters.Size** – Corresponding HVAC Equipment's selected Size of Filters
39. **USC.Install.Filters.Types** – Corresponding HVAC Equipment's selected Type of Filters
40. **USC.Install.ReturnFan.HorsePower** – Corresponding HVAC Equipment's selected Return Fan Horsepower
41. **USC.Install.ReturnFan.ModelNumber** – Corresponding HVAC Equipment's selected Return Fan Model #
42. **USC.Install.SupplyFan.HorsePower** – Corresponding HVAC Equipment's selected Supply Fan Horsepower
43. **USC.Install.SupplyFan.ModelNumber** – Corresponding HVAC Equipment's selected Supply Fan Model #
44. **USC.Install.VSD.HorsePower** – Corresponding HVAC Equipment's selected VSD/VFD Horsepower
45. **USC.Install.VSD.ModelNumber** – Corresponding HVAC Equipment's selected VSD/VFD Model Number

USC SHARED PARAMETER TXT FILE (SEE: ATTACHMENT)

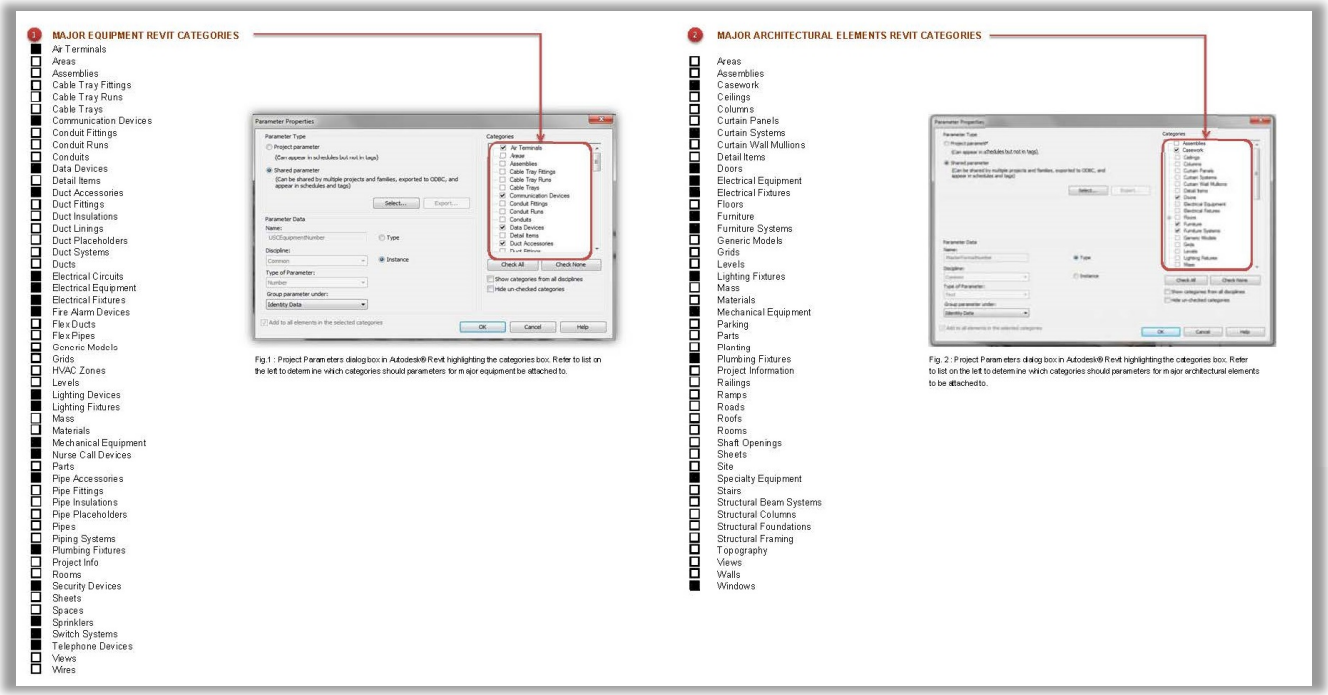
USC to provide Architect with Revit shared parameter list and file. Design team to incorporate shared parameter list into respective Revit models.

Design team to provide and populate the following shared parameters as indicated below. Parameters are to be added from the USC provided shared parameter file for the Revit categories. See image below.

Reports are run throughout project to verify USC Shared Parameters are assigned to appropriate categories and contain data.

Elements provide in both architect and MEP models will be populated with USC Share Parameters in both models. . For MEP the USC SysQue Revit library may be used to assist with USC Shared Parameters.

USC SHARED PARAMETERS CATEGORIES (SEE: ATTACHMENT)



SECTION K: MINIMUM MODELING MATRIX (M3)

The USACE M3 Minimum Modeling Matrix, in spreadsheet format, is a tool that shall be used by the entire project team for non-Revit files to document and communicate the scope of modeled content of CADD files within the Revit with linked AutoCAD deliverables, and help the project team organize the content by using common classification systems such as Omniclass, Uniformat and Masterformat of CADD files. Additional instructions are provided in the M3.

The Minimum Modeling Matrix (M3) can be found on the USC FMS Website.

SECTION L: ATTACHMENTS

Either insert the relevant information pertaining to the following within the applicable section of this document, or attach all documentation in this section:

1. **LEVEL 1 PROCESS OVERVIEW MAP** [SECTION E]
2. **LEVEL 2 DETAILED Revit with linked AutoCAD USE PROCESS MAP(S)** [SECTION E]
3. **INFORMATION EXCHANGE REQUIREMENT WORKSHEET(S) – COBie** [SECTION J]
4. **MINIMUM MODELING MATRIX (M3)** [SECTION K]
5. **FILE NAMING STANDARD** [SECTION I]
6. **OTHER** [AS APPLICABLE]

SECTION M: EXECUTION PLAN SIGNATURE PAGE

By signing this form, the signatory certifies that he/she will follow the processes described in this Revit with linked AutoCAD Execution Plan and provide all of the USC deliverables as scheduled.

DESIGN COMPANY	PRINT NAME	SIGNATURE	DATE

INSTALLATION COMPANY	PRINT NAME	SIGNATURE	DATE