USACE

USACE\CAD-BIM Technology Center

US Army Corps
of Engineers®
Engineer Research and
Development Center

Guide Documentation

US Army Corps of Engineers Building Information Modeling Template for Revit

Template based on the 2012 Autodesk Revit Software

Structural Template v1.1	June 2012

Author: Kevin J. Russ, USACE Sacramento District, Structural Template Lead
Co-Authors: David Johnson, ERDC, CAD/BIM Tech Center, Hai Le, USACE Mobile District
Special Thanks to contributions made by: Mobile, Sacramento, Seattle, Fort-Worth, Omaha, Norfolk, Baltimore Districts and Autodesk Consulting Services.

Contents

Overview

The Revit structural template is used as a basis to begin a design in Revit Structure and is to provide a framework to facilitate a structural engineer and technician to develop their design and documentation for the US Army Corps of Engineers. This template was developed based on Revit Structure 2012.

This guide is NOT intend to be a Revit tutorial, but rather assumes that the user has a sufficient level of proficiency to comprehend the template descriptions outlined in this guide.

Browser and View Organization

The default browser setting in the template is 'USACE View Purpose' and is organized by View Purpose, Family and Type, and sorted by associated level.

There are no predefined sub-disciplines in the structural template.

Pre-defined view purposes within the structural template are COORD (coordination views), WORK (working views), DOC (documentation), and Analytical (Anl). Please note there is also: Z-Detail Component Palette. Please refer to appendix for information on palette. View purpose is defined as a project parameter and the uppercase abbreviation is also appended to the end of the view names to facilitate user recognition of the views.

List of Browser Organization Types:

Browser View Type	Grouping	Filter
USACE View Purpose	Group by: View Purpose, Using All Characters Then by: Family and Type Then by: None Sort by: Associated Level, Ascending	<None>
Discipline_USACE	Group by: Discipline, Using All Characters Then by: Family and Type Then by: None Sort by: View Name, Ascending	<None>
Not on Sheets_USACE	Group by: Family and Type Then by: <None> Then by: <None> Sort by: View Name, Ascending	Filter by: Sheet Name = <None> And: View Purpose = Documentation

View Types:

To separate the purposes of the views and to make creating the sheets simpler, separate view purposes have been created for Working Views (where the main modeling is done), Documentation Views (the views are specifically added to sheets for official model documents), Presentation Views (for required or accessory presentation views) and Coordination Views (used to coordinate model in the structural and other linked disciplines).

View Naming

Naming of views is to follow the standard set in the template and is divided into categories by: Floor Level_View Type_Region (use all if building 'NOT' divided) _Function (depends on view purpose) _View Purpose

Architectural Example A: 02_Floor Plan_East_Dimensions_Doc

Structural Example B: 00_North and South Elevations_All_Framing_Work

Mechanical Example C: 03_Mechanical Plan_West_HW Piping_Coor

Working Views

These views are intended to be used for laying out all structural components and structural modeling elements in the structural discipline.

List of Working Views in Template:

Structural Plans:

Name of View	Hidden Structural Categories	Reason for View
00_Foundation Plan_All_WORK	Parts Mass	The view is intended to be the location where you would begin modeling your foundation elements (footings, slabs, foundation walls, etc)
01_Framing Plan_All_WORK	Parts Mass	This view is intended to be the location where you would model any structural framing elements on level 1.

02_Framing Plan_All_Work	Parts Mass	This view is intended to be the location where you would model any structural framing elements on level 2. If structure is only 1 story then view may be deleted or renamed to Roof Framing. The structural template was designed with 3 levels as a default.
03_Roof Framing Plan_All_Work	Parts Mass	This view is intended to be the location where you would model any structural roof elements such as rafter, joists, trusses, etc. The structural template was designed with 3 levels as a default.

Elevations (Framing Elevation):

Name of View	Hidden Structural Categories	Reason for View
EAST_WORK	Parts	This view is intended to be the location where you would view your model from an East Framing elevation perspective. Modeling can be done in this view (ex. Cross brace framing and connection components).
NORTH_WORK	Parts	This view is intended to be the location where you would view your model from a North Framing elevation perspective. Modeling can be done in this view (ex. Cross brace framing and connection components).
SOUTH_WORK	Parts	This view is intended to be the location where you would view your model from South Framing elevation perspective. Modeling can be done in this view (ex. Cross brace framing and connection components).
WEST_WORK	Parts	This view is intended to be the location where you would view your model from a West Framing elevation perspective. Modeling can be done in this view (ex. Cross brace framing and connection components).

Coordination Views

These views are intended to be used for interference checks and design collaboration between your own structural discipline and other types of disciplines. The collaboration purpose is also to be used for temporary storage area for quickly created plans, sections, and elevations for visual reference inside own discipline and linked Revit models. Modeling is to take place in the views associated to the working view purpose.

List of Coordination Views in Template:

3d Views:

Name of View	Hidden Structural Categories	Reason for View
3D - Structural and Architectural_COORD	Parts	This view is intended to be a view only showing the models from Structural and Architectural. After linking of all Revit model files then visibility of models will be turned off except the Architectural model in Revit links.
3D - Structural and MEP_COORD	Parts	This view is intended to be a view only showing the models from Structural and MEP. After linking of all Revit model files then visibility of models will be turned off except the MEP model in Revit links.
3D - Structural Only_COORD	Parts	All view links to be turned off and the model visible is Structural.
3D - Structural, Architectural, and MEP_COORD	Parts	This view is intended to be view showing all major disciplines, Structural, Architectural, and MEP.
3D - Working	Parts	This view is to be used for coordinating will all models across disciplines and is the main view where categories will be hidden and visibility turned on/ off for 3D collaboration.

Documentation Views

These views are intended to be placed on sheets. Depending on workflow in many, if not, most cases; structural tags, notes, etc. are done directly in the documentation views, while the modeling is done in the working view purpose. Appropriate visibility and/or filter settings are applied to display only relevant categories and objects.

List of Documentation Views in Template

Structural Plans:

Name of View	Hidden Structural Categories	Reason for View
00_Foundation Plan_ALL_DOC	Mass Parts	The view is intended to be the location where you would begin documenting your model for construction purposes (notes, tags, keynoting, etc). This view would be added to the appropriate sheet.

01_Framing Plan_ALL_DOC	Mass Parts	The view is intended to be the location where you would begin documenting your model for construction purposes (notes, tags, keynoting, etc). This view would be added to the appropriate sheet.
02_Framing Plan_ALL_DOC	Mass Parts	The view is intended to be the location where you would begin documenting your model for construction purposes (notes, tags, keynoting, etc). This view would be added to the appropriate sheet.
03_Framing Plan_ALL_DOC	Mass Parts	The view is intended to be the location where you would begin documenting your model for construction purposes (notes, tags, keynoting, etc). This view would be added to the appropriate sheet.

Elevations (Framing Elevation):

Name of View	Hidden Structural Categories	Reason for View
EAST_DOC	Parts	This view is intended to be the location where you would view your model from an East Framing elevation perspective. This view is specifically for documenting with tags, notes, legends, etc which will be added to a sheet.
NORTH_DOC	Parts	This view is intended to be the location where you would view your model from a North Framing elevation perspective. This view is specifically for documenting with tags, notes, legends, etc which will be added to a sheet.
SOUTH_DOC	Parts	This view is intended to be the location where you would view your model from a South Framing elevation perspective. This view is specifically for documenting with tags, notes, legends, etc which will be added to a sheet.

WEST_DOC	Parts	This view is intended to be the location where you would view your model from a West Framing elevation perspective. This view is specifically for documenting with tags, notes, legends, etc which will be added to a sheet.

Drafting Views (Detail):

Additional Views can be created for new details of the model.

Name of View	Hidden Structural Categories	Reason for View
TYPICAL CONNECTION DETAILS	NA	This view is intended strictly for 2d drafting views only
TYPICAL FOUNDATION DETAILS	NA	This view is intended strictly for 2d drafting views only
TYPICAL FRAMING DETAILS	NA	This view is intended strictly for 2d drafting views only

Analytical Views

The analytical views are used to demonstrate the analytical model and are depicted differently in these views by the visibility overrides of the elements being modeled. The depiction of these colors can be seen in the object styles for analytical model objects. The lateral and horizontal loads are depicted in orange, while the blue depicts vertical loads. Different structural load cases and their associated weights and colors are also listed in the image below.

Engineering the model for structural integrity can be performed natively in Revit or can be exported out to the compatible structural package (Ram, Staad, Risa, Robot, etc)

List of Analytical Views in Template:

Plan views:

Name of View	Hidden Structural Categories	Reason for View
01_LoadDiagram_All_ANL	Columns, Detail Items, Mass, Parts, Ramps, Raster Images, Roofs, Stairs, Structural framing subcategories.	To display a plan view that displays the analytical model of level and to place load combinations on the model.
02_LoadDiagram_ALL_ANL	Columns, Detail Items, Mass, Parts, Ramps, Raster Images, Roofs, Stairs, Structural framing subcategories.	To display a plan view that displays the analytical model of level and to place load combinations on the model.
03_RoofLoadDiagram_All_ ANL	Columns, Detail Items, Mass, Parts, Ramps, Raster Images, Roofs, Stairs, Structural framing subcategories.	To display a plan view that displays the analytical model of the roof and to place load combinations on the model.

3d views:

Name of View	Hidden Structural Categories	Reason for View
Dead Loads Visible	Columns, Detail Items, Mass, Parts, Ramps, Raster Images, Roofs, Stairs, Structural framing subcategories.	To display a 3d view that displays the analytical model with dead load combinations visible.
Live Loads Visible	Columns, Detail Items, Mass, Parts, Ramps, Raster Images, Roofs, Stairs, Structural framing subcategories.	To display a 3d view that displays the analytical model with live load combinations visible.
Loads NOT Visible	Columns, Detail Items, Mass, Parts, Ramps, Raster Images, Roofs, Stairs, Structural framing subcategories.	To display a 3d view that displays the analytical model with no load combinations visible.
Snow Loads Visible	Columns, Detail Items, Mass, Parts, Ramps, Raster Images, Roofs, Stairs, Structural framing subcategories.	To display a 3d view that displays the analytical model with snow load combinations visible.
Wind Loads Visible	Columns, Detail Items, Mass, Parts, Ramps, Raster Images, Roofs, Stairs, Structural framing subcategories.	To display a 3d view that displays the analytical model with wind load combinations visible.

Further structural settings have been included in the template and can be accessed under the analyze tab:
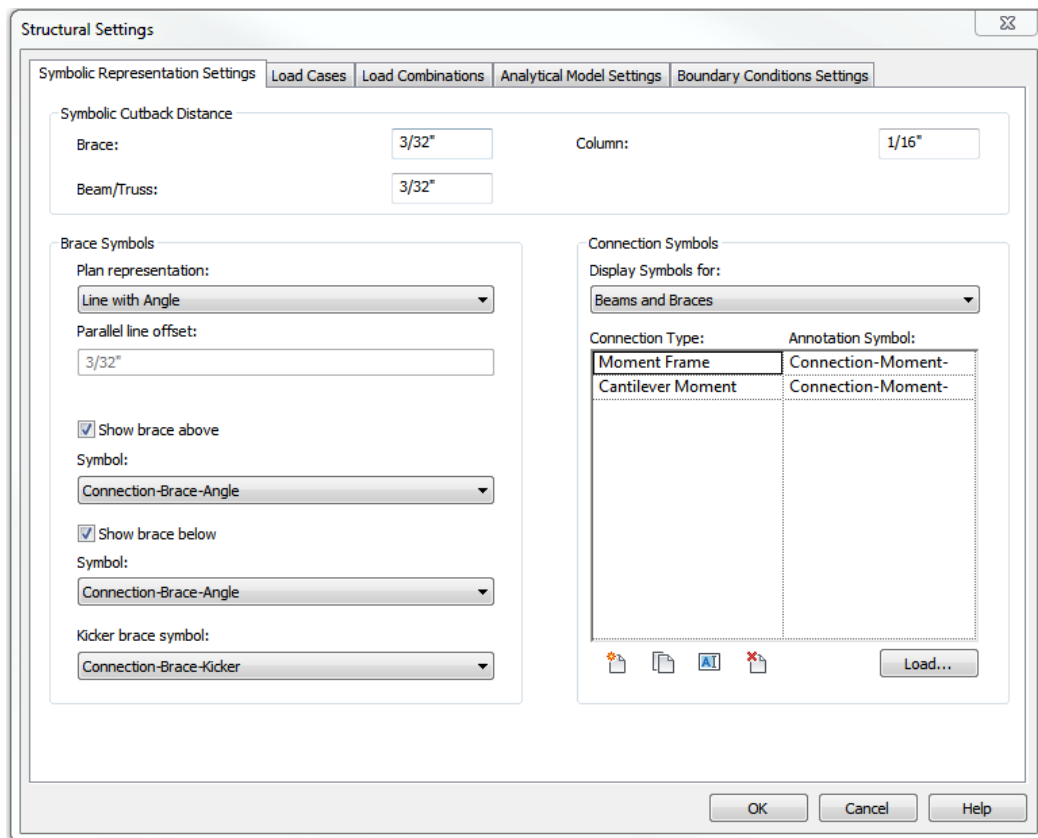
View Template Settings

Typical View templates have been created to allow a consistent modeling visibility environment for certain types of views. These templates allow to control view scales, phase filters, visibility, view purposes, analytical and import overrides, model display, and view ranges.

View Type Classification	View Type Name	Purpose
Elevations	USACE Coordination – Elevation	This template is used for the coordination of an elevation with another linked model
Plans	USACE Documentation – Foundation	This template is used for the documentation views for the Foundation plan
Plans	USACE Documentation – Framing	This template is used for the framing plans on documentation framing views
Analytical Views	USACE Structural Analytical Normal	This template can be applied to view only the analytical stick view of model.
Analytical Views	USACE Structural Analytical Stick	This template can be applied to view only the analytical stick view of model
Elevations	USACE Structural Building Elevation	This template can be applied for a structural building elevation view
Plan	USACE Structural Foundation Plan	This template can be applied to a working foundation view
Elevations	USACE Structural Framing Elevation	This template can be applied to a working framing elevation.
Plan	USACE Structural Framing Plan	This template can be applied for a working framing plan
Sections	USACE Structural Sections	This template can be applied for a working section view

Legends

The "Legends" View section contains legends that will need to be changed based on the specific project type and requirements. The "*ABBREVIATIONS*" legend uses a sample set of abbreviations that are derived from the National CAD Standards/Uniform Design System 5.0 list. The "*Legend, Building Summary and General Notes*" sections will need to be changed for the specific design and project requirements. The "*KEY PLAN*" legend contains the building outline legend view that can be applied to multiple sheets.

Annotation/Dimensions

USACE fonts have been added that are based upon the National CAD Standards 5.0. For dimensions there are two types of dimensions that are set up: one contains arrows and the other contains slashes, both of which are acceptable in the National CAD Standards. There may be additional standards required by the owner or organization that is responsible for review of documentation. These shall be followed in lieu of these standards.

Structural Schedules

As seen in the template there are many structural schedules that can be used, but that doesn't mean they will all be used. Many might not be needed and whether it will be needed depends on the project and type of design.

If it's determined that a schedule will not be needed, then it may be deleted to help eliminate unneeded schedules in the browser. Any schedule name that is capitalized indicates it's a document schedule and is to be added to a sheet. Any working schedules preceded with a 'Z' indicates it's a working schedule and never to be added to a sheet.

Below is a list of Document schedules in the template:

Schedule	Fields	Heading	Filter Rules
COLUMN SCHEDULE	Family and Type Assembly Description Level Offset Elevation at Bottom Type Width Length Thickness Reinforcing A Bar Qty Reinforcing A Bar Size Reinforcing B Bar Qty Reinforcing B Bar Size Type Comments Volume Reinforcing Quantity	Mark Dimensions –Width, Length, Depth Reinforcing- A Bars(Qty and Size) B Bars(Qty and Size) Remarks	Assembly Description-Equals(Spread Footings)
CONCRETE BEAM SCHEDULE	Family and Type Assembly Description Reference Level	MARK DIMENSIONS-Width, Depth REINFORCING	Assembly Description = BEAMS CIP

	Z-Direction Offset Value Start Level Offset Type Concrete Beam Width Concrete Beam Depth Reinforcing A Bar Qty Reinforcing A Bar Size Reinforcing B Bar Qty Reinforcing B Bar Size Reinforcing C Bar Qty Reinforcing C Bar Size Reinforcing D Bar Qty Reinforcing D Bar Size Reinforcing E Bar Qty Reinforcing E Bar Size Reinforcing Stirrup Size Reinforcing Stirrup Spacing Reinforcing Type Type Comments Length Volume Longitudinal Qt PLF Quantity Longitudinal Stirrup Qty EACH Quantity Stirrups	A – BARS-Qty, Size B – BARS-Qty, Size C – BARS-Qty, Size D – BARS-Qty, Size E– BARS-Qty, Size Stirrups-Size, Spacing, Type REMARKS	
DRILLED PIER SCHEDULE	Family Assembly Description Type Shaft Diameter Bell Diameter Bell Height Longitudinal Qty Longitudinal Size Transverse Size Transverse Spacing Volume Offset Shaft Length Elevation at Bottom	MARK DIMENSIONS-Shaft Diameter, Bell Diameter BELL HEIGHT REINFORCING-Longitudinal Qty Longitudinal Size Ties-Size, Spacing	Assembly Description = Caissons
FLOOR FRAMING PLAN NOTES	Note Number Description Usage	NUMBER DESCRIPTION	USAGE = Framing Floor
FOUNDATION PLAN NOTES	Note Number Description Usage	NUMBER DESCRIPTION	USAGE = Foundation
GRADE BEAM SCHEDULE	Family and Type Assembly Description Reference Level Z-Direction Offset Value Start Level Offset Type Concrete Beam Width	MARK DIMENSIONS-Width, Depth REINFORCING A – BARS-Qty, Size B – BARS-Qty, Size C – BARS-Qty, Size D – BARS-Qty, Size	Assembly Description = Grade Beams - CIP

	Concrete Beam Depth Reinforcing A Bar Qty Reinforcing A Bar Size Reinforcing B Bar Qty Reinforcing B Bar Size Reinforcing C Bar Qty Reinforcing C Bar Size Reinforcing D Bar Qty Reinforcing D Bar Size Reinforcing E Bar Qty Reinforcing E Bar Size Reinforcing Stirrup Size Reinforcing Stirrup Spacing Reinforcing Type Type Comments Length Volume Longitudinal Qt PLF Quantity Longitudinal Stirrup Qty EACH Quantity Stirrups	E– BARS-Qty, Size Stirrups-Size, Spacing, Type REMARKS	
INDEX OF DRAWINGS-Structural	Sheet Number Sheet Name Sheet Issue Date Drawn By Designed By Checked By Approved By	SHEET NUMBER SHEET NAME	

PILE CAP SCHEDULE	Family
	Assembly Description
	Level
	Offset
	Type
	Thickness
	Reinforcing A Bar Qty
	Reinforcing A Bar Size
	Reinforcing B Bar Qty
	Reinforcing B Bar Size
	Pile Type
	Pile Length
	Pile Capacity Compression
	Pile Capacity Tension
	Pile Capacity Lateral
	Count
	Number of Piles
	Volume
	Reinforcing Quantity
		MARK
		DEPTH
		REINFORCING – A BARS – QTY, SIZE
		                   B BARS – QTY, SIZE
		PILE PROPERTIES – TYPE
		                LENGTH
		                CAPACITY-
		COMPRESSION, TENSION, LATERAL
			Assembly Description = Pile Caps

RECTANGULAR CONCRETE COLUMN SCHEDULE	Family Assembly Description Base Level Base Offset Top Level	MARK DIMENSIONS – WIDTH, DEPTH REINFORCING – LONGITUDINAL, QTY, SIZE TIES, SIZE, SPACING REMARKS	Assembly Description = Columns - CIP

	Top Offset Type Concrete Column Width Concrete Column Depth Longitudinal Qty Longitudinal Size Stirrup Qty EACH Quantity Ties		
REVIEW COMMENTS	Comment Number Reviewer Date Comment Status	Comment Number Reviewer Date Comment Status	
ROUND CONCRETE COLUMN SCHEDULE	Usage Family Assembly Description Base Level Base Offset Top Level Top Offset Type Concrete Column Diameter Longitudinal Qty Longitudinal Size Reinforcing Tie Size Reinforcing Tie Spacing Type Comments Length Volume Longitudinal Qty PLF	MARK DIAMETER REINFORCING-LONGITIDUANAL, QTY,SIZE TIES, QTY, SIZE REMARKS	Assembly Description = Columns - CIP
WALL FOOTING SCHEDULE	Family Assembly Description Description Structural Usage Type Width Foundation Thickness Longitudinal Qty Longitudinal Size Transverse Size Transverse Spacing Comments Elevation at bottom Volume	MARK DIMENSIONS – WIDTH, DEPTH REINFORCING – LONGITUDINAL,QTY,SIZE TRANSVERSE, SIZE,SPACE NOTES	Assembly Description = Strip Footings And Description does not = Stepped Footing And Structural Usage does not = Retaining

Sheets

A sheet labeled "0 – USACE Revit Starting View' has been created as the initial opening sheet for the project. The sheet contains general project information and is linked to the Project Information Attributes (accessed under the "Manage" tab, "Project Information" icon). Additional user instructions may be contained on this sheet.

Additional sheets have been created as a guide to facilitate the documentation of model and follow the typical sheet set that follows NCS and AEC CAD standards. Use of this sheet set may necessitate modification because of varying model conditions or as required by contract requirements.

There are sheet attributes that can be used for making a custom sheet order to manually control the order of sheets to be exported. There is also a checkbox for the sheet attribute "Appears in Sheet List" that can control whether the sheet appears in a sheet schedule (this is a default Revit parameter).

There are also project and sheet parameters to allow a printed AEC Sheet Name to appear on the left hand side of the sheet (outside of the Border). See image below.

References:

The location for download of the templates is: https://cadbim.usace.army.mil/BIM. Links to documentation, Q&A and a review form is also available on this site.

Please direct questions or comments about the Structural Templates to : David M. Johnson and Kevin Russ.

Appendix A: USACE Structural Families

Additional Structural families have been included in the USACE Structural Template V1. These families were created in conjunction with structural designers, technicians, and 3rd party consultants. The below list is intended to be a guide to determine what additional families have been loaded in the template separate of what is included by Autodesk OTB(Out of the box) structural families and a brief description of the family. Any families that have been modified or created as new includes: '_USACE' at the end of the family name.

Below is a list of USACE Structural Families:

Name of Family	Description
Anchor Bolts-Side w-Nut and Thread Only_USACE	Parametric 2d family for detailing anchor bolts and nuts. Parameters Include Washer Height, Bolt Length, Head Height, Head Width, Diameter, and Embedment.
Concrete Grade Beam_USACE	Parametric 3d family for concrete grade beam. Parameters include Stirrup types, Rebar Sizes and Quantities, Widths, Depths, etc.
Concrete-Rectangular Beam_USACE	Parametric 3d family for concrete beam. Parameters include Stirrup types, Rebar Sizes and Quantities, Widths, Depths, etc.
Concrete-Rectangular Column_USACE	Parametric 3d family for square concrete column. Parameters include Stirrup types, Rebar Sizes and Quantities, Widths, Depths, etc.
Concrete-Rectangular Column_USACE	Parametric 3d family for round concrete column. Parameters include Stirrup types, Rebar Sizes and Quantities, Diameters, etc.
Drilled Pier Cap-Rectangular_USACE	Parametric 3d family to add additional CAP to a drilled pier. Parameters include Width, Length, and Thickness
Footing-Rectangular-(2000PSF)_USACE	Parametric 3d family for Footing that requires 2000 PSF. Parameters include Rebar Sizes and Quantities, widths, length and depth
Masonry Bond Beam Unit_USACE	Parametric 3d family for a masonry block that includes bonding element. Parameters include Mortar Visibility, Core Visibility, Joint thickness, height, length, depth.
Masonry CMU Grouted_USACE	Parametric 3d family for grouted CMU block. Parameters include Mortar Visibility, Core Visibility, Joint thickness, height, length, depth.
Masonry CMU UnGrouted_USACE	Parametric 3d family for ungrouted CMU block. Parameters include Mortar Visibility, Core Visibility, Joint thickness, height, length, depth.
Masonry Lintel Units_USACE	Parametric 3d family for lintel unit. Can adjust web dimensions, height, thickness, length.
Masonry Mortar-Section_USACE	Parametric 2d family for only the mortar as part of a CMU wall. Parameters to adjust Length and Thickness and hatch display
Metal Floor Deck-Composite_USACE	2d family for one rib of composite floor decking
Metal Floor Deck-Non-Composite_USACE.rfa	2d family fir one rib of non-composite floor decking. 4" length
Metal Floor Deck-Non-Composite (9-16)_USACE.rfa	2d family for one rib of non-composite floor decking. 2" length

|	
Metal Roof Deck_USACE.rfa	Parametric 2d family for one rib of a metal roof deck. Parameters include cell width and depth
Pile Cap-P-1 (with Piles)_USACE.rfa	Parametric 3d family for one precast concrete piles with cap. Parameters include pile tension, lateral and compression, materials, Reinforcing bar size and quantity, widths, lengths, thickness, embedment.
Pile Cap-P-2 (with Piles)_USACE.rfa	Parametric 3d family for two precast concrete piles with cap. Parameters include pile tension, lateral and compression, materials, Reinforcing bar size and quantity, widths, lengths, thickness, embedment.
Pile Cap-P-3 (with Piles)_USACE.rfa	Parametric 3d family for three precast concrete piles with cap. Parameters include pile tension, lateral and compression, materials, Reinforcing bar size and quantity, widths, lengths, thickness, embedment.
Pile Cap-P-4 (with Piles)_USACE.rfa	Parametric 3d family for four precast concrete piles with cap. Parameters include pile tension, lateral and compression, materials, Reinforcing bar size and quantity, widths, lengths, thickness, embedment.
Pile Cap-P-5 (with Piles)_USACE.rfa	Parametric 3d family for five precast concrete piles with cap. Parameters include pile tension, lateral and compression, materials, Reinforcing bar size and quantity, widths, lengths, thickness, embedment.
Pile Cap-P-6 (with Piles)_USACE.rfa	Parametric 3d family for six precast concrete piles with cap. Parameters include pile tension, lateral and compression, materials, Reinforcing bar size and quantity, widths, lengths, thickness, embedment.
Pile Cap-P-12 (with Piles)_USACE.rfa	Parametric 3d family for 12 precast concrete piles with cap. Parameters include pile tension, lateral and compression, materials, Reinforcing bar size and quantity, widths, lengths, thickness, embedment.
Pile-Drilled Pier with Bell_USACE.rfa	Parametric 3d family for one pile with enlarged bearing base capacity (bell). Parameters include shaft width, length, diameter, and bell diameter and heights.
Pile-Drilled Pier without Bell_USACE.rfa	Parametric 3d family for one pile with no bell or cap. Parameters include width, length, and diameter.
Reinf Bar Bend 3-8 - 90 Degrees Each End_USACE.rfa	Parametric 2d family for Rebar with 3-8 bend w/90 degree ends. Parameters include Bar diameter, Length, and height of both ends.
Reinf Bar Bend 3-8_USACE.rfa	Parametric 2d family for Rebar with 3-8 bends w/ (1) 90 degree end. Parameters include Bar diameter, Length, and height.
Reinf Bar Bend 9-11_USACE.rfa	Parametric 2d family for Rebar with 9-11 bends w/ (1) 90 degree end. Parameters include Bar diameter, Length, and height.
Reinf Bar Elevation - with 180-degree Hooks_USACE.rfa	Parametric 2d family for Rebar with 180 degree hooks at each end. Parameters include Bar diameter, Length, and outside/inside bend radius.
Reinf Bar Elevation_USACE.rfa	Parametric 2d family for elevation for one piece of rebar. Parameters include length and rebar size.
Reinf Bar Stirrup Edge_USACE.rfa	Parametric 2d family for a stirrup edge. Parameters include length and rebar size.
Reinforcing Bar Section_USACE.rfa	Parametric 2d family for a section cut of rebar. Parameter is radius of rebar

Reinforcing Bend Type S3_USACE.rfa	Parametric 2d family for fabricated rebar standard S3. Parameters include bend radius, extension length, diameter, stirrup depth and width.
Reinforcing Bend Type T1_USACE.rfa	Parametric 2d family for fabricated rebar standard T1. Parameters include bend radius, extension length, diameter, stirrup depth and width.
Reinforcing Bend Type T2_USACE.rfa	Parametric 2d family for fabricated rebar standard T2. Parameters include bend radius, extension length, diameter, stirrup depth and width.
Reinforcing Bend Type T3_USACE.rfa	Parametric 2d family for fabricated rebar standard T3. Parameters include bend radius, extension length, diameter, stirrup depth and width.
Reinforcing Bend Type T6_USACE.rfa	Parametric 2d family for fabricated rebar standard T6. Parameters include bend radius, extension length, diameter, stirrup depth and width.
Reinforcing Bend Type T9_USACE.rfa	Parametric 2d family for fabricated rebar standard T9. Parameters include bend radius, extension length, diameter, stirrup depth and width.
Slab Edge-Thickened_USACE.rfa	Profile family that allows for thickened slab edge.
Reinforcing Concrete Beam Stirrup_USACE.rfa	Parametric 2d family for stirrup tie used in a concrete beam. Parameters include top bar location, diameter, stirrup width, depth, diameter, bottom bar location, and diameter.
Reinforcing Stirrup Tie_USACE.rfa	Parametric 2d family for reinforcing stirrup tie. Parameter includes tie length.
Steel Base Plate-Side-Length wo-Holes_USACE.rfa	Parametric 2d family for a steel shear plate from a side view which does not display holes. Parameters include width, length, thickness, hole spacing and diameter (hole spacing and diameter do not display since a side view only.
Steel Shear Plate-Face_USACE.rfa	Parametric 2d family for a steel shear plate face that has bolts. Parameters include number of holes, visibility of bolts, thickness, length, width, and hole diameter.
Stepped Footing - Sloped Bottom_USACE.rfa	Parametric 3d family for a stepped footing design w/ slopped bottom. Parameters include width, step run, step rise, length, and footing depth.
Stepped Footing - Stepped Bottom_USACE.rfa	Parametric 3d family for stepped footing design w/ a stepped bottom. Parameters include width, step run, step rise, length, and footing depth
Structural Beam System Tag_USACE.rfa	Tag for a structural beam system which line and arrow with beam type and a parameter to offset text from center of arrow line.
Structural Column Tag-45_USACE.rfa	Tag for structural columns which include the type name as label to display the member type following NCS5 and allows for a 45 degree angle to tag.
Structural Column Tag_USACE.rfa	Tag for structural columns which includes the type name as label to display the member type following NCS5
Structural Foundation Tag_USACE.rfa	Tag for structural foundations which includes the type name as label to display the member type following NCS5
Structural Framing Tag-End Reactions_USACE.rfa	Tag for structural framing for analytical model to display the end reaction forces of member that only includes the total kips.
Structural Framing Tag-Joist Girder_USACE.rfa	Tag for structural framing that does not include box and displays the Depth, Girder type, Space number, and point load.
Structural Framing Tag-Start	Tag for structural framing for analytical model to display the start

Reactions_USACE.rfa	reaction forces of member that only includes the total kips.
Structural Framing Tag_PRELIMINARY SIZE_USACE.rfa	Default tag on placement of member. This tag has been colored and given two ** to indicate just a placeholder for the member and indicates that it might not meet requirements for type and size and still needs further engineering. After the member size and type has been engineered then the tag can be changed to Structural Framing Tag_USACE.rfa.
Structural Framing Tag_USACE.rfa	Tag for Structural framing tag which is compliant with AEC CAD Standards
Structural Truss Tag_USACE.rfa	Tag for Structural Truss tag which is compliant with AEC CAD Standards
Thickened Slab_USACE.rfa	Profile family that allows for thickened slab edge. Duplicate Slab Edge-Thickened and can be deleted in future release.
Welded Wire Fabric_USACE.rfa	2d Family for displaying Welded Wire Fabric following AEC CAD standards.

Appendix B: Detail Component Palette

Part of the detail component palette is shown below and the purpose of this palette is to aid the structural engineer and technician to add common components together in a created Palette (a Revit Drafting View). During additional detailing of the model it is suggested to have palette open, and to copy and paste these components from the palette over to the view that you are detailing.

Shown below is component palette (on left) and view of footing (right). Bolt connections were copied and pasted from component palette on left and pasted specifically to that detail view of connection. Additional common components used at the districts can be copied into your own palette for ease of detailing.
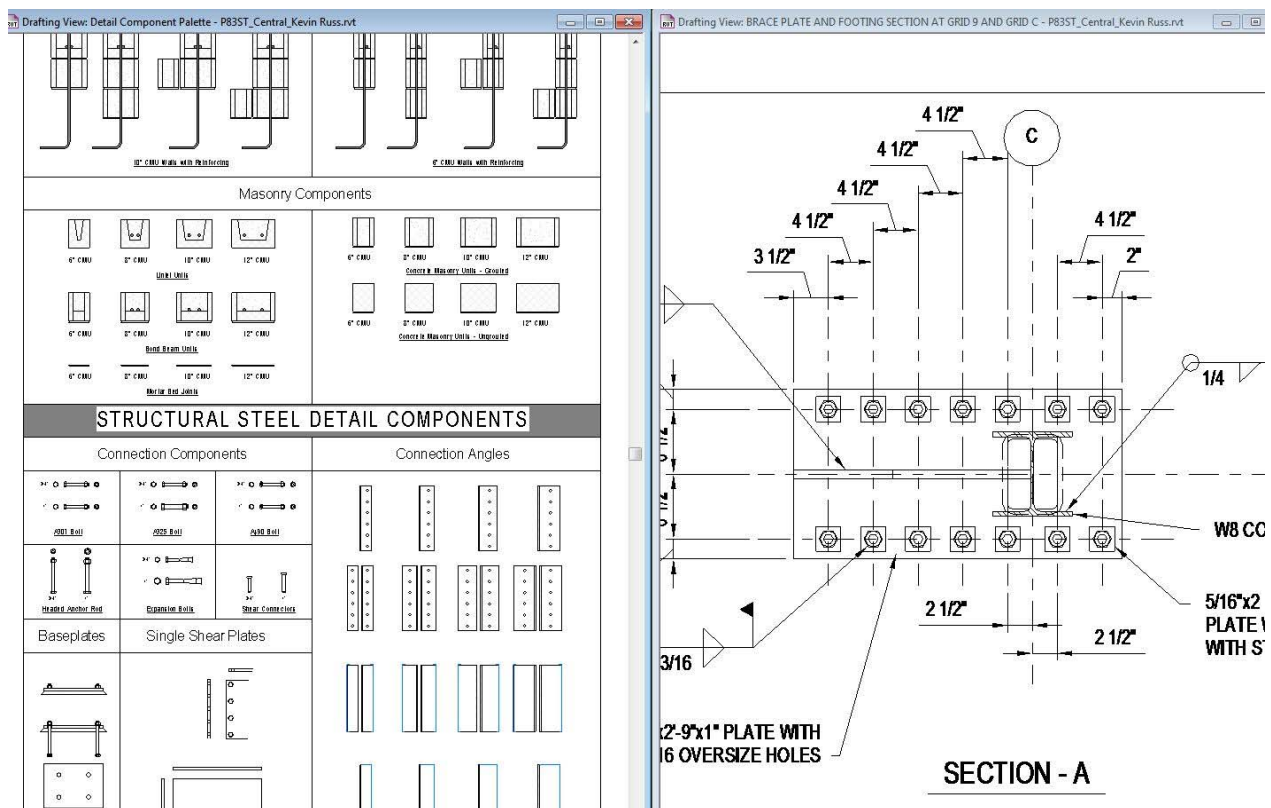
Appendix C: Shared Parameters

Shared parameters are built into the Project Information to link to the sheets and the cover sheet.

Sheet parameters are connected to sheet information. Alternate categories may be used in place of the Solicitation Number and the Contract Number if these are not necessary. There is a setting in the sheet type properties (USACE Standard) to change from the default to the Alternate Information is set. There are separate parameters for the Titles (Alternate Category Title 1, Alternate Category Title 2) that can be changed and the specific Project attributes that apply to these (Alternate Text 1, Alternate Text 2).

There is a View attribute to identify the View Purpose (Working, Documentation, Presentation, Coordination views).

Instance Properties

Family: System Family: Project Information   Load...

Type: Edit Type...

Instance Parameters - Control selected or to-be-created instance

Parameter	Value
Text	
PW_PROJ_TITLE_2	
Alternate_Info 1	Alternate Text 1
Alternate_Info 2	Alternate Text 2
Alternate_Info_Title 1	Alternate Categorgy Title 1:
Alternate_Info_Title 2	Alternate Categorgy Title 2:
Identity Data	
Author	dd
USACE_Template_Version	ARCH v1
USACE_Template_Date	May 2012
Energy Analysis	
Energy Settings	Edit...
General	
ORG_DIST_OFFC	CAD/BIM CENTER DISTRICT
ORG_LOC	VICKSBURG, MS.
CONTRACTOR_ADDRESS	MAIN STREET, 20121 WEST
CONTRACTOR_ID	ID #343az3228
CONTRACTOR_LOCATION	JACKSON, MS.
CONTRACTOR_NAME	BEST CONSTRUCTION
DISTRICT	ERD DISTRICT
Other	
Project Issue Date	2012/4/21
Project Status	RECORD DRAWINGS
Client Name	U.S. ARMY
Project Address	Edit...
Project Name	NEW PROJECT CONSTRUCTION
Project Number	# 34543-23-wld
PROJ_TITLE_1	BASIC BARRICKS COMPLEX
PROJ_TITLE_2	TRAINEE BARRICKS
PROJ_TITLE_3	CAMP CLINTON
CONTRACT_NO	# 23423-34
SOLICIT_NO	# 907345-lpd
PROJ_TITLE_4	-
ISSUE_DATE	2012/5/1
NO_OF_SHEETS	21
Project Code	PC # 3492-9823

OK   Cancel

Appendix D: Annotation Symbols and the NCS 5.0

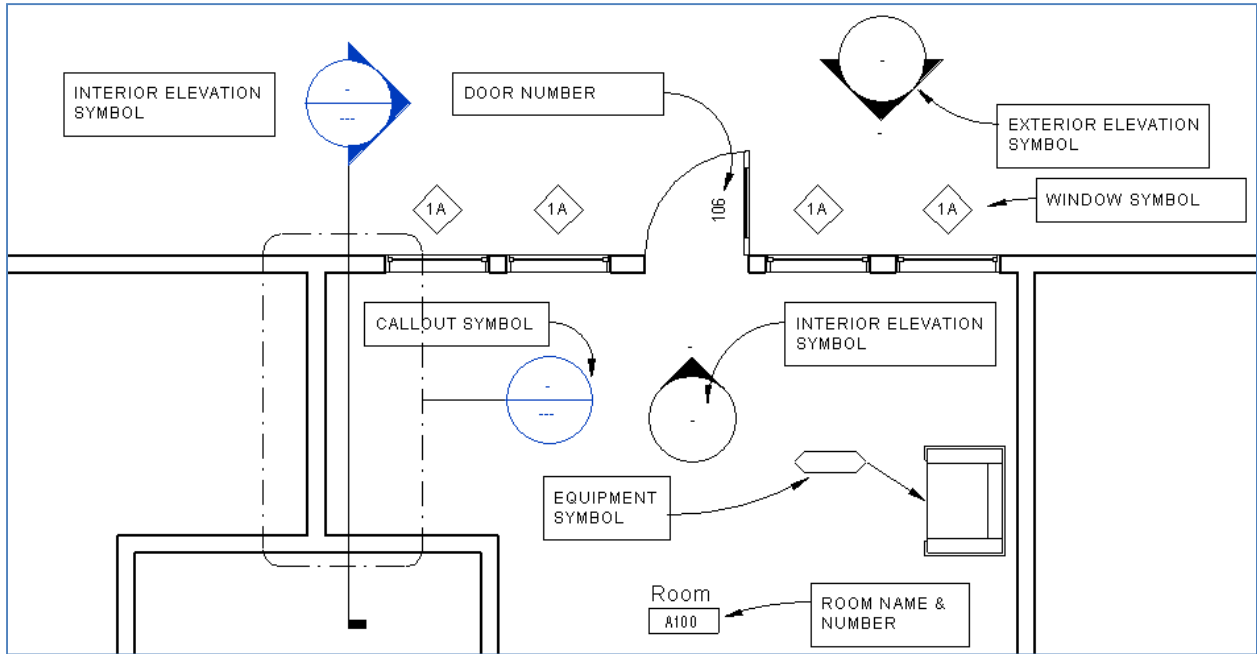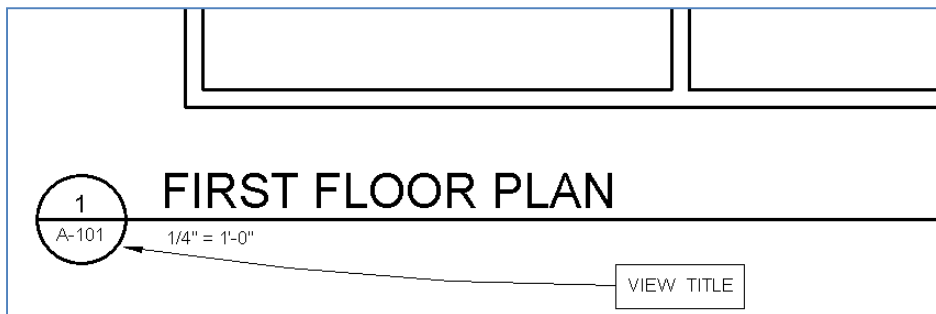The symbols shown below are based upon the requirements of the NCS 5.0. Images are not to scale.

Figure 1 Floor Plan Symbols

Figure 2 View Title Symbol