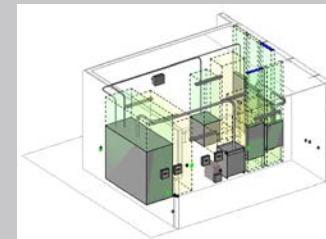
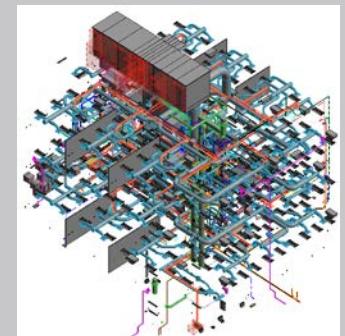
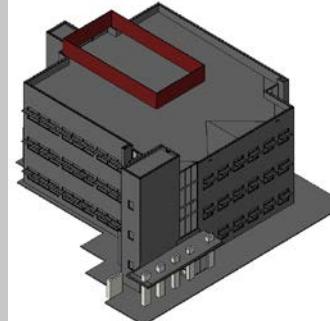


# SNL Facilities Organization

## BIM Program

2017 Update

*Exceptional service  
in the national interest*



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# 2015 BIM Program Focus & Goals Refresher

Development of BIM Standards

Development of Model Progression Management & Meetings

Development of Revision Management for Projects

Development of SNL Facilities BIM Revit Files Template

Include 3D Scanning into the As-built Process

# 2016 BIM Program Focus & Goals



Create Revit BIM Template

Establish a Project Browser Standard Format

Establish a Standard Parameter Naming Convention

Install SNL FMOC BIM Server Hardware

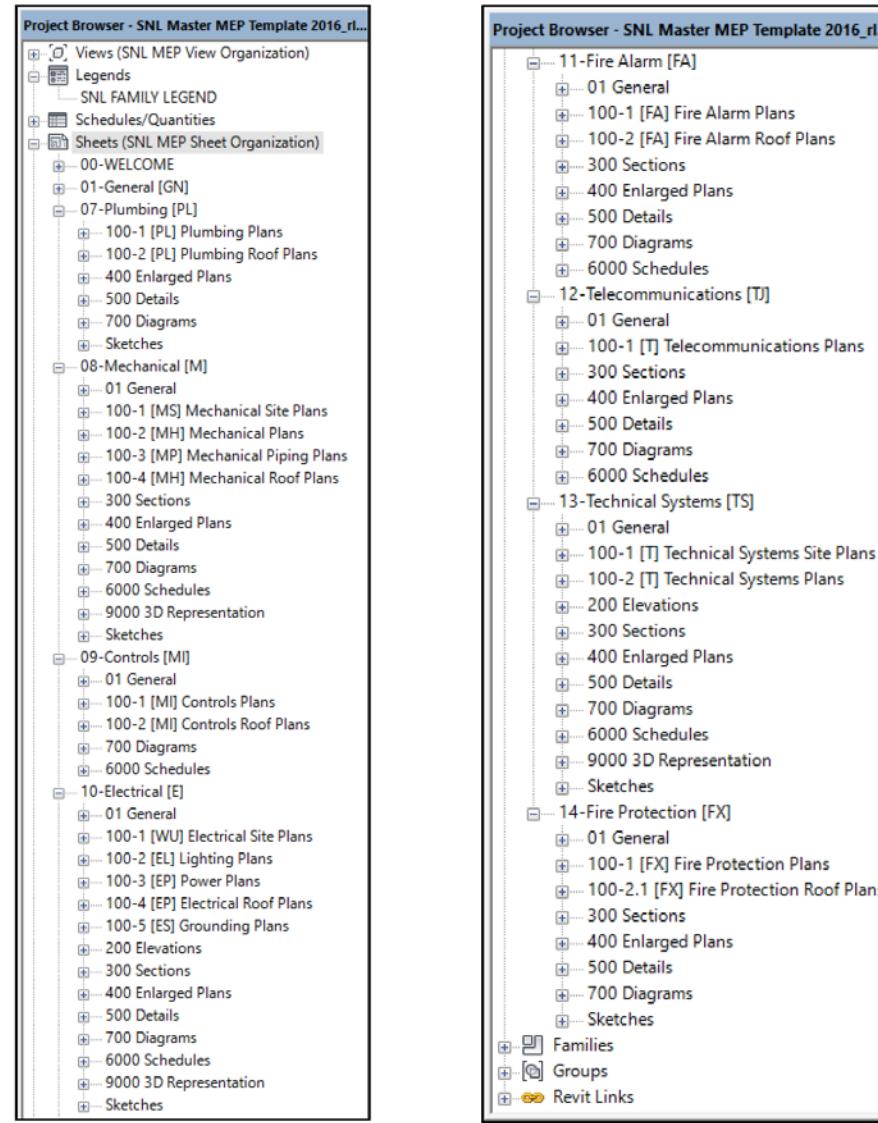
Implement IMAGINiT's Clarity Software for BIM Viewing

Pilot the use of Revit BIM for Fabrication

White Paper on BIM Platform Neutral Deliverables

# Project Browser Layout

Refer to image below for first two levels of sheet organization in SNL MEP Master Revit Template:



# Parameter Naming Convention

## Sheet & View Organization

### Title Block Population

Project Parameters	
Parameters available to elements in this	
SNL_Sheet Discipline	SNL_IREV CKD A
SNL_Sheet Discipline Order	SNL_IREV CKD B
SNL_Sheet Set Organization	SNL_IREV CKD C
SNL_Sheet Submitted	SNL_IREV CKD D
SNL_View Organization	SNL_IREV CKD E
SNL_11X17_8.5X11 ASI-RFI	SNL_IREV CKD F
SNL_11X17_8.5X11 ASI-RFI TITL	SNL_IREV CKD G
SNL_11X17_8.5X11 DATE	SNL_IREV DWN A
SNL_11X17_8.5X11 REFERENCE S	SNL_IREV DWN B
SNL_11X17_8.5X11 REFERENCED	SNL_IREV DWN C
SNL_JAE PROJECT NUMBER	SNL_IREV DWN D
SNL_BLDG NUMBER	SNL_IREV DWN E
SNL_IDISCIPLINE	SNL_IREV DWN F
SNL_IDISCIPLINE SUB	SNL_IREV DWN G
SNL_IP.O. NUMBER	SNL_ISEQ NUMBER
SNL_IPROJECT DESCRIPTION	SNL_ISUBMITTAL INFO
SNL_IREF CWD A	

## Project Submittal Information

Project Parameters	
Parameters available to elements in th	
SNL_IREV CKD A	SNL_BLDG FLOORS
SNL_IREV CKD B	SNL_BLDG NAME
SNL_IREV CKD C	SNL_BLDG SQ FT
SNL_IREV CKD D	snl_MEL Equip Class
SNL_IREV CKD E	snl_MEL Maximo Number
SNL_IREV CKD F	snl_MEL New Remove Replace
SNL_IREV CKD G	snl_MEL Quadrant
SNL_IREV DWN A	snl_MEL Tech Area
SNL_IREV DWN B	snl_revision A
SNL_IREV DWN C	snl_revision B
SNL_IREV DWN D	snl_revision C
SNL_IREV DWN E	snl_revision D
SNL_IREV DWN F	snl_revision E
SNL_IREV DWN G	snl_revision F
SNL_ISEQ NUMBER	snl_revision G
SNL_ISUBMITTAL INFO	SNL_TA-NUMBER

## General Building Information

### MEL Equipment & Revision Tracking

Project Parameters	
Parameters available to elements in th	
SNL_BLDG FLOORS	SNL_BLDG FLOORS
SNL_BLDG NAME	SNL_BLDG NAME
SNL_BLDG SQ FT	SNL_BLDG SQ FT
snl_MEL Equip Class	snl_MEL Equip Class
snl_MEL Maximo Number	snl_MEL Maximo Number
snl_MEL New Remove Replace	snl_MEL New Remove Replace
snl_MEL Quadrant	snl_MEL Quadrant
snl_MEL Tech Area	snl_MEL Tech Area
snl_revision A	snl_revision A
snl_revision B	snl_revision B
snl_revision C	snl_revision C
snl_revision D	snl_revision D
snl_revision E	snl_revision E
snl_revision F	snl_revision F
snl_revision G	snl_revision G
SNL_TA-NUMBER	SNL_TA-NUMBER

**Note:** "SNL\_11X17" and "SNL\_I" designations in Parameter names indicate **Shared Parameters** in Title Block Family - these Parameters should not be edited.

## **Mechanical Equipment Parameters**

Additional Parameters were created for reporting Mechanical Equipment information. These parameters are designated with the naming format of "z\_SNLM..." and are shown in the images below. These parameters are currently **Project Parameters** but may be replaced by **Shared Parameters** depending on data transfer solutions.

z_snLM_AHU CC MIN ROWS
z_snLM_AHU CC S.H. MBH
z_snLM_AHU CC T.H. MBH
z_snLM_AHU CC VOL GAL
z_snLM_AHU CC WATER PD FT
z_snLM_AHU CC WB IN
z_snLM_AHU CC WB LVG
z_snLM_AHU HC AIR PD IN WG
z_snLM_AHU HC CLG CFM
z_snLM_AHU HC EAT DEG, F
z_snLM_AHU HC EWT DEG, F
z_snLM_AHU HC GPM
z_snLM_AHU HC LAT DEG, F
z_snLM_AHU HC LWT DEG, F
z_snLM_AHU HC MBH
z_snLM_AHU HC MIN ROWS
z_snLM_AHU HC VOL GAL

z_snLM_AHU HC VOL GAL
z_snLM_AHU HC WATER PD FT.
z_snLM_AHU HZ
z_snLM_AHU LOCATION
z_snLM_AHU OPER. WEIGHT
z_snLM_AHU PHASE
z_snLM_AHU RET BHP
z_snLM_AHU RET EXT. SP. IN.
z_snLM_AHU RET FAN RPM
z_snLM_AHU RET FAN WHEEL SI
z_snLM_AHU RET HP
z_snLM_AHU RET TOT SP. IN.
z_snLM_AHU RET TOTAL CFM
z_snLM_AHU SERVICE
z_snLM_AHU SUP BHP
z_snLM_AHU SUP CFM FAN

z_snLM_AHU SUP EXT. SP. IN.
z_snLM_AHU SUP FAN QUAN
z_snLM_AHU SUP FAN RPM
z_snLM_AHU SUP FAN WHEEL SI
z_snLM_AHU SUP HP
z_snLM_AHU SUP MIN OSA CFM
z_snLM_AHU SUP TOT SP. IN.
z_snLM_AHU VOLTS
z_snLM_BLOWER COIL AIR P.D.
z_snLM_BLOWER COIL CFM
z_snLM_BLOWER COIL ENT DB (
z_snLM_BLOWER COIL ENT WB (
z_snLM_BLOWER COIL EWT (°F)
z_snLM_BLOWER COIL GPM
z_snLM_BLOWER COIL HP
z_snLM_BLOWER COIL HZ

# Families Convention

## Families

Custom Families contained in the SNL Master Template files are focused on Annotation Families. These custom families have the prefix of “**SNL\_**” followed by a description of the annotation, or a single discipline designator followed by a description of the annotation. SNL Revit Template model Annotation Families are listed below:

Project Browser - BP\_MEPM SNL Master 2016

- [-] Families
  - [-] Air Terminals
  - [-] Annotation Symbols
    - [-] Area Tag
    - [-] Automatic Up/Down Direction
    - [-] Elevation Mark Body\_Circle
    - [-] Elevation Mark Body\_Square
    - [-] Elevation Mark Pointer\_Circle
    - [-] Elevation Mark Pointer\_Square
    - [-] Fixed Up Direction
    - [-] Grid Head - Circle
    - [-] Grid Head - No Bubble
    - [-] Level Head - Circle
    - [-] Level Head - No Bubble
    - [-] SNL\_BORDER\_8.5x11
    - [-] SNL\_BORDER\_11x17
    - [-] SNL\_BORDER\_D-
    - [-] SNL\_COVER SHEET
    - [-] SNL\_DEMO EXTENT
    - [-] SNL\_DETAIL CALLOUT
    - [-] SNL\_DOOR TAG
    - [-] SNL\_E CIRCUIT PANEL TAG
    - [-] SNL\_E CONDUIT SIZE TAG
    - [-] SNL\_E HOMERUN TAG
    - [-] SNL\_E MECHANICAL EQUIPMENT Tag
    - [-] SNL\_E PANEL TAG
    - [-] SNL\_E TRIANGLE Keynote
    - [-] SNL\_E TRIANGLE TAG Left
    - [-] SNL\_E TRIANGLE TAG Right
    - [-] SNL\_FIRE ALARM DEVICE CIRCUIT Tag
    - [-] SNL\_KEY PLAN FAMILY
    - [-] SNL\_KEYNOTE ELLIPSE
    - [-] SNL\_KEYNOTE REMOVAL
    - [-] SNL\_M CONTROL DIAMOND
    - [-] SNL\_M DIFFUSER CFM TAG
    - [-] SNL\_M DIFFUSER HEX TAG
    - [-] SNL\_M DUCT ABBV TAG
    - [-] SNL\_M DUCT ACC
    - [-] SNL\_M DUCT ACC2
    - [-] SNL\_M DUCT BOD TAG
    - [-] SNL\_M DUCT SIZE ROTATED TAG
    - [-] SNL\_M DUCT SIZE TAG
    - [-] SNL\_M FLEX DUCT TAG
    - [-] SNL\_M MECH SYMBOL HEX
    - [-] SNL\_M VAV CFM TAG
    - [-] SNL\_M VAV GPM TAG
    - [-] SNL\_NEW TO EXISTING
    - [-] SNL\_NORTH ARROW
    - [-] SNL\_NORTH ARROW SITE

- [-] SNL\_PIPE ABBREVIATION Tag
- [-] SNL\_PIPE FLEX Size Tag
- [-] SNL\_PIPE SIZE AND ABBREVIATION Tag
- [-] SNL\_PIPE SIZE ROTATED Tag
- [-] SNL\_PIPE SIZE Tag
- [-] SNL\_PLUMBING HEX SYMBOL
- [-] SNL\_REFERENCE TITLE
- [-] SNL\_REFERENCE TITLE NTS
- [-] SNL\_REVISION TRIANGLE
- [-] SNL\_REVISION TRIANGLE REMOVAL
- [-] SNL\_ROOM Tag
- [-] SNL\_SECDN
- [-] SNL\_SECL
- [-] SNL\_SECR
- [-] SNL\_SECS
- [-] SNL\_SECTION CALLOUT
- [-] SNL\_SECTION TAIL
- [-] SNL\_SECTION TITLE
- [-] SNL\_SECTION TITLE NTS
- [-] SNL\_SITE LOCATION ARROW
- [-] SNL\_SPACE Tag
- [-] SNL\_T CABLE TRAY SIZE TAG
- [-] SNL\_T GPON OUTLET Annotation
- [-] SNL\_T RED USER OUTLET Annotation
- [-] SNL\_T TELEPHONE OUTLET Annotation
- [-] SNL\_TBIRD
- [-] SNL\_VIEW REFRENCE
- [-] SNL\_VIEW TITLE
- [-] SNL\_VIEW TITLE NTS
- [-] SNL\_VIEW TITLE SHORT
- [-] SNL\_WALL Tag
- [-] SNL\_WELCOME BORDER
- [-] SNL\_Window Tag
- [-] Spot Elevation - Crosshair
- [-] Spot Elevation - Target Filled
- [-] Wire Tag
- [-] Zone Tag

# Worksets Convention

## Worksets

Revit Worksets provide multiple users the ability to work in one file simultaneously. Worksets can also be used for manipulation of Revit Elements for improved Modification & Visibility Control. Default SNL Template Worksets are:

### Architectural Model Worksets

Worksets	
Active workset:	
<b>*LINKED SITE (Not Editable)</b>	<input type="checkbox"/> Gray Inactive Workset
Name	Editable
*LINKED MEP	No
*LINKED SITE	No
*LINKED SNL 1site	No
*LINKED STRUCTURAL	No
*SCOPE BOXES	No
*SHARED LEVELS AND GRIDS	No
SNL_A_FURNITURE	No
SNL_A_INTERIOR	No
SNL_A_SHELL	No
SNL_A_SITWORK	No

### MEP Model Worksets

Worksets	
Active workset:	
<b>*LINKED_ARCH (Not Editable)</b>	<input type="checkbox"/> Gray Inactive Workset
Name	Editable
*_SYNCHRONIZE	No
*GRIDS-ACTIVE	No
*LINKED_SNL_1site	No
*LINKED_ARCH	No
*LINKED_STRCT	No
*SCOPE BOXES	No
SNL_E-FIRE ALARM	No
SNL_E-GROUNDING	No
SNL_E-LIGHTING	No
SNL_E-PANELBOARDS	No
SNL_E-POWER	No
SNL_E-RECEPTACLES	No
SNL_E-SITE	No
SNL_M-AIR TERMINALS	No
SNL_M-CONTROLS	No
SNL_M-DESIGN	No
SNL_M-EQUIPMENT	No
SNL_M-PIPEING	No
SNL_M-TSAT	No
SNL_M-VAVS	No
SNL_P-EQUIPMENT	No
SNL_P-FIRE PRO	No
SNL_P-FIXTURE	No
SNL_P-GAS PIPING	No
SNL_P-PRESSURE PIPING	No
SNL_P-ROOF DRAINS	No
SNL_P-WASTE & VENT	No
SNL_T-AUDIO VISUAL	No
SNL_T-CABLE TRAY	No
SNL_T-NURSE CALL	No
SNL_T-PUBLIC ADDRESS	No
SNL_T-SECURITY	No
SNL_T-VOICE/DATA	No

### Structural Model Worksets

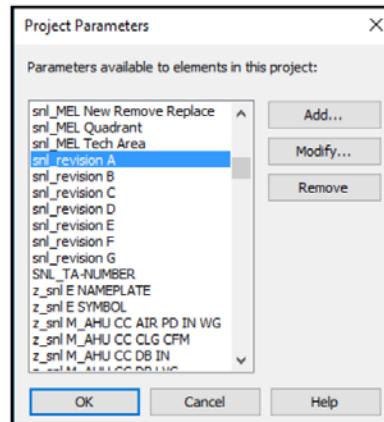
Worksets	
Active workset:	
<b>SNL_S_MAIN (Not Editable)</b>	<input type="checkbox"/> Gray Inactive Workset
Name	Editable
*LINKED ARCH	No
*LINKED CAD	No
*LINKED MEP	No
*LINKED SNL 1site	No
*SCOPE BOXES	No
*SHARED LEVELS AND GRIDS	No
SNL_S_FOUNDATION	No
SNL_S_FRAMING	No
SNL_S_INTERIOR	No
SNL_S_MAIN	No
SNL_S_SHELL	No

# Revision Tracking

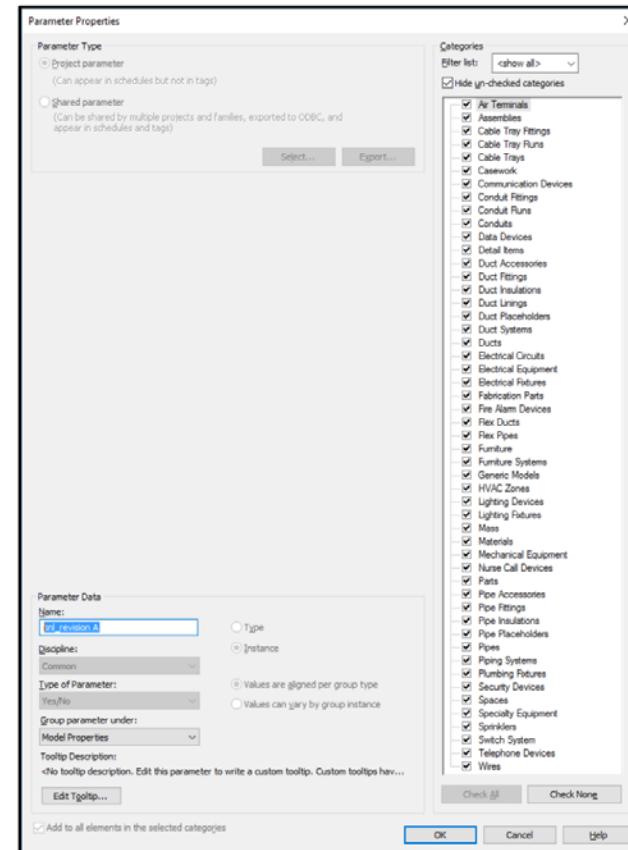
## SNL Model Element Revision Tracking

SNL Revit Templates includea **Yes/No** Revit parameters named: *snl\_revision A - G* for model element categories. To activate these parameters, elements added or modified during a revision can be manually selected, after which the parameter for that element can be manually activated **Yes** (clicked on). Elements with the appropriate Revision parameter checked **Yes** will then be accessible for **Scheduling** or **Visibility Graphics Control with Filters**. Refer to **View Filters** and **Scheduling** sections of this document for more information on scheduling and filtering.

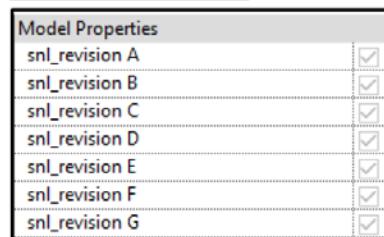
Project Parameters:



Revision Parameter Model Element Categories:

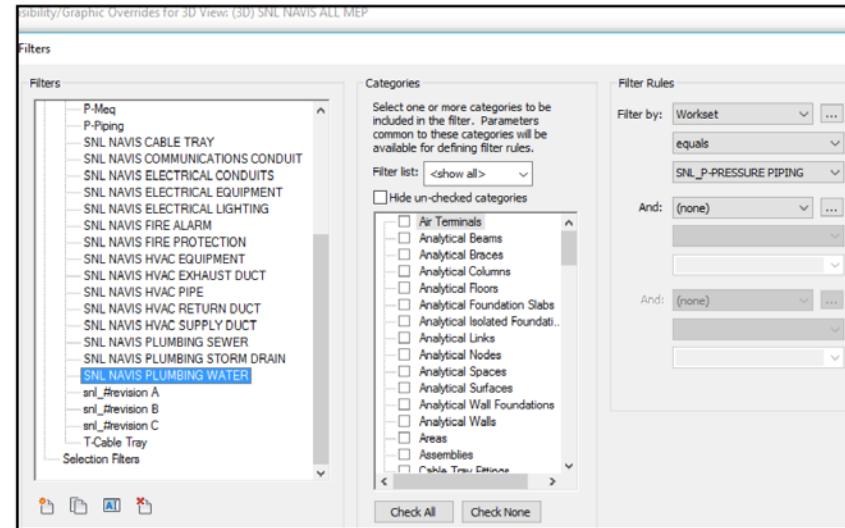


Project Element Browser:



# Navis Works Views for Export

Filter names beginning with **SNL Navis...**, are created using MEP model Worksets (1<sup>st</sup> image below) and applied to **[SNL] NAVIS 3D VIEWS**. These views area colored (2<sup>nd</sup> image below) to create colored MEP system differentiation for improved visualization and coordination or to export to *Navisworks* for collision detection.



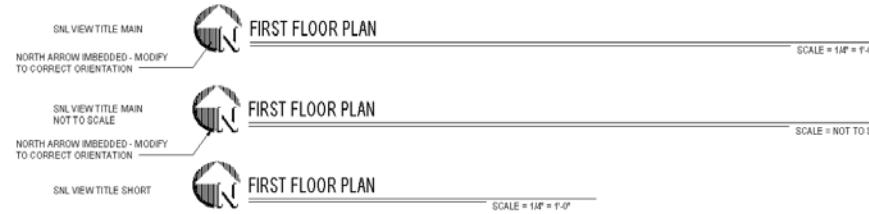
Visibility/Graphic Overrides for 3D View: (3D) SNL NAVIS ALL MEP

Name	Visibility	Projection/Surface		
		Lines	Patterns	Transparency
SNL NAVIS PLUMBING WATER	<input checked="" type="checkbox"/>			
SNL NAVIS PLUMBING SEWER	<input checked="" type="checkbox"/>			
SNL NAVIS PLUMBING STORM DRAIN	<input checked="" type="checkbox"/>			
SNL NAVIS FIRE PROTECTION	<input checked="" type="checkbox"/>			
SNL NAVIS HVAC PIPE	<input checked="" type="checkbox"/>			
SNL NAVIS HVAC EQUIPMENT	<input checked="" type="checkbox"/>			
SNL NAVIS HVAC SUPPLY DUCT	<input checked="" type="checkbox"/>			
SNL NAVIS HVAC RETURN DUCT	<input checked="" type="checkbox"/>			
SNL NAVIS HVAC EXHAUST DUCT	<input checked="" type="checkbox"/>			
SNL NAVIS ELECTRICAL EQUIPMENT	<input checked="" type="checkbox"/>			
SNL NAVIS ELECTRICAL LIGHTING	<input checked="" type="checkbox"/>			
SNL NAVIS ELECTRICAL CONDUITS	<input checked="" type="checkbox"/>			
SNL NAVIS COMMUNICATIONS CONDUIT	<input checked="" type="checkbox"/>			
SNL NAVIS CABLE TRAY	<input checked="" type="checkbox"/>			
SNL NAVIS FIRE ALARM	<input checked="" type="checkbox"/>			

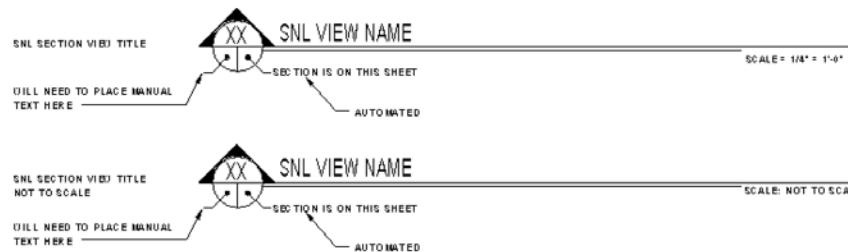
# SNL Facilities Theme Notation

SNL Annotation Families are shown in the **SNL FAMILY LEGEND** in each SNL Revit template and in images below.

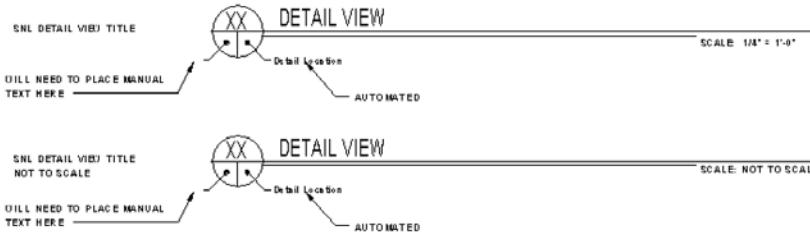
## VIEW TITLES ON SHEET



## SECTION VIEW TITLES ON SHEET

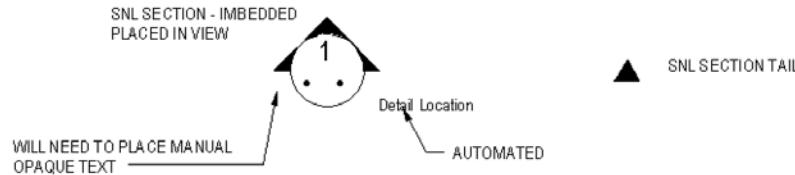


## DETAIL REFERENCE TITLES ON SHEET

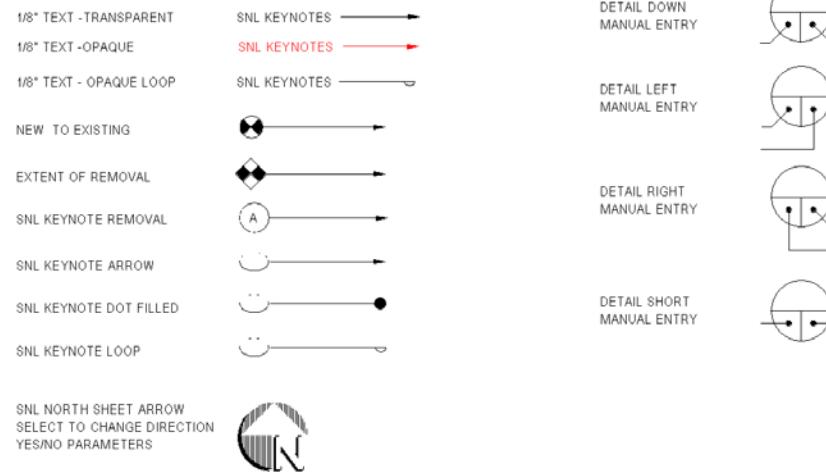


# SNL Facilities Theme Notation

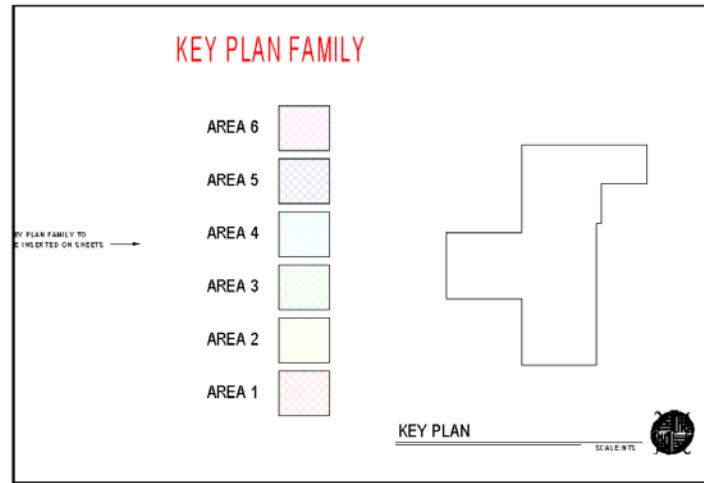
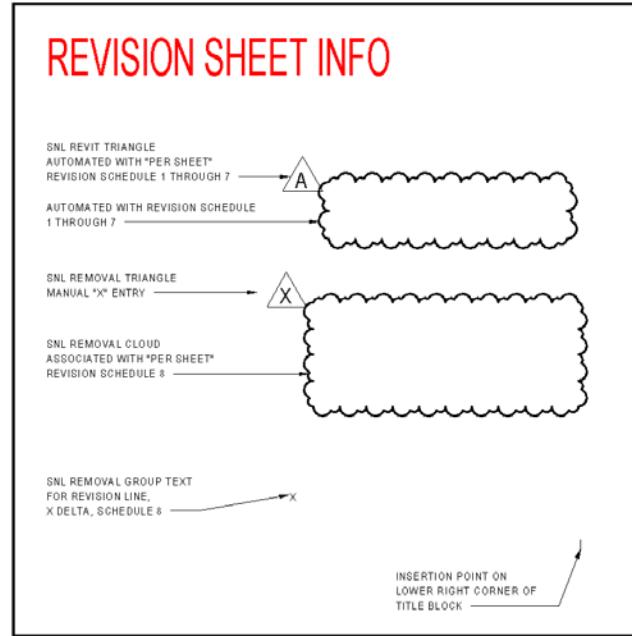
## SECTION CALLOUT - IN VIEW



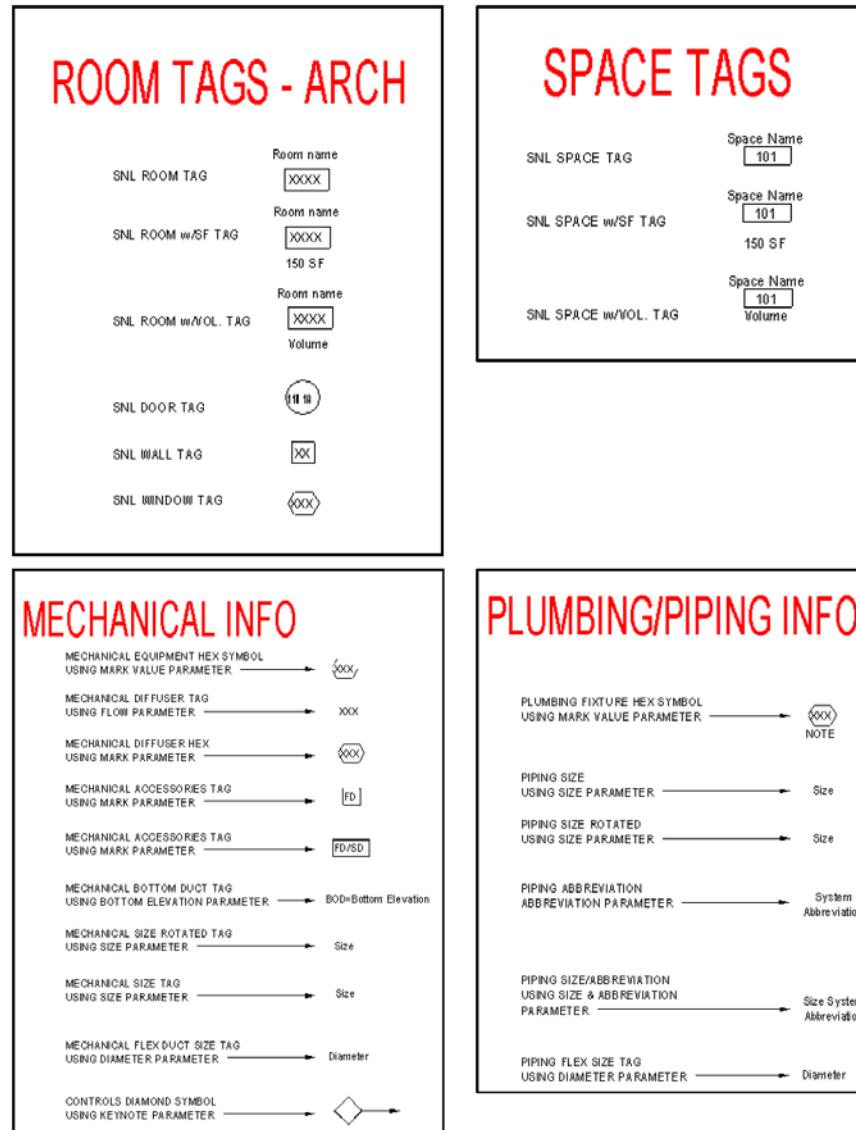
## GENERAL SHEET INFO



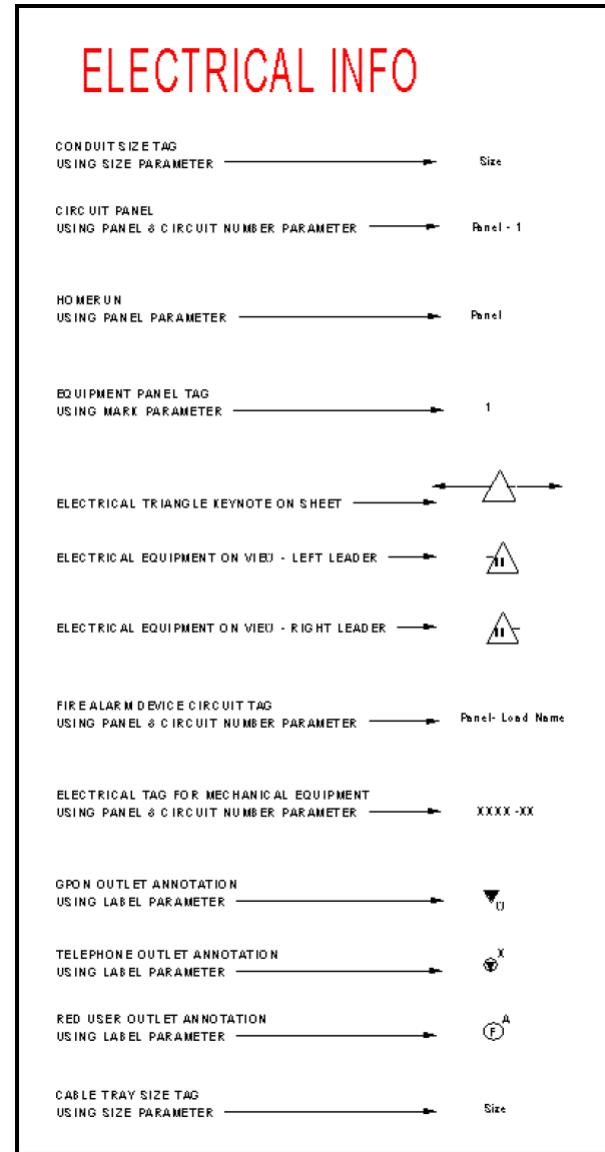
# SNL Facilities Theme Notation



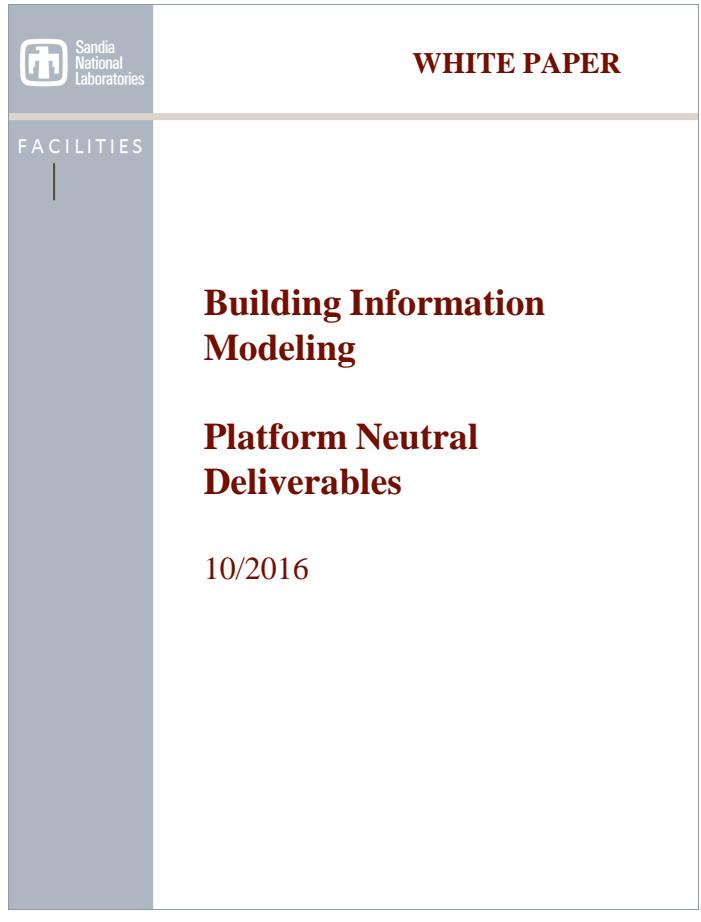
# SNL Facilities Theme Notation



# SNL Facilities Theme Notation



# SNL Facilities BIM Standards



**WHITE PAPER**

**FACILITIES**

**Building Information Modeling**

**Platform Neutral Deliverables**

10/2016

**Facilities** June 2015

**4.0 Con**

- Coord
- BIM P
- The pro

The role of Sandia in ac  
is supporting a

**4.1 Roles**

Collaborative &  
documenta  
assurance danc  
Sandia, the Dei  
responsibilitie  
project team w

**4.2 Coordination**

Prior to each  
Construction  
the coordinat

On construct  
on coordinat

Coordinate resolv

conf teams shall

• The Design

• Design i

• Meetings on

• coordination

• During the d

• Conflicts sha

• During the c

• Approval, si

• Detection, co

**4.3 BIM**

• Clash detect

• The design ph

• Conflicts re

• All reported

• Both the De

• Discuss best

• Include all re

**4.4 Owner**

Sandia has e  
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**4.5 Software**

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Software Vi

lifecycle, an

**4.6 Standards**

• Clash detect

• The design ph

• Conflicts re

• All reported

• Both the De

• Discuss best

• Include all re

**4.7 Coordination**

• Clash detect

• The design ph

• Conflicts re

• All reported

• Both the De

• Discuss best

• Include all re

**4.8 BIM**

• Clash detect

• The design ph

• Conflicts re

• All reported

• Both the De

• Discuss best

• Include all re

**4.9 Coordination**

A Federated BIM shall be assembled for the purpose of performing a visual check for the building's spatial and system coordination. Vertical shafts should also be reviewed to ensure that a adequate space has been allocated for all of the mechanical systems and that all other elements have been allocated to these

**4.9.1 Coordination Meetings**

A Federated BIM shall be assembled for the purpose of performing a visual check for the building's spatial and system coordination. Vertical shafts should also be reviewed to ensure that a adequate space has been allocated for all of the mechanical systems and that all other elements have been allocated to these

**6.3 IT Infrastructure**

Facilities CADD/BIM/3D Scanning Technology/Solutions Diagram - Current State

**Record BIM - Design Team**

BIMs that are field-verified LOD 300 models that provides element graphically represented as installed conditions of size, shape, location, quantity, and orientation with required non-graphic information attached to the model elements. These models will reflect all field changes made after coordination and review due to EFT's and change orders.

**Required Graphically Updated:**

- All life safety systems will be updated to match the As-Built models provided by the Prime Contractor
- All product types identified in the Facility Information Specifications as requiring a component serial number shall be manufacturer provided objects
- All component location will be updated to match the As-Built models under any of the following conditions:
  - a. Moved due to interference with Life safety
  - b. Creates a safety hazard for future projects (conduit in walls)
  - c. Installed location is different than what was represented Coordination BIMs

**Required Information Update:**

- All attributes of product types in the Record model and identified in the Facility Information Specifications will be updated to match AS-Built models

**IFC - Coordination View**

The IFC file must come from IFC certified software for export and be the IFC Coordination View (2x3). The coordination view shall contain:

- a. Building spatial structure
- b. Building elements and spaces with their semantic information
- c. IFC Property sets as well as native properties

Construction Team Deliverables		
Contract Award	Construction	Close Out
• IFC	• IFC	• As-Built
• LOD 300	• Architectural	• Architectural
• Architectural	• MEP	• MEP
• Structural	• Furniture	• Furniture
2D Deliverables		
• AutoCAD	• PDF	• PDF
• DWG	• PDF	• PDF
Deliverable formats		
• MS Word & PDF	• Native Revit	• Native Revit

**Figure 4. Construction Team Deliverables**

# Future – 2017 BIM Program Goals



Incorporate ARCH/STRUC into Revit BIM Template

Pilot the Extraction of SNL Facilities BIM Parameters

Create Clarity Data Sheets and Reports

Finalize the Navis Works Workflow for Viewing BIM

Incorporate Process Updates into BIM Standards

# Thanks for Having Listening!

Matt Pacheco

505.845.9780

[mipache@sandia.gov](mailto:mipache@sandia.gov)