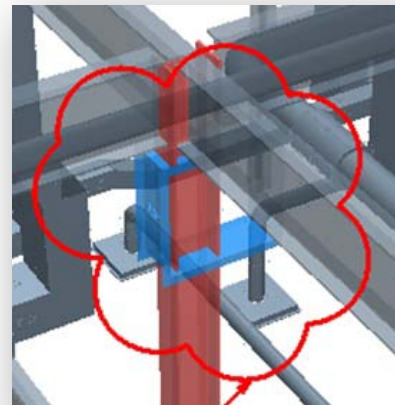


i-models

Stuart Milne

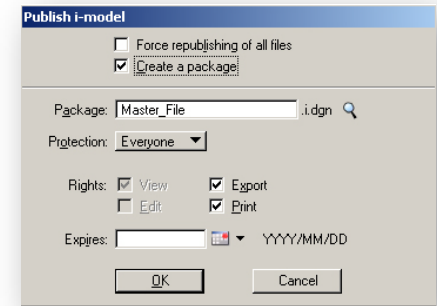
What is an i-model?

- **An i-model** is a container for graphical and multi-discipline information published from known sources in a known state at a certain point in time.
- **An i-model** is a compressed, portable, single file method of project data exchange.
- **An i-model** and its data can be opened with any application that can open a DGN file.
- **An i-model** is read only to prevent corruption to the original source.

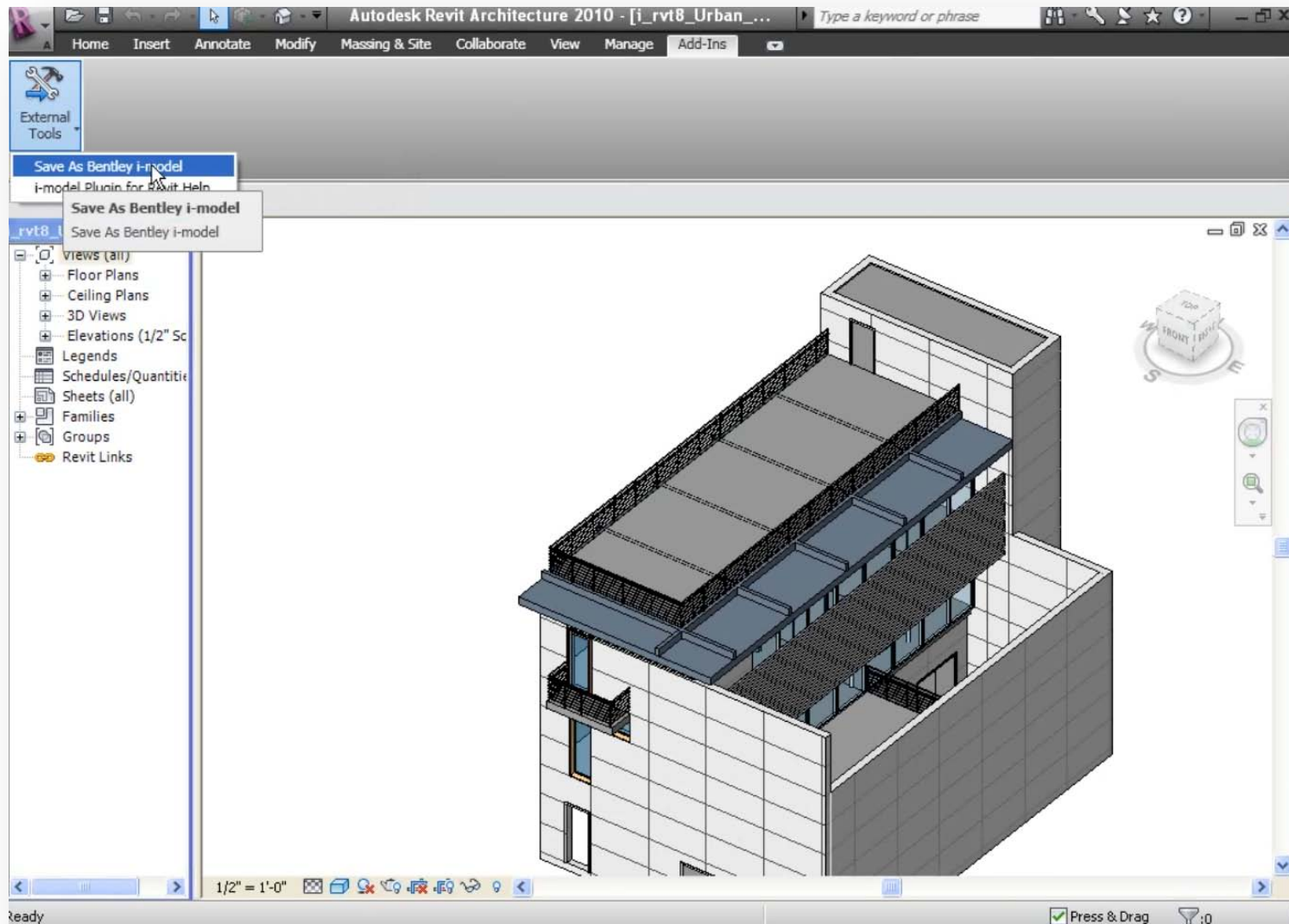


How do I create an i-model?

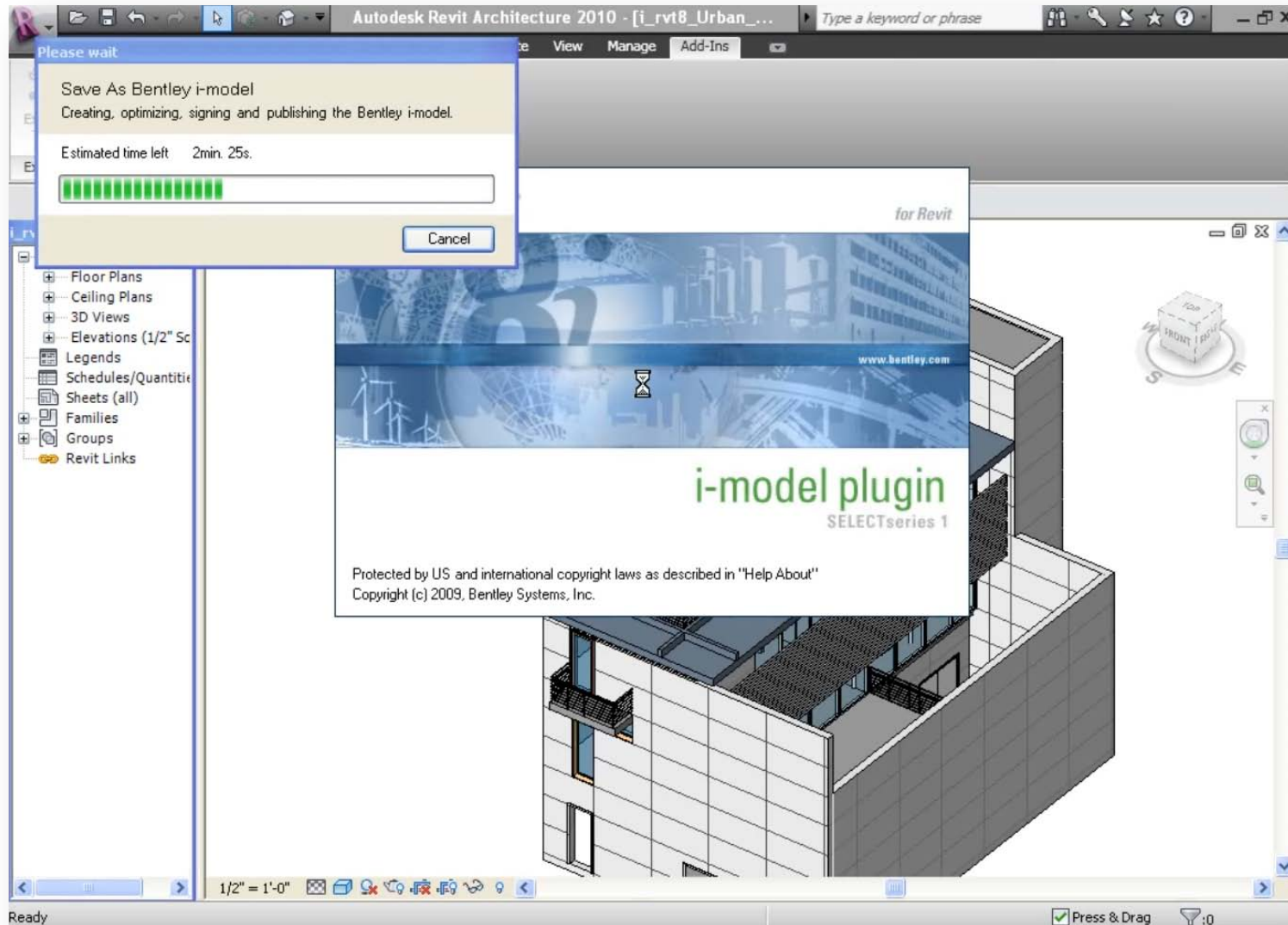
- ProjectWise i-model Composer.
- From Microstation: *File > Publish i-model*
- From a Building Application
 - Bentley Architecture
 - Bentley Structural
 - Bentley Mechanical
 - *File > Publish i-model*
- i-model plug-in for Revit
 - <http://www.bentley.com/en-US/Promo/Revit/i-model.html>



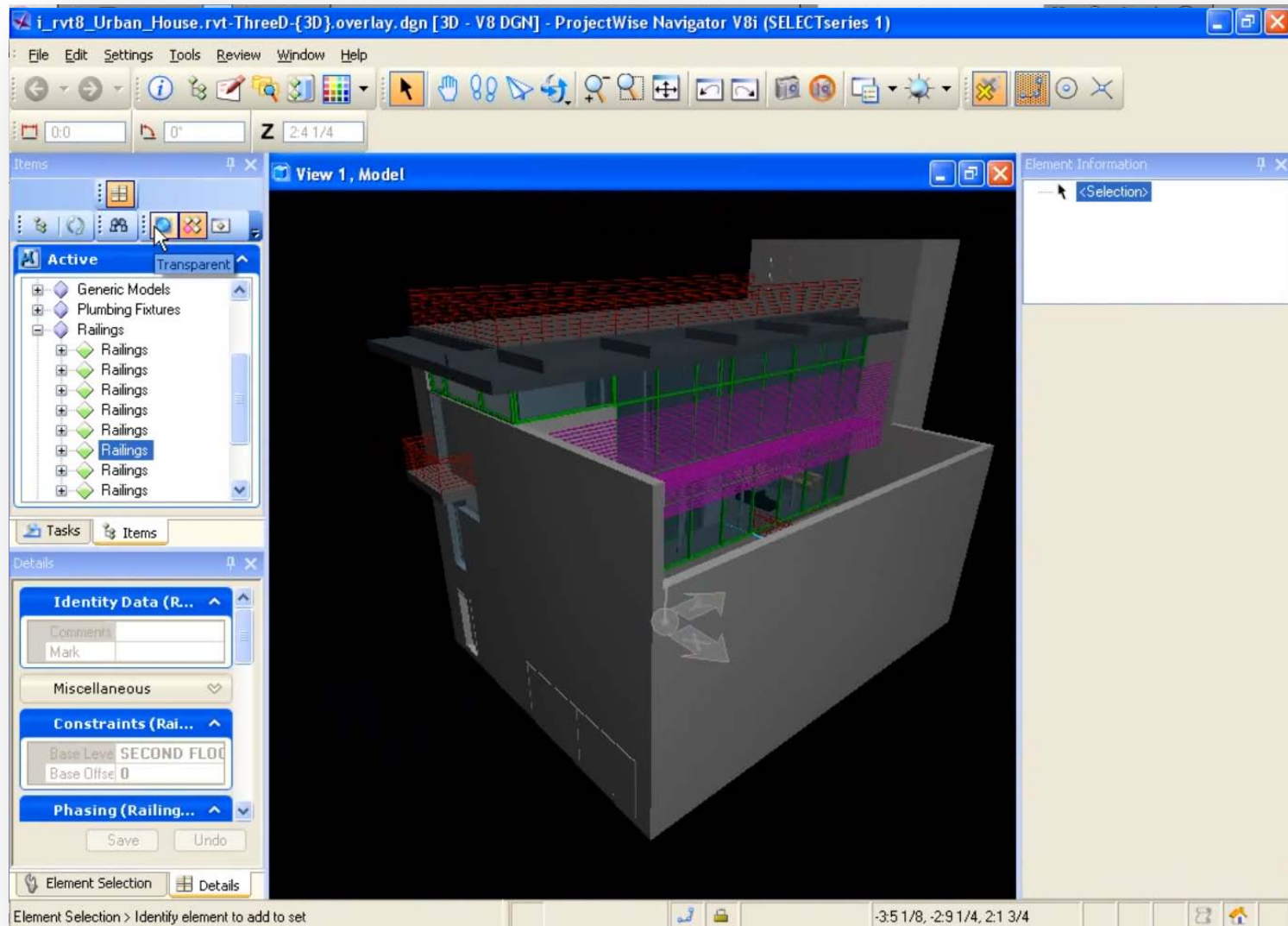
i-model Plug-in for Revit



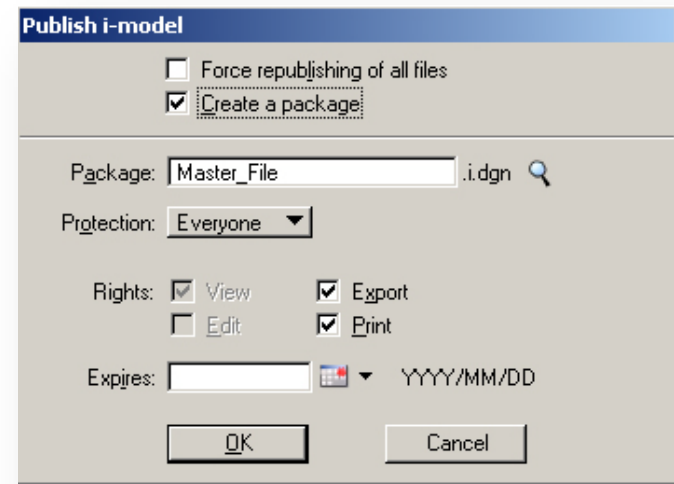
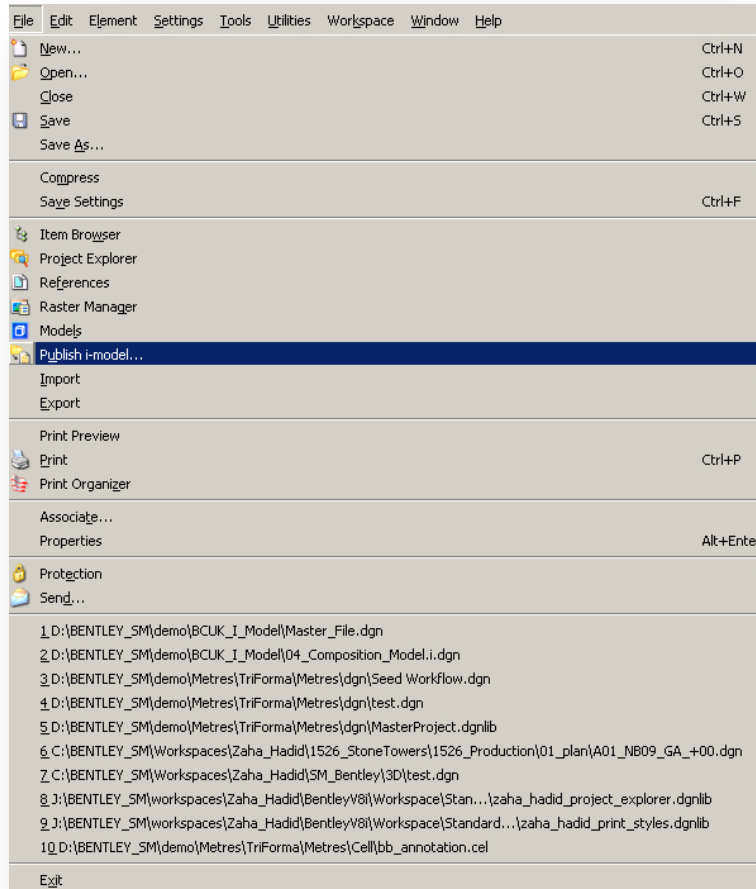
i-model Plug-in for Revit



i-model Plug-in for Revit



Publishing an i-model from a Bentley Application?



Publishing i-models - Variables

Publish i-model configuration variables

The following table lists the configuration variables that affect the publishing of i-models. Each configuration variable expects a valid value. An invalid value will not override a setting. You do not need to close and restart in order for the configuration variable change to take effect.

Variable	"Short name"	Description
MS_PUBLISHDGN_BUSINESSDATA	(not applicable)	Disables the publishing of business data into the i-model. This may be useful in models where there is a large amount of business data and the i-model is intended for visualization only. Values are 0 (OFF) or 1 (ON). The default setting is ON.
MS_PUBLISHDGN_CONVERTTOXGRAPHICS	(not applicable)	Disables the conversion of model graphics into an optimized viewing format in the i-model. This is rarely necessary and is typically only used for testing purposes. Values are 0 (OFF) or 1 (ON). The default setting is ON.
MS_PUBLISHDGN_LOAD_REFS	(not applicable)	Optimizes reference file loading during the i-model publishing process. If 0, references of individual files are not loaded during publishing. If 1, references are loaded. Suppressing reference loading can improve performance with some files (particularly those using overlay DWG attachments or limited nest-depth attachments). Values are 0 (OFF) or 1 (ON). The default setting is OFF for ProjectWise i-model Composer.
MS_PUBLISHDGN_MESHBSURF_MINORDER	(not applicable)	Defines a numeric value that specifies the minimum order for which B-spline surfaces will be converted to meshes during publishing. If specified, B-spline surfaces at or above this order will be converted to meshes to optimize visualization performance in the i-model. If not specified, the default value is 6. Most users will not need to change this value.
PUBLISHDGN_ECPROPERTIES_NOT_TO_FILTER	(not applicable)	Used to define the names of the EC properties not to filter out while publishing an i-model. Any property listed in this configuration variable will always be published. The format for defining multiple EC property names is: <property_name_1>;<property_name_2>;... In ProjectWise i-model Composer, by default it is set to: SNAP_POINTS;CONNECT_POINTS;ATTACH_POINTS
PUBLISHDGN_REMOVEATTRIBUTEIDS	(not applicable)	Used to remove attribute linkages from i-models. This variable should not be changed by users.

What is compatible with an i-model?

Getting Started

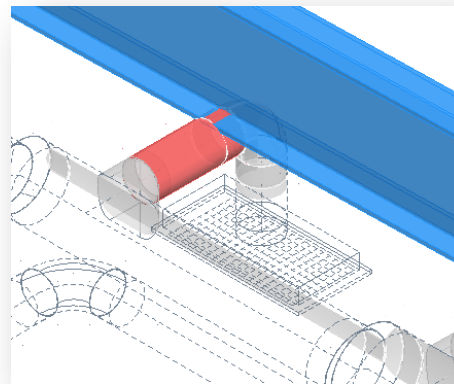
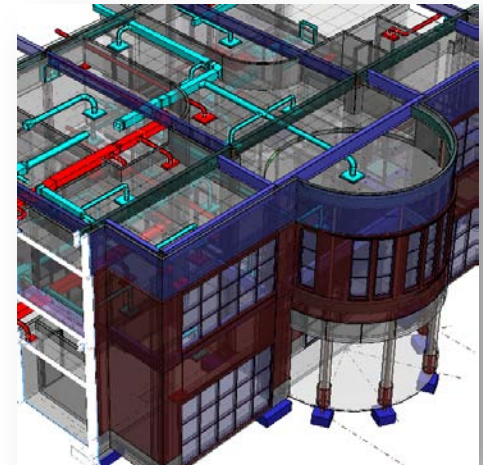
ProjectWise i-model Composer Application Support

The following is a list of some of the applications that ProjectWise i-model Composer supports.

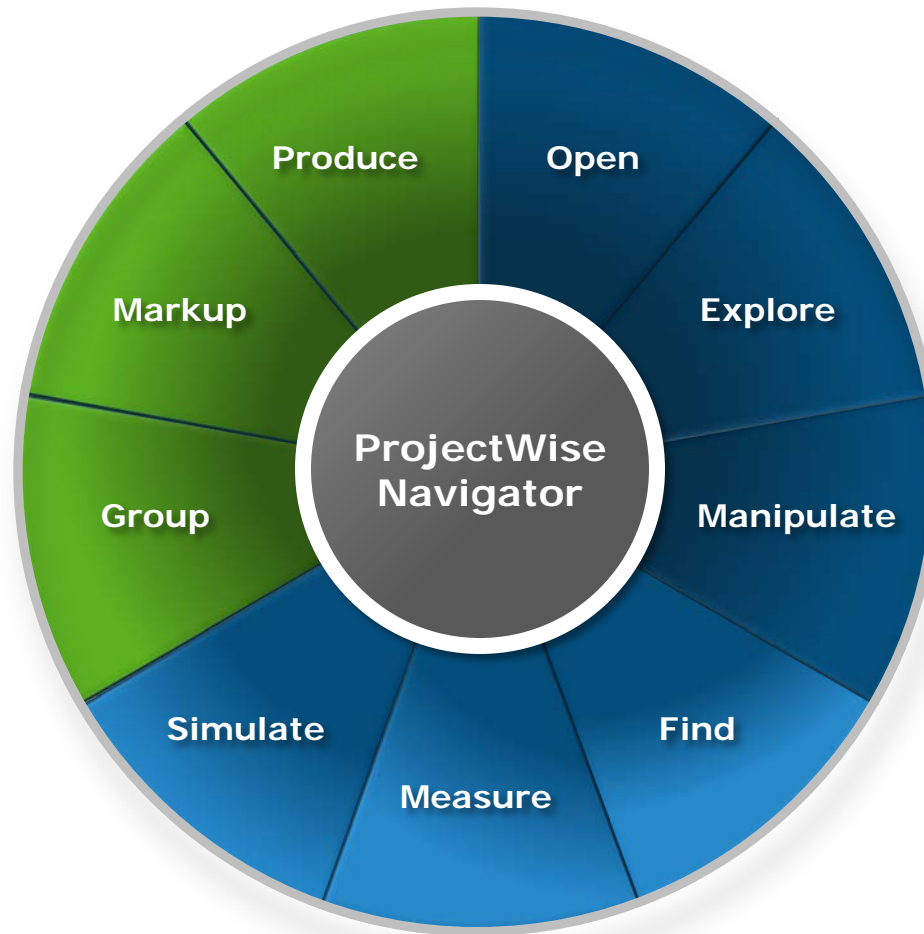
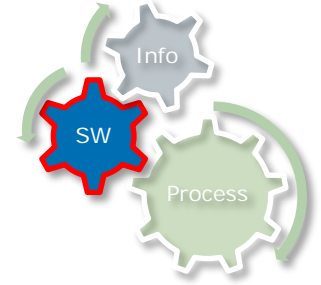
Application	Version	Format	ProjectWise i-model Composer	ProjectWise Dynamic Composition Service	Property Support	Comments
ADT / AutoCAD Architecture	.	DWG	X	.	.	.
AutoCAD MEP	.	DWG	X	.	.	Object Enabler required
Autodesk 3ds	3.0 to 2009	3DS	X	.	.	.
AutoPipe	6.3 to 9.1	DAT	X	.	X	.
AutoPlant P&ID	8.9, 8.11	DWG	X	X	X	.
AutoPlant PDW (3D)	8.9, 8.11	DWG	X	X	X	.
Bentley Architecture	8.9, 8.11	DGN	X	.	X	.
Bentley Electrical	8.11	DGN	X	X	.	.
Bentley Map	.	DGN	X	.	.	.
Bentley Building Mechanical Systems	8.9, 8.11	DGN	X	.	X	.
Bentley Rail Overhead Line	.	DGN	X	X	.	.
Bentley Rail Track	.	DGN	X	X	.	.
Bentley Structural	8.9, 8.11	DGN	X	X	X	.
CAD-Duct	.	DWG	X	.	.	Object Enabler required
CAD-Mech	.	DWG	X	.	.	Object Enabler required
CIS/2	.	STP	X	.	X	Requires Bentley Structural to import to DGN.
GenerativeComponents	.	DGN	X	X	.	.
Bentley GEOPAK	.	DGN	X	.	.	.
IFC	.	IFC	X	.	X	.
InRoads	.	DGN	X	.	X	.
ISM	8.11	DGN	X	.	X	Supported via import/export capability provided in Building applications
JSM	.	JSM	X	.	X	.
Bentley MXROAD	.	DWG	X	.	.	.
OBJ	.	OBJ	X	.	.	.
OpenPlant P&ID	8.11	DGN	X	X	X	.
PDMS	.	XML	X	.	X	Requires XMpLant
PDS (DRV)	.	DGN	X	.	X	.
PlantSpace Design Series (3D)	8.9	DGN	X	X	X	.
MicroStation PowerDraft	.	DGN	X	X	.	.
ProSteel AutoCAD	8.9, 8.11	DWG	X	X	X	.
ProSteel MicroStation	.	DGN	X	X	X	.
Bentley Rebar	.	DGN	X	X	.	.
Revit Architecture (former Revit Building)	.	RVT	X	.	X	Supported via Revit plug-in which is available with Bentley Architecture
Revit MEP (former Revit Systems)	.	RVT	X	.	X	Supported via Revit plug-in which is available with Bentley Architecture
Revit Structural	.	RVT	X	.	X	Supported via Revit plug-in which is available with Bentley Architecture
Rhino (OpenNURBS)	.	3DM	X	.	.	.
RM Bridge	.	DGN	X	.	.	.
SketchUp	.	SKP	X	.	.	.
Bentley SpacePlanner	.	DGN	X	.	X	.
Speedikon (AutoCAD)	.	DWG	X	.	.	.
Speedikon (MicroStation)	.	DGN	X	.	.	.
XMpLant	.	XML	X	.	X	.

What is an i-model used for?

- **An i-model** is used for:
 - Walkthrough, Navigate and Explore
 - Markups and Review
 - Measuring
 - Dynamic Plans, Sections and Details
 - Finding and Reviewing Intelligent data
 - Printing and PDF
 - Schedule Simulation
 - Clash Detection
 - Visualisation
 - Animation

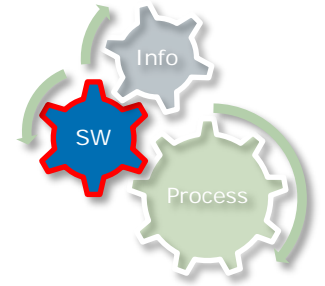


ProjectWise Navigator



View + Analyze + Augment

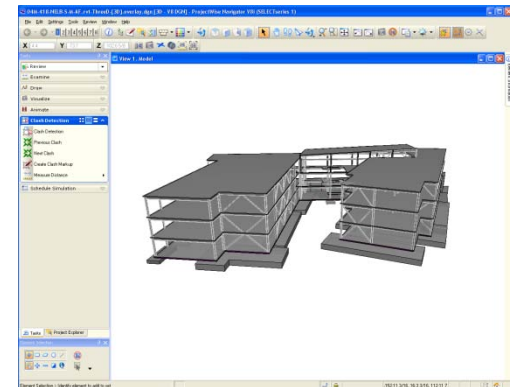
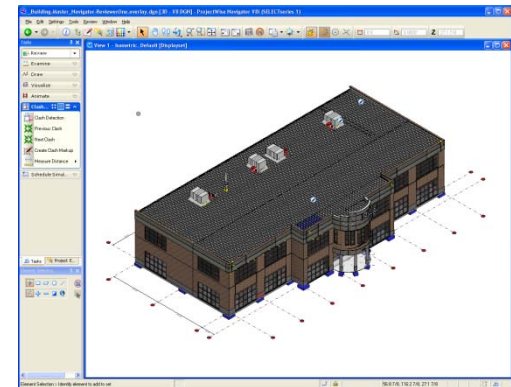
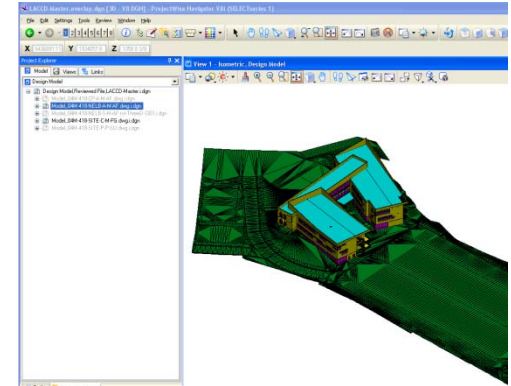
ProjectWise Navigator



View + Analyze + Augment

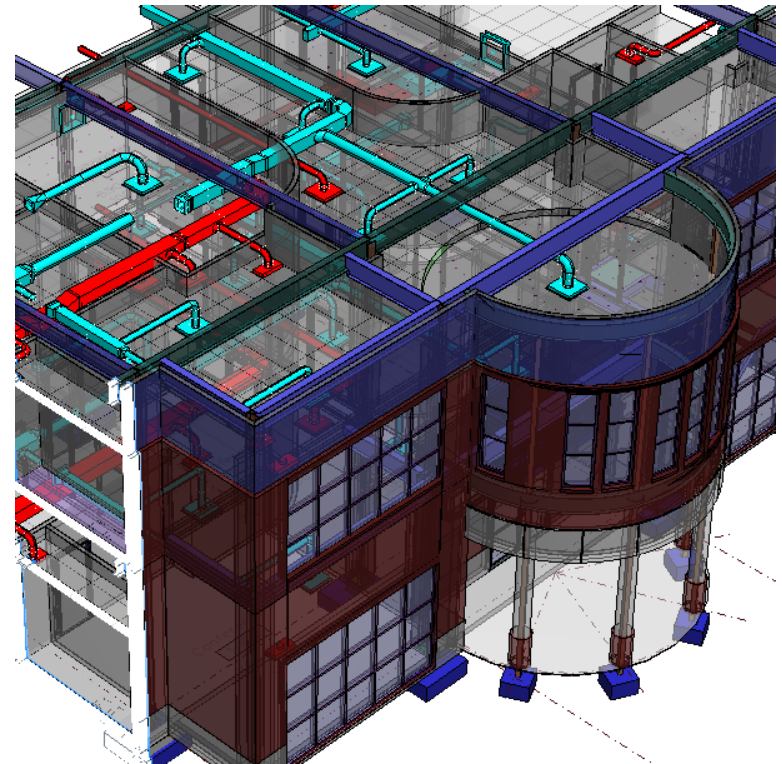
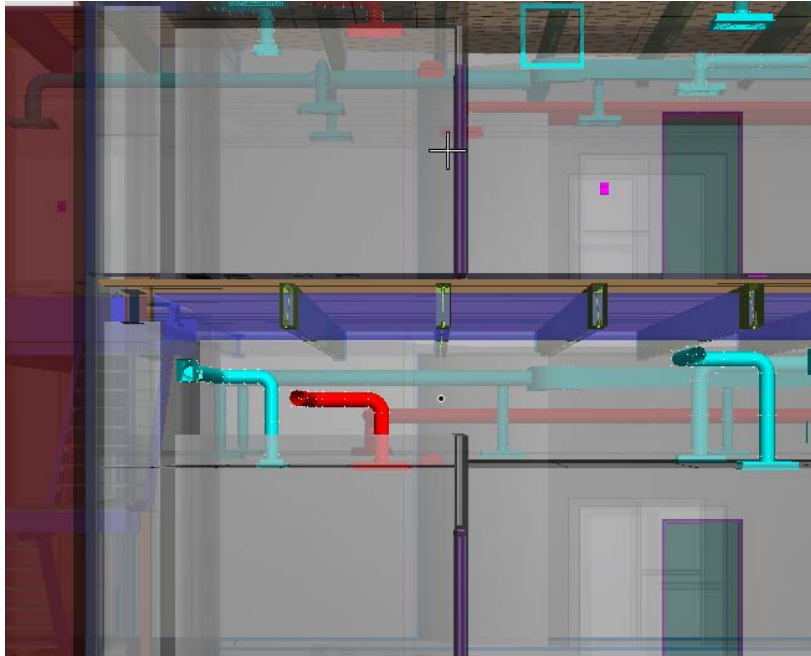
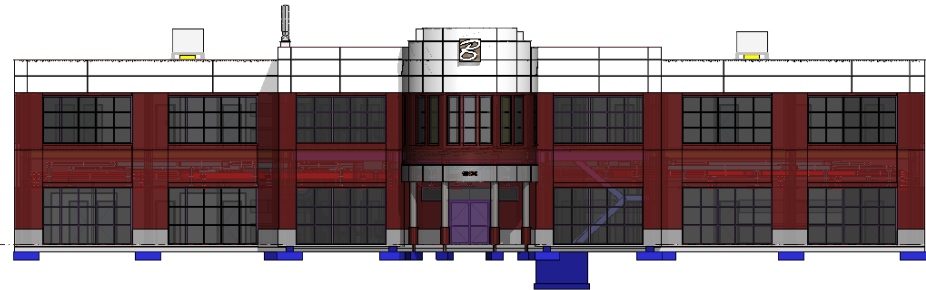
Open

- i-model from DWG
- i-model from Bentley BIM
- i-model plug-in for Revit



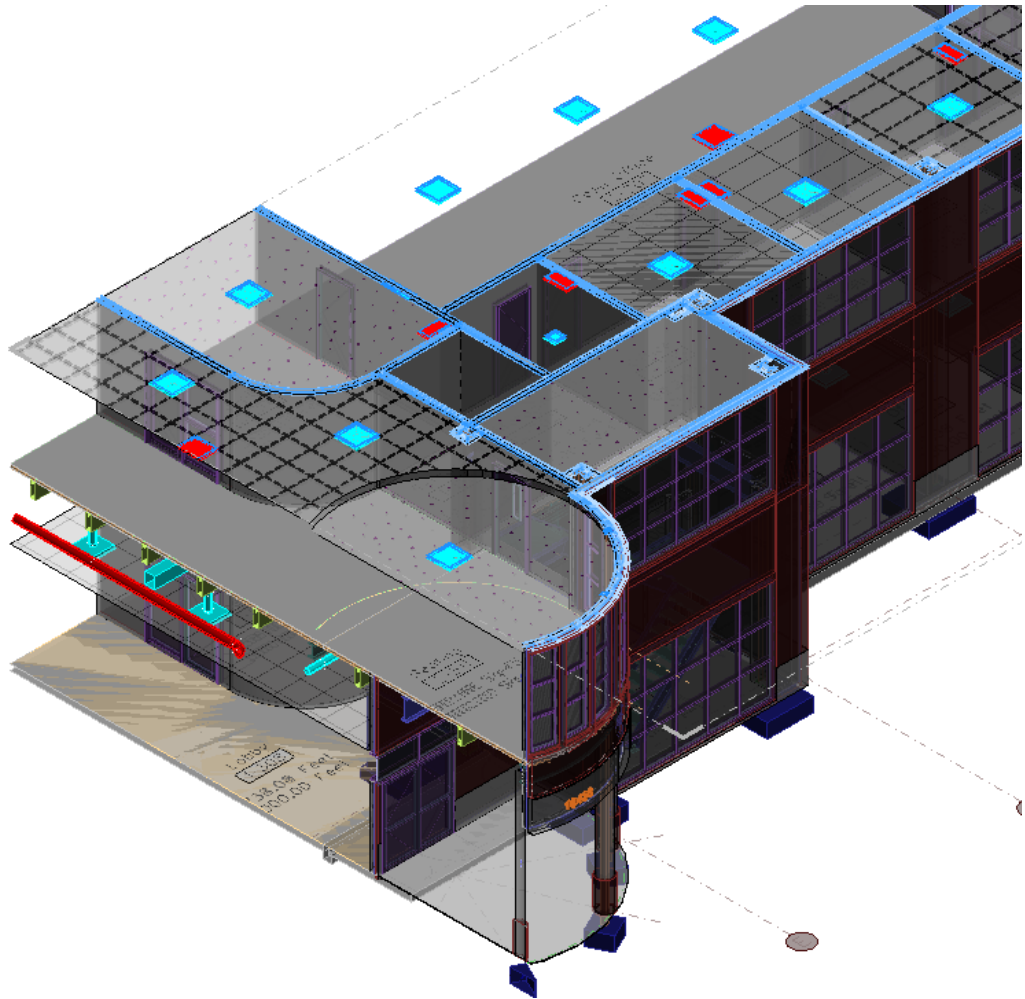
Explore

- Walk
- Fly
- Rotate

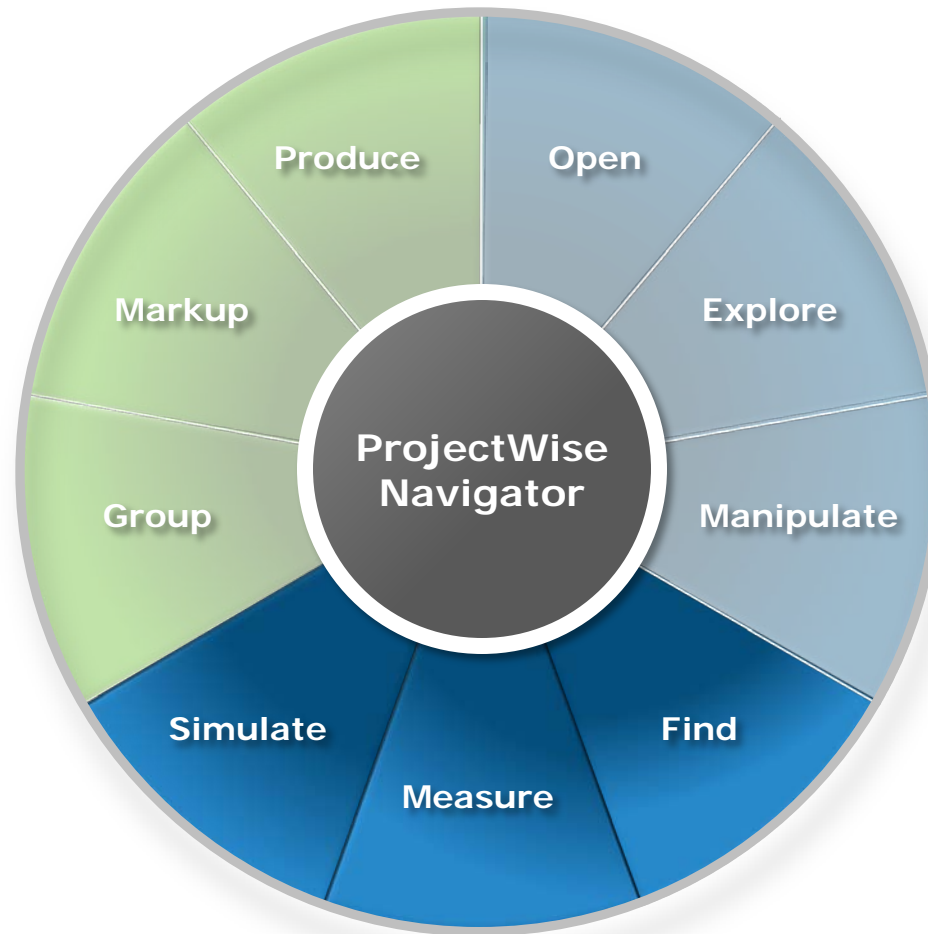
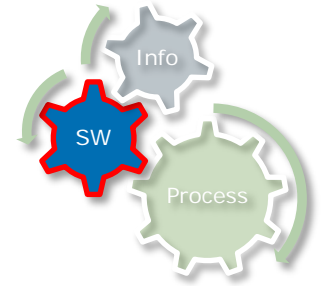


Manipulate

- Display Modes
- Saved Views
- Sectioning

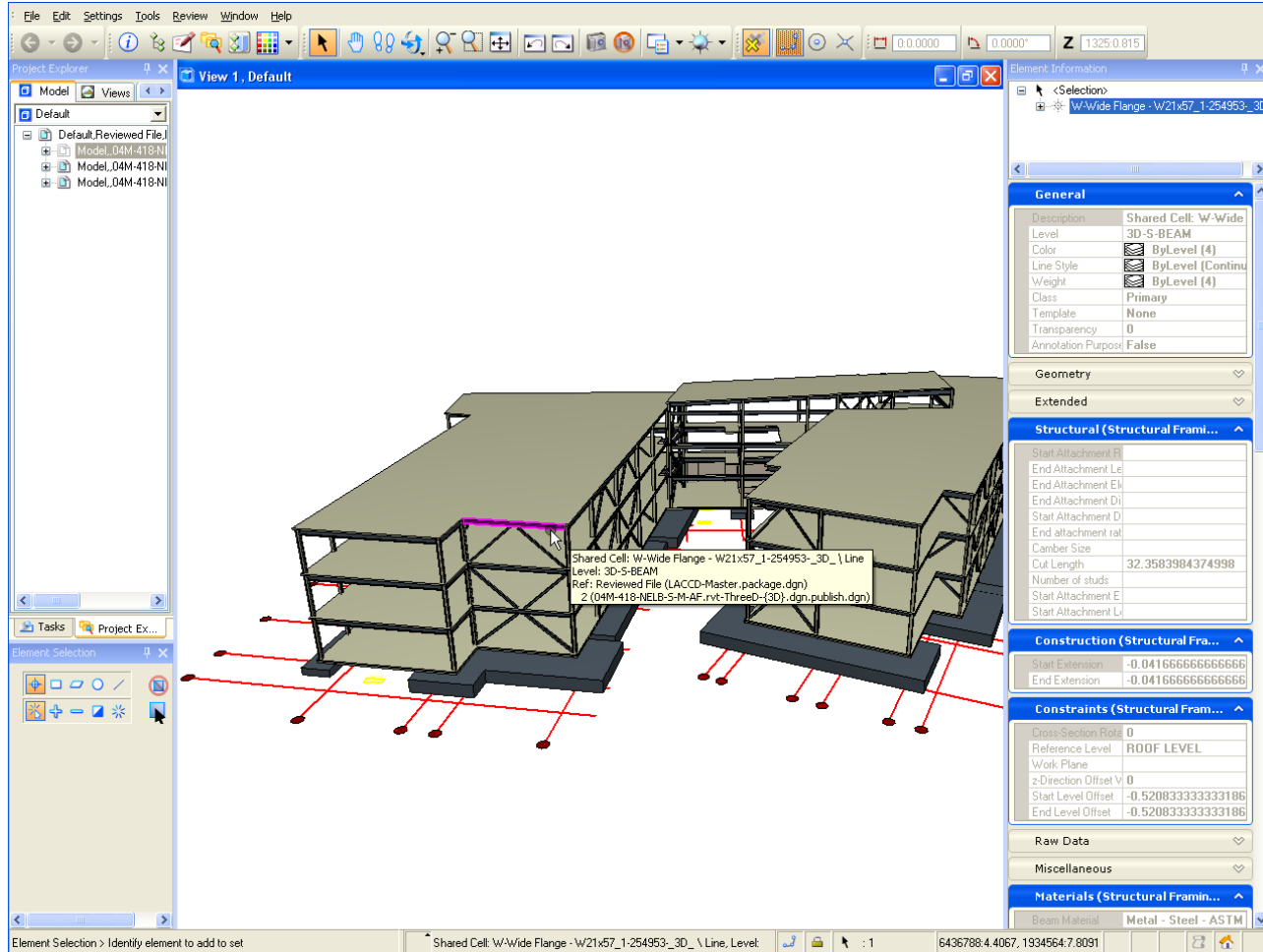


ProjectWise Navigator



View + **Analyze** + Augment

Find



Measure

Review

Examine

Draw

Visualize

Animate

View 3 - Front, Default [Displa...]

Measure Distance

Method: Between Points

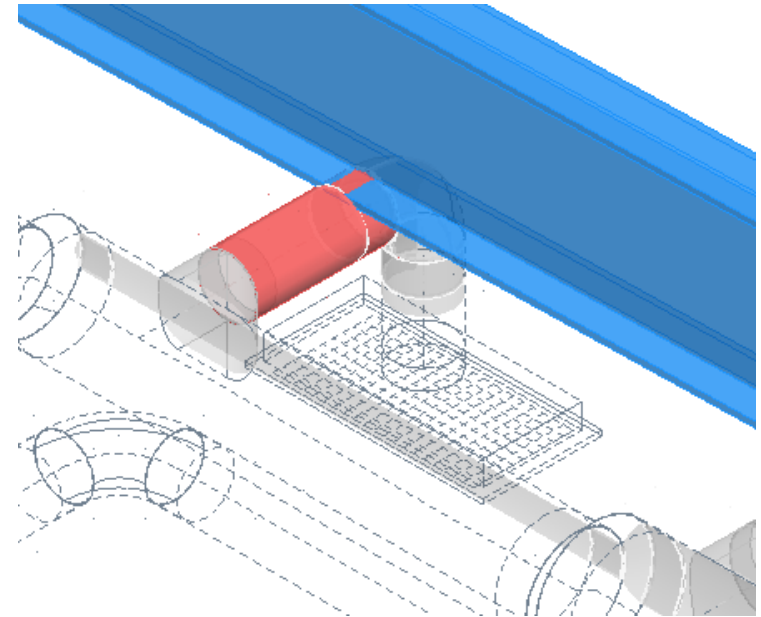
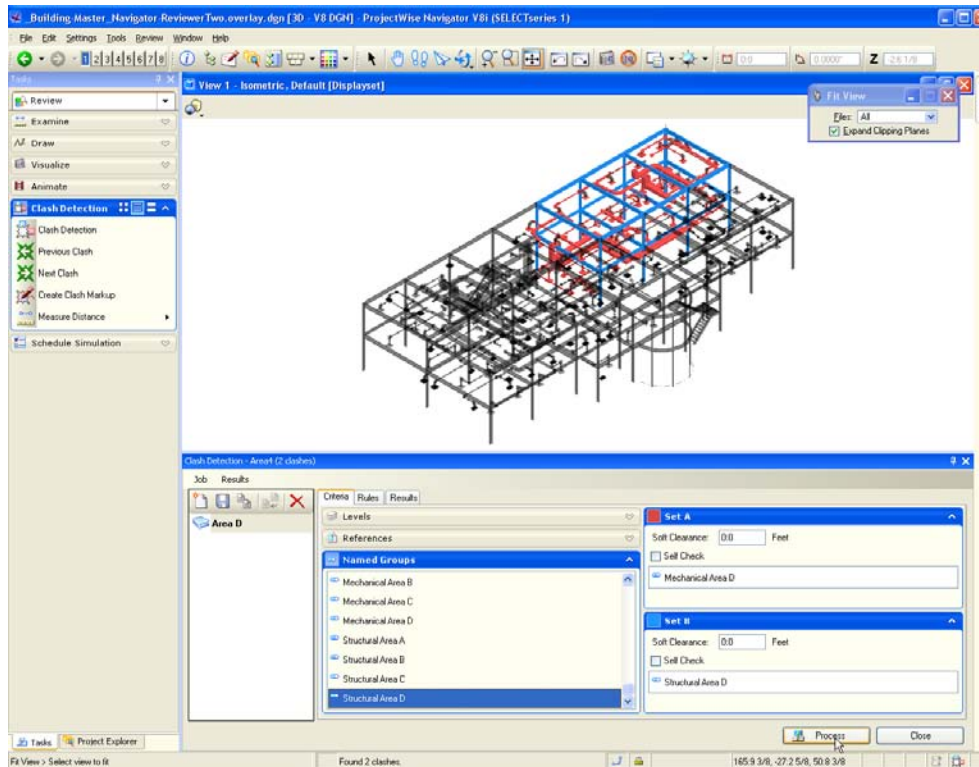
About: Global Z

	True	Projected
Distance:	1' 11 1/2"	0' 0"
Total:	1' 11 1/2"	0' 0"

	X	Y	Z
Start Point:	95' 9 3/8"	7' 5 5/8"	11' 5"
Finish Point:	95' 9 3/8"	7' 5 5/8"	13' 4 1/2"
Delta:	0' 0"	0' 0"	1' 11 1/2"

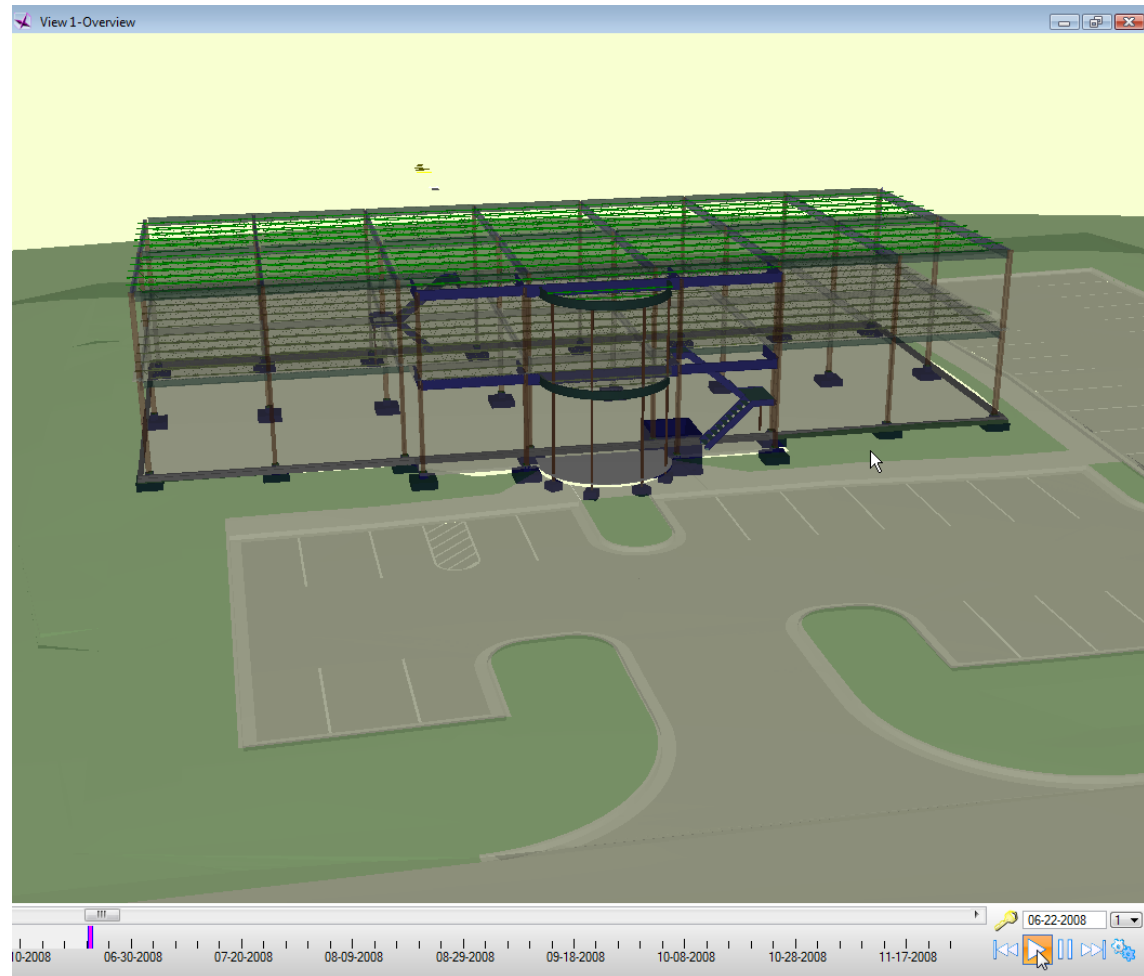
Simulate

- Clash

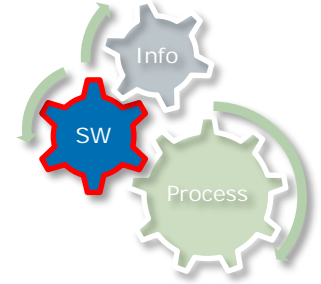


Simulate

- Schedule



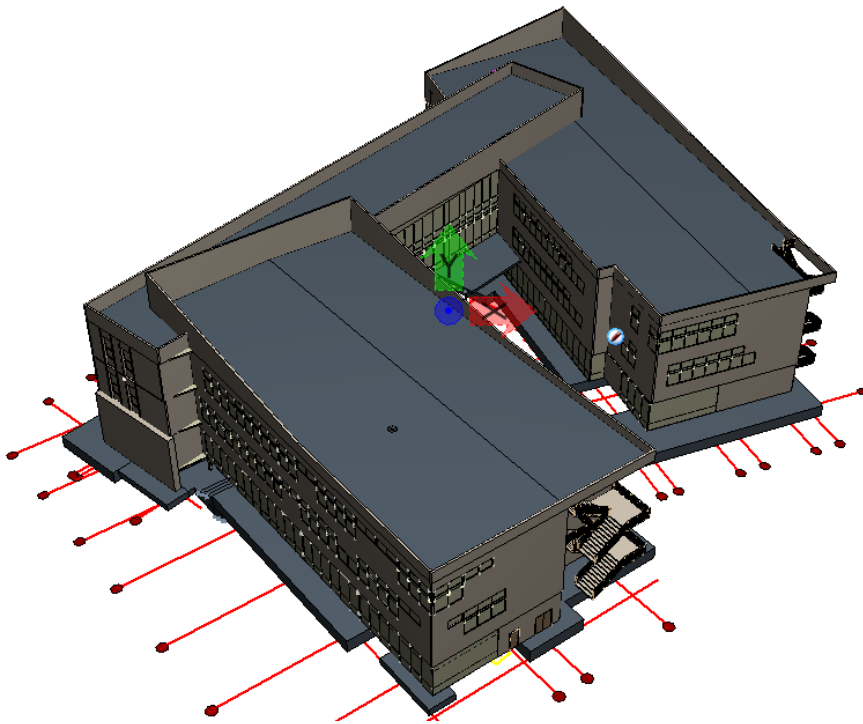
ProjectWise Navigator



View + Analyze + **Augment**

Produce

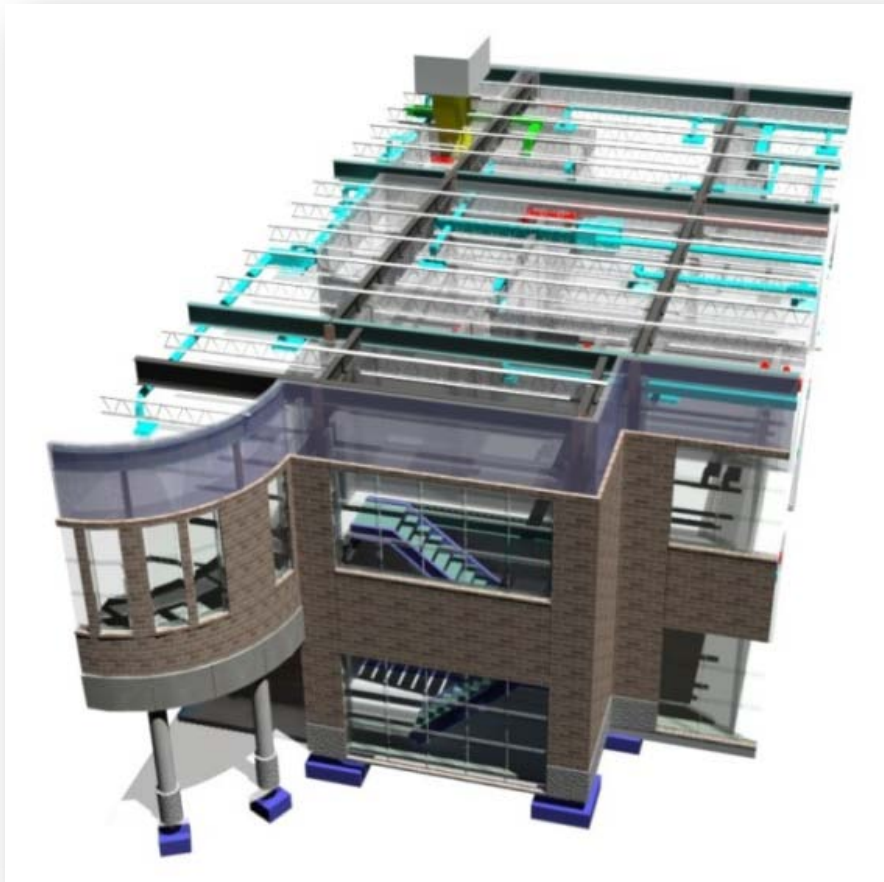
- Quantity and Schedule Reporting



Item	Area	Assembly Code	Assembly Description	Volume	Width
Walls	871.88	82010	Exterior Walls	2179.69	2.5
Walls	1575.01	82010	Exterior Walls	3937.51	2.5
Walls	648.55	82010	Exterior Walls	1609.84	2.5
Walls	750.46	82010	Exterior Walls	1862.54	2.5
Walls	403.97	82010	Exterior Walls	993.85	2.5
Walls	157.50	82010	Exterior Walls	393.75	2.5
Walls	202.50	82010	Exterior Walls	506.25	2.5
Walls	376.75	82010	Exterior Walls	941.88	2.5
Walls	214.50	82010	Exterior Walls	536.25	2.5
Walls	487.50	82010	Exterior Walls	1218.75	2.5
Walls	660.01	82010	Exterior Walls	1624.87	2.5
Walls	363.14	82010	Exterior Walls	891.77	2.5
Walls	153.00	82010	Exterior Walls	382.50	2.5
Walls	115.50	82010	Exterior Walls	288.75	2.5
Walls	41.85	A1010200	Foundation Walls	41.85	1
Walls	79.63	A1010200	Foundation Walls	79.63	1
Walls	37.77	A1010200	Foundation Walls	37.77	1
Walls	75.54	A1010200	Foundation Walls	75.54	1
↳					
Total Area	7215.05		Total Volume	17602.98	

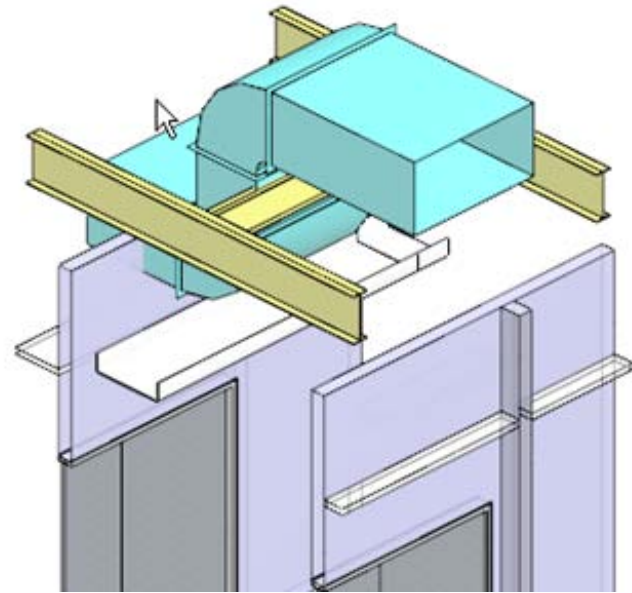
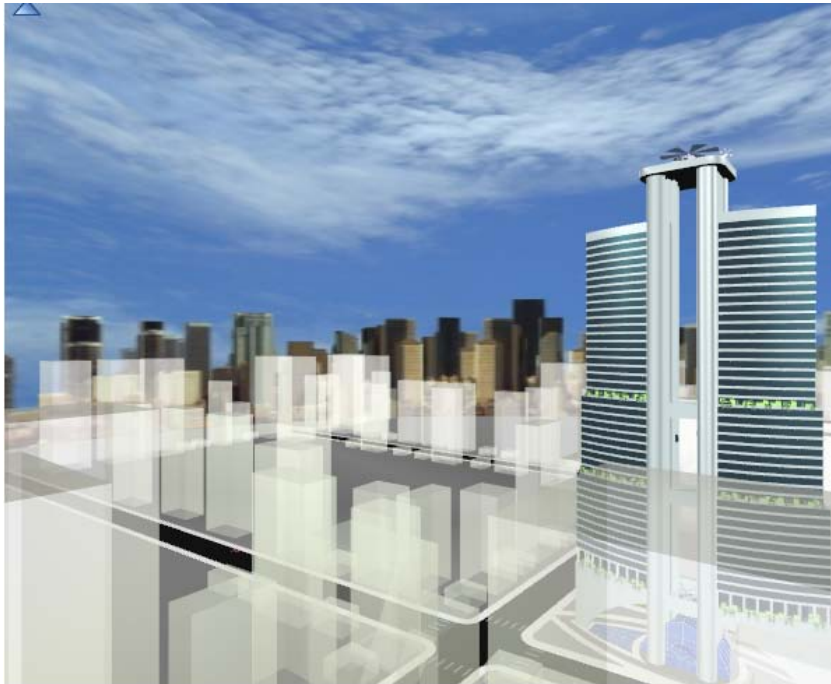
Produce

- Visualization



Produce

- PDF



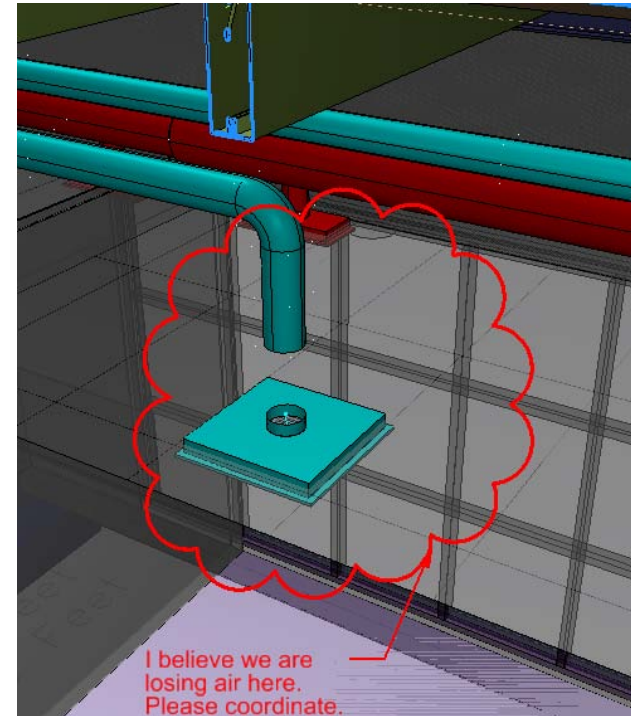
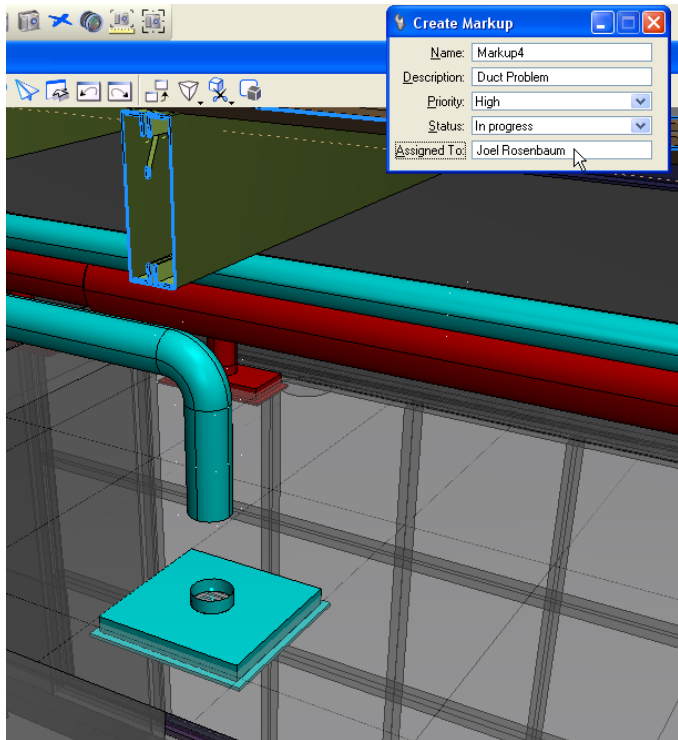
Group

The screenshot displays the Bentley ProjectWise Navigator V8i software interface. The main window shows a 3D model of a building's mechanical systems, including a complex network of blue and orange pipes and ducts. The interface includes a menu bar (File, Edit, Settings, Tools, Review, Window, Construction, Design Review, Help), a toolbar, and a Tasks panel on the left. The Tasks panel is currently set to 'Review' and includes options like 'examine', 'Measure Distance', 'Apply or Modify Clip Volume', 'Create Markup', 'Draw', 'Visualize', 'Animate', 'Clash Detection', and 'Schedule Simulation'. At the bottom, the 'Item Sets' table is visible, listing various system components and their properties.

Active	Name	Description	Count	Volume	Selection Expression	Last Rebuild
<input type="checkbox"/>	Airflow - Exhaust	Exhaust system	6	0	188 Search for any Items w...	9/22/2009 10:08:47 AM
<input checked="" type="checkbox"/>	Airflow - Return	return system	5	48,104,255	612 Search for any Items w...	9/22/2009 10:11:43 AM
<input checked="" type="checkbox"/>	Airflow - Supply	supply system	4	167,255,14	958 Search for any Items w...	9/22/2009 10:10:32 AM
<input type="checkbox"/>	Existing		1	0	41 Search for any Items w...	9/22/2009 10:15:23 AM
<input checked="" type="checkbox"/>	Low supply	low pres supply	3	6	817 Search for any Items w...	9/22/2009 10:13:34 AM
<input type="checkbox"/>	New		2	0	1717 Search for any Items w...	9/22/2009 10:15:01 AM

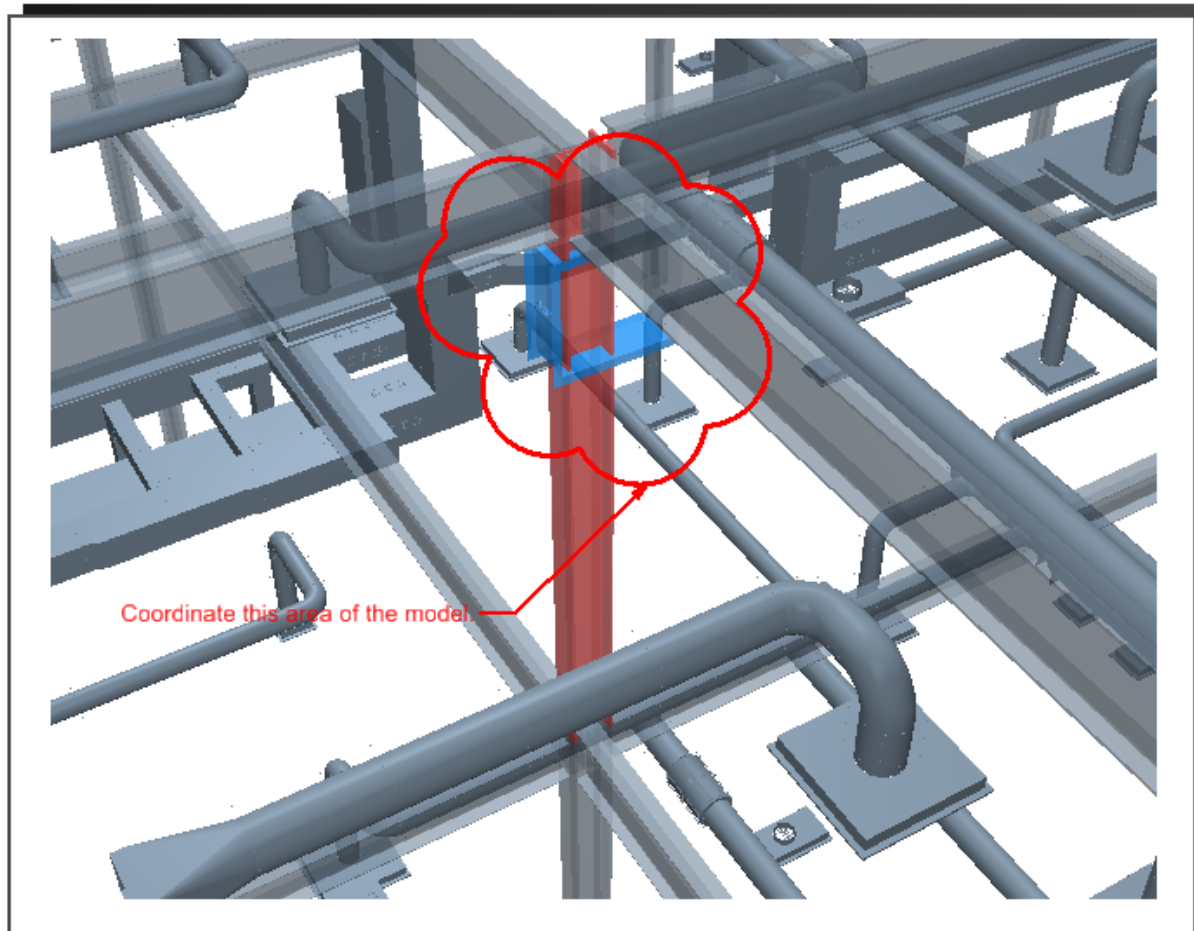
Mark-Up

- Visual Inspection



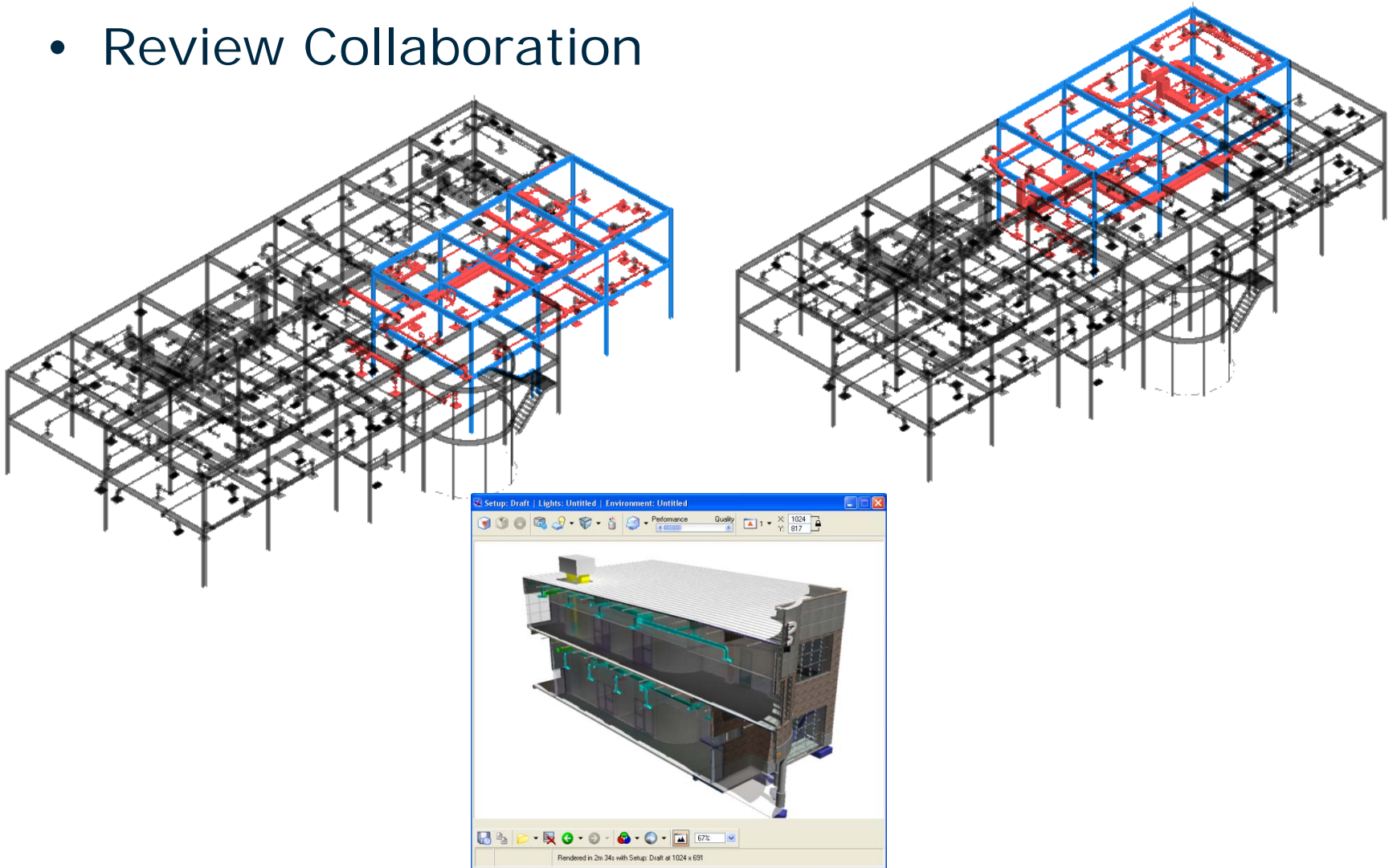
Mark-up

- Clash Review

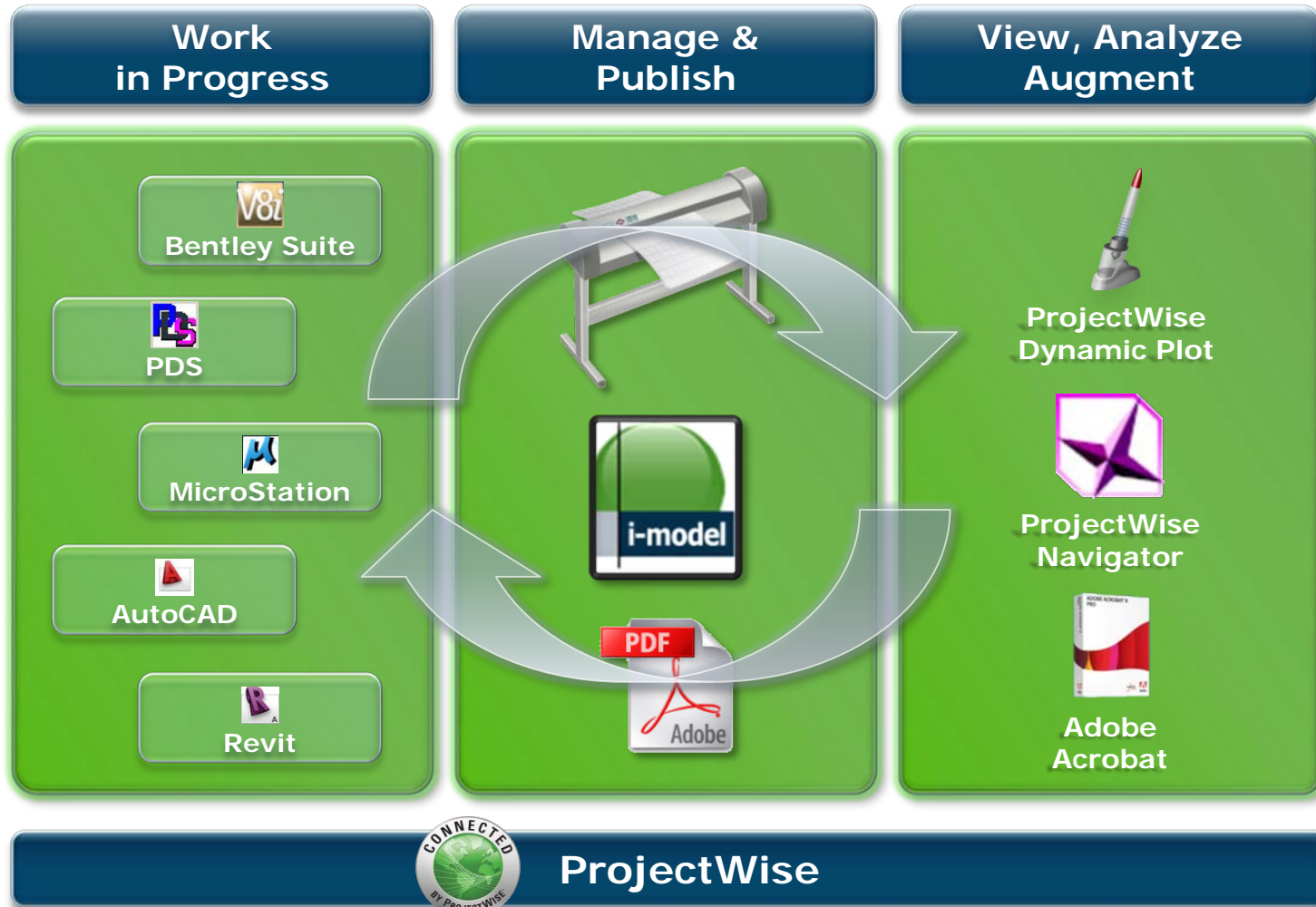


Mark-up

- Review Collaboration



Dynamic Collaboration Workflows



Paper is the Preferred Media for Review



It's Portable



It's Recyclable



It's Rollable



It's Scalable

Paper Review Workflow Challenges



Design is computer-based



Review is paper-based

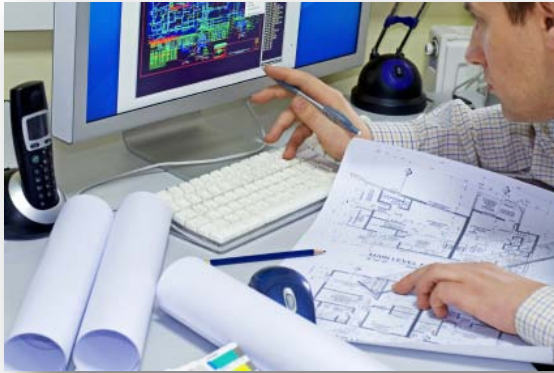


Two worlds are disconnected



Synchronizing both is slow

Dynamic Review for Paper Solution



Integrate the PC and Paper



Capture Markups in Real-Time



Enable Error-Free Transfer

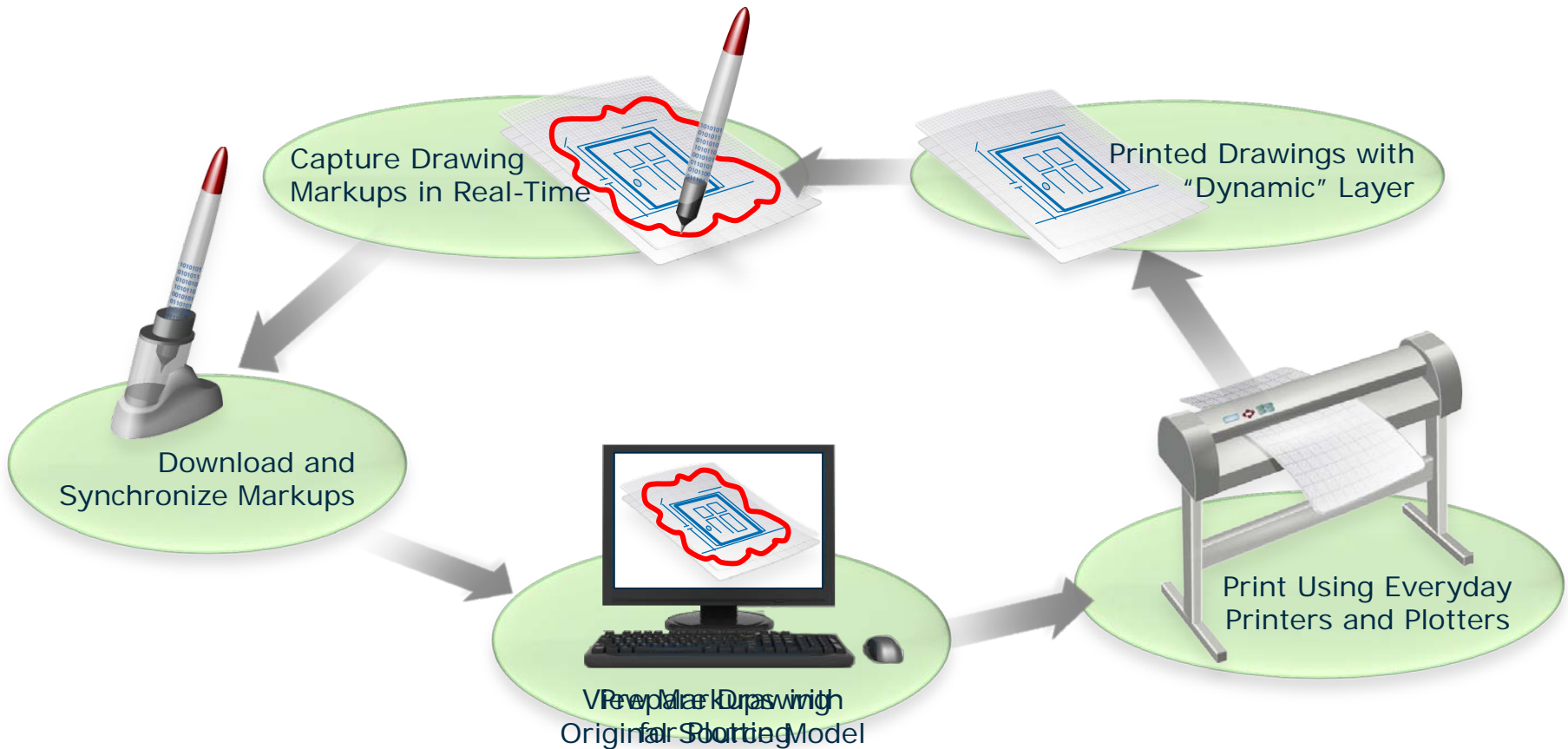


Synchronize Markups Immediately

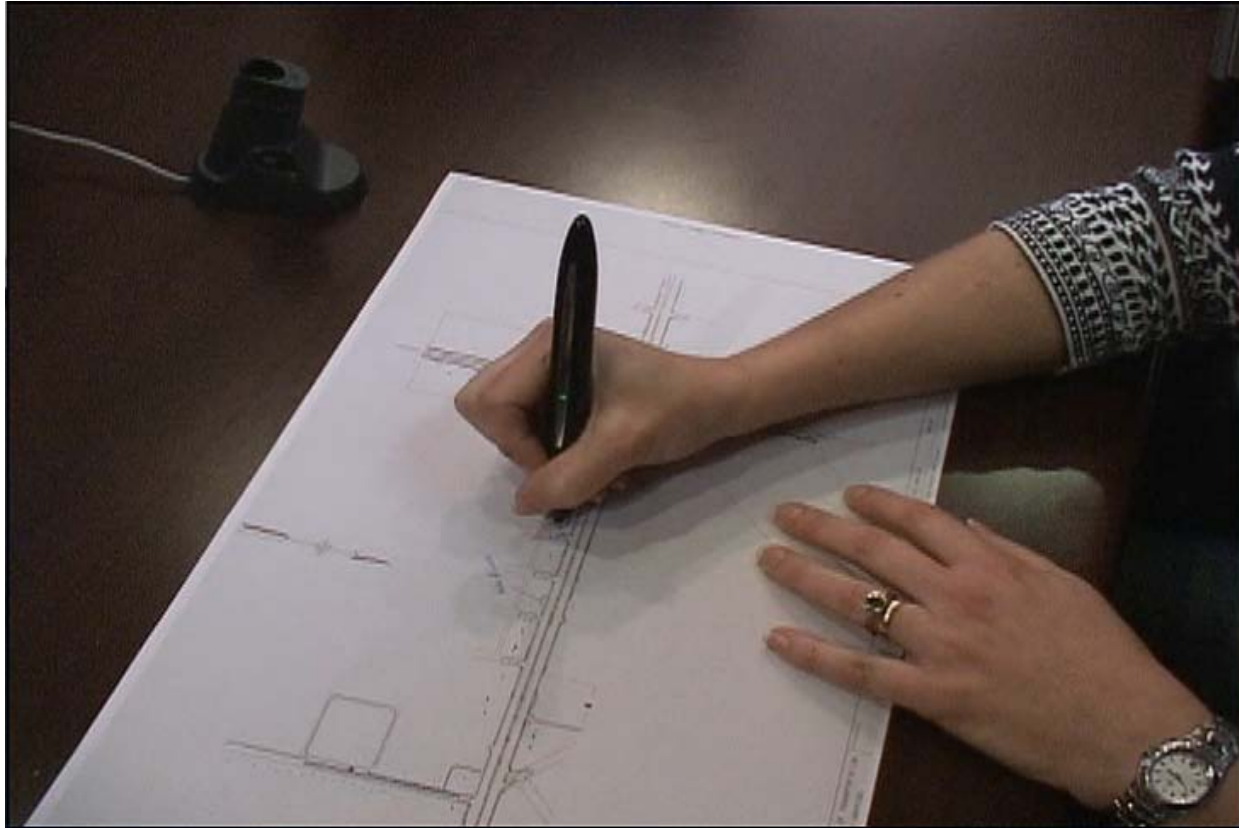


ProjectWise Dynamic Plot

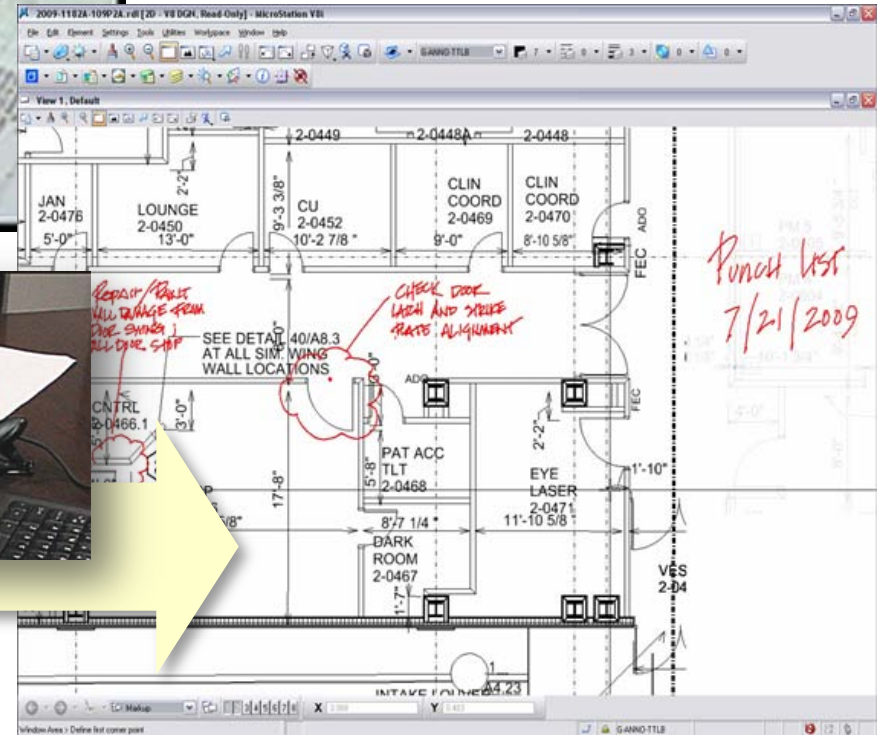
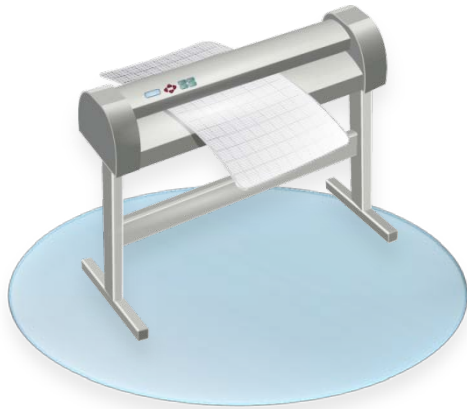
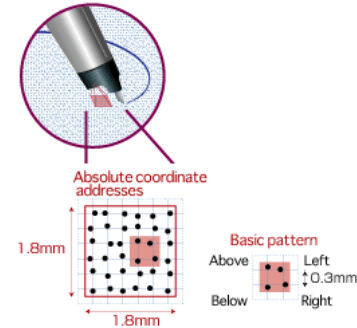
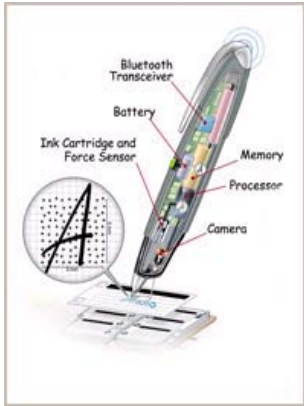
Bringing Paper into the Digital Age



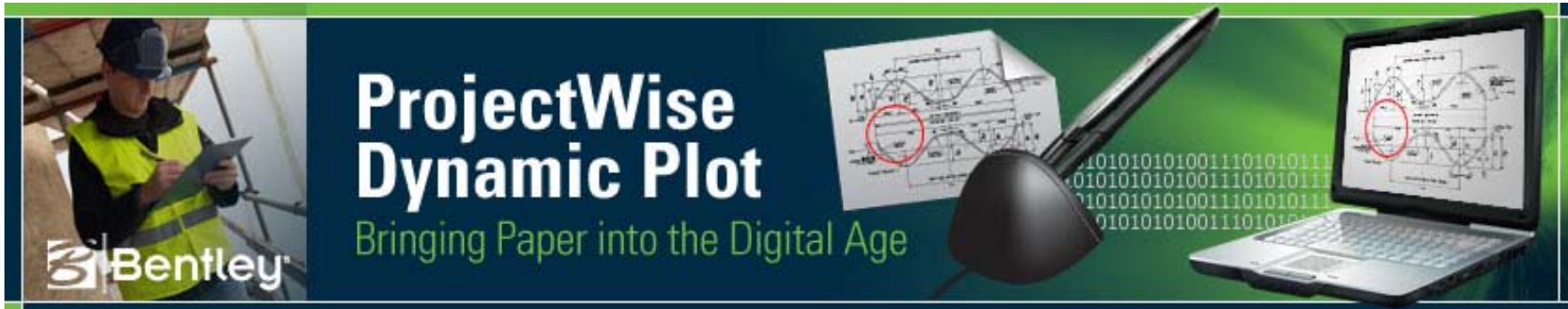
Dynamic Plot



Dynamic Plotting







- ✓ Eliminate risk of losing markups during manual transfers
- ✓ Establish markup audit trail for regulatory compliance
- ✓ Dramatically reduce time taken to sync plots and models
- ✓ Increase project quality, improve safety, reduce risk

i-models – Q&A

Q: Can I use the Graphics in an I-Model?

A: Some graphics can be used after compression – the method is to copy the elements through

Q: Why is an I-Model created with every reference file?

A: Individual i-models are created for each reference to allow for republishing after changes occur. Also control performance as the overall data set scales up.

Q: Can you edit data in an Imodel?

A: NO an i-model is read only by design, PWN is a review tool not a production tool

Q: Can you review 2d drawing?

A: Yes you can the workflow is akin to the redline work flow

Q: Can you reference separate i-models together?

A: Yes you can in PWN

Q: Can I animate the objects in an I-model?

A: Any object that you would like to animate will need to be copied into the overlay file first. This is known limitation of the software.