Automating Large Rail Project Workflows

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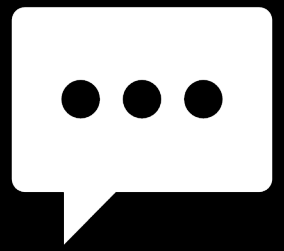
AUTODESK. UNIVERSITY

Introduction



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A Changing Paradigm

- Contemporary rail projects are vastly complex due to an intersection of several key factors. The deliverables and support that agencies and contractors ask for are shifting.
- On two large Design Build rail projects, tailored workflows and custom automation tools were developed in order to meet the project requirements.

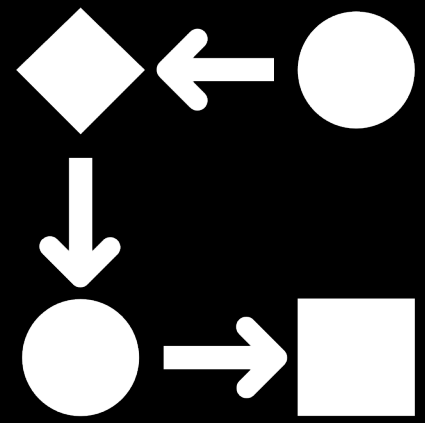
Problem

- Contractor and owner requirements scaling with new technology
  - No current project execution standards
- Project requirements
  - ProjectWise – main collaboration environment
    - BIM 360 integration did not exist yet for Civil 3d, models lived in PW
    - CDs produced from Revit
  - AM and Visualization deliverables
  - Amorphous model deliverable requirements

Solution

- Workflow Design
- Parametric Wall Design with Custom Subassemblies
- Parametric Bridge Modeling with Inventor
- Data Replication (ProjectWise <> BIM 360 <> Azure)
- Dynamo Civil 3D for Utility Model Optimization
- Geolocated dwg sheet automated export from Revit
- Asset Management

Workflow



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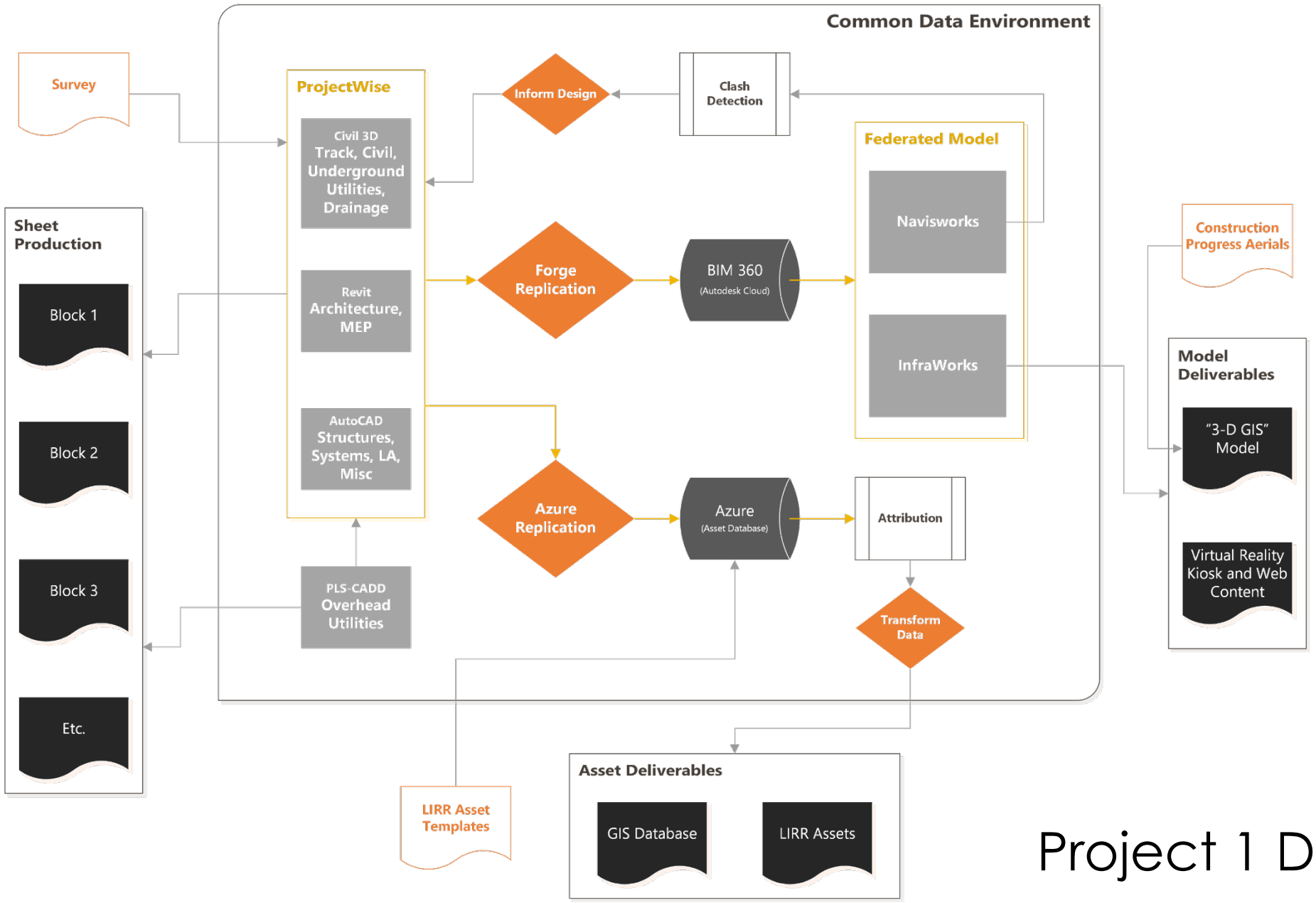
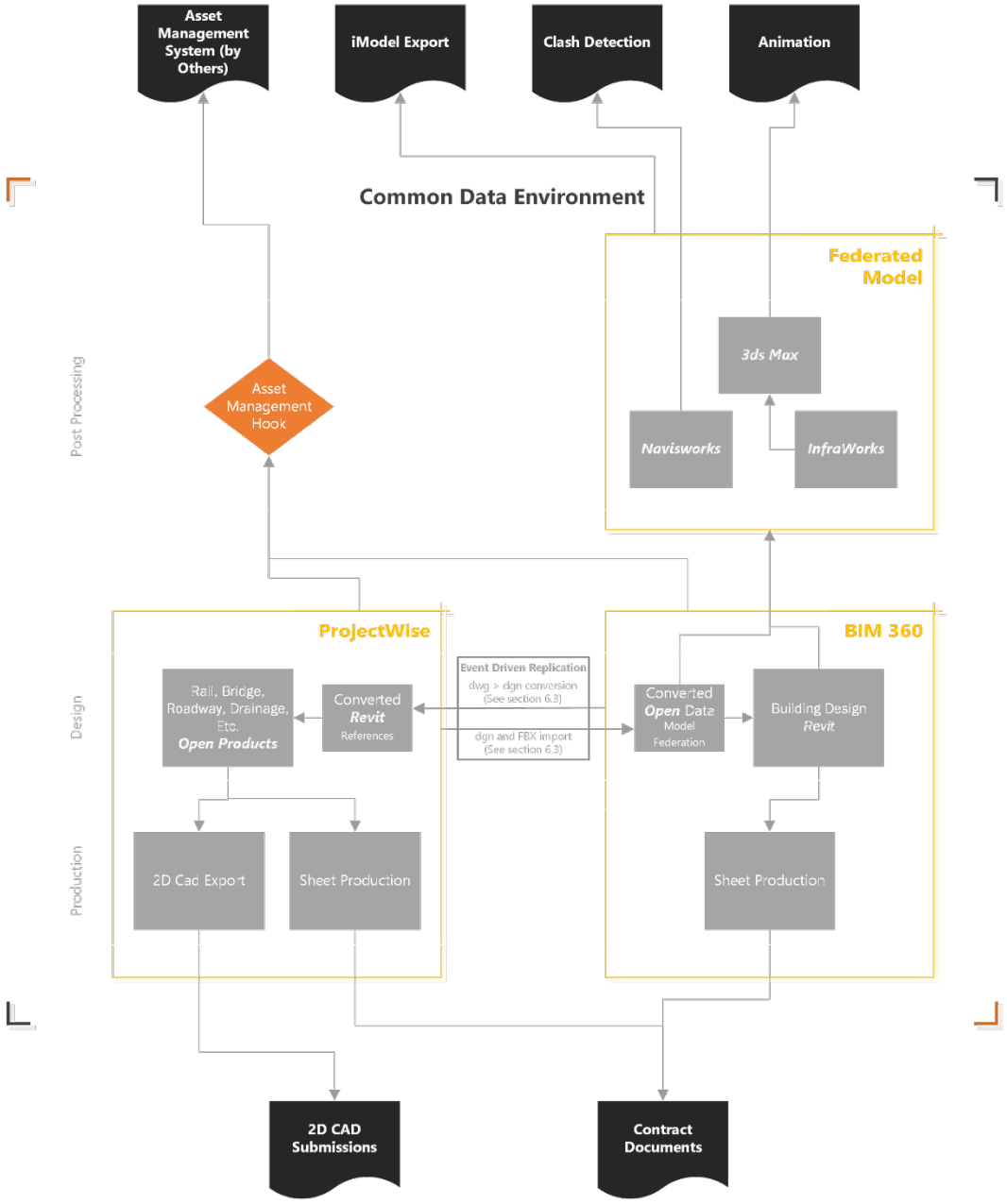
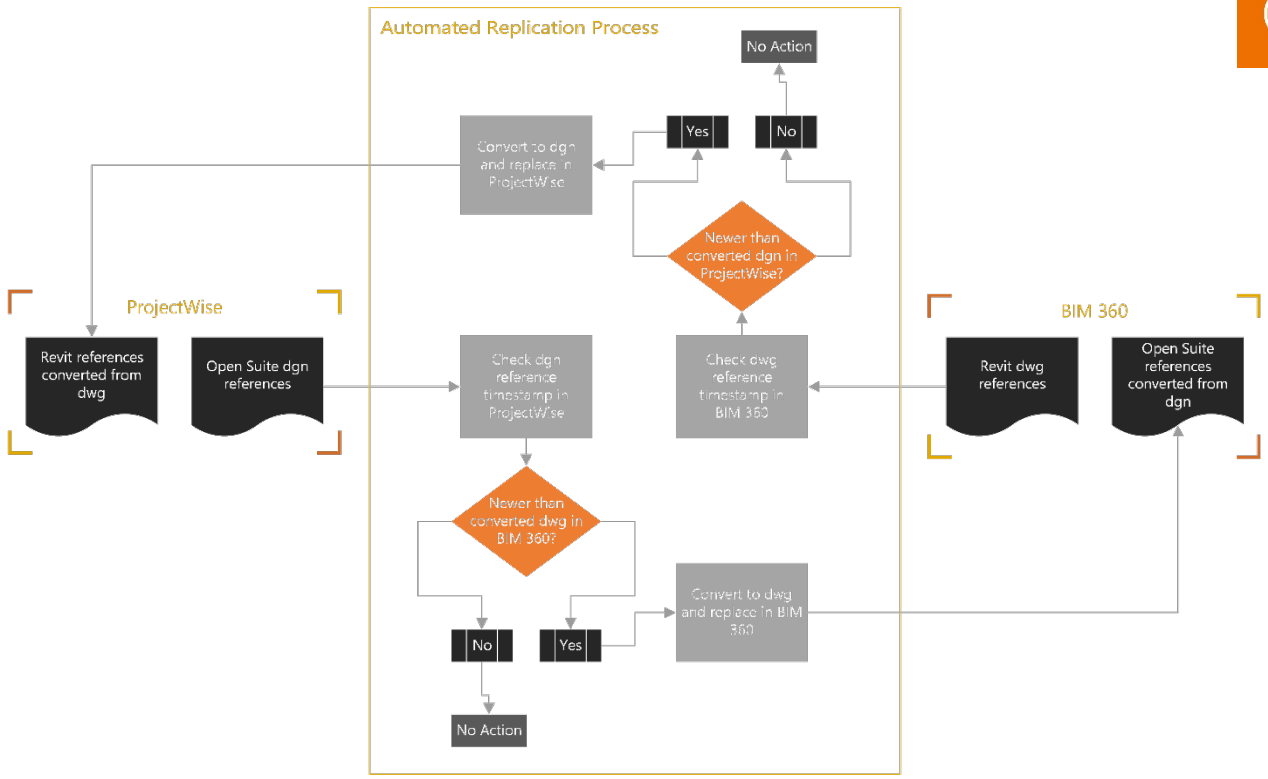
Projects 1 & 2

- Design-Build
- ProjectWise for Documentation
- BIM 360 for Federation
- Asset Management



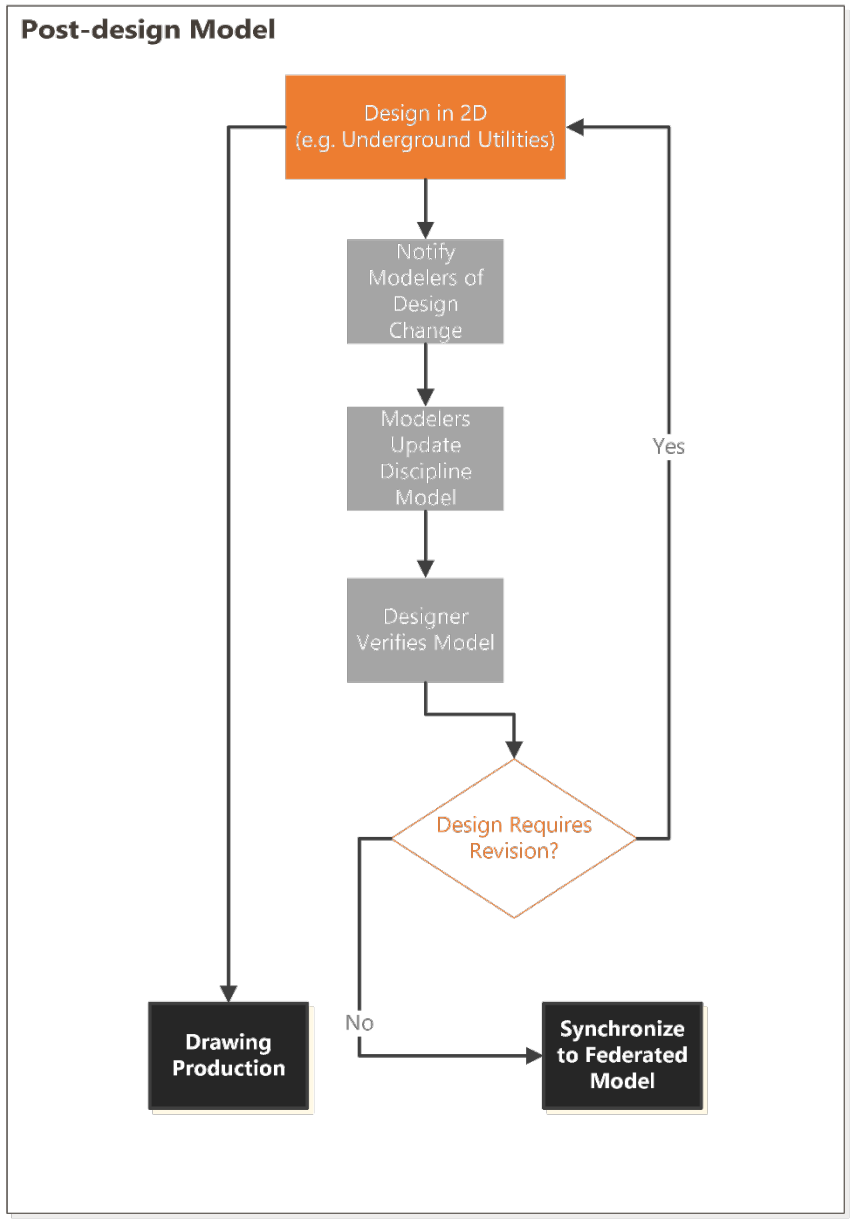
Project 1 Data Workflow

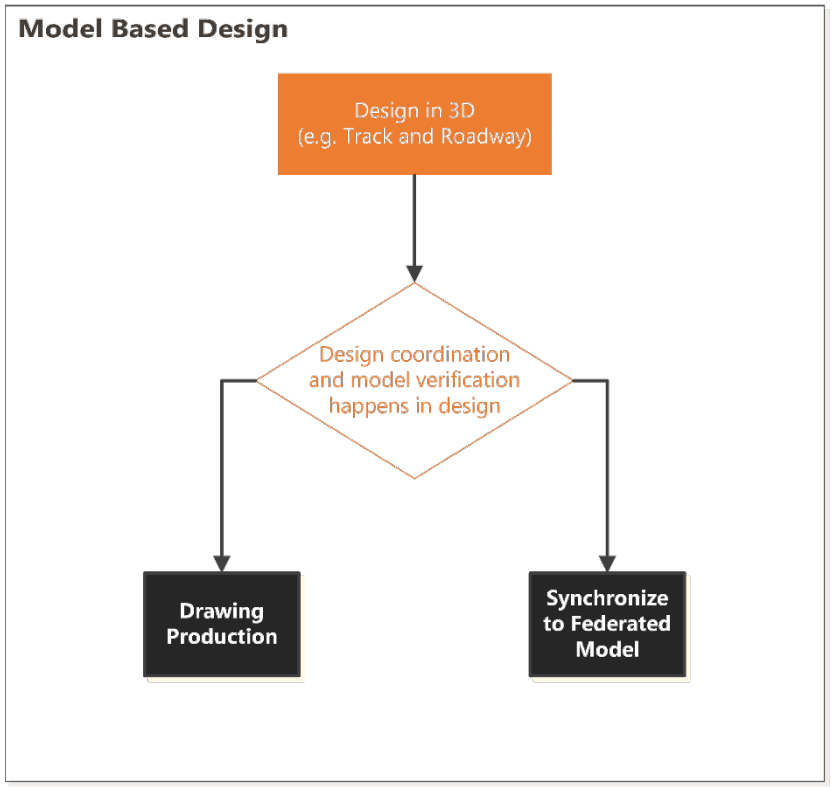




Project 2 Data Workflow

Project 1 & 2 Model Workflow



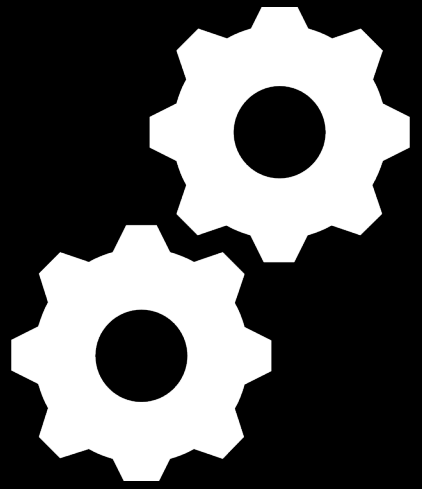


Post Design Modeling

Model Based Design

Process Maps

Project Execution



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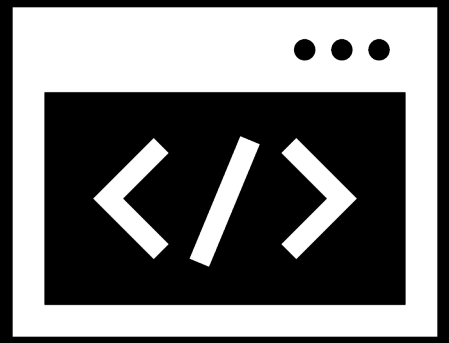
Subassembly Composer



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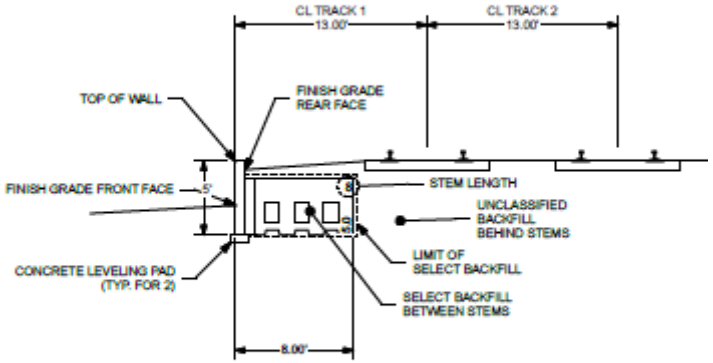
Parametric Design with Custom Subassemblies

Sample from Project 1

- Understanding the Engineering Problem
  - Foundation design is rule based with several design cases
  - Design cases must properly be represented in cross sections
  - Foundations must be used in clash detection

- Defining SAC Parameters
  - Define variables
  - Set SAC geometry
  - Build design logic

TYPE A



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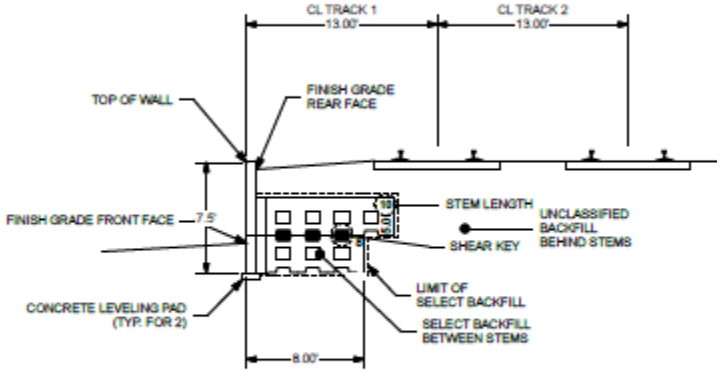
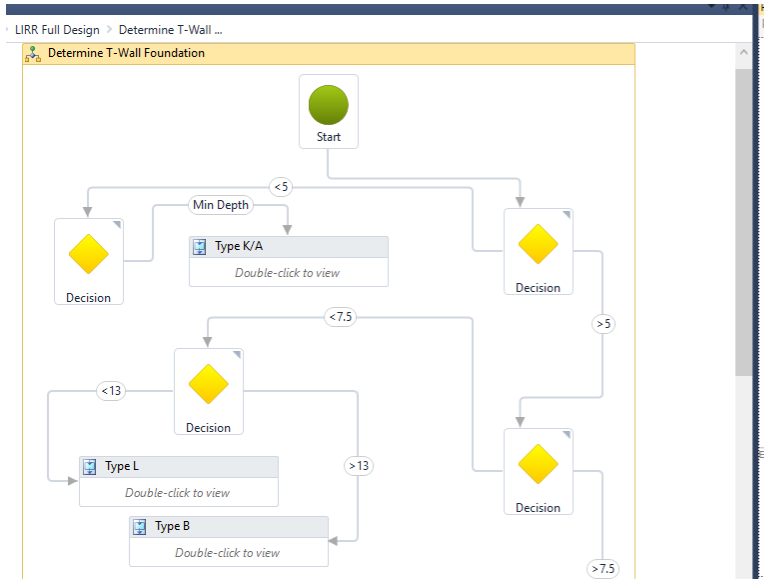
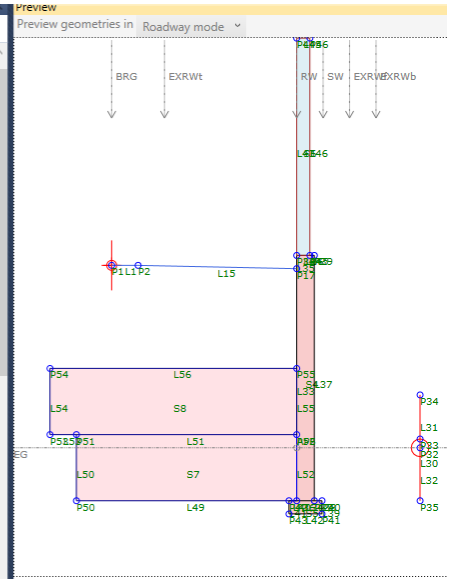


1 TYPICAL 5' HIGH T-WALL®
Scale: 1:50

2 TYPICAL 7.5' HIGH INVERTED T-WALL®
Scale: 1:50





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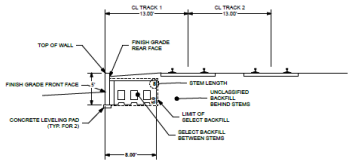

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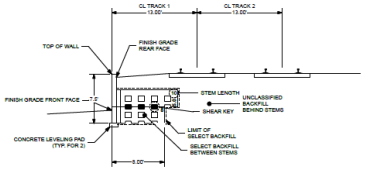

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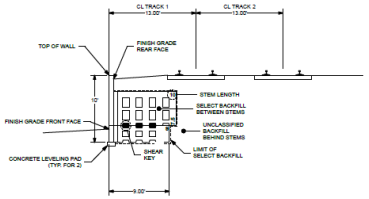

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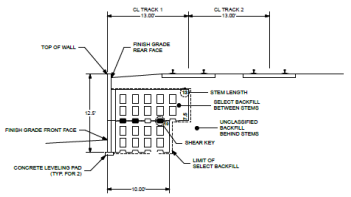

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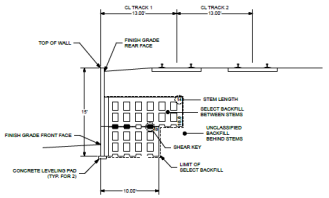

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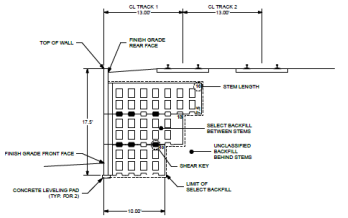

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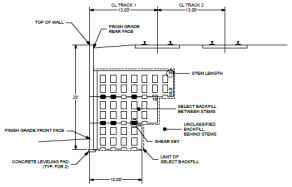

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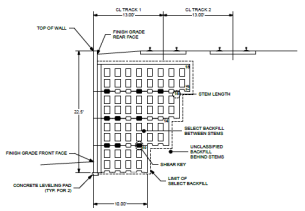

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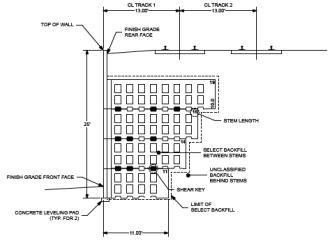
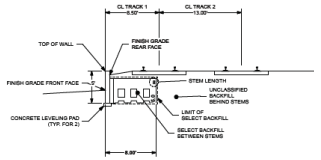
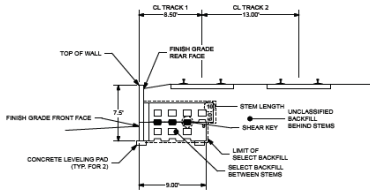


TYPE K

TYPE L





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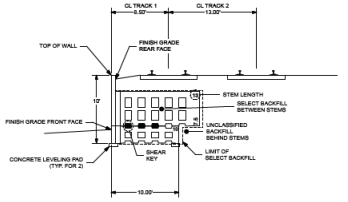

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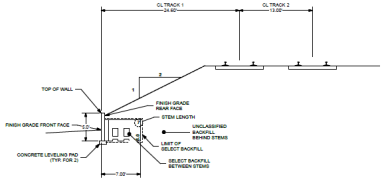

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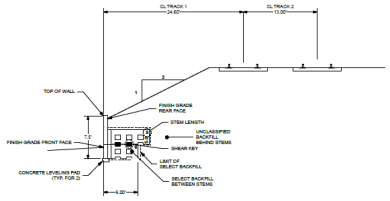

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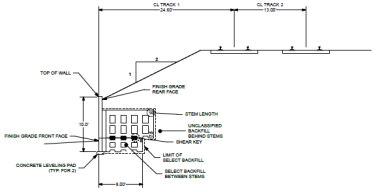
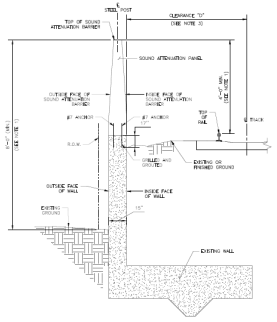
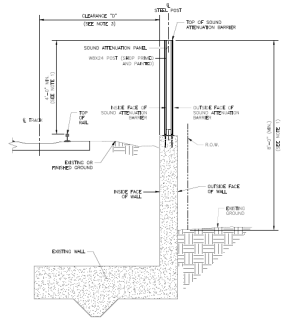
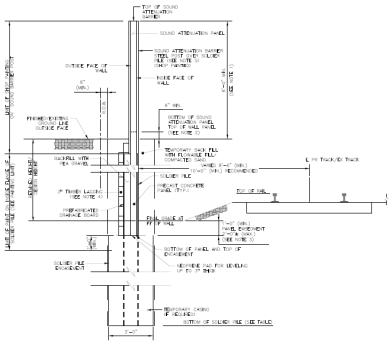




EXISTING WALL WITH NORTH SOUND ATTENUATION BARRIER ≤6 FT.
TYPICAL SECTION

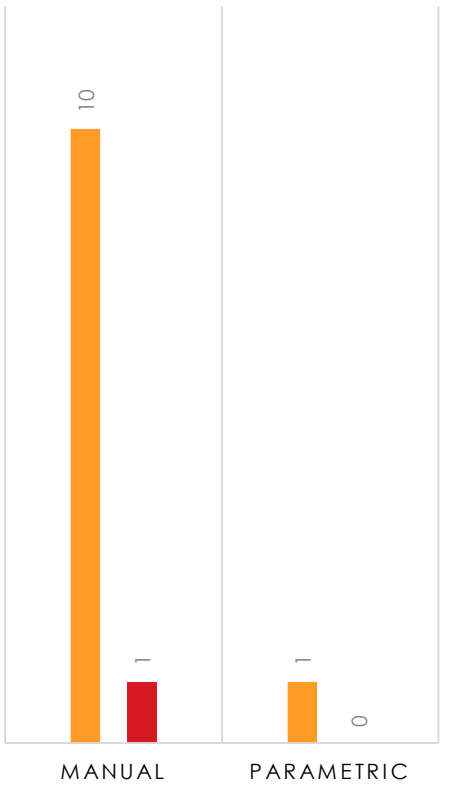


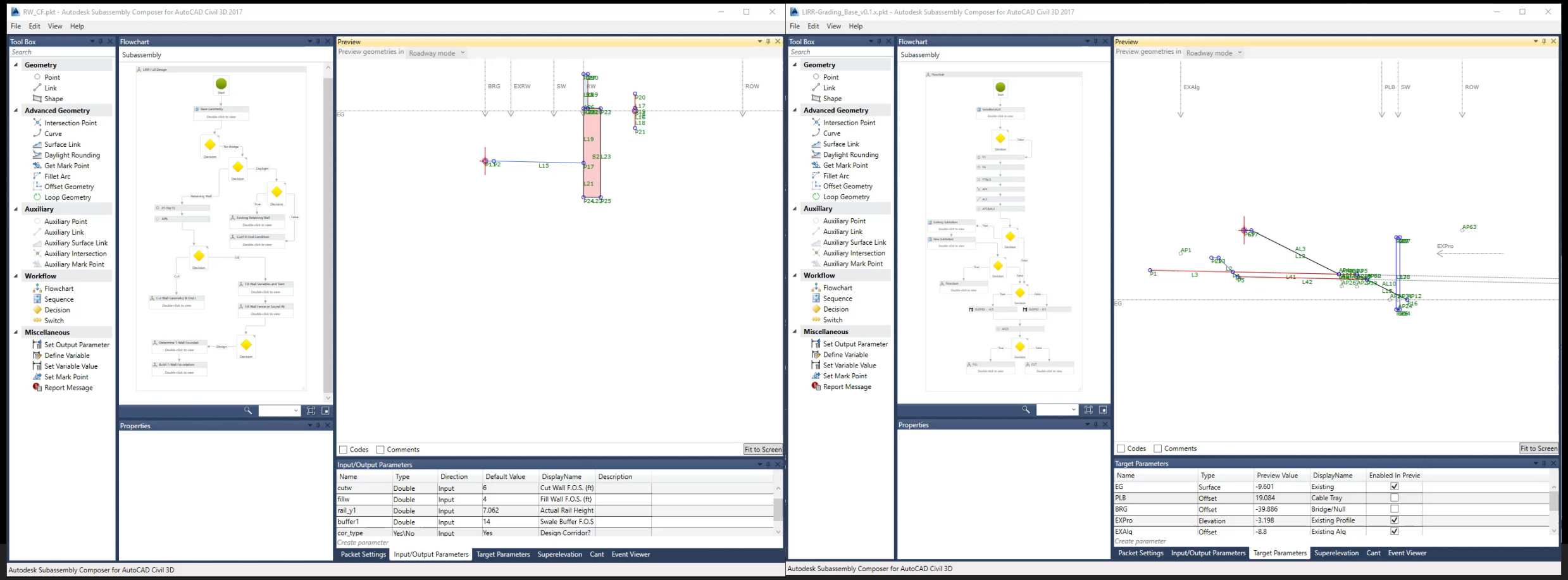
EXISTING WALL WITH SOUTH SOUND ATTENUATION BARRIER >6 FT.
TYPICAL SECTION



NORT/SOUTH TYPICAL CUT SECTION
STEEL POST AND PANEL WALL


....
HOW MANY RETAINING WALLS DO WE NEED TO DESIGN MANUALLY?
OVER 9000!!
WHAT!? 9000?!

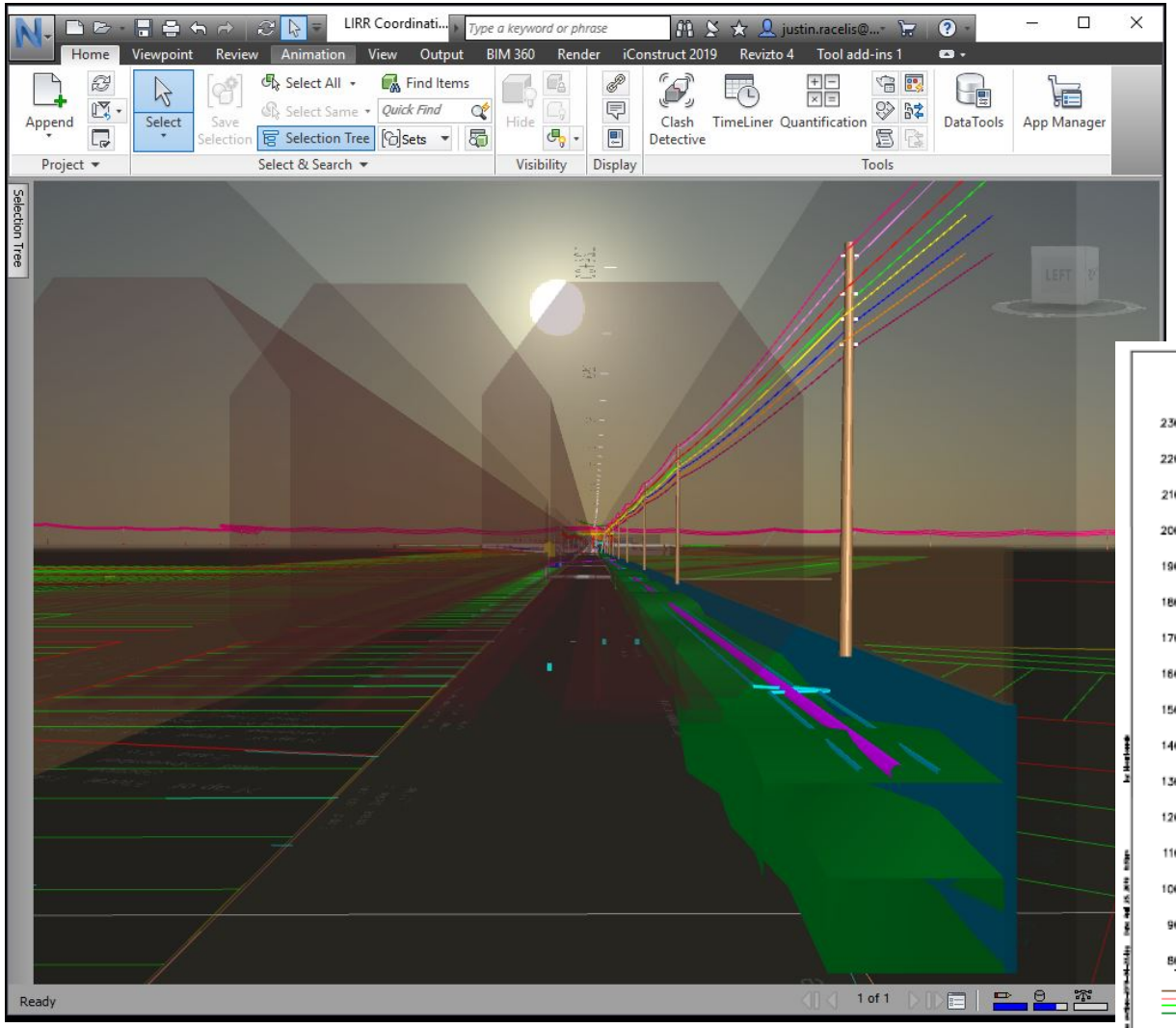

LOE (DAYS)
Preliminary Design
Design Revision (100ft)
10
1
1
0
MANUAL
PARAMETRIC

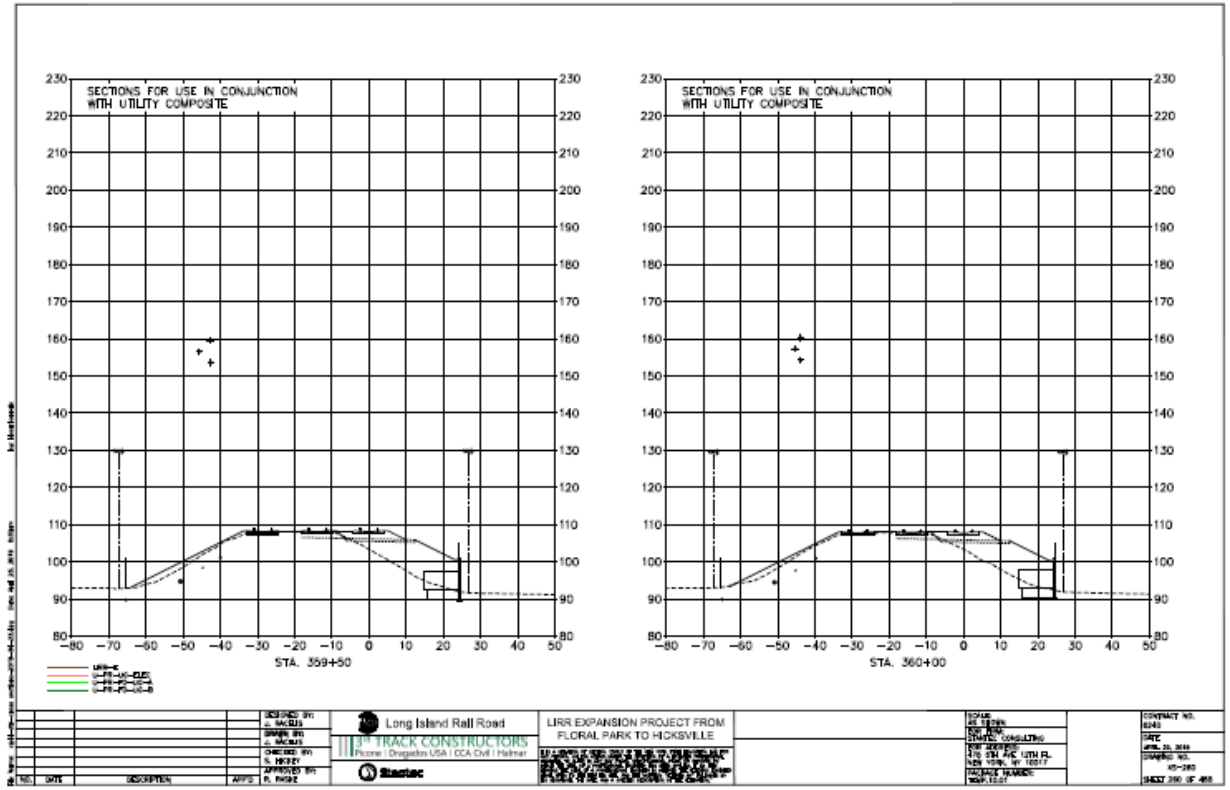


Parametric Wall Design

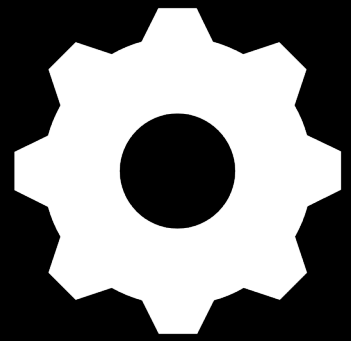
Design case iteration for retaining walls and subsurface conditions

Parametric Design with Custom Subassemblies





Inventor Implementation



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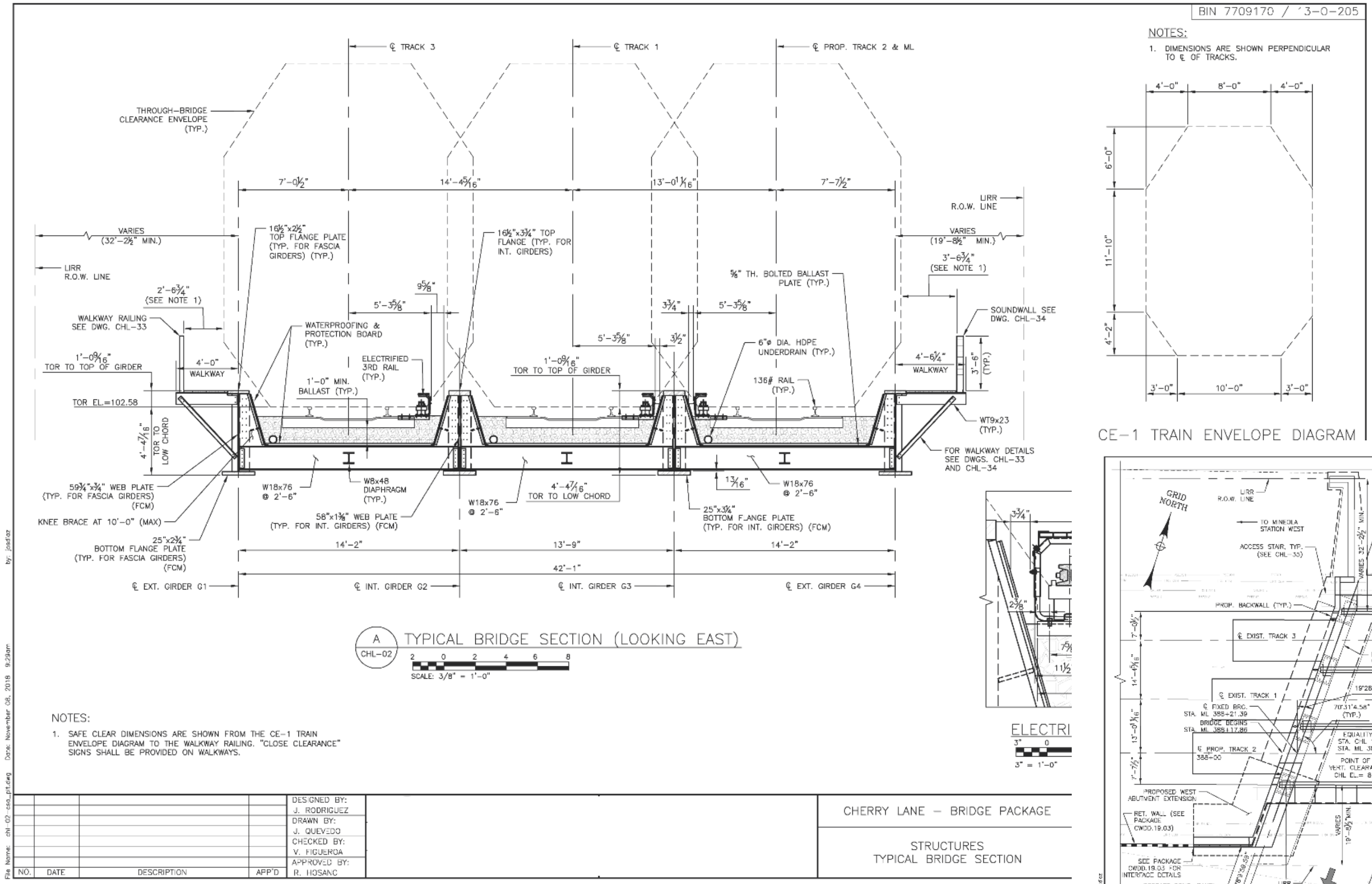
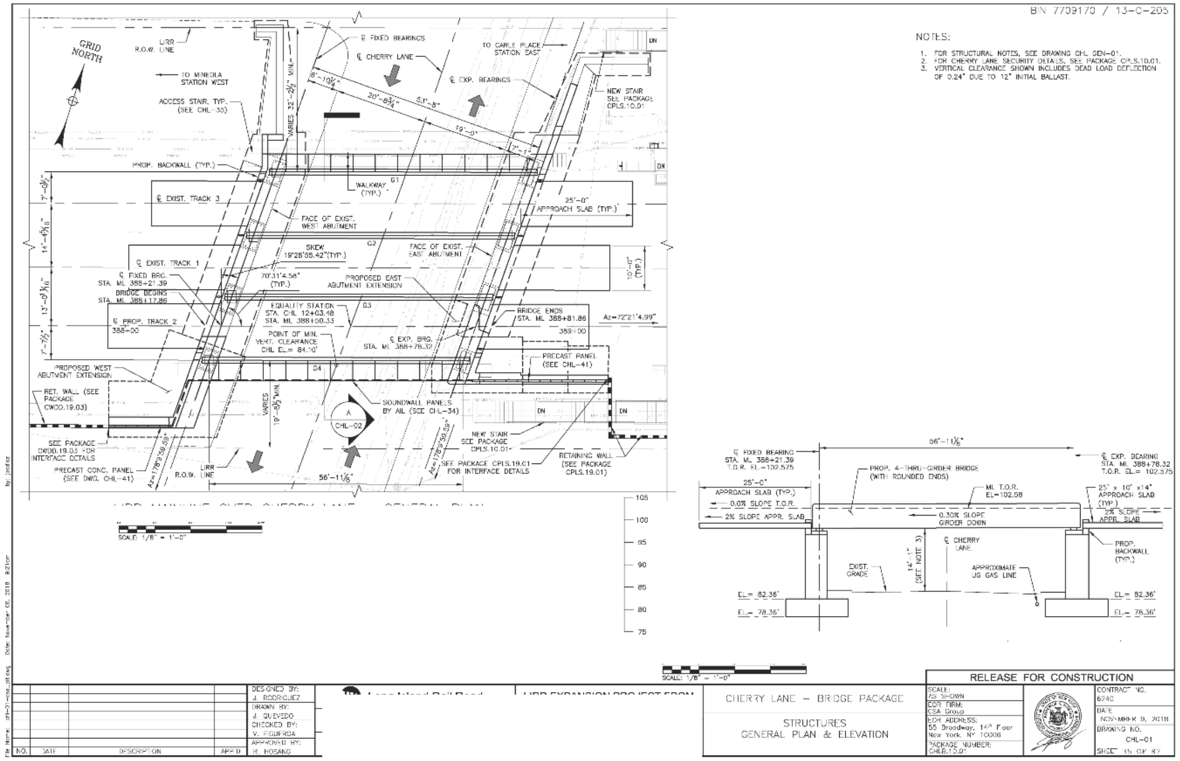
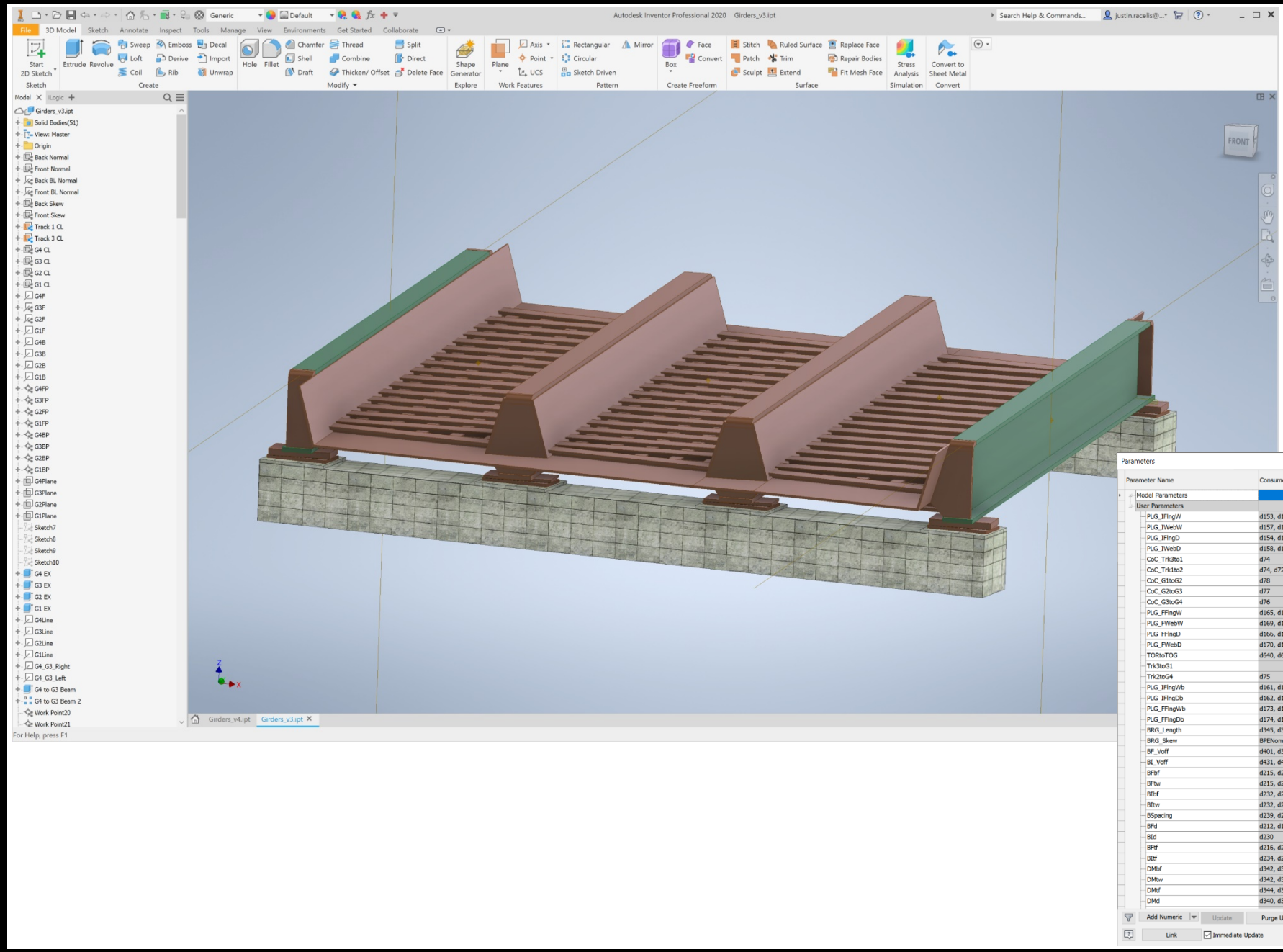
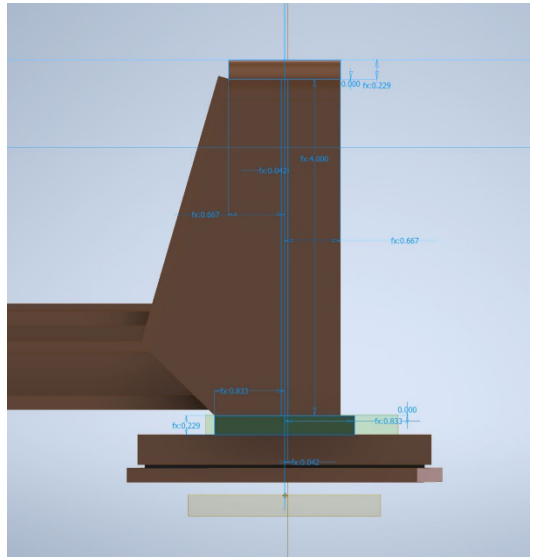

BIN 7709170 / 13-0-205
NOTES:
1. DIMENSIONS ARE SHOWN PERPENDICULAR TO ℄ OF TRACKS.
CE-1 TRAIN ENVELOPE DIAGRAM
℄ TRACK 3
℄ TRACK 1
℄ PROP. TRACK 2 & ML
THROUGH-BRIDGE CLEARANCE ENVELOPE (TYP.)
LIRR R.O.W. LINE
WALKWAY RAILING SEE DWG. CHL-33
SOUNDWALL SEE DWG. CHL-34
WATERPROOFING & PROTECTION BOARD (TYP.)
ELECTRIFIED 3RD RAIL (TYP.)
1'-0" MIN. BALLAST (TYP.)
136# RAIL (TYP.)
6"ø DIA. HDPE UNDERDRAIN (TYP.)
TOR EL.=102.58
W8x48 DIAPHRAGM (TYP.)
KNEE BRACE AT 10'-0" (MAX)
FOR WALKWAY DETAILS SEE DWGS. CHL-33 AND CHL-34
42'-1"
℄ EXT. GIRDER G1
℄ INT. GIRDER G2
℄ INT. GIRDER G3
℄ EXT. GIRDER G4
A CHL-02 TYPICAL BRIDGE SECTION (LOOKING EAST)
SCALE: 3/8" = 1'-0"
NOTES:
1. SAFE CLEAR DIMENSIONS ARE SHOWN FROM THE CE-1 TRAIN ENVELOPE DIAGRAM TO THE WALKWAY RAILING. "CLOSE CLEARANCE" SIGNS SHALL BE PROVIDED ON WALKWAYS.
DESIGNED BY: J. RODRIGUEZ
DRAWN BY: J. QUEVEDO
CHECKED BY: V. FIGUEROA
APPROVED BY: R. HOSANG
NO. DATE DESCRIPTION APP'D
CHERRY LANE – BRIDGE PACKAGE
STRUCTURES
TYPICAL BRIDGE SECTION

BIN 7709170 / 13-0-205
NOTES:
GRID NORTH
℄ CHERRY LANE
℄ EXIST. TRACK 3
℄ EXIST. TRACK 1
℄ PROP. TRACK 2
PROP. BACKWALL (TYP.)
25'-0" APPROACH SLAB (TYP.)
PROPOSED EAST ABUTMENT EXTENSION
PRECAST CONC. PANEL (SEE DWG. CHL-41)
RETAINING WALL (SEE PACKAGE CPLS.19.01)
SCALE: 1/8" = 1'-0"
PROP. 4-THRU-GIRDER BRIDGE (WITH ROUNDED ENDS)
RELEASE FOR CONSTRUCTION
CHERRY LANE – BRIDGE PACKAGE
STRUCTURES
GENERAL PLAN & ELEVATION

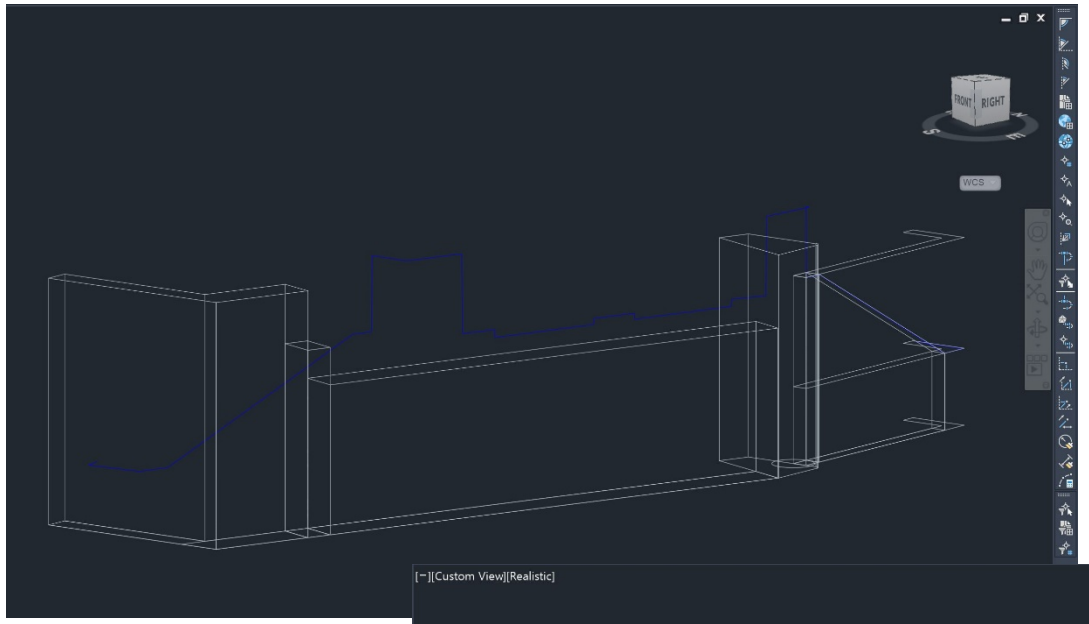




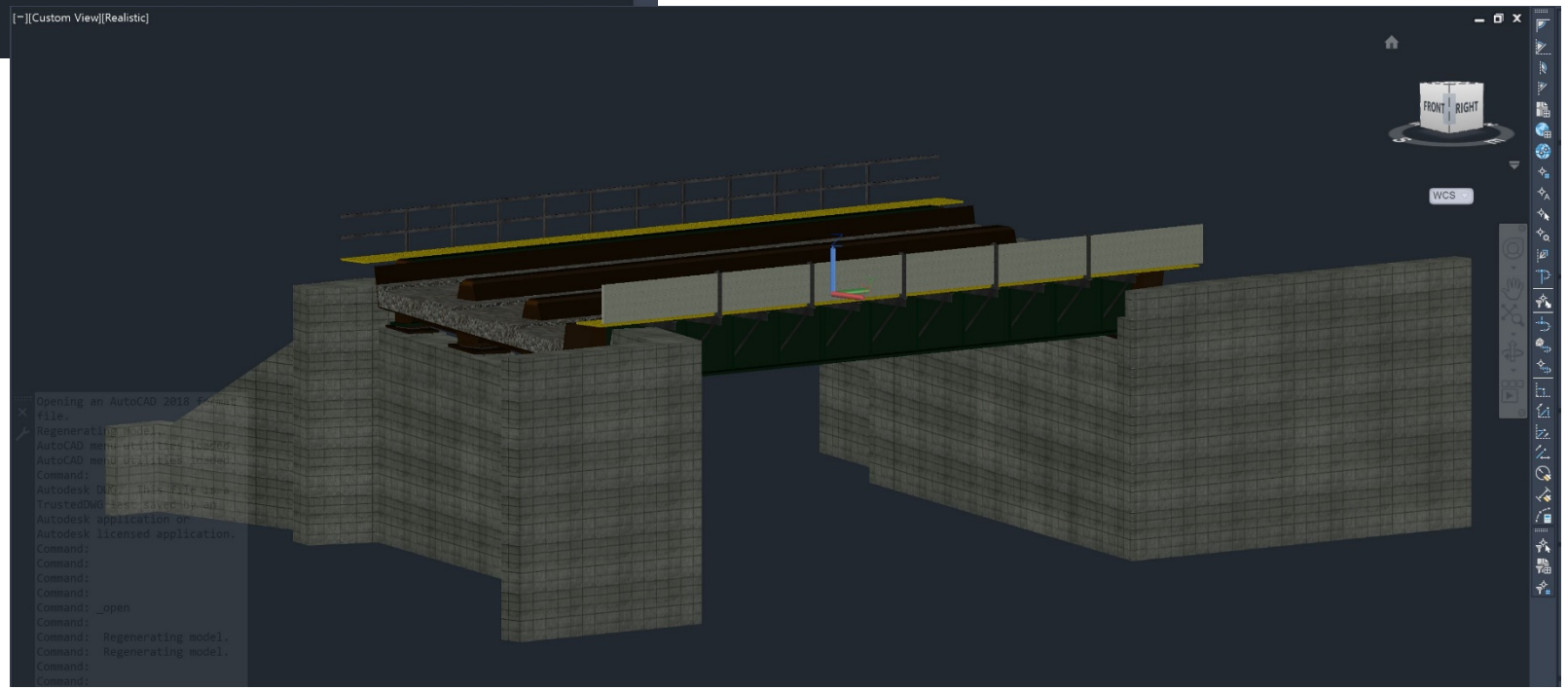
Parameters

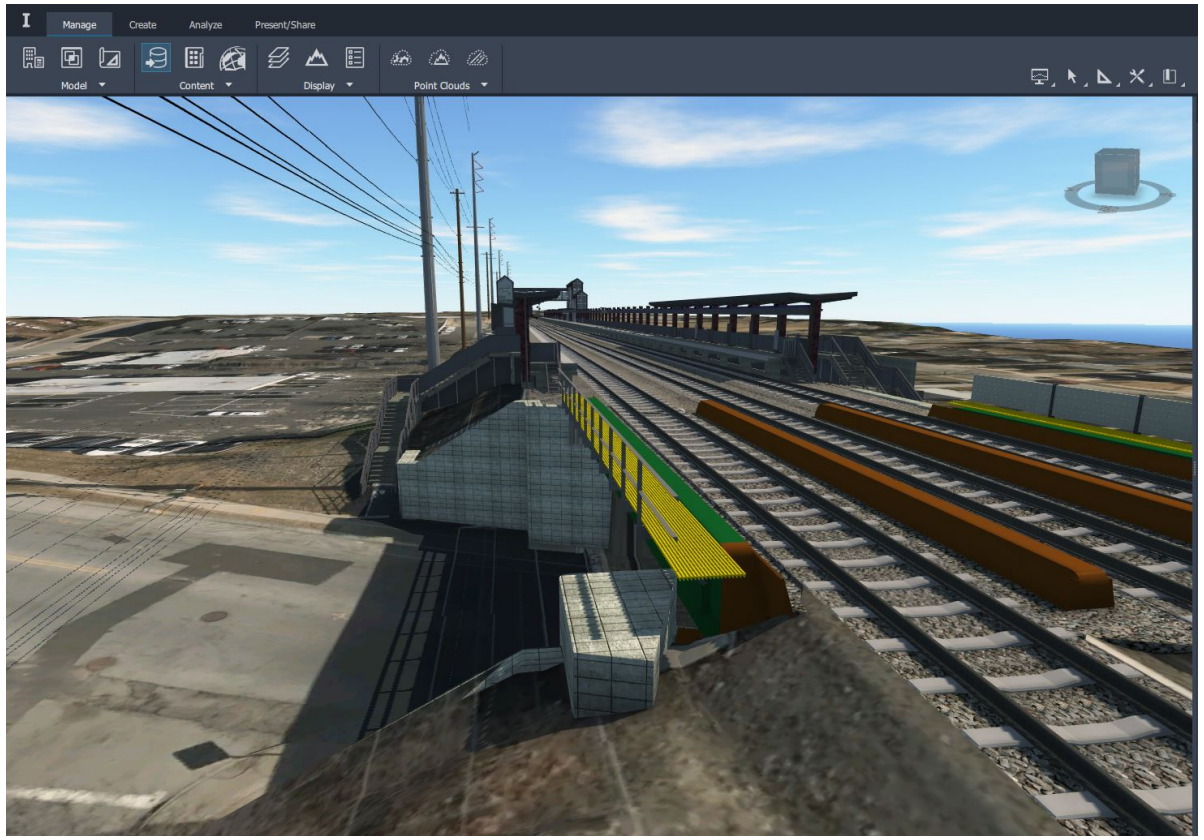
Parameter Name	Consumed by	Unit/Type	Equation	Nominal Value	Driving	Tol.	Model Value	Key	Export P	Comment
Model Parameters										
User Parameters										
PLG_IFlngW	d153, d152, d1...	in	17.5 in	17.500000			17.500000			
PLG_IWebW	d157, d156, d1...	in	1 in	1.000000			1.000000			
PLG_IFlngD	d154, d142	in	3 in	3.000000			3.000000			
PLG_IWebD	d158, d146	in	50 in	50.000000			50.000000			
CoC_Trk3to1	d74	ft	13 ft	13.000000			13.000000			
CoC_Trk1to2	d74, d72	ft	13 ft + 1 in + 3/16"	13.098958			13.098958			
CoC_G1toG2	d78	ft	12 ft + 10.25 in	12.854167			12.854167			
CoC_G2toG3	d77	ft	13 ft	13.000000			13.000000			
CoC_G3toG4	d76	ft	13 ft + 1 in + 3/16"	13.098958			13.098958			
PLG_FFlngW	d165, d164, d1...	in	16 in	16.000000			16.000000			
PLG_FWebW	d169, d168, d1...	in	1 in	1.000000			1.000000			
PLG_FFlngD	d166, d130	in	2.75 in	2.750000			2.750000			
PLG_FWebD	d170, d134	in	48 in	48.000000			48.000000			
TORtoTOG	d640, d639, d6...	in	1 ft + 9/16"	12.562500			12.562500			
Trk3toG1		ft	7 ft + 0.5 in	7.041667			7.041667			
Trk2toG4	d75	ft	6 ft + 6 in + 13/16"	6.567708			6.567708			
PLG_IFlngWb	d161, d160, d1...	in	22 in	22.000000			22.000000			
PLG_IFlngDb	d162, d150	in	3 in	3.000000			3.000000			
PLG_FFlngWb	d173, d172, d1...	in	20 in	20.000000			20.000000			
PLG_FFlngDb	d174, d138	in	2.75 in	2.750000			2.750000			
BRG_Length	d345, d328, d3...	ft	41.04907863 ft	41.049079			41.049079			
BRG_Skew	BPENominal, d...	deg	9.47254406 deg	9.472544			9.472544			
BF_Voff	d401, d354, d184	in	13 in / 16 ul	0.812500			0.812500			
BI_Voff	d431, d416, d3...	in	2 in + 13/16"	2.812500			2.812500			
BFbf	d215, d214, d2...	in	14 in + 5/8"	14.625000			14.625000			
BFtw	d215, d214, d2...	in	0.5 in	0.500000			0.500000			
BIbf	d232, d231, d2...	in	14 in + 5/8"	14.625000			14.625000			
BItw	d232, d231, d2...	in	0.5 in	0.500000			0.500000			
BSpacing	d239, d221, d203	ft	2.5 ft	2.500000			2.500000			
BFd	d212, d193	in	14 in + 3/8"	14.375000			14.375000			
BId	d230	in	14 in + 3/8"	14.375000			14.375000			
BFtf	d216, d212, d2...	in	7/8"	0.875000			0.875000			
BItf	d234, d230, d226	in	7/8"	0.875000			0.875000			
DMbf	d342, d341, d3...	in	8 in + 1 in / 8 ul	8.125000			8.125000			
DMtw	d342, d341, d3...	in	3 in / 8 ul	0.375000			0.375000			
DMtf	d344, d340, d3...	in	11 in / 16 ul	0.687500			0.687500			
DMd	d340, d323, d3...	in	8.5 in	8.500000			8.500000			

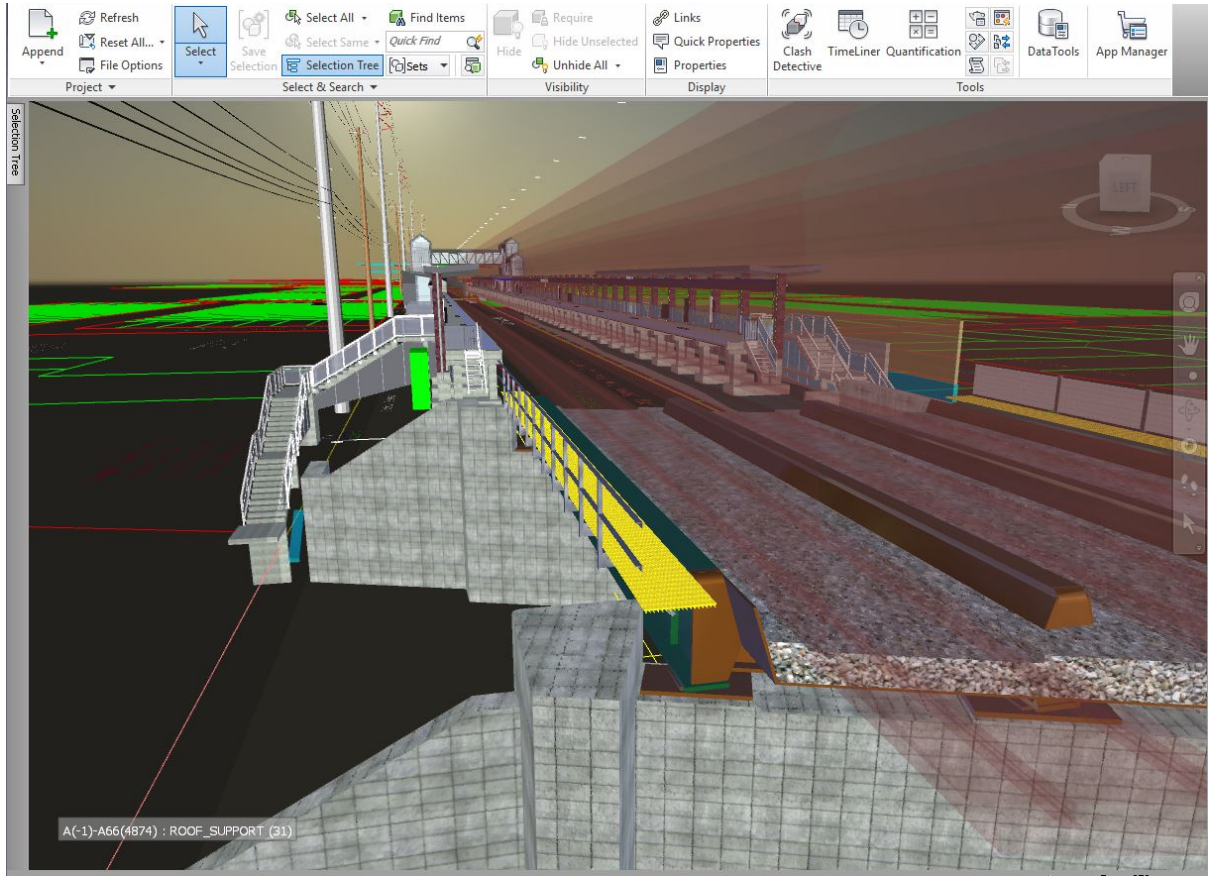
Add Numeric | Update | Purge Unused | Reset Tolerance | << Less
Link | Immediate Update | Done



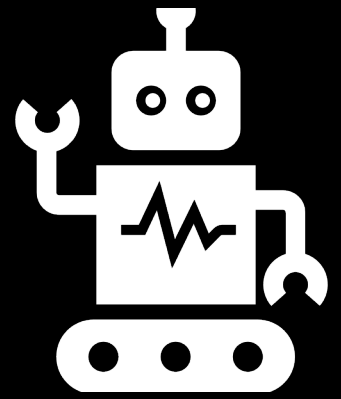
- Inventor solids brought into AutoCAD for reference.
- Abutments are modeled in AutoCAD.
  - Bridge references and existing information are easily accessible in AutoCAD.
  - Abutment shapes are irregular. Developing parametric criteria for all abutments in Inventor is not cost effective in this case.




Manage
Create
Analyze
Present/Share
Model
Content
Display
Point Clouds

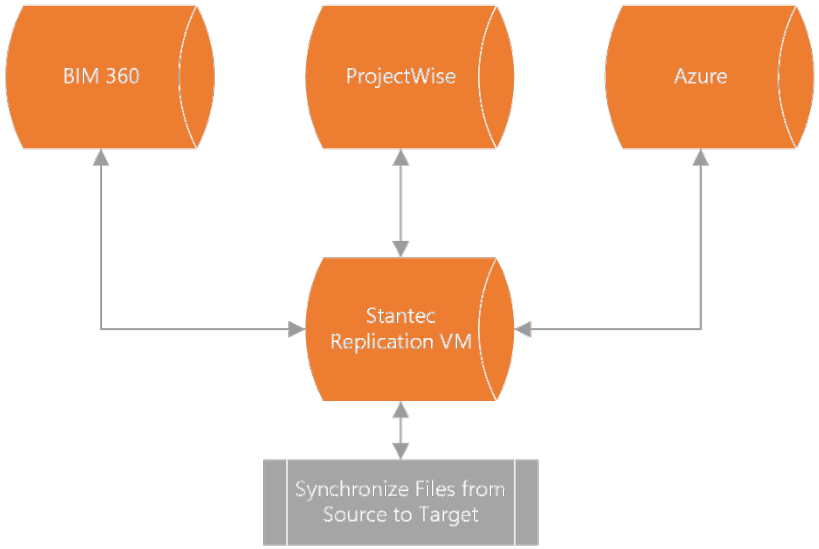

Append
Refresh
Reset All...
File Options
Project
Select
Save Selection
Select All
Select Same
Find Items
Quick Find
Selection Tree
Sets
Select & Search
Hide
Require
Hide Unselected
Unhide All
Visibility
Links
Quick Properties
Properties
Display
Clash Detective
TimeLiner
Quantification
DataTools
App Manager
Tools
Selection Tree
A(-1)-A66(4874) : ROOF_SUPPORT (31)

ProjectWise/BIM 360/Azure Replication

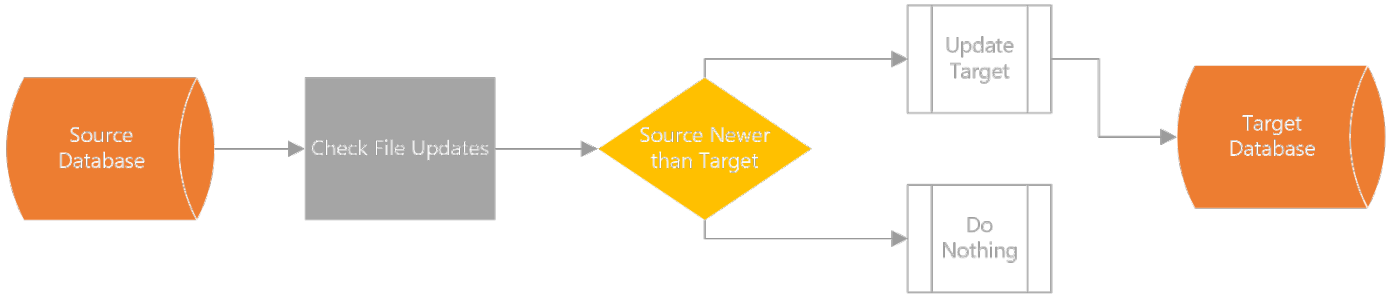


Stantec

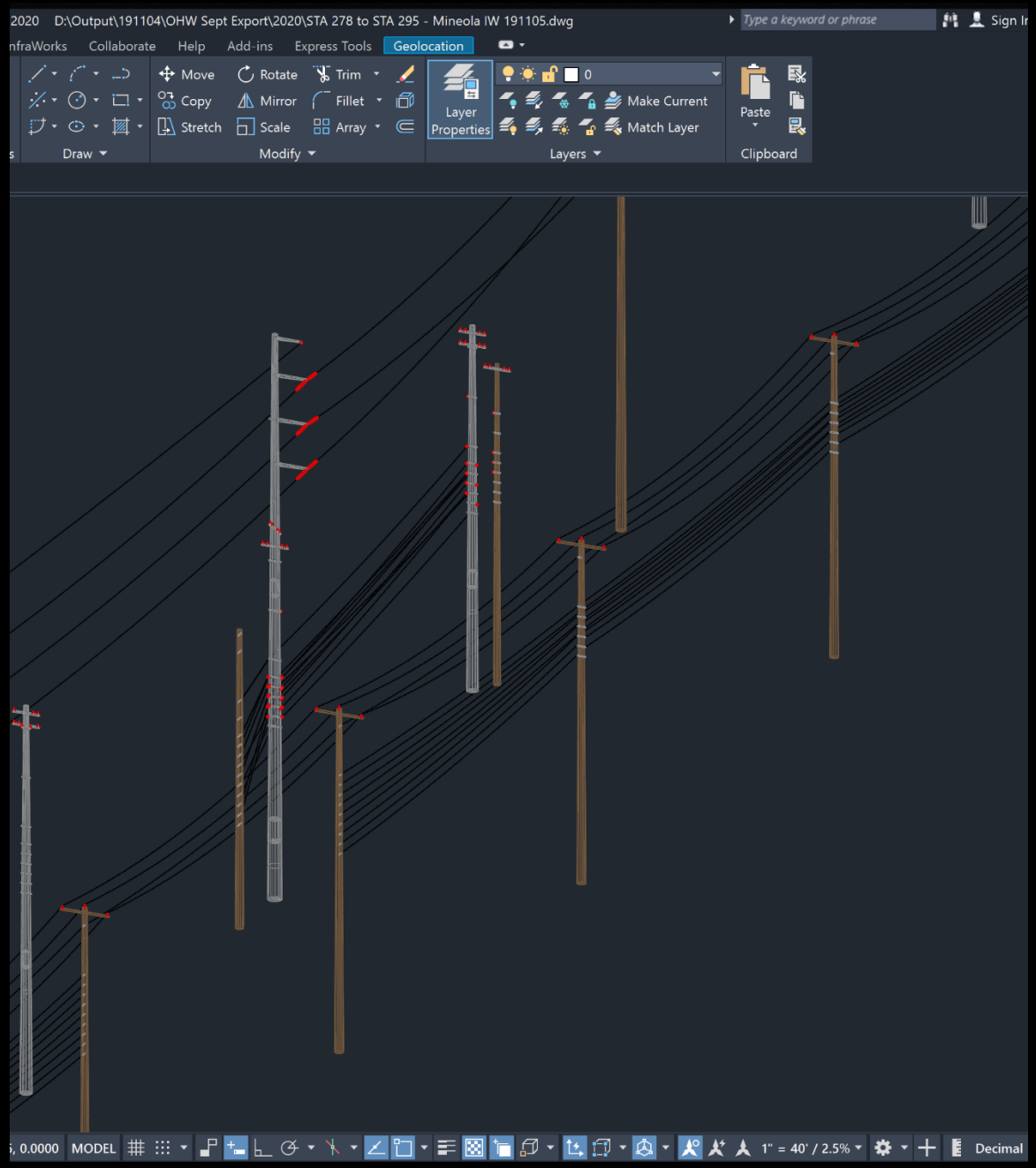
- Database Relationship



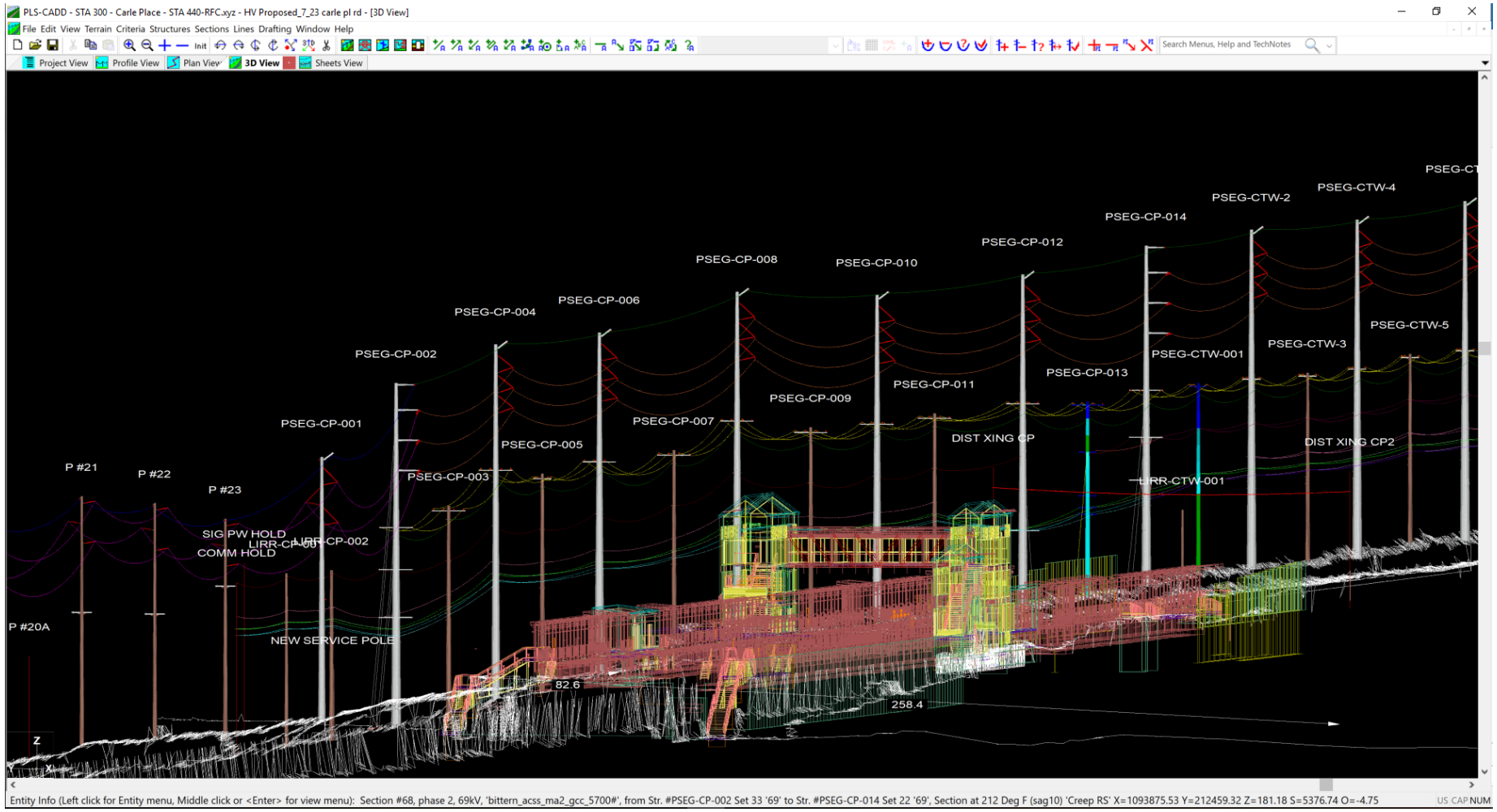
- Versioning Logic

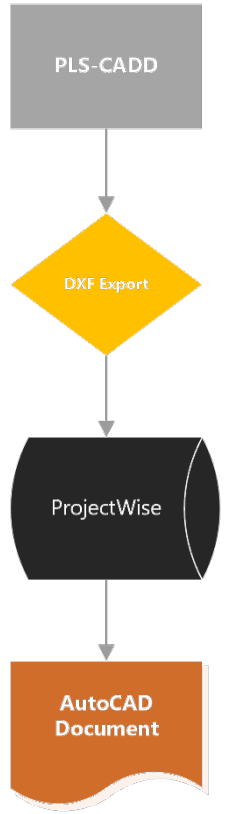


Dynamo for C3D

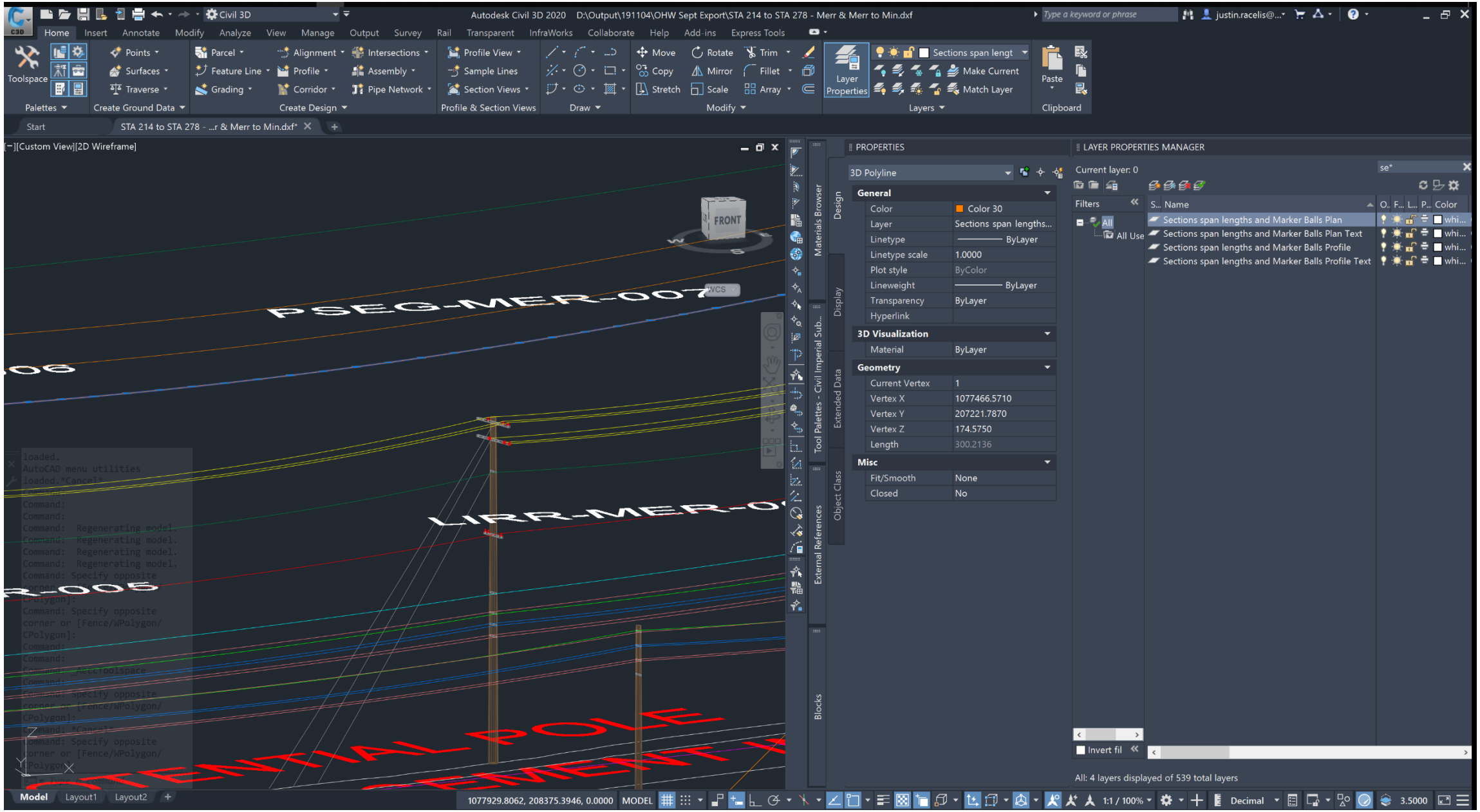


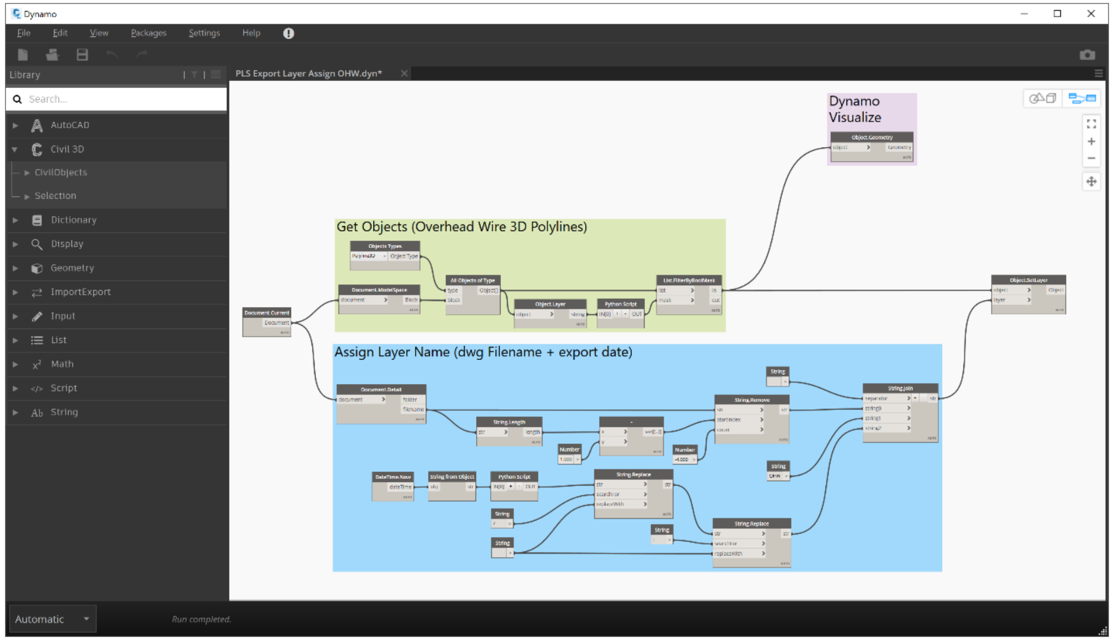
Stantec

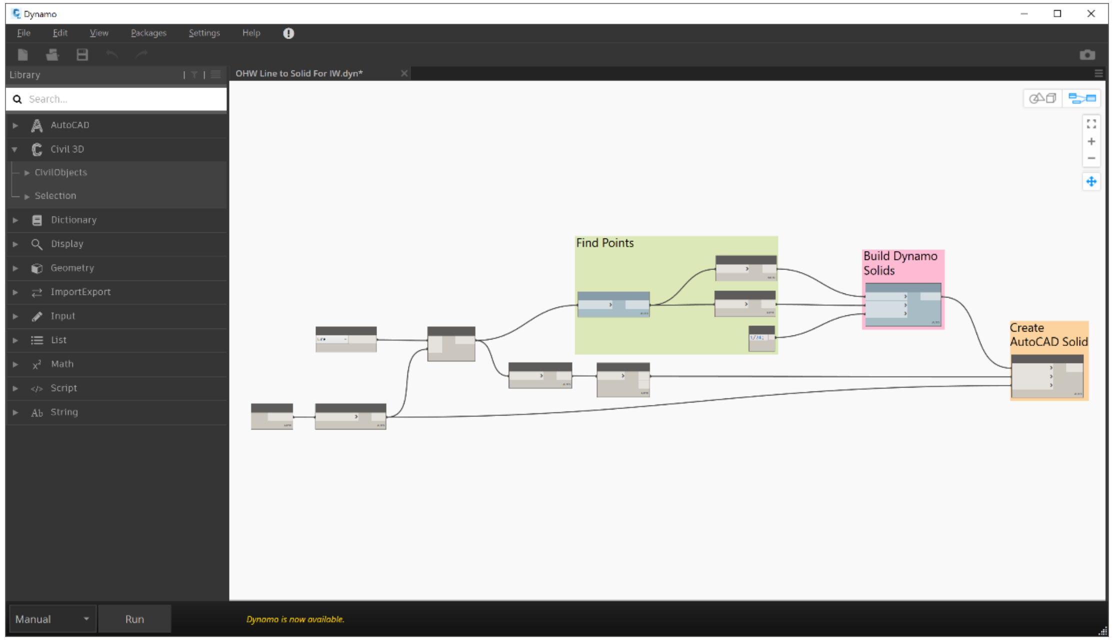


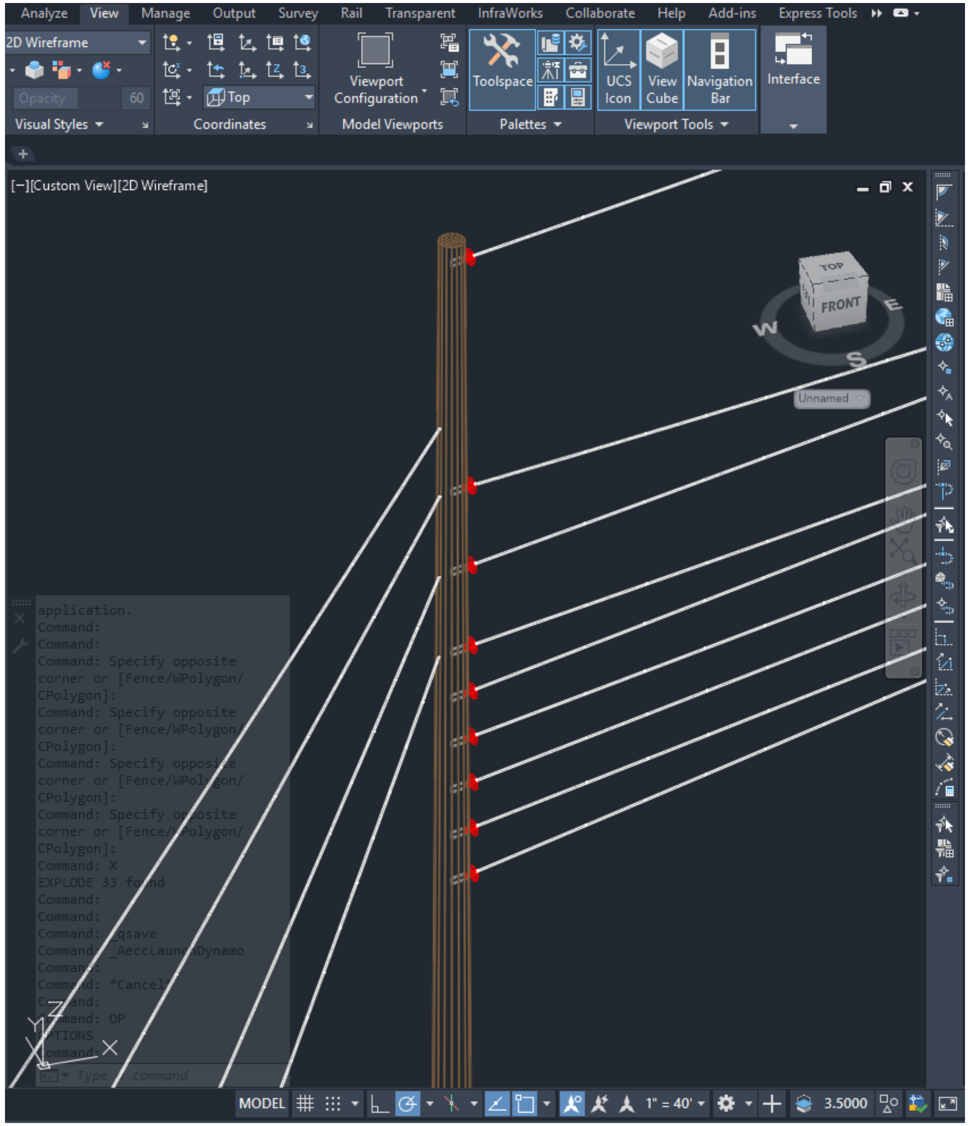


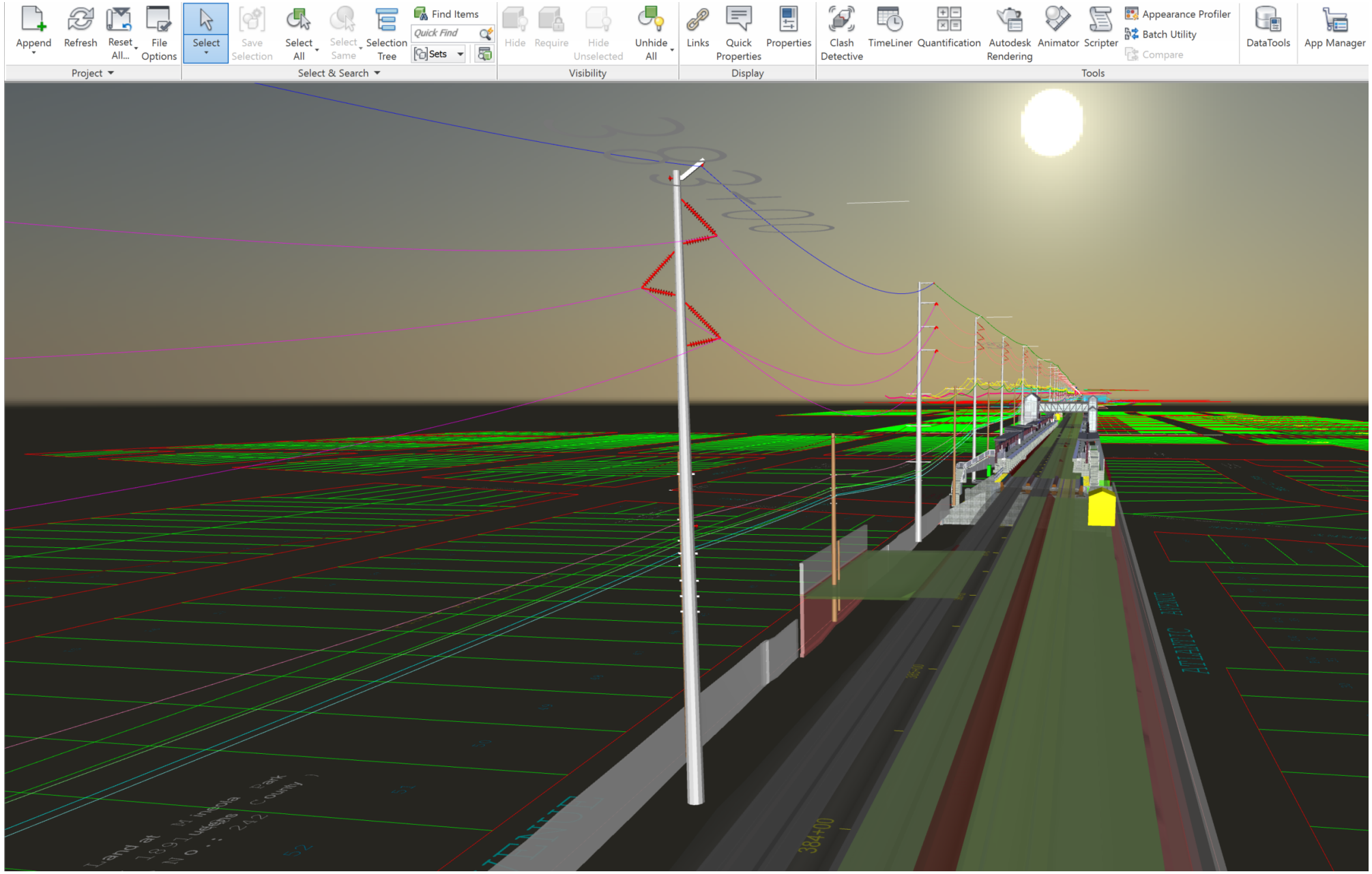
- PLS-CADD has limited interoperability with non-PLS authoring platforms
- DXF export is the only option


Civil 3D
Autodesk Civil 3D 2020 D:\Output\191104\OHW Sept Export\STA 214 to STA 278 - Merr & Merr to Min.dxf
Home Insert Annotate Modify Analyze View Manage Output Survey Rail Transparent InfraWorks Collaborate Help Add-ins Express Tools
Toolspace
Points Surfaces Traverse
Parcel Feature Line Grading
Alignment Profile Corridor
Intersections Assembly Pipe Network
Profile View Sample Lines Section Views
Move Copy Stretch
Rotate Mirror Scale
Trim Fillet Array
Layer Properties
Sections span lengt
Make Current
Match Layer
Paste
Palettes
Create Ground Data
Create Design
Profile & Section Views
Draw
Modify
Layers
Clipboard
Start
STA 214 to STA 278 - ...r & Merr to Min.dxf*
[−][Custom View][2D Wireframe]
FRONT
WCS
PSEG-MER-007
LIRR-MER-0
PROPERTIES
3D Polyline
General
Color Color 30
Layer Sections span lengths...
Linetype ByLayer
Linetype scale 1.0000
Plot style ByColor
Lineweight ByLayer
Transparency ByLayer
Hyperlink
3D Visualization
Material ByLayer
Geometry
Current Vertex 1
Vertex X 1077466.5710
Vertex Y 207221.7870
Vertex Z 174.5750
Length 300.2136
Misc
Fit/Smooth None
Closed No
LAYER PROPERTIES MANAGER
Current layer: 0
Filters
All
All Use
Name
Sections span lengths and Marker Balls Plan
Sections span lengths and Marker Balls Plan Text
Sections span lengths and Marker Balls Profile
Sections span lengths and Marker Balls Profile Text
Invert fil
All: 4 layers displayed of 539 total layers
Materials Browser
Design
Display
Extended Data
Tool Palettes - Civil Imperial Sub...
Object Class
External References
Blocks
Model Layout1 Layout2
1077929.8062, 208375.3946, 0.0000 MODEL
1:1 / 100%
Decimal
3.5000

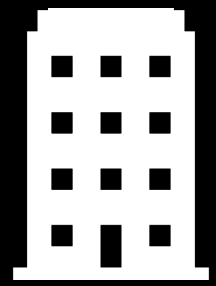

PLS Export Layer Assign OHW.dyn*
Dynamo Visualize
Get Objects (Overhead Wire 3D Polylines)
Assign Layer Name (dwg Filename + export date)
Run completed.


OHW Line to Solid For IW.dyn*
Find Points
Build Dynamo Solids
Create AutoCAD Solid
Dynamo is now available.


[−][Custom View][2D Wireframe]
Viewport Configuration
Model Viewports
Toolspace
Palettes
UCS Icon
View Cube
Navigation Bar
Viewport Tools
Interface
Visual Styles
Coordinates
MODEL


Append
Refresh
Reset All...
File Options
Project
Select
Save Selection
Select All
Select Same
Selection Tree
Find Items
Quick Find
Sets
Select & Search
Hide
Require
Hide Unselected
Unhide All
Visibility
Links
Quick Properties
Properties
Display
Clash Detective
TimeLiner
Quantification
Autodesk Rendering
Animator
Scripter
Appearance Profiler
Batch Utility
Compare
Tools
DataTools
App Manager

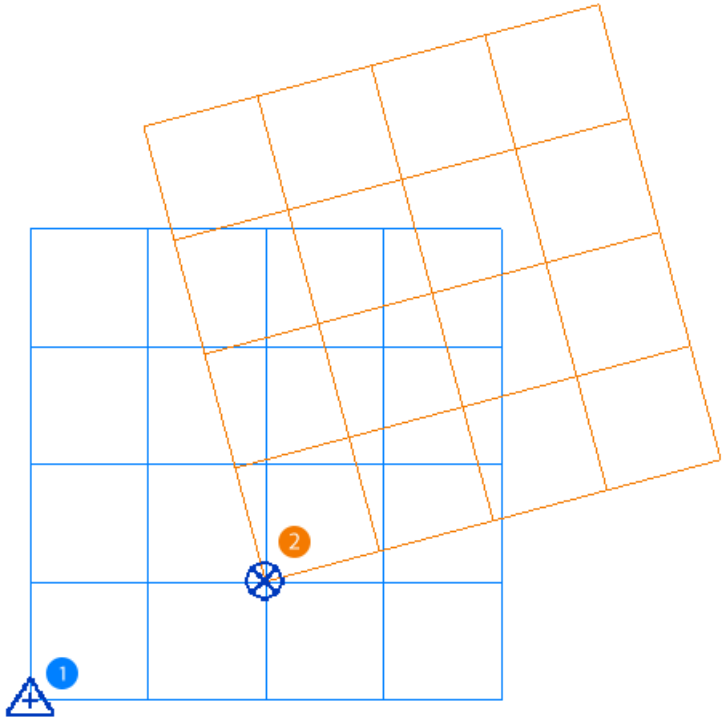
Revit Sheet Geolocation and Conversion

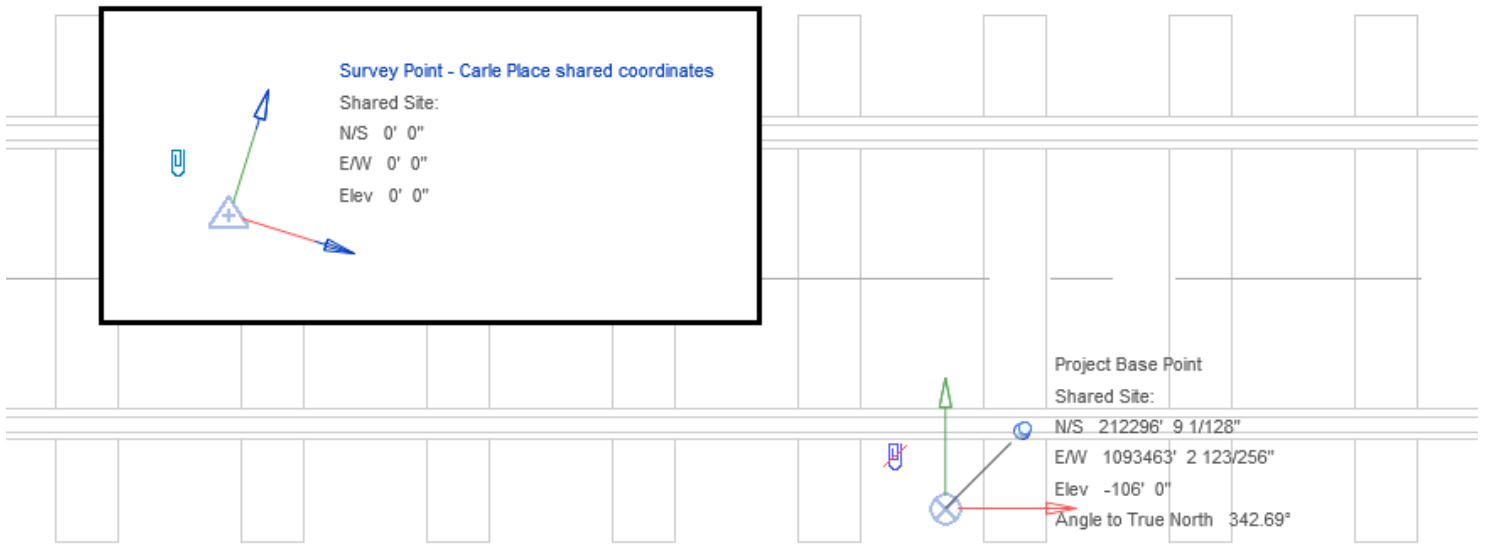


Stantec

REVIT COORDINATE SYSTEMS

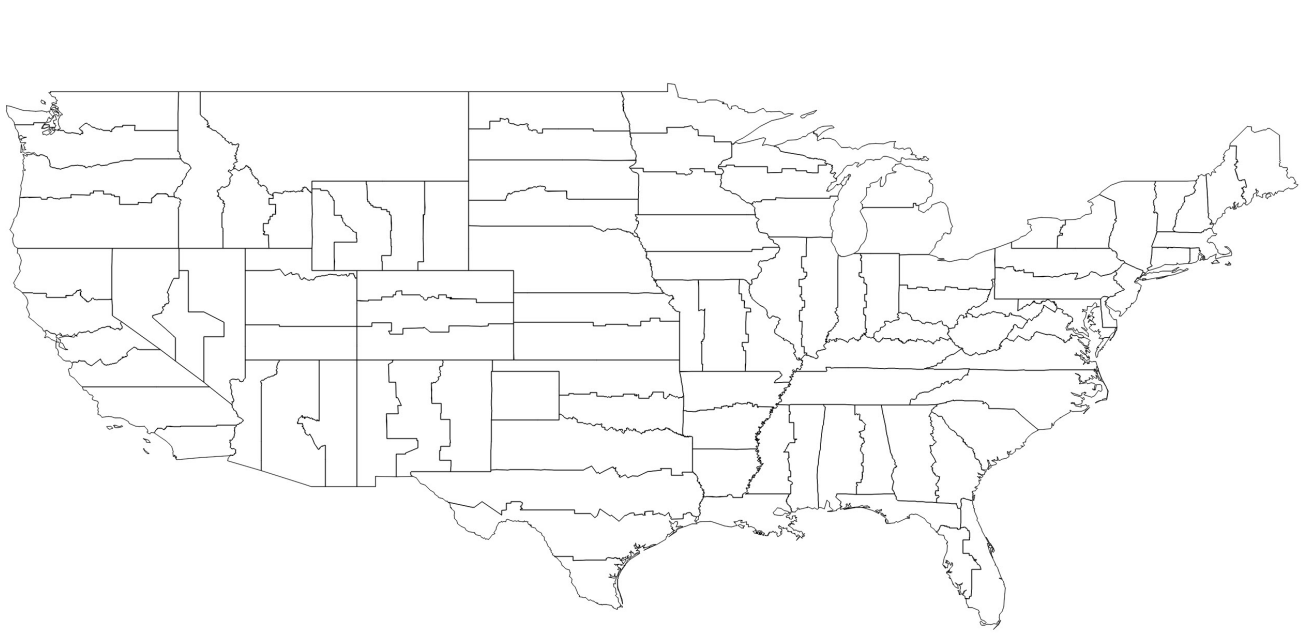
Revit has two coordinate systems, (1) a project coordinate system, which utilizes an internal origin point that provides the basis for positioning all elements in the model and never moves and (2), a survey coordinate system that provides a real-world context for the building model and is intended to describe locations on the surface of the earth.

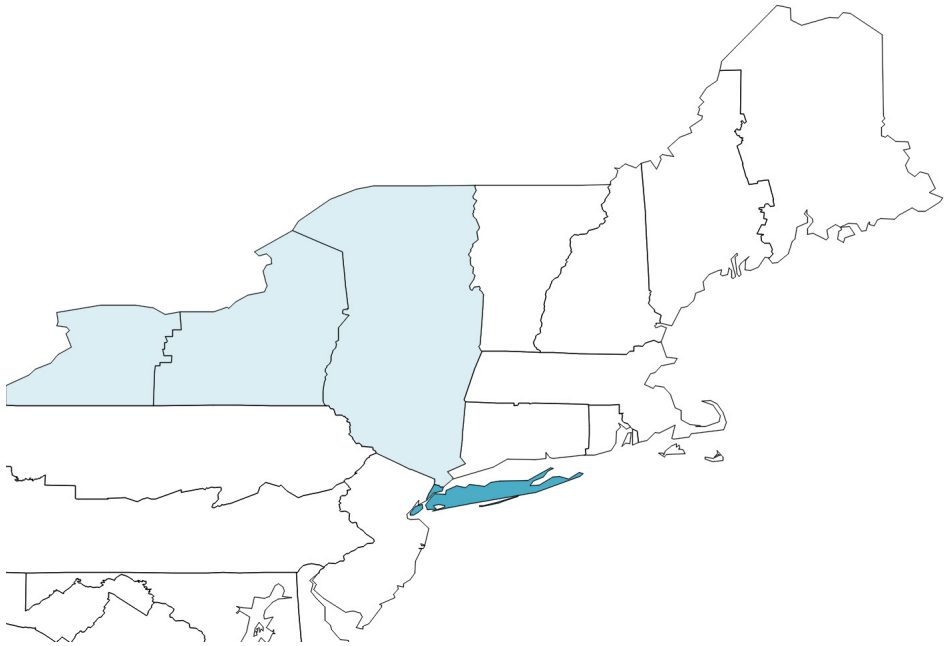




CIVIL 3D COORDINATE SYSTEMS

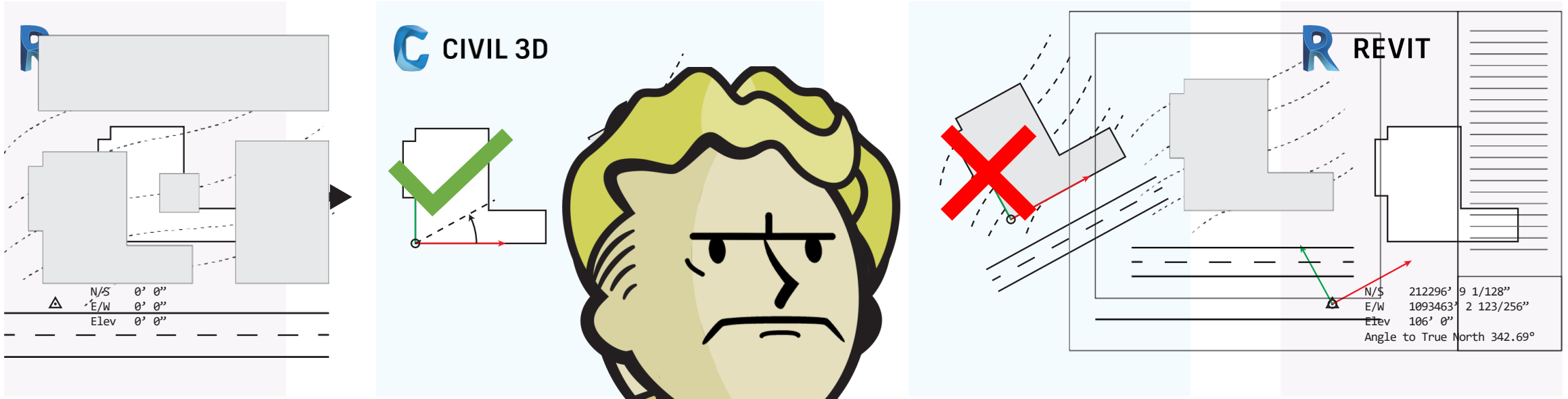
Civil 3D utilizes an internal origin of 0,0 and one can establish either a user-based coordinate system or in the case of the two projects we are discussing, a known coordinate system such as the State Plane Coordinate System (SPCS).





SHARED REFERENCE POINT UTILITY

To simplify the exchange of data between Revit and Civil 3D, Autodesk developed the Shared Reference Point Utility which uses a handful of clicks and an XML file to establish a common point in both platforms.

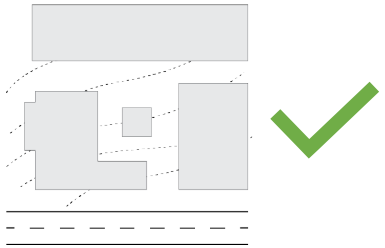


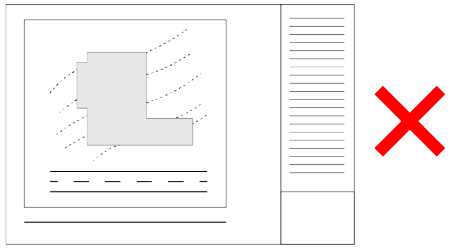
THE CHALLENGE

How do you automate the process of getting Revit sheet views exported so that any plan views that are exported with their respective sheets are accurately geolocated with respect to all the other drawings.

RESEARCH

Many subject matter experts argued that Revit already exports geolocated plan views, so if you need to perform project coordination, the plan views should be used, not the sheets.





1. We were contractually obligated to deliver fully coordinated DWGs

2. Many trades/disciplines are not using Revit

3. The process of exporting sheets in its current state is incomplete

EXPORT SHEETS TO DWG USING SHARED COORDINATES

https://forums.autodesk.com/t5/revit-architecture-forum/export-sheets-to-dwg-using-shared-coordinates/td-p/6293522

PROBLEM RE-EXAMINED

ISSUE: NAMING CONVENTION

REVIT

A-445 - OVERPASS BRIDGE - PLANS & RCP

- Floor Plan: OVP BRIDGE - PLAN
- Floor Plan: OVP BRIDGE - ROOF PLAN
- Reflected Ceiling Plan: OVP BRIDGE - RCP
- Reflected Ceiling Plan: OVP BRIDGE - UNDERSIDE

SHORT

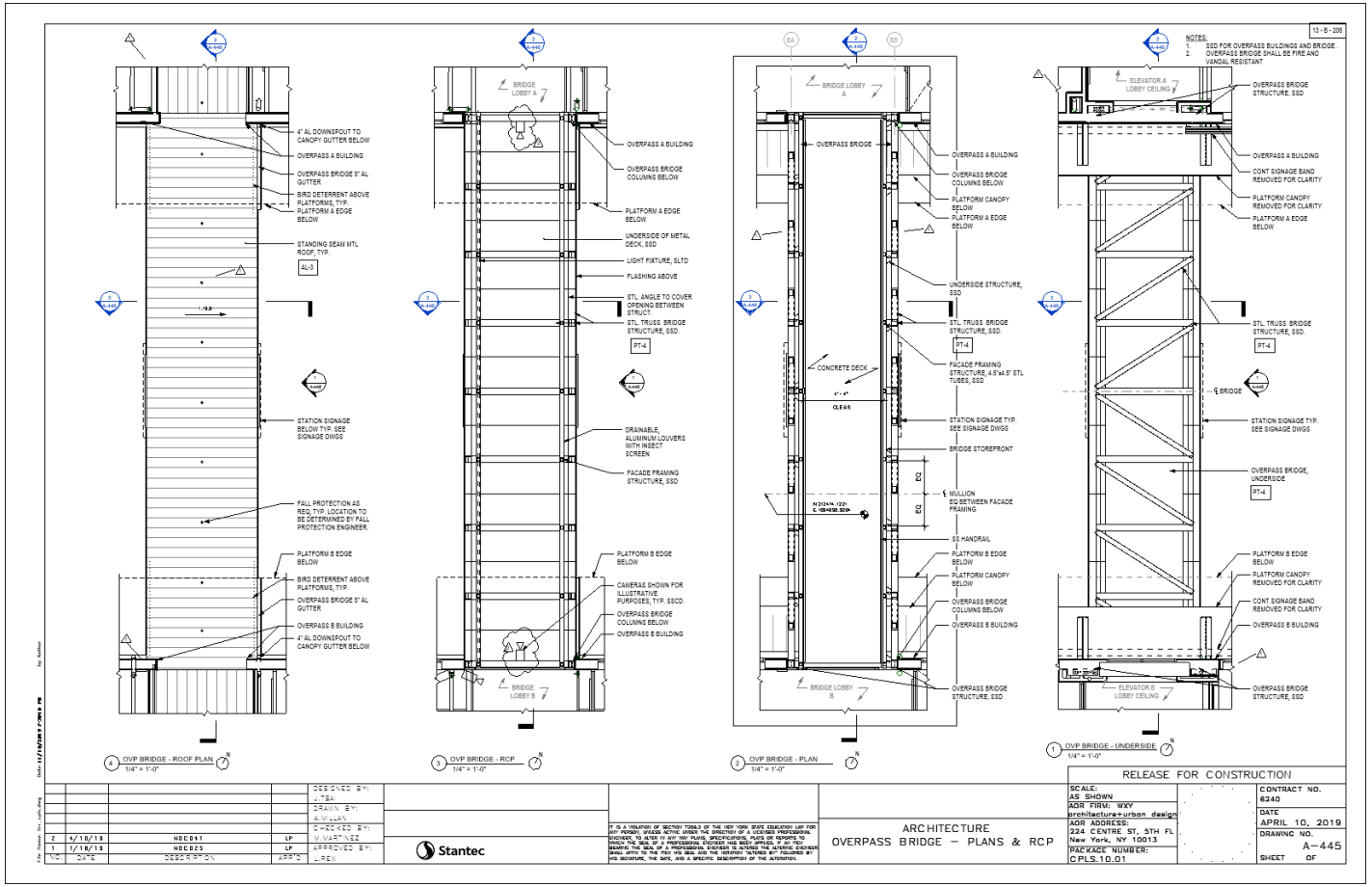
- A-445.dwg
- A-445-View-1.dwg
- A-445-View-2.dwg
- A-445-View-3.dwg
- A-445-View-4.dwg

LONG

- CPLS-10-01_NDC_CENTRAL_2019 - Sheet - A-445 - OVERPASS BRIDGE - PLANS & RCP.dwg
- CPLS-10-01_NDC_CENTRAL_2019 - Reflected Ceiling Plan - OVP BRIDGE - UNDERSIDE.dwg
- CPLS-10-01_NDC_CENTRAL_2019 - Reflected Ceiling Plan - OVP BRIDGE - RCP.dwg
- CPLS-10-01_NDC_CENTRAL_2019 - Floor Plan - OVP BRIDGE - ROOF PLAN.dwg
- CPLS-10-01_NDC_CENTRAL_2019 - Floor Plan - OVP BRIDGE - PLAN.dwg

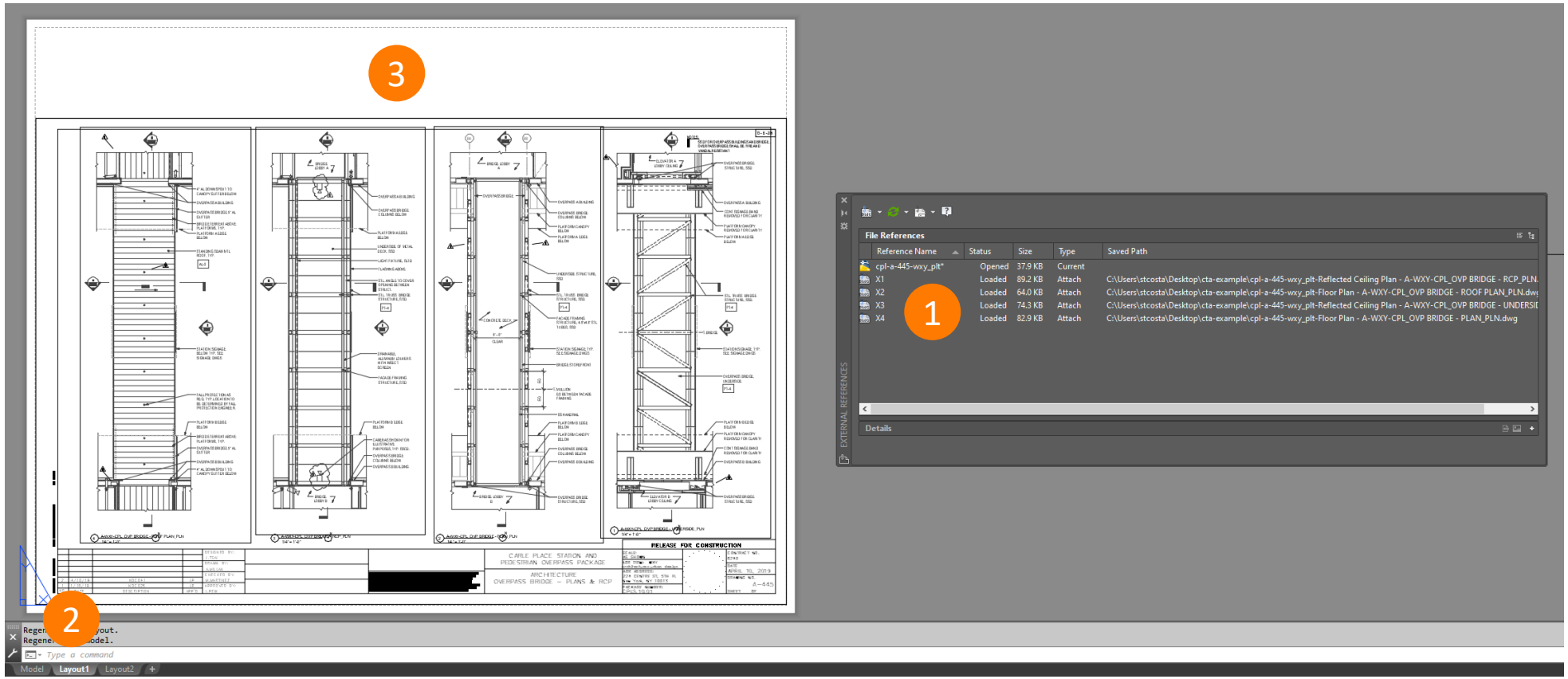
AGENCY STANDARD

- cpl-a-445-wxy_plt.dwg
- a-wxy_ovp bridge - underside_pln.dwg
- a-wxy_ovp bridge - roof plan_pln.dwg
- a-wxy_ovp bridge - rcp_pln.dwg
- a-wxy_ovp bridge - plan_pln.dwg



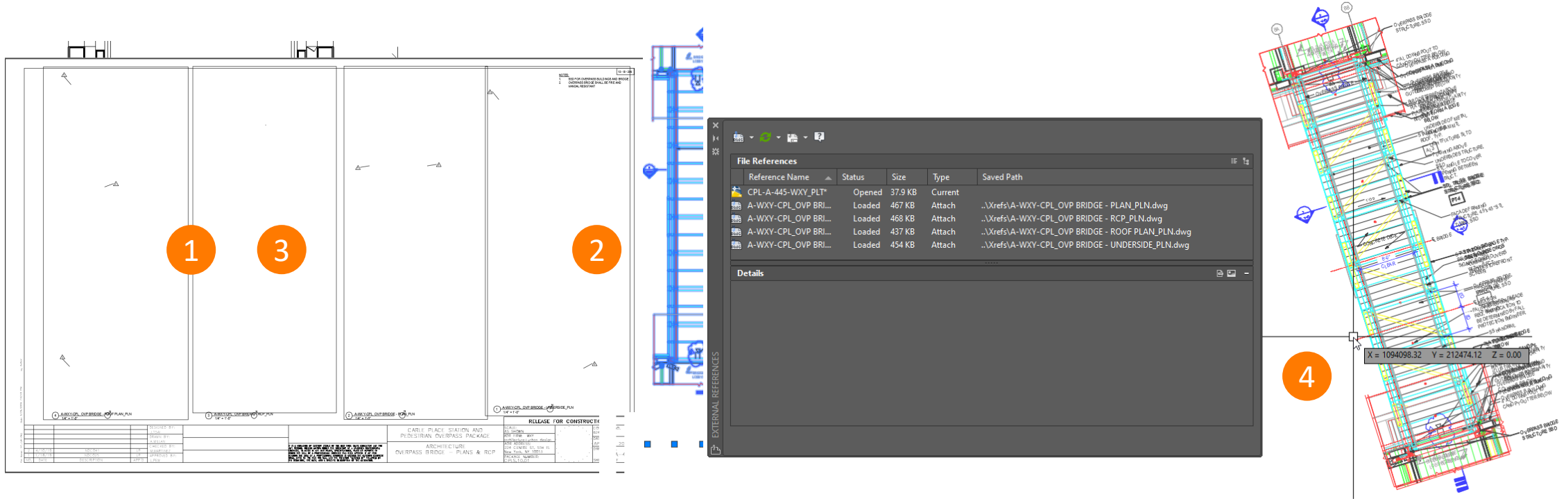
ISSUE: SHEETS

1. Referenced used generic incremental naming convention i.e. X1, X2, X3.
2. The default name “Layout 1” was used rather than the Revit drawing number.
3. The sheet size is determined by AutoCAD’s default plotter settings

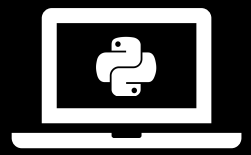


ISSUE: REFERENCES

1. Reference views are all attached to their respective sheets about the internal origin.
2. Drawings with multiple references have a seemingly arbitrary offset away from each other.
3. When references move to their geospatially correct location, viewports would need to be updated.
4. Sheets with multiple views of the same plan at different elevations, overlap with each other.



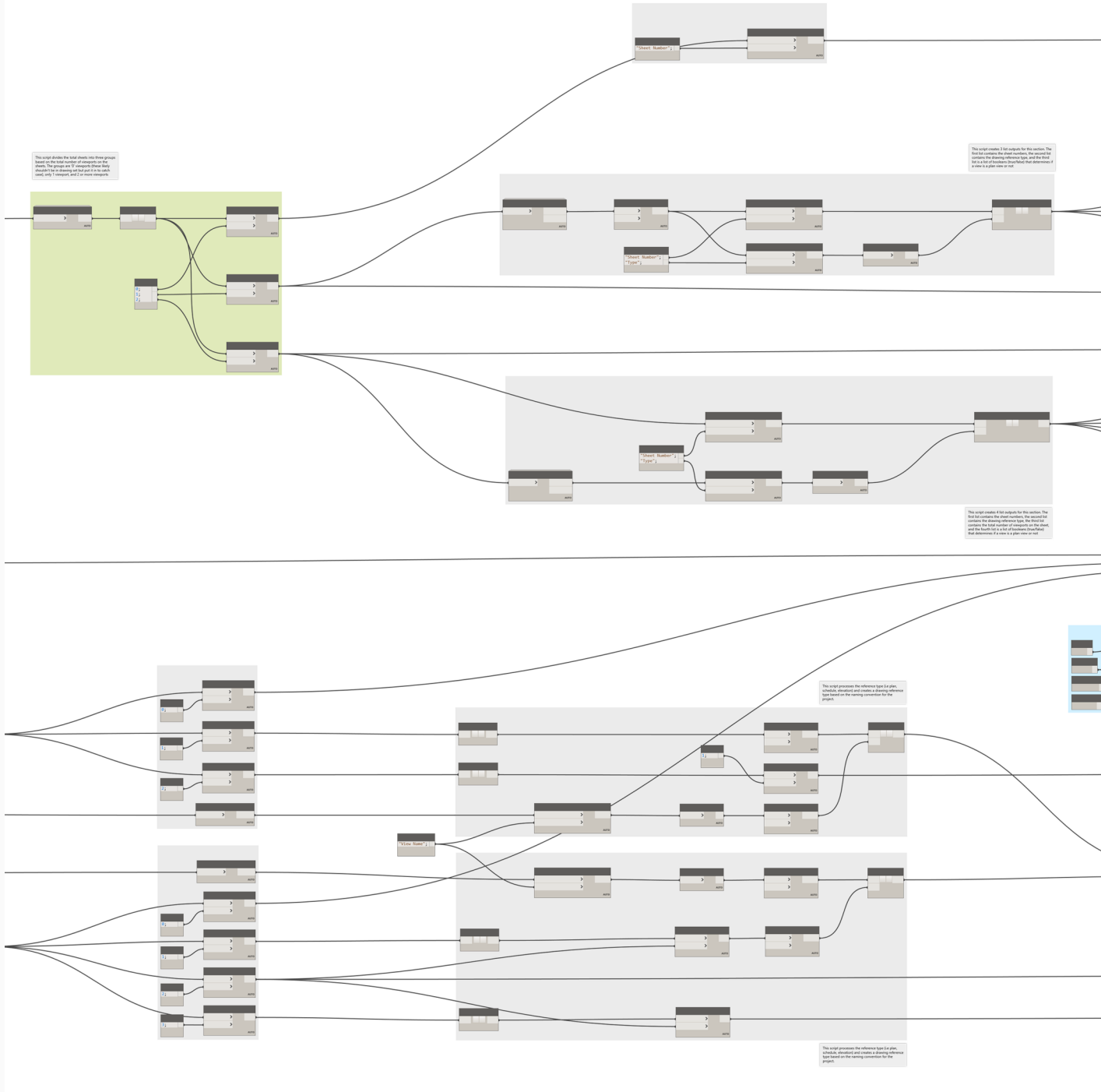
2ND DAY ON THE JOB



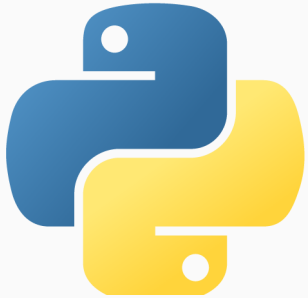
STRATEGY

DYNAMO

1. Archilab (2019.2.21)
2. Genius Loci (2019.3.11)
3. SpringNodes (132.2.8)



PYTHON 3.7



```python
import re
import glob
import os


folder = "./"
dwg_search = r'*.dwg'
all_search = r'*.*'
dwgs = glob.glob(folder + dwg_search)

old_plans = []
plan_search = "plt-"
for i in dwgs:
    if plan_search in i:
        old_plans.append(i)

regex = r'(.*(?<=\\)).*?\s-\s(.*?)$'
subst = r'\1\2'

new_plans = []
for i in old_plans:
    result = re.sub(regex, subst, i, re.MULTILINE)
    new_plans.append(result)

file_changes = list(zip(old_plans, new_plans))


log = open(folder+"log.txt", "w+")

for i in file_changes:
    try:
        os.rename(i[0], i[1])
    except FileExistsError:
        log.write("Duplicate File name found: {} :: {}; file will be deleted\n".form
        os.remove(i[0])

plot_directory = "Plot Sheets"
xref_directory = "Xrefs"

os.mkdir(folder + plot_directory + "\\")
os.mkdir(folder + xref_directory + "\\")

dwgs = glob.glob(folder + dwg_search)

for i in dwgs:
    if re.search(r'\\[a-z]{3}-', i):
        log.write("File moved from {} to {};\n".format(i, folder + plot_directory +
        os.rename(i, folder + plot_directory + "\\" + os.path.basename(i))
    elif re.search(r'\\[a-z]-[a-z]{3}', i):
        log.write("File moved from {} to {};\n".format(i, folder + xref_directory +
        os.rename(i, folder + xref_directory + "\\" + os.path.basename(i))

dwgs = glob.glob(folder + all_search)
for i in dwgs:
    if re.search(r'\.(jpg|JPG|png|PNG|bmp|BMP|gif|GIF)$', i):
        log.write("File moved from {} to {};\n".format(i, folder + xref_directory +
        os.rename(i, folder + xref_directory + "\\" + os.path.basename(i))

dwgs = glob.glob(folder + all_search)
for i in dwgs:
    if re.search(r'\.pcp$', i):
        log.write("File deleted: {}\n".format(i))
        os.remove(i)

log.close()
```

PY GET VP COUNT

```python
views = UnwrapElement(IN[0])
no_vp = []
single_vp = []
multi_vp = []

for i in views:
    if len(i.GetAllPlacedViews()) < 1:
        no_vp.append(i)
    if len(i.GetAllPlacedViews()) == 1:
        single_vp.append(i)
    if len(i.GetAllPlacedViews()) > 1:
        multi_vp.append(i)

OUT = (no_vp, single_vp, multi_vp)
```

Run | Save Changes | Revert

PY REFERENCE TYPE

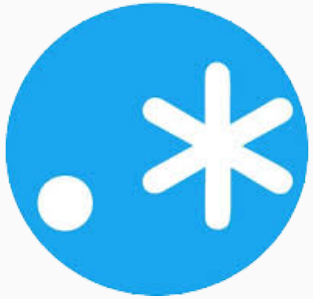
```python
dwg_type = []

for i in IN[0]:
    for j in i:
        if "Plan" in j:
            dwg_type.append("pln")
        elif "Legend" in j:
            dwg_type.append("lgd")
        elif "Schedule" in j:
            dwg_type.append("sch")
        elif "Elevation" in j:
            dwg_type.append("ele")
        elif "Section" in j:
            dwg_type.append("xsc")
        elif "Detail" in j:
            dwg_type.append("dtl")
        elif "3D" in j:
            dwg_type.append("mod")

        else:
            dwg_type.append("xxx")

OUT = (dwg_type)
```

Run | Save Changes | Revert

LISP

```lisp
(vl-load-com)

(defun RegExpSet (pattern ignoreCase global / regex)
  (setq regex
        (cond
          ((vl-bb-ref '*regexp*))
          ((vl-bb-set '*regexp* (vlax-create-object "VBScript.RegExp")))
        )
  )
  (vlax-put regex 'Pattern pattern)
  (if ignoreCase
    (vlax-put regex 'IgnoreCase acTrue)
    (vlax-put regex 'IgnoreCase acFalse)
  )
  (if global
    (vlax-put regex 'Global acTrue)
    (vlax-put regex 'Global acFalse)
  )
  regex
)

(defun RegexpTest (string pattern ignoreCase)
  (= (vlax-invoke (RegExpSet pattern ignoreCase nil) 'Test string) -1)
)

(defun RegExpExecute (string pattern ignoreCase global / sublst lst)
  (vlax-for match (vlax-invoke (RegExpSet pattern ignoreCase global) 'Execute string)
    (setq sublst nil)
    (vl-catch-all-apply
      '(lambda ()
     (vlax-for submatch (vlax-get match 'SubMatches)
       (if submatch
         (setq sublst (cons submatch sublst))
       )
     )
       )
    )
    (setq lst (cons (list (vlax-get match 'Value)
                  (vlax-get match 'FirstIndex)
                  (reverse sublst)
                )
                lst
              )
    )
  )
  (reverse lst)
)

(defun RegExpReplace (string pattern newStr ignoreCase global)
  (vlax-invoke (RegExpSet pattern ignoreCase global) 'Replace string newStr)
)
```

REGEX (REGULAR EXPRESSIONS)



REGULAR EXPRESSION

```
r' (.*(?<=\\)).*?\s-\s(.*?)$
```

TEST STRING

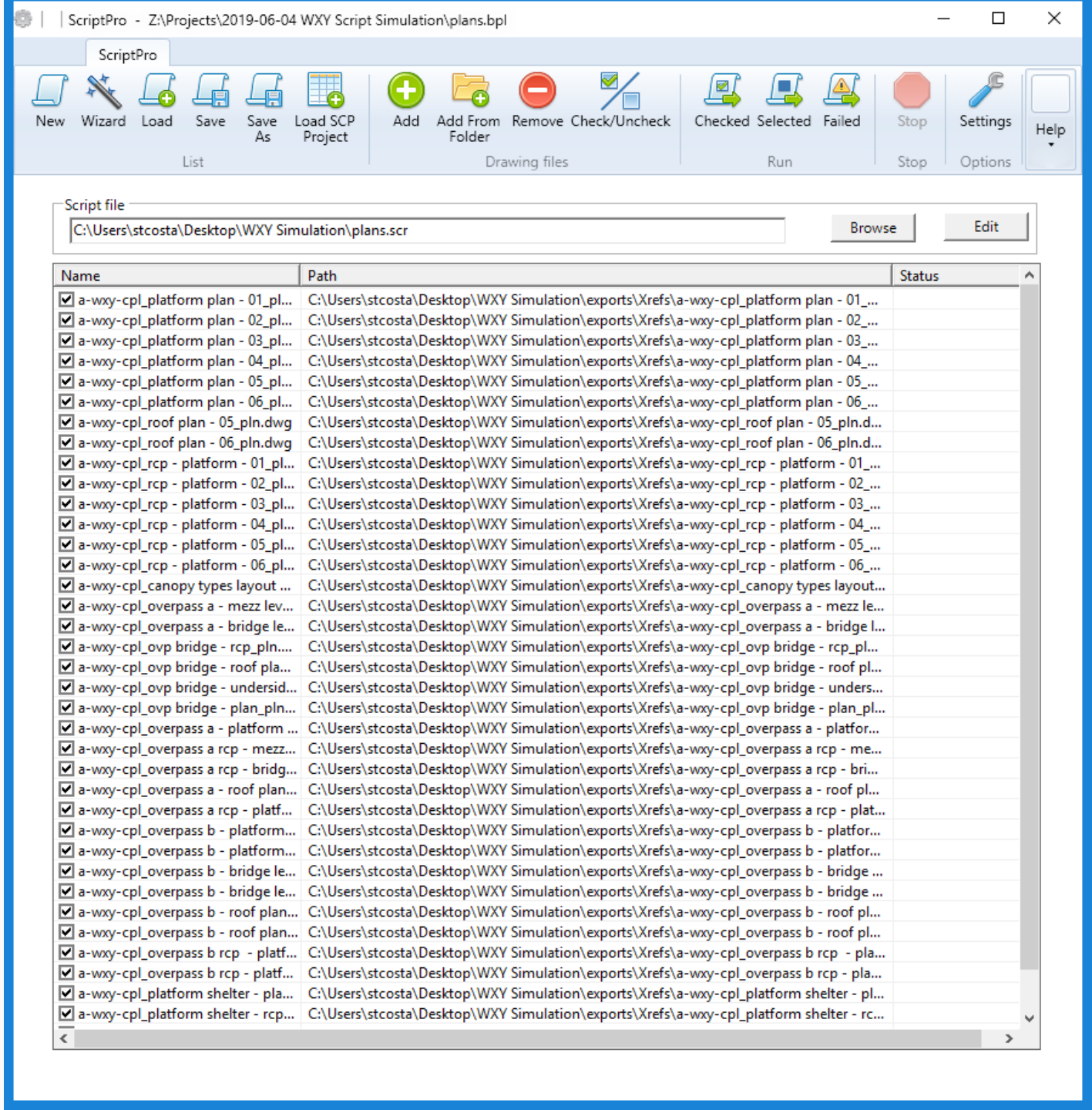
```
Z:\Projects\Sample Folder\_archive\cpl-a-100-wxy_plt-floor plan - a-wxy-cpl_site plan - station package_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-100-wxy_plt-legend - a-wxy-cpl_platform lengths_lgd.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-110-wxy_plt-floor plan - a-wxy-cpl_platform plan - 01_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-111-wxy_plt-floor plan - a-wxy-cpl_platform plan - 02_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-112-wxy_plt-floor plan - a-wxy-cpl_platform plan - 03_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-113-wxy_plt-floor plan - a-wxy-cpl_platform plan - 04_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-114-wxy_plt-floor plan - a-wxy-cpl_platform plan - 05_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-115-wxy_plt-floor plan - a-wxy-cpl_platform plan - 06_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-120-wxy_plt-floor plan - a-wxy-cpl_roof plan - 01_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-121-wxy_plt-floor plan - a-wxy-cpl_roof plan - 02_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-122-wxy_plt-floor plan - a-wxy-cpl_roof plan - 03_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-123-wxy_plt-floor plan - a-wxy-cpl_roof plan - 04_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-124-wxy_plt-floor plan - a-wxy-cpl_roof plan - 05_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-125-wxy_plt-floor plan - a-wxy-cpl_roof plan - 06_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-130-wxy_plt-reflected ceiling plan - a-wxy-cpl_rcp - platform - 01_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-131-wxy_plt-reflected ceiling plan - a-wxy-cpl_rcp - platform - 02_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-132-wxy_plt-reflected ceiling plan - a-wxy-cpl_rcp - platform - 03_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-133-wxy_plt-reflected ceiling plan - a-wxy-cpl_rcp - platform - 04_pln.dwg
Z:\Projects\Sample Folder\_archive\cpl-a-134-wxy_plt-reflected ceiling plan - a-wxy-cpl_rcp - platform - 05_pln.dwg
```

SUBSTITUTION

```
\1\2
```

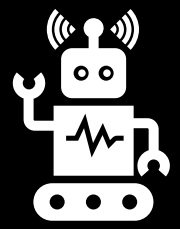
```
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_site plan - station package_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_platform lengths_lgd.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_platform plan - 01_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_platform plan - 02_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_platform plan - 03_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_platform plan - 04_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_platform plan - 05_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_platform plan - 06_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_roof plan - 01_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_roof plan - 02_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_roof plan - 03_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_roof plan - 04_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_roof plan - 05_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_roof plan - 06_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_rcp - platform - 01_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_rcp - platform - 02_pln.dwg
Z:\Projects\Sample Folder\_archive\a-wxy-cpl_rcp - platform - 03_pln.dwg
```

AUTODESK SCRIPTPRO

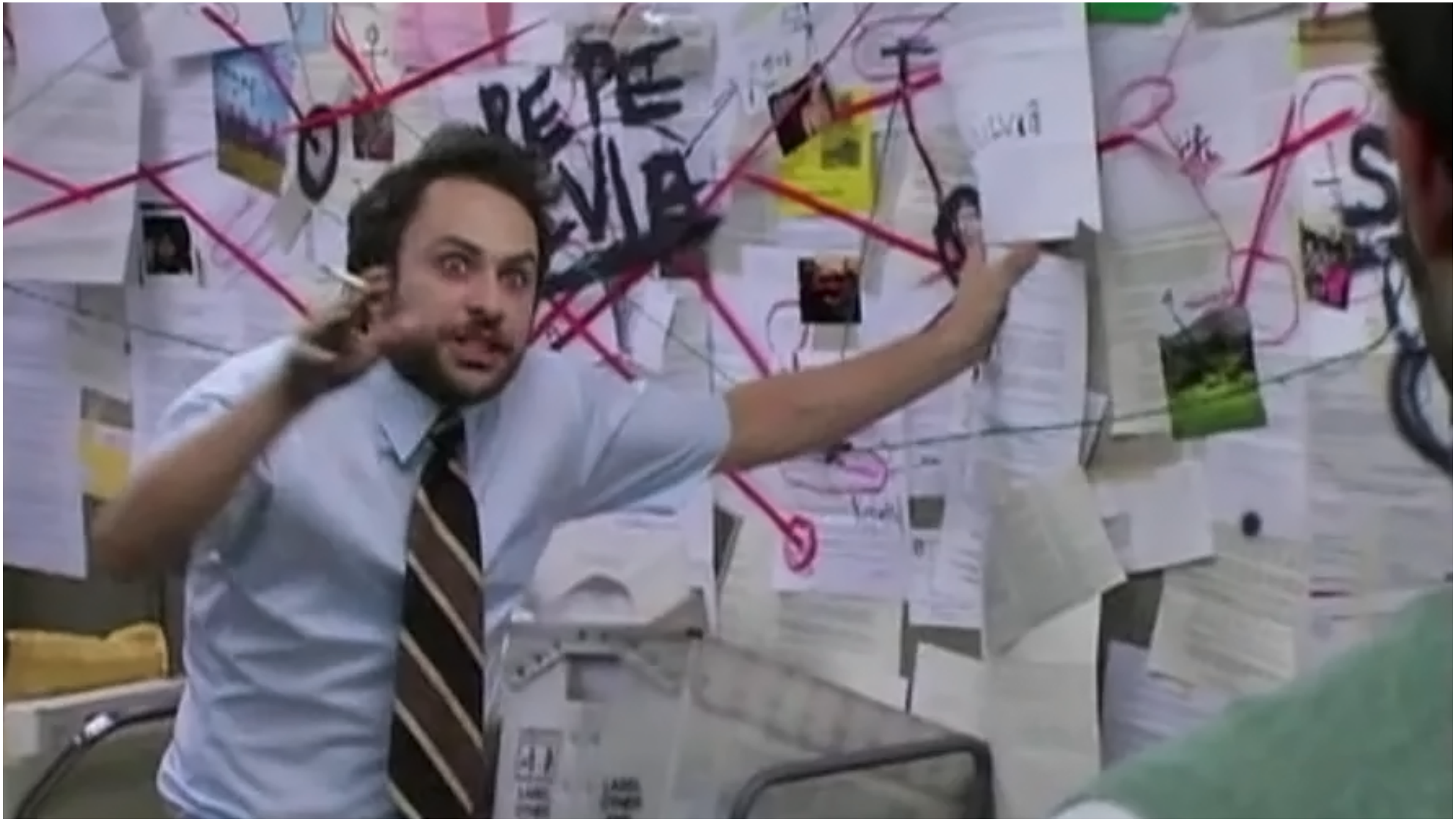


.NET CORE & API

???



TECHNICAL DETAIL



EXPORT SCRIPTS

VIEW SET

Create Collections of views from sheet set sorting by no viewports, a single viewport, or multiple viewports

No viewports
Sheet View Number

One viewport
Sheet View Number
Sheet View Type Name
Boolean value (IsPlan?)

Multiple viewports
Sheet View Number
Sheet View Type Name
Number of Viewports
Boolean value (IsPlan?)

Get Project and Survey Base point Information and assign a LISP variable for the delta of each constituent

PROJECT BASE POINT
X Coordinate
Y Coordinate
Angle To True North

SURVEY BASE POINT
X Coordinate
Y Coordinate

SpringNodes: Expandable Watch Window

```
cpl-a-445-wxy_plt.dwg
  a-wxy-cpl_ovp bridge - rcp_pln
  a-wxy-cpl_ovp bridge - roof plan_pln
  a-wxy-cpl_ovp bridge - underside_pln
  a-wxy-cpl_ovp bridge - plan_pln
  True
  True
  True
  True
cpl-a-446-wxy_plt.dwg
  a-wxy-cpl_overpass bridge - section 2_xsc
  a-wxy-cpl_overpass bridge - typ. elevation_ele
  a-wxy-cpl_overpass bridge - section 1_xsc
  False
  False
  False
cpl-a-500-wxy_plt.dwg
  a-wxy-cpl_thermoplastic & platform edge detail_dtl
  a-wxy-cpl_thermoplastic detectable warning tile plan_dtl
  a-wxy-cpl_thermoplastic truncated dome typical detail_dtl
  a-wxy-cpl_platform expansion joint_dtl
  False
  False
  False
  False
cpl-a-502-wxy_plt.dwg
  a-wxy-cpl_shelter details - column - af plan at guard rail_dtl
  a-wxy-cpl_shelter details - column - af plan under platform_dtl
  a-wxy-cpl_shelter details - af plan at storefront corner_dtl
  a-wxy-cpl_shelter details - af plan at storefront_dtl
  a-wxy-cpl_shelter details - column - af plan at guard rail - callout_dtl
  False
  False
  False
  False
  False
cpl-a-503-wxy_plt.dwg
  a-wxy-cpl_shelter details - af storefront sill 1_dtl
  a-wxy-cpl_shelter details - af storefront head_dtl
  a-wxy-cpl_canopy c & d details - gutter_dtl
  False
  False
```

Close

Combine view set data with “baked” LISP files to create final output. Export additional files for use in Scriptpro

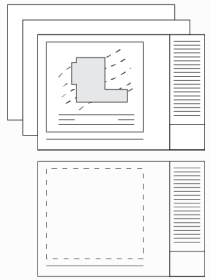
LISP

```
N/S    212296′ 9 1/128″
E/W    1093463′ 2 123/256″
Angle to True North 342.69°
```

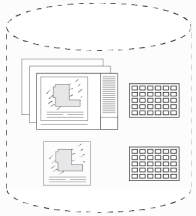
EXPORT SHEETS

VIEW SET

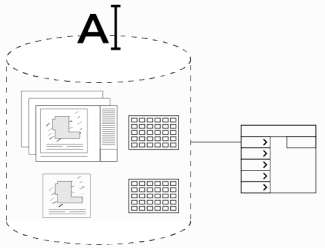
Create list of views from set and check for sheets with no views



Collect and organize data extracted from from the sheets and their references; View Number, Reference Names, and Reference Type



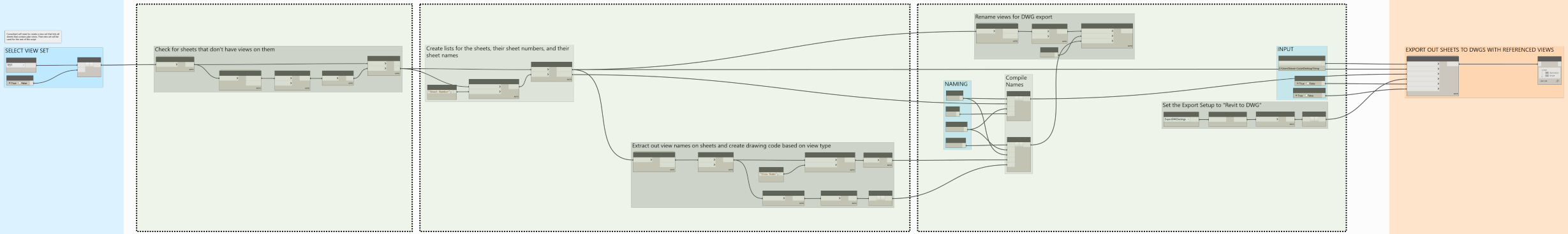
Apply naming convention to views and sheets . Prepare input nodes for custom GeniusLoci Revit to DWG node

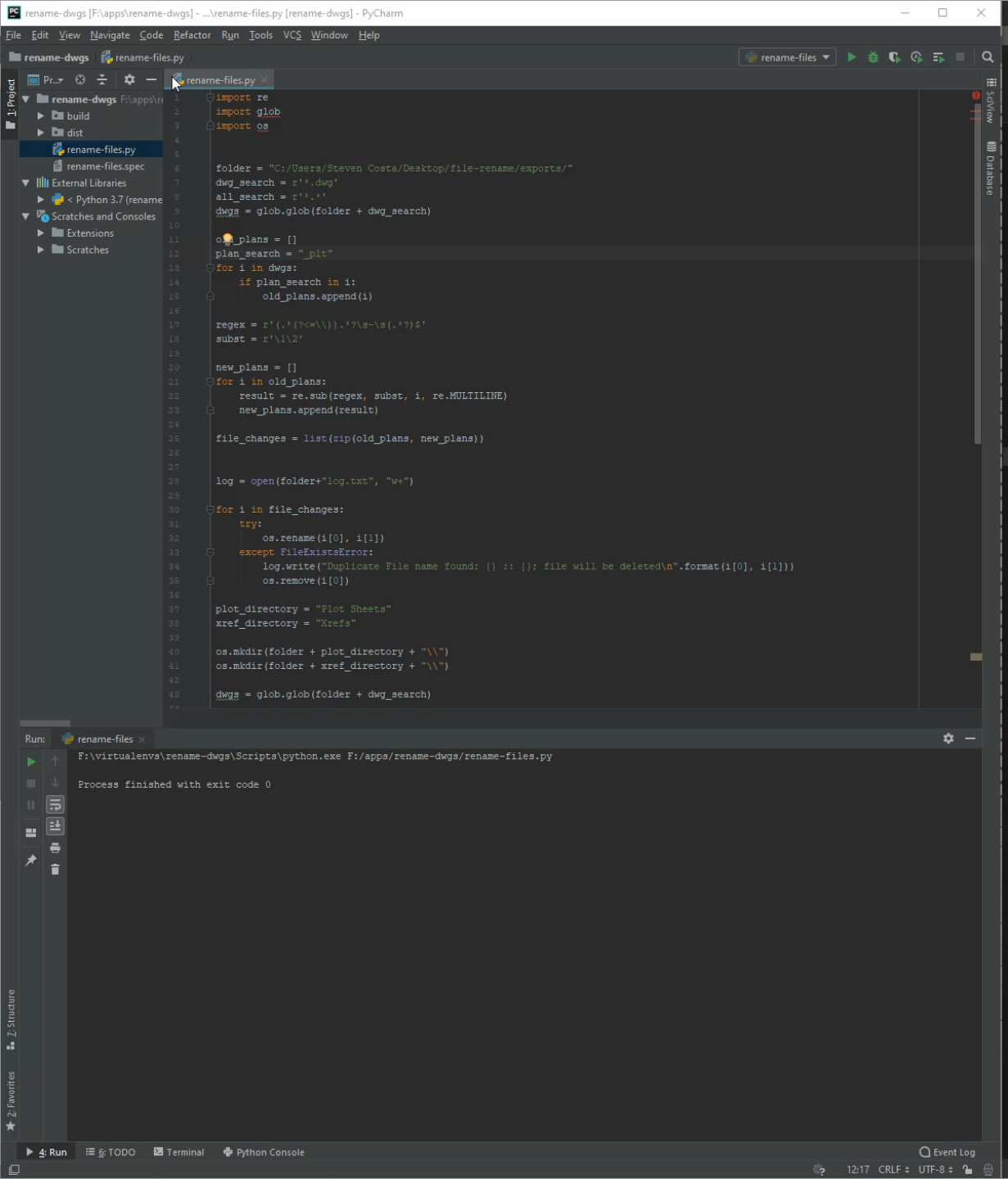


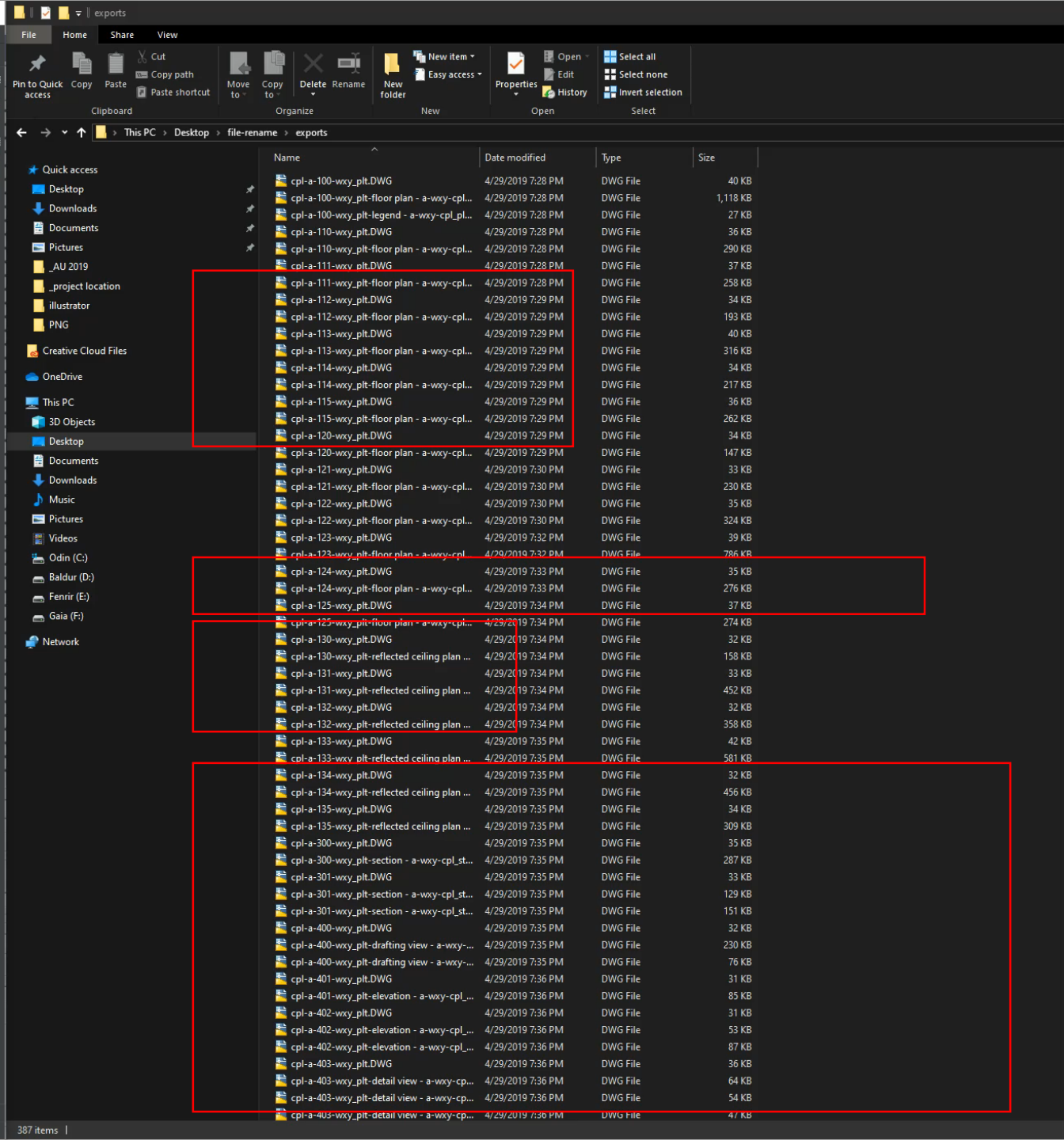
cpl-a-440-wxy_plt.dwg
cpl-a-440-wxy_plt-elevation - a-wxy-cpl_overpass b - stair side_ele.dwg
cpl-a-440-wxy_plt-elevation - a-wxy-cpl_overpass b - track side elevation 1_ele.dwg
cpl-a-441-wxy_plt. dwg
cpl-a-441-wxy_plt-elevation - a-wxy-cpl_overpass b - track side elevation 2_ele.dwg
cpl-a-442-wxy_plt. dwg
cpl-a-442-wxy_plt-section - a-wxy-cpl_overpass a - section 1_xsc.dwg
cpl-a-442-wxy_plt-section - a-wxy-cpl_overpass a - section 2_xsc.dwg
cpl-a-443-wxy_plt. dwg
cpl-a-443-wxy_plt-section - a-wxy-cpl_overpass b - section 1_xsc.dwg

cpl-a-444-wxy_plt.dwg
cpl-a-444-wxy_plt-section - a-wxy-cpl_overpass b - section 2_xsc.dwg
cpl-a-445-wxy_plt. dwg
cpl-a-445-wxy_plt-floor plan - a-wxy-cpl_ovp bridge - plan_pln.dwg
cpl-a-445-wxy_plt-floor plan - a-wxy-cpl_ovp bridge - roof plan_pln.dwg
cpl-a-445-wxy_plt-reflected ceiling plan - a-wxy-cpl_ovp bridge - rcp_pln.dwg
cpl-a-445-wxy_plt-reflected ceiling plan - a-wxy-cpl_ovp bridge - underside_pln.dwg
cpl-a-446-wxy_plt. dwg
cpl-a-446-wxy_plt-elevation - a-wxy-cpl_overpass bridge - typ- elevation_ele.dwg
cpl-a-446-wxy_plt-section - a-wxy-cpl_overpass bridge - section 1_xsc.dwg
cpl-a-446-wxy_plt-section - a-wxy-cpl_overpass bridge - section 2_xsc.dwg

DWG



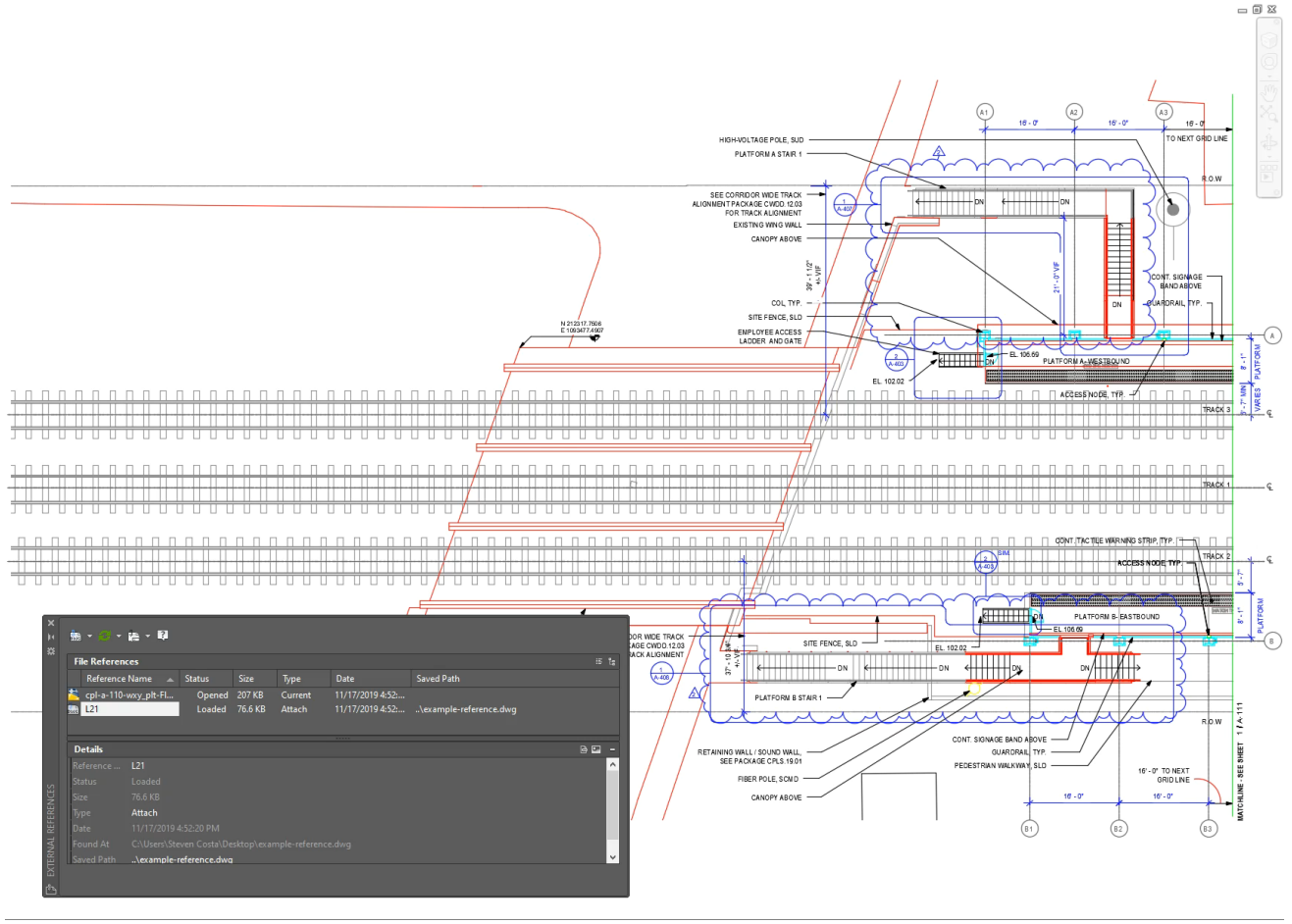

rename-dwgs [F:\apps\rename-dwgs] - ...\rename-files.py [rename-dwgs] - PyCharm
File Edit View Navigate Code Refactor Run Tools VCS Window Help
rename-dwgs
rename-files.py
rename-files
rename-files.py
rename-dwgs F:\apps\r
build
dist
rename-files.py
rename-files.spec
External Libraries
< Python 3.7 (rename
Scratches and Consoles
Extensions
Scratches
import re
import glob
import os
folder = "C:/Users/Steven Costa/Desktop/file-rename/exports/"
dwg_search = r'*.dwg'
all_search = r'*.*'
dwgs = glob.glob(folder + dwg_search)
old_plans = []
plan_search = "_plt"
for i in dwgs:
if plan_search in i:
old_plans.append(i)
regex = r'(.*(?<=\\)).*?\s-\s(.*?)$'
subst = r'\1\2'
new_plans = []
for i in old_plans:
result = re.sub(regex, subst, i, re.MULTILINE)
new_plans.append(result)
file_changes = list(zip(old_plans, new_plans))
log = open(folder+"log.txt", "w+")
for i in file_changes:
try:
os.rename(i[0], i[1])
except FileExistsError:
log.write("Duplicate File name found: {} :: {}; file will be deleted\n".format(i[0], i[1]))
os.remove(i[0])
plot_directory = "Plot Sheets"
xref_directory = "Xrefs"
os.mkdir(folder + plot_directory + "\\")
os.mkdir(folder + xref_directory + "\\")
dwgs = glob.glob(folder + dwg_search)
Run:
rename-files
F:\virtualenvs\rename-dwgs\Scripts\python.exe F:/apps/rename-dwgs/rename-files.py
Process finished with exit code 0
4: Run
6: TODO
Terminal
Python Console
Event Log
12:17
CRLF
UTF-8


exports
File Home Share View
Pin to Quick access
Copy
Paste
Cut
Copy path
Paste shortcut
Move to
Copy to
Delete
Rename
New folder
New item
Easy access
Properties
Open
Edit
History
Select all
Select none
Invert selection
Clipboard
Organize
New
Open
Select
This PC › Desktop › file-rename › exports
Quick access
Desktop
Downloads
Documents
Pictures
_AU 2019
_project location
illustrator
PNG
Creative Cloud Files
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Odin (C:)
Baldur (D:)
Fenrir (E:)
Gaia (F:)
Network
Name
Date modified
Type
Size
cpl-a-100-wxy_plt.DWG 4/29/2019 7:28 PM DWG File 40 KB
cpl-a-100-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:28 PM DWG File 1,118 KB
cpl-a-100-wxy_plt-legend - a-wxy-cpl_pl... 4/29/2019 7:28 PM DWG File 27 KB
cpl-a-110-wxy_plt.DWG 4/29/2019 7:28 PM DWG File 36 KB
cpl-a-110-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:28 PM DWG File 290 KB
cpl-a-111-wxy_plt.DWG 4/29/2019 7:28 PM DWG File 37 KB
cpl-a-111-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:28 PM DWG File 258 KB
cpl-a-112-wxy_plt.DWG 4/29/2019 7:29 PM DWG File 34 KB
cpl-a-112-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:29 PM DWG File 193 KB
cpl-a-113-wxy_plt.DWG 4/29/2019 7:29 PM DWG File 40 KB
cpl-a-113-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:29 PM DWG File 316 KB
cpl-a-114-wxy_plt.DWG 4/29/2019 7:29 PM DWG File 34 KB
cpl-a-114-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:29 PM DWG File 217 KB
cpl-a-115-wxy_plt.DWG 4/29/2019 7:29 PM DWG File 36 KB
cpl-a-115-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:29 PM DWG File 262 KB
cpl-a-120-wxy_plt.DWG 4/29/2019 7:29 PM DWG File 34 KB
cpl-a-120-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:29 PM DWG File 147 KB
cpl-a-121-wxy_plt.DWG 4/29/2019 7:30 PM DWG File 33 KB
cpl-a-121-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:30 PM DWG File 230 KB
cpl-a-122-wxy_plt.DWG 4/29/2019 7:30 PM DWG File 35 KB
cpl-a-122-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:30 PM DWG File 324 KB
cpl-a-123-wxy_plt.DWG 4/29/2019 7:32 PM DWG File 39 KB
cpl-a-123-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:32 PM DWG File 786 KB
cpl-a-124-wxy_plt.DWG 4/29/2019 7:33 PM DWG File 35 KB
cpl-a-124-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:33 PM DWG File 276 KB
cpl-a-125-wxy_plt.DWG 4/29/2019 7:34 PM DWG File 37 KB
cpl-a-125-wxy_plt-floor plan - a-wxy-cpl... 4/29/2019 7:34 PM DWG File 274 KB
cpl-a-130-wxy_plt.DWG 4/29/2019 7:34 PM DWG File 32 KB
cpl-a-130-wxy_plt-reflected ceiling plan ... 4/29/2019 7:34 PM DWG File 158 KB
cpl-a-131-wxy_plt.DWG 4/29/2019 7:34 PM DWG File 33 KB
cpl-a-131-wxy_plt-reflected ceiling plan ... 4/29/2019 7:34 PM DWG File 452 KB
cpl-a-132-wxy_plt.DWG 4/29/2019 7:34 PM DWG File 32 KB
cpl-a-132-wxy_plt-reflected ceiling plan ... 4/29/2019 7:34 PM DWG File 358 KB
cpl-a-133-wxy_plt.DWG 4/29/2019 7:35 PM DWG File 42 KB
cpl-a-133-wxy_plt-reflected ceiling plan ... 4/29/2019 7:35 PM DWG File 581 KB
cpl-a-134-wxy_plt.DWG 4/29/2019 7:35 PM DWG File 32 KB
cpl-a-134-wxy_plt-reflected ceiling plan ... 4/29/2019 7:35 PM DWG File 456 KB
cpl-a-135-wxy_plt.DWG 4/29/2019 7:35 PM DWG File 34 KB
cpl-a-135-wxy_plt-reflected ceiling plan ... 4/29/2019 7:35 PM DWG File 309 KB
cpl-a-300-wxy_plt.DWG 4/29/2019 7:35 PM DWG File 35 KB
cpl-a-300-wxy_plt-section - a-wxy-cpl_st... 4/29/2019 7:35 PM DWG File 287 KB
cpl-a-301-wxy_plt.DWG 4/29/2019 7:35 PM DWG File 33 KB
cpl-a-301-wxy_plt-section - a-wxy-cpl_st... 4/29/2019 7:35 PM DWG File 129 KB
cpl-a-301-wxy_plt-section - a-wxy-cpl_st... 4/29/2019 7:35 PM DWG File 151 KB
cpl-a-400-wxy_plt.DWG 4/29/2019 7:35 PM DWG File 32 KB
cpl-a-400-wxy_plt-drafting view - a-wxy-... 4/29/2019 7:35 PM DWG File 230 KB
cpl-a-400-wxy_plt-drafting view - a-wxy-... 4/29/2019 7:35 PM DWG File 76 KB
cpl-a-401-wxy_plt.DWG 4/29/2019 7:36 PM DWG File 31 KB
cpl-a-401-wxy_plt-elevation - a-wxy-cpl_... 4/29/2019 7:36 PM DWG File 85 KB
cpl-a-402-wxy_plt.DWG 4/29/2019 7:36 PM DWG File 31 KB
cpl-a-402-wxy_plt-elevation - a-wxy-cpl_... 4/29/2019 7:36 PM DWG File 53 KB
cpl-a-402-wxy_plt-elevation - a-wxy-cpl_... 4/29/2019 7:36 PM DWG File 87 KB
cpl-a-403-wxy_plt.DWG 4/29/2019 7:36 PM DWG File 36 KB
cpl-a-403-wxy_plt-detail view - a-wxy-cp... 4/29/2019 7:36 PM DWG File 64 KB
cpl-a-403-wxy_plt-detail view - a-wxy-cp... 4/29/2019 7:36 PM DWG File 54 KB
387 items

TRANSFORM PLANS

This LISP routine translates and rotates all drawing objects using data from Project/Survey Basepoints.

```
(setq x 1093463.20661146 y 212296.75058402 r 17.30745684)
(SETVAR "OSMODE" 0)
(COMMAND "TILEMODE" 1)
(COMMAND "ROTATE" "ALL" "" "0,0,0" (rtos r 2 8))
(COMMAND "MOVE" "ALL" "" "0,0,0" (strcat (rtos x 2 8) "," (rtos y 2 8)))
(COMMAND "ZOOM" "EXTENTS")
(vl-load-com)
(setq *acad-object* (vlax-get-acad-object))
(setq *active-doc* (vla-get-ActiveDocument *acad-object*))
(setq *blocks* (vla-get-Blocks *active-doc*))
(setq names'())
(vlax-for n *blocks*
    (if (eq (vla-get-IsXref n) :vlax-true)
        (progn
            (setq xnameo (vla-get-name n))
            (setq names (append (list xnameo) names))
        )
    )
)
(while (setq def (tblnext "block" (null def)))
    (if (= 4 (logand 4 (cdr (assoc 70 def))))
        (setq lst (vl-list* "," (cdr (assoc 2 def)) lst))
    )
)
(if
    (and lst
        (setq sel
            (ssget "_X"
                (list '(0 . "INSERT")
                    (cons 2 (apply 'strcat (cdr lst)))
                )
            )
        )
    )
    (repeat (setq inc (sslength sel))
        (setq enx (entget (ssname sel (setq inc (1- inc)))))
        (entmod (subst '(10 0.0 0.0 0.0) (assoc 10 enx) enx))
    )
)

(if (not (null names))
    (COMMAND "XCLIP" "ALL" "" "DELETE")
)
(SETVAR "OSMODE" 1)
```



```
(setq x 1093463.20661146 y 212296.75058402 r 17.30745684)

(setq sheets '(("cpl-----wxy_plt.dwg" (("a-wxy-cpl_signs legend v_lgd" "False"))) ("cpl-----wxy_plt.dwg" (("a-wxy-cpl_signs legend v_lgd" "False"))) ("cpl-----wxy_plt.dwg" (("a-wxy-cpl_signs legend v_lgd" "False"))) (
"cpl-----wxy_plt.dwg" (("a-wxy-cpl_signs legend v_lgd" "False"))) ("cpl-----wxy_plt.dwg" (("a-wxy-cpl_signs legend v_lgd" "False"))) ("cpl-----wxy_plt.dwg" (("a-wxy-cpl_signs legend v_lgd" "False"))) ("cpl-----wxy_plt.dwg" ((
```

```
cpl-a-419-wxy_plt.dwg
  a-wxy-cpl_canopy type - g - section_dtl
  a-wxy-cpl_canopy type - h_dtl
  False
  False
cpl-a-420-wxy_plt.dwg
  a-wxy-cpl_support building - plan_pln
  a-wxy-cpl_support building - rcp_pln
  a-wxy-cpl_underbarrier location plan diagram at support bldg_dtl
  True
  True
  False
cpl-a-421-wxy_plt.dwg
  a-wxy-cpl_support building - track side elevation_xsc
  a-wxy-cpl_support building type a - section through room_ele
  a-wxy-cpl_support building - side elevation_ele
  a-wxy-cpl_support building - non-track side_ele
  a-wxy-cpl_thermal values of building components_lgd
  False
  False
  False
  False
  False
cpl-a-422-wxy_plt.dwg
  a-wxy-cpl_support building - section 01_xsc
  a-wxy-cpl_support building - roof plan_pln
  False
  True
cpl-a-425-wxy_plt.dwg
  a-wxy-cpl_overpass a - platform level_pln
  a-wxy-cpl_thermal values of building components_lgd
  True
  False
cpl-a-426-wxy_plt.dwg
  a-wxy-cpl_overpass a - mezz level_pln
  a-wxy-cpl_overpass a - bridge level_pln
  True
  True
cpl-a-427-wxy_plt.dwg
  a-wxy-cpl_overpass a - roof plan_pln
  a-wxy-cpl_overpass a rcp - platform level_pln
  True
  True
cpl-a-428-wxy_plt.dwg
  a-wxy-cpl_overpass a rcp - mezz level_pln
  a-wxy-cpl_overpass a rcp - bridge level_pln
  True
  True
cpl-a-430-wxy_plt.dwg
```

```
egend v_lgd" "False"))) ("cpl-----wxy_plt.dwg" (("a-wxy-cpl_signs legend v_lgd" "False"))) ("cpl-a-100-wxy_plt.dwg" (("a-wxy-cpl_site plan -
wxy_plt.dwg" (("a-wxy-cpl_platform plan - 01_pln" "True"))) ("cpl-a-111-wxy_plt.dwg" (("a-wxy-cpl_platform plan - 02_pln" "True"))) (
_plt.dwg" (("a-wxy-cpl_platform plan - 04_pln" "True"))) ("cpl-a-114-wxy_plt.dwg" (("a-wxy-cpl_platform plan - 05_pln" "True"))) (
_plt.dwg" (("a-wxy-cpl_roof plan - 01_pln" "True"))) ("cpl-a-121-wxy_plt.dwg" (("a-wxy-cpl_roof plan - 02_pln" "True"))) (
.dwg" (("a-wxy-cpl_roof plan - 04_pln" "True"))) ("cpl-a-124-wxy_plt.dwg" (("a-wxy-cpl_roof plan - 05_pln" "True"))) ("cpl-a-125-wxy_plt.dwg"
platform - 01_pln" "True"))) ("cpl-a-131-wxy_plt.dwg" (("a-wxy-cpl_rcp - platform - 02_pln" "True"))) ("cpl-a-132-wxy_plt.dwg" ((
cp - platform - 04_pln" "True"))) ("cpl-a-134-wxy_plt.dwg" (("a-wxy-cpl_rcp - platform - 05_pln" "True"))) ("cpl-a-135-wxy_plt.dwg" ((
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plan_dtl" "False") ("a-wxy-cpl_employee access ladder at platform end- section_dtl" "False") ("a-wxy-cpl_employee access ladder and gate -
atform edge - elevation_dtl" "False"))) ("cpl-a-404-wxy_plt.dwg" (("a-wxy-cpl_platform shelter - plan_dtl" "False") ("a-wxy-cpl_canopy type -
- elevation_dtl" "False") ("a-wxy-cpl_platform shelter - elevation - non-track_dtl" "False"))) ("cpl-a-406-wxy_plt.dwg" (("a-wxy-cpl_platform
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e") ("a-wxy-cpl_platform b stair 1 - elevation 01_dtl" "False"))) ("cpl-a-409-wxy_plt.dwg" (("a-wxy-cpl_platform a stair 2 - plan_dtl" "False")
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air 4 - plan_dtl" "False") ("a-wxy-cpl_platform a stair 4 - elevation 01_dtl" "False") ("a-wxy-cpl_platform b stair 4 - elevation 1_dtl"
") ("a-wxy-cpl_platform a ramp 1 - elevation 01_dtl" "False") ("a-wxy-cpl_platform a ramp 1 - elevation 02_dtl" "False"))) (
l_platform b ramp 2 - plan_dtl" "False") ("a-wxy-cpl_platform b ramp 1 - elevation 1_dtl" "False") ("a-wxy-cpl_platform b ramp 1 - elevation
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building - track side elevation_xsc" "False") ("a-wxy-cpl_support building type a - section through room_ele" "False") ("a-wxy-cpl_support
_ele" "False") ("a-wxy-cpl_thermal values of building components_lgd" "False"))) ("cpl-a-422-wxy_plt.dwg" (("a-wxy-cpl_support building -
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- mezz level_pln" "True") ("a-wxy-cpl_overpass a rcp - bridge level_pln" "True"))) ("cpl-a-430-wxy_plt.dwg" (("a-wxy-cpl_overpass b - platform
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wxy-cpl_thermoplastic & platform edge detail_dtl" "False") ("a-wxy-cpl_thermoplastic detectable warning tile plan_dtl" "False") (
form expansion joint_dtl" "False"))) ("cpl-a-502-wxy_plt.dwg" (("a-wxy-cpl_shelter details - column - af plan at guard rail_dtl" "False") (
_shelter details - af plan at storefront corner_dtl" "False") ("a-wxy-cpl_shelter details - af plan at storefront_dtl" "False") (
("cpl-a-503-wxy_plt.dwg" (("a-wxy-cpl_shelter details - af storefront sill 1_dtl" "False") ("a-wxy-cpl_shelter details - af storefront
504-wxy_plt.dwg" (("a-wxy-cpl_shelter details - storefront sill 2_dtl" "False") ("a-wxy-cpl_shelter details - storefront canopy edge_dtl"
dtl" "False") ("a-wxy-cpl_guardrail section @ top of stair_dtl" "False") ("a-wxy-cpl_stair run section (typ)_dtl" "False") (
form section @ stair/ramp landing to platform (typ)_dtl" "False") ("a-wxy-cpl_guardrail section @ guardrail panel connection (typ)_dtl" "False"
y_plt.dwg" (("a-wxy-cpl_top or bottom of stair/ramp at landing with continuous handrail - plan_dtl" "False") ("a-wxy-cpl_guardrail module
s - plan (typ)_dtl" "False") ("a-wxy-cpl_top of stair plan detail non-continuous (typ)_dtl" "False") ("a-wxy-cpl_stair external corner - plan
lse") ("a-wxy-cpl_stair internal corner detail (typ)_dtl" "False") ("a-wxy-cpl_top or bottom stair at landing handrail returns to
"False") ("a-wxy-cpl_guardrail to platform edge - plan detail_dtl" "False"))) ("cpl-a-513-wxy_plt.dwg" (("a-wxy-cpl_section @ bottom of ramp
bottom of ramp - plan detail (typ)_dtl" "False") ("a-wxy-cpl_handrail - section and elevation detail (typ)_dtl" "False") ("a-wxy-cpl_handrail
air/ramp guardrail and underbarrier section (typ)_dtl" "False") ("a-wxy-cpl_stair/ramp guardrail and underbarrier - elevation (typ)_dtl"
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-section (typ)_dtl" "False") ("a-wxy-cpl_typical platform guardrail module - track side_dtl" "False") ("a-wxy-cpl_platform guardrail module at
- mid panel plan (typ)_dtl" "False") ("a-wxy-cpl_guardrail module at platform edge (typ)_dtl" "False") ("a-wxy-cpl_typical under platform
ction at pier (typ)_dtl" "False"))) ("cpl-a-518-wxy_plt.dwg" (("a-wxy-cpl_infill panel connection at mid post - plan detail_dtl" "False") (
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corner - plan_dtl" "False") ("a-wxy-cpl_guardrail mount at platform joint - plan_dtl" "False") ("a-wxy-cpl_guardrail mount at bottom of ramp_dtl" "False") ("a-wxy-cpl_guardrail mount at bottom of ramp - plan_dtl" "False"))) (
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1_dtl" "False") ("a-wxy-cpl_canopy details - column - section 2_dtl" "False"))) ("cpl-a-522-wxy_plt.dwg" (("a-wxy-cpl_canopy details - column - plan at guard rail_dtl" "False") ("a-wxy-cpl_canopy details - column - plan under
```
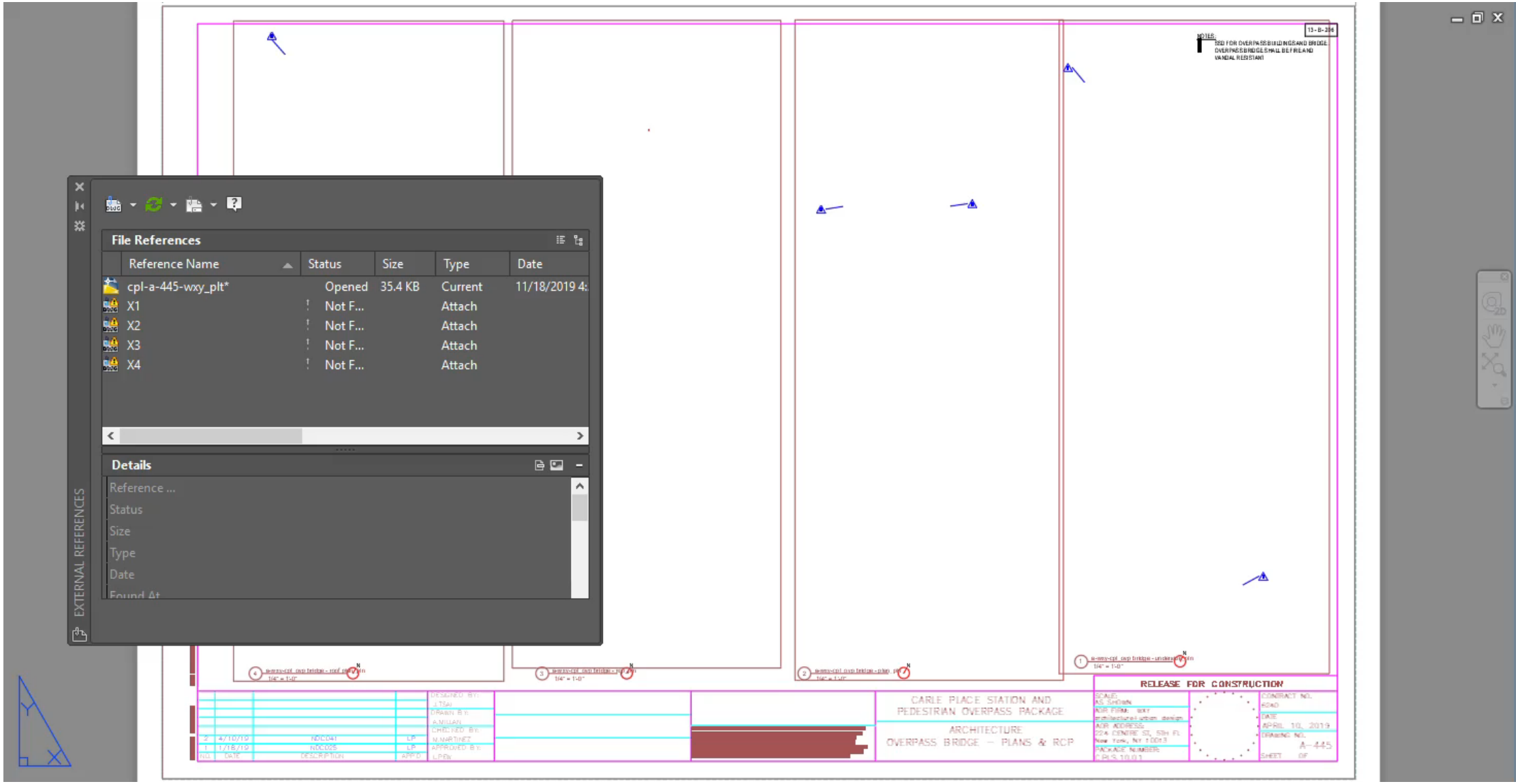
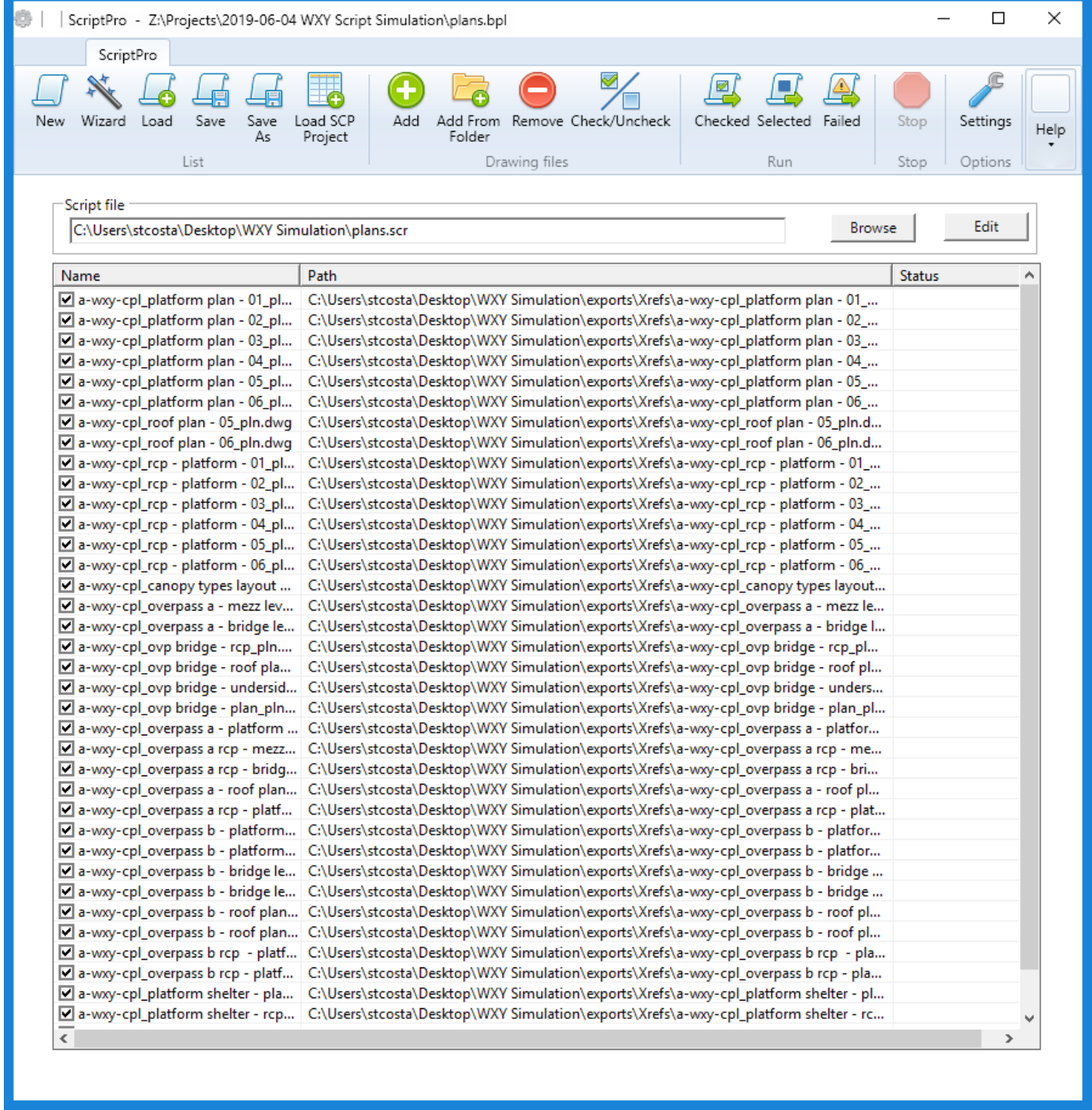

ADJUST VIEWPORTS

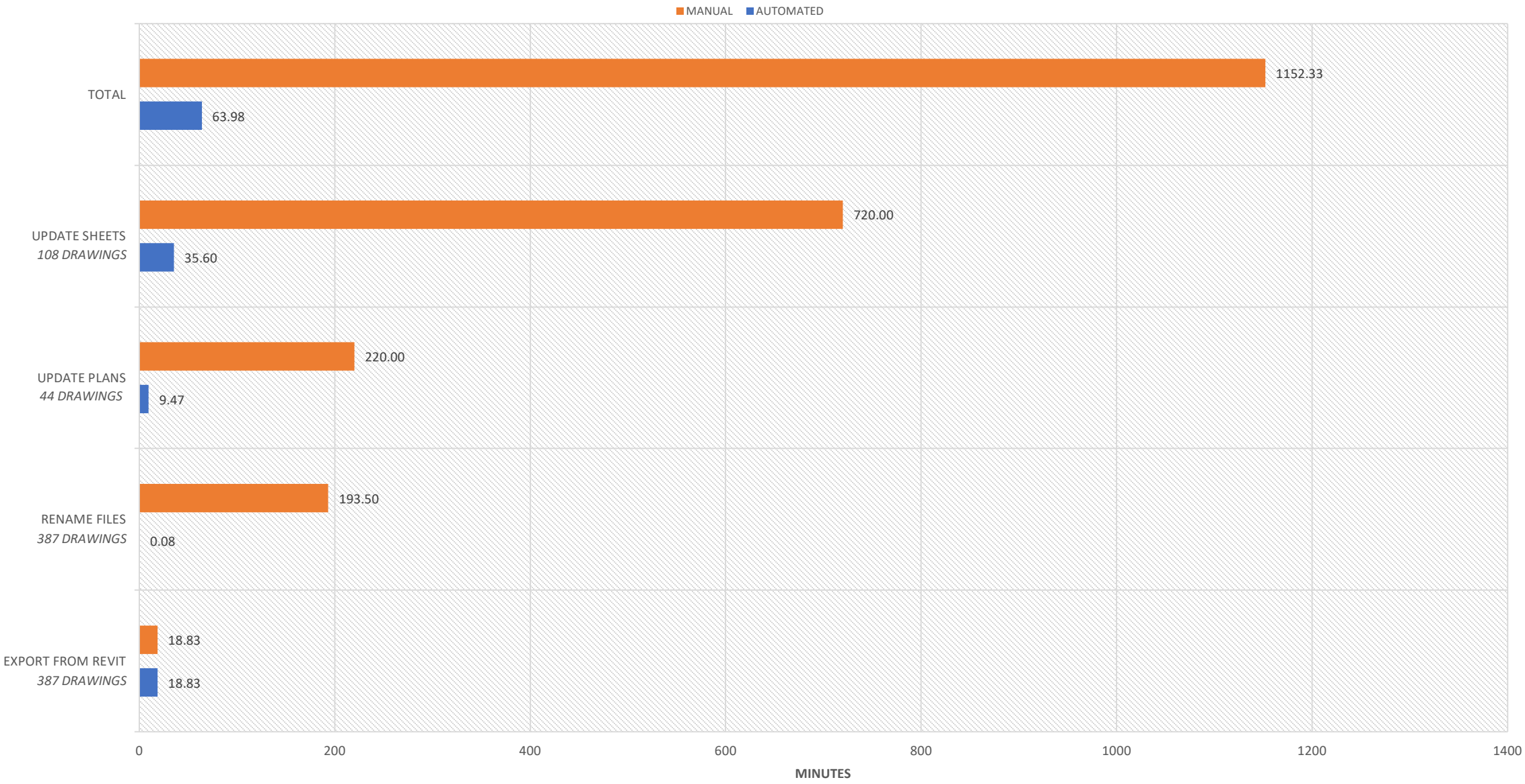


AUTODESK SCRIPTPRO

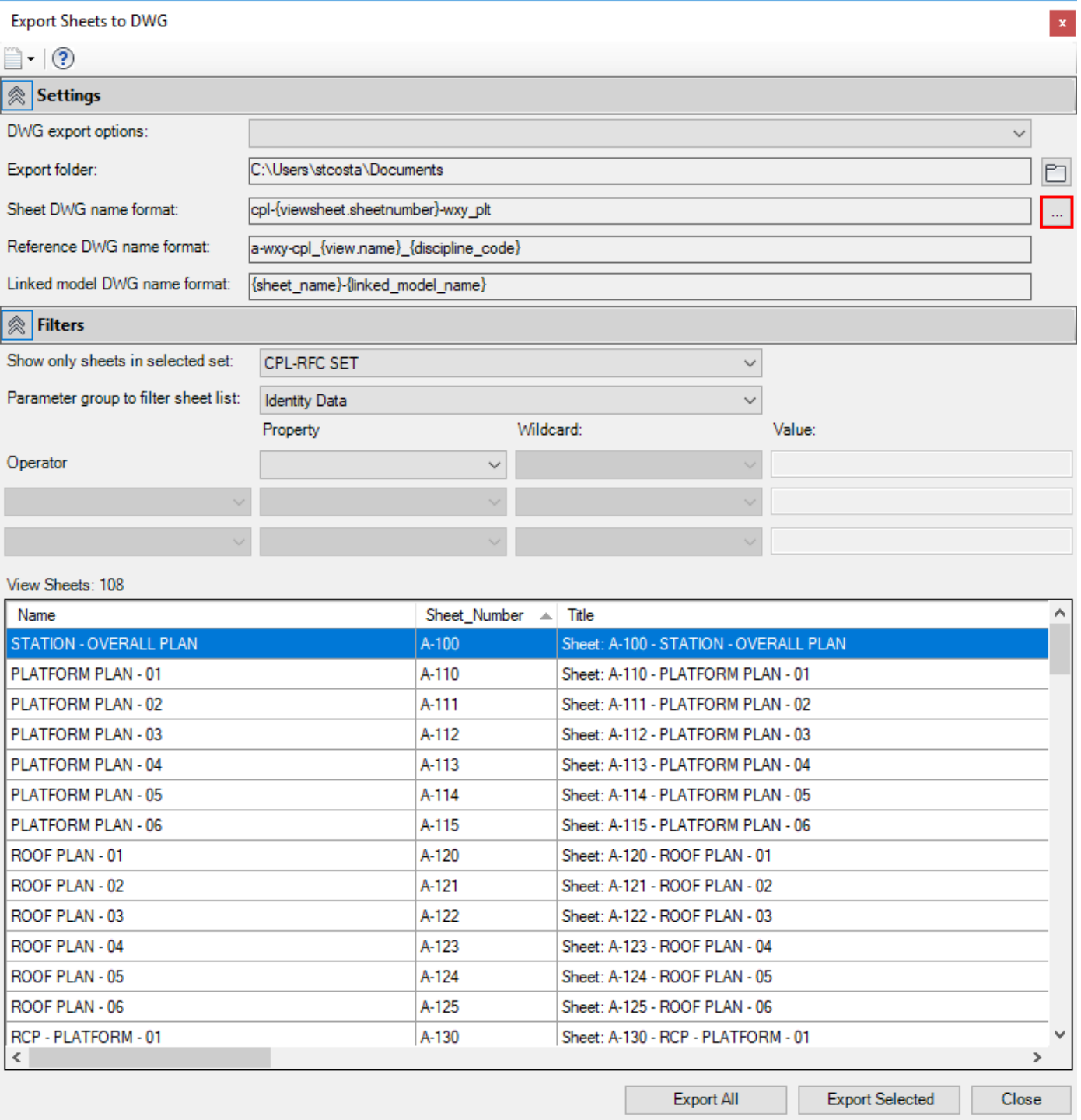
Using ScriptPro, you can apply a set of commands to multiple drawings by simply specifying a script file and the list of drawings that you would like to apply the script to.

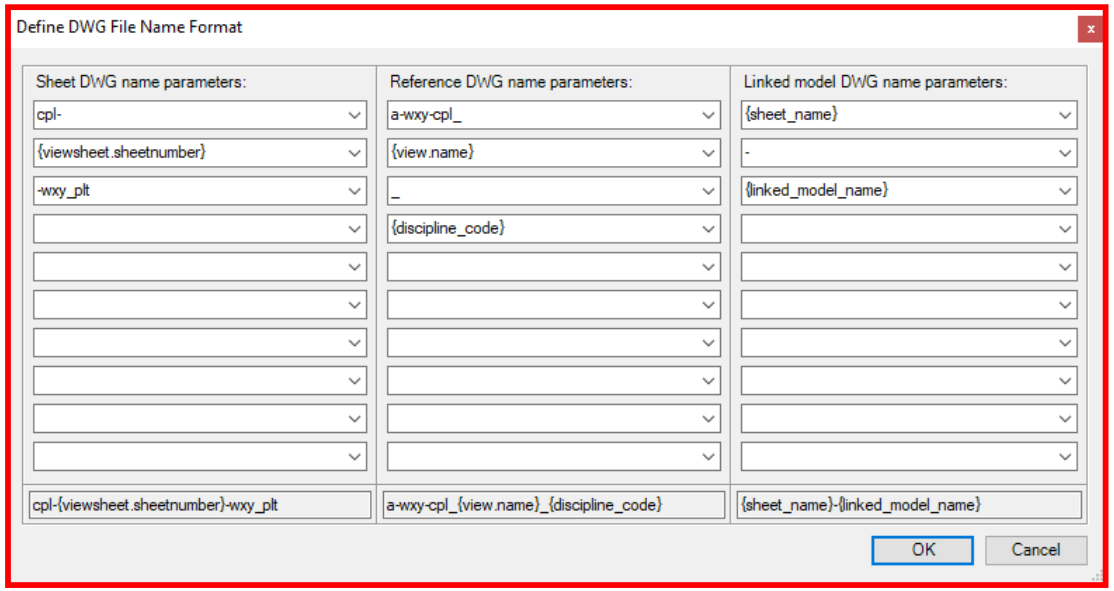


RESULTS

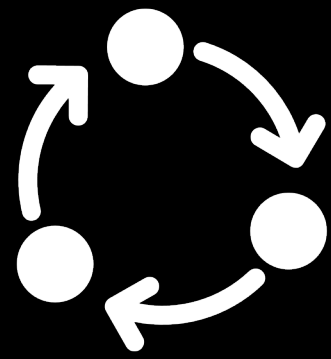

MANUAL
AUTOMATED
TOTAL
1152.33
63.98
UPDATE SHEETS
108 DRAWINGS
720.00
35.60
UPDATE PLANS
44 DRAWINGS
220.00
9.47
RENAME FILES
387 DRAWINGS
193.50
0.08
EXPORT FROM REVIT
387 DRAWINGS
18.83
18.83
0
200
400
600
800
1000
1200
1400
MINUTES

.NET CORE & API

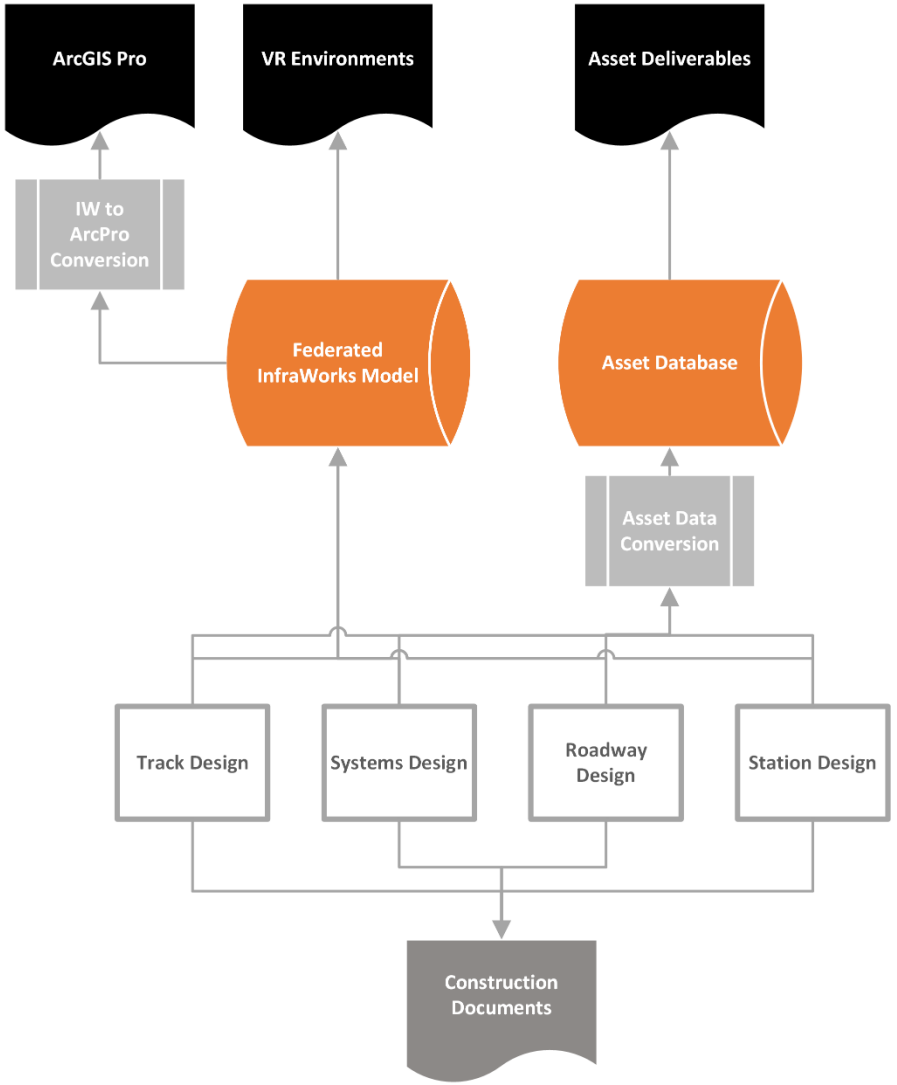

Export Sheets to DWG
Settings
DWG export options:
Export folder:
C:\Users\stcosta\Documents
Sheet DWG name format:
cpl-{viewsheet.sheetnumber}-wxy_plt
...
Reference DWG name format:
a-wxy-cpl_{view.name}_{discipline_code}
Linked model DWG name format:
{sheet_name}-{linked_model_name}
Filters
Show only sheets in selected set:
CPL-RFC SET
Parameter group to filter sheet list:
Identity Data
Property
Wildcard:
Value:
Operator
View Sheets: 108
Name
Sheet_Number
Title
STATION - OVERALL PLAN
A-100
Sheet: A-100 - STATION - OVERALL PLAN
PLATFORM PLAN - 01
A-110
Sheet: A-110 - PLATFORM PLAN - 01
PLATFORM PLAN - 02
A-111
Sheet: A-111 - PLATFORM PLAN - 02
PLATFORM PLAN - 03
A-112
Sheet: A-112 - PLATFORM PLAN - 03
PLATFORM PLAN - 04
A-113
Sheet: A-113 - PLATFORM PLAN - 04
PLATFORM PLAN - 05
A-114
Sheet: A-114 - PLATFORM PLAN - 05
PLATFORM PLAN - 06
A-115
Sheet: A-115 - PLATFORM PLAN - 06
ROOF PLAN - 01
A-120
Sheet: A-120 - ROOF PLAN - 01
ROOF PLAN - 02
A-121
Sheet: A-121 - ROOF PLAN - 02
ROOF PLAN - 03
A-122
Sheet: A-122 - ROOF PLAN - 03
ROOF PLAN - 04
A-123
Sheet: A-123 - ROOF PLAN - 04
ROOF PLAN - 05
A-124
Sheet: A-124 - ROOF PLAN - 05
ROOF PLAN - 06
A-125
Sheet: A-125 - ROOF PLAN - 06
RCP - PLATFORM - 01
A-130
Sheet: A-130 - RCP - PLATFORM - 01
Export All
Export Selected
Close


Define DWG File Name Format
Sheet DWG name parameters:
Reference DWG name parameters:
Linked model DWG name parameters:
cpl-
a-wxy-cpl_
{sheet_name}
{viewsheet.sheetnumber}
{view.name}
-
-wxy_plt
_
{linked_model_name}
{discipline_code}
cpl-{viewsheet.sheetnumber}-wxy_plt
a-wxy-cpl_{view.name}_{discipline_code}
{sheet_name}-{linked_model_name}
OK
Cancel

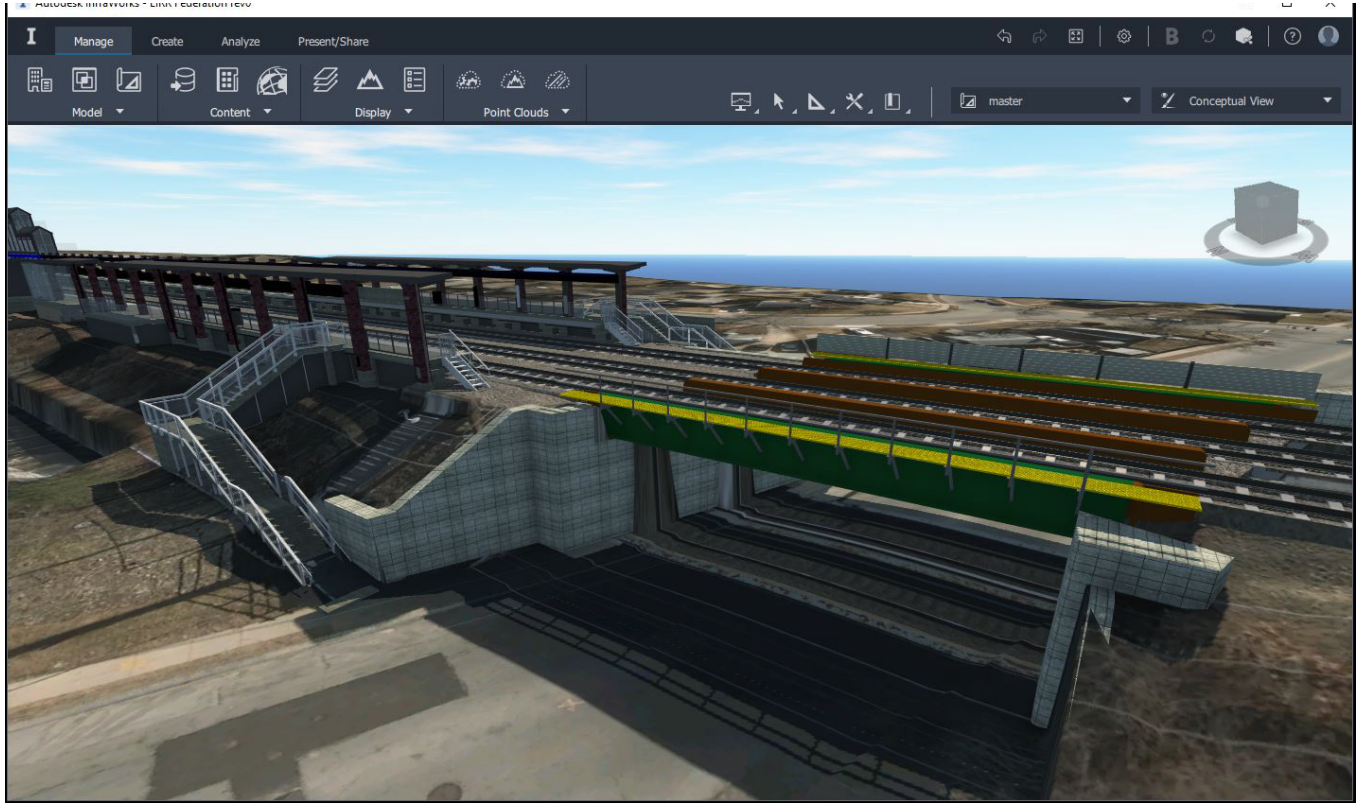
Asset Management



Stantec

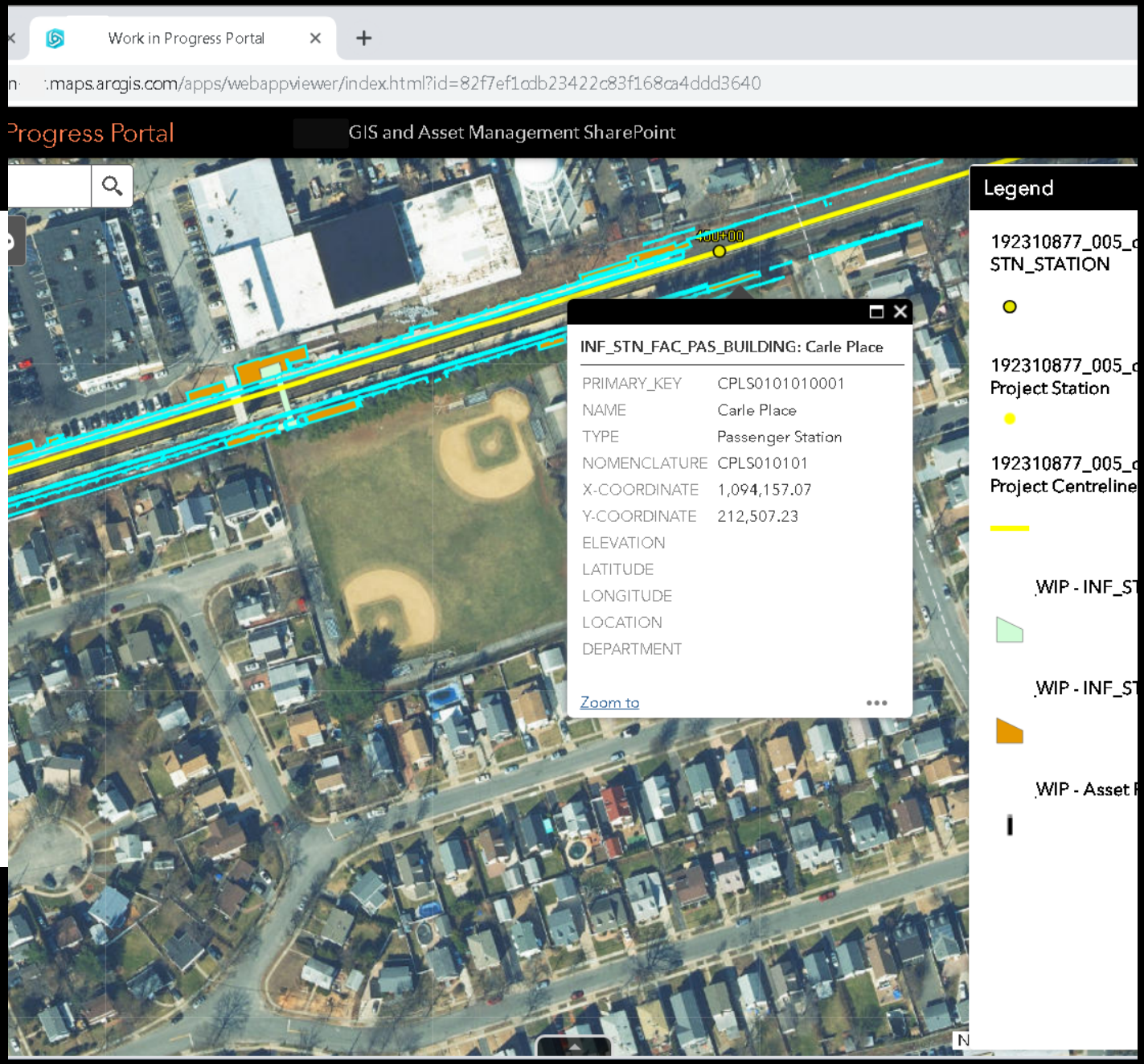


- Asset Deliverables
- ArcGIS Visualization Deliverables



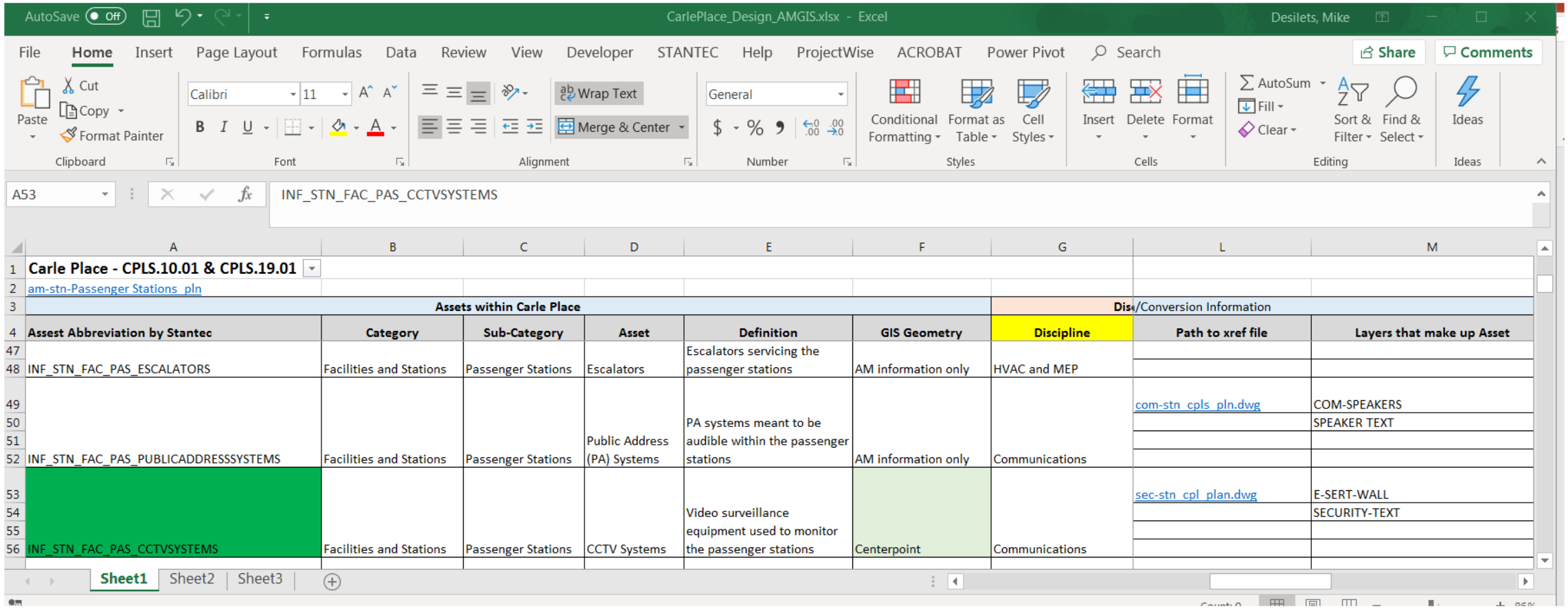
Conversion had two goals

- Satisfy 3D model Visualization Desire of Client
- Create a Compatible link to Asset Information



Stantec

Layer to Asset Mapping



AutoSave Off — CarlePlace_Design_AMGIS.xlsx - Excel — Desilets, Mike

File Home Insert Page Layout Formulas Data Review View Developer STANTEC Help ProjectWise ACROBAT Power Pivot Search Share Comments

Paste Cut Copy Format Painter | Calibri 11 | Wrap Text | General | Conditional Formatting | Format as Table | Cell Styles | Insert Delete Format | AutoSum Fill Clear | Sort & Filter | Find & Select | Ideas

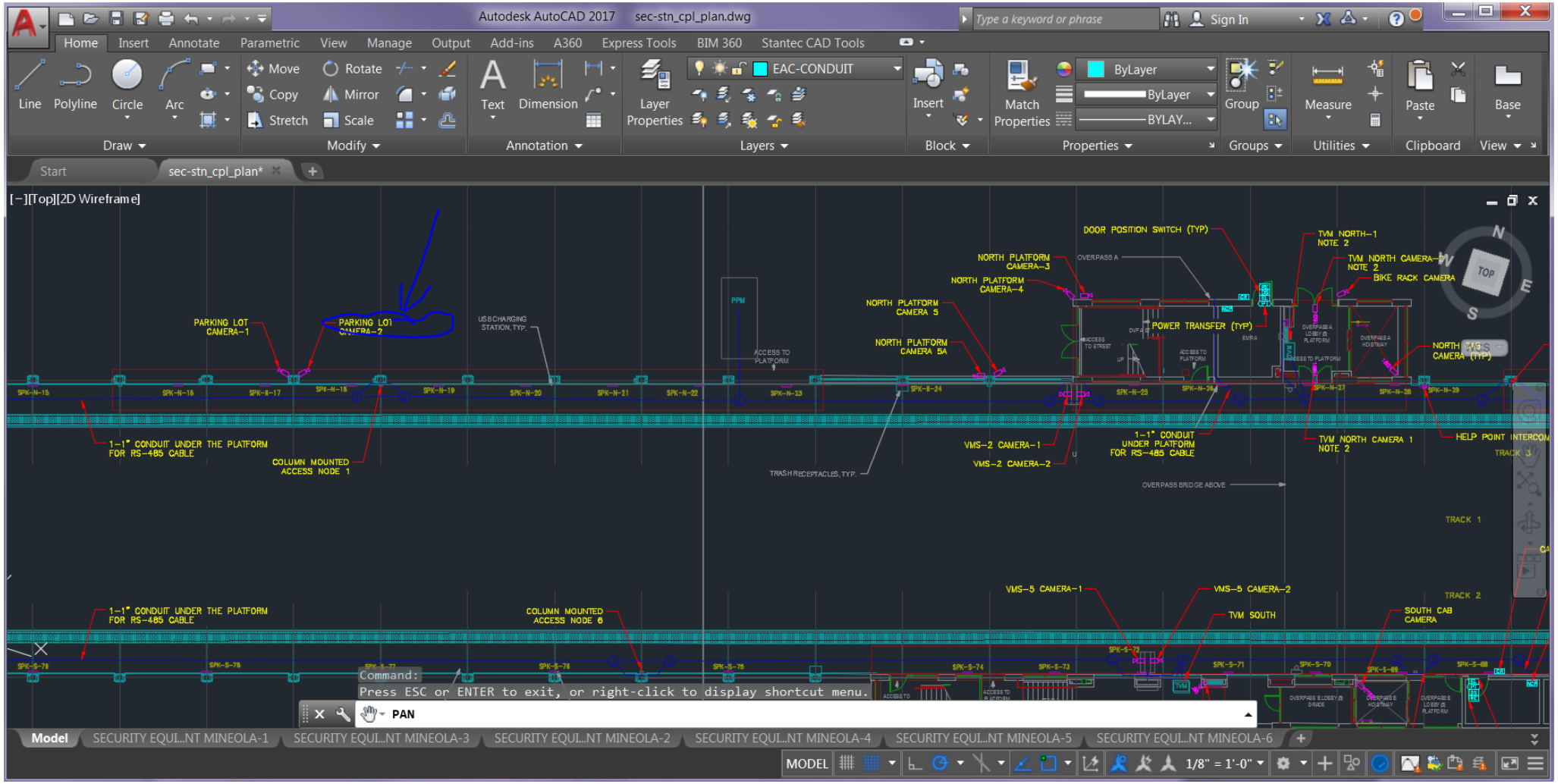
Clipboard Font Alignment Number Styles Cells Editing Ideas

A53 INF_STN_FAC_PAS_CCTVSYSTEMS

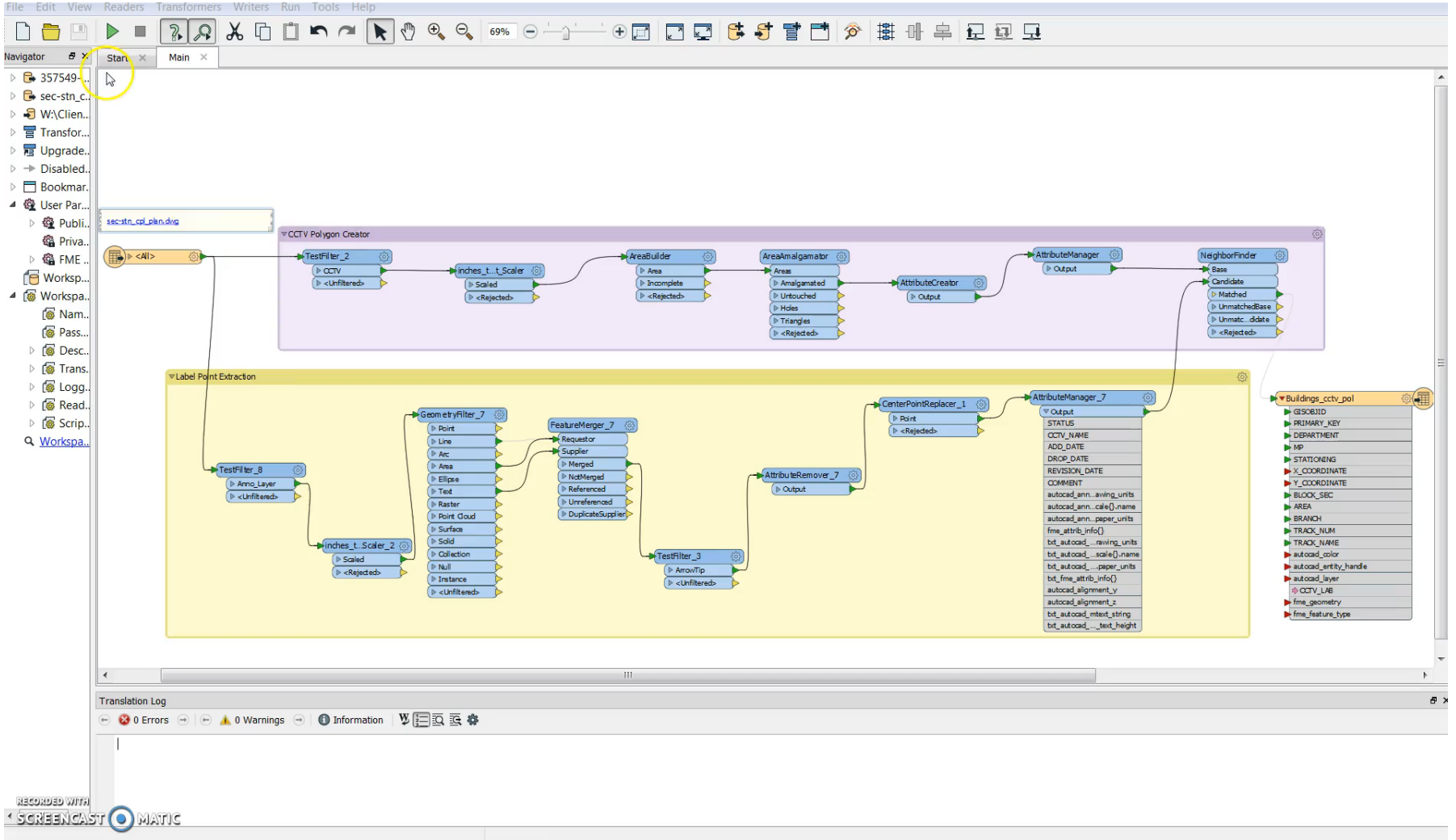
	A	B	C	D	E	F	G	L	M
1	**Carle Place - CPLS.10.01 & CPLS.19.01**								
2	am-stn-Passenger Stations_pln								
3	**Assets within Carle Place**						**Dis/Conversion Information**		
4	**Assest Abbreviation by Stantec**	**Category**	**Sub-Category**	**Asset**	**Definition**	**GIS Geometry**	**Discipline**	**Path to xref file**	**Layers that make up Asset**
47					Escalators servicing the				
48	INF_STN_FAC_PAS_ESCALATORS	Facilities and Stations	Passenger Stations	Escalators	passenger stations	AM information only	HVAC and MEP		
49								com-stn_cpls_pln.dwg	COM-SPEAKERS
50					PA systems meant to be				SPEAKER TEXT
51				Public Address	audible within the passenger				
52	INF_STN_FAC_PAS_PUBLICADDRESSSYSTEMS	Facilities and Stations	Passenger Stations	(PA) Systems	stations	AM information only	Communications		
53								sec-stn_cpl_plan.dwg	E-SERT-WALL
54					Video surveillance				SECURITY-TEXT
55					equipment used to monitor				
56	INF_STN_FAC_PAS_CCTVSYSTEMS	Facilities and Stations	Passenger Stations	CCTV Systems	the passenger stations	Centerpoint	Communications		

Sheet1 Sheet2 Sheet3

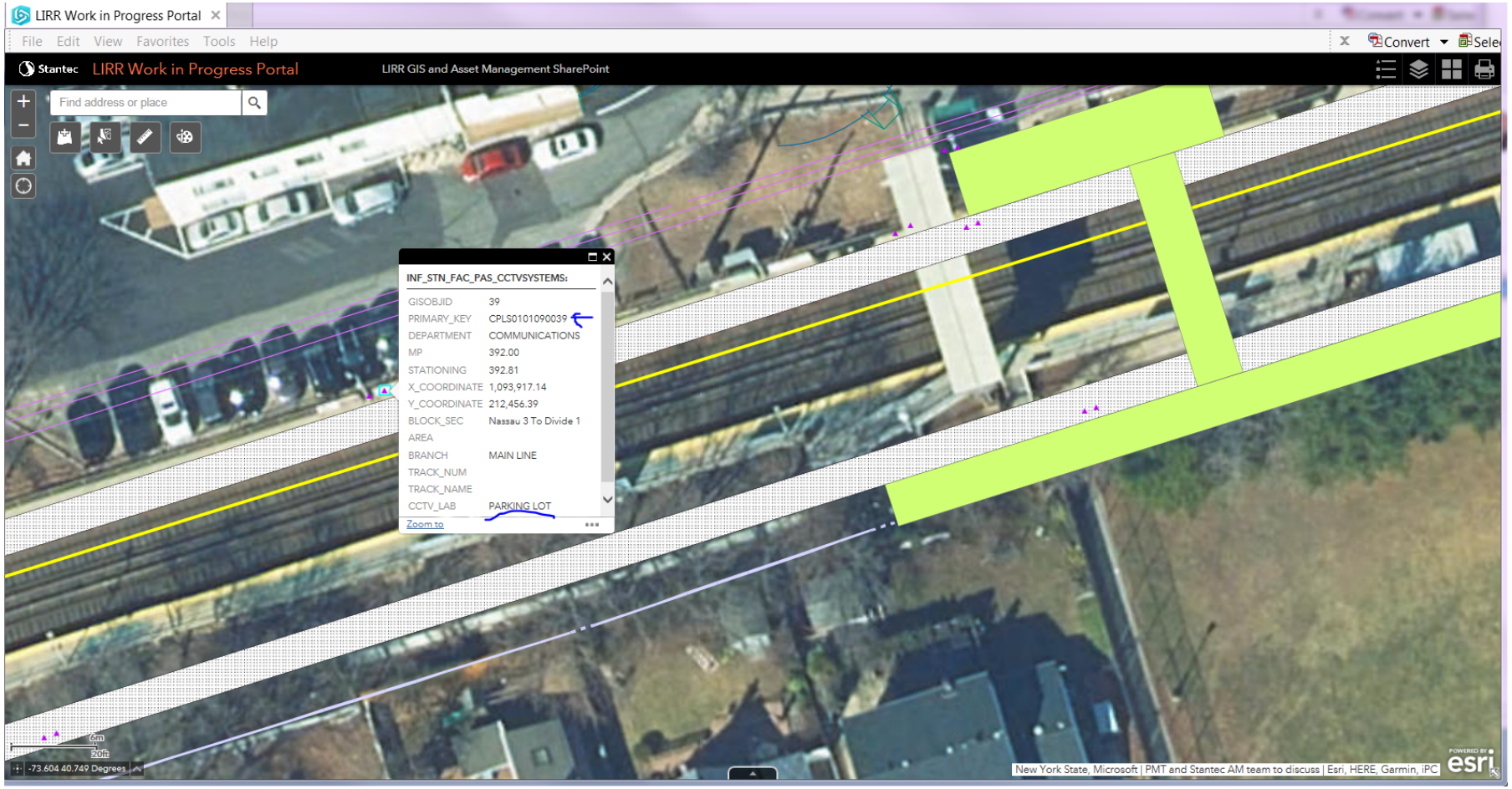
Metadata Extraction



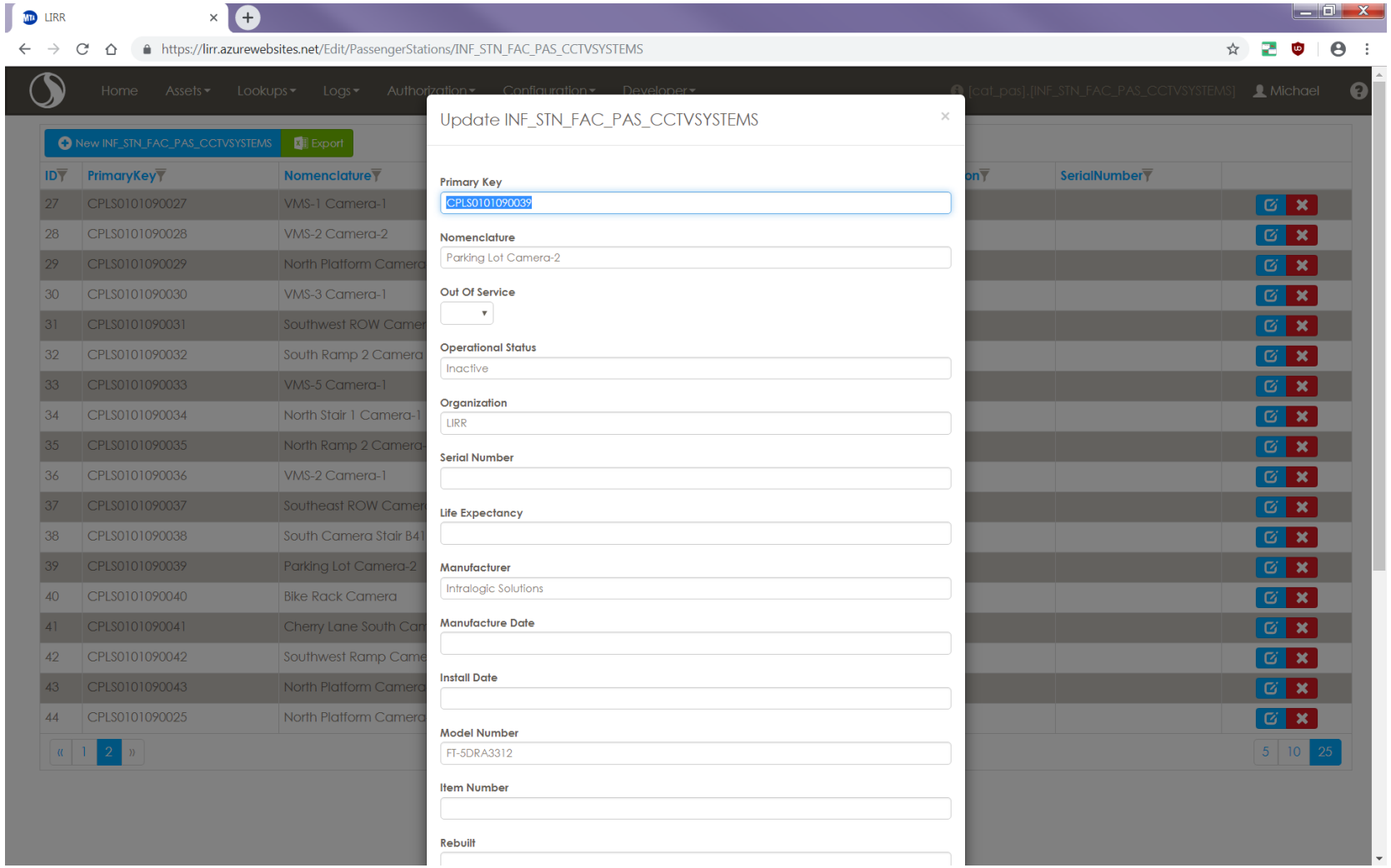
Spatial Data Transformation



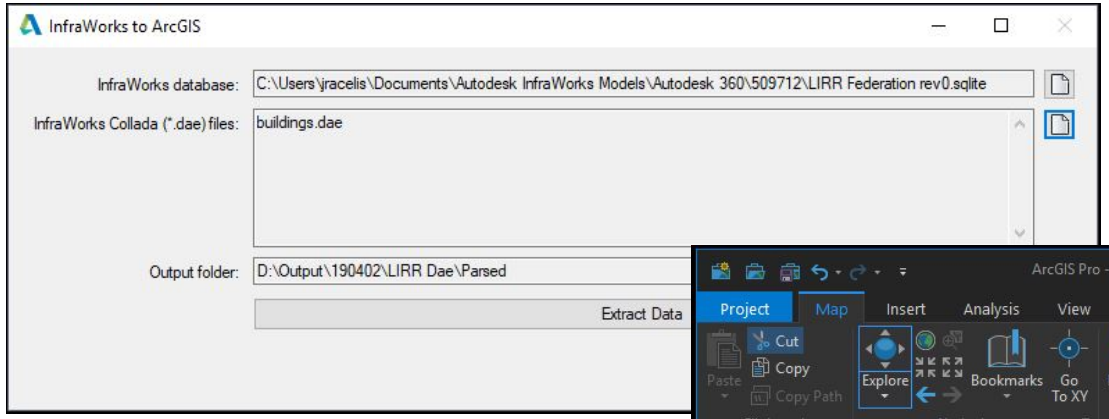
AGOL Web Application

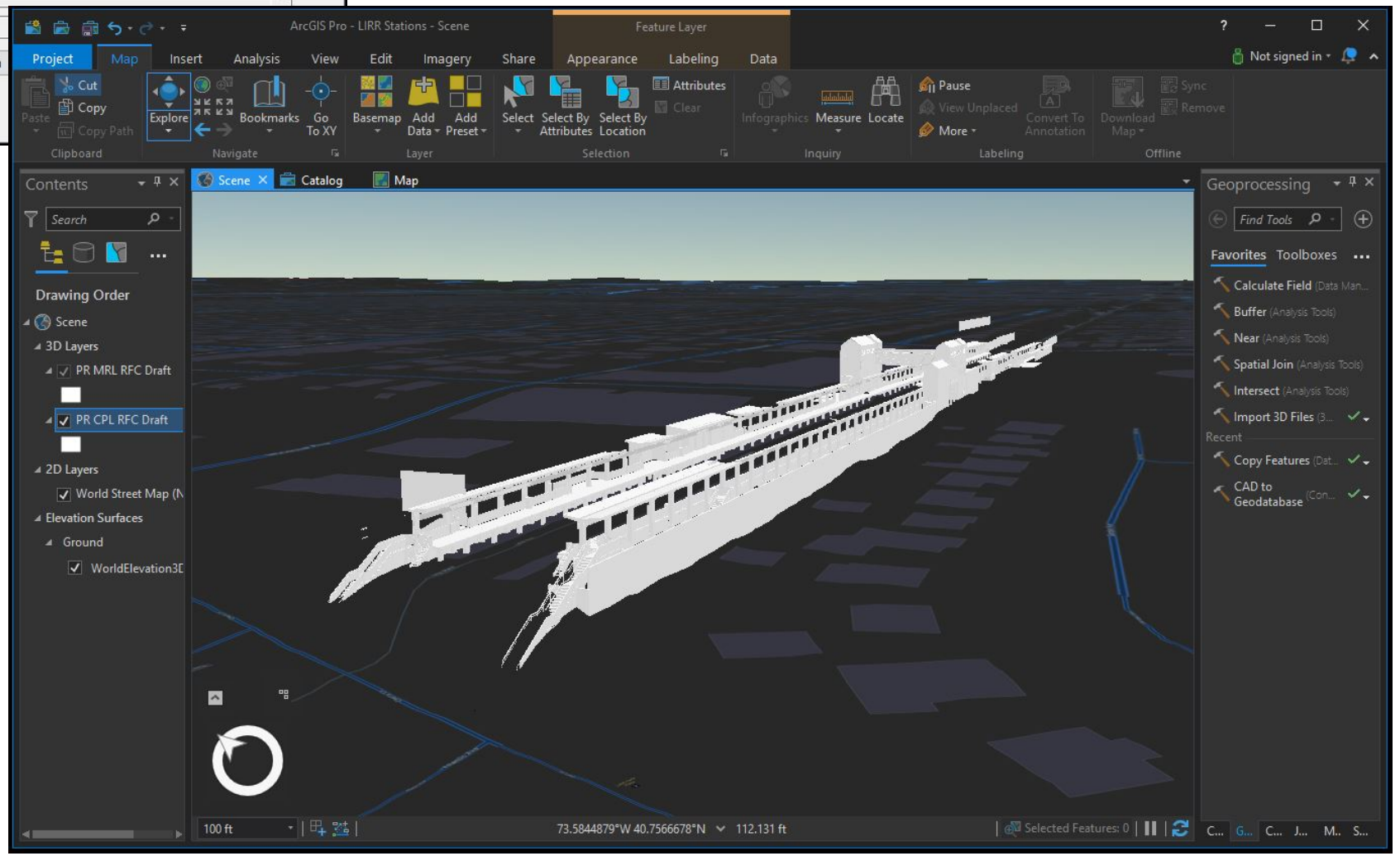


Azure hosted Infor Assets

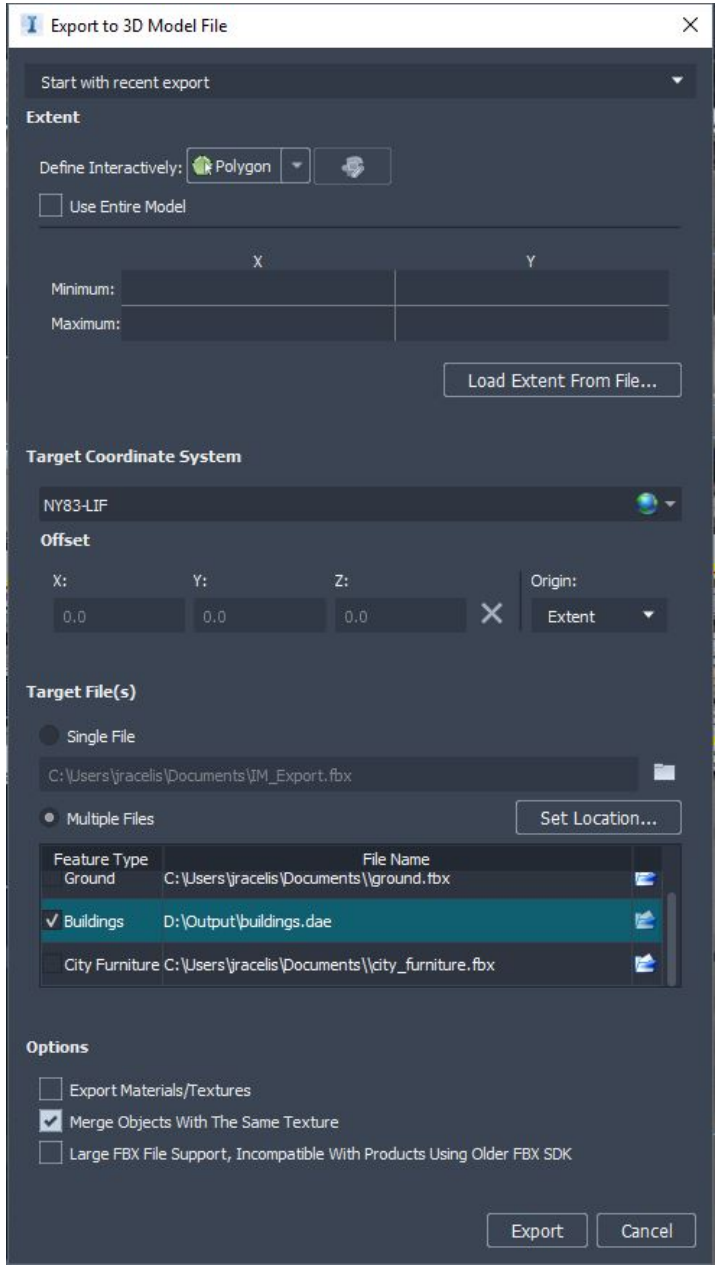


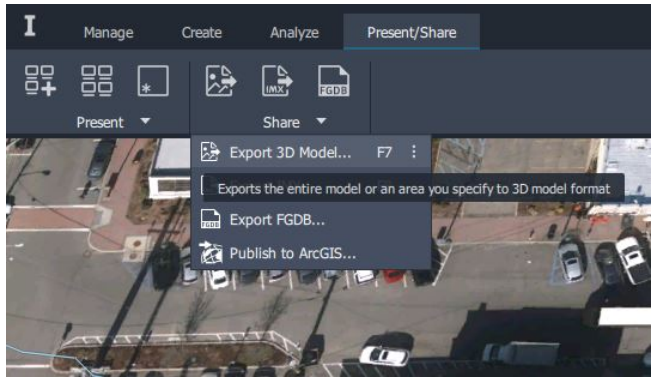
ArcGIS Pro Integration





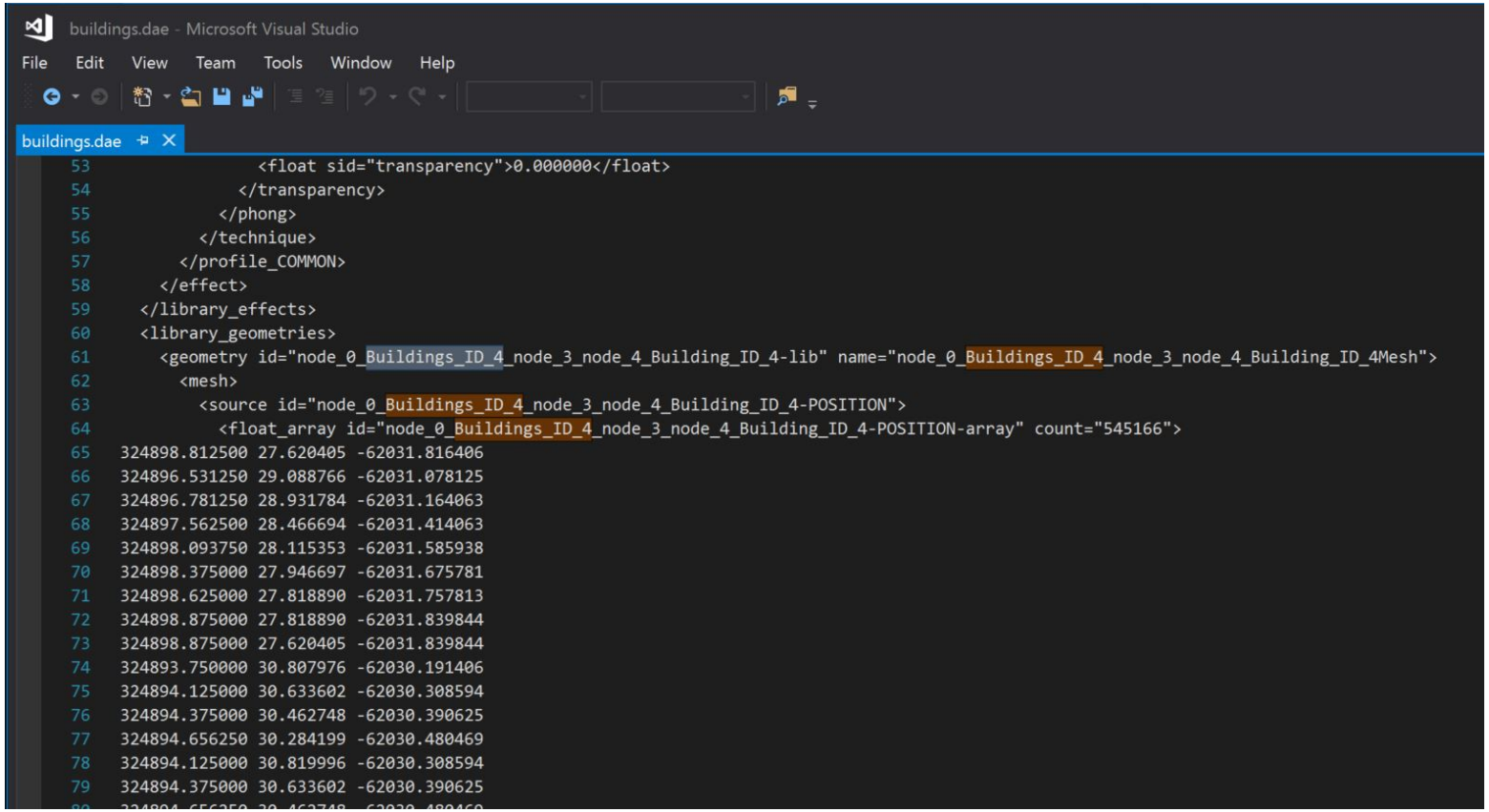
- Using application components developed in partnership with Autodesk, our team was able to pull in a station model from InfraWorks into ArcGIS Pro

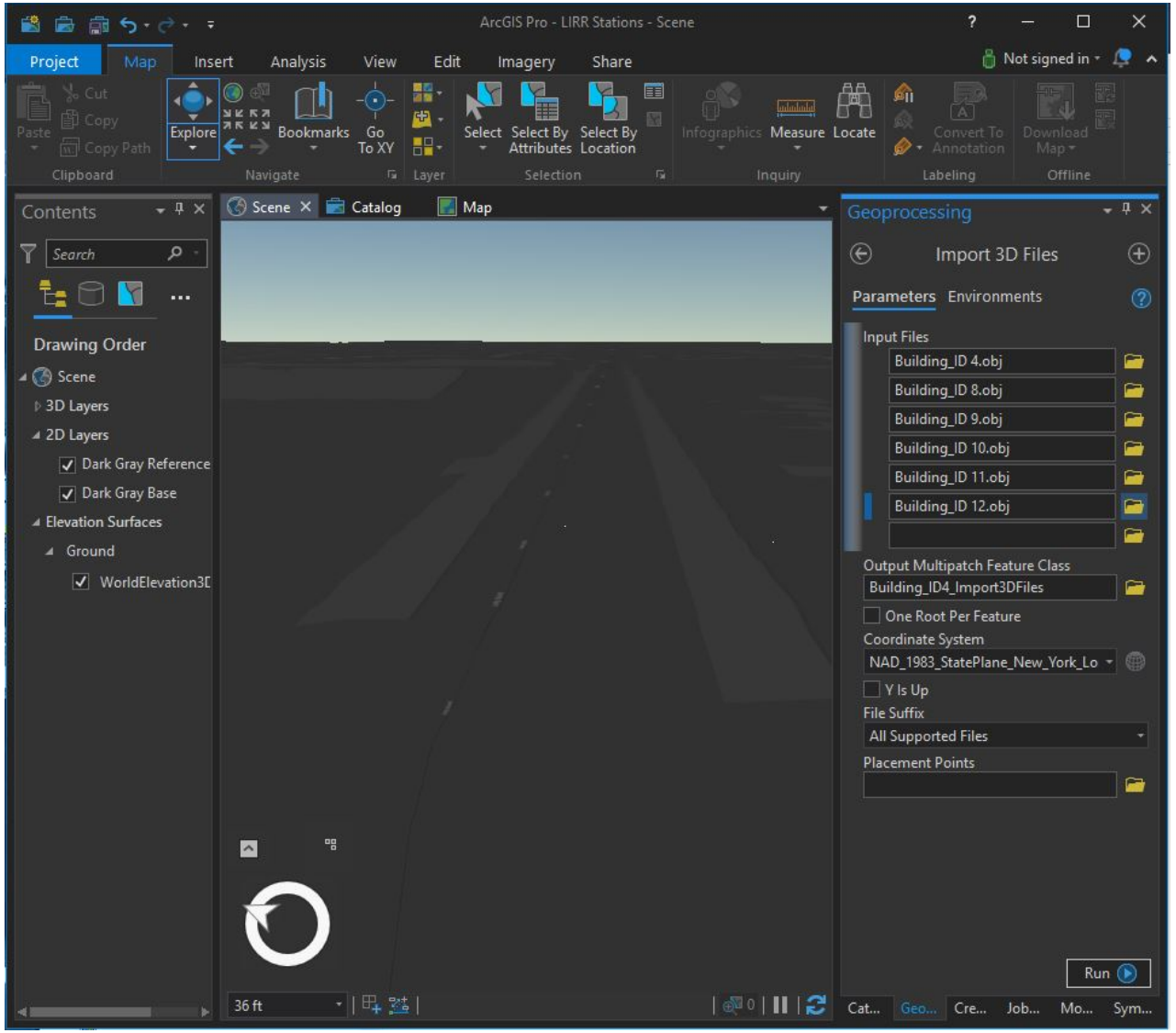




1. Export 3D Model from InfraWorks as COLLADA

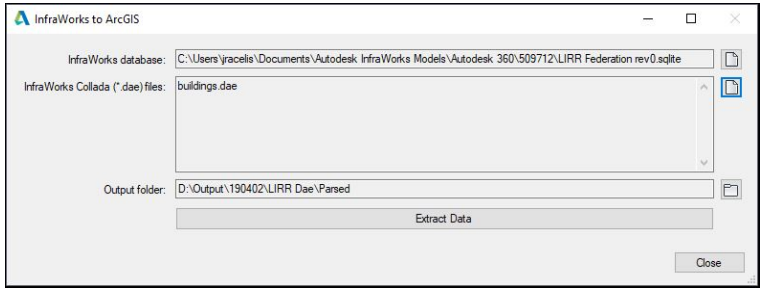
- InfraWorks exports models by type as a single model. I.e. 8 Revit models and 4 Sketchup models in InfraWorks as "Building" feature class.
- Examining the XML structure reveals that the geometry is grouped by individual feature and can be parsed.

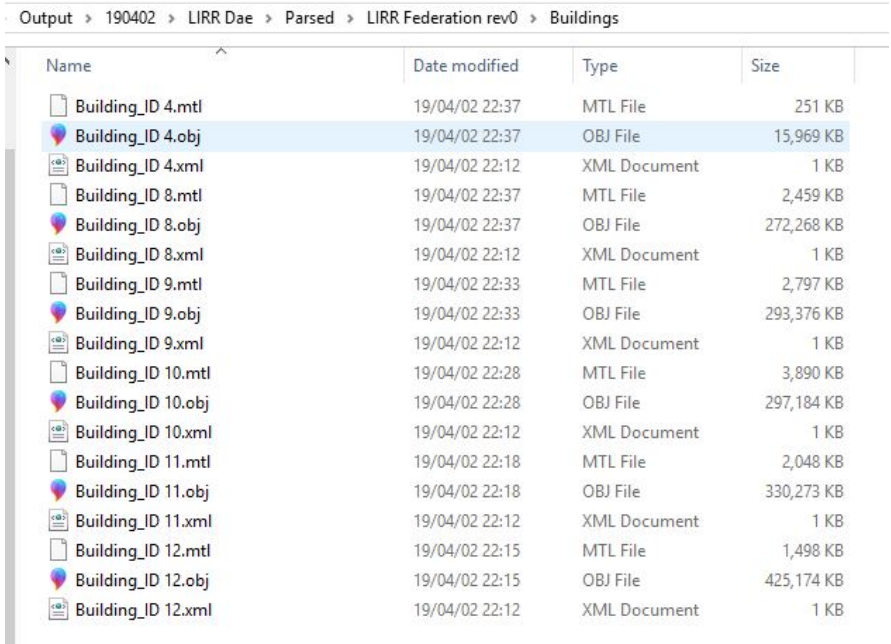


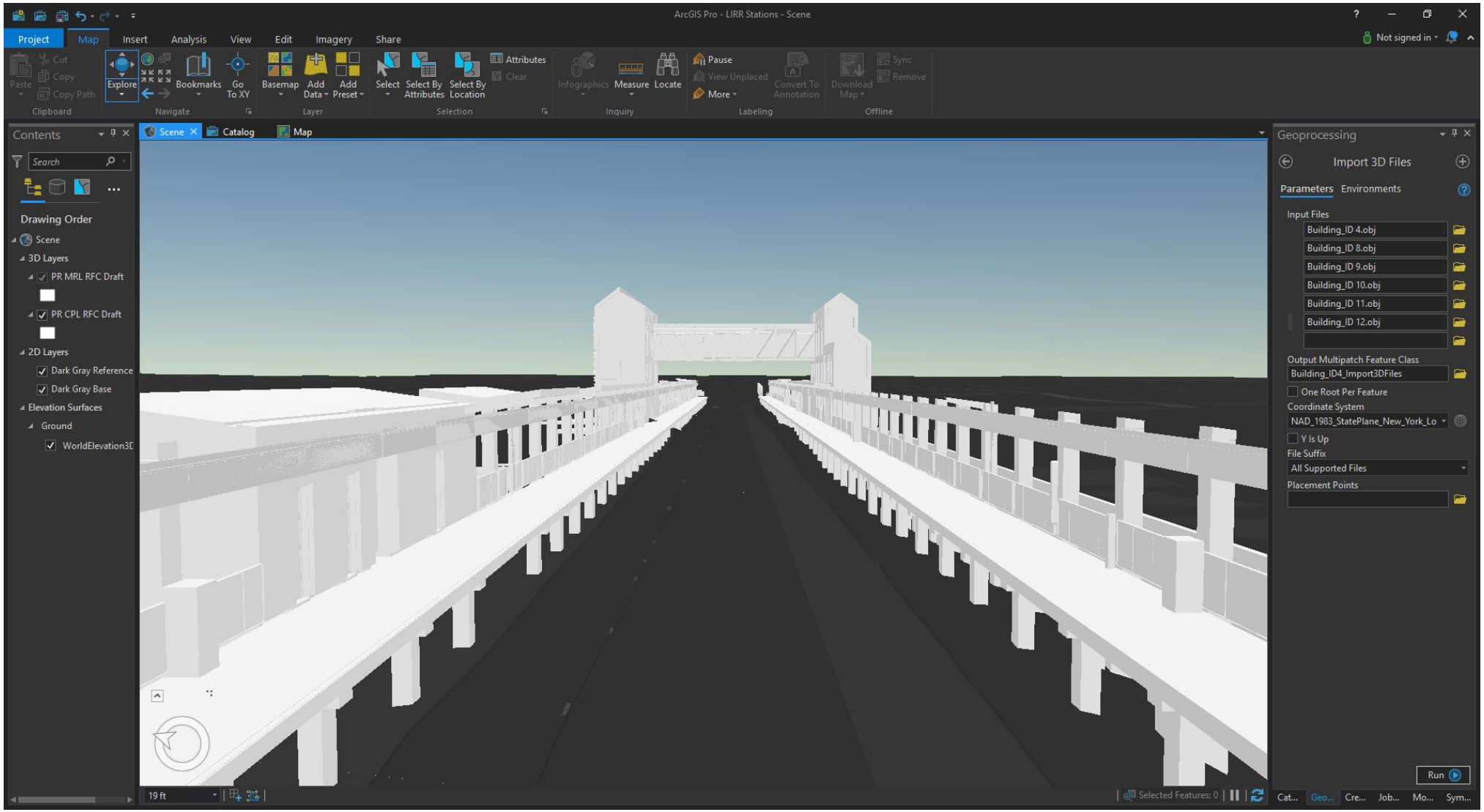


2. Parse COLLADA file with tool and import in ArcGIS Pro

- Coordinate System is preserved from InfraWorks

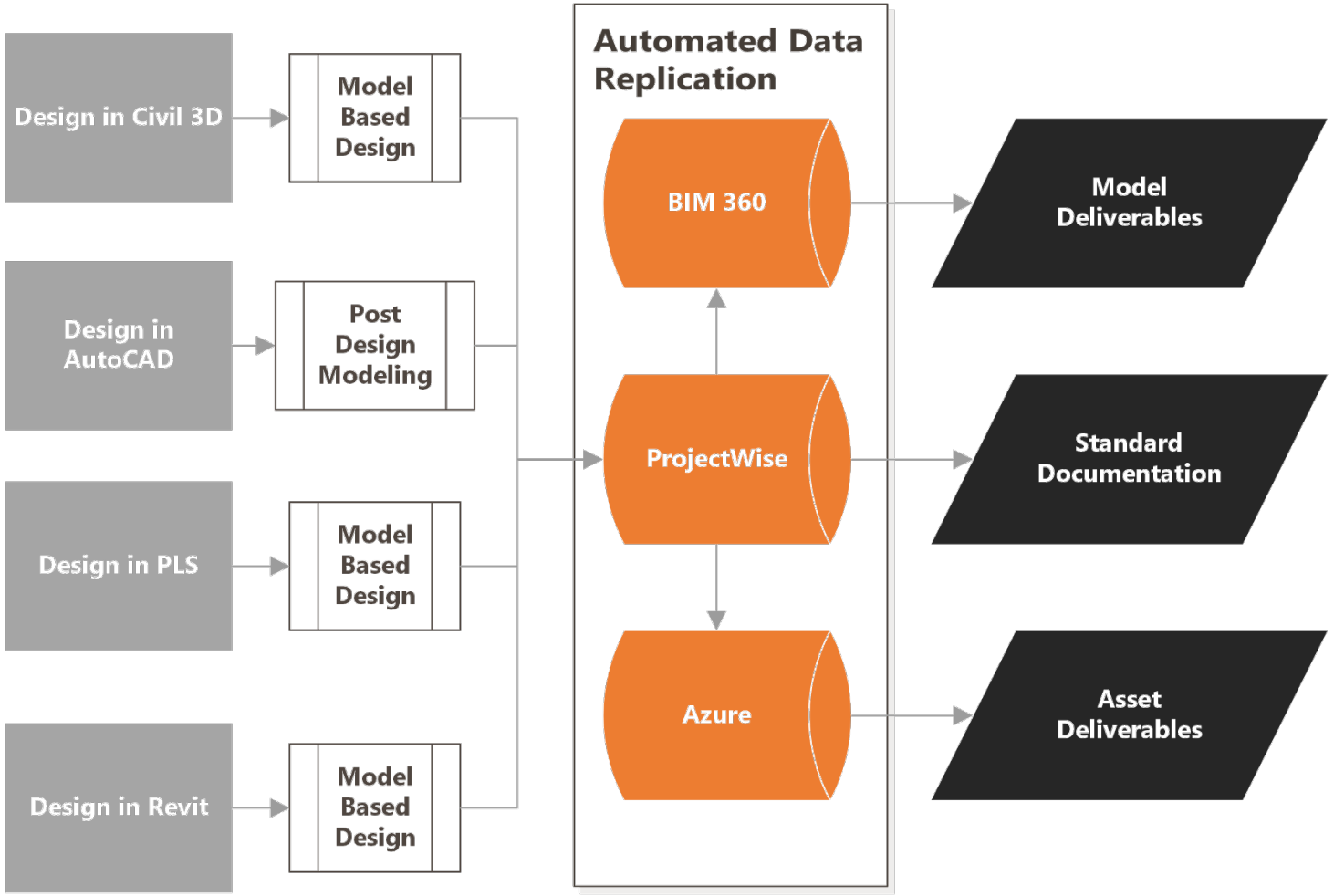





ArcGIS Pro - LIRR Stations - Scene
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
Not signed in
Contents
Search
Drawing Order
Scene
3D Layers
PR MRL RFC Draft
PR CPL RFC Draft
2D Layers
Dark Gray Reference
Dark Gray Base
Elevation Surfaces
Ground
WorldElevation3D
Scene
Catalog
Map
Geoprocessing
Import 3D Files
Parameters
Environments
Input Files
Building_ID 4.obj
Building_ID 8.obj
Building_ID 9.obj
Building_ID 10.obj
Building_ID 11.obj
Building_ID 12.obj
Output Multipatch Feature Class
Building_ID4_Import3DFiles
One Root Per Feature
Coordinate System
NAD_1983_StatePlane_New_York_Lo
Y Is Up
File Suffix
All Supported Files
Placement Points
Run
19 ft
Selected Features: 0

To Summarize

- Automated data transfer and versioning between 3 collaboration platforms
- Enabled models from several different design platforms to be federated in BIM 360
- Centralized data could then be transformed into client defined assets



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If you live through defeat, you are not defeated. If you are beaten but acquire wisdom, you have won. Lose yourself to improve yourself. Only when we shed all self-definition do we find who we really are.

RZA