

Civil 3D Design & Modeling Advanced



Presenter: Mary Peterman

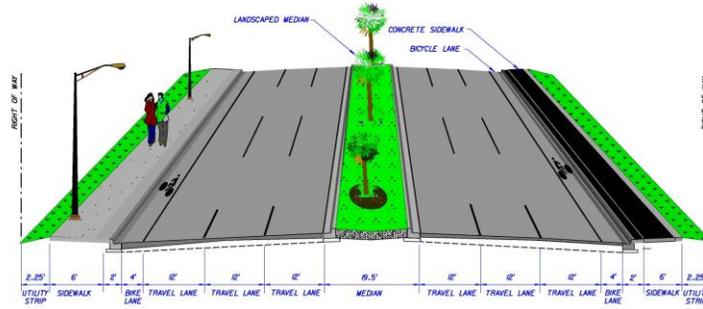
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SURVEY: EXISTING ROADWAY



Proposed Roadway Cross Section

STATE ROAD 7 / US 441
ROADWAY IMPROVEMENT PROJECT FROM COUNTY LINE RD. TO SW 25TH STREET



TYPICAL SECTION
6-LANE DIVIDED ROADWAY

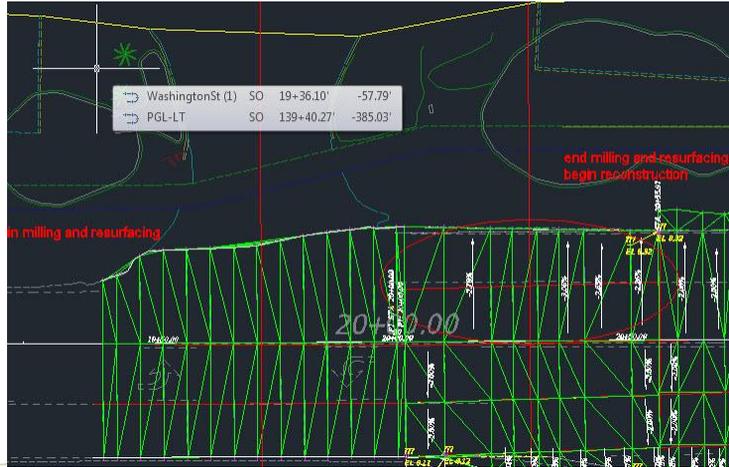
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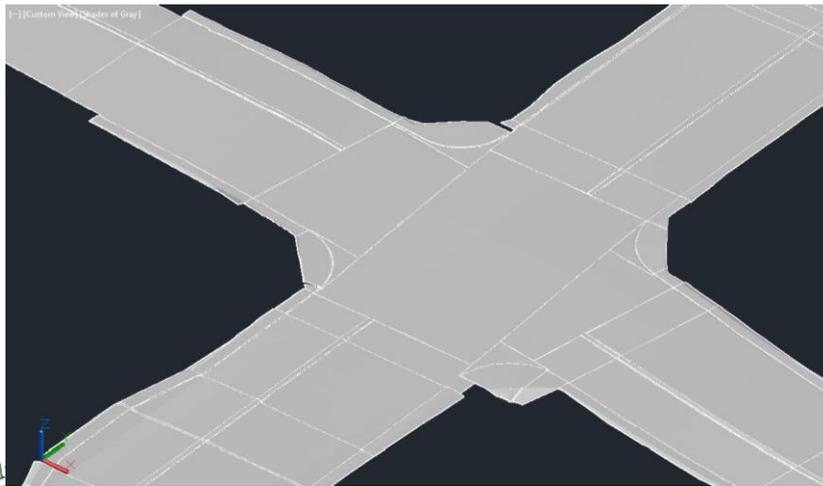
BUILDING 3D MODEL Assembly and Cross Section Views



3D MODEL CREATED



ROADWAY DESIGN: 3D MODELING



Planning the 3D model Corridor Model Files “Sushi Roll”

- ◆ Complex Intersections
 - ✓ Include the Secondary Road
- ◆ Urban Side Streets
 - ✓ Connections which extend past curb returns
 - ✓ Reconstruction where minor work adjacent
- ◆ Primary Road Segments between Primary Intersections
 - ✓ Build 3D model in single until file size becomes excessive
 - ✓ Include driveways
- ◆ Special use corridors:
 - ✓ Existing Conditions and Point Labels



Essentials of the Civil 3D 2012 Corridor

- ◆ Alignment
- ◆ Profile
- ◆ Assembly
- ◆ Targets for Subassembly
 - ✓ Surface
 - ✓ Design Geometry



Files for Corridors in a FDOT Project

- ◆ Alignment
 - ✓ ALGNRD## < Assign Superelevation
- ◆ Vertical Alignment (Profile)
 - ✓ ALGNRD## << Contains Verticals also or put in DSPFRD##
- ◆ Assembly
 - ★ CORRRD##
- ◆ Targets for Subassembly
 - ✓ Surface > GDTMRD##
 - ✓ Geometry > DSGNRD##, TOPORD##



Things to know about References

1. C3D 2012 Corridors cannot target geometry through XREFS.
This is NOT the case for C3D 2014
 - In 2012, convert the following to Alignments for Primary Road:
 - All EOP, Median, Curb and PGL's
2. External References also bring in data references. All data shortcuts at any nesting level is processed by C3D.
 - ✓ Duplicated Data References overlay each other
 - ✓ User Layer Manager to control visibility or Unload unneeded external references
3. C3D Allow for labeling of C3D objects such as surfaces thru XREFs.
NEVER UNLOAD a reference that is associated with labels!
 - ✓ Label data references directly when practical
 - ✓ Limit the labeling of common C3D objects to the design files



Data Reference Names

- ◆ KEEP IT SHORT - *The XML Path to the data reference cannot exceed 256 characters including the UNC and the name of the object so it is generally good to keep them in a folder near the project root.*
- ◆ KEEP IT SIMPLE - *Make sure folder names and names of the actual 3D object that will be referenced (alignments, surfaces or pipe networks) do not include special characters that cannot be read by XML:*

& < > “ ‘

- ◆ KEEP IT – Give your objects thoughtful names and do not rename them unless absolutely necessary.



Data Reference Rules

- ◆ NEVER open a drawing without first insure the correct project working folder and path is set correctly. While project is set to another path, C3D will write to that project's _shortcut folder.
 - ✓ Avoid keeping duplicate Project locations (as backup)
- ◆ Avoid duplication of drawings containing SOURCE objects for data references. C3D must resolve these.
 - ✓ Keep backups, recovered files and so on in a different folder that is not a XML path.
 - ✓ Use SAVEAS cautiously making sure all duplicated objects are renamed or removed.



Data Reference Clean-up

◆ KEEP IT CLEAN

- ✓ If you need to delete a reference, clean up the mess.
 - Remember Promoting a reference only makes a copy of the source object. It does not delete any object or data reference
- ✓ Make sure broken references are resolved at all times.

◆ Validating Shortcuts - *This is not a synchronization feature. They are always valid.*

- ✓ Use only after the user has intentionally changed a data reference source or name.

Tip...think of this as a saving process



Data Reference Rules - AutoCAD

- ◆ Never WBLOCK a drawing containing data references and source data drawings
- ◆ Do not make a block containing a C3D object or data references. **Duplicate is a DON'T**
- ◆ Limit Copy and Paste between drawings to prevent moving non-visible objects in anonymous blocks
- ◆ DO NOT Explode objects.
- ◆ DO use EXPORT to “dummy” down geometry to share to other drawings. This is fastest and easiest because it does the exploding and purging of blocks



File Size and processing

- ◆ Unload External References you do not need
- ◆ Detach External References you never need
- ◆ Delete unused Layouts
- ◆ Freeze unused Layers
- ◆ When you insert blocks that need to be exploded, select Explode on insert.
- ◆ Strive to keep drawing files under 10mb at the most
 - ✓ Make new corridor model drawings when approaching this limit



A look at something more than a simple corridor.

CREATING A PROPOSED CORRIDOR



What to Design?

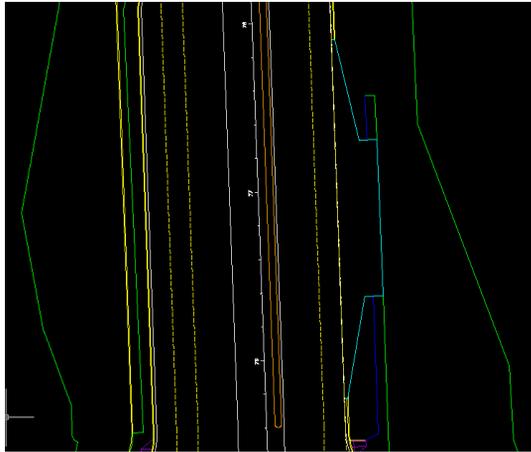
Design Feature Details:

Typical divided road

Traffic Separator

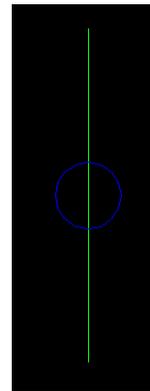
Double PGL

Driveway



Creating an Assembly

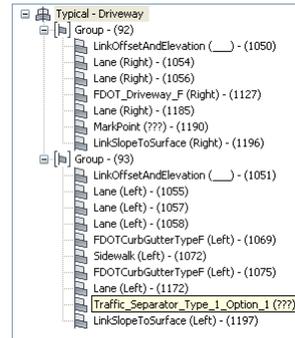
- ◆ An assembly object can be created using the Home tab > Assembly > Create Assembly command (**CreateAssembly**)
- ◆ The assembly marker that appears represents the starting point for subassembly insertion.



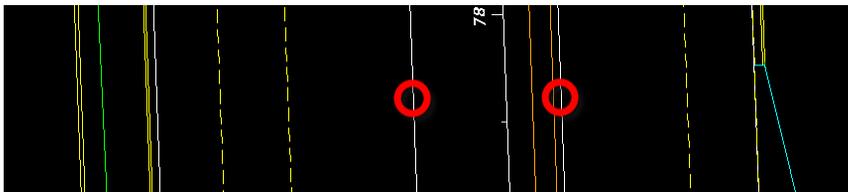
Edit the Names

- ◆ It is wise to change the name of the subassemblies that will use targets.

Allows us to identify the subassembly quickly by name.
 Allows us to select the correct target for the subassembly without guessing.
 When we copy the assembly the names will be transferred with it.



Create the PGLs

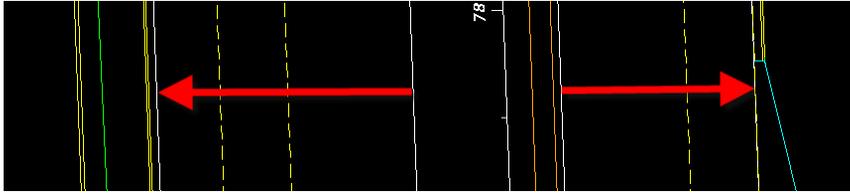


- ◆ Use Autodesk Generic `LinkOffsetElevation` and the Omit the Link option to move to a new location.
- ◆ Point codes control how the point will be labeled in cross section view. Use upper case to type PGL

Offset from Baseline	5.00'
Elevation	0.00'
Point Codes	PGL
Link Codes	Top, Datum
Omit Link	Yes



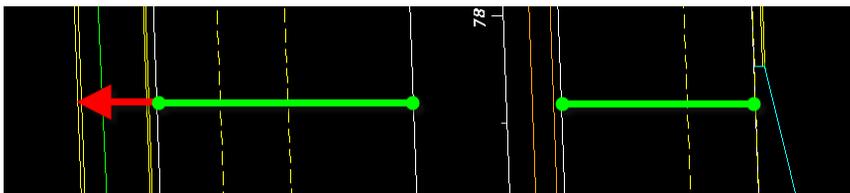
Create the Lanes



- ◆ Be sure to select a marker point to ensure the subassemblies are attached.
- ◆ Insert a Lane subassembly everywhere slope changes
- ◆ The Lane subassemblies can use targets or distances to control the lane width.
- ◆ Assign .



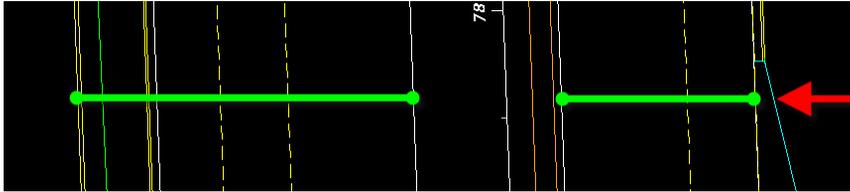
Create the Left Side



- ◆ Add additional lanes, for features such as bus bays with limited usage, using 0 as a width or depth. This creates a placeholder and will not show up in typical cross sections but only where a target is assigned.
- ◆ Use mirror to flip lane to Rt. Side



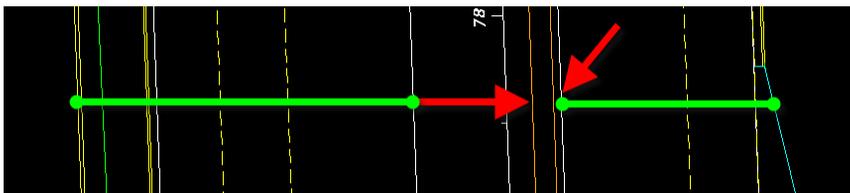
Create the Right Side



- ◆ Complex subassemblies like the driveway require understanding of what it creates. Use the help file if there are any doubts.
- ◆ Subassemblies can only see what is in the cross section (frequency). It is ignorant to what is ahead or before it.



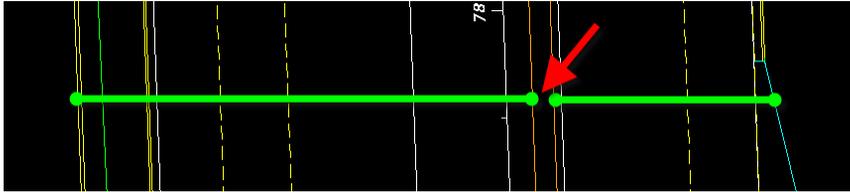
Create the Inside Turn Lanes



- ◆ Edits to the subassemblies can be made anytime.
- ◆ Users should be careful to include additional subassemblies to cover the gapped areas.



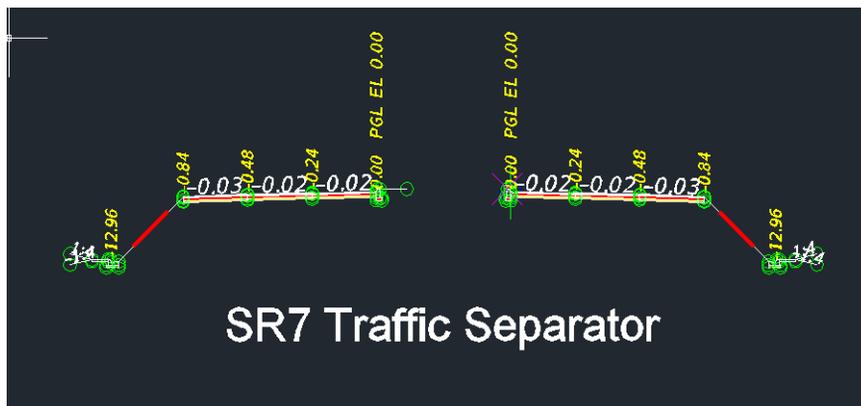
Create the Traffic Separator



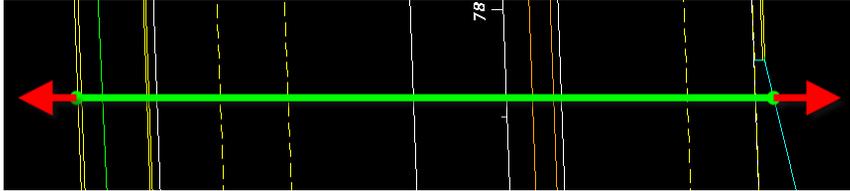
- ◆ Use Marked Points to connect two ends together. Procedure shown applies to all medians.
- ◆ Moving the PGLs are only necessary if you are planning on using the Assembly for the Typical Sheets for 30%.



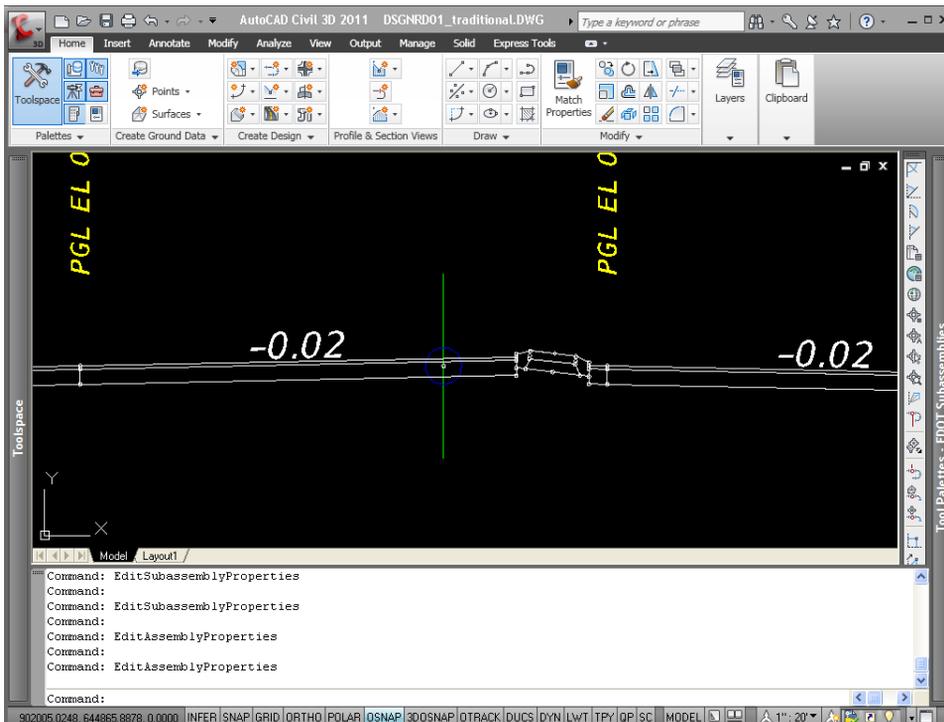
Conditional Subassemblies



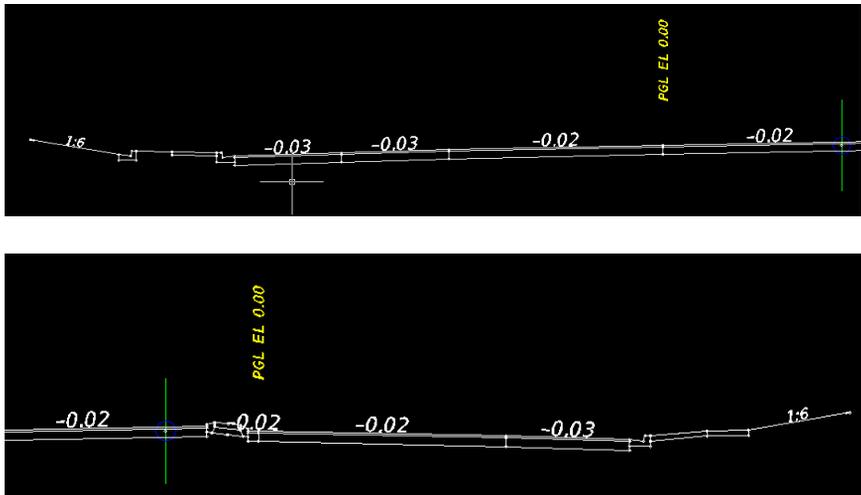
Create the Daylight



- ◆ Use Marked Points to connect two ends together. Procedure shown applies to all medians.
- ◆ Moving the PGLs are only necessary if you are planning on using the assembly for the Typical Sheets.



What We Have Now



Saving the Assembly

- ◆ Assemblies can be saved onto the Tool Palette for future use and modification.
- ◆ Don't recreate a assembly. Modify an existing one.
- ◆ Decide on a name that describes the Assembly.
- ◆ Use the Description field in the Tool Palette to further detail the assembly.



Putting the Assembly to Good Use.

CREATING THE CORRIDOR



Adding the Assembly to the Corridor

- ◆ The next step will allow us to connect the assembly to the corridor.
- ◆ We need to provide information on how the assembly will be connected
 - ✓ What will its starting point be (alignment and profile)?
 - ✓ What stations should it be applied to? And at what Intervals?
 - ✓ What Targets should be used?



Techniques to view the Corridor

- ◆ Section Editor
- ◆ Create Design Section Views
 1. Create Sample Lines
 2. Create Single Section



Final Thoughts and Tips

- ◆ Start by creating the simplest assembly possible.
- ◆ Be sure to add on turn lanes and set them to 0 width for maximum reusability.
- ◆ Save your assemblies for use in later stations and in other projects.
- ◆ When dragged to a tool palette, the saved assembly is automatically stored as drawings here

<C:\Documents and Settings\All Users\Application Data\Autodesk\C3D 201#\enu\Assemblies>



Corridor Completed

