DU Complex Terrain Creation

A common question that arises when performing drainage design is how to best place nodes and select a reference surface if the surfaces are different for each node or if the surface is expected to change over time? We see this issue when we need to perform a drainage analysis before the project actually has a proposed terrain from Roadway. If a hydraulics designer selects an existing terrain as a reference surface and then later on, a proposed terrain becomes available, it has been a manual, node-by-node edit to change the reference surface.

One solution is to provide a reference surface with a ***name*** and ***GUID*** (globally unique identifier) that does not change, but where the ***content*** can be updated. A **complex terrain** can provide a stable terrain name and GUID for the reference surface. The nodes will retain their elevation link to the complex terrain. The designer can change the contents of the complex terrain as proposed terrains are added to the project, and the complex terrain will dynamically update in response to changes to the existing terrain.

Method to Create a Complex Terrain for DU

The steps below explain how to create a complex terrain for drainage and utilities design and analysis that can be created at the beginning of a project, before a proposed terrain is available. The steps will also explain how to change the contents to add a proposed terrain.

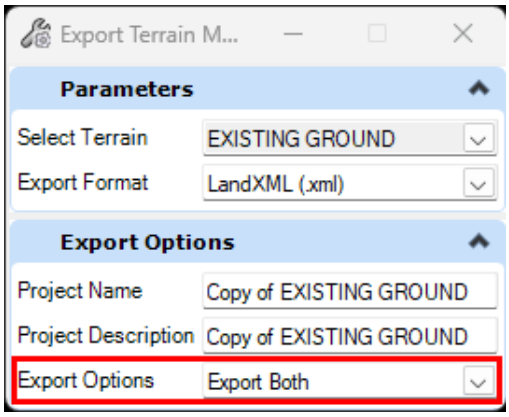
Prepare

P1. Create a new file from a 3D seed in the Hydraulics folder to hold the terrain. (H_K#####_TERR_Complex-DU_pub_01.dgn)
P2. Attach a reference to the project's Survey terrain base container file. (TERR_e_bas_CF, use Live Nesting Depth=1)
P3. Fit the view.
P4. Use Set As Active Terrain to create the 3D ***managed*** model.

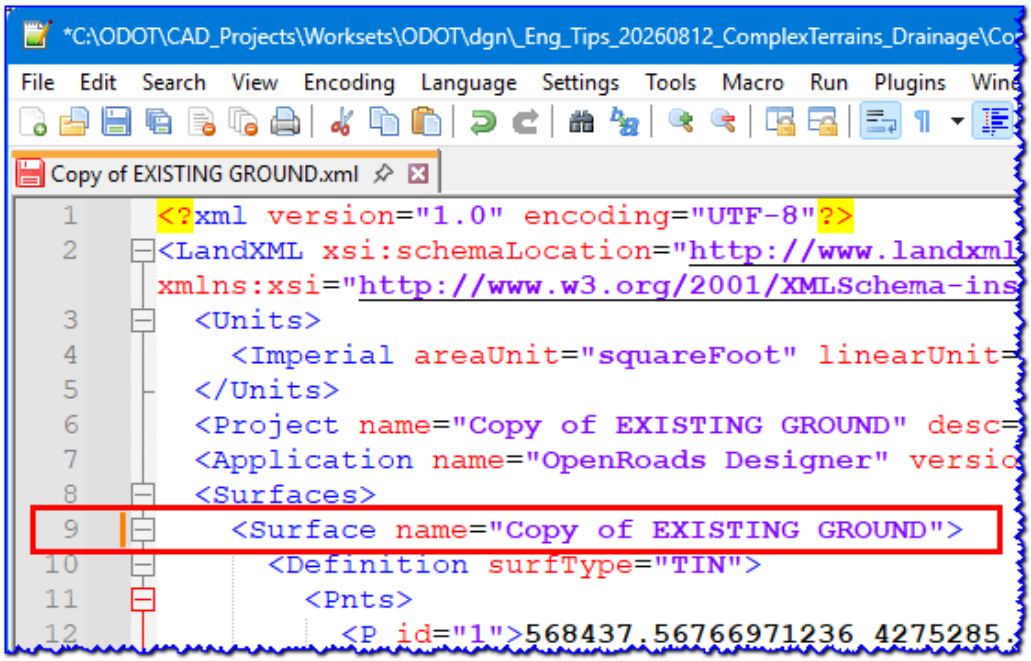
Create a Copy of the Existing Ground Terrain

Export To File

E1. After selecting [**Export To File**], select the terrain from the Terrain>Miscellaneous group, and select the export format of **LandXML (.xml)**.

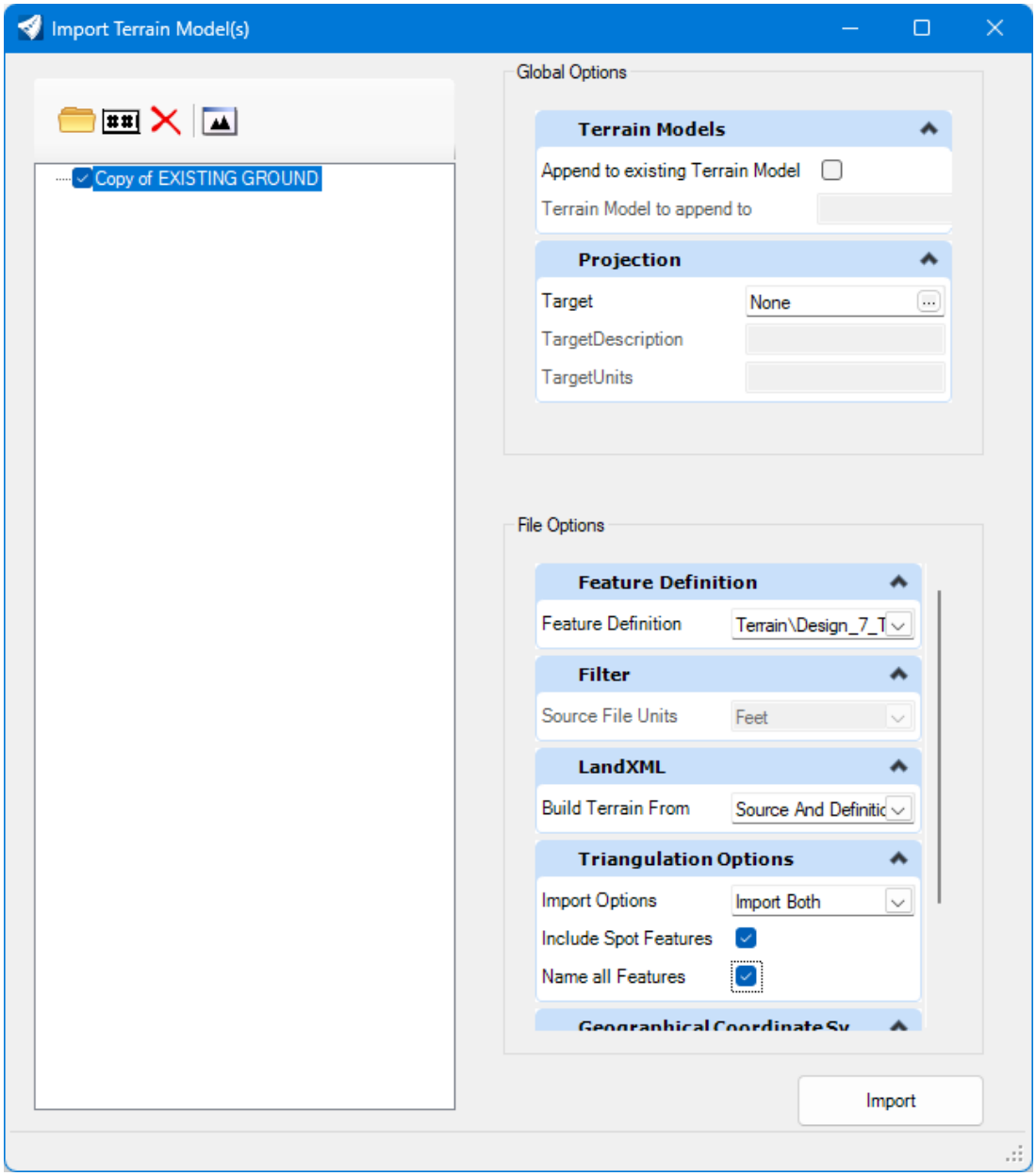


E2. Good practice – fill in the **Project Name** and **Project Description** fields to document you are making a "Copy of" the existing ground.
E3. Set the Export Options to **Export Both** (required).
E4. Left click to accept the heads-up prompts. Navigate to a folder location and click [Save].
E5. <**Esc**> or choose Element Selection to exit the command.
E6. Open the LandXML file using Notepad ++.
E7. Insert "Copy of" between the quotes on line #9 to change the Surface name, as shown below. Then Save the .xml file.



Create>From File

F1. In ORD, after selecting [**From File**], navigate to the location of a surface LandXML file, select the file, and click [**Done**] to open the Import Terrain Model(s) dialog.
F2. In the Import Terrain Model(s) dialog, File Options area - set a **Terrain Feature Definition**.
F3. Good practice – set the LandXML Build Terrain From to **Source and Definition** *(this chooses which paragraphs in the LandXML file to load)* and set the Triangulation Options to **Import Both** *(this specifies how to address the external triangles of the created Terrain Model)*.



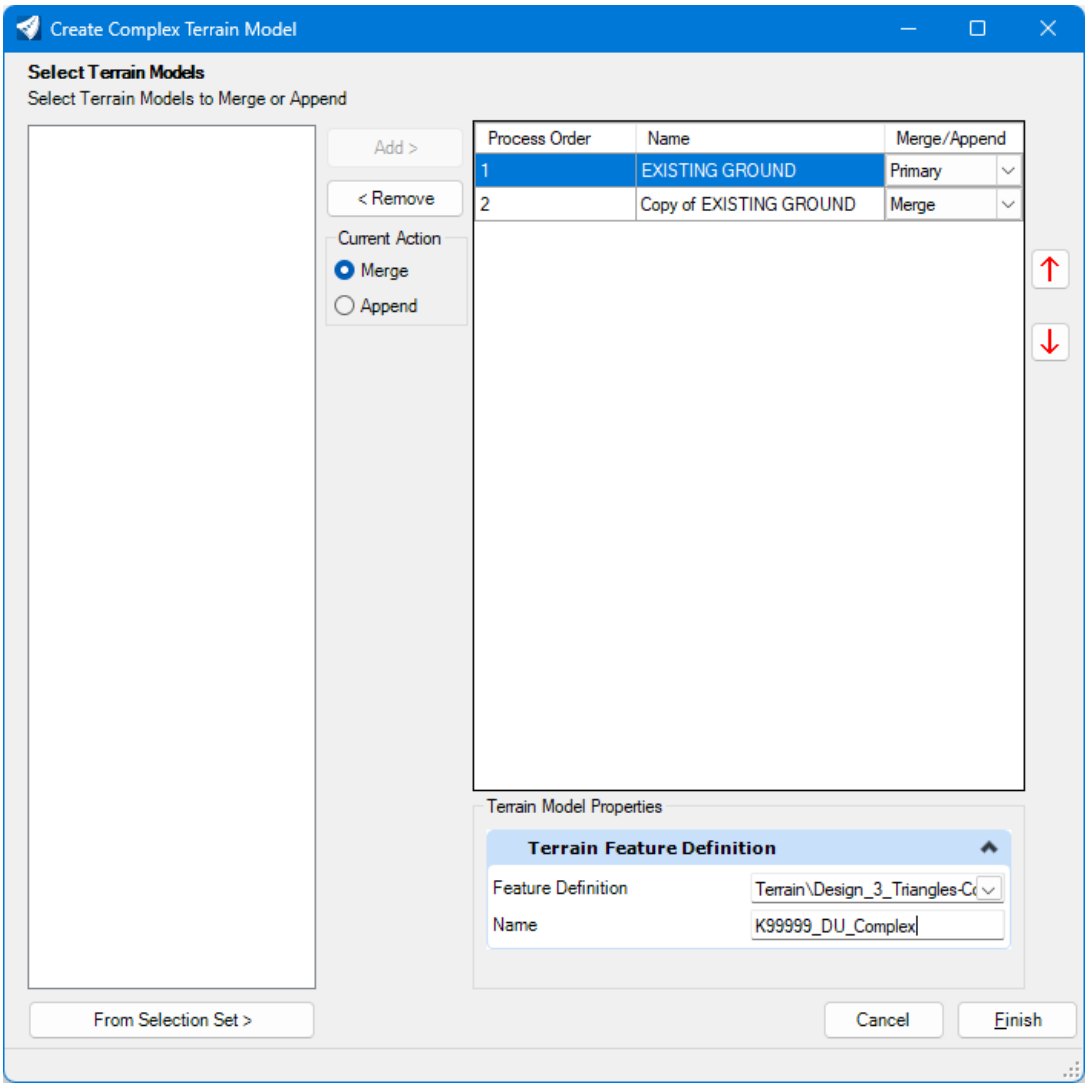
F4. Click the [**Import**] button to create the terrain.
F5. Use the [**X**] in the upper right corner of the Import Terrain Model(s) dialog to close the dialog.
F6. Verify that your copy of the existing ground in the active DGN matches the original that is attached as a reference.

Note: This is a static copy of the existing ground on the date that you exported it.

Create the Complex-DU Terrain

1. Run Terrain>Create>Additional Methods>**Create Complex Terrain Model**.
2. On the Create Complex Terrain Model dialog, first add the existing ground as primary, then add the Copy of Existing Ground set to Merge, as shown below.

3. Set an appropriate terrain feature definition and give the complex terrain model a name, like K#####_DU_Complex.
4. Click [Finish].

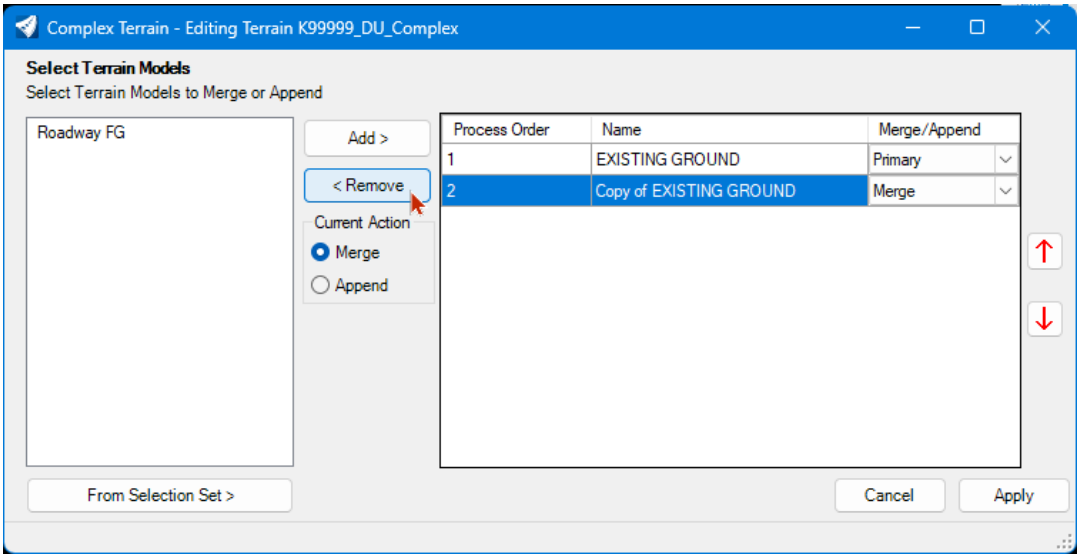


5. The DU Complex terrain is immediately created and displayed in the active DGN; verify that DU Complex terrain in the active DGN matches the original.

Editing the Complex-DU Terrain

When the Roadway Finish Grade becomes available, a Hydraulics Designer will need to edit the Complex-DU terrain to remove the Copy of Existing Ground and add the Finish Grade.

1. Edit the H_K#####_TERR_Complex-DU_pub_01.dgn.
2. Attach a reference to the project's Finish Grade Terrain Base Container File. (R_K#####_TERR_FG_bas_CF_##.dgn, use Live Nesting Depth = 1)
3. Run Terrain>Edit>**Edit Complex Model**.
4. Left click on some graphic in the Complex-DU terrain and left click again to accept it – this will open the Complex Terrain – Editing Terrain dialog.



5. Select the Copy of EXISTING GROUND on the right side and click [<Remove].
6. Select the Roadway FG on the left side, “Merge”, and click [Add>].
7. Click [Apply].