

Civil 3D Productivity Tools for ANZ

Civil 3D Productivity Tools for ANZ is a suite of customised add-ins to allow more productive design and documentation of your Civil 3D projects.



The tools cover a broad range of tasks, including:

- Aquaplaning analysis
- Annotating of Section Views (including corridor point cuts and staggering)
- Exporting flattened 2D AutoCAD drawings from a 3D GENIO import
- Exporting corridors and featurelines for construction
- Create roadside barriers in 3D
- Exporting Featurelines to 3D XYZ coordinates
- Copy Data Band Profile parameters
- Adjusting datum levels on multiple Profile Views

These tools currently reside in the Toolbox folder located at:

%LocalAppData%\Autodesk\C3D <version>\enu\Data\ToolBox\ANZ

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Civil 3D Drip

Drip allows users to perform immediate on-screen aquaplaning calculations through a custom dialog. The user selects a Civil 3D surface object, a point to analyse and a terminating (or break) string. The program will determine the flow path and calculate the aquaplaning depths for each segment along the flow path in accordance to Austroads Guide to Road Design Part 5a – Section 4 (Aquaplaning).

The resulting aquaplaning calculation is shown on-screen through a series of coloured bands (green, orange and red) to indicate whether issues exist on the surface.

This output can finally be output to Excel for use in design reports.

General Notes

- A Point Code Terminator is required to run the analysis, regardless of whether a terminator is required or not. This issue will be addressed in a future release.
- It is recommended to turn on viewport lineweights (in the status bar)  to better visualise the flow paths.
- The Drip add-in will create an XML file, called '*Drip.xml*', in the same folder where the current drawing is located. The XML file will read and write settings so when the program is re-run, the latest settings in the dialog are not lost.
- The analysis result shown in the bottom portion of the dialog (after clicking 'Drip') is a simplified analysis that utilises the Gallaway method (1979), and uses the average length and slope of the entire flow path (i.e. point to point). Detailed analysis results are found in the generated Excel report.
- To get a better aquaplaning result, it is preferred to create a corridor region through the aquaplaning analysis zone with lower region frequencies (i.e. 1-2m). This creates a smoother triangulation used to calculate the waterdrop flow path.

Loading

Navigate to the Toolspace – Toolbox - Australia and New Zealand Reports Manager – ANZ Tools – Drip (Aquaplaning), and either right-click and select 'Execute' or double-click the left mouse button to run the command.

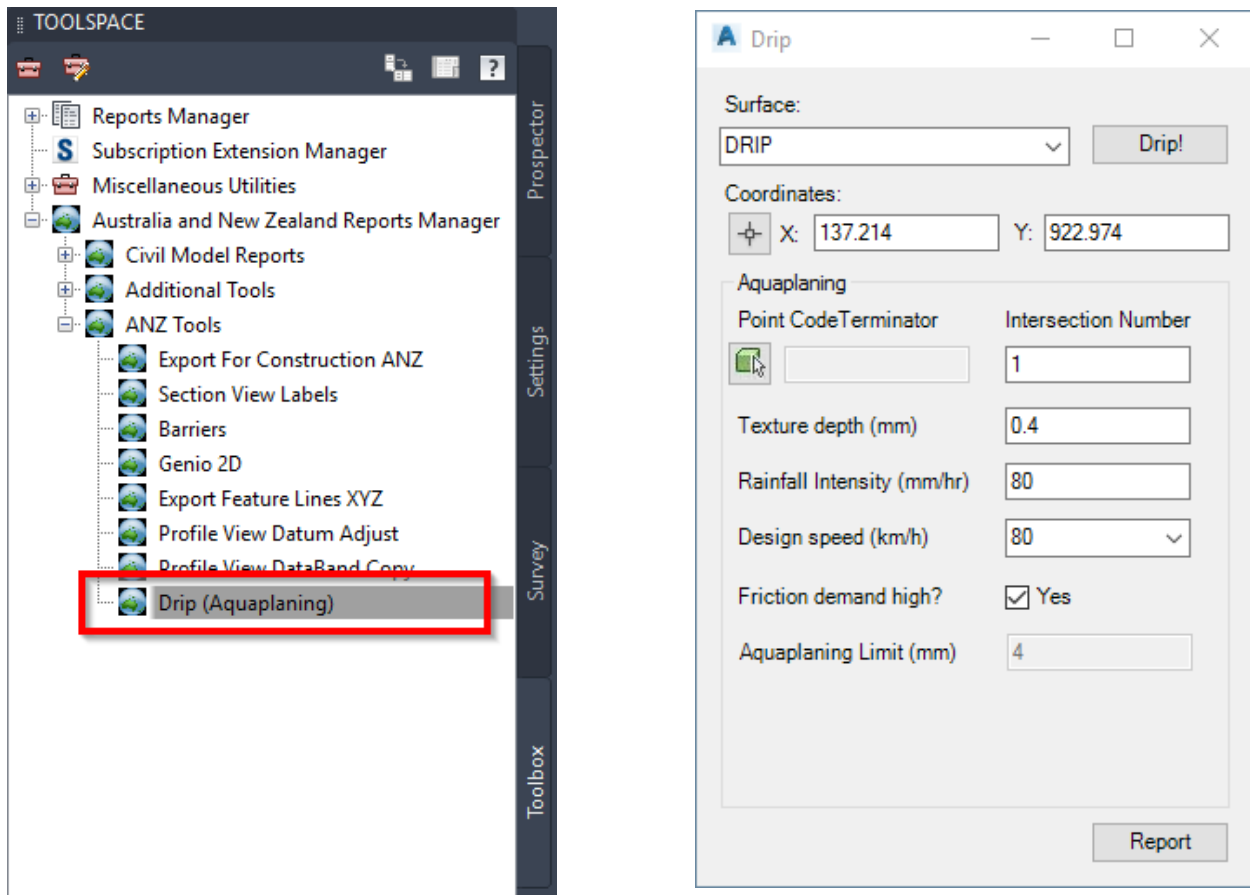


Figure 1: Drip dialog

Process

Surface

The surface pulldown lists all surfaces in the drawing. The currently selected surface is the surface the analysis will be run on.

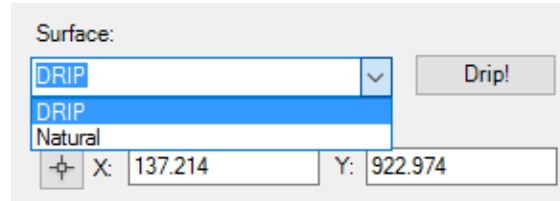



Figure 2: Selecting a surface

Coordinates

Coordinates are used to select the upstream flow path point on the Surface (see above). Values can be entered directly into the X and Y boxes, or simply clicking the  icon.

Once the point selection icon is selected, a point can then be selected directly on screen. Points are selected on screen by using the left-click button. Clicking on the surface will display a thick blue line indicating the selected flow path (running from the selected upstream point to the downstream end, stopping at the low point on the surface)

If the selected point does not lie on the surface, a red cross marker will appear.

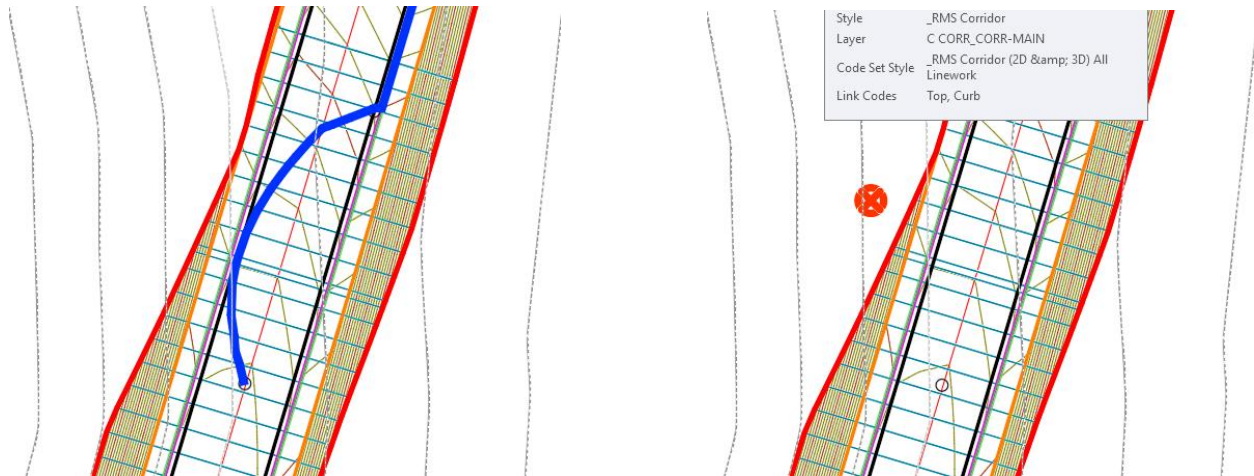



Figure 3: Point selection on surface (left) and invalid point selection (right)

To finalise and confirm the selected point, either right-click the mouse button. The X and Y coordinates in the Drip dialog will update to reflect the new analysis point.

Aquaplaning Point Code Terminator

The Point Code Terminator is a selected feature line from the underlying corridor model, and a related Intersection Number will determine where the two strings (Point Code Terminator and the Water Drop flow path) intersect.

Point Code Terminator	Intersection Number
 CORR-MAIN->CE	1

Typically, when a flow-path is selected, the initial flow path runs from the selected upstream point to the surface low-point. This full-length line is not typically used for the analysis, as the waterdrop will typically stop at a feature on the pavement (i.e. linemarking edge, lip of kerb etc). The image below shows this scenario.

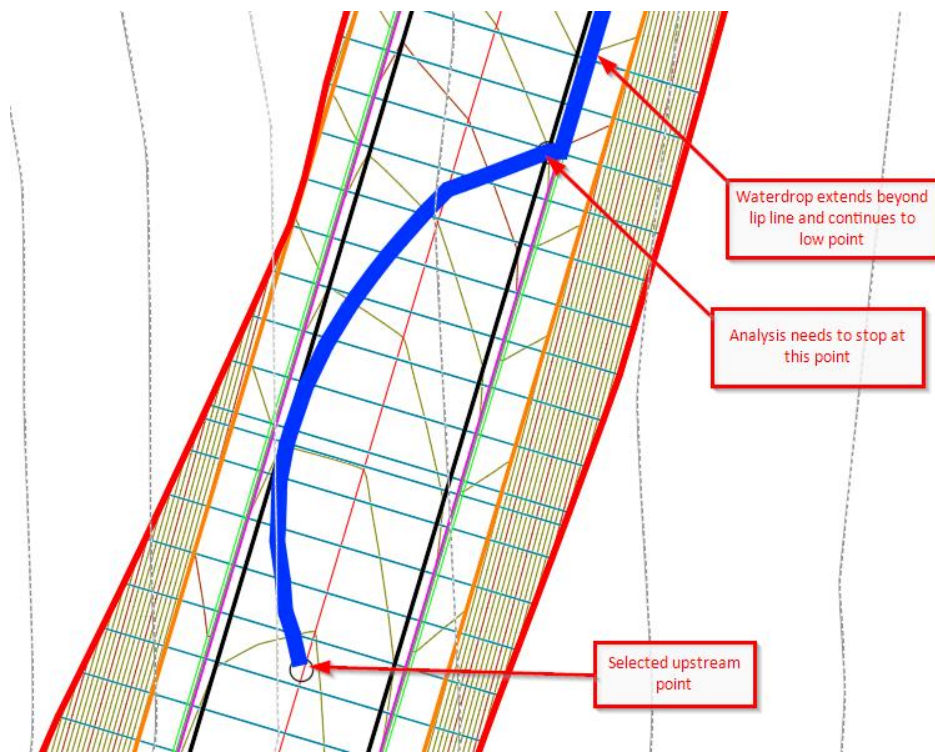



Figure 4: Point Code Terminator

Once the Point Code Terminator  icon is selected, a feature line can be selected from a corridor model. This corridor model is typical the same one used to generate the surface for the analysis.

At the command prompt, select either a CorridorFeatureLine or FeatureLine on-screen. If a CorridorFeatureLine is selected and the cursor detects more than one featureline under the cursor, a list will appear prompting the Feature Line section. Double click the feature or highlight the line or select OK to confirm.

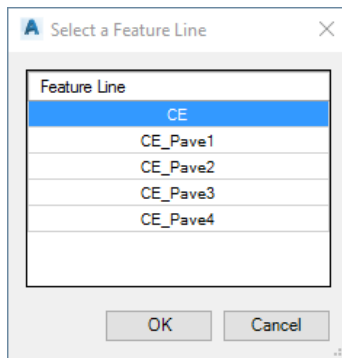


Figure 5: Select A Corridor Feature Line

On confirmation of a selected Feature Line, the textbox next to the Point Code Terminator will display the Corridor name followed by the feature line name, separated by a '->' symbol (i.e. CORR-MAIN->CE)

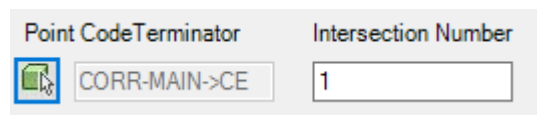


Figure 6: Point Code Terminator and Intersection Number

The Intersection Number is an integer value calculating when and how many times the two lines intersect (flow path and feature line). For instance, an Intersection Number of 0 indicates that the entire flow path string will be used for the analysis. In the image below, the Intersection Number of 1 is used to terminate the analysis at the first intersection point between the water drop and the featureline.

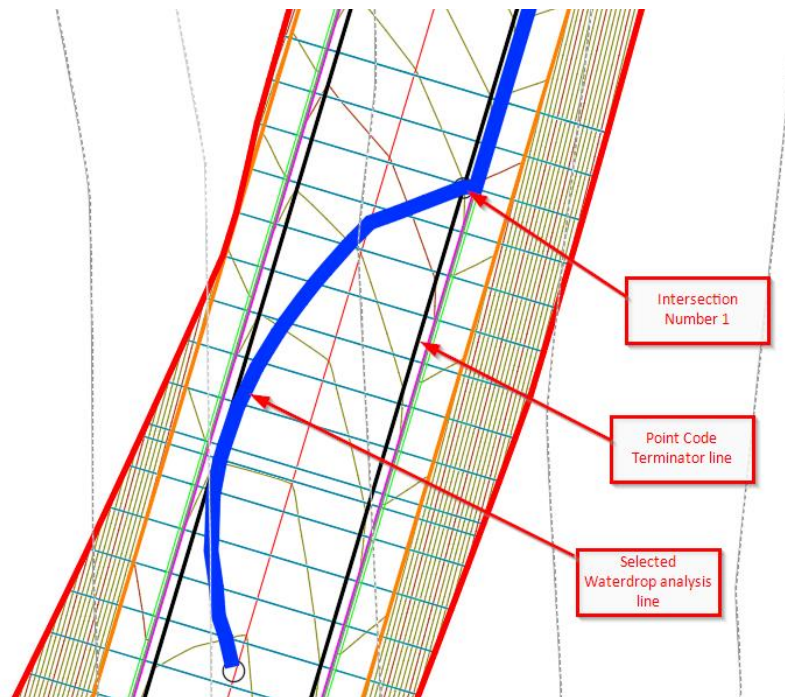


Figure 7: Intersection Number 1 selected for analysis

Aquaplaning Parameters

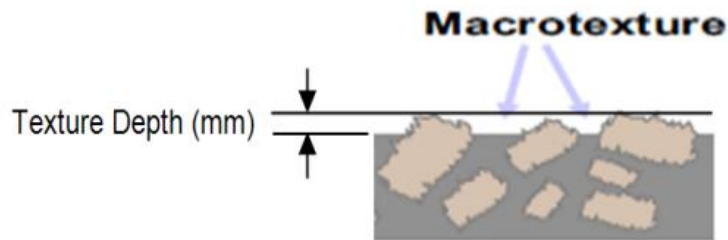
Aquaplaning parameters are used to calculate the flow path analysis and are described below.

Texture depth (mm)	<input type="text" value="0.4"/>
Rainfall Intensity (mm/hr)	<input type="text" value="80"/>
Design speed (km/h)	<input type="text" value="80"/>
Friction demand high?	<input checked="" type="checkbox"/> Yes
Aquaplaning Limit (mm)	<input type="text" value="4"/>

Figure 8: Aquaplaning Parameters

Texture Depth (mm)

Refers to the average depth of the macrotexture of the road surface.



Source: DTMR (2010).

Figure 9: Pavement Texture Depth

Rainfall Intensity (mm/hr)

For design, rainfall intensity is determined from an appropriate rainfall intensity-frequency-duration (IFD) chart for a particular site, using a selected ARI and appropriate duration.

Design Speed (km/h)

A design speed is selected from the drop-down menu. Design speeds range from 30km/h to 120km/h. The design speeds, in conjunction with the 'Friction Demand High' checkbox, determine the overall Aquaplaning Limit

Design speed (km/h)	<input type="text" value="80"/>
Friction demand high?	<input type="checkbox"/>
Aquaplaning Limit (mm)	<input type="text" value="4"/>

Figure 10: Design Speeds

Friction Demand High?

This checkbox is used where the friction demand is high, such as at intersections, steep downhill grades or where the road design speed is 80km/h or higher. See Section 4.10.1 in Austroads Part 5a: Drainage – Road Surface, Networks, Basins and Subsurface for more details.

Aquaplaning Limit (mm)

The Aquaplaning limit is a read-only value calculated from a combination of design speed and Friction Demand. The values fall between 4mm and 5mm.

Analysis

Aquaplaning analysis is performed by left-clicking the 'Drip' button in the upper-right corner of the dialog.

It is required to have all elements in the dialog populated before a successful analysis is calculated.

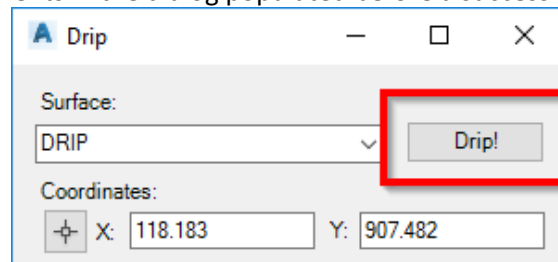


Figure 11: 'Drip' Analysis button

Analysis results are displayed on-screen as a thick polyline, with color bands indicating successful or non-successful aquaplaning calculations. Note the original blue flow path is removed from screen upon running the analysis.

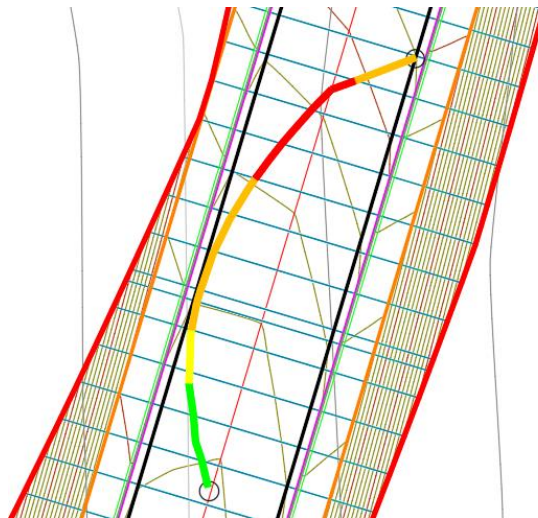


Figure 12: Analysis result on-screen

The analysis result shown in the bottom portion of the dialog (after running a 'Drip' analysis) is a simplified analysis that utilises the Gallaway method (1979) and uses the average length and slope of the entire flow path (i.e. point to point). Detailed analysis results are found in the generated Excel report.

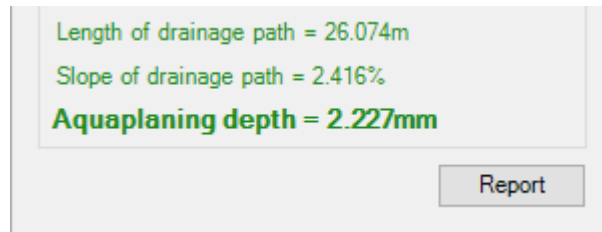


Figure 13: Point to Point analysis (simplified)

The image below shows a successful aquaplaning analysis on a corridor design surface using the following design parameters:

- Right-edge lip as the Point Code Terminator (CORR-MAIN->CE)
 - Intersection Number 1
- Texture Depth 0.4mm
- Rainfall Intensity 50mm/hr
- Design Speed 80km/h
- Friction Demand High? Yes
- Aquaplaning Limit 4mm

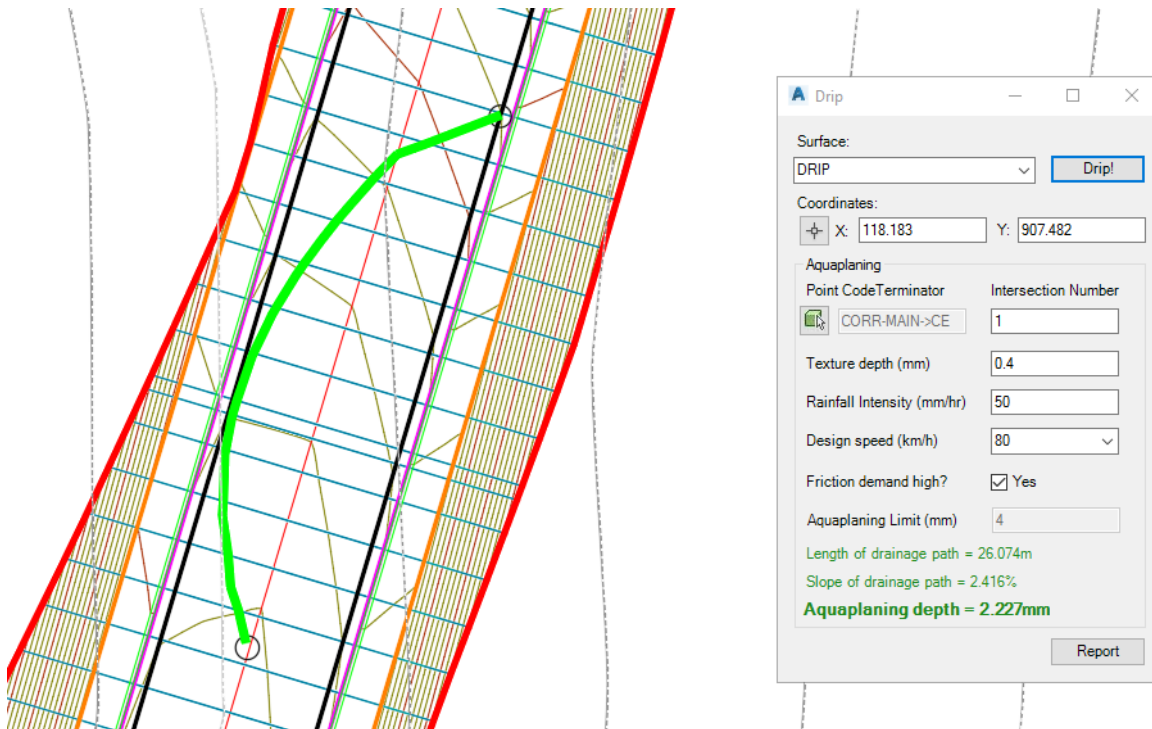


Figure 14: Successful aquaplaning analysis

The image below shows an unsuccessful aquaplaning analysis on a corridor design surface using the following design parameters:

- Right-edge lip as the Point Code Terminator (CORR-MAIN->CE)
 - Intersection Number 1
- Texture Depth 0.4mm
- Rainfall Intensity **120mm/hr**
- Design Speed 80km/h
- Friction Demand High? Yes
- Aquaplaning Limit 4mm

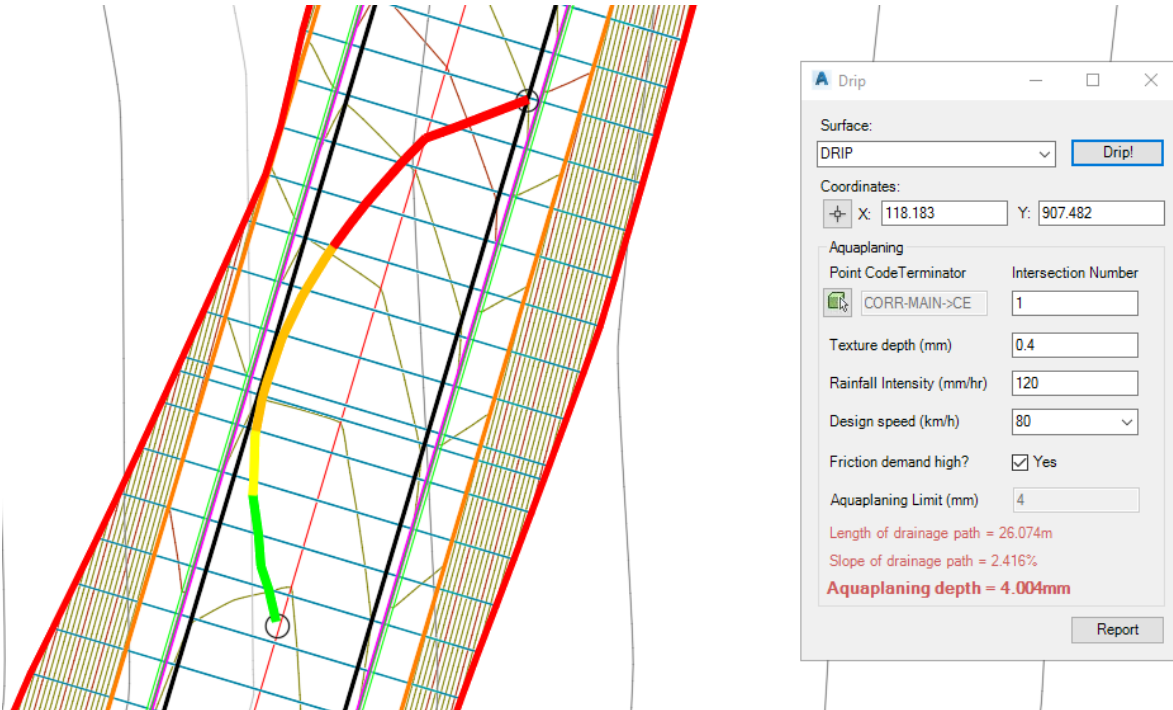


Figure 15: Unsuccessful aquaplaning analysis

Reporting

Upon completion of an analysis. Select the 'Report' button in the bottom-right of the dialog. This will create an Excel file (called 'Drip.xlsx'), which can then be saved in another location (Save-As) for use in reports

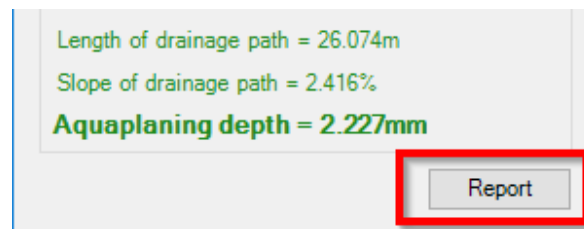


Figure 16: Reporting to Excel

The Excel report includes all calculation information, including charts and a table of the calculation segments.

	A	B	C	D	E	F	G	H	I	J	K
1	Aquaplaning Potential Assessment										
2											
3	Project Information (Name,Chainage,Direction)								Date		
4	<Project Info>								12-Mar-19 11:52:14 AM		
5											
6	Version				Calculated by			Checked By			
7	<Version>				<Designer>			<Checker>			
8											
9	Texture Depth (mm)										
10	0.4										
11											
12	Intensity (mm/h)										
13	50										
14											
15	Design Speed (km/h)										
16	80										
17											
18	Is Friction Demand High										
19	High										
20											
21											
22											
23											
24											
25											
26											
27	Water Film Depth Prediction										
28	Point	Distance from	Section Length	Vertical Design	Total Area (m2)	Equal Area	Se (%)	Predicted Depth			
29								T = 0.4	T = 0.4		
30	1	0.00		79.92							
31	2	1.32	1.32	79.90	0.01	0.02	1.38	0.52	0.52		
32	3	2.31	1.00	79.89	0.03	0.03	1.25	0.82	0.82		

Optional - Paste screen shot of flow path contours

56	27	24.27	1.33	79.47	6.49	0.53	2.20	2.25	2.25	
57	28	26.07	1.81	79.40	8.21	0.63	2.42	2.23	2.23	
58	Total (m)		26.07							
59										
60									Warnings Legend Guidelines for water film depth for design speed 80km/h & friction High *Between 2.5 - 3.2mm *Between 3.2 - 4mm *Greater than 4mm Flow Path > 60m	
61										
62										
63										
64										
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Figure 17: Sample Excel report

Civil 3D SectionLabel

SectionLabel will allow the user to select a single Section View (as part of a Section View Group) and annotate user-defined point codes within data bands, allowing for staggering of overlapping text labels.

Steps to be considered when using the SectionLabel tool:

- Use a Code Set Style to add point code labels to a Corridor Section on a Section View. The SectionLabel tool will only annotate Corridor Sections (i.e. not Surface Sections). See '*Section View Corridor Sections - Code Set Style*' for more details.
- Add Data Bands to Section View(s). See '*Section View Data Bands*' for more details.
- Edit the Section View Style description to add/remove specific customised Section View attributes (no ticks, XYZ annotation etc). See '*Section View Style*' for more details.
- Select a single Section View contained in the Section View Group

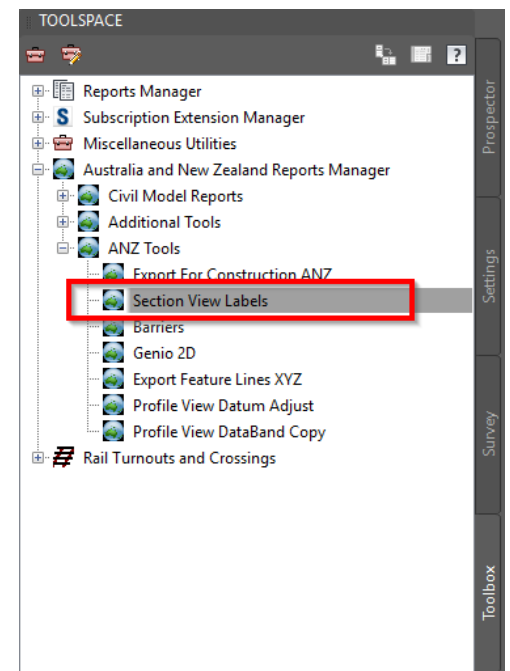
The program relies on specific coding standards and Civil 3D Settings that the user must conform with to successfully use the add-in.

General

- The Section Views must be part of a Section View Group (no Individual Sections)
- To scale the text in the data bands correctly, the system variable 'Measurement' should be set to '0' for Imperial and '1' for Metric

Loading

Navigate to the Toolspace – Australia and New Zealand Reports Manager – ANZ Tools – Section View Labels, and either right-click and select 'Execute' or double-click the left mouse button to run the command.



Section View Corridor Sections - Code Set Style

The SectionLabel add-in annotates only Corridor Sections displayed on a Section View. Surface Sections are not used to label the specific point codes, except for the existing surface, which is used to extract levels at the Corridor Section cut offset locations.

To annotate labels on Corridor Sections, the Corridor Section Code Set Style must be setup for the section labels to be cut.

1. Assign a Code Set Style to the Corridor Sections

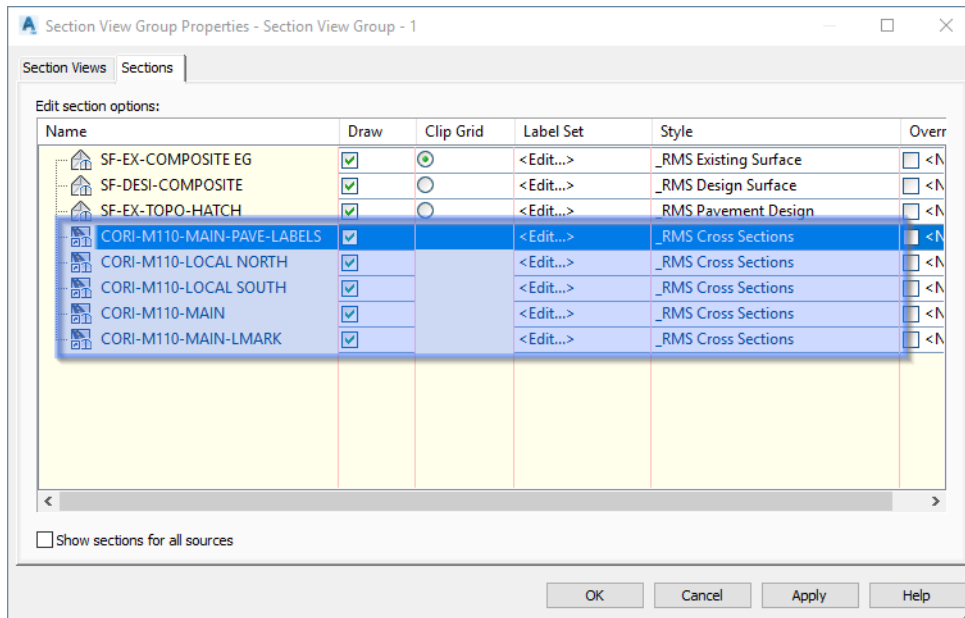


Figure 18- Assign Code Set Style to Corridor Sections

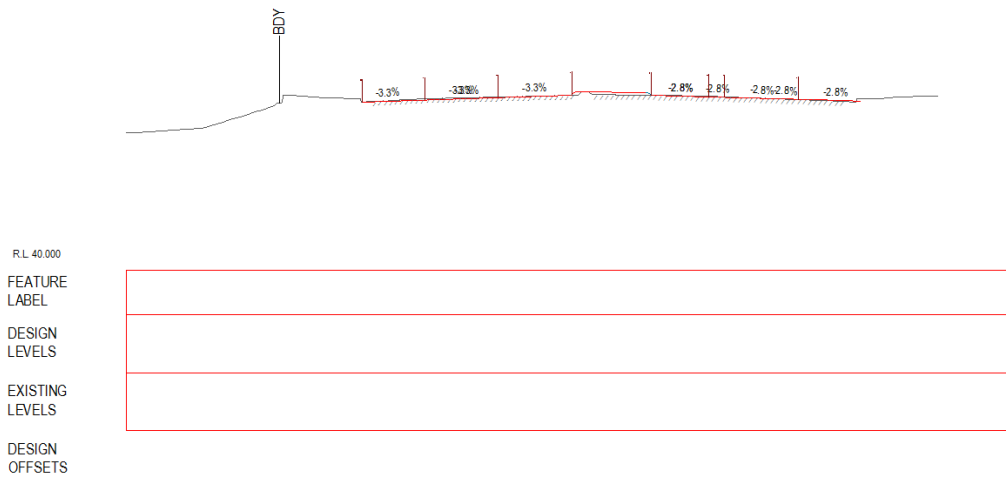


Figure 19 - Starting point for Section View labelling

2. Edit the Code Set Style.
To determine which labels to annotate, edit the Code Set Style.
Under the Point category, assign a Label Style called 'ADSK_SectionLabel' (not case sensitive). This tells the program which codes to annotate. For example, in the image below, the codes CB, CE, CF and CT will be labelled through the program.
 - a. Additionally, assigning a label style called 'ADSK_SectionLabel_Sub' will allow you to annotate a separate set of points along the Subgrade (or Datum) data band, separate from the top surface design strings.
3. Optionally, add a value to the Points 'Description' column to override the value of the feature label in the data band.
4. Note: 'ADSK_SectionLabel' and 'ADSK_SectionLabel_Sub' labels are design for use in the SectionLabel tool only. It is recommended to place the resulting Section View objects onto non-plotting layers

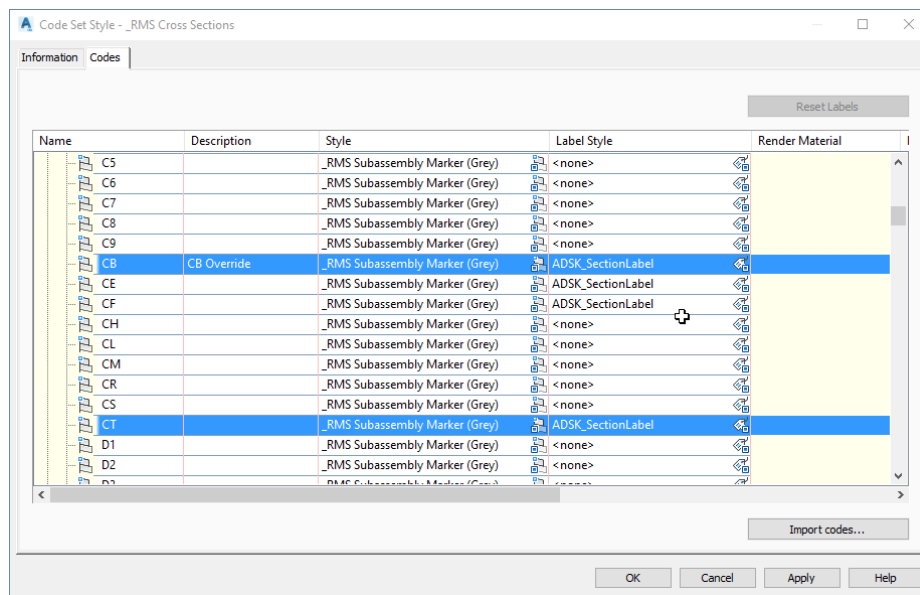
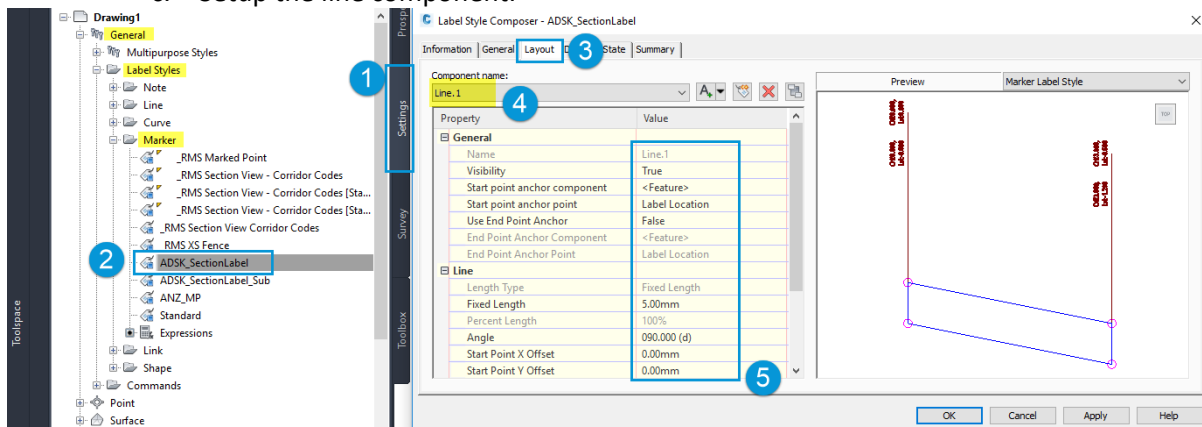


Figure 20 - Adding Label Styles to determine Section View annotation

5. In case old template, or other than an ANZ template is used the 'ADSK_SectionLabel' and 'ADSK_SectionLabel_Sub' marker label styles must be created:
 - a. Go to General > Label Style > Marker.
 - b. Update or Create a new style called 'ADSK_SectionLabel' or copy from ANZ template.
 - c. Setup the line component.



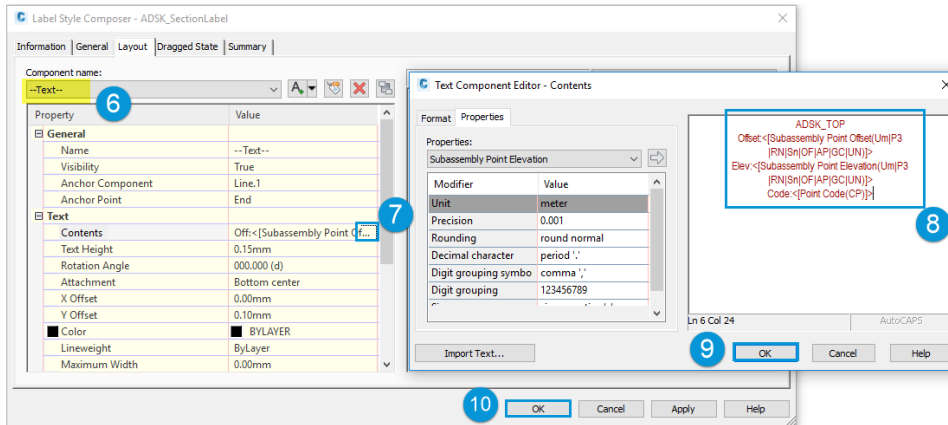
- d. Setup the text component, Copy and paste the codes below.

ADSK_TOP

Offset:<[Subassembly Point Offset(Um|P3|RN|Sn|OF|AP|GC|UN)]>

Elev:<[Subassembly Point Elevation(Um|P3|RN|Sn|OF|AP|GC|UN)]>

Code:<[Point Code(CP)]>



- e. **NOTE:** If 2020 or older ANZ templates used the first line of the above text, 'ADSK_TOP' must be added as the first line in the label text, otherwise the tool won't recognise the labels!
- f. If needed to use 'ADSK_SectionLabel_Sub' repeat similar steps a-d above.
6. Check system variable 'Measurement' to be 0 for imperial and 1 for metric.

Section View Styles

- In the Section View Styles dialog, adding the text string '#XYZ' to the description box annotate the master baseline (alignment) label just above the datum (LHS)

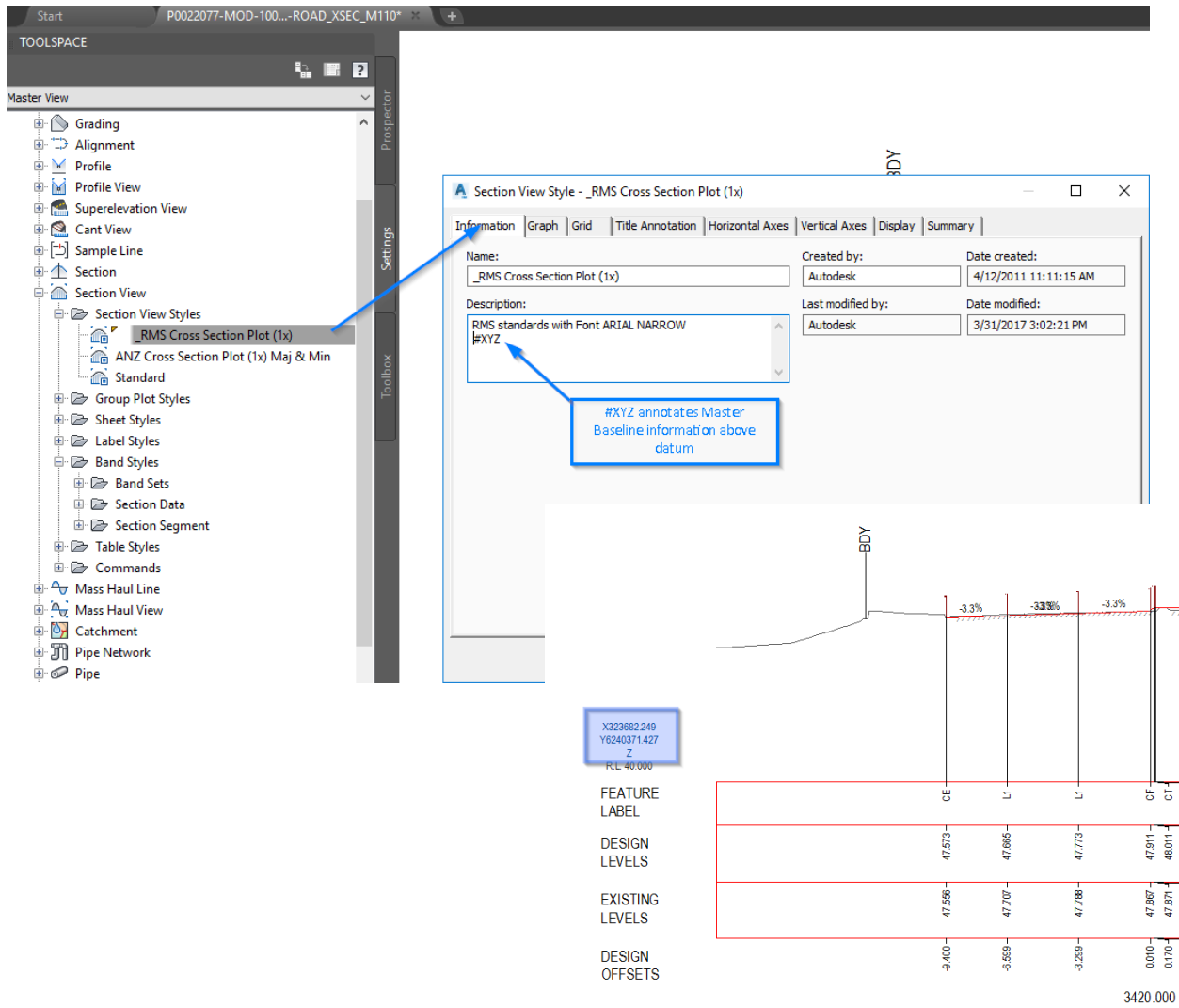


Figure 21- Adding XYZ annotation to Section View

Section View Data Bands

The SectionLabel add-in annotates all specified text values within existing Section View Data Bands, including labelling the existing surface at the same 'cut' locations, specified by the user. To avoid excessive user-interface, the program is hard-coded to search through all Section View Data Bands in your DWG file, and return text information (height, style etc.) that matches any of the following naming criteria. Note the data band labels only have to *contain* any of the following text strings and is not case sensitive.

1. Name the Data Bands in accordance with the following criteria
Section View – Band Styles – Section Data - Data Band Names
 - Feature Lines / Codes
 - 'FEAT'
 - 'LABEL'
 - 'CODE'
 - Design Levels
 - 'DESI'
 - 'PROP'
 - Existing Levels
 - 'EXISTING'
 - 'NATU'
 - Level Difference
 - 'DIFF'
 - Offset
 - 'OFF'
 - 'DIST'
 - Subgrade/Datum
 - 'SUB'
 - 'STRAT'
 - 'DATUM'

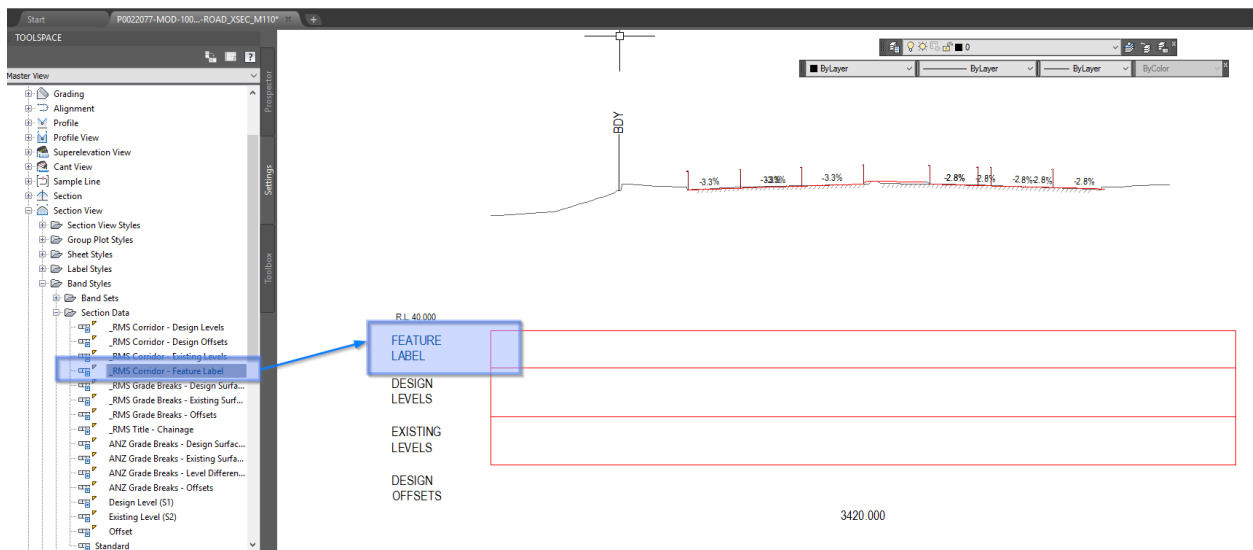


Figure 22- Data Band Naming Convention

2. In the Section Data Band Style dialog, edit the Data Band text style through the 'Summary' tab – Band Details – Band Text Style.

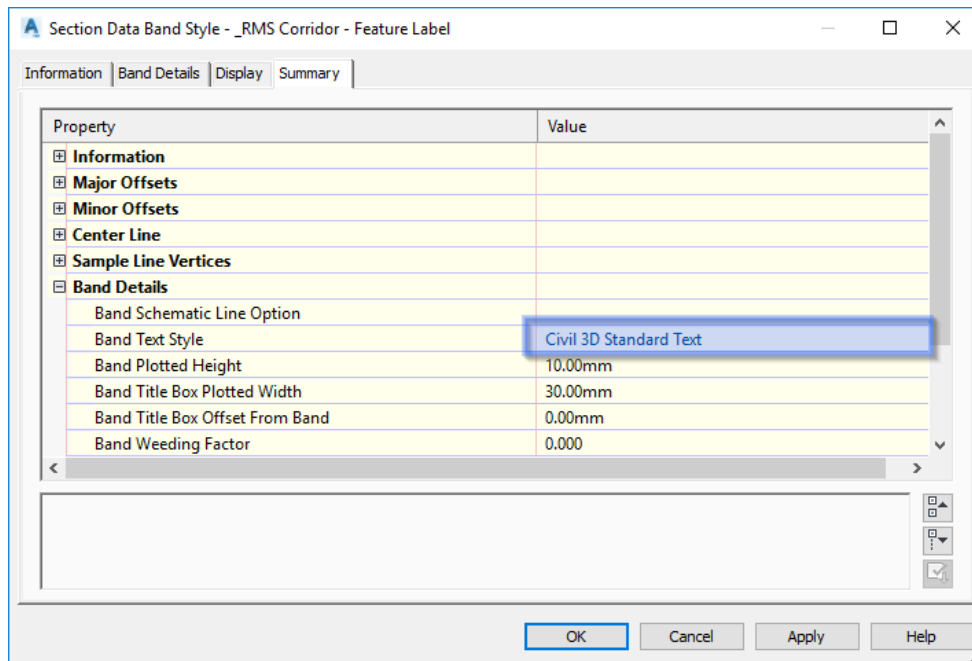


Figure 23 - Edit Data Band Text Style

3. In the Section Data Band Style dialog, edit the Data Band text height through the 'Band Details' tab – Grade Breaks – Compose Label.

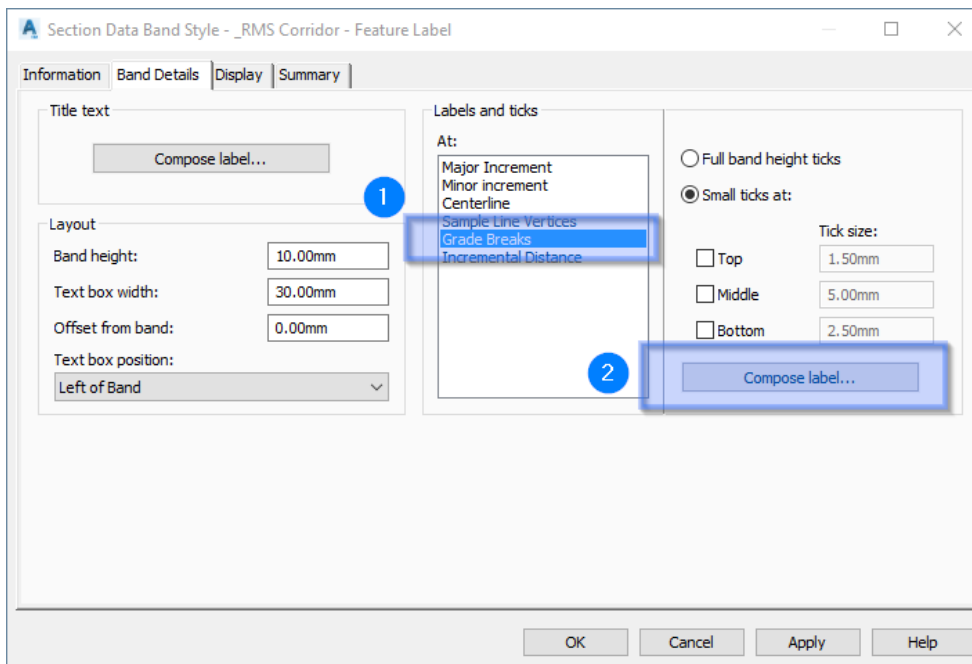


Figure 24 - Edit the Data Band Text Height (through Grade Breaks)

- a. In the Label Style Composer, add a Text Component, and change its text height value. The add-in will read this value and set the text heights for the data band.

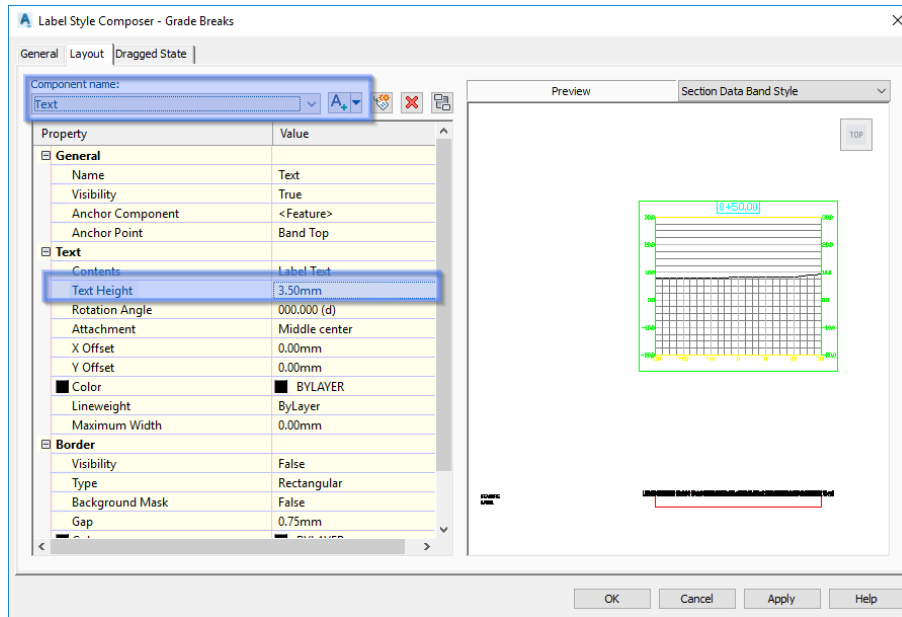


Figure 25 - Changing the Data Band Text Height property

4. Inside the Section Data Band Style dialog, adding the text string '#NoTicks' into the Description will remove ticks from the Data Band

The screenshot shows the 'Section Data Band Style - _RMS Corridor - Design Levels' dialog box. The 'Description' field contains 'RMS standards with Font ARIAL NARROW' and '#NoTicks'. A callout box points to '#NoTicks' with the text '#NoTicks value added to description removes ticks in Data band'. Below the dialog is a cross-section diagram showing 'Design Levels' and 'Existing Levels' with a callout pointing to the 'Design Levels' row: 'Ticks removed from 'Design Levels''.

Feature Label	Design Levels	Existing Levels	Design Offsets
CE	47.573	47.556	-0.400
L1	47.865	47.707	-6.599
L1	47.773	47.788	-3.299
CF	47.911	47.887	0.010
CT	48.011	47.871	0.170
CB	48.011	47.872	0.240

Figure 26 - Remove ticks from a Data Band

Surfaces

The SectionLabel add-in annotates an existing (or natural) surface at the same 'cut' locations as specified by the user. To avoid excessive user-interface, the program is hard-coded to search through all TIN surfaces in your DWG file, and return the first surface that matches any of the following naming criteria. Note the surface only has to *contain* any of the following text strings and is not case sensitive.

- 'EX'
- 'EG'
- 'GROU'
- 'TERR'
- 'NGL'
- 'TX'
- 'SURV'
- 'NATU'

For example, a surface called '*Existing Ground*' will be returned, as it contains 'EX' and 'GROU' within the name.

Civil 3D Genio2D

Genio2D allows users to take a 3D Genio import (from the Autodesk® Import-Export Extension for GENIO) and create a flattened 2D version of the file for Xref underlays and CAD exports.

This add-in will convert all 3D elements based on layer and object type. 3D Linework and COGO points are all converted to their relative 2D polyline and block counterparts through a text mapping file (*.txt)

GENIO (General Input-Output) is a text-based file format developed for exchanging data between MOSS/MX and other design packages.

The current version of the product is setup for RMS workflows (although the add-in can be customised to suit any region).

Future releases will include functionality for other regions.

Prerequisites

Prior to running the Genio2D add-in, the following steps are required

- Create a new drawing using the default survey template. The template must contain all relevant layers and block definitions to match the mapping file.
The default survey template for the RMS Country Kit is in the user's Local 'AppData' folder (%LocalAppData%\Autodesk\C3D <version>\enu\Template)
 - _AutoCAD Civil 3D 2019 ANZ Survey_RMS.dwt
- A Genio Import tables mapping file is required for the initial Genio file import.
C:\ProgramData\Autodesk\C3D <version>\enu\Data\Import Export Extension for GENIO\
 - 'Genio Import Survey RMS No Layer Prefix.tbl'
- A Genio2D mapping file is required to successfully run the add-in. The default table is located in
C:\ProgramData\Autodesk\C3D <version>\enu\Data\ToolBox\ANZ\Settings\
 - 'genio_import_app_settings_2D.txt'

General Notes

- Prior to running the Genio2D add-in, it is required to have a drawing open that contains a 3D survey model that has been imported via the GENIO Import module
 -

Loading

Navigate to the Toolspace – Toolbox - Australia and New Zealand Reports Manager – ANZ Tools – Genio 2D, and either right-click and select 'Execute' or double-click the left mouse button to run the command.

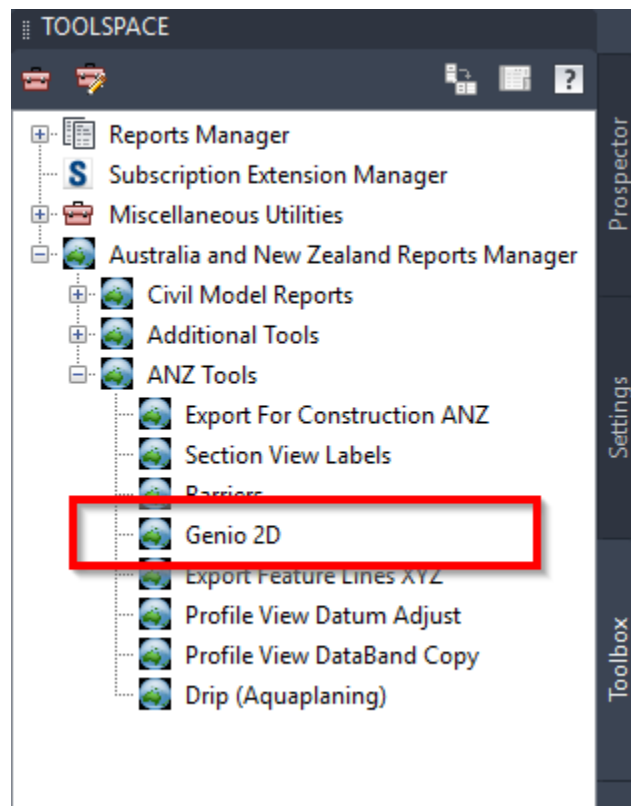


Figure 27: Genio 2D Loader

Process

Create a new drawing

Create a new file using the default survey template (File – New). This DWT should will contain the layers and block for local standards.

For example, the image below shows a new file created from template ‘_AutoCAD Civil 3D 2019 ANZ Survey_RMS.dwt’

Delete any linework and blocks from the new drawing, as these are at origin (0,0) and for display purposes only.

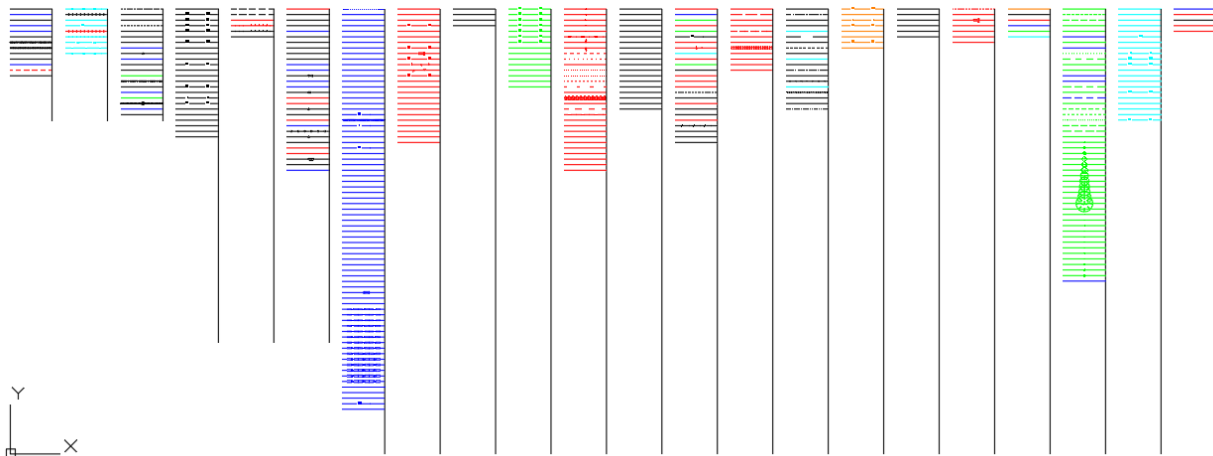
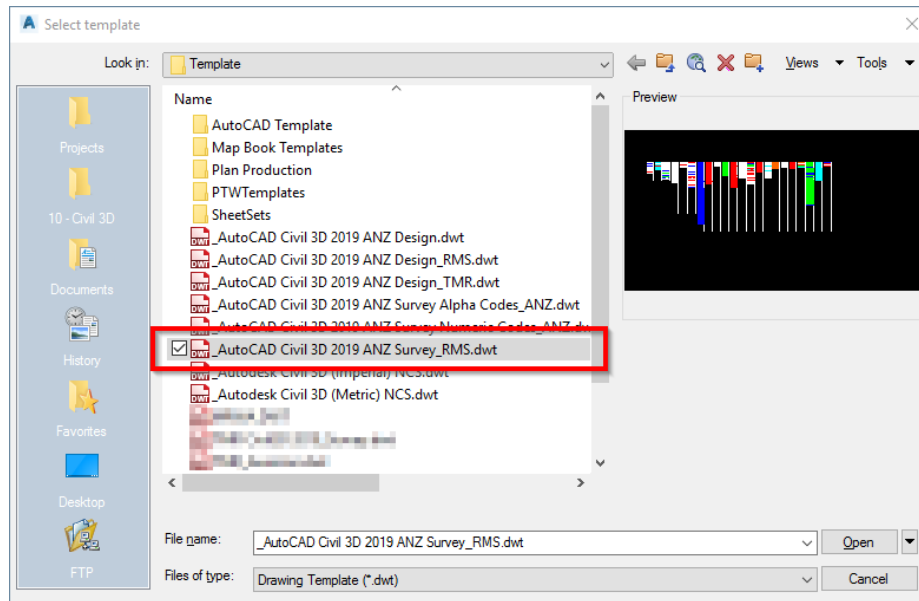


Figure 28: New file with survey template

Import a GENIO file

The Autodesk® Import-Export Extension for GENIO is a separate add-in provided with Civil 3D to subscription customers, and can be downloaded from the user's Autodesk Account page (<https://manage.autodesk.com/>)

The installation guide is located <https://up.autodesk.com/2019/CIV3D/GENIOExtension2019.htm>

The image below shows the GENIO extension on the Autodesk Accounts page

1. <https://manage.autodesk.com/>
2. Login
3. Product Updates
4. Search for 'GENIO'
5. Download (if available)

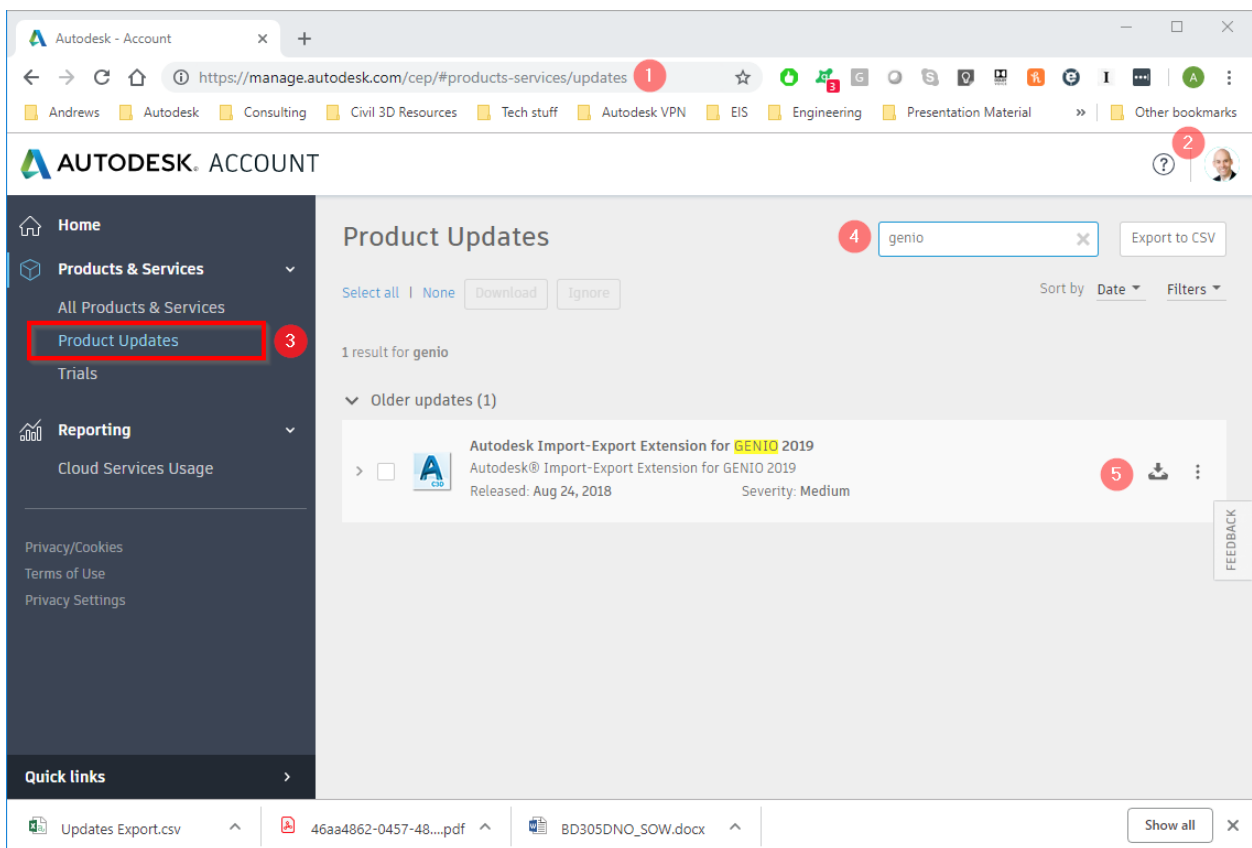
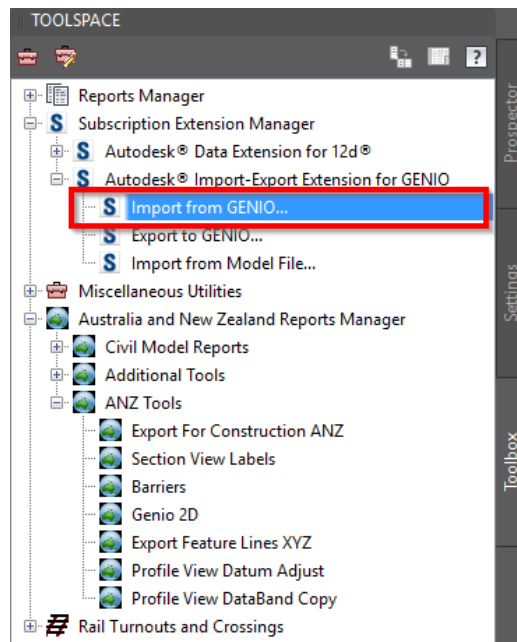


Figure 29: GENIO download from Autodesk Accounts page

- From the Toolbox, navigate and select 'Subscription Extension Manager – Autodesk® Import-Export Extension for GENIO – Import from GENIO...'



- Update or check the 'GENIO Import Options' tab, and load the String Label Layer Table 'Genio Import Survey RMS No Layer Prefix.tbl', which is installed as part of the ANZ Country Kit

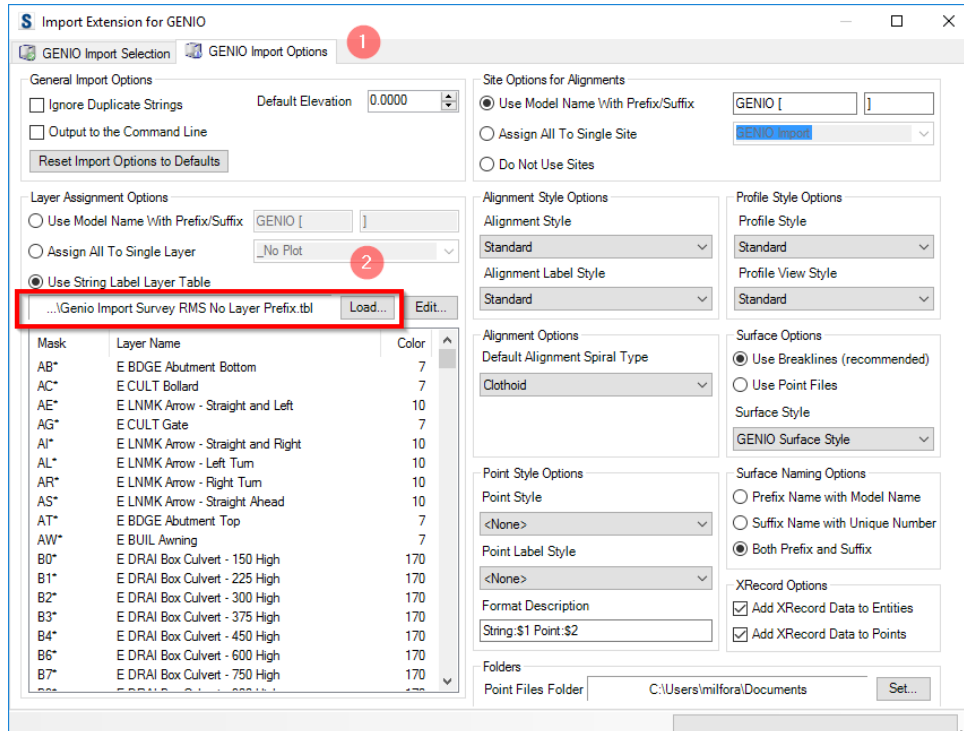


Figure 30: GENIO Import Options

- In the 'GENIO Import Selection' tab,
 - Open the Genio file
 - Select the Genio file from the left column (Models)

- Select the strings to import from the right column (Strings)
- Click 'Import'

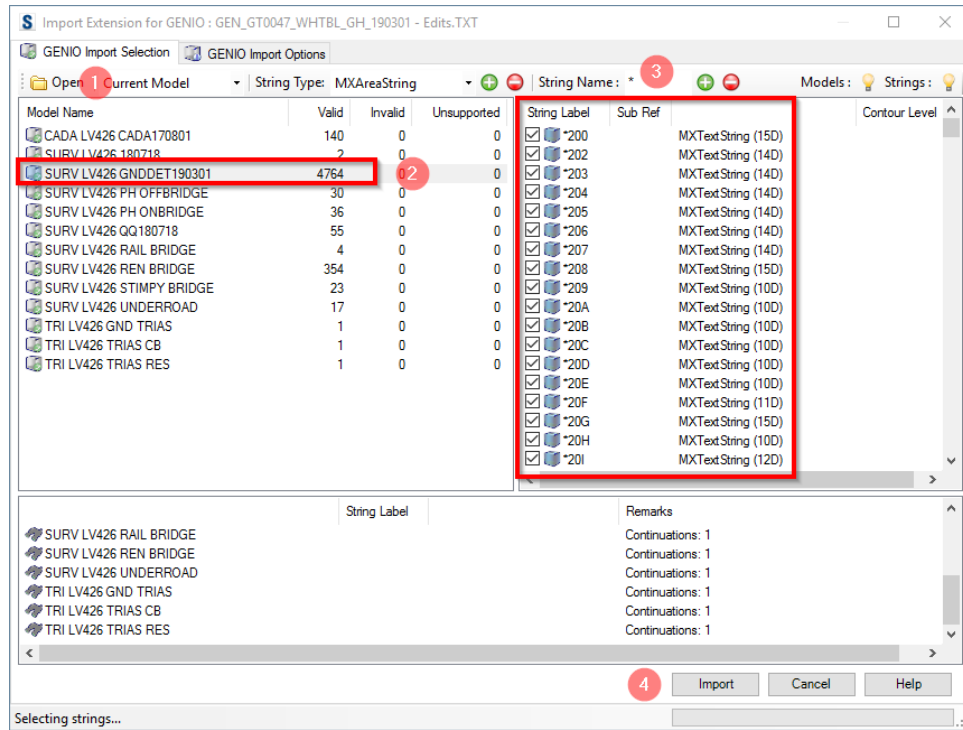


Figure 31: GENIO Import Selection

- The imported Genio provides 3D Polylines and COGO Points

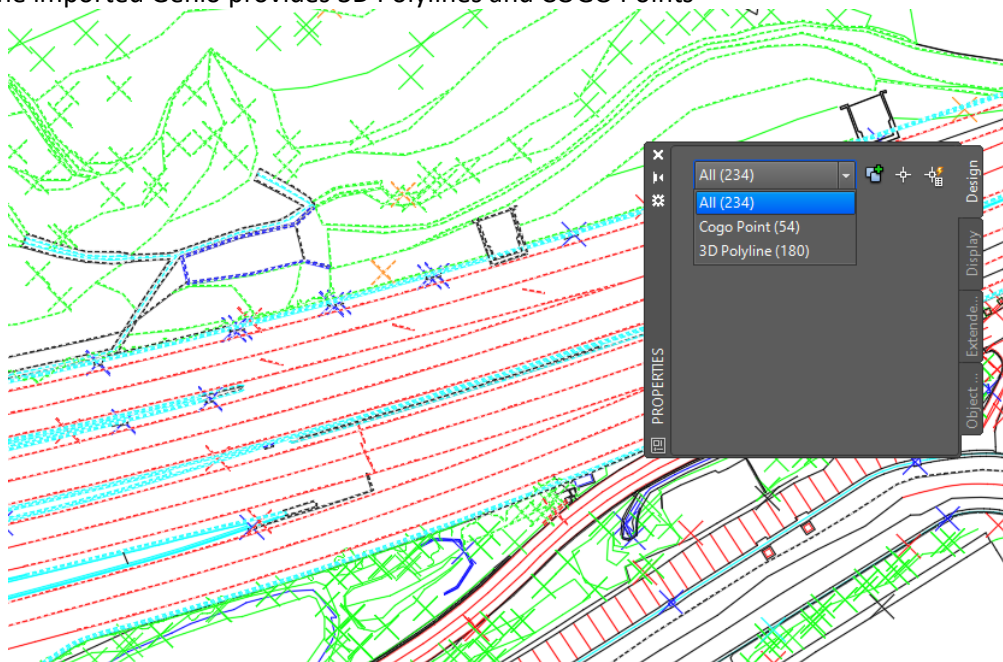
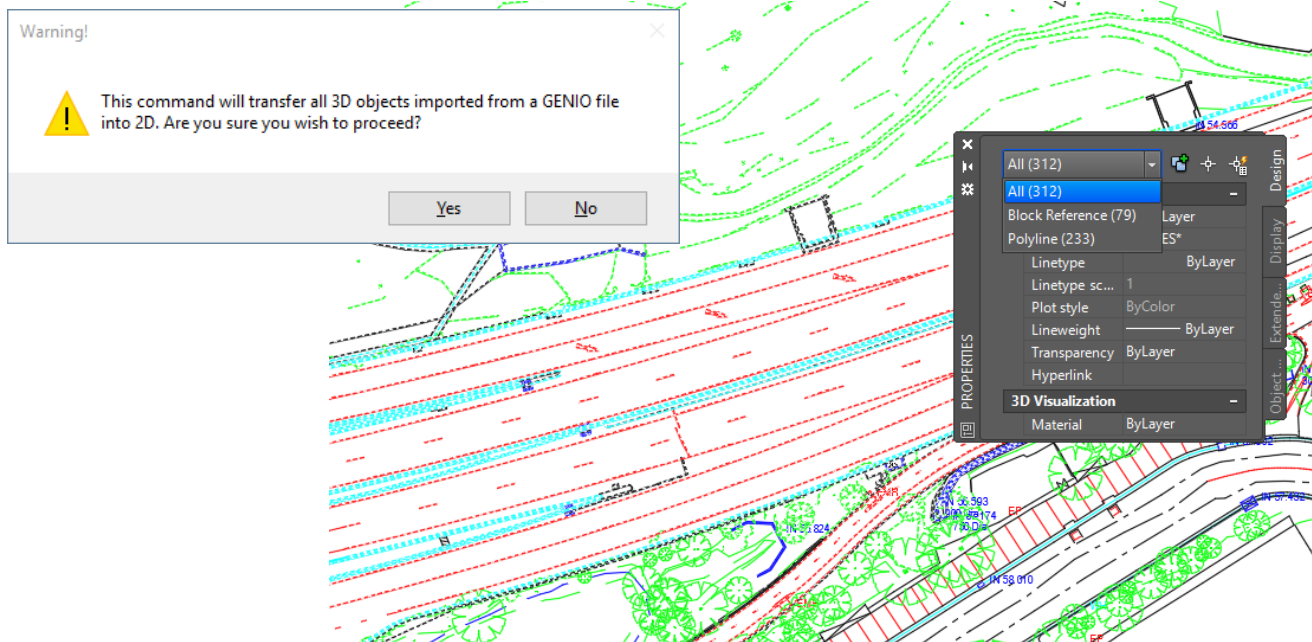


Figure 32: GENIO Import 3D Polylines and COGO Points

Convert the drawing to 2D

- Run the Genio2D add-in from the Toolbox (described above)
- A warning dialog will ask if you wish to proceed. Please note that all 3D polylines and COGO points are deleted (or converted) into a 2D Polyline, Block References and MText.

- Click 'Yes'



- This applied mapping file is in a subfolder (called **\Settings**) under the add-in installation folder, for example, the executable file in:
 - C:\ProgramData\Autodesk\C3D <version>\enu\Data\ToolBox\ANZ\Autodesk.Consulting.Civil3D.Genio2D.<version>.dll
 Looks for a mapping file in the folder:
 - C:\ProgramData\Autodesk\C3D <version>\enu\Data\ToolBox\ANZ\Settings\genio_import_app_settings_2D.txt'
- Save the drawing and open it again to see all the block references applied correctly.
- This drawing is now ready to be used as a 2D representation of the survey Genio.

Civil 3D ExportForConstruction

ExportForConstruction allows users to export Corridor Feature Lines and Site Feature Lines into a new AutoCAD drawing as a 2D or 3D drawing.

Prerequisites

Prior to running the Export add-in, the following steps are required

- The drawings should contain either:
 - One (1) Corridor containing feature line(s)
 - One or more ground Feature Lines

General Notes

- The ExportForConstruction add-in will create an XML file, called '*ExportForConstruction.xml*', in the same folder where the current drawing is located. The XML file will read and write settings so when the program is re-run, the latest settings in the dialog are not lost.

Loading

Navigate to the Toolspace – Toolbox - Australia and New Zealand Reports Manager – ANZ Tools – Export For Construction ANZ, and either right-click and select 'Execute' or double-click the left mouse button to run the command.

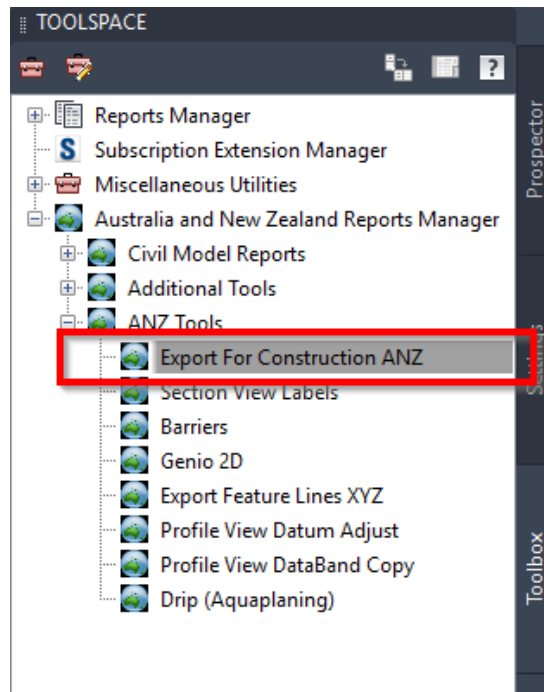


Figure 33: Export For Construction Loader

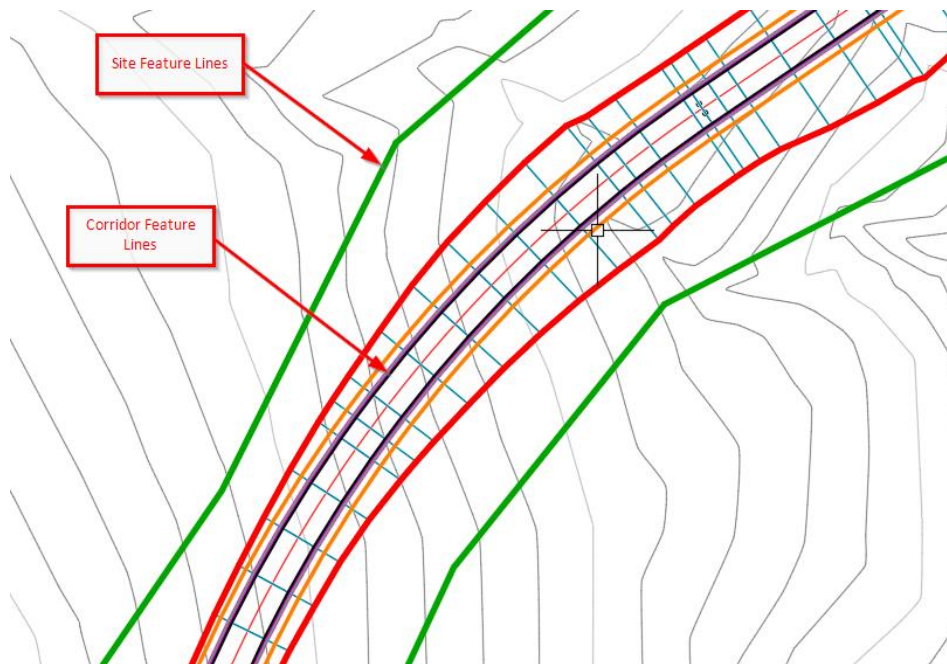


Figure 34: Corridor Feature Lines and Site Feature Lines

Process

Run the Genio2D add-in from the Toolbox (described above)

The screenshot shows the TOOLSSPACE interface with the project tree on the left. A red box highlights the 'Sites' folder, which contains 'Site 1', 'Alignments', and 'Feature Lines'. A red arrow points from the 'Feature Lines' folder to a table at the bottom of the interface.

Name	Style	Layer	2D Len
Boundary 1	_RMS - PAVT SI S	C FEAT	322.86
Boundary 2	_RMS - PAVT SI S	C FEAT	294.27

The dialog box is titled 'Export Corridor and Site Feature Lines to 3D and 2D Polylines'. It contains the following sections:

- Corridors:** A dropdown menu set to '<All Corridors>'. Below it are two columns of checkboxes for various corridor types: CB, CE, CE_Pave1, CE_Pave2, CE_Pave3, CE_Pave4, CF, CT, EH, EH_Pave1, IA, None, None_Pave1, None_Pave2, None_Pave3, and None_Pave4.
- Sites:** A dropdown menu set to '<All Sites>'. Below it are two checkboxes for 'Boundary 1' and 'Boundary 2'.
- Export Options:** A section with several checkboxes: 'Use Existing AutoCAD Layer' (unchecked), 'Join AutoCAD Polylines' (checked), 'Save in a New Drawing' (checked), 'Export a 2D Drawing' (checked), and 'Open the Drawing' (unchecked). There is a text input field next to 'Save in a New Drawing' and a dropdown menu next to 'Use Existing AutoCAD Layer'.

At the bottom of the dialog is a large 'Export Feature Lines' button. On the right side of the dialog, there is a vertical label: 'AUTOCAD CIVIL 3D EXPORT FOR CONSTRUCTION'.

Corridors

The ExportForConstruction add-in will allow exporting from either multiple corridors or allow selection of a single corridor.

The drop-down <All Corridors> will combine the feature line codes for all corridors in the current drawing. Conversely, selecting a single corridor from the drop-down will display feature line codes for that specific corridor. Note that when changing the corridor selection in the drop-down, the checkboxes in the selection panel underneath will change also.

The check list boxes below the corridor selection displays the specific corridor's codes, which can be individually selected for export.

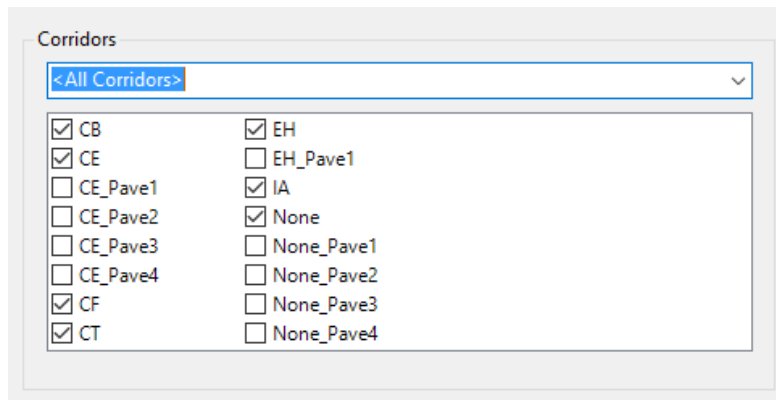


Figure 35: All Corridors selected with specific feature line codes

Sites

The drop-down <All Sites> will combine the feature line codes for all sites in the current drawing. Conversely, selecting a single site from the drop-down will display feature lines for that specific site. Note that when changing the site selection in the drop-down, the checkboxes in the selection panel underneath will change also.


The check list boxes below the site selection displays the specific site's feature lines, which can be individually selected for export.



Figure 36: All Sites selected with specific feature lines

Export Options

Several export options are available to customise the exports, including:

- **Use Existing AutoCAD Layer**
Checking this box will enable a drop-down list allowing the selection of a custom layer. This option will force all exported 3d polylines onto the layer specified in the drop-down
- **Join AutoCAD Polylines**
Checking this box will attempt to join adjacent 3D polylines based on endpoint proximity and the exported feature line code.
Note: this option can take longer to process
- **Save in a New Drawing**
Clicking the  icon will open a 'Save As' dialog. Enter a new drawing name and click 'Save'
 - **Export a 2D Drawing**
Checking this option will create an additional 2D 'flattened' version of the export. The name given to the 2D version is the same as the name give from the Save option above, with a suffix '_2D' added.
 - **Open the Drawing**
Checking this option will open the new 3D drawing upon processing.

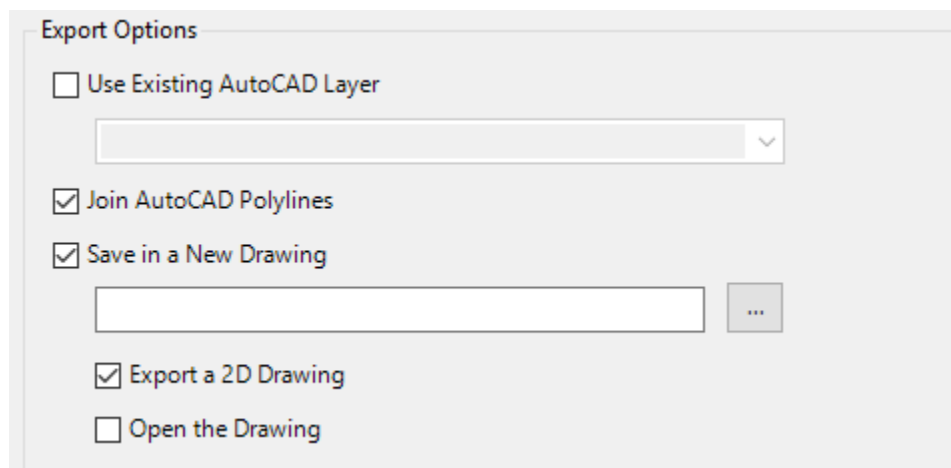


Figure 37: Export Options

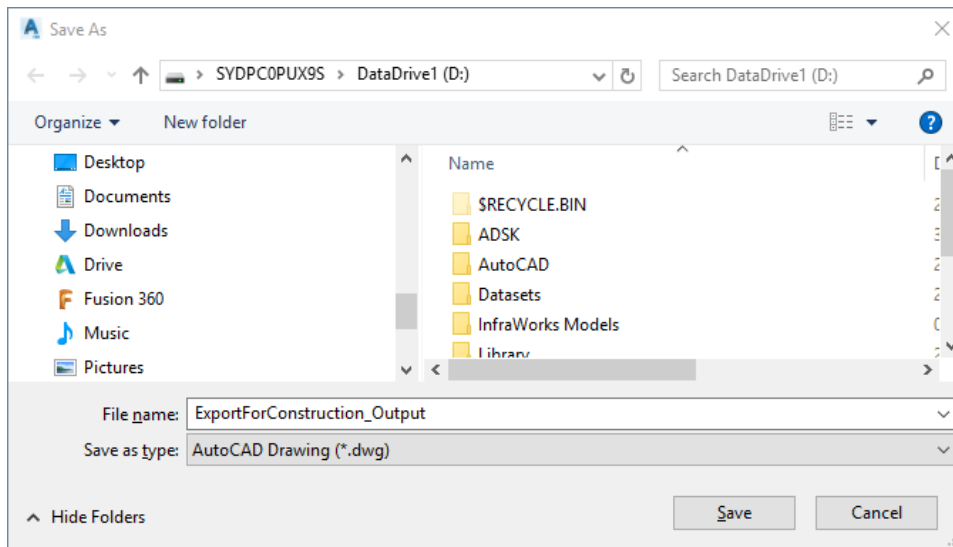


Figure 38: Save in a new drawing dialog

Export Feature Lines

This button will begin exporting the feature lines into new drawing(s)

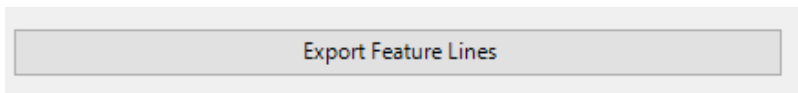


Figure 39: Export Feature Lines

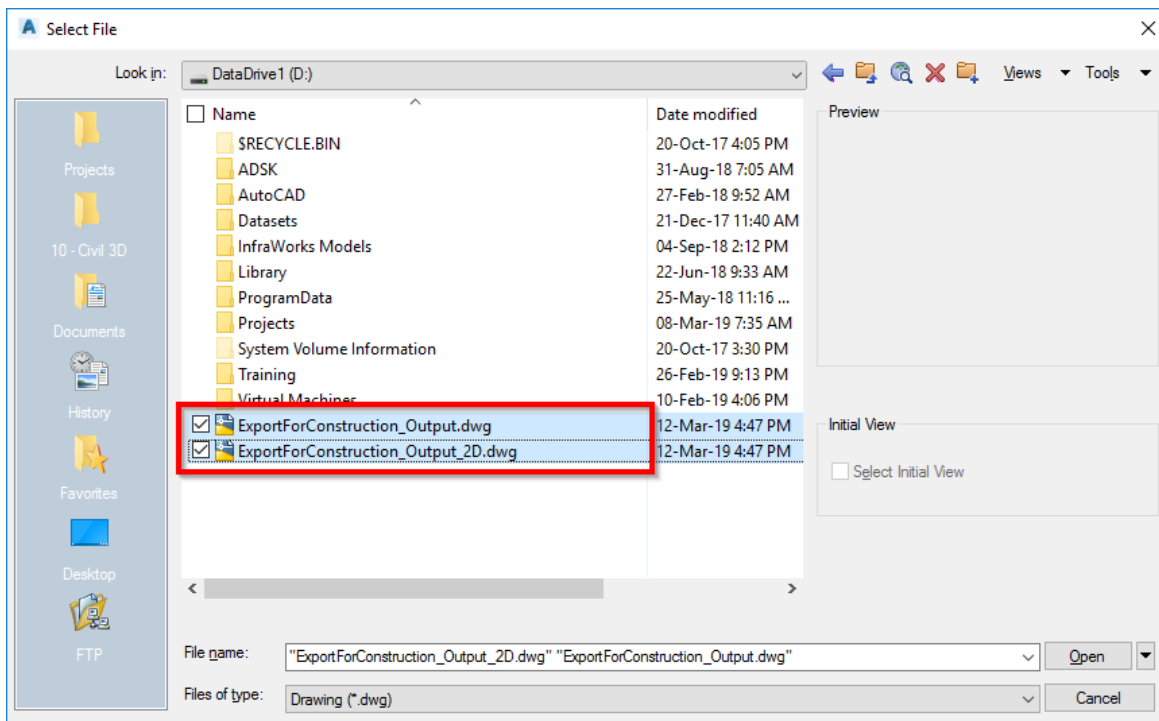


Figure 40: Resulting output drawings (3D and 2D)

Civil 3D Barriers

Civil 3D Barriers allows users to create custom safety barrier objects from Civil 3D Alignments as 3D AutoCAD solids within the design model, for use in design review and clash detection workflows.

Barrier systems currently available are Wire Rope (4-wire) and W-Beam barrier types.

Barrier terminals and posts are added at the ends of the alignment and at regular spacings, respectively, and can be customised to local requirements.

Prerequisites

Prior to running the Barriers add-in, the following steps are required

- The drawings should contain:
 - One (1) Alignment object defining the setout control of the barrier
 - A Civil 3D Surface with the text characters 'BARR' in the name (not case sensitive). The add-in will search for and return the first Tin Surface containing the characters 'BARR', and use the surface levels to layout the 3D AutoCAD solid barrier objects.

General Notes

- The Barrier add-in creates Extended Data on each Alignment object in the model so that when the program is re-run, previous settings (barrier type, terminal type, post spacing etc.) are retained for future use.
- For AutoCAD blocks (Posts and Terminals) to be read into the Barrier dialog, a single instance of each block must exist in the drawing Modelspace prior to running the command. This is a limitation of the software and will be addressed in a future release.
- To add custom Terminals, create a 3D block containing the characters 'TERM' (not case sensitive)
- To add custom Posts, create a 3D block containing the characters 'POST' (not case sensitive)
- Sample 3D Terminal and Post 3D blocks can be found in the ANZ template drawing
 - %LocalAppData%\Autodesk\C3D <Version>\enu\Template_AutoCAD Civil 3D <Version> ANZ Design_RMS.dwt

Loading

Navigate to the Toolspace – Toolbox - Australia and New Zealand Reports Manager – ANZ Tools – Barriers, and either right-click and select 'Execute' or double-click the left mouse button to run the command.

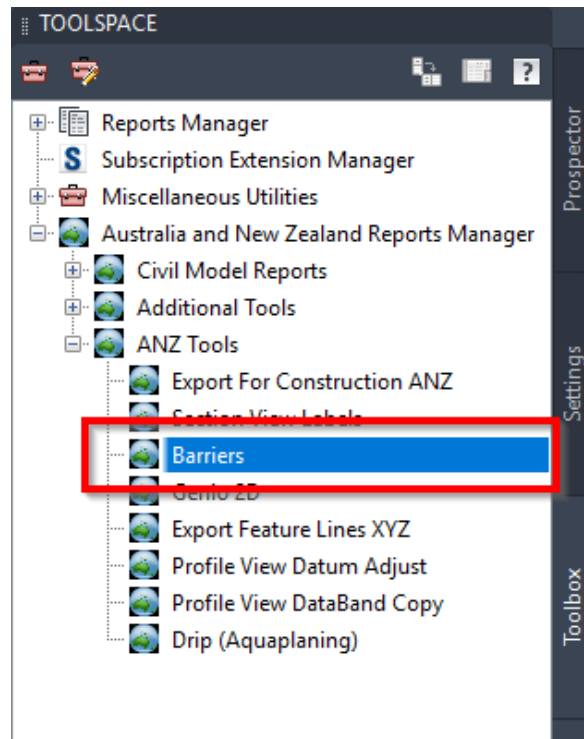


Figure 41: Barriers loader



Figure 42: Corridor surface and Alignments

Process

Run the Barrier add-in from the Toolbox (described above)

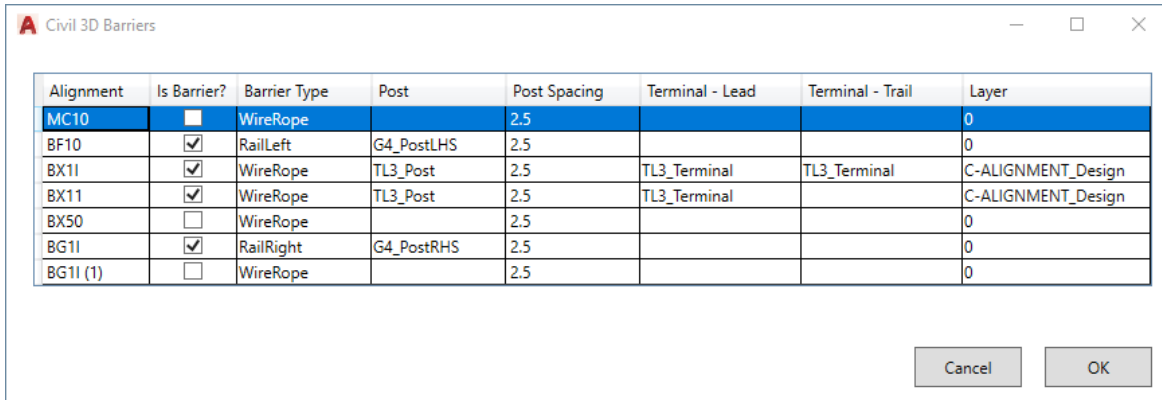


Figure 43: Civil 3D Barriers

The table below depicts the provided 3D blocks from the template file ‘\AutoCAD Civil 3D <Version> ANZ Design_RMS.dwt’

	Block Name	2D View w/ Insertion	2D View	3D View
1	G4_PostLHS			
2	G4_PostRHS			
3	TL3_Post			
4	TL3_Terminal			

Civil 3D Barrier Options

Several options are available to customise the barriers, including:

- **Alignment**
This column takes the name of the Civil 3D alignment. It is a read-only column. It is good practice to name alignments using a clear and concise naming convention.
- **IsBarrier?**
Checking this box will enable the creation of the barrier 3D Solid objects along the alignment. An unchecked box will ignore the alignment object for processing.
- **Barrier Type**
The drop-down list enables selection of the barrier type, including:
 - WireRope 4-post Wire Rope barrier swept object
 - RailLeft W-Beam swept object (Left side)
 - RailRight W-Beam swept object (Right side)
 - None Does not create a swept barrier
- **Post**
Posts are 3D block objects that reside in the AutoCAD / Civil 3D Modelspace. The drop-down list enables selection of the barrier post type and is populated by searching through all block names in the drawing containing the characters 'POST' (not case sensitive)

To add a custom post, create a 3D block containing the characters 'POST' (not case sensitive)

- **Post Spacing**
Setting the post spacing will array the selected posts along the alignment at the nominated interval.
- **Terminal – Lead**
Terminals are 3D block objects that reside in the AutoCAD / Civil 3D Modelspace. The drop-down list enables selection of the barrier terminal type and is populated by searching through all block names in the drawing containing the characters 'TERM' (not case sensitive)

To add a custom terminal, create a 3D block containing the characters 'TERM' (not case sensitive)

The Lead terminal is applied to the start of the Alignment string and aligns the rotation to the bearing of the start point.

- **Terminal – Trail**
The Trail terminal is identical to the Lead terminal described above.

The Trail terminal is applied to the end of the Alignment string and aligns the rotation to the bearing of the end point.

- **Layer**
Enables a drop-down list allowing the placement of the 3D barrier objects to a specific layer. On object creation, all 3D solid objects and block references for a specific alignment will be placed onto the layer specified in the drop-down.

Civil 3D Export Feature Lines XYZ

Civil 3D FeatureLineExport allows the export of selected Civil 3D Feature Lines to a single CSV file. The output report includes values such as Chainage, Easting, Northing and Elevation. Unlike the built-in report tools. 'i.e. Corridor Points Report', the FeatureLineExport sorts the outputs by object type, not by chainage, for use in downstream export compatibility.

General Notes

- The Barrier add-in creates Extended Data on each Alignment object in the model so that when the program is re-run, previous settings (barrier type, terminal type, post spacing etc.) are retained for future use.
- For AutoCAD blocks (Posts and Terminals) to be read into the Barrier dialog, a single instance of each block must exist in the drawing Modelspace prior to running the command. This is a limitation of the software and will be addressed in a future release.
- To add custom Terminals, create a 3D block containing the characters 'TERM' (not case sensitive)
- To add custom Posts, create a 3D block containing the characters 'POST' (not case sensitive)
- Sample 3D Terminal and Post 3D blocks can be found in the ANZ template drawing
 - %LocalAppData%\Autodesk\C3D <Version>\enu\Template_AutoCAD Civil 3D <Version> ANZ Design_RMS.dwt

Loading

Navigate to the Toolspace – Toolbox - Australia and New Zealand Reports Manager – ANZ Tools – Export Feature Lines XYZ, and either right-click and select 'Execute' or double-click the left mouse button to run the command.

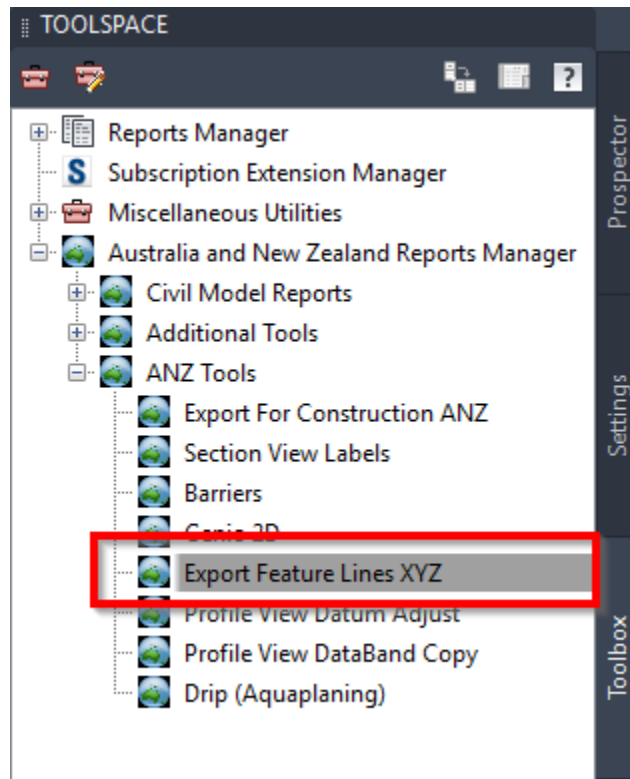


Figure 44: Barriers Export Feature Lines XYZ loader

Process

Run the Export Feature Lines XYZ add-in from the Toolbox (described above)

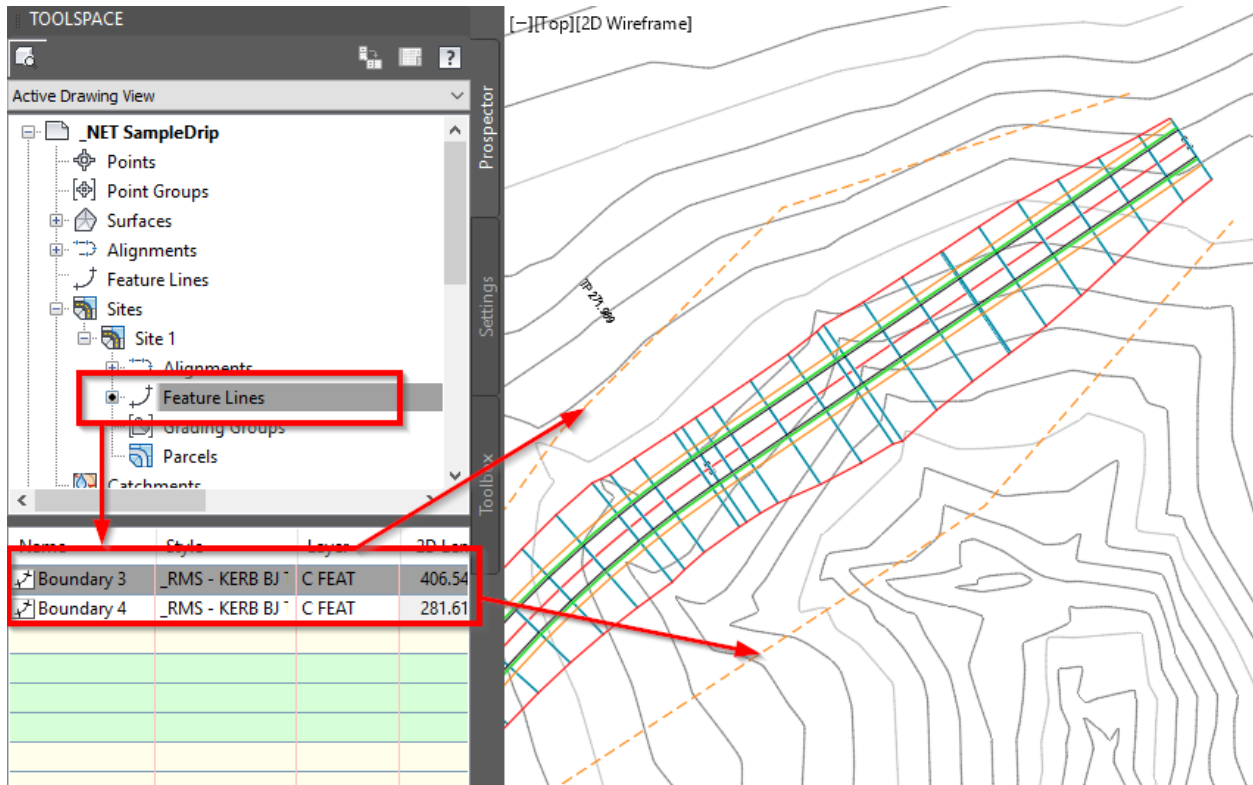


Figure 45: Export Feature Lines XYZ

- Select objects on-screen.

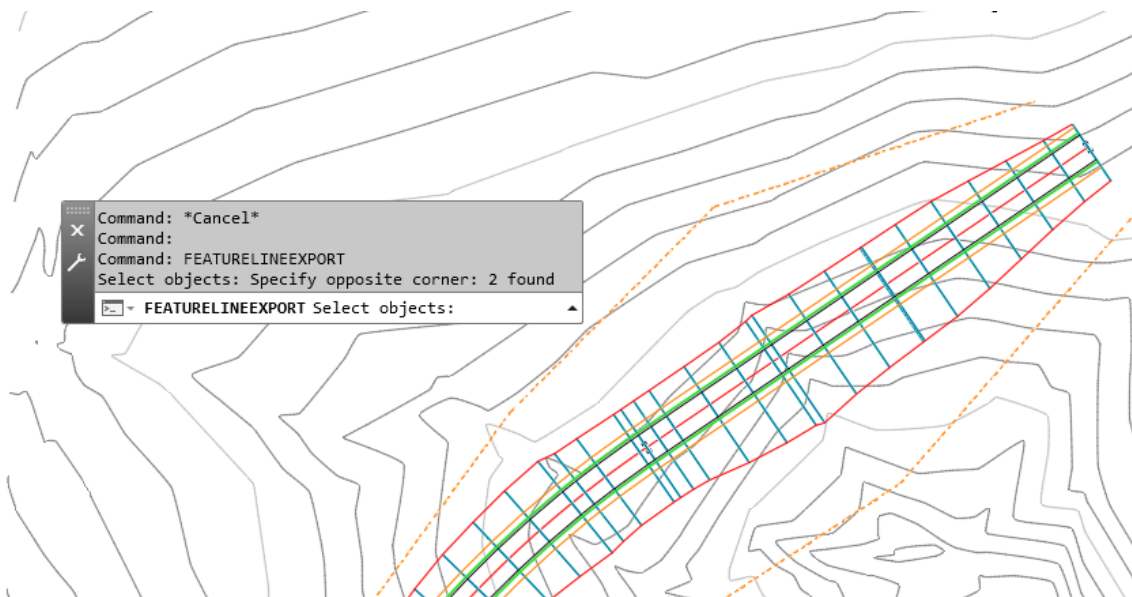


Figure 46: Select Feature Lines

- Select a folder and filename to save the CSV file

File name: Save

Files of type: *.csv Cancel

- Open the CSV file to view / edit

	A	B	C	D
1	Civil 3D Feature Line Export			
2				
3	FeatureLine Name: Boundary 4			
4	Chainage	X	Y	Z
5	0	346.418	1141.961	0
6	82.443	292.226	1079.832	0
7	214.779	181.609	1007.189	0
8	281.619	152.6	946.972	0
9				
10	FeatureLine Name: Boundary 3			
11	Chainage	X	Y	Z
12	0	87.983	866.088	0
13	57.156	102.928	921.255	0
14	116.297	125.246	976.024	0
15	165.959	145.596	1021.325	0
16	258.731	200.099	1096.4	0
17	327.013	248.234	1144.828	0
18	406.546	323.785	1169.68	0