NavView User Guide – 09 Pipelines

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9. Pipelines

NavView uses several supporting files including waypoints, survey line, pipelines. This section covers the creation and editing of pipelines.

9.1 Overview

A pipeline in NavView represents the design route of a real-world pipeline or cable. This can be displayed in Map and 3D Map views, selected for a Point to Route Guidance and tracked via the Layback Connection for pipe laying. NavView maintains a local Pipelines.xml file in the Local\[Station]\Working folder. Pipelines are also maintained in the NavView database used for distributed systems (see Network Services section).

If Rolls and Privileges are enabled, the following are what is allowed for each role:

Roles	Privileges
Not Logged In	Cannot add, load, import, edit or remove pipelines
User	Can add, load, import, edit pipelines but cannot remove pipelines
Online/Supervisor/ Administrator	Can add, load, import, edit and remove pipelines

9.2 Pipelines Window

The Pipelines window is opened by clicking on the Pipelines button in the Files section of the Home Ribbon Tab (see Figure 9-1) or project Explorer view (see Figure 9-2). This window provides access to all Pipelines for creating and editing (see Figure 9-3)

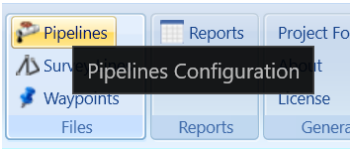


FIGURE 9-1 PIPELINES - HOME RIBBON TAB

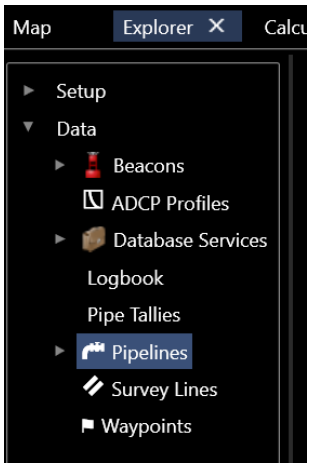


FIGURE 9-2 PIPELINES – PROJECT EXPLORER VIEW

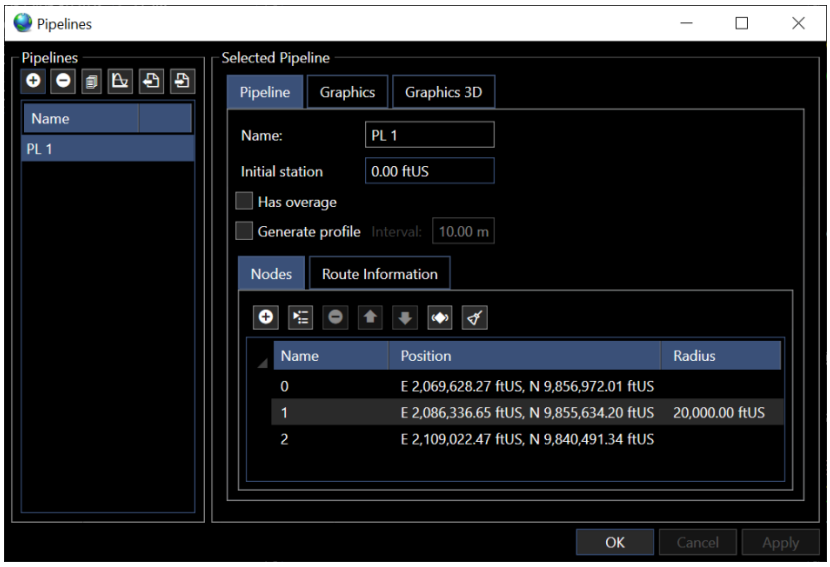


FIGURE 9-3 PIPELINES - MANAGEMENT WINDOW

The Pipelines management window (shown in Figure 9-3) consists of the following elements:

1. **Pipeline List**
   This lists the pipelines that currently loaded in NavView.
2. **Pipelines Toolbar** 
   The pipelines toolbar provides the means to manipulate the pipelines list as a whole, but not the individual settings of each pipeline.

    Click to add a pipeline

    Click to remove the selected pipeline. A prompt will appear asking for confirmation before deletion of the pipeline

    Click to create a copy of the selected pipeline. The new pipeline will have the same name with (Copy) appended

Note: Overage loops are not copied

    Click to create alignment route from multiple segments in the selected pipeline

    Click to export the selected pipeline to a file

    Click to import a pipeline from a text file
3. **Selected Pipeline**
   This displays the details of the selected pipeline for review and editing.
   - **Pipeline Tab**
     - **Name:** Name assigned to the pipeline
     - **Initial Station:** Offset applied to the stationing. For instance, if the stationing starts at an arbitrary point after the start of the route which needs to be tracked, this feature allows correct stationing in NavView

- **Has Overage:** Allows overages to be configured and added to pipeline
- **Generate Profile:** Generates a 3D model of the pipeline in the 3D map
- **Interval:** Spacing along pipeline the DTM is queried to generate the profile

- **Nodes Tab**

  Allows for editing of the nodes in the pipeline. This view consists of the following elements:

  - **Name:** Name of the node. The name is displayed on the map for easy interpretation. This is optional
  - **Position:** Position of the node can be edited by clicking in this column
  - **Radius:** Radius of the node. Entering a radius greater than 0 makes the node into an intersection point, for which a curve will be calculated along with a Point on Curve (PC) at the start of the curve and a Point on Tangent (PT) at the end of the curve
  - **Nodes Toolbar** 

    Used for adding, removing, and sorting nodes

     Adds a new node to the bottom of the nodes list

     Inserts a new node above the currently selected node

     Removes the currently selected node

     Moves the currently selected node up in the list

     Moves the currently selected node down in the list

     Reverses the Node order

     Validate the route, checks for any errors in the route data

- **Route Information Tab**

  The Route Information tab is shown below in Figure 9-4. This provides details on the entire route. If a radius is entered for a node in the Nodes tab, NavView will consider that point an intersection point, and will generate a curve segment which consists of a beginning of curve and tangent point, based on the specified radius.

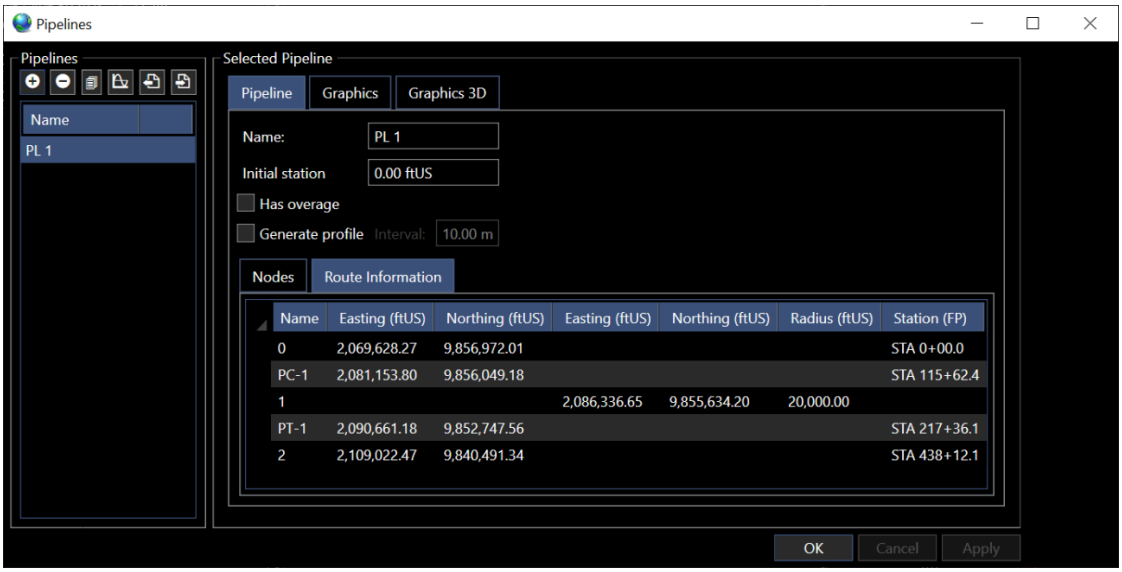


FIGURE 9-4 PIPELINES - ROUTE INFORMATION TAB

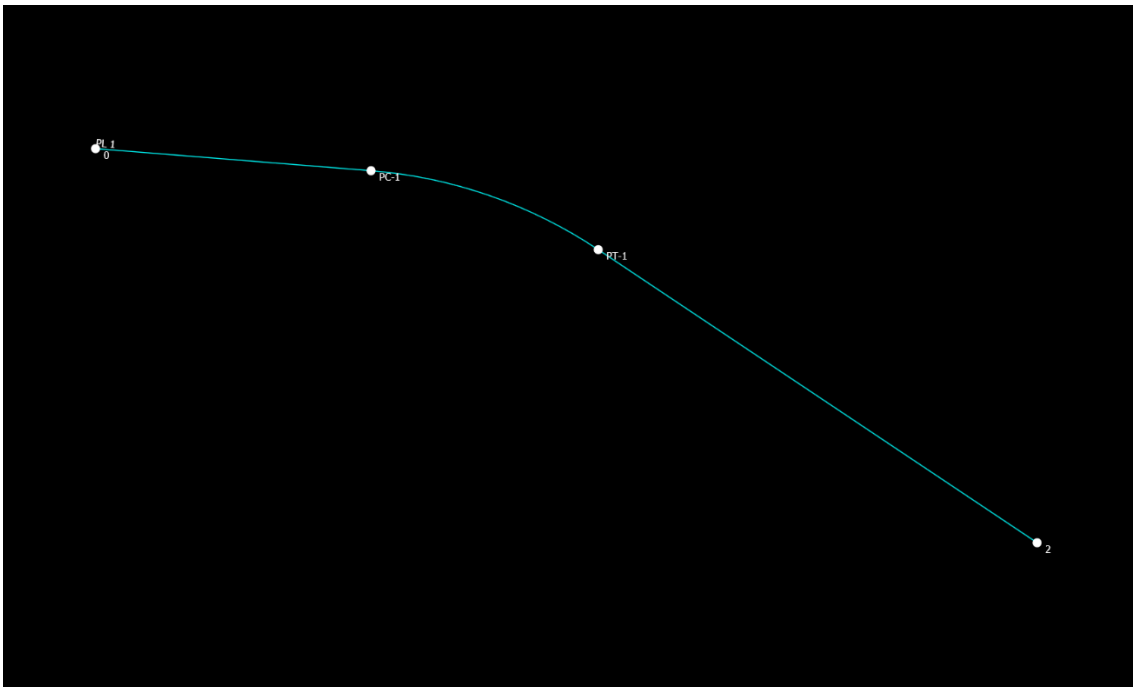


FIGURE 9-5 PIPELINES - CURVE ON MAP

Figure 9-5 shows a curve represented on a map display. Note that the curve point (PC) and the tangent point (PT) take the name of the intersection point node after a dash. In this example the intersection point is called “1”, so “PC-1” and “PT-1” are generated.

The curve points are automatically generated using the intersection point and the radius and cannot be edited.

- **Node Details**
  Clicking on a node in the Route information tab opens a node details window. The node details window is based on the type and location of the node that is selected and provides information about the segments connected to that node. The two types of segment details views are shown below in Figure 9-6

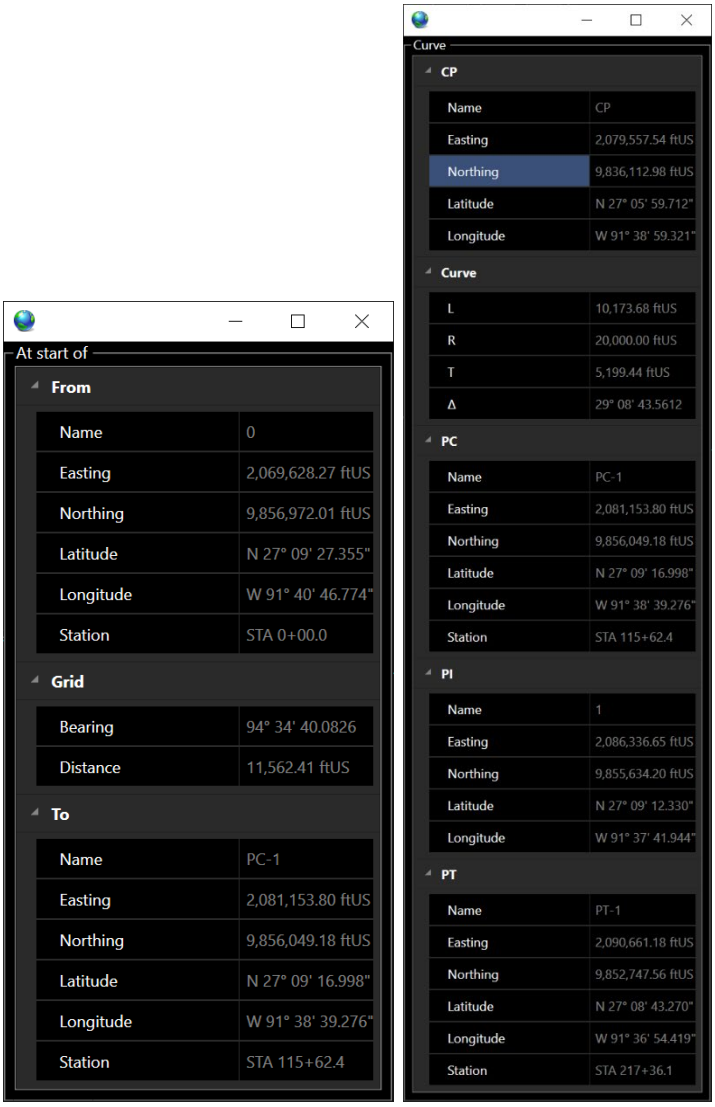


FIGURE 9-6 PIPELINES - LINE AND CURVE SEGMENT DETAILS

- **Overages Tab**
  The Overages Tab (see Figure 9-7) is available when the “Has Overages” has been checked. This view allows overages to be configured and added to route. This view consists of the following:

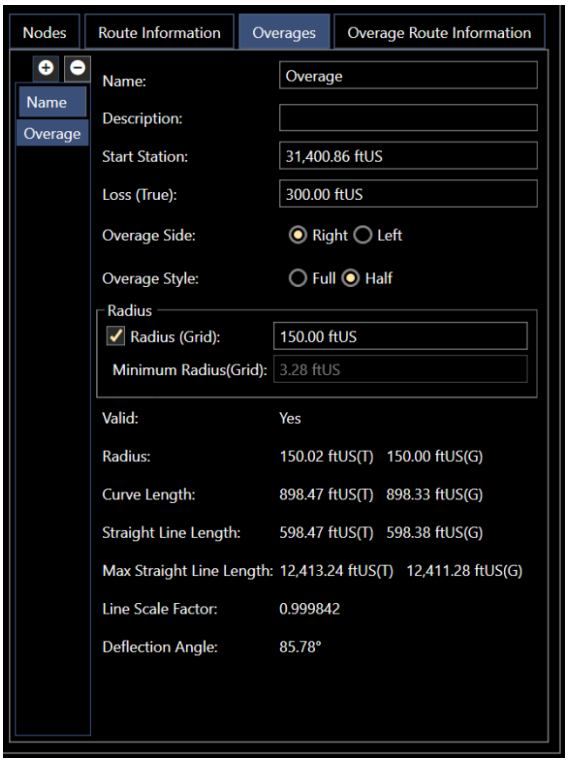


FIGURE 9-7 PIPELINES - OVERAGES TAB

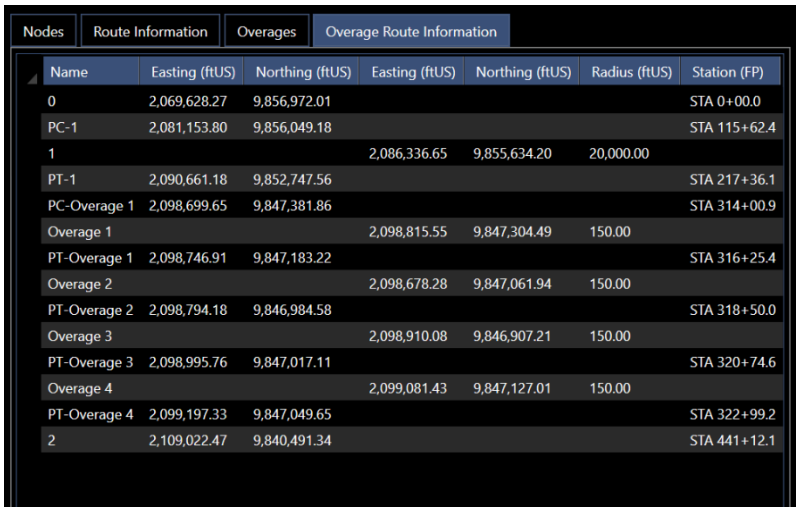
- **Name:** Name assigned to the overage
- **Description:** Description assigned to the overage
- **Start Station:** Start station of the overage (along line distance)

Note: Overage loops cannot be added on a curve.

- **Loss (True):** Distance to lose from pipeline/cable
- **Overage Side:** Side of the pipeline the overage is to go at the start
- **Overage Style:** Assign half for overage to be applied to one side., assign full for overage to be distributed evenly on both sides
- **Radius:** Assign radius for overage to be applied

- **Overage Route Information Tab**

  The Overage Route Information tab is shown below in Figure 9-8. This provides details on the entire route with added overage



Name	Easting (ftUS)	Northing (ftUS)	Easting (ftUS)	Northing (ftUS)	Radius (ftUS)	Station (FP)
0	2,069,628.27	9,856,972.01				STA 0+00.0
PC-1	2,081,153.80	9,856,049.18				STA 115+62.4
1			2,086,336.65	9,855,634.20	20,000.00	
PT-1	2,090,661.18	9,852,747.56				STA 217+36.1
PC-Overage 1	2,098,699.65	9,847,381.86				STA 314+00.9
Overage 1			2,098,815.55	9,847,304.49	150.00	
PT-Overage 1	2,098,746.91	9,847,183.22				STA 316+25.4
Overage 2			2,098,678.28	9,847,061.94	150.00	
PT-Overage 2	2,098,794.18	9,846,984.58				STA 318+50.0
Overage 3			2,098,910.08	9,846,907.21	150.00	
PT-Overage 3	2,098,995.76	9,847,017.11				STA 320+74.6
Overage 4			2,099,081.43	9,847,127.01	150.00	
PT-Overage 4	2,099,197.33	9,847,049.65				STA 322+99.2
2	2,109,022.47	9,840,491.34				STA 441+12.1

FIGURE 9-8 PIPELINES - OVERAGE ROUTE INFORMATION TAB

- **Graphics Tab**
  In the Graphics tab, it is possible to control all aspects of the visibility of the line, nodes, and associated text items. The Graphics display is shown below in Figure 9-9

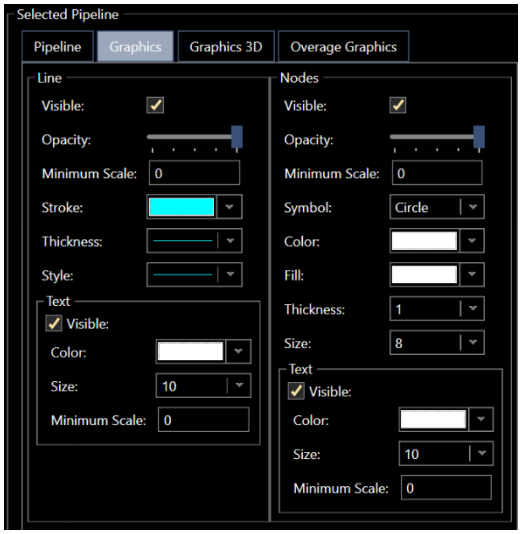


FIGURE 9-9 PIPELINES - GRAPHICS TAB

Note: The Minimum Scale setting is based on the Map view scale as displayed in the Map views when the Display scale bar option is enabled (see Windows section). As the Map view is zoomed in, the scale increases, as it is zoomed out the scale decreases. The pipeline will display when the scale is greater than the Minimum Scale setting.

- **Graphics 3D Tab**
  In the Graphics 3D tab, it is possible to control all aspects of the visibility of the line, line color and line diameter. The Graphics 3D display is shown below in Figure 9-10

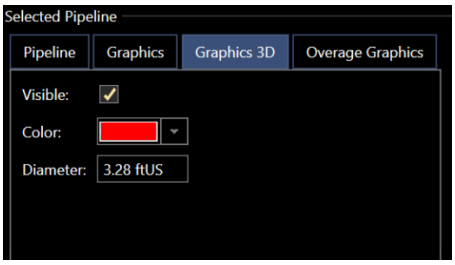


FIGURE 9-10 PIPELINES - GRAPHICS 3D TAB

- **Overage Graphics**
  In the Overage Graphics tab, it is possible to control all aspects of the visibility of the line, nodes, and associated text items. The Graphics display is shown below in Figure 9-11

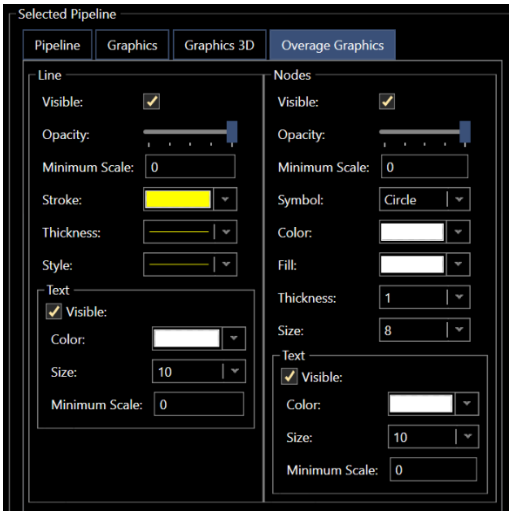


FIGURE 9-11 PIPELINES - OVERAGE GRAPHICS TAB

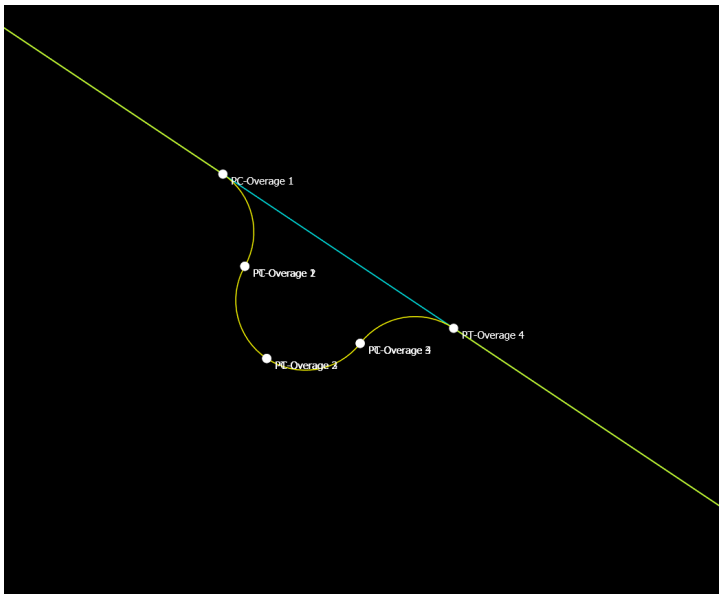


FIGURE 9-12 PIPELINES - OVERAGE LOOP – STYLE HALF EXAMPLE

9.3 Add a Pipeline

A pipeline can be added in several ways, from the map and pipelines window.

9.3.1 Add a Pipeline from the Pipelines Window

1. Open the Pipelines window from the Home Tab or from the project Explorer view.
2. Click the  button.
3. A pipeline is created and displayed in the selected pipeline view.

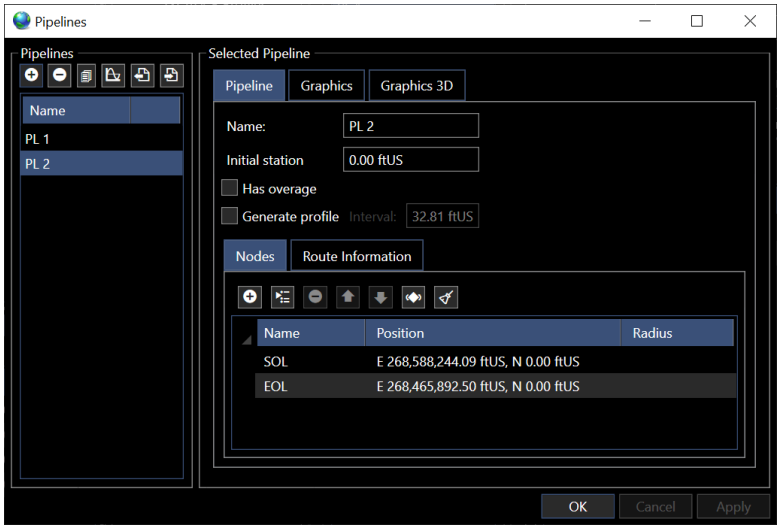


FIGURE 9-13 PIPELINES – PIPELINE ADDED

4. Edit the new pipeline as required.
5. Click **Apply** to save the changes but keep the window open. Click **Cancel** to discard changes and keep the window open or click **Ok** to save the pipeline and close the window.

9.3.2 Add a Pipeline from the Map View

1. In a Map window, activate the Multi-Point Coordinate Picker  or Ruler  (see Map Window in the Windows section for details)
   a. Create at least two points in the Map
   b. To create a pipeline, right mouse click with the mouse over the line or line annotation and select **Copy To > Pipeline > New Pipeline**

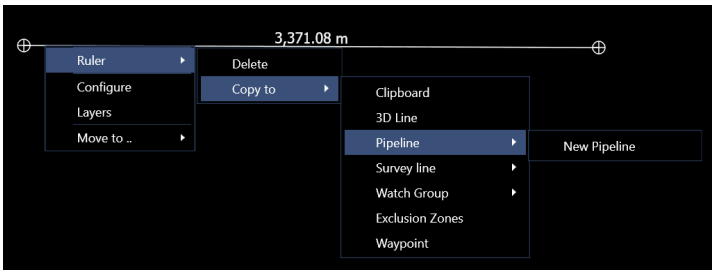


FIGURE 9-14 PIPELINES - COPY TO PIPELINE

c. The Configure Pipeline window will appear with the newly created pipeline selected for review and editing

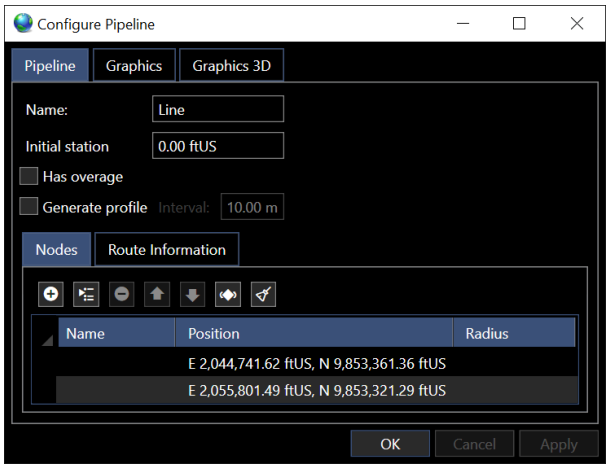


FIGURE 9-15 PIPELINES - COPY TO - CONFIGURE PIPELINE WINDOW

2. In the Map window, select an existing pipeline from the map background by mouse right click with the pointer on the pipeline.
   a. From the pop-up menu select **Convert .... Polyline to > Pipeline**

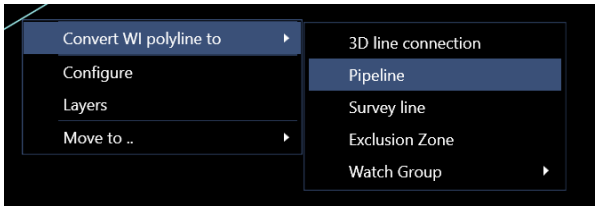


FIGURE 9-16 PIPELINES - CONVERT POLYLINE TO PIPELINE

   b. Click **Okay** in Deviation Report popup. The Configure Pipeline window will appear with the newly created pipeline selected for review and editing

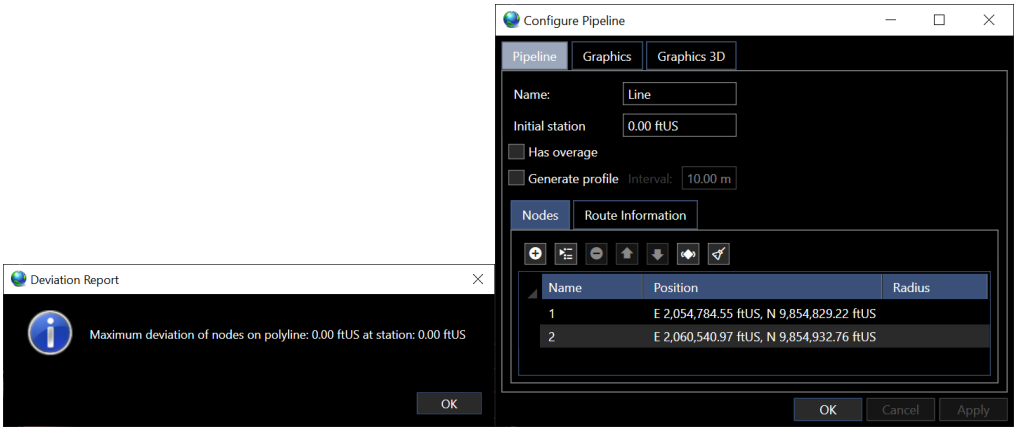


FIGURE 9-17 PIPELINES - CONVERT TO – CONFIGURE PIPELINE

3. Click **OK** to accept the pipeline and add it to Pipelines (if the pipelines window is open, you will see the line added to the bottom of the list)
4. Click **Cancel** to discard the pipeline.

9.4 Create a Route Alignment from a Pipeline

The route alignment tool generates a pipeline with curves given a pipeline that does not contain curves.

1. Open the Pipelines window from the Home Tab or from the project Explorer view.
2. Select the pipeline that is to be the base for the route alignment.
3. Click the  button.
4. When prompted to enter an external distance, enter a value for the mid ordinate to use for calculating the curves to apply and click OK.

FIGURE 9-18 PIPELINES - CREATE ALIGNMENT – EXTERNAL DISTANCE

Note: External distance entered will be used to calculate curves at all tangent IP's.

5. A new pipeline will be generated with the name of the base pipeline with the "-Alignment-X u" where X is the mid ordinate distance used and u is the units with curves added to the nodes (see Figure 9-19)

Note: If a curve with the entered mid ordinate value is not possible due to the length of the associated segments, curve(s) will be added such that sequential PT (Point on Tangent or end of curve) and PC (Point on Curve or start of curve) are coincidental.

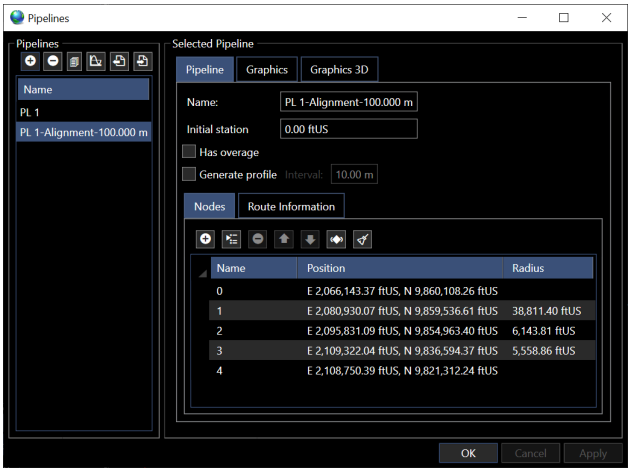


FIGURE 9-19 PIPELINES - CREATE ALIGNMENT – ALIGNMENT ADDED

9.5 Remove a Pipeline

1. Open the Pipelines window from the Home Tab or from the project Explorer view.
2. Select an existing pipeline.
3. Click the  remove button.

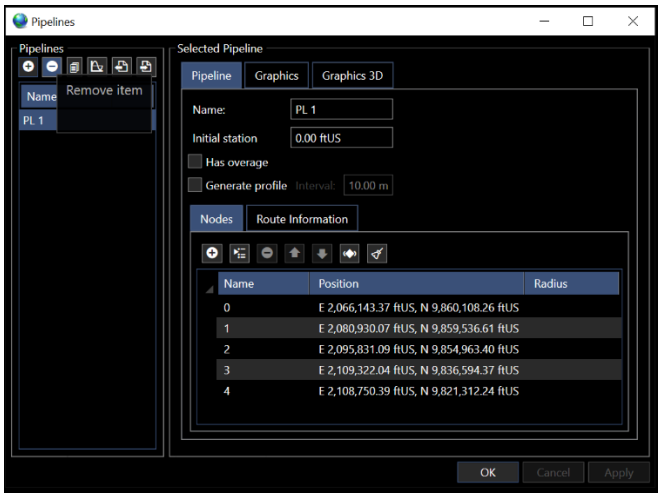


FIGURE 9-20 PIPELINES - REMOVE PIPELINE

9.6 Edit a Pipeline

Pipelines can be edited from the pipelines window or from the map view. These operations are described below.

9.6.1 Edit a Pipeline from the Pipelines Window

1. Open the Pipelines Window from the Home Tab or from the project Explorer view.
2. Select the pipeline to be edited.
3. Edit the pipeline as required. The pipeline can be edited using the  pipeline editing toolbar.
    - Add Button to add a new node to the pipeline
    - Insert Button to the insert a node above the selected node
    - Remove Button to remove the selected node from the list
    - Move Up Button to move the selected node up one position
    - Move Down Button to move the selected node down one position
    - Reverse Node Order Button to reverse the Node order of the survey line
    - Validate the Route Button to check the route for errors
4. Click **Apply** to save the changes and keep the window open. Click **Ok** to save the changes and close the window or click **Cancel** to discard the changes but keep the window open.

9.6.2 Edit a Pipeline from the Map View

1. Right click on a pipeline in the Map View to bring up the Pop-Up menu (see Figure 9-21)

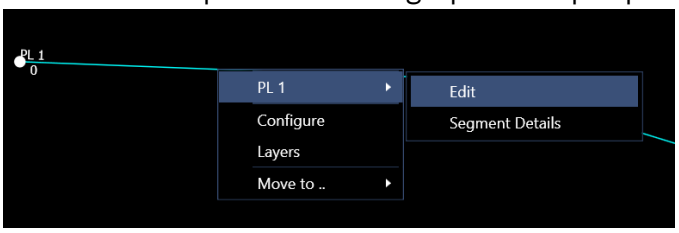


FIGURE 9-21 PIPELINES – MAP EDIT - POP-UP MENU

2. Click **Edit** to open the Configure Pipeline window (see Figure 9-22)

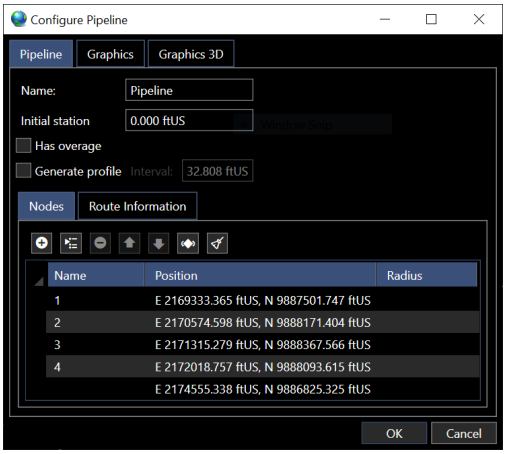


FIGURE 9-22 PIPELINES - CONFIGURE PIPELINE WINDOW

Note: In addition, the pipeline nodes are highlighted with grips which can be selected and dragged (see Figure 9-23)

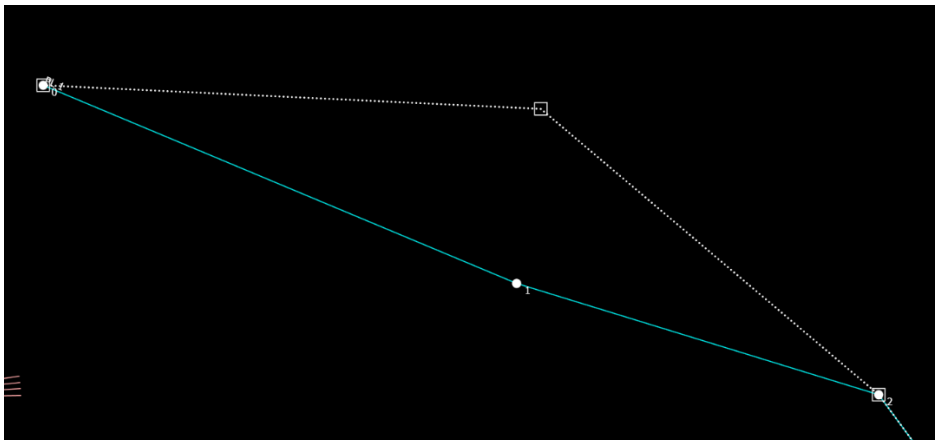


FIGURE 9-23 PIPELINES – MAP EDIT - PIPELINE NODE GRIPS

3. Drag a node to the desired location, and the node coordinates will be updated in the Configure Pipeline Dialog when closed.
4. Right clicking on the line while in Editing Mode will display a context menu with an Insert Node option. Click this option to insert a new node at the mouse coordinates (see Figure 9-24)

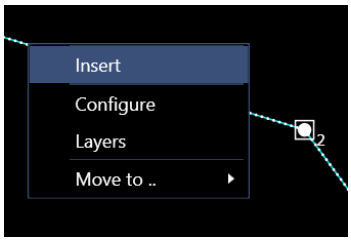


FIGURE 9-24 PIPELINES – MAP EDIT - INSERT NODE POP-UP

5. Right clicking on a node while in Editing Mode will display a context menu with a Remove Node option. Click this option to remove the node (See Figure 9-25)

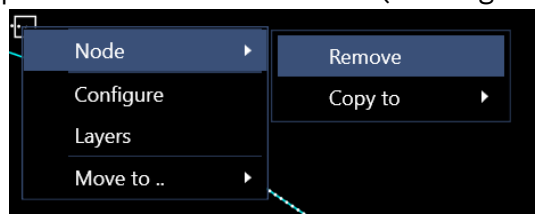


FIGURE 9-25 PIPELINES – MAP EDIT – REMOVE NODE POP-UP

9.7 Export Pipelines

Pipelines can be exported from the Pipelines Window to a text file.

1. Open the Pipelines Window from the Home Tab or from the project Explorer view.
2. Select one single pipeline.

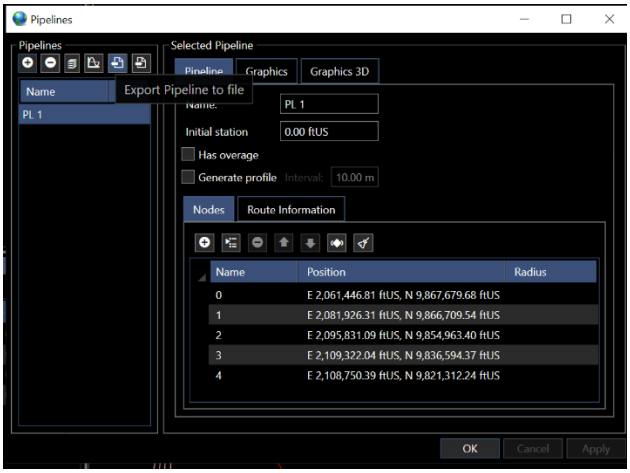


FIGURE 9-26 PIPELINES – EXPORT PIPELINE TO FILE

3. Click the Export Button, this will open an export configuration dialog (see Figure 9-27)

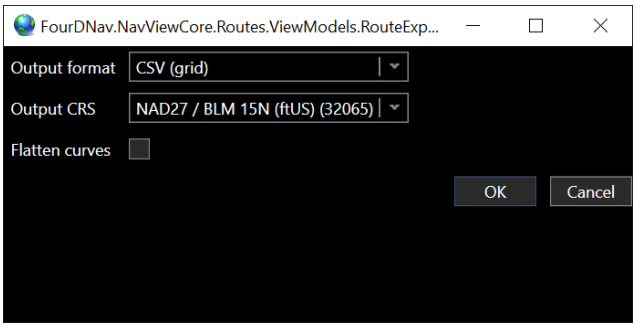


FIGURE 9-27 PIPELINES – EXPORT CONFIGURATION DIALOG

4. Select **Output format**
   - **CSV (grid):** The file contains one line for each node in the pipeline route in the following format: Node Name, Easting, Northing and Radius
   - **CSV (geo):** The file contains one line for each node in the pipeline route in the following format: Node Name, Latitude (dd.dd……), Longitude (dd.dd……) and Radius
   - **Navipac (.rln):** File contains one line for line name and one line for each node Easting, Northing
   - **Route Exchange Format (.rtz):** Format is latitude (dd.dd……) and longitude (dd.dd……) and radius in meters
5. Select **Output CRS**
6. **Flatten curves:** If selected, curves are approximated using straight line segments
7. Click **Okay** to open a save file dialog. Select a location and filename and click **Save** to export the pipeline. Click **Cancel** to abort the operation or to exit after saving exported file

9.8 Import Pipelines

The Import option allows the user to load a pipeline route from file and add this to existing **Pipelines**. On a networked system, this will result in the updating of the pipelines for all NavView systems on the network.

NavView supports custom import of any ASCII text data in a file. The input settings are configurable for delimited or for offset from start of line, as described below.

1. Open the pipelines Window from the Home Tab or from the project Explorer view.
2. Click the  Import Button to launch the Open file dialog.
3. Browse to the file to import, select and click Open.
4. The **Import Route Data** wizard is launched on the first page, File Settings (see Figure 9-28)

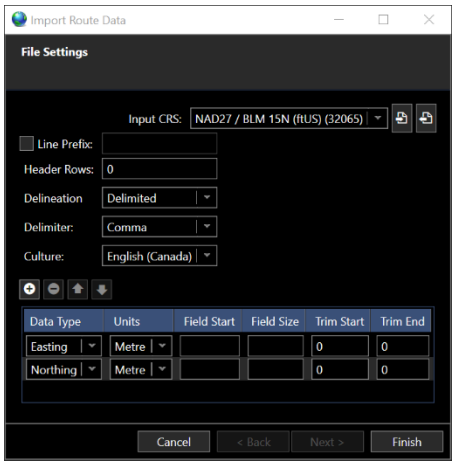


FIGURE 9-28 PIPELINES - IMPORT ROUTE DATA - FILE SETTINGS

- **Input CRS:** From the drop-down list of Horizontal CRSs present in NavView, select the CRS the points to be imported are on
- **Load Settings:** Click to load saved route import settings from a file
- **Save settings:** Click to save the current route import settings to a file
- **Line Prefix:** Check the box if there is a line prefix and enter the prefix in the box
- **Header Rows:** If a header is present in the file, enter the number of header rows
- **Delineation:** Select the data format, Delimited or Fixed Length
- **Delimiter:** Select the field delimiter from the respective drop-down list options
  - Comma
  - Space
  - Tab
  - Custom: Selection of this option enables entry of the delimiter character
- **Culture:** From the drop-down list select the country numerical format

5. Click the button to add an entry to the data grid for every field in the record, whether the field is to be used in the import or not.

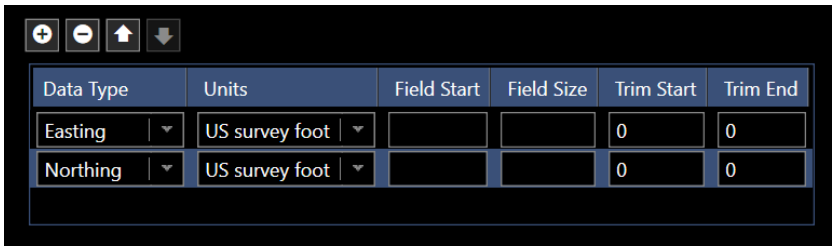


FIGURE 9-29 PIPELINES - IMPORT ROUTE DATA – ADD DATA FIELDS

- **Data Type:** Select the data type contained in the field, if the field is not to be used, select **Ignore**
- **Units:** Select the units or format that applies to the field and data type

- If **Delimiter** is Fixed Length
  - **Field Start:** Enter the zero-based index of the start of the field, e.g. the index of the first character in a record is 0, the index of the 10th character is 9
  - **Field Size:** Enter the length of the data in the field
- If **Delimiter** is comma, tab, space or custom
  - **Trim Start:** Enter the number of characters to trim from the start of the field value, e.g. if a field containing Depth contains “D 567.89”, 2 would be entered to trim the “D“ before reading the value
  - **Trim End:** Enter the number of characters to trim from the end of the field value, e.g. if a field containing Depth contains “567.89 D”, 2 would be entered to trim the “D“ before reading the value

Note: When using fixed length and Field Size, use the setting of the field start and field size to Trim unwanted start and end characters.

6. To **Move** a selected field up or down to re-order its place in the record, select the field and click either the  or  button
7. Click **Finish** to import the pipeline route and append them to the existing pipelines in NavView.