TECHNICAL DOCUMENTATION FRONT SHEET

BP EXPLORATION (SHAH DENIZ) LIMITED

SHAH DENIZ STAGE 2 PROJECT

SD2 PODS GIS User Guide

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1 General

1.1 Introduction

The BP Shah Deniz field is a High Pressure (HP) gas-condensate development located off the deepwater shelf in the Azerbaijan sector of the Caspian Sea, approximately 100km south of Baku.

The development of the Shah Deniz second stage consists of a subsea production system comprising subsea trees and manifolds located on the north, west and east flanks of the field development, and will be installed in water depths ranging from approximately 70m in the north to approximately 540m in the south east area of the field.

The wells and subsea manifolds (incorporating a HIPPS) making up each cluster are tied back via looped carbon steel flowlines to the fixed SDB-PR Processing platform. Each production flowline incorporates a Direct Electrical Heating System (DEH) for hydrate management. Two production control umbilicals per cluster are tied into the fixed SDB-QU Quarters and Utilities platform. Both platforms are located in approximately 95m water depth and are bridge-linked.

The produced fluids will be exported from the SDB-PR platform to the onshore Sangachal terminal via two separate gas pipelines and a single condensate pipeline. MEG is imported from the terminal to the SDB-PR platform via a pipeline piggy-backed to the condensate export pipeline.

The infield flowlines and export pipelines incorporate Subsea Safety Isolation Valves (SSIV), located in the platform area, which are controlled via SSIV umbilical's tied into the SDB-QU platform

The SDB-QU platform will be connected to the existing fibre optic telecommunications network.

1.2 Purpose

This document is a user guide for SD2 PODS GIS, the web-based GIS interface to the PODS and survey databases. It should be used to support initial training and as a reference guide for experienced users.

1.3 What is SD2 PODS GIS?

SD2 PODS GIS is a project specific version of Wood Group Kenny's NEXUS-GIS platform. This has the following key benefits:

- Key information from multiple sources and project phases are integrated within the single centralised PODS database. This through-life record of the pipeline system enables better informed design, more efficient construction and improved integrity management.
- The system is web-based so can be accessed by multiple project teams in different geographic locations, making information more readily available and improving collaboration. New project information is instantly available to all users.
- Information is presented through an intuitive map-based interface that allows the user to understand information about the pipeline system and its relationship with the surrounding environment and other external influences that are otherwise unknown.
- Dynamic information such as weather, vessel locations and valve status changes can be added to reduce time and costs of field operations whilst improving safety.

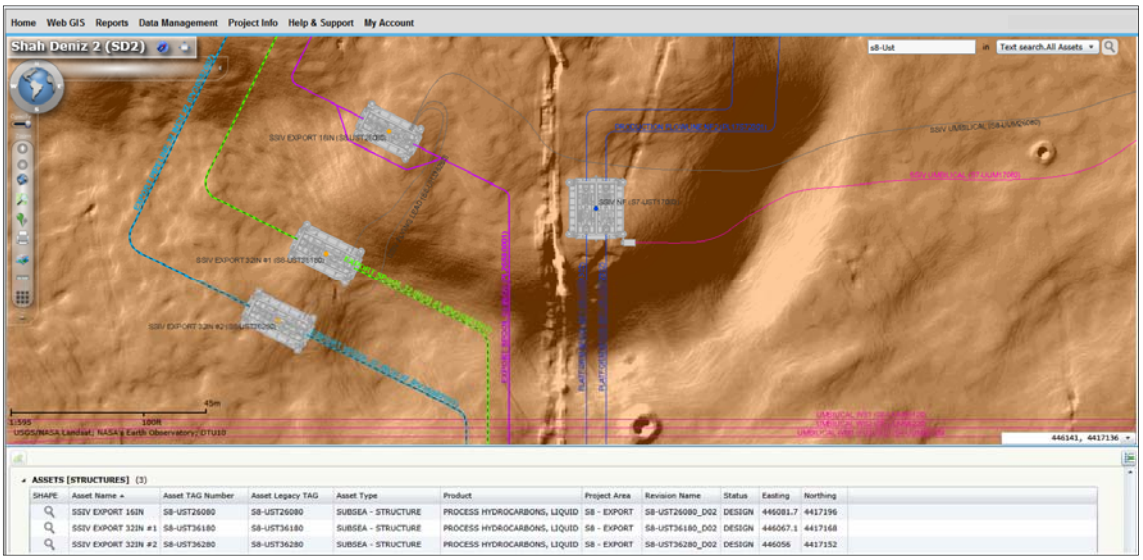


Figure 1: SD2 PODS GIS

1.4 What Information is Available?

SD2 PODS GIS is a key source of spatial information and can be used to answer many questions. Examples include:

- What are the depth, slope and seabed conditions at design locations?
- What are the local geohazards and how close are high risk areas and exclusion zones?
- Where are other existing services and seabed features located?
- Where have geotechnical and environmental samples been collected?
- What are the temperatures, pressures, span limits, pipe dimensions, coating requirements and other design criteria associated with a specific part of the pipeline?
- What are the tag numbers associated with an asset or where is a specific tagged asset located?
- What assets have been installed and how close are they to the design locations?
- How is the asset sitting on the seabed and what survey or video information is available?
- Where have incidents or reports of damage occurred?
- What inline inspections have been carried out and what is the status of any anomalies discovered?
- Where are other items from the same material batch or heat number installed?
- What other vessels are operating in the area and what are the exclusion zones, buffer areas and emergency evacuation routes?

It's also a key source of PODS information prior to installation activities. Examples of the questions that can be answered include:

- How many components have been manufactured with specific dimensions?
- What are the material properties of a specific heat?
- Where are pipes currently located or how many pipes are in a specific location?
- What components have been clad, coated, welded or fabricated?

SD2 PODS GIS covers the entire pipeline system from the Sangachal Terminal to the platforms and from the platforms to the wellhead xmas trees.

More information and functionality will be added as the project progresses. Please speak to a member of the SD2 PODS GIS team or email WGKSD2DMT@woodgroupkenny.com if you would like to discuss any specific requirements.

1.5 Abbreviations

Abbreviation/ Acronym	Description
AIS	Automatic Identification System
CSV	Comma Separated Values
DEH	Direct Electrical Heating
ESRI	Environmental Systems Research Institute
GIS	Geographical Information System
HIPPS	High-Integrity Pressure Protection System
HP	High Pressure
NEXUS-GIS	Wood Group Kenny's Geographical Information System
PDF	Portable Document Format
PODS	Pipeline Open Data Standard
SDB-QU	Shah Deniz Bravo – Quarters & Utilities (Platform)
SDB-PR	Shah Deniz Bravo – Production & Riser (Platform)
SSIV	Subsea Safety Isolation Valve
XML	Extensible Markup Language

Table 1: Abbreviations

2 Access Requirements

2.1 User Account

A user account is required to access SD2 PODS GIS. Many people will automatically be assigned an account based on their project role. Contact details for new account requests are provided on the Help & Support page (Section 7).

2.2 Internet Connection

SD2 PODS GIS requires an internet connection. For improved performance, a good quality broadband connection is recommended. If you are using the system from a remote office or vessel, performance may be slower. Custom settings can be applied to improve performance for such users - please contact the Data Management Team for more information (Section 7).

3 Login

3.1 Supported Web Browsers

Microsoft Internet Explorer v11 and above is the only web browser that is supported. Other web browsers such Mozilla FireFox can be used but are not supported. Google Chrome cannot be used for viewing Web GIS Maps.

3.2 Web Address

To launch SD2 PODS GIS, please go to:

https://sd2-pods-gis.woodgroup.com/NexusGIS/v2.3/Main/Portal/SD2/

The following page will launch:

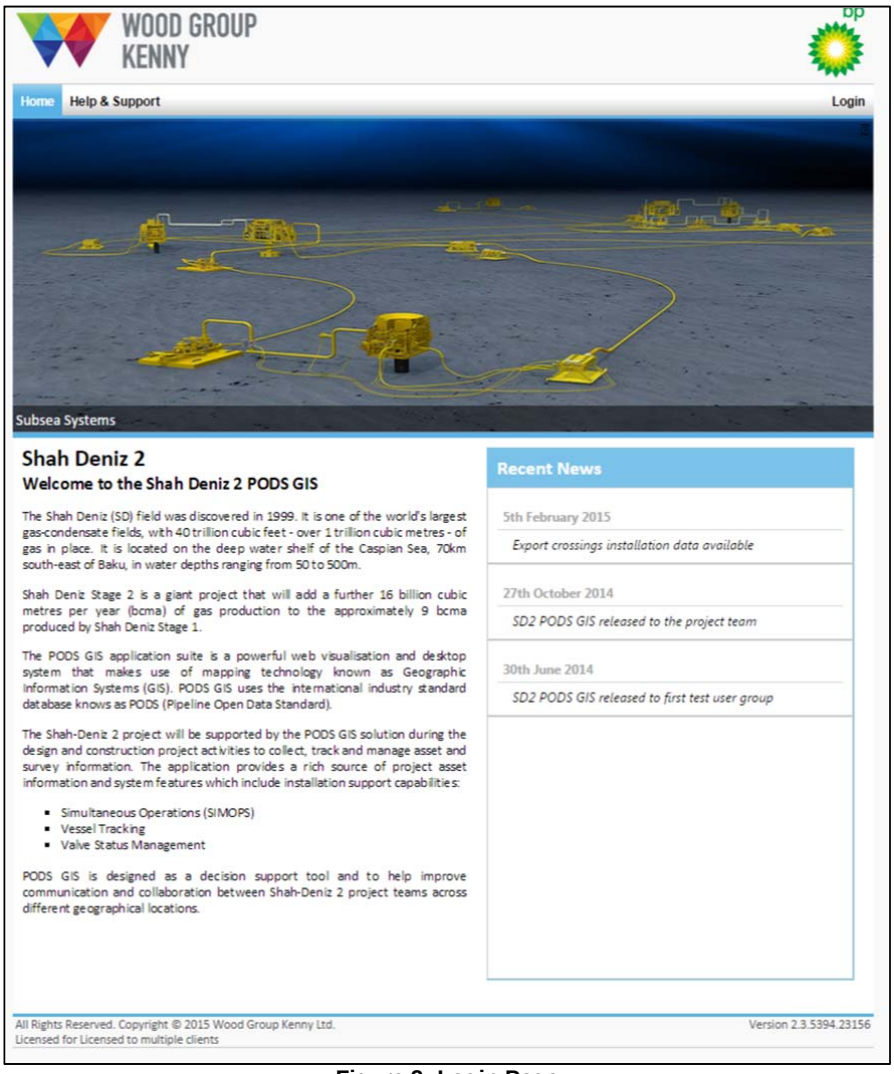


Figure 2: Login Page

3.3 Login Page

The 'Home' page at the login stage introduces the Shah Deniz 2 project and the SD2 PODS GIS system.

Recent news about SD2 PODS GIS, such as system and data updates appears on the right hand side of the screen.

3.4 Login

Click 'Login' at the top right corner of the window. WGK personnel will be automatically logged in if they are connected to the company network. External users will need to enter their email address and the SD2 PODS GIS password provided by email when logging in for the first time.

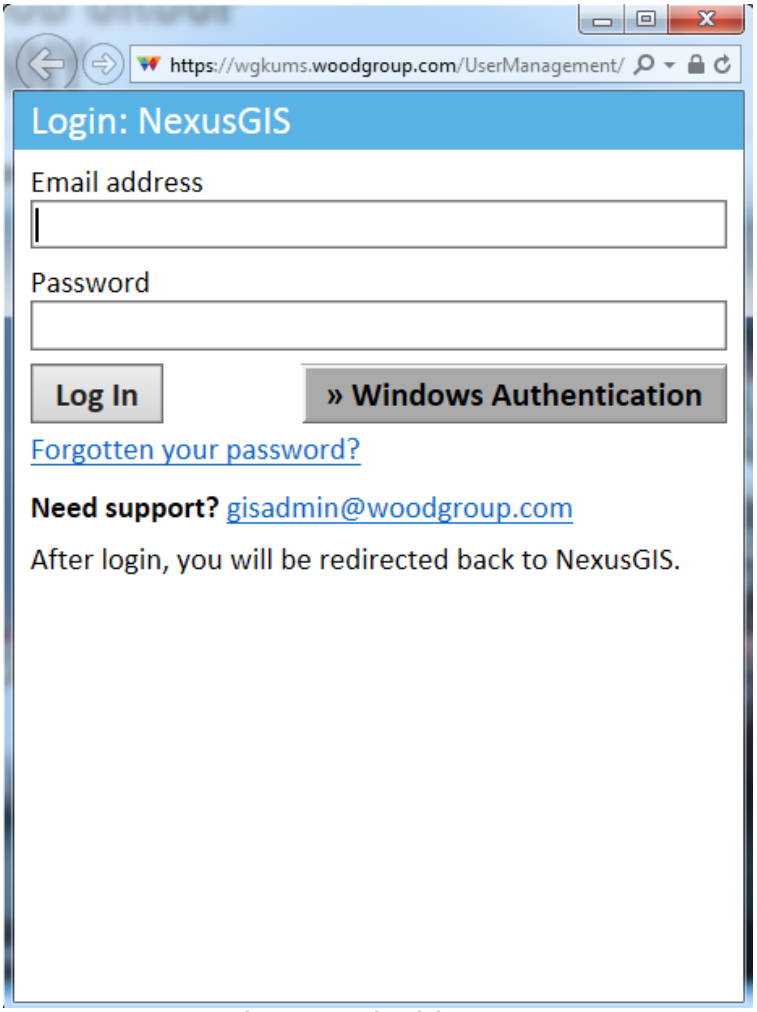


Figure 3: Login Dialog Box

3.5 Home Page

After login, five menu options are available on the Home page – 'Web GIS', 'Reports', Project Info', 'Help & Support' and 'My Account'.

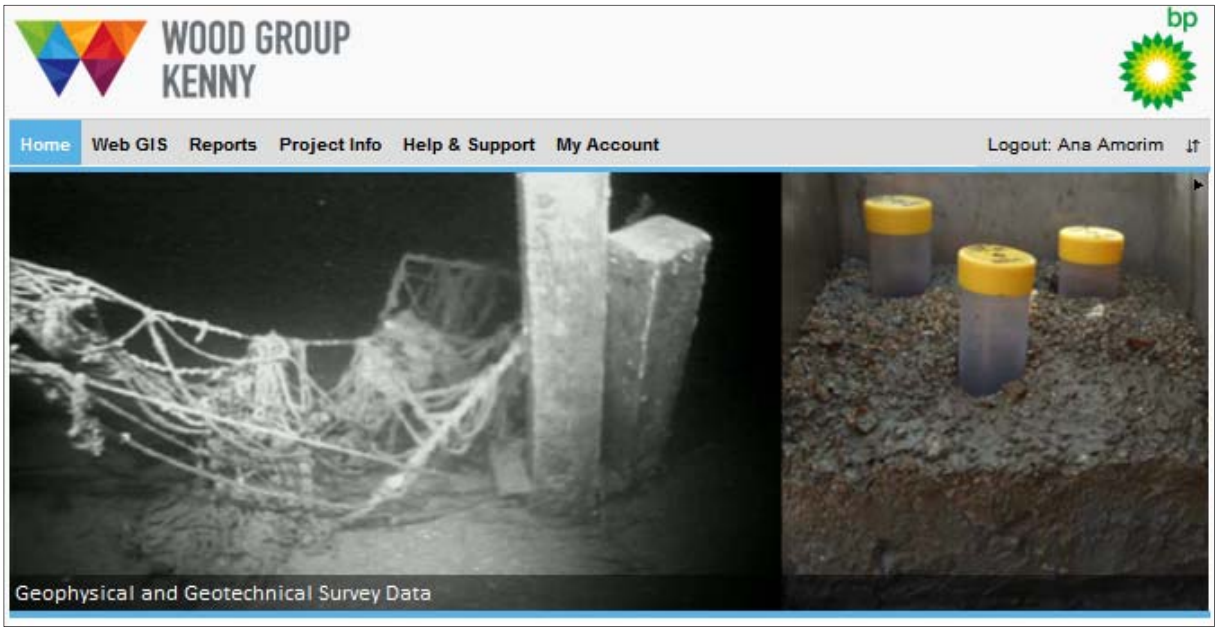


Figure 4: Home Page

'Web GIS' opens the map-based view where you can navigate around the project area, view different data layers, perform queries and many other map-based tasks (Section 4).

'Reports' opens the self-service reporting interface to access tabular data from the underlying PODS database (Section 5).

'Project Info' opens up a page displaying recent developments and news concerning the Shah Deniz field and the PODS GIS system (Section 6).

'Help & Support' the contact details for the GIS support team can be found here as well as documents, downloads and frequently asked questions relating to the system (Section 7).

'My Account' provides user account facilities such as contact details and password changes (Section 8).

4 Web GIS

4.1 Key Components at Loading

When you load the Web GIS page, the following key components are displayed:

1. **Map Window**: this provides a graphical view of the infrastructure and surrounding environment;
2. **Navigation Tools**: these tools enable you to navigate around the map;
3. **Toolbar Menu**: these tools enable you to interact with the map;
4. **Search Boxes**: these tools enable you to search for a specific asset or data type using a free text box or rectangle drawn on the map, and filter results from the drop down menu;
5. **Coordinate Boxes:** these display the map coordinates of the mouse pointer;
6. Vessel Tracking Panel: these tools control vessel tracking features.

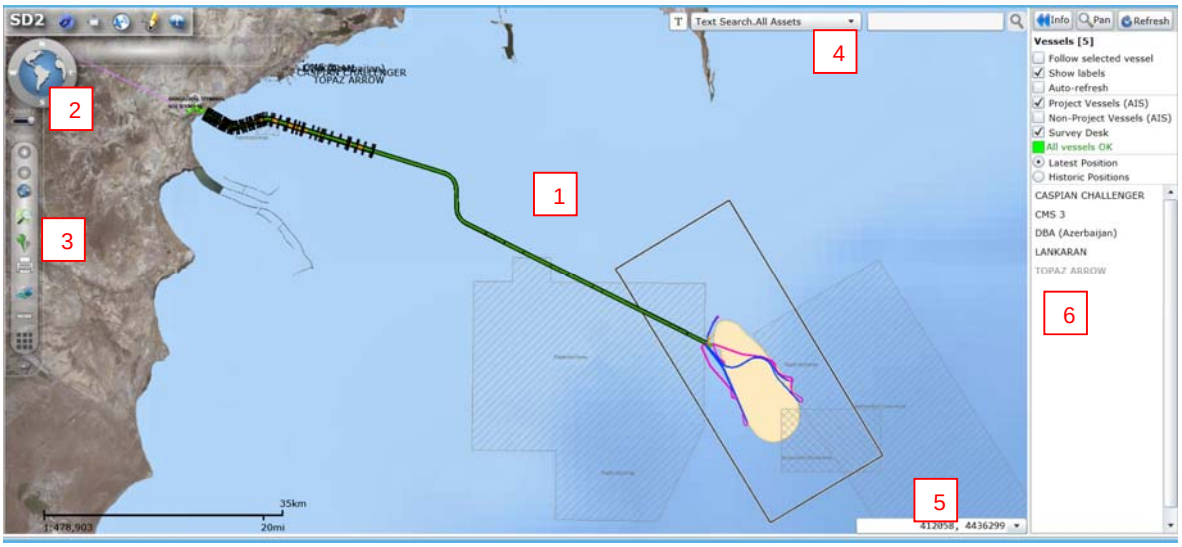


Figure 5: Web GIS Key Components

The following tools are available (they are discussed in more detail in the following sections):

	Toggle Navigation Tools: hides the navigation and toolbar menu		Zoom In: zooms into the map
	Toggle Fullscreen: extends the map window to fill the screen		Zoom Out: zooms out of the map
	Opacity slider: makes the navigation and toolbar menu semi-transparent		Full Extent: zooms to the full extent of the map

	Identify Tool: A quick way of finding additional information on features through clicking on them.
	SIMOPS Tool: Allows for the creation and sharing of simultaneous operation plans.
	Toggle Vessel Tracking Panel: show/hide the AIS vessel tracking panel
	Zoom to Coordinates Panel: zoom to defined coordinates in the Pulkovo or WGS 84 coordinate systems.

	Display Places and Locations: zoom to predefined map locations such as the platforms and manifold clusters. You can also create and save shortcuts to locations you frequently visit.
	Display Map Layers: turn map layers on and off, adjust layer transparency and save custom layer settings for your own tasks.
	Print Tool: prints the map with the extent, scale and layers as you're viewing on the screen. The title for the output map, paper format and printing style can all be customised by the user.
	Display Measure Tools: return map coordinates, depth and slope angles, measure line distances and areas on the map.
	Display Base Map: choose from a selection of pre-defined base maps, customised for different project teams and tasks.

The final element in the Toolbar is the page load bar which shows the percentage of the map page which has loaded. This can be collapsed from view by clicking the triangle icon to the right of the bar.

Figure 6: Page Load Bar

4.2 Map Tools

4.2.1 Map Navigation Control

The Map Navigation Control enables you to pan the map by clicking once on the compass bearings, or twist the map by holding down the mouse on the outer rim of the tool and dragging.

Figure 7: Map Navigation Control

You can also pan the map by hovering the mouse over the map, holding down the left mouse key and dragging.

4.2.2 Reset Map Twist

Clicking in the space to the left of the map navigation control will reset the map rotation back to North.

Figure 8: Reset Map Rotation

4.2.3 Opacity

The Opacity tool is useful if the navigation controls and map tools are covering an important part of the map but you still want to use them.

Hovering the mouse over the slider will change the pointer to a horizontal arrow. Holding the left mouse button down and dragging will move the slider left and right. This increases and decreases the opacity of the navigation controls and map tools.

Figure 9: Opacity Slider

4.2.4 Toggle Navigation Tools

The Toggle Navigation Tools button is useful if the navigation controls and map tools are covering an important part of the map and you do not need to use them.

Clicking once on this button will hide the navigation controls and map tools. Clicking again will reinstate them.

Figure 10: Toggle Navigation Tools

The map tools can also be collapsed from view by clicking on the triangle icon at the bottom of the toolbar.

4.2.5 Toggle Fullscreen

The Toggle Fullscreen button is a very useful feature as it maximises the map window by hiding the address bar, browser tools and other menu options.

Clicking once on this button maximises the map window. Clicking again or pressing the Escape key returns the map window to the normal view. Please note that the keyboard is disabled in fullscreen mode so toggle back to the normal view when entering information.

Figure 11: Toggle Fullscreen

4.2.6 Identify Tool

Figure 12: Identification Tool

The Identify tool is an easy way to find out more information about the assets or survey information held within the system. By left-clicking the 'Identification' tool button at the top of the screen a new window will open.

With the Identification tool window open you need to then click on the 'Point' button. With this activated you can then simply click on the feature you wish to know more about. The selected features are then displayed in the 'Feature window'. If you wish to clear your selection you can click the 'clear' button.

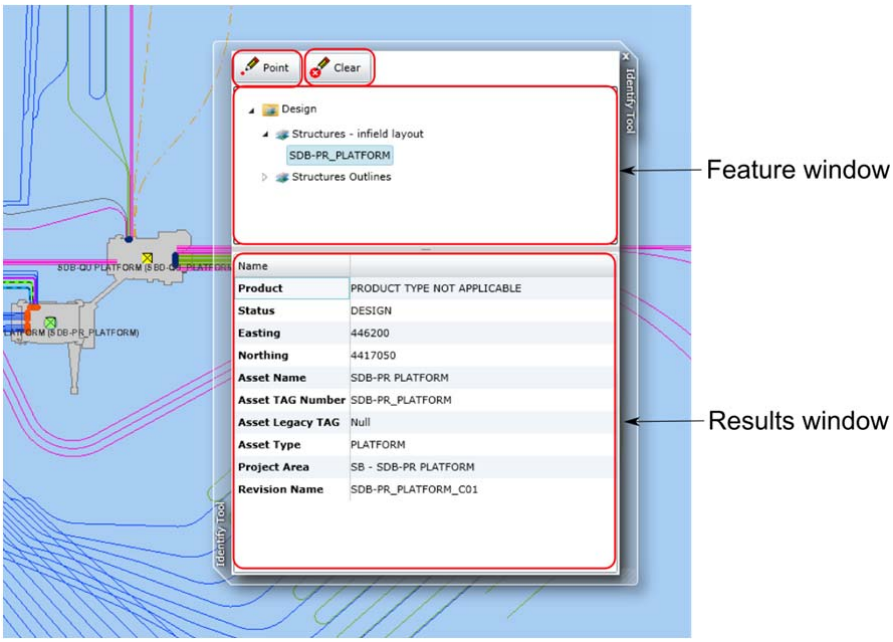


Figure 13: Identification Tool window

In the feature window your selection is automatically sorted between Design, Construction and Survey categories. These categories can be expanded by clicking on the small arrow to the left of it. Information about the item is then displayed in the 'Results window' at the bottom of the window.

4.2.7 Zoom Controls

The Zoom Controls enable you to zoom in and out of the map. Clicking once on the three tools identified below performs the following functions:

1. Zoom In
2. Zoom Out
3. Zoom to the Full Extent of the Map

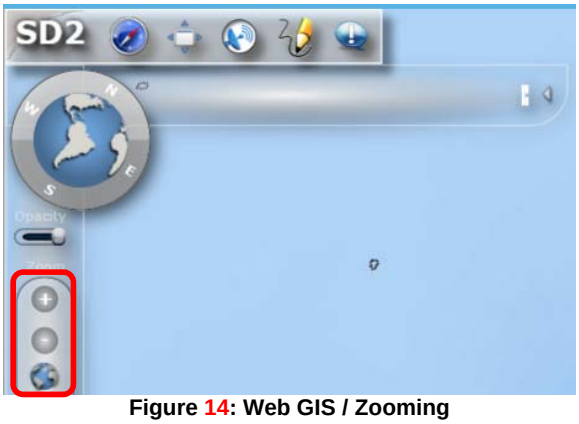


Figure 14: Web GIS / Zooming

You can also zoom in and out by hovering the mouse over the map and moving the mouse roller. Rolling forwards zooms in, rolling backwards zooms out. Centre the mouse on the area you wish to zoom in to or out from.

Double-clicking the left mouse button will zoom in to the map. Holding down the Shift key enables you to zoom in to a chosen area by holding down the left mouse button and dragging to draw a box.

4.2.8 Zoom to Coordinates

The 'Zoom To Coordinates' tool enables you to zoom to a map location based on projected Pulkovo 1942 Zone 9N or WGS 84 latitude and longitude coordinates.

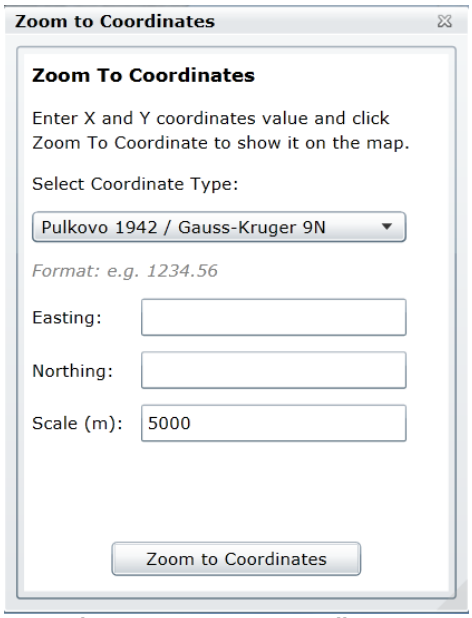


Figure 15: Zoom to Coordinates

Select the Coordinate Type from the dropdown list, enter the known coordinates into the relevant boxes, the required map scale (how far into the map to zoom) and click 'Zoom to Coordinates'.

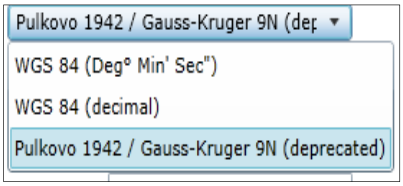


Figure 16: Supported Coordinate Systems

After zooming to coordinates it is possible to convert the known coordinates by selecting another Coordinate Type from the dropdown list.

It is also possible to zoom to coordinates using the coordinate box in the lower right corner of the map. Click on the coordinate box and type in the required coordinates to zoom to. The coordinate system can be changed by clicking on the dropdown arrow to the right of the coordinates.

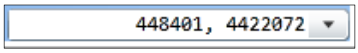


Figure 17: Coordinates Box

All tool windows can be moved by left click and dragging the top edge of the window and re-sized by left click and dragging the bottom right hand corner of the window. Tool windows are closed by clicking on the 'x' in the top right corner.

4.3 Display Places and Locations

The 'Display Places and Locations' tool enables you to zoom to a predefined or custom area of interest, commonly referred to as a bookmark.

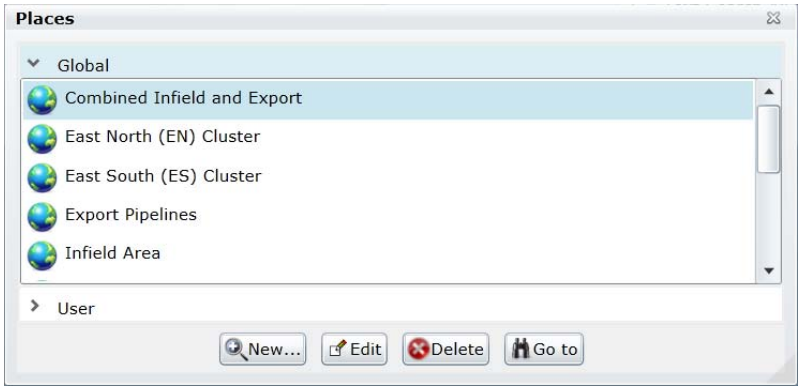


Figure 18: Places

4.3.1 Global Places

The places listed under 'Global' are managed by the SD2 PODS GIS Team and include well defined project areas, such as the North Flank (NF) Cluster below.

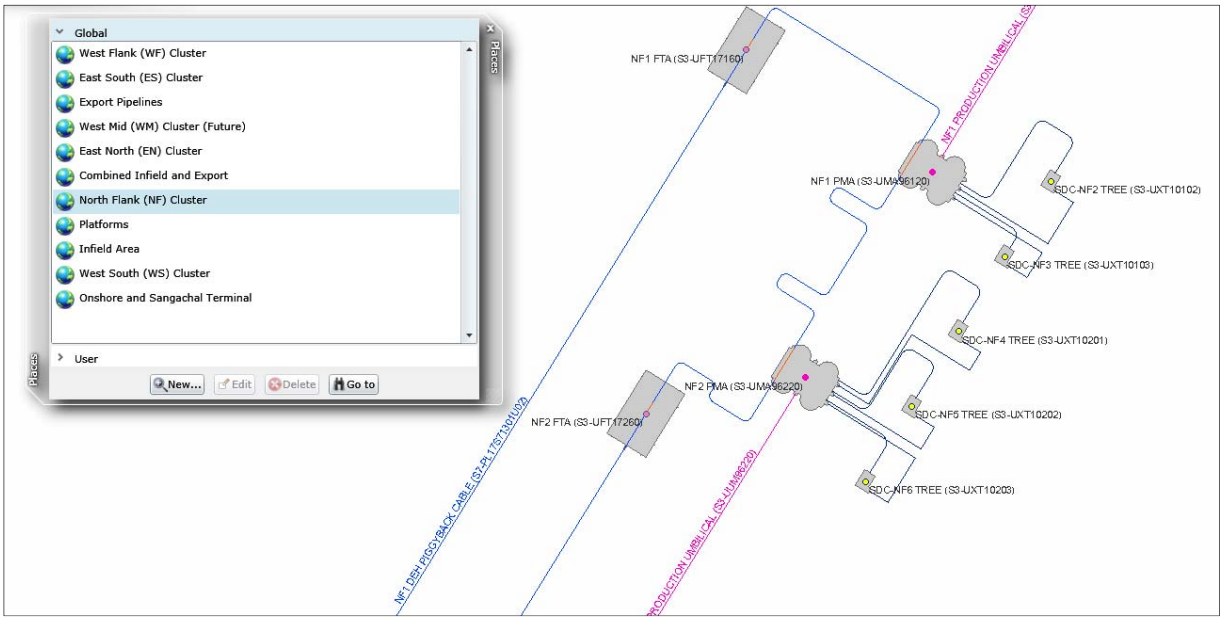


Figure 19: North Flank (NF) Cluster

New Global places can be added on request.

User Places

If you frequently visit a place on the map that isn't included in the global list, you can create your own custom place. To do this:

1. Navigate to the required place on the map
2. Click 'User'
3. Click 'New'
4. Enter a name for the place
5. Click OK

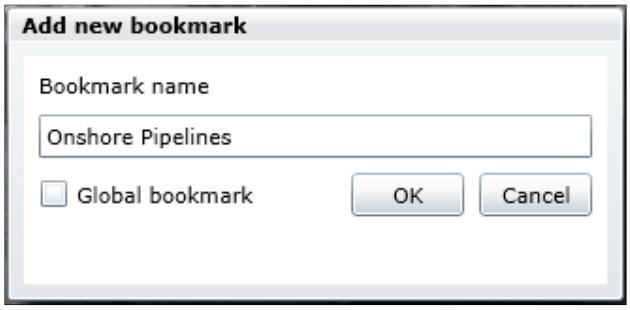


Figure 20: New User Place

The new place will be saved in the 'User' list and can be used time and again in the future.

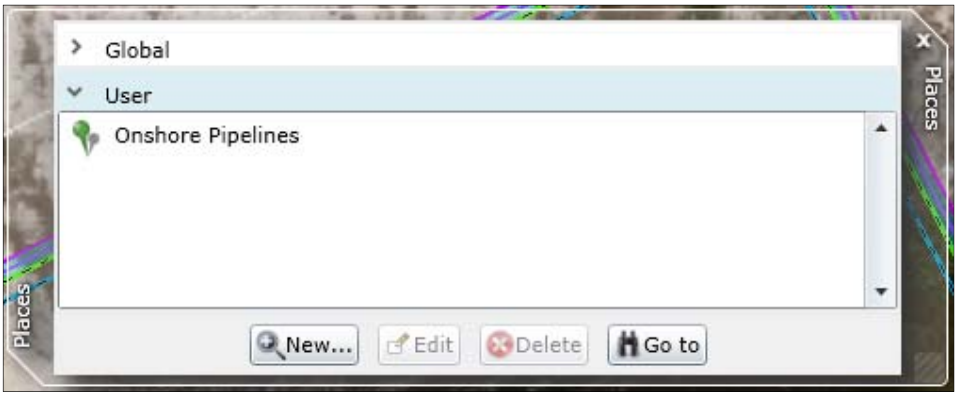


Figure 21: New User Place Example

The following example shows the extents of the 'Onshore Pipelines' place created above.

Figure 22: Example Place

4.4 Map Layers

The 'Display Map Layers' tool enables you to control which map layers are visible. It also acts as a legend to show the symbols for different map features.

Layer Visibility

Layers are currently organised into three main logical groups:

1. The Construction group contains as built information and as installed data associated with the different assets, such as crossing locations, span limits, pipe dimensions and coating requirements.
2. The Design group contains layout information and design data associated with the different assets, such as crossing locations, span limits, pipe dimensions and coating requirements.
3. The Background group contains information about existing facilities, wells, geohazards, boundaries and all survey data.

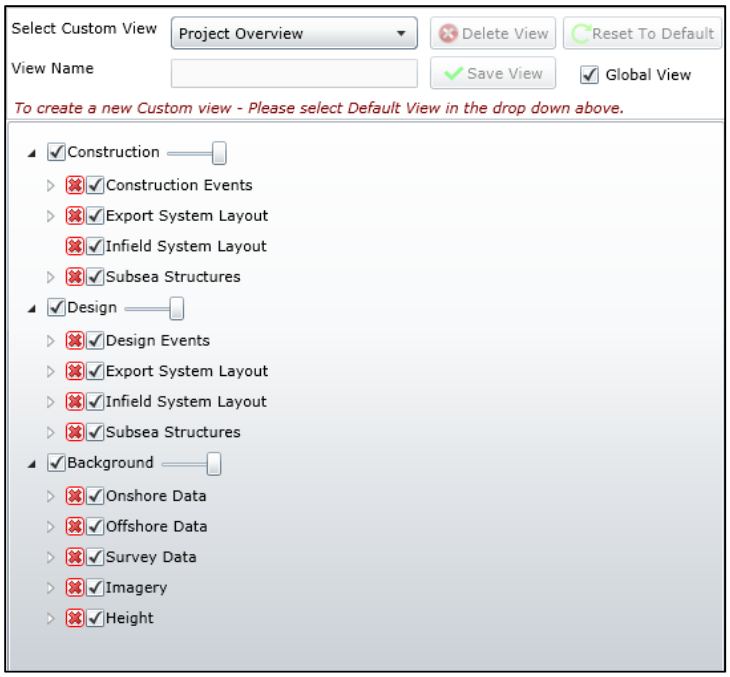


Figure 23: Map Layers

Groups and layers are expanded by clicking on the triangle icon to the left of the name. Often there are several levels of groups and sub-groups to organise the map layers. Groups are collapsed again by clicking the solid triangle icon .

Layers are switched on and off by clicking on the checkbox .

Layers can also be removed from the table of contents by clicking on the red cross . To return the layer settings to their original state or to reinstate a layer that has accidentally been removed, click on the 'Reset To Default' button.

If a group layer is unchecked, all sub-groups and layers will also be turned off in the map. In the example below, unchecking the 'Point Events' group layer will result in the 'Crossings', 'Elbow' and 'Pipe Bends' being turned off in the map, even though they are individually checked to be visible.

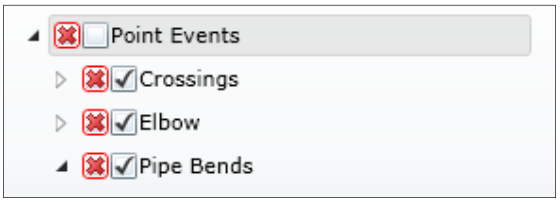


Figure 24: Group of Layers Turned Off

The same principle applies to removing layers using the red check box . If a group layer is removed, all sub-groups and layers will also be removed.

Zoom Scales

If a layer name is greyed out in the Map Layers window, a zoom scale has been applied. zoom scales are used to avoid too much information and detail being displayed at wide zoom levels. These layers will become visible when the map window is zoomed to the appropriate scale.

Figure 25: Layer Not Within Zoom Scale

4.4.3 Layer Transparency

Transparency can be applied to all layers within one of the main logical groups using the slide bar next to the group name. This is particularly useful when making visual comparisons between data i.e. viewing differences between DESIGN and AS-BUILT location data. The example below shows the Background data around the platforms with no transparency.

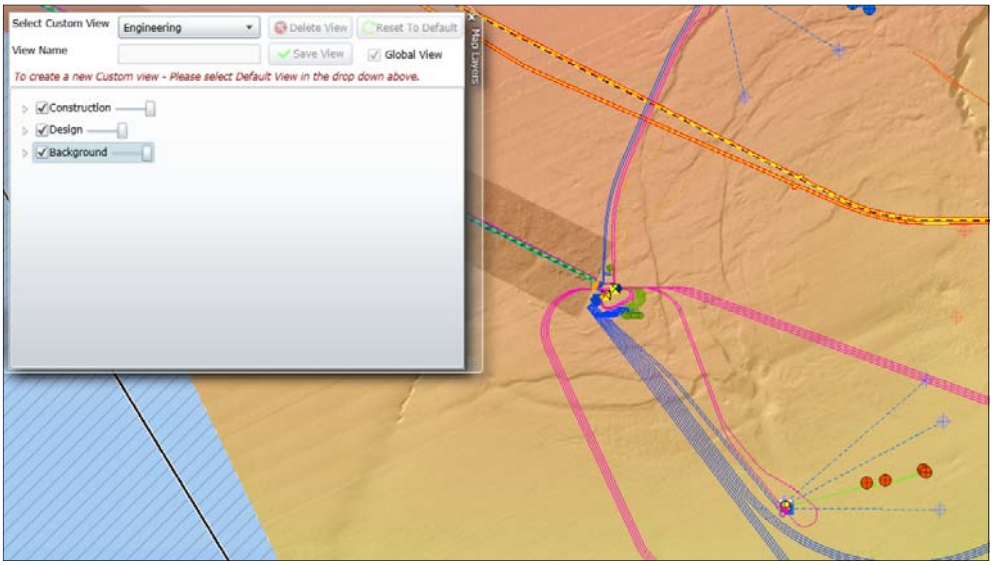


Figure 26: Background Data with No Transparency

The example below this shows the same area with around 50% transparency.

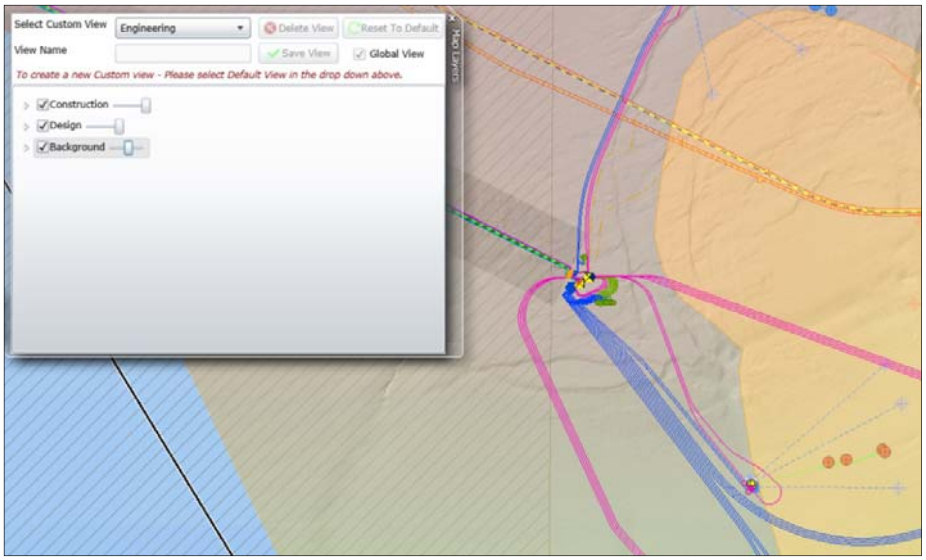


Figure 27: Background Data with 50% Transparency

4.4.4 Custom Views

Custom views enable you to save map layer settings for future visits. For example, a user who is interested in geotechnical information may always want to display sample locations, soils data and the digital terrain model of the seabed.

To create a custom view you must first make sure that the '-Default View -' is selected in the 'Select Custom View' dropdown menu. With this option you can enable or disable the required map layers. Enter a name for your new view and click 'Save View'.

Figure 28: Custom Views

The new view will now be available from the 'Select Custom View' dropdown box. Custom views can also be deleted by selecting them from the dropdown list and clicking 'Delete View'.

If a layer is removed from the map layers window, the Save View button will become active to prompt you to save a custom view. This can be ignored if you don't need to save the view for future visits.

4.5 Print Tool

The Print tool allows the user to print a map which contains the same extent, scale and layers as displayed on the screen. There are some options that the user can select in order to have a more customized map, such as: Title, Print Style (Standard, Map Only or Legend Only). The printing format and orientation can be adjusted in selected printer windows options screen.

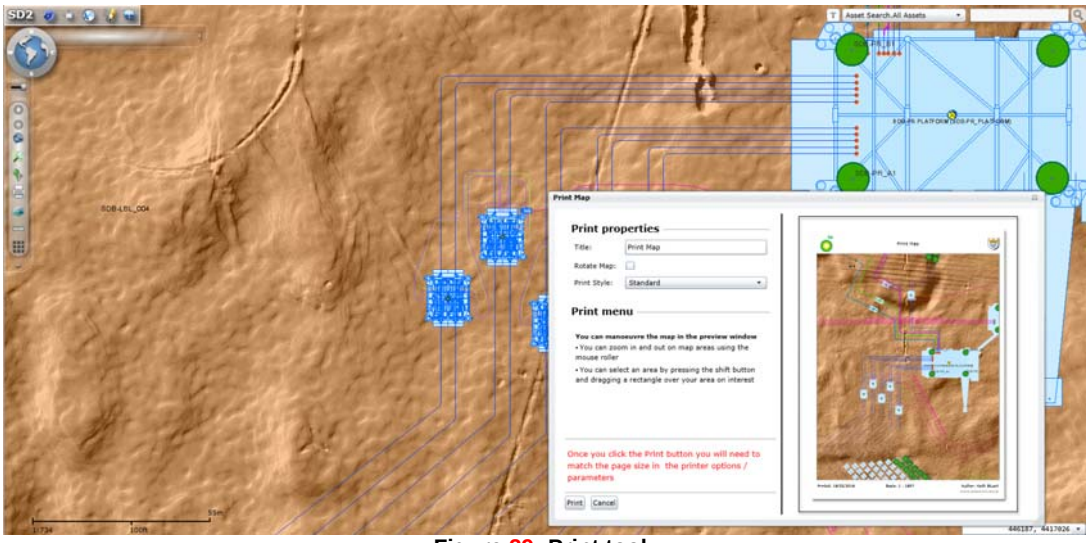


Figure 29: Print tool

4.6 Measure Tools

'Display Measure Tools' enables you to perform various measurement tasks on the map.

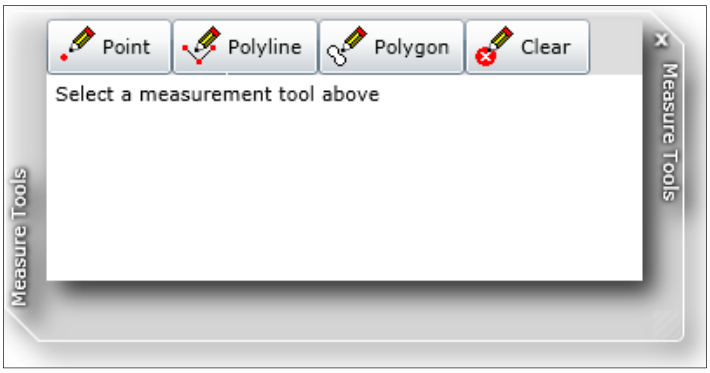


Figure 30: Measure Tools

4.6.1 Point Measures

Selecting the 'Point' button and clicking on the map will return both the projected Pulkovo 1942 Zone 9N and WGS84 latitude/longitude coordinates (in both decimal degrees and degrees, minutes & seconds format). It will also show the depth value at that point and the slope angle of the seabed as well as providing a comparison between all the surveys which have covered that point.

Please note that the slope angle may be a very local measurement and therefore should not be used to infer the general slope of the seabed in that location. Please contact a member of the SD2 PODS GIS Team (Section 7) if accurate slope angles are required.

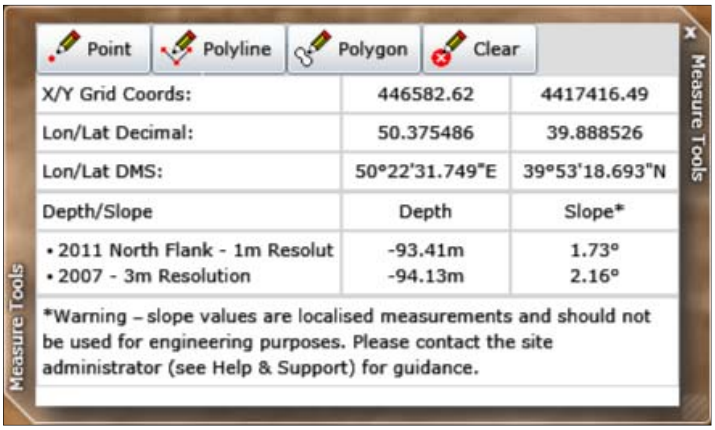


Figure 31: Point Measure Tool

Polyline Measures

The 'Polyline' button is used to draw a line on the map. Click once to add each new line vertex and then double-click to complete the line. The distance and bearing of each line segment is returned as well as the total length of the line. Units can be changed from the dropdown box.

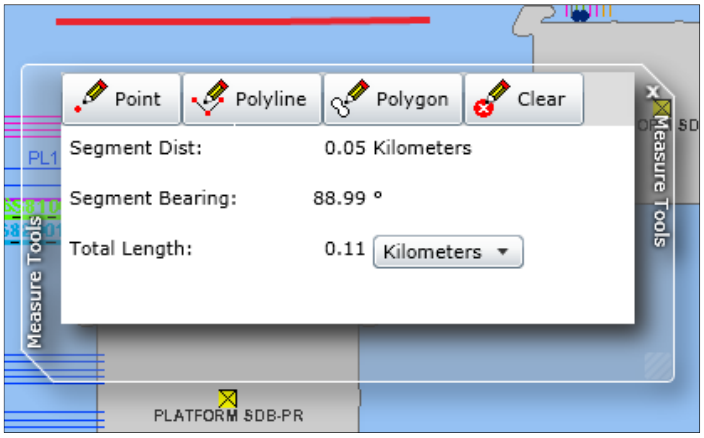


Figure 32: Line Measure Tool

Polygon Measures

The 'Polygon' button is used to draw a polygon (area) on the map. Click once to add each new polygon vertex and then double-click to complete the polygon. The perimeter and area of the polygon are returned and the units can be changed from the two dropdown boxes.

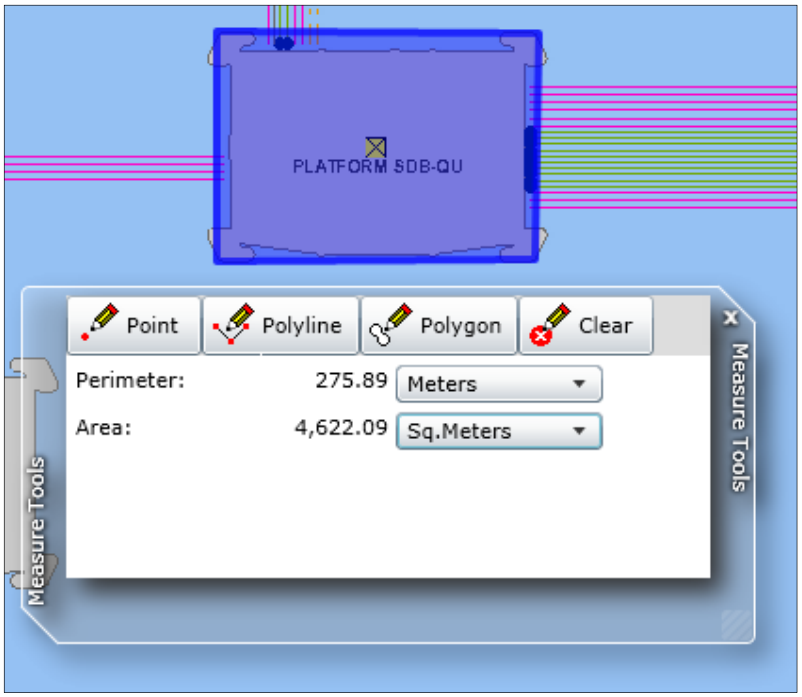


Figure 33: Area and Perimeter Tool

The 'Clear' button is used to remove a drawn graphic and clear the measure results.

4.7 Display Base Map

The Display Base Map tool enables the user to choose from a selection of pre-defined base maps, customised for different project teams and tasks.

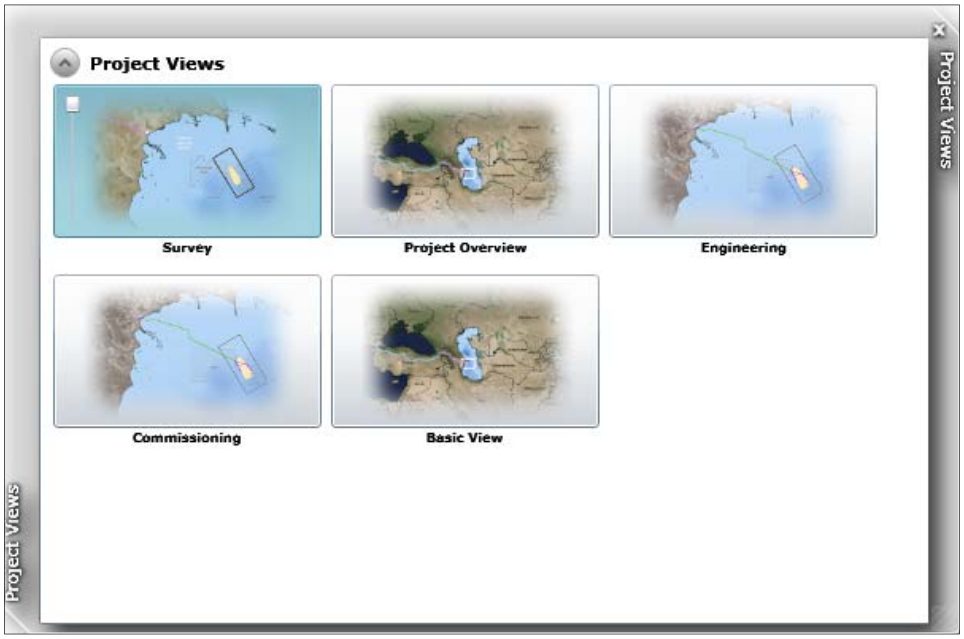


Figure 34: Base Maps

This functionality allows different groups of users, or communities of users, to have customised views of the data simplifying and optimising their user experience. For example, the Survey user group may be more interested in viewing at all times survey data while the Engineering user group may need to have immediate access to coating event data.

All the SD2 PODS GIS portal functionalities are similar and available the same way in each Base Map, and all the types of searches as well, the only difference is what layers are visible or not visible by default. The layer list is exactly the same.

The user is logged in by default on its default Base Map but can switch views at all times.

4.8 Query Tools

There are two main search categories which compose the Query Tools. They are:

1. Text Query
2. Map Query

These searches are split up into more specific queries which provide the user with the ability to easily interrogate and query the data stored within the PODS database. More specific searches will be added overtime as new datasets becomes available.

The following sections will look at these Query Tools and give a run-through of some of the uses of each.

4.8.1 Text Query Tool

Text search is sub-divided into two categories Event and Asset searches. To perform a text query first toggle the search type button to display a 'T'.

Figure 35: Text Query

4.8.1.1 Event Search

The Event Query Tool is designed to retrieve additional information on the linear and point events which are found along a pipeline. This can be information relating to the pipelines coatings to individual crossings.

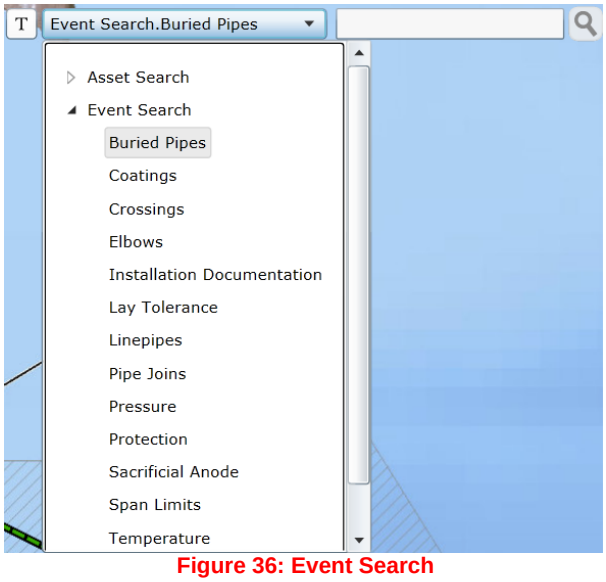


Figure 36: Event Search

The Event Query tool is accessed by expanding the event search menu by clicking on the small arrow to the left of events. From the expanded menu you can then select the search of your choice. By left-clicking the magnifier button all the available Events related to your selection will be shown in the Search Results pane at the bottom of the screen.

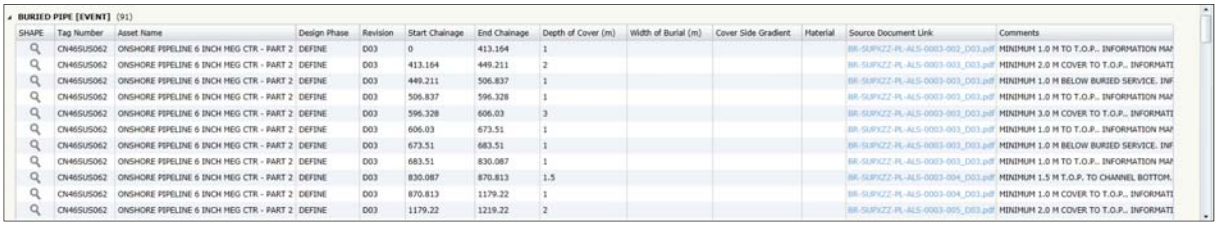


Figure 37: Non-filtered Event Search Results

More specific searches can be performed by typing the filter criteria in the text box found to the right of the Search drop-down menu.

Figure 38: Text filter for an Event Search

This will provide a more focussed set of search results to be displayed in the Search Result pane.

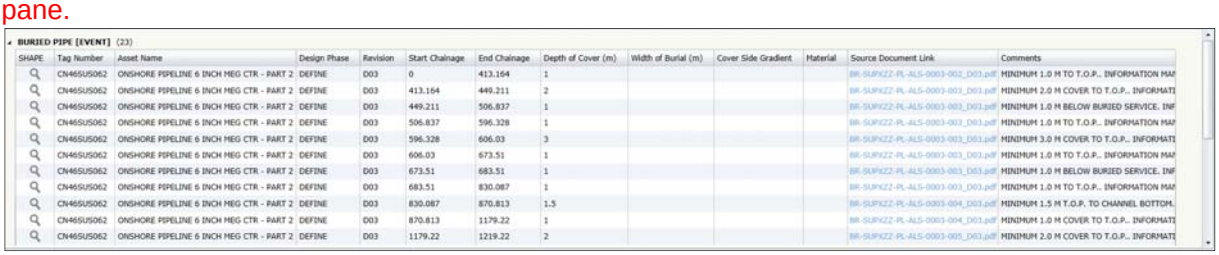


Figure 39: Filtered Event Search Results

4.8.1.2 Asset Search

A powerful feature of SD2 PODS GIS is the ability to retrieve detailed attribute information about the pipeline system assets from the underlying PODS database. This is enabled through the query tools found in the top right corner of the map window.

These consist of a free text box to enter a search term (such as a tag number or keyword), a dropdown box to narrow the search results to a specific asset or information group and a magnifier icon to run the search.

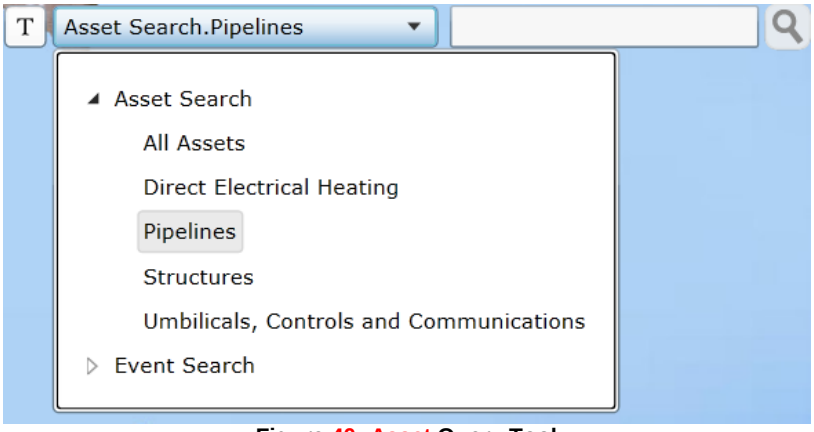
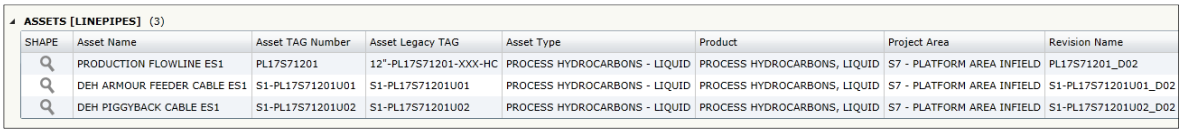


Figure 40: Asset Query Tool

To perform a query, enter a search term in the free text box, choose the appropriate group from the dropdown list and click on the magnifier icon. The example below is a search for part tag number 'S71201' in the pipelines asset group.

Figure 41: Detailed Asset Search

Results are displayed in a new panel at the bottom of the screen. The results from the example above show that three separate pipeline assets contain the search value in their tag number.



ASSETS [LINEPIPES] (3)

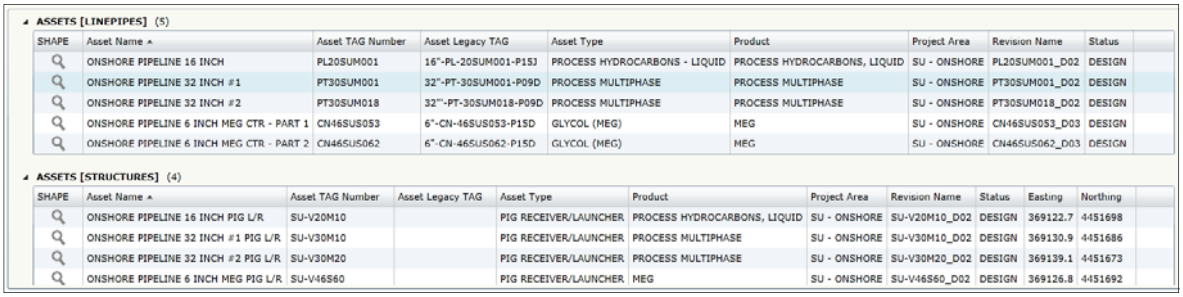
SHAPE	Asset Name	Asset TAG Number	Asset Legacy TAG	Asset Type	Product	Project Area	Revision Name
	PRODUCTION FLOWLINE ES1	PL17S71201	12"-PL17S71201-XXX-HC	PROCESS HYDROCARBONS - LIQUID	PROCESS HYDROCARBONS, LIQUID	S7 - PLATFORM AREA INFIELD	PL17S71201_D02
	DEH ARMOUR FEEDER CABLE ES1	S1-PL17S71201U01	S1-PL17S71201U01	PROCESS HYDROCARBONS - LIQUID	PROCESS HYDROCARBONS, LIQUID	S7 - PLATFORM AREA INFIELD	S1-PL17S71201U01_D02
	DEH PIGGYBACK CABLE ES1	S1-PL17S71201U02	S1-PL17S71201U02	PROCESS HYDROCARBONS - LIQUID	PROCESS HYDROCARBONS, LIQUID	S7 - PLATFORM AREA INFIELD	S1-PL17S71201U02_D02

Figure 42: Detailed Attribute Results

Where the asset or information group is unknown, or assets belong to multiple groups, set the dropdown list to 'All Assets'. The following search is for onshore assets in all data groups.

Figure 43: All Assets Attribute Search

This returns all assets that contain the word 'onshore' across the different groups. Results are grouped by asset or information type. These groups can be expanded or collapsed using the triangle icon to the left of the group name. The total number of assets found for each group is shown in brackets.



ASSETS [LINEPIPES] (5)

SHAPE	Asset Name	Asset TAG Number	Asset Legacy TAG	Asset Type	Product	Project Area	Revision Name	Status
	ONSHORE PIPELINE 16 INCH	PL20SUM001	16"-PL-20SUM001-P15J	PROCESS HYDROCARBONS - LIQUID	PROCESS HYDROCARBONS, LIQUID	SU - ONSHORE	PL20SUM001_D02	DESIGN
	ONSHORE PIPELINE 32 INCH #1	PT30SUM001	32"-PT-30SUM001-P09D	PROCESS MULTIPHASE	PROCESS MULTIPHASE	SU - ONSHORE	PT30SUM001_D02	DESIGN
	ONSHORE PIPELINE 32 INCH #2	PT30SUM018	32""-PT-30SUM018-P09D	PROCESS MULTIPHASE	PROCESS MULTIPHASE	SU - ONSHORE	PT30SUM018_D02	DESIGN
	ONSHORE PIPELINE 6 INCH MEG CTR - PART 1	CN46SUS053	6"-CN-46SUS053-P15D	GLYCOL (MEG)	MEG	SU - ONSHORE	CN46SUS053_D03	DESIGN
	ONSHORE PIPELINE 6 INCH MEG CTR - PART 2	CN46SUS062	6"-CN-46SUS062-P15D	GLYCOL (MEG)	MEG	SU - ONSHORE	CN46SUS062_D03	DESIGN

ASSETS [STRUCTURES] (4)

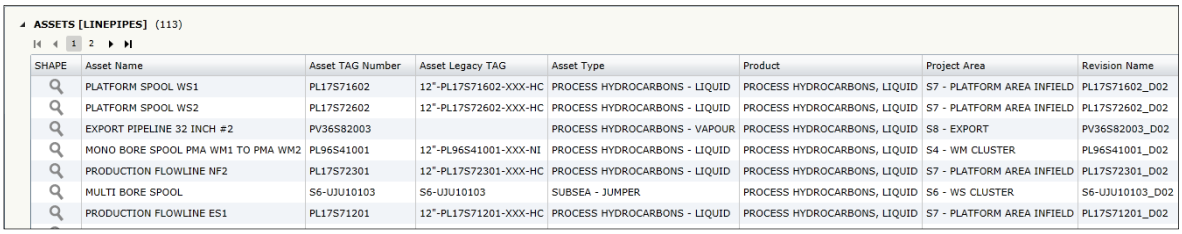
SHAPE	Asset Name	Asset TAG Number	Asset Legacy TAG	Asset Type	Product	Project Area	Revision Name	Status	Easting	Northing
	ONSHORE PIPELINE 16 INCH PIG L/R	SU-V20M10		PIG RECEIVER/LAUNCHER	PROCESS HYDROCARBONS, LIQUID	SU - ONSHORE	SU-V20M10_D02	DESIGN	369122.7	4451698
	ONSHORE PIPELINE 32 INCH #1 PIG L/R	SU-V30M10		PIG RECEIVER/LAUNCHER	PROCESS MULTIPHASE	SU - ONSHORE	SU-V30M10_D02	DESIGN	369130.9	4451686
	ONSHORE PIPELINE 32 INCH #2 PIG L/R	SU-V30M20		PIG RECEIVER/LAUNCHER	PROCESS MULTIPHASE	SU - ONSHORE	SU-V30M20_D02	DESIGN	369139.1	4451673
	ONSHORE PIPELINE 6 INCH MEG PIG L/R	SU-V46S60		PIG RECEIVER/LAUNCHER	MEG	SU - ONSHORE	SU-V46S60_D02	DESIGN	369126.8	4451692

Figure 44: All Assets Attribute Results

To return all assets within a group, leave the text entry box blank, set the dropdown list to the appropriate group and click the magnifier icon.

Figure 45: Asset Type Attribute Search

This returns all data about the chosen asset or information group.



ASSETS [LINEPIPES] (113)

SHAPE	Asset Name	Asset TAG Number	Asset Legacy TAG	Asset Type	Product	Project Area	Revision Name
	PLATFORM SPOOL WS1	PL17S71602	12"-PL17S71602-XXX-HC	PROCESS HYDROCARBONS - LIQUID	PROCESS HYDROCARBONS, LIQUID	S7 - PLATFORM AREA INFIELD	PL17S71602_D02
	PLATFORM SPOOL WS2	PL17S72602	12"-PL17S72602-XXX-HC	PROCESS HYDROCARBONS - LIQUID	PROCESS HYDROCARBONS, LIQUID	S7 - PLATFORM AREA INFIELD	PL17S72602_D02
	EXPORT PIPELINE 32 INCH #2	PV36S82003		PROCESS HYDROCARBONS - VAPOUR	PROCESS HYDROCARBONS, LIQUID	S8 - EXPORT	PV36S82003_D02
	MONO BORE SPOOL PMA WM1 TO PMA WM2	PL96S41001	12"-PL96S41001-XXX-NI	PROCESS HYDROCARBONS - LIQUID	PROCESS HYDROCARBONS, LIQUID	S4 - WM CLUSTER	PL96S41001_D02
	PRODUCTION FLOWLINE NF2	PL17S72301	12"-PL17S72301-XXX-HC	PROCESS HYDROCARBONS - LIQUID	PROCESS HYDROCARBONS, LIQUID	S7 - PLATFORM AREA INFIELD	PL17S72301_D02
	MULTI BORE SPOOL	S6-UJU10103	S6-UJU10103	SUBSEA - JUMPER	PROCESS HYDROCARBONS, LIQUID	S6 - WS CLUSTER	S6-UJU10103_D02
	PRODUCTION FLOWLINE ES1	PL17S71201	12"-PL17S71201-XXX-HC	PROCESS HYDROCARBONS - LIQUID	PROCESS HYDROCARBONS, LIQUID	S7 - PLATFORM AREA INFIELD	PL17S71201_D02

Figure 46: Asset Type Search Results

It's also possible to do a search on all assets within the database by leaving the free text box blank and the dropdown list on 'All Assets'. This is not recommended however as it may take a long time to return results and it will be harder to find the required information.

Figure 47: All Data Search

4.8.2 Map Query Tool

The Map Query Tool allows the user to spatially query the underlying PODS database about features or structures in a user-defined area. This is accessed through the drop-down search box in the top right of the screen. First ensure that the spatial search is toggled .

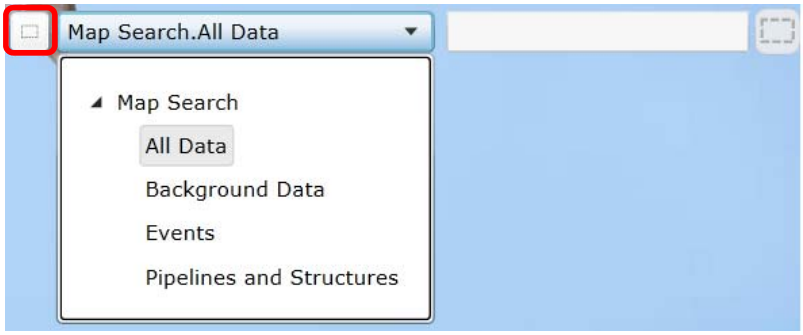


Figure 48: All Data Map Search

The Map Query tool can perform four different searches:

- The All Data search will query and retrieve information on everything in a user-defined area including Design, As-Built and Survey information.
- The Background Data search queries any background data namely survey, geotechnical and geohazard data.
- The Event Search will retrieve information on the events which will occur along linear assets for a selected area. This is particularly useful for viewing data such as spans, crossings, document references, coatings etc. for the specific area of interest.
- The Pipelines and Structures search retrieves all the asset and pipeline information for both As-Built and Design phases for a user-defined area.

To use the Map Query tool the user must first select one of the Map Searches from the dropdown search menu. The Map Search list is expanded by clicking on the small arrow to the left of it. When you have selected one of the map searches the magnifier search button will change to a rectangle symbol . By left-clicking on this and then holding the left mouse button a rectangle can be dragged over the area of the map you wish to query.

The results of Map Searches will appear in the Search Result pane and can be displayed and sorted in the same way as when using the Attribute Query Tool.

4.8.3 Navigating the Results Panel

Multiple pages of query results can be navigated through using the page buttons found in the top left corner of the Results pane. Keyboard navigation is possible by using the keyboard arrow keys.

Figure 49: Results Page Navigation

4.8.4 Hide Results Panel

Query results can be hidden and retrieved by clicking the icon at the top right corner of the Results panel.

4.8.5 Resize Results Panel

Query results can be resized by hovering the mouse along the results panel border until the pointer converts into a double arrow. Drag up or down to resize as preferred.

4.8.6 Close the Results Panel

The Results panel can be closed using the 'Close' button found in the top-right corner of the panel.

4.8.7 Viewing PODS Data

The initial search results contain a list of assets. Further information about these assets, stored within the underlying PODS database, is retrieved by clicking on the asset within the query results dialog. This will expand a window showing all the PODS data groups associated with that asset. If an asset doesn't yet have any associated PODS data, no further results will be returned.

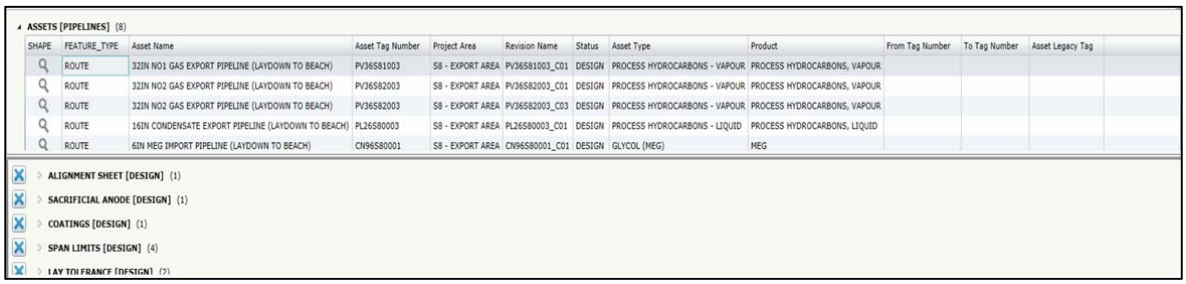


Figure 50: PODS Data Groups

Click the small grey triangle icon to the left of the data group to display the detailed PODS information.

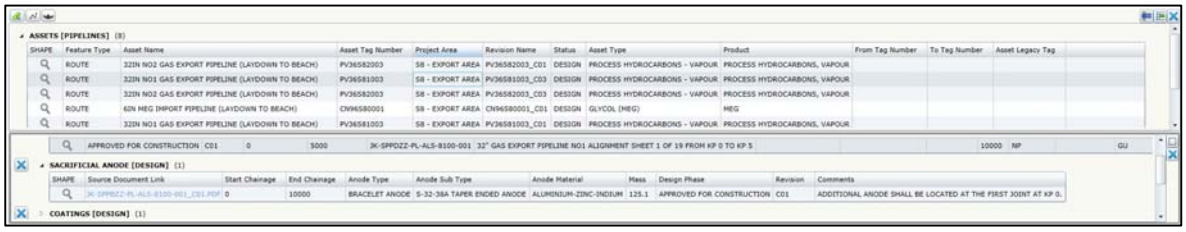


Figure 51: PODS Information

The PODS data window can be expanded to cover the entire results pane by clicking the square button in the right of the window. To reset it to its normal extent, click the button again. To close the PODS data window click the 'Close' button found on the right hand side of the window.

4.8.8 Document Link

Some assets and events, which are stored in the PODS database, also contain additional official or supporting documents. These are accessed from a WGK webserver through the Source Document Link column in the Search Results pane.

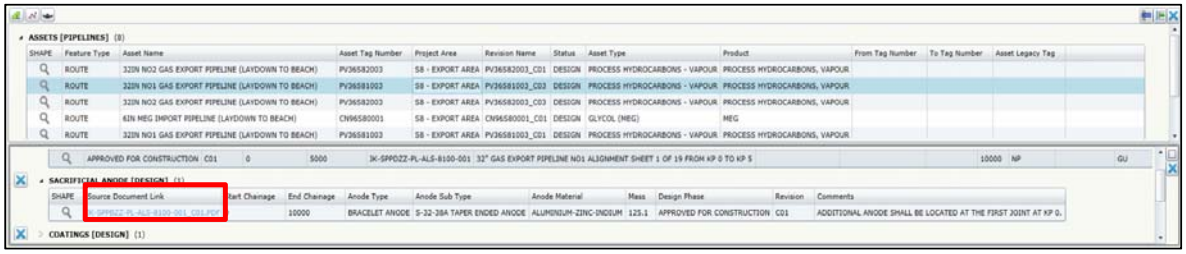


Figure 52: Source Document Link

If you have any trouble opening these links please contact the support team (Section 7).

4.8.9 Zoom to Selected

You can zoom to a selected asset or to the location/section of the asset described by the PODS data record, using one of two methods:

1. Click the magnifier glass icon in the SHAPE field of the selected PODS record.

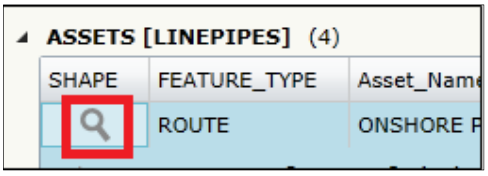


Figure 53: Zoom to Selected

2. Right click the selected record and select 'Zoom to..'

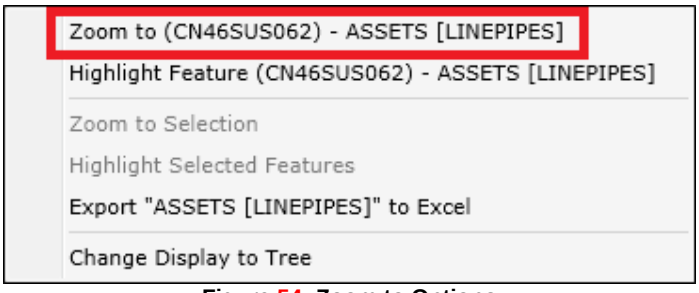


Figure 54: Zoom to Options

4.8.10 Highlight Feature

With long pipelines or areas around the platform where there are lots of assets, it may be difficult to see what feature the map has zoomed to. The Highlight Feature tool will temporarily flash an outline on the map of the selected feature to make this clear. To do this, right click the record and select 'Highlight Feature..' from the context menu.

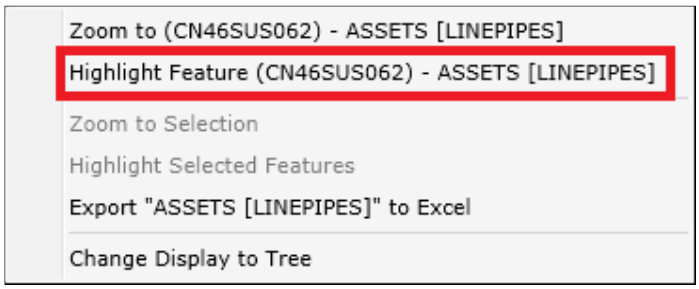


Figure 55: Highlight Feature

4.8.11 Clear Selected Feature

The Clear Selected button allows you to clear the results that you have selected from the Results pane. The button is found at the top-right hand corner of the results pane and is activated by a single left-click.

4.8.12 Change Display Tree

The way results are displayed in the dialog panel can be altered to reflect a tree hierarchy.

Right click anywhere on the attribute information in the Results panel and select 'Change Display to Tree'.

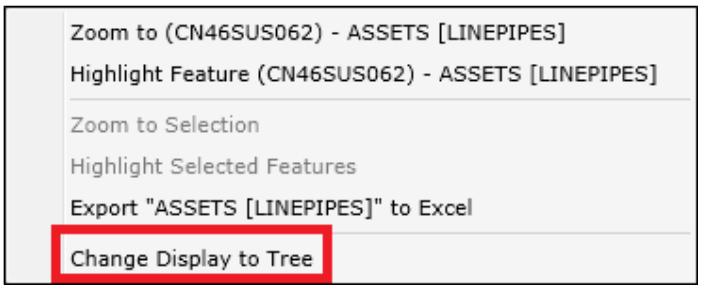


Figure 56: Change Display Tree

The new tree structure will list all features by their tag number. Events can be seen as sub-branches when the triangle icon is expanded.

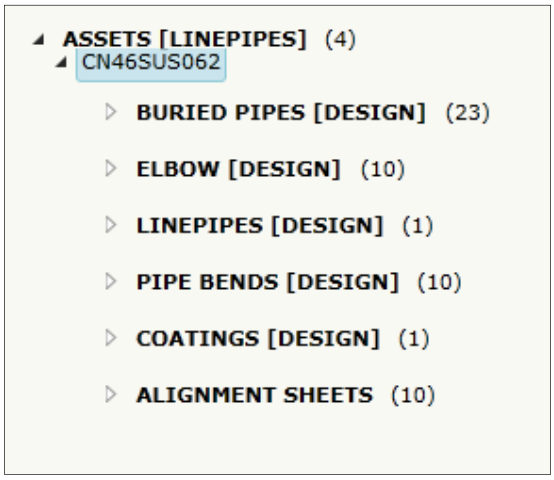


Figure 57: Features by Tag Number

4.9 Customise Query Results

4.9.1 Sort by Column

You can choose to sort the output in the Results panel by the values of a certain column. Click on the column heading you want to sort by and a triangle will appear either pointing up or down. This signifies an ascending or descending order.

The following example shows Pipelines that are sorted by tag number in ascending order.

Asset Name	Asset TAG Number ▲
ONSHORE PIPELINE 6 INCH MEG CTR - PART 1	CN46SUS053
ONSHORE PIPELINE 6 INCH MEG CTR - PART 2	CN46SUS062
IMPORT PIGGYBACK PIPELINE 6 INCH MEG CTR	CN96S80001
IMPORT PIGGYBACK PIPELINE 6 INCH MEG CTR	CN96S80002
MONO BORE SPOOL PMA EN1 TO FTA EN1	PL17S11001

Figure 58: Sorted Results

4.9.2 Change Display Columns

The columns shown in the Results panel are predefined. It is possible to remove unwanted fields or add new ones to the display that are hidden by default. To do this, right click anywhere in the header area of the Results panel where the field names are shown.

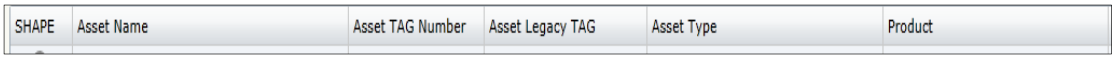


Figure 59: Default Results Columns

Hover the mouse over ‘Displayed Columns’ and then tick the boxes of all field names that you want to include.

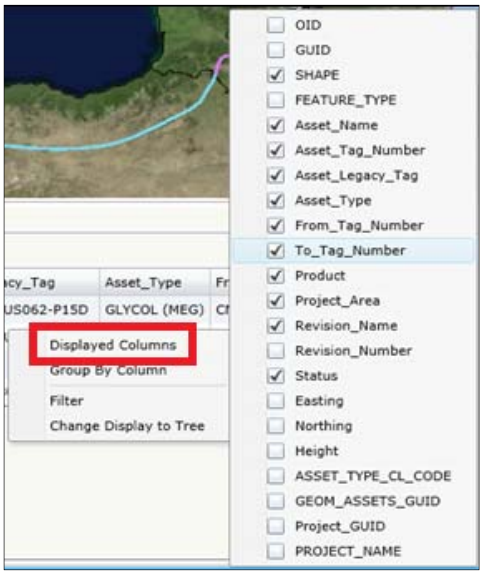


Figure 60: Updating Results Columns

Only the attributes of those field names selected will now be shown in the Results panel.

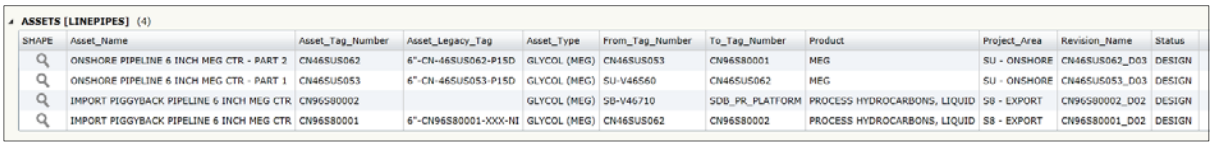


Figure 61: Updated Results Columns

The default columns will be restored whenever a new search is made.

4.8.3 Group by Column

Sometimes it is easier to view the results if they have been grouped together. For example, you may have searched for all Pipelines but now want to refine the output to group by the different asset types. Right click anywhere in the header area of the Results panel showing the column names (same as for displaying columns). Now hover over the ‘Group By Column’ text and tick the boxes of all field names that you want to group.

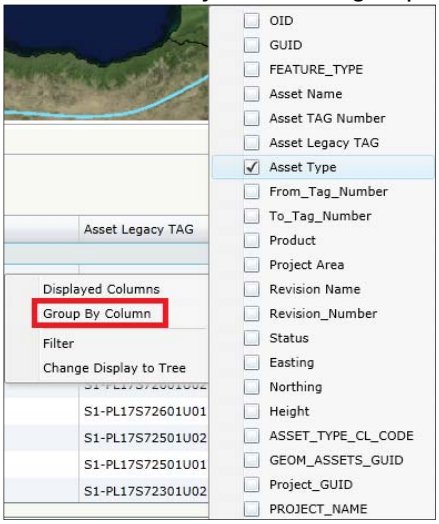


Figure 62: Group By Column

The attributes have now been grouped by all unique values in the ‘Asset Type’ field in the

Results dialog. In the example below this shows PROCESS HYDROCARBONS – LIQUID and SUBSEA – JUMPER.

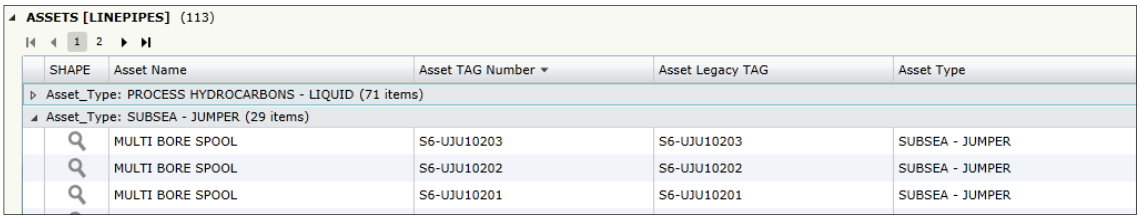


Figure 63: Group by Column Results Dialog

You can apply as many layers to the grouping of results as you wish simply by ticking more field names. The grouping will occur in the order that the various column names have been selected. The example below shows a further sub grouping of the 'Asset Type' by the 'Project Area'.

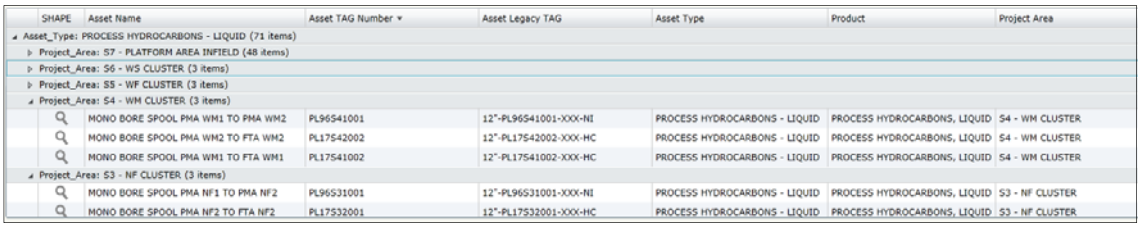


Figure 64: Sub Group Results Dialog

4.9.3 Filtering Attribute Results

You can apply a filter to refine the query results. Again, right click anywhere in the header area of the Results panel showing the field names and select 'Filter'.

Figure 65: Filter Attribute Results

A new query form will appear.

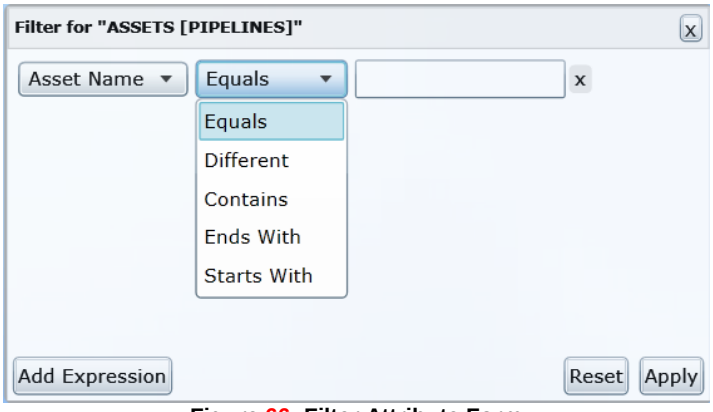


Figure 66: Filter Attribute Form

The first dropdown lists contains the field that will be searched. The second dropdown lists the operators that can be applied:

Search Operator	Results
Equals	Returns an exact match on the search criteria.
Different	Returns all values different to the search criteria.
Contains	Returns all values containing the search criteria.
Ends With	Returns all values that end with the search criteria.
Starts With	Returns all values that start with the search criteria.

Table 2: Search Operators

Extra search expressions can be applied by selecting the 'Add Expression' button. A new dropdown menu will appear at the top with the option to select 'And/Or'.

Use 'And' when you want all search criteria statements to be met.

Use 'Or' when any of the search criteria statements can be met.

In the following example, the Asset_Tag_Number must start with 'CN46' and the Project_Area must contain 'SU'.

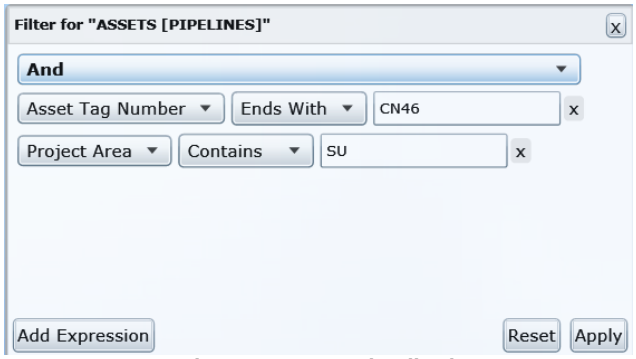


Figure 67: Example Filtering

Click 'Apply' and the filtered results are shown in the Results panel.

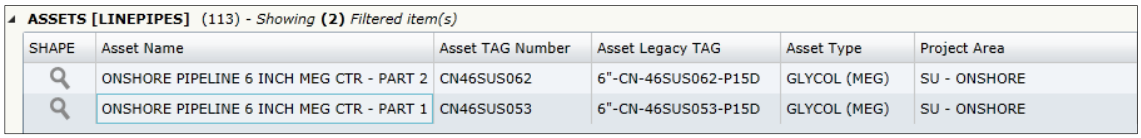


Figure 68: Filtered Results

4.10 Exporting Results to Excel

At times you may want to extract information from the Web GIS for presentation or analysis. To do this, right click anywhere on the attribute values shown in the Results panel and select 'Export "[RESULTS]" to Excel'.

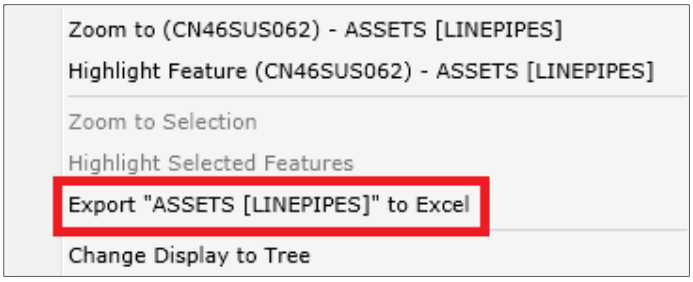


Figure 69: Export to Excel

A Save As dialog box will appear and you can choose to save results as an XML file. Choose a file location and name and click 'Save'.

4.11 Buffer Tool

A buffer can be applied to any feature or features which are retrieved from a search. To do this select the feature or features from the search results panel that you wish to buffer and left click on the buffer icon found in the top left corner of the search results panel. This will open a new buffer window.

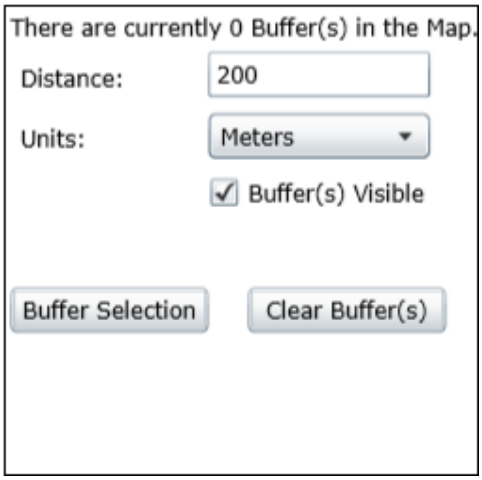


Figure 70: The Buffer Window

From this window the width of the buffer can be chosen and its units and visibility altered. After choosing a suitable distance the buffer is applied by clicking “Buffer Selection”.

Figure 71: An Applied Buffer

All currently applied buffers can be removed by clicking “Clear Buffer(s)”.

4.12 Longitudinal Profile Tool

The Longitudinal Profile tool can be used to view the longitudinal profile for many of the different pipelines stored within the PODS database.

To access the longitudinal profile tool you must first search for the required pipeline using either the Text or Map – Design Data Query Tools, the required pipe is then displayed in the search results panel. Currently only offshore and onshore pipelines have profiles, with piggybacking DEH pipes not being included in this tool.

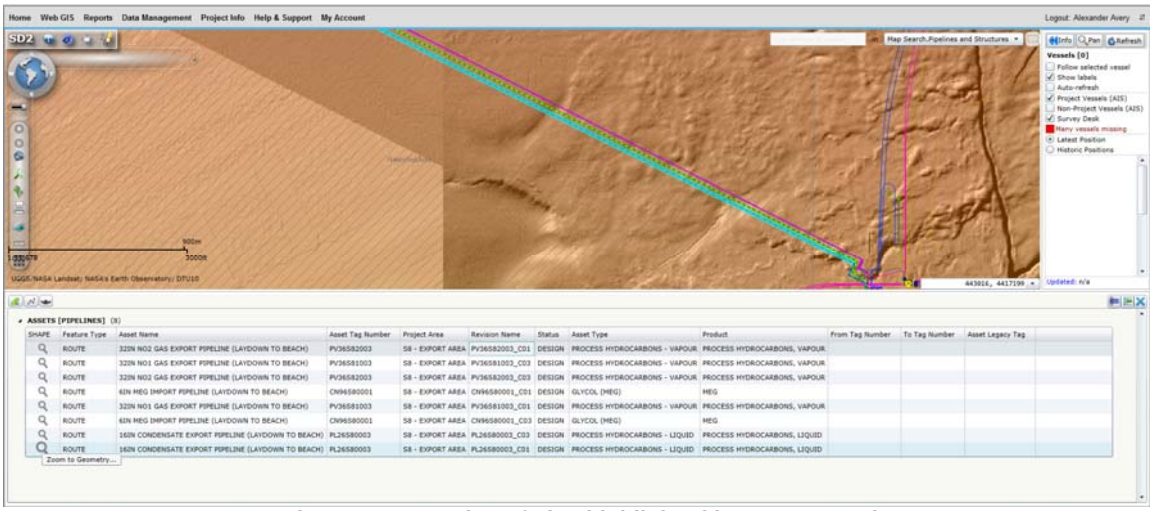


Figure 72: A section of pipe highlighted in a Map Search

After locating the required pipeline you must select it. This is done by left-clicking on it in the Search Results pane, with the pipe then turning blue both on the map and within the Search Result panel. With the pipe selected you can then see its profile by left-clicking on the Longitudinal Profile button, as shown in the figure below.

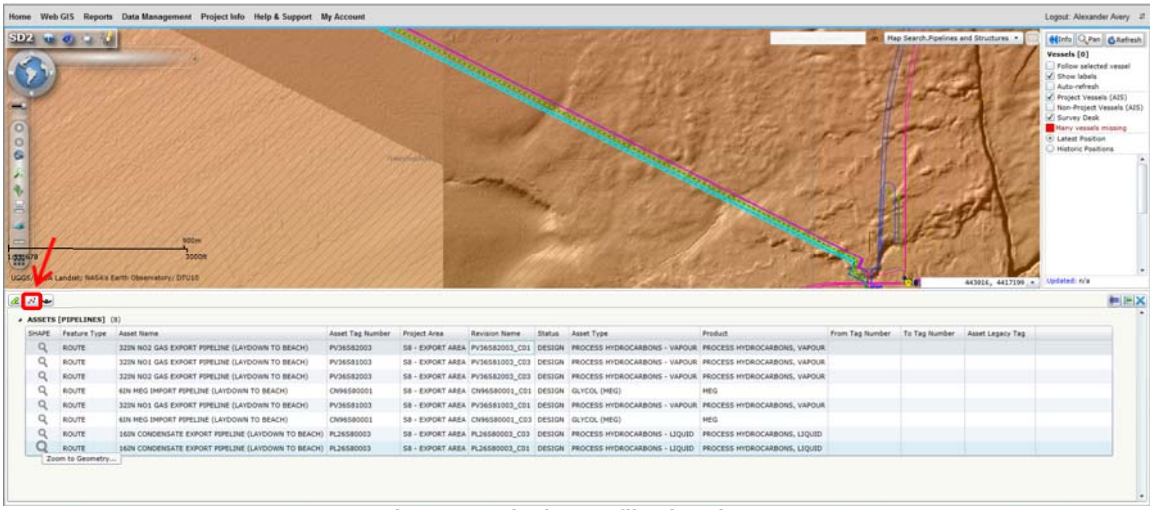


Figure 73: Display profile chart button

The longitudinal profile is then displayed in the profile panel which contains a large range of options for viewing the profile. These will be explored in the following sections.

To return to the Search Results panel you must click the Back to Search Results Button found in the top left of the Profile viewer.

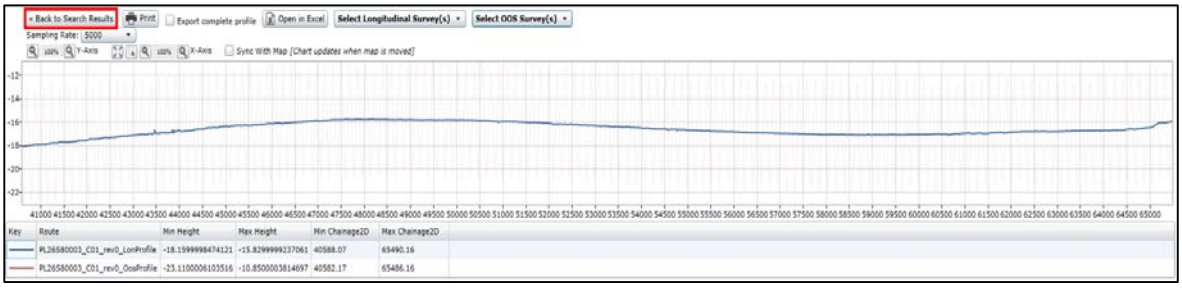


Figure 74: A profile of a section of pipe

It is also possible to select more than one pipeline by left-clicking on the records in the Search Results panel while holding the Shift or Ctrl button.

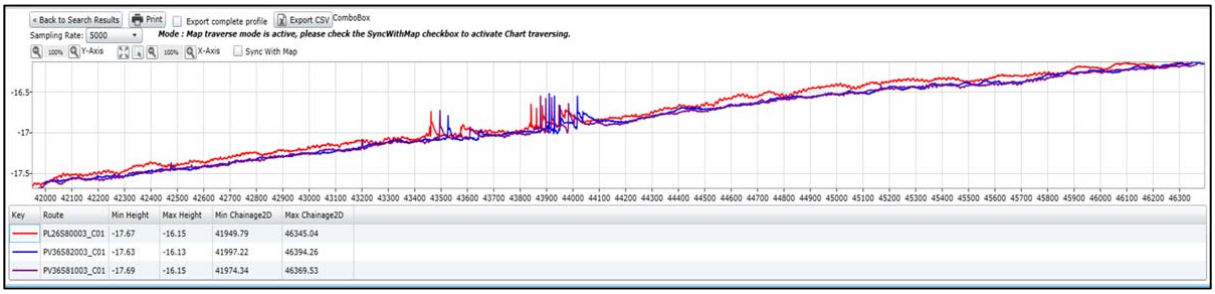


Figure 75: Multiple profiles displayed simultaneously

4.12.1 The Cross-Profile Tool

The Cross-Profile tool can be used to view cross-sectional profiles for many of the assets which are stored within the PODS database.

The tool works in a similar way to the profile tool; with you first searching for, and then selecting the pipe you wish to look at using one of the query tools. Having selected the pipeline you wish to view you then click the Cross-Profile button found at the top-left of the results pane.

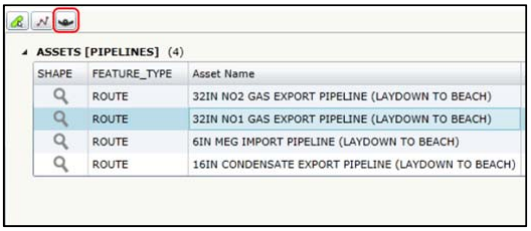


Figure 76: Cross-Profile tool

This will open up the cross profile viewer which will display a 500m cross-profile across the selected asset. If multiple surveys have been performed around the asset then multiple profiles will be displayed in the viewer. A legend is shown below the profile viewer which describes the profiles which are being displayed.

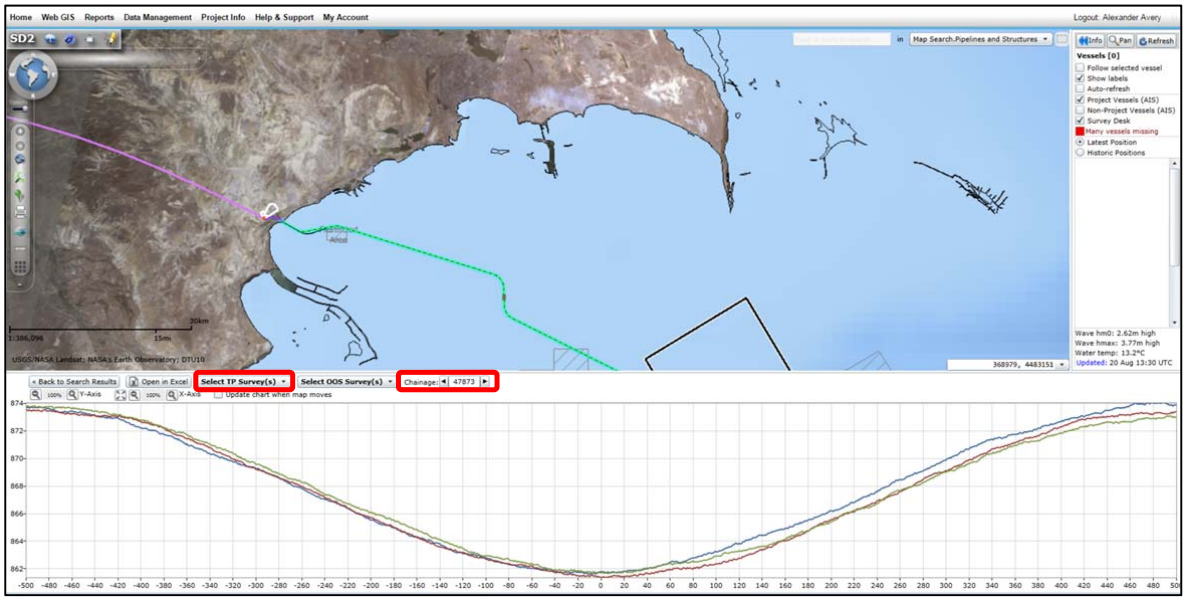


Figure 77: Cross-Profile Viewer

To view cross-profiles along the length of the asset you can either use the ◄ or ► buttons to move in 1m steps along it. Alternatively, you can enter a KP value into the free-text box between them to move directly to that KP value.

Figure 78: Chainage navigation

The cross profile viewer will display cross-profiles for all the available surveys at the current chainage. To alter this, use the Select TP Survey(s) drop down menu and select or deselect the tickboxes ☑ next to the profiles.

4.12.2 Out of Straightness (OOS) Tool

The OOS Tool allows you to view Out of Straightness profiles alongside the original Longitudinal and Cross profiles. This allows for the difference between the two to be easily recognised.

OOS surveys can be enabled using the 'Select OOS Survey(s) dropdown menu, shown in the figure below. This will display the profile alongside the current one.

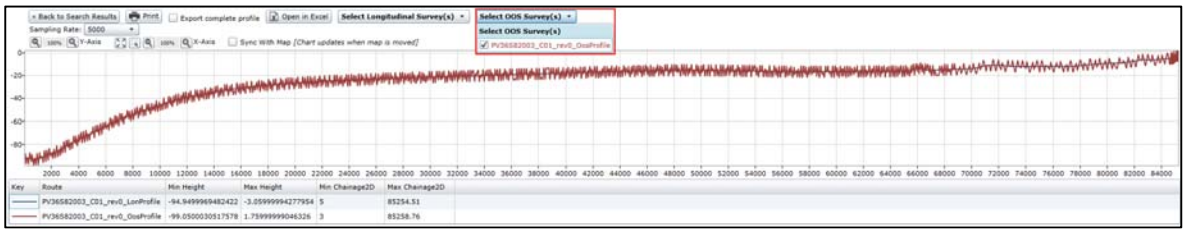


Figure 79: Out of Straightness Viewer

4.12.3 Movement and Zoom

You can navigate around the profile by clicking and dragging with the mouse. When using the longitudinal profile viewer areas can be zoomed into for closer inspection by using the 'Area Zoom' tool found under the profile. Both profile viewers can be reset by using the 'Reset View' button .

4.12.4 Altering the Profile Display

The profile viewer's axis can be altered by using the zoom tools found directly above the profile viewer.

Figure 80: Axis zoom control

It can also be reset by using the 'Reset View' button.

4.12.5 Sample Rate

The Sample Rate can be altered for the longitudinal profile viewer by using the Dropdown menu. The values which can be chosen are 5000, 10,000 or All.

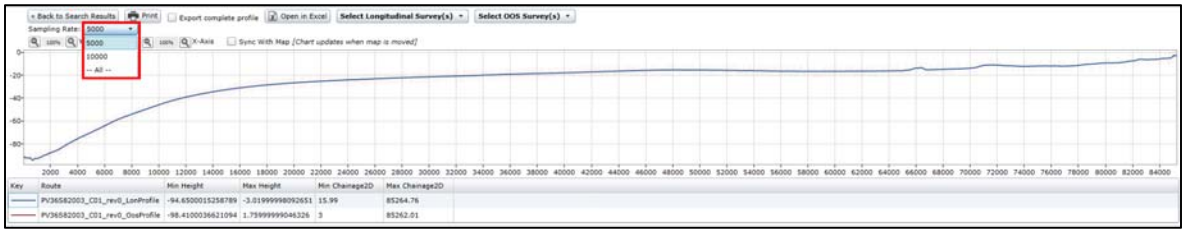


Figure 81: Sample Rate

4.12.6 Export to Csv

You can retrieve profile data for use in Excel and other systems by clicking the 'Open in Excel' button located on the top of the profile window. When using the longitudinal profile viewer you will be prompted to choose a location for the csv file. By default the file name contains the Pipe Number and the Min and Max Chainage of the visible area of the profile. The Cross-Profile viewer will instead download an excel file directly to your default download location.

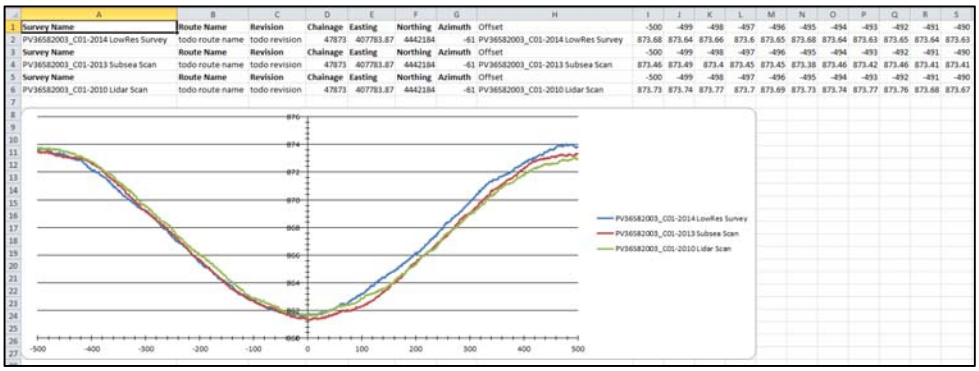


Figure 82: Downloaded cross-profile file

If you have zoomed in to a specific area of the longitudinal profile and you want to export data for the entire profile, you must tick the following box: Export complete profile .

Figure 83: Export profile to CSV

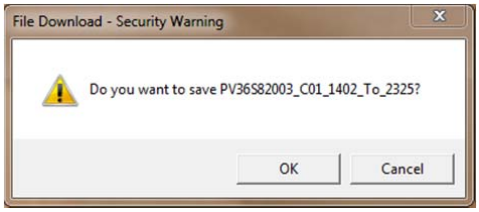


Figure 84: Profile download

For the cross-profile tool you can also select which surveys you would like to export profiles from. This is done through the same drop-down list used to alter which profiles are visible in the viewer. By default the profiles from all the available surveys are selected and will be exported. The number being exported can be reduced by deselecting (unticking) the boxes in the drop-down menu.

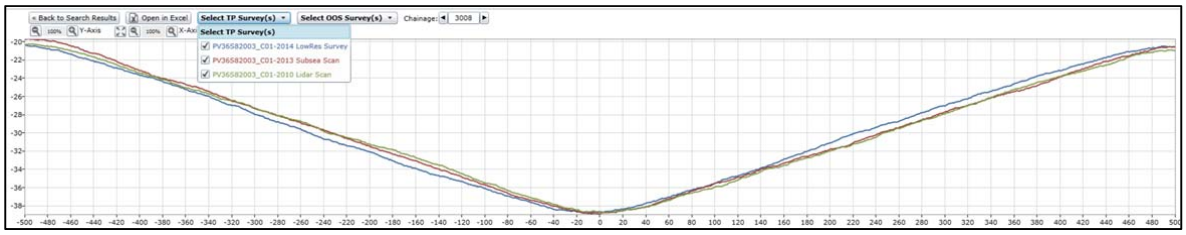


Figure 85: Survey Selection and Export

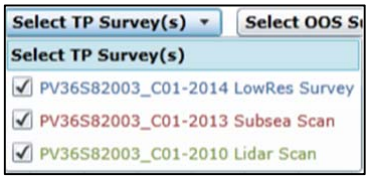


Figure 86: Survey Selection Menu

4.12.7 Print Profile

In order to print a profile, you can click the Print button located on the top right hand side of the longitudinal profile panel. The area of the profile that is visible in the panel will be printed.

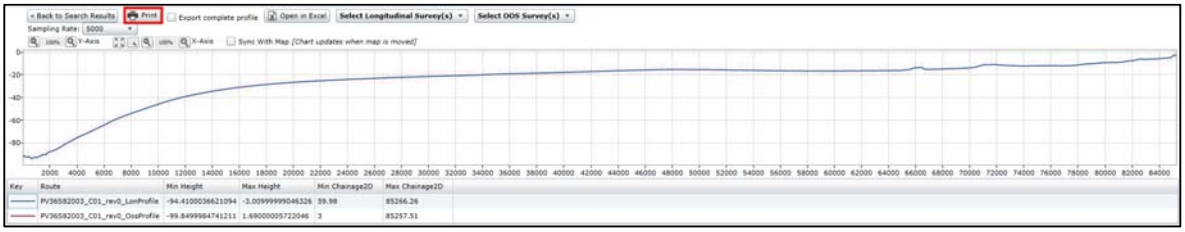


Figure 87: Print profile

To avoid profile distortions it is recommended to use the print option 'fit to page' or

change the orientation to landscape when printing a profile.

If displaying multiple profiles in the cross-profile viewer you can select which ones to print using the Select Survey(s) drop-down menu.

4.12.8 Map Sync

Both the profile and cross-profile viewers are in sync with the map display extent. If you zoom or pan the profile graph, the Min and Max Chainage are updated automatically to correspond with the currently visible pipe extent.

Points on the profile can also be highlighted on the map by clicking on the profile in the profile viewer. This point will then be highlighted on the map by a red dot and details of the chainage and height will be displayed on the right hand corner of the profile tool.

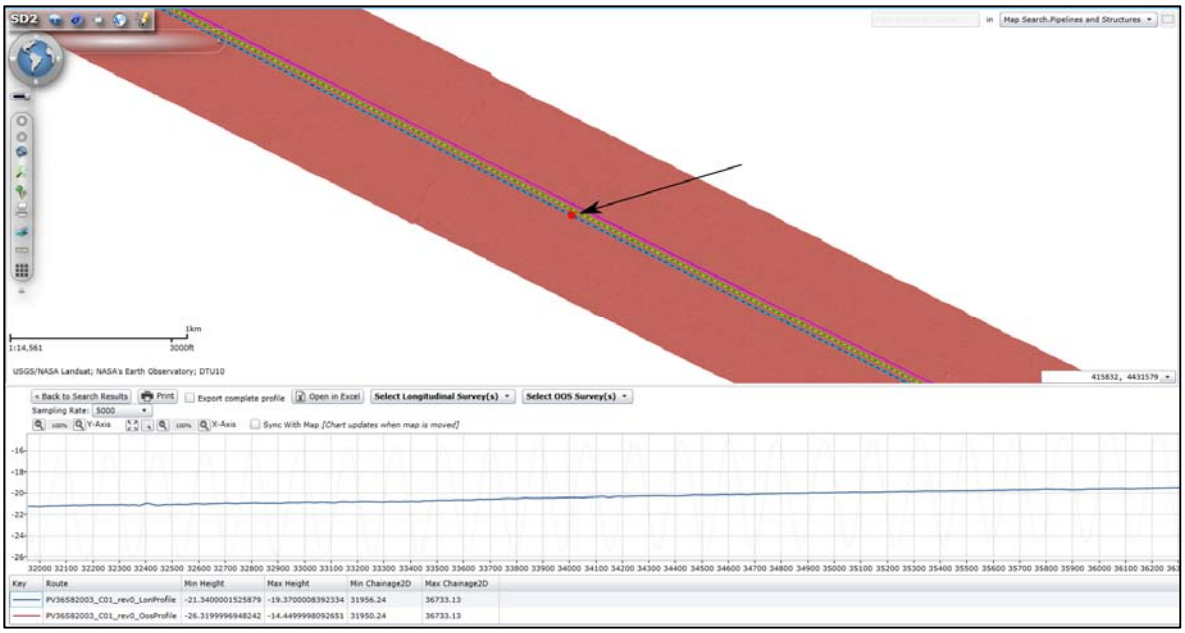


Figure 88: Profile sync with map

The ‘Map Sync’ tool reverses the default behaviour of the profile viewer, with the profile viewer controlling the map display rather than vice versa. For example, when using the profile viewers ‘Area Zoom’ tool with Map Sync enabled you will zoom into the same pipeline section on the map as you selected in the profile viewer.

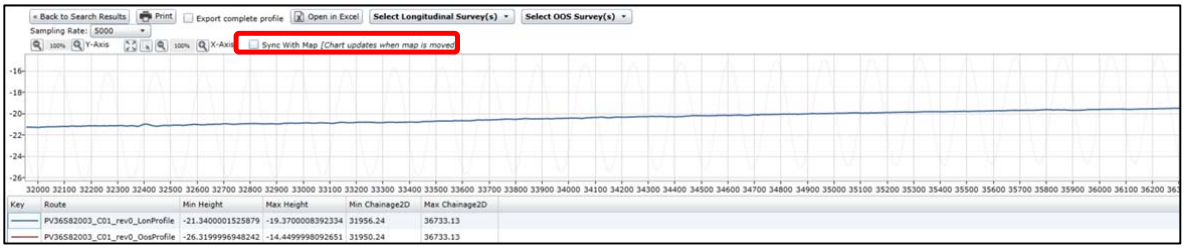


Figure 89: Map sync with profile

4.13 Simultaneous Operations Planner (SimOPS)

The SIMOPS tool is an effective way of both planning and sharing SIMOPS plans with the wider project group. It is accessed by left-clicking the SIMOPS button located on the top toolbar.

Figure 90: SimOPS toolbar

4.13.1 Finding an existing drawing

Upon opening the SimOPS window you will be in the drawing tab. Here is listed all the drawings which have been currently created with the tool.

There are several ways of searching through this list. By ticking the 'My Drawings Only' checkbox at the bottom left of the window only your own drawings will be displayed.

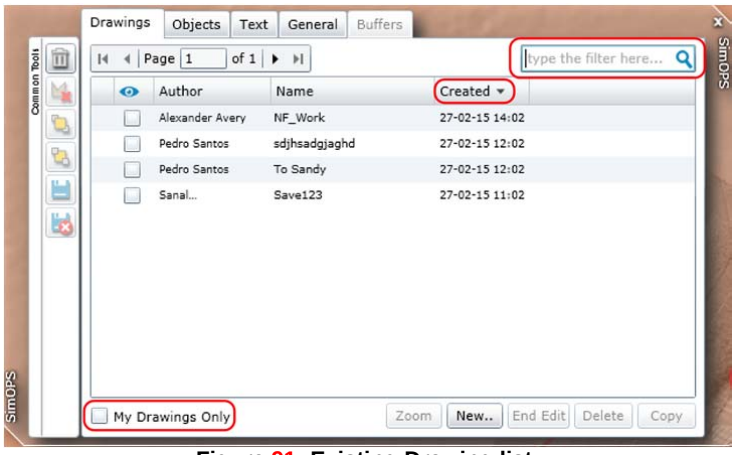


Figure 91: Existing Drawing list.

The results can also be filtered by using the free text box in the top right. Here searches can be performed against either the Author or Name fields with only the drawings which fit the search criteria then being displayed in the window.

The drawing list can also be sorted by creation date by clicking on the 'Created' column.

4.13.2 Viewing an existing drawing

To view information on the drawing you can select it from the SimOPS Drawings list by left clicking on it. This will expand the drawing record showing a small image of the drawing as well as a text description of the workflow the drawing is representing.

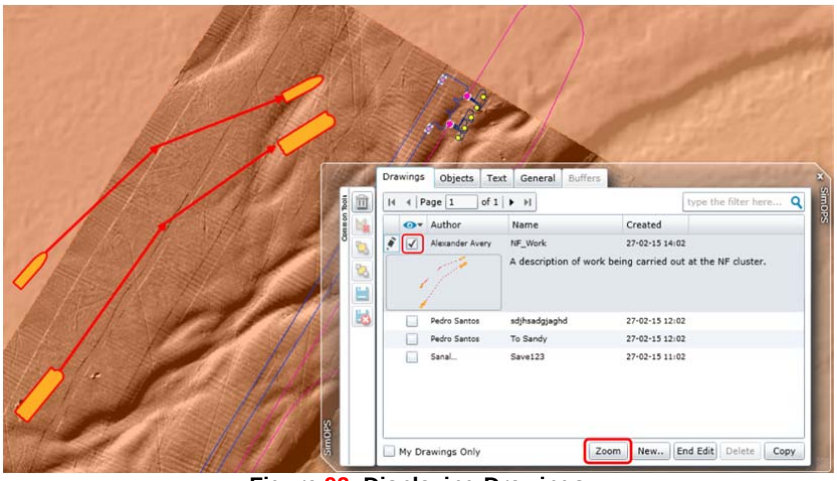


Figure 92: Displaying Drawings

The drawing can then be displayed on the map as a layer by checking the visibility checkbox. By displaying the drawing as a layer the option to zoom to the displayed graphic will then be enabled. This is done through clicking the 'zoom' button to the bottom right of the window.

4.13.3 Creating a New Drawing

To create a new drawing you need to open the SimOPS tool window and make sure that the Drawing tab is selected. To the bottom right of this window there is a 'New…' button. Clicking on this will start your new drawing and allow you to begin drawing directly onto the basemap.

4.13.4 Adding Vessel Outlines to your Drawing

The first tab you will go to is the 'Objects' tab. Here you can add vessel outlines to your drawing. The vessels are listed by name as default, this can be changed to include vessel images by checking the 'Show Images' checkbox at the top right of the window.

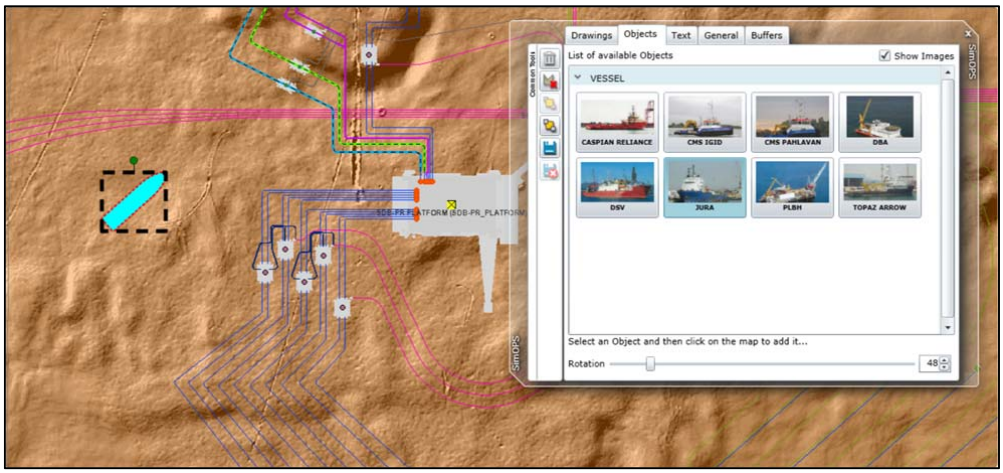


Figure 93: Adding Vessels and Objects

To add an outline, you need to first click on the vessel you wish to add and then click on the map where you wish to place it. The heading of the outline can be altered by clicking and dragging the green dot at the top of the placed outline.

4.13.5 Adding Annotations to your Drawing

Annotations can also be added to the drawing to convey additional information. This is done through the ‘Text’ tab.

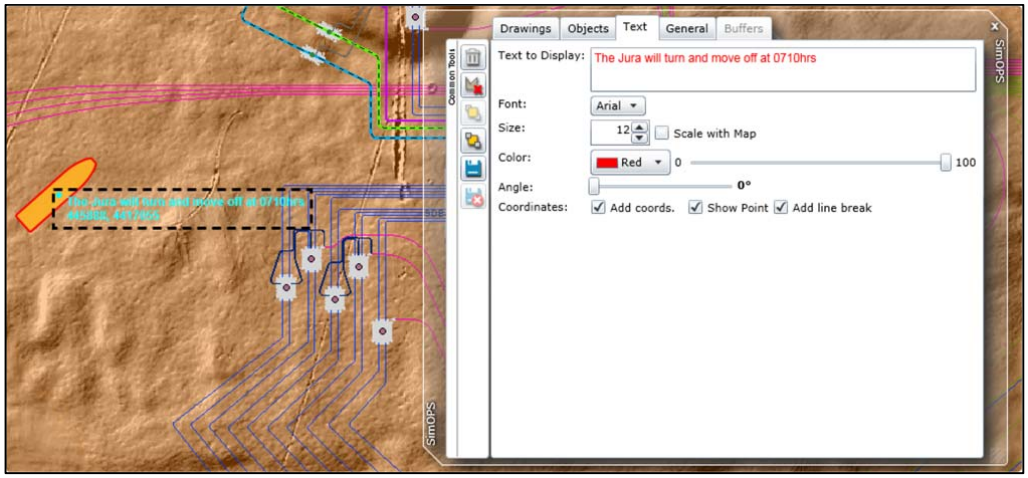


Figure 94: Adding Annotations

Here you can enter your annotation into the free text box and format how it will be displayed; such as font, size, scalability, transparency, positioning and colour. Additional options, such as showing a point and coordinates with the annotation can also be chosen. The coordinates can also be displayed underneath the text by checking the ‘Add line break’ checkbox.

4.13.6 Adding Shapes to your Drawing

Shapes can also be added to the drawing by going to the ‘General’ tab. Here you can select from a variety of shapes through the buttons at the top of the window. The fills and border colours can also be altered through the two drop-down menus. The transparency of both the fills and borders can also be adjusted through the two sliders to the side of the colour selection.

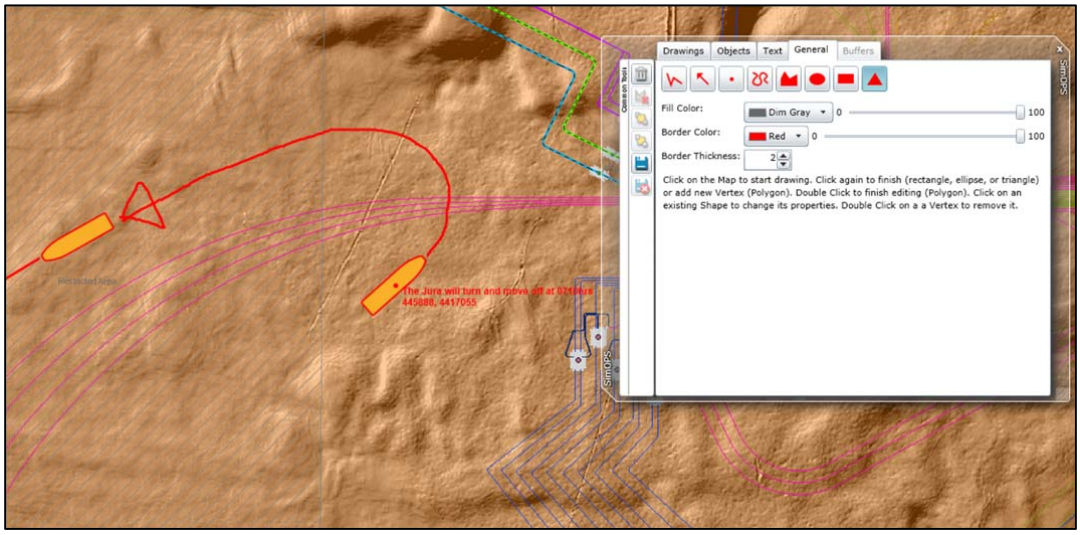


Figure 95: Adding General Shapes

The shapes can be added to the map by first selecting the shape you wish to use from the buttons and any additional parameters from the options provided. For the majority of the shapes they are drawn by clicking and dragging the shapes onto the map. For the points and

polygon shapes are drawn through individual clicks, with each adding an additional vertex.

Unwanted shapes can be deleted by selecting them and using your delete key or through the Delete tool found on the left hand toolbar on the SimOPS window.

4.13.7 Adding Buffers to your Drawing

Buffers can be added to the drawing to allow for the depiction of work and restricted zones. To add a buffer you must first select a vessel in your drawing. This is done by left-clicking on it. With the vessel selected, the 'Buffer' tab will become active allowing you to switch to it.

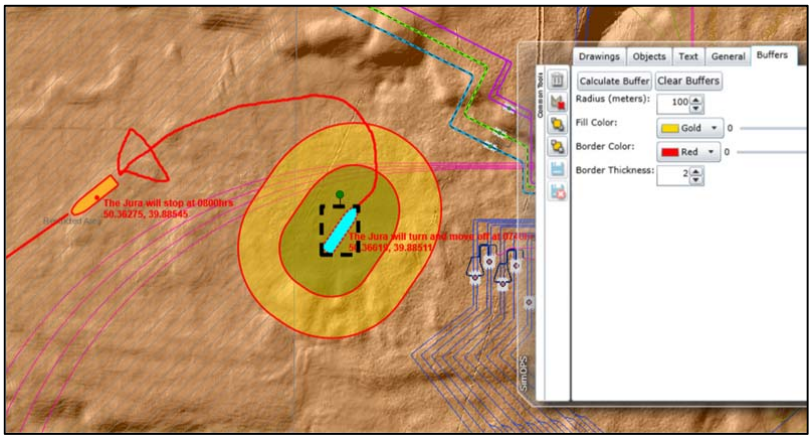


Figure 96: Adding Buffers to drawings

The 'Buffer' tab allows you to choose the radius of your buffer, as well as its fill colour and transparency; along with its border colour, transparency and thickness. With suitable formatting selected, the buffer can be created by clicking the 'Calculate Buffer' button.

Additional buffers can be created, either for the original vessel or against other buffers. This allows for complex modelling of workflows. Buffers are also dynamic and will move along with its parent vessel or buffer.

Buffers can be deleted individually by selecting them and using the 'delete' key on your keyboard or the delete button in the right hand SimOPS toolbar. All the buffers for a selected object can be deleted by using the 'Clear Buffers' button in the Buffer tab.

4.13.8 Ordering Tools

A set of ordering tools have been included in the SimOPS module to allow for the easy arrangement of multiple over-lapping graphics into a specific order. The tools are found on the common toolbar, located to the left of the SimOPS window, and consist of a 'Bring to Front' and a 'Send to Back' button.

These tools are used by first selecting the object you wish to re-order. Its level can then be altered by simply clicking on one of the two tools outlined above.

4.13.9 Saving a Drawing

Once you have created your drawing you will want to save it, it is also advisable to save the drawing whilst creating it. The drawing is saved by clicking the 'Save' button located in the left hand SimOPS toolbar. Upon clicking this button you will be shown an overview of your drawing and will be prompted to add a Name and optional Description for the drawing.

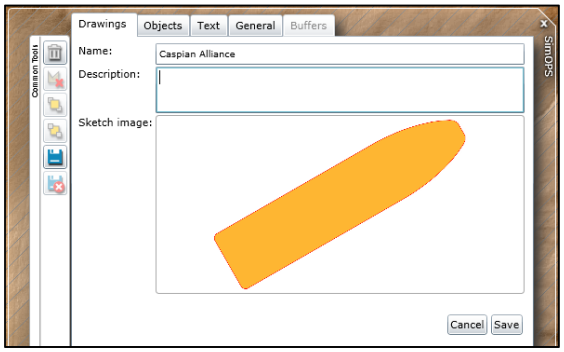


Figure 97: SimOPS save screen

4.13.10 Editing a Drawing

Existing drawings can be edited in two ways. The drawing's name and description can be edited by clicking on the pencil tool found on the left-hand side of the Drawing list. The shape and vessel outlines within the drawing can be edited using the 'Edit' button found at the bottom of the SimOPS window.

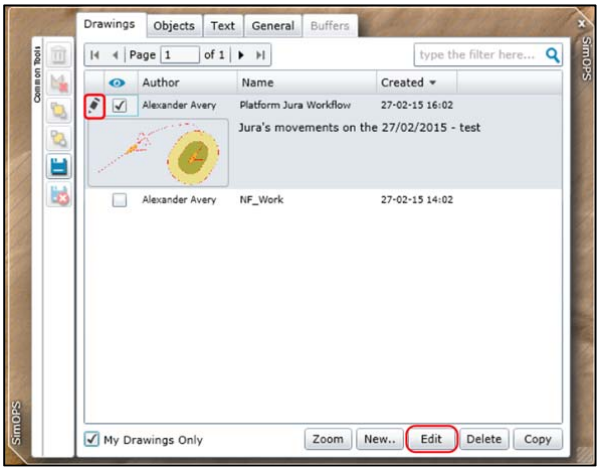


Figure 98: Drawing editors

To save your edits either click the 'Save' button for the Descriptions and Names. Or the 'End Edit' button, which is found on the drawing tab in the same place as the Edit button, to both save and end your edit session.

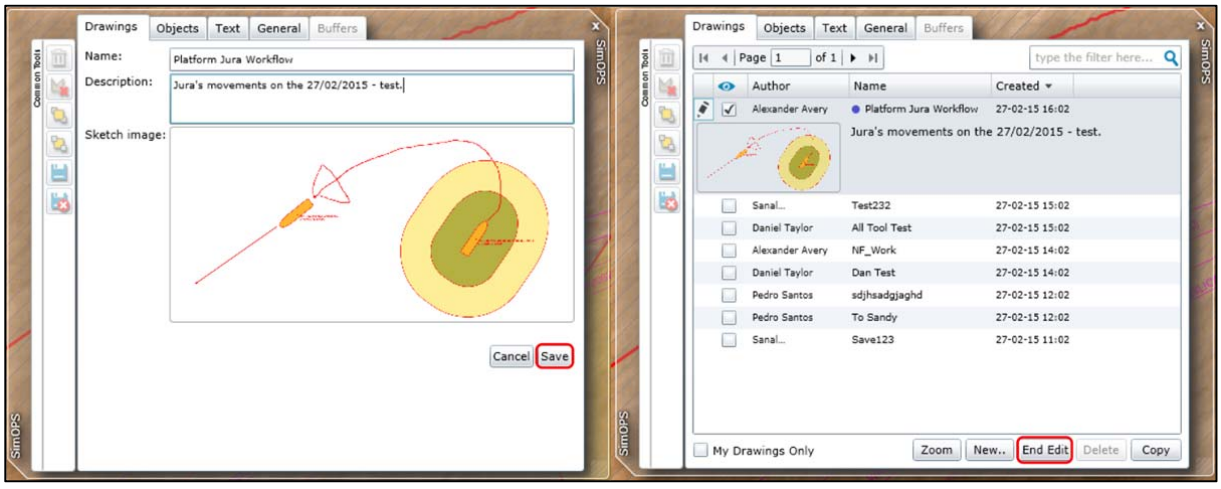


Figure 99: Saving edits

4.13.11 Deleting an existing Drawing

Your old drawings can be deleted from the system by using the delete button found at the bottom right of the drawing list.

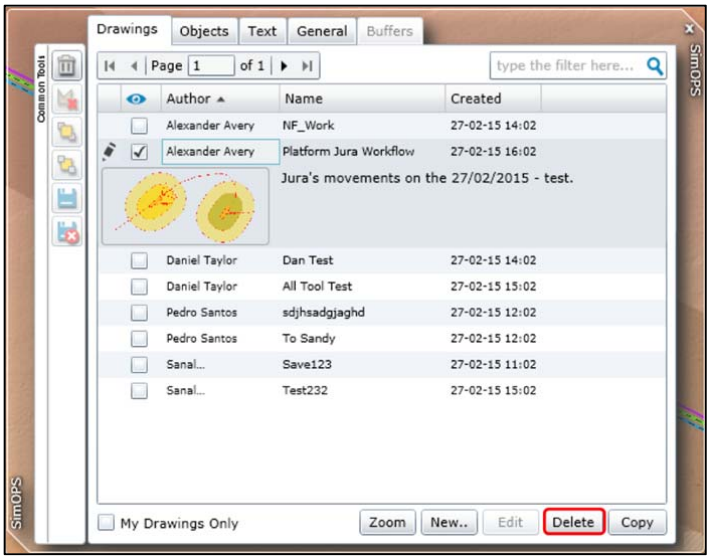


Figure 100: Deleting Sketches

To delete a sketch you must own it or have write access to it and cannot be currently editing it.

4.14 AIS Vessel Tracking

The Vessel Tracking panel provides useful information on vessels and their real time location on the map display window. It is enabled by left-clicking the Vessel Tracking button located on the top toolbar.

Figure 101: Toggle Vessel Tracking Panel

The Vessel Tracking panel is split into four sub divisions.

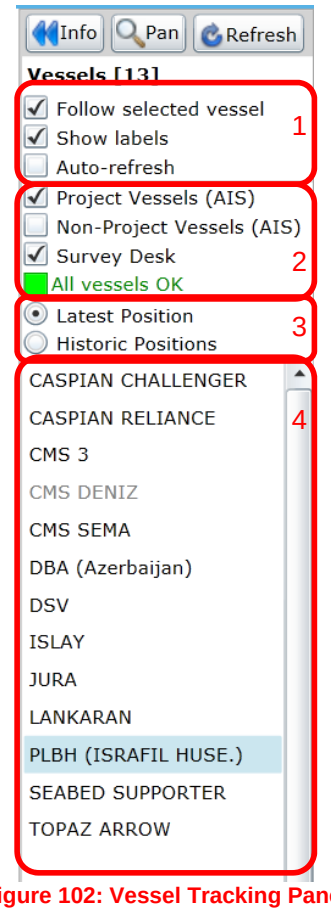


Figure 102: Vessel Tracking Panel

Block one contains a set of check box tools allowing the user to have the map automatically pan as the vessel moves, hide or display vessel labels in the map and auto-refresh vessel data (useful for tracking on-going vessel activities).

Block two contains a set of check box filters applied to the list of available vessels. Project and non-project vessels can be displayed independently. Survey Desk data is used to supplement AIS data for tracking non-AIS enabled vessels and equipment. Typically this would be ROV's which are tracked via a different data stream managed by the onboard

survey vessel equipment. Finally an AIS feed status is displayed using traffic light colour scheme. Click this button to view further information on vessel feeds.

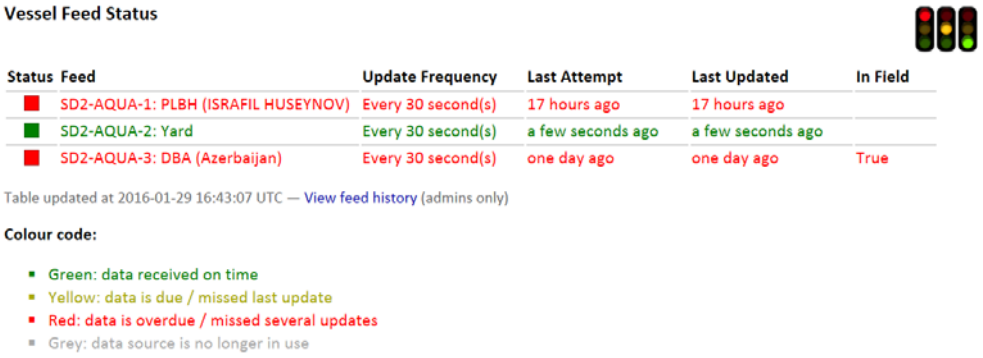


Figure 103: Vessel Feed Status

Block three allows the user to switch between a live data feed and historic vessel positions from a user set time period. See section 4.14.2.

Block four contains the list of filtered vessels which are currently being displayed in the map window.

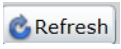
4.14.1 Locating a Vessel

To locate a vessel select it from the Vessel Tracking panel and click the Pan button

to centre the vessel in the map window. This is performed at the current map scale and so it may be necessary for the user to zoom in or out as required.

While a vessel is selected more information for that particular vessel is available by clicking the Info button

. A picture of the vessel (where available) is displayed along with detailed navigation and contact information. This can be hidden again by clicking the info button arrows.

When looking at vessel data it is advisable to have the auto-refresh check box ticked so that the user has the most up-to-date data available. If low bandwidth restricts this then the auto-refresh can be turned off and the user may manually refresh the vessel data by clicking the Refresh button 

as desired.

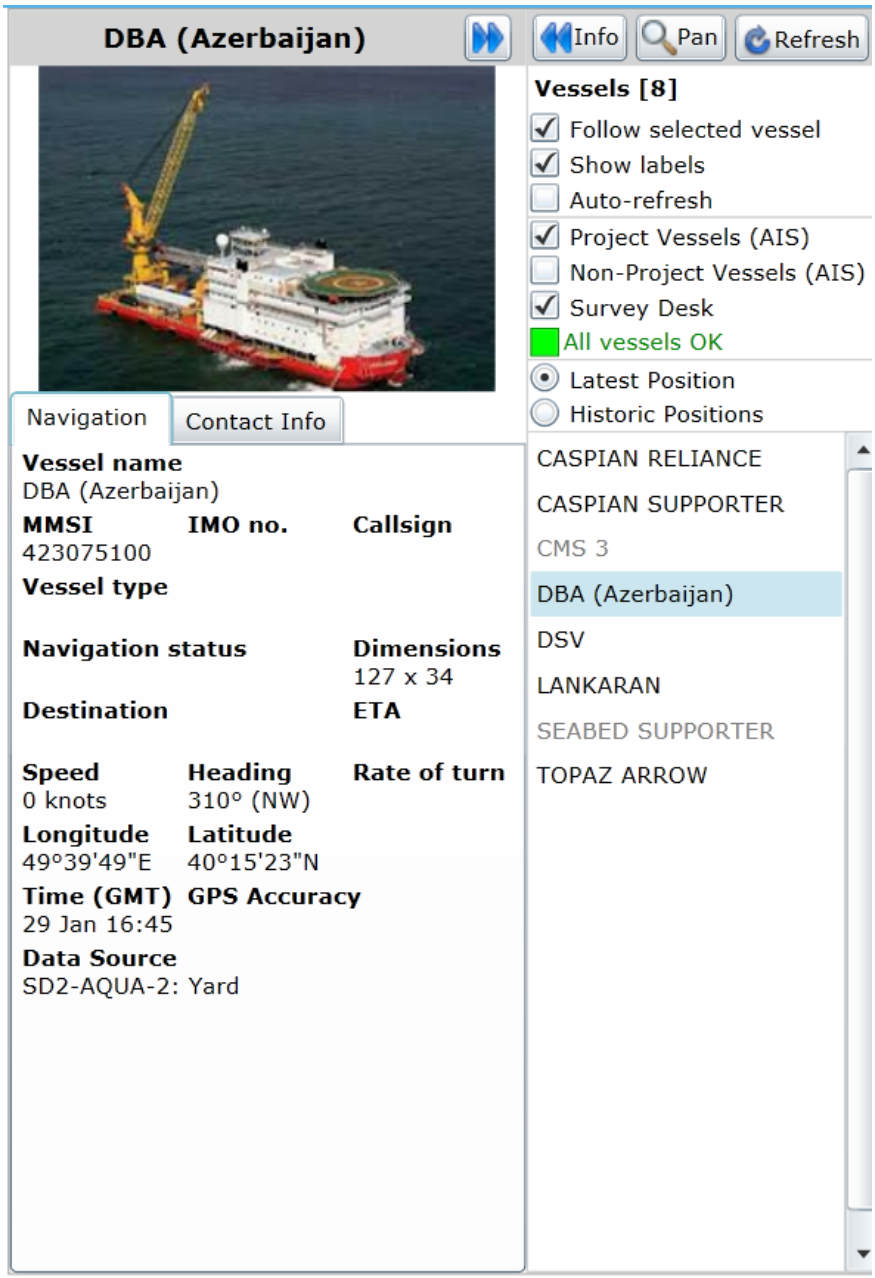


Figure 104: Vessel Navigation Information

4.14.2 Historic Vessel Positions

Selecting Historic Positions in the Vessel Tracking panel will open a further menu to query past vessel data. Select a date from the calendar search, manually type in a time interval and click load. The time interval must be entered as UTC so it may be necessary to factor this if working with Azerbaijan Time (UTC+4).

Once the data has been loaded use the media style navigation bar to play, pause, rewind, fast forward and skip through the data viewed in the map window.

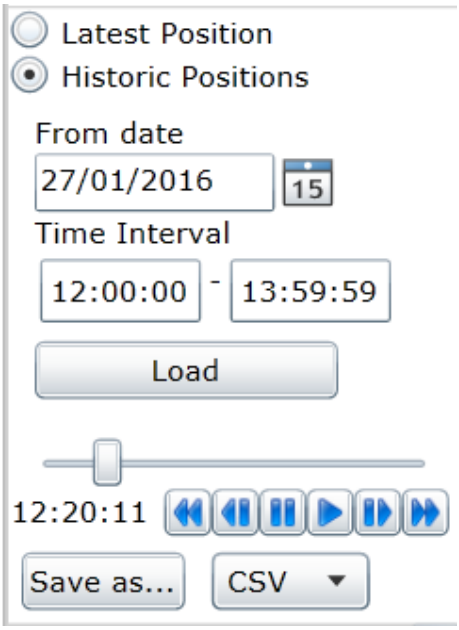


Figure 105: Historic Positions

The vessel location data can be exported to CSV, GPX or KML files by selecting the relevant format from the drop down menu and clicking Save as.

5 Reports

Clicking the “Reports” tab opens the self-service reports page. This enables information to be retrieved from the PODS database, including manufacturing and testing information prior to installation (when it will also be retrievable through the Web GIS).

To run a report, first click on one of the listed reports.

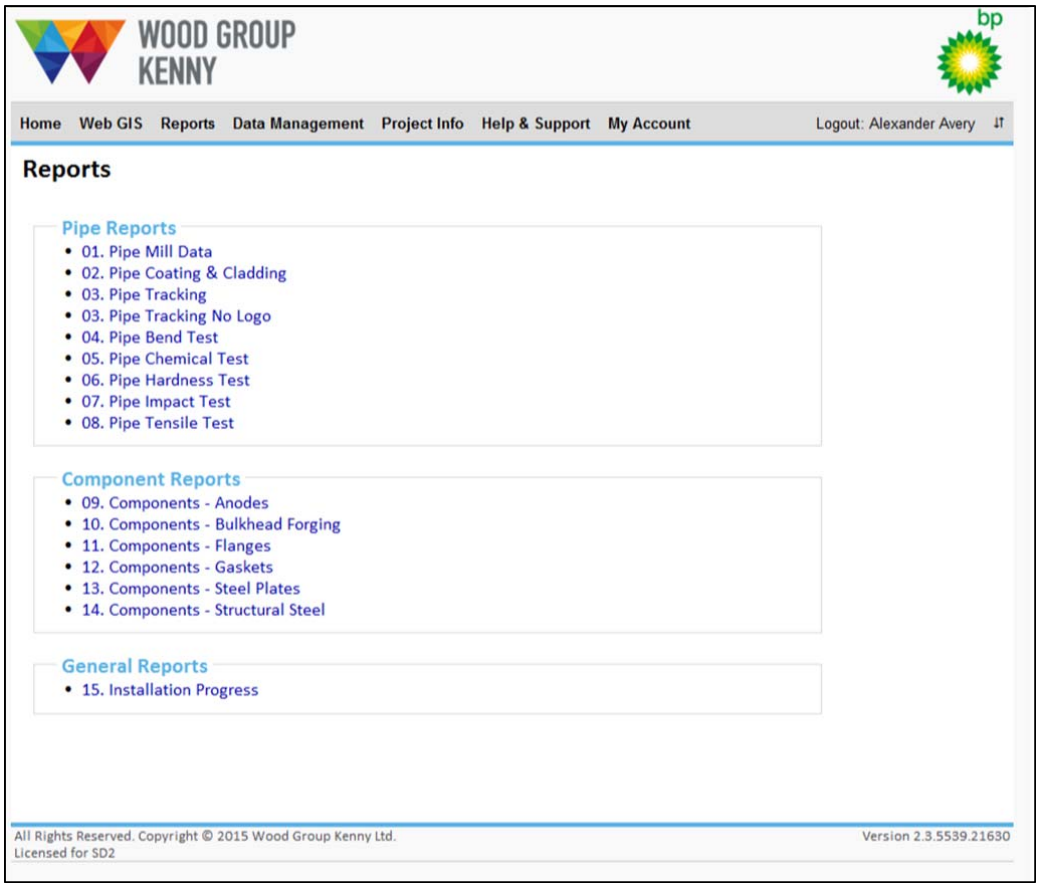


Figure 106: Reports Selection Page

This will open a new page that enables you to select the output format (PDF, CSV or EXCEL) and to refine the information returned in the report using a combination of free text boxes and dropdown lists. You can also choose if you want to include company logos and banners in the report. It is recommended that these are not included if the report is to be used in excel or similar software.

The example below is a search for pipes that fulfil the following criteria:

- Nominal Internal Diameter = 313.8mm
- Nominal Wall Thickness = 38.76mm
- Minimum length is 11m
- Currently located at Proclad in Dubai

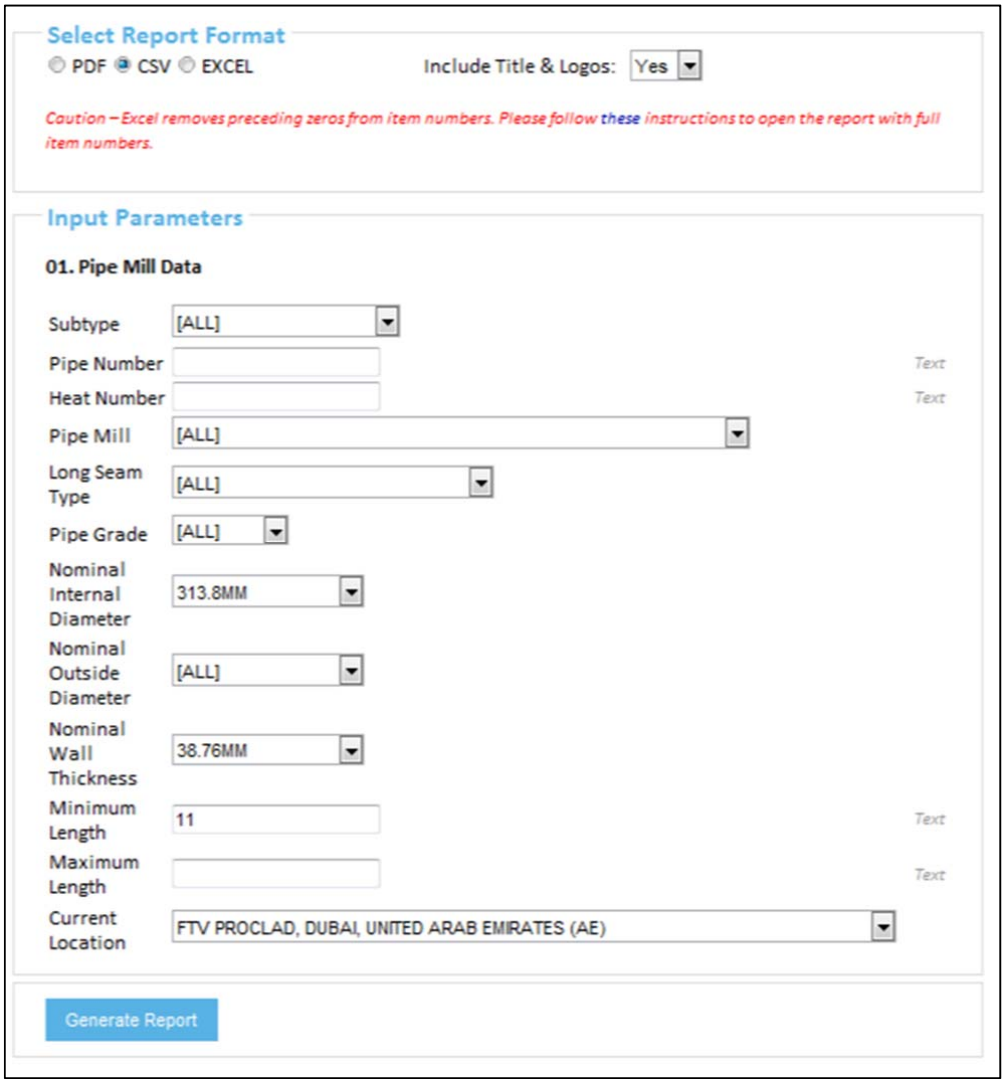


Figure 107: Report Criteria

Once the report format and search criteria have been entered, click 'Generate Report'. This will open the following dialog:

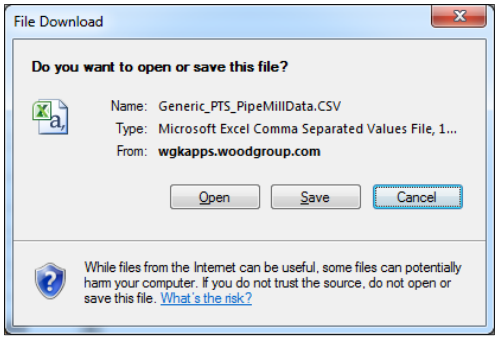


Figure 108: Report Download

The report can either be opened or saved onto a desktop or network location.

6 Project Info

The 'Project Info' tab provides information on developments within the Shah Deniz field as well as updates on any new functionality or data which is being added to the GIS system. Sections can be added to this page on request to help communicate news and information with the wider project.

This tab also includes several links to where downloads are stored for information such as daily weather forecasts and vessel reports along with weekly sea level updates.

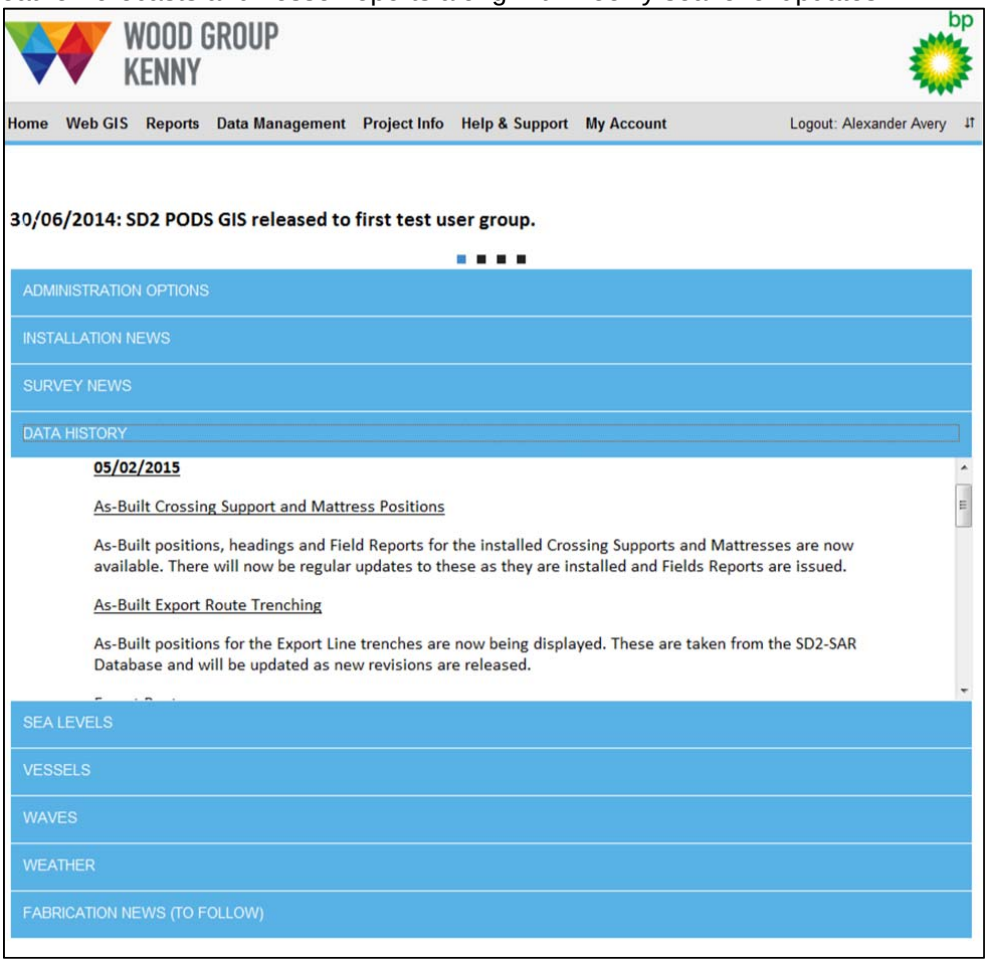


Figure 109: Project Info page

7 Help & Support

The ‘Help & Support’ page provides contact details for support, links to user guides, video tutorials, a case study, general project information and frequently asked questions.

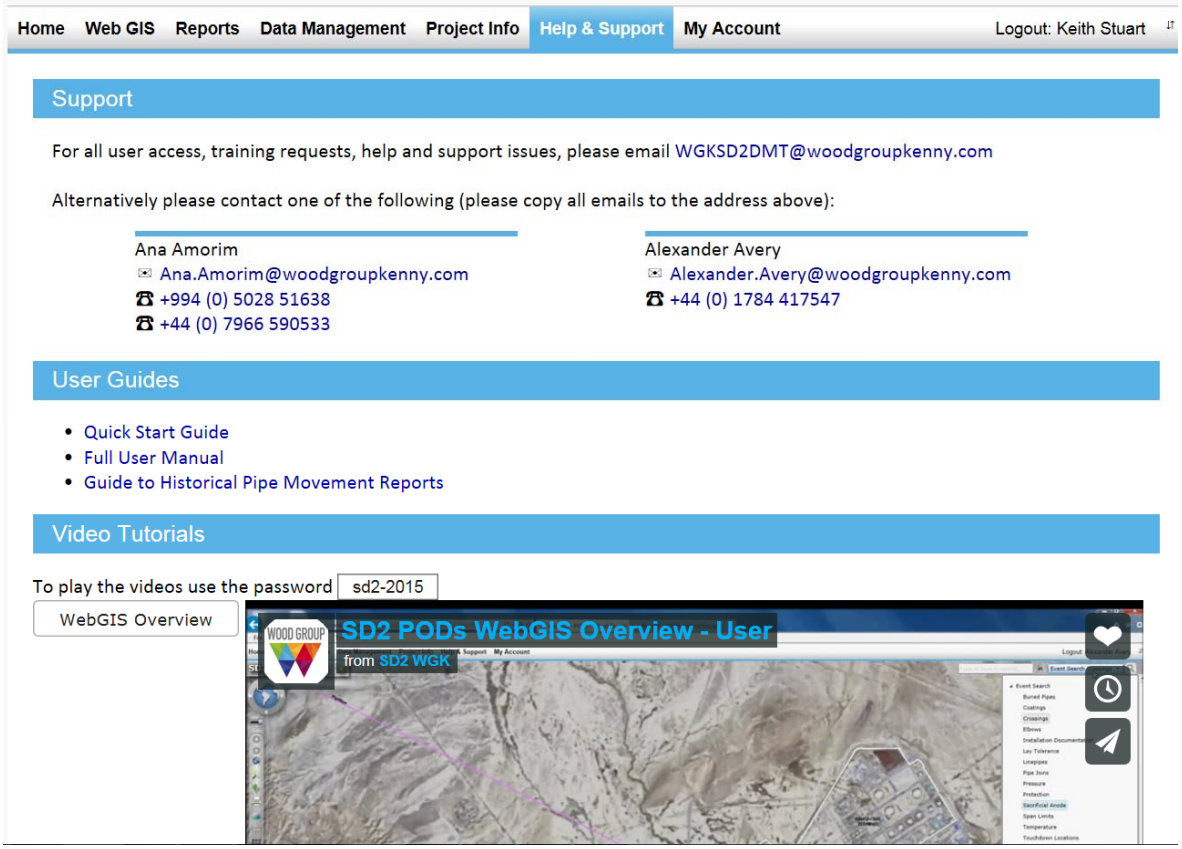


Figure 110: Help & Support

8 My Account

Clicking the “My Account” tab opens the End User account management page.

Users on the WGK network are able to update their personal details (job title, office location and telephone number) on this page.

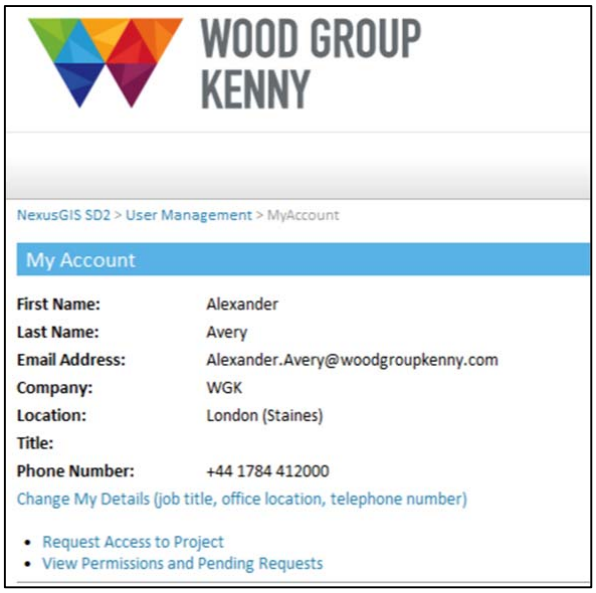


Figure 111: Wood Group Kenny Personnel

External users can also change their email address, password and security question here.

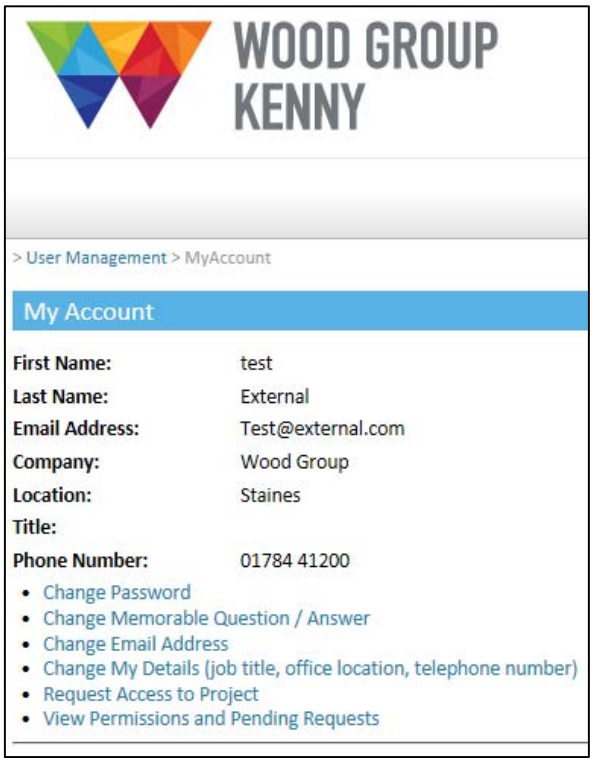


Figure 112: External Personnel