Kubla Ports User Manual

Version 5.1

Contents

Chapter

1

Introduction

Kubla Ports is software which facilitates the design and management of port and coastal infrastructure.

The software consists of core functionality (known as *Kubla Ports Essentials*) as well as a number of optional modules.

The optional modules can be licensed as required by the user. They all share a common interface which is described in the following sections.

All *Kubla Ports* files can be opened and viewed regardless of the licenses that have been activated. Even *Kubla Ports Essentials* can open a file which uses one or all of the optional components. However, it will not be possible to edit assets which have been generated by modules which are not licensed.

Modules

Kubla Ports currently has three optional modules:

|	
	Essentials *Kubla Ports Essentials* provides core functionality, including features to define and visualise bathymetry, image overlays and water levels. It also allows for the creation of generic project assets, as well attaching documentation to these assets. For further details, see Kubla Ports Essentials.
	Channels Module *optional* The *channels* module facilitates the design of approach channels using the PIANC Guidelines. For details on these calculations refer to the technical manual. As well as designing widths and depths for approach channels, dredging volumes are also calculated. If the Nav. Markers module is also activated, lateral markers for the channel can be designed. For further details, see Channels Module.
	Dredging & Reclamation Module *optional* The *Dredging & Reclamation* module allows the user to define areas of dredging & reclamation and *Kubla Ports* will calculate the dredging volumes that are required. For further details, see Dredging & Reclamation Module.
	Navigation Markers Module *optional* The *Nav. Markers* module allows the user to lay out navigation markers that are required. For further details, see Navigation Markers Module.

Interface

The interface of *Kubla Ports* is briefly overviewed in this section. Each part of the process is elaborated on in subsequent sections of this help file.

The main window of *Kubla Ports* is shown below. The controls of this window are described underneath.
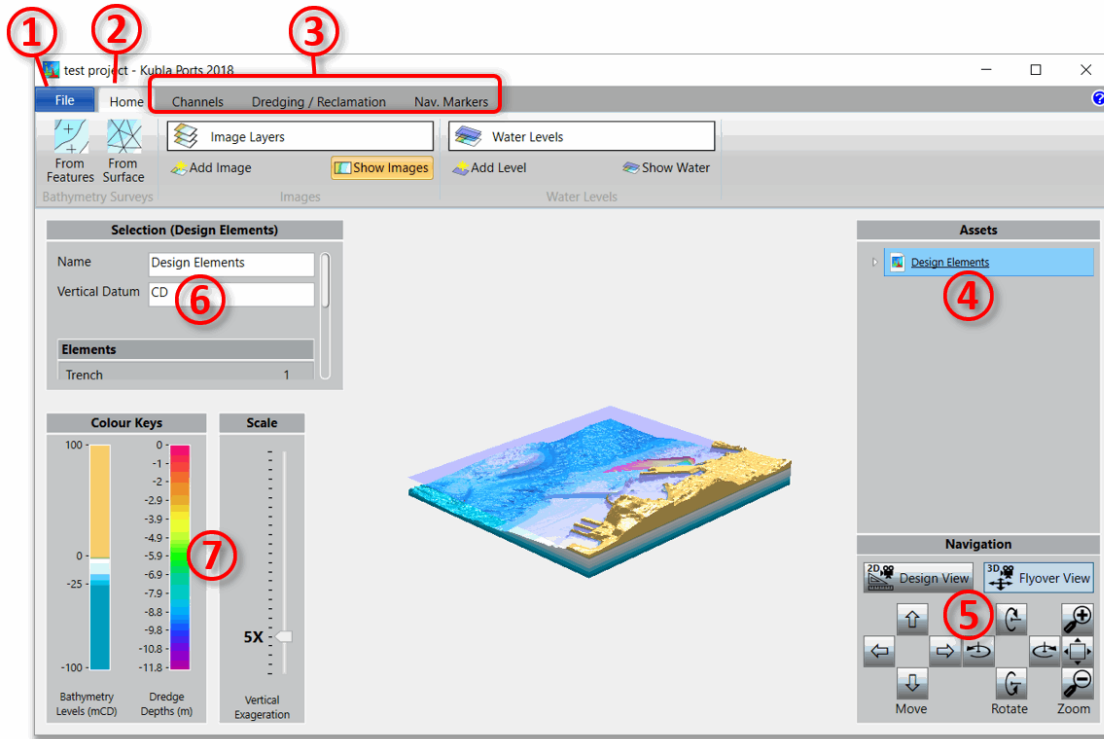
- ① The file button is used to save and load files. Software options, such as units, licenses and the background colour, are also accessed here.
- ② The home tab contains the tools to define project bathymetry, site plans, and water levels. For further details see Defining Bathymetry, Defining Image Overlays and Defining Water Levels
- ③ The remaining tabs shown will only be visible if you have activated the relevant modules of the software. They contain the tools for those modules. For further details see Channels Module, Dredging & Reclamation Module and Navigation Markers Module.
- ④ This box will display all of the project data in a tree structure. For further details see Essentials
- ⑤ Navigation. These buttons can be used to navigate the screen as an alternative to using the mouse. For further details see Navigation
- ⑥ This box will display details of the selected item.
- ⑦ This section is where the display of the project is controlled. Note that only controls relevant to the content you have loaded into the project will be shown here. E.g. bathymetry shading controls will not be displayed until you have loaded bathymetry into the project. For further details see Display

Activating Modules

Kubla Ports is licensed on a modular basis. You can license only those modules which are useful to you.

Once you have purchased a license for a particular module, you will be sent an activation code by email. To activate the module you click File, Options and then Licenses before selecting the module you would like to activate. You will be prompted to input your activation code, and once you have entered your code the module will be activated.

Units

Kubla Ports can display a variety of units. These will initially be set to default values depending on the region settings of the computer. However, these settings can easily be changed by clicking File, Options and then Units

Kubla Files are units-independent, and the units setting applies to the computer rather than the saved files. In other words, if one user's computer is set to show metric units and they save a file and send it to a user whose computer

is set to show imperial units, the file will open correctly with the correct values, but displaying imperial instead of metric units.

Kubla Ports does not currently support spherical co-ordinates. It is assumed that co-ordinates will have been converted into a Cartesian co-ordinate system (such as UTM) before being loaded into the software.

Important Note

No software is a substitute for engineering knowledge and judgement. *Kubla Ports* is designed to make it easier and quicker for a qualified and experienced professional to develop design options. The user is assumed to understand the relevant design guidelines described in the Technical Manual. They should familiarise themselves with how the software works by reading the Technical Manual, and apply their experience to the design process, and never blindly accept the designs that the software produces.

Chapter

2

Bathymetry

Topics:

- **Overview**
- **Definition from Features**
- **Definition from Surface**

Defining bathymetry levels is an essential step. This bathymetry will be used by the software to calculate levels throughout the site, dredging quantities, etc.

Overview

There are two options to define the existing bathymetry levels in Kubla Ports:

From Features	**From Features** This option allows you to define bathymetry features, such as contour lines or spot levels. The software will create a bathymetry surface from the features you define. For further details see Define from Features
From Surface	**From Surface** This option allows you to load in a finished surface from another file. Currently supported file formats include CAD files (.dwg, .dxf), LandXml (.xml) and Kubla Cubed Project (.kcp). For further details see Define from Surface

It is important to note that the bathymetry can either be defined from features or loaded from a surface, but not both. If it has been defined from features and then a surface is loaded the defined bathymetry will be overwritten, and vice versa.

Definition from Features

The bathymetry is defined by specifying a number of elevation features, either by tracing them on the screen or loading them from a file. Any combination of the following features can be used to define the bathymetry:

	Outlines This element is used to define the boundary(s) of the project area. Usually there will be only one outline, but it is possible to define more than one to create several 'islands' of bathymetry
	Contour Lines Contour lines (or isolines) are used to define lines on the bathymetry with a fixed elevation
	Point Levels Point levels are used to define the levels for individual points in the bathymetry area

The properties of each feature vary depending on the feature type, but they all have a 'Tag' which can optionally be set. This is an identifier for the feature (akin to the feature's name), and it is used to help the user identify particular features.

Adding Elevation Features

Elevation features can be added either by tracing them manually on the screen, or by loading them in from a file. Outlines and contour lines can be loaded from a CAD file (.dwg, .dxf) whereas Point Levels can be loaded from either a CAD file or from an excel or text data file.

To add a new feature, select the feature type that you want to create ① and then click either Add Manually ② or Add from File ③.
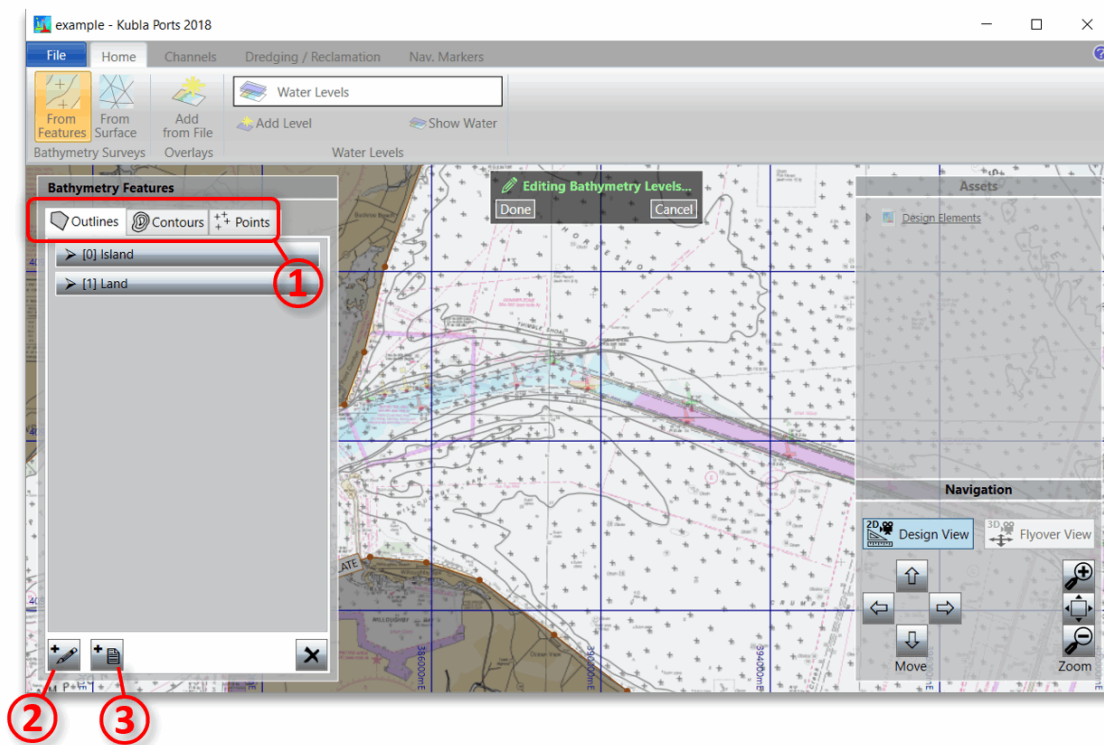
For more information on tracing elevation features on the screen see Adding features Manually. For more information on loading a CAD file see Adding dxf Features, and for point data files see Loading Points from a File.

Draw Features On-Screen

The process once you have clicked on the button to add a new elevation feature on-screen depends on the type of feature you have selected. In all cases you draw the features in the design area on the right of the screen.

- **Outlines**

    When you choose to add an outline, the following prompt will appear, providing two options to create outlines.
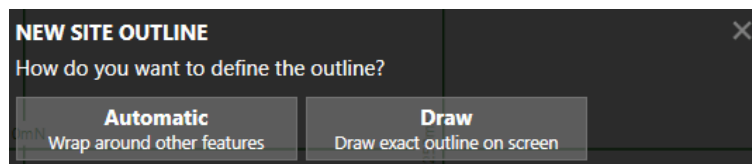
- **Automatic outline**. If you choose this option the software will automatically create outlines, based on the features that you have defined. This process is analogous to wrapping a rubber band around the features that

you have already defined to create an outline. You will be able to adjust how much this 'rubber band' is 'sucked in'.

- **Draw**. If you choose this option you will draw an exact outline on the screen. You will be provided with a number of options to set the levels for this outline:

  1. *Extrapolate from other Features (Default):* Takes the levels from nearby elevation features that you have defined (e.g. contour lines and points).
  2. *Define Varying Levels:* Allows you to set levels for the outline which vary at each point. This can be used if you need maximum control of the surface outline elevations.
  3. *Define Fixed Level:* Allows you to set a single level for the outline, this is only used in very unique scenarios.
  4. *Use Ground Levels:* Snaps the Outline elevations to the ground (This can only be used with a feature surface used to define proposed earthworks)

When you choose you preferred option follow the steps to completed the outline. Once you have finished you will see the prompt below.

You can define a Tag for the Outline if you wish. Click Next to draw another Outline, or Finish to stop drawing Outlines.

- **Contour Lines**

Draw each point of the Contour Line by left clicking on the designer panel. Finish drawing the contour by right clicking, or by pressing the enter key. The following prompt will appear:

You should type the level for the Contour Line into this prompt. You can also define a Tag if you wish. Lastly if the Contour Line is a closed loop you can click the Closed checkbox. Click Next to draw another Contour Line or Finish to stop drawing Contour Lines. Note that the '...' before the 'Level' input box can be used to adjust the levels you type. E.g. if all of your levels start from an elevation of 1000 you can click on '...' and input '1000+'. You can then type, for example '26' into levels box and this will be converted into '1026'. This can save time in some take-off scenarios.

- **Point Levels**

Draw the Point Level by left clicking on the designer panel. The following prompt will appear:

You should type the level for the Point Level into this prompt. You can also type X and Y values for precise positioning. If you wish, you can type a Tag for the Point Level. Click Next to draw another Point Level or Finish to stop drawing Point Levels. Note the comment on 'Contour Lines' above regarding the '...' in front of the level input box.

Load from a CAD File

Once you have selected a CAD file the following window will appear. Note that this window will only display the features that can be interpreted as a feature type you have selected. I.e.

- **Outlines:** Only closed lines will be displayed
- **Contour Lines:** Only lines will be displayed (closed or open)
- **Points:** Only points will be displayed
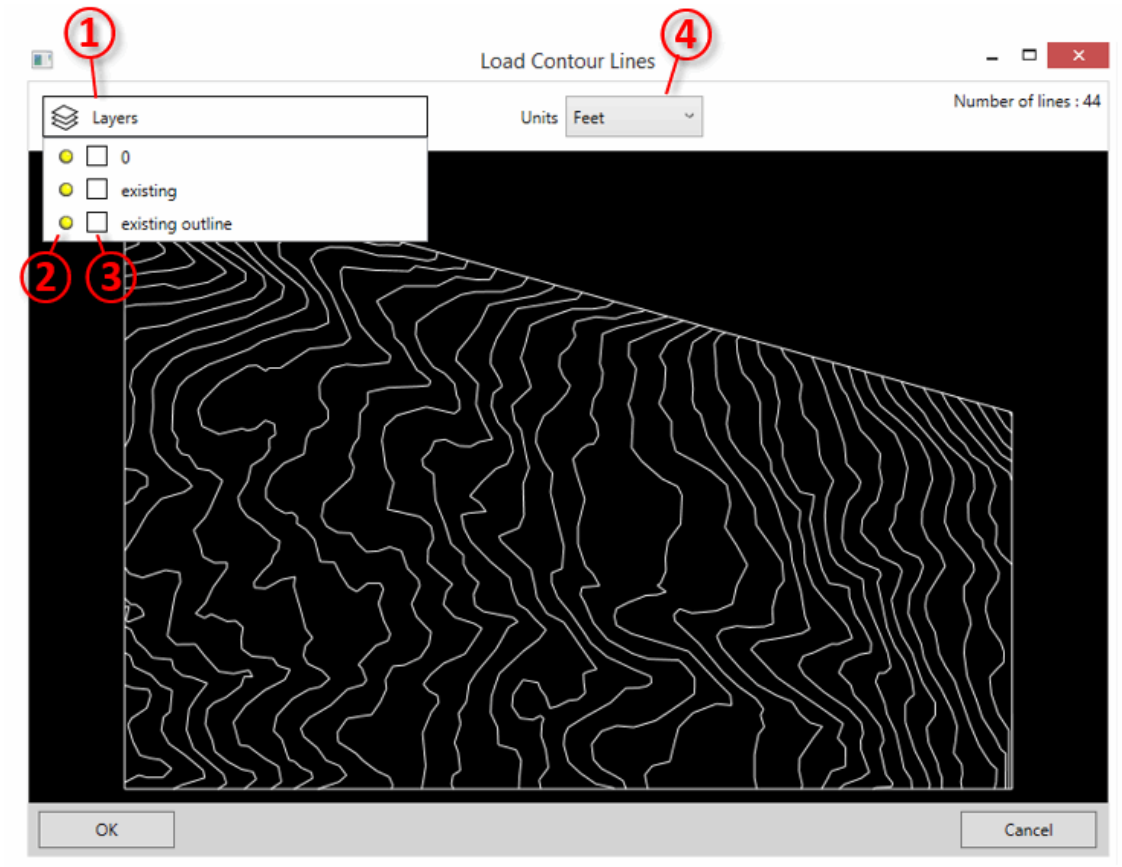
You can inspect the layers in the file by clicking on the Layers Bar ①. You can toggle each layer on and off ②. Layers which have been turned off will not be imported. You can also change the colour of layers by clicking in the colour box ③. This is purely to help identify different layers in this window, and the changes you make will not be saved into the CAD file.

The other important setting is the units of the file which can be chosen from the dropdown ④. By default, the units are set to metres if the dxf's insertion units are metric. They are set to feet if they are imperial (English units). However, the insertion units variable is often set incorrectly when dxf files are saved, so it is important to check that this is as you expect.

Load Points from a File

Once you have selected an excel or text file the following window will appear. In the case of an excel file, the 'File Format' and 'File Preview' sections will not be there, as this is only used when importing from text file formats.
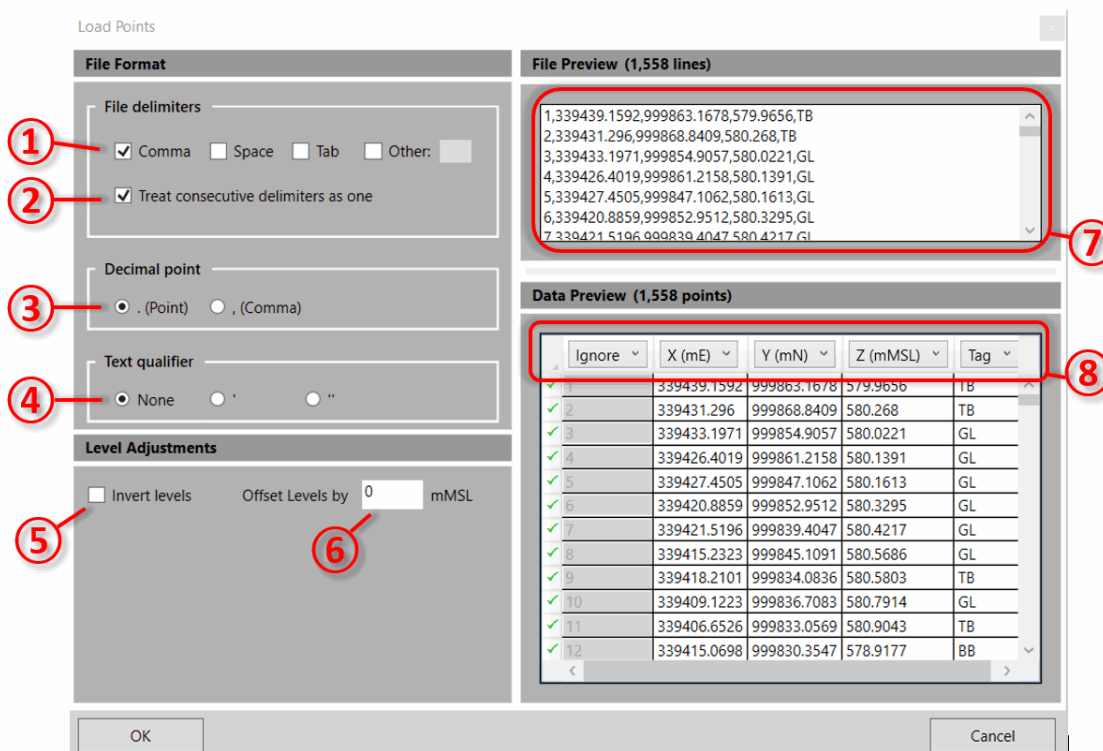
If you are using a text file it is necessary to define the file format with the controls on the left. In many cases the file will immediately show correctly in the previewer. However, if you have an unusual file format you may need to amend the details of the file format on the right side as follows:

You will see a preview of the raw data in the text file ⑦ which will help you to determine the settings you need to select for the file format.

- ① File delimiters Specify what character is used to delimit the fields in your file. Files are typically tab, comma or space delimited, but any character can be specified here by clicking Other and typing in the text box.
- ② Treat consecutive delimiters as one Specify whether several consecutive delimiters in a file line should be treated as one, or if these should be treated as several fields with empty values.
- ③ Decimal Point Specifies whether your file uses a point or a comma to denote a decimal point. This is used to deal with different number formats used in different parts of the world.
- ④ Text Qualifier Specifies the character that is used on either side of a text field in the file, if your file contains text fields.

There are also some controls which can be used to adjust the levels (Z values) in the file:

- ⑤ Offset Levels by - If the points in your file are offset from the vertical datum you want to use then you can specify it here.
- ⑥ Invert Levels - *Kubla Ports* uses upwards-positive convention for levels. If your file uses upwards-negative convention, then you can use this option to invert the values in your file so that they are suitable for *Kubla Ports*. This option is mostly used for hydrographic surveys, which often report depths as positive values.

Finally, you must specify which columns in your file represent the X, Y, Z and Tag (if it contains tags) values for the data. This is done by clicking on the column header in the data preview ⑧ and selecting *'X'*, *'Y'*, *'Z'* or *'Tag'* from the dropdown. You can also specify *'Ignore'* if that column contains data which is not relevant.

Edit and Delete Features

Elements can be selected in two ways - either by clicking the element on the list to the left of the window, or by clicking on the element in the designer panel. Note that only the current element type is selectable in the designer panel. E.g. in the example shown below only contour lines ① are selectable in the designer panel. Multiple elements can be selected by holding down the shift key and clicking on several items.

Once features have been selected, they can be deleted by clicking on the Remove ② button.
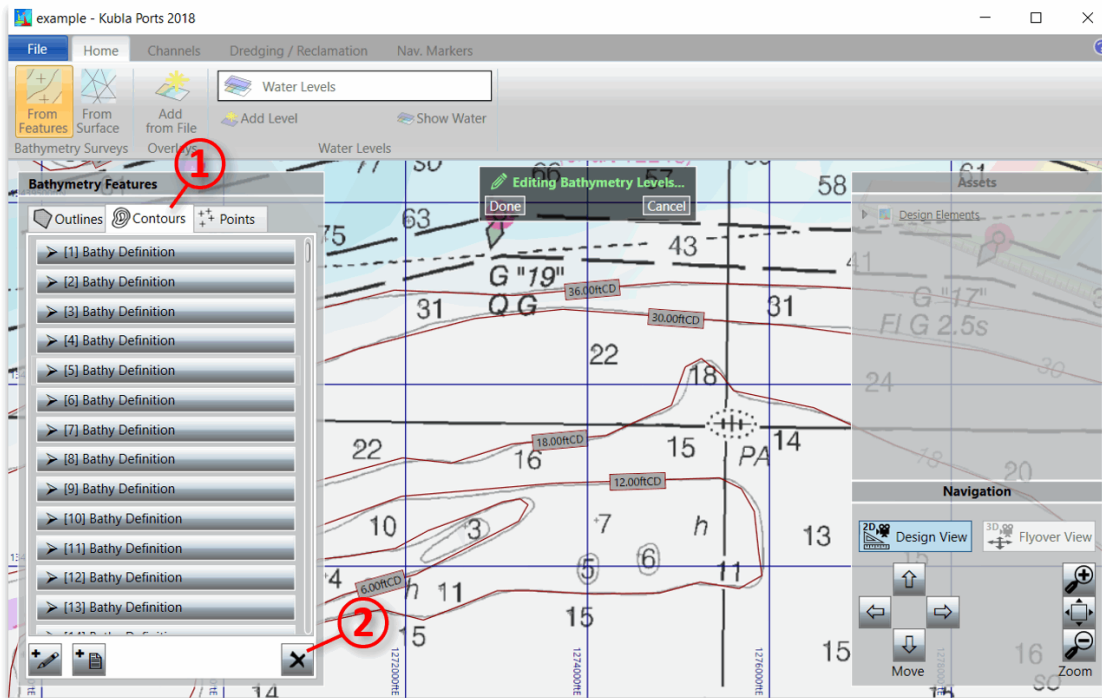
A feature can be edited by double-clicking on it in the side bar or design area. When you do this the feature will be expanded in the side bar, exposing its properties so that you can change them. You can now edit this feature, either by typing new values into the side panel or by dragging points and lines in the designer panel ②. Points can be added to or removed from lines by clicking on the ± button in the table ①.
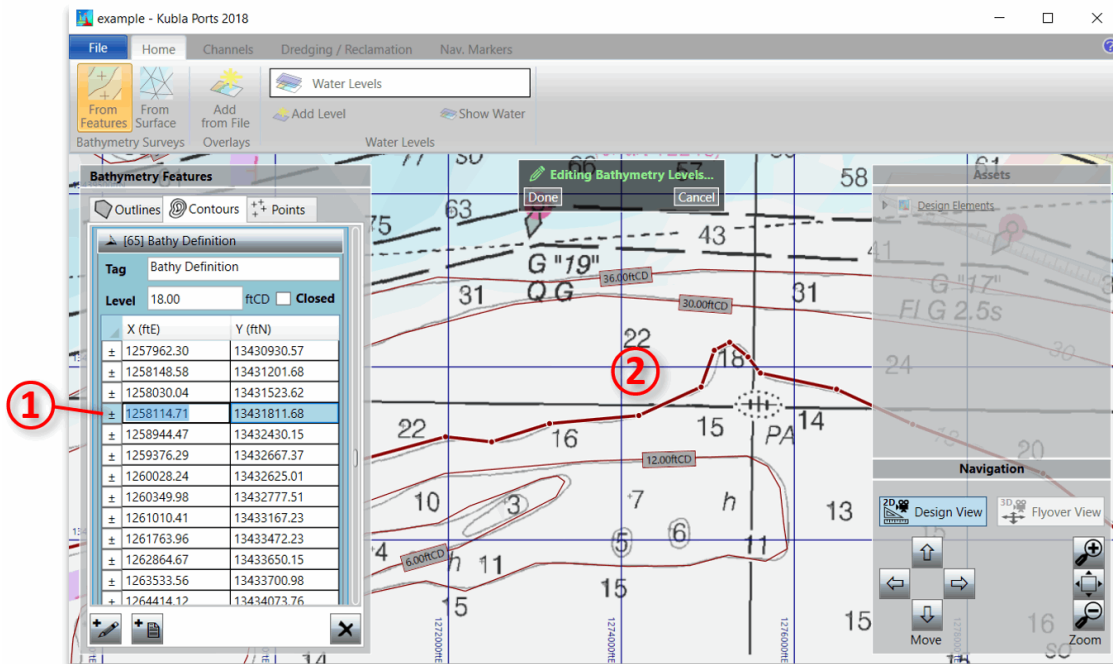
Definition from Surface

To load the existing bathymetry from another file, click From Surface in the bathymetry section of the home ribbon. The following window will appear:
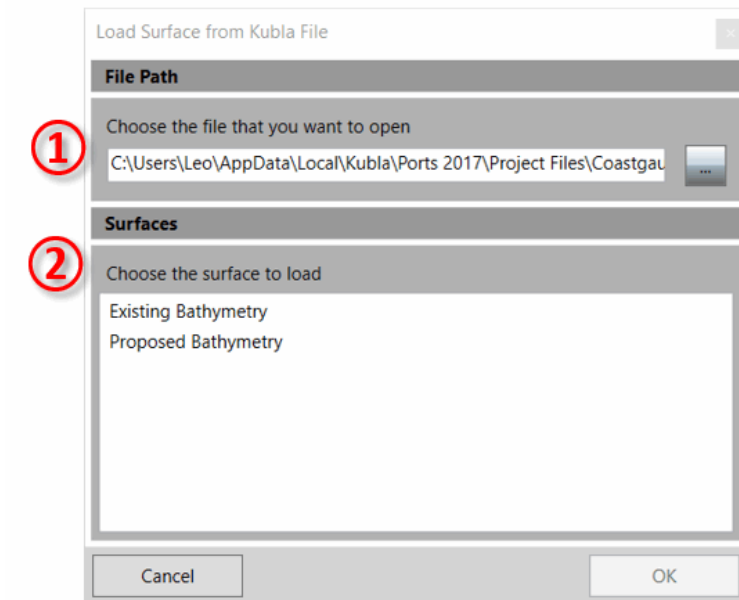
The first thing to do is to select the path of the file that you wish to import the bathymetry from ①. Once you have done this a list of the surfaces contained in the file will be displayed ②. Select a surface from this list and press OK to import it into the project.

Chapter

3

Water Levels

Topics:

- Overview

Water levels optionally be defined for the project. The water level is principally for visualisation, but it is also used to display water depths at locations.

Overview

Any number of water levels can be defined for the project. This functionality is typically used to define standard water levels, such as the Lowest Astronomical Tide (LAT), Highest Astronomical Tide (HAT) and Mean Sea Level (MSL).
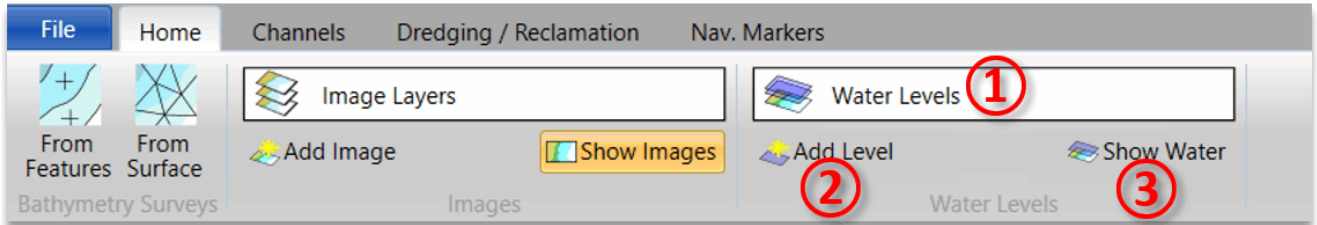
To add a water level click Add Level ② in the water levels section of the home tab. You will be prompted to type in a name, description and level relative to the project datum. Once you have done this the water level will be added and will be displayed in the drop-down list ①. From this list you can edit or delete the water levels you have defined.

The project visualiser will only show the active water level. The active water level is indicated with a tick on the water levels drop-down, and it can be changed by clicking on a different water level on the list. It is also possible to turn off the display of all water levels by toggling the Show Water ③ button in the water levels section of the home tab.

Chapter

4

Navigation

Topics:

Navigation is done either using the mouse, the keyboard or the buttons on the navigation panel. The way the navigation works depends upon the camera you have selected for display. For more information on camera selection see

Overview

The following controls are the same regardless of the camera you have selected.

2D	**Design View** A 2D view of the project. This view is always used when drawing entities on the screen
3D	**Flyover View** A 3D flyover view of the project

The following controls are the same regardless of the camera you have selected.

🔍+	**Zoom In** Keyboard: *'+' key* Mouse: *Scroll Wheel Forwards*
🔍−	**Zoom Out** Keyboard: *'-' key* Mouse: *Scroll Wheel Backwards*
⬌	**Zoom to Extents** This button zooms to frame all visible items.

The rest of navigation controls depend upon the camera you have selected. For more information see Navigating in Design View and Navigating in Flyover View

When you select a project asset the software will automatically navigate to the frame that asset. You can reverse this automatic navigation by pressing 'b' to go back a camera navigation step.

Navigation in Design View

The following controls are available to navigate in design view, in addition to the general navigation controls described here

⇨	**Pan Right** Keyboard: *'right arrow' key* Mouse: *Press Scroll Wheel and Move Mouse Right*
⇦	**Pan Left** Keyboard: *'left arrow' key* Mouse: *Press Scroll Wheel and Move Mouse Left*
⇧	**Pan Up** Keyboard: *'up arrow' key* Mouse: *Press Scroll Wheel and Move Mouse Up*

	Pan Down
	Keyboard: *'down arrow' key*
	Mouse: *Press Scroll Wheel and Move Mouse Down*

Navigation in Flyover View

The following constrowols are available to navigate in flyover view, in addition to the general navigation controls described

	Move Right
	Keyboard: *'right arrow' key*
	Mouse: *Press Scroll Wheel and Move Mouse Right*
	Move Left
	Keyboard: *'left arrow' key*
	Mouse: *Press Scroll Wheel and Move Mouse Left*
	Move Forward
	Keyboard: *'up arrow' key*
	Mouse: *Press Scroll Wheel and Move Mouse Up*
	Move Back
	Keyboard: *'down arrow' key*
	Mouse: *Press Scroll Wheel and Move Mouse Down*
	Look Right
	Mouse: *Press Left and Right Buttons and Move Mouse Right*
	Look Left
	Mouse: *Press Left and Right Buttons and Move Mouse Left*
	Look Up
	Mouse: *Press Left and Right Buttons and Move Mouse Up*
	Look Down
	Mouse: *Press Left and Right Buttons and Move Mouse Down*

Chapter

5

Display

Topics:

- [Overview](#)
- [Editing Colour Keys](#)

Kubla Ports has a number of controls to control the diplay of the project. These include changing shading of terrain, as well as vertical exaggeration in 3D views.

Overview

The display controls are shown in the bottom left of the main window. Only those relevant to the content that you have loaded will be displayed, and before you have loaded content none of these controls will be visible.
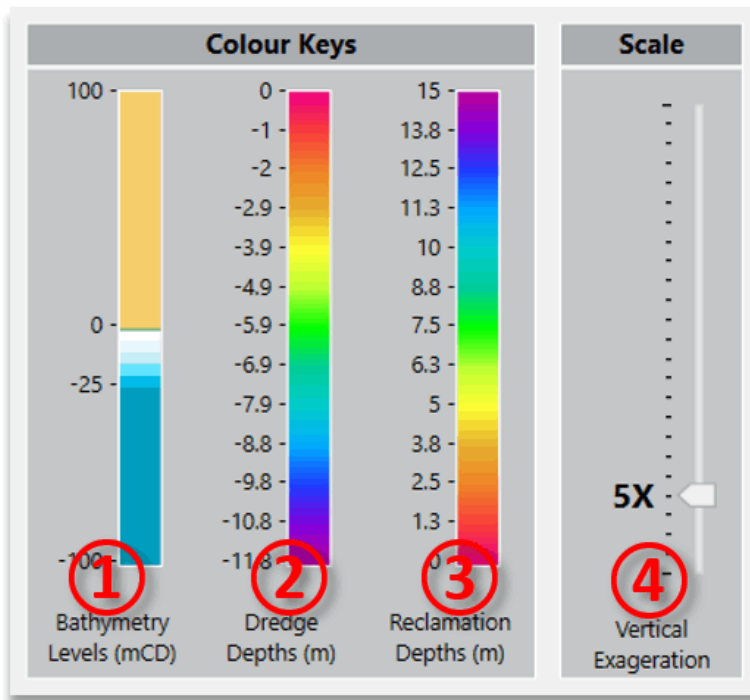
- ① Bathymetry Shading *Only displayed if bathymetry is loaded into the project*

  This controls the shading of the bathymetry levels.
- ② Dredging Shading *Only displayed if there is dredging defined with the 'Shade Depths' option turned on*

  This controls the shading of the dredging depths.
- ③ Reclamation Shading *Only displayed if there is reclamation defined with the 'Shade Depths' option turned on*

  This controls the shading of the reclamation depths.
- ④ Vertical Exaggeration *Only displayed if there is 3D content loaded and the 3D Flyover View camera is selected.*

  This controls the vertical exaggeration used to visualise the project. Since coastal project are generally relatively flat, the Z axis is often exaggerated to improve the visualisation of levels.

To edit the vertical exaggeration, simply move the slider up and down. To edit any of the colour keys, click on the key and a pop-up window will be displayed with editing options. For more detail on these controls see Editing Colour Keys.

Editing Colour Keys

The colour keys used to display surfaces can be fully customised using the window below.
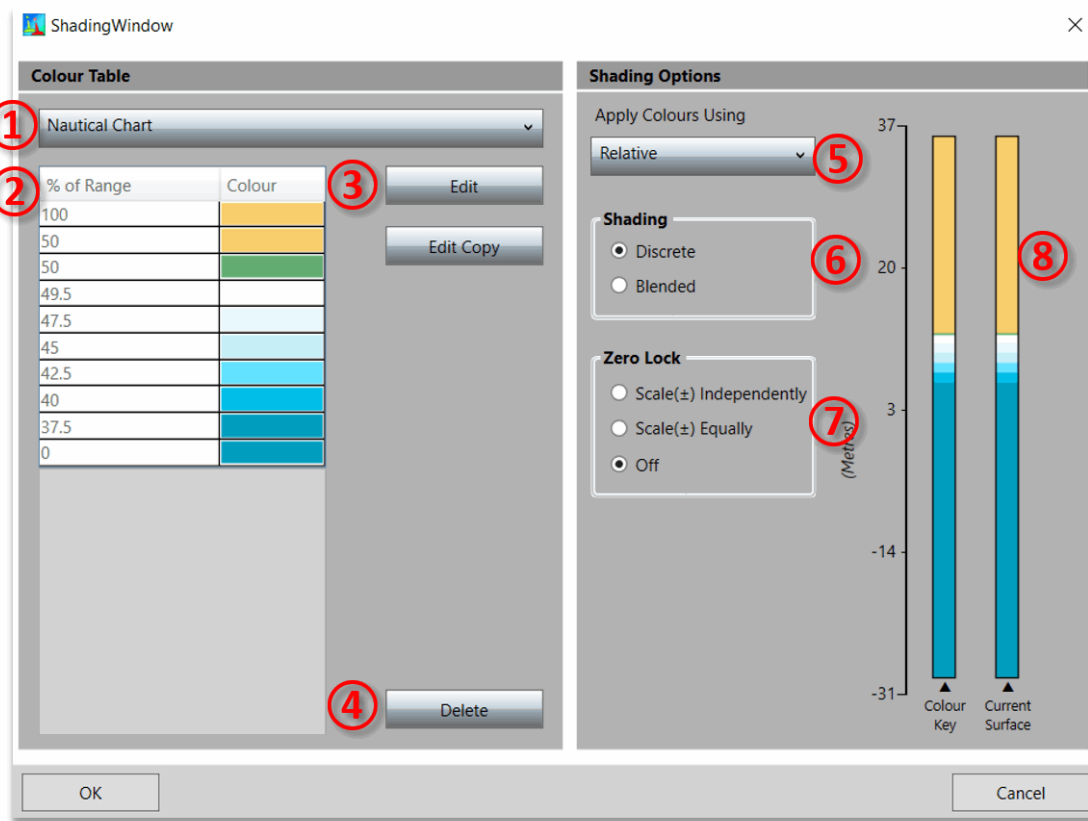
A colour key is made up of a table of colours with corresponding values ②. There is a library of these colour tables to choose from and a key's colour table can be changed by selecting a different one from a drop-down box ①. You can manage the library of colour tables by deleting ④ those that are no longer needed as well as creating and amending existing ones with the Edit or Edit Copy buttons ③.

On the hand side of the form there are options for controlling the way the colour table is applied to a surface. When you select different options, the diagram ⑧ updates to show where on the surface the colours will be displayed.

Apply Colours Using ⑤ This is where the method by which the colour table is applied to the surface is chosen. The two methods are:

- Relative A shading scheme using the relative shading will scale the scheme to fully cover the surface which is being shaded. For this reason, in relative mode colour table values show as percentages. This method is useful for ensuring that the surface uses the full range of colours in the table, and it will adapt as the design is changed.
- Absolute The absolute method applies colours using the exact values in the table. This gives total control in regard to where the colours are applied on the surface. However, it does not adapt when the surface range changes so it may need to be manually adjusted when there are significant changes.

Shading ⑥ There are two different shading options Blended and Discrete. When blended is selected the surface is shaded by smoothly interpolating between the colours in the colour table. With discrete shading colours are not blended, resulting in discrete blocks of the same colour. See the image below for an illustration of the difference between these two shading modes.

A consequence of using an absolute scheme with discrete shading is that the last colour in the table will not be used. This is because the first two values are used for the range of the first colour, the second and third for the next and so on, resulting in the last colour being redundant. In relative mode the values are adjusted to make use of all the colours in the table.

Discrete Shading

Blended Shading
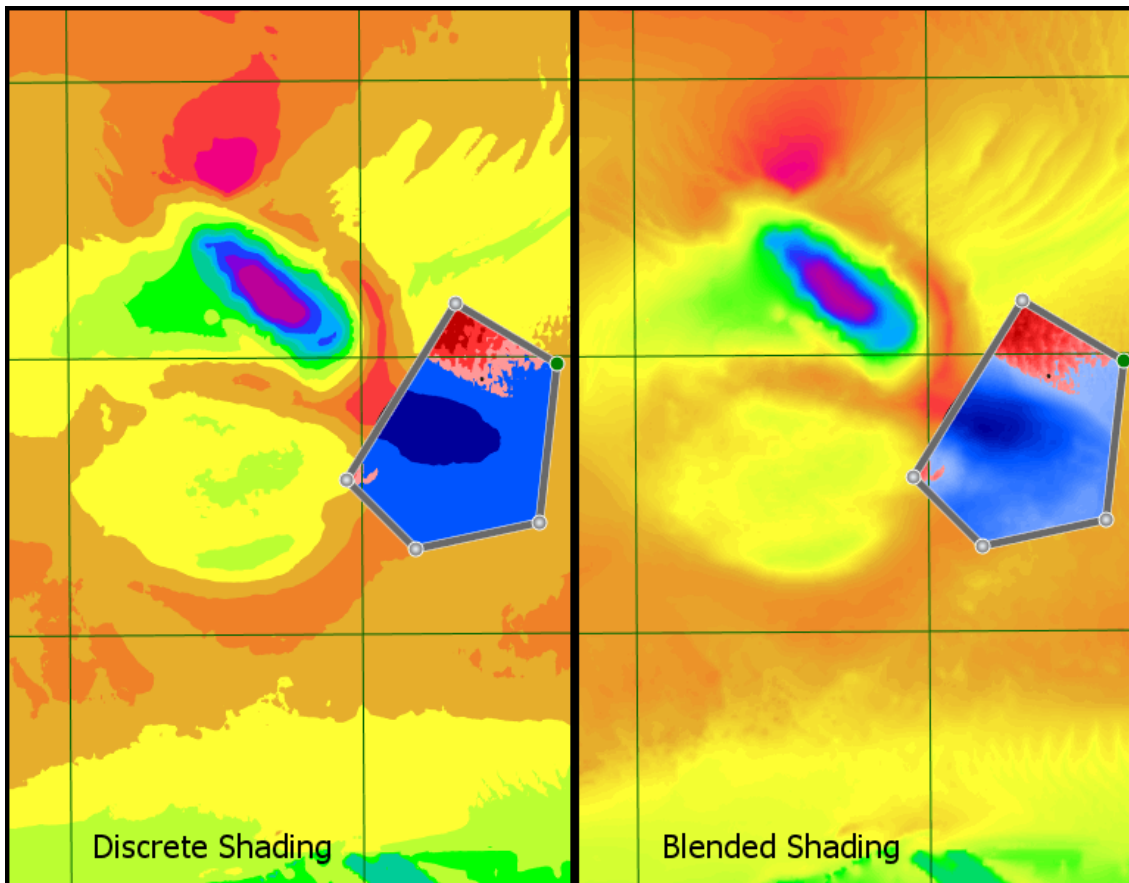
Zero Lock ⑦ *Only displayed when using relative shading and when editing bathymetry levels*

It is often a requirement when shading a surface with relative shading that a particular colour is locked to zero. For instance, when shading bathymetry you might want a colour locked at zero to indicate the difference between land and sea. With absolute shading schemes this is simply a matter of setting a colour value to zero. However, with relative shading it is a little more complicated, as the 'zero' value will be move as it is scaled to fit the surface being shaded.

To resolve this there is a zero lock feature that locks any colour with a value of zero to zero on the surface. The two different zero lock options are:

- Scale ± Independently. This scales both positive and negative values independently so that the colour table covers the entire surface. This is useful when you want to display the full range of colours in the table for maximum contrast.
- Scale ± Equally. This option scales values above and below zero equally. This is useful in many situations, particularly for a cut and fill shading scheme so that you can get a feeling for the depths of cut compared to fill. However, with this option not all of the values in the table will be displayed.

Chapter

6

Essentials Module

Topics:

- **Overview**
- **Items and Groups**
- **Exports**
- **Adding an Overlay**

Kubla Ports Essentials provides core functionality for the software. This includes the definition of bathymetry, image overlays and water levels. These aspects are covered elsewhere in this documentation. Refer to Defining Bathymetry and Defining Water Levels.

Overview

Kubla Ports Essentials also includes the ability to define a number of asset types. The following assets are currently included in *Essentials*:

	Overlay The *Overlay Element* is used to display an image overlay in Kubla Ports. This is useful to give context to the project and to draw on top of existing imagery. The ability to easily align imagery from numerous sources and file types allows Kubla Ports to be used consolidate image data into a single location. For more information see Adding Overlays.
	Generic Element The *Generic Element* is the most basic asset in Kubla Ports. It is non-specific and can be used to represent any entity. This is in constrowast to a Nav. Marker item for instance, which is a very specific entity. Generic elements are therefore versatile, but not intelligent.
	Document The *Document* is simply a document loaded into *Kubla Ports*. Any document can be loaded and basic metadata and comments can be attached to it. This element, attached to other assets in *Kubla Ports* allows the software to be used for document management.

Assets in Kubla Ports are laid out in a tree structure, which is displayed on the panel on the right of the screen ②. At the top level is the project itself, and selecting this will display the project properties which can be edited on the left of the screen ①.
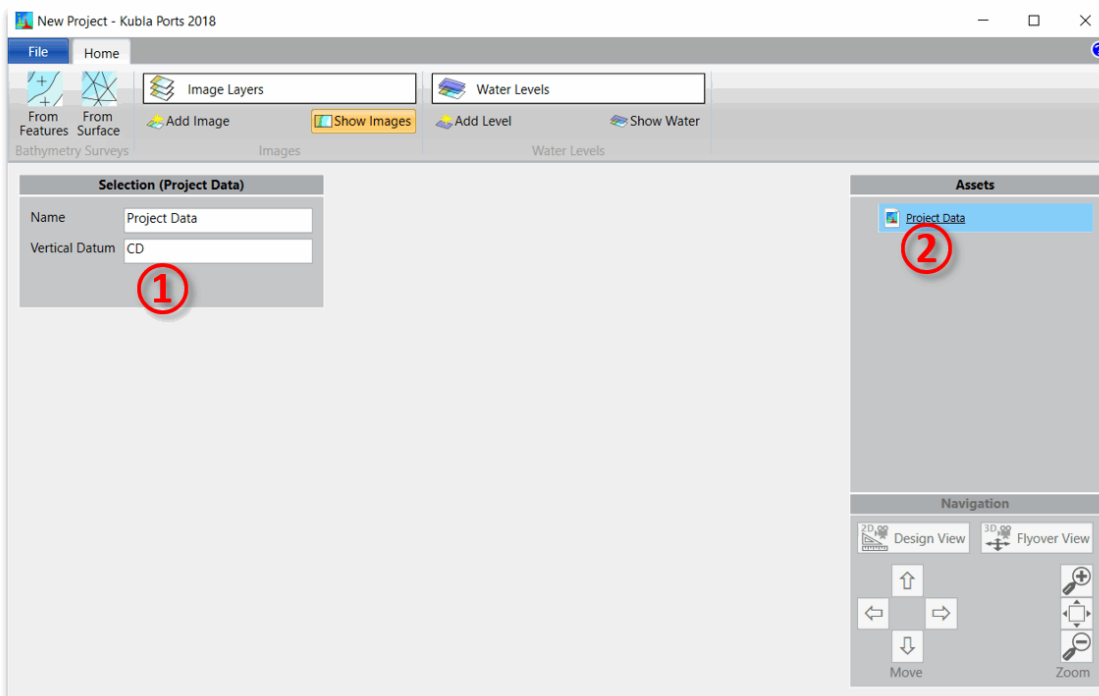
Child assets can be added to the project data, by right-clicking on the project data. A menu will be displayed with a list of the assets that can be added. Items that could be added but are not licensed will be greyed out. Both individual items and groups can be added from this context menu. For a description of the difference between items and groups refer to Items and Groups.
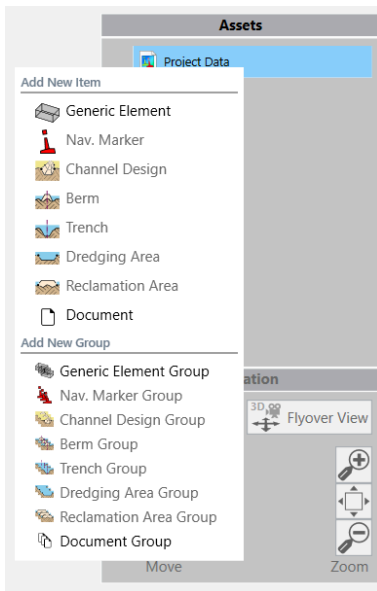
This principle of adding children to assets does not only apply to the top-level project data item, but in fact to any assets within the project. This allows a versatile tree data structure which enables projects to be laid out in the way that best suits the nature of the project. This can be seen as somewhat similar to a file directory structure, with the difference being that the assets can contain data themselves, as well as being a container for child assets.
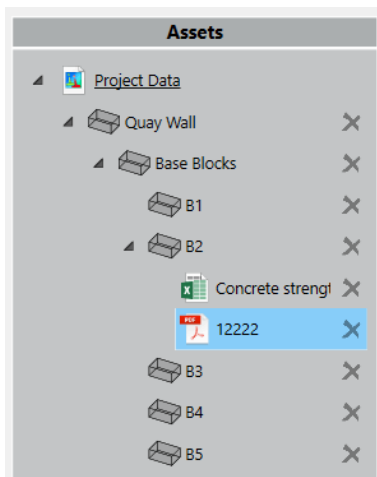
The children that can be added to a given asset depend on their type. In general, if it makes logical sense to do so, it will be possible to add an asset as a child. E.g. it is possible to add a document as a child of a navigation marker, because it is logical to add documentation to a marker. However, it is not possible to add a navigation marker as a child element of a document, because this makes little sense.

Items and Groups

Using the same context menu described here, it's possible to add both items and groups. While an item is an individual entity, a group is a collection of the same item type. E.g. you could define a group of documents, or a group of dredging areas.

Since normal assets can contain child elements it's perhaps a natural question to ask, 'what is the purpose of groups?'. The answer is twofold; firstly, it allows for a more rigid data structure to be enforced when required and tends to improve the organisation of the project when used correctly. Secondly, because the items in the group have the same properties, the software can summarise items within a group. For example, if you define a group of dredging areas, the software can give you the volumes for each dredging area, but it will also give you the total volume for the

dredging group. If you added these dredging areas as children of a generic element, for example, you would not be able to see these totals.

As well as taking a collection of individual items, a group can also accept another group as a child element, provided that it is of the correct asset type. This allows for complete flexibility in laying out how the data should be summarised.

Exports

When you right-click on an asset in the project, you will see a list of the assets you can add as children, as has been described previously. If there are export options for the asset you have selected, you will also see these at the bottom of the menu.
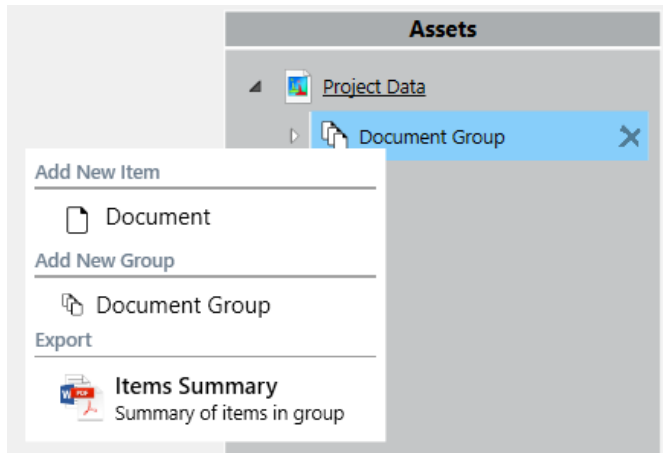
The exports which are available depend on the asset that you have selected, but all groups can export a summary of the items in the group. More advanced elements will provide more advanced exports. For example, if you have the channel design module enabled the *channel design* item can export a full summary of how the channel dimensions have been calculated.

Adding an Overlay

To load a new overlay from a file, click on the Add From File button. Alternatively, you can use the drop-down menu on the assets panel to add overlays to other assets. You will be prompted to select the file which you want to load. If you choose a pdf file with several pages you will also be prompted to choose which page to load.

Once you have chosen the file the overlay will normally be displayed on the screen in an arbitrary position. You will then have to edit the scale and position of the overlay to adjust it to its real-world position. However, if it is a geo-referenced image format it will be automatically displayed in its defined location.

To edit the overlay you have loaded, click on the Edit button on the overlay's properties panel. For the option available after clicking on this button see Editing Overlays.

Editing Overlays

Once you have chosen to edit and overlay the window will appear as show below.
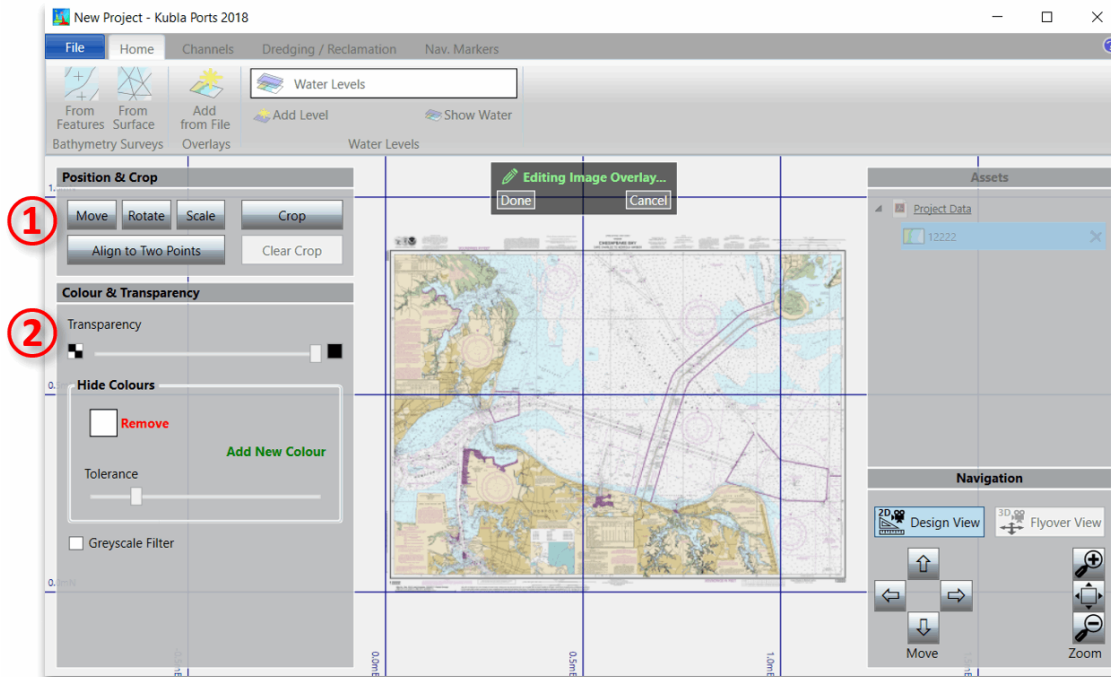
The different elements of this window are summarised below. They are described in more detail in the following sections.

- ① This is where the position, rotation and scale of the loaded image, in the real world, will be specified. You can also choose to crop the image if you wish. The crop option is particularly useful for drawings which have title blocks which you want to remove.
- ② This is where transparency can be set, so that the user can see through the loaded site plan.

The setting of the image position, crop and the transparency is described further in Position & Scale and Transparency.

Setting Position and Cropping

The overlay is positioned into its real-world location by scaling, moving, and rotating the image as required. Alternatively, if you have two known co-ordinates on the overlay you can define these and the software will scale, rotate and move the image to match these two co-ordinates.
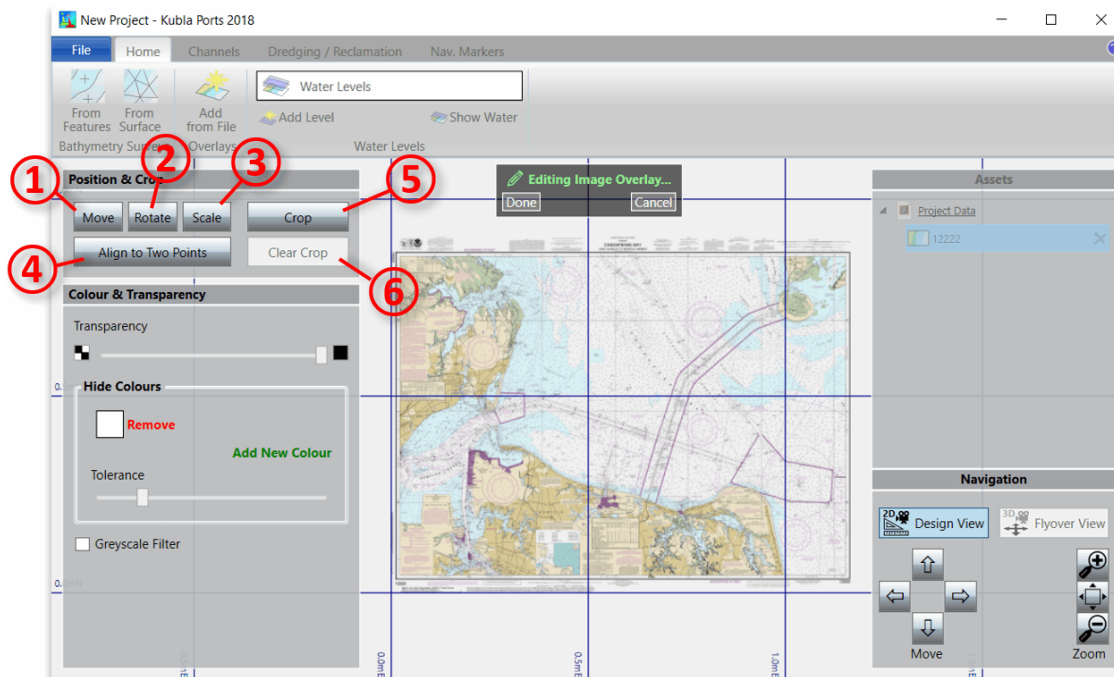
The following controls are used to define the overlay's position:

• ① Move

This option allows you to move the overlay by defining a point on the overlay and then typing its position in the real world. This is useful if there is a co-ordinate defined on your overlay. It is important to remember that you should move the overlay after you have done any scaling and rotation you need to do, because these operations will cause positions on the overlay to change.

• ② Rotate

This option allows you to rotate the overlay by defining a north reference angle on the overlay. You can also rotate by 90° clockwise or anti-clockwise. This is useful if you want to show your overlay in a different orientation to the default orientation of the overlay.

• ③ Scale

This option will scale the overlay. You can do this with one of two methods:

1. By scale (PDF's only). Type a defined scale for the PDF, such as 1:100, or 1"=25'.
2. By Length. Specify a length on the image and then type its length in the real world. This option is particularly useful if you have a defined length on your overlay. E.g. a scale bar or a marked dimension.

• ④ Align to two points

This is the easiest option if you have two co-ordinates defined in the overlay. It allows you to specify the two points on the overlay and then type their co-ordinates in the real world. The software will then scale, move and rotate as required to match these two points.

Once you have selected one of these options, you will receive further instructions depending on the option you selected. These are described below:

• Move

1. *Select a base point to move*

Define the point which you want to move by clicking once in the preview.

2. *Enter the new position of this base point*

Type the location (X and Y) that you want this point to be moved to.

- Rotate

    1. *Draw the north arrow (base to tip)*

    Draw a line on the preview to define your reference north angle. Click once to start drawing the line and a second time to finish.

    ... OR ...

    1. *Rotate 90° Clockwise*

    Rotate the overlay by exactly 90° in a clockwise direction.

    ... OR ...

    1. *Rotate 90° Anti-Clockwise*

    Rotate the overlay by exactly 90° in an anti-clockwise direction.

- Scale

   Select the option you wish to use ('By Scale' or 'By Length') and then...

    1. *Specify the new scale*

    Type the new scale for the PDF.

    ... OR ...

    1. *Draw a line along a scale guide or any other known length*

    Draw a line on the preview to define your reference length. Click once to start drawing the line and a second time to finish.

    2. *Enter the new length*

    Type the length you want the reference length to be scaled to.

- Align to two points

    1. *Select the first point to align*

    Define the position of the first reference point by clicking once in the preview.

    2. *Enter the new position of the first point*

    Type the location (X and Y) that you want the first point to be placed at.

    3. *Select the second point to align*

    Define the position of the second reference point by clicking once in the preview.

    4. *Enter the new position of the second point*

    Type the location (X and Y) that you want the second point to be placed at.

Once you completed the instructions on the prompts, the prompt will disappear and the overlay will be adjusted as you have specified.

You can also crop the overlay to remove any unnecessary borders and titles. This is done by clicking on the Crop⑤ button. You will be prompted to draw the crop rectangle on the screen. You can clear this crop by clicking on Clear Crop⑥ and you can always adjust it by clicking again on the Crop⑤ button.

Setting Transparency

Since the overlay will often be displayed on top of the existing terrain and earthworks, it is necessary to give it transparency so that it's possible to see through the overlays to the elements below. In many cases the default transparency settings will be suitable. However, when the transparency needs to be adjusted this can be achieved using the controls shown below.
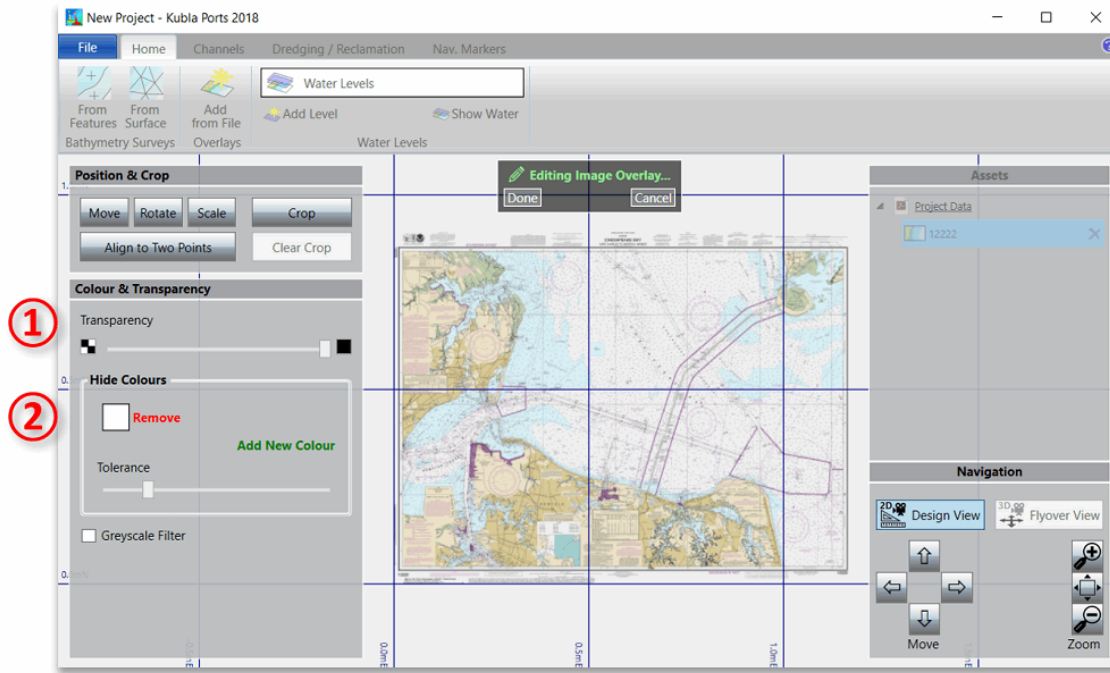
These controls work together as follows:

- ① This slider can be used to define the overall transparency to apply to the whole overlay. If set to its minimum (the default) there will be no overall transparency. As the slider is moved to the right the overall transparency will be increased until at the maximum value the overlay will completely disappear.
- ② These controls can be used to completely mask out specified colours. By default, there is a mask on white, which is the background colour for most drawings. Additional mask colours can be set by clicking add new colour and then clicking a point on the overlay to select a colour. Mask colours can be changed by clicking into the colour box and selecting a new colour on the screen, and they can be removed by clicking remove.

  It is possible to also remove colours which are similar to the selected mask colour(s) by adjusting the tolerance slider. If the slider is set to its minimum only exact matches on the mask colour(s) will be removed. As the tolerance value is increased, more and more colours will be removed in a widening band around the specified colour(s). If the image you are loading is not coloured you can select the greyscale filter which will improve performance.

Chapter

7

Channels

Topics:

As well as the core functionality contained in the *Essentials* module, there are a number of additional modules that can be licenced as required.

For a description of how to enable the modules see Activating Licenses.

Dredging & Reclamation

Once the *Dredging & Reclamation* module is enabled, you will see an extra ribbon tab as shown below. For a description of how to enable the *Dredging & Reclamation* module see Activating Licenses.
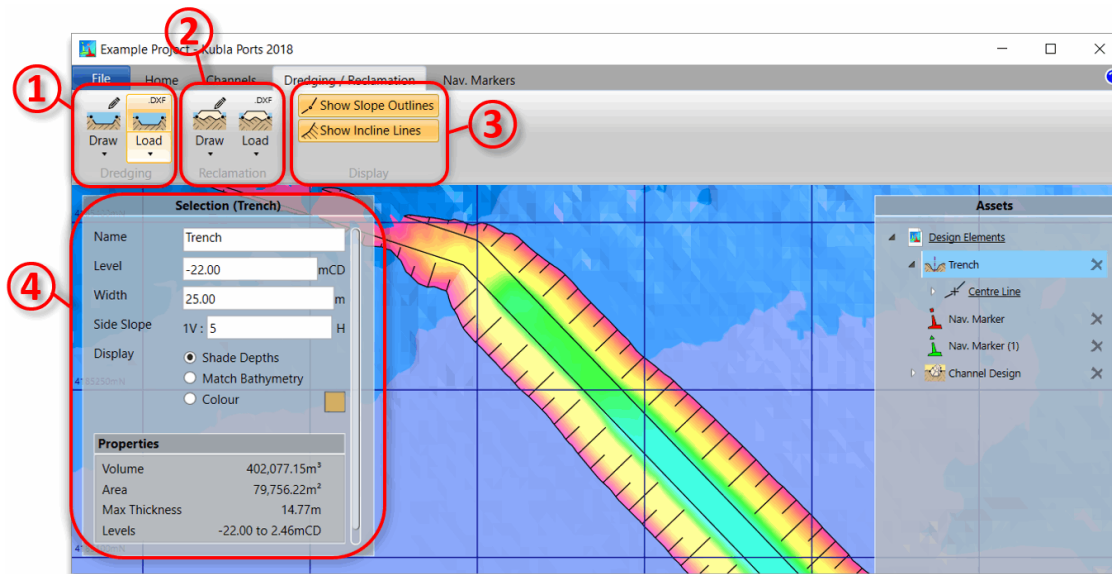
The following tools are available in the dredging and reclamation tab:

- ① Here you can add dredging, either as areas defined by an outline, or trenches defined by a centre-line and width. For both options you can either draw the definition line on the screen or load it from a CAD .dxf file. By default, it will add the previous option (area or trench) that you have added. You can change this by clicking on the bottom of the split button.
- ② Here you can add reclamation, either as areas defined by an outline, or berms defined by a centre-line and width. For both options you can either draw the definition line on the screen or load it from a CAD .dxf file. By default, it will add the previous option (area or berm) that you have added. You can change this by clicking on the bottom of the split button.
- ③ Here you can adjust how the dredging and/or reclamation lines are displayed on the screen.
- ④ When you have drawn and selected a dredging or reclamation item, it's properties can be edited here.

Once the centre-line or outline has been defined dredging or reclamation item will be created and will appear in the side bar. This item will have the following automatically-generated child item:

- **Centre Line** or **Outline**. If you need to edit this definition line, you can select this from the panel when in Design View and the line will appear on the screen. You can then either drag the points of the line around on the screen, or you can select points and type in their exact co-ordinates. If you need to split an edge of the line you can select the edge and click on 'Split Edge'.

The item itself will have the following properties:

- **Name** The name of the dredging or reclamation.
- **Level** The level of the dredging or reclamation.
- **Width** *(trenches and berms only)* The width of the trench or berm.
- **Side Slope** The angle of the side slopes for the dredging or reclamation.
- **Display** How the dredging or reclamation is to be shaded. Either shade by depth, shade levels as for the bathymetry, or shade in a specified colour.

The dredging or reclamation item can generate the following exports:

- **Quantity Summary (.docx, .pdf).** Exports a summary of the quantities that have been calculated, such as volumes, areas and depths.

For dredging and reclamation areas, it is possible to set the batter angle for individual edges of the outline. This is done by selecting the edge in the side panel and adjusting the batter angle for the edge which will be displayed in the selection panel.

Channels

Once the *Channels* module is enabled, you will see an extra ribbon button as shown below. For a description of how to enable the *Channels* module see Activating Licenses.
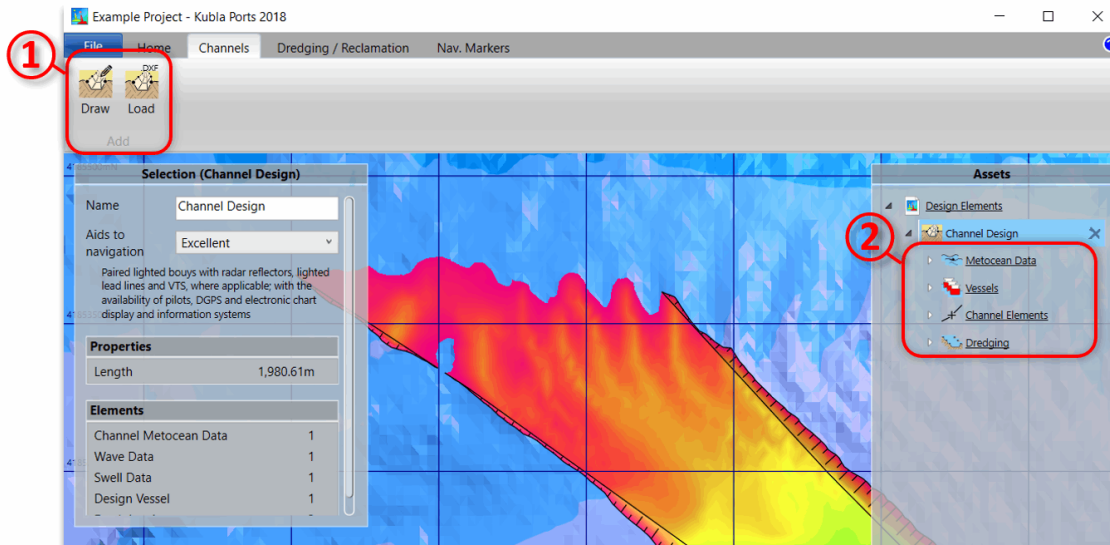
A new channel can be created by clicking one of the buttons on the ribbon ①, choosing to either define the centre-line on the screen or load it from a CAD .dxf file.

Once the centre-line has been defined a channel item will be created and will appear in the side bar ②. This item will have four automatically-generated child items:

- **Metocean Data.** This holds the metocean data that will be used to design the channel. For more details see Metocean Data.
- **Vessels.** This defines the vessels used to design the channel. For more details see Design Vessels.
- **Channel Elements.** This defines both the basic geometry, as well as properties for each section (straight or bend) of the channel. For more details see Channel Elements.
- **Dredging.** This is a group of dredging areas which are automatically-generated based on the channel dimensions. Although the outlines of these dredging areas are locked, you can still amend the side slopes as described in Dredging & Reclamation.

As well as these child items, the channel itself has the following properties:

- **Aids to Navigation.** The quality of aids to navigation for the channel. This affects the calculated widths as described in the Technical Manual.

The channel item can generate the following exports:

- **Design Summary (.docx, .pdf).** Exports a comprehensive summary of the calculations that have been performed to determine the channel dimensions.
- **Cross Sections (.dwg, .dxf).** Exports cross sections at regular defined intervals along the channel, showing the existing and dredged bathymetry levels.

Metocean Conditions

The metocean item has four children which are automatically generated. The children define the metocean conditions for the channel, as described below.
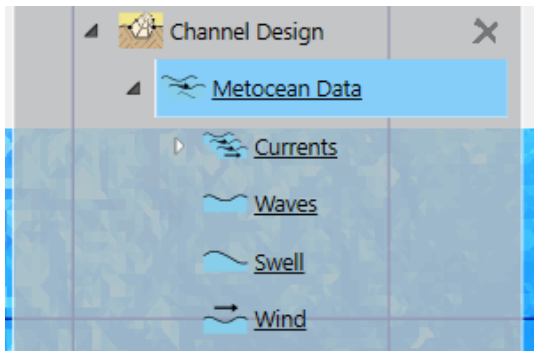
- **Currents.** This is a group of current roses. You can define as many current locations as you need to specify conditions throughout the length of the channel. Like all groups, you add items by right clicking on the Currents and then choose 'Add New Item' -> 'Current Rose'.
- **Waves.** This defines the waves that are used to design the channel. You can define waves from spot levels or from contours, in just the same was a you define bathymetry. The only difference is that no outlines need to be defined, since the shoreline will be used. For more information on these controls see Defining Bathymetry.
- **Swell.** This defines the swell that is used to design the channel. You can define swell from spot levels or from contours, in just the same was a you define bathymetry. The only difference is that no outlines need to be defined, since the shoreline will be used. For more information on these controls see Defining Bathymetry.
- **Wind.** This item defines the wind that is used to define the channel. Only one wind rose is defined as it is assumed to be the same throughout the channel's length.

Design Vessels

The Design Vessels asset is a group of Design Vessels. Like any other group, you can add an item by right clicking on the Design Vessels and then choosing 'Add New Item' -> 'Design Vessel' from the pop-up menu.

When you create a new design vessel or edit an existing vessel the following window will appear.
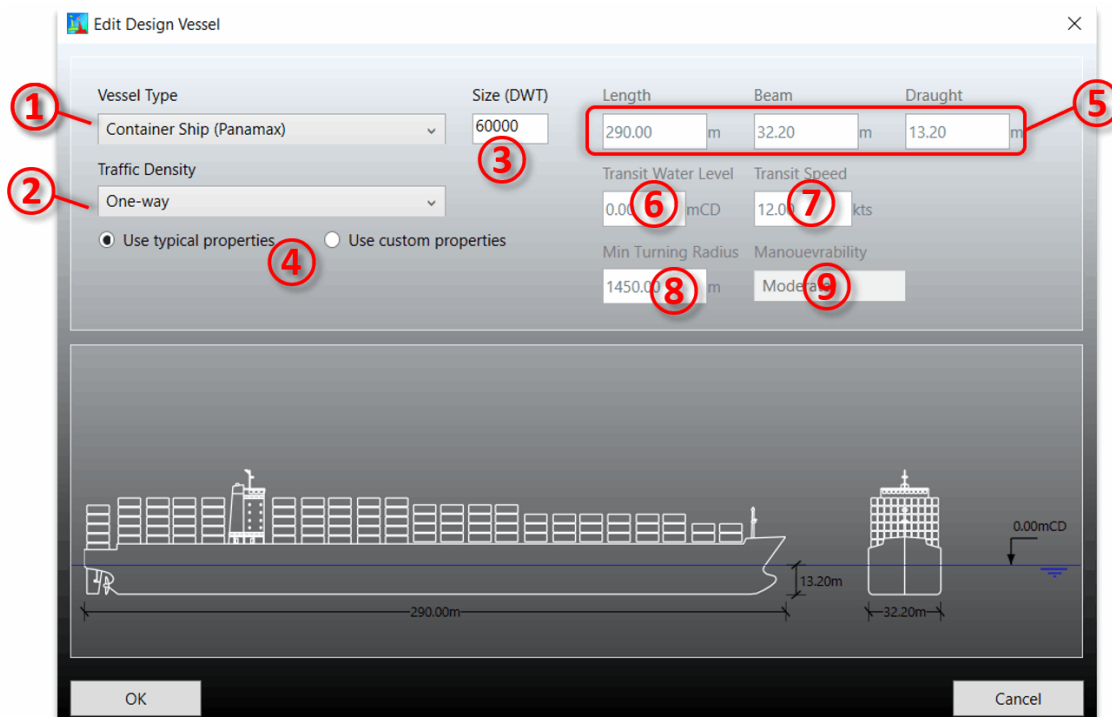
The controls in this window are described below.

- ① Vessel Type The type of vessel. If the type of your vessel does not appear on the list then select *'Other Vessel Type'*
- ② Traffic Density The two-way traffic density. *'One-Way'*, *'Light'* (≤3 vessels/day) or *'Heavy'* (>3 vessels/day)
- ③ Size (DWT) The dead weight tonnage of the design vessel
- ④ Use typical properties / use custom properties This option indicates if you want the software to use typical properties for the specified vessel type and size, or if you want to input the vessel properties manually. If you select to use typical properties the remaining controls on this list will be disabled.
- ⑤ Length, Beam, Draught - The length (overall), beam and draught of the design vessel, all in metres.
- ⑥ Transit water level The water level at which the vessel will transit the channel. If the vessel must transit at all states of the tide this may be set to the lowest water level. If the vessel may transit using a tidal window a higher level may be specified.
- ⑦ Transit speed The speed at which the vessel will transit the channel.
- ⑧ Min turning radius The vessel's min turning radius
- ⑨ Manoeuvrability The manoeuvrability of the vessel.

Channel Elements

To edit individual elements of the channel you can select the lines and points of the channel definition line. The selection box will display the selected start point, end point, straight section or bend of the channel. Properties which are calculated by the software will have an Auto button which indicates that the software is calculating this property and the input box will be disabled. If you want to override the values the software has calculated you can de-select Auto and type into the box.

The controls for channel elements are described below.

- ① Position The position in X and Y of the selected point
- ② Channel Type The type of the channel element - 'Inner' or 'Outer'. This affects the calculation of channel dimensions.
- ③ Bottom Type The material of the channel bottom - 'Mud', 'Sand/Clay' or 'Rock/Coral'. This affects the channel depth.
- ④ Bank Type The nature of the channel bank - 'Gentle underwater channel slope', 'Sloping channel edges and shoals' or 'Steep and hard embankments, structures'.
- ⑤ Bottom Level The minimum bottom level for the channel.
- ⑥ Over-dredge The over-dredging that is required beneath the minimum bottom level. This is usually added for construction tolerances and/or allowance for siltation.
- ⑦ Width The width of the channel element.
- ⑧ Bend Radius The radius of the channel bend
- ⑨ Add Bend Click this button to add a bend in the middle of a straight section of the channel.

Navigation Markers

Once the *Nav. Markers* module is enabled, you will see an extra ribbon button as shown below. For a description of how to enable the *Nav. Markers* module see Activating Licenses.
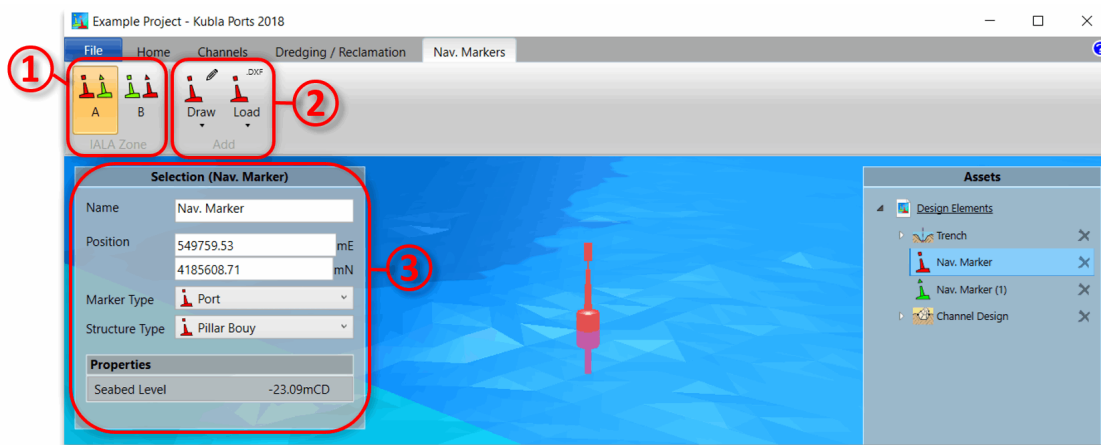
The Nav. Markers ribbon provides the following options:

- ① Here you can set the IALA Zone for the project. This affects the appearance of lateral markers as they are different in each zone.
- ② Here you can add new navigation markers, either by drawing on the screen or from a file. If you click on the icon it will add the last type of Nav. Marker you added. You can change the type of marker to add using the arrow at the bottom of the button. Note the you can also add Nav. Markers to an asset by right clicking and using the pop-up menu as described here.

Once you have drawn a navigation marker you can select it on the screen or in the side panel and its properties will be shown in the selection pane on the left ③. The marker's properties are described below.

- **Name.** The name of the marker.
- **Position.** The X and Y position of the selected marker
- **Marker Type.** The type of marker - 'lateral' (port or starboard, channel divider port/starboard preferred), 'cardinal' (N, E, S, W), 'danger', 'safe water' or 'special'
- **Structure Type.** The structure type for the marker - 'Buoy', 'Pillar Buoy' or 'Beacon'

The Nav. Markers group can generate the following exports:

- **Items Summary (.docx, .pdf).** Exports a summary of the Nav. Markers that are contained in the group, including their properties and the seabed level.