



# CAYDENCE® (v 3.4.6) USER GUIDE





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## Introduction

## About this guide

The Caydence User Guide contains information on using Caydence components and features. The guide assumes you have a working knowledge of your computer and its operating conventions, including operation of a web browser.

## Using the online help

Caydence also includes an online version of this manual that can be accessed via the Caydence Help & Support Section.

## **About Caydence**

Caydence is a secure online portal provided by NM Group that enables enterprise access to spatial-asset information produced from high-grade surveys and mapping. It provides progress reporting and tracking tools for survey and mapping activities, the ability to rapidly visualise and analyse the information gathered, summary statistics and business intelligence, and dataset download capabilities for CAD and GIS programs. Caydence also serves as the platform for analysis modules provided by NM Group for the electricity industry. Caydence only requires a web browser to access. It is provided as a managed service (Software As A Service) supporting configuration, content and training.

## Licensing

Caydence is licensed at the organisation and user level. For further information on Caydence licensing please contact <a href="mailto:sales@nmgroup.com">sales@nmgroup.com</a>.

## **Product capabilities**

#### Browser based 3D visualisation

- visualise spatial datasets in a cohesive 3D virtual world,
- remote sensing point cloud data including aerial LiDAR, mobile mapping and terrestrial scan data,
- remote sensing imagery data including aerial imagery, satellite imagery, drone imagery, RGB, NIR etc.,
- oblique asset imagery such as pole top imagery or structure imagery,
- attributed vector data along from 3D GIS source.





• access location based street-view imagery.

#### **Search and Query**

- Search for features based on coordinate, location or asset information.
- Filter features and layers.
- Query assets for attributed information.

#### **Data Tables**

- Read tabulated asset information,
- Customise result filtering,
- Export reports based on queries,
- Support asset location and issue reporting.

#### **User Management**

- Add and remove users as an organisation administrator,
- Configure user access levels through roles,

#### **Data Management**

Access historical datasets.

#### Integrate with other systems

- Export data in common formats,
- Integrate through industry standard interfaces (OGC, ESRI).





# **Getting started**

Caydence v3 introduced two significant improvements over previous versions: HTML5 based install free operation and Data Table views.

**Install free operation -** Caydence is now fully supported by the HTML5/WebGL standard which enables 3D visualisation from within a web browser without the need for installing any additional software. It is supported by modern web browsers including Chrome, FireFox, Edge and others.

**Data Table views -** Caydence now supports access to underlying tabulated feature data direct from the spatial database. Data tables can be configured to meet user requirements and commonly include tabulated asset data in the form of power line structures, power line spans or tree canopies. The tabulated data can then be filtered by the user and exported from the system. Data tables support client workflows and integration with other systems.

## Minimum system requirements

- Operating System: Windows / Linux / MacOS / Android / iOS.
- **System Memory:** 2 GB RAM (4 GB or more recommended).
- **Processor:** Dual Core (4 or 8 cores recommended).
- **Browser:** Chrome, Firefox, Safari, Opera, Edge
- **Network Bandwidth:** Ideally >20Mbps

## **Accessing Caydence**

Caydence can be accessed at <a href="https://nmcaydence.com/">https://nmcaydence.com/</a> where you will be prompted to sign in with your Trimble ID email and password. To request access to Caydence contact either your organisation administrator or <a href="mailto:sales@nmgroup.com">sales@nmgroup.com</a> if your organisation does not have a Caydence account. You will also need to apply for a Trimble ID, which must be for the same email address as your Caydence user.

## **Access through Microsoft Edge**

If you will need access to datasets that you have been informed are only available through Edge (previously reported as available only through IE) then you will need to change settings on your computer to ensure that Edge opens in IE mode when it is running Caydence.





From Edge open Settings, and find the section titled Allow sites to be reloaded in Internet Explorer mode.

If this section is disabled then you would need to check with your IT department.

Select Allow to enable IE mode for Caydence

Then add 2 Caydence URLs;

https://id.trimble.com

https://nmcaydence.com

# **Getting help**

The Help & Support section in the menu bar provides access to an HTML version of this guide along with other support material. Issues can be reported to the Caydence Help Desk by emailing <a href="mailto:caydence.support@nmgroup.com">caydence.support@nmgroup.com</a>.





# **Basic concepts**

## What is Caydence?

Caydence can be used with a wide range of spatial data sets and contains functionality optimised for workflows of electricity network operators. Caydence supports desk based communication and investigation of asset infrastructure issues, is used extensively in power line vegetation management and can be extended with field modules supporting in field task execution. Caydence brings together asset data, remote sensing spatial data with bespoke analysis customised to client requirements to identify and report on asset issues. Caydence supports organisational level account management with user profiles and roles.

## **Caydence modules**

Caydence adopts a modular approach to functionality and enables customers to choose licensing models which meets their needs. Caydence supports integration with other systems including asset record GIS and Enterprise Resource Planning (ERP) systems through common data exchange formats, common API standards and data exports.

Caydence core modules include the 3D Viewer and Data Table modules. The Administration Module can be configured on request. Caydence Field is a supplementary module that requires additional licensing.

## 3D Viewer module

The 3D viewer is the core Caydence module that enables visualisation of 3D spatial datasets as a virtual world in a web browser. Caydence is optimised for streaming extremely large data sets with fast performance. Caydence places client asset data in a virtual world with global background imagery and terrain models. This provides the context for setting higher detail spatial datasets captured as part of a survey campaign.

The viewer enables basic navigation, searching, measuring and links to street view for detailed scene inspection. Attributes for vector datasets can be queried for inspection and feature layers turned on and off as required.

Caydence is able to support a wide range of spatial data types and less common standards can be converted as required:





Raster Layers	Point Clouds	Attributed Feature Layers
Orthorectified imagery (.jpg, .ecw, .tiff etc) Oblique imagery (.jpg, .png etc) Terrain Models (.xyz, .csv, .ascii etc) WMS feeds (supports integration with other systems)	Aerial LiDAR, Mobile mapping or Terrestrial scan data (.las, .xyz, .csv, ascii, .pts, .ptx)	Attributed vector features such as points, lines, polygons (all common GIS formats)  WFS feeds (supports integration with other systems)

#### **Data Table module**

The Caydence Data Tables module exposes the rich detail of the GIS database to users for searching, filtering and querying. The data tables brings the value of attributed geospatial data to the user in support of user workflows and can be used for asset location, issue identification and workflows and systems integration. The data table enables control of the 3D viewer with a 'fly-to' functionality that places the asset in the field of view. The data table is fully configurable and queries can be exported for reporting or input into other systems.

Example use cases by power utilities of the data table module include querying the power line spans data table for all high risk vegetation infringements on circuit XY1 and adding an ACTION tag for easy identification in Caydence field, flying to the asset imagery associated with pole top defect entries for review or exporting the clearance reporting records associated with circuit GH5 for compliance reporting.

## **Administration module**

Caydence supports full organisation level account management putting the power of adding and removing users into the hands organisation administrators. User profiles support role assignments that can be configured to control access to data and system functionality.





## System architecture and security

Caydence is hosted on Amazon Web Services employing auto-scaling groups for load response, cross availability zone infrastructure for availability and network access controls for security. Please see the <u>Caydence Security and Reliability</u> document for more details. Security controls can be extended to include IP whitelisting on request.



As part of the Trimble group of companies, Caydence has been developed according to the Trimble Secure Development Life Cycle (TSDLC) to ensure it is robust and secure against cyber attacks. TSDLC employs a number of threat prevention and detection controls including vulnerability scanning, intrusion detection, dynamic analysis, static analysis and open source vulnerability analysis, supplemented with developer training and incident response procedures.

## **Integration**

Caydence is designed to be easily integrated with other systems to consume data sources and expose results and analysis. Common integrations options include:

 WMS: Caydence supports the Open Geospatial Consortium (OGC) Web Map Service standard. WMS provides a simple HTTP interface for requesting geo-registered map images. This enables integration with common GIS platforms that support this service including ESRI ArcGIS and GE Smallworld.





- **WFS:** Caydence supports the Open Geospatial Consortium (OGC) <u>Web Feature Service</u> standard. WFS offers direct fine-grained access to geographic information at the feature and feature property level. This enables integration with common GIS platforms that support this service including ESRI ArcGIS and GE Smallworld.
- **GeoServices REST API:** Caydence supports the Feature Service through the <u>ESRI</u> GeoServices REST API.
- **Tabulated data exports:** Customised data exports can be generated on demand with the Caydence Data Tables module. This will export tabulated data in .csv format that can be opened in basic text editors, worksheet applications or imported into third party databases. This is a common method of integrating Caydence data with custom workflows allowing data manipulation prior to ingestion into other systems.
- **GIS exports**: GIS exports as ESRI shapefiles or SQLite format on request.
- **Data requests**: Open access to underlying source geospatial datasets such as LiDAR and imagery is not provided as standard to protect system integrity but can be provided on request.
- **Custom Integrations:** Caydence can be integrated with an ERP such as SAP on request. Integrations are customised to meet an individual organisation's needs.

For guidance on how to integrate your system with any of the above methods, please contact caydence.support@nmgroup.com.

## **User access**

## Logging in

Caydence can be accessed at <a href="https://nmcaydence.com/">https://nmcaydence.com/</a>.

To access the system you will need to have applied for and received a Trimble Identity, which must be for the same email address that your Caydence Organisational Administrator has to define your access to Caydence.

After clicking the login button click the Logon with Trimble ID on the next screen.

Login with Trimble ID

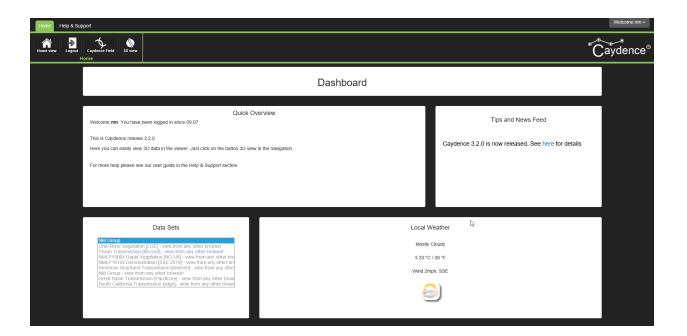
Then you may be prompted for your Trimble Id credentials - this will be dependent on the length of time since you last logged on, if that is less than the session time out limit then you will be returned directly to the home screen.





# Using the Home view

The 'Home' menu item in the top left hand corner brings the user to the home dashboard.



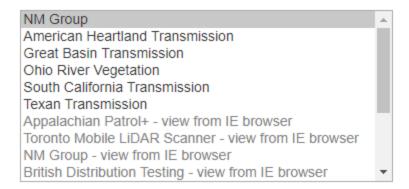
## Selecting a data set

Caydence supports access to multiple datasets from the Dashboard. Select the appropriate dataset from the dropdown list prior to opening the 3D viewer. Where only a single dataset exists, no choice will be possible. Note that some datasets have browser compatibility limitations, datasets that are not compatible with the web browser being used will be greyed out and not selectable.





#### Select Data Set



# **Using the 3D Viewer**

## **Starting the 3D Viewer module**



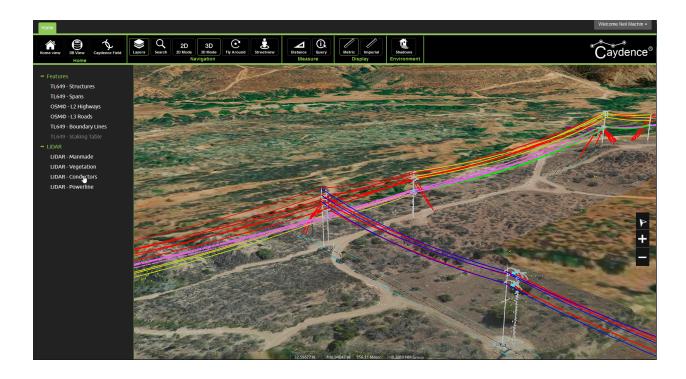
The 3D viewer can be started from the menu bar on the 'Home' screen using the '3D view' button.

## **General layout**

The viewer is composed of the menu bar at the top of the screen, a sliding panel for layers and search on the left of the screen and navigation controls to the right of the screen. Basic positional information is detailed at the bottom of the viewer.







## **Basic navigation**

#### **Panning around**

To pan around the map, hold down the left mouse button while dragging. (Use the keyboard controls if no mouse is available).

#### **Zooming in and out**

To zoom in and out, use the mouse scroll wheel. The viewer will zoom to the location of the cross-hairs in the centre of the screen. (Use the keyboard controls if the mouse has no scroll wheel).

#### **Orbiting**

To orbit in 3D, move the mouse with the middle button depressed (scroll wheel). (Use the keyboard controls if the mouse has no scroll wheel)

#### **Keyboard Navigation**

Navigation can be controlled from the keyboard:

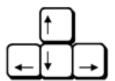




- A move forwards
- B move backwards
- **Q** move left
- **W** move right
- S zoom in
- X zoom out



- **Up** arrow tilt camera view up
- **Down** arrow tilt camera view down
- **Left** arrow rotate camera view left
- **Right** arrow rotate camera view right



#### **Orienting north**



The viewer can be oriented north using the North Arrow on the right hand side of the viewing window.

#### 2D/3D mode



The viewer can be toggled between 2D and 3D mode. When in 2D mode, the camera orientation will be locked downwards and the 3D orbit functionality will be dissabled.

#### Fly around



Caydence supports a fly-around function which will orbit the camera around the central location identified by the cross-hairs

## Layers

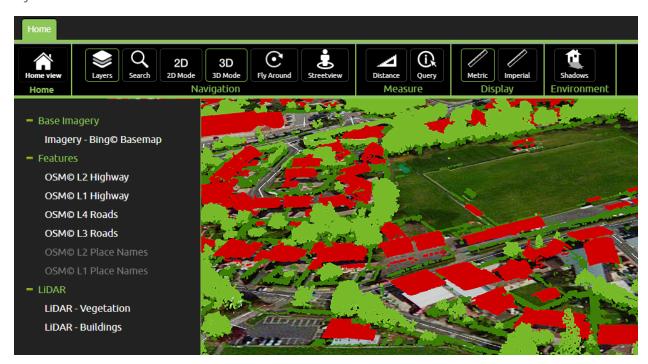


The dataset layering schema is opened using the 'Layers' button in the menu bar and is then displayed on the left-hand side of the viewing window. Clicking a layer



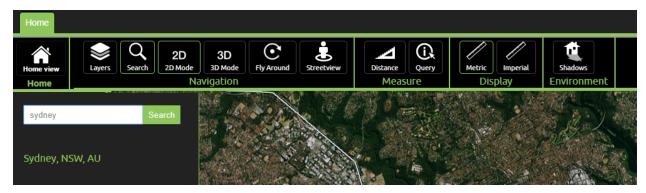


name once will toggle the layers display status (visible / not visible). Greyed out layers are not visible in the viewing window. Double clicking a layer name will 'zoom' the viewer to the layer location.



## **Searching for locations**

The search button opens the search bar in the left hand panel. Valid searches include place names, zip / postal codes, addresses and positions (latitude, longitude). Searches may result in a number of options, click on the relevant option to zoom to the location. (Note that the Data Table module should be used for asset searches).



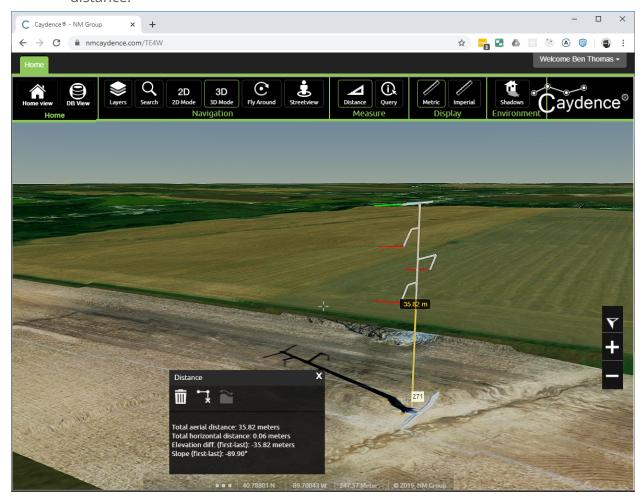




## **Measuring distances**



The 'Distance' icon starts the measuring tool. The tool measures in 3D and will snap to features and the ground. The tool will report on horizontal, vertical 3D distance.



## **Changing the units**



Units can be toggled between metric and imperial using the display options.

## **Querying features**



Feature attribution can be displayed using the query tool. Pressing the Query tool

button in the menu bar will change the mouse cursor symbol to include a?

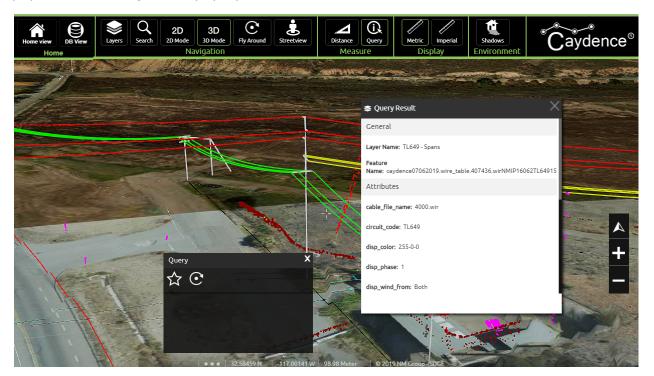






indicating that query mode is enabled. Hovering over an attributed vector feature will

change the cursor to the hand symbol and highlight the feature . Clicking will populate the Query Result pop-up window with the selected features attributes:



# **Shadow rendering**



Shadow rendering can be toggled on and off using the Shadows button on the menu bar. Shadows are turned off by default, in some cases turning them on can improve the visibility of a feature of interest.





## Shadows off:







#### Shadows on:



## **Streetview**



Streetview for a given location can be accessed through the button on the menu bar. Streetview will open in a new window at the location of the cross-hairs of the cursor.







If the cross hairs were not directly on a road which has been included in streetview then the screen will be black. In this case the navigation panel in the bottom left of the window can be used to move the view to the nearest included road.





# **Using Data Tables**

Caydence provides a data table functionality to provide a tabulated view on the data. The views available depend on the structure of the chosen data representation. Commonly this would include a spans and structures view but might also include bays, tree canopies or tree peak-points.

## **Accessing the Data Tables module**

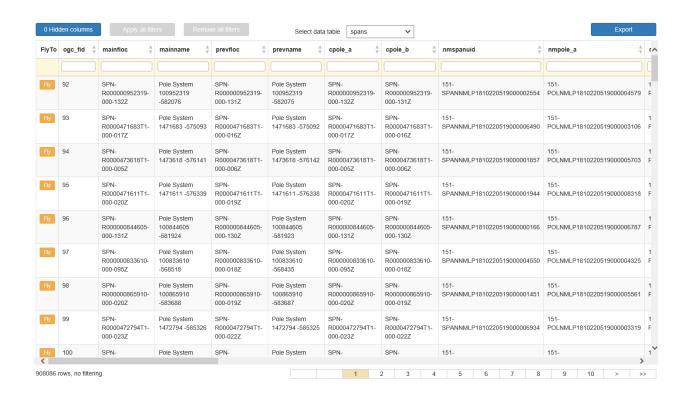
The Data Table button can be found on the menu bar of the 3D viewing module. The data table will open in a new window. The available data tables can be selected from a drop down list.

If viewing a data set that is viewable only from IE or Edge this button will also be visible. This allows the data table to be seen on the same tab as the 3D Viewer with the screen split vertically. Repeatedly clicking the button will cycle through full screen data table, full screen viewer, then back to both visible. This option restores Fly To functionality when running from the Skyline shell. Otherwise operation is as detailed below for the regular full screen DB View.

This will open a scrollable, paginated table table that allows sorting, locating in the 3D viewer and export of feature attribution.





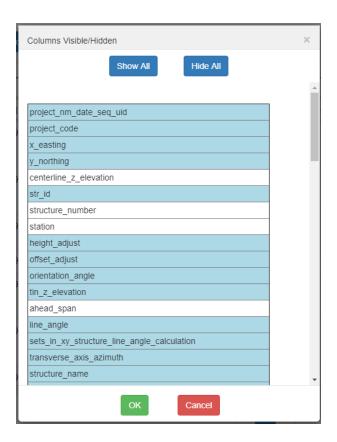


## **Customising visible columns**

- By default, all feature attributes will be visible. This can be adjusted upon request by emailing Caydence support.
- Columns can be hidden to limit the view to just what is needed at the time by clicking the click on the hidden columns button.
- This button is also the method to later show the columns that were previously hidden







## Sorting the table

- The data can be sorted on any column by clicking on the column name.
- Clicking the name a second time switches sorting from ascending to descending, and vice versa

## Filtering the table

Changing a filter value and then clicking enter will apply that filter immediately

Changing a value and then tabbing out of the field, or clicking elsewhere with the mouse, will allow other filter/sort changes to be made prior to the data being refreshed. When filter changes have been made but not applied the Apply All Filters button will be active, and this can then be clicked at any time to apply all filters changes.

Any validated filter changes will show with a green border until they are applied.





FlyTo	ogc_fid	$_{\nabla}^{\triangle}$	m
	<20		
Fly	1		EF RC 00
Fly	2		EF R0

If a changed filter is not valid then the border will be red. At this point the changes can not be applied until the value is corrected, at which time the border will revert to green and the Apply All Filters button will be made active.

FlyTo	ogc_fid	$_{\triangledown }^{\triangle }$	main
	one		
Fly	1		EPN- R000 000-0
Fly	2		EPN- R000

Filtering the data is different for boolean, numeric, character or date columns (examples quoted here are for a structures table):

Note that the data type can vary from what may be expected from the display - columns that look to be boolean or date may be stored as character form, which will affect the filtering that can be applied.

Hovering over the filter box will show a tooltip which shows the actual type





#### **Boolean data**

For boolean data the only valid filters are true and false. This may be entered in upper or lower case.



#### Numeric data

Any number entered will match exactly; i.e. 20 in supportheight will match only 20.0, not 20.1, 20.2 etc.

FlyTo	ogc_fid	$\overset{\triangle}{\triangledown}$	m
	20		
Fly	20		nu

Numbers can also be preceded by '<' or '>' to match data with a value less than or greater than.

$\overset{\triangle}{\triangledown}$	heightrd	$\overset{\triangle}{\triangledown}$	aı
	<4		C
	3.54		18
	3.59		18





Values can also be combined with ' or ' to select multiple values. Note that the spaces on either side of the word are required.

$\nabla$	condtcut $\stackrel{\triangle}{\nabla}$	lir
)	0 or 1 or 2	C
	1	6.
	2	3.;

A filter of 'null' or 'not null' can also be used to select rows where data is, or is not, available. These values can be entered in upper or lower case.

Δ	heightrd	$_{\nabla}^{\triangle}$	ambtemp $\stackrel{\triangle}{_{\!$	0
)	not null		NOT NULL	
	6.49		11	N
	5.40		11	N

#### **Character data**

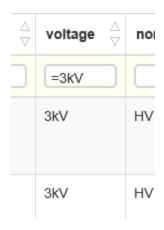
Any string of characters without '=' or wildcards ('\*') will match the sequence of character anywhere in the target field, i.e. PSA6 will match PSA6, PSA60 and PSA61. Character data filters are case sensitive, so 33kv will not match 33KV.







Preceding the filter with '=' will force the filtering to match the whole value. I.e. '=3kV' will match only '3kV', and not '33kV'.



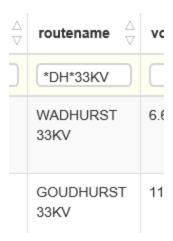
Wildcards can be used anywhere in the input, with each one matching any number of characters. Note that when used they must be fully used - with wildcards before and after the string, unless you are deliberately searching for characters only at the beginning or end.

#### e.g. for towerlabel;

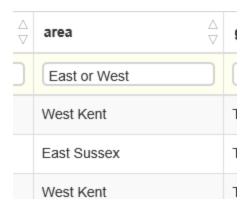
- o S\*6 will not match anything (nothing in the data starts in S and ends in 6)
- \*S\*4\* will match PSA44, PSA45, PSA54 etc.
- o \*S\*4 will match the same as above, except any values that do not end in a 4







Multiple search patterns can be entered by separating them with ' or '. Note that the spaces on either side of the word are both required.



Preceding the filter with 'not' or 'NOT' will select values which do not contain those characters.

$\overset{\triangle}{\triangledown}$	√ voltage	∆ ∀	tr
	not 415V		
	11kV		nı
	6.6kV		5





A filter of 'null' or 'not null' can also be used to select rows where data is, or is not, available. These values can be entered in upper or lower case.



#### Date data

A valid date value will search for that particular date

A filter of 'null' or 'not null' can also be used to select rows where data is, or is not, available. These values can be entered in upper or lower case.







Clicking at any time will remove all filters, and also any applied. If the button is not active then there are no filters or sorts to be removed.

## Filtering examples

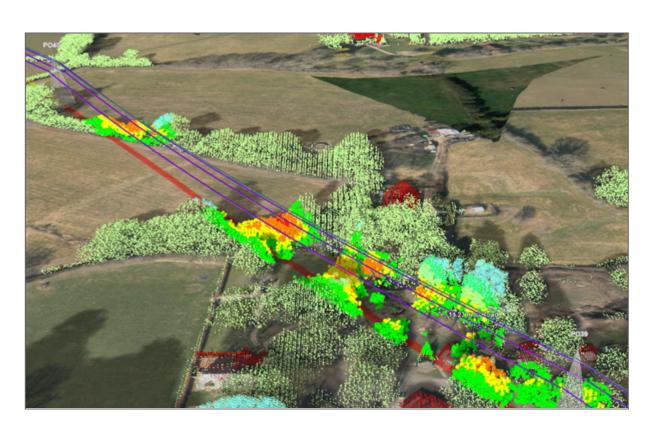
How do I search for the 132kV circuit with Routeref PO from Eastbourne to Lewes for any very high risk tree cutting (CONTCUT = 4)?

Filtering on Routeref =PO (to exclude 'POA'), voltage '132kV' and CONTCUT 4 identifies a single span with a high risk infringement. Routname filtering was not required in this case, but if needed then 'LEWES' could be added to remove any results which had occurred in other circuits:

$\overset{\triangle}{\triangledown}$	routeref $\stackrel{\triangle}{\triangledown}$	routename $\stackrel{\triangle}{\triangledown}$	voltage $\stackrel{\triangle}{ abla}$	nom_voltage $\stackrel{\triangle}{ abla}$	locationrisk1 $\stackrel{\triangle}{\nabla}$	baylength $\stackrel{\triangle}{\triangledown}$	condtcut $\overset{\triangle}{\triangledown}$	he
	=PO		132kV				4	
	PO	EASTBOURNE TO LEWES	132kV	132kV	Common Land/Pasture	276.56	4	7.5







How do I identify conductor heights below 5.8 over roads at HV or LV?

Filtering on heightrd <5.8 and nom\_voltage HV or LV on route 952312 identifies a single low clearance span at HV.

Δ ∇	vrouteref ⇔	routename $\stackrel{\triangle}{\triangledown}$	voltage $\stackrel{\triangle}{\triangledown}$	nom_voltage $\stackrel{\triangle}{ abla}$	heightlp $\stackrel{\triangle}{\bigtriangledown}$	heightrd $\overset{\triangle}{\bigtriangledown}$	amb
	952312			HV or LV		<5.8	
	952312	HASTINGS LOCAL 132/11KV	11kV	HV	5.78	5.78	12

## **Locating entries in the 3D Viewer**

The data table can be used to control the 3D viewing window. Features with a spatial attribute will have a button in the left hand most column. Pressing the Fly button will move the view in the 3D viewer to the location of the selected feature. (Note the 3D viewer must still be active in the original window for this feature to work).





## **Exporting the table**

The table can be exported to CSV by pressing the button in the top right corner of the Data Table. This can then result in two export options: 1) export all columns or 2) export only visible columns. If all columns in the view are currently visible then only the All Columns option will be offered.



# **Using the Administration section**



Caydence supports an Organisation Administrator role. Organisation Administrators have the ability to manage Caydence users within their organisation

and can assign roles with pre-configured access levels for those users.

## Adding and removing users



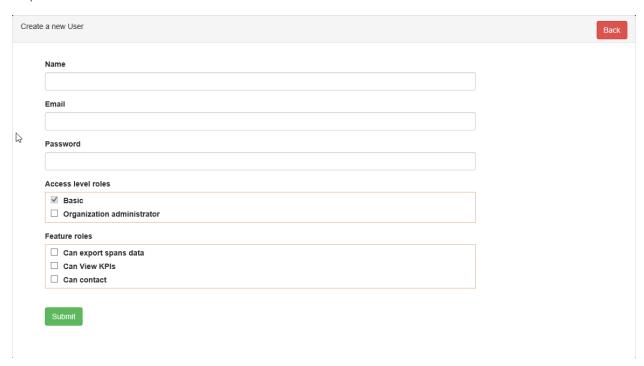
New users can be added through the Admin section. Clicking on the 'Users' button will open a table of all users within an organisation. From this table, it is possible to edit the user profile, delete the user or send a welcome email with login credentials.







A new user can be added with the button. To create a new user, enter the details required in the form.



## **Assigning roles**

By default, Caydence supports access level roles of basic (default for all users) and organisation administrator. Basic users are unable to add and remove users. Additional feature roles can be configured on request to limit access to functionality or data. Please contact <a href="mailto:caydence.support@nmgroup.com">caydence.support@nmgroup.com</a> to configure additional roles for your organisation.

Current feature role definitions include:

- Spandata Export can view and export data
- Can contact has direct email contact for the Caydence Help Desk
- Can view KPI's can view KPI's





# Reporting an Issue

If you encounter issues when using Caydence, please let us know via email at <a href="mailto:caydence.support@nmgroup.com">caydence.support@nmgroup.com</a>. Please include as much information as possible to help us identify the issue including the data set you are accessing and the browser you are using.

# Improvements and new features

Want to see a new feature? Think we could do something better? We'd love to hear from you. Caydence is under constant development and suggestions and new features will be considered to be incorporated into future releases. Please get in touch via caydence.support@nmgroup.com.

