

Chapter 1: Welcome

Congratulations on your subscription!

If you are creating swept path movements or validations as part of your business, rest assured that you have made the right decision in subscribing to **RapidPath Online**. It is, without doubt, the easiest and fastest way to create swept path plans for your works - from any platform. Read on below to learn a little more about **Invarion**, and our plans for RapidPath Online.

1.1 About Invarion

Since our inception in 2001, it has been our singular focus to be the best in the market with our traffic planning software solutions, now used by over 6,000 customers in 27 countries. Every one of our customers is valuable to us, which is why we offer unrivaled ongoing support from initial setup through to plan creation.

1.2 Our plans for RapidPath Online

We are committed to the continual improvement of RapidPath Online, and we actively encourage feedback from users around the world who would like to see improvements, additions or modifications to the system. It's this feedback that helps us shape our future releases for our customer base. If you have an idea for a new feature or a suggestion for an improvement or change to the current version of RapidPath Online you are using, please submit feedback via the "Contact support" option in the Main Menu.

1.3 If you need support

If you require assistance, just contact the **Technical support** team, they are available **24 hours, 5 days** a week to assist you. Visit the [Invarion Website](#) for contact details in your region.

Chapter 2: Getting Started

2.1 Logging into Invarion Cloud

To start using **RapidPath Online**, first log into your **Invarion Cloud** account. [Log in here](#) using the credentials you created when signing up for a subscription.

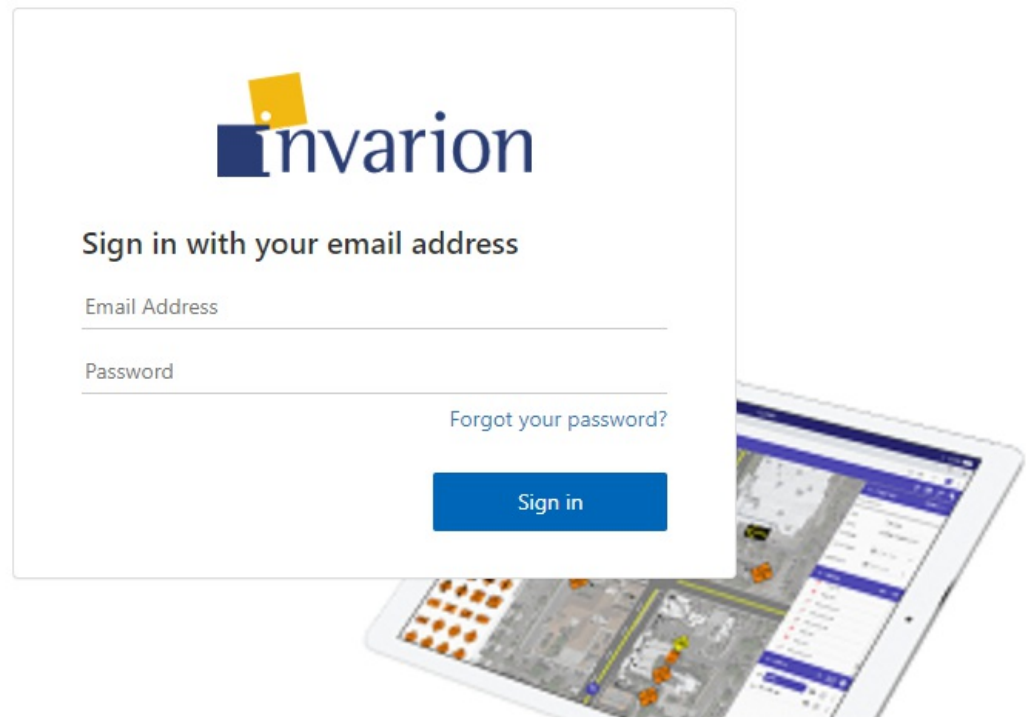


Figure 2.1 Log in to the Invarion Cloud

2.2 Creating your first plan

To create your first plan click on **Create** button and choose **New swept path plan** from the menu. You will be automatically taken to the **RapidPath Online** interface.

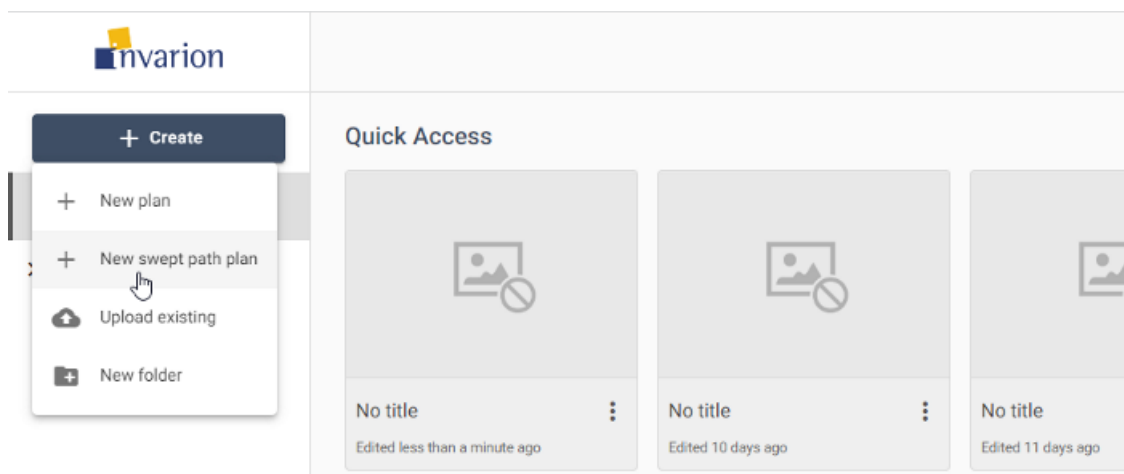


Figure 2.2 New plan

After you finish, you can find your plan in the **Plans** sections inside **Invarion Cloud**.

2.3 My Account

If you ever need to update your subscription, [Log in here](#) and navigate to the **My Account** page.

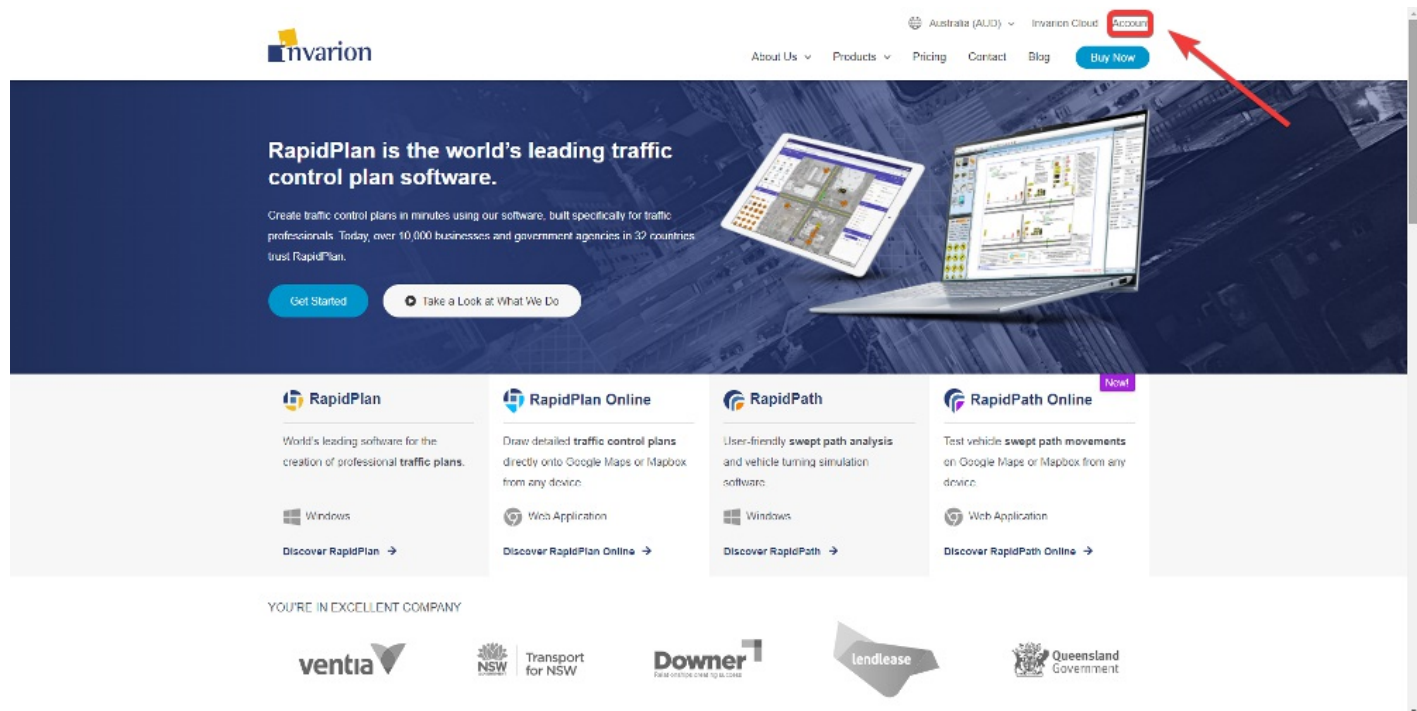


Figure 2.3 Invarion account

Chapter 3: Using Invarion Cloud

Invarion Cloud is an online application for storing all your plans and related documents. It is also the entry point to the RapidPath Online and other web-based Invarion applications.

Note: Invarion Cloud has superseded our old storage application, the RapidPlan Cloud.

3.1 Layout

Invarion Cloud is a dynamic web-application that consists of four main elements:

Element	Description
Navigation Menu	Navigation menu located on the left side of the screen is used to navigate through different sections of the Invarion Cloud such as "Plans", "Trash" or "Shared with Me". Navigation menu also holds "+ Create" button for creating new plans, folders or uploading existing plan from your computer.
Top Bar	At the top of the page, on the left side you can find an interactive path to your current location. Right part of the top bar is populated by a search input for searching folders and plans, toggle buttons for switching the type of view and your initials button that holds a link to account settings, support page and logout option.
Main View	Main view of the page showing selected folder or section.
Offcanvas Panel	Panel on the right side of the screen used for displaying details of selected plan or folder.

Table 3.1

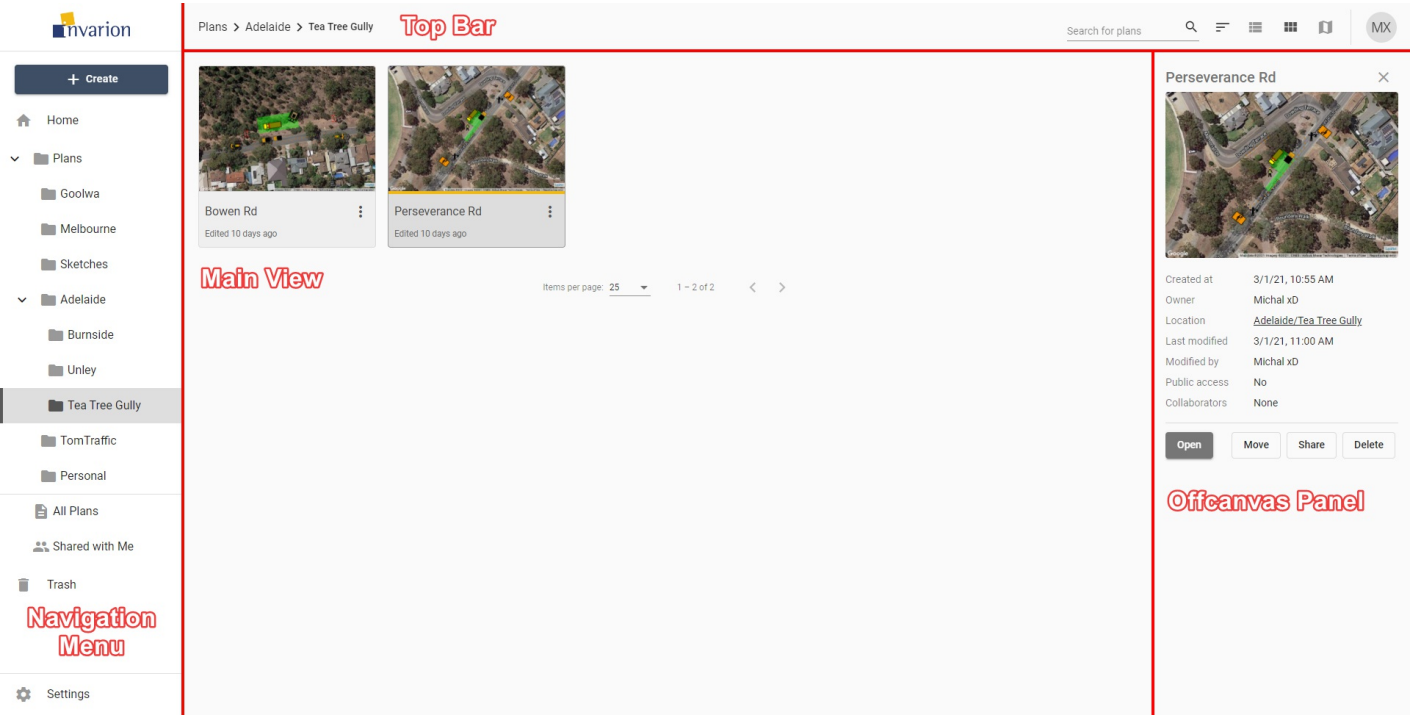


Figure 3.1 Invarion Cloud Layout

Note: Even though Invarion Cloud is a single page application, it stores your current folder location in your web browser search bar. Thanks to that, you can successfully create browser bookmarks for your favourite or commonly used sections.

3.2 Sections

Invarion Cloud consists of different sections. You can switch between sections using the navigation menu on the left side of the screen.

3.2.1 Home

When you first open the Invarion Cloud, the Home section is where you land. Here you can see your recently created/modified plans but also plans that have been shared to you recently. Home is divided into three parts:

- **Quick Access** - most recently created, modified or shared to you plans.
- **This Week** - plans that were active this week.
- **This Month** - plans that were active this month.

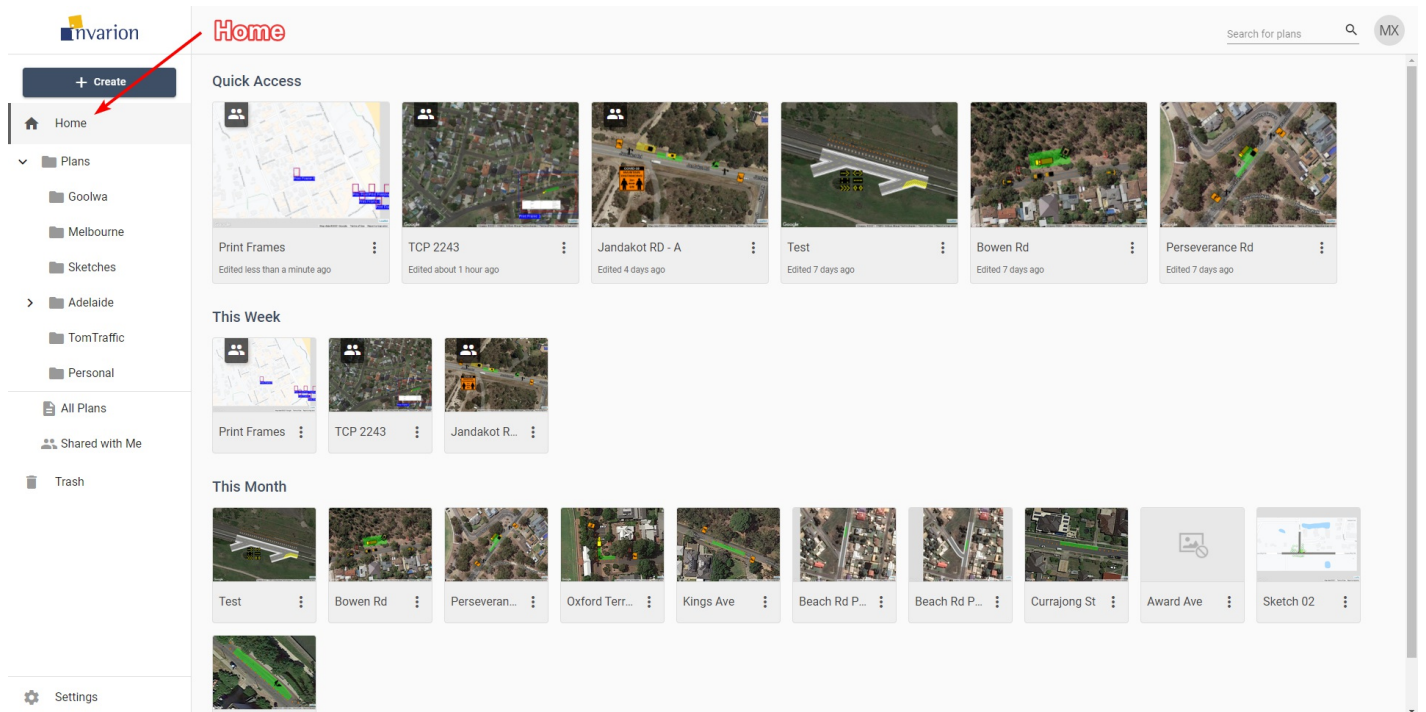


Figure 3.2 Home

3.2.2 Plans

Plans is the main directory, containing all of your folders and files. Click on the arrow next to the plans to expand the folder tree and see your whole folder structure.

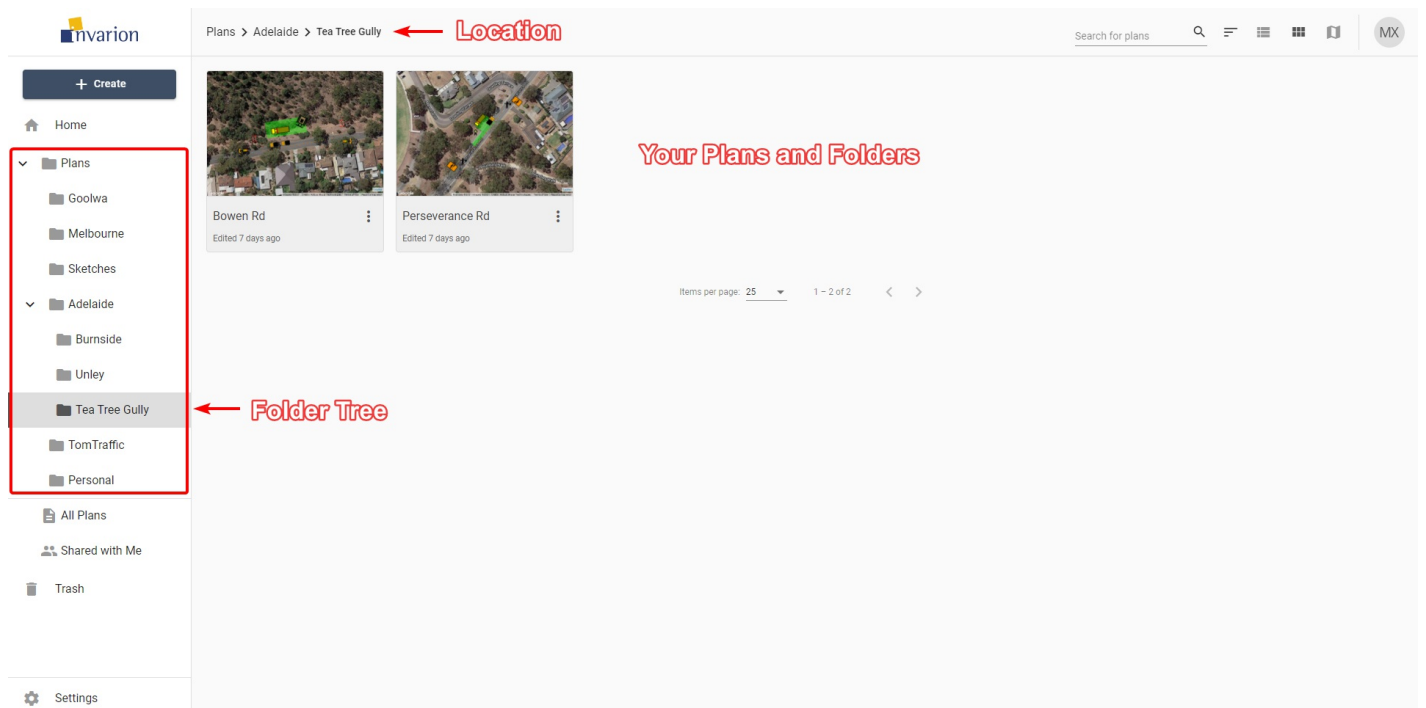


Figure 3.3 Plans

Clicking on the folder will take you straight to that location. Your current location is also displayed on the top bar in the form of

a path. Each element of the path is clickable:

- Click on the folder's name that is before the current directory to go back.
- Click on the folder's name that is your current directory to display the folder's details in the hideable panel on the right side.

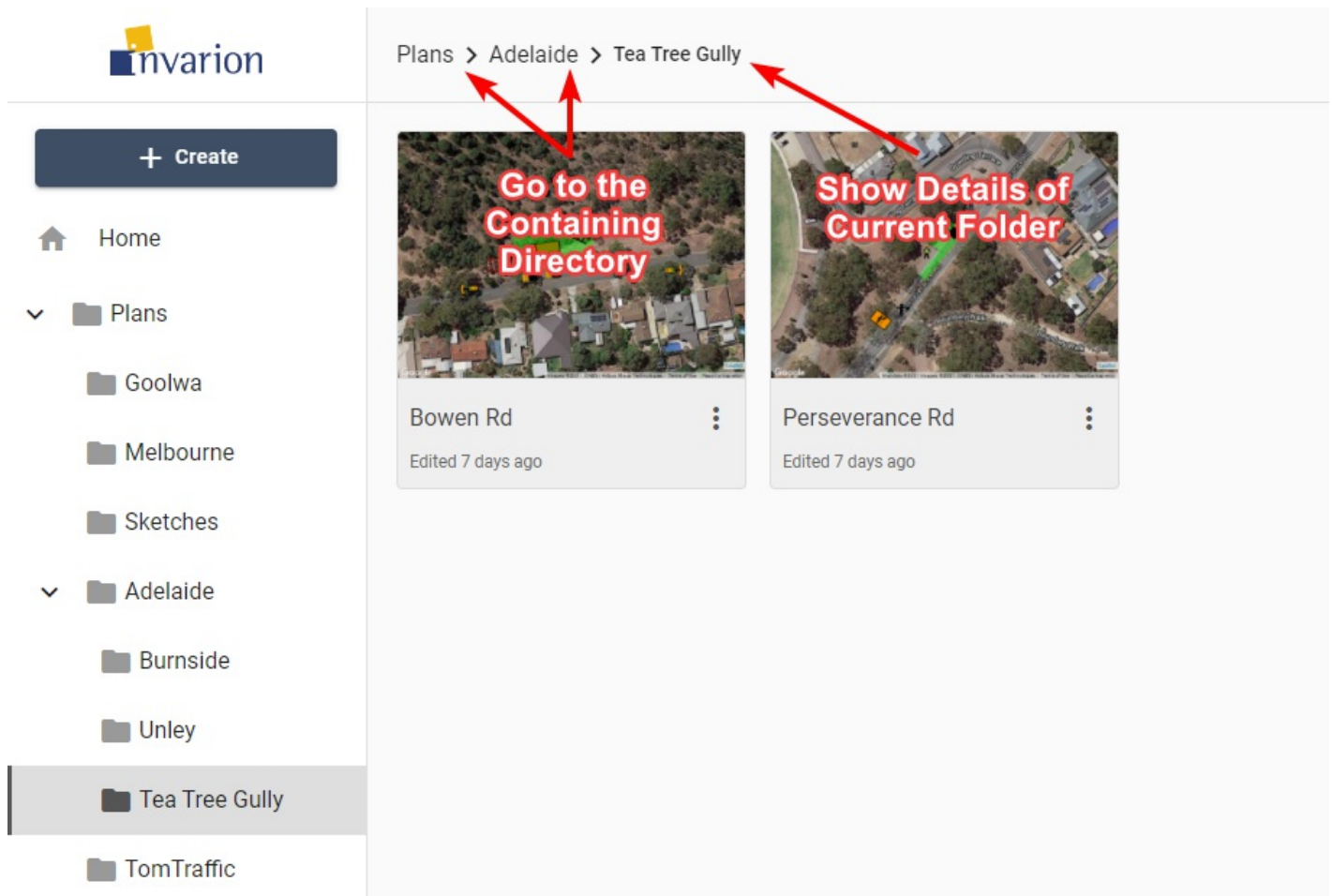


Figure 3.4 Current Location

3.2.3 All Plans

All Plans is a special section that shows all plans that you have access to. That includes plans shared with you by other users. This section doesn't show folders. Plans are displayed regardless of their containing folder.

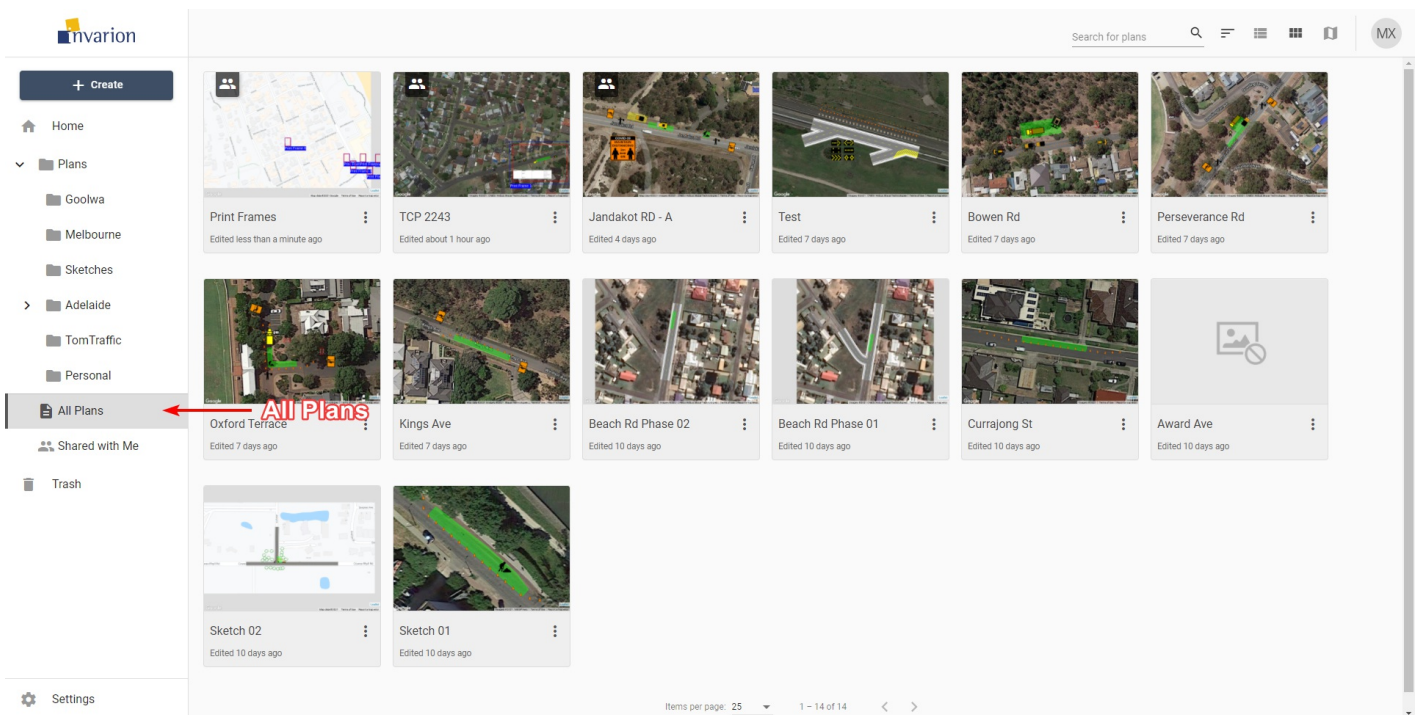


Figure 3.5 All Plans

Tips:

- You can see plan location in plan's details. To do this simply click on the plan, the panel with extra information will show up on the right side of the screen.
- All Plans section was designed to let users quickly find the plan they are interested in.

3.2.4 Shared with Me

In this section, you can see all the plans that were shared with you by other RapidPath Online users.

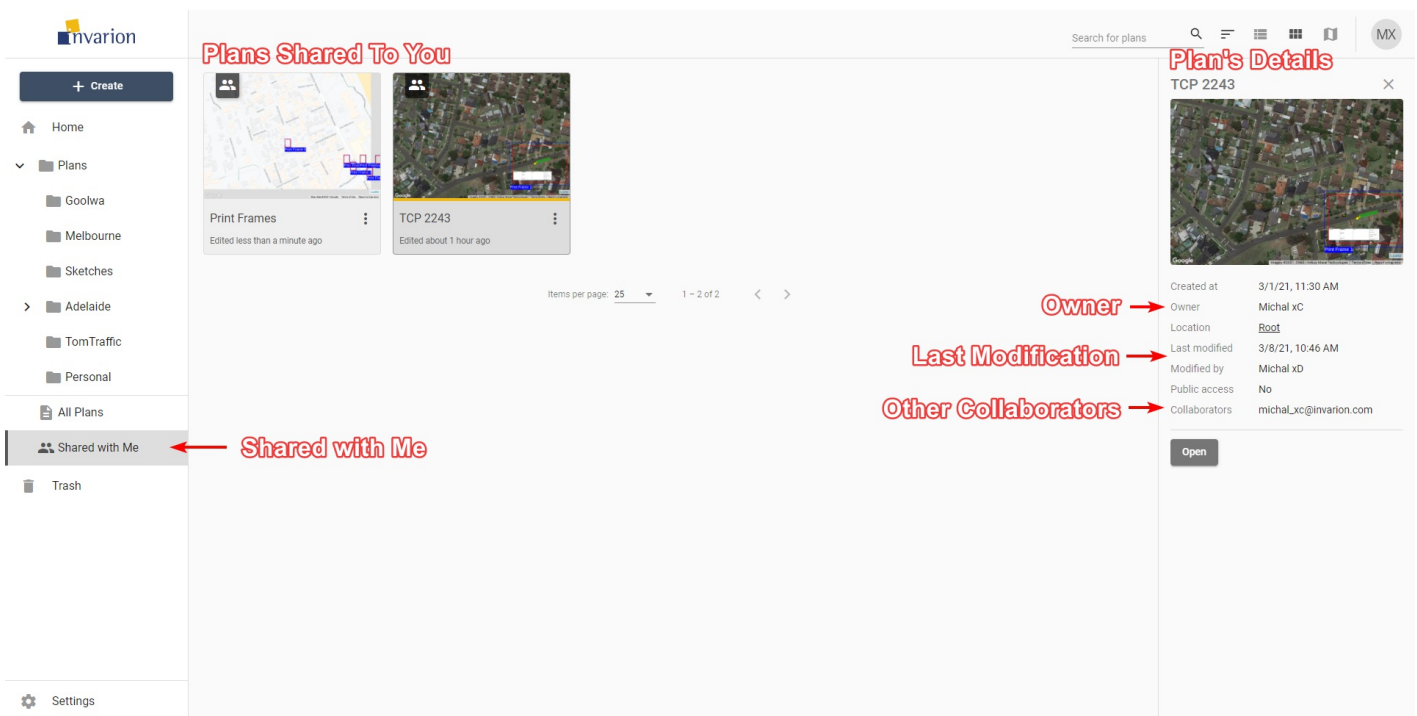


Figure 3.6 Shared With Me

3.2.5 Trash

Inside the Trash section you can find all your deleted plans and folders. Plans and folders in the trash will be automatically deleted after 30 days.

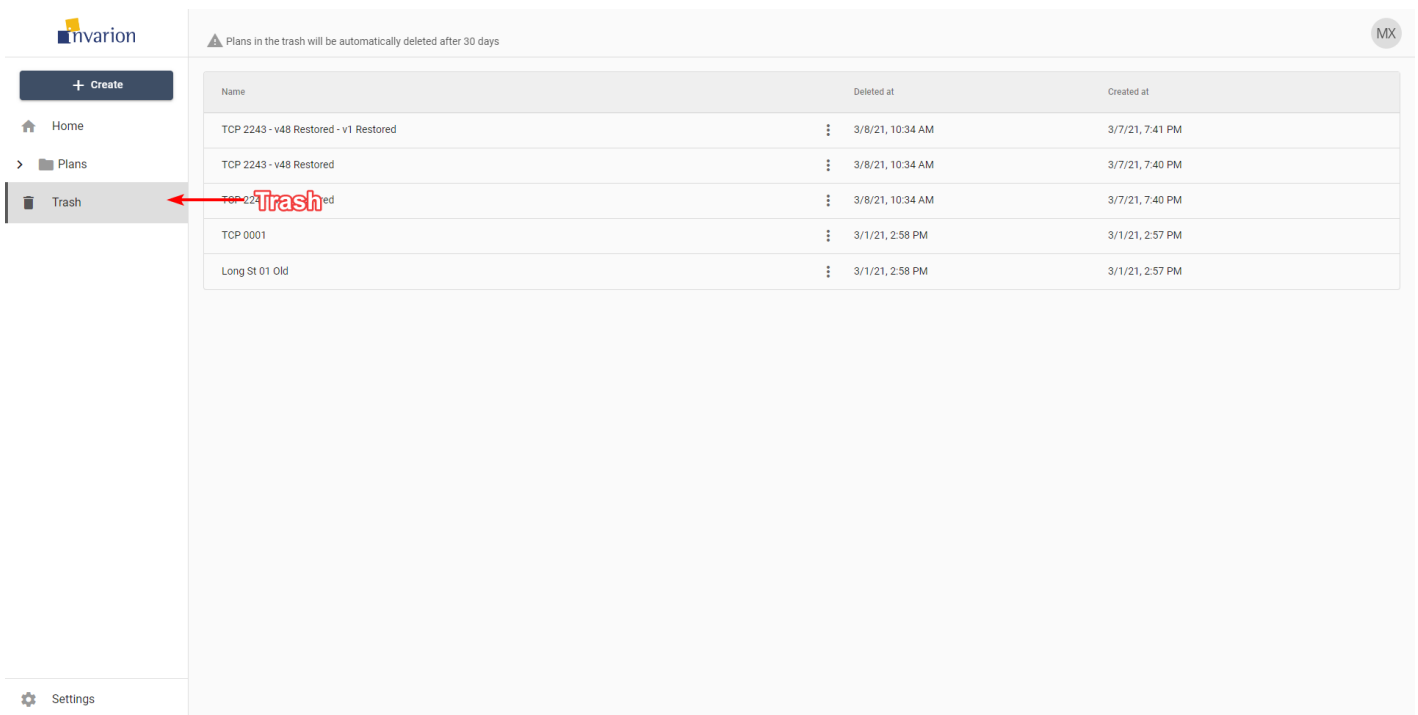


Figure 3.7 Trash

You can restore the plan or a folder by choosing "Restore" option in the plan's or folder's context menu. If you want to clean up your trash manually, choose the "Delete forever" option from the same menu.

3.3 Plans

3.3.1 Creating New Plan

To create a new plan simply click on the "Create" button in the navigation menu and choose "New plan" from the menu. The plan will be created in the folder you are currently in, and you will be taken automatically to RapidPath Online.

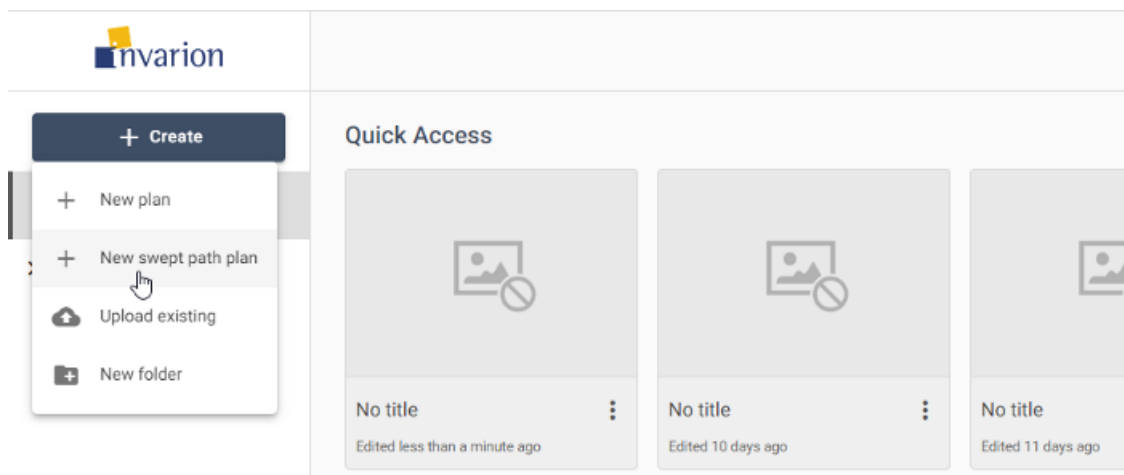


Figure 3.8 New plan

3.3.2 Opening Plans

To open the plan click on it. This will open the panel with plan's details. Look for it on the right side of the screen. Inside the panel click on the "Open" button to open the plan in RapidPath Online.

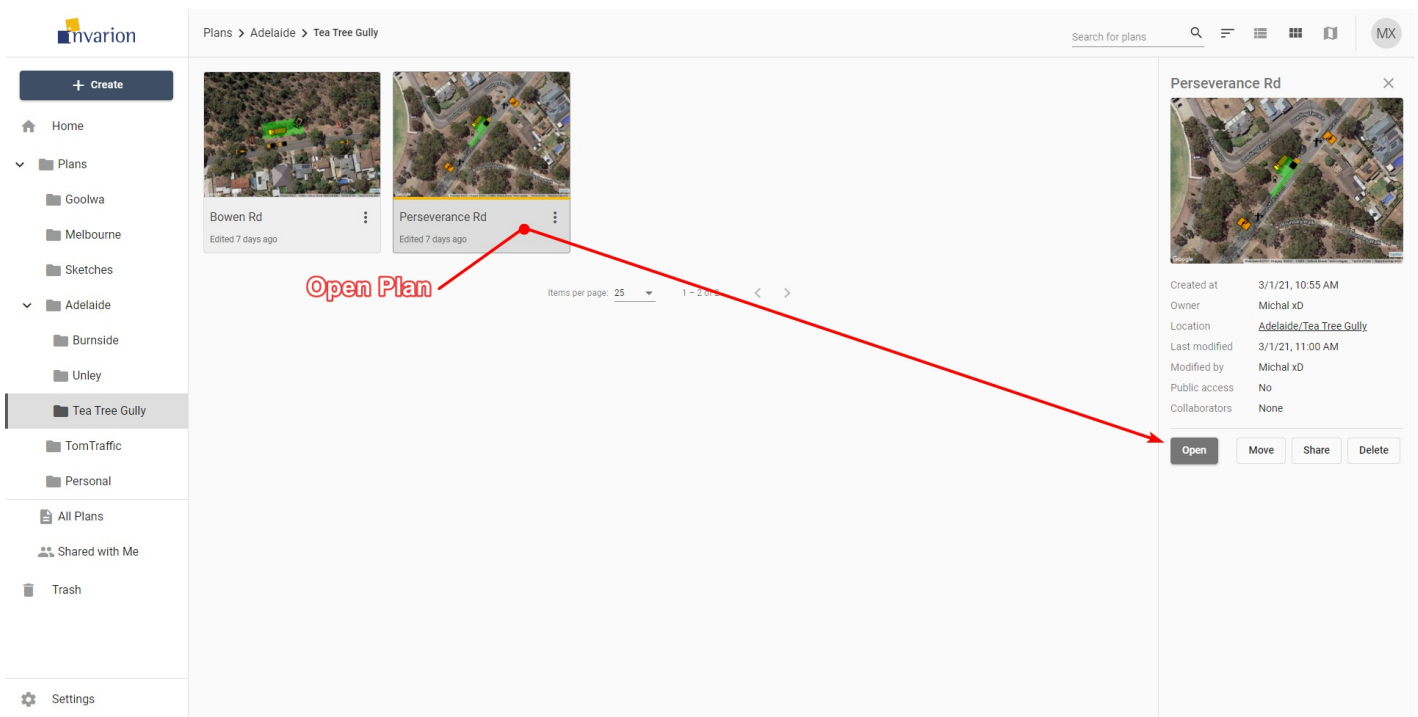


Figure 3.9 Opening A Plan

Figure 3.9 Opening A Plan

Tip: To open the plan in a separate tab or window, right click on "Open" and choose the desired option from the context menu.

Note: Depending on the current view ([3.6 Different Views](#)) plans can be represented by a rows in a table, tiles or pins on the map.

3.3.3 Uploading Existing Plan

You can upload the plan from your computer to your online storage. This may come useful when someone shares the RapidPath Online ".tcp" plan with you by other means than through the Invarion Cloud, for example as an attachment to an email.

To upload existing ".tcp" file to your storage click on the "Create" button in the navigation menu and choose "Upload existing" from the menu. The plan will be uploaded to the folder you are currently in.

3.3.4 Plans Actions

You can see available actions for the plan by clicking on the "three dots" button near its name. This will open plan's context menu with all options listed.

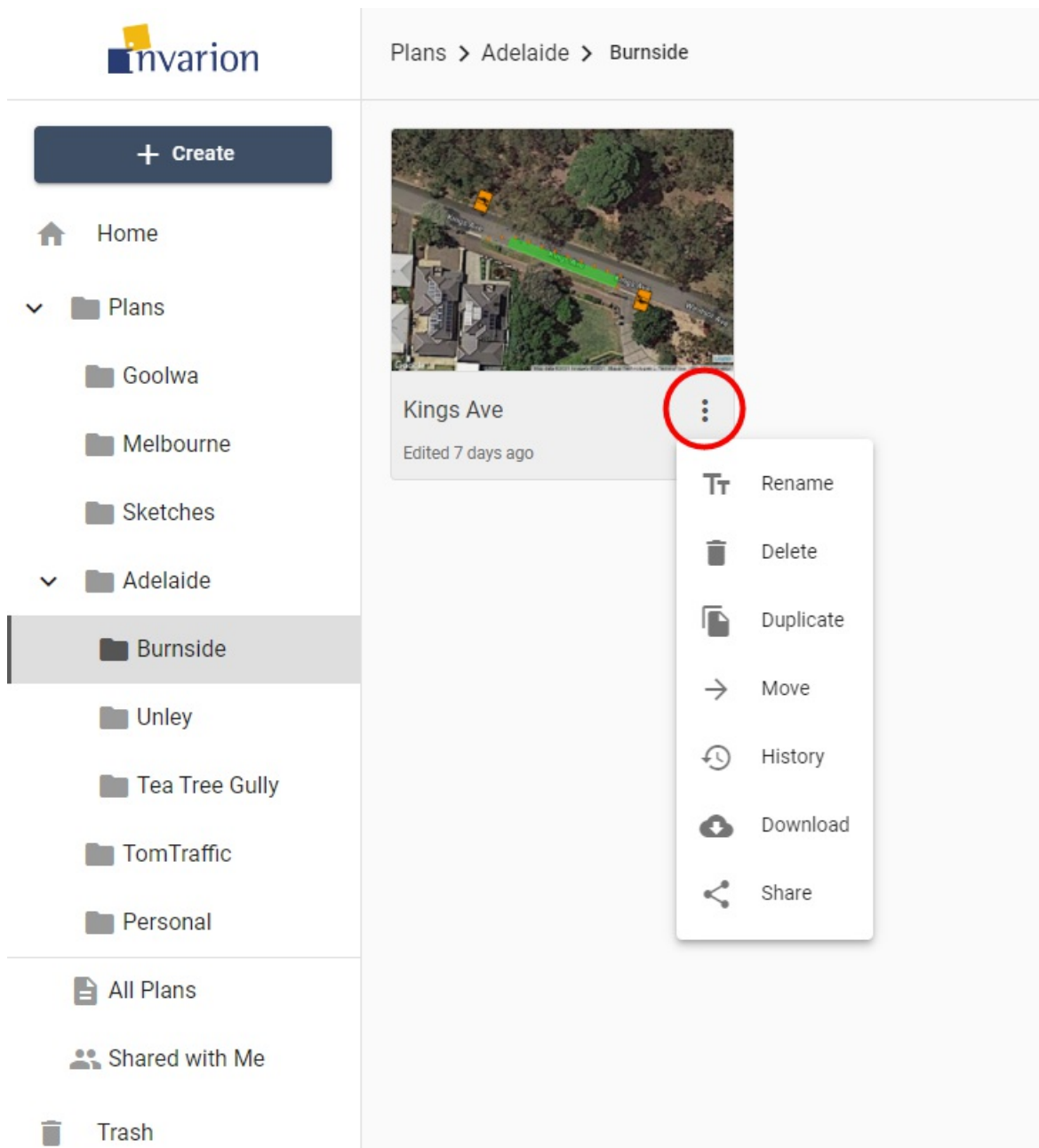


Figure 3.10 Plan Actions

Different actions you can do on plans:

Action	Description
Rename	Rename plan.
Delete	Move plan to trash.
Duplicate	Create a copy of the plan. Duplicate will appear in the same location as the original plan.
Move	Move plan to a different location.
History	Restore the previous version of the plan. Read more in chapter 3.9 Plan's History
Download	Download plan to your device.
Share	Opens window with sharing options for the plan. Read more in chapter 3.8 Sharing Plans

Table 3.2

3.4 Folders

Folders help you keep your files organized and separate inside your Invarion storage. They work the same way as they work on your computer.

3.4.1 Creating New Folder

To create a folder click on "+ Create" a button and choose the "New folder" option. A window will appear with input for the new folder's name. Enter the desired name for the folder and click "Ok". New folder will appear in your current location, and you will be taken straight into it.

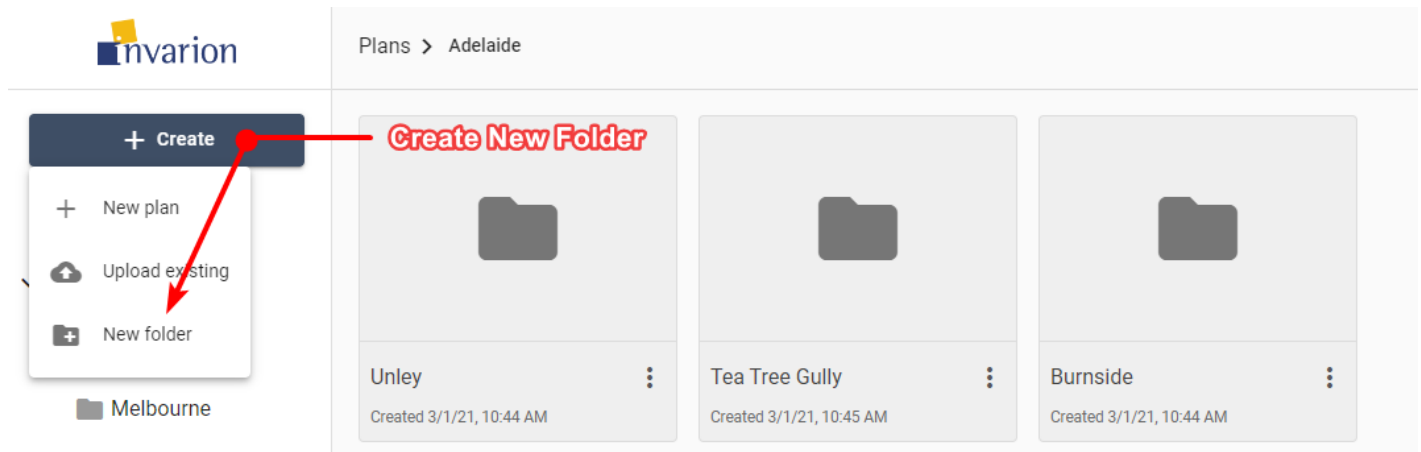


Figure 3.11 Creating New Folder

Notes:

- You can change folder's name at any time using rename option in the folder's context menu on folder's details.
- You can't create a folder inside Home, All Plans or Shared with Me section.

3.4.2 Folders Actions

You can see available actions for the folder by clicking on the "three dots" button near its name. This will open folder's context menu with all options listed.

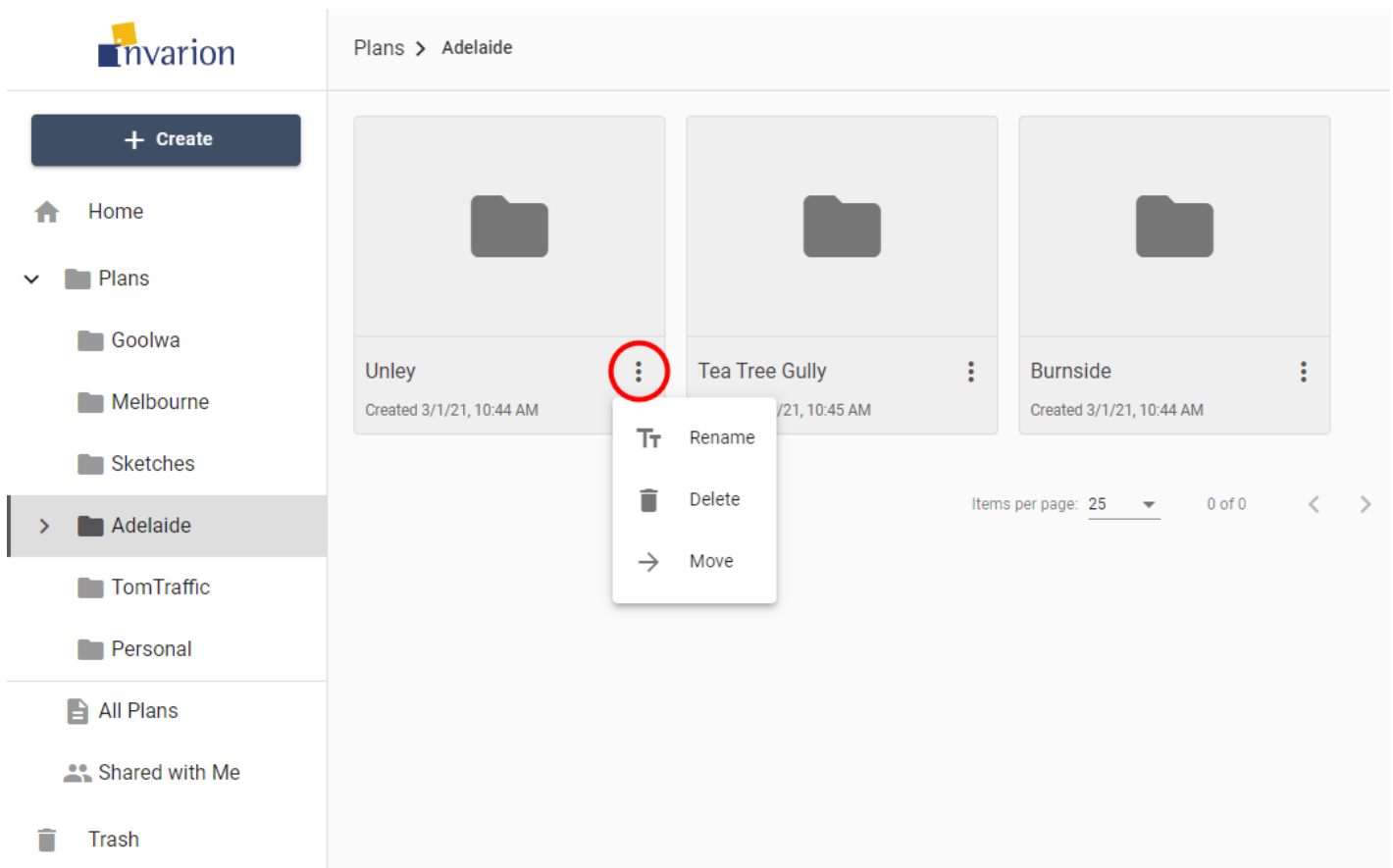


Figure 3.12 Folder Actions

Different actions you can do on folders:

Action	Description
Rename	Change name of the folder.
Delete	Move folder and its contents to trash.
Move	Move folder and its contents to a different location.

Table 3.3

3.5 Details Panel

Plan's or folder's details can be shown in the hideable panel on the right side of the screen. To see them click on a plan that interests you or open the folder. If you already are inside the folder which the details you want to see, click on the folder's name in the top bar.

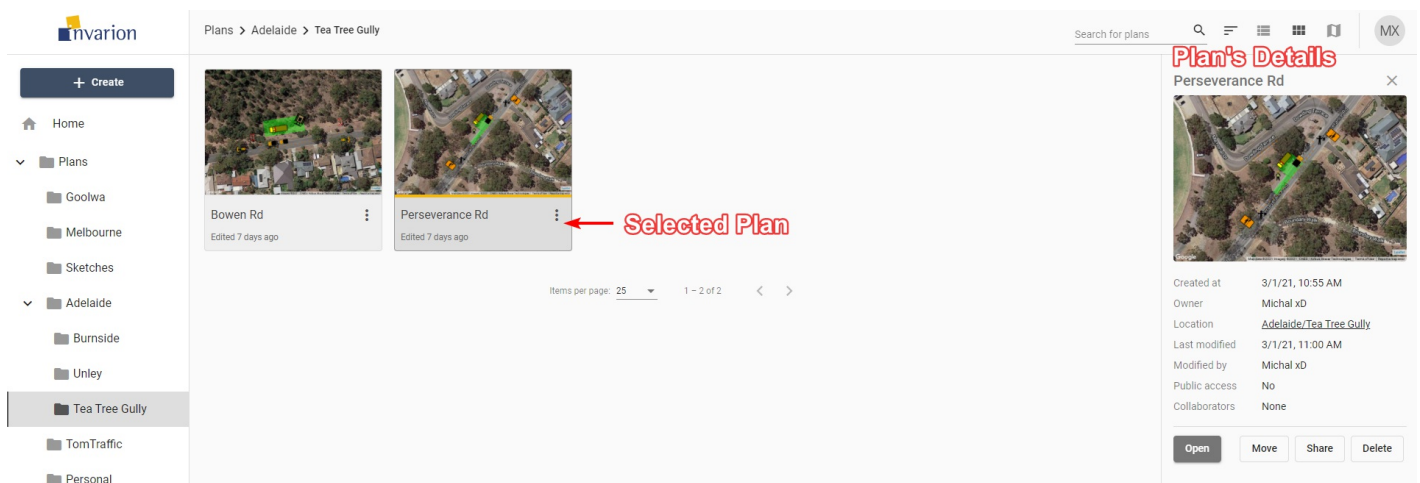


Figure 3.13 Plan Details

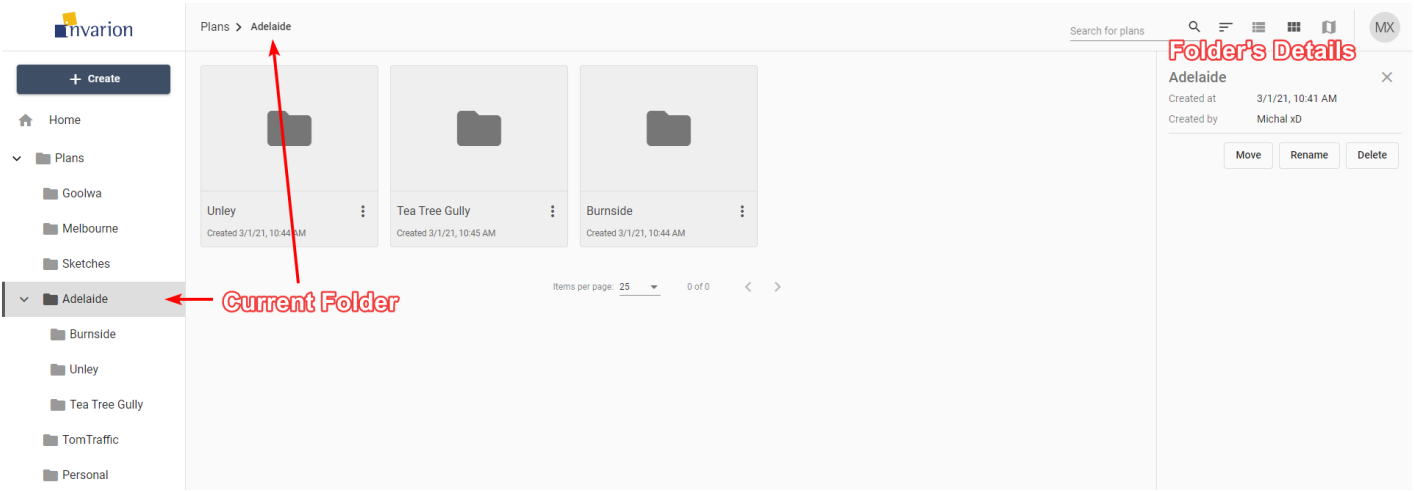


Figure 3.14 Folder Details

Plan's Details	
Created at	Creation time and date
Owner	Plan's owner
Location	Location of the plan in the Invarion Cloud. Clicking on it will take you to the containing folder.
Last modified	Time and date of the last modification made to the plan.
Modified by	User responsible for the last modification. This is especially useful when collaborating with others.
Public access	Shows whether the plan has enabled sharing via public link.
Collaborators	List of the other collaborators invited to the plan.

Table 3.4

Folder's Details	
Created at	Creation time and date
Created by	Folder's owner

Table 3.5

Additionally, the details panel includes buttons for basic option such as "Open", "Move", "Share", "Delete" for plans, and "Move", "Rename", "Delete" for folders.

Tip: Click on plan's or folder's name to rename this plan or folder.

3.6 Different Views

Invarion Cloud lets you view your plans in three different ways:

View	Description
Table View	The Table view presents all of your plans in a table. The table shows the document name, the date it was created, last modified and the editor's name. You can also see if a plan is public, private and or has been shared with a collaborator. You can sort your plans by clicking on column's heading to order by plan's name, creation date or last modified date.
Tile View	The tile view presents your plans as a series of thumbnail images. The tiles show a preview of the plan, for easy identification. Shared plans have special overlay icon that indicates that a plan has been shared. To sort in tile view click on "sort" button on the top bar and choose a desired sorting option.
Map	The map view displays your plans on a map. This can be useful when searching for a plan at a specific location, or for visualizing clusters of projects within a particular region. Plans displayed on the map will show depending on the folder you are currently in. To see all of your plans on the map, open map view while in the "All Plans" section.

Table 3.6

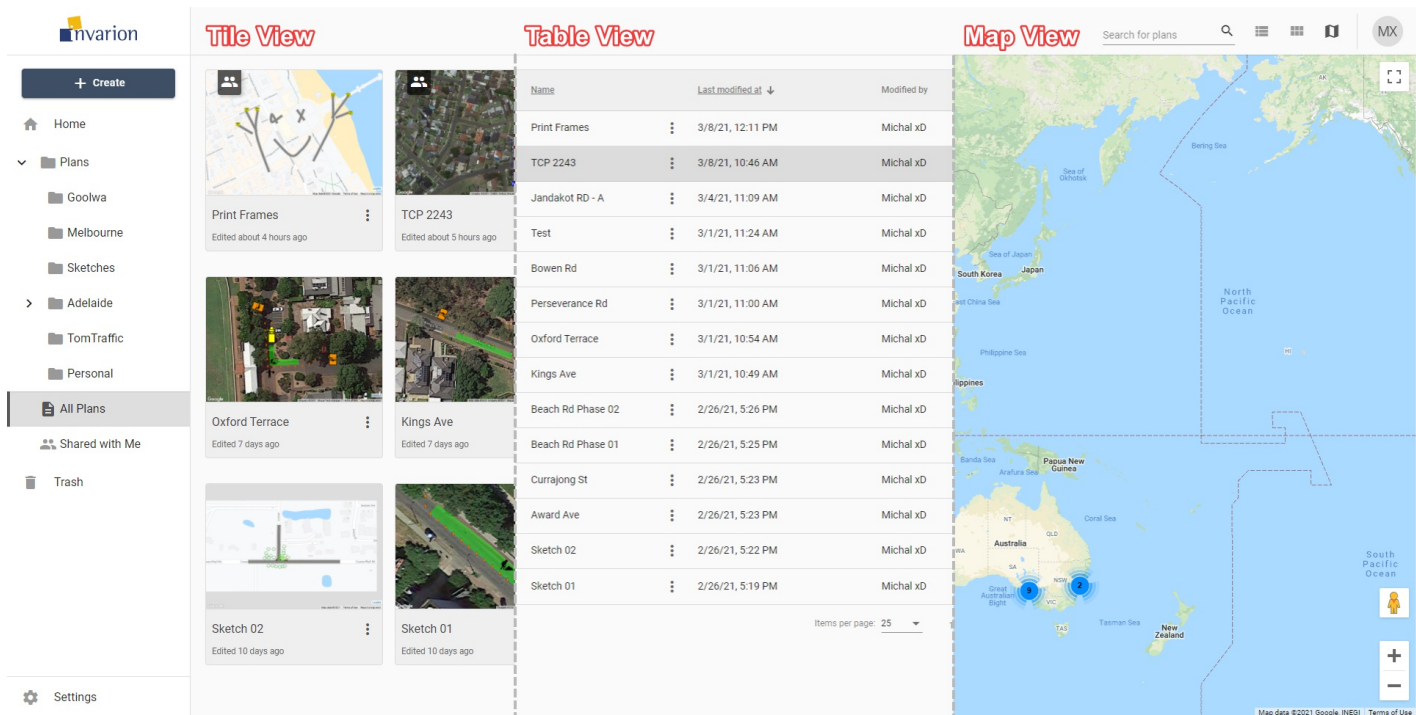


Figure 3.15 Different Views

To change the view use the appropriate buttons on the top bar.

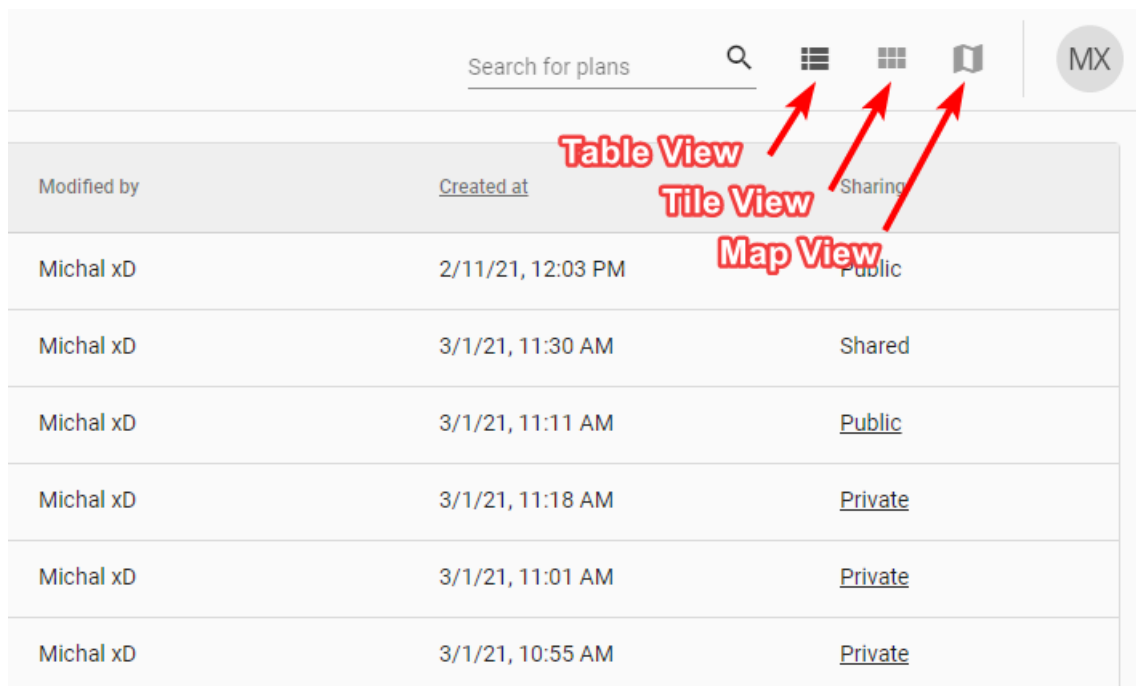


Figure 3.16 Switching The View

You can change the view at any moment. It won't reset your current location or search results. The view you last selected will be saved in your browser as your default view. So next time you enter Invarion Cloud your preferred view will be shown.

3.7 Searching

In the top right corner of the page you will find search input for searching your plans or folders. Searching will search in the current location (folder). If you want to search in all of your plans, switch to the "Home" or "All Plans" section.

3.8 Sharing Plans

Invarion Cloud features two options for sharing your plans with others.

3.8.1 Sharing with Other RapidPath Online Subscribers

Sharing plan with other RapidPath Online subscribers will allow for a collaboration in creating the plan. To add collaborators to your plan click on the "Share" option in the plan's context menu or on the plan's details panel. New dialog box will appear. In the top section of the dialog enter RapidPlan Online user's email and click "Add".

Invited user will be notified about this fact in email, and the shared plan will appear in his or her "Shared with Me" section. In your storage this plan will be marked as "shared" and collaborators will be listed in the plan's details. You can add multiple collaborators to a single plan. To remove the collaborator click the "X" button near the email of the user you want to delete.

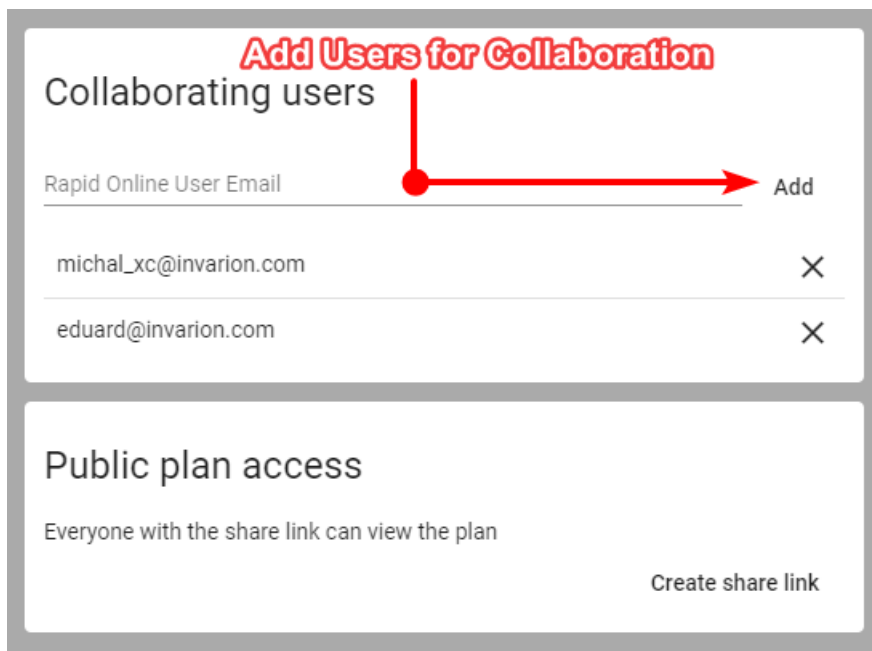


Figure 3.17 Adding Users To The Plan

List of things collaborators can do:

- edit your plan,
- rename your plan,
- duplicate your plan,
- restore the previous version of the plan.

List of things collaborators can't do:

- further share your plan with other people or users,
- move your plan to a different location,
- delete your plan.

You can track the activity on your shared plan using the plan's details where the last modification date and person responsible for the change are listed. Collaborators are also listed in the plan's history where you can restore any previous version of the plan ([3.9 Plan's History](#)).

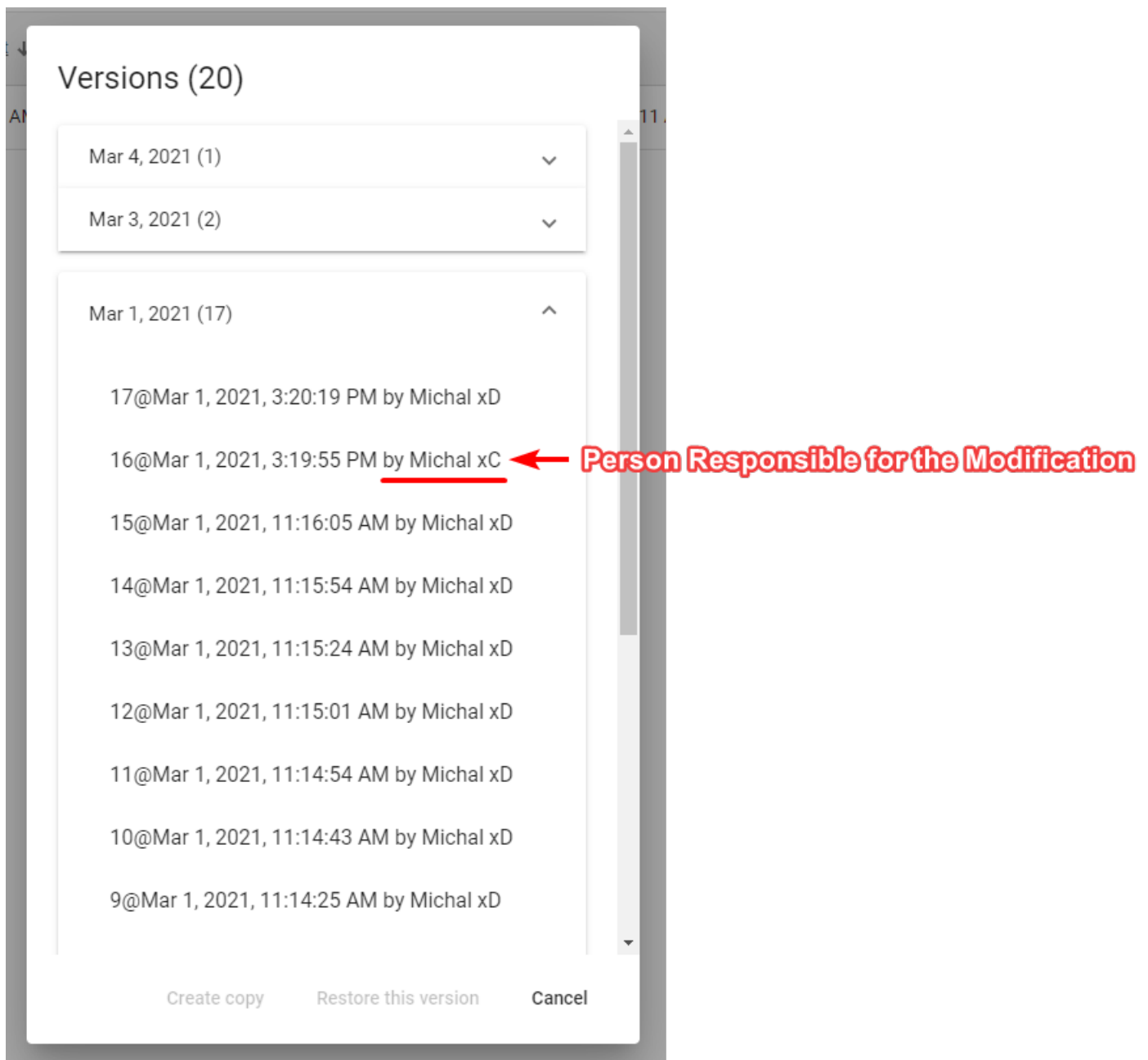


Figure 3.18 Collaborators In Plan History

3.8.2 Sharing via Public Link with Anyone

You can share your plan with anyone (including people who don't have RapidPath Online subscription) via a unique link. A Person who has the link can view the document but cannot edit it. This applies to both RapidPath Online subscribers and non users. If you want to share a plan with the editing privilege use the method mentioned in the previous point ([3.8.1 Sharing with Other RapidPath Online Subscribers](#)).

To create a sharable link click on the "Share" option in the plan's context menu or on the plan's details panel. A new dialogue will appear. In the bottom section of the dialogue click the "Create share link" button. You can then copy the link and share it with anyone you want. From now on this plan will be marked as "public". You can stop sharing at any time using "Remove share link" option in the same dialogue.

Collaborating users

Rapid Online User Email	Add
<input type="text" value="michal_xc@invarion.com"/>	×
<input type="text" value="eduard@invarion.com"/>	×

Public plan access

Everyone with the share link can view the plan

Create Public Share Link
→
Create share link

Public plan access

Everyone with the share link can view the plan

Remove share link
Copy link

Figure 3.19 Creating Public Link



Figure 3.20 Plan In Read Only Mode

3.9 Plan's History

Invarion Cloud keeps track of every modification made to the plan. Anytime the plan autosaves a new recovery point is made. Thanks to this you can easily go back to any previous version of the plan undoing some unwanted changes made by yourself or other collaborators. It is like turning back the clock.

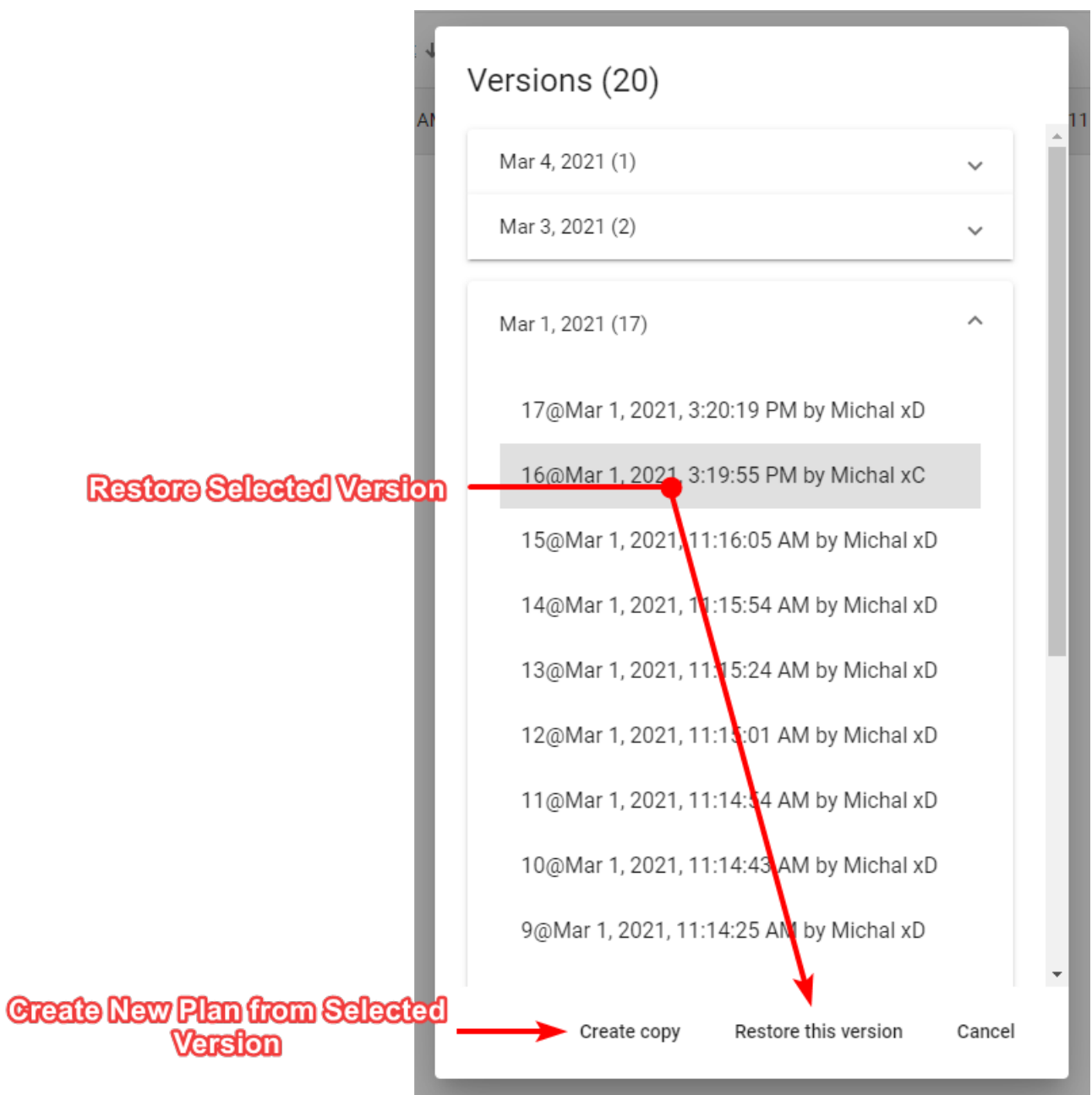


Figure 3.21 Plan History

To use recovery options select "History" from the plan's context menu. A new dialogue will appear listing all the possible recovery points for this plan. Select the one you are interested in and choose one of two options, "Restore this version" or "Create copy". The former restores the original plan to the selected previous version. The latter creates a new plan from information saved in the selected recovery point. Recovery points listed in the "History" dialogue are divided by date. Additionally to that each one has unique number, timestamp and user responsible for the modification made to the plan.

Note: If you restore a previous version of the plan, you will still have access to the later versions of the document. So, no risk is involved.

Tip: Plan's history may also come in handy when something unexpected happens to your plan. You can then retrieve last correctly working version of the plan.

3.10 Settings

To enter settings use the "Settings" button at the bottom of the navigation menu. From here you can visit your account page to change your password or edit your billing details. You can also change your default plan settings such as author and company name, your website or upload a company logo. This information will be used to populate the title block when used in RapidPath Online.

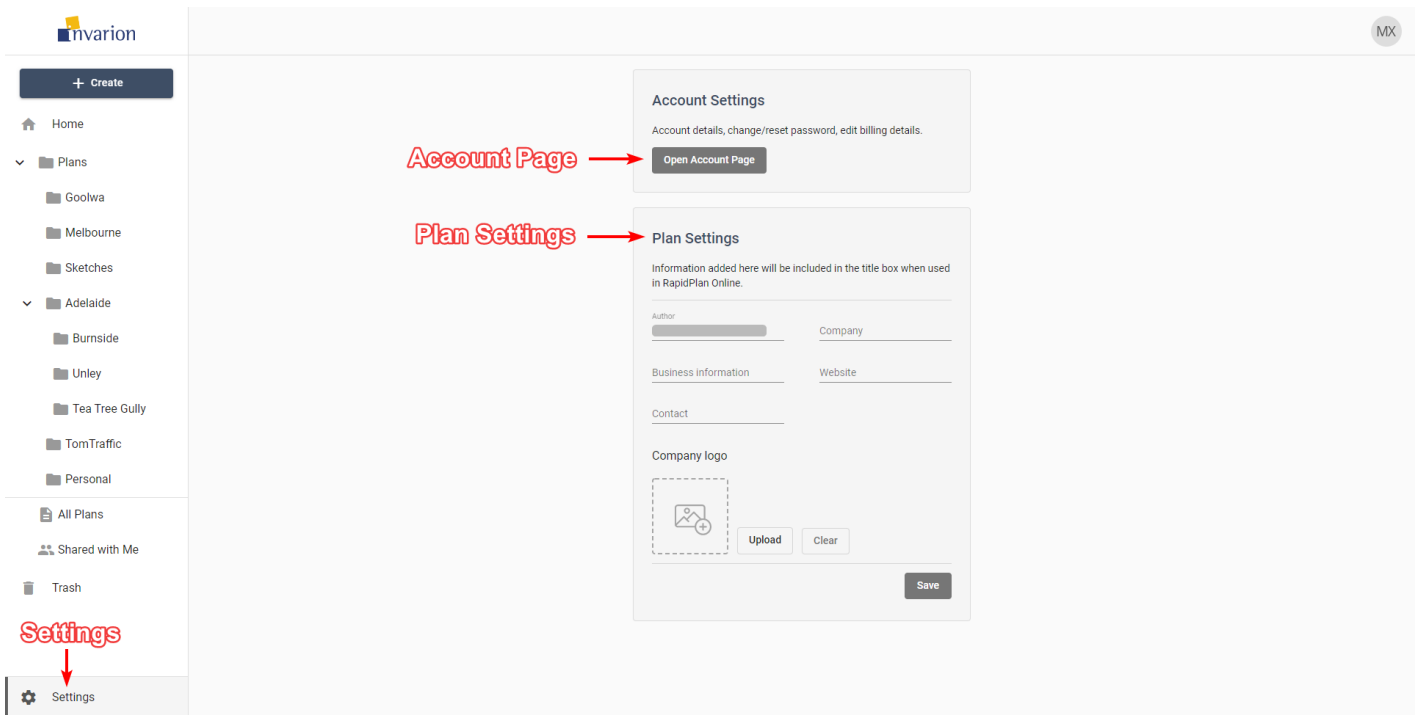


Figure 3.22 Settings

3.11 Logging Out and Contact

To Log out of the Invarion Cloud click on the "your initials" button in the top-right corner of the screen and choose "Logout".

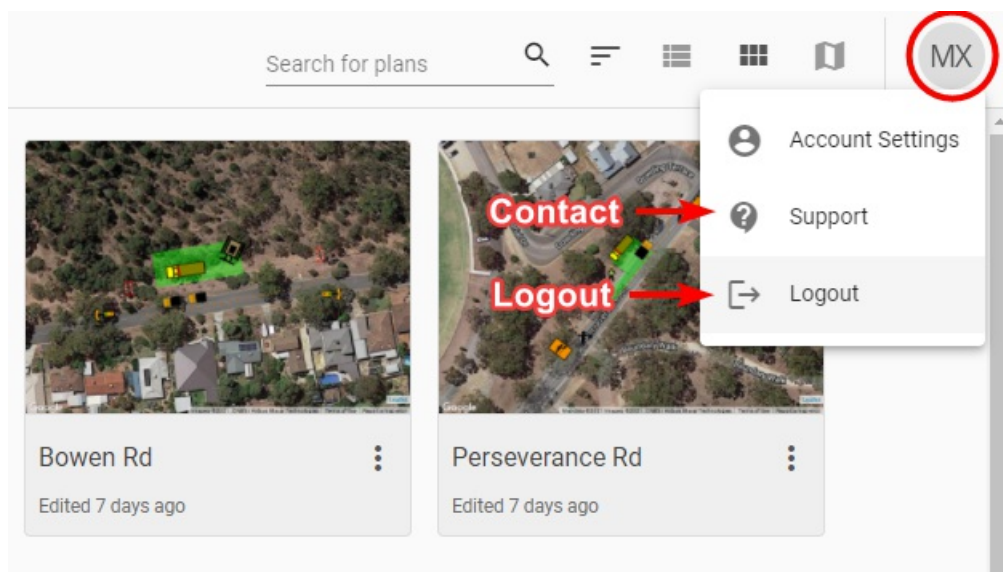


Figure 3.23 Logging Out

If you have any questions about Invarion Cloud, or you would like to see a particular feature added, please feel free to contact us. To open contact page click on the "your initials" button in the top-right corner of the screen and choose "Support".

Chapter 4: RapidPath Online Workspace

Before starting to create plans, we recommend getting to know your way around the workspace. It has been designed to be intuitive, easy to follow and to allow you the maximum available working space to create your traffic plan.

There are four main components of the RapidPath Online workspace:

- Canvas area
- Main Menu
- Toolbar
- Palettes

These workspace components are highlighted in the below.



RapidPath Online Workspace

To name your plan, simply click where it mentions the plan title, highlighted above. Once renamed, the plan will autosave.

The plan author, comments and job work dates can be adjusted in Plan properties.

The following sections steps through each of component of the workspace.

4.1 Canvas area

The Canvas area is where your swept path plan is created. When you open a new plan, a Google Maps (satellite view) of your worksite location is displayed on the canvas background.

4.2 Main Menu

The Main menu contains a number of options to assist with plan creation. The image below shows the main tools of the RapidPlan Online menu.

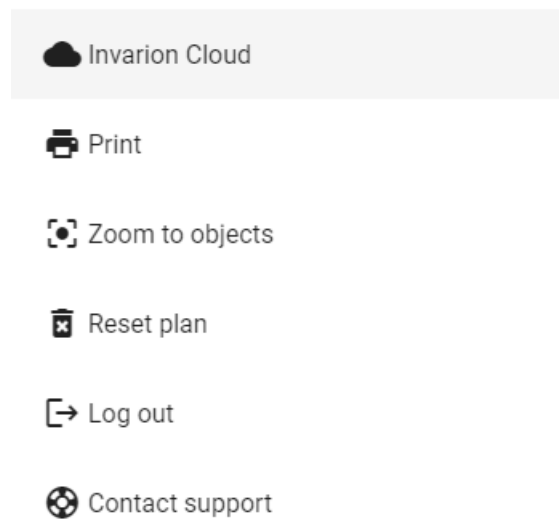


Figure 4.24 RapidPath menu

Menu Selections	Description
Invarion Cloud	Navigates to Invarion Cloud.
Print	This option opens the Print dialogue box.
Zoom to objects	Selecting this option will return your view to where the objects are situated on your plan. This feature is especially helpful if you lose your bearings on the unrestricted canvas and wish to return to the plan's point of origin.
Reset plan	This option erases all objects, signs, layers, plan location and history within a plan.
Contact support	Opens a webpage with Tech support contact information

Table 4.1

4.2.1 Select tool

When drawing on the canvas area, your mouse can perform a number of functions. It can select objects, pan across the workspace and zoom in and out (using a mouse wheel). RapidPath Online offers two options for alternating between these functions - canvas button, tool selection in the main menu.

The Select tool is principally used to drag and drop objects onto the canvas area. It also has a special drag-select function, used when selecting multiple objects. Clicking (tap and hold on mobile devices) and dragging your mouse creates a selection window. The direction you drag the mouse creates a different colored window.

If you drag to the right, the window is purple. This selects objects that are completely within the purple window.

If you drag to the left, the window is green. This selects all objects touching the green window.

Examples of this are shown below.

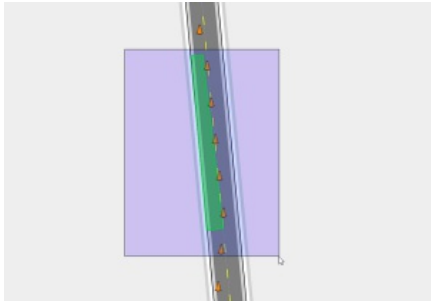

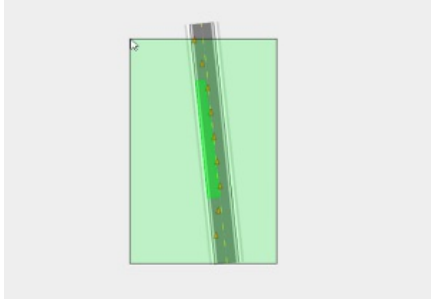
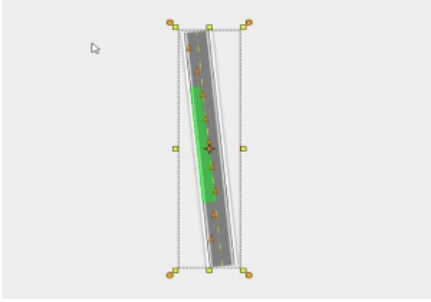
	Drag right (Purple)		Object selection
	Drag left (green)		Object selection

Table 4.2

4.3 Toolbar

The Toolbar, located in the top right corner of the workspace, contains a number of buttons available for quick access. Each button is described below.




Label	Button	Description
Print		Open the printing dialogue to print or export a plan.
Tools		Show/hide the Tools palette.
Operations		Show/hide the Operations palette.

Table 4.3

4.4 Palettes

The palettes are located on the left (Tools) and right (Operations) of the canvas area. They can be shown/hidden by toggling the corresponding button on the Toolbar. This can be helpful for maximizing the canvas area when preparing larger-scale plans.

The Tools palette includes:

- Tools
- Vehicles

The Operations palette includes:

- Properties

- History; and
- Layers.

Each palette can be minimized by clicking the arrow icon at the top left.

The following sections describe the functions of each palette in detail.

4.4.1 Tools palette

The Tools palette contains most of the elements required to annotate a swept path plan. The tools are separated into three categories, detailed in the Tables below:

4.4.1.1 Marker tools

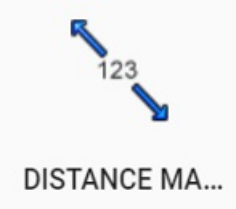



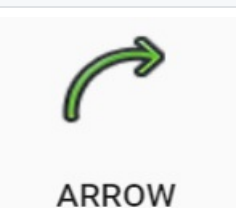













Label	Button	Description
Distance marker		Mark the distance between two points
Combined distance marker		Mark multiple distances separated into segments
Offset distance marker		Mark the distance between two points and offset the marker
Manifest box		Itemizes the number of objects on a plan
Arrow marker		Draws an arrow object
Angle marker		Marks the angle between two points

Table 4.4

4.4.1.2 Primitive tools

Label	Button	Description
-------	--------	-------------

Label Label	Button Button	Description Description
Polyline	 POLYLINE	Draws straight lines that can be connected in a series of segments
Polygon	 POLYGON	Draws a polygon shape that can be filled with a custom color
Spline	 SPLINE	Creates a curved line along path
Filled Spline	 FILLED SPLINE	Creates a curved line that can be connected and filled with a custom color
Bezier	 BEZIER	Create a curved line with greater precision using control points and curve handles
Filled Bezier	 FILLED BEZIER	Create a curved line with greater precision using control points and curve handles. Fill with custom colors
Text object	 TEXT OBJECT	Creates an object out of text that can be manipulated like any other object
Text box	 TEXT BOX	Creates a box that can be filled with text
Rectangle	 RECTANGLE	Draw rectangular shapes and fill with custom colors
Ellipse	 ELLIPSE	Draw elliptical shapes and fill with custom colors
Arc	 ARC	Draw a line in the shape of an arc
Arc Pie		Creates an arc shape that can be filled with a custom color



Label	Button	Description
Rounded Rectangle	 ROUNDED RE...	Creates rectangle with rounded edges that can be filled with a custom color
Insert Image	 IMAGE	Insert an image file (jpeg, png, gif) to drop onto the canvas area

Table 4.5

4.4.2 Vehicles palette

The Vehicles palette is the repository for each of the vehicles in RapidPath Online.

There are 2 components, **Vehicle libraries** and **Vehicle selection**.

- Your license will come with the standardized vehicles package for your region, you can choose to add more vehicle libraries to your license via your [Account portal](#)
- You can select a vehicle by left-clicking and then left-clicking to position it on the canvas area.

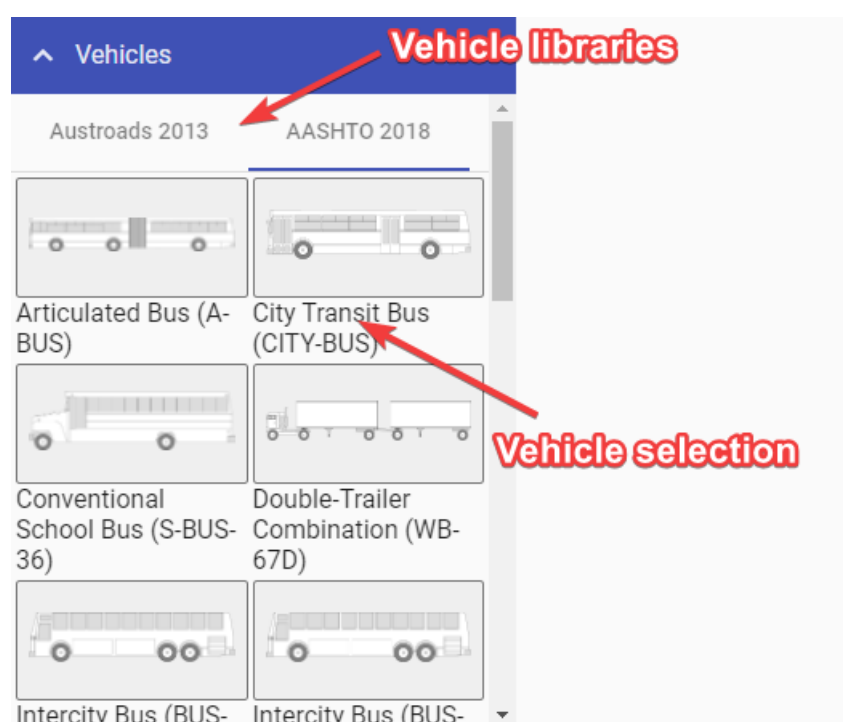


Figure 4.25 Vehicle palette

4.4.3 Properties palette

The Properties palette displays all the information pertaining to any selected vehicles, tools, markers or objects. This is where you can change fonts, colors, etc - of a selected object.

The Properties palette allows for full customization of a vehicle path on your plan. Select the vehicle path, and you can then adjust its properties. For example, you can customize any aspect of a vehicle, as seen below.

This applies for all objects you place on your canvas area; each object has its own properties that you can edit and customize to suit your plan.

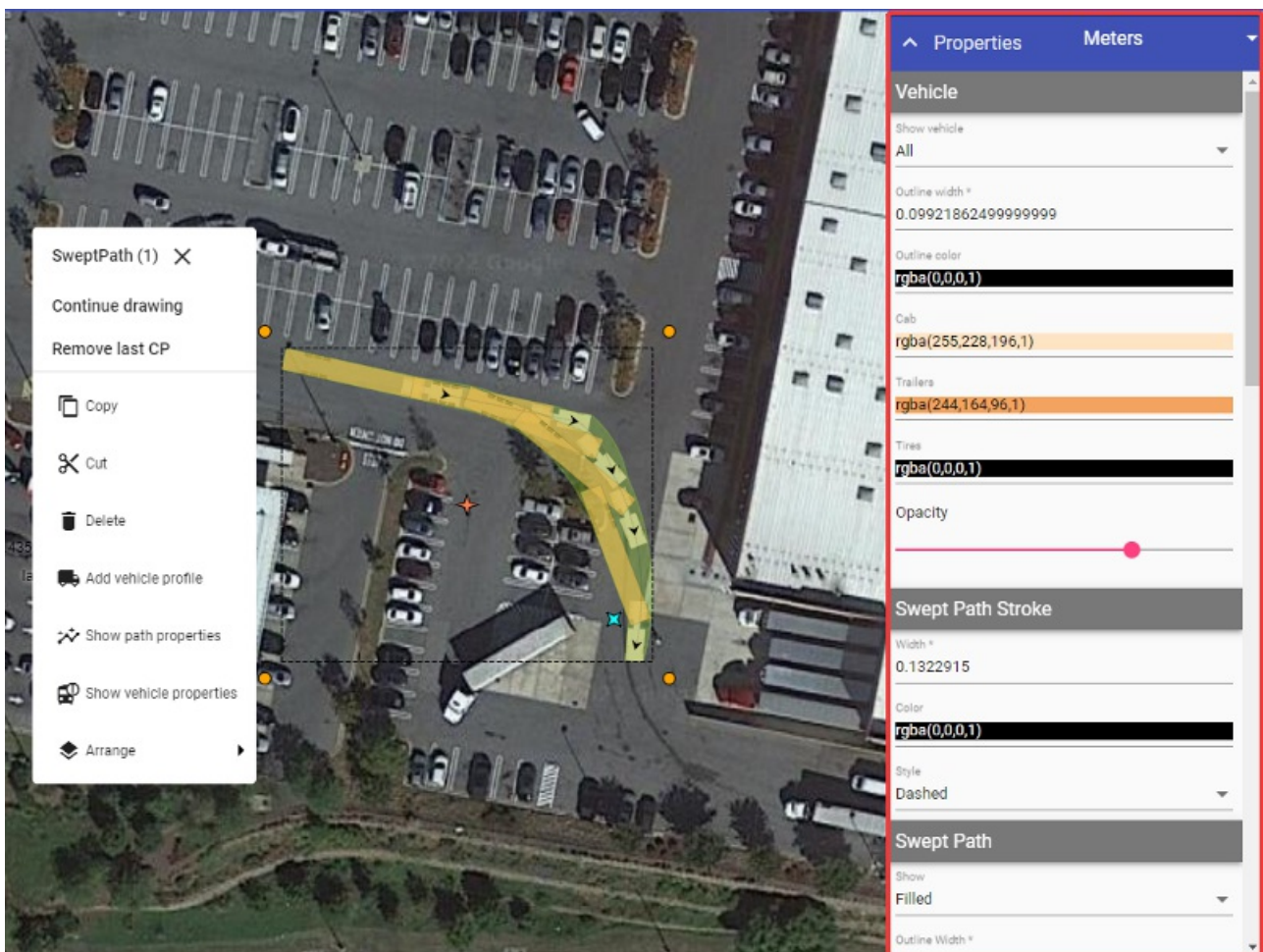


Figure 4.26 Properties palette

4.4.4 History palette

The History palette contains the list of changes that you have made on the plan. On the top right of the palette, there are two arrows that represent undo and redo operations.

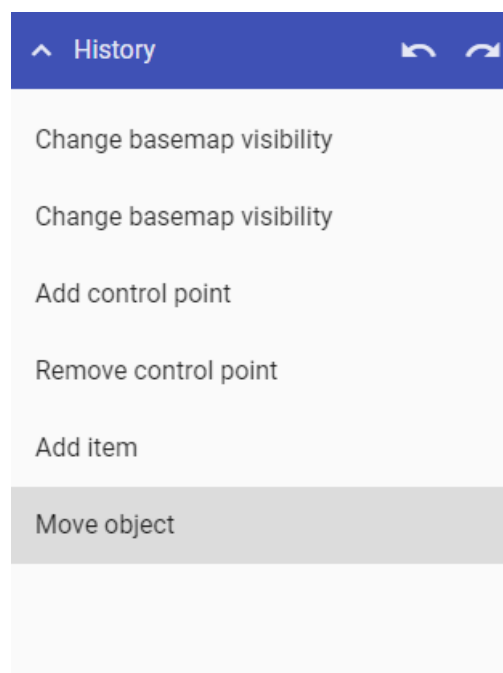


Figure 4.27 History palette

You can click on any of the changes made to take you back to that particular point in the creation of the plan.

4.4.5 Layers palette

There will be a lot of cases where you will need to create more than one plan for a job, such as when you have different stages of work or multiple vehicle paths. That's why RapidPath Online enables you to place multiple layers on your plan.

Layers will, more importantly, help you keep things organized in your plan. You can have a separate layer for vehicles, distances and other plan objects. Layers will improve your workflow and allow for easier changes on a more complex plan.

By default, every plan starts with only one layer, the Background.

Layers palette is divided in two sections:

- "Layers" for managing layers, and
- "Basemap" for basemap settings.

The image below highlights elements of the "Layers" section.

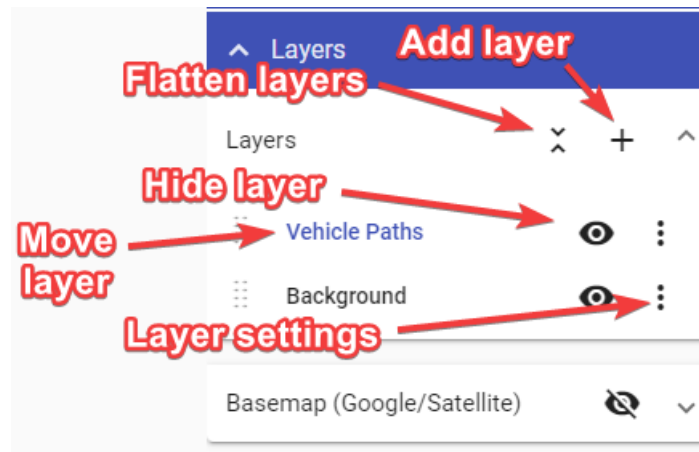


Figure 4.28 Layer settings

Elements in "Layers" section and their functions:

- **Add new layer** - Creates a new layer, which is then visible in the layers list.
- **Flatten layers** - Brings all of your current layers, and their objects, into a single layer.
- **Move layer** - Dragging this icon allows you to adjust the sequence of the layers in the list. This determines the order in which layers are drawn on the plan.
- **Hide layer** - This icon toggles the visibility of the layer.
- **Layer settings** - The 'More Options' icon allows you to rename the layer, adjust its opacity or delete that layer

Adjust basemap to your needs in "Basemap" section of Layers palette.

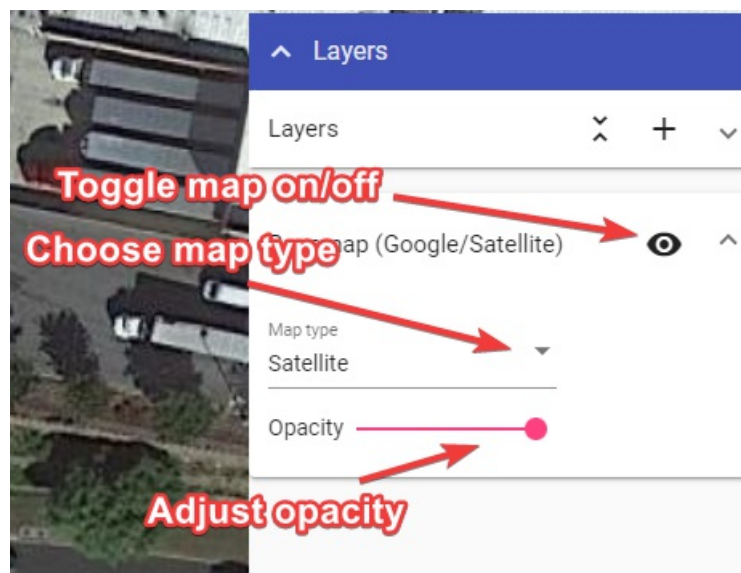


Figure 4.29 Map type

Elements in "Basemap" section and their functions:

- **Toggle map on/off** - Turn basemap on and off.
- **Map Type** - Change between different map types (road, satellite, hybrid, etc.).
- **Opacity** - Change basemap opacity, you can make it a little transparent so the drawn objects stand out more.

4.5 Autosave feature

Changes made to a plan are saved automatically. The status bar located at the top of the page shows the autosave status. There are three stages which take about 4 seconds to cycle through:

- **Pending changes** - The system is updating changes made to your plan. It is recommended you don't exit the page when changes are pending.
- **Saving** - The file is saving to Invarion Cloud. It is recommended you don't exit the page while the plan is saving.
- **Up to date** - Your plan is now saved. It is now safe to exit the page.

Note: Panning across the map or changing plan location will not trigger the autosave function. You must draw or place an object on the canvas area to initial the autosave.

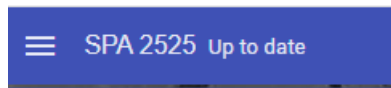


Figure 4.30 Status bar

Chapter 5: Definitions

Term	Definition
Vehicle	The chosen object from the Vehicle Library. It can't be resized, its size is automatically adjusted to the scale of the base map.
Vehicle Path	Steering path for the vehicle. The path consists of user control points that reflect subsequent vehicle positions during the manoeuvre. The path consists of sections that can have different parameters such as speed, friction and turn on stop setting (on/off) within a single path.
Vehicle Profile	An object that can be placed onto the document to represent the vehicle used in Swept Path Analysis. Vehicle profile consists of vehicle's name, basic properties, and side diagram with key dimensions.
Path Section	These are the sections between the user control points of the Vehicle Path. Each segment has properties such as speed, friction and turn on stop setting (on/off).
Sweep Envelope	The result of the swept path analysis. Defined as the visible turning space needed for a specific vehicle on a specific path to operate safely on the road network and to avoid causing damage to roadside furniture.
Clearance Envelope	Clearance Envelope is a zone outside the actual Sweep Envelope. It allows you to add an extra offset to accommodate for driver error or real-world situations.
Lock To Lock Time	Time in seconds that it takes the driver of the vehicle to turn the steering from full lock in one direction to full lock in the opposite direction in a single continuous movement. This may differ depending on which standards and vehicle types are used.
Speed and Friction Link	The lateral friction factor is dependent on the vehicle speed and is calculated according to the chosen vehicle and its related standards. You can disable this behavior by clicking on the link/unlink toggle button in the "Section details" window while drawing the vehicle path.
Turn on Stop	The option that allows the vehicle to make a stop and turn the front wheels between different sections of the Vehicle Path.
Steering Angle	The steering angle is defined as the angle between the front of the vehicle and the wheels direction.
Turning Radius - Curb to Curb	The radius of the turning circle that denotes how wide a street would need to be so the vehicle can make a U-turn without hitting the street curb with the wheel. Value of minimum turning radius (curb to curb) for each vehicle can be found inside the Vehicle Library.
Turning Radius - Wall to Wall	The radius of the turning circle that denotes how far apart two walls would need to be so the vehicle can make a U-turn without scraping the walls with the bumper. Value of minimum turning radius (wall to wall) for each vehicle can be found inside the Vehicle Library.
Min Radius	Centerline radius of the smallest circular turn that the vehicle is capable of making at a given speed.

Chapter 6: Preparing Swept Path Analysis

6.1 Adding Vehicle to the Plan

The first step in creating the Swept Path Analysis is adding a vehicle to your plan. To do this, navigate to the Vehicle Library. In the Vehicle Library palette, choose the library and vehicle you are interested in and left-click. Now, place the vehicle onto your plan with the left mouse button.

Vehicles in RapidPath Online can be positioned and rotated just like any other object. But, their size is automatically adjusted to the plan's scale and cannot be changed.



Figure 6.1 Select vehicle

When clicking on a vehicle you can check its most important parameters inside the Properties palette.

6.2 Drawing a Vehicle Path

To start drawing a Vehicle path, select the vehicle on your plan and click on "Continue drawing" in the context menu.

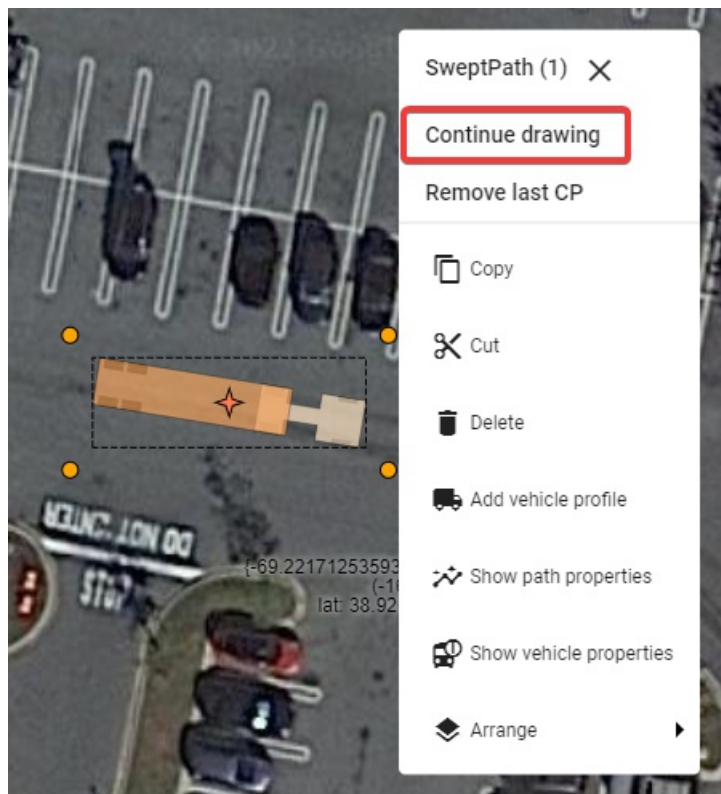


Figure 6.2 Vehicle path

When in "Continue drawing" mode a special window called "Section details" will appear with settings for:

- **Speed** - Vehicle speed.
- **Friction** - Lateral friction factor dependent on the vehicle speed and calculated according to the chosen standard. To set a custom value disable speed and friction dependency by clicking on the "derive friction from speed" toggle button on the left and enter the desired value in the field.
- **Turn on Stop** - Turning this option on ("True") allows the vehicle to make a stop and turn the front wheels between

different sections(at control points) of the Vehicle path.

and info such as:

- **Min radius** - Minimum turning radius (centerline) of the vehicle at the given speed and friction.
- **Max angle** - Maximum turn angle of the vehicle at the given speed and friction.
- **Max speed** - Maximum speed for the vehicle taking into account standard guidelines, given speed, friction and current turn radius.

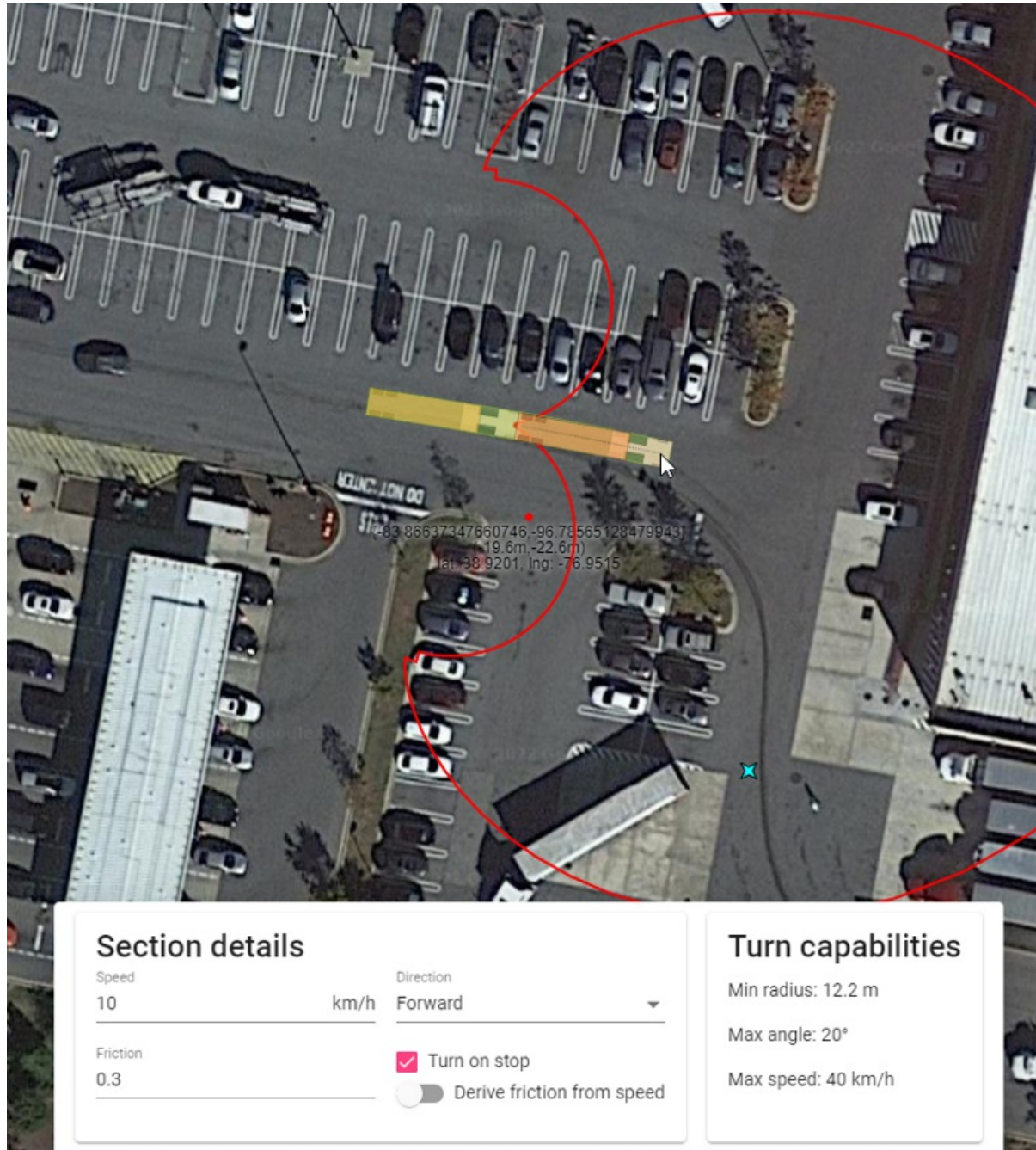


Figure 6.3 Section details

After setting the speed, friction and "Turn on stop" option you can start drawing the path. To do this, indicate the points on the canvas area by clicking the left mouse button. Each point creates another section of the Vehicle path. Each section can have different parameters such as speed, friction and turn on stop setting. You can adjust section parameters before making each point to create a path that consists of sections with different speeds, friction and other parameters.

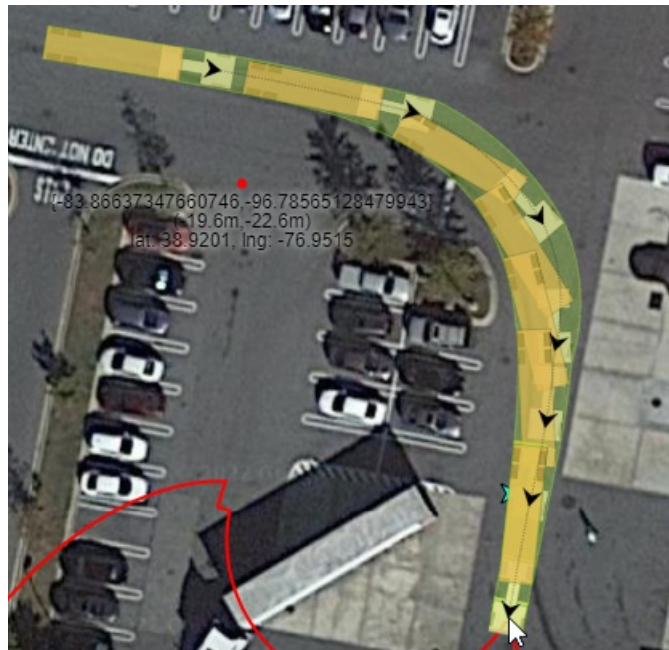


Figure 6.4 Control points

You can only create a path within the maneuverability capabilities of the current vehicle at given parameters such as speed, friction, lock to lock time, etc. Observing a real-time preview of the vehicle, the turning angle indicator during drawing will help you make the desired path. The turn angle indicator will show you your max turning radius.

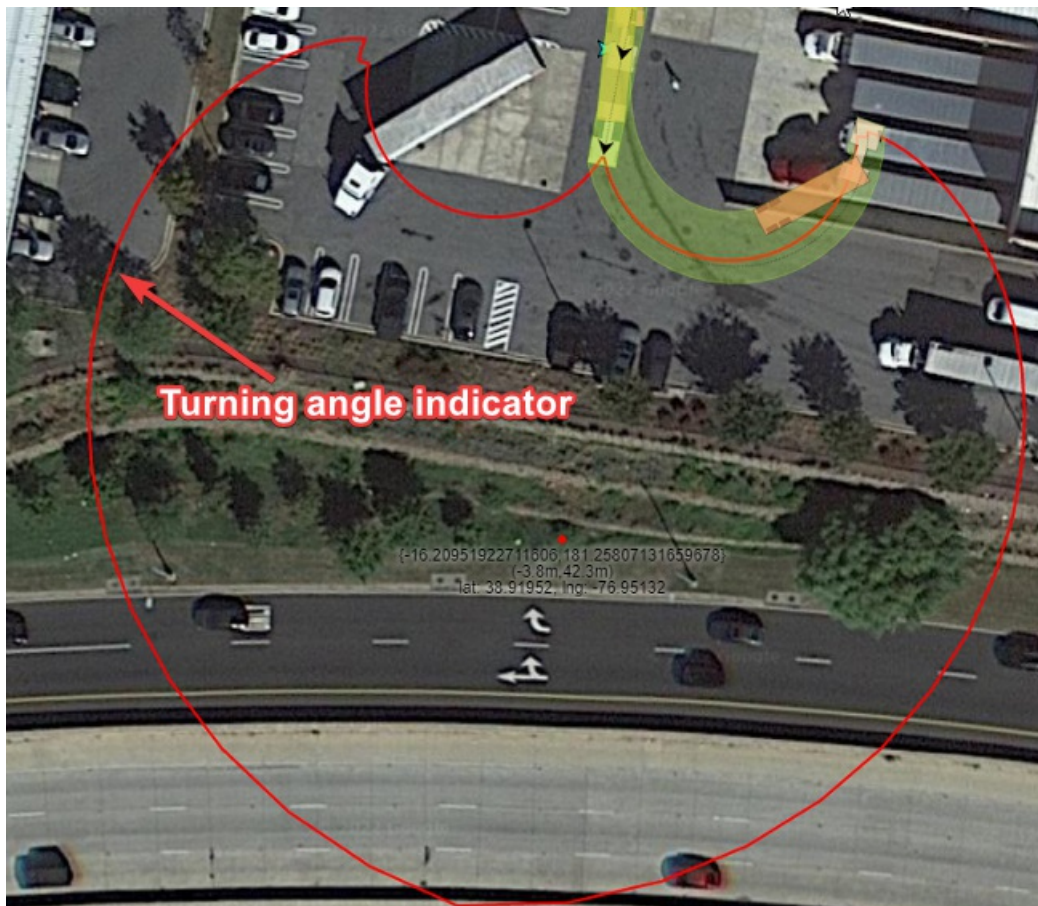


Figure 6.5 Turning angle indicator

Finish drawing the path by clicking the right mouse button. Once the Vehicle Path is finished it turns into a single object that can be freely moved and rotated.

6.3 Clearance Envelope

Clearance Envelope will allow you to add offset to the Sweep Envelope to accommodate for driver error or real world

situations. To turn on the Clearance Envelope go to the "Clearance" section in path's properties and change "Show" property to "Filled" or "Outline".

You can edit the clearance envelope offset distances in the "Clearance dimension" section of the path's properties.



Figure 6.6 Clearance appearance

6.4 Styling Vehicle Path, Sweep Envelope and Wheel Paths

Vehicle Path, Sweep Envelope and Wheel Paths can be styled in many different ways using Vehicle Path's properties in the Object Properties window. Aside from visual customization, you can also:

- Add wheel paths separately for front and rear wheels;
- Show/hide directional arrows that indicate the start of each path section; and
- Show/hide vehicles along the path.

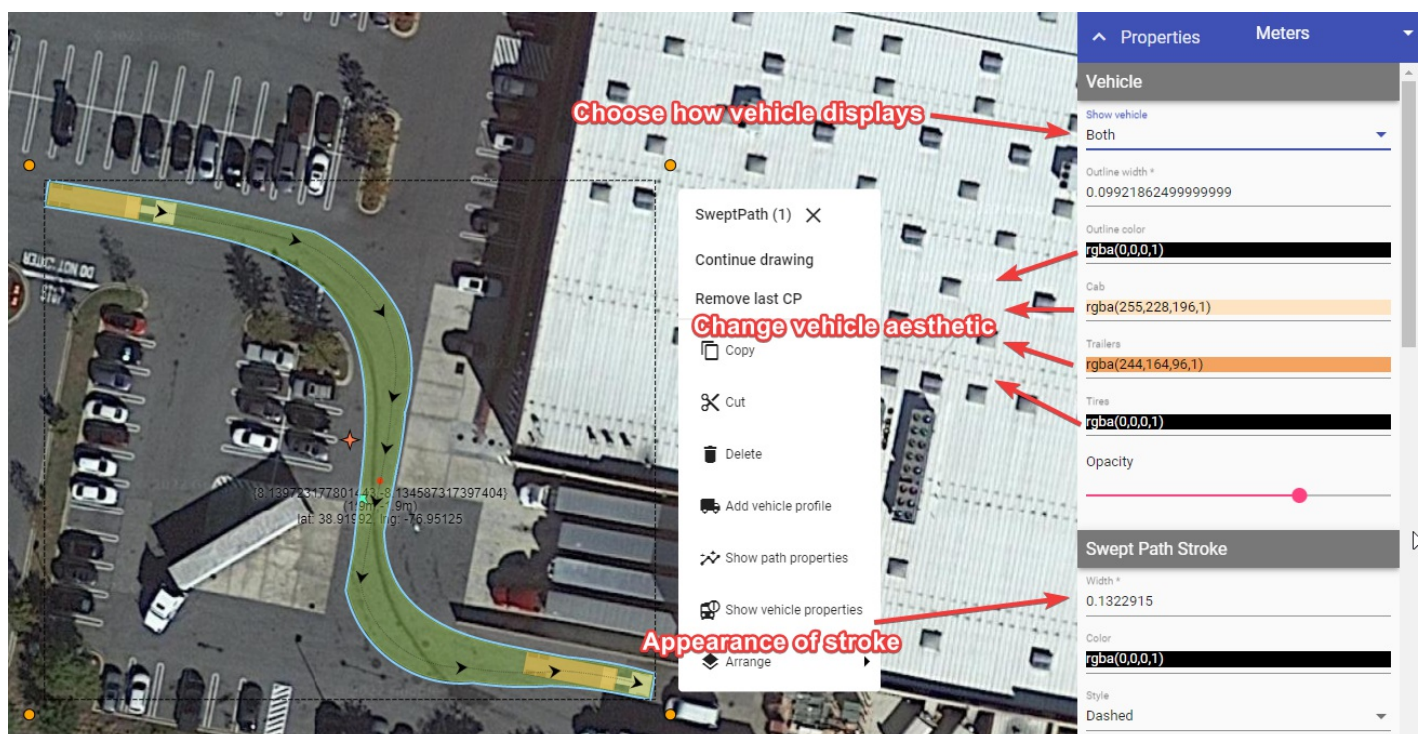


Figure 6.7 Path edit

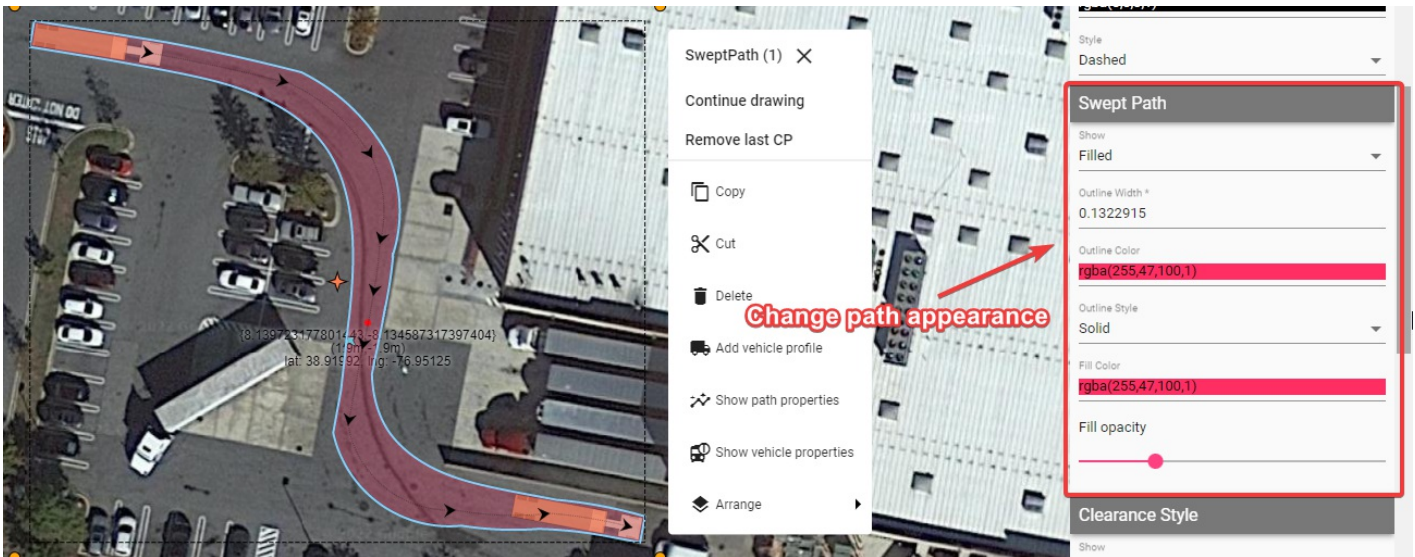


Figure 6.8 Change path appearance

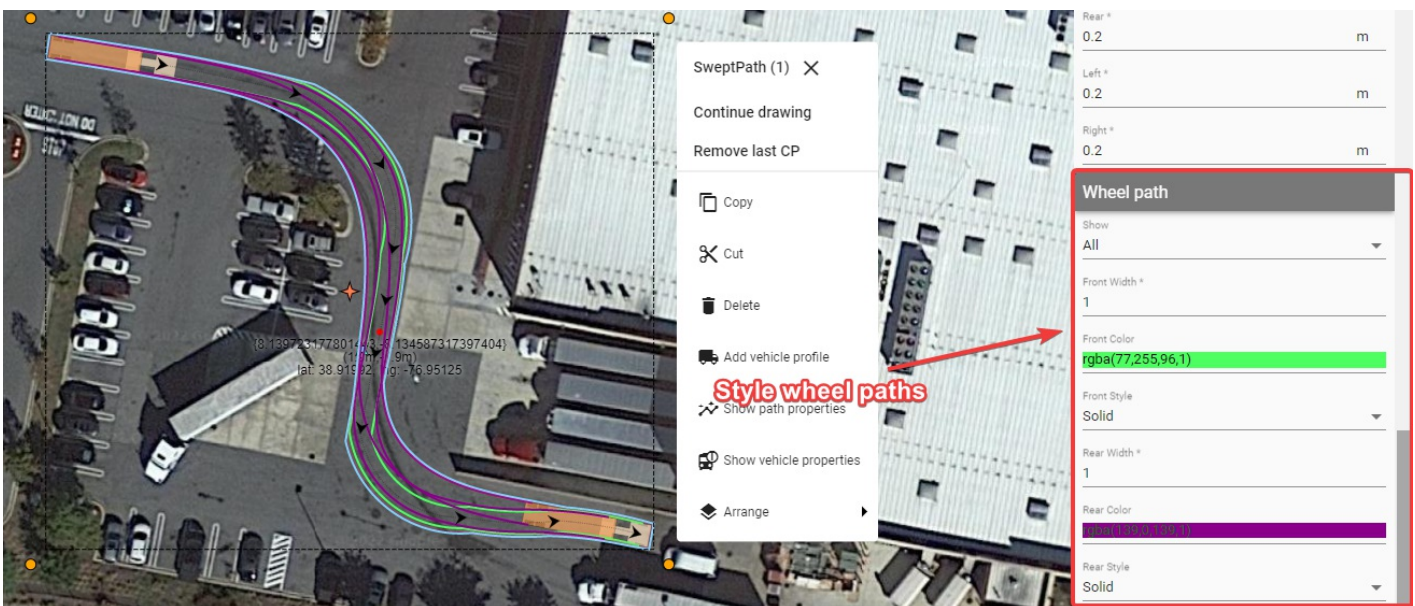


Figure 6.9 Style wheel paths

6.5 Adding Vehicle Profile to the Plan

It is always a good idea to add the description of the vehicle used for the Swept Path Analysis to your document. You can easily do this by clicking the left mouse button on the vehicle or Vehicle Path and choosing "Add vehicle profile" from the context menu.

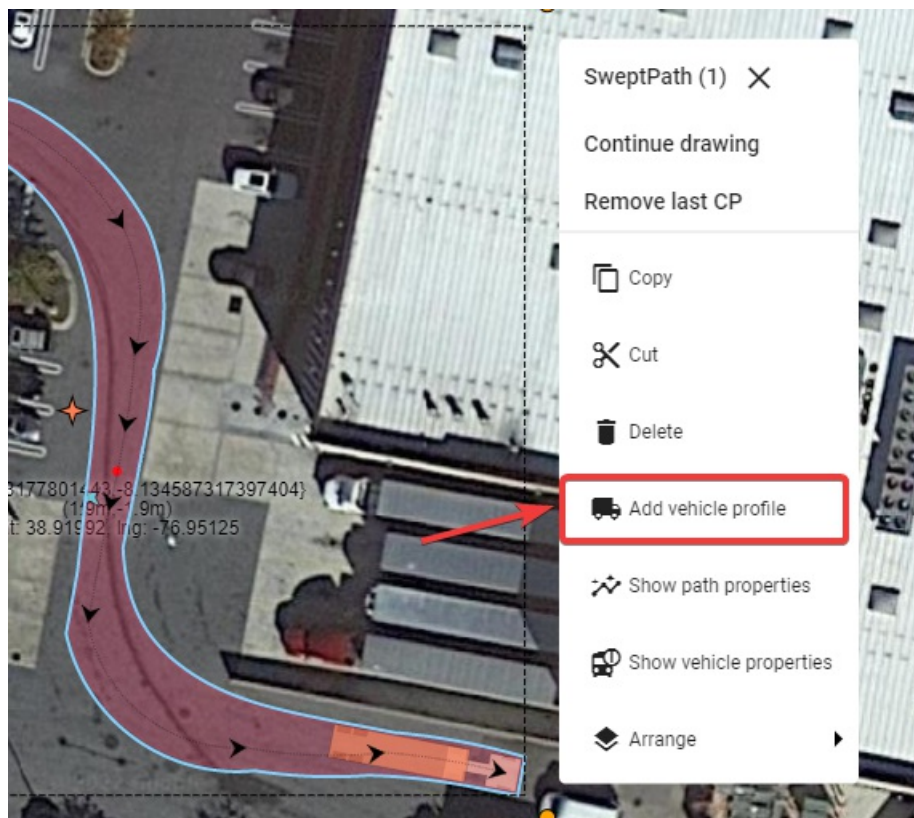


Figure 6.10 Add vehicle profile

The Vehicle Profile displays the:

- Vehicle's name;
- Vehicle's side view with the most important dimensions; and
- Vehicle's properties crucial for the Swept Path Analysis.

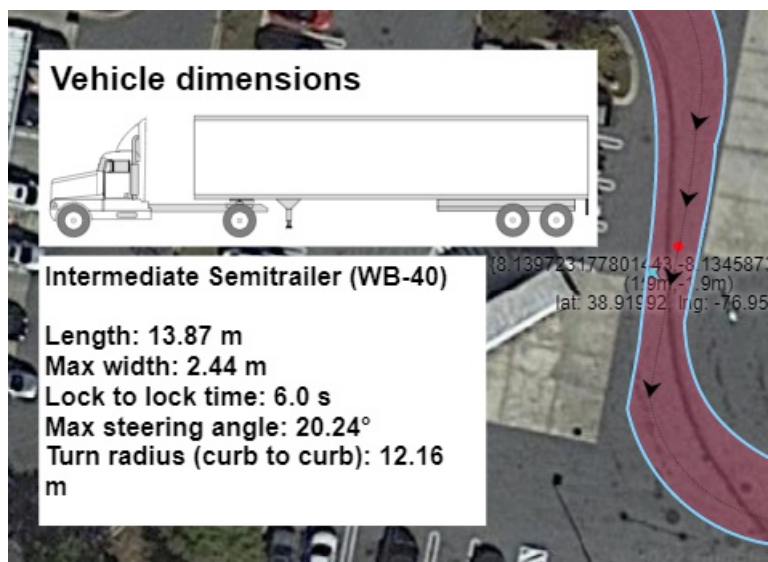


Figure 6.11 Vehicle profile

6.6 Additional features

The final 2 features of the Vehicle path relate to the context menu.

Left-click your vehicle path to view the context menu.

Selecting "**Show path properties**" will display a window with a breakdown of each path section drawn (speed, direction, friction etc).

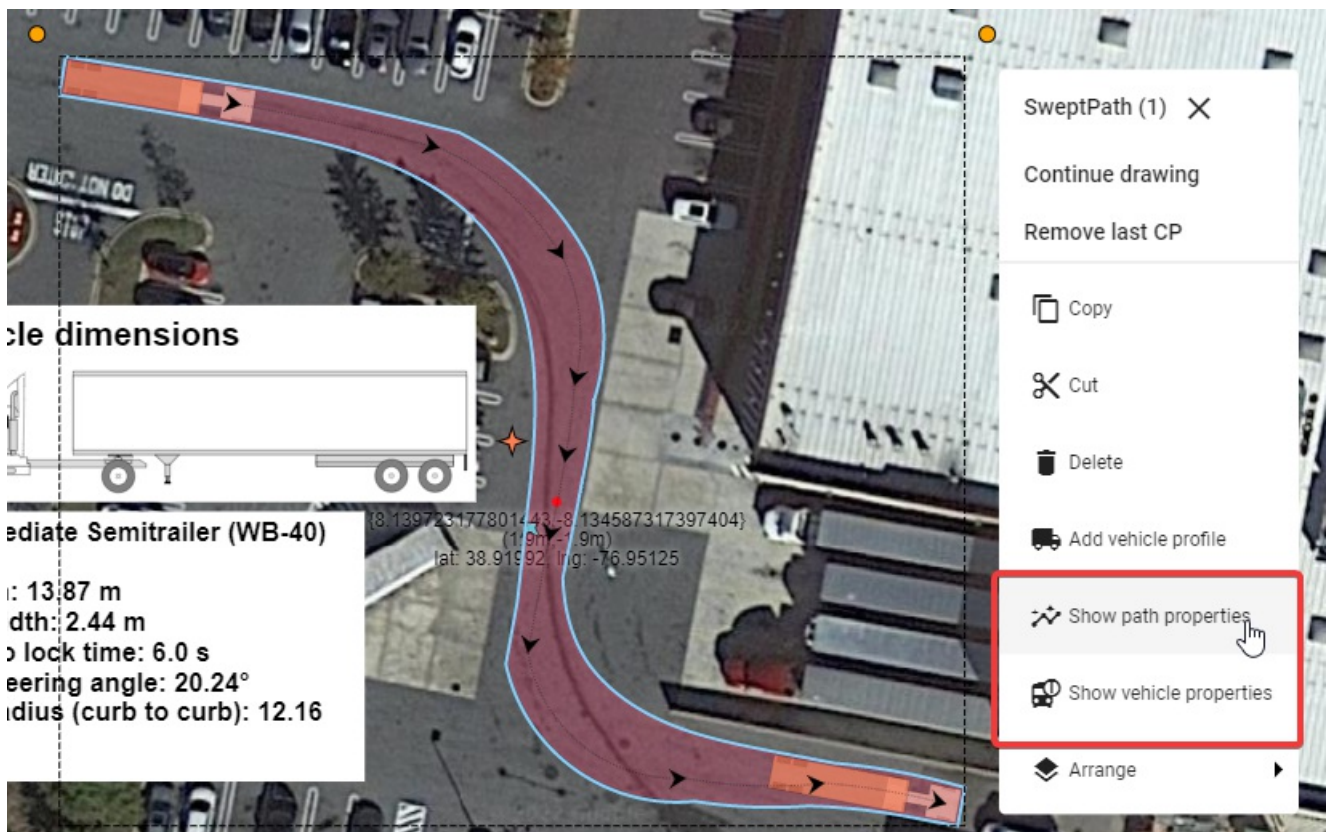


Figure 6.12 Show path properties

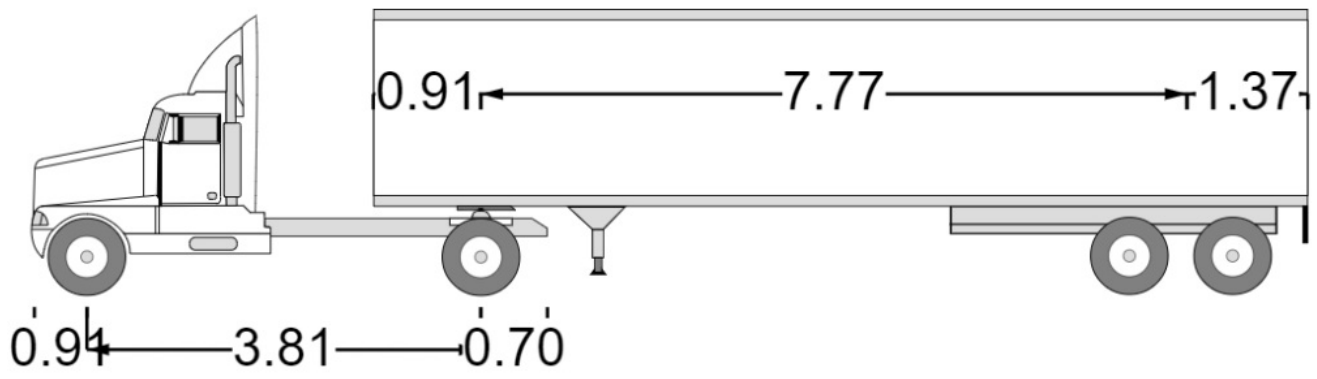
The window will only display the information for each path section and is not yet editable.

No.	Speed (km/h)	Direction	Friction	Turn Wheel on Stop
1	10	Forward	0.3	Yes
2	10	Forward	0.3	Yes
3	10	Forward	0.3	Yes
4	10	Forward	0.3	Yes
5	10	Forward	0.3	Yes
6	10	Forward	0.3	Yes
7	10	Forward	0.3	Yes
8	10	Forward	0.3	Yes
9	10	Forward	0.3	Yes

Figure 6.13 Path properties window

Clicking on "**Show vehicle properties**" will display a window with a breakdown of the vehicle selected in more detail.

Intermediate Semitrailer (WB-40)



Overall dimensions

Length: 13.9 m
Max Width: 2.4 m
Lock To Lock: 6s

Steering Angle: 20°
Turn Radius (Curb To Curb): 12.2 m
Turn Radius (Wall To Wall): 12.5 m

Articulating Angles: 46°

Figure 6.14 Show vehicle properties

Chapter 7: Printing and Exporting

Completed plans can be printed directly from the application, or exported as a PDF and Image file.

7.1 Printing dialogue

When your plan is ready for Printing or Exporting, simply select the **Print** option in the Main Menu, or click the printer icon (



Figure 7.1 printicon

) in the toolbar. Once selected, the following print dialogue window opens, containing several options to customize your document.

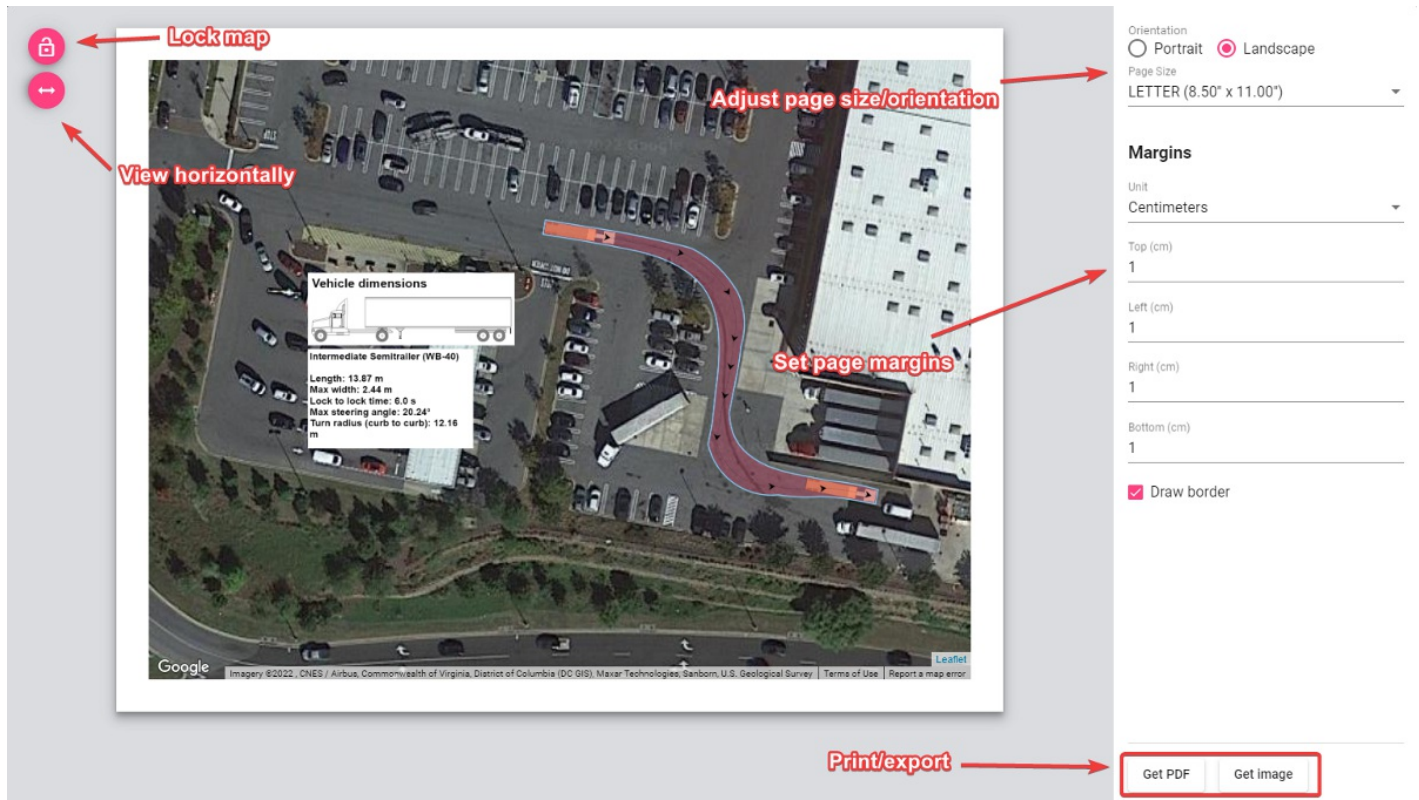


Figure 7.2 Print dialogue

These options include:

- **Live preview:** The preview of your plan in the center shows how your plan will print out. In this preview window you can adjust the plan to fit the page size, by simply clicking and moving the map around, or by simply scrolling up and down to zoom in and out on the map area.
- **Lock map:** The lock plan preview button locks the ability to adjust the plan preview.
- **View horizontally:** The view horizontally button adjusts the view of the plan for different screen sizes. For example, a laptop screen is quite often smaller - this button adjusts the view so that you can view the plan appropriately on your screen.
- **Page size and orientation:** Change the page size and orientation to suit your printout. When selected you will also need to make sure, if you have added a template, that it matches the page size/orientation you have chosen.
- **Page margins:** Adjust the page margins.
- **Print or export:** When ready to print, simply select the **Get PDF** button to download your plan as a .PDF file, or select **Get Image** to download the plan as a .PNG file.

7.2 Printing and exporting plans

Once the **Get PDF** button has been selected, you will be able to Print or Download your plan to PDF.

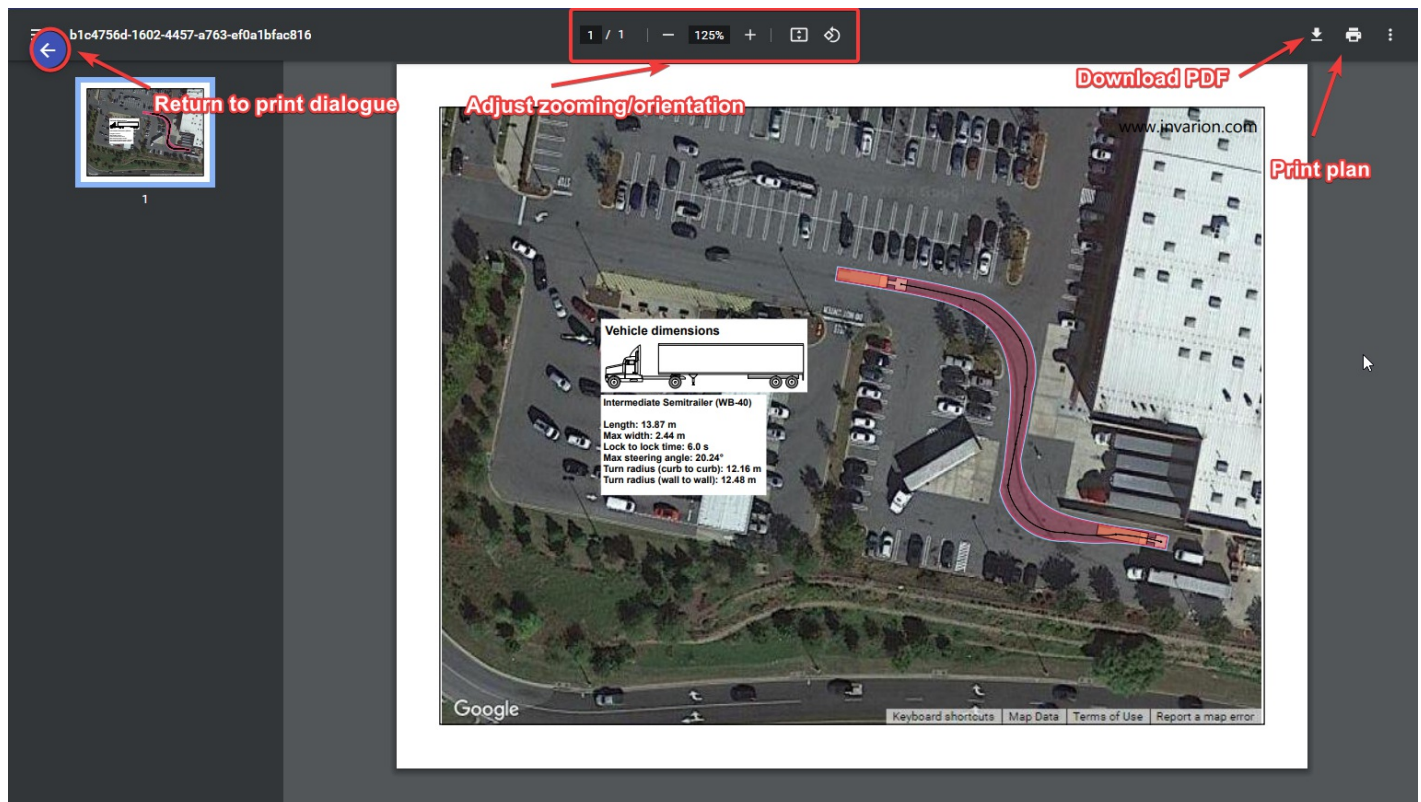


Figure 7.3 Export dialogue

As shown in the image above, clicking the Download PDF button will allow you to save your plan as a PDF file. This will then open your default PDF application and show you a preview of your downloaded plan. Clicking Print plan will open your default printer dialogue.

Chapter 8: Using mobile devices

RapidPath Online can be used on any mobile device that has a web browser. The application will simply adjust the screen to fit, based on the device you are using.

8.1 Creating and selecting objects

8.1.1 Creating objects

To use tools/vehicles on a mobile device, simply tap the tool/vehicle you wish to use. Tapping on your screen is the same action as a left mouse click.

Tap on to your canvas area to begin using the selected tool. Each tap on the canvas area will then create a new control point.

Note: You can also **tap, hold and drag** when using a tool to control the direction of the next object control point.

8.1.2 Selecting objects

To select an object, simply **tap** on the object.

To select multiple objects, simply **tap, hold and drag** across the objects you wish to select and create a [selection box](#).

To access the Context menu tap the object and the menu will appear.

8.2 Panning

If you want to pan, use a single finger, hold and drag across the canvas area.

8.3 Zooming

To **zoom in**, pinch inwards on the canvas area.

To **zoom out**, pinch outwards on the canvas area.