Operator's Manual
7/21/2026

Quarterhill

iTHEIA™ System

User Interface

DWG No.: **3902-00213-00108**



Rev #: H

Hardware Version: iTHEIA 3

Software Versions: itheia-ai 2.0.0, itheia-app 2.0.0, itheia-os 2.0.0

For further information or assistance, call
Quarterhill's Customer Service Hotline Toll Free at **(877) 444-4473**

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TABLE OF CONTENTS

TABLE OF CONTENTS ..... **I**
1 ABOUT THIS MANUAL **1-1**
1.1 Quarterhill **1-1**
1.2 Purpose **1-1**
1.3 Related Documents **1-1**
1.4 Points of Contact **1-1**
1.5 Document Overview **1-1**
1.5.1 Document Conventions 1-2
1.5.2 Acronyms 1-2
2 GETTING STARTED WITH THE ITHEIA WEB UI **2-1**
2.1 iTHEIA Web Launch **2-1**
2.2 iTheia Log In **2-1**
3 USER INTERFACE AND OPERATION **3-1**
3.1 Page Layout **3-1**
3.1.1 Header 3-1
3.1.2 Side Menu 3-3
3.1.3 Main View 3-3
4 HOME **4-1**
4.1.1 Camera Video Feed 4-1
4.1.2 Display Controls and Filters 4-5
4.1.3 Lane Display 4-10
4.1.4 Warnings 4-11
5 SITE CONFIGURATION **5-1**
5.1.1 Configure New Site 5-2
5.1.2 Stop Data Collection 5-33
5.1.3 Resume Data Collection 5-34
5.1.4 Edit Site Configuration 5-35
5.1.5 General Tab 5-36
5.1.6 System Tab 5-37
5.1.7 Camera Tab 5-37
5.1.8 Lanes Tab 5-38
6 DATA FILES **6-1**
6.1.1 Daily Web Retrieval Tab 6-1
6.1.2 On-Demand Tab 6-3
6.1.3 MS2 Push API Tab 6-4
6.1.4 iTHEIA Pull API Tab 6-18
7 VEHICLE SEARCH **7-1**
8 PROFILE **8-1**
9 PERFORMANCE CHECK **9-1**
9.1.1 Quota Remaining 9-1
9.1.2 New Sample Session 9-2
9.1.3 Sample Session Record 9-5

10 SYSTEM MANAGEMENT 10-1
10.1 Overview 10-1
10.1.1 Site Information 10-2
10.1.2 Current Usage 10-2
10.1.3 Other Logged In Users 10-3
10.1.4 Certificate Information 10-3
10.1.5 Installed Applications 10-3
10.2 Users 10-4
10.2.1 User Information 10-4
10.2.2 Add User 10-7
10.2.3 Display Controls 10-10
10.3 Settings 10-11
10.3.1 Security Settings Tab 10-12
10.3.2 Network Settings Tab 10-14
10.4 Disk Space Manager 10-15
10.4.1 Header Alerts 10-16
10.4.2 Disk Usage Alerts 10-17
10.4.3 Category Usage Graph 10-17
10.4.4 Configure Retention 10-19
10.5 Install/Update 10-22
10.5.1 File Upload Area 10-22
10.5.2 Uploaded Files 10-30
10.5.3 Ready to Install Applications and Certificates 10-30
10.5.4 Installed Applications 10-31
10.5.5 Certificate Information 10-31
10.6 Audit Logs 10-33
10.6.1 Login Tab 10-33
10.6.2 User Management Tab 10-35
10.6.3 API Keys Tab 10-37
10.6.4 API Access Tab 10-38
10.6.5 Installation Tab 10-39
10.6.6 Security Settings Tab 10-40
10.7 Logout 10-41
11 TROUBLESHOOTING 11-1
11.1 iTHEIA™ Application Issues 11-1
11.2 Quarterhill Support 11-2
APPENDIX A – CLASS SCHEMES A-1

1 ABOUT THIS MANUAL

1.1 QUARTERHILL

Quarterhill Inc., a leading provider of tolling and enforcement solutions in the Intelligent Transportation System (ITS) industry, has vested the operational responsibilities of its safety and enforcement division to its subsidiary, International Road Dynamics Inc. (IRD). Quarterhill's safety and enforcement division is legally operated by IRD. This legal designation ensures that the safety and enforcement division's activities are executed in accordance with prescribed legal and regulatory frameworks within Quarterhill's organizational structure. For the purpose of this manual, "Quarterhill" refers to both entities.

1.2 PURPOSE

The iTHEIA™ Artificial Intelligence (AI) Traffic Data System uses video and machine learning to collect data for vehicle traffic counting and classification. This system utilizes high performance AI hardware to perform the vehicle counting and classification without uploading video for third-party processing.

This manual describes the iTHEIA™ web user interface. The iTHEIA™ web user interface provides user access to the iTHEIA video feed, vehicle details, and data files as well as the ability to configure lanes, adjust site settings and check performance. The System Management menu options, available only to users with the Admin role, are intended for administration of the iTHEIA system, including software installation and updates, user management, system configurations and viewing audit logs.

1.3 RELATED DOCUMENTS

User Manual – Portable Installation *3902-00213-00101*

User Manual – Permanent Installation *3902-00213-00102*

iTHEIA Data File Pull REST API Specifications

iTHEIA Per Vehicle Data File Formats

iTHEIA Sample Session CSV File Format

The most up-to-date documents are available at the following links:

https://pages.quarterhill.com/itheia-portable

https://pages.quarterhill.com/itheia-permanent

1.4 POINTS OF CONTACT

Please contact Quarterhill for any support or assistance needed.

Toll Free: 1(877) 444-4473
E-mail: support@quarterhill.com

1.5 DOCUMENT OVERVIEW

Specific conventions and abbreviations are used throughout this document. Terms and general definitions are provided for quick reference.

1.5.1 Document Conventions



Indicates a potentially concerning situation that, if not avoided, may result in minor to moderate loss of data or software functionality.



Indicates *Important* information about equipment or procedures that can impact future decisions and/or actions.



Indicates a *best practice* procedure.

1.5.2 Acronyms

List of Abbreviations

Abbrev.	Refers To
API	Application Programming Interface
CSV	Comma Separated Value – simple text file format using commas
DNS	Domain Name System
FHWA	Federal Highway Administration
FPS	Frames Per Second
IP	Internet Protocol
PDF	Portable Document Format
RTSP	Real-Time Streaming Protocol
UI	User Interface
URL	Uniform Resource Locator or web address.
WAN	Wide Area Network

2 GETTING STARTED WITH THE iTHEIA WEB UI

2.1 iTHEIA WEB LAUNCH

To connect locally to the iTHEIA web user interface, follow the steps below**:**

- Connect your laptop to the external network ports on an iTHEIA Portable system or the ports labelled *POE+1 or POE+2* on an iTHEIA Permanent system.
- Wait a minute for your computer to establish a connection with the iTHEIA device, and then enter this URL in the browser:

  https://itheia.quarterhill.local/
- If you are connecting for the first time, use the provided password for the admin account. Upon first login, you will be prompted to change the password. Contact Quarterhill Support if you require login assistance.

When connecting remotely to an iTHEIA permanent system, the URL will appear as the modem IP: https:// <modem ip>

2.2 iTHEIA LOG IN

To access the login page, complete the following steps:

1. Open web browser.
2. Enter URL to open Login page.
3. For permanent systems, when accessing the user interface using the modem IP or when there is no DNS entry, a security error may appear, as shown in • Figure 2-1 •. *Note: Error shown below is using Firefox. The error will appear differently depending on the browser being used.*



Figure 2-1 Security Risk Warning

4. Click Advanced... . Another error will appear, as shown below. *Error will vary depending on the browser used.*

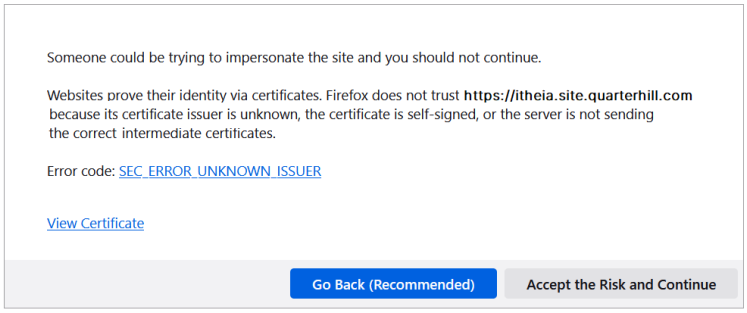


Figure 2-2 Certificate Error

5. Press Accept the Risk and Continue.

The login page will appear, and the user can proceed with the login procedure.

To log in, complete the following steps:

1. Using the login credentials provided by an administrator, enter the following information:
   a. **Username**: Username provided by an administrator (*case sensitive*).
   b. **Password**: Password supplied by an administrator
2. Select Login or press *Enter*. Users must read and agree to the *Terms of Service* prior to logging in.

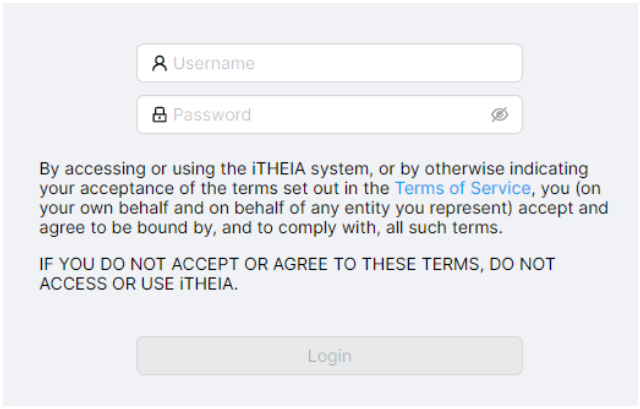


Figure 2-3 iTHEIA Log In: Username and Password

When logging in for the first time, users will be prompted to change the password.

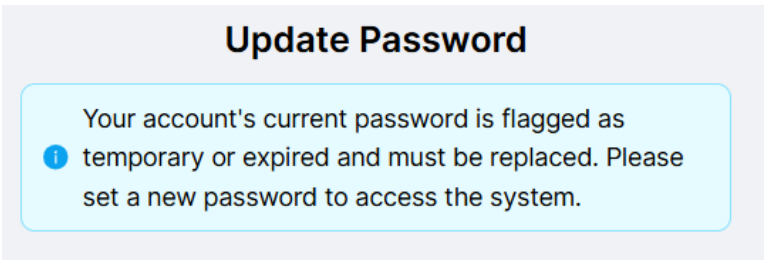


Figure 2-4 Update Password

Upon logging in, the home page will be displayed.

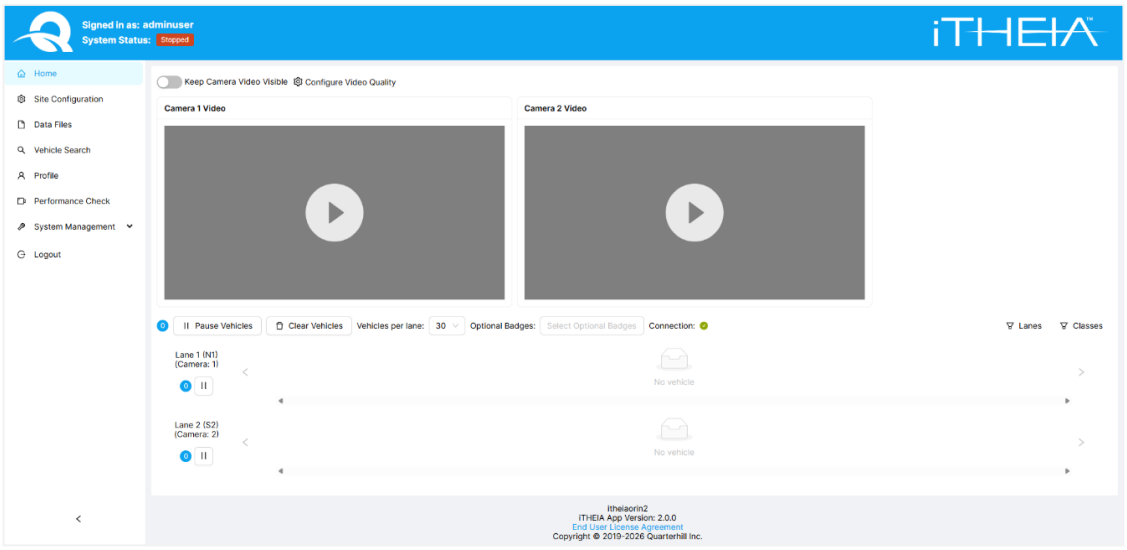


Figure 2-5 iTHEIA Home Page

3 USER INTERFACE AND OPERATION

3.1 PAGE LAYOUT

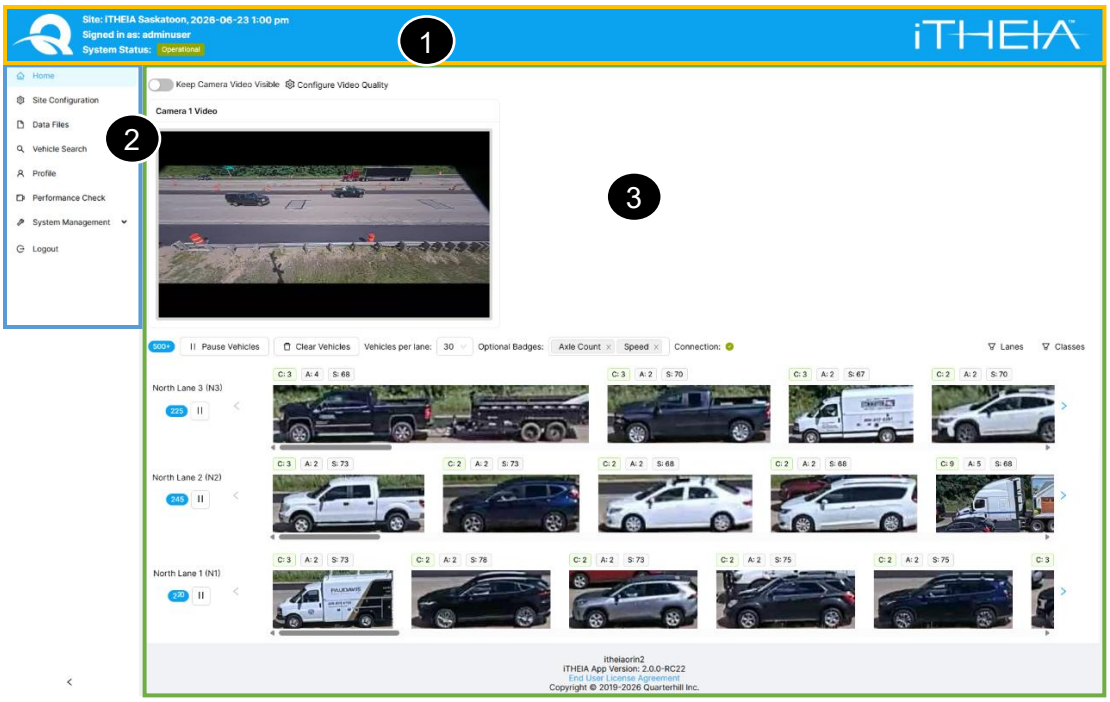


Figure 3-1 Page Layout

Figure 3-1 displays the page layout for the iTHEIA user interface. The user interface is comprised of the following elements:

❶ Header

❷ Side Menu

❸ Main View

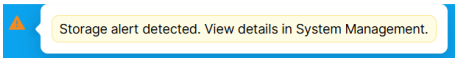
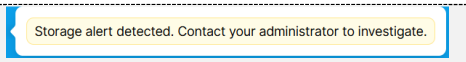
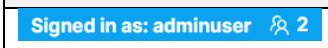
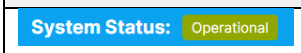
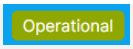
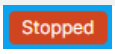
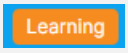
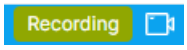
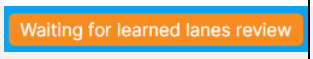
3.1.1 Header



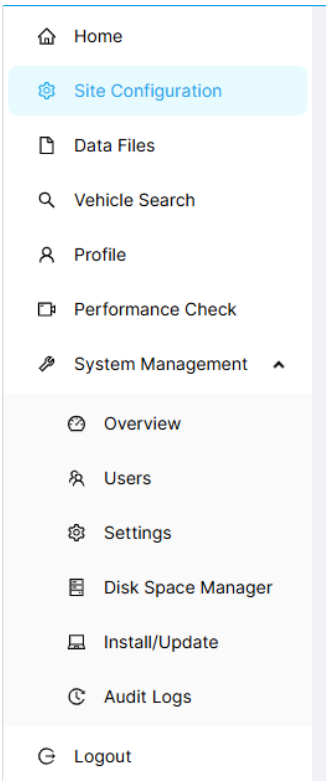
Figure 3-2 Header

The header contains the following information:

Site: iTHEIA Saskatoon, 2025-05-27 10:13 am	The site name, configured in the General tab of the Site Configuration page, is listed at the top of the header, along with the date and time based on the time zone configured for the site. • SEE SECTION 5.1.5 GENERAL TAB •
Site: iTHEIA Saskatoon, 2025-05-27 10:31 am ⚠	If there are any Disk Usage Alerts, a warning icon ⚠ will be displayed.

	Hover over the icon to view details about the alert. • SEE SECTION 10.4 DISK SPACE MANAGER •
	Users with the USER role will be directed to contact their administrator for assistance.
	The username of the currently signed in user is displayed, along with the number of other users who are signed in at the same time. If there are no other users signed in, just the username of the current user will appear.
	Hover over the number for more details.
	The current system status is displayed on the header. Possible statuses include:
	*The system is operational.*
	*Data collection and vehicle detection for the site is temporarily stopped. The user must resume data collection to make the system operational.* • SEE SECTION 5.1.2 STOP DATA COLLECTION. •
	*Auto-learning is currently in progress. Certain functionalities, such as performance checks, are unavailable at this time.* • SEE SECTION 5.1.1.4.7 AUTO-LEARN LANES •
	*A performance check is currently recording video footage for a sample session.* • SEE SECTION 9 PERFORMANCE CHECK •
	*Auto-learning is complete and is waiting for user review. The user must click 'Apply' to complete the process. This status only appears if the user has enabled the 'Review Lanes Before Applying' toggle.* • SEE SECTION 5.1.1.4.7 AUTO-LEARN LANES •
	*This status may appear briefly when auto-learning is complete but has not yet been applied by the system. The status should change to 'Operational' within a few seconds. This status only occurs when the user has disabled the 'Review Lanes Before Applying' toggle.* • SEE SECTION 5.1.1.4.7 AUTO-LEARN LANES •
	*The system status is unknown at this time. This status will only occur if there is a communication error with the app software.*

3.1.2 Side Menu



The side menu provides access to the pages on the user interface.

- Click on any side menu item to navigate to that page. The current page will be highlighted in blue.
- Click on the arrow next to *System Management* to expand the menu to display the *System Management* pages.

3.1.3 Main View

The main view provides access to all the features for that page. Each page is described in the sections of this manual.

4 HOME

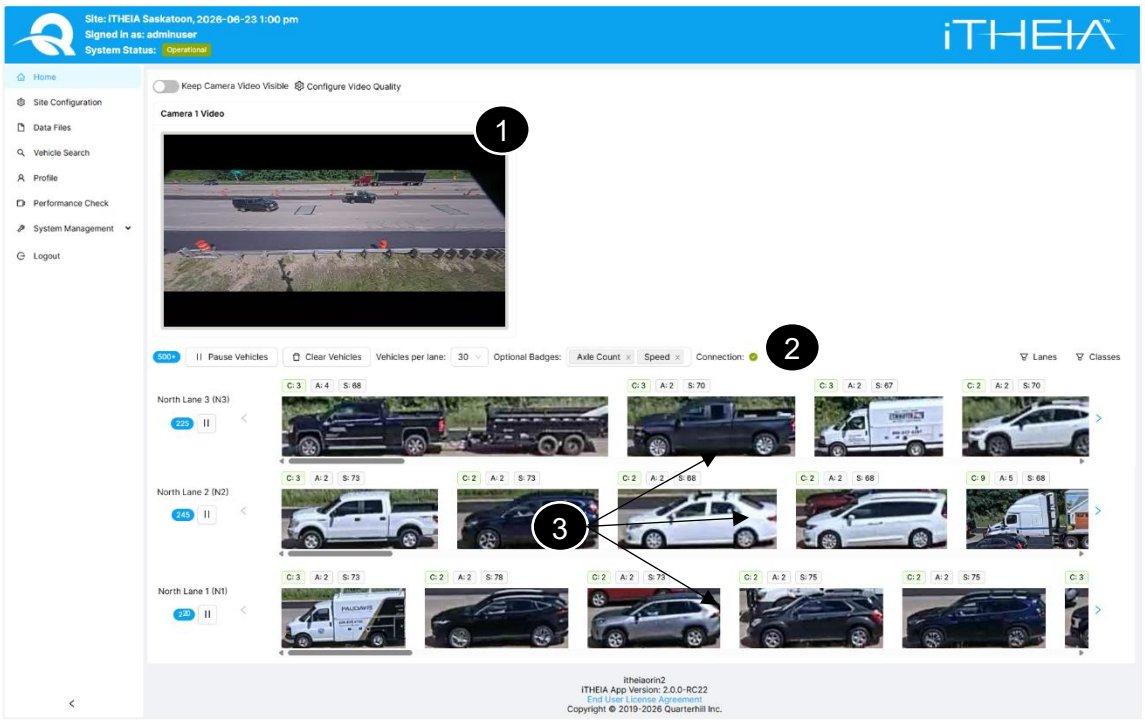


Figure 4-1 iTHEIA Home Page

The *Home* page provides access to the camera video feed of the lane(s) being monitored, allows the user to specify lanes or classes to display, and provides the ability to view any vehicles as they pass through the lanes. This page displays:

❶ Camera Video Feed

❷ Display Controls and Filters

❸ Lane Display

To access the home page:

1. Select Home from the side menu.

The example above shows a site with one camera. Sites with a Permanent iTHEIA may have up to two cameras, as shown in Figure 4-3.

Users may not have access to all menu items in the side menu depending on their user role. Some options are not available to all users. SEE SECTION 10.2.2.1 ROLES.

4.1.1 Camera Video Feed

The camera video feed displays the live RTSP feed of traffic passing through the lanes.

Turning on the live RTSP feed video can consume significant data and bandwidth.



Figure 4-2 Video Feed (1 Camera)

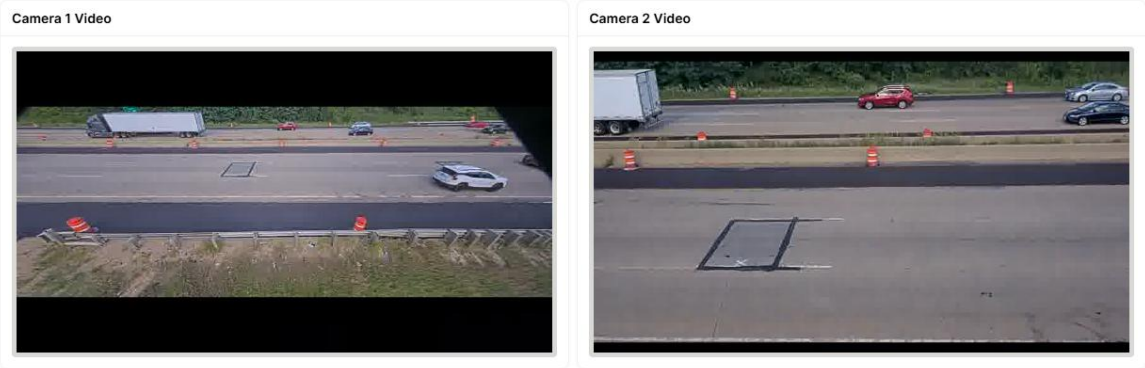
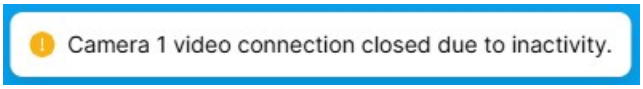
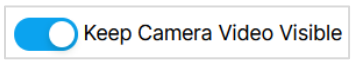


Figure 4-3 Video Feed (2 Cameras)

The camera video feed will turn off after a set period of inactivity. (*The default is 5 minutes*.) The following notification will be displayed:



4.1.1.1 Keep Camera Video Visible



There is an option to show the video feed on the screen even when scrolling down the page. This option is disabled by default. To enable this option, switch the **Keep Camera Video Visible** toggle to *On* .

When scrolling down on the page to view lanes for vehicles, the Camera Video feed will shrink and move its position to the top right corner.

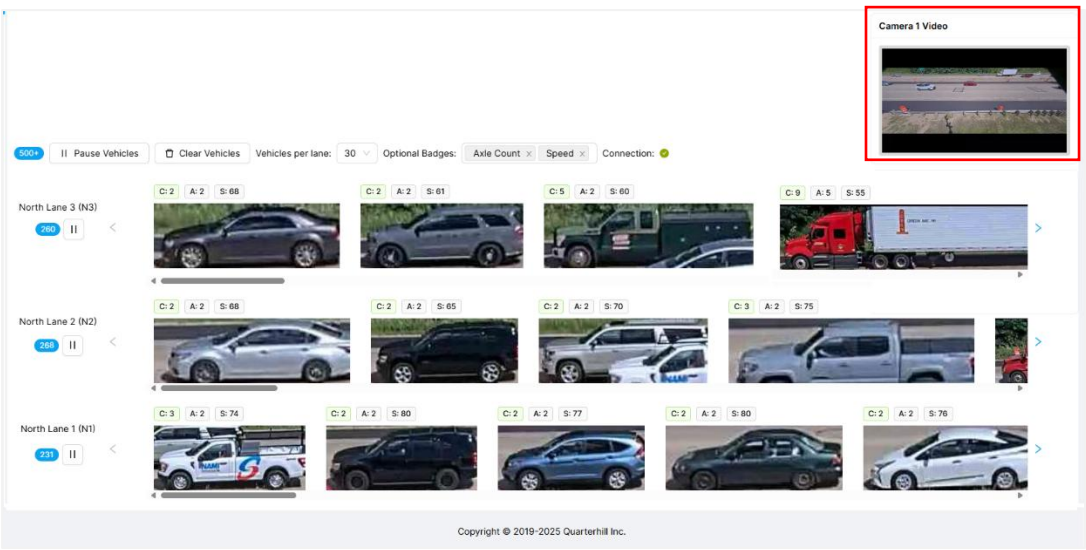


Figure 4-4 Minimized Camera Video Feed (*Toggled On*)

When **Keep Camera Video Visible** is toggled *Off*, the video feed may disappear from view when scrolling down the page.

4.1.1.2 Configure Video Quality

The **Configure Video Quality** option allows the user to reduce the amount of data sent to the user's web browser when displaying the live feed. This is useful for users connecting over a metered connection, such as a cell data modem.

It is important to note that adjusting these settings will affect video quality for all users. These settings impact the quality of video that users can view from their web browser; however, the quality of video used by the traffic counting and classification engine will be unaffected.

To configure the quality of the video feed:

1. Press Configure Video Quality. The **Configure Quality** pop-up window will appear.

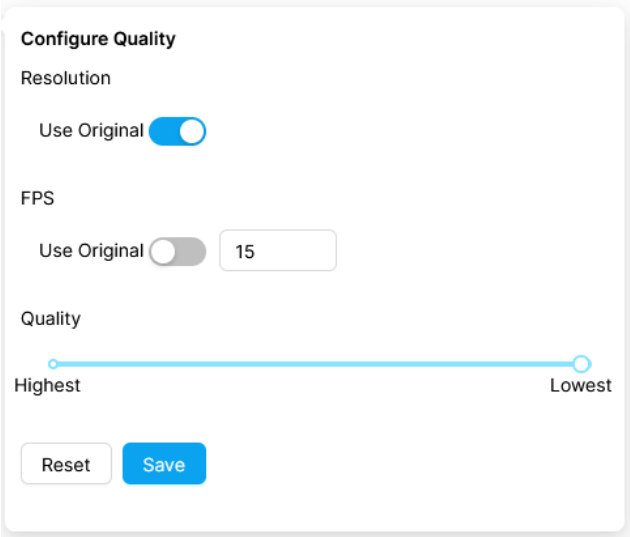


Figure 4-5 Configure Quality Pop-Up

Video feed must be paused for configuration options to be active.

If video feed is still active, the following warning message will appear, and the options will not be configurable. Pause the video before proceeding.

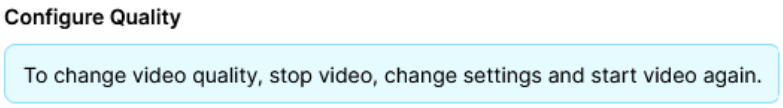
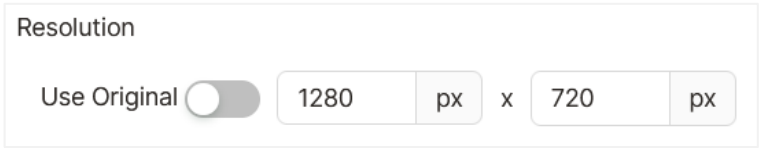
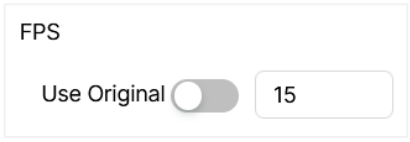


Figure 4-6 Configure Quality

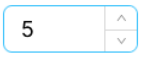
2. To customize resolution, change the **Use Original** toggle to off . Next, type in a specific number of pixels for width and height.



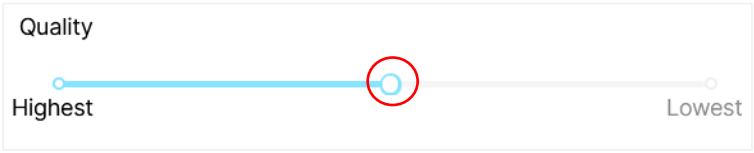
3. To specify Frames Per Second (FPS) quality, change the **Use Original** toggle to off.



4. Type in the number of FPS or click inside the textbox and use the up and down arrows until the desired value is reached. A higher FPS will reduce input lag and lead to a smoother video.

E.g., 

5. To change the quality of the video, click and drag the circle to the right to *lower* the quality or to the left to *increase* the quality.



6. After all changes have been made, press Save to save the quality settings. If the user clicks away from the **Configure Quality** pop-up window before changes have been saved, the following warning will be displayed. Click Yes to proceed without saving, or No to go back to the Configure Quality window and save.

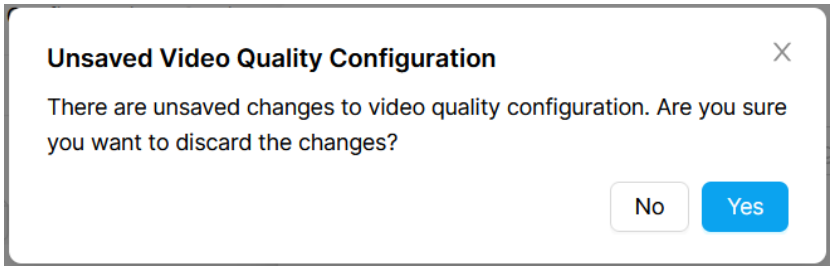
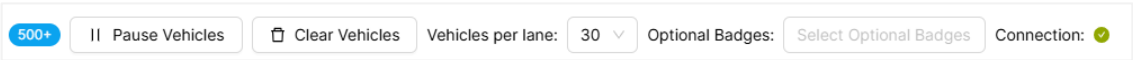


Figure 4-7 Unsaved Video Quality Configuration

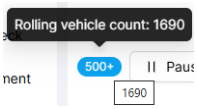
7. Press Reset to revert back to the most recently saved settings.

4.1.2 Display Controls and Filters



There are several display controls and filters that can be used, as described below.

4.1.2.1 Vehicle Number



Displays the number of vehicles that have passed through the specified lanes since the live view was started.

When over 500 vehicles have passed through the lanes, the number 500+ will appear. Hover over the 500+ icon to see the exact rolling vehicle count.

The vehicle count will not be updated when vehicles are paused for that lane. The count will begin updating again when vehicles are resumed (but will exclude vehicles that were detected during the paused period).

4.1.2.2 Pause/Resume Vehicles

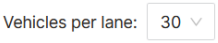
Click to pause displaying live vehicles in all lanes. Vehicles will still be recorded during this time, but they will be excluded from the lane display. If vehicles have already been paused for specific lanes, pressing this button will pause vehicles for the remaining lanes.

Click to resume displaying vehicles in all lanes. Vehicles that were detected during the paused period will not be added to the lane display. However, they will still be accessible in the Vehicle Search and data files.

4.1.2.3 Clear Vehicles

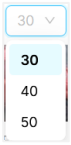
Click to clear all the vehicle records from the display.

4.1.2.4 Vehicles Per Lane



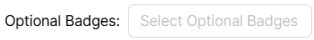
Allows user to select how many vehicles per lane to display.

To change how many vehicles per lane are displayed:

1. Select the drop-down 

menu.
2. Select the number of vehicles to be displayed per lane.
3. The number of vehicles displayed per lane will automatically be updated.

4.1.2.5 Optional Badges



Provides the option to display the axle count and/or speed on vehicle records.

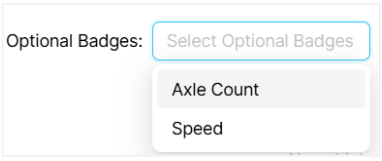
Axle Count: Axle counts are displayed.

Speed: Speed is displayed.

When no optional badges have been selected, axle counts and speed will not be shown. By default, optional badges will not be displayed.

To enable axle count and/or speed badges:

1. Click to open the drop-down menu *or* start typing the name of a speed badge for it to appear.



2. Select **Axle Count** from the drop-down menu to enable axle counts.
3. The axle count will now be displayed above each thumbnail image on the lane display.

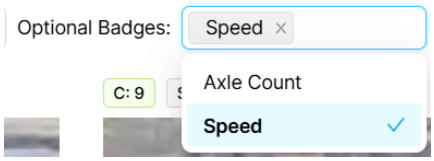


Figure 4-8 Lane Display: Axle Count Enabled

4. Hover over the thumbnail image to view the axle count and class number.



5. Select **Speed Count** from the dropdown menu to enable speed badges.



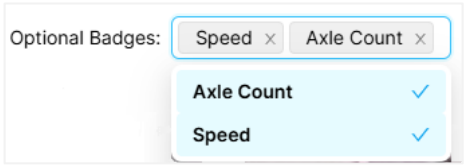
6. The vehicle speed (in *mph*) will now be displayed above each thumbnail image on the lane display.



7. Hover over the thumbnail image to view the speed and class number.



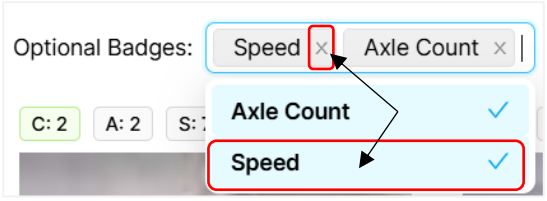
8. Select **Speed Count** and **Axle Count** from the dropdown menu to enable both badges.



9. The vehicle speed and axle count will be displayed above each thumbnail.



10. To remove a badge, click the × beside the badge, or click on the badge again in the drop-down menu to de-select it.



11. The badge(s) that has been removed will no longer be displayed.

4.1.2.6 Connection Status

Connection: Shows the current connection status of the equipment.

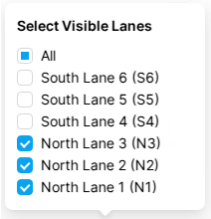
- Indicates good connection; no issues were detected.
- Indicates no connection to vehicle data stream.

4.1.2.7 Lanes Filter

Lanes Allows user to filter vehicle display by lane.

To filter which lanes appear in the Lane Display:

1. Click Lanes.
2. The **Select Visible Lanes** pop-up will be displayed.



3. Click to select or deselect lanes to appear in the Lane Display. Only lanes with a ☑ will appear in the Lane display. Check **All** to select all lanes.

   If only South Lane 4 is selected, only South Lane 4 will appear in the video display.

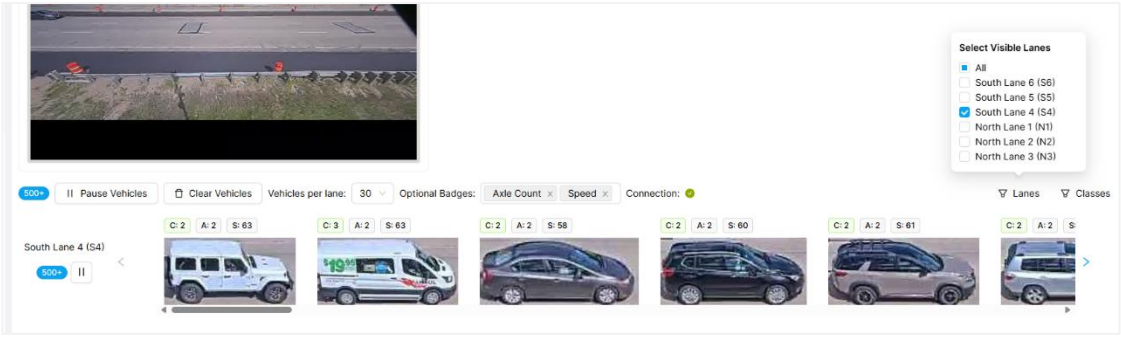


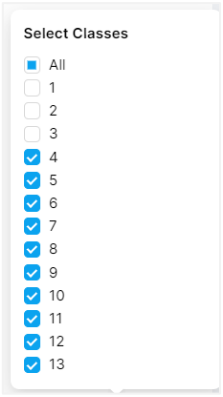
Figure 4-9 Lanes Filter Applied

4.1.2.8 Classes Filter

Classes Allows user to filter vehicle display by class.

To filter which classes appear in the Lane Display:

1. Click Classes.
2. The **Select Classes** pop-up will be displayed.



3. Click to select or deselect classes to appear in the Lane Display. Only vehicles with classes that have a ☑ will appear in the Lane display. Check **All** to select all classes.

   If only FHWA2 is selected, then only vehicles that have been classified as Class 2 will appear in the Lane display.

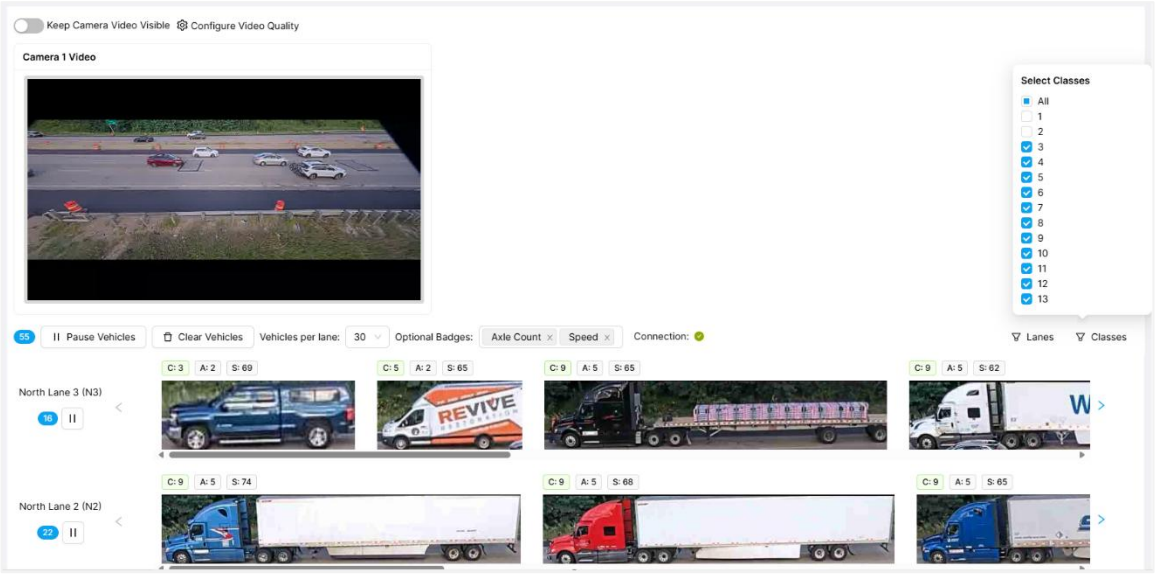


Figure 4-10 Lane Display: Single Camera

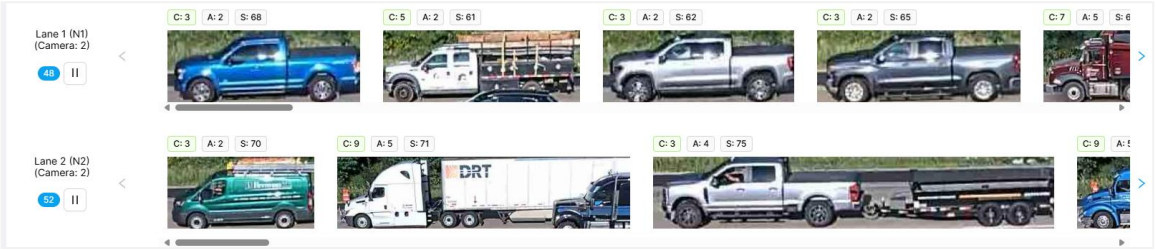


Figure 4-11 Lane Display: Two Cameras

4.1.3 Lane Display

The lane display shows a thumbnail preview image of all the vehicles that have passed through the lanes that have been configured on the Site Configuration page since the session started or since the vehicles were last cleared. • SEE SECTION 5 FOR DETAILS •

Lane display does not allow for historical viewing. • FOR HISTORICAL VIEWING, SEE SECTION 7 VEHICLE SEARCH •



North Lane 2 (N2) Indicates Lane Name with (Direction and Number) in parentheses, as specified on the Site Configuration page. Lane Name, Direction and Number are configured in the **Lanes** tab. • SEE SECTION 5.1.8 •

Lane 1 (W1) (Camera: 1) A red dot will appear when new vehicles have been added that have not yet been viewed by the user. This occurs when the user has scrolled to the right and new vehicles have been added to the front of the list. The red dot will disappear once the user has scrolled to the left to view the new vehicles.

(Camera: 2) Indicates which camera (1 or 2) captured the vehicles for that lane. *Only shown for sites with 2 cameras.*

17 Indicates the number of vehicles that have passed through the lane since the session started, the lane configuration was saved, or Clear Vehicles was used — whichever was more recent.

II Click to pause displaying live vehicles for the corresponding lane. Vehicles will still be accessible in the Vehicle Search and data files later.

▶ Click to resume displaying live vehicles for the corresponding lane. Vehicles detected while the lane was paused will not be added to the lane display.

< > Scrolls back and forth through the vehicles in that lane.

C: 9 Indicates the Class of the vehicle. Classifications are configured to be shown or not shown using the Classes filter. • SEE SECTION 4.1.2.8 •

A: 5 Indicates the axle count for the vehicle. The axle count is only displayed if Axle count is selected from the Optional Badge menu. • SEE SECTION 4.1.2.5 •

S: 56 Indicates the speed of the vehicle in *mph*. The speed is only displayed if Speed is selected from the Optional Badge menu. • SEE SECTION 4.1.2.5 •

4.1.3.1 Vehicle Details

To access Vehicle Details:

- Click on any thumbnail vehicle image.

The Vehicle Details window will open in a pop-up window, displaying a full-sized vehicle image, vehicle image thumbnail, and information including:

- Vehicle #
- Site Name, Station Number and Site ID* (*from Vehicle Search Only*)

- Lane Name, Direction, and Lane # (*and Camera #, if applicable*)
- Class
- Axle Count
- Speed (*mph*)
- Timestamp

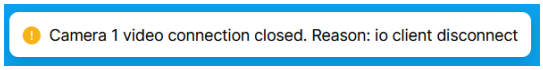


Figure 4-12 Vehicle Details

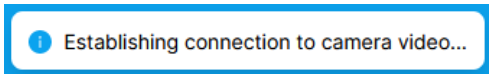
*Site information is not included in Vehicle Details when opened from the *Home* page.

4.1.4 Warnings

Various warnings may be displayed when a certain condition occurs. Possible warnings are described below.



This warning appears when there is an interruption to connection, or because the timeout period for the playback of the camera has been completed.



This warning appears during the brief waiting period after turning on the video feed while iTHEIA establishes the connection to the camera video.

5 SITE CONFIGURATION

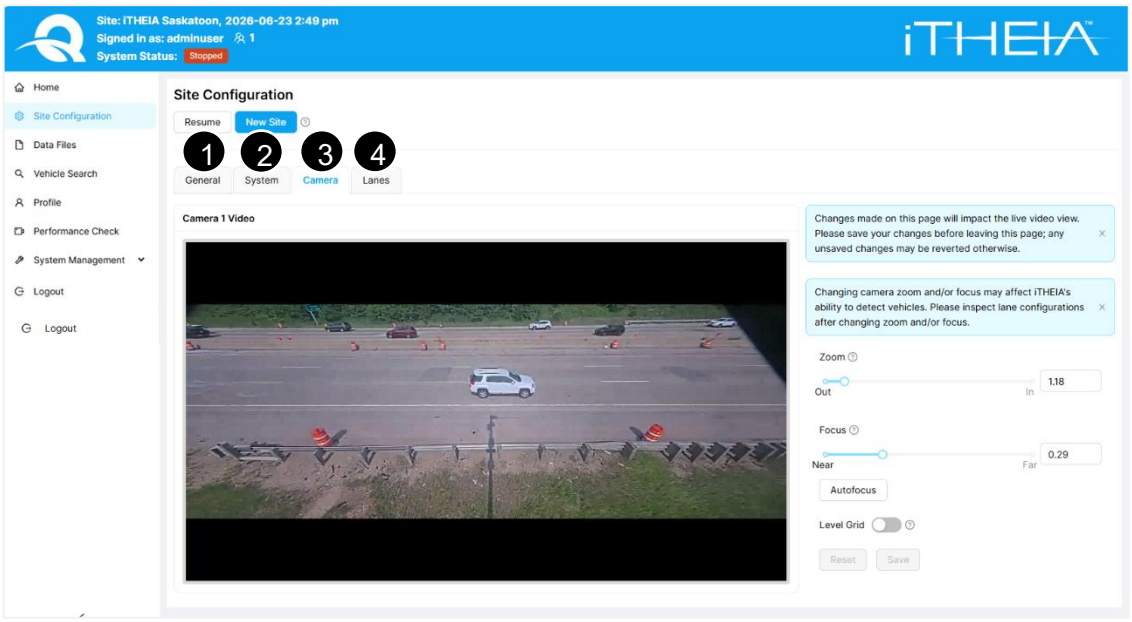


Figure 5-1 iTHEIA Site Configuration Page

The *Site Configuration* page allows the user to perform system configuration for a new or existing site. Users can also start, stop, and resume data collection from this page.

The following four (4) tabs are available to edit the configuration once the initial configuration has been performed:

❶ General Tab

❷ System Tab

❸ Camera Tab

❹ Lanes Tab

The *Site Configuration* page will open to the Camera tab by default.

When a new site has not yet been configured, only the Camera tab will appear.

The following actions are available to the user:

- New Site
- Stop
- Resume

When a new site has not yet been configured, the System Status will be Stopped in the header, and the **New Site** button will be the only available button.

The New Site button is only available when the site has not yet been configured for the first time or when the user has manually stopped data collection.

The Stop button is only available when the site has been configured and is currently collecting data.

The Resume button is only available when data collection has been stopped by the user.

To access the Site Configuration page:

1. Select Site Configuration from the side menu.
2. The *Site Configuration* page will be displayed.

The *Site Configuration* Page is not visible for users with a 'User' role.

5.1.1 Configure New Site

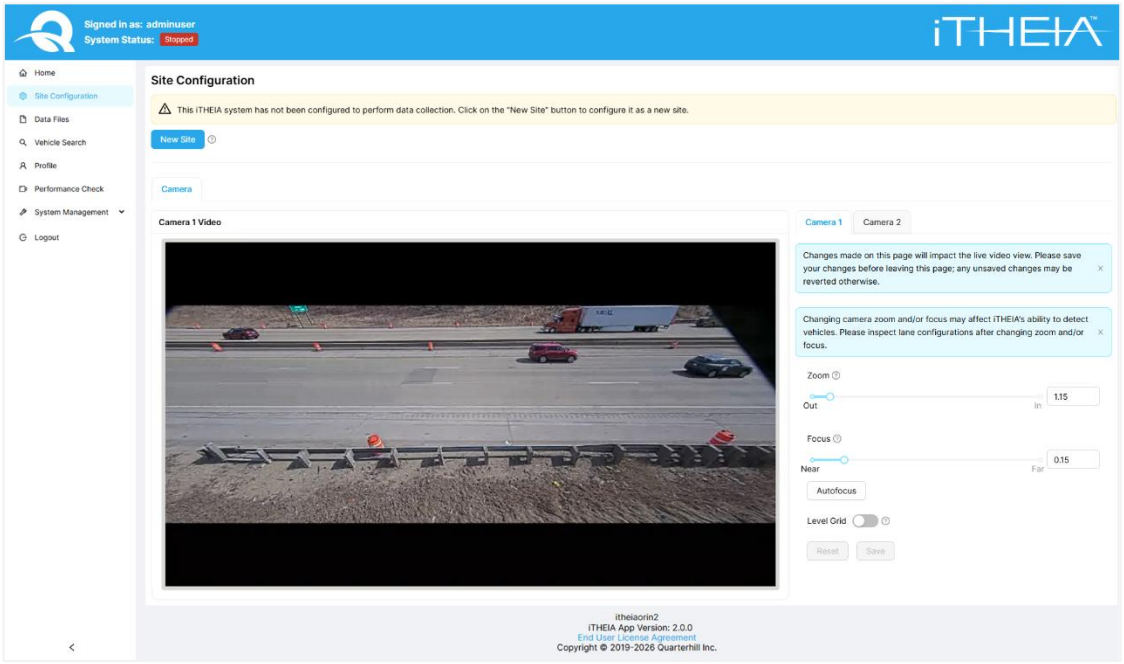


Figure 5-2 Site Configuration Page (New Site – Not Yet Configured)

If the site has not yet been configured for the first time, the user will be prompted to configure the new site before continuing. The System Status will be Stopped, and the **New Site** button will be the only available option. When the user clicks the **New Site** button, the *New Data Collection Configuration Wizard* will be displayed.

From the *Configuration Wizard*, users will be able to configure a site by performing the following five (5) steps:

❶ General Configuration
❷ System Configuration
❸ Camera Configuration
❹ Lane Configuration
❺ Review

The Camera Tab is still accessible to the user when a new site has not yet been configured. Users may adjust camera settings without using the *Configuration Wizard*.

To configure a new site:

1. Click on the **New Site** button.

   The **New Site** button will be disabled if a Performance Check is currently running.

2. A pop-up window will be displayed asking the user to confirm the action.

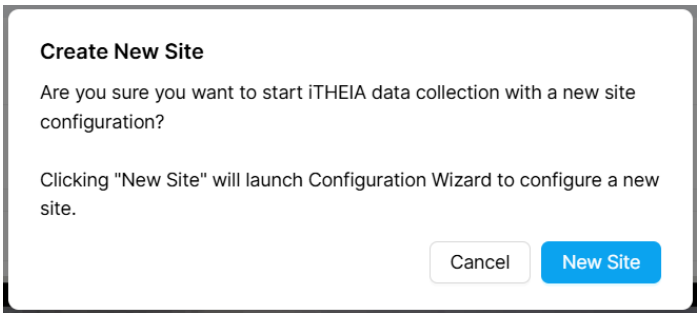


Figure 5-3 Create New Site Warning

3. Click New Site to launch the Configuration Wizard and proceed with configuring a new site. *Press* Cancel *to go back to the Site Configuration page without configuring a new site.*
4. The *New Data Collection Configuration Wizard* will be displayed. The Wizard will automatically start on **Step 1: General**.

5.1.1.1 Step 1: General Configuration

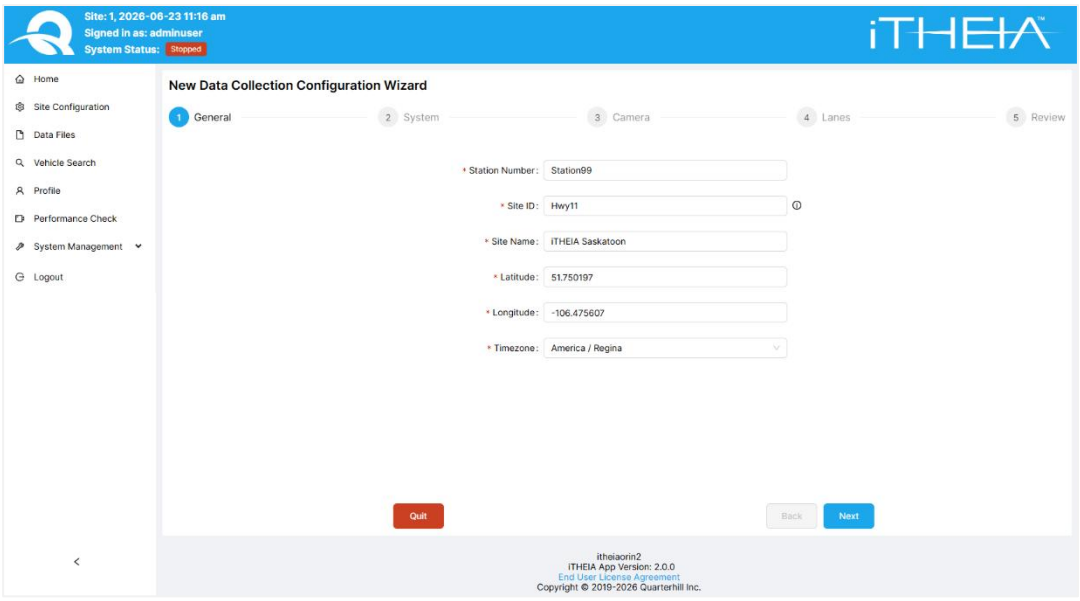


Figure 5-4 Step 1: General

The **General** configuration parameters are included in the headers of the produced data files.

A warning will appear on the page if the camera failed to connect. Please contact support or fix camera connection issues before proceeding with the setup.

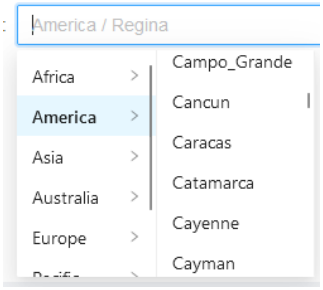
To complete General Configuration:

1. Specify the following parameters.
   a. Station Number†: *A data collection station reference number*.
   b. Site ID†: *Identifies the site and is used as part of the site's data file name. The Site ID is also used to populate the MS2LocationId field in the MS2 data file.*
   c. Site Name†: *Descriptive site name that is displayed on the header of the user interface and populates the Site Name heading in the Per Vehicle data file (maximum 100 characters)*.

   †The Station Number, Site ID, and Site Name are only configurable through the New Site Configuration Wizard. If accessing through the GENERAL TAB, they cannot be altered.

   †When one of these values is changed, the system considers the configuration to be a new site, and all future data will be recorded under the new site name/ID in the Vehicle Search and data files.

   d. Latitude: *Latitude coordinate of the site in decimal degrees.*
   e. Longitude: *Longitude coordinate of the site in decimal degrees.*
   f. Timezone: *Enter timezone of the site. The timezone will affect the timestamp of the Per Vehicle data in the data file as well as the automatic generation of the daily data file.*



* Indicates a mandatory field.

Hover over an ⓘ icon for additional information.

2. Press Next to proceed to the next step.

At any point during the Configuration process, press Quit *to exit out of the wizard without saving. Any changes will be reversed.*

Note: If the user presses Next *without entering valid information into all fields, an error will occur. Check the warning messages that appear under the fields, correct the errors and then try again*.

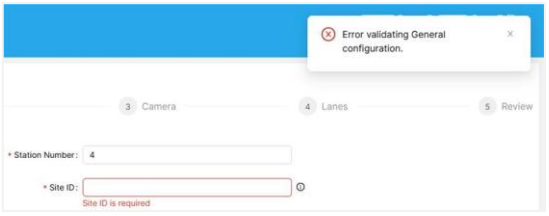


Figure 5-5 Error Configuring Demo

3. **Step 2** of the *Configuration Wizard* will be displayed.

5.1.1.2 Step 2: System Configuration

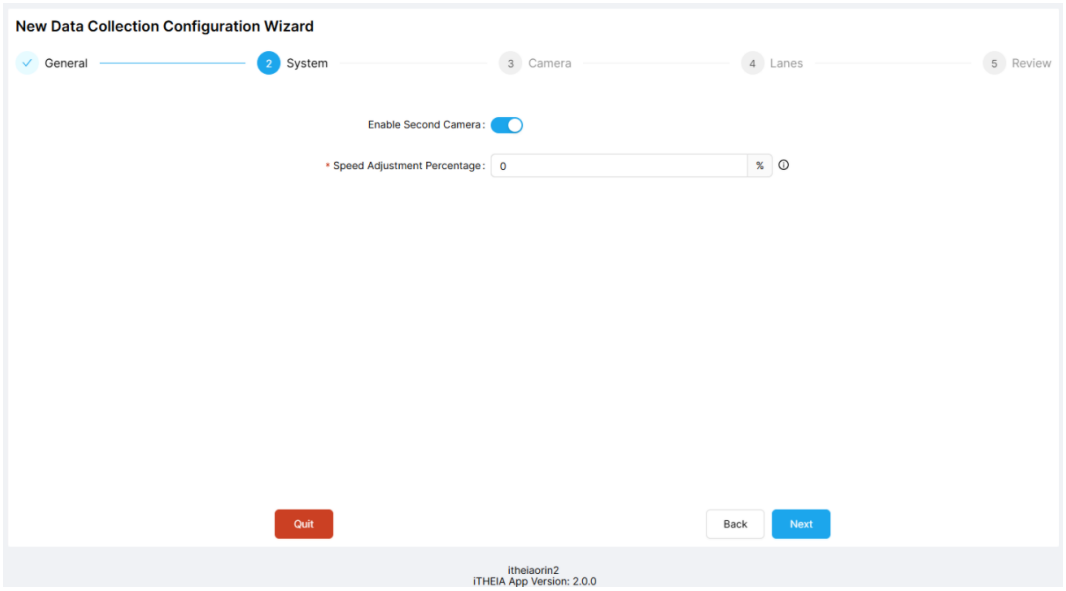


Figure 5-6 Step 2: System

The **System** configuration step allows the user to configure the speed adjustment percentage as well as enable a second camera (if applicable).

To complete System Configuration:

1. Configure the following items:
    a. Enable Second Camera: *Allows second camera to be enabled if present. Toggle on to display a second camera's video feed on the home page.*

    'Enable Second Camera' option does not appear on Portable systems. For Permanent systems, this option will be toggled off by default.

    Toggle off to disable the second camera. When disabling the second camera, a warning will be displayed advising the user that this action will delete all existing lines and corresponding lanes (if already configured).

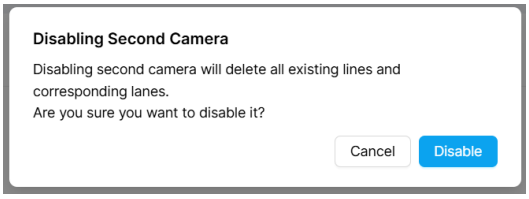


Figure 5-7 Disabling Second Camera Warning

Press Disable *to proceed with disabling the second camera, or press* Cancel *to keep the second camera enabled.*

b. *Speed Adjustment Percentage: *Enter a speed adjustment percentage. This value must be a whole number. This value will proportionally increase or decrease the speed of all vehicles in all lanes. The percentage must be a whole number between -25 and 25.*

2. Press Next to proceed to the next step.

At any time during the configuration process, press Back *to go back to the previous step to make changes.*

Note: If the user presses Next *when there is an invalid value in the Speed Adjustment Percentage field, an error will occur. Correct the error based on the warning message and try again.*



Figure 5-8 System Configuration Error

3. The *Configuration Wizard* will display **Step 3: Camera Configuration**.

5.1.1.3 Step 3: Camera Configuration

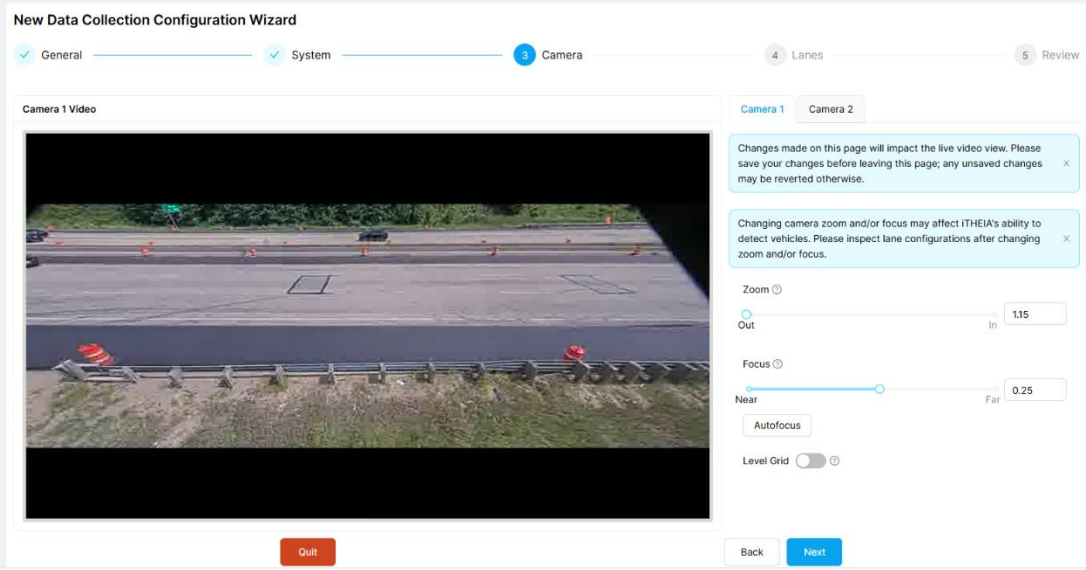


Figure 5-9 Step 3: Camera

The **Camera** configuration step allows the user to adjust the zoom and focus settings for the camera to achieve the optimal view.

To complete Camera Configuration:

1. Zoom in or out by using the slider bar, or by increasing or decreasing the value in the text box. The zoom should be selected to make the farthest away vehicles as large as possible while ensuring the longest vehicles in the closest lane will still be completely visible. After changing the zoom, the focus settings will likely have to be adjusted. The zoom value may change slightly after being set due to precision loss during mechanical operations.
2. Change the focus settings by adjusting the slider bar towards “Near” or “Far” until the camera view comes into clear focus. You can also adjust the focus by increasing or decreasing the values in the text box to make the focus farther away or closer up, respectively. If the view is still blurry, the focus needs to be adjusted further. *The focus position may change slightly after being set due to precision loss during mechanical operations.*

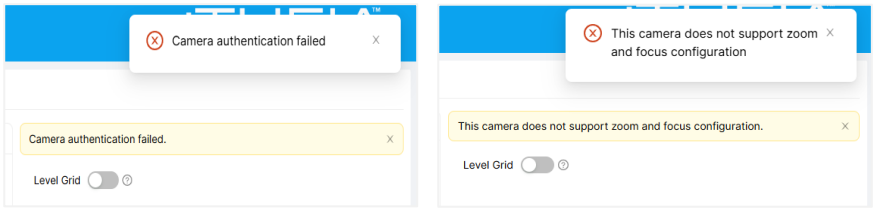


Poor Focus (Needs Adjusting) **Clear Focus**

Figure 5-10 Focus Examples

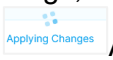
3. Click the Autofocus button to use the automatic focusing feature.

Camera and Focus settings will not be displayed if there is a camera authentication failure or if the camera does not support zoom and focus configuration. In this case, a warning message will be displayed. Please contact support for assistance. • SEE SECTION 11.2 QUARTERHILL SUPPORT •



Camera Authentication Failed Zoom and Focus Not Supported

Figure 5-11 Camera Error Messages

After adjusting any of the settings, a graphic will appear showing that changes are being applied. 

After that, the camera view will refresh with the new settings in place.

4. Turn on the Level Grid using the toggle button to help position the camera to the correct angle. Gridlines will appear over the camera view. This page is useful during installation to check that the camera is close to perpendicular to the road so the lane lines are parallel to the horizontal grid lines. *Level grid is only visible on this page. It will not affect the video stream used for vehicle detection and classification.*

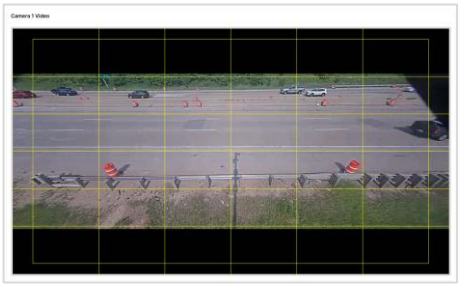


Figure 5-12 Level Grid – On

Changes made on this page will impact the live video view. If the user presses the Quit button or exits out of this window before finishing the *Configuration Wizard,* any unsaved changes will be reverted to previous settings.

Changing camera zoom and/or focus may affect iTHEIA's ability to detect vehicles. Please inspect lane configurations after changing zoom and/or focus.

5. Repeat the steps to configure Camera 2 if applicable.

6. Press Next to proceed to the next step.

   Note: On sites with 2 cameras enabled, if the user presses Next *without configuring both cameras, an error will occur. Navigate to the* ***Camera 2*** *tab and configure the camera before proceeding to the next step.*

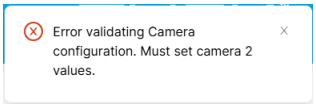


Figure 5-13 Camera Configuration Error

7. The *Configuration Wizard* will display **Step 4: Lanes**.

5.1.1.4 Step 4: Lane Configuration

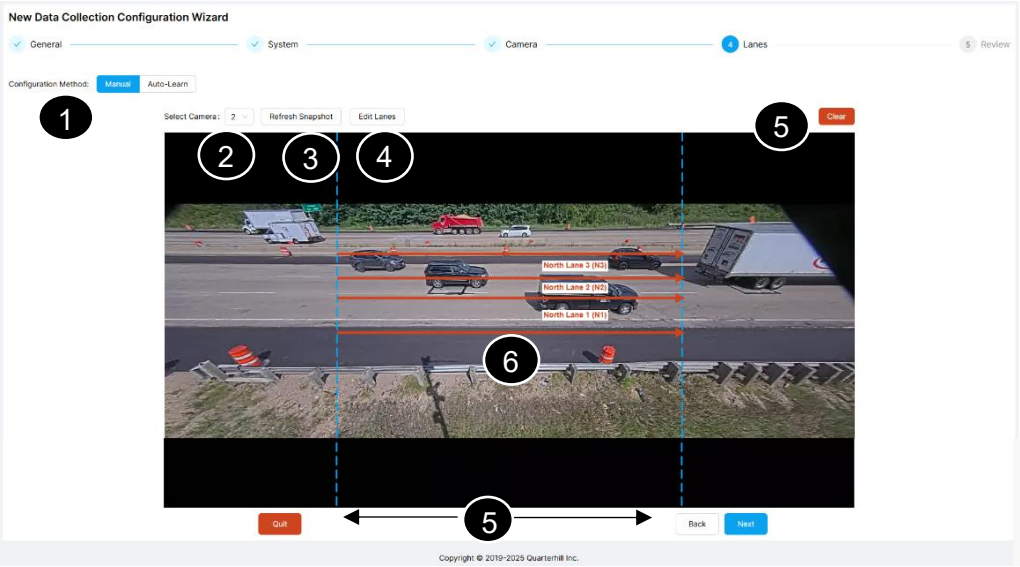


Figure 5-14 Step 4: Lane Configuration (Dual Cameras) – Manual Method

Step 4 allows the user to configure lanes for the site. The lanes configured on this step are the lanes that will appear on the lane display of the *Home* page. • SEE SECTION 4.1.3 • The lane parameters set here are also included in the data files. • SEE SECTION 6 •

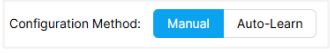
Figure 5-14 displays the **Lane** configuration step using the Manual method when two cameras are enabled.

The dual camera display is only available on Permanent iTHEIA systems. The second camera must also be enabled in the **System** Tab. • SEE SECTION 5.1.1.2 STEP 2: SYSTEM CONFIGURATION •

The following features are shown in the **Lane** configuration step using the Manual method:

❶ Configuration Method
❷ Select Camera Dropdown Menu (** *Dual Cameras Only*)
❸ Refresh Snapshot
❹ Edit Lanes
❺ Options: Clear, Next, Back, Quit
❻ Camera View

5.1.1.4.1 Configuration Method

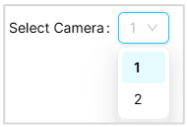


Select a method for configuring the lanes.

Manual — Allows the user to manually draw lane lines for each direction.

Auto-Learn — Allows the system to automatically learn lanes and directions based on traffic. • SEE SECTION 5.1.1.4.7 AUTO-LEARN LANES •

5.1.1.4.2 Select Camera Dropdown Menu



Select a camera from the dropdown menu to display the camera view from that camera. • For instructions on setting up lanes for a site with two cameras enabled, SEE SECTION 5.1.1.4.4 LANE CONFIGURATION: GETTING STARTED •

This feature is only available on Permanent iTHEIA systems with two cameras enabled in the System Configuration.• SEE SECTION 5.1.1.2 STEP 2: SYSTEM CONFIGURATION •

5.1.1.4.3 Refresh Snapshot

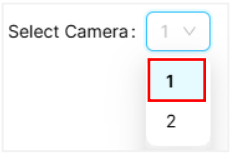
Refresh Snapshot — Click to refresh the page with a newly updated snapshot of the current camera view. This is helpful when a large vehicle in close lanes is blocking the view of farther away lanes.

5.1.1.4.4 Lane Configuration: Getting Started

This section describes the basics of how to add, move, or delete a lane line. For detailed instructions on how to set up lanes for different traffic configurations, SEE SECTION 5.1.1.4.5.

To edit the lane configuration:

1. If desired, click Refresh Snapshot to refresh the image on the page so the lanes can be seen clearly.
2. (*Permanent Sites Only**) For sites with two cameras enabled, select camera 1 from the 'Select Camera' dropdown menu. The most recent snapshot from camera 1 will be displayed on the page.



**This step is only for sites with Permanent iTHEIA systems with two cameras enabled. For sites with a single camera enabled, skip to the next step.*

3. Two dotted vertical lines will appear on the current snapshot to direct the user to draw lines within those two lines.
4. To draw a lane line boundary, hover the cursor over the vertical line from which the arrow should start. When the cursor is near or on one of the vertical lines, a small circle will appear at the same vertical position as the cursor. This will guide the user to draw the directional line starting at the position of the circle.

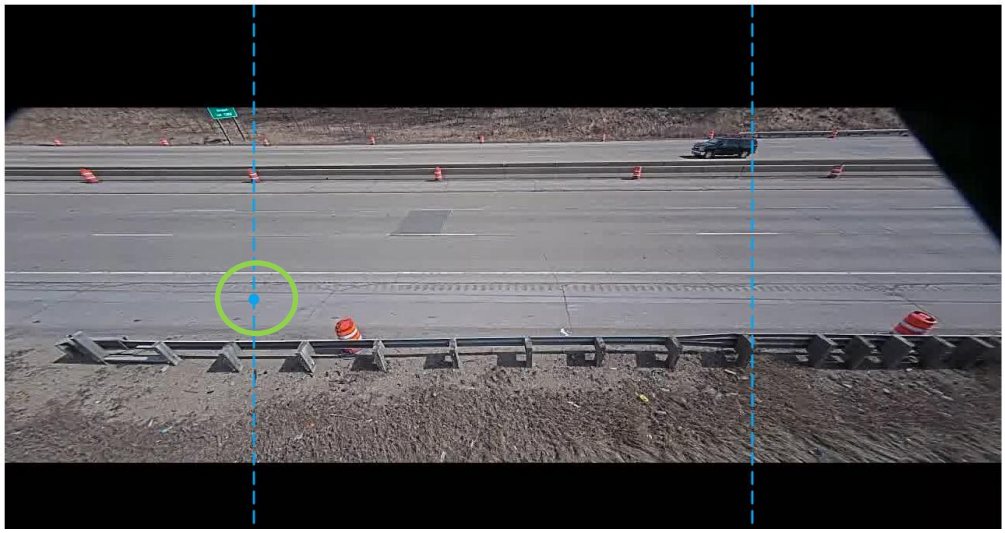


Figure 5-15 Lane Line Starting Point

5. Left-click and move the cursor in a straight line (*horizontally*) in the direction of the traffic. There will be an arrow indicating the direction of the line. When the user gets close enough to the vertical dotted line, the directional line will snap onto the vertical line automatically and another blue dot will appear, indicating that the line should end at this point. Click again to end the line. Ensure that the line is as horizontal as possible and is parallel to the nearby lane line. It should not be at a significant angle.

The maximum allowable tilt angle for lane lines is ±10 degrees.

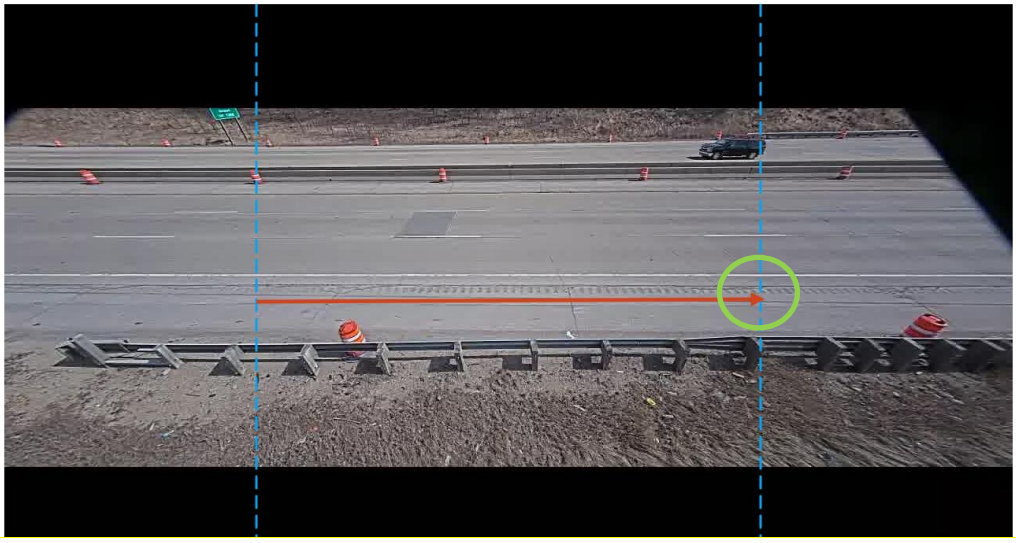


Figure 5-16 Drawing an Arrow

When using the *Configuration Wizard*, any lane configuration changes will be automatically saved to the browser. Changes will not be lost if the user stays within the Wizard.

However, if the user presses Quit before completing the *Configuration Wizard*, all changes will be lost, including any lane lines drawn.

Note: When accessing Lane Configuration through the LANES TAB (SEE SECTION 5.1.8), users will *not* be saved automatically. Once the user has made any changes, a warning will be displayed at the top of the screen advising the user that any unsaved changes will be lost if navigating away from the page or clicking on Reset without saving.

6. Next, draw a second line in the same direction to set the boundary for the other edge of the same lane. The lane will be automatically assigned a lane label with a default lane number, name and travel direction.• To modify the lane information, SEE SECTION 5.1.1.4.6 EDIT LANES •

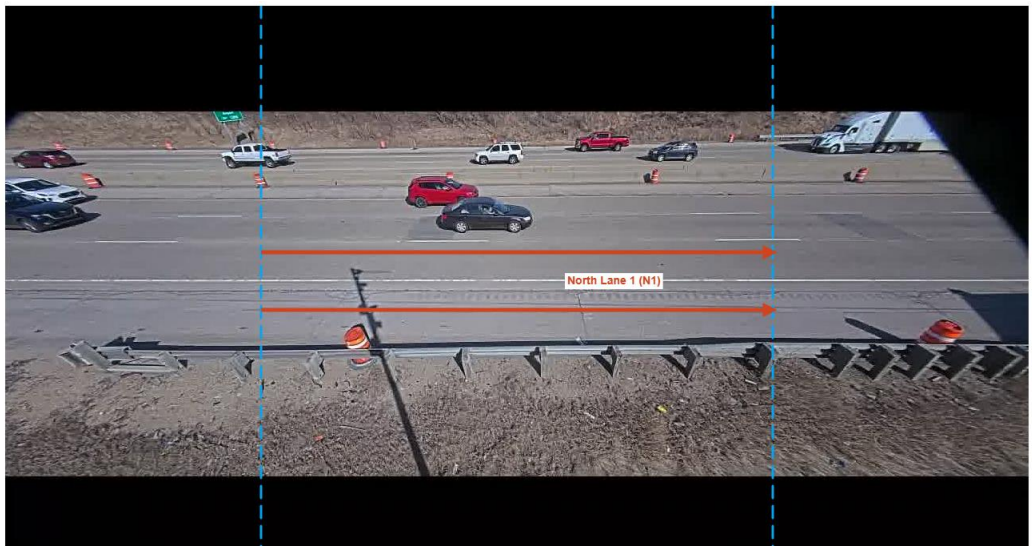


Figure 5-17 Lane Boundary Drawn

Lanes must be drawn between the bounds of the two vertical lines.

To draw a lane in the opposite direction, start the line from the right dotted line and end at the left dotted line.



Figure 5-18 Line in Opposite Direction

A line cannot intersect with another line in the same direction. If a user draws or moves a line so that it intersects with another line in the same direction, the line will be deleted and an error notification will be displayed.

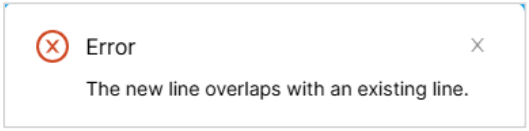
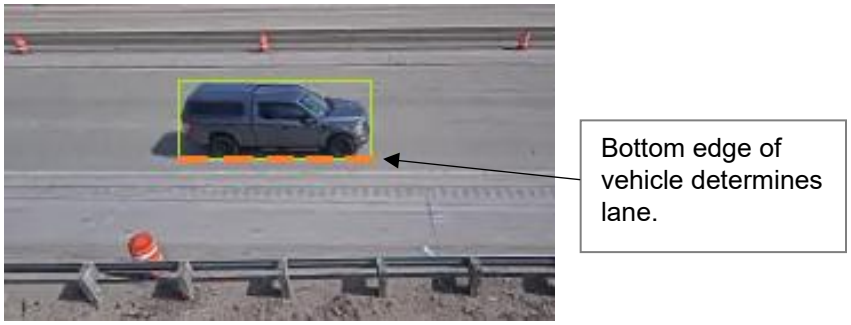
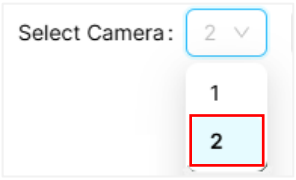


Figure 5-19 Overlapping Lines

Lane lines should be placed slightly offset – below the actual position of the lane. The reason for this is that the system detects vehicle position based on the lowest part of the side of the vehicle nearest the camera.



7. Continue drawing lane lines until all lanes are configured.• For specific instructions on how to configure sites with different traffic configurations, SEE SECTION 5.1.1.4.5 CREATING LANES FOR DIFFERENT CONFIGURATIONS •
8. (*Permanent Sites Only**) For sites with two cameras enabled, select camera 2 from the 'Select Camera' dropdown menu. Repeat the steps for drawing lane lines to configure all of the lanes for the camera 2 view.



**This step is only for sites with Permanent iTHEIA systems with two cameras enabled. For sites with a single camera enabled, disregard this step.*

To change a lane's position:

1. Click on a line to select it.
2. Drag and drop the line anywhere on the image to reposition it vertically.

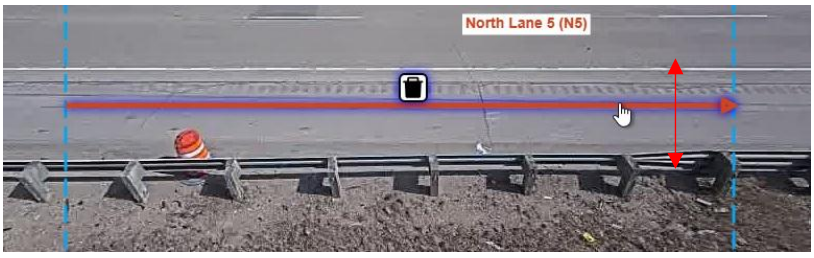


Figure 5-20 Drag and Drop Line

To delete a line:

1. Click on a line.
2. Click on the icon to delete the line

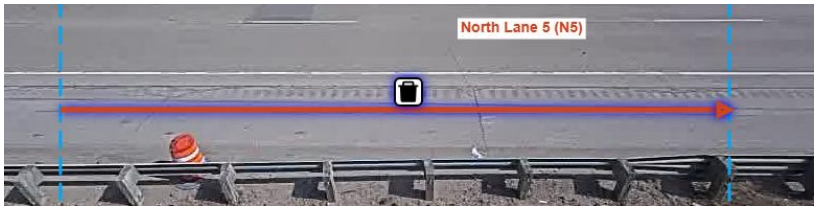


Figure 5-21 Deleting a Lane Line.

3. The line will be removed and the lanes will be redefined accordingly.

To clear all lanes:

1. Click Clear to remove all lanes.
2. A pop-up warning will be displayed asking the user to confirm the action.

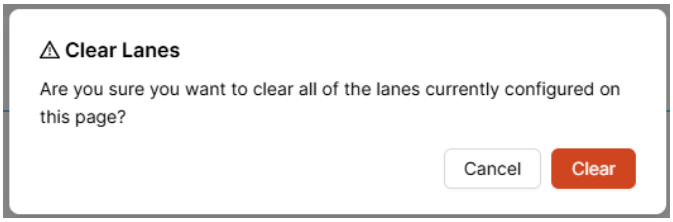


Figure 5-22 Clear Lanes Warning

3. Click Clear to confirm the action and remove all lanes. *Click* Cancel *to cancel the action. All lane configuration changes will be retained.*
4. All lane lines and information will be removed. Any previous lane configuration will be lost. The user must configure new lanes.

To finalize lane changes and proceed to the next step:

1. When all lane changes are complete, click the Next button to proceed to the next step in the Wizard.

Before proceeding to the next step, please ensure that you have completed all steps in the lane configuration process. This may include editing lane names/numbers. • SEE SECTION 5.1.1.4.6 EDIT LANES •

*Note: If the user presses **Next** without drawing any lane lines for a camera, or if a lane is not complete (e.g., the second lane line was not drawn), an error will occur. Please ensure lane lines are drawn correctly and try again. If two cameras are enabled on site, ensure lanes are configured for both cameras before pressing **Next** again.*

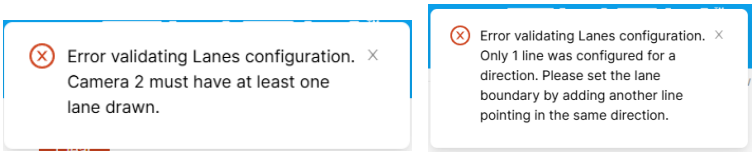


Figure 5-23 Lanes Configuration Error Examples

Error messages will vary depending on which camera is affected, if applicable.

*If the user presses **Next** when there are duplicate lane names, an error message will be displayed. Please ensure all lane names are unique before pressing **Next** again.*

2. The *Configuration Wizard* will display **Step 5: Review.** • SEE SECTION 5.1.1.5 •

5.1.1.4.5 Creating Lanes for Different Configurations

Bidirectional Traffic Divided by a Median

When configuring two-way traffic divided by a median, the user will configure the lanes for each direction separately.

To configure bidirectional traffic divided by a median:

1. Draw the first lane line to set a boundary for one of the lanes with the corresponding travel direction.• For instructions on drawing a lane line, SEE SECTION 5.1.1.4. •

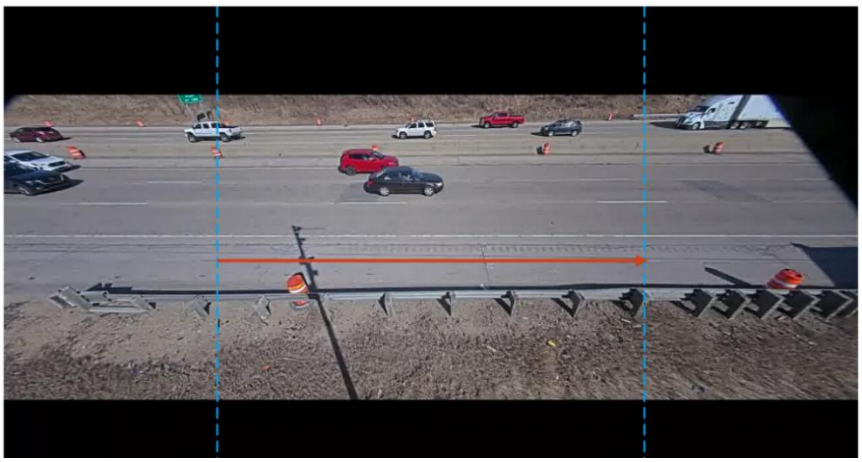


Figure 5-24 Divided Traffic: Line 1

2. Draw a second line in the same direction to set the outer boundary of the lane. The lane will be automatically assigned a lane label with a default lane number, name and travel direction.

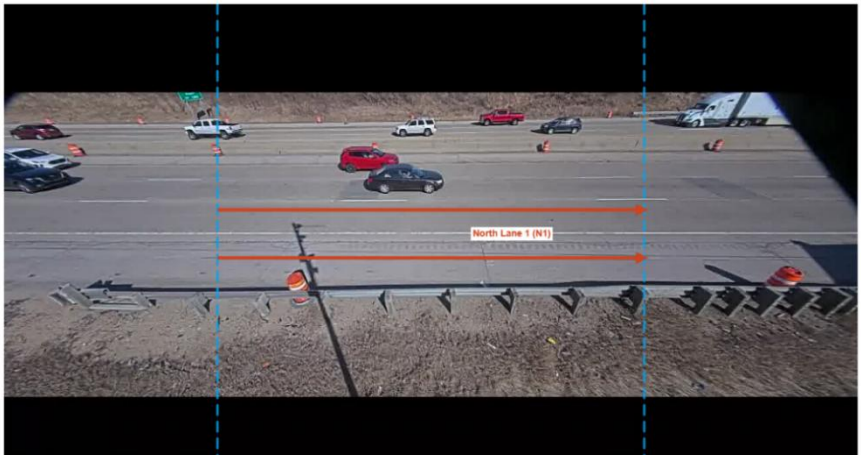


Figure 5-25 Divided Traffic: Line 2

3. To define the second lane, draw a third line pointing in the same direction. The user interface will use the second and third lines to define the second lane, and it will also be assigned a default number, name and travel direction.

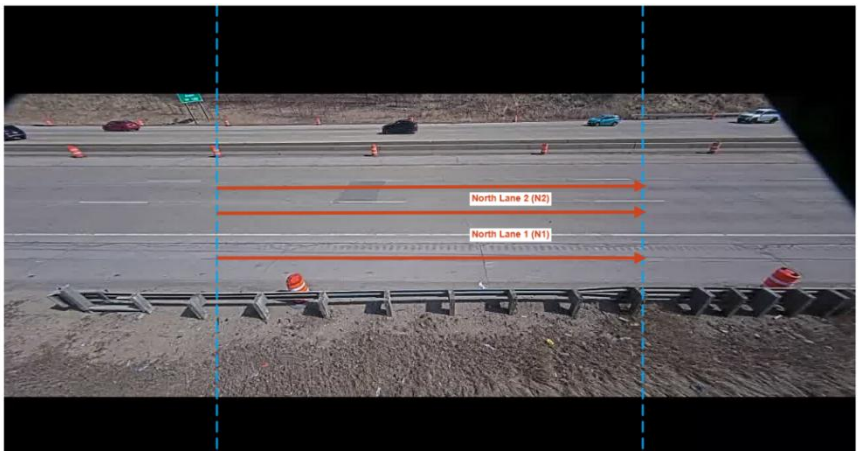


Figure 5-26 Divided Traffic: Line 3

4. If applicable, repeat until all lanes in the same direction are defined.

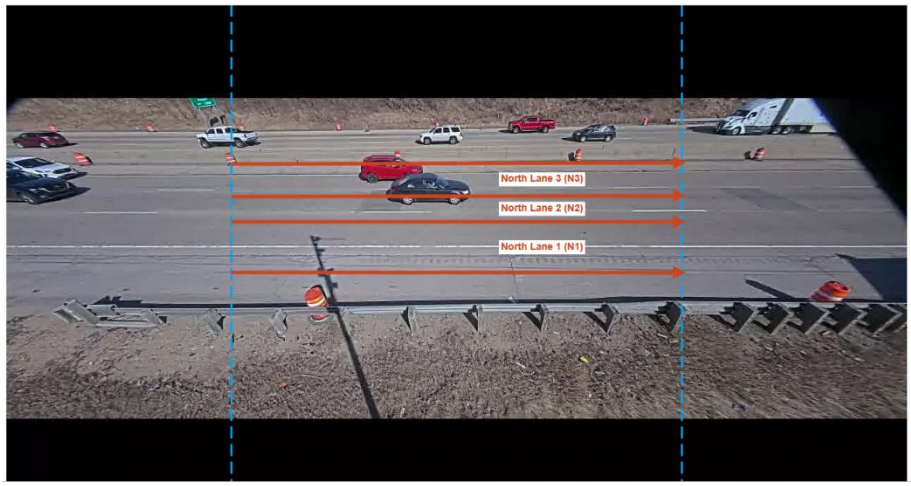


Figure 5-27 Divided Traffic: 3 Lanes

5. On the other side of the median, draw a line in the opposite direction to create the lane boundary for the traffic in the opposite direction. Repeat the above steps to define the lanes across the median in the opposite direction.

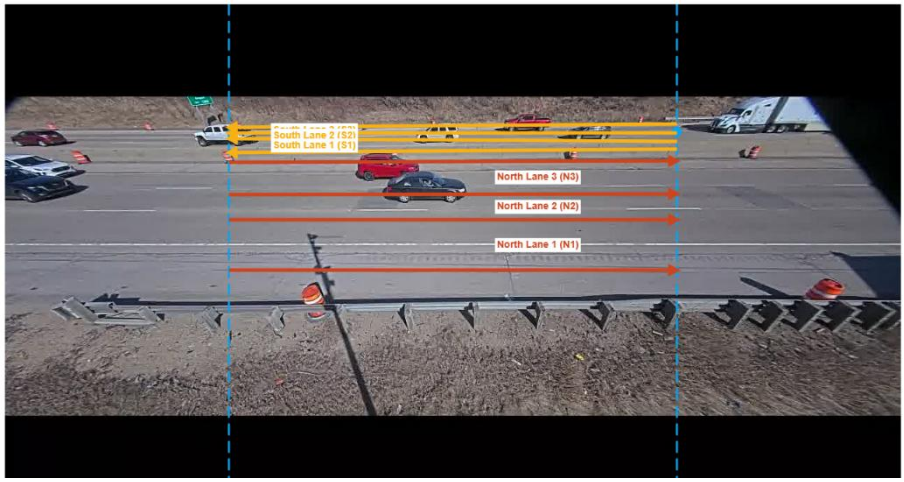


Figure 5-28 Divided Traffic: Opposite Direction

For sites with two cameras enabled, it may be more effective to configure one direction of traffic per camera view. If lines are too close together, some vehicles may be missed.

Configuring Bidirectional Traffic with No Median

For a site with bidirectional traffic with no median, there will be two lanes traveling in opposite directions that share a common edge. In this case, users will configure the lanes adjacent to each other.

To configure bidirectional traffic with no median:

1. Draw the lanes for one direction of traffic.

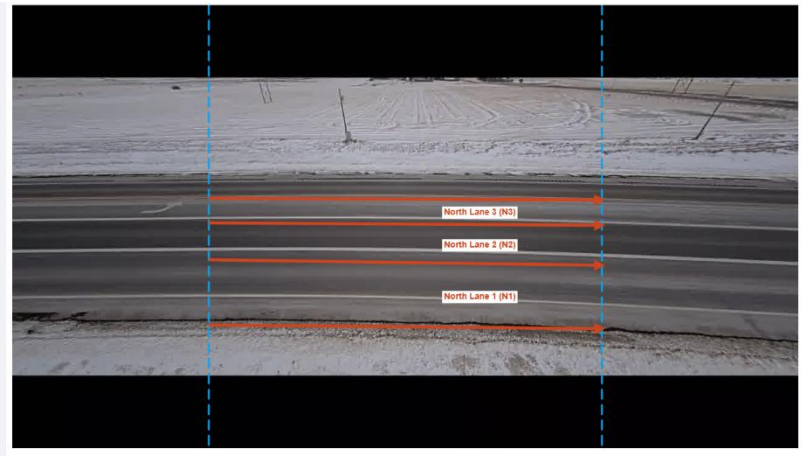


Figure 5-29 Bidirectional: North Lanes Configured

2. For the lane in the opposite direction, draw the first lane line very close to the innermost lane boundary of the previous direction. Since these lanes are in different directions, these lanes can overlap slightly to account for any vehicles crossing over the lane lines.
3. Draw another line for the outer lane boundary for the lane in the opposite direction. Repeat steps 3 and 4 for multiple lanes if applicable. Ensure that the outermost lane includes the shoulder to ensure that all vehicles are detected.

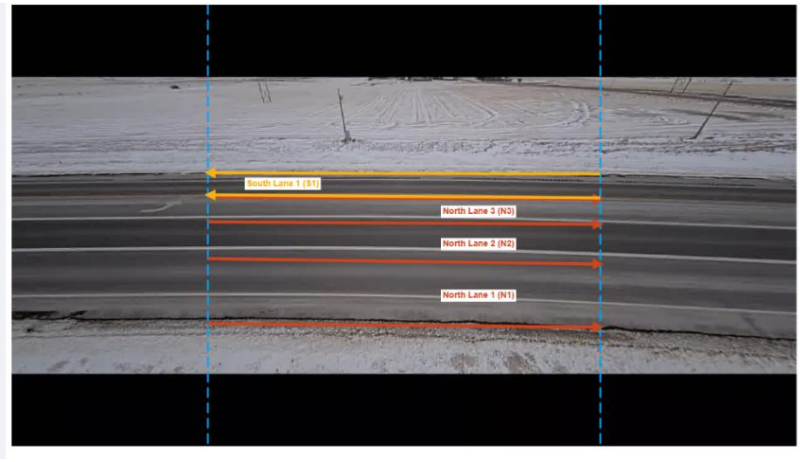


Figure 5-30 Bidirectional Traffic with No Median

Configuring Unidirectional Traffic

To configure one-way traffic:

1. Follow steps 1-4 for configuring lanes for bidirectional traffic divided by a median. Define the lanes for one direction. Ensure that the outer lanes also include the shoulder to ensure all vehicles are detected.

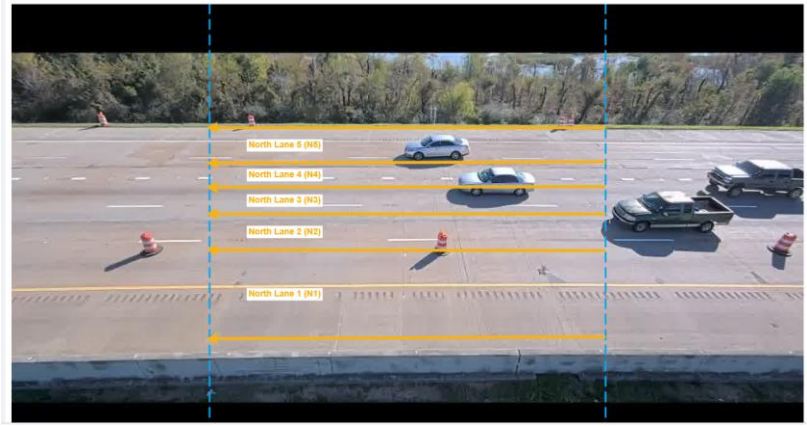


Figure 5-31 Unidirectional Traffic

Configuring Lanes for Overlapping Traffic

For some sites, there may be roads with bidirectional traffic with no curb or clear line to separate the traffic, which allows vehicles to occasionally drive into the other lane in the opposite direction. In order to capture all vehicles, including those partially driving into the other lane in the opposite direction, these lanes can be configured to partially overlap each other.

To configure lanes for overlapping traffic:

1. Draw the first line to capture the outer lane boundary in one direction.
2. Draw a second line in the same direction to define the lane. Ensure that the line encompasses the entire roadway so that it captures vehicles that are traveling at any point on the road.
3. Draw the lines for the opposite direction so that they overlap with the lane lines drawn in steps 1 and 2, as shown in the figure below.

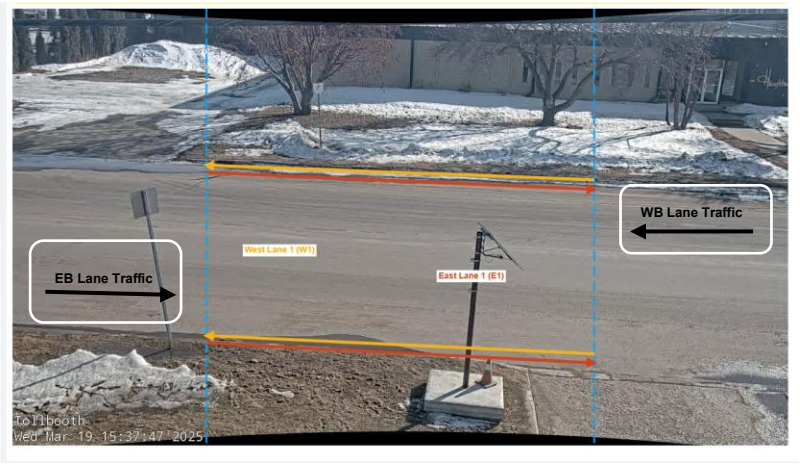


Figure 5-32 2 Lanes with Overlapping Traffic

Configuring Lanes for Bidirectional Traffic with Service Roads without a Median

There may be some sites that have bidirectional traffic without a median as well as bidirectional service roads with no median within the camera view. To capture vehicles for both the main traffic and the service road, configure them as separate traffic using overlapping lanes, as shown in the steps below.

To configure bidirectional traffic with overlapping lanes and service roads:

1. For the main roadway, draw the first line to capture the outer lane boundary in one direction. Draw a second line in the same direction to define the lane. Ensure that the lane encompasses the entire roadway so that it captures vehicles that are traveling at any point on the roadway.
2. Draw the lines for the opposite direction so that they overlap with the lane lines drawn in step 1, as shown in Figure 5-32.

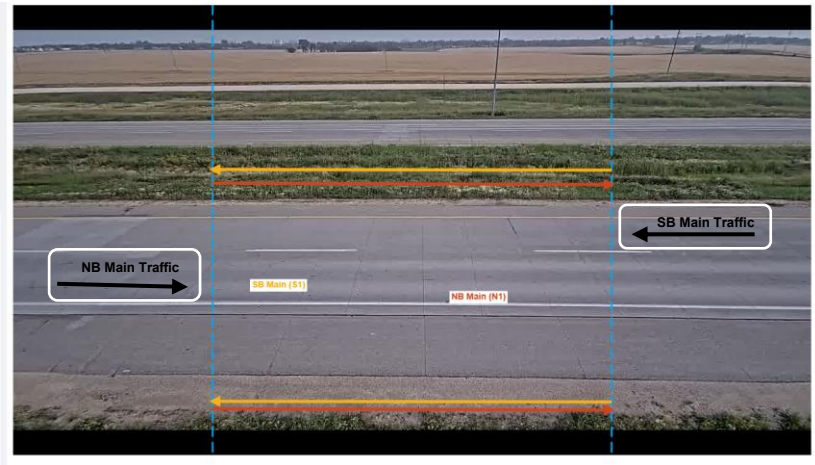


Figure 5-33 Main Roadway: Bidirectional Traffic with Overlapping Lanes

3. For the service road, follow the same steps to define both directions of traffic flow.

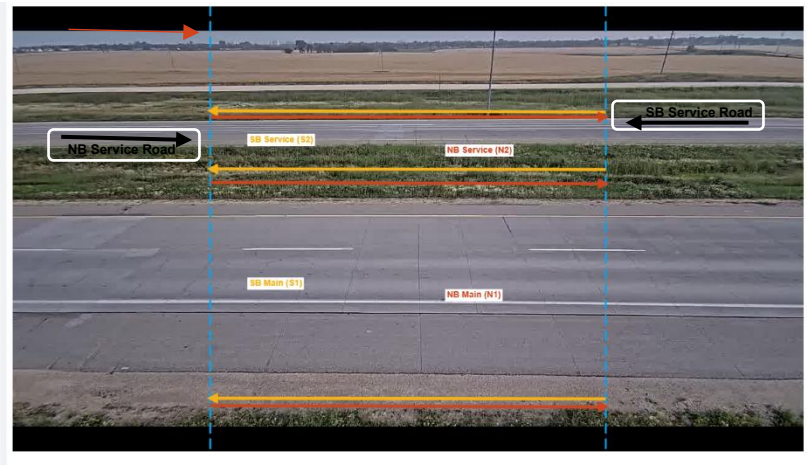


Figure 5-34 Bidirectional Overlapping Traffic with Service Roads

The user can modify the lane names to indicate which lanes are the main roadway and which lanes are service roads (e.g., S #2 SB Service and S #1, SB Main in the figure above). • SEE SECTION 5.1.1.4.6 EDIT LANES •

Configuring Lanes with Center Turn Lanes

For sites in which traffic includes center lanes that are shared by vehicles traveling in both directions, the user will need to define the center turn lanes for both directions so that they overlap each other.

To configure lanes with center turn lanes shared by both directions:

1. Draw lane lines for the traffic facing one direction as described in previous instructions.



Figure 5-35 One Direction

2. Draw a lane for the center turn lane in that same direction.

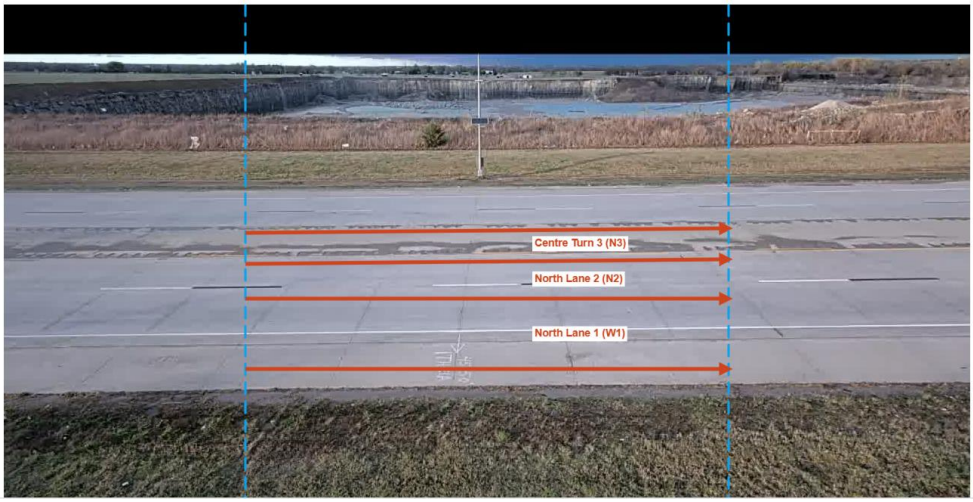


Figure 5-36 North Center Turn Lane

3. Draw a lane for the center turn lane in the opposite direction with the lane boundaries overlapping with the other center turn lane.

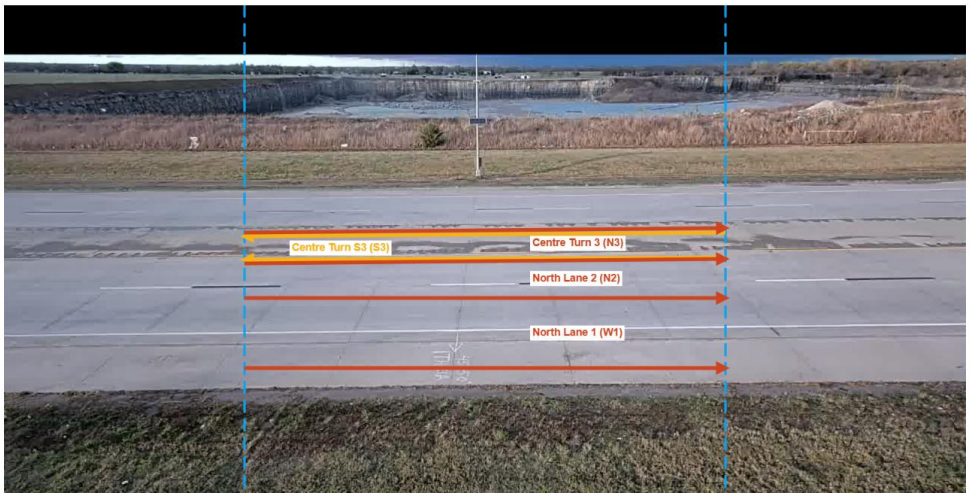


Figure 5-37 South Center Turn Lane

4. Draw the lines for the remaining lanes in the opposite direction.

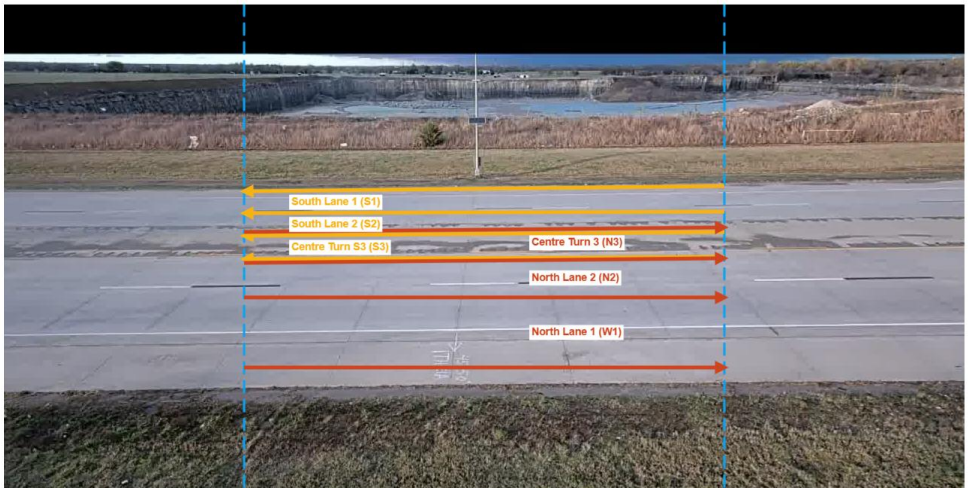


Figure 5-38 Traffic with Center Turn Lanes

The user can change the lane names to indicate which lanes are center turn lanes if desired, as shown in the examples above. • SEE SECTION 5.1.1.4.6 EDIT LANES •

5.1.1.4.6 Edit Lanes

To configure lane number, lane name and direction of travel:

1. Click Edit Lanes .
2. The **Edit Lanes** drawer will be displayed on the right side.

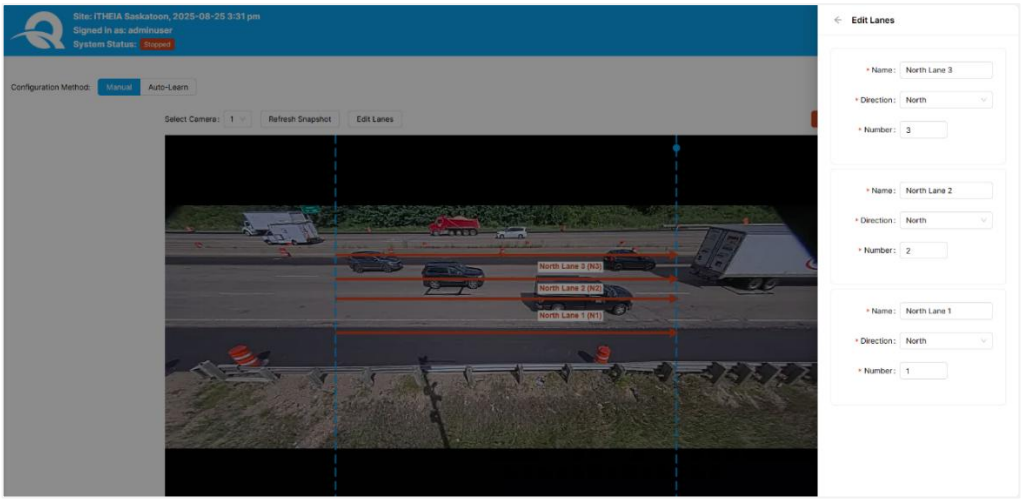


Figure 5-39 Edit Lanes

3. Enter a name for each lane. This is the name that will appear on the lane image on the **Lanes** tab and on the Lane Display on the *Home* page. The lane name must be unique. *If a duplicate name is used, an error will be displayed. The user must correct the error by entering a unique name before closing the drawer.*

   If the Name field is left blank, an error will be displayed to inform the user that a lane name is required. Enter a name to continue. The drawer cannot be closed until a name is entered.

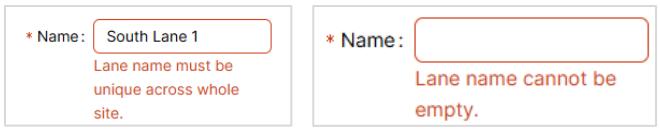


Figure 5-40 Lane Name Warnings

4. Choose the direction of traffic for each lane using the dropdown menu.

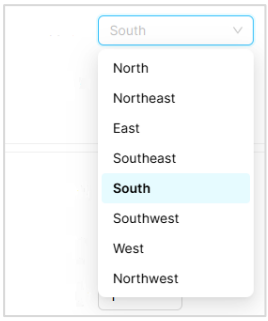


Figure 5-41 Direction Dropdown Menu

5. Assign a lane number for each lane. Lanes should be numbered sequentially from 1 up to a maximum of 8* lanes, following the FHWA guidelines or the jurisdiction's lane numbering standards. The lane number and direction appear in parentheses beside the lane name in the Lane Display on the Home Page.

Lane names, numbers, and directions must be assigned for both cameras when two cameras are enabled.

*Users can add up to 8 lanes, for a maximum of 2 cameras, per site. Portable iTHEIA systems only support 1 camera.

If the Number field is left blank, an error will be displayed warning the user that a lane number is required.

Lane number and direction must be a unique combination. If there is a duplicate lane number with the same direction, a warning message will be displayed and the user will be prompted to change the lane number.

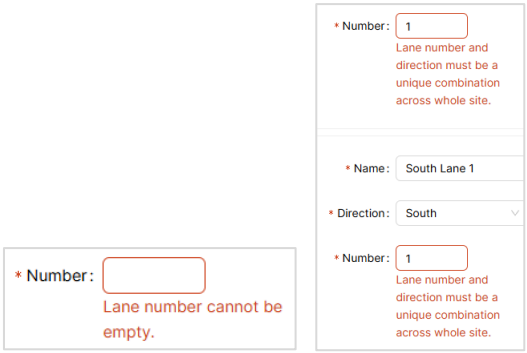


Figure 5-42 Lane Number Warnings

Users will be unable to close the drawer if an error is displayed. The user must first correct the error before continuing. If the user attempts to close the drawer before correcting the error, a warning message will be displayed.

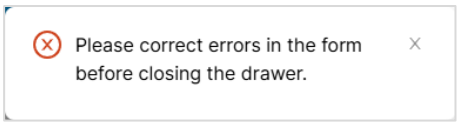


Figure 5-43 Closing Drawer Warning

6. When all changes have been made, click on the button at the top of the drawer *or* click outside of the drawer on main screen to close it.

Changes made in the Edit Lanes drawer are saved automatically. The changes will be reflected in the camera view once the drawer has been closed.

5.1.1.4.7 Auto-Learn Lanes

The user can also allow the system to automatically learn lanes and directions based on traffic rather than manually configuring them. There must be sufficient traffic volumes in each lane for this to be successfully completed.

The length of time required, and position of the learned lanes is highly dependent on the availability of traffic.

Auto lane learning will be completed in a maximum of 30 minutes, or when 50 vehicles have passed through the lanes in each direction – whichever is sooner.

It is not possible to auto-learn lanes while a Performance check sample session is running or scheduled to run within 30 minutes.

To set iTHEIA to auto-learn lanes:

1. Before starting the auto-learn lane process, ensure that the current camera view is satisfactory while still in Manual mode. If desired, press Refresh Snapshot to refresh the camera view.

2. Switch the Configuration Method to Auto-Learn by clicking on the Auto-Learn button. The Auto-Learn Method page will be displayed.

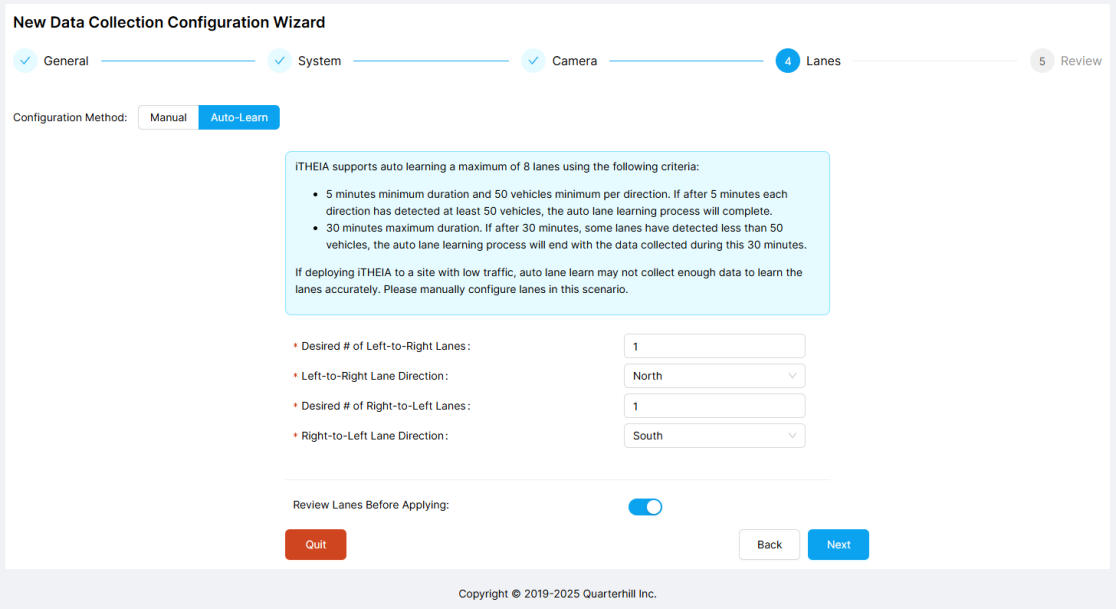


Figure 5-44 Step 4: Lane Configuration – Auto-Learn Method (Single Camera)

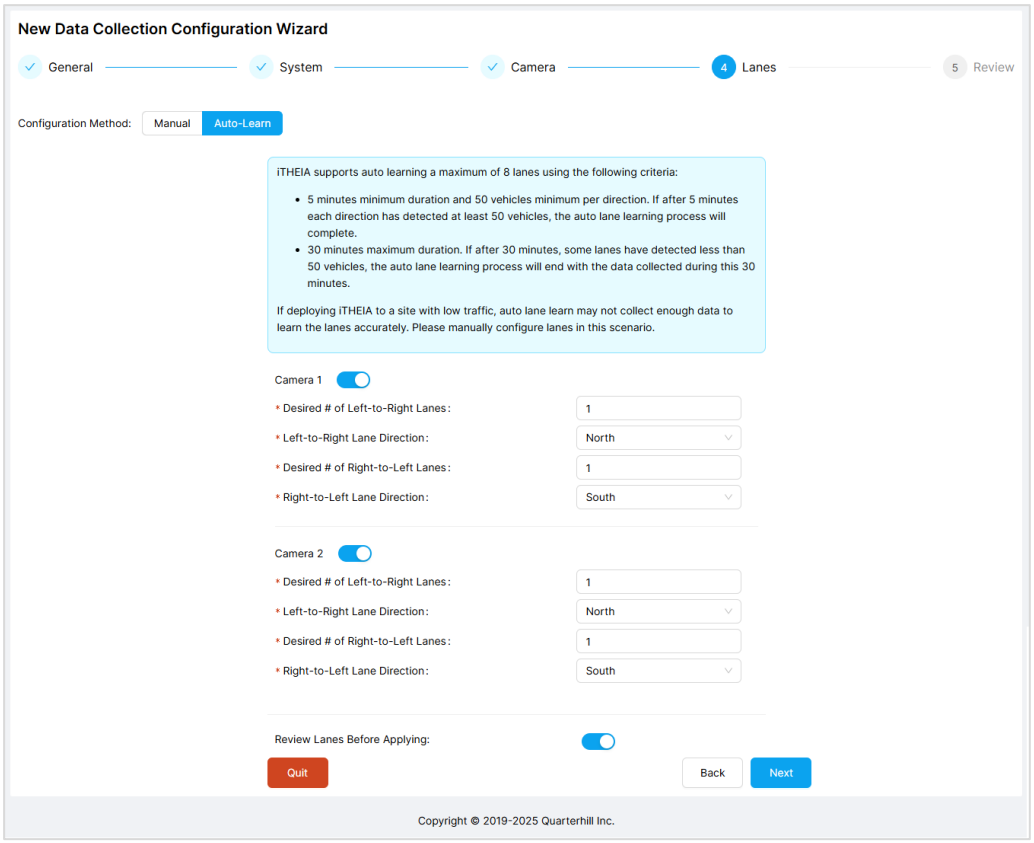
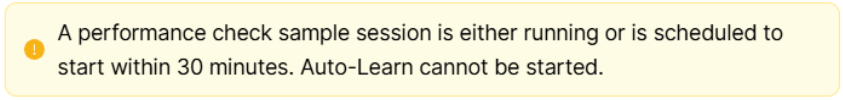


Figure 5-45 Site Configuration: Auto-Learn Method (Dual Cameras)

If the user has already manually configured lanes for the site, these changes will be lost.

Auto-lane learning for two cameras is only available on Permanent systems. On Portable systems, or if the second camera is disabled, the Camera toggle will not appear, and the lane configuration will only appear for one camera.

A warning will appear if a performance check sample session is scheduled to start within 30 minutes. Please wait until the performance check is completed to start auto-learning.



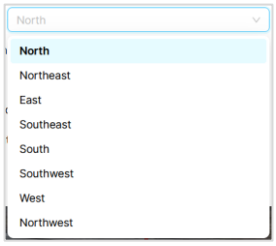
3. (*Permanent Sites Only**) Ensure that Camera 1 is toggled *On* to proceed with auto-lane learning for that camera. Complete steps 4-7 below for Camera 1. If you do not wish to perform auto-lane learning for Camera 1, toggle Camera 1 to *Off* and skip to step 8.

   **This step is only for sites with Permanent iTHEIA systems with two cameras enabled. For sites with a single camera enabled, skip to the next step.*

4. Enter the desired number of lanes on which vehicles will move from left-to-right (based on the video feed). If this is a single lane site with no lanes in the left-to-right direction, change the desired number of lanes to "0."

   "0" lanes can only be entered for one direction. There must be at least one lane in one direction to proceed with auto-lane learning.

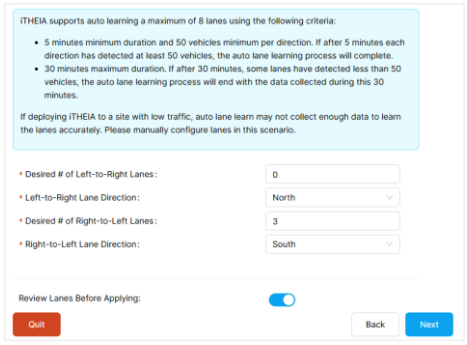
5. Select the direction of traffic for the Left-to-Right lane using the drop-down menu. If there are no left-to-right lanes, you may choose any direction.



6. Enter the desired number of lanes on which vehicles will move from right to left (based on the video feed). If this is a single lane site with no lanes in the right-to-left direction, enter "0" for the desired number of lanes.

There must be at least one lane configured in one direction to complete auto-lane learning.

7. Select the direction of traffic for the Right-to-Left lane using the drop-down menu. If there are no left-to-right lanes, you may choose any direction.



Single-Direction Site **Bi-Directional Site**

Figure 5-46 Auto-Learn Lanes with Number of Lanes Selected

8. (*Permanent Sites Only**) Ensure that Camera 2 is toggled *On* to proceed with auto-lane learning for that camera. Repeat steps 4-7 above for Camera 2. If you do not wish to perform auto-lane learning for Camera 2, turn the Camera 2 toggle to *Off* and proceed to step 9.

At least one camera must be enabled to complete auto-lane learning. An error will occur if the user attempts to disable both cameras.

**This step is only for sites with Permanent iTHEIA systems with two cameras enabled. For sites with a single camera enabled, skip to the next step.*

9. Enable/disable the *Review Lanes Before Applying* toggle.

Once auto-lane learning is complete, the user will be able to review the auto-learned lanes and confirm that the lanes are correct or modify the lanes before applying the changes. The user can also revert to the previous configuration.

Once auto-lane learning is complete, the lane configuration will be automatically saved and applied. The user will be unable to review changes before they are applied. The user can still modify lanes after they are applied if desired. A warning message will appear advising the

user that auto learned lanes will be applied immediately after auto learning is complete.

This toggle will be disabled if auto-lane learning for one of the cameras is disabled (*on Permanent sites with two cameras enabled only*).

10. Once all fields have been filled out, press Next to proceed to the next step.
11. The *Configuration Wizard* will display **Step 5: Review**. Auto-lane learning will not start until the user has completed the 'Review' step and started the wizard.

5.1.1.5 Step 5: Review

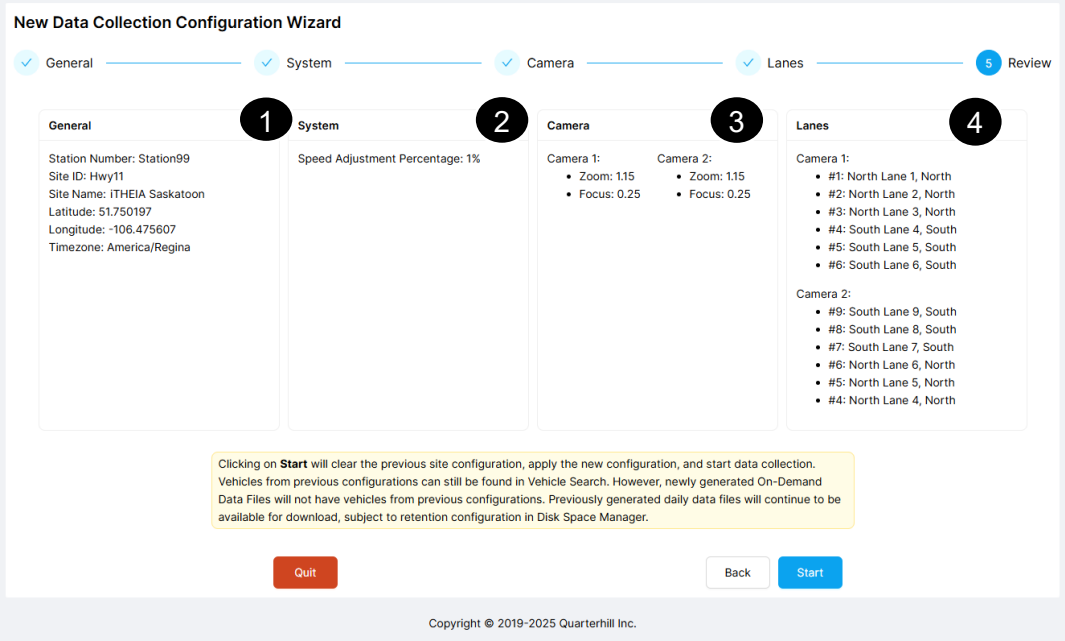


Figure 5-47 Step 5: Review (Manual Lanes)

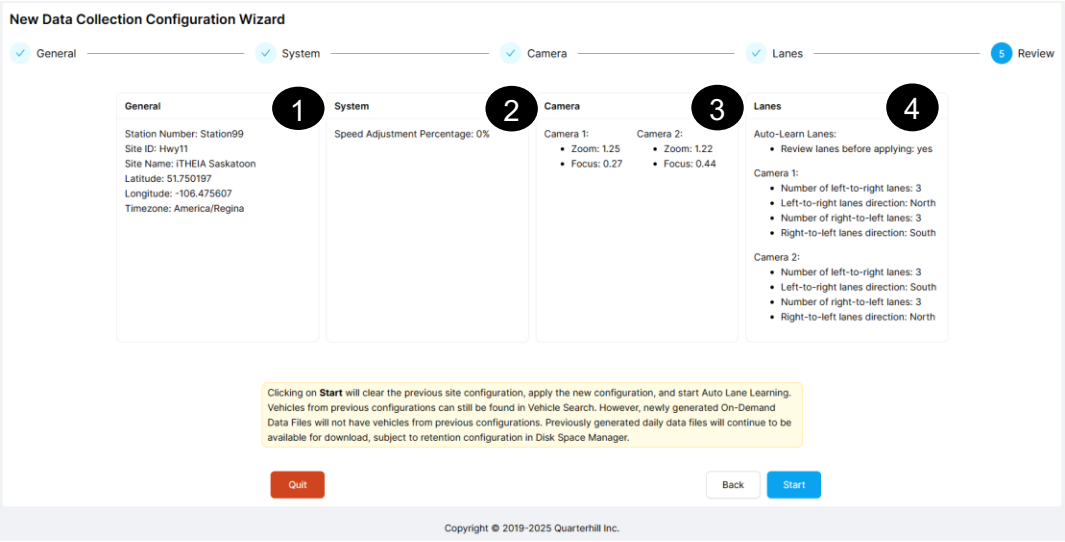


Figure 5-48 Step 5: Review (Auto-Learning)

The **Review** step allows the user to review all the configuration details that were entered for each step of the *Configuration Wizard*:

❶ General

❷ System

❸ Camera

❹ Lanes

To complete the configuration process:

1. Review the configuration details and ensure that all information is correct.
2. If there is an error in any of the configuration information, press the Back button to move back through the steps until you reach the configuration step that you wish you change.
3. Make any changes to the configuration as needed.
4. When the configuration changes for a step are complete, press Next to proceed to the next step until all steps have been revised and are complete. Press Back to move to a previous step and repeat for multiple configuration steps if needed.
5. Review your changes on the Review screen again.

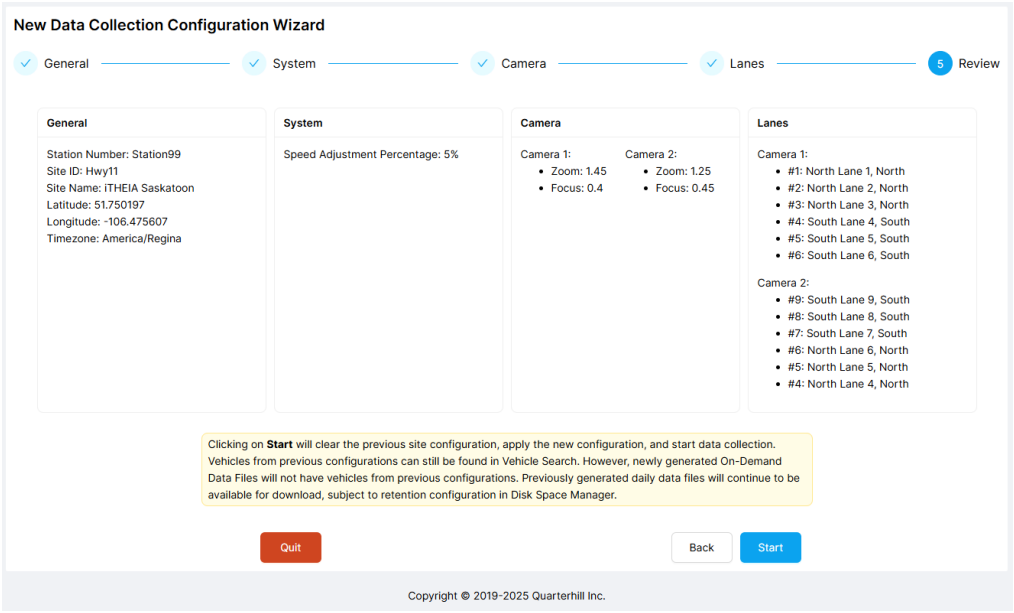


Figure 5-49 Review Changes

6. When all configuration details are correct, press Start to complete the configuration process and start data collection on site. *Press Quit to exit out of the Configuration Wizard without saving. All configuration details will be lost.*

   Pressing **Start** will clear the previous site configuration, apply the new configuration, and start Auto Lane Learning if applicable.

7. A success message will be displayed if the configuration was saved successfully.

If the configuration failed to save, an error message will be displayed. This may occur due to a network error. Please contact Quarterhill for support.

8. If the Wizard is in Auto-Learning mode, see SECTION 5.1.1.5.1 below.

5.1.1.5.1 Auto-Learn Lanes Mode

If lanes were configured in auto-learn lane mode, the following steps will occur after pressing Start on the *New Data Collection Configuration Wizard*.

1. The *Site Configuration* page will be displayed with the new configuration details for General, System and Camera tabs applied. The auto-learning process will be initiated.

   If the updated site information does not appear in the header, try refreshing your browser.

2. Navigate to the **Lanes** tab.
3. While the Auto-learning is underway, a progress bar will be displayed showing the percentage of completion.

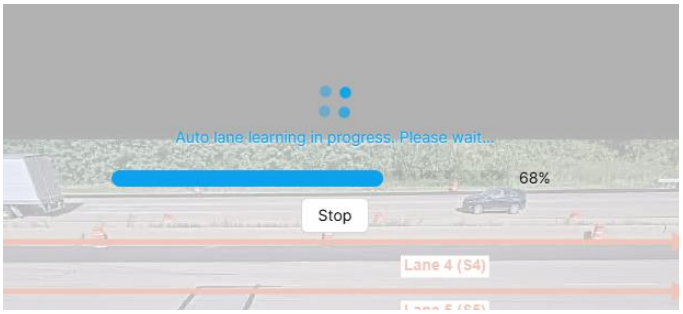


Figure 5-50 Auto-Learning Progress Bar

During the auto-learning process, the user can navigate to other pages from the side menu and the auto-learning will continue in the background. Navigate back to the **Lanes** tab to check if auto-learning is complete.

While auto lane learning is in progress, the 'System Status' will change to Learning.

Auto learning can be stopped at any point during the process. • SEE INSTRUCTIONS TO STOP AUTO-LANE LEARNING. •

a.) If 'Review Lanes Before Applying' was toggled *On*:

4. When auto-learning is complete, a success message will be displayed instructing the user to review the lanes. The 'System Status' will change to Waiting for learned lanes review and the lane configuration will be displayed for the user to review.

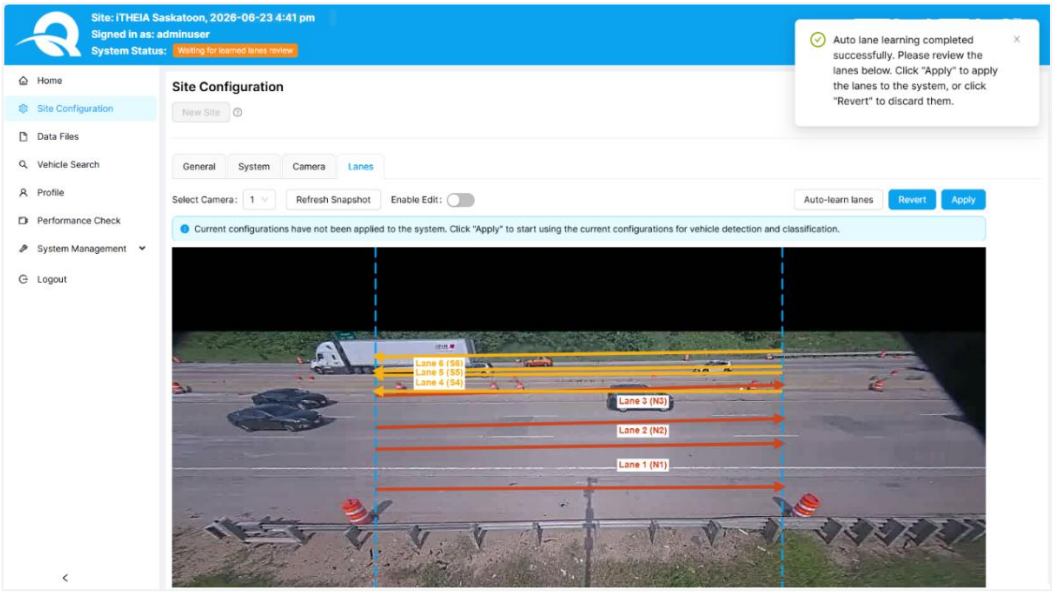


Figure 5-51 Auto-Learned Lanes for Review

5. If there are any changes to be made, toggle 'Enable Edit' to *On*. • SEE SECTION 5.1.8.1 ENABLE EDIT. • Modify, delete, or re-draw lanes as needed. Press **Revert** to discard all auto-learned lanes and immediately revert to the previous configuration.

Use the **Save** or **Reset** buttons as needed. See descriptions in SECTION 5.1.8.1.1.

If auto-learning was performed from the Lanes tab, **Edit** mode will be automatically enabled and the user must press **Save** before applying the changes.

6. If the lane configuration is acceptable, press Apply to apply the auto-learned (or user-modified) lanes. *If the user has made changes to the lane configuration, the user must press **Save** before applying.*

7. A pop-up warning will be displayed.

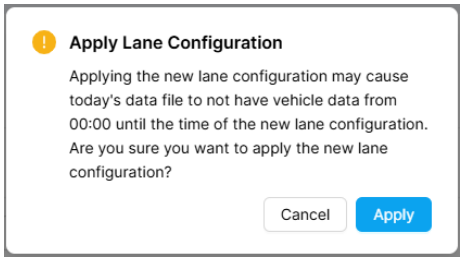


Figure 5-52 Apply Lane Configuration Warning

8. Press the Apply button to accept the warning and proceed with applying the lane configuration.

Lane configuration changes cannot be applied if a performance check sample session is currently running. An error message will be displayed. Please wait until the sample session is complete to apply changes.

9. A success message will be displayed, and the new lane configuration will appear on the Lanes tab.

b.) If 'Review Lanes Before Applying' was toggled *Off*:

4. After the completion of automatic lane learning, the lanes will be displayed on the image in the **Lanes** tab. The auto-learned lanes will be automatically saved and applied.

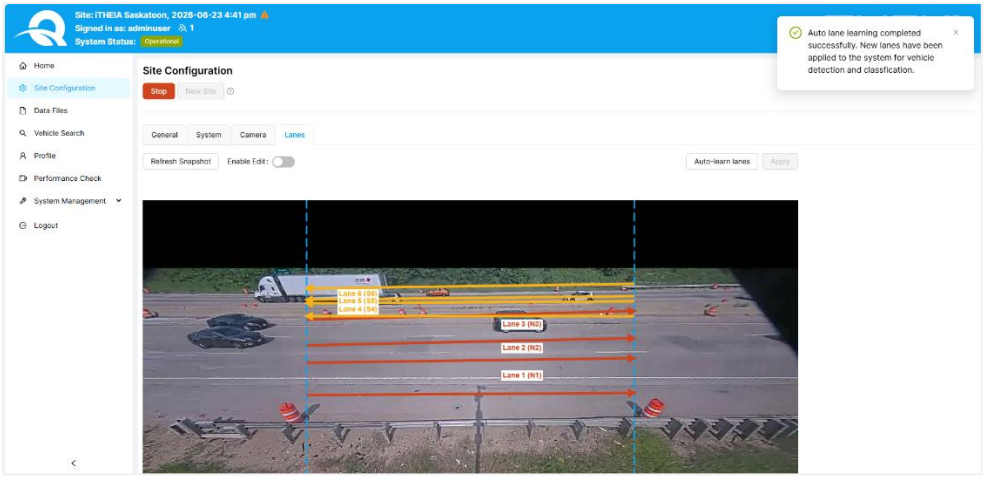


Figure 5-53 Image with Auto-Learned Lanes

Lines tend to track lower than the actual physical lane when using Auto-Learn. This is because the system detects vehicle position based on the side of the vehicle nearest to the camera.

5. The user can manually modify the results as well as add or remove lanes if needed. • SEE SECTION 5.1.1.4.4 LANE CONFIGURATION: GETTING STARTED •

To stop auto-lane learning:

1. While auto learning is still in progress, press the Stop button.
2. A pop-up will be displayed.

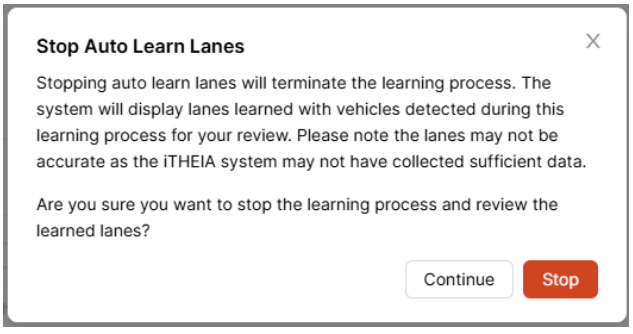


Figure 5-54 Stop Auto Learn Lanes

3. Press Stop to proceed with terminating the learning process.

4. A success message will be displayed if lane learning was stopped successfully. The lanes that have been configured so far using auto learning will be displayed for user review.

When the auto lane learning process is stopped manually, the user will have to review and approve the lanes before continuing, regardless of whether 'Review Lanes before Applying' was enabled.

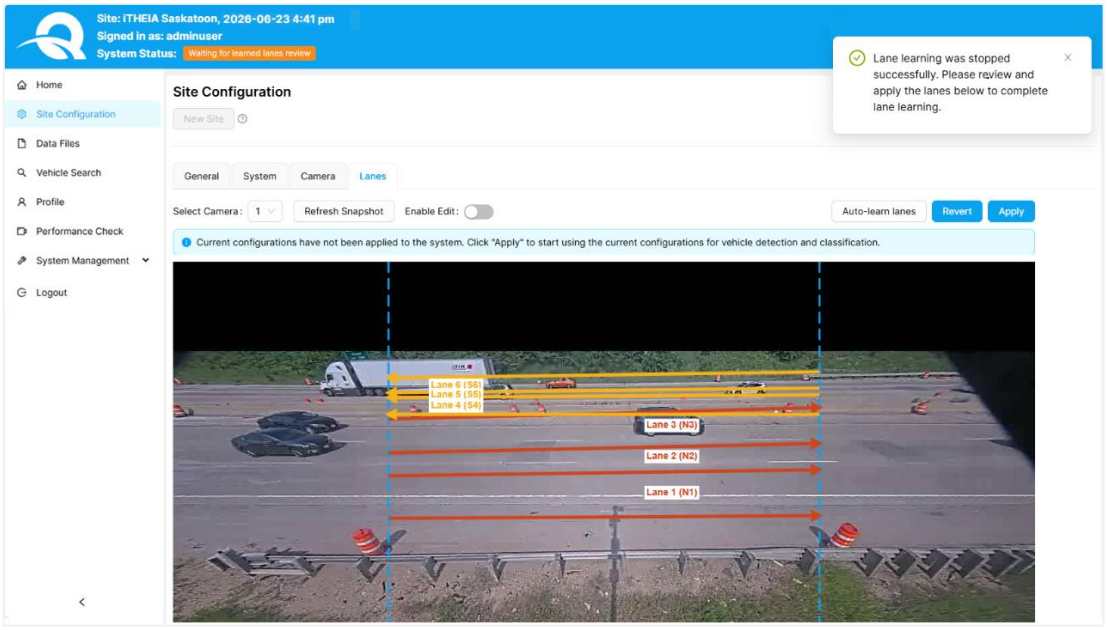


Figure 5-55 Lane Learning Stopped

5. If desired, users can modify the lane configuration by enabling Edit mode and altering the lanes as needed.

If auto-learning was performed from the Lanes tab, **Edit** mode will be automatically enabled and the user must press **Save** before applying the changes.

6. When all changes are complete, or if the user is satisfied with the auto-learned lanes as they are, press the Apply button to save and apply the new configuration. *Press* Revert *to immediately revert and apply the previous lane configuration before auto-learning took place.*

7. A success message will be displayed, and the new lane configuration will appear on the Lanes tab.

5.1.2 Stop Data Collection

Stop

Click to stop iTHEIA data collection and produce final data files for the current site covering the period from midnight to the present time. Once this button is pressed, these data files will be automatically downloaded to your computer and added to the Data Files page when they are complete.

This button is only visible when the System Status is 'Operational.'

The Stop button will be disabled when a Performance Check is running.

Stopping data collection will result in all scheduled Performance Checks being cancelled.

To stop data collection:

1. Press the Stop button.

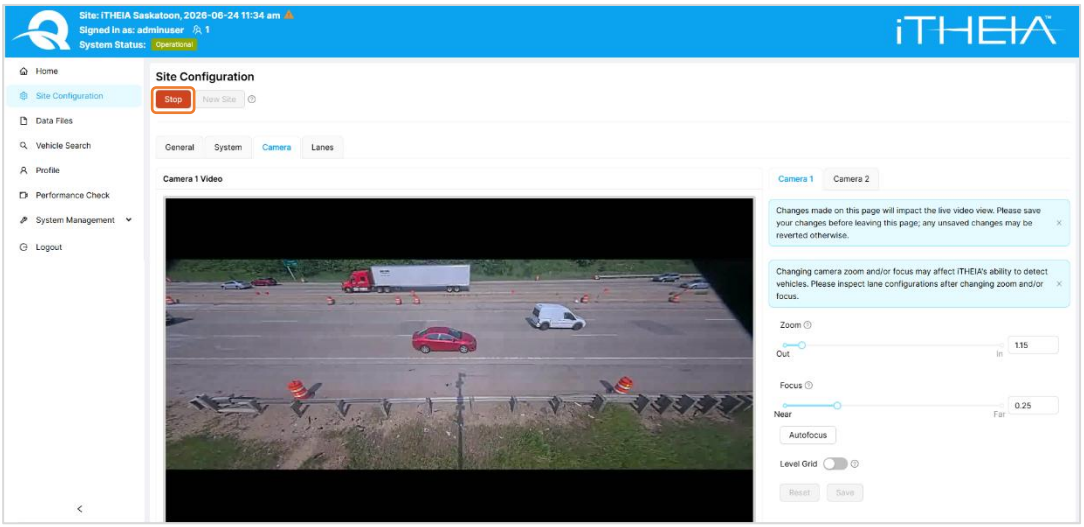


Figure 5-56 Site Configuration

2. A pop-up window will be displayed advising the user that the system will no longer detect vehicles and will produce final data files.

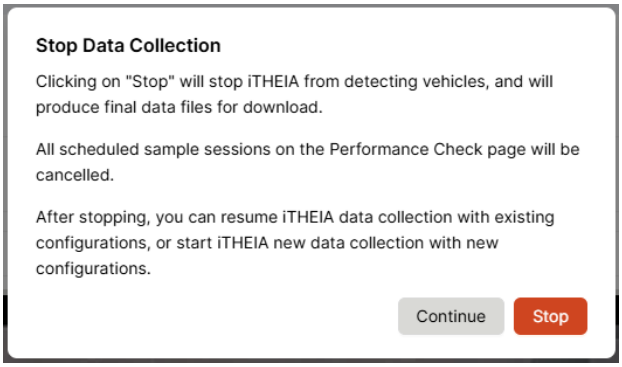


Figure 5-57 Stop Data Collection Warning

3. Press Stop to proceed with stopping data collection. *Press* Continue *to cancel the action and continue with data collection and vehicle detection.*

4. If data collection was successfully stopped, a success message will be displayed, and the System Status will change to Stopped. The system will no longer detect vehicles. A zip folder containing the final data files will be downloaded to your computer. The data files will also be accessible on the Data Files page.

   The user will now have the option to edit the current site confirmation or to RESUME DATA COLLECTION.

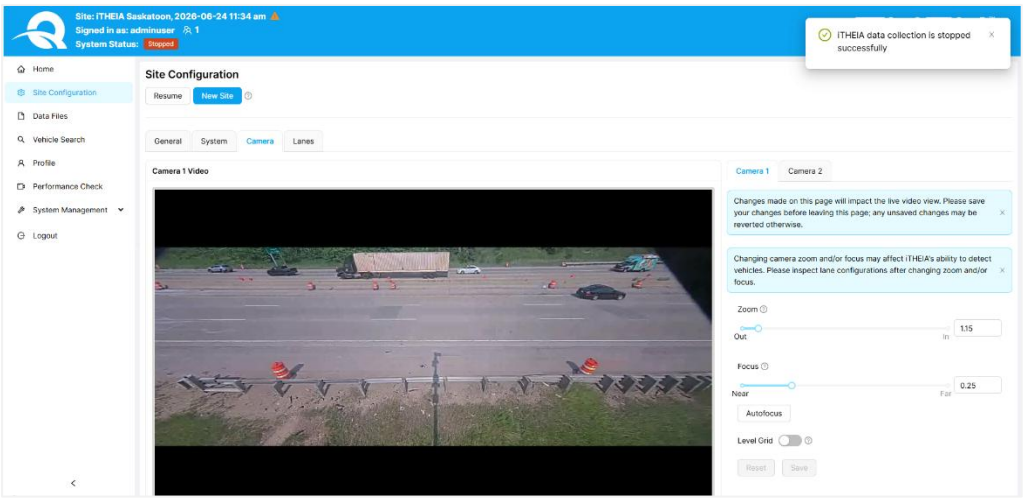


Figure 5-58 Data Collection: Stopped

An error may occur if data collection if the system failed to stop data collection, as shown below. If this error occurs, try again in a few minutes. If the error continues, please contact Quarterhill support.

5.1.3 Resume Data Collection

Resume — Click to resume data collection and vehicle detection with the current site configuration.

This button is only visible when the System Status is 'Stopped.'

To resume data collection:

1. Click the Resume button.
2. A pop-up window will be displayed prompting the user to confirm the action.

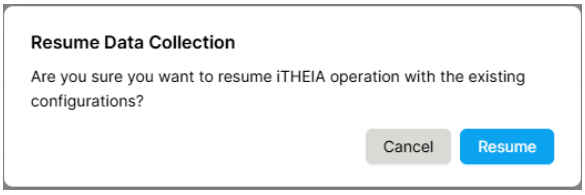


Figure 5-59 Resume Data Collection

3. Press Resume to proceed with resuming operations with the existing configurations. *Press* Cancel *to cancel the action. The System Status will remain as 'Stopped.'*
4. If data collection was successfully resumed, a success message will be displayed, the System Status will change to 'Operational,' and the Stop button will be enabled.

The automatically generated data files for that day will only include data from the currently active site. If a new site was started while data was stopped, the file will only include data starting from the time the new site was started.

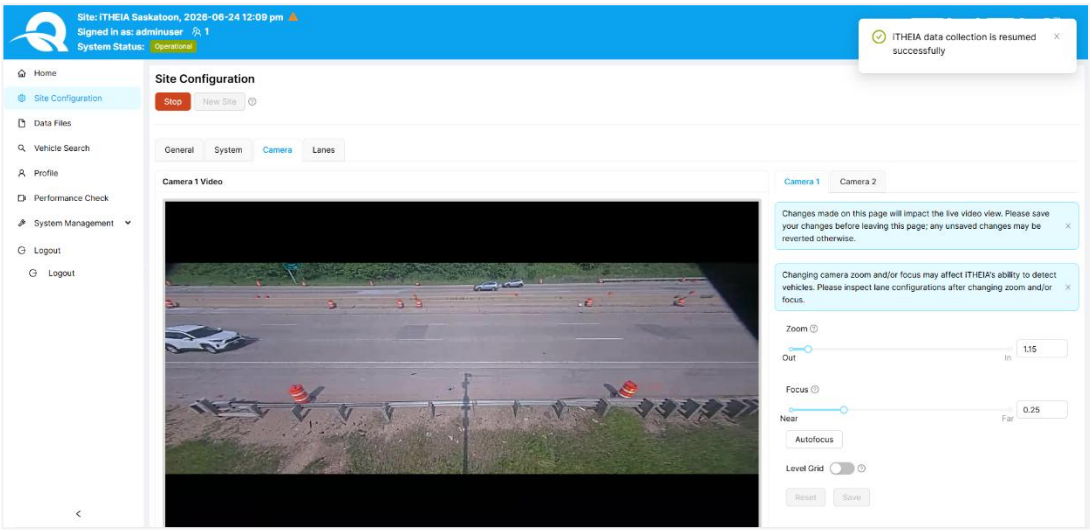


Figure 5-60 Data Collection: Resumed

An error may occur if the system failed to resume data collection. In this case, try again in a few minutes. If the error persists, please contact Quarterhill for support.

5.1.4 Edit Site Configuration

If the site has already been configured, users can edit the configuration at any time using the GENERAL TAB, SYSTEM TAB, CAMERA TAB and LANES TAB. If setting up a new site in a different location, or if the user wants to change the Station Number, Site ID, or Site Name of the current site, the user can also enter the *New Site Configuration Wizard* to make changes to the configuration.

To edit the site configuration using the New Site Wizard:

1. If the system is currently operational, press the Stop button.

The **New Site** button is only available when the System Status is 'Stopped.'

2. A pop-up window will be displayed. Press the Stop button to confirm the action.

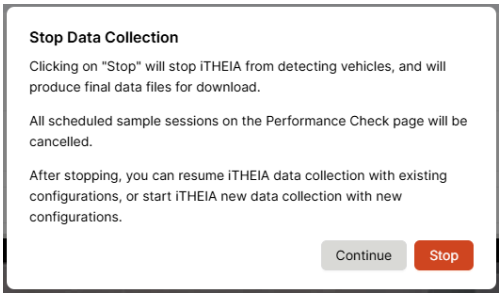


Figure 5-61 Stop Data Collection Warning

3. Press New Site.
4. The *New Data Collection Configuration Wizard* will be displayed with the previously configured values already filled in. Follow the steps from SECTION 5.1.1 CONFIGURE NEW SITE to change any values as desired and press **Start** to save and apply the changes.

5.1.5 General Tab

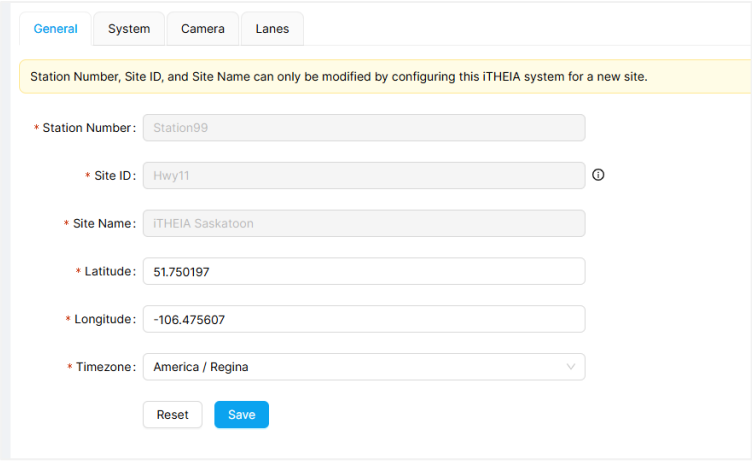


Figure 5-62 Site Configuration: General Tab

Refer to SECTION 5.1.1.1 STEP 1: GENERAL CONFIGURATION for a description of the General Configuration Parameters.

Press Save to save the new configuration. Press Reset to revert to the most recently saved settings.

A success message will be displayed if the configuration has been saved successfully.

5.1.6 System Tab

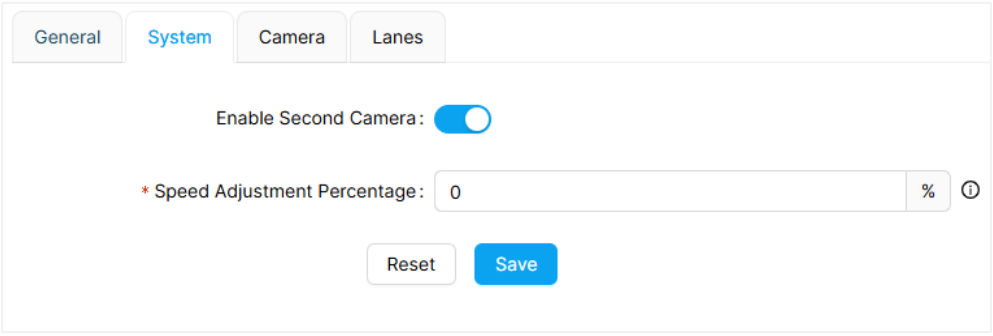


Figure 5-63 Site Configuration: System Tab

Refer to SECTION 5.1.1.2 STEP 2: SYSTEM CONFIGURATION for a description of the System Configuration parameters.

5.1.7 Camera Tab

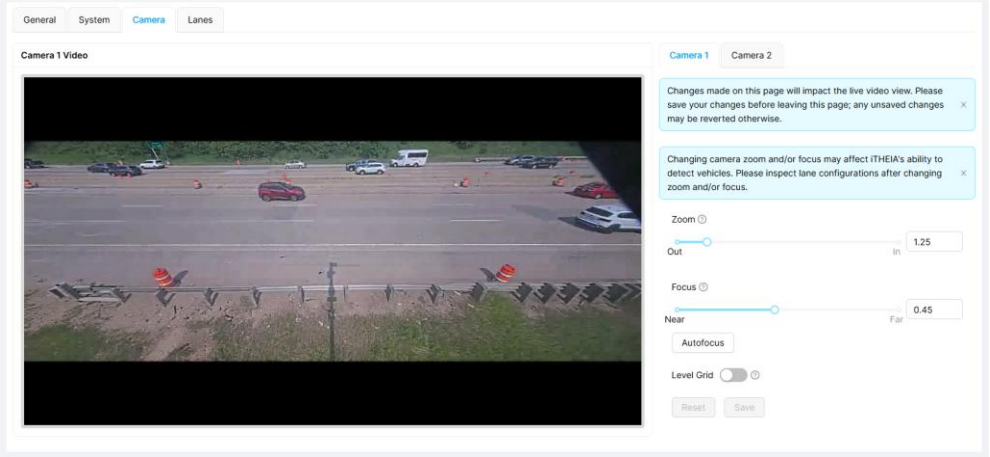


Figure 5-64 Site Configuration: Camera Tab

Refer to SECTION 5.1.1.3 STEP 3: CAMERA CONFIGURATION for a description of the Camera settings.

The **Save** and **Reset** buttons will be disabled unless changes have been made.

Changes made on this page will impact the live video view. Please save your changes before leaving this page; any unsaved changes may be reverted to previous settings.

5.1.8 Lanes Tab

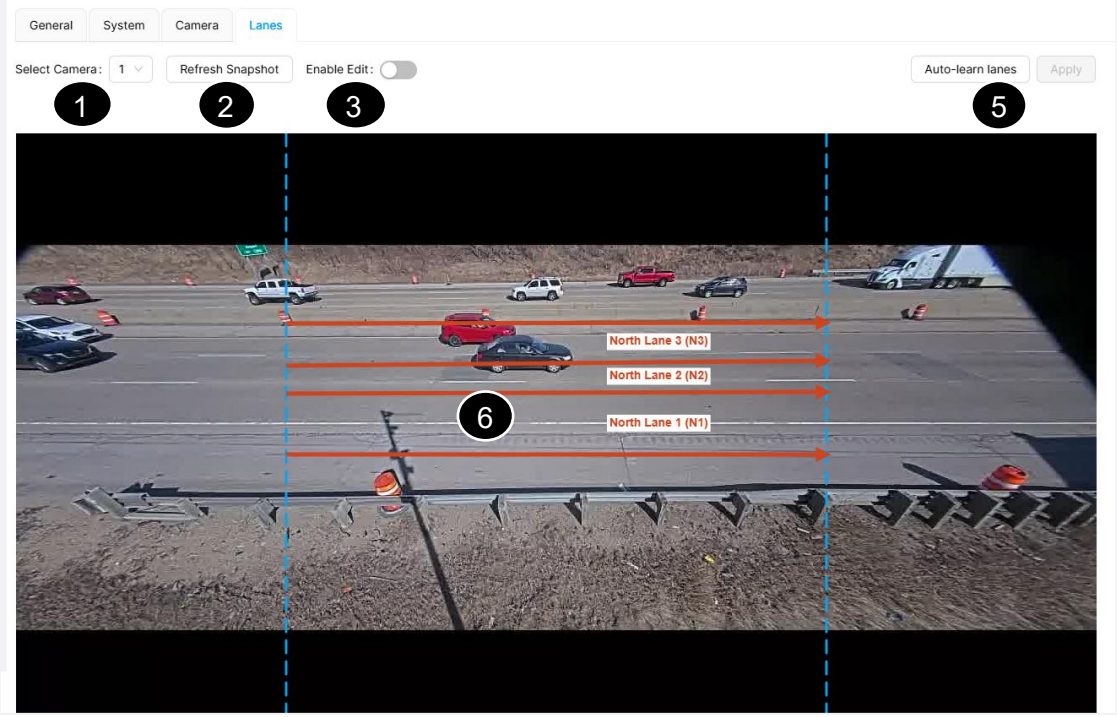


Figure 5-65 Site Configuration: Lanes Tab – Dual Camera (View-Only Mode)

When selecting the **Lanes** tab, the page will be displayed in view-only mode by default. In this mode, users can view the most recent snapshot taken by the camera on site as well as the lane lines that have been drawn (if any). The camera view snapshot is captured at the moment that the user first selects the tab. The view may include any vehicles present at that time.

The dual camera display is only available on Permanent iTHEIA systems. The second camera must also be enabled in System Configuration. • SEE SECTION 5.1.1.2 STEP 2: SYSTEM CONFIGURATION •

The following features are shown in the **Lanes** tab in view-only mode:

❶ Select Camera Dropdown Menu† (***Dual Cameras Only)*

❷ Refresh Snapshot†

❸ Enable Edit

❹ Auto-Learn Lanes

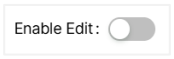
❺ **Apply** Option

❻ Camera View†

†Refer to SECTION 5.1.1.4 STEP 4: LANE CONFIGURATION for a description of these features.

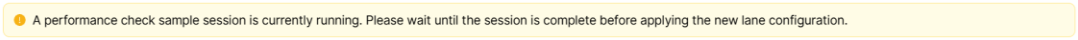
The features described below only apply to the **Lanes** tab once a new site has been configured. These features differ from those shown in the *New Site Configuration Wizard*.

5.1.8.1 Enable Edit

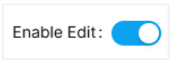


The **Lanes** Tab is displayed in view-only mode by default (Enable Edit: *Off*). To edit the lane configuration for this site, edit mode must be enabled.

If a performance check session is running, the Enable Edit toggle will be disabled, and a warning will be displayed. The user must wait until the session is complete to make any changes to the lane configuration.



To enable edit mode:



1. Toggle Enable Edit to *On*.
2. The **Lanes** tab will be displayed in edit mode.

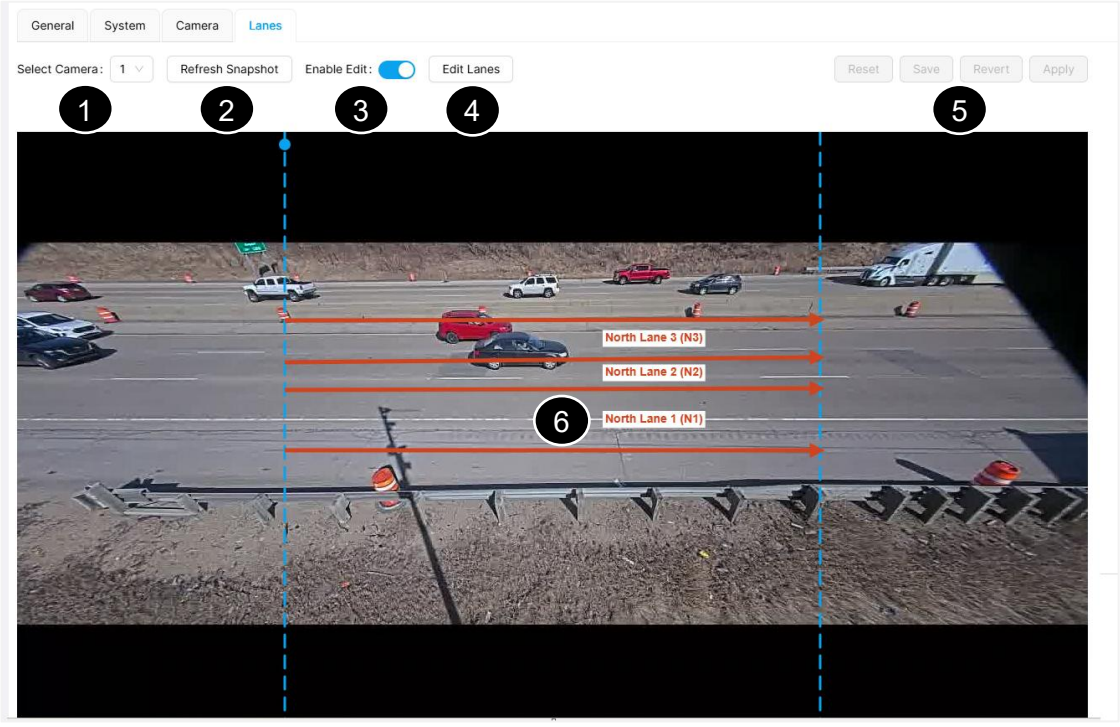


Figure 5-66 Configuration: Lanes Tab – Dual Cameras (Edit Mode)

The figure above displays the **Lanes** Tab in edit mode when two cameras are enabled.

The dual camera display is only available on Permanent iTHEIA systems. The second camera must also be enabled in **System** Configuration. • SEE SECTION 5.1.1.2 STEP 2: SYSTEM CONFIGURATION •

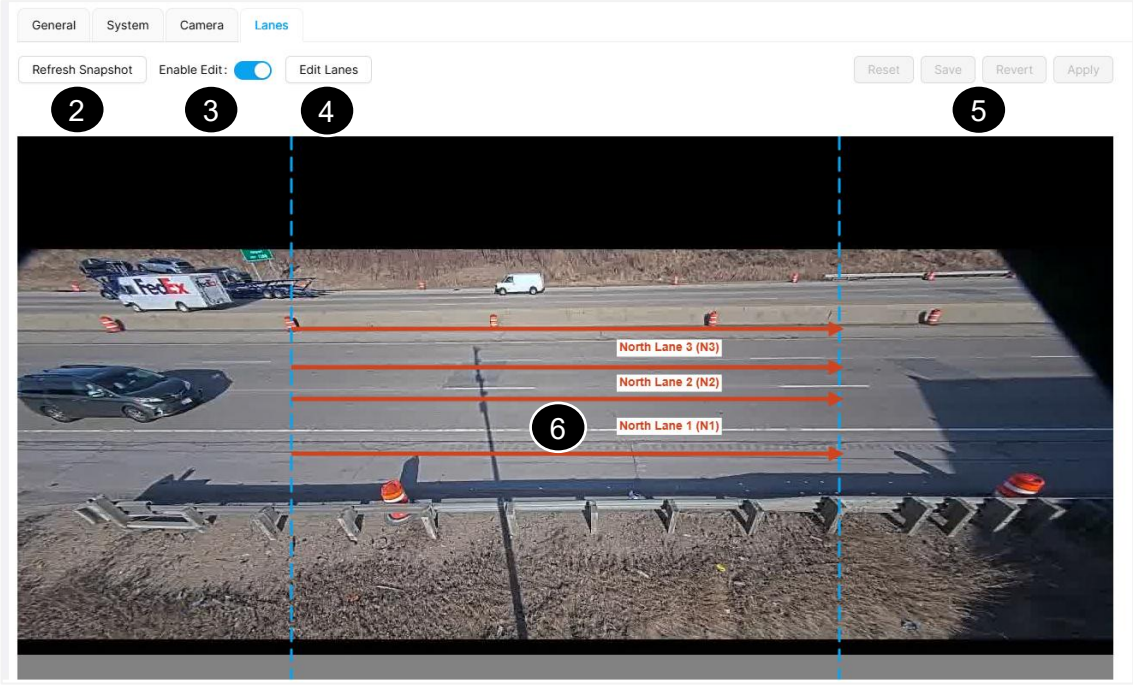


Figure 5-67 Configuration: Lanes Tab – Single Camera (Edit Mode)

Figure 5-67 figure above displays the **Lanes** Tab in edit mode when a single camera is enabled.

Portable iTHEIA systems can only have one camera configured.

The following features are shown in the **Lanes** tab in edit mode:

❶ Select Camera Dropdown Menu† (***Dual Cameras Only)*

❷ Refresh Snapshot†

❸ Enable Edit (*On*)

❹ Edit Lanes†

❺ Options: Reset, Save, Revert & Apply

❻ Camera View†

†Refer to section SECTION 5.1.1.4 STEP 4: LANE CONFIGURATION for a description of these features.

5.1.8.1.1 Edit Mode

To edit the lane configuration:

1. Ensure that edit mode is enabled. If desired, click Refresh Snapshot to refresh the image on the page so the lanes can be seen clearly.
2. Follow the steps from SECTION 5.1.1.4.4 LANE CONFIGURATION: GETTING STARTED. For detailed instructions on how to set up lanes for different traffic configurations, SEE SECTION 5.1.1.4.5.



Once the user has made any changes, a warning will be displayed at the top of the screen advising the user that any unsaved changes will be lost if navigating away from the page or clicking on Reset without saving. The exact wording of the warning will vary depending on the number of cameras enabled.

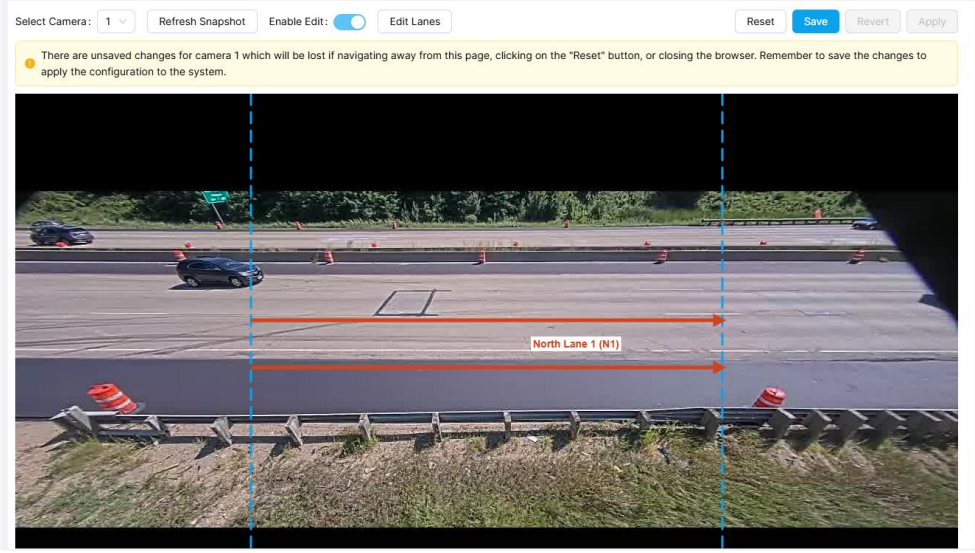


Figure 5-68 Lane Boundary Drawn

To reset changes:

1. Click Reset to discard all *unsaved* changes. *This button will be disabled if no changes have been made.*
2. All unsaved changes will be removed, and the lane configuration will be reset to the most recently applied changes.

To save changes:

1. After all lanes have been configured, click the Save button. *The button will be disabled if no changes have been made.*
2. The configuration will be saved, but the changes will not yet be applied to the system. A success message pop-up will be displayed showing that the changes have been saved.

   A message will appear on the page notifying the user that the configurations have not yet been applied.

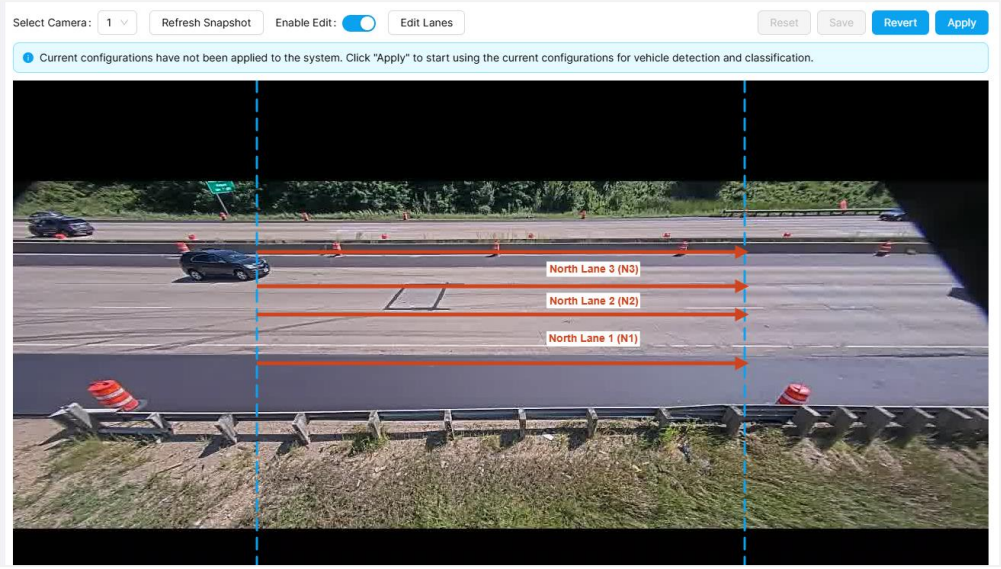


Figure 5-69 Configurations are Saved but not Applied

If configuration errors are detected when a user clicks on the Save button, an error notification will be displayed.

When only one line is drawn for a particular direction, the following error message will be shown. The user must add another line in the same direction to continue.

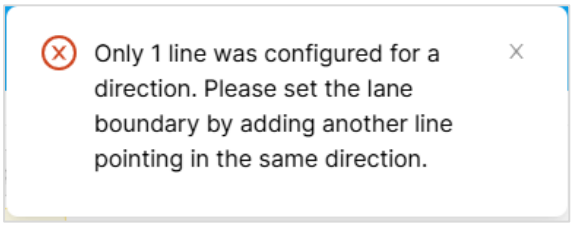


Figure 5-70 One Line Configured Warning

If there are no lines drawn on the camera view, the following error message will be displayed. The user must add two lines in the same direction to form a lane before saving.

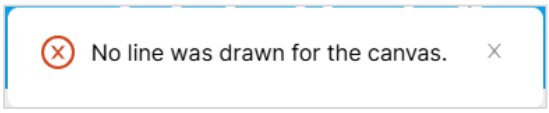


Figure 5-71 No Line Drawn Warning

The wording of the error messages will vary depending on the number of cameras enabled on site.

If the lines are drawn too close together for the iTHEIA to accurately detect vehicles, an error message will be shown.

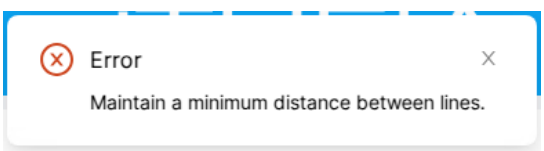


Figure 5-72 Maintain Minimum Distance Warning

To apply changes:

1. After saving all changes using the Save button, press the Apply button. *The button will be disabled if changes have not yet been saved.*
2. A warning message will be displayed informing the user that applying changes to the lane configuration may cause the Vehicle Search and daily data file to exclude vehicles detected prior to the lane configuration change.

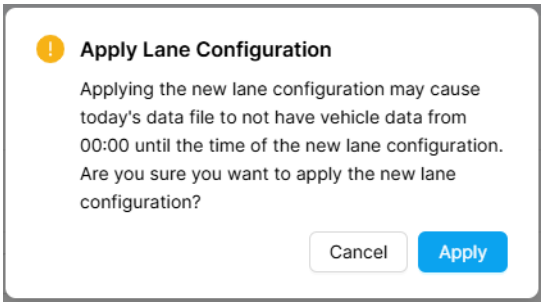


Figure 5-73 Apply Lane Configuration

3. Press the Apply button to accept the warning and proceed with applying the lane configuration.

Lane configuration changes cannot be applied if a performance check sample session is currently running. An error message will be displayed. Please wait until the sample session is complete to apply changes.

Press Cancel to go back to the Lanes tab without applying any of the changes. The Vehicle Search page will be unaffected.

*To undo all changes that have been made, the user will have to **revert** to the previously applied configuration.*

To revert to the previous lane configuration:

1. Press Revert to discard all *saved* changes. *This button will be disabled until changes have been saved.*
2. All saved changes will be lost and the lane configuration will revert to the most recently applied configuration.

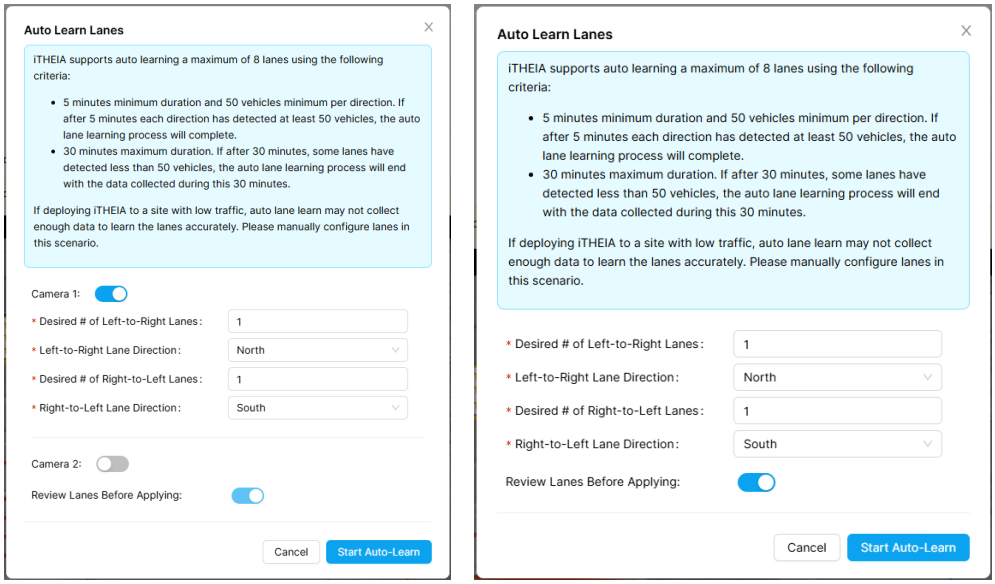
5.1.8.2 Auto-Learn Lanes

The user can also allow the system to automatically learn lanes and directions based on traffic rather than manually configuring them. There must be sufficient traffic volumes in each lane for this to be successfully completed.

The user must toggle Edit mode to *Off* to be able to use the Auto-learn lanes function.

To set iTHEIA to auto-learn lanes:

1. Before starting the auto-learn lane process, ensure that the current camera view is satisfactory. If desired, press Refresh Snapshot to refresh the camera view.
2. When the **Lanes** tab is in view-only mode (*Enabled Edit: Off*), click the Auto-learn lanes button. The **Auto Learn Lanes** pop-up will appear.



Permanent System (Dual Cameras) **Portable System (Single Camera)**

Figure 5-74 Auto-Learn Lanes

3. Configure the fields by following the instructions in SECTION 5.1.1.4.7 AUTO-LEARN LANES.
4. Once all fields have been filled out, press Start Auto-Learn to start lane learning.
5. See SECTION 5.1.1.5.1 AUTO-LEARN LANES MODE, starting with step 3, for a description of the remaining steps.

6 DATA FILES

The *Data Files* page allows users to manage how they want to access the per vehicle data from iTHEIA. The user can retrieve automatically generated daily data files through the web UI as well as generate data files on demand. They can also choose to push MS2 files with a push API or pull files with a REST API.

To access the *Data Files* page:

1. Select Data Files from the side menu.
2. The *Data Files* page will be displayed. The **Daily Web Retrieval** tab will be selected by default.

For information regarding MS2 Push API, please refer to SECTION 6.1.3 of this document.

For information regarding Pull API Requests, please refer to the iTHEIA DATA FILE PULL REST API SPECIFICATION document.

6.1.1 Daily Web Retrieval Tab

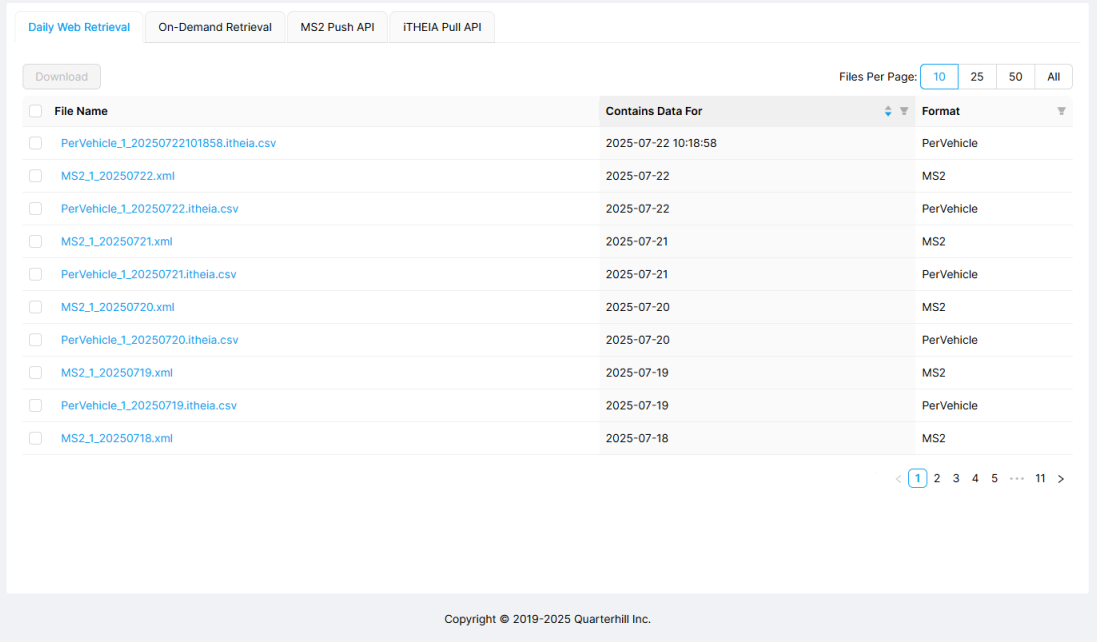


Figure 6-1 Daily Web Retrieval Tab

The **Daily Web Retrieval** tab displays the reports that are automatically generated on a daily basis (around 12:00 AM based on time zone configured in the **General** tab) in two file types:

- **PerVehicle** CSV text file: the system has a report which creates an entry for every vehicle counted in the system. REFER TO THE iTHEIA PER VEHICLE DATA FILE FORMAT DOCUMENT.
- **MS2** per vehicle file: This format follows the *MS2 Data Import Format Specification – Version 1.7.*

The reports are also generated in two file types (CSV and MS2) whenever a user stops data collection for a site. The files will include data for the current site from

midnight that day until the time that data collection was stopped. The files will not include data from any previous sites from the same day.

The automatically-generated daily files will only include data for the currently configured site. If a new site has been started that day, the daily file will only contain data starting from the time when the newest site was started.

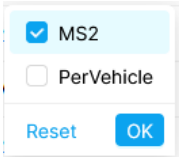
Individual or multiple files can be downloaded.

To change the number of files shown per page:

- Select the **10**, **25**, **50**, or **All** button.

To filter the results:

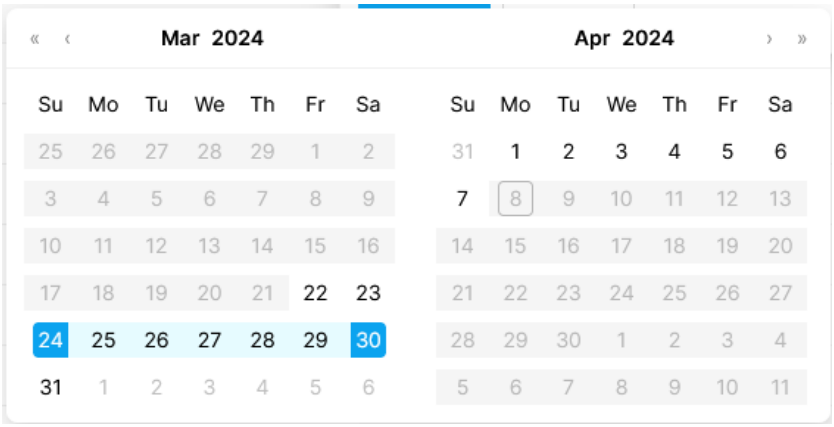
- Click the button on the **Format** column to filter results by format type. Users can choose one or both formats to be displayed. Press **OK** to save changes. Click **Reset** to remove filter.



- Click the button on the **Contains Data For** column to filter the results by a date range.
  - Select a Start and End date from the date picker.



  - Press Search to only display files from that date range.
  - Press Reset to remove filter.



- In the **Contains Data For** column, click the down arrow to display the files from newest to oldest (top to bottom). Click the up arrow to sort the files from oldest to newest.

To download a file(s):

1. Select the checkbox(es) next to the file(s) intended for download. The number of files selected will appear on the Download button. Download (4)

2. When all have been selected, select the Download button.
3. A zip file will be downloaded to your computer. Open this file to access the downloaded files.

6.1.2 On-Demand Tab

The **On-Demand** tab allows for on-demand data file generation. This option allows the user to create one data file over any user selected time span of up to five (5) days from the available date range. The on-demand file is downloaded when complete.

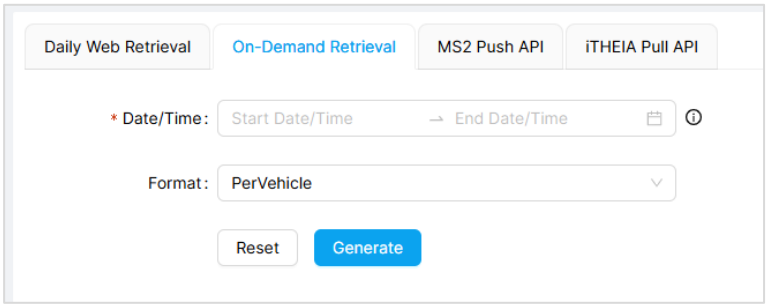
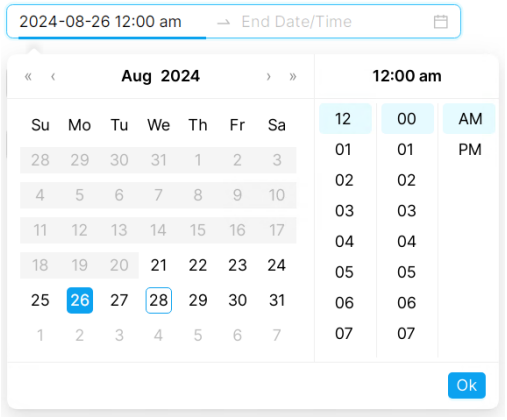


Figure 6-2 On-Demand Tab

To generate a file on demand:

1. Select a Start Date/Time and End Date/Time from the date picker.



2. Select the applicable time zone from the dropdown menu.
3. Select the format for the file from the dropdown menu. Options include:
   - Per Vehicle (.CSV)
   - MS2
4. Press Generate to create the file. A zip file will be downloaded to your computer.
5. To revert to previous selections, press Reset or navigate off the page and return.

Data files can only be generated for up to 60 days prior to the current date, depending on the retention settings configured on the Disk Space Manager. • SEE SECTION 10.4 • Older dates will be greyed out and not available to select.

The headers for the on-demand data files will display the site information that was configured at the time that the first vehicle in the data file was recorded.

Note: On-Demand data file names are based on the currently configured site, which may differ from the site that was configured during the specified date range.

On-Demand data files will contain all vehicle records for the specified time range, regardless of the site in which they were recorded.

6.1.3 MS2 Push API Tab

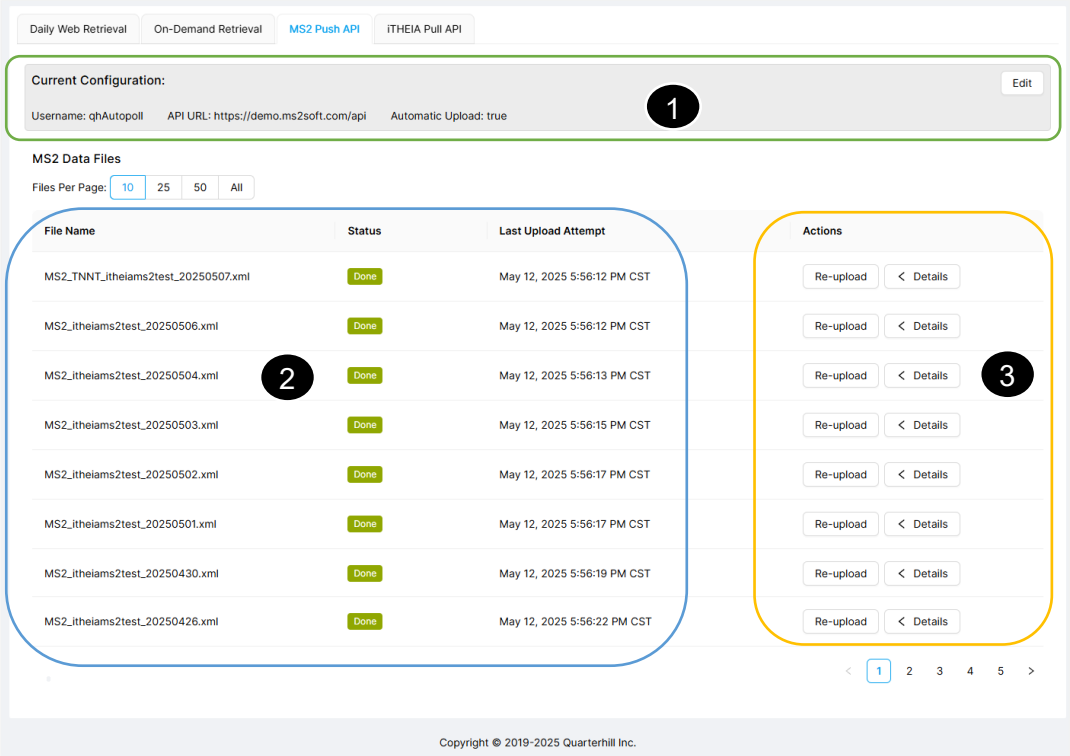


Figure 6-3 MS2 Push API Tab: Automatic Upload Enabled

The **MS2 Push API** tab displays a list of upload jobs, as well as upload attempts for each upload job, for the data files that are automatically generated by the system each day around midnight. • SEE SECTION 6.1.1 DAILY WEB RETRIEVAL TAB. • The **MS2 Push API** tab allows users to view and manage these upload jobs. Users with ADMIN access can also configure the MS2 Import API and upload method from this tab.

Figure 6-3 displays the **MS2 Push API** tab when Automatic Upload is *enabled*. For instructions on how to enable Automatic Upload, SEE SECTION 6.1.3.1.

The **MS2 Push API** tab contains the following elements when Automatic Upload is *enabled*:

❶ Current Configuration

❷ MS2 Data File Information

❸ Actions

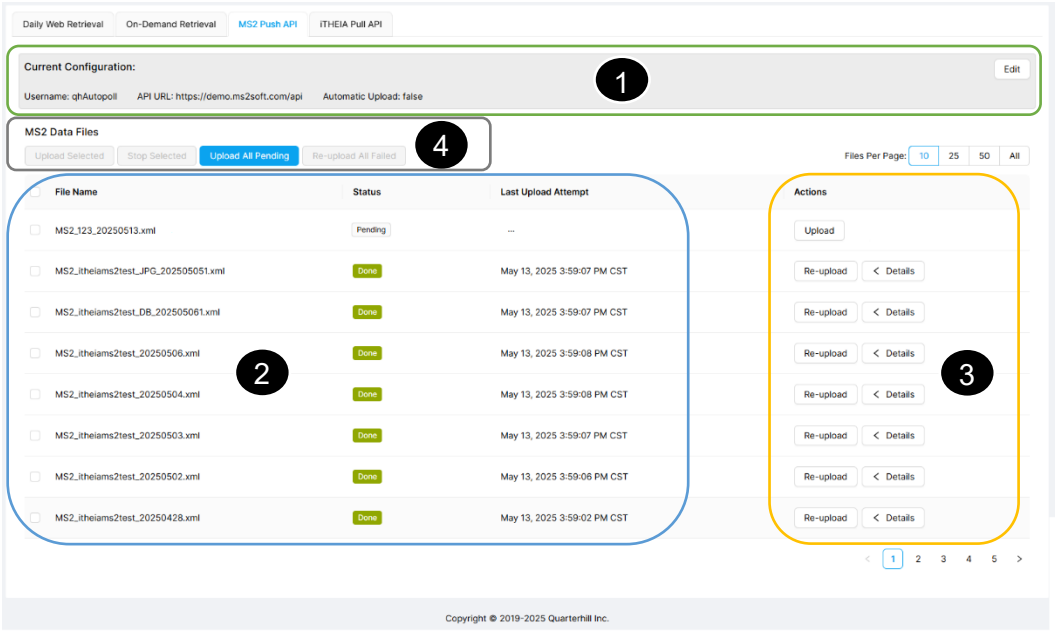


Figure 6-4 MS2 Push API Tab: Automatic Upload Disabled

The figure aboveFigure 6-4 displays the **MS2 Push API** tab when Automatic Upload is *disabled*. For instructions on disabling Automatic Upload, SEE SECTION 6.1.3.1.

The **MS2 Push API tab** contains the following elements when Automatic Upload is *disabled*:

❶ Current Configuration

❷ MS2 Data File Information

❸ Actions

❹ Upload Controls

These features are described in the sections below. If the MS2 Push API has not yet been configured for the first time, the user will be prompted to configure the page before continuing. No other elements of the page will be displayed until the configuration is complete. For configuration instructions, see SECTION 6.1.3.1.

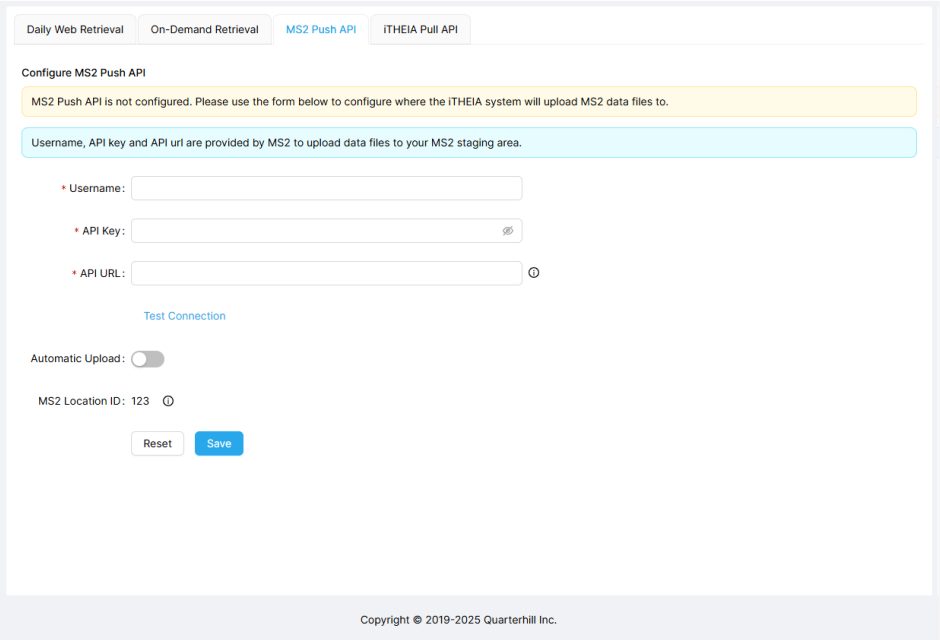


Figure 6-5 MS2 Push API Tab: Not Yet Configured

Only ADMIN users can configure the MS2 Push API page. Accounts with the USER role will be prompted to contact their administrator to configure the page.

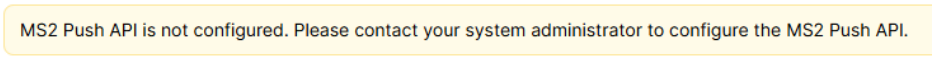


Figure 6-6 Configuration Warning for User Role

6.1.3.1 Current Configuration

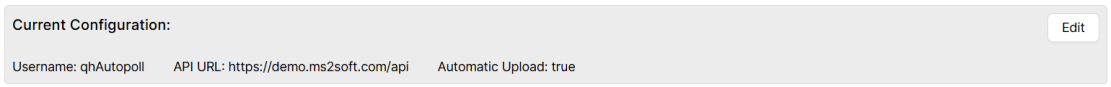


Figure 6-7 Current Configuration

The *Current Configuration* pane displays a quick overview of the current configuration details. The following information is displayed:

- Username
- API URL
- Automatic Upload (*True/False*)
- Edit option*

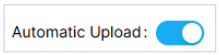
This information will only be displayed if the MS2 Push API has already been configured.

To configure the MS2 Push API for the first time:

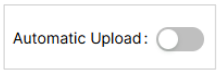
1. Configure the following items:
    a. Username: *Enter the username provided by MS2.*
    b. API Key: *Enter the API key provided by MS2.*

c. API URL: *Enter the endpoint URL for MS2. The format must be https://xxxx.ms2soft.com/api, where xxxx is customer specific.*

d. Automatic Upload: *Use the toggle to control whether MS2 data files should be uploaded automatically.*



MS2 data files will be automatically uploaded.



Automatic uploads are disabled.

e. MS2 Location ID (*View-Only*): *Displays the location ID, as configured in the General tab of the Site Configuration page.* • SEE SECTION 5.1.1.1 STEP 1: GENERAL CONFIGURATION •

2. After entering the URL and other configuration details, click the Test Connection link to ensure that the connection is working properly.
3. If the connection was successful, a success message will be displayed.

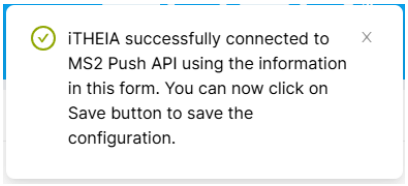


Figure 6-8 Successfully Connected Message

There are several errors that can occur when testing the connection.

If the correct format is not used for the URL, the following errors will occur. Ensure that the URL is in the correct format and try again.

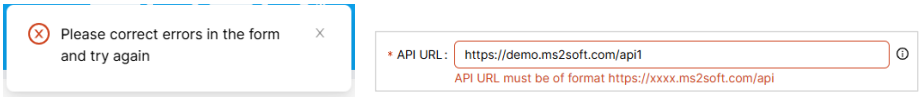


Figure 6-9 Please Correct Errors

If an invalid URL is used, an unauthorized warning will be displayed. Correct the URL and try again.

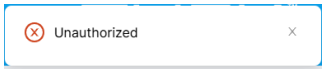


Figure 6-10 Unauthorized Warning

If the server fails to make the request, the following error will occur. Please contact Quarterhill for support.

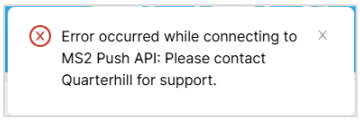


Figure 6-11 Connection Error

4. If the test connection was successful, press Save to save the configuration. Press Reset to cancel all changes and revert to the previous state.

5. If the configuration was saved successfully, a success message will be displayed.

Once the configuration is saved, the page will display the current configuration along with any data files available to upload in the system. • SEE FIGURE 6-3 •

If no data files have been generated yet, the MS2 Data Files section will contain a message advising the user that there are no data files present, and to check again after data files have been generated by the system around midnight based on the time zone set in the General Tab. • TO SET THE TIME ZONE, SEE SECTION 5.1.1.1 STEP 1: GENERAL CONFIGURATION •

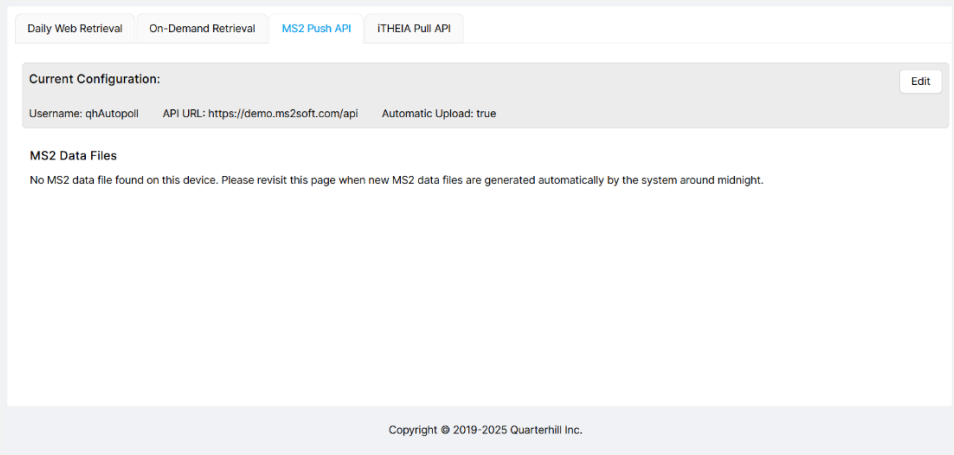


Figure 6-12 MS2 Push API Tab: No Data Files

6.1.3.1.1 Edit Configuration

To edit the MS2 Push API configuration:

1. Click the Edit button.
2. The **Configure MS2 Push API** form will appear.

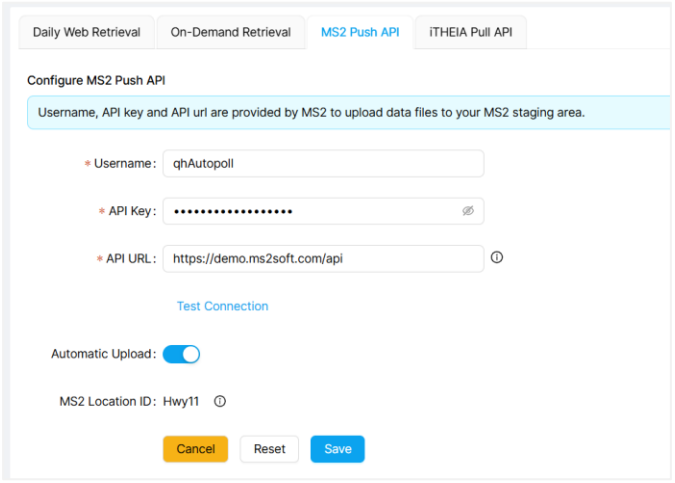


Figure 6-13 Configure MS2 Push API

3. Edit the fields as needed and test the connection to ensure that the configuration is working properly. • SEE SECTION 6.1.3.1 CURRENT CONFIGURATION •

4. Once changes have been made, press Save. Press Reset to revert the form to the previously saved state. Press Cancel to exit out of the Configuration form without making any changes.
5. If the configuration was saved successfully, a success message will be displayed.

6.1.3.2 MS2 Data File Information

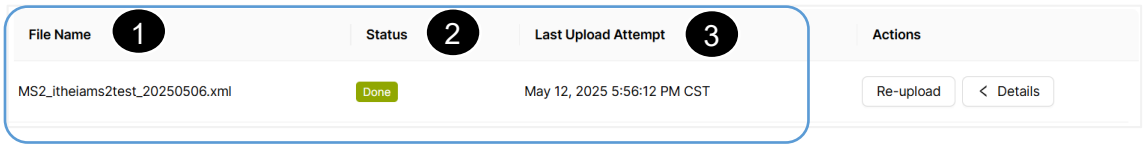


Figure 6-14 MS2 Data File Upload Job Record

Whenever an MS2 data file is automatically generated by the system, an upload job record will appear on the MS2 Push API data tab. Each record includes the following information:

❶ File Name

❷ Status

❸ Last Upload Attempt

6.1.3.2.1 File Name

MS2_itheiams2test_20250506.xml — Lists the name of the MS2 data file.

6.1.3.2.2 Status

The status for an upload job is a summary of the status for the most recent upload attempt. The possible statuses include:

Pending	An upload job for the file has been created, but it is not scheduled due to Auto Upload being disabled. • SEE SECTION 6.1.3.1 CURRENT CONFIGURATION. •
Queued	The upload is in the queue to be uploaded later. After an MS2 data file has been generated automatically, an upload job will be created for the data file, and an upload job attempt will be added to the queue. The system will process each upload job attempt in sequential order. *Note: This status only occurs when Auto Upload is enabled.*
Queued ⚠	The ⚠ appears next to the Queued status to indicate that the file upload has failed its most recent attempt and has been rescheduled. See the section on AUTOMATIC RE-UPLOADS for specific timelines.
In Progress	An upload of the data file is currently in progress.
Stopped by user	The upload was manually stopped by the user. This status is considered a critical error. The user will have to manually re-upload the file.
Failed	The most recent upload attempt has failed and may be re-queued. See AUTOMATIC RE-UPLOADS for details.
Done	The upload has been completed successfully.

6.1.3.2.3 Last Upload Attempt

May 12, 2025 5:56:12 PM CST

Lists the date and time that the last upload attempt was made.

6.1.3.3 Actions

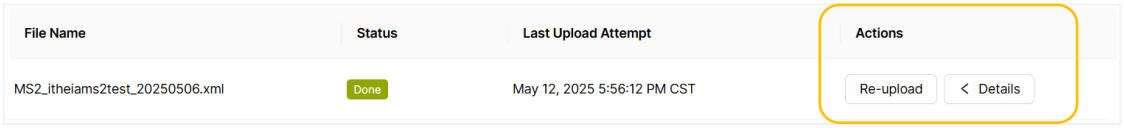


Figure 6-15 Actions (Automatic Upload: Enabled)

Figure 6-15 above displays two of the possible options for an upload job when Automatic Uploads are enabled.

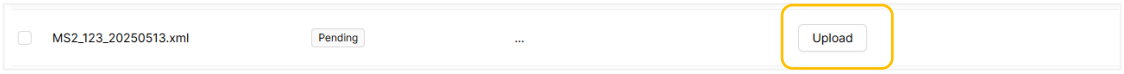


Figure 6-16 Action (Automatic Upload: Disabled)

Figure 6-16 displays another possible action available for an upload job when Automatic Uploads are disabled. There are four (4) possible actions available for an upload job.

Details — Click to expand to a detailed view. *This action is only available for data files that have had at least one upload attempt.*

Upload — Click to manually upload an individual data file. *This action is only available for 'pending' data files when Automatic Uploads are disabled.*

Stop — Click to manually stop the upload attempt while it is in the process. *This action is only available while an upload is in progress.*

Re-upload — Click to re-upload a previously uploaded data file. *This action is only available for data files that have had at least one upload attempt.*

6.1.3.3.1 Detailed View

To view the detailed view:

1. Click Details for an upload job to expand to the detailed view.

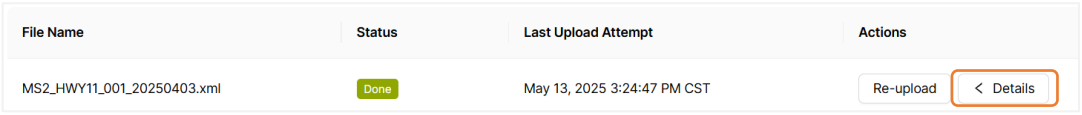


Table 6.1 File Upload Job

2. The detailed view will be displayed.

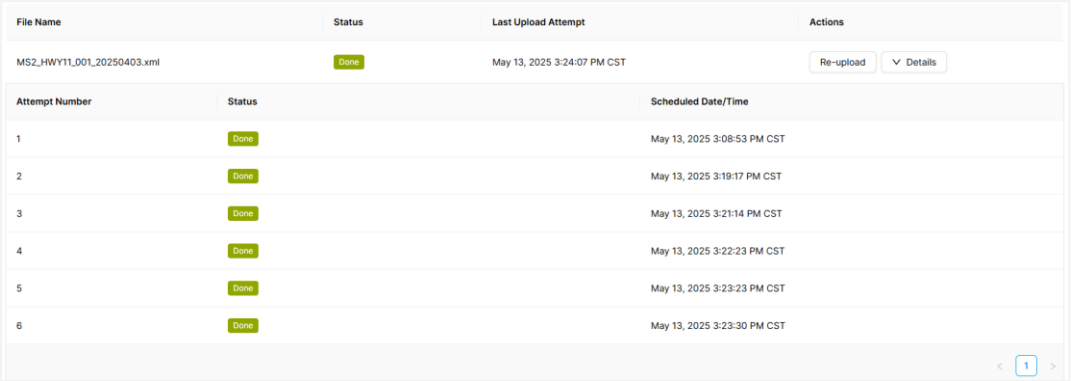


Figure 6-17 File Upload Record: Detailed View

The detailed view of the upload job record contains the following information:

a. Attempt number: *The attempt number for the upload.*

b. Status: *The status of the upload attempt. The possible statuses are described above in* SECTION 6.1.3.2.2 STATUS*, or could also be one of the following:*

Scheduled — The upload attempt is scheduled for a future time. The status of the attempt will remain as 'Scheduled' until it reaches its scheduled time to be added to the queue. *This status is only present for upload attempts*.

Queued — The upload attempt has reached its scheduled time and is in the queue waiting to be uploaded. It will remain queued until the upload begins. The time before this occurs will vary depending on how many other upload attempts are in the queue.

For an upload attempt, the Failed status may also be accompanied by a status message explaining the reason for failure. Failure statuses can be due to a minor or critical error. Possible status messages are listed in the following table.

Table 6.2 Failed Status Messages

Status	Error Type	Reason for Failure and Follow-Up Actions
Failed Job was interrupted	Minor	The upload attempt failed because the job was interrupted (e.g., network connectivity issues or power outage). Ensure that the network connection is working and re-upload.
Failed Unauthorized (401)	Minor	The username or key may be wrong or expired, or the upload URL may be incorrect. Correct errors and re-upload.
Failed Bad Request (400)	Critical	A critical error has occurred. Please contact Quarterhill for support.
Failed Internal Server Error (500)	Minor	There was an error with the system that needs to be investigated. Please contact Quarterhill for support.
Failed Upload timed out (408)	Minor	A network error may have occurred. This may be fixed if the network quality improves. Please check network quality and try to re-upload. If necessary, contact Quarterhill for support.

Failed Unsupported Media Type (415)	Critical	A critical error has occurred. Please contact Quarterhill for support.

When one or more files fail to upload, an error message will also be displayed at the top of the MS2 Push API tab, such as in the example below.

Figure 6-18 Files Failed to Upload

The error message will vary depending on the reason for failure. The warning above is an example.

c. Scheduled Date/Time: *The date and time on which the upload attempt is scheduled to occur.*

Automatic Re-Uploads

If an upload job fails, the system will typically make another attempt to re-upload the file. Each upload job has a maximum of 5 attempts per day.

For the first four upload attempts that fail (whether due to a *critical* or *minor* error), an attempt to re-upload will be added to the queue with a minimum of 15 minutes, 1 hours, 2 hours and 4 hours from the current attempt, respectively.

If the 5th attempt fails due to a *minor* error, no more upload attempts will be scheduled for that day. The upload job will be requeued for the next day, when it will have a maximum of 5 retries for that day. This process will be repeated until the file is uploaded, or until a critical error occurs.

If the 5th attempt fails due to a *critical* error, the upload job will be marked as "Failed" and the file will not be requeued. The user must manually re-upload the file.

The automatic re-upload process only occurs when Automatic Uploads are enabled. If an upload job fails when Automatic Uploads are disabled, the user must re-upload the file manually.

6.1.3.3.2 Upload a File Manually

When Automatic Uploads are disabled, a user must upload files manually.

To upload an individual file manually:

1. Click the Upload button next to the file you wish to upload.

The Upload button will not appear unless Automatic Uploads are disabled.

• SEE SECTION 6.1.3.1 CURRENT CONFIGURATION. •

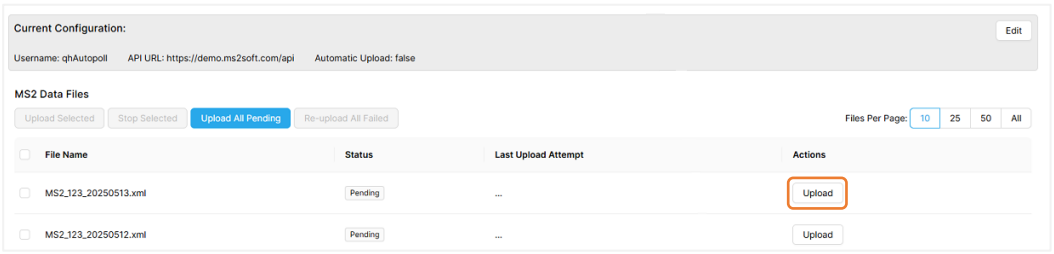


Figure 6-19 Upload a File

2. A message will be displayed asking the user to confirm that the listed file should be uploaded.

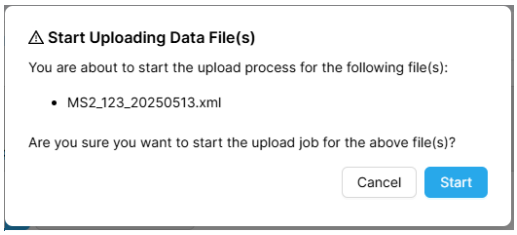


Figure 6-20 Start Uploading Data File(s)

3. The status will change to In Progress.

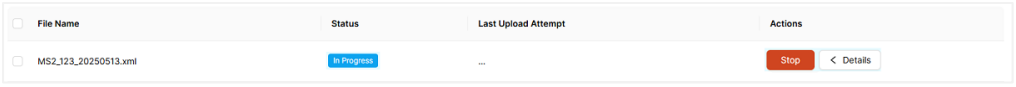


Figure 6-21 Upload in Progress

The user can stop uploading the file at any time using the Stop *button. See the instructions to* STOP AN UPLOAD *below.*

4. When the upload has been completed successfully, the status will be changed to Done. There will now be an option to re-upload or view the expanded details.

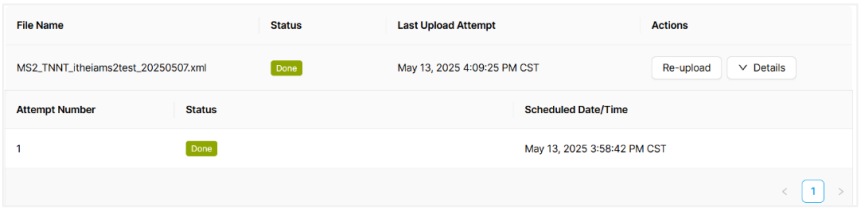


Figure 6-22 Upload is Complete

6.1.3.3.3 Stop an Upload

When uploading a file manually, the user can stop the upload process at any time before the upload is complete.

Users cannot stop the upload process when Automatic Uploads are enabled. To stop a file from uploading, first disable Automatic Uploads in the M2Push API Configuration, and then stop the files.

To stop an upload job while it is in progress:

1. While an upload is in progress, press the Stop button.
2. A warning message will be displayed for the user.

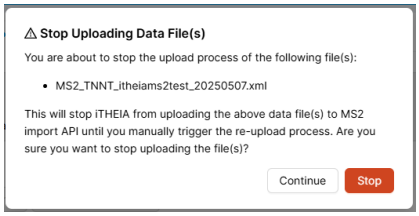


Figure 6-23 Stop Uploading Data File(s)

3. Press Stop to proceed with stopping the upload. Press Continue to continue the upload process.

   In some cases, there may be a slight time lag on the page, and the user may be able to press the Stop button even though the upload has already been completed. In this case, an error will occur. Refresh the page and check the status. If the Status is Done, then the upload has already been completed.

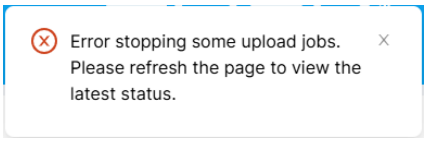


Figure 6-24 Error Stopping Upload Jobs

4. If the Stop process was successful, the data file will not be uploaded, and the status will change to Stopped by user. The user will have to press Re-upload to attempt the upload again.

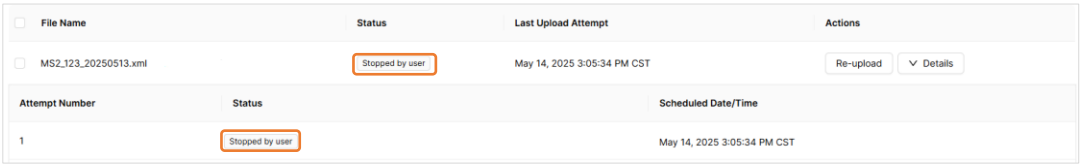


Figure 6-25 Upload Job: Stopped by User

6.1.3.3.4 Re-Upload a File

A file can be re-uploaded if there has been a previous upload attempt. This action is available for all uploads that have been attempted, regardless of the status of the upload job. Users can re-upload files when Automatic Uploads are enabled or disabled.

To re-upload a file:

1. Locate the file name to be re-uploaded.
2. Click the Re-upload button.

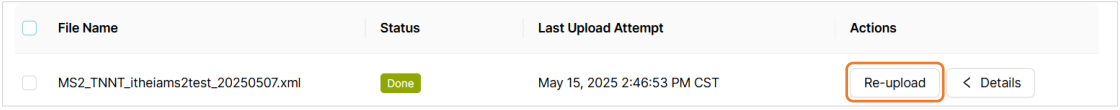


Figure 6-26 File to Re-Upload

3. A pop-up window will be displayed asking the user to confirm that the file should be uploaded.

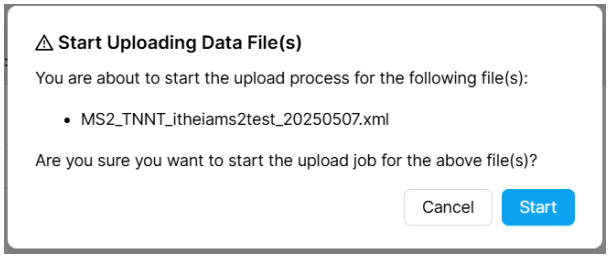


Figure 6-27 Start Uploading Data File(s)

4. If the file listed is correct, press the Start button to proceed with uploading the file. Press Cancel to exit out of the window without re-uploading the file.
5. A new attempt will be added to the detailed view, and the status for the file and the attempt will be changed to In Progress while the upload is underway.

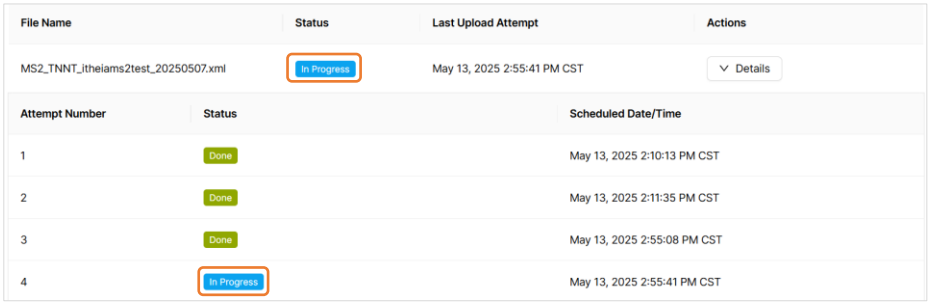


Figure 6-28 Re-Upload in Progress

To stop the upload, SEE SECTION 6.1.3.3.3 STOP AN UPLOAD.

6. Once the upload is complete, the status will change to Done.

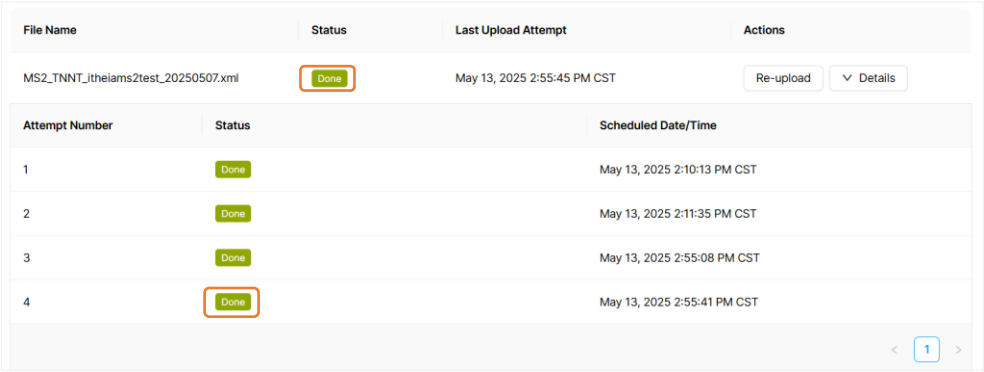


Figure 6-29 Re-Upload is Complete

6.1.3.4 Upload Controls

There are four (4) upload control options available when Automatic Uploads are *disabled*.

Upload Selected (2)	Click to upload selected data files.
Stop Selected	Click to stop uploading the selected data files currently in progress.
Upload All Pending	Click to upload all data files with the pending status.
Re-upload All Failed	Click to re-upload all failed upload jobs at once.

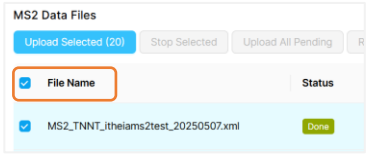
Upload control options are not visible when Automatic Uploads are *enabled*.

6.1.3.4.1 Upload Files

To upload MS2 Data files using upload controls:

1. If uploading selected files, check the boxes beside the data files that you wish to upload. *If using the Upload All Pending or Re-upload All Failed buttons, skip to step 2.*

   Check the box next to the File Name column at the top of the page to select all the data files on that page. This can be done for multiple pages.



   The number of files selected will be indicated on the button.

2. Click the Upload Selected (3), Upload All Pending, or Re-upload All Failed button to upload the files. A message will be displayed asking the user to confirm that the listed files should be uploaded.

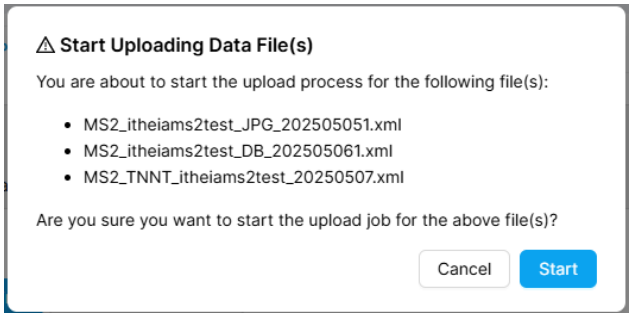


Figure 6-30 Start Uploading Data Files

3. Click Start to proceed with uploading the files.
4. The status of the data files will be updated. Upload jobs that are currently running will have an In Progress status. Uploads that are currently in progress will have the option to stop the process. • SEE SECTION 6.1.3.4.2 STOP SELECTED FILES. • If there are three data files in progress, any additional files will have the Queued status.
5. When the files have been uploaded successfully, their statuses will be changed to Done. There will now be an option to re-upload or view the expanded details.

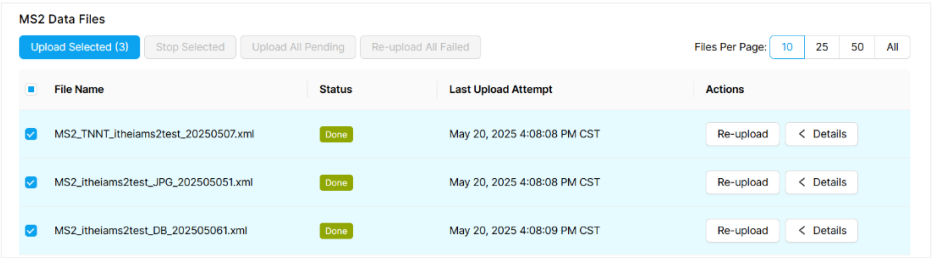


Table 6.3 Selected Files Uploaded Successfully

If there are no files that currently have the Pending status, the Upload All Pending button will be greyed out and cannot be used.

If none of the data file upload jobs currently have a Failed status, the Re-upload All Failed button will be greyed out and cannot be used.

6.1.3.4.2 Stop Selected Files

When uploading files manually, the user can stop the upload process at any time before the upload is complete.

Users cannot stop the upload process when Automatic Uploads are enabled. To stop a file from uploading, first disable Automatic Uploads in the M2Push API Configuration, and then stop the files.

To stop files from uploading while they are in progress:

1. While the file uploads are in progress, press the Stop Selected (3) button to stop the selected files. This can be done for a single file or multiple files, depending on how many files are selected.

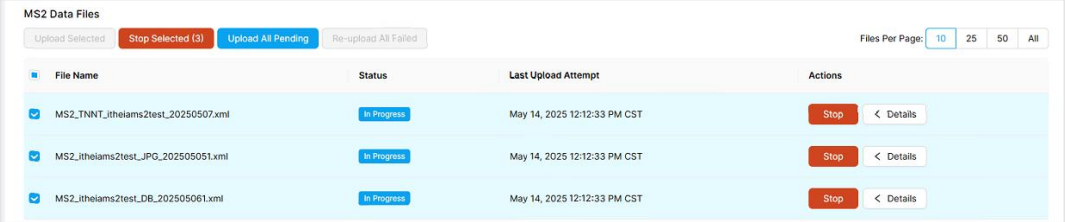


Figure 6-31 File Uploads in Progress

2. A warning message will be displayed for the user.

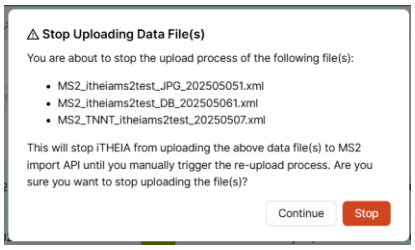


Figure 6-32 Stop Uploading Data Files

3. Press Stop to proceed with stopping the upload. Press Continue to continue the upload process.

In some cases, there may be a slight time lag on the page, and the user may be able to press the Stop button even though the upload has already been completed. In this case, an error will occur. Refresh the page and check the status. If the Status is Done, then the upload has already been completed.

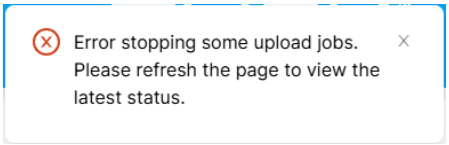


Figure 6-33 Error Stopping Upload Jobs

4. If the Stop process was successful, the data files will not be uploaded, and the statuses will change to Stopped by user. The user will have to press Re-upload to attempt the uploads again. • SEE SECTION 6.1.3.3.4 RE-UPLOAD A FILE. •

Users can stop the uploading process using the Stop Selected (3) button or by using the Stop button located on an individual upload job. • SEE SECTION 6.1.3.3.3 STOP AN UPLOAD FOR ALTERNATIVE INSTRUCTIONS. •

6.1.4 iTHEIA Pull API Tab

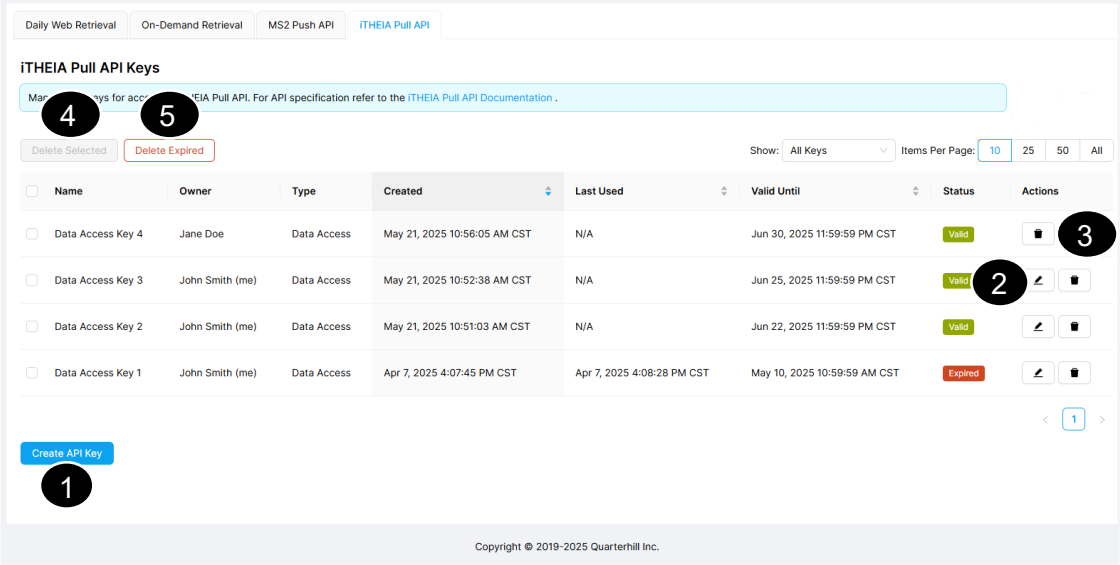


Figure 6-34 iTHEIA Pull API Tab

The **iTHEIA Pull API Keys** tab allows users with API Access to view and manage API keys* and to create new ones. These keys are used in conjunction with Pull API requests. If you are not using this feature, then API keys are not required.

*Users with an ADMIN role can view and manage their own API keys as well as delete the keys of others with an ADMIN or USER role. Accounts with the USER role can only view and manage their own API keys.

For information regarding Pull API Requests, please refer to the iTHEIA Data File Pull REST API Specification document.

The following actions are available to the user:

❶ Create API Key

❷ Edit API Key†

❸ Delete API Key

❹ Delete Selected

❺ Delete Expired§

The following information will be displayed for each API key:

- Name: *The name that the user has assigned to the API Key*

- Owner‡: *The user who created the API key. If the currently logged in user is the owner, the name will be accompanied by "(me)."*
- Type: *The type of API Key (Data Access)*
- (Date) Created: *The date that the API key was created*
- Last Used: *The date that the API key was used. If it has not been used, N/A will appear.*
- Valid Until: *The date and time until which the API key will remain valid.*
- Status: *Status of the API key (Valid/Expired)*
- Actions: *The actions available to the user.*

†The Edit feature is only available for the current user's API keys. Users cannot edit other users' API keys.

‡The 'Owner' column is only visible to users with the ADMIN role.

§The Delete Expired button is only available for users with the ADMIN role.

The **iTHEIA Pull API** tab is only visible for currently logged in users who have API Access turned **On**. • SEE SECTION 10.2 USERS •

If no API keys have been created yet, there will be a message at the top of the page advising the user to use the Create API Key button to create a new API key.

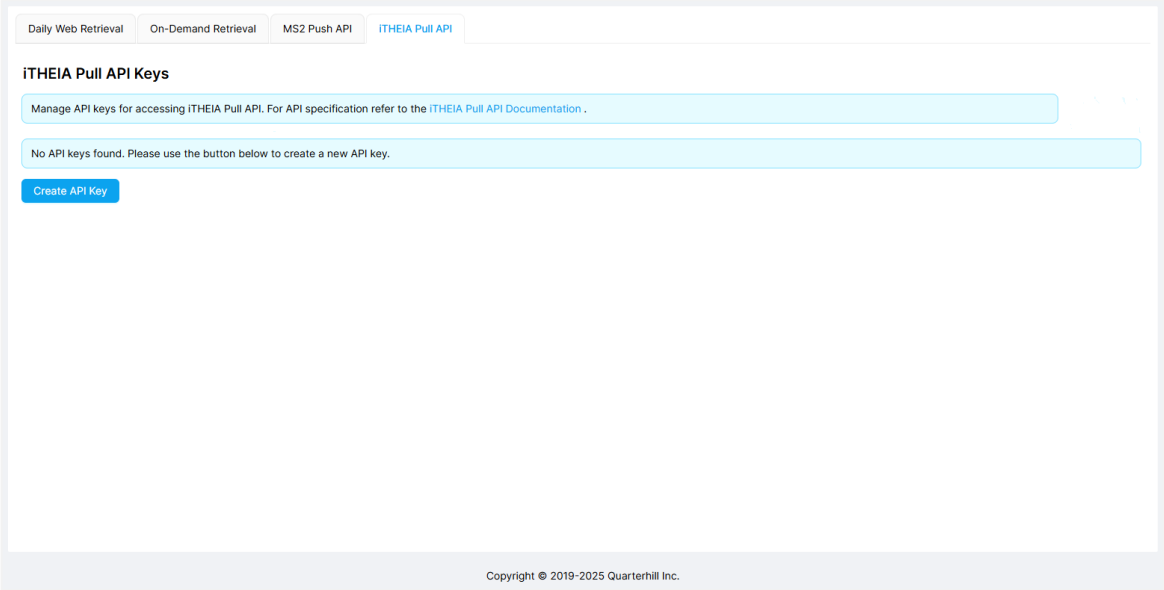
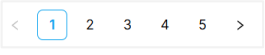


Figure 6-35 iTHEIA Pull API Tab (No Keys Created)

6.1.4.1 Display Controls and Navigation

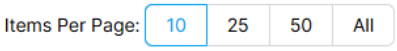
There are several display controls and filters that can be used, as described below.

6.1.4.1.1 Page Navigation



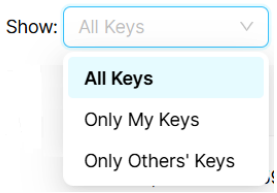
Navigate through the pages by selecting a page number or using the arrow buttons.

6.1.4.1.2 Items Per Page



Select the **10**, **25**, **50**, or **All** button to change the number of files shown per page.

6.1.4.1.3 Display Filter



Use the drop-down menu to filter which keys are displayed on the page. *The filter option is unavailable for accounts with the USER role.*

All Keys The API keys of all users with an ADMIN or USER role will be displayed.

Only My Keys Only the current user's API keys will be displayed.

Only Others' Keys Only API keys created by other users will be displayed.

6.1.4.2 Create API Key

To create an API key:

1. Press the Create API Key button.
2. The **Create API Key** pop-up window will open.

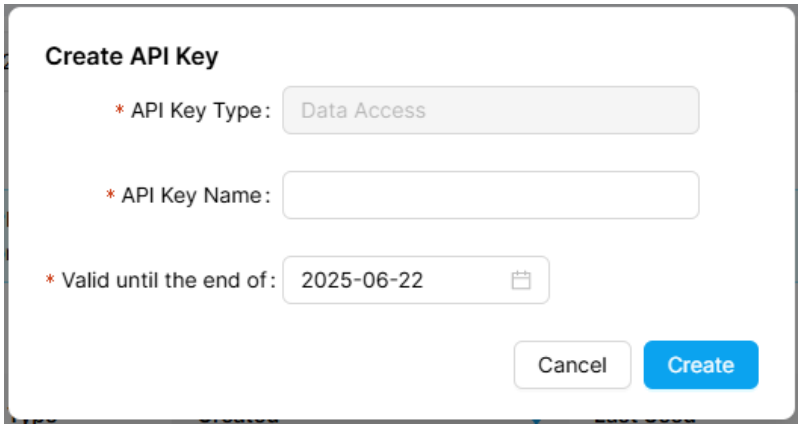
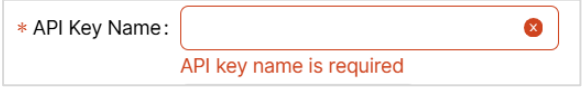


Figure 6-36 Create API Key

3. The API Key Type will be displayed. This field is non-editable and is automatically set to Data Access. Data Access means that users can only use the API key to access data files.
4. Fill out a custom API Key Name in the text field. When a valid API Key Name has been entered, a green checkmark will appear. If the API Key Name is deleted and the text field is left blank, a red 'x' will appear with a message informing the user that an API key name is required.



5. Select a date from the date picker until which the API key will be valid. *The earliest valid date based on the currently set default API Key expiry* will be*

selected automatically. The 'valid until' date can only be set if API Key expiry is enabled.

**The default API Key expiry can be set and enabled/disabled from the System Management Settings page.* • SEE SECTION 10.3.1 SECURITY SETTINGS TAB •

Select a different expiry date if desired. If 2025-06-22 is selected, then the API key will remain valid until 2025-06-22 at 11:59:59 PM in the user's configured time zone.

The valid date must be at least 30 days after the date of the API Key's creation. Any dates earlier than the 30 days will be greyed out.

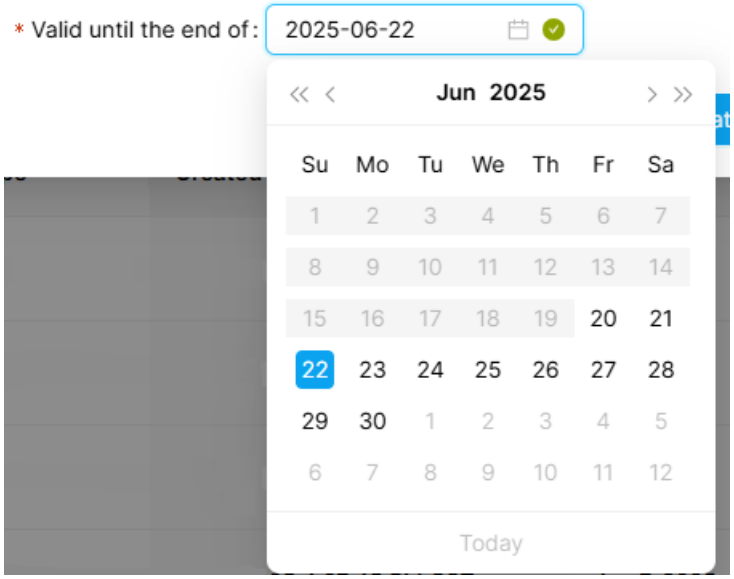
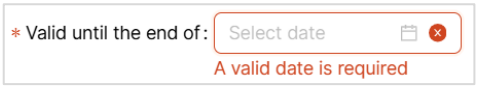


Figure 6-37 Valid Until the End of (Date Selection)

- If a date has not been selected, a red 'x' will appear and users will see a message prompting them to choose a valid date.



- When the user selects a valid date that differs from the default date selected, a green checkmark will appear beside the entry showing that the change has been made successfully.

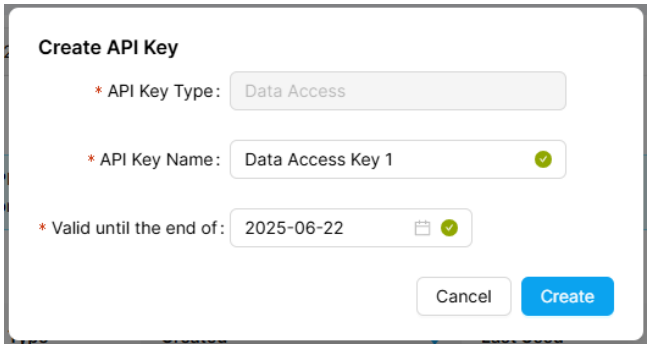


Figure 6-38 Completed Create API Key Form

If API Key expiry is *disabled* in the System Management *Security Settings* page, the **Create API Key** pop-up window will not have the option to select an API Key expiry, as shown in Figure 6-39.

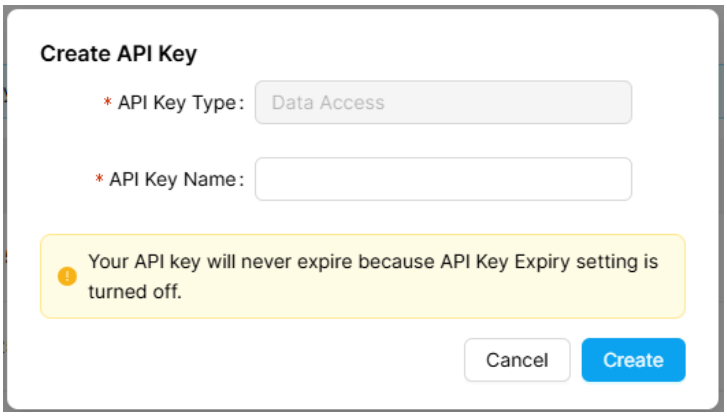


Figure 6-39 Create API Key: API Key Expiry Disabled

If expiry is enabled at a later date, an expiry date will be automatically issued for all API keys without a pre-existing expiry date.

6. When the form is complete, press the Create button to create the API key.

   To exit out of the Create API Key window without saving the API Key, press Cancel.

7. If the API key was created successfully, a pop-up window will appear displaying the unique API key associated with the newly created key.

This is the only time that the key will be viewable. The user must save the key in a secure location before clicking **OK**. After this time, there is no way to access the API key.

Randomized API keys are automatically generated by the software. Users cannot specify their own API Keys.

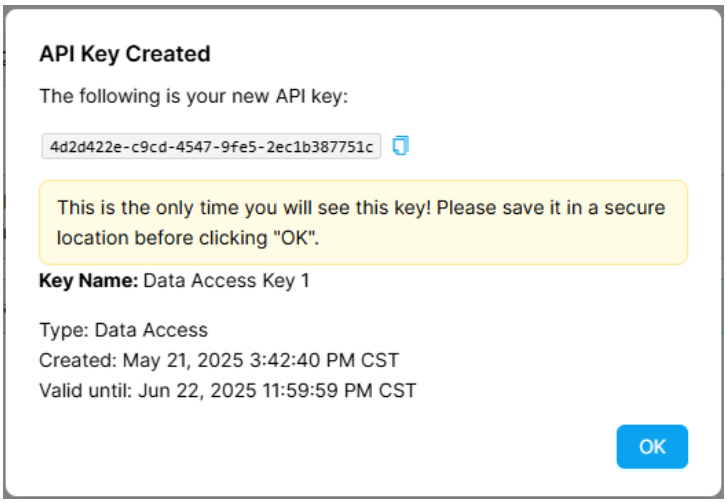


Figure 6-40 API Key Created

8. Click the Copy button to automatically copy the code. Paste the code into a secure document for future reference.

9. When the API key is recorded, press OK. The **iTHEIA Pull API Keys** tab will load and will display the API key that was just created, along with any other existing keys made by the user, if applicable. If expiry dates are disabled, there will be an "N/A" in the 'Valid Until' field.

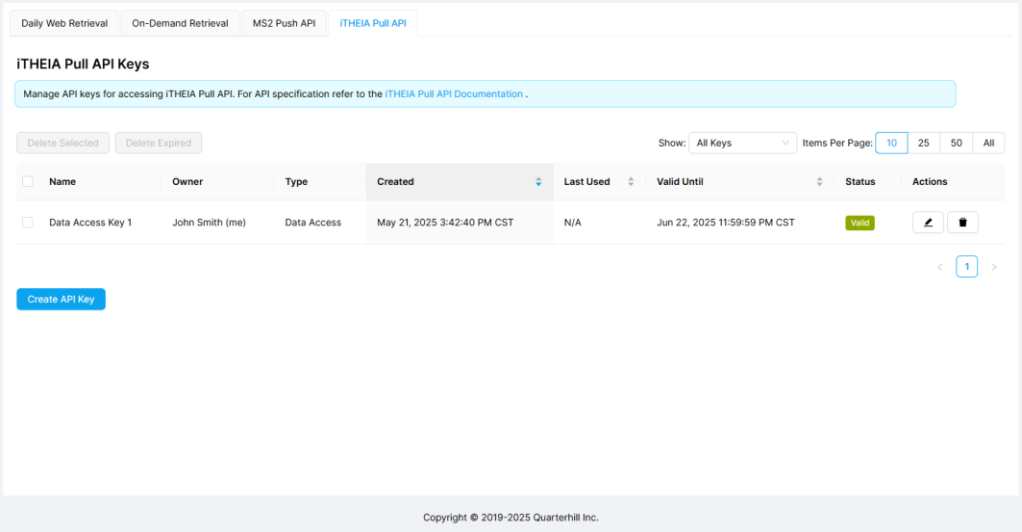


Figure 6-41 iTHEIA Pull API Tab – API Key Displayed

10. To create another API key, repeat steps 1-9 above. There is no limit to the number of API keys that can be created.

For instructions on how to make an API request, please refer to the iTHEIA Data File Pull REST API Specification document.

6.1.4.3 Edit API Key

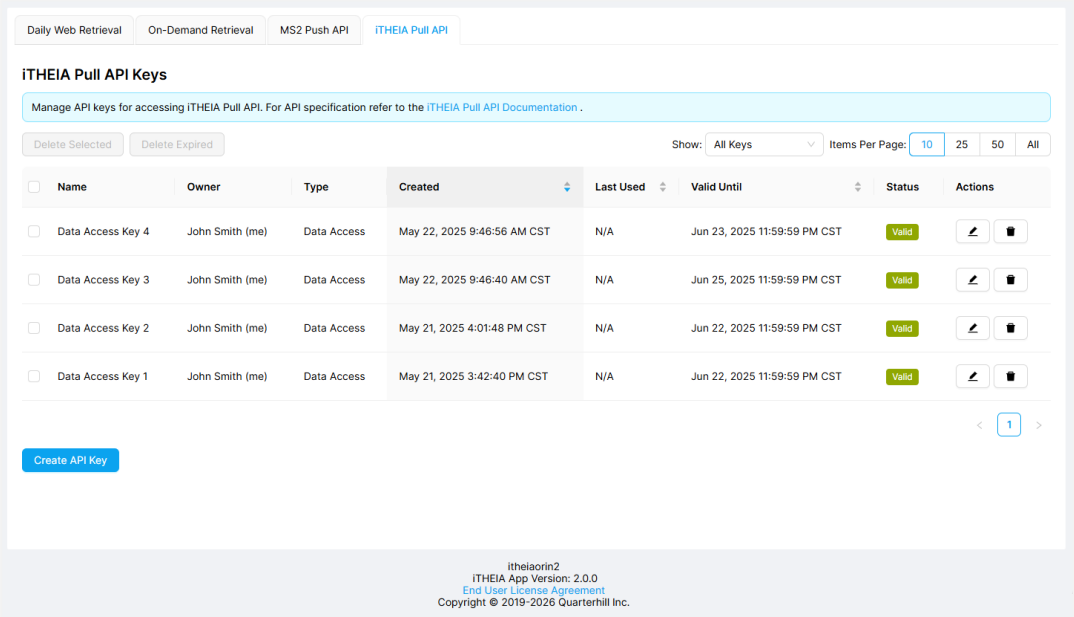


Figure 6-42 iTHEIA Pull API Keys

Users have the option to edit any of the API keys that they have created.

To edit an API key:

1. Click on the Edit button in the row of the API key to be edited.
2. The **Edit API Key** pop-up window will be displayed.

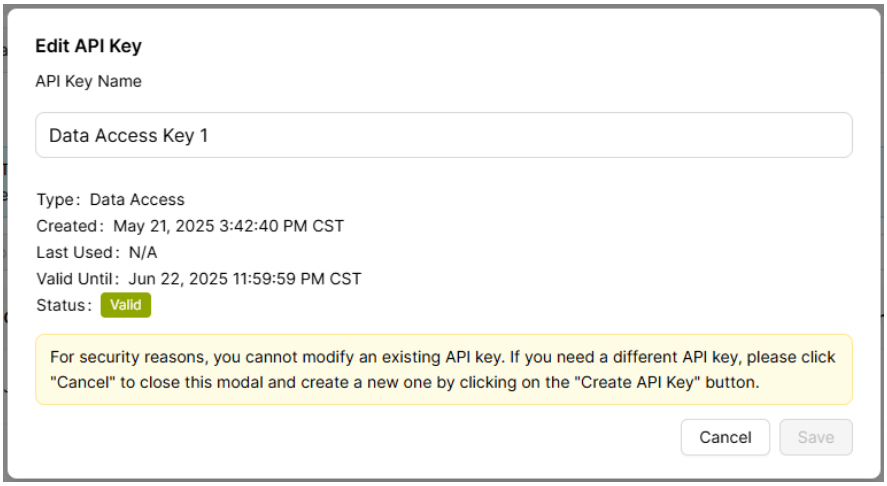
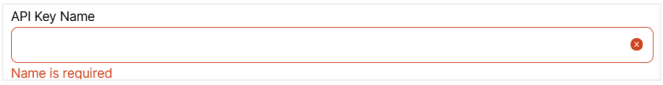


Figure 6-43 Edit API Key

3. Type a new API Key Name in the text field. When a valid name has been entered, a green checkmark will appear beside it. If the API Key Name is deleted and the text field is left blank, a red 'x' will appear with a message informing the user that an API key name is required.



Only the API Key Name can be modified. For security reasons, you cannot modify an existing API key.

If you need a different API key, please click the Cancel button to close this modal and create a new one by clicking on the Create API Key button.

4. Once the name has been changed, the Save button will be activated. When the changes are complete, press Save to save the new name and return to the **iTHEIA Pull API** tab. A success message will be displayed, and the change in name will be reflected in the list of API keys.

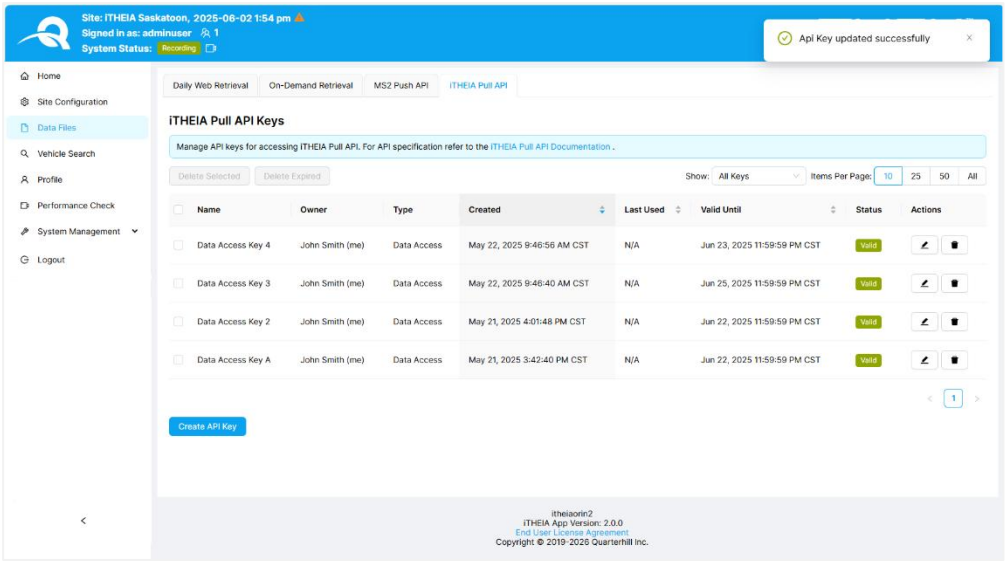


Figure 6-44 Updated iTHEIA Pull API Keys

Note: To cancel the changes and revert to the original API Key Name, press Cancel *. The **iTHEIA Pull API** tab will be displayed and none of the changes will be saved.*

6.1.4.4 Delete an API Key

To delete an API key:

1. Click on the delete button in the row of the API key to be removed.
2. A pop-up window will be displayed asking the user to confirm that the API key should be deleted. Details about the API key including the name, owner*, type, date created, date last used, valid until date and status will also be displayed. **The 'Owner' column is only visible for ADMIN users.*

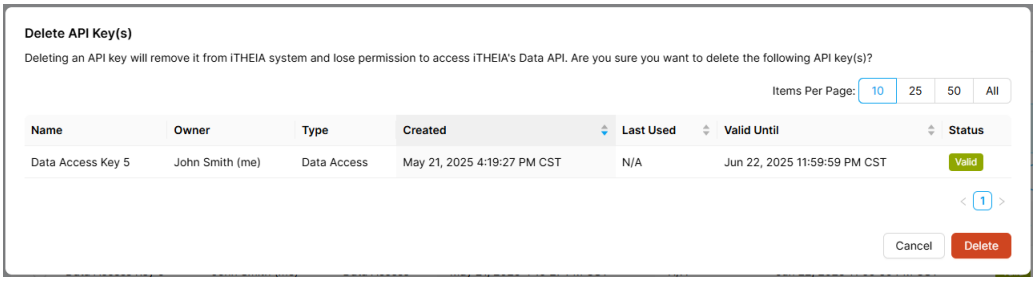


Figure 6-45 Delete API Key

3. Click Delete to permanently remove the API key from the UI.
4. A success message will be displayed showing that the API key has been deleted. The ***iTHEIA Pull API Keys*** tab will be displayed with an updated list of API keys.

   Note: Press the Cancel *button to cancel the deletion and keep the API key.*

6.1.4.5 Delete Selected

Users have the option to delete individual or multiple API keys using the Delete Selected button.

To delete selected API keys:

1. Check the boxes next to the API keys you wish to remove.
2. The Delete Selected button will be updated to reflect the number of files selected.

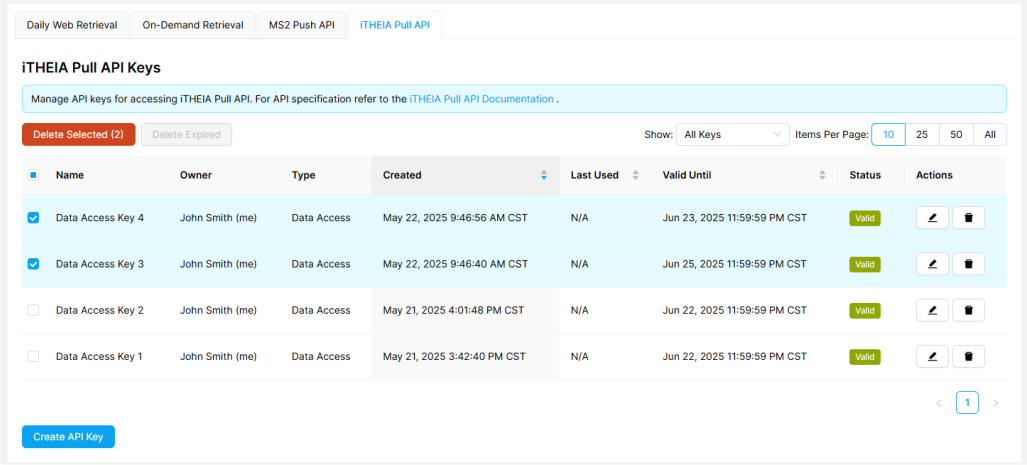


Figure 6-46 API Keys Selected

3. Click the Delete Selected (2) button to delete the selected files.
4. A pop-up window will be displayed asking the user to confirm that the selected API keys should be deleted. Details about the API key including the name, owner*, type, date created, date last used, valid until date and status will also be displayed. **The 'Owner' column is only visible for ADMIN users.*

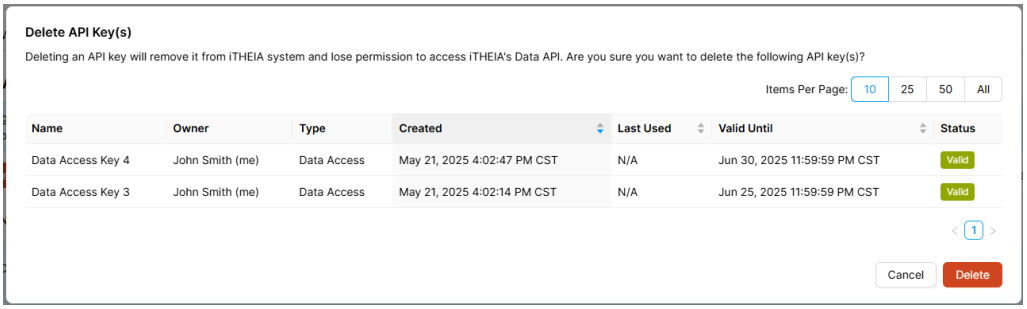


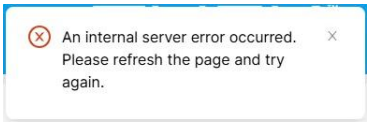
Figure 6-47 Delete Selected API Keys

Click Delete to permanently remove the API keys. *Note: Press the* Cancel *button to cancel the deletion and keep the API keys.*

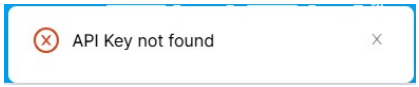
5. A success message will be displaying showing that the selected API keys have been successfully deleted.

An error may occur when deleting API keys.

If an internal server error occurs, there may be a temporary problem with the system. Please refresh the page and try again.



If the API key cannot be found, an error message will be displayed as follows. This may occur if the key was deleted by another user.



6.1.4.6 Delete Expired

There is an option to delete all expired API keys at once.

To delete all expired API keys:

1. Click Delete Expired.

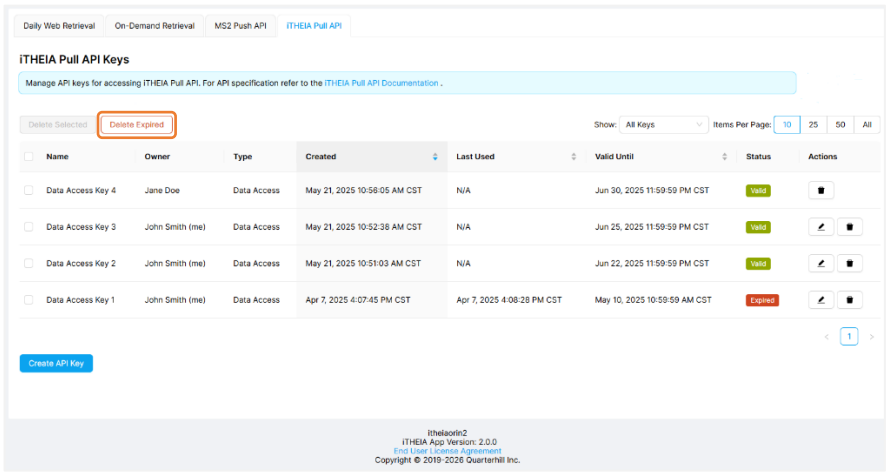


Figure 6-48 iTHEIA Pull API Keys Tab

2. A pop-up window will be displayed confirming which API keys will be deleted. All API keys with the Expired status should be shown.

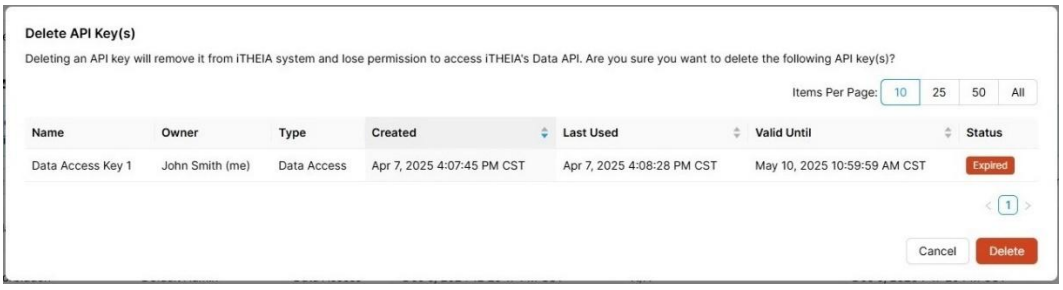


Figure 6-49 Delete Expired API Keys

Press Delete to proceed with permanently deleting all expired API keys. *Note: Press the* Cancel *button to cancel the deletion and keep expired API keys.*

3. A success message will be displayed showing that the expired API keys have been deleted.

An error may occur when deleting API keys. SEE SECTION 6.1.4.5 ABOVE.

7 VEHICLE SEARCH

The *Vehicle Search* page allows the user to search for and view vehicles that match the class, site and lane criteria over a specified time range within the last 30 days. Depending on the image retention settings, thumbnail and overview images are only available for up to the last 7 days.

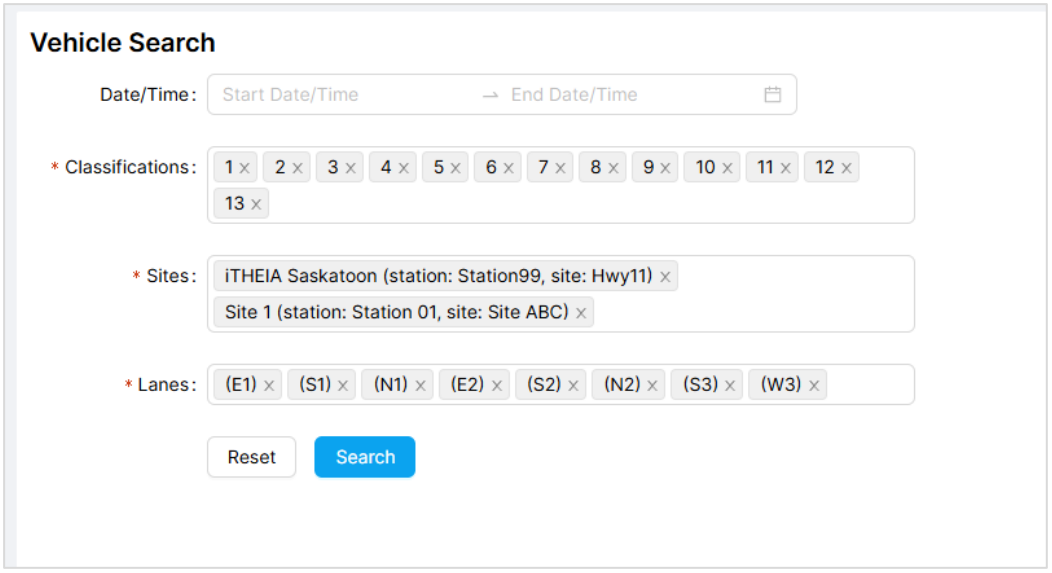


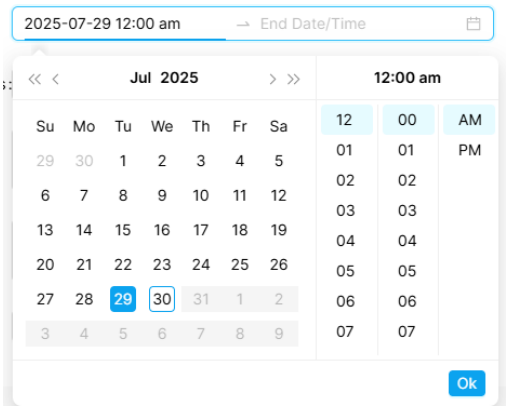
Figure 7-1 Vehicle Search

To access the *Vehicle Search* page:

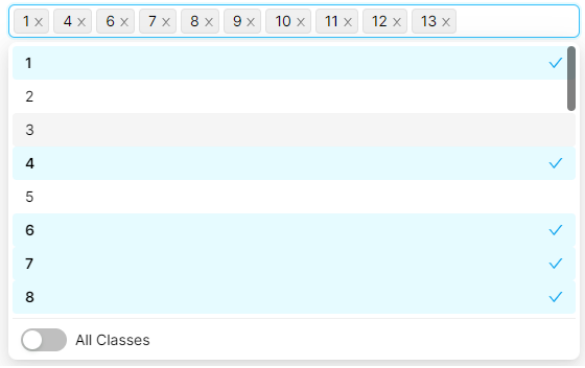
1. Select Vehicle Search from the side menu.
2. The *Vehicle Search* page will be displayed.

To conduct a vehicle search:

1. Select a Start Date/Time and an End Date/Time.



2. Select the classification(s) to be included in the search. *All classifications are selected by default.* Multiple classifications can be selected. A ✓ will appear beside the selected class schemes, and they will be added to the Classifications field. To remove one, press × in the text box, or click on the classification from the dropdown to de-select it.





Toggle **All Classes** to **On** to select all classes. Click on a classification again to deselect if needed. If you select all classes individually, **All Classes** will be automatically toggled to **On**. Deselecting a class will automatically toggle **All Classes** to **Off**.



Toggle **All Classes** to **Off** to deselect all classes. Click on classes to individually add them. Select the classes to be included.

At least one classification must be selected in the vehicle search. If the user de-selects all classifications, a warning message will be displayed to remind the user to select at least one classification.

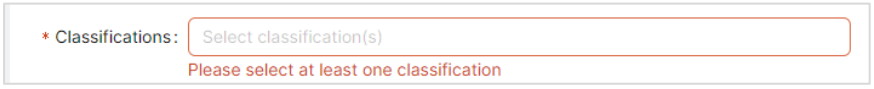
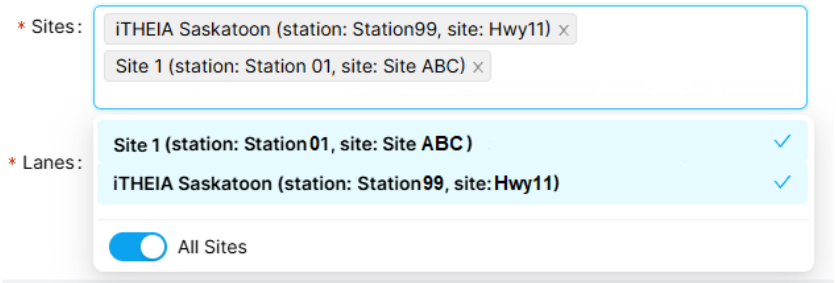


Figure 7-2 Vehicle Search: Classifications Warning

3. Choose the site(s) to be included in the search. Whenever the *New Site Configuration Wizard* is used to change the Station ID, Site Number, and/or Site Name, a new site is created and will be displayed in the search options.

Sites will only be listed if they contain at least one vehicle record.

Only the lanes from the sites selected here will be available for selection in the next step.



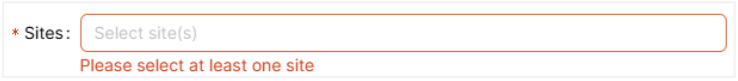


Toggle **All Sites** to **On** to select all sites. Click on a site again to deselect it. If you select all sites individually, **All Sites** will be automatically toggled to **On.** Deselecting a site will automatically toggle **All Sites** to **Off**.

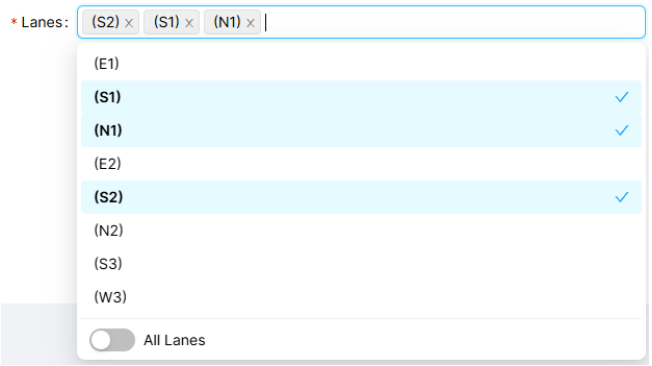


Toggle **All Sites** to **Off** to deselect all sites. Click on sites to individually add again.

At least one site must be selected in the vehicle search. If the user de-selects all sites, a warning message will be displayed to remind the user to select at least one site.



4. Choose the lane(s) to be included in the search by selecting from the dropdown menu or typing into the textbox. All lanes from the sites selected in the previous step, both past and present, will be listed. *All lanes are selected by default.* A ✓ will appear beside the selected lanes, and they will be listed in the Lanes field. To remove one, press X in the text box, or click on the lane from the dropdown again to de-select it.





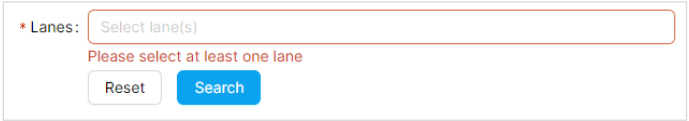
Toggle **All Lanes** to **On** to select all lanes from the selected sites. Click on a lane again to deselect it. If you select all lanes individually, **All Lanes** will be automatically toggled to **On**. Deselecting a lane will automatically toggle **All Lanes** to **Off**.



Toggle **All Lanes** to **Off** to deselect all lanes from the selected sites. Click on lanes individually to add again.

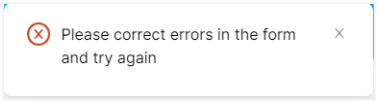
Only lanes with at least one vehicle record will be displayed.

At least one lane must be selected in the vehicle search. If the user de-selects all lanes, a warning message will be displayed to remind the user to select at least one classification.

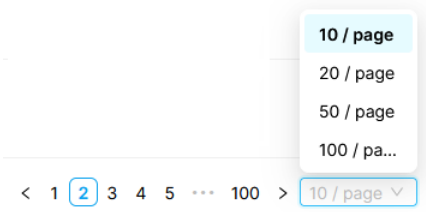


5. Press Search to complete the search. Press Reset to revert to the default settings and start over. (All classifications, lanes, and sites will be selected; the date will be cleared.)

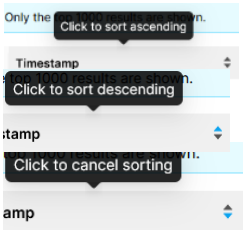
If the user clicks Search with no classification, lane and/or site selected, an error notification will be displayed.



6. The results will appear at the bottom of the screen. Only the top 1,000 results will be shown. When a large number of search results are listed, there is an option to choose how many results per page to display. Make a selection from the dropdown menu.



7. Vehicles can be sorted based on timestamp in ascending or descending order by clicking on the up/down arrows on the Timestamp column.



a. Click once to sort in ascending order.

b. Click again to sort in descending order.

c. Click a third time to cancel sorting settings.

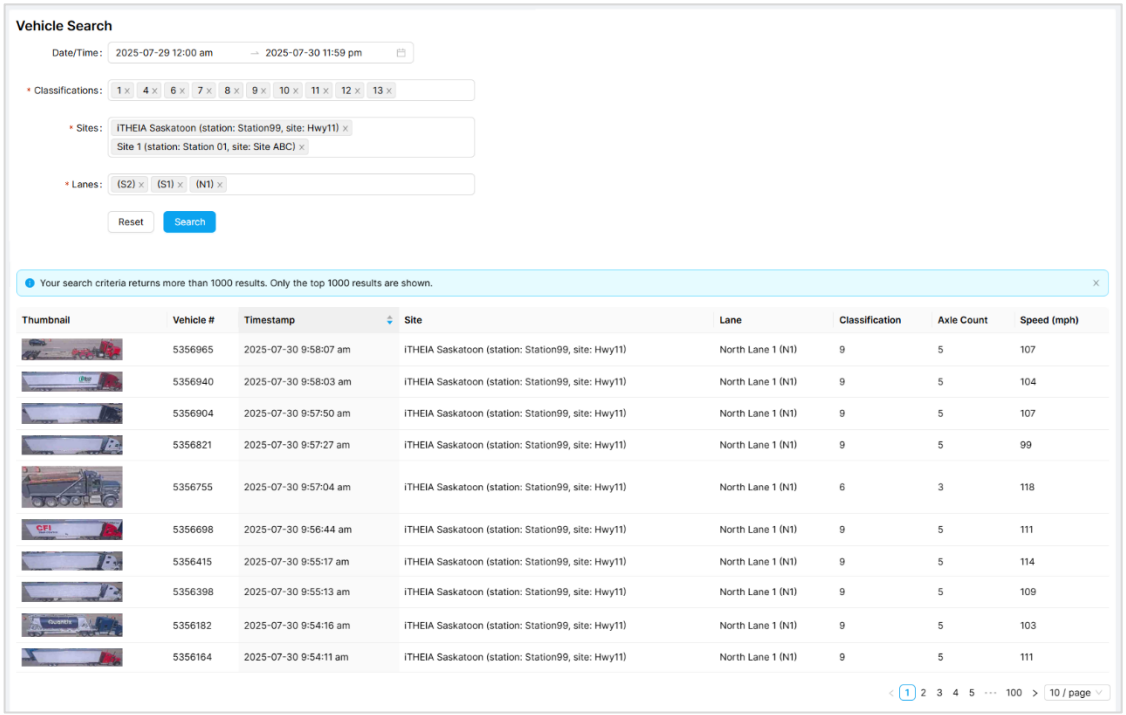


Figure 7-3 Vehicle Search Results

8. Vehicle Details can be accessed by clicking anywhere on the vehicle record.

• SEE SECTION 4.1.3.1 •

8 PROFILE

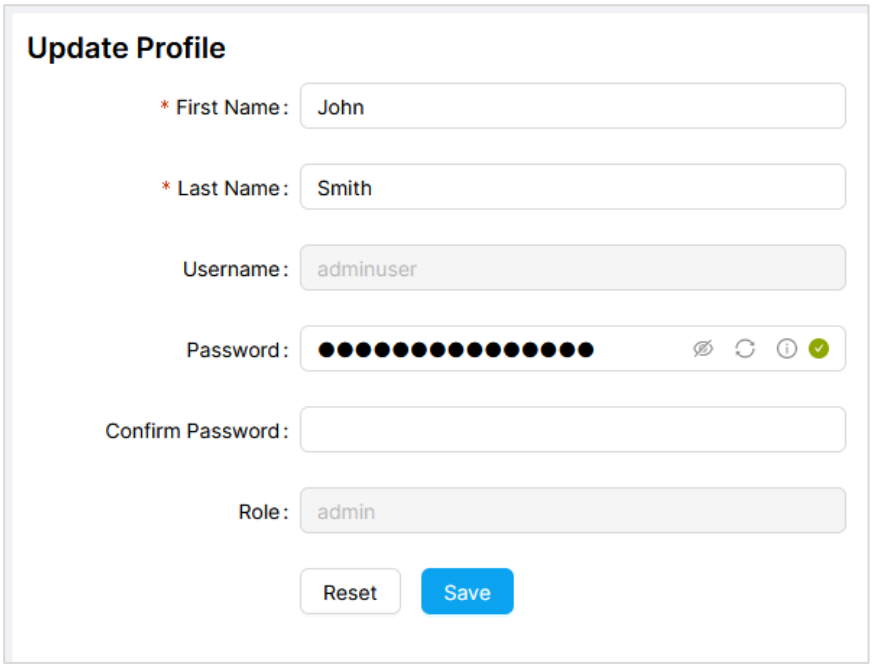


Figure 8-1 Update Profile

The *Profile* page allows the user to update personal information for the account that is currently signed in.

1. Specify the following:
    a. *First Name: *Enter first name of user.*
    b. *Last Name: *Enter last name.*
    c. Username: *The username under which the current user is logged in. This field cannot be changed.*
    d. Password: *Enter a password for the account.*
        - *Click the icon to visually display password. Click again to hide.*
            Password is shown.
            Password is hidden.
        - *Click the icon to generate a secure password.*
        - *Hover over the icon to view password requirements.*

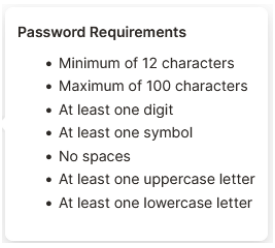


Figure 8-2 Password Requirements

- *If the password does not meet requirements, a red icon will appear, and an error message will be displayed.*

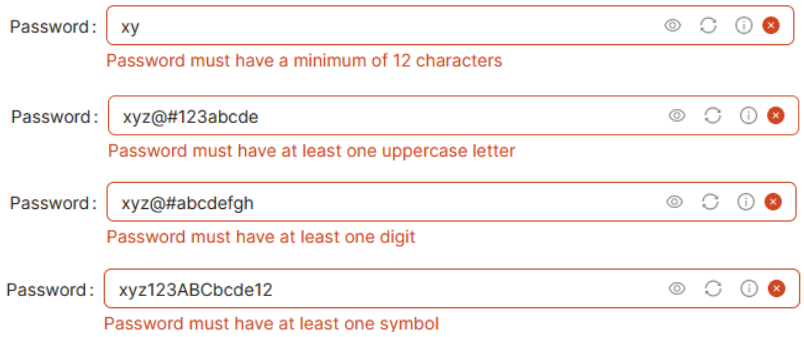


Figure 8-3 Error Message Examples

- *Follow the instructions on the message to correct the password. A green checkmark will appear when the password meets all requirements.*

e. Confirm Password: *Re-type the same password to confirm.*

f. Role: *Displays the role associated with username. This field cannot be edited from this page. To edit a user's role, navigate to the Users page from the System Management menu.* • SEE SECTION 10.2 USERS •

2. Press Save to save the updated information to the current user's profile.

* Indicates a mandatory field.

9 PERFORMANCE CHECK

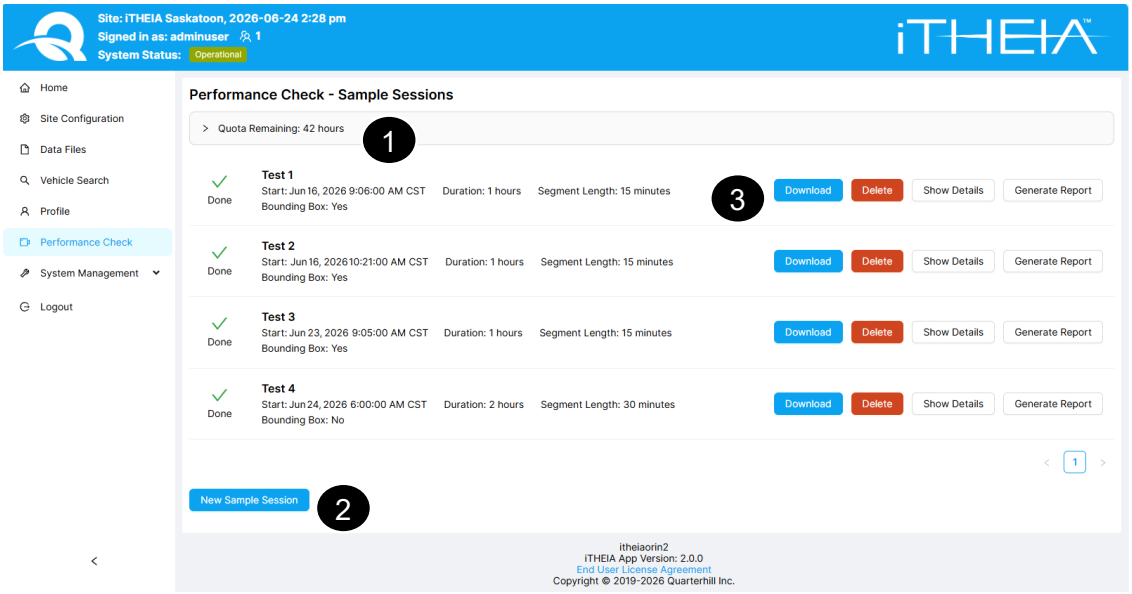


Figure 9-1 Performance Check

The *Performance Check* page allows users to gather and review data samples and then download a report for the purpose of checking the system performance for the counting and classification of vehicles. The user selects time periods in advance to create sample sessions during which the system records video footage that can be later reviewed along with the information on each vehicle in the UI. This reviewed data is summarized into a report to indicate the performance of the system during the sample session.

This page displays:

❶ Quota Remaining

❷ New Sample Session

❸ Sample Session Records

To access the Performance Check page:

1. Select Performance Check from the side menu.
2. The *Performance Check* page will be displayed.

The *Performance Check* page is not visible for accounts with a 'User' role.

9.1.1 Quota Remaining

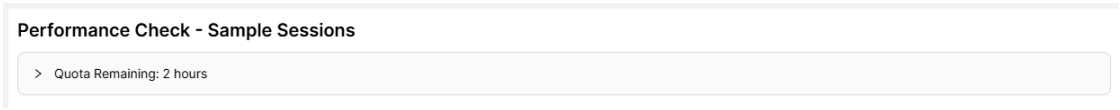


Figure 9-2 Quota Remaining

iTHEIA has a limited quota of 48 hours for the total of all sample sessions. The *Quota Remaining* pane displays the number of hours remaining in the sample session

quota. Sample sessions that are scheduled to run at a future time, are currently running, or have completed running will consume the quota.

To view the details of the remaining quota:

1. Click the arrow › button to expand the *Quota Remaining* display.
2. The *expanded view* with a progress bar will be displayed. The progress bar will show the total number of hours in the quota, along with the quota used. Completed hours are shown in green, pending hours are shown in blue, and the remaining (free) hours are shown in grey.



Figure 9-3 Quota Remaining: Expanded

3. Hover over the progress bar to see a list of the completed, pending and free hours.

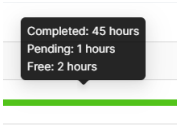


Figure 9-4 Progress Bar Breakdown

Please note that sample sessions may be deleted by the Disk Space Manager at any time if the system-wide disk usage exceeds the high water mark. • SEE SECTION 10.4 DISK SPACE MANAGER •

When the quota has been reached, a warning will be displayed. The user must delete some existing sample sessions to be able to create a new sample session.

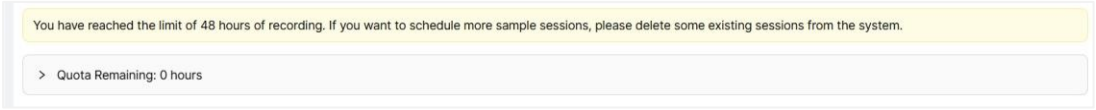
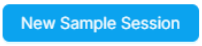


Figure 9-5 Maximum Quota Warning

9.1.2 New Sample Session



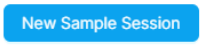
Click to start a new sample session. A sample session is a period of time during which the system will record video footage and additional vehicle information that the user can review.

A new sample session cannot be created if the quota has been reached. Please delete some of the existing sample sessions* and try again.

**The user must delete the whole sample session. Deleting segments from a sample session will not free up space.*

A new sample session can only be created if the System Status is currently 'Operational.'

To create a new sample session:

1. Click the 

button.
2. The **New Audit Session** pop-up window will be displayed.

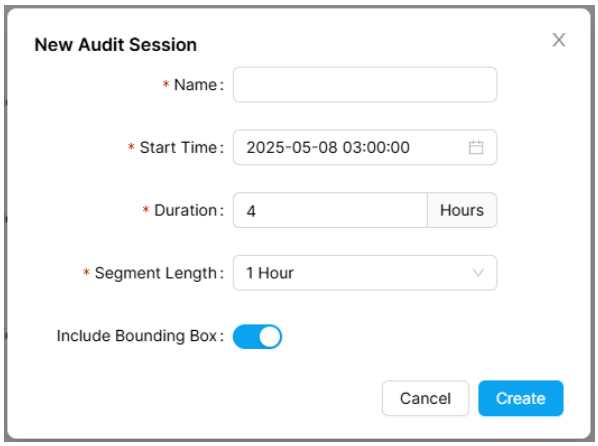


Figure 9-6 New Audit Session

3. Enter a unique name for the audit session. *The name must be 50 characters or fewer, the field cannot be left blank, and the name cannot be the same as a pre-existing sample session. A warning message will be displayed if the name does not meet the criteria for a valid name.*

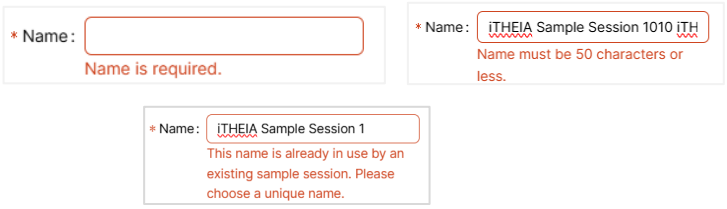


Figure 9-7 Name Warnings

4. Choose a start date and time using the date picker.

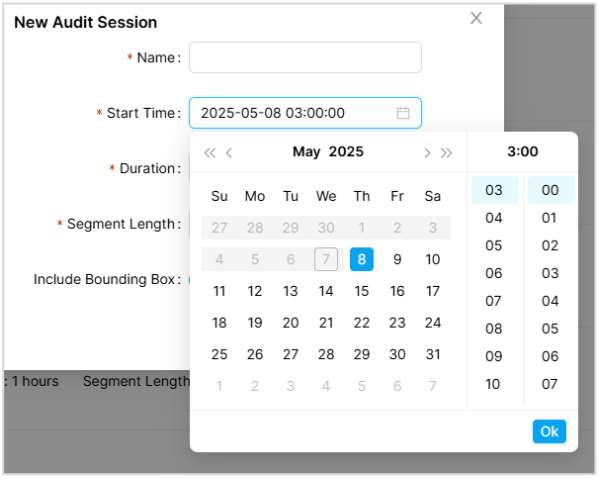


Figure 9-8 Start Date Picker

The start time cannot interfere with auto-lane learning or overlap with another sample session. If the user selects a start time that interferes with either of these processes, a warning message will be displayed.

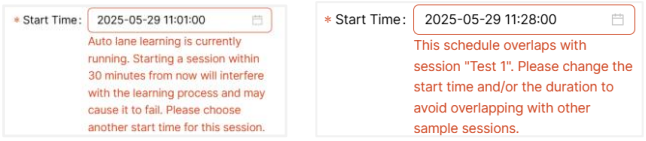


Figure 9-9 Start Time Warnings

5. Enter a duration in hours. The duration must be a minimum of 1 hour and cannot exceed the remaining quota. The duration is the total amount of time during which the additional vehicle information and video will be recorded. *A warning will be displayed if an invalid duration is used.*

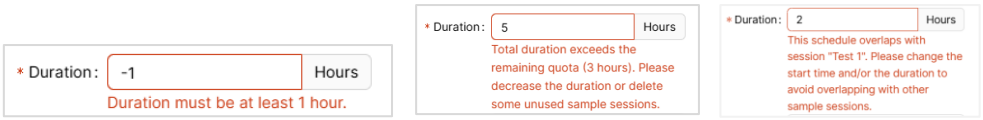


Figure 9-10 Duration Warnings

6. Choose a segment length from the dropdown menu. The sample session will be broken into smaller segments, defined by the segment length. *Example: If the duration is set to 3 hours and the segment length is set to 15 minutes, then the system will record sample session data in 15-minute increments for a total of 3 hours. At the end of the 3 hours, there will be twelve 15-minute segments; each segment will contain a video recording and vehicle records to review for those 15 minutes.*

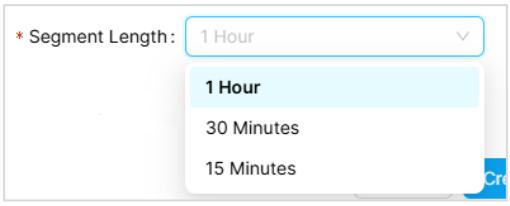
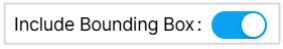
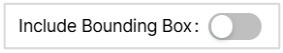


Figure 9-11 Segment Length Dropdown menu

7. Choose whether to include the bounding box in the sample session by toggling 'Include Bounding Box' *on* or *off*.

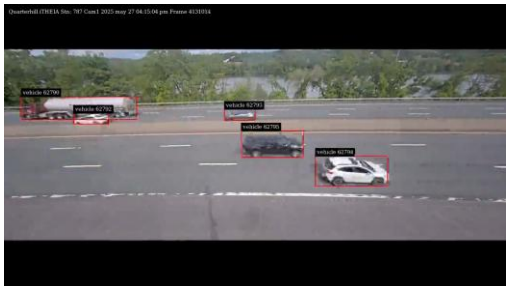


The sample session will include bounding boxes.



The sample session will not include bounding boxes.

The figure below displays an example of overview images from a sample session generated with and without bounding boxes.



Bounding Boxes *Included*



Bounding Boxes *Not Included*

Figure 9-12 Overview Images

8. When all fields have been filled in, press Create to create the sample session.

   Press Cancel to exit out of the sample session window without saving any of the changes. The sample session will not be created.

9. If the sample session was scheduled successfully, a success message will be displayed.

If data collection is stopped when a sample session is scheduled to occur, all scheduled sample sessions will be cancelled.

9.1.3 Sample Session Record

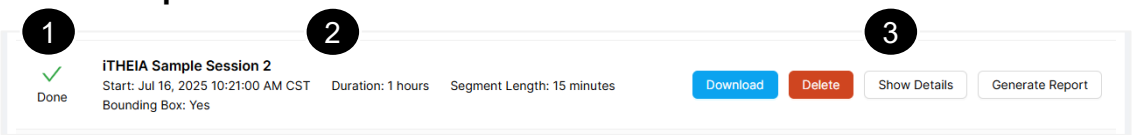


Figure 9-13 Sample Session Record

A Sample Session Record lists information about each sample session that has been created.

The information provided in each session record includes:

❶ Session Status

❷ Sample Session Information

❸ Sample Session Controls

9.1.3.1 Session Status

The session status displays the status of the sample session. The possible statuses are as follows:

Done — The sample session is complete.

Scheduled — The sample session is scheduled for a future date or time.

Running — The sample session is currently running.

Missed — The sample session was missed. *A sample session may be missed due to an interruption of power, such as in the case of a power outage.*

9.1.3.2 Sample Session Information

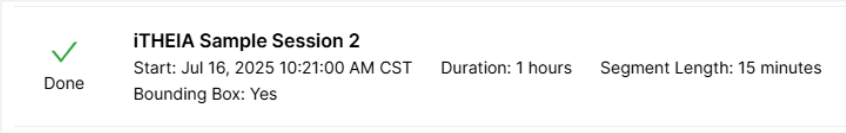
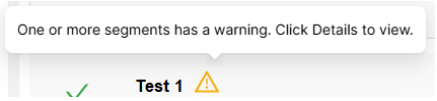


Figure 9-14 Sample Session Information

The sample session record includes the following information:

- Name of Sample Session*
- Start date and time of sample session, including time zone
- Duration of the sample session (in hours)
- Length of segment (*15 Minutes, 30 Minutes, or 1 Hour*)
- Bounding Box Enabled (*Yes/No*)

*A warning icon may occur next to the name of the sample session. Hover over the icon to see the warning. Click Details to view the specific segment warnings. • SEE SAMPLE SESSION DETAILS. •



9.1.3.3 Sample Session Controls

There are five (5) control buttons available for each sample session record.

Download	Click to download the sample session.
Delete	Click to delete the sample session record.
Show Details	Click to expand to the detailed view.
Hide Details	Click to hide the detailed view. *Only shown in the detailed view.*
Generate Report	Click to generate a report for the sample session.

There are additional control buttons available in the detailed view. • SEE SECTION 9.1.3.4 SAMPLE SESSION CONTROLS. •

9.1.3.3.1 Download a Session

To download the sample session:

1. Click Download for the sample session.

   The **Download** function is only available for sample sessions that are already completed.

2. The **Download Sample Session** pop-up window will be displayed.

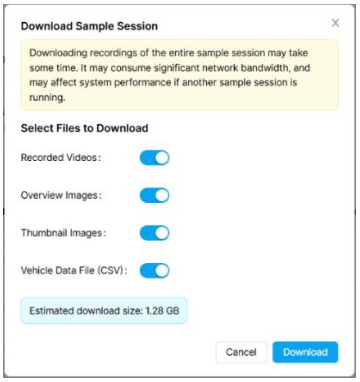


Figure 9-15 Download Sample Session Window

3. Turn the toggle *on* or *off* for each of the files to download:
   - Recorded videos
   - Overview images
   - Thumbnail images
   - Vehicle Data File (CSV)

   If the toggle is turned off, those files will not be downloaded.

   The estimated download size will be updated in a few seconds according to which files are included in the download.

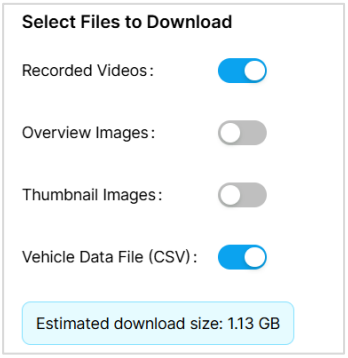


Figure 9-16 Estimated Download Size

4. Click Download to proceed with downloading the selected files. *Press* Cancel *to exit out of the window without downloading any files.*

5. When the download has begun, a progress bar will appear at the top of the page to show the percentage of the sample session that has been downloaded.

Only one sample session can be downloaded at a time. All other download buttons will be disabled while a download is in progress.



Figure 9-17 Downloading Sample Session Progress Bar

To cancel a sample session that is already in progress, click the Cancel *button to the right of the progress bar. None of the files will be downloaded.*

6. When the file has been successfully downloaded, a zip file will be downloaded to the user's download folder. The zip file will be divided into segments, as defined by the segment length of the session. Each segment folder will include the overview images, thumbnail images, raw video files and video data (CSV) files, if selected, for that segment.

Please refer to the iTHEIA SAMPLE SESSION CSV FILE FORMAT document for details.

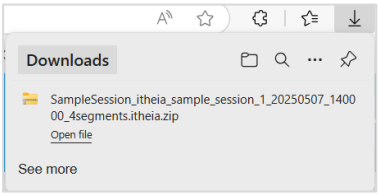


Figure 9-18 Downloaded Zip File

9.1.3.3.2 Delete a Session

To delete a sample session:

1. Click the Delete button on the sample session record that you would like to remove.
2. A message will be displayed warning the user that the sample session will be permanently deleted from the system and cannot be restored.

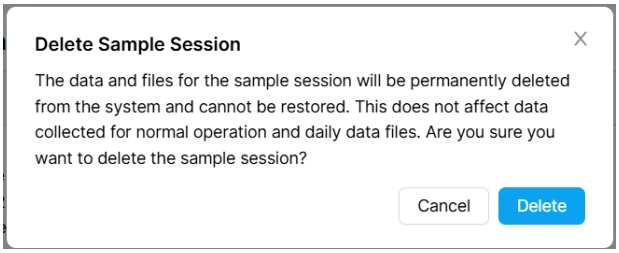


Figure 9-19 Delete Sample Session Warning

3. Press Delete to proceed with permanently deleting the sample session from the system. *Press* Cancel *to keep the Sample Session.*
4. Once the session has been deleted, it will disappear from the list of sample sessions and will no longer affect the remaining quota.

9.1.3.3.3 Sample Session Details

To view the sample session detailed view:

1. Click the Show Details button on the sample session record that you want to expand.
2. A detailed version of the sample session record will be displayed.

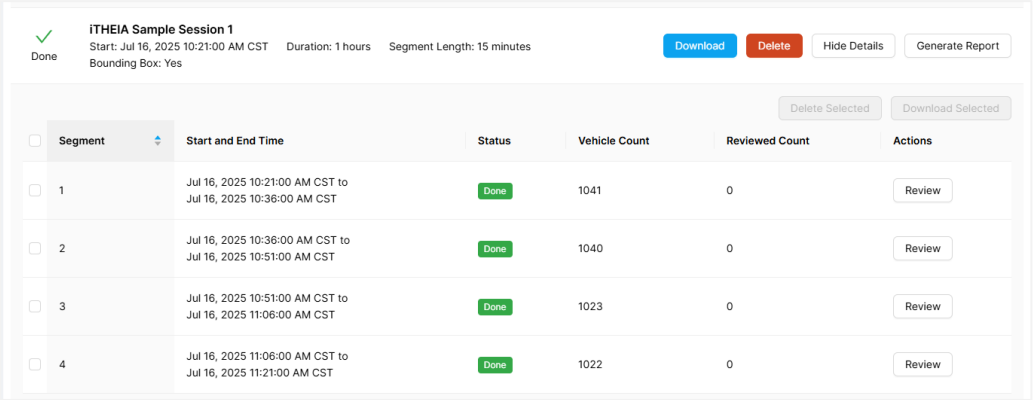


Figure 9-20 Sample Session Record: Detailed View

The detailed view of the sample session record includes the following elements:

b. Segment: *The segment number.*

c. Start and End Time: *The start and end time of the segment.*

d. Status: *The status of the segment. The possible statuses include:*

i. Running: *The segment is currently running.*

ii. Scheduled: *The segment is scheduled to occur at a future time.*

iii. Compressing: *The segment has finished running. Segment files are being compressed before the segment is considered complete.*

iv. Done: *The segment is complete.*

Done ⚠: A warning icon may be displayed to indicate an error with the completed segment. Hover over the ⚠ icon to display the warning. Possible warnings include:

- *This segment is missing files, possibly due to disk space manager purging.*
- *This segment could not be successfully deleted and may contain incomplete data.*
- *This segment may not have been recording for the entire run time.*

v. Missed ⚠: *The segment was not recorded. The segment may have been missed due to an interruption of power or disk space limits being exceeded. Hover over the ⚠ icon to display the following warning message.*

vi. Deleted: *The segment was deleted.*

Deleted ⚠: *A warning icon may be displayed to indicate an error with the deleted segment. Hover over the ⚠ icon to display the following warning:*

- *This segment is missing files, possibly due to disk space manager purging.*

e. Vehicle Count: *The number of vehicles that passed through during the segment.*

f. Reviewed Count: *The number of vehicles that have been reviewed using the* Review *action.*

g. Actions: *The action available for the segment.*

i. Review: *Click to review vehicle records from the sample session segment.* • SEE SECTION 9.1.3.4.1 REVIEW A SESSION SEGMENT. •

h. Delete Selected Option: *An option to delete the selected segment(s).*

• SEE SECTION 9.1.3.4.2 DELETE A SELECTED SEGMENT. •

i. Download Selected Option: *An option to download the selected segment(s).* • SEE SECTION 9.1.3.4.3 DOWNLOAD SELECTED SEGMENT. •

All segments, regardless of status, count towards used quota. Deleting a segment does not free up quota. The user must delete the whole sample session to free up quota.

If a segment that was previously 'Done' is missing files (e.g., due to the disk space manager purging files), then that segment's status will be changed to 'Deleted.'

Click Hide Details to close the expanded view.

9.1.3.3.4 Generate Report

To generate a Performance Report:

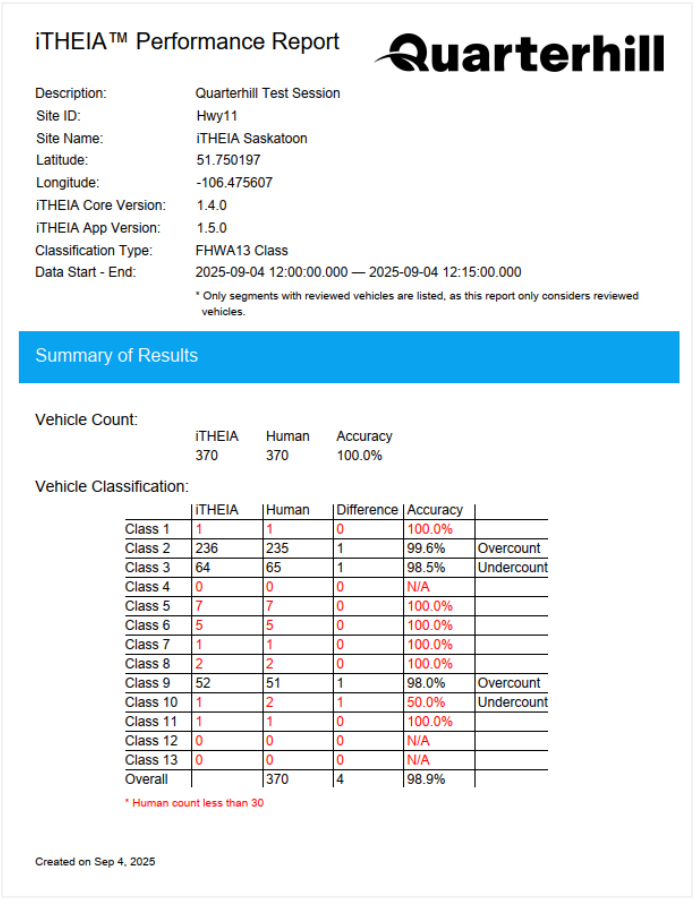
1. Click Generate Report for the sample session.

   A report can only be generated if the sample session is complete.

2. A .zip folder containing a PDF and a .CSV version of the iTHEIA Performance Report for the sample session will be downloaded to the user's computer.

3. Double-click on the iTHEIA Performance Report to open it. The Performance Report evaluates iTHEIA's accuracy by providing a comparison of iTHEIA's classifications with the operator's review. An example of the PDF report is shown below.

   Vehicle counts in the Performance Report only include vehicles reviewed by the user. • SEE SECTION 9.1.3.4.1 REVIEW A SESSION SEGMENT. •



iTHEIA™ Performance Report

Quarterhill

Description:	Quarterhill Test Session
Site ID:	Hwy11
Site Name:	iTHEIA Saskatoon
Latitude:	51.750197
Longitude:	-106.475607
iTHEIA Core Version:	1.4.0
iTHEIA App Version:	1.5.0
Classification Type:	FHWA13 Class
Data Start - End:	2025-09-04 12:00:00.000 — 2025-09-04 12:15:00.000

* Only segments with reviewed vehicles are listed, as this report only considers reviewed vehicles.

Summary of Results

Vehicle Count:

iTHEIA	Human	Accuracy
370	370	100.0%

Vehicle Classification:

	iTHEIA	Human	Difference	Accuracy	
Class 1	1	1	0	100.0%	
Class 2	236	235	1	99.6%	Overcount
Class 3	64	65	1	98.5%	Undercount
Class 4	0	0	0	N/A	
Class 5	7	7	0	100.0%	
Class 6	5	5	0	100.0%	
Class 7	1	1	0	100.0%	
Class 8	2	2	0	100.0%	
Class 9	52	51	1	98.0%	Overcount
Class 10	1	2	1	50.0%	Undercount
Class 11	1	1	0	100.0%	
Class 12	0	0	0	N/A	
Class 13	0	0	0	N/A	
Overall		370	4	98.9%	

* Human count less than 30

Created on Sep 4, 2025

Figure 9-21 iTHEIA Performance Report (PDF)

9.1.3.4 Sample Session Controls

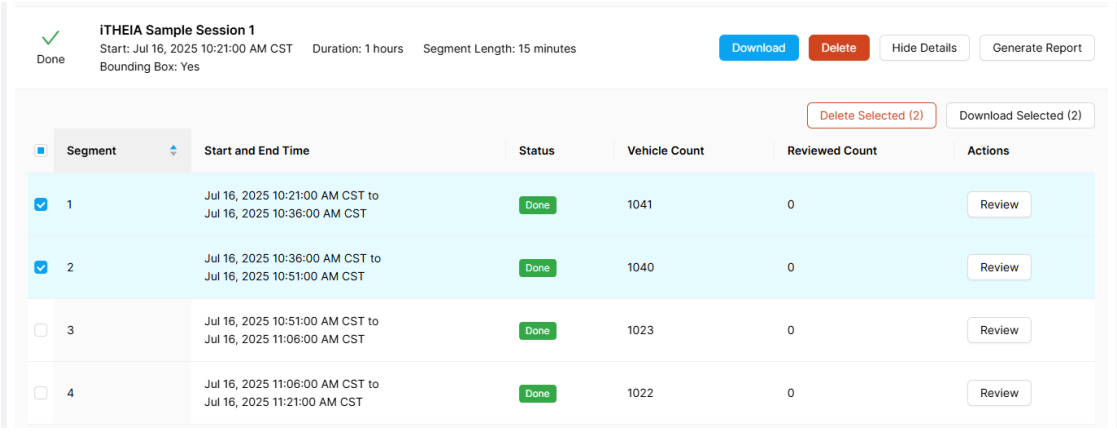


Figure 9-22 Sample Session Record (Detailed View)

There are three (3) control buttons accessible from the Sample Session Record Detailed View.

Review — Click to review a sample session segment.

Delete Selected (2) — Click to delete selected session segments.

Download Selected (2) — Click to download selected session segments.

9.1.3.4.1 Review a Session Segment

When a segment in a sample session is finished recording, the Review button will be displayed under the Actions column. The Review button allows users to conduct a manual audit of the vehicles recorded for that segment.

To review a sample session segment:

1. Click the Review button for the segment to be reviewed. *A segment can be reviewed as soon as it is Done, even if the sample session is not yet complete.*

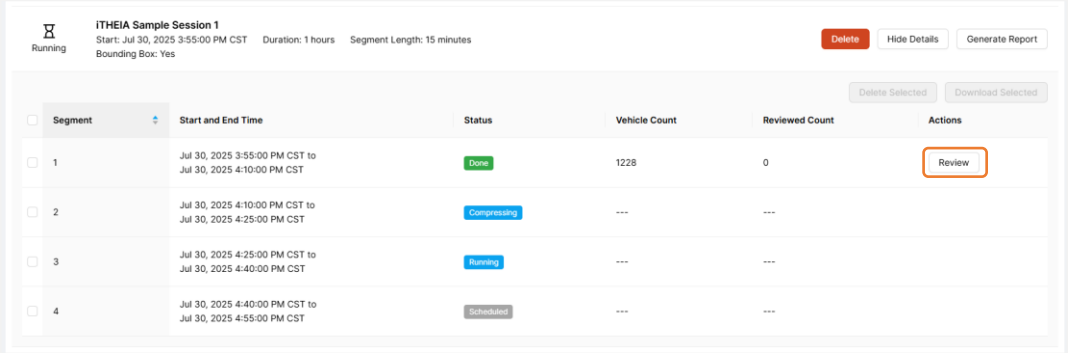


Figure 9-23 Sample Session Record (Detailed View)

The *Reviewing Session* page for that Segment will be displayed. There will be a record for each vehicle that passed through during the session segment. 10 vehicle records will be displayed per page. SEE DISPLAY CONTROLS AND FEATURES

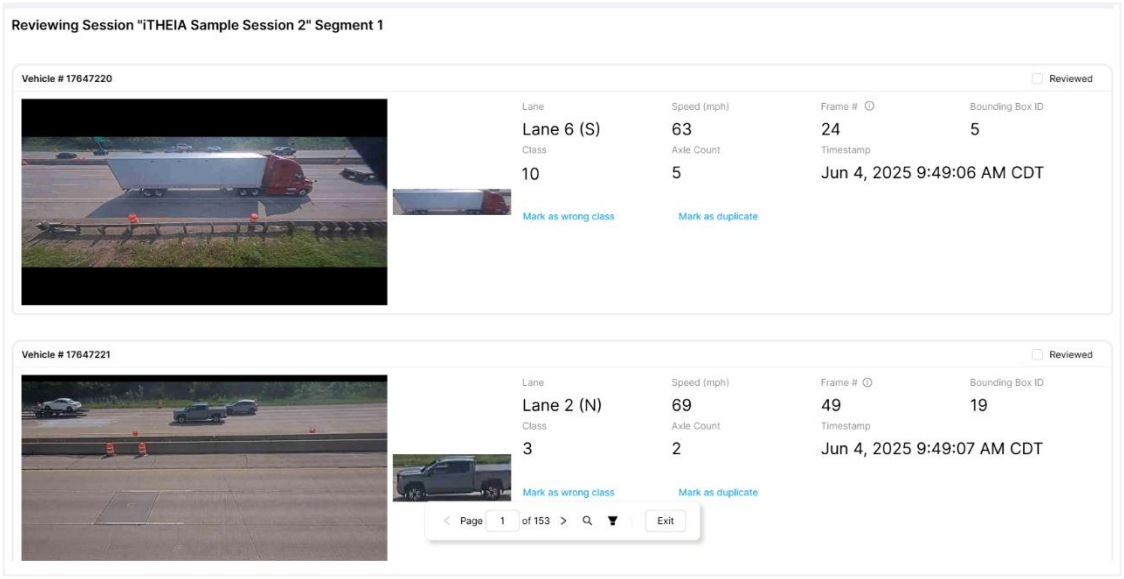


Figure 9-24 Reviewing Session "iTHEIA Sample Session 2" Segment 1

Details for each vehicle record include:

- Full size image
- Thumbnail image
- Lane Name, Number and Direction
- Speed

- Frame #
- Bounding Box ID
- Class
- Axle Count
- Timestamp

Actions available for each vehicle record include:

- Mark as wrong class
- Mark as duplicate
- Reviewed checkbox
- Full size image preview
- Thumbnail image preview

Users can also add a missing vehicle after an existing vehicle record.

2. Compare the vehicle images with the information that is recorded in the vehicle record. Click on a vehicle image to view a larger version of the image. Click away from the image to close it.



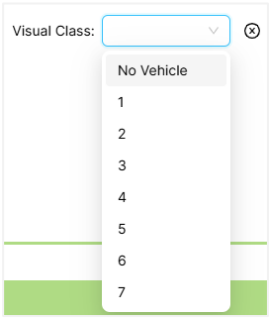
Figure 9-25 Full Size Image

To identify a vehicle that has been marked as the wrong class:

3. If the vehicle class recorded by iTHEIA is incorrect, click the link.



4. The Visual Class drop-down menu will be displayed.



5. Select the correct class for the vehicle based on your visual identification.



No Vehicle *can be selected if the vehicle image does not contain a vehicle.*

If you no longer wish to choose a visual class, click the ⊗ button. The Visual Class dropdown will disappear, and the vehicle will no longer be marked as the wrong class.

6. Your class selection will be saved automatically and will be displayed on the vehicle record.

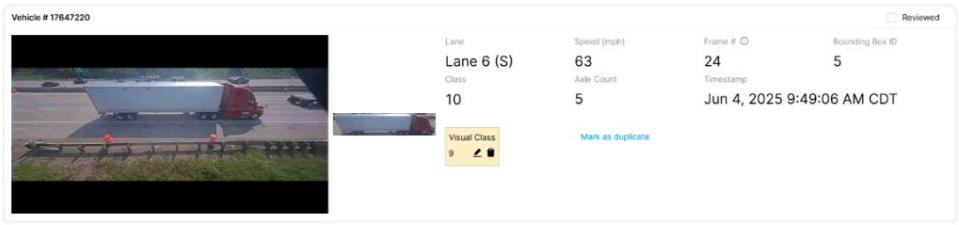


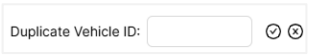
Figure 9-26 Vehicle with Wrong Class

a. To modify your selection, click the Edit icon. The Visual Class drop-down will be displayed again. Select a different class. It will be saved automatically. *To revert to the previous class selection without making changes, click the ⊗ button. The Visual Class dropdown will disappear, and the previously saved vehicle class will be displayed.*

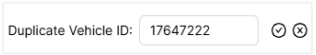
b. To delete your selection, click the Delete icon. The class selection will be removed, and the vehicle record will no longer be marked as the wrong class.

To identify a duplicate vehicle:

7. If you have identified that the vehicle record is a duplicate of another vehicle record, click the Mark as duplicate link.
8. The Duplicate Vehicle ID text field will be displayed.



9. Type in the Vehicle ID of the original vehicle. This will mark the current vehicle record as a duplicate of the entered Vehicle ID.



10. Press ✓ to save the duplicate vehicle ID. *Press ⊗ to cancel the action. A duplicate ID will not be saved.*
11. If the vehicle ID was saved successfully, it will appear on the vehicle record. *The vehicle ID will be a clickable link. If you click on the duplicate vehicle ID link, you will be automatically directed to the page with that vehicle. You may need to scroll up or down to see it.*

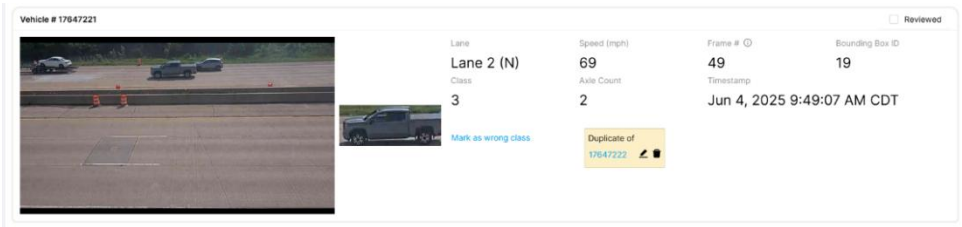


Figure 9-27 Vehicle Record Marked as Duplicate

a. To modify your selection, click the Edit icon. The Duplicate Vehicle ID field will be displayed again. Type in the correct Vehicle ID and press the button to save the changes. *To undo your selection, click the button. The Duplicate Vehicle ID field will disappear, and the previously saved duplicate vehicle ID will appear.*

An error will occur if the duplicate vehicle ID entered is not from a valid vehicle. Please correct the vehicle ID and try again.

b. To delete your selection, click the Delete icon. The duplicate vehicle ID will be removed, and the vehicle record will no longer be marked as duplicate.

To add a missing vehicle:

12. If a vehicle was not detected by the system, the user can add it manually. Hover over the space between the two vehicles (or after the last vehicle on the page) in which the missing vehicle should appear. Ensure that vehicles are added in the order in which they pass through the midline of the lane. A line with a sign will appear.

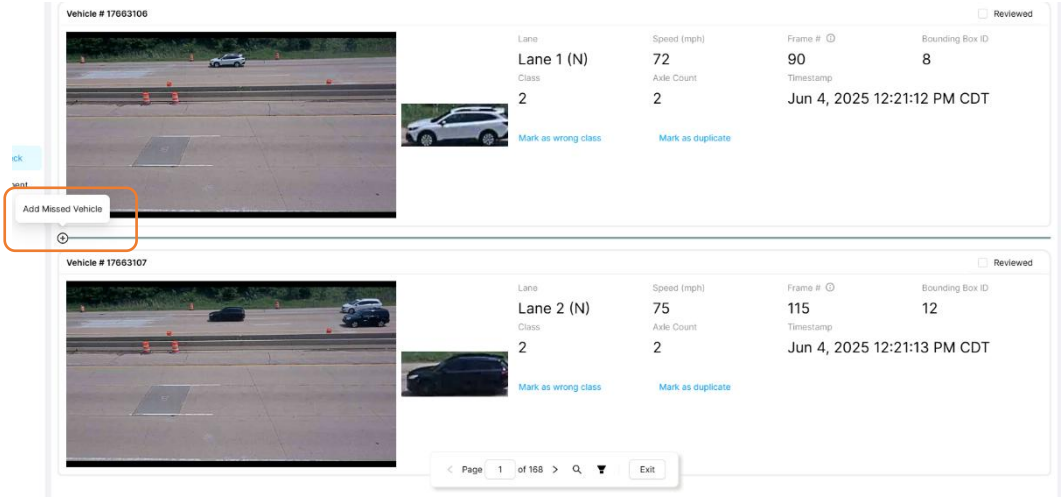
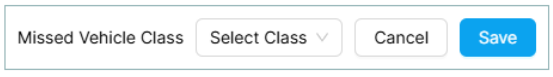


Figure 9-28 Adding a Missed Vehicle

13. Click on the icon to add a missed vehicle between the two vehicle records (or after the last vehicle of the page).
14. A form to add the missing vehicle will be displayed.



15. Select the correct vehicle class from the Missed Vehicle Class drop-down menu for the missing vehicle.

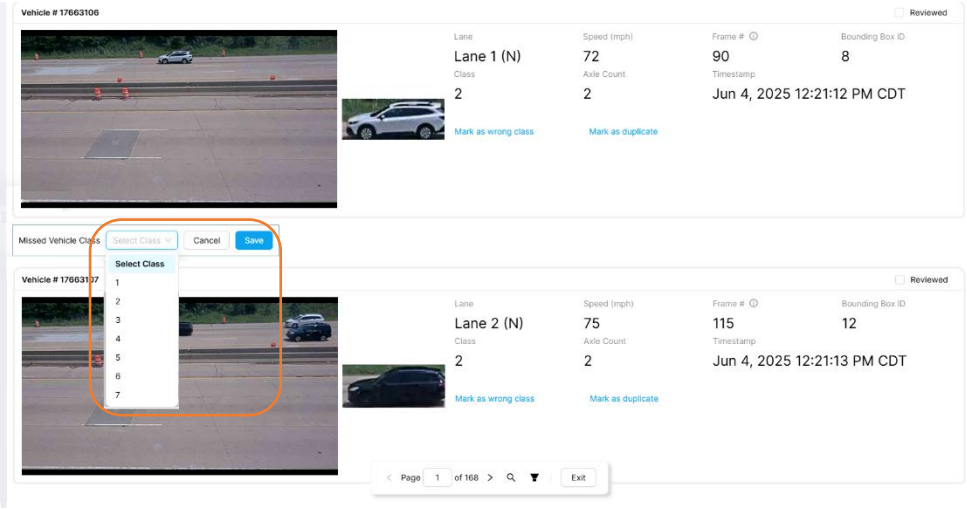
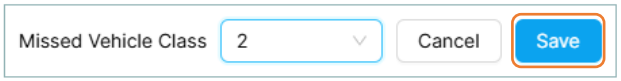


Figure 9-29 Selecting a Missed Vehicle Class

16. When the correct vehicle class has been entered, press Save to save the changes. *Press* Cancel *to remove the missing vehicle.*



17. An entry for the missed vehicle will be added.

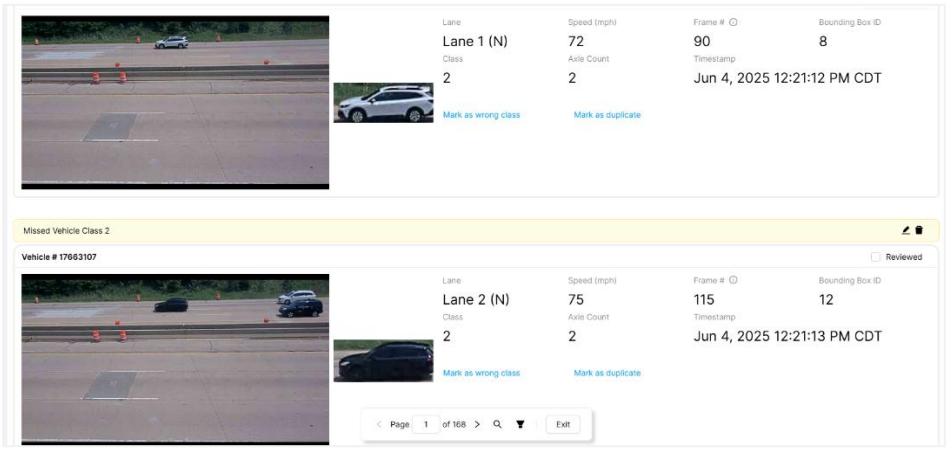


Figure 9-30 Missed Vehicle Added

a. To edit the missing vehicle class, click the Edit icon. The Missed Vehicle Class drop-down will be displayed again. Select the correct vehicle class and press Save to apply the changes. Press Cancel to revert to the previously saved missing vehicle class.

b. To delete the missing vehicle, click the Delete icon. The missing vehicle will be removed.

Missing vehicles do not count towards the Vehicle Count or Reviewed Count listed on the SAMPLE SESSION DETAILS. However, any missing vehicles added by the user will be reflected in the data files (DOWNLOAD A SESSION or DOWNLOAD SELECTED SEGMENT) and accuracy report (GENERATE REPORT).

To mark a vehicle record as reviewed:

18. When you have completed your review of a vehicle record, check the Reviewed box at the top right-hand corner of the vehicle record. The vehicle record will become bordered in green. *Missing vehicles cannot be marked as reviewed.*

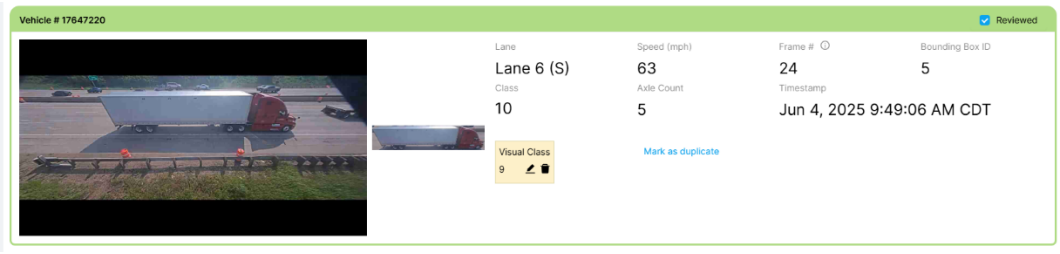


Figure 9-31 Vehicle Record: Marked as Reviewed

19. Repeat the above steps for each vehicle record in the segment.

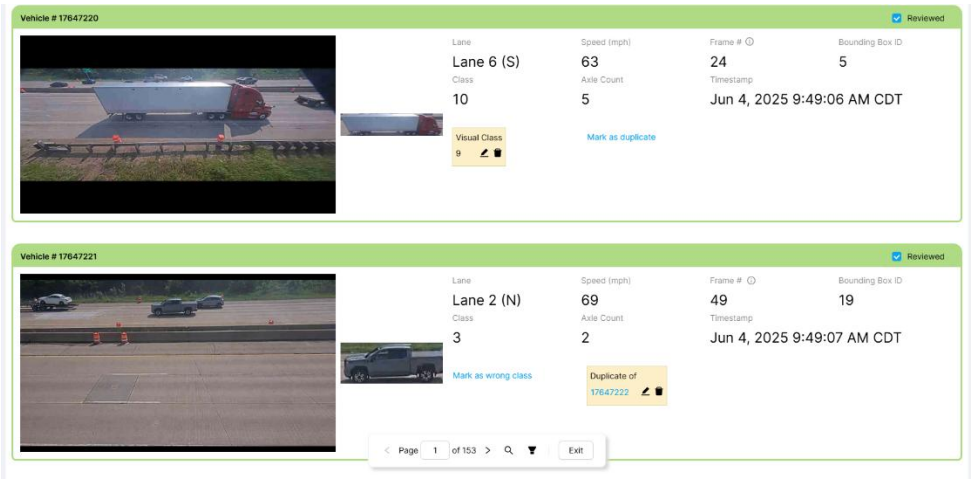


Figure 9-32 Multiple Vehicle Records Reviewed

As a way to fast track the review process, users may choose to review all the vehicles on the page first without checking the review box on each record and then mark all the vehicle records on the page as reviewed at once.

To mark all records on the page as reviewed:

1. Go through the above steps for reviewing a vehicle record for every vehicle record on a page. It is not necessary to check the 'Reviewed' box on each one.
2. When all the vehicle records on the page have been reviewed, click the Mark page as reviewed button.
3. Every record on the page will be marked as reviewed. The Mark page as reviewed button will be disabled to show that this action has already been completed. The user can navigate to the next page using the page navigation controls and repeat the steps for the next page.

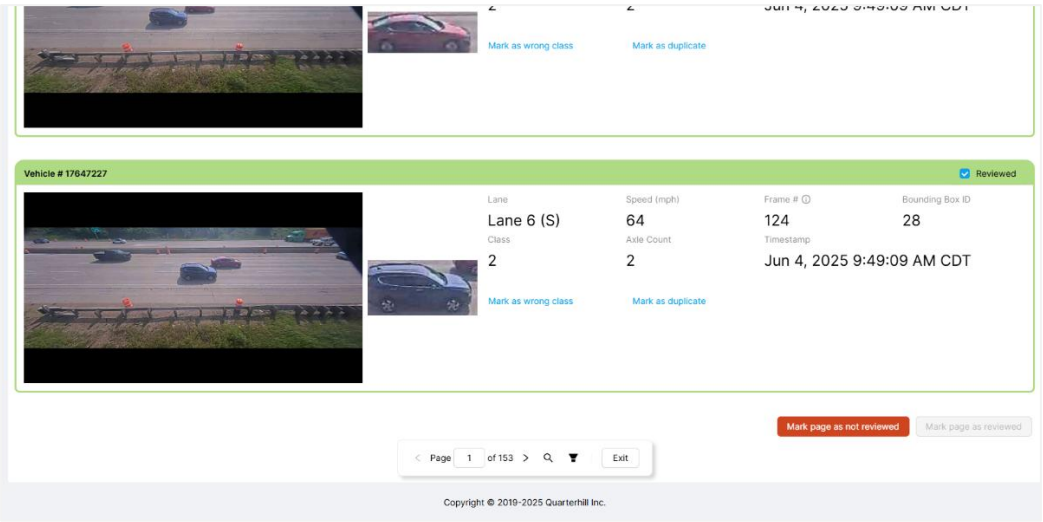


Figure 9-33 Page Marked as Reviewed

If the user has accidentally marked unreviewed vehicle records as reviewed, or if the user wishes to re-review vehicle records, there is the option to mark all records on the page as not reviewed.

To mark all records on the page as not reviewed:

1. Click the Mark page as not reviewed button. *At least one vehicle record on the page must be marked as reviewed for the button to be enabled. If none of the vehicle records on the page have been marked as reviewed, the button will be disabled.*
2. All vehicle records on the page will be marked as not reviewed. Any class errors or duplicate vehicles that the user has identified will not be removed.

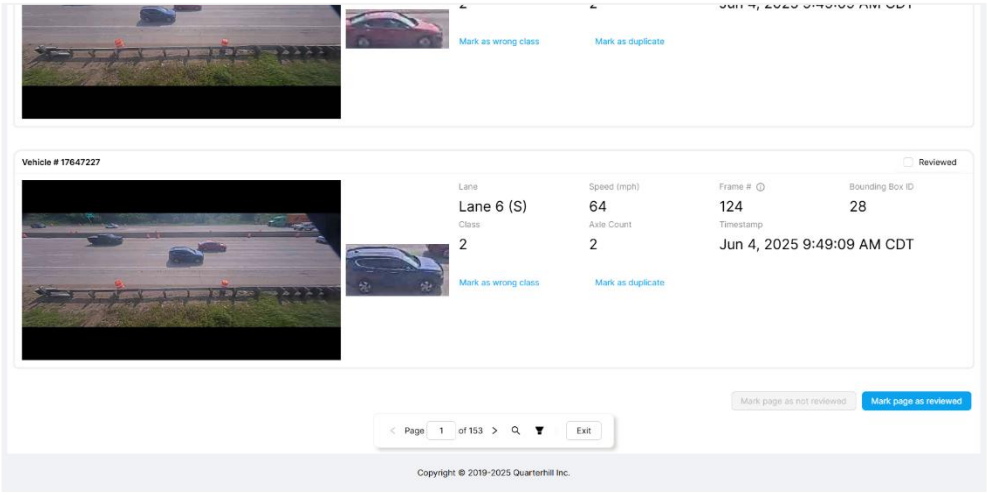


Figure 9-34 Page Marked as Not Reviewed

3. Navigate to the next page to repeat the process for more pages if desired.

Display Controls and Features



There are several display controls and filters that can be used, as described below.

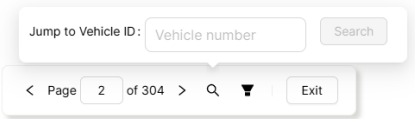
Page Navigation

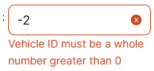


Click the < > arrows to navigate back and forth through the pages, *or* type in a page number and press the *Enter* key to go directly to that page.

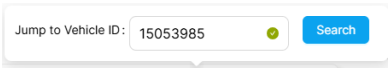
Vehicle Search

Click to open a pop-up window where you can search for a specific vehicle ID.





- Type in a vehicle ID number and press the *Enter* key. A green checkmark will appear if the entry is valid. The vehicle ID must be a whole number greater than 0. If the field is left blank, or an invalid number is used, a red x will appear and a warning will be displayed. Type in a valid vehicle ID before continuing.

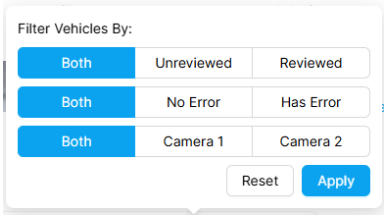


- Press the Search button to jump directly to that vehicle ID.

Filters

Click to open a pop-up window where you can filter the vehicle records on the Review Session page.

From the pop-up window, choose from the available filters.



- On the top row, choose whether to display only Reviewed or Unreviewed vehicles, *or* choose to display both.
- On the second row, choose whether to display only vehicle records with an error, or vehicle records with no error – or choose to display both.
- On the third row*, select an option to display vehicles from Camera 1, Camera 2, or both cameras. **Camera filters are only available on sites that support two cameras. For Portable systems, the Camera filter options will not be displayed.*

- Click the Apply button to apply the selected filters. The review results will only display vehicle records that match the filter selections. *For example, if the user filtered vehicles by "Reviewed" and "Has Error" vehicles from "Both" cameras, then the results will show vehicle records from both cameras that have been reviewed and had either a visual class error or a duplicate vehicle ID. Missed vehicles will also be included, along with the reference vehicle immediately following the missed vehicle. Unreviewed or non-error vehicles will not be displayed.*

  If none of the vehicle records match the filter criteria, then the page will be empty. Click Reset *to cancel any applied filters. All vehicles from the session segment will be displayed.*

When a filter is applied, the filter icon will be displayed in blue. Click the icon again to change the filter at any time.



Filters can be used to aid in the review process. For example, one operator may review a certain number of vehicles and mark them as reviewed. If there are vehicle records that the operator is unsure about, the operator can leave them as unreviewed. The next operator can then filter the results to only display 'unreviewed' vehicles before completing the review of the remaining vehicles.

If a user wants to only review any vehicle correction data that has been entered, the user can set the filter to show all error vehicles and ignore the rest.

Exit

Exit

Click to exit the *Reviewing Session* page. The user will be redirected to the Performance Check page.

9.1.3.4.2 Delete a Selected Segment

To delete a segment from a sample session:

1. Select the checkboxes beside the segment(s) from the sample session that you wish to delete. Click a checkbox again to de-select that segment.

   Deleted segments cannot be selected.

2. The number of files to delete will be indicated on the Delete Selected button.

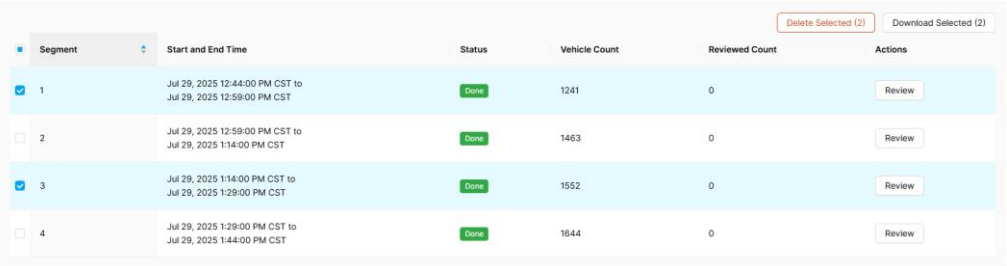


Figure 9-35 Delete Selected Items

3. Click the Delete Selected (2) button to delete the selected segments from this session. A message will be displayed warning the user that the segments will be permanently removed and will not be recoverable.

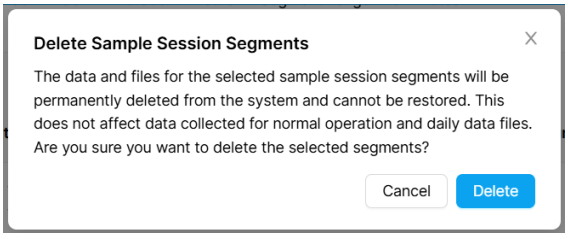


Figure 9-36 Delete Sample Session

4. Click Delete to proceed with permanently removing the selected segments from this session. *Press* Cancel *to keep the segments.*
5. The segments that were deleted will still appear under the sample session details, but their status will now be Deleted. The Vehicle Count, Reviewed Count and Actions will no longer be available.

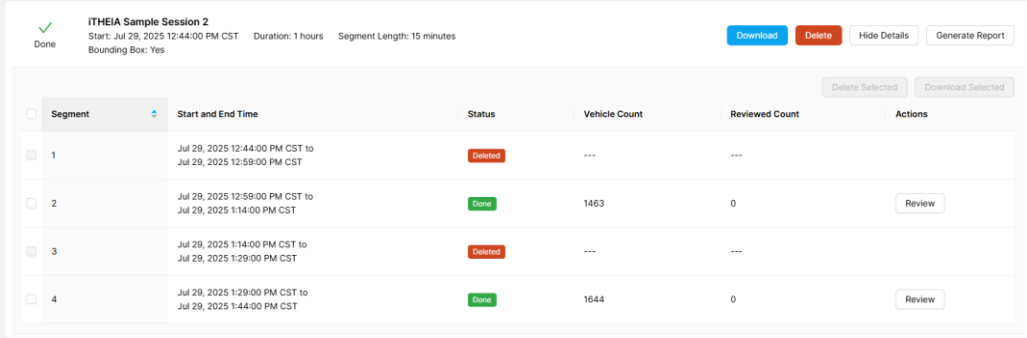


Figure 9-37 iTHEIA Sample Session: Segments Deleted

9.1.3.4.3 Download Selected Segment

To download a segment from a sample session:

1. Select the checkboxes beside the segment(s) from the sample session that you wish to download. Click a checkbox again to de-select that segment.

Only segments with the 'Done' status can be downloaded.

A completed segment can be downloaded before the full sample session is complete.

2. The number of files to download will be indicated on the Download Selected button.

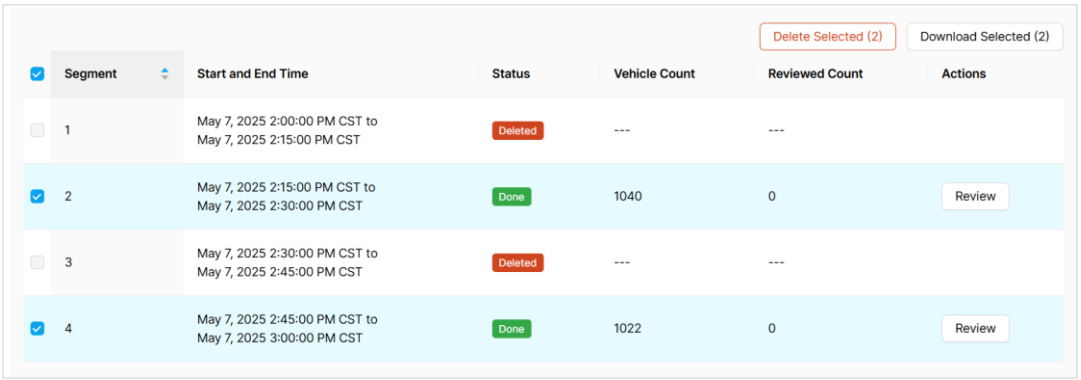


Figure 9-38 Segments Selected to Download

3. Click the Download Selected (2) button to download the selected segments.
4. The **Download Sample Session Segments** pop-up window will be displayed.

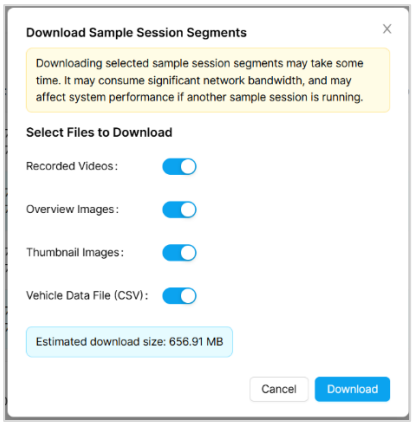


Figure 9-39 Download Sample Session Segments

5. Turn the toggle *on* or *off* for each of the files to download:
   - Recorded videos
   - Overview images
   - Thumbnail images
   - Vehicle Data File (CSV)

   If the toggle is turned off, those files will not be downloaded.

   The estimated download size will be updated according to which files are included in the download.

6. Click Download to proceed with downloading the selected files. *Press* Cancel *to exit out of the window without downloading any files.*

7. When the download has begun, a progress bar will appear at the top of the page to show the percentage of the sample session that has been downloaded. The user will be unable to download any new segments until the current download process is complete.



Figure 9-40 Downloading Segment Progress Bar

8. When the file has been successfully downloaded, a zip folder will be downloaded to the user's download folder containing the selected segments. Each segment folder will include the overview images, thumbnail images, raw video files and video data (CSV) files, if selected, for that segment.

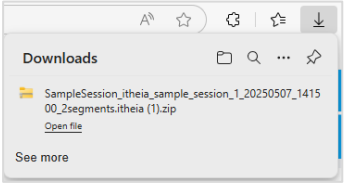
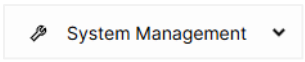


Figure 9-41 Downloaded Zipped Segment

10 SYSTEM MANAGEMENT

The System Management menu provides access to pages for the administration of the iTHEIA system, including software installation and updates, user management, system configuration and audit logs.

To access the System Management menu:

1. Click on the 

item to expand the menu.

The System Management menu and associated pages are only visible to users with an ADMIN role.

10.1 OVERVIEW

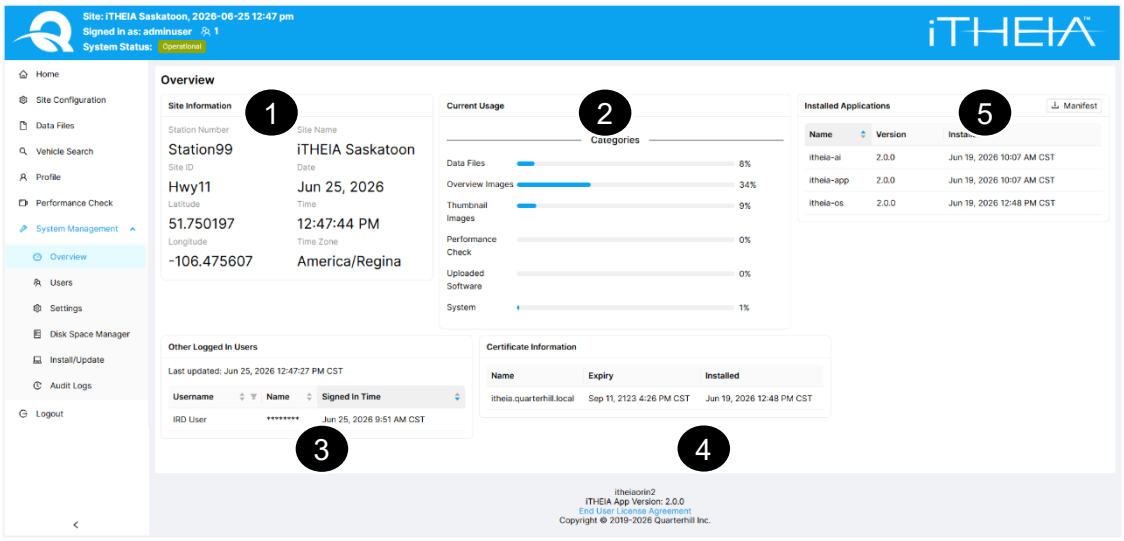


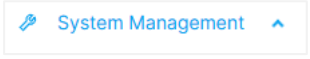
Figure 10-1 iTHEIA Overview Page

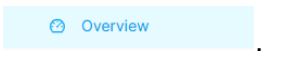
The *Overview* page displays relevant information regarding the site and system components in one central location. Information cannot be edited on this page.

This page displays:

❶ Site Information
❷ Current Usage
❸ Other Logged In Users
❹ Certificate Information
❺ Installed Applications

To access the Overview page:

1. From the 

menu,
   - Select 

.

10.1.1 Site Information

The *Site Information* pane lists relevant information about the site.

The following parameters are listed:

a. Station Number: *A site reference number. Station ID corresponds to the Station Number configured in the iTHEIA web user interface.*

b. Site ID: *Identifies the site and is used as part of the site's data file name. The Site ID is also used to populate the MS2LocationId field in the MS2 data file.*

c. Site Name*: Descriptive site name that is displayed on the header of the iTHEIA user interface and populates the Site Name heading in the Per Vehicle data file (maximum 100 characters)*.

d. Date: *Current date*.

e. Time: *Current local time.*

f. Latitude: *Latitude coordinate of the site in decimal degrees.*

g. Longitude: *Longitude coordinate of the site in decimal degrees.*

h. Time Zone: *Time zone of the site. The time zone affects the timestamp of the Per Vehicle data in the data file as well as the automatic generation of the daily data file.*

The information listed is for display purposes only. These parameters can be configured in the iTHEIA web user interface from the **General** Tab of the *Site Configuration* Page. • SEE SECTION 5.1.1.1 STEP 1: GENERAL CONFIGURATION •

10.1.2 Current Usage

The *Current Usage* pane includes information regarding Disk Space Usage for the iTHEIA hardware.

Information listed includes:

a. System-wide alert: *An alert will be displayed when system-wide disk usage exceeds the high water mark. After the alert is cleared, the message will be removed.*

b. Disk Space Usage: *The percentage of disk space storage used for each of the following categories is displayed. A higher percentage means that less space is available.*

- *Data Files*
- *Overview Images*
- *Thumbnail Images*
- *Performance Check*
- *Uploaded Software*
- *System*

• FOR MORE INFORMATION ON DISK SPACE USAGE, SEE SECTION 10.4 DISK SPACE MANAGER. •

10.1.3 Other Logged In Users

This pane lists all other users who are logged in concurrently.

10.1.4 Certificate Information

The *Certificate Information* pane displays the following information on the current https certificate:

a. Name: *Name of certificate.*

b. Expiry: *Date of Expiry in Month, Day, Year, Time, and GMT ± format.*

c. Valid: *States whether certificate is still valid* (*Yes/No).*

To upload a new certificate, navigate to the Install/Update section. • SEE SECTION 10.5 INSTALL/UPDATE •

10.1.5 Installed Applications

The *Installed Applications* pane lists the various applications installed with the iTHEIA system, as well as their version numbers.

To install new or updated versions of applications, navigate to the *Install/Update* page. • SEE SECTION 10.5 INSTALL/UPDATE •



Click to download a zipped file that can be sent to Quarterhill to identify the current components installed.

10.2 USERS

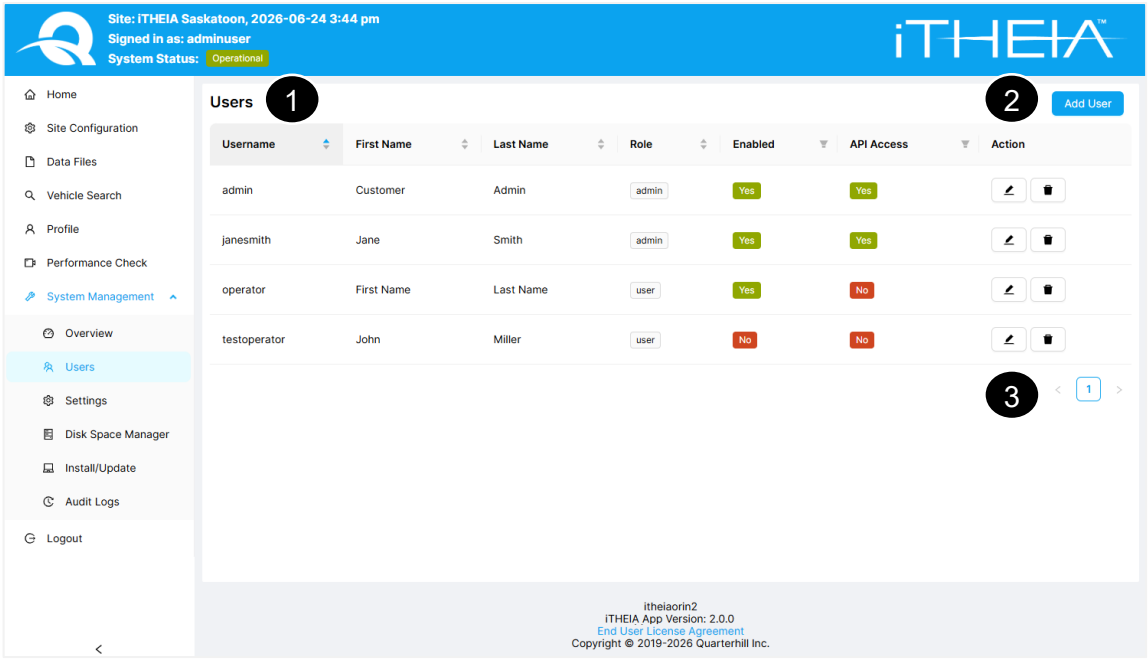


Figure 10-2 Users Page

The *Users* page provides the ability to view, add, delete and edit users and their roles for the iTHEIA system.

This page displays:

❶ User Information

❷ Add User

❸ Page Navigation

To access the Users page:

1. From the System Management menu,
   - Select Users.

10.2.1 User Information

The *User Information* pane provides the following information for each user that has been configured:

a. Username: *Account username.*

b. First Name: *First name of the user.*

c. Last Name: *Last name of the user.*

d. Role: *Shows the role that has been assigned to the user.* • SEE SECTION 10.2.2.1 ROLES •

e. Enabled: *Displays whether the user is currently enabled (* Yes *) or disabled (* No *).*

f. API Access: *Indicates whether API access is currently enabled (Yes) or disabled (No) for this user. When enabled, users can create and manage their own API keys and use those API keys to access data files. If users have an ADMIN role, they will also be able to delete the API keys of other users who have roles equal to or below their access level. When disabled, the user will not have access to the* ***iTHEIA Pull API Keys*** *tab and will be unable to assign or change API Access for any user.*

Users cannot enable or disable API Access for themselves. API Access can only be edited by another user with the ADMIN role.

g. Action: *Provides an option to edit or delete the user.* • SEE SECTION 10.2.1.1 EDIT USER AND SECTION 10.2.1.2 DELETE USER •

Users cannot view, edit, or delete their own account from this page. Users can modify their own account on the Profile page. • SEE SECTION 8 PROFILE •

10.2.1.1 Edit User

To edit a user that has already been created:

1. Locate the user that needs to be edited.
2. Click the edit button.

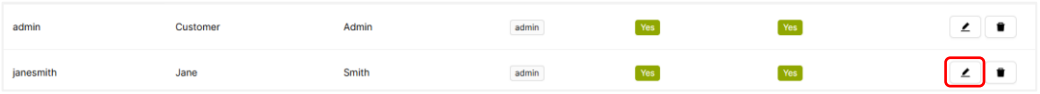


Figure 10-3 Users Page: Edit

3. The *Edit User* page will be displayed.

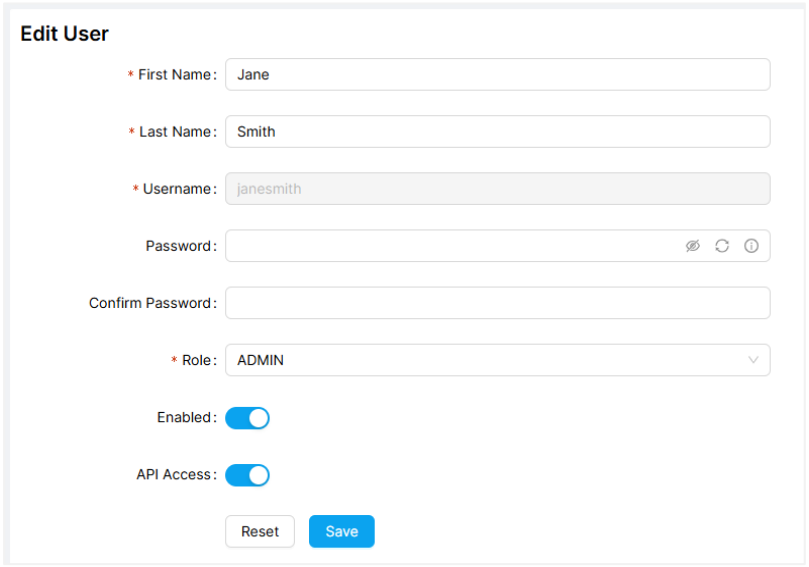


Figure 10-4 Edit User Page

Edit any applicable fields. The password can also be changed from this window.
• For a detailed explanation of each field, SEE SECTION 10.2.2 ADD USER •

The Username field cannot be edited.

The Password and Confirm Password fields must match. Leave blank to keep the password the same.

Users may only assign roles equal to or below their access level.
• SEE SECTION 10.2.2.1 ROLES •

4. Enable or disable the user account using the toggle button.

   When a user account is disabled, all of the user account's API keys will be deleted permanently and will not be recoverable. When disabling a user account, a warning message will be displayed.

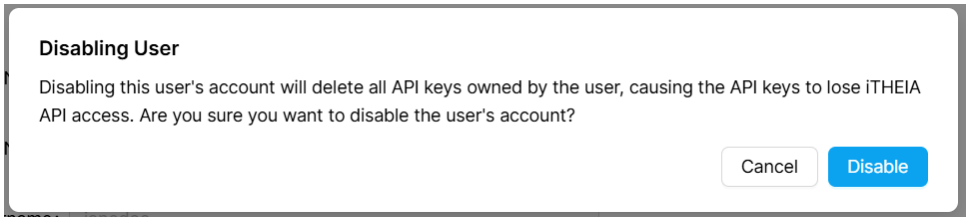


Figure 10-5 Disabling User Warning

Press the Disable button to continue the action and allow all of the user's API keys to be deleted. *Press* Cancel *to cancel the action. The user will remain enabled and the API keys owned by that user will not be deleted.*

5. Enable or disable API access for the user with the toggle button.

   When disabling a user's API access, a warning message will be displayed.

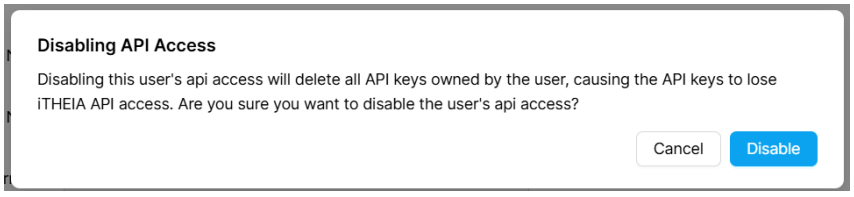


Figure 10-6 Disabling API Access Warning

To continue with disabling the user's API Access, press Disable. *To cancel the action and keep API access enabled for the user, press* Cancel.

When API Access is disabled for the currently logged in user, the API Access toggle will be disabled and the user will be unable to change API Access for any user.

6. Press Save to save changes and go back to the *Users* page. Press Reset to cancel all changes.
7. If changes were successfully saved, a success message will be displayed. All changes should be reflected on the *User Information* pane.

10.2.1.2 Delete User

To delete a user:

1. Click on the Delete button next to the user to be removed.
2. A warning message will be displayed.

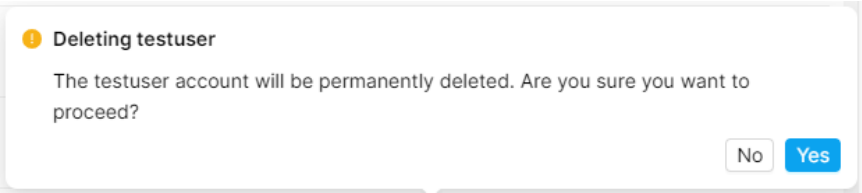


Figure 10-7 Deleting User Message

3. Press Yes to proceed with deleting the user. *Press* No *to cancel the action and keep the user.*
4. After pressing Yes, the user will be deleted and will no longer appear on the *Users* page. Upon deleting a user, all of the user's API keys will be deleted from the system. However, the user's record and all related data will still be retained in the database.

10.2.2 Add User

To add a new user:

1. Click the Add User button.
2. The *Add User* page will be displayed.

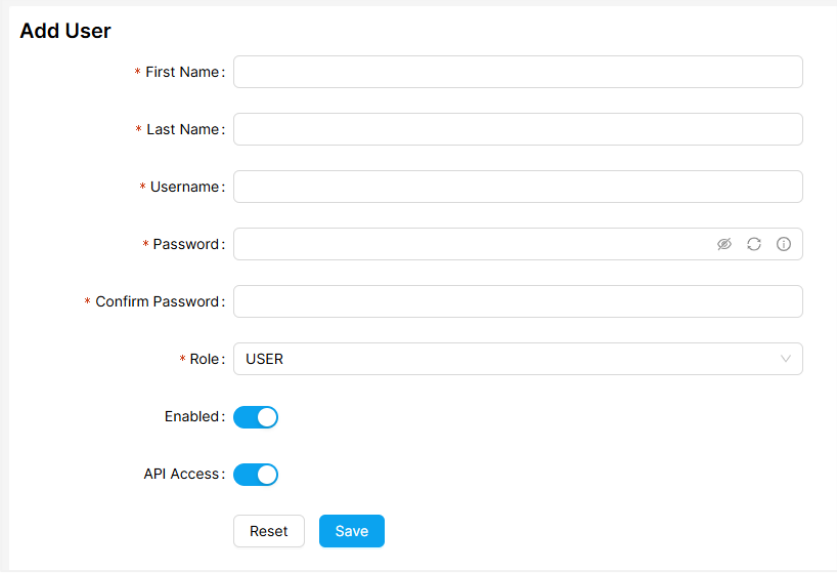


Figure 10-8 Add User Page

3. Fill out the following fields for the new user:
   a. *First Name: *Enter a first name for the new user.*
   b. *Last Name*: Enter a last name.*

c. *Username: *Enter a username. Note that this cannot be changed once the user has been saved.*

d. *Password: *Enter a password for the account. Ensure that it meets password requirements.* • FOR A DESCRIPTION OF ICONS AND PASSWORD REQUIREMENTS, SEE SECTION 10.1.5 INSTALLED APPLICATIONS •

e. *Confirm Password: *Re-type the same password to confirm.*

f. *Role: *Select a role from the dropdown menu.*

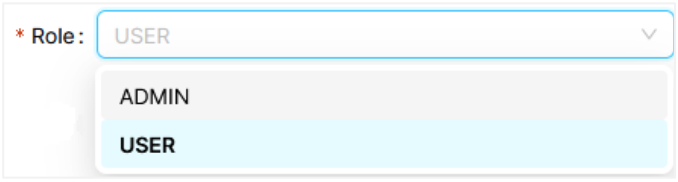


Figure 10-9 Role Dropdown Menu

Users may only assign roles equal to or below their access level.

• FOR INFORMATION ON ACCESS LEVELS FOR EACH ROLE, SEE SECTION 10.2.2.1 ROLES •

g. Enabled: *Toggle On or Off to enable or disable the user account*.

h. API Access: *Toggle On or Off to enable or disable API access for the user account. Users with API access enabled can create their own API keys and use those API keys to access API data files. If users have also been assigned the ADMIN role, they will also be able to delete other users' API keys who have roles equal to or below their access level.*

• FOR MORE INFORMATION ON API ACCESS, SEE SECTION 10.2.2.2 API ACCESS •

The current user must have API Access enabled to be able to enable/disable API Access for another user. If the current user has API Access disabled, this toggle will be greyed out.

10.2.2.1 Roles

Table 10.1 below describes the different access levels assigned to each role within the iTHEIA application. The level of access ranges from highest to lowest from left to right (i.e., The ADMIN role has a higher level of access than the USER role).

Table 10.1 Roles

	ADMIN	USER
Profile Page	Yes	Yes
View Live Vehicles	Yes	Yes

Site Configuration	Yes	No
Generating and Downloading Data Files	Yes	Yes
Vehicle Search	Yes	Yes
System Management pages	Yes	No

10.2.2.2 API Access

When users have API Access enabled, they will be able to create their own API keys. Users with an ADMIN role will also be able to delete API keys created by other users with roles equal to or below their access level. Users with API Access are able to see different pages and features than users without API Access. For a quick guide on which features are available when API Access is enabled or disabled, see Table 10.2 below.

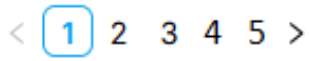
Table 10.2 API Access

Page	Feature	API Access Enabled	API Access Disabled
iTHEIA Pull API Tab (*Data Files* page)		Yes	No *(Not viewable)*
iTHEIA Pull API Tab (*Data Files* page)	Create API Key	Yes	N/A
iTHEIA Pull API Tab (*Data Files* page)	Edit API Key	Yes*	N/A
iTHEIA Pull API Tab (*Data Files* page)	Delete API Key	Yes* *ADMIN only*	N/A
iTHEIA System Management Menu			
Users	"API Access" column visible	Yes	Yes
Users – Add User	Toggle "API Access" On/Off	Yes	No *Toggle Disabled*
Users – Edit User	Toggle "API Access" On/Off	Yes	No *Toggle Disabled*
Settings	Toggle "Enable API Key Expiry" On/Off	Yes	Yes
Settings	Edit "Default API Key Expiry (days)"	Yes	Yes

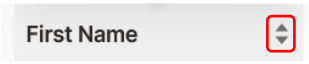
*ADMIN users can delete API keys for other users who have ADMIN or USER roles. Accounts with USER roles can only modify their own API keys.

10.2.3 Display Controls

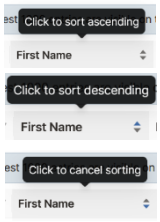
There are a number of display controls that can be used, as described below.



Navigate through the pages by selecting a page number or using the arrow buttons.



Up/down arrows appear on each column. Click on the arrows to sort in ascending or descending order as follows:



a. Click once to sort in ascending order.

b. Click again to sort in descending order.

c. Click a third time to cancel sorting settings.

10.3 SETTINGS

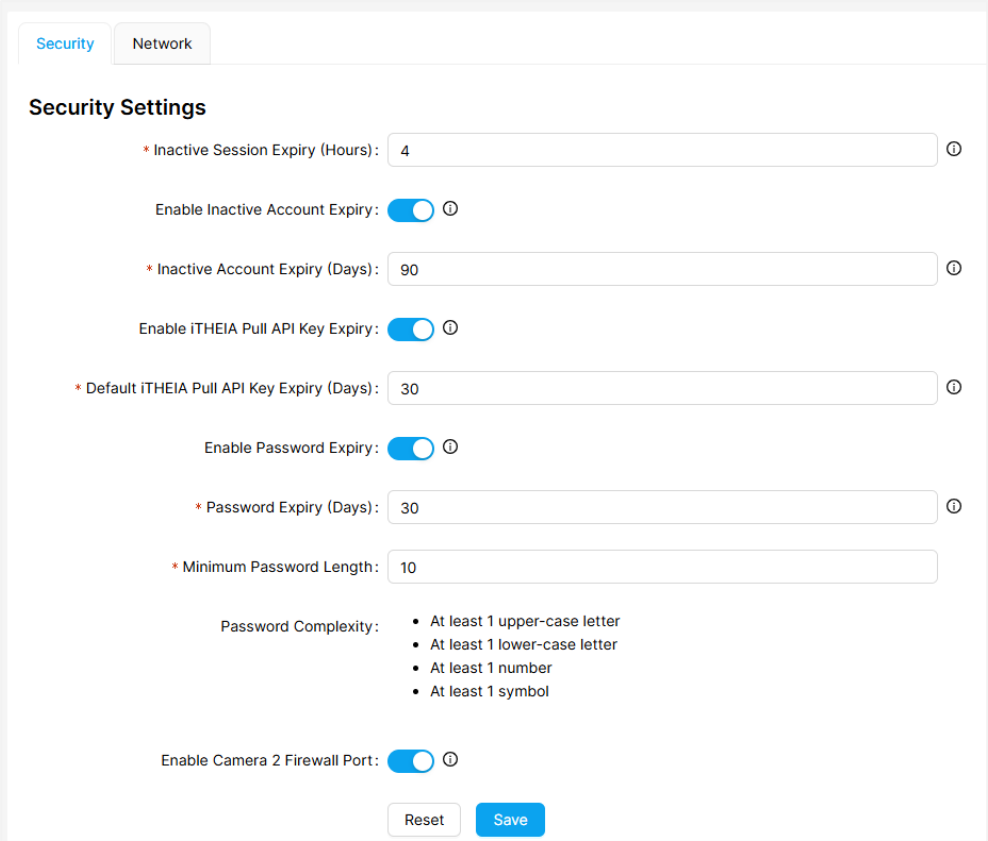


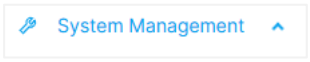
Figure 10-10 Settings Page: Security Tab

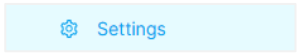
The *Settings* page allows users to change various settings using the two (2) tabs displayed:

❶ Security Tab

❷ Network Tab

To access the Settings page:

1. From the 

menu,
   - Select 

.

10.3.1 Security Settings Tab

The **Security** tab allows users to change security settings, such as password expiry, inactive session expiry and API key expiry. The **Security** tab is selected by default.

To change security settings:

1. On the *Settings* page, select the **Security** tab if needed.
2. Specify the following:
   a. *Inactive Session Expiry (Hours): *Enter the number of inactive hours that can elapse before the session automatically expires. (The value must be between 1-48.)*
   b. Enable Inactive Account Expiry: *Toggle On/Off to enable/disable the expiry of inactive USER level accounts after the Inactive Account Expiry duration has passed.*

      If this option is disabled, all USER level accounts will stay active, regardless of their inactivity duration.
   c. *Inactive Account Expiry (Days): *Enter a number of days between 30-730. USER level accounts will automatically expire after a period of inactivity exceeding this value.*

      E.g., If Inactive Account Expiry is set to 32 days, any USER level accounts that have not been active for 33 days or more will expire if Inactive Account Expiry is enabled.

      This option is hidden when Inactive Account Expiry is disabled.
   d. Enable iTHEIA Pull API Key Expiry: *Toggle On to enable the expiry of API keys. If the option is disabled, API keys will never expire.*

      When enabling API key expiry after it was previously disabled, the existing API keys without an existing expiry date will be automatically assigned an expiry date based on the default key expiry set in the field below.

      When disabling API key expiry, a warning message will be displayed informing the user that this action may put your iTHEIA system at risk.

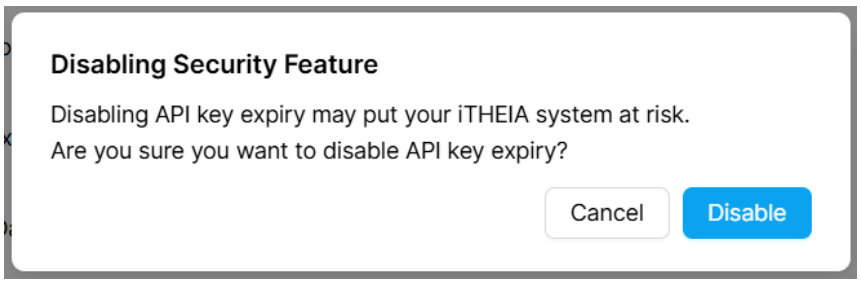


Figure 10-11 Disabling Security Feature

      Press Disable to proceed with disabling API key expiry. Press Cancel to cancel the action and keep API key expiry enabled.
   e. Default iTHEIA Pull API Key Expiry (Days): *Enter the number of days after which API keys will expire by default. This value is only the default. It will not affect previously created keys and can be overridden*

when creating new API keys. This value must be between 30-730 days. If the value is set to 31 days, keys that have been active for 31 days or more will expire.

This option is hidden when API Key Expiry is disabled.

f. Enable Password Expiry: *Toggle On to enable the expiry of passwords. Toggle Off to disable. If this option is disabled, passwords will never expire.*

g. *Password Expiry (Days): *Enter the number of days after which passwords will expire. This value must be between 30-730 days.*

This option is hidden when Password Expiry is disabled.

h. *Minimum Password Length: *Enter a minimum number of characters needed for a password. The value must be between 10-64. Complexity requirements are listed below for reference.*



If an entry meets the min/max requirements, a green checkmark will be displayed. If an entry is outside of the limits, a red icon will appear and a warning message will be displayed, as shown in the example below.

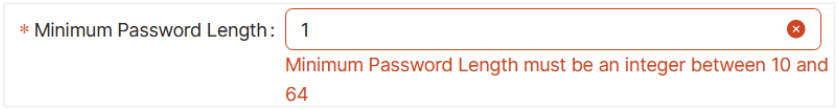


Figure 10-12 Example Warning

* Indicates a mandatory field.

i. Enable Camera 2 Firewall Port: *Toggle On to enable the firewall port for camera 2. If this option is disabled, then the camera 2 web UI cannot be accessed via the WAN IP.*

3. Press Save to save and apply all changes. Press Reset to revert back to previously saved settings.

10.3.2 Network Settings Tab

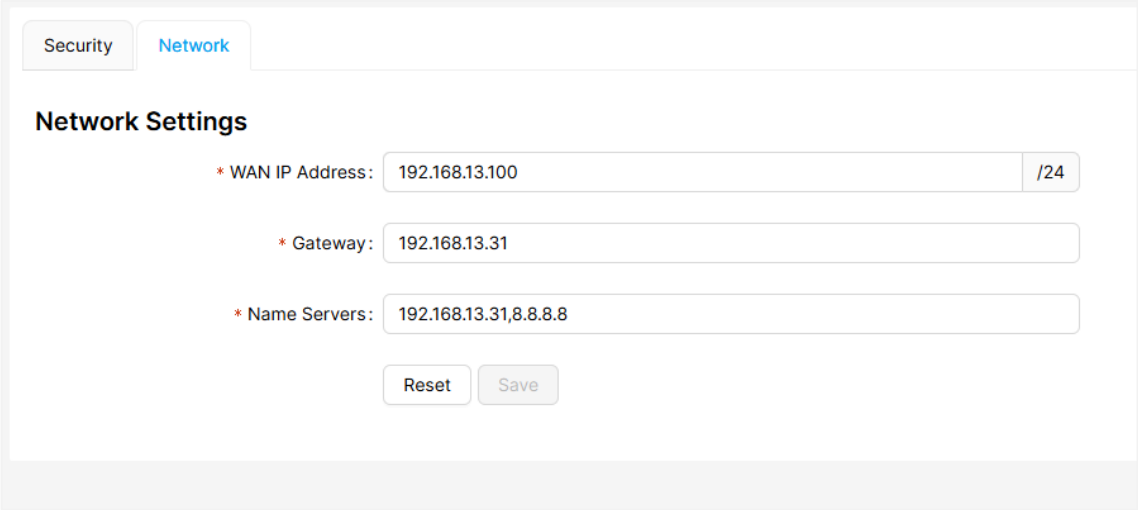


Figure 10-13 Settings: Network Tab

The **Network** tab allows users to modify the WAN IP address, Gateway and Name Servers of the user interface.

The **Network** tab is only available for Permanent iTHEIA Systems.

To change network settings:

1. On the *Settings* page, select the **Network** tab.
2. Specify the following:
   a. *WAN IP Address: *A unique IP address assigned to the device used for communication over the WAN network port 1 (e.g., "192.168.13.100").* /24 *specifies a subnet mask of 255.255.255.0*
   b. *Gateway: *The IP address of the gateway, typically a router, that connects your local network to the internet or another network (e.g., "192.168.13.31").*
   c. *Name Servers: *Server or list of servers to translate domain names into IP addresses. Listed values should be comma separated (e.g., "8.8.8.8, 192.168.13.31").*
3. Press Save to save and apply all changes. Press Reset to revert back to previously saved settings.

10.4 DISK SPACE MANAGER

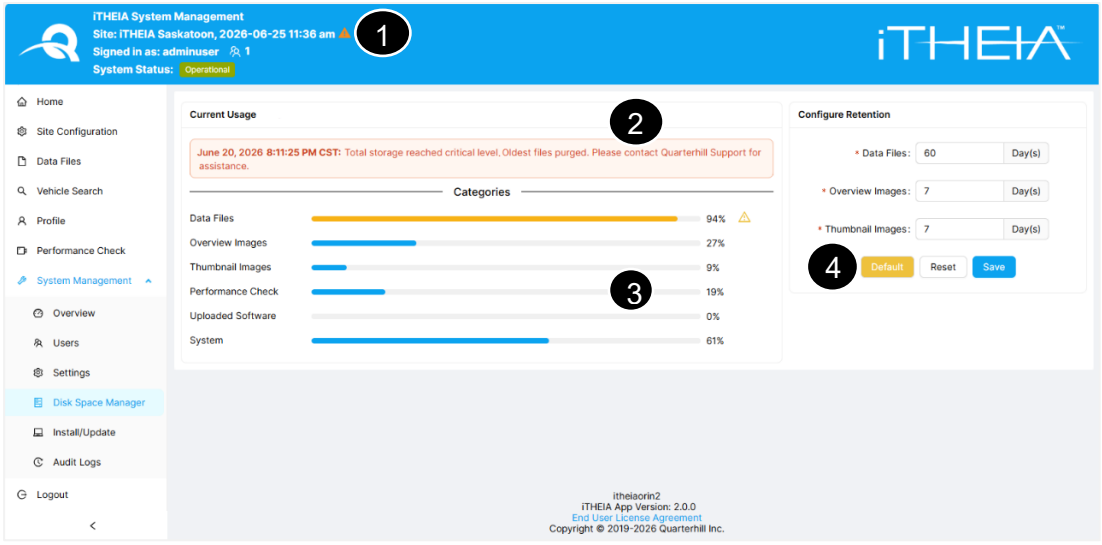


Figure 10-14 Disk Space Manager Page

The *Disk Space Manager* page provides an at-a-glance view of disk usage across all categories, along with real-time alerts and the option to configure data retention periods for certain categories.

The page is comprised of the following elements:

❶ Header Alerts

❷ Disk Usage Alerts*

❸ Category Usage Graph

❹ Configure Retention

*Disk Usage Alerts only appear if a high water mark warning is currently active.

The figure below displays the Disk Space Manager page with no disk usage alerts present.

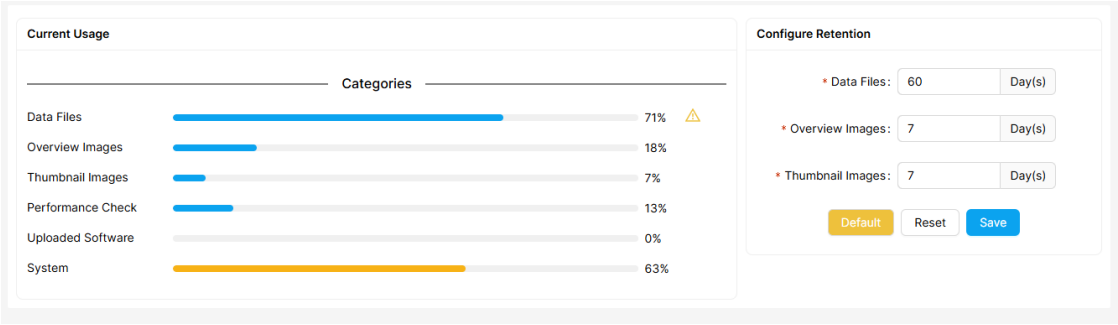
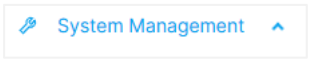


Figure 10-15 Disk Space Manager Page (No Alerts Present)

To access the Disk Space Manager page:

1. From the 

menu,
   - Select 

.
2. The *Disk Space Manager page* will be displayed.

10.4.1 Header Alerts



Figure 10-16 Header with Disk Usage Alert

All Disk Usage alerts will be displayed on the header with a warning icon .

Disk Usage Alerts on the header are only updated every 5 minutes. For Disk Usage Alerts in real time, please check the Category Usage Graph. • SEE SECTION 10.4.3. •

An alert will be displayed on the header for both category alerts and system-wide alerts.

To view Disk Usage alert details:

1. Hover over the warning icon on the header.
2. Warning details will be displayed, as shown in the example below.

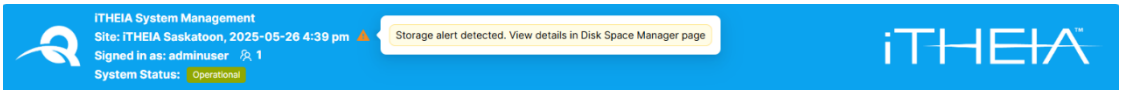


Figure 10-17 Header Alert Details (Admin User)

Users with an ADMIN role will be prompted to view details on the *Disk Space Manager* Page. Anyone logged in with a USER role will be asked to contact an administrator to investigate.

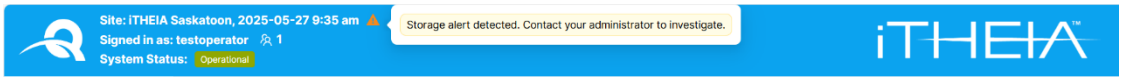


Figure 10-18 Header Alert Details (User Role)

When Disk Usage alerts are cleared, the warning icon will be removed from the header the next time the header is updated. The header is only updated every 5 minutes, so there may be a delay before the warning icon is removed.

10.4.2 Disk Usage Alerts

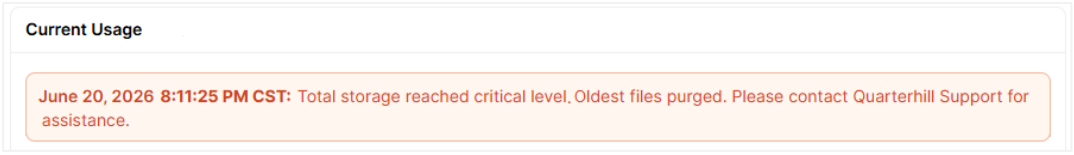


Figure 10-19 Disk Usage Alerts

A Disk Usage alert will be displayed above the Category Usage graph when system-wide disk usage exceeds the high water mark. The alert will be removed when the Disk Space Manager clears the alert.

*Disk Usage alerts only appear if a high water mark warning is currently active. Disk Usage alerts will not be displayed when there is a Category warning.

The high water mark threshold is reached when system-wide disk usage reaches 85% or higher, regardless of category usage.

The possible Disk Usage alerts include:

- "Total storage reached critical level. Oldest files purged. Please contact Quarterhill Support for assistance." *This message occurs when the disk space manager first detects that the high water mark has been reached*.
- "Storage quota exceeded. Please delete or install uploaded files to clear them from upload folder."
- "Total storage reached critical level. Files purged below configured retention level. Please contact Quarterhill Support for assistance." *Files will be purged for Data Files, Thumbnail Images, and Overview Images.*

10.4.3 Category Usage Graph

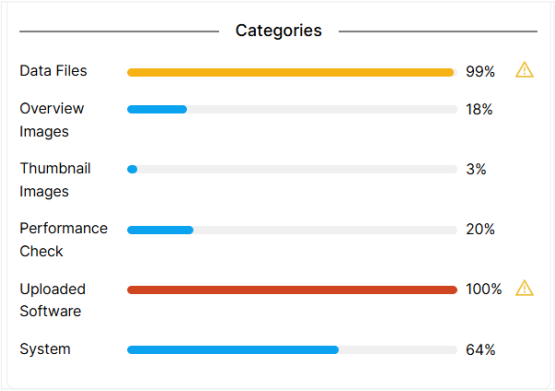


Figure 10-20 Category Usage Graph

The *Category Usage Graph* displays a progress bar for the current disk usage for each category of data. The graph is colour-coded based on usage levels.

- <90% usage
- 90-99% usage
- 100% usage

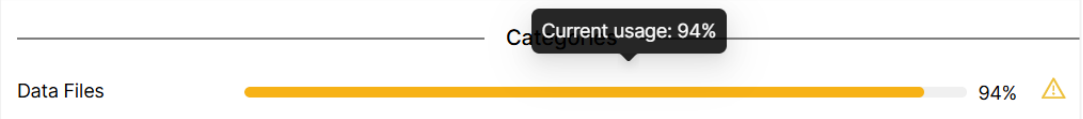
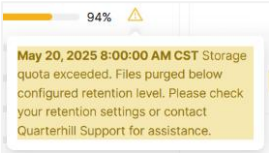


Figure 10-21 Current Usage

Hover over the progress bar to show the current usage.

A warning icon will be displayed beside a category's progress bar if a new alert has been raised that has not yet been cleared by the Disk Space Manager. There can only be one alert at a time. The warning icon will be removed when DSM clears the alert.

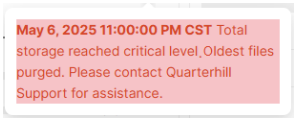


Hover over the warning icon to display the warning details. Details will include the date and time that the alert was issued, as well as the reason for the warning.

Possible warnings include:

Category Messages – These messages are displayed when the storage quota for the category has been exceeded.

- "Storage quota exceeded. Oldest files purged." *This message applies to Performance Check or Uploaded Software.*
- "Storage quota exceeded. Files purged below configured retention level. Please check your retention settings or contact Quarterhill support for assistance." *This message applies to Data Files, Thumbnail Images, and Overview Images.*



High Water Mark Messages – These messages are displayed when the storage for the overall system has exceeded the high water mark (≥85%).

- "Total storage reached critical level. Oldest files purged. Please contact Quarterhill Support for assistance." *This message occurs when the disk space manager first detects that the high water mark is first* detected.
- "Storage quota exceeded. Please delete or install uploaded files to clear them from upload folder." *This message appears for Data Files, Overview Images, Thumbnail Images, Performance Check, Uploaded Software, and System.*
- "Total storage reached critical level. Files purged below configured retention level. Please contact Quarterhill Support for assistance." *Files will be purged for Data Files, Thumbnail Images, and Overview Images.*

10.4.4 Configure Retention

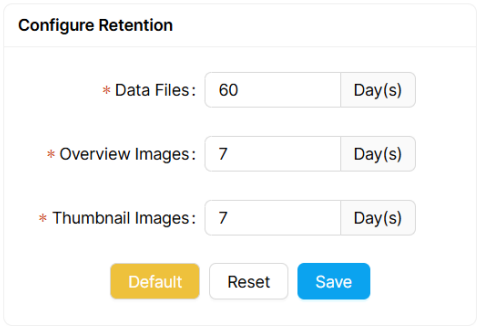


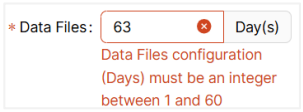
Figure 10-22 Configure Retention

The *Configure Retention* pane allows users to modify the number of days that data files, overview images, and thumbnail images are retained before being purged.

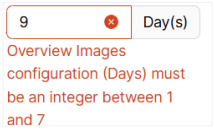
To configure retention settings:

1. Enter the number of days to retain data files. You can type the number directly into the field or use the arrow buttons to adjust the values. The value must be between 1 and 60. If the value is valid, a green checkmark will appear beside it.

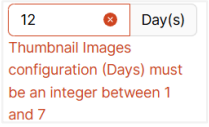
   If a value outside of this window is used, an error message will be displayed. Enter a value that fits within the parameters and try again.



2. Enter the number of days to retain overview images. The value must be between 1 and 7. A green checkmark will appear if the value is valid. *If a value outside of this window is used, an error message will be displayed. Enter a value that fits within the parameters and try again.*



3. Enter the number of days to retain thumbnail images. The value must be between 1 and 7. A green checkmark will appear if the value is valid. *If a value outside of this window is used, an error message will be displayed. Enter a value that fits within the parameters and try again.*



4. When all changes have been entered, press Save. • TO RESET CONFIGURATION OR RESTORE DEFAULT VALUES, SEE INSTRUCTIONS BELOW. •

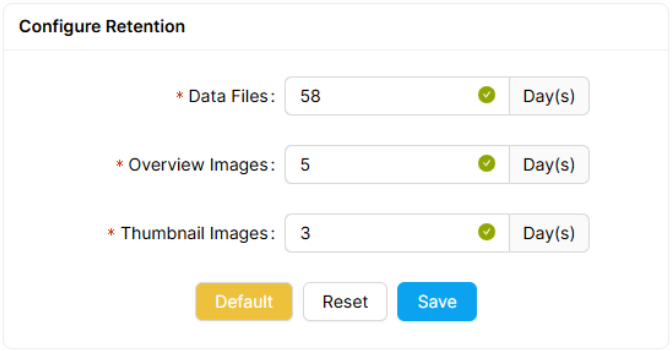


Figure 10-23 Configure Retention Changes

5. A pop-up window will be displayed asking the user to confirm the configuration changes that will be saved.

If the new retention value is lower than the previous values, data from that category that is older than the new retention value will be permanently deleted.

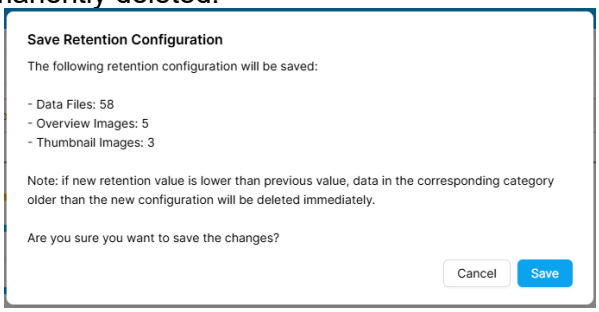


Figure 10-24 Save Retention Configuration

6. A success message will be displayed showing that the configuration was saved successfully.

To reset configuration changes:

1. Press Reset to discard all changes and revert to the previously saved values. A confirmation message will be displayed. Press Reset to proceed with discarding the changes. *Press* Cancel *to keep your changes and exit out of the Reset confirmation window.*

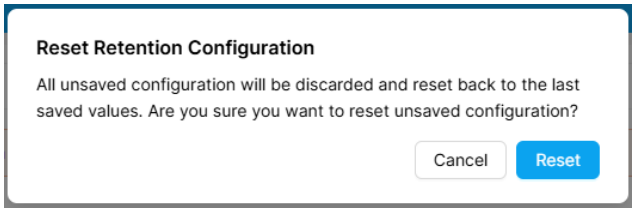


Figure 10-25 Reset Retention Configuration

2. A confirmation message will be displayed if the configuration was reset successfully.

To restore default values:

1. Press Default to revert to the default values. Press Save to restore the default retention configuration. *Press* Cancel *to cancel the action and return to the values you last entered.*
2. A confirmation message will be displayed if the configuration was reset successfully.

10.5 INSTALL/UPDATE

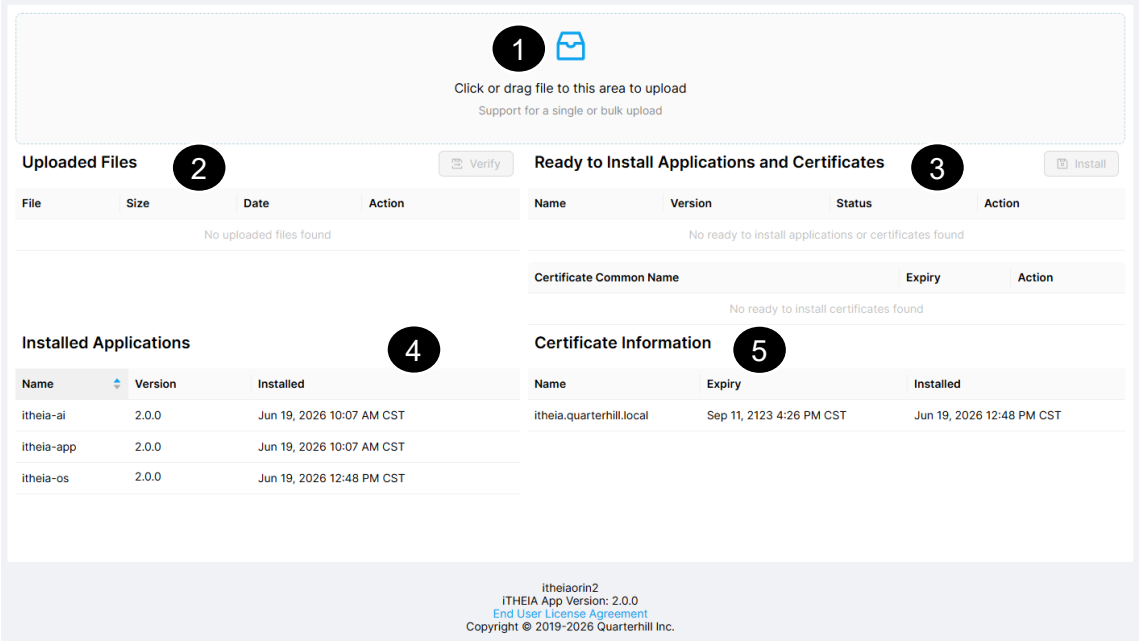


Figure 10-26 Install/Update

The *Install/Update* page provides an access point from which users can view and/or upload and install applications and certificates.

The following information is displayed:

❶ File Upload Area

❷ Uploaded Files

❸ Ready to Install Applications and Certificates

❹ Installed Applications

❺ Certificate Information

10.5.1 File Upload Area

The *File Upload Area* allows users to upload and install applications or certificates.

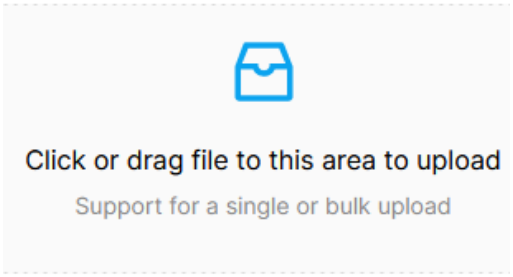
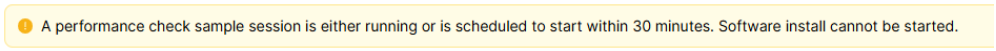


Figure 10-27 File Upload Area

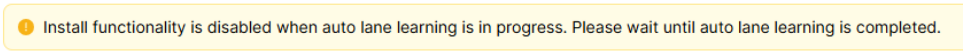
10.5.1.1 Upload and Install an Application File

Follow the steps below to upload and install an application file.

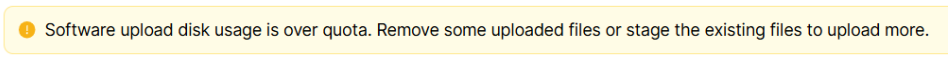
Users cannot install software when a performance check sample session is running or scheduled to start within 30 minutes. A warning will be displayed. Please wait until the session is complete to begin the installation process.



Users cannot install software when auto-lane learning is in progress. Please wait until auto lane learning is complete before proceeding.



If the software upload folder is over quota, a warning will be displayed, and users will be unable to upload new files.



The system will allow a user to upload a single file that exceeds the disk usage quota for the software upload folder. This exception allows a user to upload a new iTHEIA OS application (.7z) to receive the updated software upload folder quota defined in the new iTHEIA OS version.

Once the user has uploaded a file that exceeds the software upload folder quota, the upload box will be disabled, and the user will be unable to upload more files until more space has been made.

To upload an application file:

1. Click and drag an application (.7z) file into the *File Upload Area*.

   The File Upload Area will be disabled and a warning will be displayed if the software upload quota is currently exceeded.

2. While an upload is underway, a progress bar will be displayed to show its level of completion.

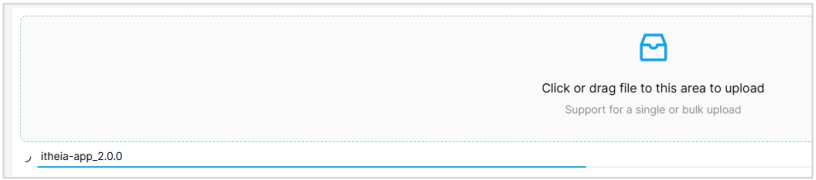


Figure 10-28 Upload in Progress

3. Once a file has been uploaded, it will appear under *Uploaded Files.*

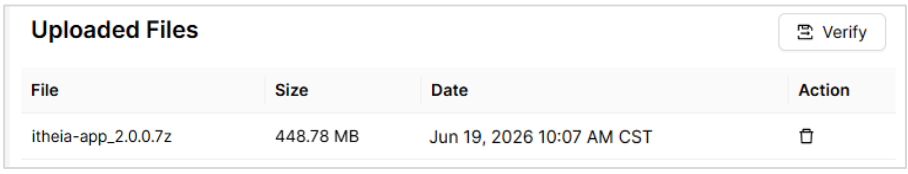


Figure 10-29 Uploaded Files

An error may occur if the uploading process is interrupted, such as in the case of a network outage. If this happens, try uploading the file again. If necessary, contact Quarterhill for assistance.

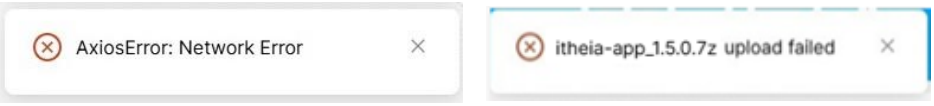


Figure 10-30 Network Error and Upload Failure Warnings

To install the uploaded file:

4. Click Verify to verify that the file is valid and all dependency requirements are met. A pop-up message will be displayed to show that apps are being staged. If the file verification has been completed successfully, a success message will be displayed.

   If the uploaded file was invalid, an error message will be displayed. Upload a valid file and attempt the verification process again.

5. The file will appear under *Ready to Install Applications and Certificates* with its current status. The status must be 'OK' to proceed with the installation. When installing an application file and certificate at the same time, the associated certificate and expiry date will also be displayed (*not shown here*).

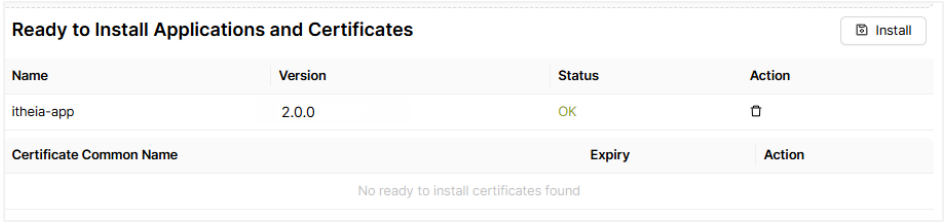


Figure 10-31 Ready to Install Applications

Note: If there is a 'Fail' status, refer to SECTION 10.5.1.1.1.

6. Click Install. A pop-up message will be displayed warning the user that any other users will be forced to log out. Press Yes to proceed with the installation. Press No to cancel the action.

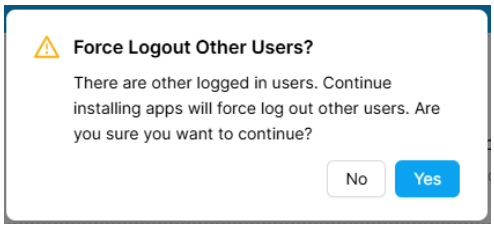


Figure 10-32 Force Logout Users

If a performance check sample session is running or scheduled to run within 30 minutes, the Install button will be disabled. Please wait until the session is complete to install uploaded files.

If auto-lane learning is in progress, the Install button will be disabled. Please wait until auto-lane learning is complete to install files.

7. A message will be displayed to show the installation progress.

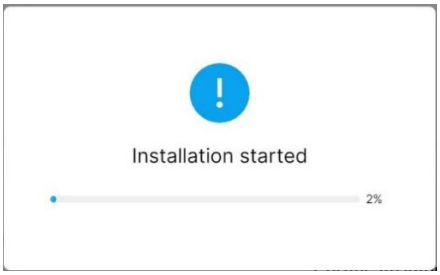


Figure 10-33 Installation Progress

8. When the installation is complete, a success message will be displayed.

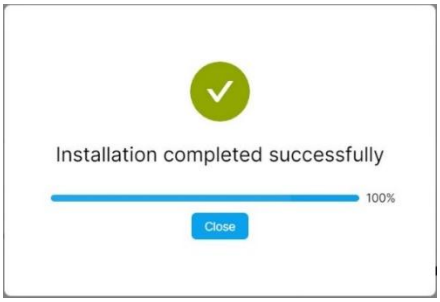


Figure 10-34 Installation Complete

9. The installed application will now appear under *Installed Applications*.

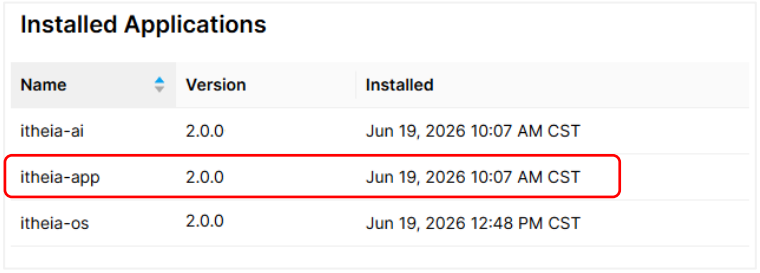


Figure 10-35 Example of Installed Application

10.5.1.1.1 Install an Application with a Failed Status

A file must be verified to ensure it is valid and all dependency requirements are met. If the file verification fails for any reason, an error message will be displayed.

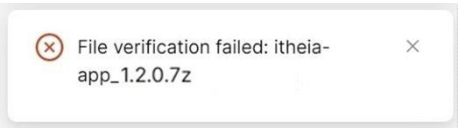


Figure 10-36 Fail Message

If the file verification fails, the file will still appear under *Ready to Install Applications*, but it will display a 'FAIL' status, as shown below. Hover over the status for a pop-up message to be displayed with the reason for failure. In the example below, the application could not be verified because of a dependency failure.

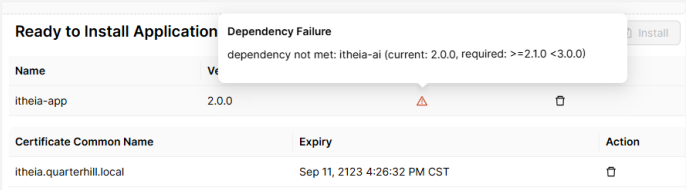


Figure 10-37 Ready to Install Application – Status: Fail (Dependency Failure)

To install an application with a dependency failure:

1. Take note of the dependency that is missing. In the above example, the "itheia-app" failed due to a version of "itheia-ai" greater than 2.1.0 and less than 3.0.0 not being installed.
2. Locate the necessary dependencies (e.g., "itheia-ai 2.1.0") on your computer and install them by following the steps in SECTION 10.5.1.1.
3. Once the needed dependencies have been installed, the status of the original application should update to OK. Once the status is OK, proceed with the installation as usual.

Another possible error can occur, as shown below. In this case, an unexpected error occurred during the verification process. Please contact Quarterhill for support.

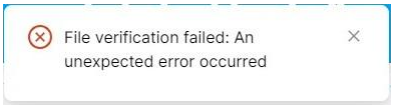


Figure 10-38 File Verification Needed

10.5.1.2 Upload and Install a Certificate File

Follow the steps below to upload and install a certificate.

To upload a certificate:

1. Click and drag a certificate (.crt) file as well as its corresponding private key (.key) file into the File Upload Area.
2. While an upload is underway, a progress bar will be displayed to show its level of completion.



Figure 10-39 Certificate Upload in Progress

3. Once the files have been uploaded, they will appear under *Uploaded Files*.

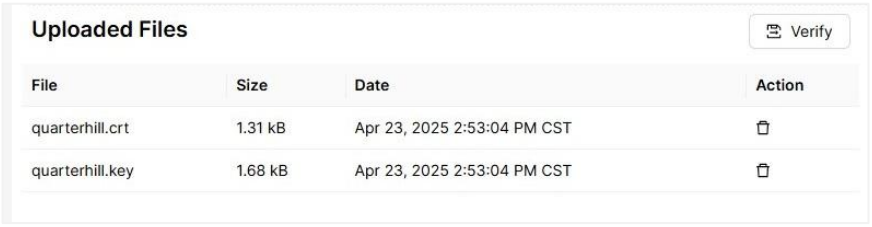


Figure 10-40 Uploaded Files

To install the uploaded certificate file:

4. Click Verify to verify that the files are valid and all dependency requirements are met. If the file verification has been completed successfully, a success message will be displayed.

   The certificate file and private key file must be installed at the same time. If the user has only uploaded one of the two files, or if the certificate and key files do not match, an error message will be displayed, as shown below.

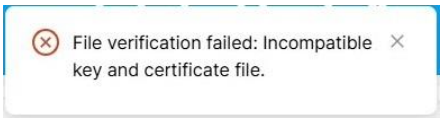


Figure 10-41 Incompatible Key and Certificate File

   Please upload the missing file and press Verify *again to proceed.*

5. The certificate file will appear under Ready to Install Applications and Certificates. Its expiry date will also be displayed.

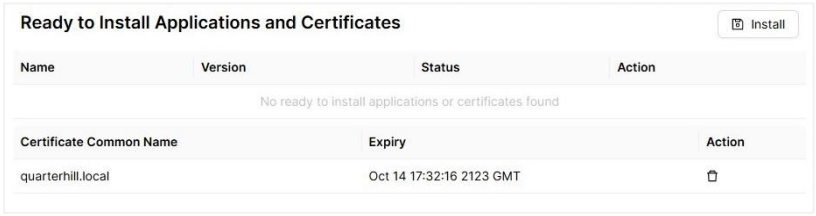


Figure 10-42 Ready to Install Certificate

3. Click Install. A pop-up message will be displayed warning the user that any other users will be forced to log out. Press Yes to proceed with the installation. Press No to cancel the action.

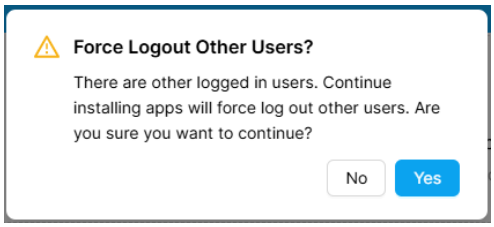


Figure 10-43 Force Logout Users

6. A message will be displayed to show the installation progress.

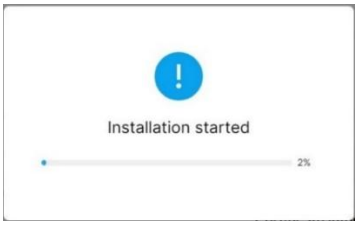


Figure 10-44 Installation Progress

7. When the installation is complete, a success message will be displayed.

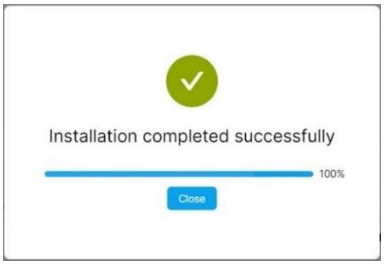


Figure 10-45 Installation Complete

When installing a certificate, a web certificate error may occur. PLEASE REFER TO SECTION 10.5.1.2.1 FOR FURTHER INSTRUCTIONS.

8. The installed certificate will now appear under Certificate Information.

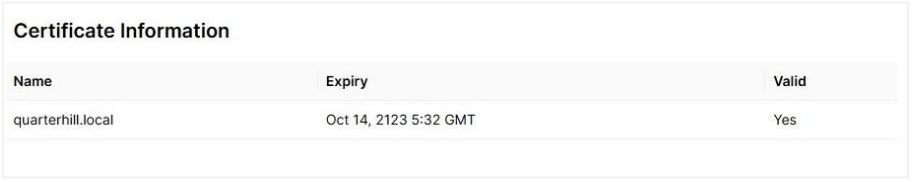


Figure 10-46 Installed Certificate

10.5.1.2.1 Error when Installing a New Certificate

When the file being installed requires a new web certificate, an error will occur as shown below. This error occurs because the new web certificate is not trusted.

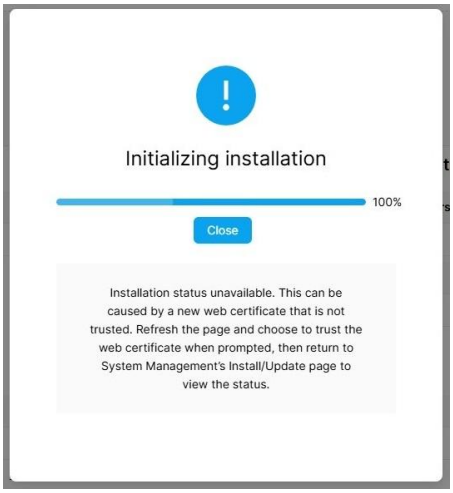


Figure 10-47 Web Certificate Error

To proceed with the installation:

1. Refresh the page.
2. A security error may appear, as shown below. *Note: The error shown below is displayed when using Firefox. The error will be displayed differently depending on the browser being used.*

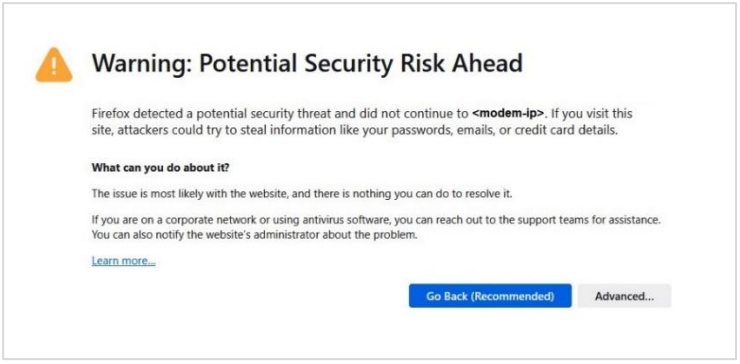


Figure 10-48 Security Risk Warning

3. Click Advanced... . Another error will appear, as shown below. *Error will vary depending on the browser used.*

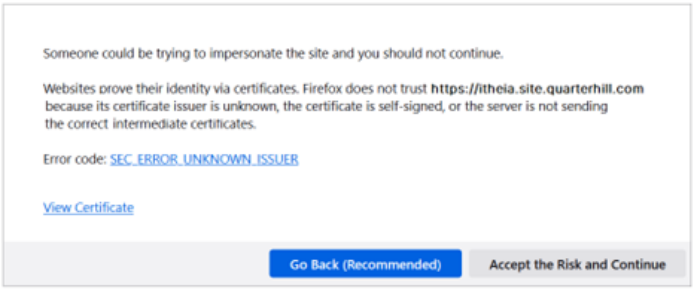


Figure 10-49 Certificate Warning

4. Press Accept the Risk and Continue .
5. The user will be redirected back to the *Install/Update* page.

   If the browser is left inactive for too long, the user may need to log in again.
6. The installation process will continue where it left off.
7. When the installation is complete, a success message will be displayed.

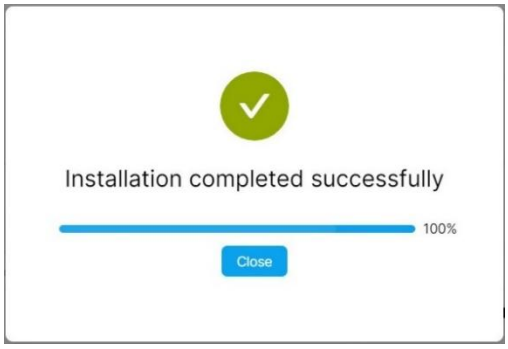


Figure 10-50 Installation Successful

8. The installed certificate will now appear under Certificate Information.

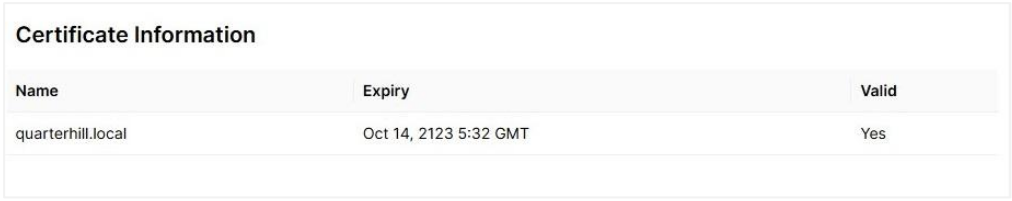


Figure 10-51 Example of Installed Applications

10.5.2 Uploaded Files

The *Uploaded Files* pane displays the files that have been uploaded but are not yet verified.

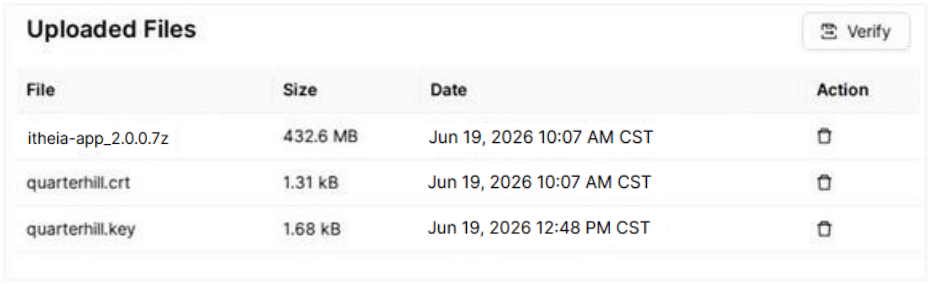


Figure 10-52 Uploaded Files

10.5.2.1 Verify



Click to verify that the uploaded file is valid and all dependency requirements are met. After verification, the file will appear under *Ready to Install Applications*. • SEE SECTION 10.5.3 READY TO INSTALL APPLICATIONS AND CERTIFICATES •

10.5.2.2 Delete



Click to delete a file.

10.5.3 Ready to Install Applications and Certificates

The *Ready to Install Applications and Certificates* pane displays files and certificates that have been uploaded and verified. A Status is shown for each application.

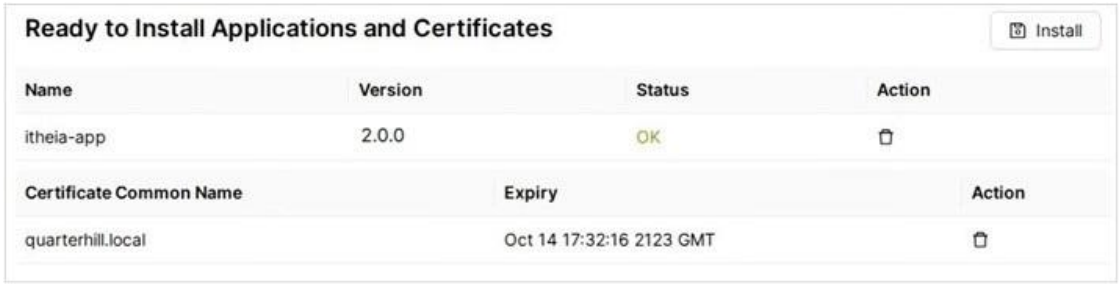


Figure 10-53 Ready to Install Applications

10.5.3.1 Statuses

There are two possible statuses, as shown below:

OK — File is valid and meets all dependency requirements. It is ready to be installed.

⚠ FAIL — File is invalid or does not meet all dependency requirements. The file cannot be installed until all dependencies have been installed.

10.5.3.2 Install

Install — Click to install the application or certificate. The status must be OK for a file to be installed.

10.5.3.3 Delete

Click to delete a file. It will be deleted from the system.

10.5.4 Installed Applications

The *Installed Applications* pane displays all applications that have been successfully installed.

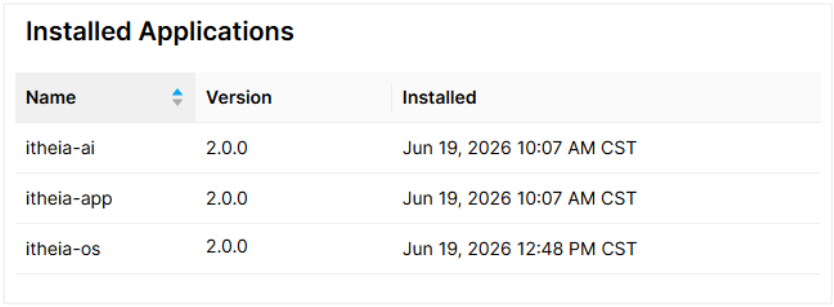


Figure 10-54 Installed Applications

The following information is listed for each application:

a. Name of the application
b. Version number
c. Date and time on which the application was installed

10.5.5 Certificate Information

The *Certificate Information* pane lists the certificates that have been installed.

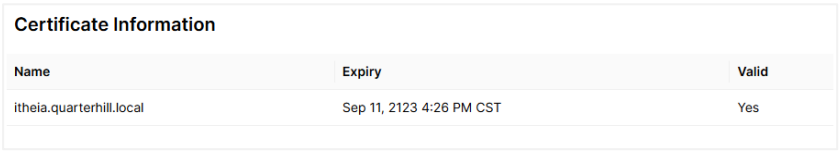


Figure 10-55 Certificate Information

The following information for each certificate is displayed:

a. Name: *Name of certificate.*
b. Expiry: *Date of Expiry in Month, Day, Year, Time, and GMT ± format.*

c. Valid: *States whether certificate is still valid* (*Yes/No).*

10.5.5.1 Valid Status

The *Valid* status indicates whether the certificate is still valid.

Yes	Certificate is valid.
No	Certificate is no longer valid and may be expired. A new certificate must be installed. • FOR INSTALLATION INSTRUCTIONS, SEE SECTION 10.5.1.1 •

10.6 AUDIT LOGS

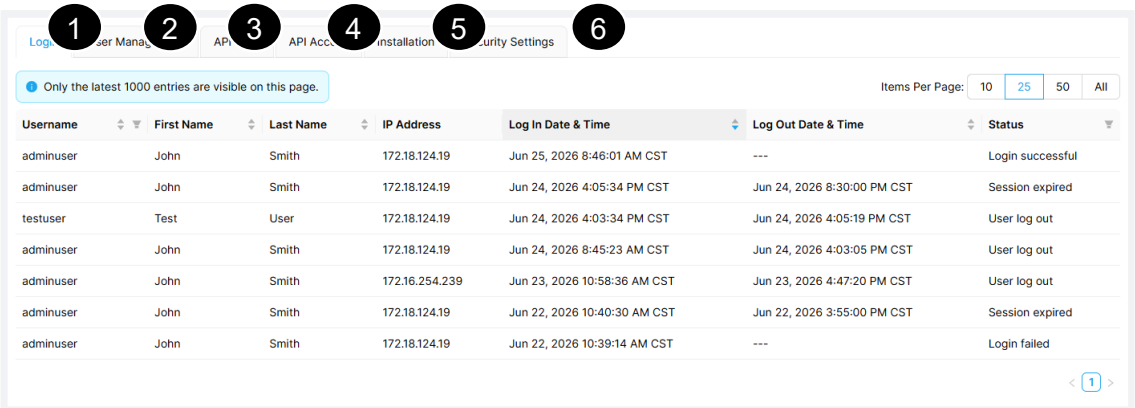


Figure 10-56 Audit Logs

All changes to the system are saved as an audit log. The *Audit Logs* page allows administrators to view these audit logs using the six (6) tabs displayed:

❶ Login Tab

❷ User Management Tab

❸ API Keys Tab

❹ API Access Tab

❺ Installation

❻ Security Settings

The *Audit Logs* page is only viewable for accounts with ADMIN access.

10.6.1 Login Tab

The **Login** tab displays all of the login attempts that have been made on the system.

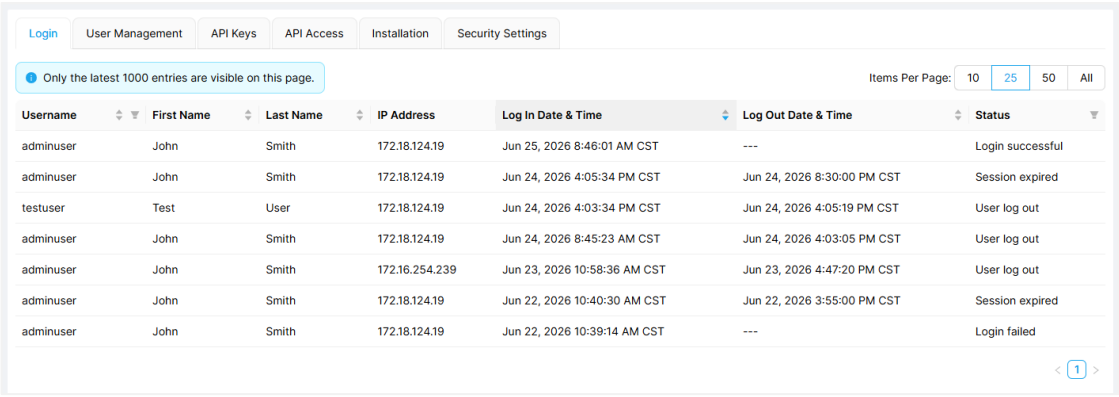


Figure 10-57 Login Tab

Only the latest 1,000 entries are visible on this page.

Information for each login includes:

a. Username: *Account username.*
b. First Name: *First name of user, as defined under Users section.*
c. Last Name: *Last name of user, as defined under Users section.*
d. IP Address: *IP Address of user logging in.*
e. Log In Date & Time: *Time of login (Month/Day/Year/Time/GMT±).*
f. Log Out Date & Time: *Time user logged out (Month/Day/Year/Time/GMT±).*
g. Status: *Displays status of login attempt. Possible statuses include:*
   - *Login successful*
   - *Login failed*
   - *Session expired*
   - *User log out*
   - *Access denied*

10.6.1.1 Display Controls and Filters

There are a number of display controls and filters that can be used, as described below.

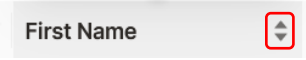


Select a number to choose how many entries are displayed per page. Click

to show all entries on one page.



Select a page number or scroll through the pages using the arrows.

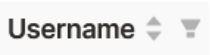


Up/down arrows appear on each column. Click on the arrows to sort in ascending or descending order as follows:



a. Click once to sort in ascending order.
b. Click again to sort in descending order.
c. Click a third time to cancel sorting settings.

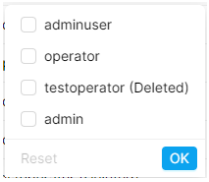
Username Filter



Allows user to filter entries based on username.

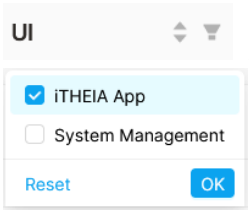
Previously deleted usernames will still appear in the audit logs – indicated by *"(Deleted)"* to the right of the name.

To filter login entries based on username:



1. Click the button based on username.
2. A pop-up will be displayed with all of the possible users.
3. Click to select or deselect usernames that will appear in the **Login** tab. Only usernames with a will appear.
4. Press **OK** to save changes. Press **Reset** to cancel filters.
5. The username column will be updated to only display the selected usernames (if filters are applied).

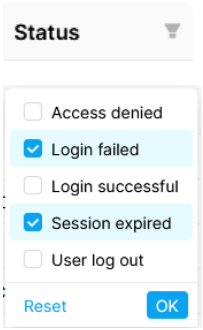
UI Filter



Allows user to filter entries based on which user interface was used.

- Select which user interface logins to display.

Status Filter



Allows user to filter entries based on login status.

- Select which login status(es) to display.

10.6.2 User Management Tab

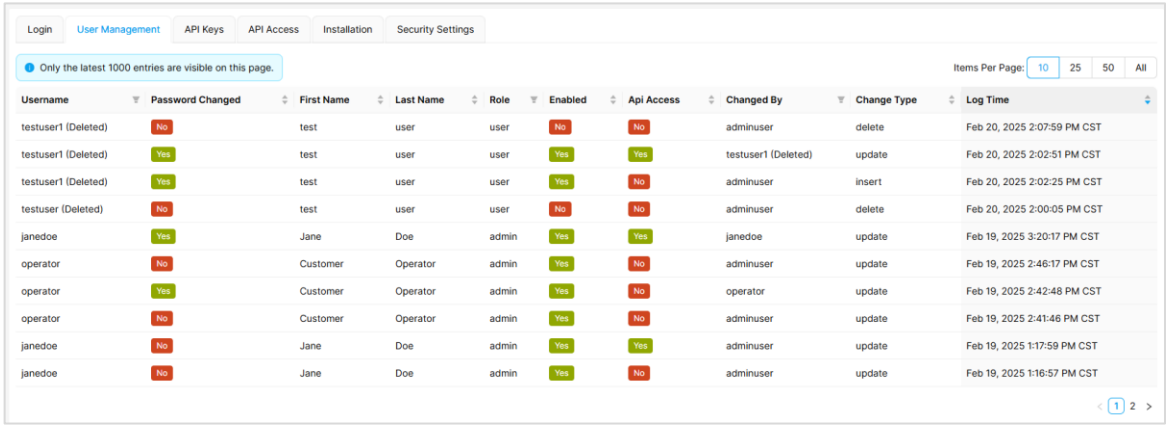


Figure 10-58 User Management Tab

The **User Management** tab displays every instance in which a user was created or changed.

The following information is displayed for each user update:

a. Username: *Username of account that was changed.*

b. Password Changed: *Indicates whether the password was changed.*

Yes *Password was changed during update.*

No *Password was not changed.*

c. First Name: *First name of user.*

d. Last Name: *Last name of user.*

e. Role: *Role assigned to user.*

f. Enabled: Indicates whether the user account was enabled during the update.

Yes *User was enabled.*

No *User was disabled.*

g. API Access: Indicates whether the user had API access enabled during the update.

Yes *API access was enabled.*

No *API access was disabled.*

h. Changed By: *The user who was logged in when making the change.*

i. Change Type: *Indicates the type of update performed. Options include:*

- *update*
- *insert*
- *delete*

j. Log Time: *Time that the change took place (Month/Day/Year/Time/GMT±)*

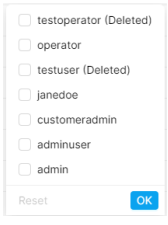
10.6.2.1 Display Controls and Filters

• SEE SECTION 10.6.1.1 DISPLAY CONTROLS AND FILTERS FOR FULL DESCRIPTION OF DISPLAY CONTROLS AND FILTERS •

Entries can be filtered by username, role, or 'changed by' user.

Previously deleted usernames will still appear in the audit logs – indicated by *"(Deleted)"* to the right of the name.

To filter entries by username:



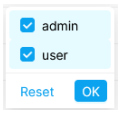
Click button.

1. Select users to be displayed.
2. Press **OK**.
3. Entries will be filtered so that only selected usernames will be displayed on the **User Management** tab.

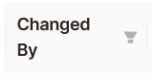


To filter entries by role:

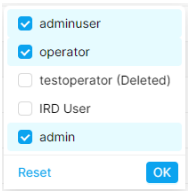
1. Click button.



2. Select roles to be displayed.
3. Press **OK**.
4. Entries will be filtered so that only selected roles will be displayed on the **User Management** tab.



To filter entries by 'Changed by' user:



1. Click button.
2. Select 'Changed by' users to be displayed.
3. Press **OK**.
4. Only entries that were changed by the selected user(s) will be displayed on the **User Management** tab.

10.6.3 API Keys Tab

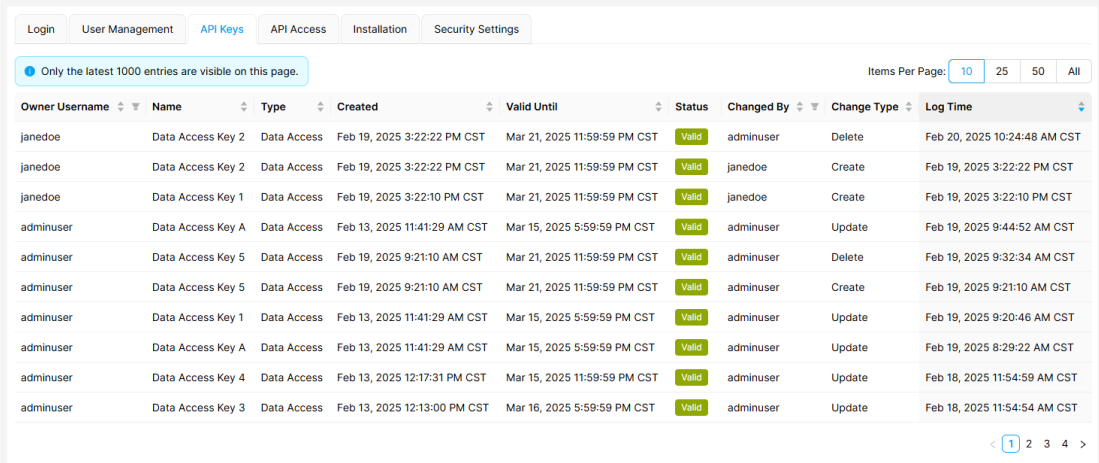


Figure 10-59 API Keys Tab

The **API Keys** Tab shows a record of every instance in which an API key was created, changed or deleted. The following information is displayed for each action performed on an API key:

a. Owner username: *Username of the user who created the API key*.
b. Name: *The name of the API key*.
c. Type: *The type of API key. The only available type is 'Data Access.'*
d. Created: *The date and time that the API key was created*.
e. Valid Until: *The date until which the API key will remain valid. After this date and time have passed, the API key will expire.*
f. Status: *The current status of the API key (Valid or Expired).*
g. Changed By: *The username of the user who changed the API key*.

If an API key was expired by the system, the 'Changed By' column will show "System" instead of a username.

h. Change Type: *The type of change performed by the user. The possible change types include:*

i. Create: The user created a new API key.

ii. Delete: The user deleted the API key.

iii. *Update: The user edited the API key.*

i. Log Time: *The date and time that the user performed the action on the API key.*

10.6.4 API Access Tab

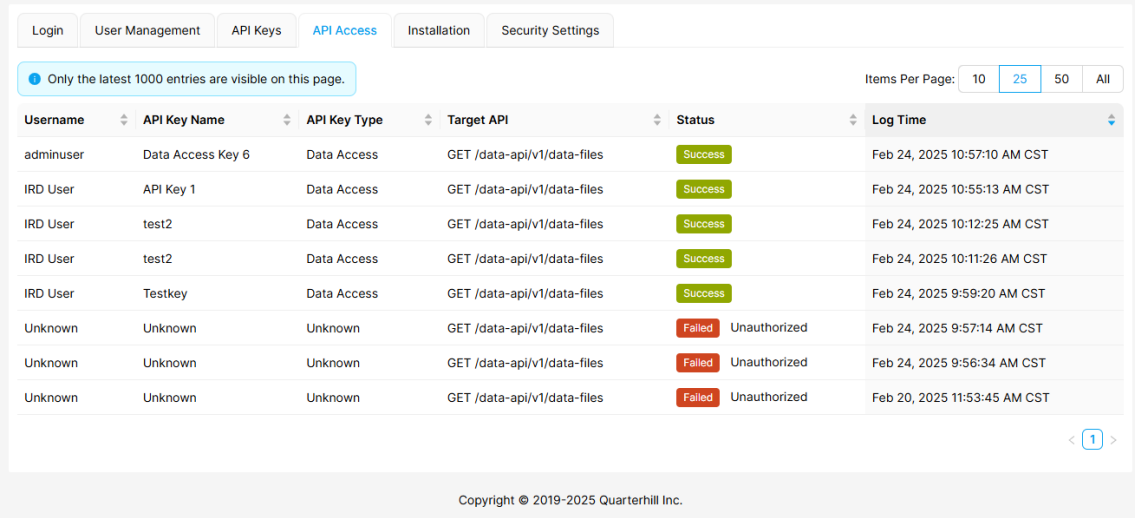


Figure 10-60 API Access Tab

The **API Access** Tab displays information about any attempts made by users to access data files using an API key.

The following information is displayed:

a. Username: *Username of the user who created the API key*.

b. API Key Name: *The name of the API key*.

c. API Key Type: *The type of API key. The only available type is 'Data Access.'*

d. Target API: *The API endpoint to which the user sent the request.*

e. Status: *Displays whether the API request was successful or failed.*

i. Success: *The user was able to successfully retrieve data files using the API request for the given date.*

ii. Failed: *The API request failed. The error type, or reason for the failure, will be displayed next to the status. The possible error types are as follows:*

- *Unauthorized: Indicates that the API key was invalid.*
- *Too Many Requests: Indicates that the client sent too many requests within a period of time and triggered the API server's rate limit protection.*
- *Bad Request: Indicates that the client request was malformed.*

- *Internal Server Error: Indicates that the API server encountered an unexpected error while processing the request.*

f. Log Time: *The date and time when the API request was performed.*

10.6.5 Installation Tab

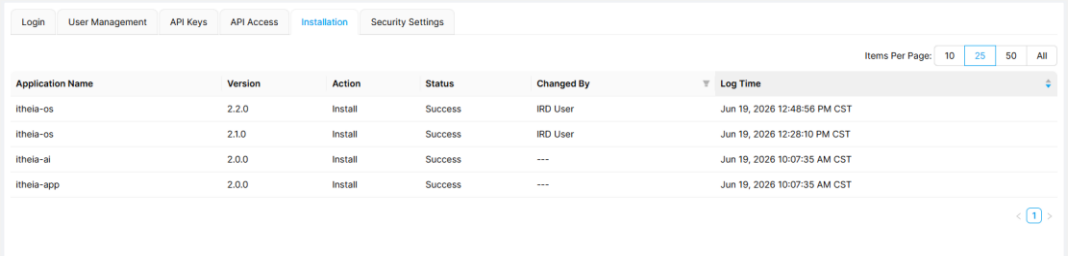


Figure 10-61 Installation Tab

The **Installation** tab displays a listing of all applications and certificates that have been uploaded or installed on the system using the *Install/Update* page.

For this section, 'application' will refer to an application *or* certificate.

The following information is displayed for each installation log:

a. Application Name: *Name of the application installed.*

b. Version: *Version number of application installed.*

c. Action: *The action that was taken for the application. Options include:*

- Install: *The user attempted to install a ready-to-install application.*
- Stage: *The user attempted to verify an uploaded file.*
- Unstage: *The user removed the application from the area (e.g., removed the application from the Ready-to-Install pane).*

d. Status: Displays the current status of the application being installed. Statuses include:

- Success: *The attempted action was successful.*
  Note: Each application may have one or more component(s) requiring installation. Information in parentheses indicates which components of the application were installed successfully.

  Success (postgres:16.1-alpine)

  If there is no information included, then the entire application was installed successfully.

  Success

- Failed: *The attempted action failed.*

  Information in parentheses indicates which components of the application failed to be installed.

  Failed (postgres:16.1-alpine)

- Start Install: *Installation process was started. It is not yet known whether it has succeeded or failed.*

e. Changed By: *Displays username of user who installed the application.*

f. Log Time: *Time that the installation occurred (Month/Day/Year/Time/GMT±).*

10.6.6 Security Settings Tab

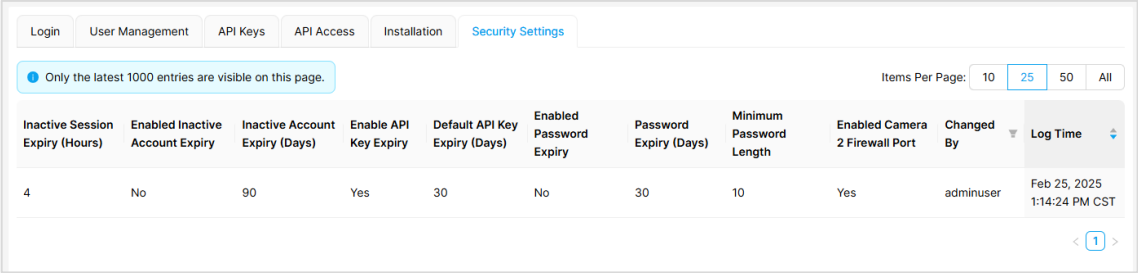


Figure 10-62 Security Settings Tab

The **Security Settings** tab displays each time security settings have been changed from the *Settings* Page.

The following information is displayed for each instance in which a change was made to the settings:

a. Inactive Session Expiry (Hours): *Number of inactive hours that can elapse before the session automatically expires.*

b. Enabled Inactive Account Expiry: *Indicates whether inactive account expiry is enabled (Yes/No).*

c. Inactive Account Expiry (Days): *Number of days of inactivity after which USER level accounts will automatically expire.*

d. Enable API Key Expiry: *Indicates whether API Key Expiry is enabled (Yes/No).*

e. Default API Key Expiry (Days): *Indicates the current default API key expiry setting in number of days.*

f. Enabled Password Expiry: *Indicates whether password expiry is enabled (Yes/No).*

g. Password Expiry (Days): *Number of days after which passwords will expire.*

h. Minimum Password Length: *Minimum number of characters for passwords that was entered.*

i. Enabled Camera 2 Firewall Port: *Indicates whether the Camera 2 firewall port is enabled (Yes/No). If disabled, then the camera 2 web UI cannot be accessed via the WAN IP.*

j. Changed By: *User who made the changes to the settings.*

k. Log Time: *Time at which the user made the changes (Month/Day/Year/Time/GMT±)*

10.7 LOGOUT

To log out:

1. Click the Logout option to log out of the iTHEIA Web User interface.
2. A pop-up message will be displayed asking you to confirm the action.

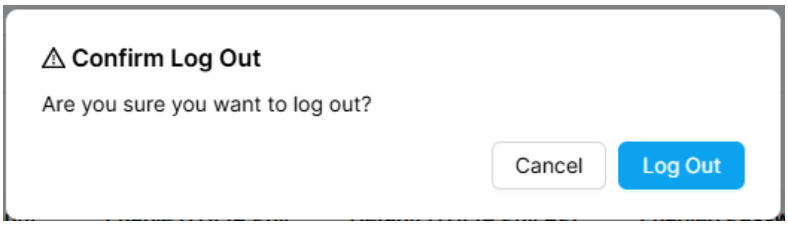


Figure 10-63 Confirm Log Out

3. Click Log Out to confirm the action and end the session. You will be logged out of the iTHEIA User Interface. *Click* Cancel *to cancel the action and continue using the iTHEIA user interface.*

11 TROUBLESHOOTING

11.1 ITHEIA™ APPLICATION ISSUES

Issue	Action
Trouble Accessing the Login Page	▪ Check physical network connection between system and laptop. ▪ Ensure laptop is in DHCP mode and allow time for connection to establish – up to 3 minutes. ▪ Try an alternate web browser. ▪ Try restarting the unit. ▪ If the problem persists, please contact your administrator.
Live View not Working	▪ Disconnect and reconnect the camera. ▪ Check that the RTSP configuration is correct. ▪ Check that the camera has power. A power LED should be visible within the camera dome for a few moments while the portable camera is powering up or under the cover of the permanent camera.
System not Counting	▪ Press **F5** to refresh the browser ▪ Press **Logout** from the side menu and log in again. ▪ Check if the display lanes are configured properly. ▪ Test by temporarily adding a new lane, where the lane boundary lines encompass several lanes and apply. ▪ Check connection to camera and ensure that it is properly aligned.
System not Classifying Correctly	▪ Using the performance check, record a sample session, review the vehicles and mark the incorrect ones, download the sample and report, and then send to Quarterhill support for review. ▪ Take screenshots of the misclassified vehicles or right click and save the vehicle thumbnail and overview images for context, and then send by email with comments on the correct classification to Quarterhill support for review.

Trouble Downloading Files	
▪ **Timeout Error**	▪ Try selecting a shorter date range.
▪ **Other**	▪ Check Network Connection. ▪ Firewall could be preventing the download.
Camera Video Quality Issues (Stutter, artifacts, broken images, or intermittent connection lost)	▪ Check if there are multiple connections playing the camera video feed from the same iTHEIA system. If so, coordinate with personnel to reduce the number of concurrent video connections so the portable system's internet connection is not overloaded. ▪ If viewing remotely, the video feed will be limited by the available bandwidth of the connection.

11.2 QUARTERHILL SUPPORT

Please contact Quarterhill for support.

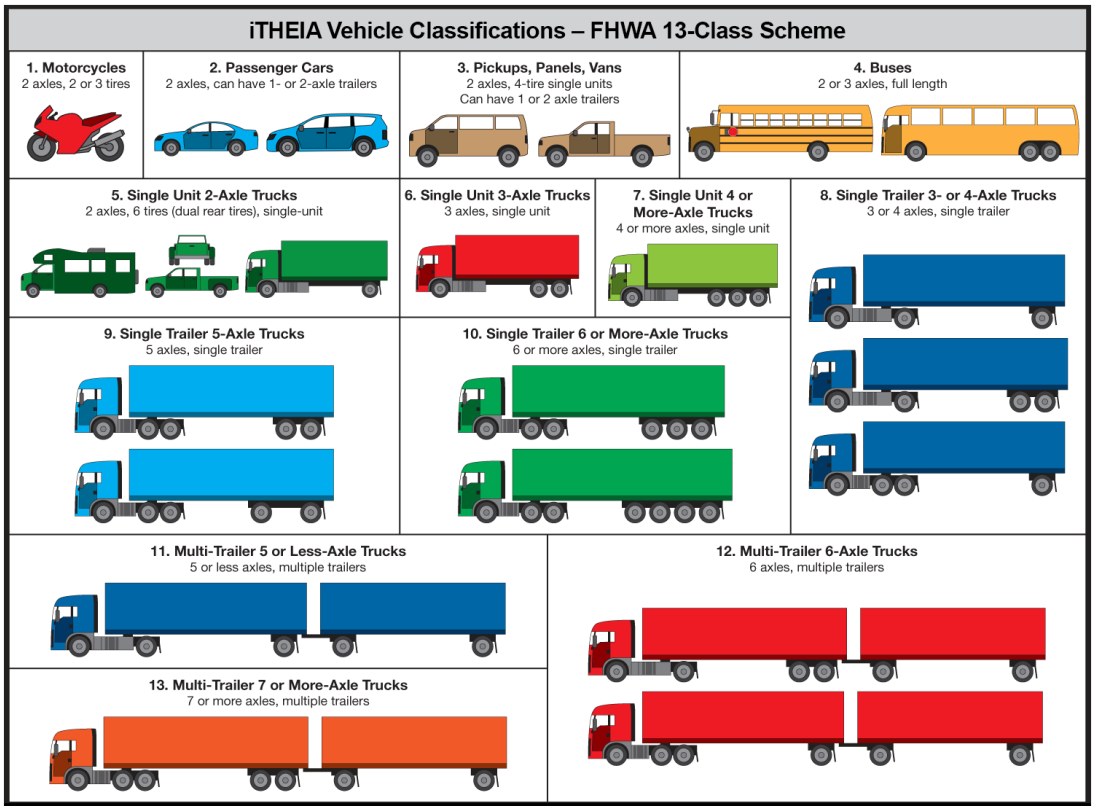
REQUESTING SUPPORT

Quarterhill Phone:	**1-877-444-4473** **(1-877-444-4IRD)**
E-mail:	**support@quarterhill.com**

APPENDIX A – CLASS SCHEMES

FHWA 13 Class

iTHEIA will classify based on the FHWA 13 class scheme, according to the figure below:



Appendix Figure A-1 iTHEIA Vehicle Classifications - FHWA 13 Class Scheme

iTHEIA visual classification is based on *FHWA Traffic Monitoring Guide 2022*.