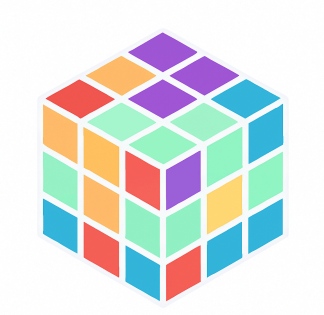
User Guide



Asphalt Intelligence

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Insight Viewer - Area of Interest

In order to select an area to analyze, the area of interest must be identified in the Asphalt Intelligence viewer.

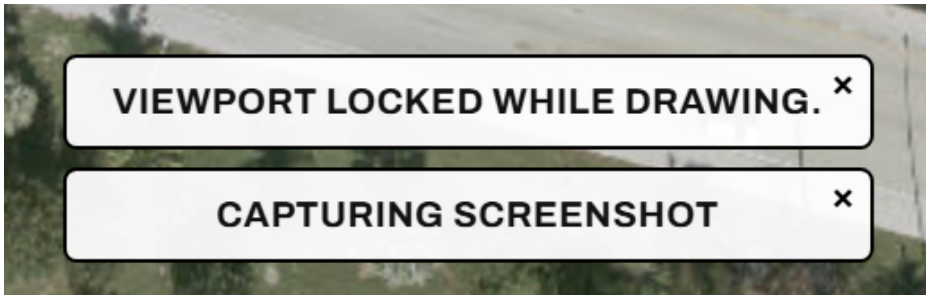
1. With the InSight viewer open, click ***Zoom to Draw Polygon***

2. The viewer will automatically zoom to the resolution required for processing. There will be two messages that pop up at the bottom of the screen:

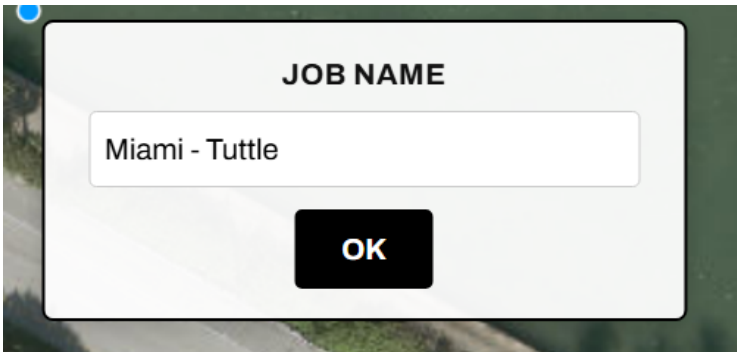
Remember**: the following actions are locked while the polygon tool is active, until the polygon is completed & processed, or click **Start Over
*Zoom: **LOCKED** ; Pan/Move: **LOCKED***

3. Click to place points (corners) of the polygon to be processed

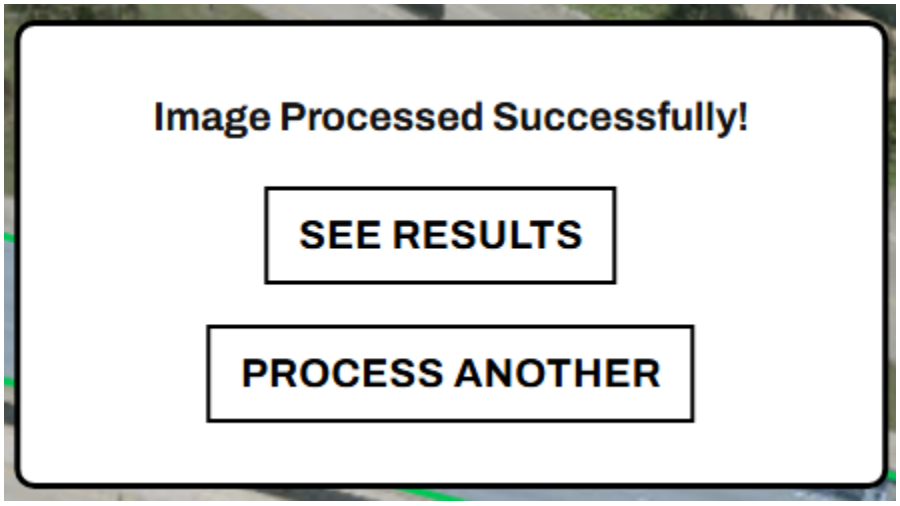
4. Once the polygon is closed (click the first point again to close it), a message will pop up at the bottom of the screen



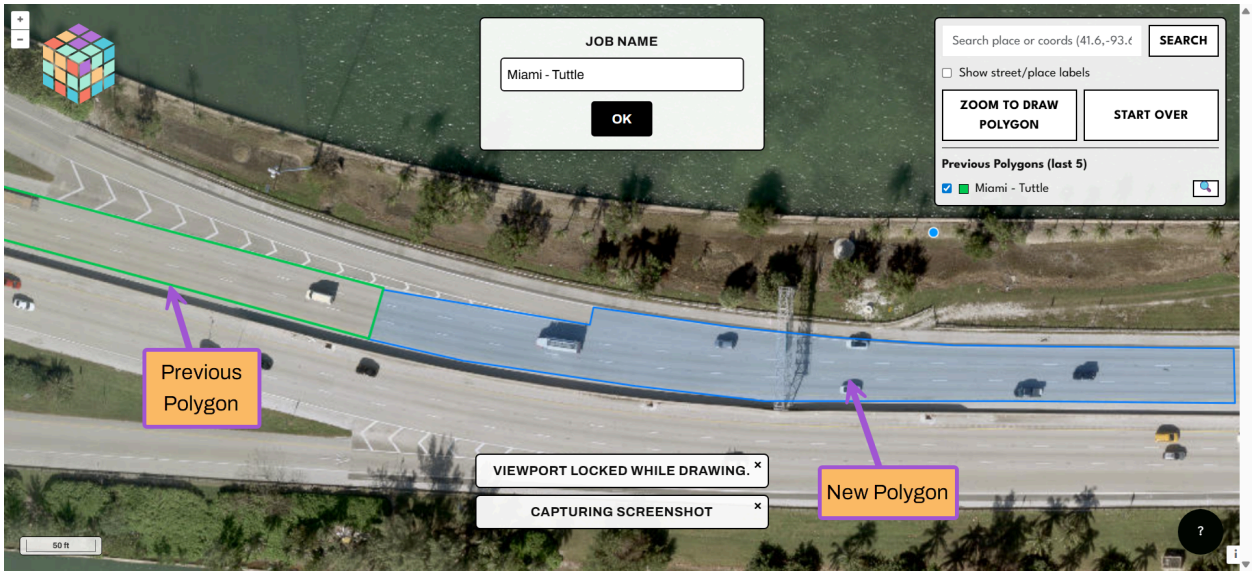
5. At the top of the screen, enter a job name. Click ***OK***



6. Once processing is complete, a message will pop up to either review the results or continue and process another polygon



7. If processing another polygon, click on Process Another. The view and zoom lock is released, and the previous polygon is shown in a green outline to allow easier drawing of the next polygon



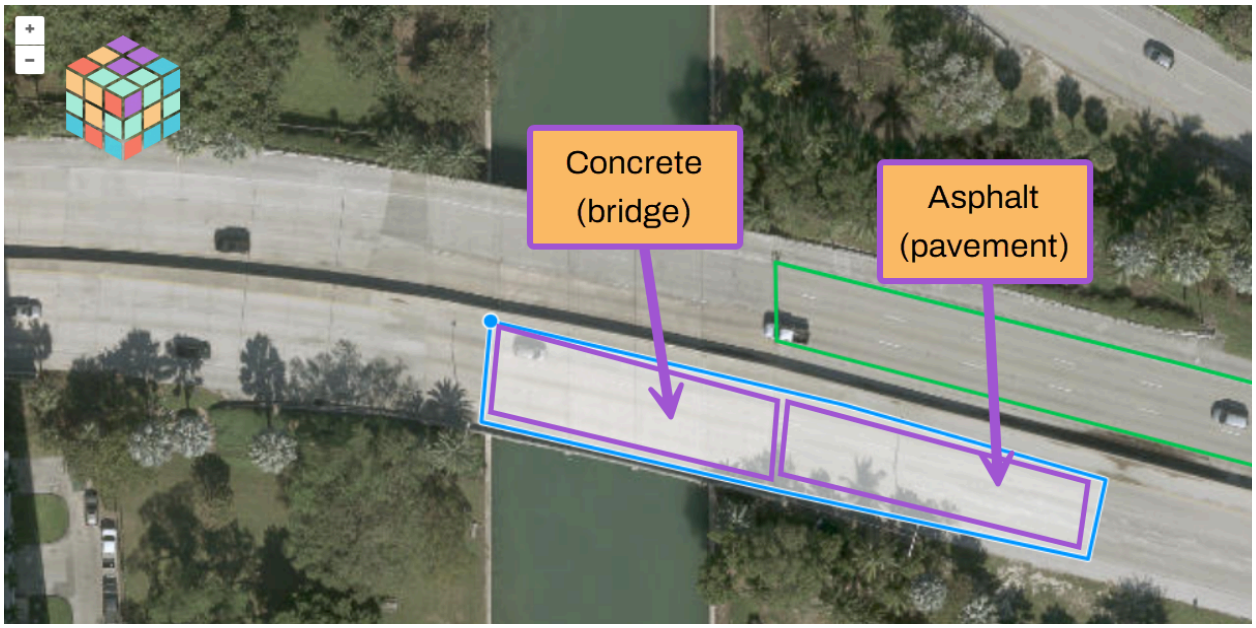
8. The five most recent previous Area of Interest polygons are shown in green, and summarized in the upper right, for reference. These can be turned off by unchecking the box next to them (1), or they can be zoomed into by clicking the magnifying glass (2)

See <u>Best Practices - Area of Interest</u> for additional tips & tricks

Best Practices - Selecting Area of Interest

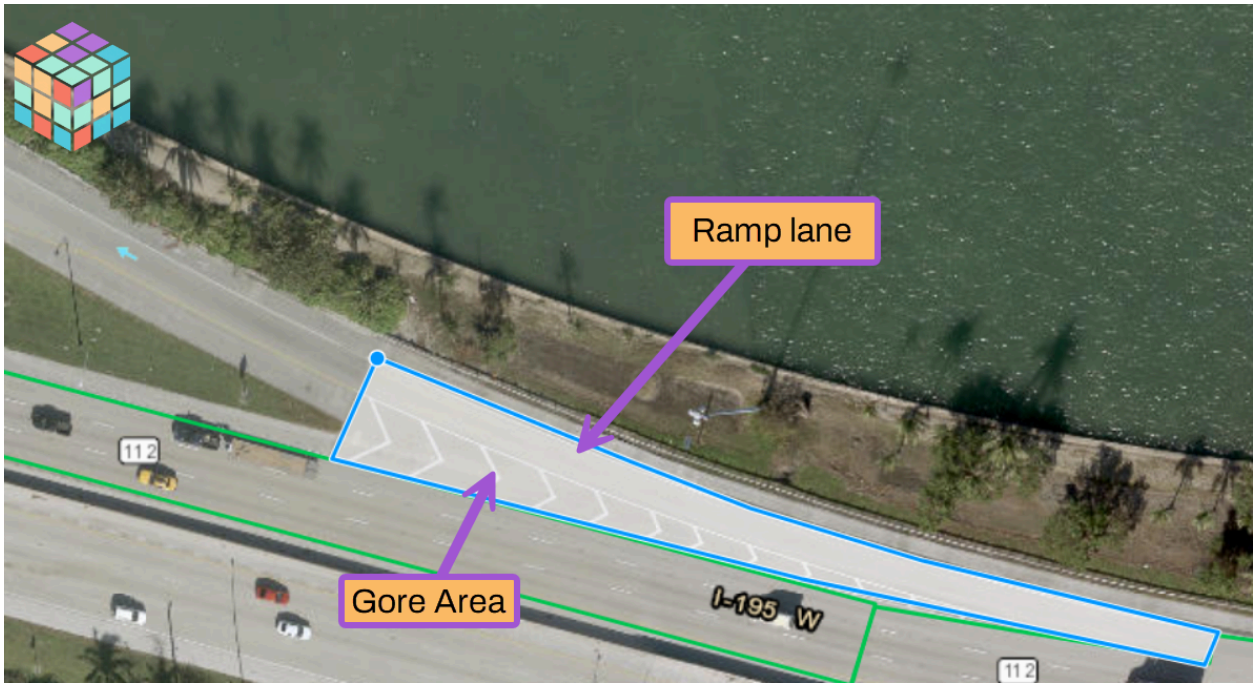
Overview: The Asphalt Intelligence computer vision model works by comparing the trafficked and untrafficked parts of roads and highways for each area of interest.

Bad: Do not include two different surface material types in the same polygon.

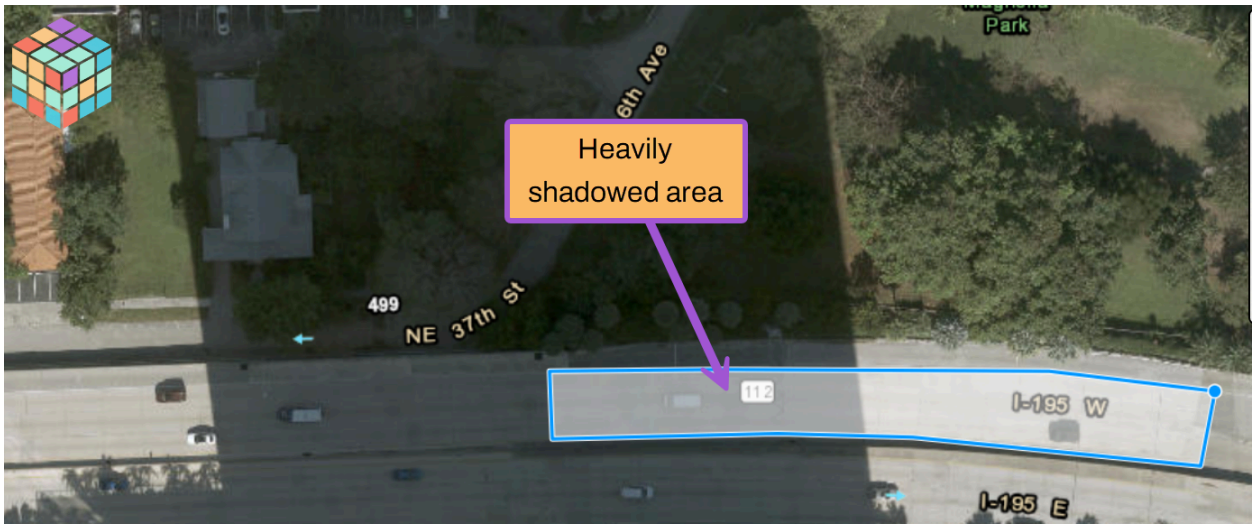


Bad: Do not attempt to cross or overlap over the polygon boundary.

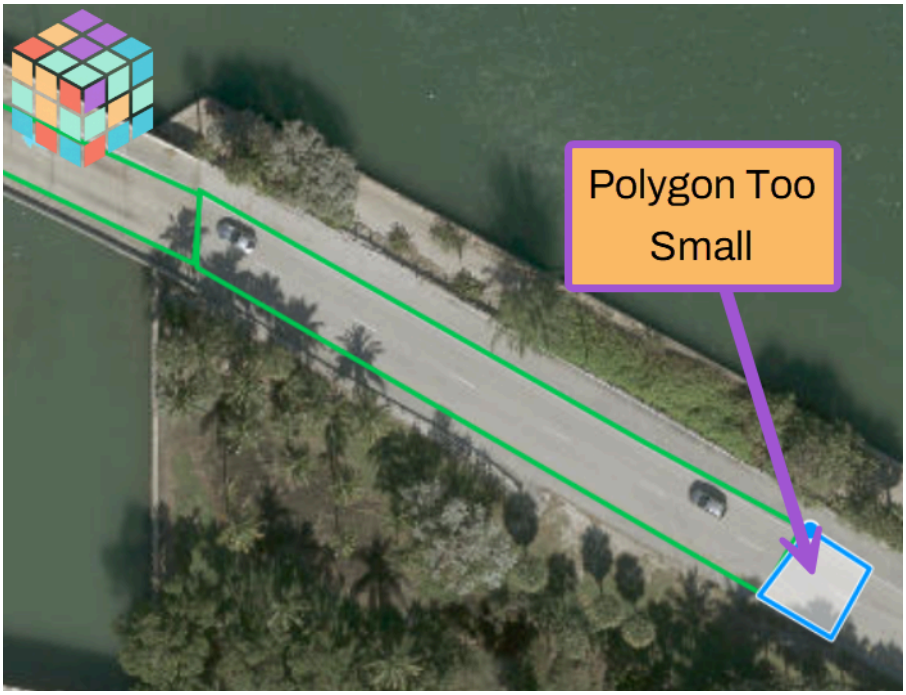
Bad: Do not include include infrequently driven surfaces with regular driving surface together in the same polygon (i.e. shoulders, gores, driveways with driving lanes).



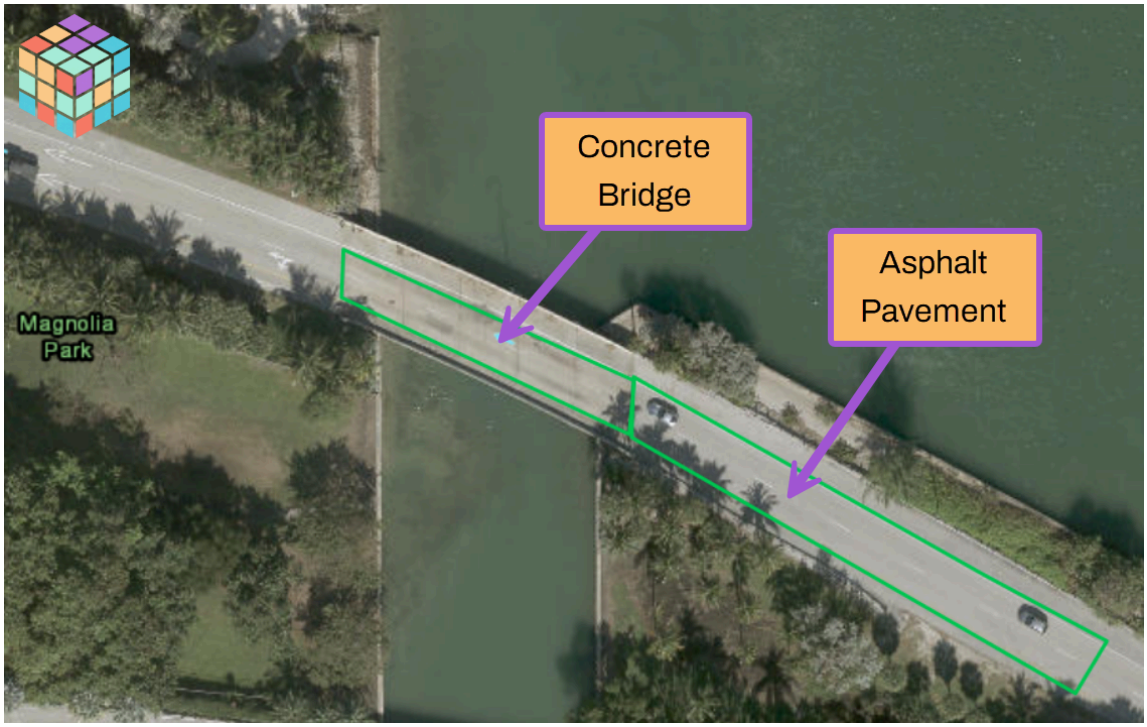
Bad: Do not include heavily shadowed areas in the area of interest polygon, or draw separate polygons just for those areas (separately).



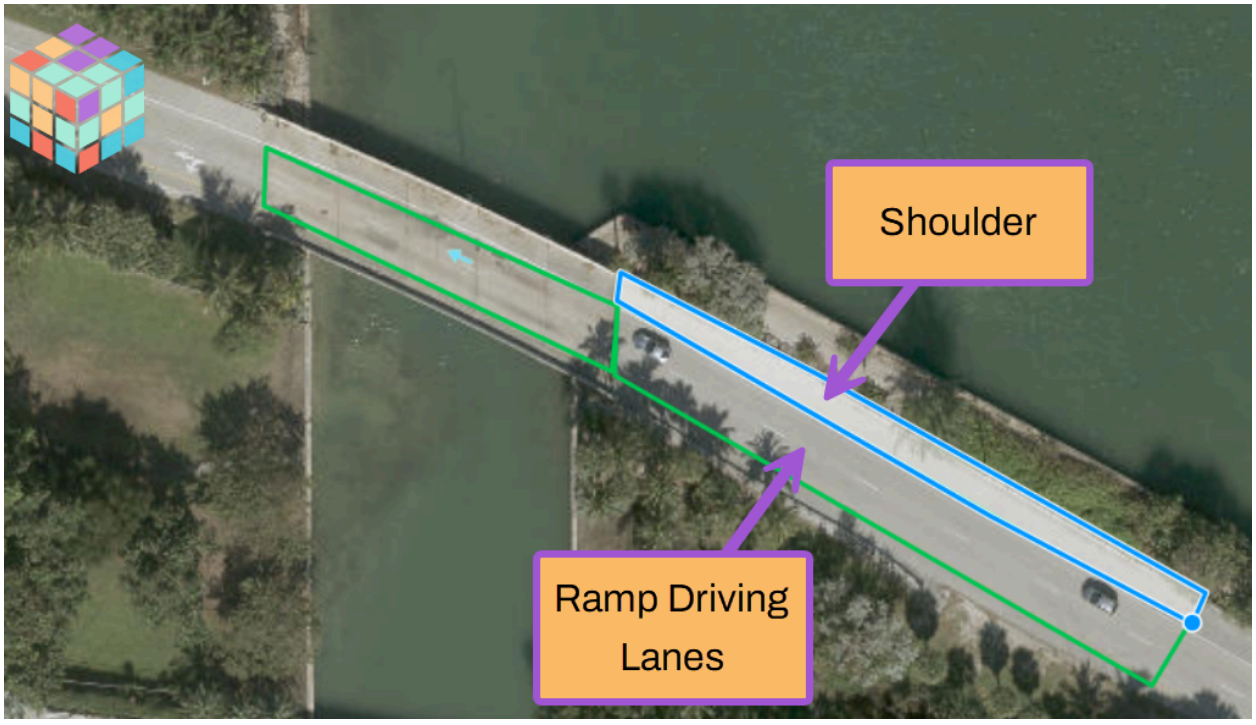
Bad: Do not draw small area of interest polygons, make them as large as possible.



Good: Separate out different types of road surfaces (i.e. concrete vs. asphalt).

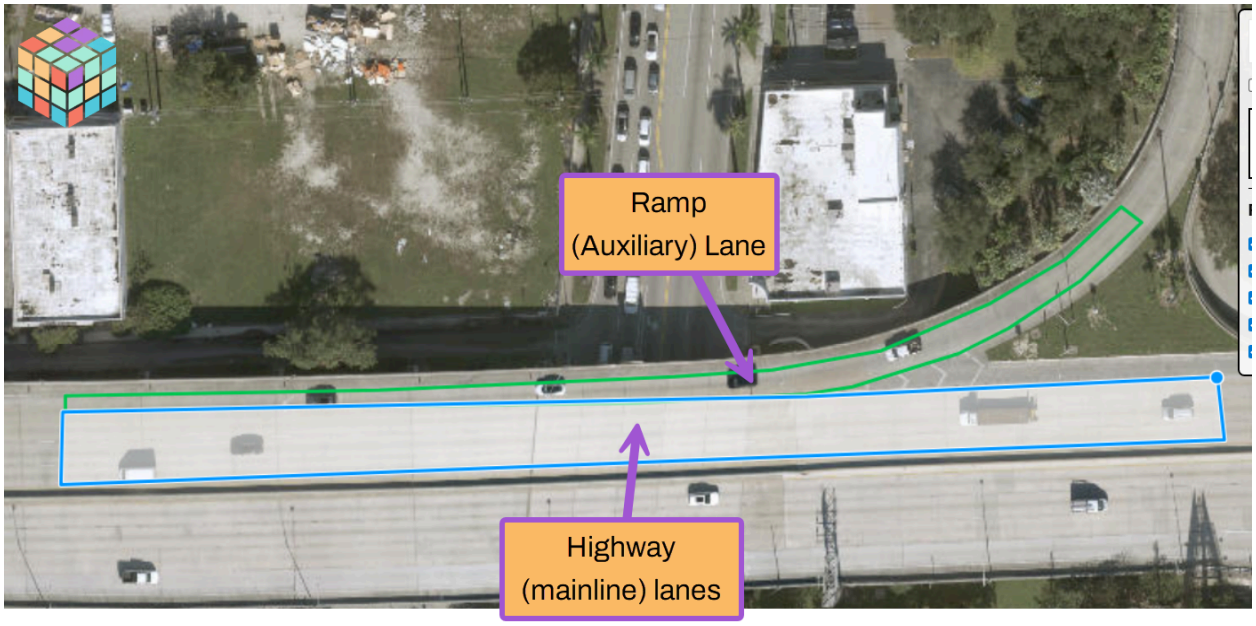


Good: Separate out infrequently driven surfaces into their own area of interest polygons.

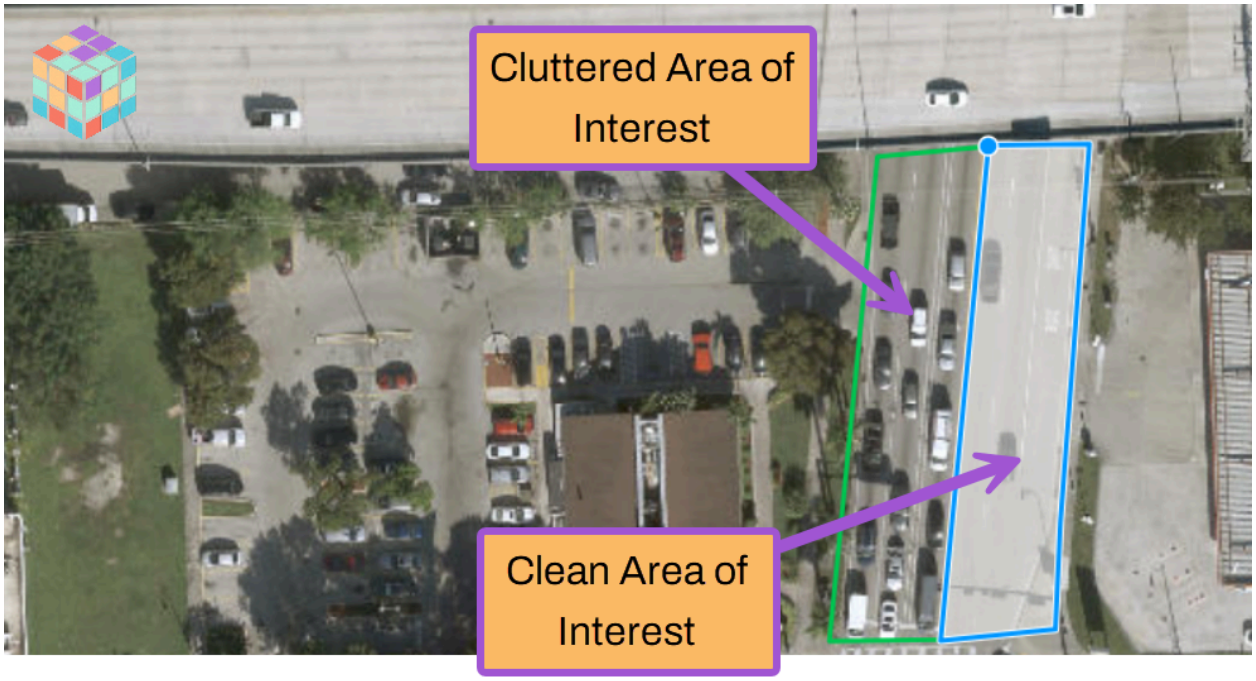


Good: Separate out heavily shadowed areas into their own area of interest polygons.

Good: Separate out different types of lanes (highway vs. ramp).



Good: Avoid road clutter (cars, trees, etc.) as much as possible.



Best Practices Summary:

Good: Separate out different driving surfaces (i.e. concrete vs. asphalt).

Good: Separate out infrequently driven surfaces into their own area of interest polygons.

Good: Separate out heavily shadowed areas into their own area of interest polygons.

Good: Separate out different types of lanes (highway vs. ramp).

Good: Avoid road clutter (cars, trees, etc.) as much as possible.

Bad: Do not include two different surface types in the same polygon.

Bad: Do not attempt to cross or overlap over the polygon boundary.

Bad: Do not include infrequently driven surfaces with regular driving surface together in the same polygon (driveway, shoulder, driving lane) , or different types of lanes (highway vs ramp).

Bad: Do not include heavily shadowed areas in the area of interest polygon, or draw separate polygons just for those areas (separately).

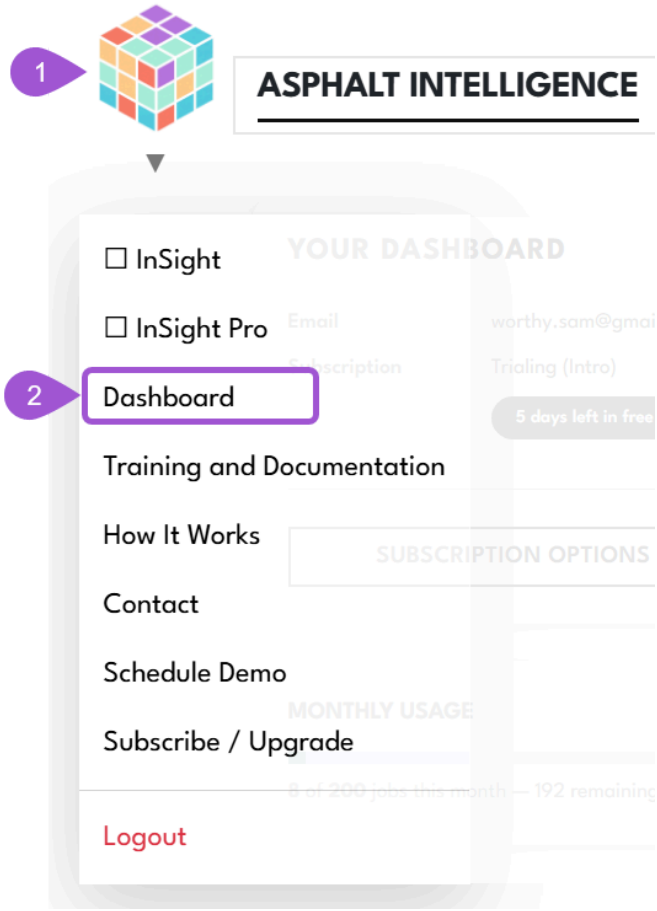
Bad: Do not draw a small area of interest polygons, make each area of interest as large as possible.

Review Output

Any Area of Interest that has been processed can be reviewed in the Asphalt Intelligence Dashboard. This dashboard also provides the ability to search through processed images by date, range of dates, or by job name (entered when the image was processed).

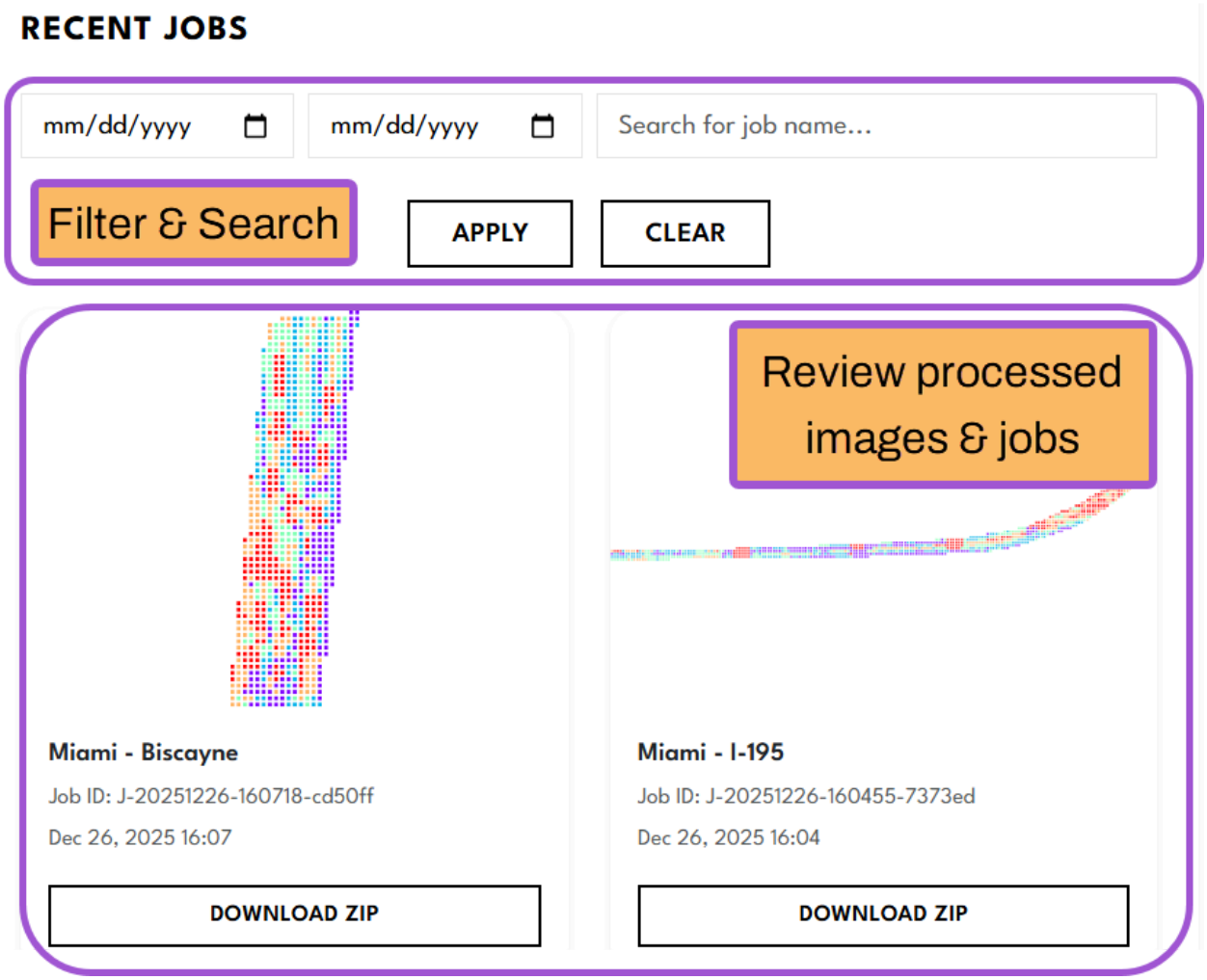
To access the dashboard and review the output follow the below steps:

1. Click the Asphalt Intelligence icon (on any page, including the InSight viewer)
2. Click on ***Dashboard***

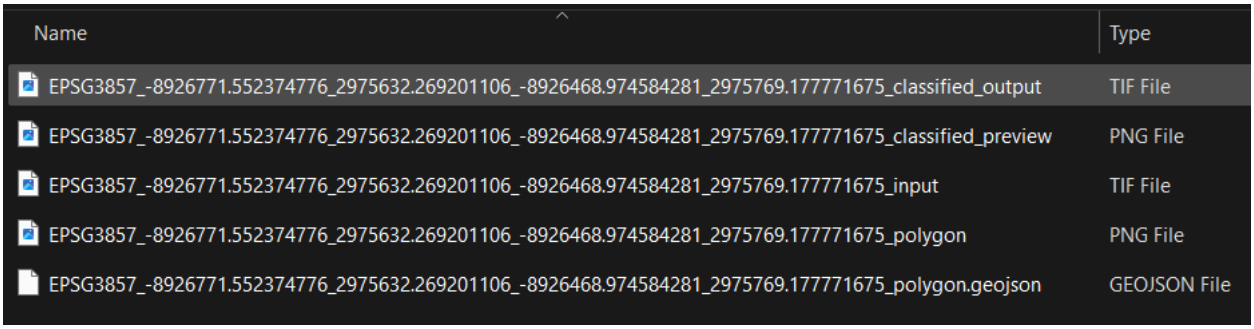


3. Utilize the filter and search functions to narrow down the processed images that are needed

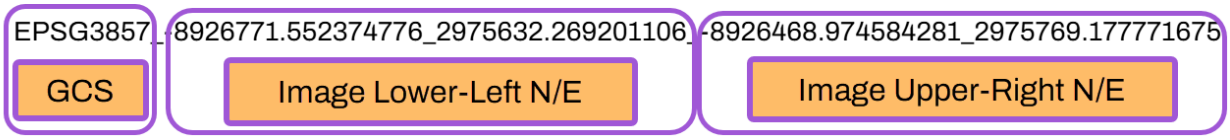
4. Click ***Download Zip*** to download the following files for any processed image



5. The downloaded zip folder contains multiple files:



6. The names of the files includes the following information:

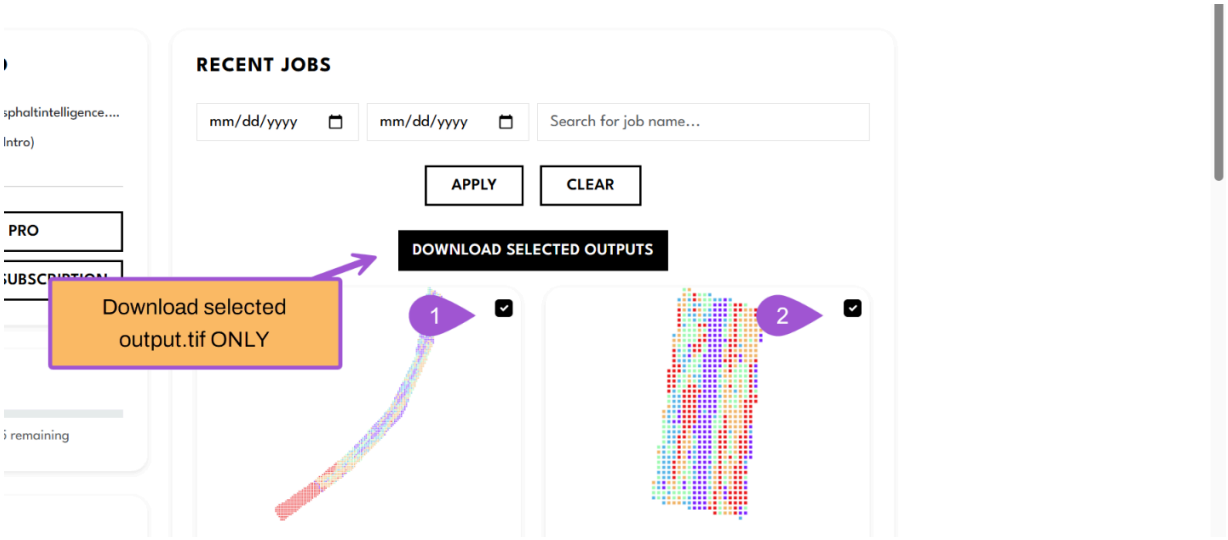


   a. EPSG / GCS Code - geographic coordinate system used to geolocate the files*
   b. Northing and Easting - approximate location of analysis polygon

7. The files included in the zip folder are the following:
   a. "...output.tif" - ***Geolocated*** image of the analysis results
   b. "...preview.png" - Thumbnail image in the dashboard
   c. "...input.tif" - ***Geolocated*** input image used for analysis
   d. "...polygon.png" - Image of polygon used to process the image
   e. "...polygon.geojson" - ***Geolocated*** polygon used to process the input

8. The following files are geolocated and can be imported into GIS or CAD platforms:
   a. ...output.tif
   b. ...input.tif
   c. ...polygon.geojson

9. Downloading lots of jobs and only want the Asphalt Intelligence **output.tif results** for each? Check the boxes near the projects you want to download, and then click **Download Selected Outputs**.



See <u>Walkthrough - Importing Results in QGIS</u> for next steps on viewing and collating results

*EPSG:3857, also known as Web Mercator or Pseudo-Mercator, is the standard projected geographic coordinate system (GCS) used for web mapping. ***All Asphalt Intelligence input and output is currently in EPSG:3857***.

Import Results in QGIS

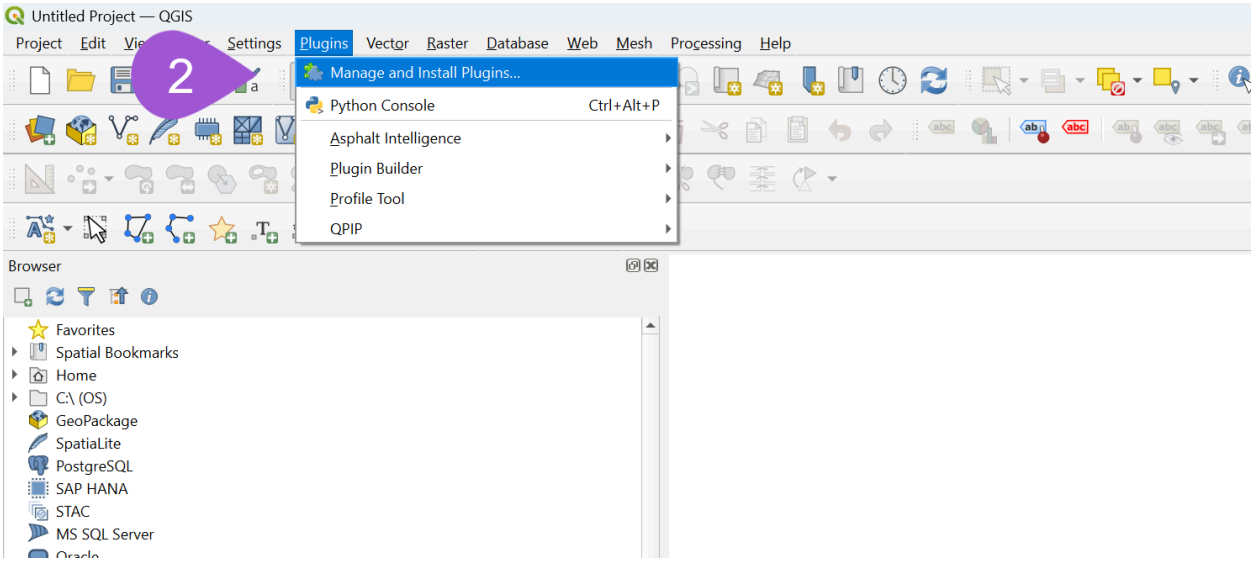
Once analysis results have been downloaded from the Asphalt Intelligence dashboard, the files can be opened or imported in a variety of software packages. This workflow focuses on QGIS, an open-source (free) software package that is widely used throughout the world. The latest desktop long term release of QGIS can be downloaded from the following link:

https://qgis.org/download/

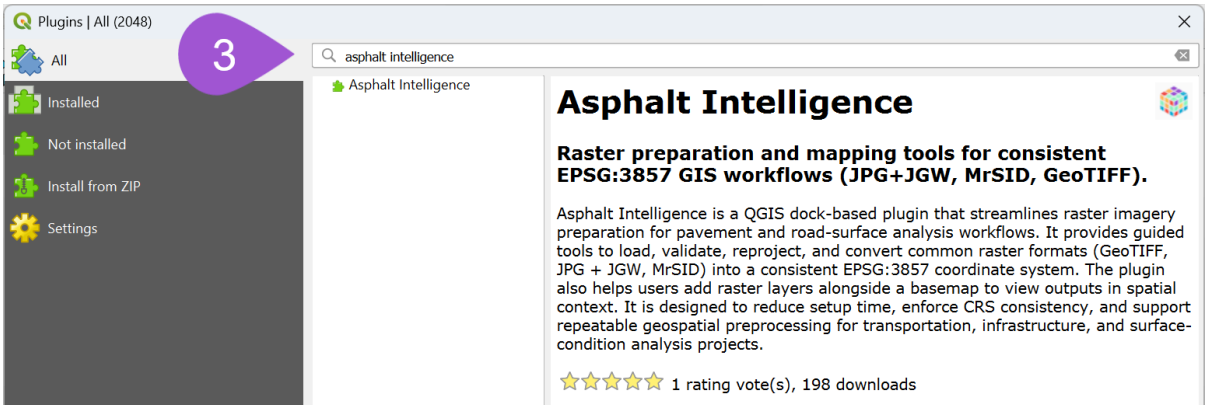
The steps for using the official QGIS Plugin developed by Asphalt Intelligence are summarized below:

1. **Download** the latest stable release for QGIS and Start a New Project at https://qgis.org/download/.

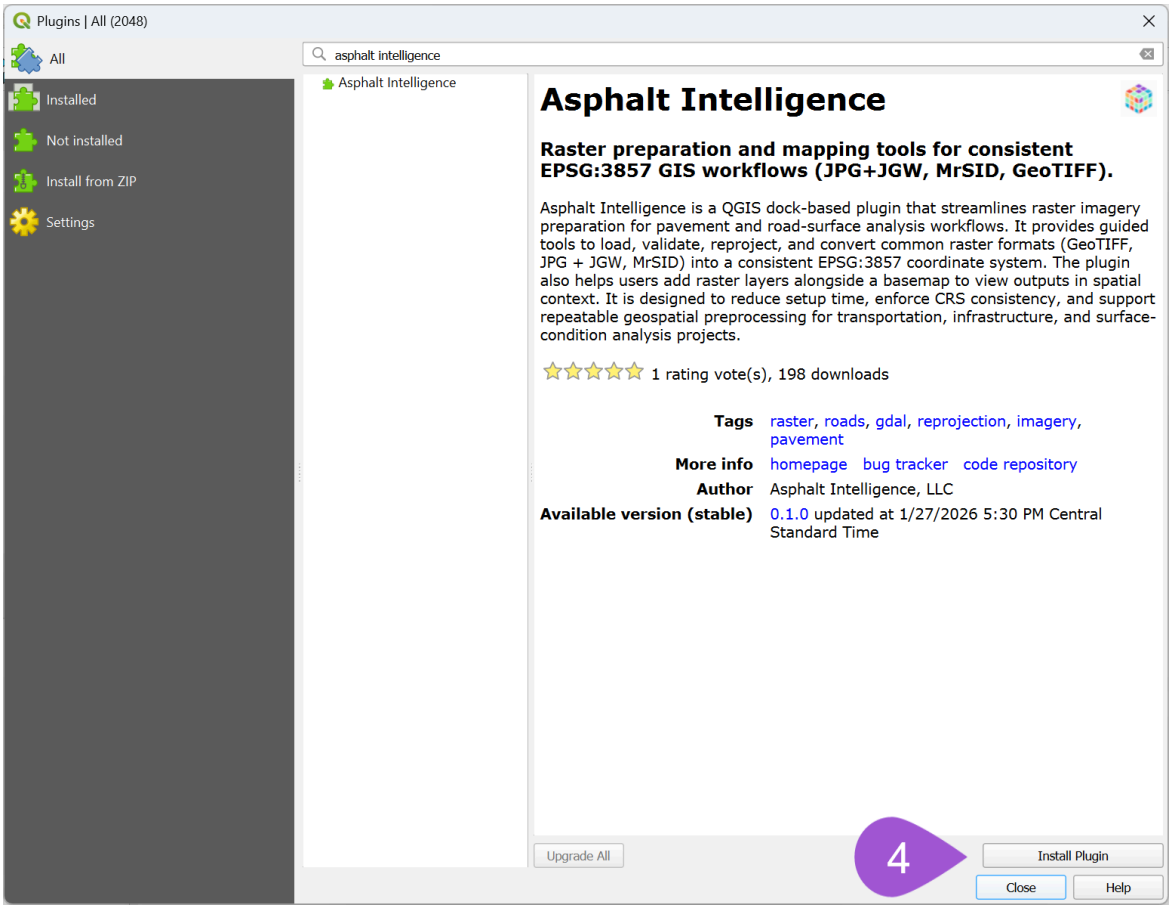
2. Open QGIS and go to **Plugins → Manage and Install Plugins**.



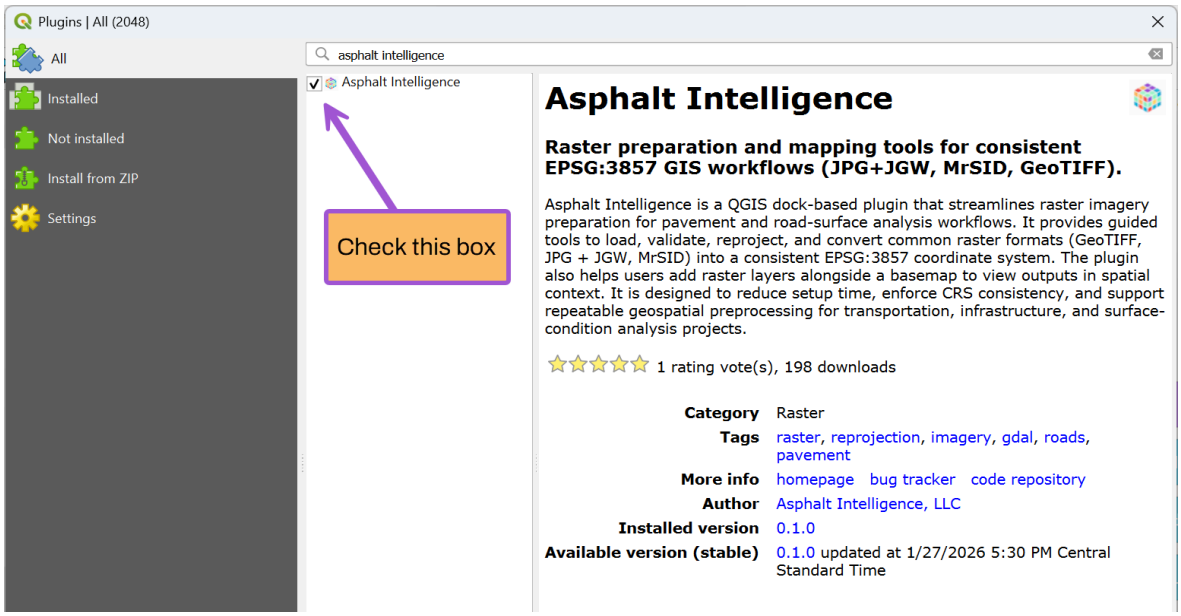
3. Search for **Asphalt intelligence** in the Plugin Manager.



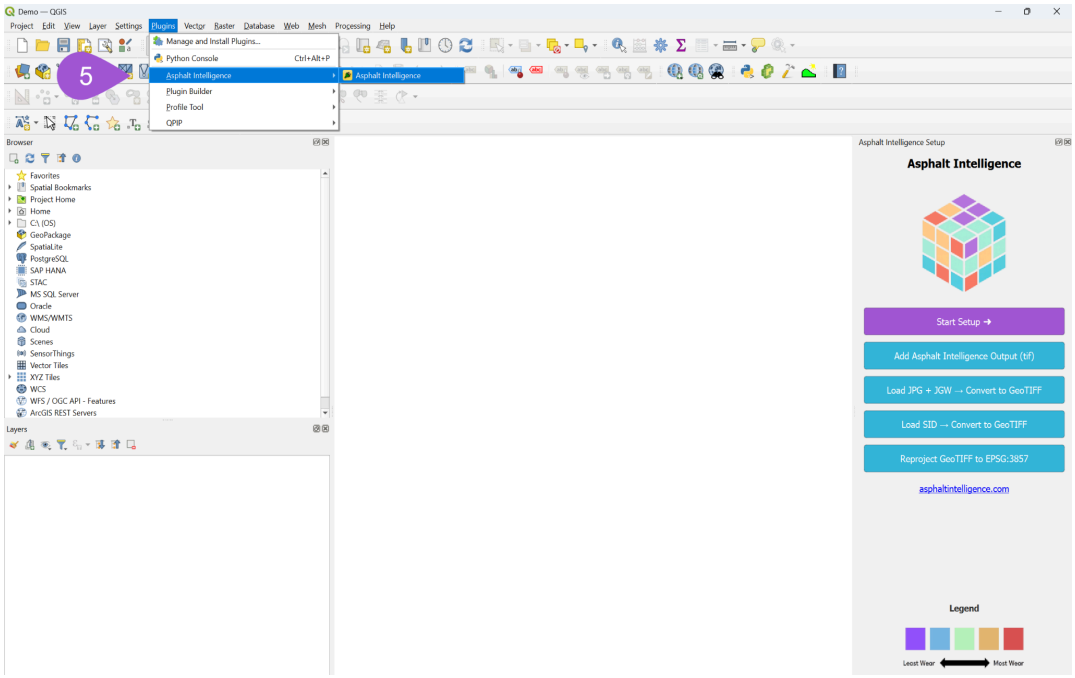
4. Click **Install Plugin**.


Plugins | All (2048)
All
Installed
Not installed
Install from ZIP
Settings
asphalt intelligence
Asphalt Intelligence
Asphalt Intelligence
Raster preparation and mapping tools for consistent EPSG:3857 GIS workflows (JPG+JGW, MrSID, GeoTIFF).
Asphalt Intelligence is a QGIS dock-based plugin that streamlines raster imagery preparation for pavement and road-surface analysis workflows. It provides guided tools to load, validate, reproject, and convert common raster formats (GeoTIFF, JPG + JGW, MrSID) into a consistent EPSG:3857 coordinate system. The plugin also helps users add raster layers alongside a basemap to view outputs in spatial context. It is designed to reduce setup time, enforce CRS consistency, and support repeatable geospatial preprocessing for transportation, infrastructure, and surface-condition analysis projects.
1 rating vote(s), 198 downloads
Tags raster, roads, gdal, reprojection, imagery, pavement
More info homepage bug tracker code repository
Author Asphalt Intelligence, LLC
Available version (stable) 0.1.0 updated at 1/27/2026 5:30 PM Central Standard Time
Upgrade All
4
Install Plugin
Close
Help

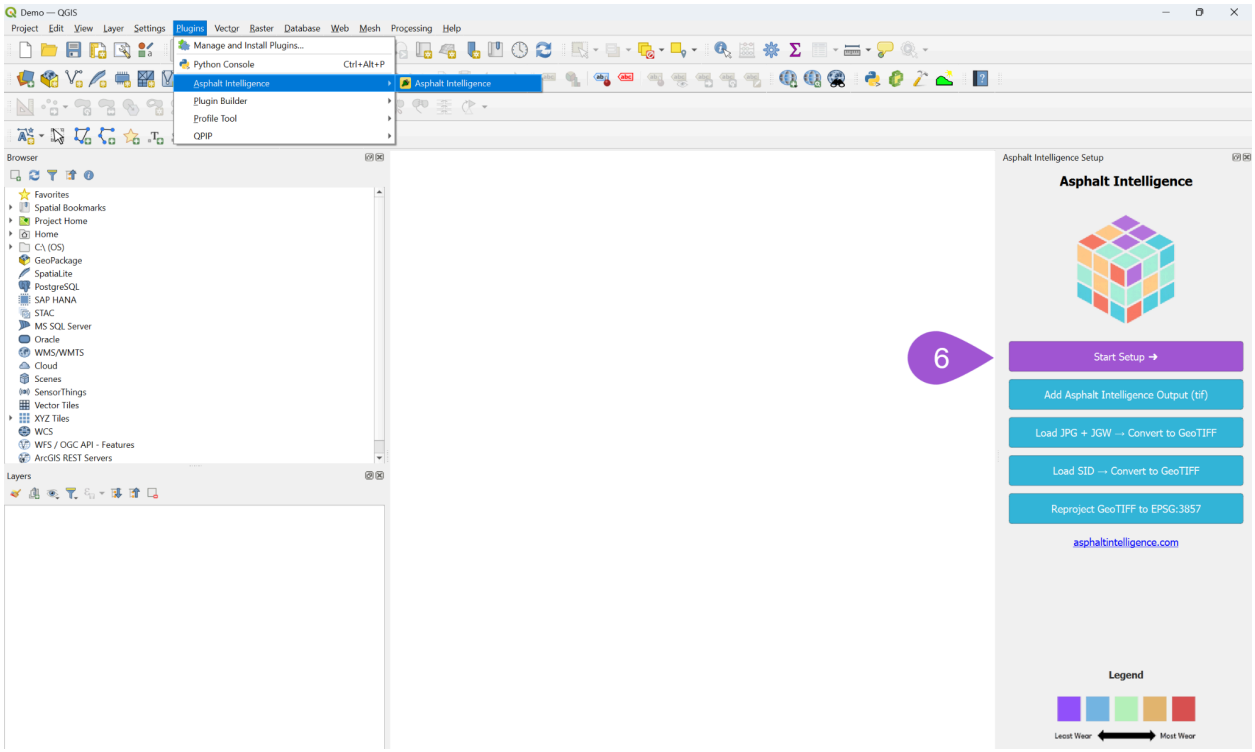
*Make sure the checkbox next to Asphalt Intelligence is enabled so the plugin appears.



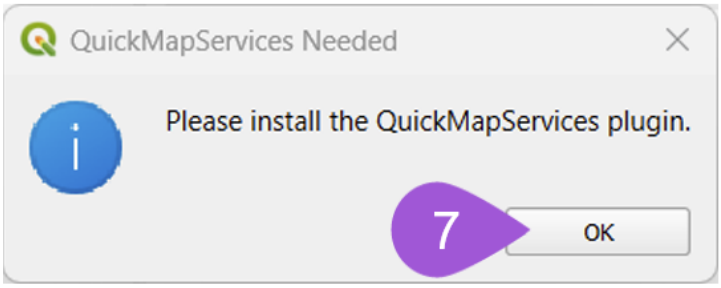
5. Launch the plugin from the QGIS toolbar or **Plugins** menu.
6.



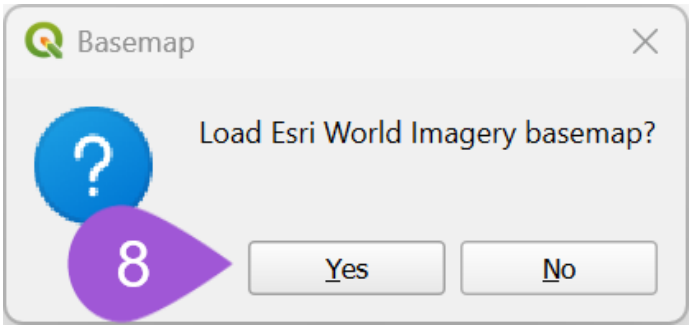
6. Click **Start Setup**.



7. A dialogue will appear, click ***OK***

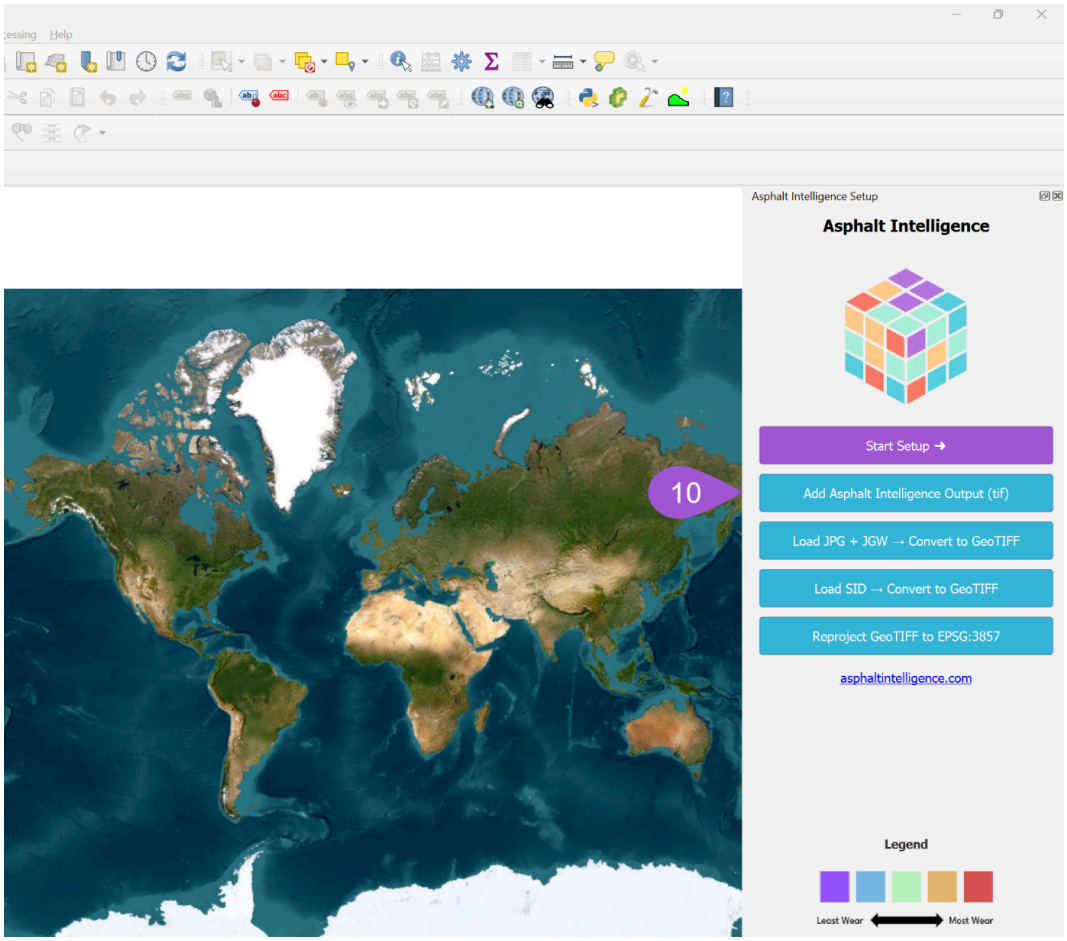


8. Click ***Yes*** to load ESRI world imagery (background)

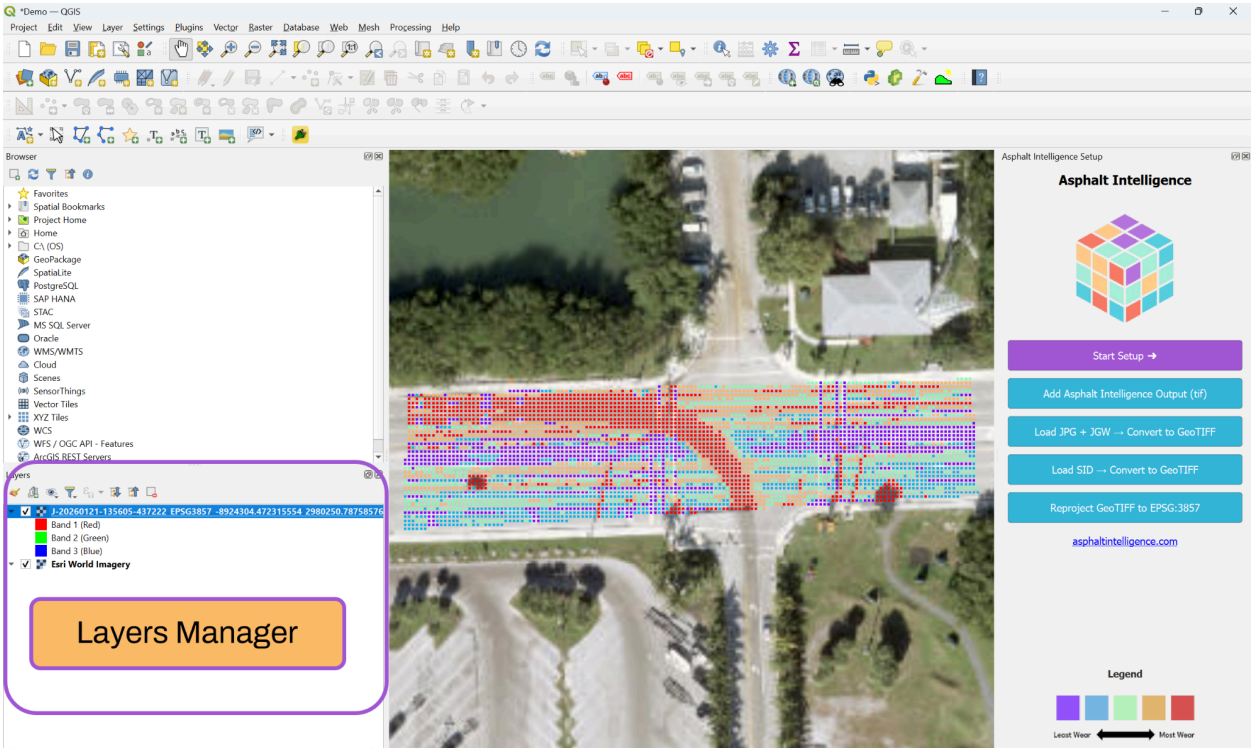


9. The world imagery will load, and EPSG 3857 will be indicated in the lower right of the screen

10. Click on ***Add Asphalt Intelligence Output (.tif)***, and navigate to a downloaded, and extracted, analysis output file, and click ***Open***



11. Once loaded; the screen will zoom to the .tif location and show the analysis results. The left side of the screen shows the loaded file, additional output files can be loaded at the same time and turned on/off in the Layers manager



Below are additional resources for loading the output files (.tif geolocated images) into other software packages:

- ArcGIS Pro
  - https://help.nearmap.com/kb/articles/315-arcgis-pro-importing-georeferenced-images
- Microstation / OpenRoads Designer
  - https://help.nearmap.com/kb/articles/669-openroads-load-georeferenced-images
- Autodesk / Civil3D
  - https://help.nearmap.com/kb/articles/258-autocad-raster-tools-plugin-importing-georeferenced-images

Preparing SID, JPG, and JGW Images in QGIS

There are many different types of aerial imagery files that can be used with Asphalt Intelligence, but they require reformatting them to the native file format which is GeoTIFF. This can be done using many different programs such as ArcGIS Pro, Civil3D, OpenRoads Designer, or QGIS. Common image file types include:

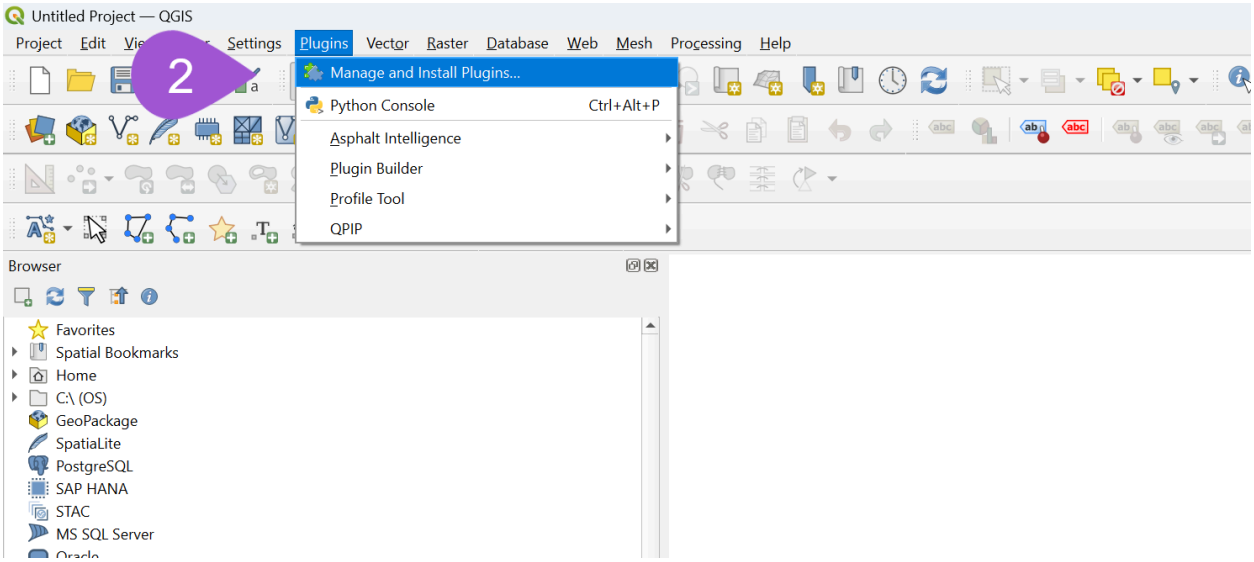
- SID - Common aerial imagery format provided by government agencies, efficient at storing and viewing large aerial and satellite images. Commonly formatted to include geo-referencing of the image.
- JPG - Most popular type of lossy compressed image file format commonly used for regular photos, not natively georeferenced.
- JGW - Small text file that provides georeferencing data associated with a JPG file.

The native file format for Asphalt Intelligence is a GeoTIFF (.tif or .tiff). This file format contains the aerial or satellite image along with geospatial information allowing the image to be correctly positioned and scaled in GIS and other mapping software. The workflow included in this document focuses on QGIS, an open-source (free) software package that is widely used throughout the world.

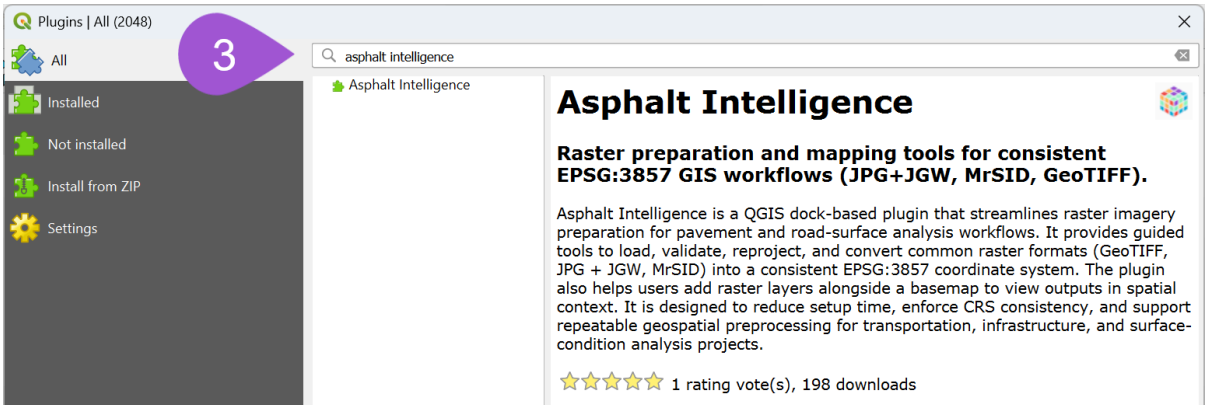
The steps to convert these common image file formats to a GeoTIFF are summarized below:

1. **Download** the latest stable release for QGIS and Start a New Project at https://qgis.org/download/.

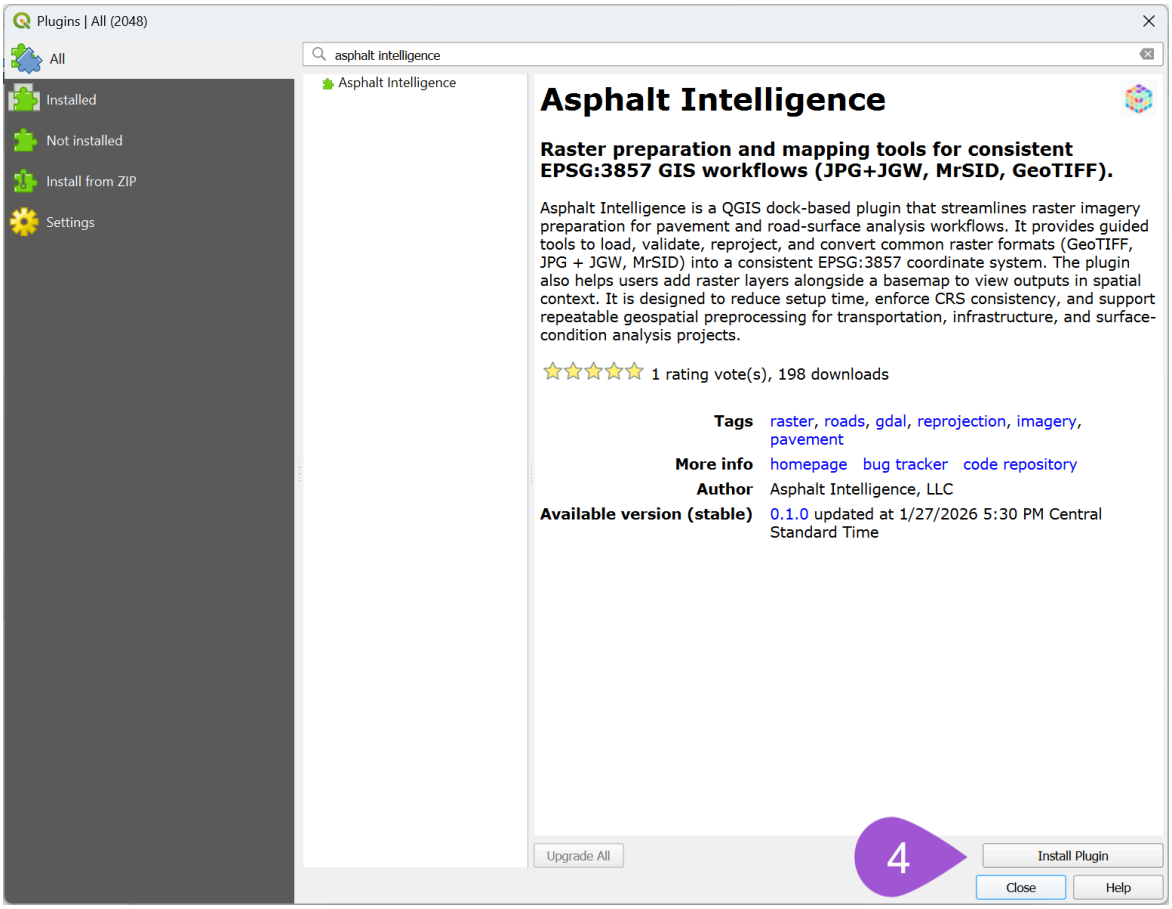
2. Open QGIS and go to **Plugins → Manage and Install Plugins**.



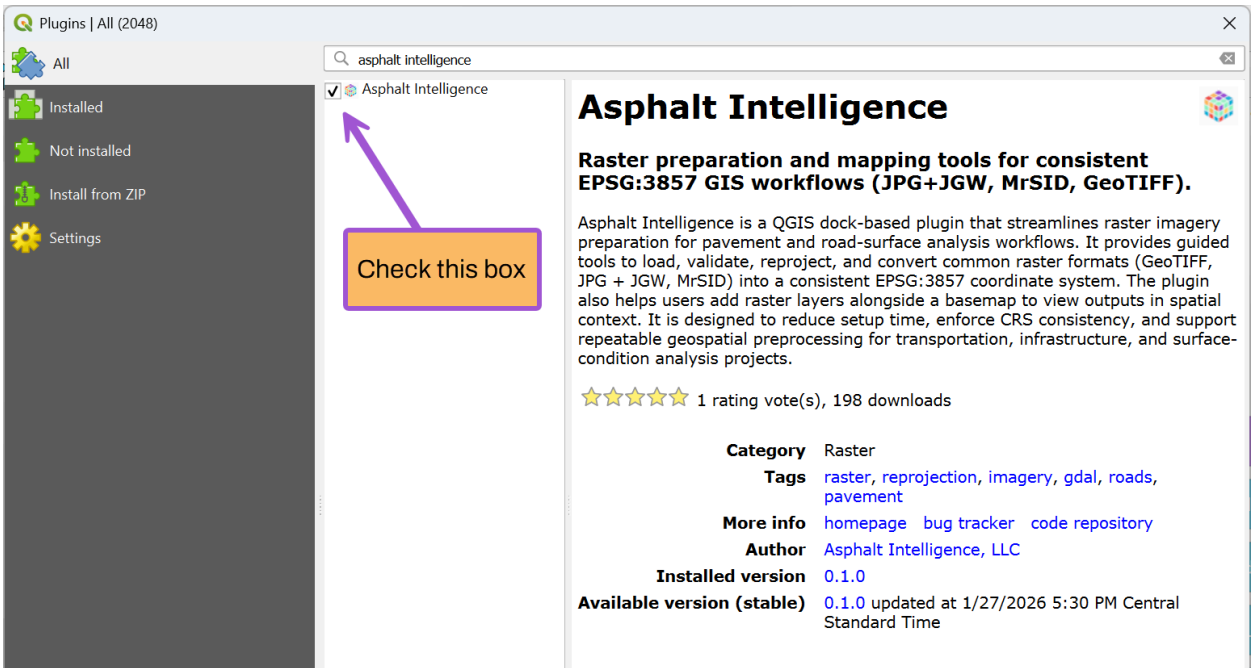
3. Search for **Asphalt intelligence** in the Plugin Manager.



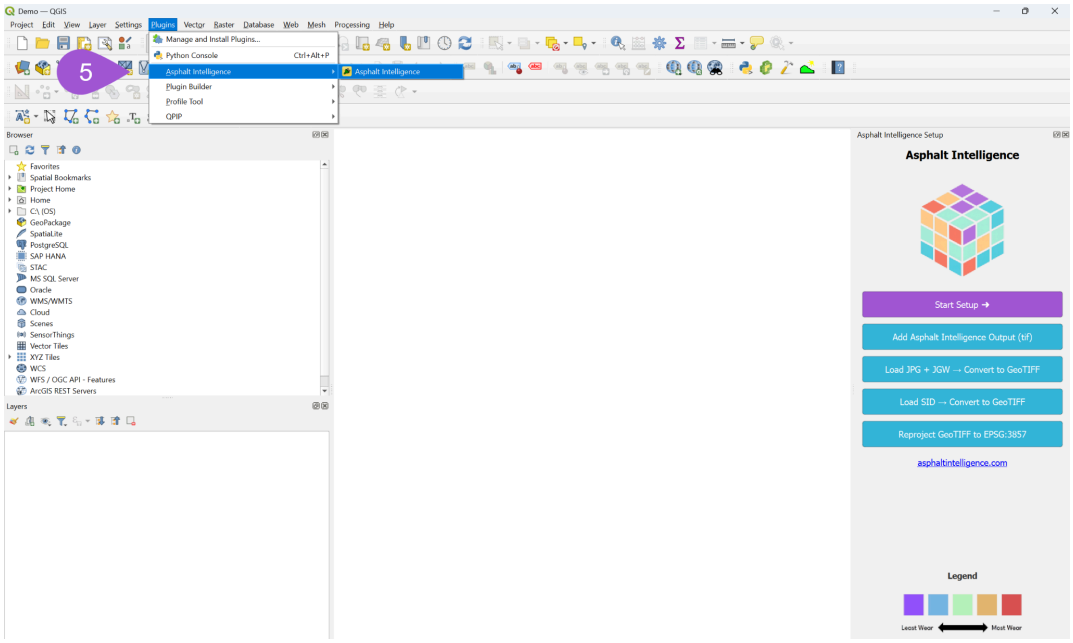
4. Click **Install Plugin**.


Plugins | All (2048)
All
Installed
Not installed
Install from ZIP
Settings
asphalt intelligence
Asphalt Intelligence
Asphalt Intelligence
Raster preparation and mapping tools for consistent EPSG:3857 GIS workflows (JPG+JGW, MrSID, GeoTIFF).
Asphalt Intelligence is a QGIS dock-based plugin that streamlines raster imagery preparation for pavement and road-surface analysis workflows. It provides guided tools to load, validate, reproject, and convert common raster formats (GeoTIFF, JPG + JGW, MrSID) into a consistent EPSG:3857 coordinate system. The plugin also helps users add raster layers alongside a basemap to view outputs in spatial context. It is designed to reduce setup time, enforce CRS consistency, and support repeatable geospatial preprocessing for transportation, infrastructure, and surface-condition analysis projects.
1 rating vote(s), 198 downloads
Tags raster, roads, gdal, reprojection, imagery, pavement
More info homepage bug tracker code repository
Author Asphalt Intelligence, LLC
Available version (stable) 0.1.0 updated at 1/27/2026 5:30 PM Central Standard Time
Upgrade All
4
Install Plugin
Close
Help

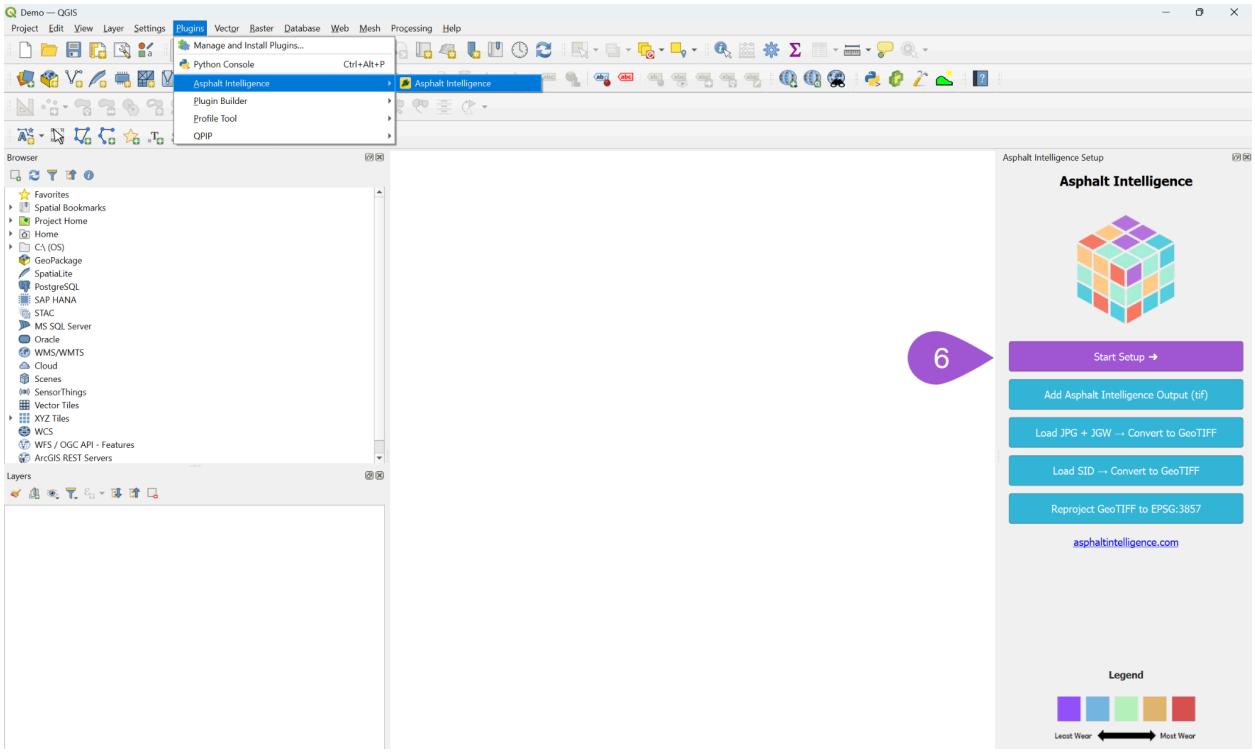
*Make sure the checkbox next to Asphalt Intelligence is enabled so the plugin appears.



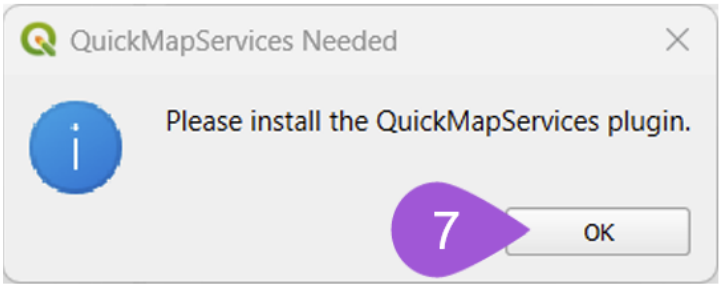
5. Launch the plugin from the QGIS toolbar or **Plugins** menu.



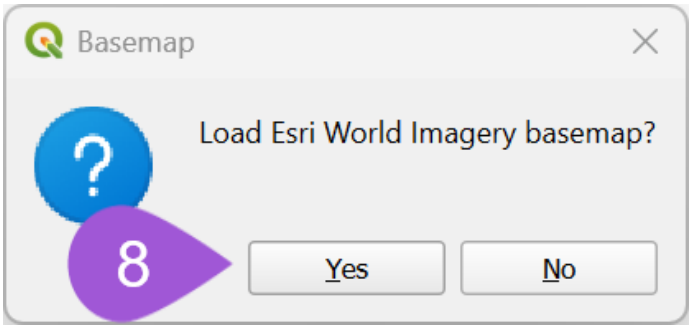
6. Click **Start Setup**.



7. A dialogue will appear, click ***OK***

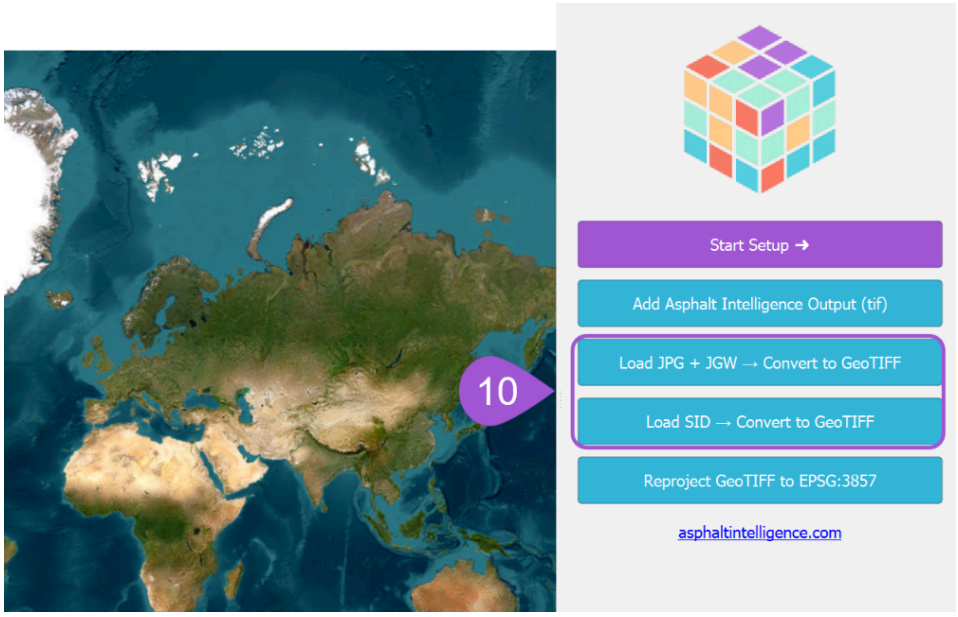


8. Click ***Yes*** to load ESRI world imagery (background)

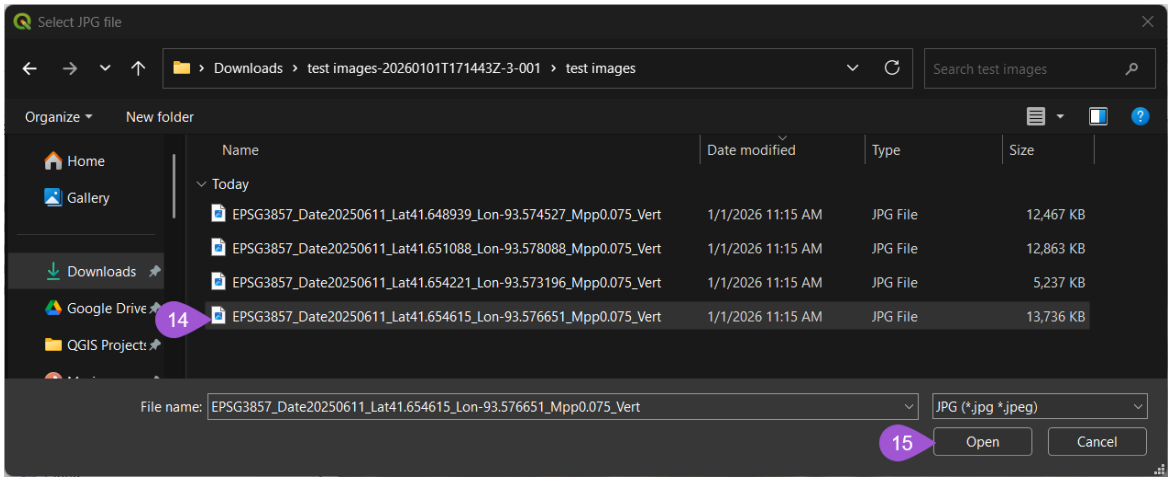


9. The world imagery will load, and EPSG 3857 will be indicated in the lower right of the screen

10. Depending on the file type being used, select the appropriate tool:
    a.
    b. If loading a JPG and a JGW, then click on ***Load JPG + JGW > Convert to GeoTIFF***
    c. If loading a SID file, then click on ***Load SID > Convert to GeoTIFF***

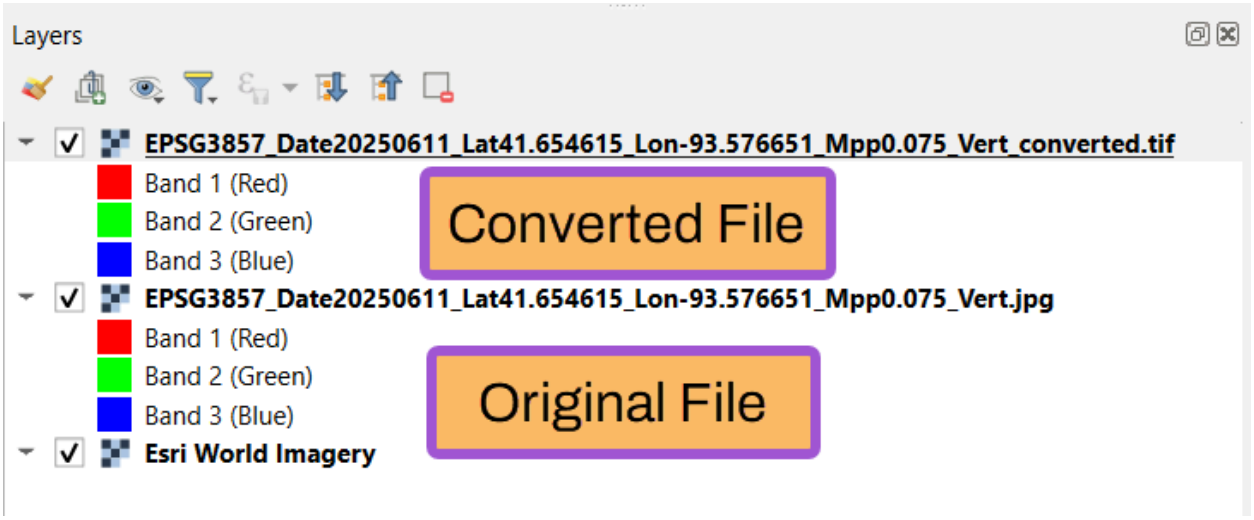


11. Navigate to your local folder with the JPG+JGW (or SID) files, and ***click*** the file to convert (only one file can be selected at a time)
12. **Note**: if selecting a JPG file, the JGW sister file must be in the same folder
13. Navigate to your file location, select the file and select ***Open***



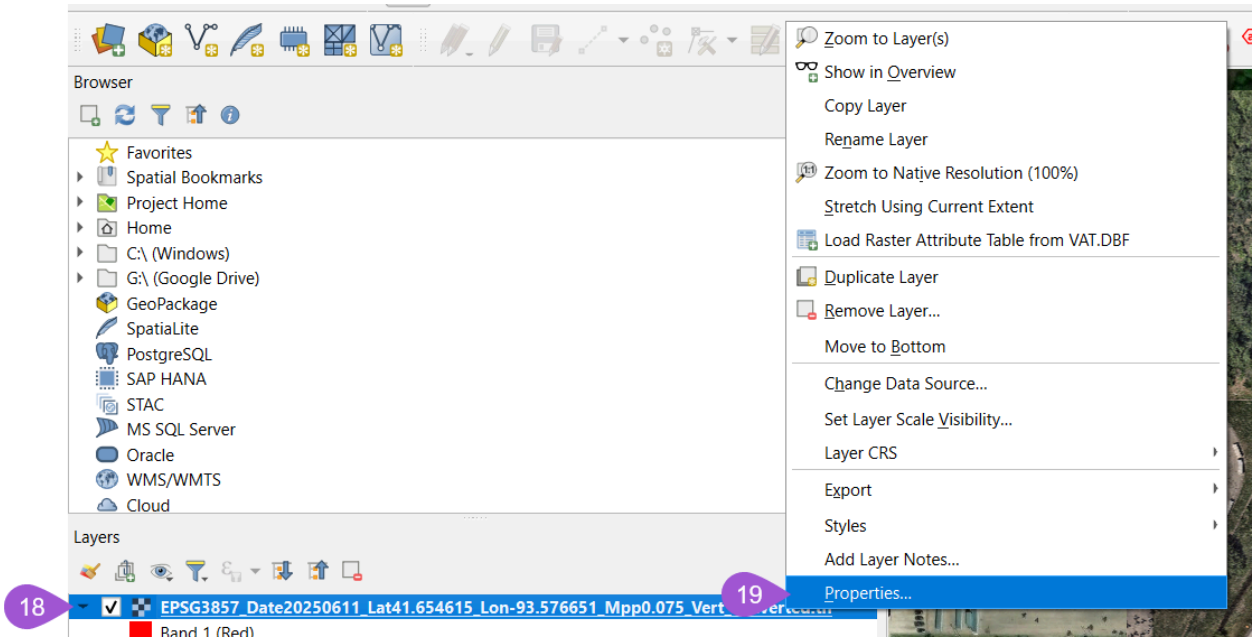
14. A message indicating successful conversion of the file to a GeoTIFF file, and indicates the location of the converted file (located within the project folder specified earlier), click ***OK***

15. In the Layer Manager, there will now be two layers; the original image and the converted GeoTIFF image; these layers can be turned on/off to verify the images are geolocated in the correct location and are at an acceptable resolution



16. To access the GeoTIFF (.tif) file, and later upload into Asphalt Intelligence, ***right-click*** the layer of the converted file

17. Click ***Properties***



18. Click on ***Information*** (at the top of the menu)
    d. **Note**: If the converted GeoTIFF size is more than **50 MB**, then the file is too large to upload to Asphalt Intelligence.Smaller files process faster. Review QGIS tools and walkthroughs to reduce the image size, or alter the image resolution referencing the following links:
        i. QGIS Clip Raster by Polygon - YouTube Link
        ii. QGIS Reduce Raster Resolution - YouTube Link
        iii. QGIS Documentation - Raster Properties & Raster Extraction

19. Click on the hyperlink location next to Path

20. This will bring up the local folder where converted GeoTIFF files are located; if multiple files are converted they will all populate in this location.

Insight Pro - Uploading GeoTIFF Images for Analysis

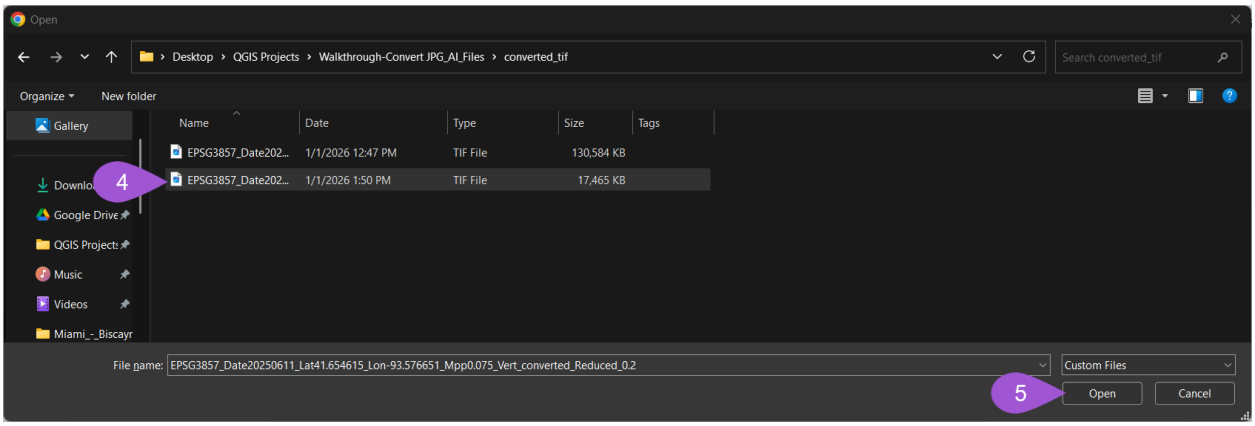
One of the main benefits of Asphalt Intelligence InSight Pro is the ability to upload user provided aerial or satellite images to be used for analysis. While the default aerial imagery used by InSight is available, sometimes specific resolutions or time periods are needed for analysis, and this is where InSight Pro is helpful.

The steps to upload custom aerial and satellite imagery for analysis are summarized below:

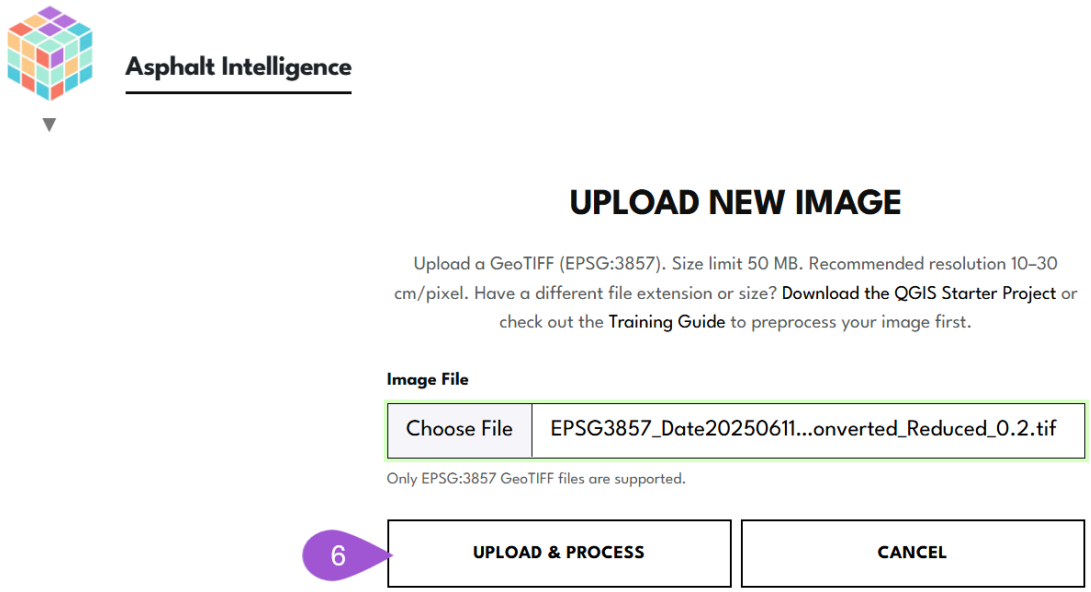
1. Navigate to the Asphalt Intelligence homepage, click on the ***menu*** button (icon)
2. Click on ***InSight Pro***

3. Select Upload New Image (or Use Previous Image Upload if analyzing an image previously uploaded)

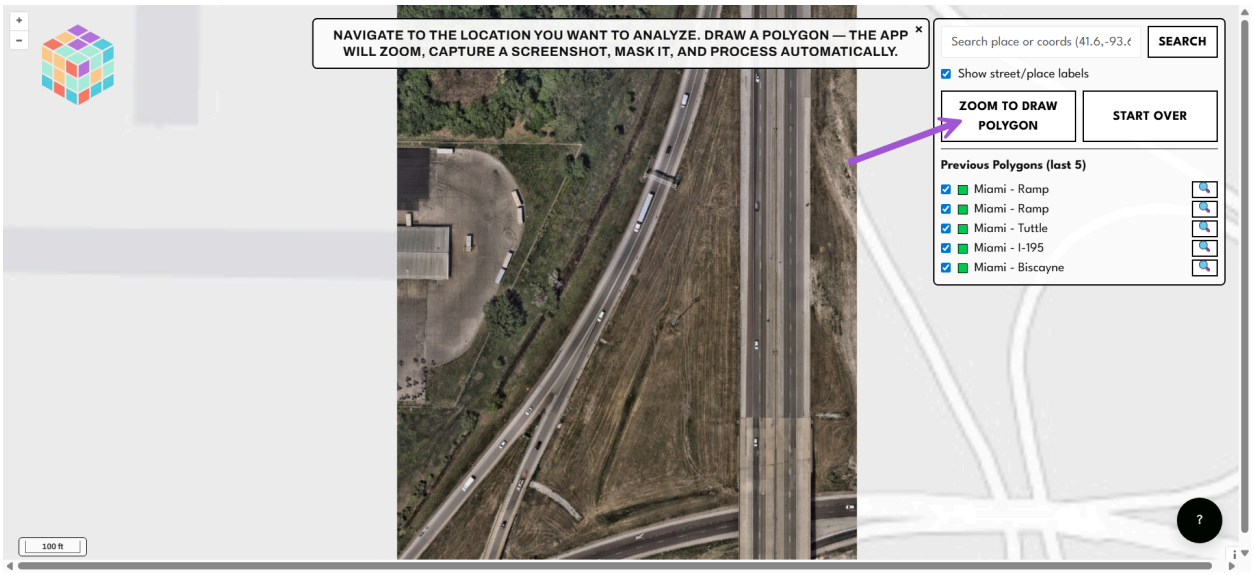
4. Click the ***image*** to upload, ensuring it meets all the **<u>requirements</u>** for Asphalt Intelligence:
    a. Maximum image size: 50 MB
    b. Image format: GeoTIFF (.tif)
    c. Image Geographic Coordinate System: EPSG 3857
5. Click ***Open***



6. Click Upload & Process



7. The image now shows up in the InSight Pro viewer overlaid onto the background map. The analysis tools can now be used to draw a new polygon for analysis



Helpful Links

Below are links that provide workflows, resources, and other helpful information related to the input and output of Asphalt Intelligence:

- Bentley Systems
  - (Microstation / OpenRoads Designer) Attaching geolocated images - https://docs.bentley.com/LiveContent/web/OpenRoads%20Designer-v2024.1/Help/en/topics/122993/GUID-4AF49494-F772-421A-859E-462B9E1259BC.html
  - (Microstation / OpenRoads Designer) Reprojection of Raster Images - https://docs.bentley.com/LiveContent/web/OpenRoads%20Designer-v2024.1/Help/en/topics/122992/GUID-18C87ACE-9E20-E69D-D8B5-13173672AC7A.html
- NearMaps
  - Placing geolocated imagery in Microstation / OpenRoads Designer - https://help.nearmap.com/kb/articles/271-microstation-loading-georeferenced-images
  - Autodesk Civil 3D: Importing Georeferenced Images - https://help.nearmap.com/kb/articles/342-autodesk-civil-3d-importing-georeferenced-images
- QGIS
  - Working with Raster Data - https://docs.qgis.org/3.40/en/docs/training_manual/rasters/data_manipulation.html
  - Raster Data Overview - https://docs.qgis.org/3.40/en/docs/gentle_gis_introduction/raster_data.html
  - QGIS Free Download - https://qgis.org/download/
- ArcGIS Pro
  - Image & Raster Processing - https://pro.arcgis.com/en/pro-app/latest/help/data/imagery/get-started-with-image-and-raster-processing.htm
  - Raster Functions Overview - https://doc.arcgis.com/en/imagery/workflows/tutorials/getting-started-with-raster-functions.htm