



Project 0170-3545

Pilot Project Using GIS Mobile Field Collection

How will this project be different than what we do now?

- The physical installation and removal of signs has not changed.
- The project specifications include a location list of both sign installations and sign removals. The main difference between this location list and previous projects with location lists, is that this location list includes GPS coordinates.
- This project will pilot a GIS mobile field collection application intended to provide more specific sign information at your fingertips to improve data quality, coordination, work reporting, and to reduce the burden of the GPS requirements typically included in signing projects.
 - Specific sign information includes location, images, sign size, number of posts, sign color, sign legend, etc.

How does this benefit the Contractor?

- Design plans and data collection are combined into a mobile application that can be installed on a cell phone or tablet.
 - The application will provide sign information including locations, images, sign size, number of posts, sign color, sign legend, etc. at your fingertips.
- All sign installations and sign removal locations are shown on the mobile field collection application.
- Section 12.00 has been modified and the GIS mobile field collection application will streamline the data requirements.
- The Traffic Subset will include a summary that quantifies the number of each sign type.
 - For example, the summary sheet will list the number of Speed Limit 65 signs that are 48x60.
 - This will allow the sign fabricators to know how large of a run will be necessary for each unique sign.
 - This should also improve material takeoffs.
- As work is being completed, the Contractor, Inspection team, and Design team can see the status of each sign assembly location.
 - Each status is color coded differently on the map for quick reference.
- Ability to run reports, from a desktop computer, at any time to verify quantities.
 - Quantify completed work.
 - Quantify work not yet completed.
 - Quantify locations where modifications are required.
 - Assist with the payment process.



Connecticut Department of Transportation

Are there mobile device requirements?

- Yes, all mobile device requirements are noted in the project special provisions.

Do we need special licenses to use the field collection application?

- Yes. All required licenses will be provided by the Department to the selected Contractor for use on this project.
- The actual mobile application is free to download on Android and iOS. An ArcGIS Online or ArcGIS Enterprise license is required to use the application.
 - As noted above, the required licenses will be provided by the Department for use on this project.

How are we going to learn how to use the field collection application?

- A user guide will walk through the application with screenshots. The user guide is contained in this document and will also be available during construction. A simplified version of the user guide is also contained in the project special provisions.
- The Department's Design team will be working very closely with both the Contractor and Inspection team to make sure all parties understand how to use the application.
- **A Pre-Bid Virtual Meeting was held on Tuesday December 22, 2020 at 10:00 am.**
 - **The Pre-Bid Virtual Meeting included a live demonstration of the field collection application.**
 - **Interested parties may view a recording of the Pre-Bid Virtual Meeting at the following link: <http://dotvideo.ct.gov/pm/0170-3545PreBidDemo.mp4>**



CTDOT Traffic Engineering Construction App User Guide

Introduction

This is a user guide to show the basic functionality of the Arc Collector App for use by DOT Contractors. Arc Collector allows easy viewing, collecting, and editing of GPS-based location data. This data is synchronized with maps created through Arc Online that are used for analysis and report building on a desktop computer. Shown below is an example of the Arc Collector map view.

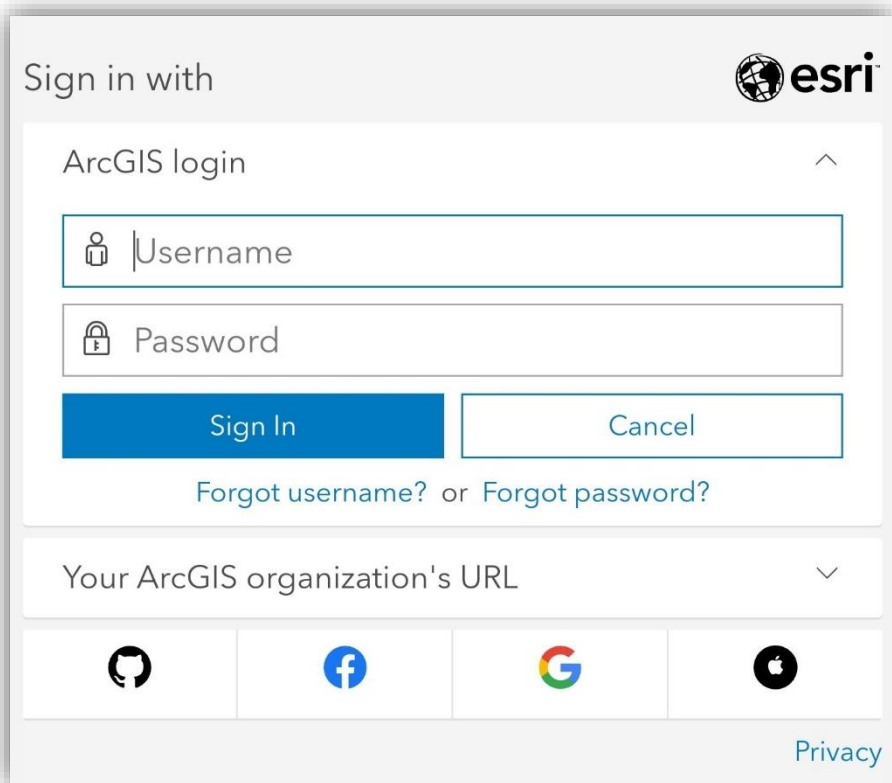


I. Installing and Signing In

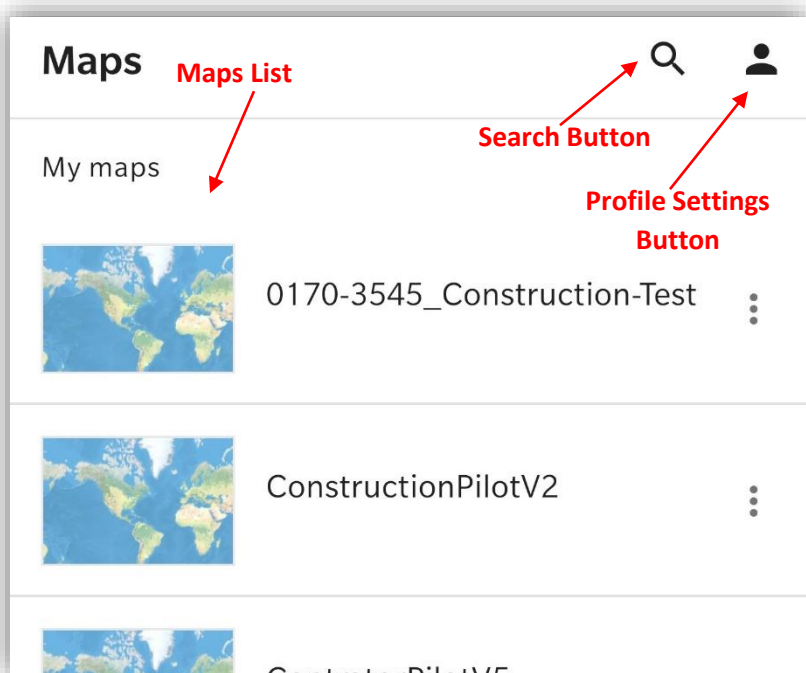
1. Installation is best completed when connected to wi-fi but can be done on a mobile data network if necessary. First, open the app you use to download other apps onto your phone. For Android this will most likely be the Play Store and for iPhones (iOS) this will be the App Store. Screenshots in this app are taken of the Android version of Collector and may show some slight differences to what is found in the iOS version.
2. In the store app, search for “ArcGIS Collector”, the correct app will most likely be the first result. Be sure you **do not** download “Collector Classic”, which has a similar icon.
3. Tap Install. A progress bar should appear for the installation.
4. Once completed, you should be able to find the ArcGIS Collector icon in your app tray. Tap the icon to open the app.



5. When you first open the app, you will reach a screen that looks something like this (above). You want to choose the option shown in white here, “Sign in with ArcGIS Online”.



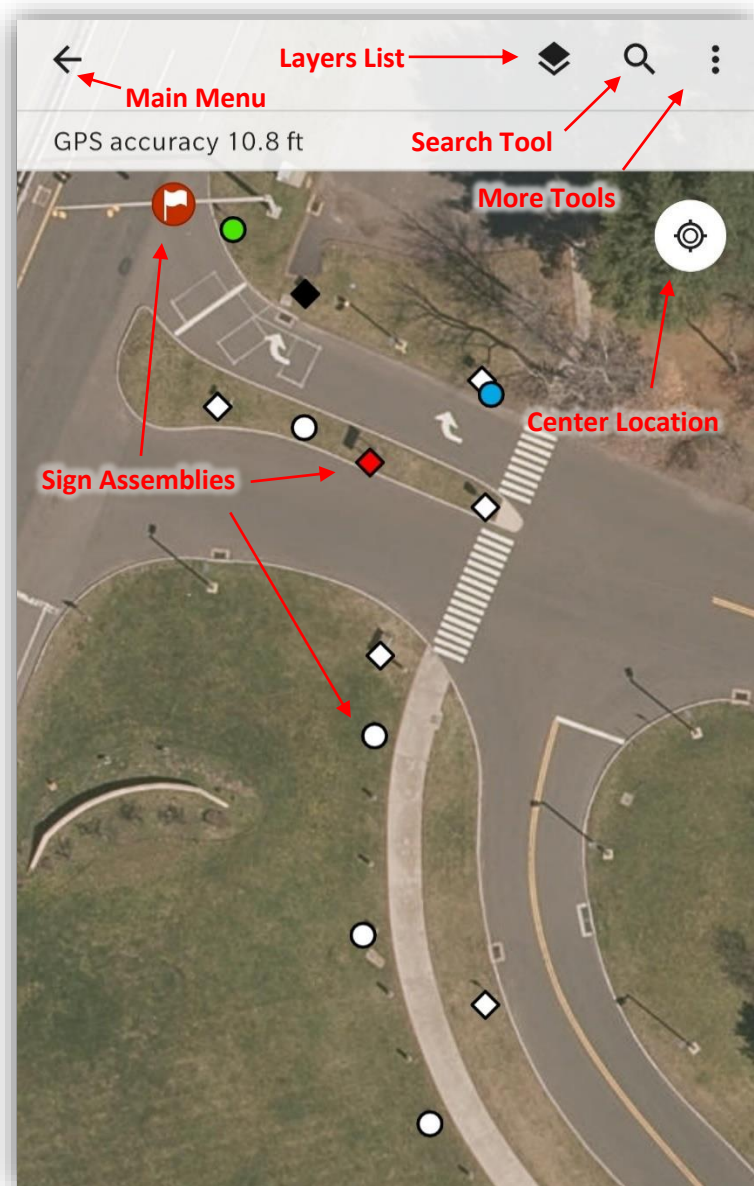
6. Next you will find yourself on the log in screen (above). Enter your ArcGIS online username and password and tap “Sign In”. The Department will provide the Contractor with a username. The password was chosen by the user when you first logged on.



- Next you should reach the main menu (above), which consists of a list of maps owned by or shared to your Arc account, a search button, and a profile settings button. Now you're signed in and ready to start using Collector.

II. Map Interface

From the Collector main menu ([section I, step 7](#)), tap on a map from the list to open in the map view (below).

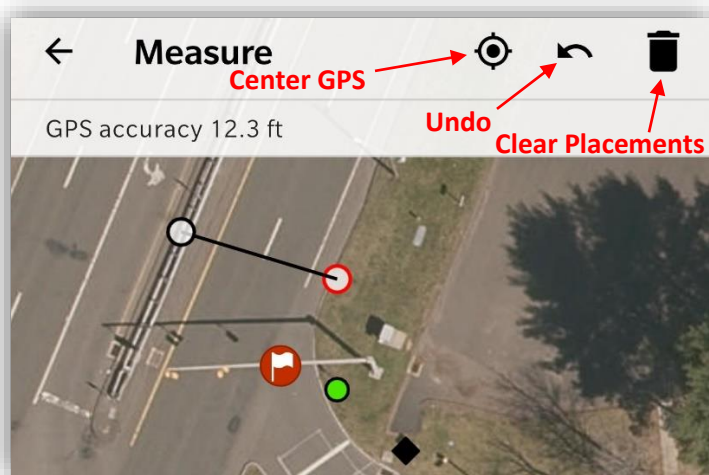


Button Descriptions:

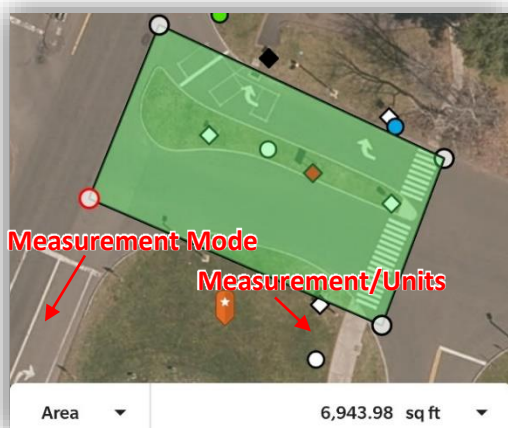
- **Main Menu:** The left arrow icon in the top left of the screen will bring you back to the main menu.
- **Layers List:** The icon of two overlapping diamonds will bring up a checklist of layers in the map. Tapping the text will zoom your map view to the full extent of that layer. Tapping the check box will toggle visibility for that layer on your map.
- **Search Tool:** The magnifying glass icon will bring up a search bar where you can search assembly ID numbers to locate specific assembly locations.
- **More Tools:** The three dots icon will bring up a selection of more map tools. These include:
 - **Basemap:** Selects the background image for the map. The base map can be changed back and forth as desired. “Imagery” is the default and recommended base map.
 - **Bookmarks:** Lets you quickly zoom to bookmarks created by the map author or “my places” saved by the user. Saving locations to “my places” will be explained later in this guide.
 - **Legend:** Shows an image of each kind of assembly symbol and a text description of what each shape/color combination means for quick reference. An in-detail explanation of each item on the legend will appear later in this guide.
 - **Measure:** Allows the user to measure a distance or an area by placing points on the map. Using the measure tool is explained below this section.
- **Center Location:** Tapping this button will center the map view on your current GPS location.
- **Sign Assemblies:** Tapping on an individual sign assembly will bring up the data attributes of assemblies at that location. If more than one assembly is present (For instance, an assembly removal and an assembly installation at the same location.) it will present you with a list of assemblies at the selected location first. Tap on the desired assembly in the list to view its attributes.

Using the Measure Tool:

1. From the map view, tap the three dots in the top right-hand corner and tap 'Measure' from the dropdown.
2. In the bottom left dropdown, you can pick if you'd like to measure an area or a line. Note that changing this setting will clear any measuring placements currently on the screen.
3. In the bottom right dropdown, you can pick the units you'd like to see the results in.
4. In the top right there are three buttons (shown below). The far-left button centers the map view on your current GPS location. The middle button will undo your last measuring placement. The far-right button will clear all measuring placements.



5. To begin measuring, tap on the map view to create a measuring placement. When measuring a line, it will begin measuring when you have made more than one placement. For areas, it will begin measuring when you have made more than two placements. You can create as many placements as you like to create more complex areas and lines. The distance or area is shown in the bottom left-hand corner.
6. Remember to press the trash can in the top right to clear your placements before starting your next measurement.

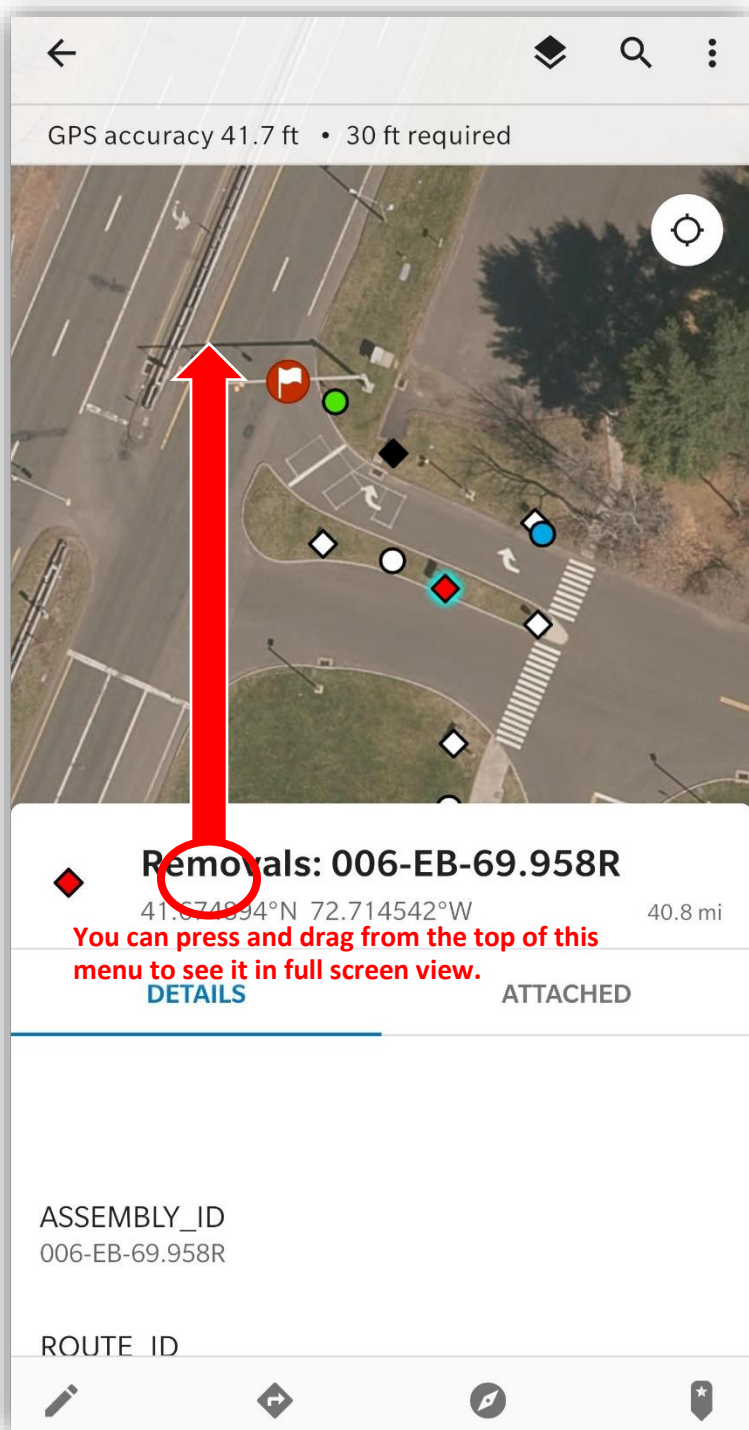


III. Viewing Attributes

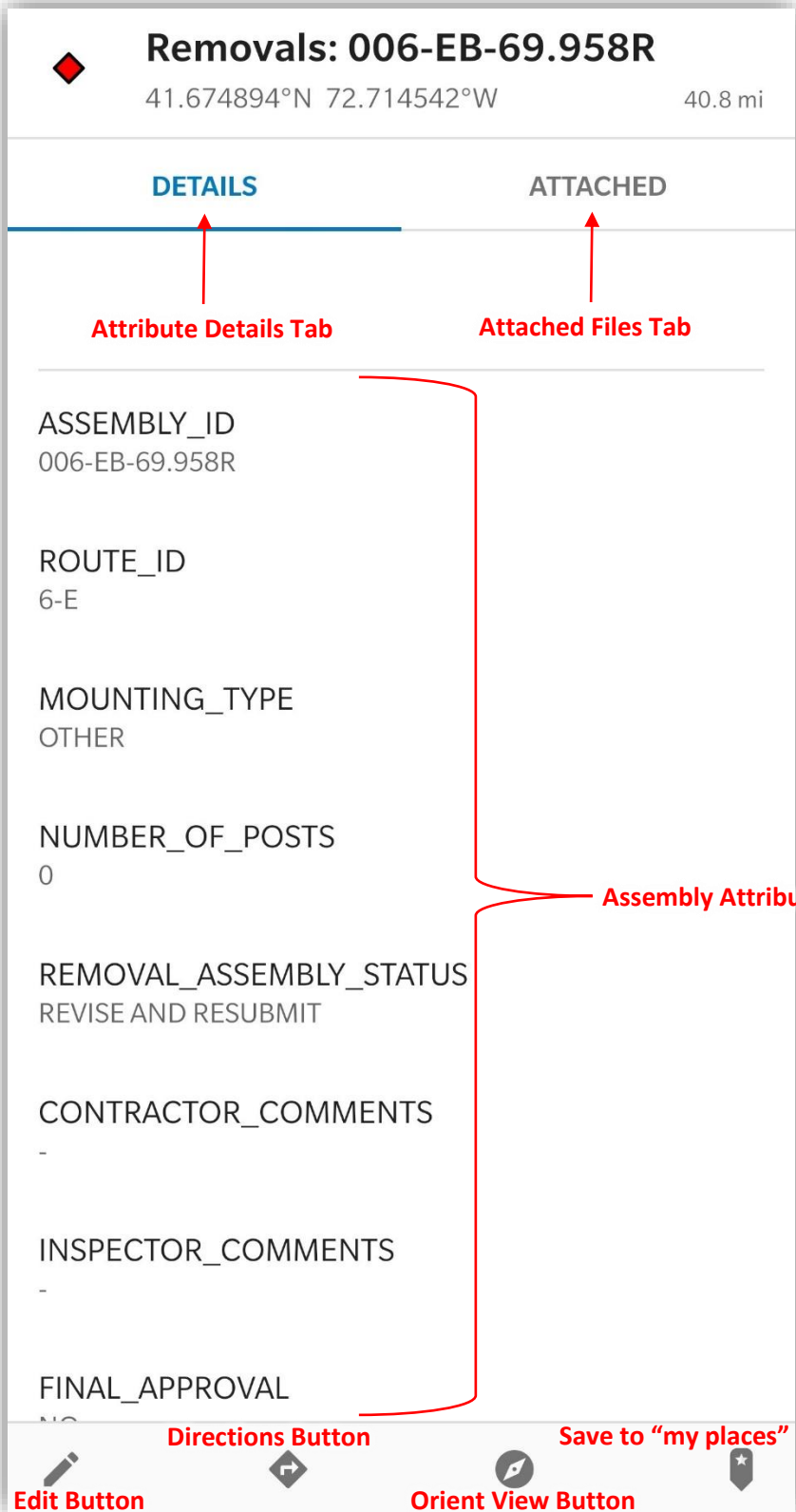
1. First, tap a data point on the map that you wish to view the attributes of. If more than one point is present around where you tap on the map, it may bring up a list of options as seen in the screenshot below. Tap on the desired assembly to open the attributes list.



- When you first open the attribute details window, it will open in the bottom half of the screen. Press and drag from the top of the menu to the top of your phone screen to expand the window to full screen view, as seen in the image below.



3. With the attribute details window in full screen view, we can get a better look at all the assembly attributes visible through the collector app.



Button Descriptions:

- **Attribute Details Tab:** The default view when you open this window, this tab displays all the attributes associated with the selected assembly.
- **Attached Files Tab:** The alternate view of this window that displays any files or photos associated with the selected assembly. Attaching photos to an assembly will be explained later in this guide.
- **Assembly Attributes:** A list of all the attributes associated with the selected assembly. Attributes can only be viewed from the current screen.
- **Edit Button:** Opens the attribute editing view. Editing attributes will be explained in detail later in this guide.
- **Directions Button:** Opens your phone's default GPS app (usually Google Maps or Apple Maps on iOS) with directions guiding you to the GPS location of the selected assembly.
- **Orient View Button:** Minimizes the attribute window and shows your GPS location in relation to the selected assembly in the Collector map view.
- **Save to "my places":** Saves the selected assembly location as a bookmark in the "my places" tab of the bookmarks window. Bookmarks will be explained later in this guide.

Attribute Descriptions:

- **ASSEMBLY_ID:** Unique identifying code for each assembly.
- **ROUTE_ID:** Route ID associated with the assembly.
- **MOUNTING_TYPE:** Type of sign assembly support.
- **NUMBER_OF_POSTS:** Number of posts used on the assembly.
- **POSITION:** Position of the assembly in relation to the roadway. **(installs only)**
- **REMOVAL_ASSEMBLY_STATUS:** Progress status of an assembly being removed.
- **INSTALL_ASSEMBLY_STATUS:** Progress status of an assembly being installed.
- **CONTRACTOR_COMMENTS:** Text field for Contractors to write comments about an assembly.
- **INSPECTOR_COMMENTS:** Text field for inspectors to write comments about an assembly.
- **FINAL_APPROVAL:** Inspector's final approval of an installation or removal.

IV. Viewing Attached Images

○ **Installs: PROJECT_0170-3...**
 41.674917°N 72.714599°W 40.9 mi

DETAILS

ATTACHED



PROJECT_0170-3545_91010016.jpg

58.1 KB



Photo 2.jpg

583.5 KB



To view the images attached to an assembly, tap the “ATTACHED” tab. Here you will see a list of all attachments associated with the assembly, as shown above.

○ **Installs: PROJECT_0170-3...**
 41.674917°N 72.714599°W 40.8 mi

DETAILS

ATTACHED



PROJECT_0170-3545_91010016.jpg

58.1 KB



Photo 2.jpg







583.5 KB









To open an image, you first have to tap once on the image to download it to your phone. In the screenshot above, Collector is downloading “Photo 2.jpg”. You can tell when the download is finished when the thumbnail is visible to the left of the image. In the screenshot above “PROJECT_0170-3545_91010016.jpg” is ready to be opened. Tap on the image again to view it.

V. Legend Details

01703545 - Installs

-  COMMISSIONED
-  FLAGGED
-  IN-PROGRESS
-  INSTALLED
-  PLANNED
-  REVISE AND RESUBMIT

01703545 - Removals

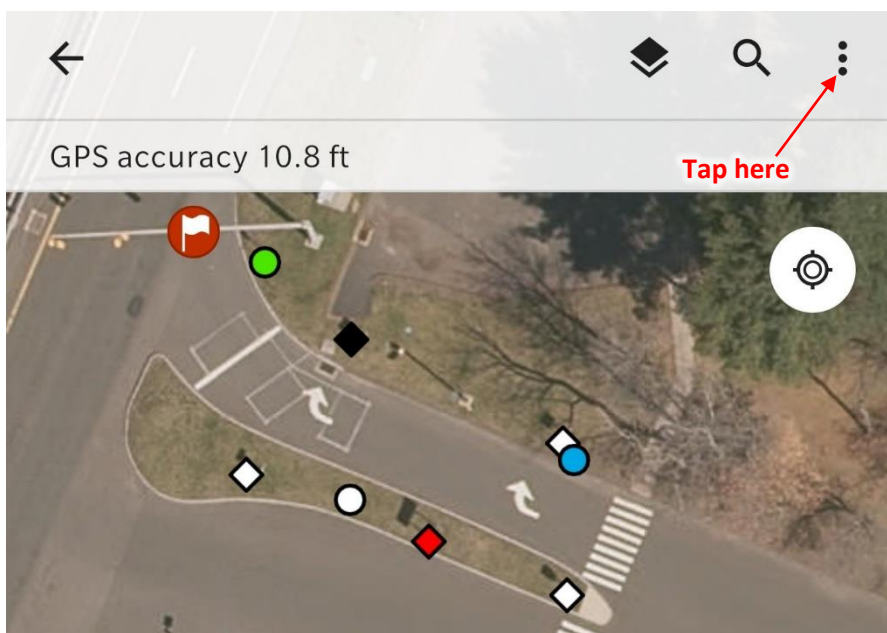
-  DECOMMISSIONED
-  FLAGGED
-  IN-PROGRESS
-  PLANNED
-  REMOVED
-  REVISE AND RESUBMIT

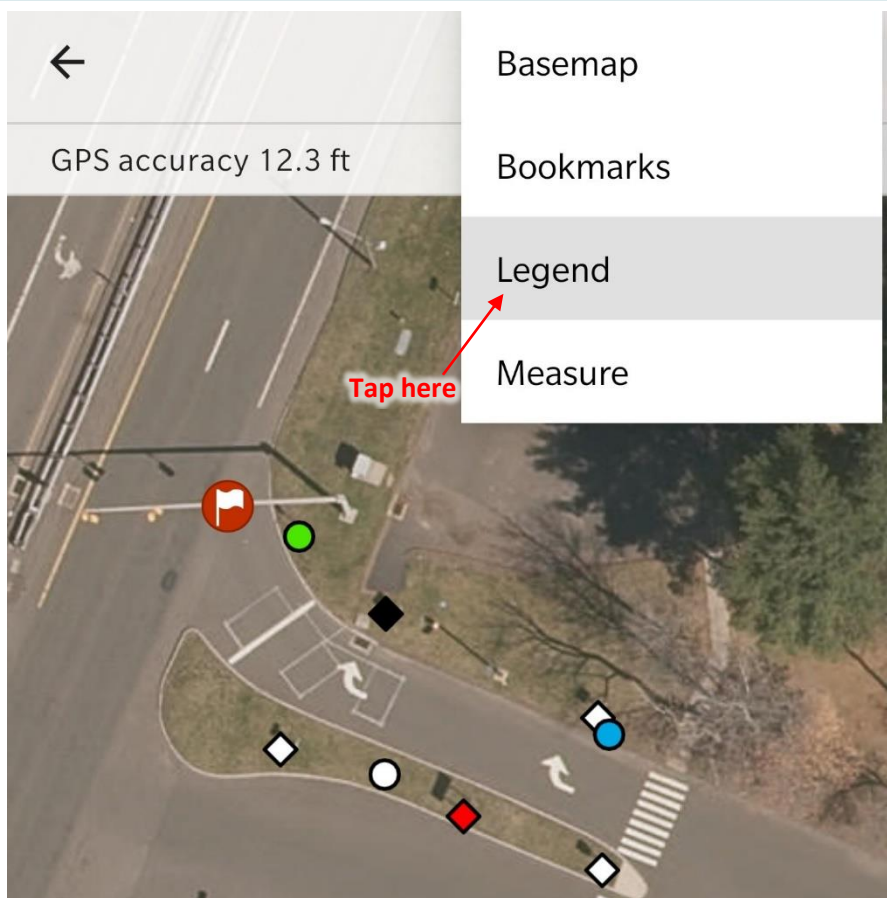
Above is the Collector legend for the assembly points in the Construction app. In this map, assembly install locations are represented by colored circles and assembly removal locations are represented by colored diamonds. The color of the symbols correlates with the assembly status field.

Status Descriptions:

- **Planned:** The assembly included in the project to be removed or installed.
- **Flagged:** This assembly requires discussion between the Contractor and Inspection teams.
- **In-Progress:** Contractor has begun but not completed installation or removal of sign(s) at this location.
- **Installed/Removed:** All work at the location is complete and all required pictures have been captured and ready for review by the Inspection team.
- **Revise and Resubmit:** Work items related to the location are required to be fixed. **(Contractor should view the Inspector Comments field for details or contact the Inspection team for further instructions.)**
- **Commissioned/Decommissioned:** Work has been completed and all parties have accepted the work. **(Note- final acceptance by the Department is verified under Final_Approval attribute in case this status is set by mistake)**

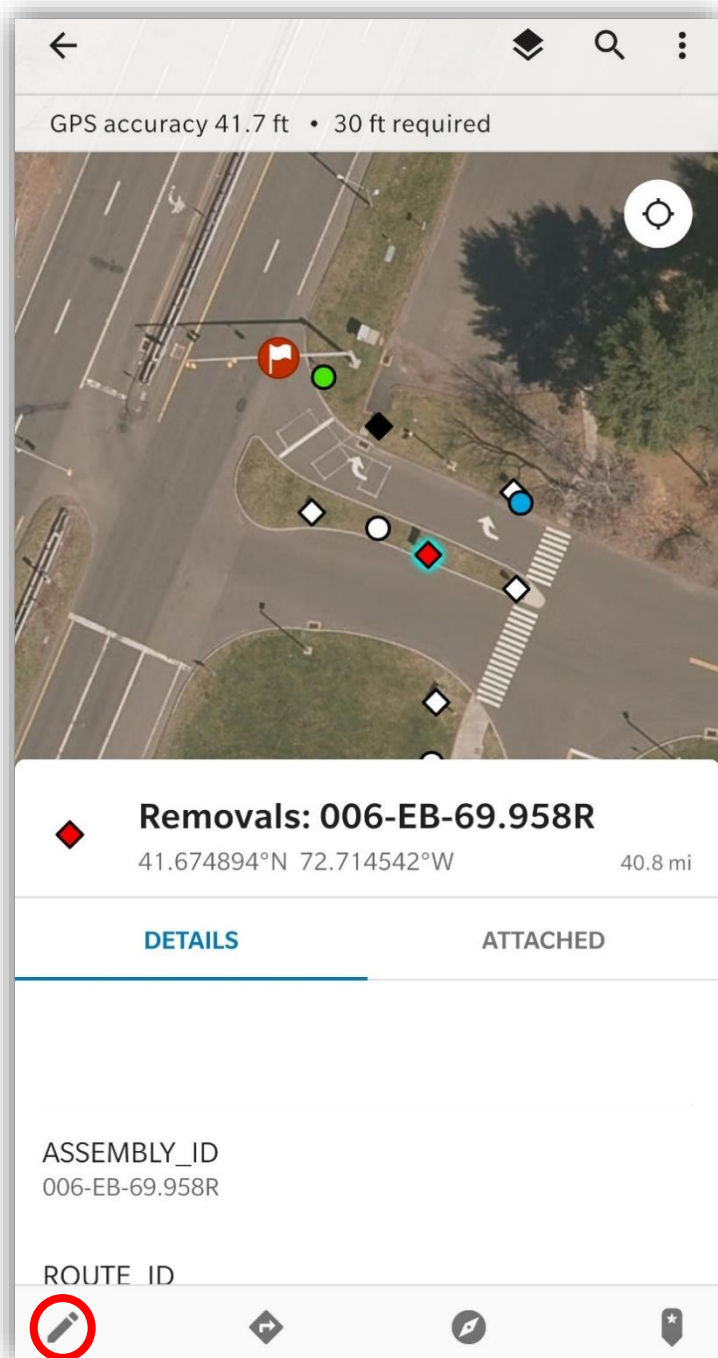
You can view this legend in the Collector app at any time. Follow instructions in the two images below to open the legend.



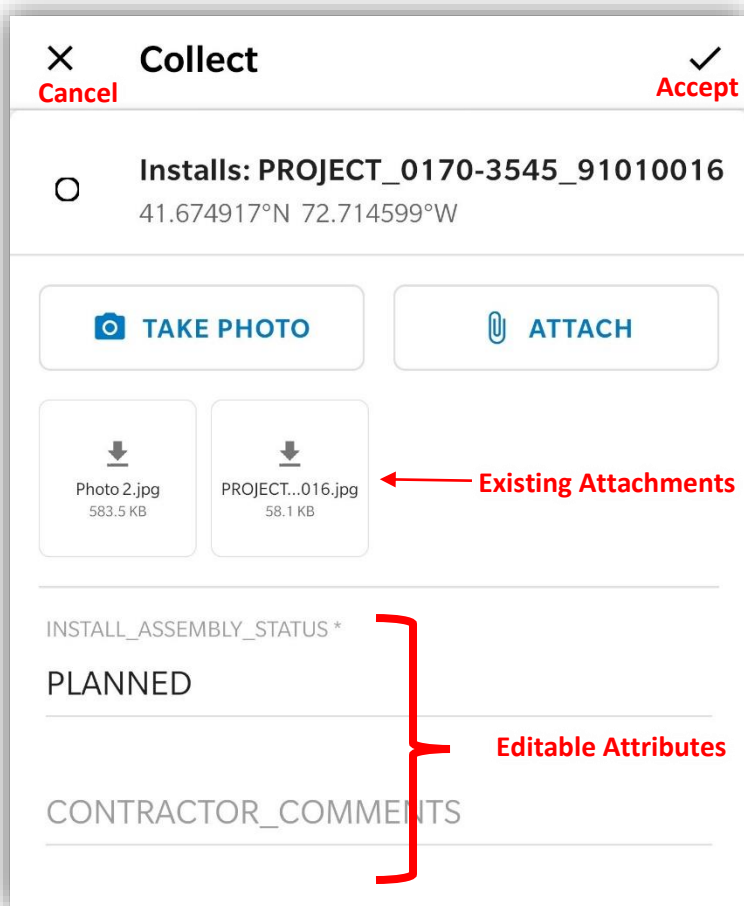


VI. Edit Attributes and Attachments

1. To edit an assembly attribute, tap on the assembly point you wish to edit the attributes of to bring up the attribute details window.
2. Next, tap the Edit button in the bottom left to open the editing window, as shown in the red circle below.



3. To edit an attribute, tap on the line next to the attribute name, and begin typing or choose from the domain list (drop-down list), if applicable. For the construction app, comment fields will allow you to enter text while the assembly status field uses a domain list. Tap the check icon in the top right frequently as you work so you do not lose any changes.



4. Attaching an image to the assembly can be done in two ways. The easiest option will be to choose “TAKE PHOTO” from the editing window. If Collector asks for permission to access your camera, microphone, and phone storage choose to allow it.
5. The Collector camera will open and allow you to take a picture. After you take a picture, tap the check icon to attach the image, the X icon to cancel, or the circular arrow icon to take a new picture instead.
6. If you want to remove or rename an attachment, press and hold on the attachment in the editing window (shown above, where the image says “Existing Attachments”) and you will see the option to “Rename”, “Remove” (delete), or “Save Image” (this will save a copy of the attachment to your device. **(Note: After removing an attachment, once the check icon is tapped to save changes, the attachment cannot be re-added without taking a new picture. If you accidentally remove an attachment, tap the X icon to cancel your edits and replace the attachment. Please keep in mind this will also undo any unsaved edits, including new attachments.)**)

7. The other option to add an attachment is to upload and existing image from your phone. To do so, tap “ATTACH” from the editing window.
8. At the bottom of the screen tap “Photo gallery” to browse files from your phone. Tap on the picture you want to add it.
9. When you are done attaching images, be sure to tap the check icon in the top right to accept and save your changes.

VII. Using Offline Areas

Offline areas allow you to view a selected map area (as well as the data that already exists there) when you have poor or no internet connection. Downloading offline areas is useful when working in areas that may have spotty cell reception. They allow you to collect new data that you can sync to the online database when you return to an area where you have internet access. Offline areas can include very large files, so it is recommended that you begin downloading them connected to wi-fi and well ahead of when you intend to use them.

1. Navigate to the Collector main menu, where you can browse the map list ([Section I, step 7](#)).
2. Find the map you wish to use an offline area on and tap the three dots to the right of that map. From the dropdown, tap ‘Add Offline Area’.

Important note: once you download an offline area for a Collector app, you will only be able to use that map offline until the offline areas are synced and removed. Ensure you download all areas you will be working in, even if you may have cell coverage in some areas.

3. Now you will be taken to a map view on the selected map. There will be a square in the center of the screen for choosing the area you want to download. Zoom into your area of interest.
4. When you have the proper area selected wholly within the box, tap the “DOWNLOAD AREA” button at the bottom of the screen. If your work area is very large, you may need to download more than one area to ensure coverage.
5. You will see your area listed with a progress circle on the right. Tap the x in the progress circle if you want to cancel the download. You can also tap the back arrow in the top left to begin downloading more offline areas if necessary.
6. Back on the main menu, your map will now say “offline areas” underneath the map name. To use the offline area, click on the map to view a list of available areas, and choose one to start working. The data will work as usual if you don’t cross the boundaries of the offline area.

It is good practice to ensure that your offline areas are working before you leave cell reception. To do so, set your

phone to airplane mode and attempt to open the map again. This will simulate being out in the field where there is no available reception.

7. On the list of offline areas, you can tap the three dots to the right of each area to rename, remove, or sync map areas from the dropdown.
8. The sync button in the dropdown is used after completing work in an offline area. When you return to an area with internet connection (best on wi-fi), click sync to upload your new data set the server. If you forget this step, no one will be able to see your changes except for you.
9. Once you are done syncing, you may tap the dropdown again, and choose 'remove' next to each offline area to return to using the online version of the map.