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06-09-2017

Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
**OFFICE OF THE SECRETARY**
Manila

08 JUN 2017

**DEPARTMENT ORDER NO. 79 Series of 2017** 06.09.17

**SUBJECT: Guidelines for Geotagging Infrastructure Projects in Contract Management Stages**

In order to improve transparency and accountability, Construction personnel shall capture geotagged photographs of all infrastructure projects for implementation in accordance with the Guidelines for Geotagging Infrastructure Projects in Contract Management Stage. The use of geotagging technology will provide a more transparent and accurate reporting of project accomplishments.

**Definition of Terms**

| | |
|---|---|
| Infrastructure Project<br>Alias Civil Works, Works, Capital Outlay Project, Capital Project | Include the construction, improvement, rehabilitation, demolition, repair, restoration or maintenance of roads and bridges, railways, airports, seaports, communication facilities, civil works components of information technology projects, irrigation, flood control and drainage, water supply, sanitation, sewerage and solid waste management systems, shore protection, energy/ power and electrification facilities, national buildings, school buildings, hospital buildings and other related construction project of the government. To be classified as a capital outlay project, the works must extend the life of the asset by more than 1 year. |
| Civil Works Contract<br>Alias<br>Construction Project | A binding agreement between the Agency and a Contractor or consultant and the specific plan or design to complete terms identified in the Contract. |

**Contract Management**

For all Civil Works Contracts, staff from the Construction Division/Section of the Implementing Offices must capture geotagged photographs showing the location of the Contract.

There are three (3) specific stages and purposes for capture of these photographs:

| | |
|---|---|
| Before | 'Before' photos shall be captured during the conduct of the joint field as-staked survey to ensure that the contract is in the same location as the actual project and to confirm site availability and condition. |
| During | 'During' photos shall be captured at least once for the entire duration of the project to show physical progress and, potentially, for billing purposes |

| | |
|---|---|
| After | 'After' photos shall be captured during final inspection and should be uploaded before or on the day of issuance of Certificate of Completion to show the completed infrastructure |

The number and type of photographs to be taken shall be as follows:

| Type Of Infrastructure | Location | Photographs to be taken |
|---|---|---|
| Linear: Roads, Bridges, Flood Control Structures | Start, Intermediate, and End | **Start**: take photographs no greater than five (5) meters away from the start of the contract site, facing the start of the contract site.<br>**Intermediate**: take as many photos as needed, at an interval of no less than one hundred (100) meters.<br><br>**End**: take photographs no more than five (5) meters away from the end of the contract site, facing the end of the proposed site. |
| Point: Office buildings, school buildings, day care centers, municipal buildings and other similar infrastructure | If flagpole is available, get the location there. Otherwise, get the location no greater than five meters from the door of the building (or the closest area in front of the building where GPS signal is available) | At least four (4) photographs showing the contract site.<br>• Front<br>• Right<br>• Left<br>• Back/Rear<br><br>For the **After Photos**, the entire structure should be captured in the photograph. |

Photographs shall be taken using the attached Mobile Data Collection System Project Monitoring Manual. All photographs will be visible through the Project and Contract Management Application (PCMA). Project Engineers (PEs) shall be responsible for the review and quality assurance of these photographs. Appropriate training shall be conducted by personnel from the Bureau of Construction (BOC) with the assistance of the Information Management Service (IMS).

This Order shall take effect immediately.

**MARK A. VILLAR**
Secretary

11.1.1 ETC/RBC/NSP

Department of Public Works and Highways
Office of the Secretary

WIN7P01548

**ANNEX A**

# Mobile Data Collection System

## Project Monitoring

## User Manual

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# 1 Introduction

## *1.1 Subject*

This document provides 1) the guidelines for recording location and geotagging photos of DPWH-implemented projects and 2) step-by-step procedures on using the open source mobile application for DPWH-implemented projects, which is part of the mobile data collection system (MDCS) recently set up in the Department.

## *1.2 Purpose*

- The geotagging guidelines and procedures discussed on this manual shall be used by DPWH to enhance its documentation and monitoring system for Before and After stages of project completion through recording of GPS-based location and capturing geotagged photos for DPWH-implemented projects.

- The mobile application for project monitoring (hereafter, MDCS-PM) shall also aim to complement the Project and Contract Management Application (PCMA).

## *1.3 Audience*

This document is intended primarily for engineers from Bureau of Construction (BOC), project engineers and monitoring engineers from District Engineering Offices (DEOs) and Regional Offices (ROs). Experience in operating Android-powered mobile devices and basic ArcGIS applications are useful but not necessary.

## *1.4 Other Documentation*

A user manual on how to build XLSForm – file format being used by Open Data Kit (ODK) tools – using MS Excel is also available for those who are interested on designing and deploying other ODK-based survey forms.

# 2 Definition of Terms

- Geotagging – the attachment of geographical identification to electronic media such as photographs, video or any file. One of its simplest forms is the attachment of x and y coordinates to a photograph, so that the location at which the photograph was taken can be shown automatically in a map. Any electronic file, including a Word document or a PDF can be geotagged.

- Georeferencing – aligning geographic data to a known coordinate system so it can be viewed, queried, and analyzed with other geographic data. Georeferencing may involve shifting, rotating, scaling, and skewing (ESRI)

- Mobile device – portable computing device such as a smartphone or tablet computer (Oxford Dictionaries)

- Open-source software (OSS) – computer software with its source code made available with a license in which the copyright holder provides the rights to study, change and distribute the software to anyone for any purpose (St. Laurent, 2008)

- Project Component – distinct task or activity in the life cycle of a project that needs to be tracked separately for management and monitoring purposes. Examples of Project Component include Feasibility, Right-of-Way, Civil Works, Supervision and Lump Sum (MYPS Operations Guide V 1.2)

# 3 About ODK

- The platform used in developing MDCS-PM is based on Open Data Kit (ODK). ODK is an open-source suite of tools that helps organizations author, field, and manage mobile data collection solutions. The main goals of ODK are to make open-source and standards-based tools which are easy to try, easy to use, easy to modify and easy to scale. There are three general requirements in using ODK: design a form; setup a server; and connect the device to that server.

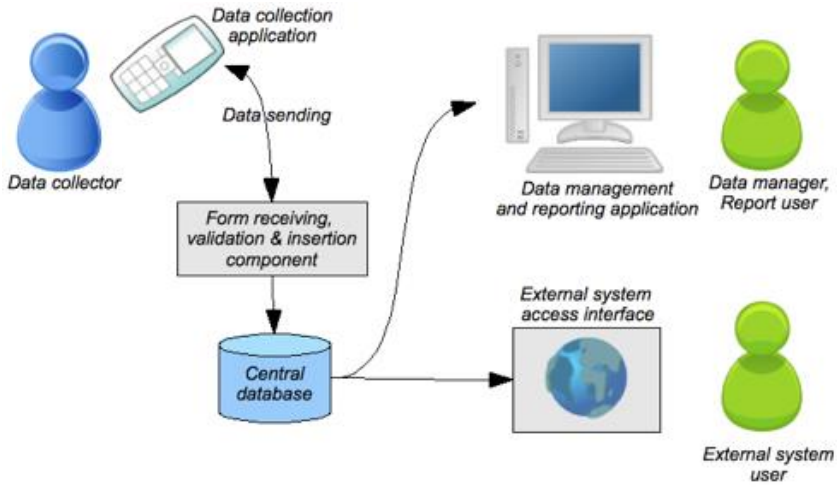



**Figure 1: General ODK Process Flow**

- Once those three items have been accomplished, the user is ready to conduct data gathering. The user shall need three tools: Build or XLSForm (to design the survey form), Collect (that runs on an Android mobile device to download and fill-in the survey) and Aggregate (for hosting the survey form and gathering the survey results).

# 4 ODK Process Flow for DPWH

In using the ODK tools, the DPWH shall refer to the process flow illustrated below:

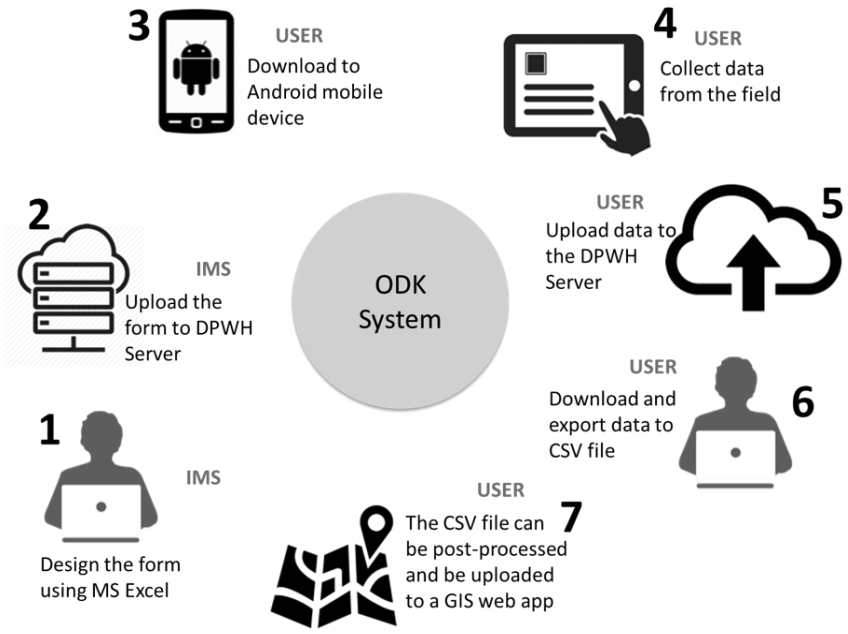



**Figure 2: ODK Process Flow for DPWH**

**Table 1: ODK Process Flow for DPWH**

| Process Flow No. | Description | Tools | In-charge |
|---|---|---|---|
| 1 | Design XLSForm using MS Excel. The XLSForm will be converted to XForms, which will be loaded in the mobile device to gather data. | XLSForm Offline converter, ODK Validate, ODK Collect | IMS |
| 2 | Set up a dedicated server using PostgreSQL to aggregate and house the data that will be collected by the mobile app. | ODK Aggregate | IMS |
| 3 | Load the XForm into the android mobile device | ODK Collect | BOC |
| 4 | Collect data in the field using the XForm loaded in the android mobile device. | ODK Collect | BOC |
| 5 | Upload the collected data from mobile device to ODK Aggregate (server) using ODK | ODK Aggregate, ODK Briefcase | BOC |

| Process Flow No. | Description | Tools | In-charge |
|---|---|---|---|
| | Briefcase. | | |
| 6 | Download the data in csv format from ODK Aggregate server to desktop computer using ODK Briefcase | ODK Aggregate, ODK Briefcase | BOC |
| 7 | Post-process the csv file and import it to a GIS web app for further visualization and analyses | MS Excel, ArcGIS Online | BOC |

Process flow numbers 1 and 2 are discussed in a separate manual intended for programmers, system and network development personnel.

# 5 Minimum Requirements for Mobile Device

For better results in using ODK-based mobile app such the MDCS-PM, the users should make sure that they are using a mobile device that has the minimum technical specifications. The users should use a uniform/standard mobile device for data gathering. Using a mobile device that does not meet the minimum specifications can result to sub-par output or data not being collected properly. The users may get in touch with Mr. Fortunato Bergania, Jr. of User Support Division at local 43567 for details on minimum specifications and how to procure the required mobile devices.

# 6 Mobile Device Initialization

It is a good practice for users to always check the GPS capability of their mobile devices. This will help the users to ensure that the data being collected have coordinates or geotagged.

- Make sure that your device is GPS-capable. To check this, the user shall go to device's **Settings** and turn on **Location**
- Make sure the camera app of your device is also GPS-capable: Open device's camera app → go to camera's **Settings** → turn on **Location** or **GPS** or **GPS tag**

Once the device has been set-up, the users shall go out in an open area to perform an actual test of the GPS capability of the device. It is also highly advisable for the user to perform GPS initialization if the user has spent too much time inside an enclosed area (e.g. inside a room or vehicle) before resuming data gathering.

# 7 Mobile App Requirements

- The user shall download two (2) mobile apps: ODK Collect and GPS Map Camera. The user shall download the mobile apps directly from Google Playstore. Copying the mobile apps through Bluetooth or other file-sharing app is not advisable because it can lead to problems/issues.

- ODK Collect is the main app that the users will need in collecting data including location and geotagged photos.
- GPS Map Camera, on the other hand, is a camera app that already embeds the GPS coordinates on top of the photo and can be used as the default camera app for ODK Collect. By showing the coordinates before capturing the photo, GPS Map Camera allows the user to ensure that the photos will be geotagged.
- Both mobile apps are available in Google Playstore for free.

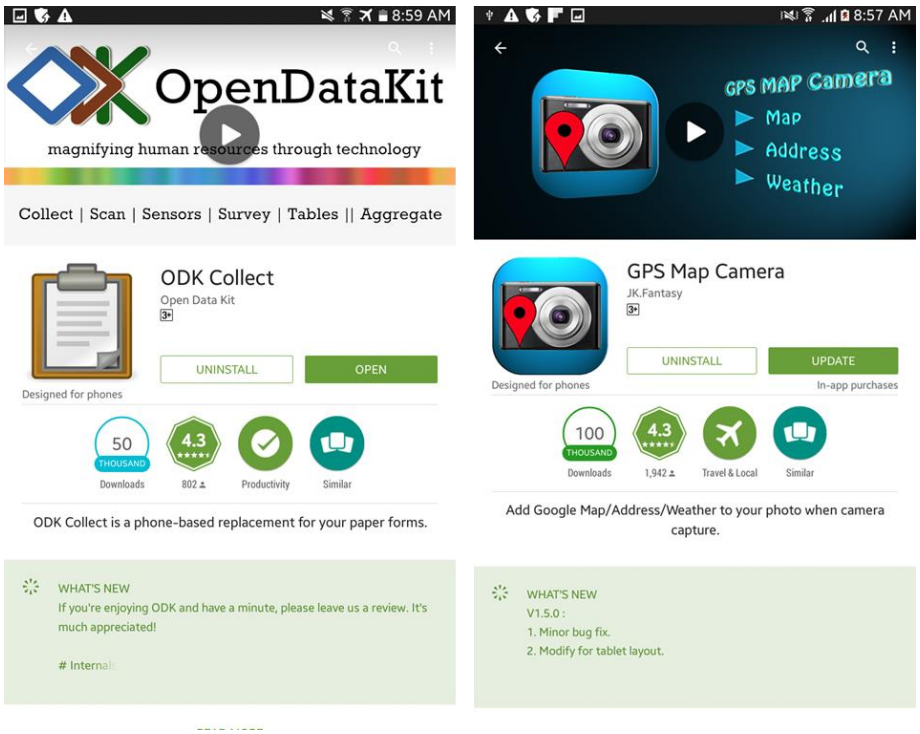



**Photo 1: Open Source Mobile Apps**

# 8 ODK Collect's Main Menu

- From the Home Page of mobile device, select the **ODK Collect app icon**. By clicking the ODK Collect app icon, the default Main Menu of ODK Collect will appear.

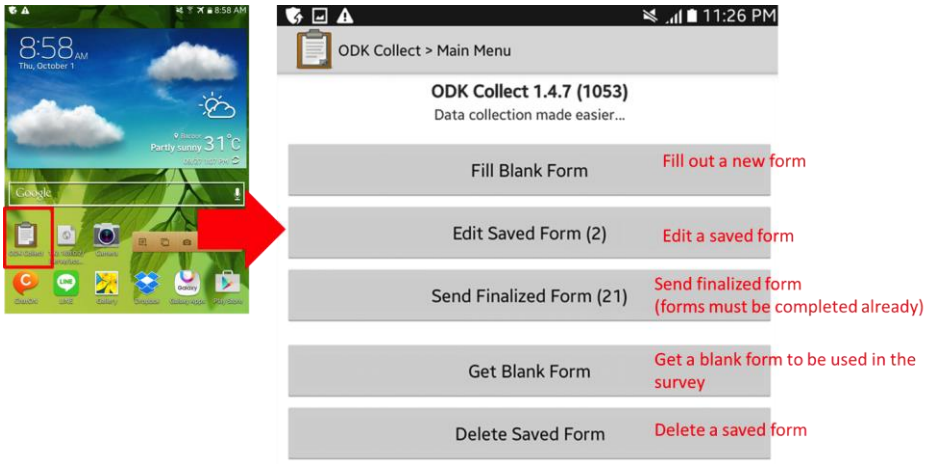



**Photo 2: ODK Collect Main Menu**

## *8.1 Get Blank Form*

It is important that users will **only use one blank form** throughout the course of data gathering. Using multiple blank forms will result to different databases making data consolidation extremely difficult.

- While the user can directly download the form from the DPWH Server to his/her mobile device, this is not possible as of the moment since it requires the mobile device to be connected to the Intranet. Connecting the mobile device to the Intranet is not allowed as per the Department's IT Policy. In this case, loading a blank form to the mobile device will be done manually/offline.
- It is highly advisable for BOC distributes the copy of blank form (.xml file) and corresponding media folder during the training session with Regional Offices (ROs) and Project Engineers (PEs) to ensure that all users will just use one and the same blank form.
- BOC shall copy the folder containing the files **mdcs_pm3.xml** and **mdcs_pm3-media** sub-folder **and** paste these files to *storage/odk/forms* of the user's mobile device.

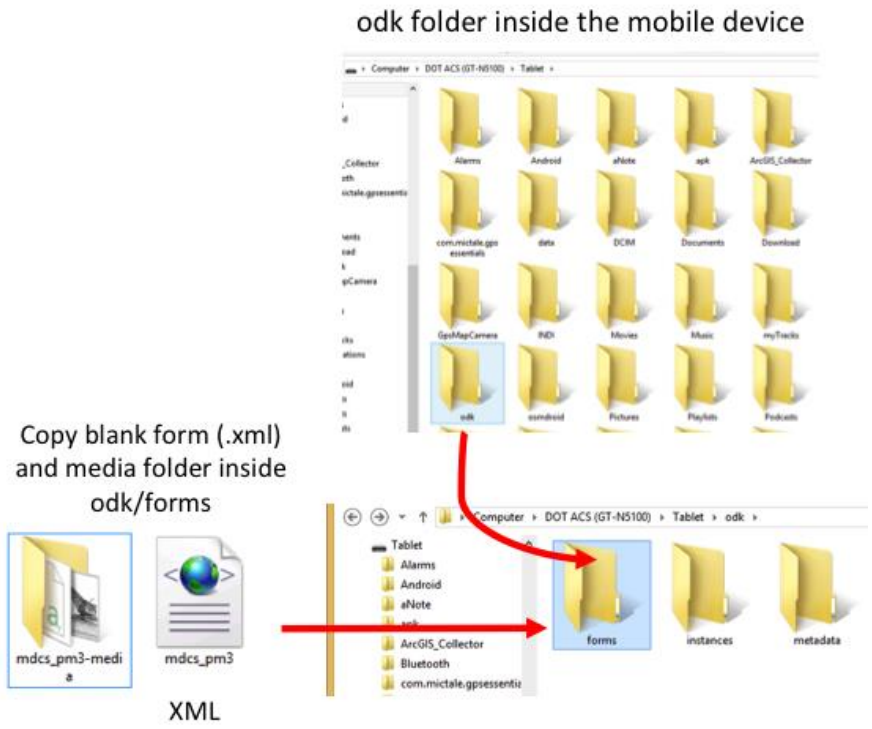



**Photo 3: Offline loading of ODK blank form**

## 8.2 Edit Saved Form

- This allows the user to edit previously saved or finalized form.
- From ODK Collect Main Menu, select **Edit Saved Form**.
- Select the form the user wishes to edit.

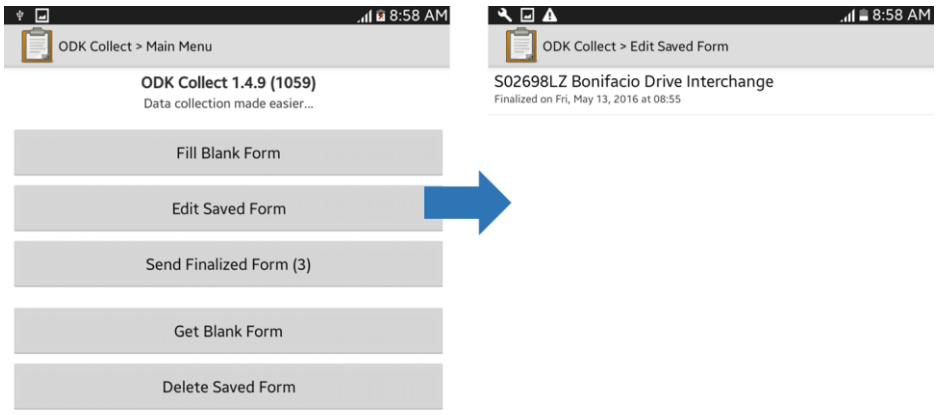



**Photo 4: Edit Saved Form**

## *8.3 Delete Saved Form*

- This allows the user to delete a previously saved or finalized form. This is useful when the user has to free up space on his/her device to gather more data. **Make sure all SAVED DATA have been backed-up in the PE's computer before performing this operation.**
- From ODK Collect Main Menu, select **Delete Saved Form.**
- Select the form(s) the user wishes to delete.
- Click **Delete Selected**

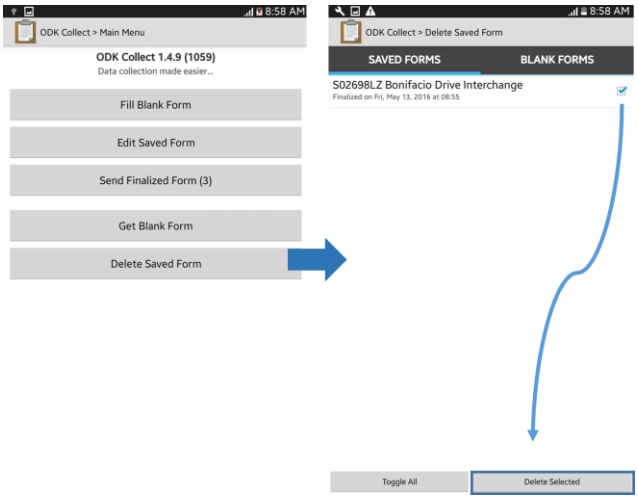



**Photo 5: Delete Saved Form**

# 9 Fill Blank Form (survey proper)

- From the ODK Collect Main Menu, select **Fill Blank Form**
- Select **Mobile Data Collection System – Project Monitoring 3.**

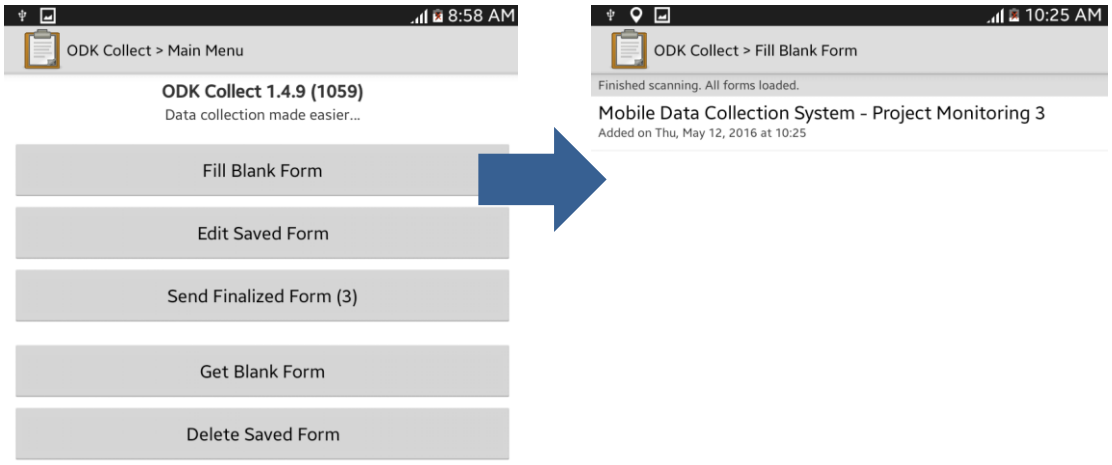



**Photo 6: Fill Blank Form**

## *9.1 Start of survey*

- Every time the users will fill up a blank form, this screen will appear showing how they will go forward/backward with the survey form.

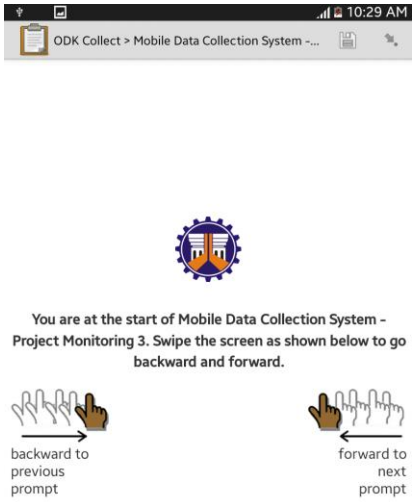



**Photo 7: Default Start of Survey**

## 9.2 Select Region

- The user shall choose the region where s/he belongs. This entry will facilitate post-processing of data gathered from the field.

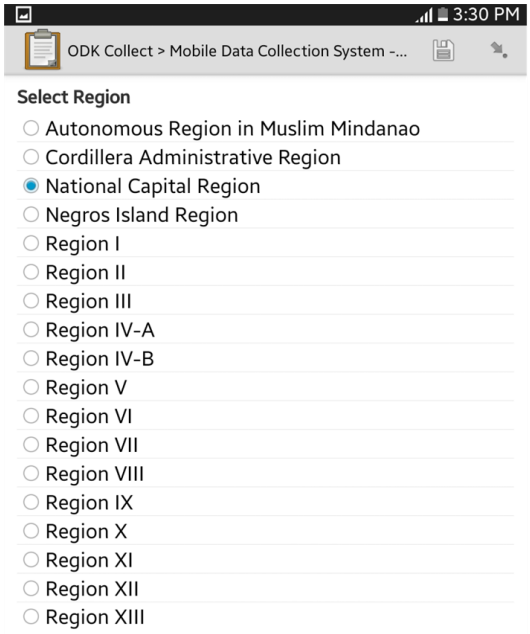



**Photo 8: Select Region**

## 9.3 Enter Project Component ID

The mobile app has preloaded data on DPWH-implemented projects, which are sourced from PCMA, which in turn, generated from MYPS.

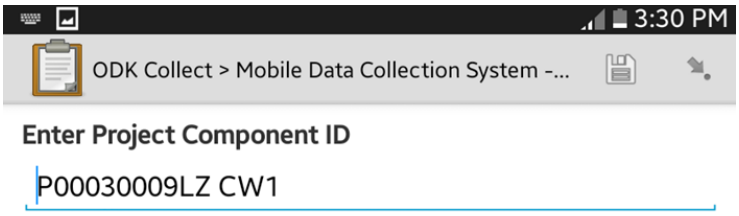



**Photo 9: Project Component ID**

## *9.4 Summary of Project Component Details*

- Upon entering a valid Project Component ID, a summary of details pertaining to that Project Component will appear to check if the user if surveying the right project component.

- If the user entered a Project Component ID that is not yet in the preloaded dataset, this portion will appear blank but the user can still proceed to the next steps.

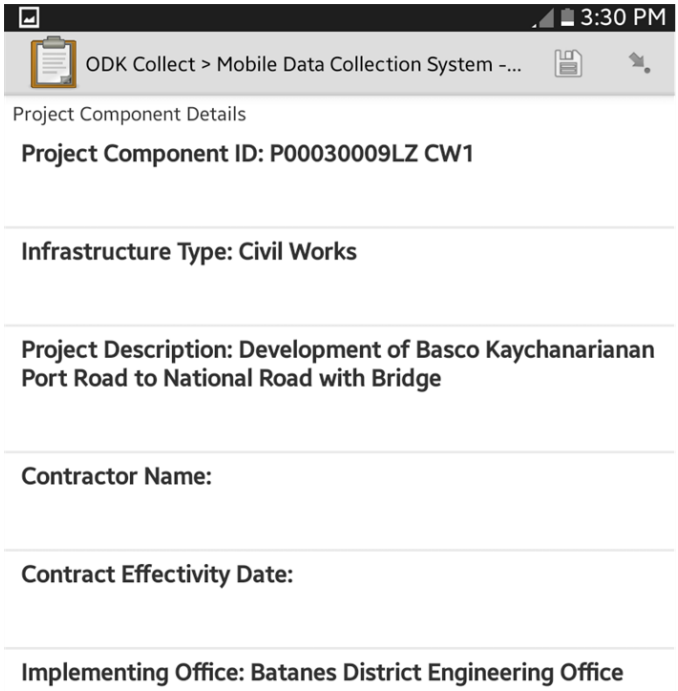



**Photo 10: Summary of Project Component**

## *9.5 Confirm Summary of Project Component*

The user shall confirm (by a simple Yes or No) if the Summary of Project Component is correct or not. If user selects **No**, the user can provide the correction on the next step. These corrections will be forwarded to the PCMA and MYPS teams for their verification. Note that the user cannot make changes on preloaded data within the mobile app.

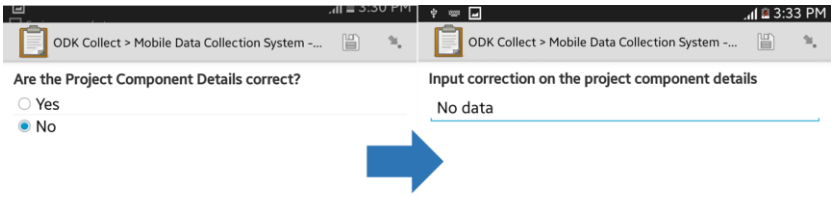



**Photo 11: Confirm Summary of Project Component**

## 9.6 Infrastructure Type for Geotagging Purposes

- The user shall specify the infrastructure type that will be geotagged.
- Note that the answer to this portion shall determine the structure of the proceeding questions.

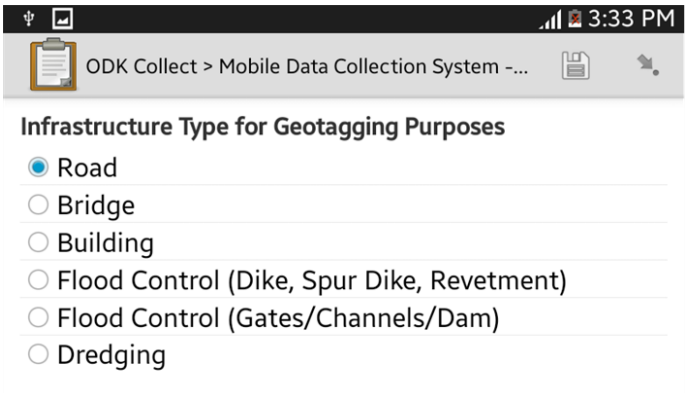



**Photo 12: Infrastructure Type for Geotagging Purposes**

## 9.7 Purpose of Geotagging

The user shall also specify whether the purpose of geotagging is for BEFORE or AFTER project completion. The option PROGRESS PHOTOS shall be selected for dredging activity only.

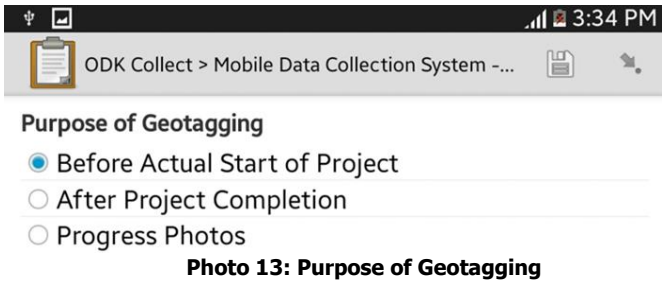
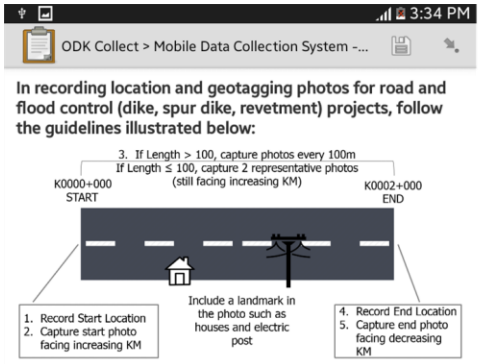



**Photo 13: Purpose of Geotagging**

## *9.8 Guidelines for Recording Location and Geotagging Photos*

The user shall refer to the following guidelines and procedures in geotagging location and photos for before and after stages of DPWH project component. Note that these images are also available in the mobile application.

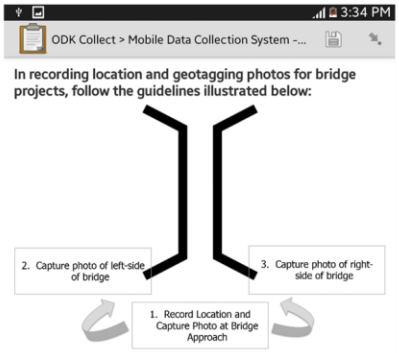
For road, dike, spur dike and revetment

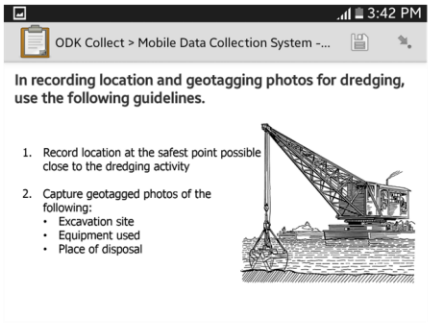




For buildings, gates, channels and dams

For bridge




For dredging

**Photo 14: Affected Station Limits**

## *9.9 Record Location Coordinates*

The user shall record GPS coordinates following the same guidelines in 9.8.

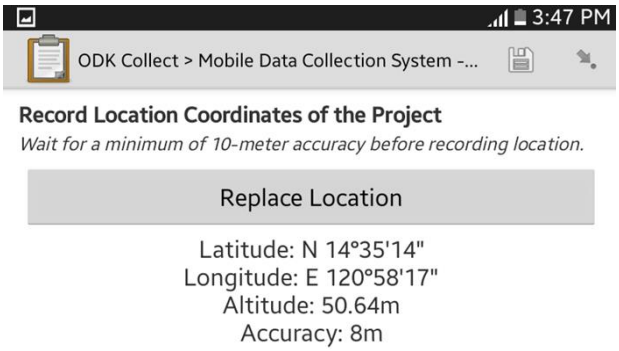



**Photo 15: Record Coordinates**

## *9.10 Capture Photos*

- After recording the location, the user will start capturing geotagged photos for before/after stages of DPWH project component. The user should note that this is a repeating process.

- The user shall select **Add Group** to start capturing photos. The user shall also use the **GPS Map Camera app**  (discussed above) in capturing photos during the survey.

- In the GPS Map Camera, click the **Settings** (lower right corner) and do the following:
  - For **GPS Use**, set it to **roughly GPS location** (if the user thinks that there is a good signal in the area, s/he can choose **good GPS location** instead.
  - For **Prompt Dialog**, set it to **disable** to prevent dialog box to popping up.

- Set the information that will appear on top of the picture by clicking the second icon from the upper-left corner. The user may check all the information. If the mobile device has Internet connection, the map and address will be available. If the mobile device has no Internet connection (offline) only the Latitude, Longitude, Date and Time will appear.

- If the coordinates (Lat-Long) are not visible, the user may need to do GPS initialization of the device and camera app again.

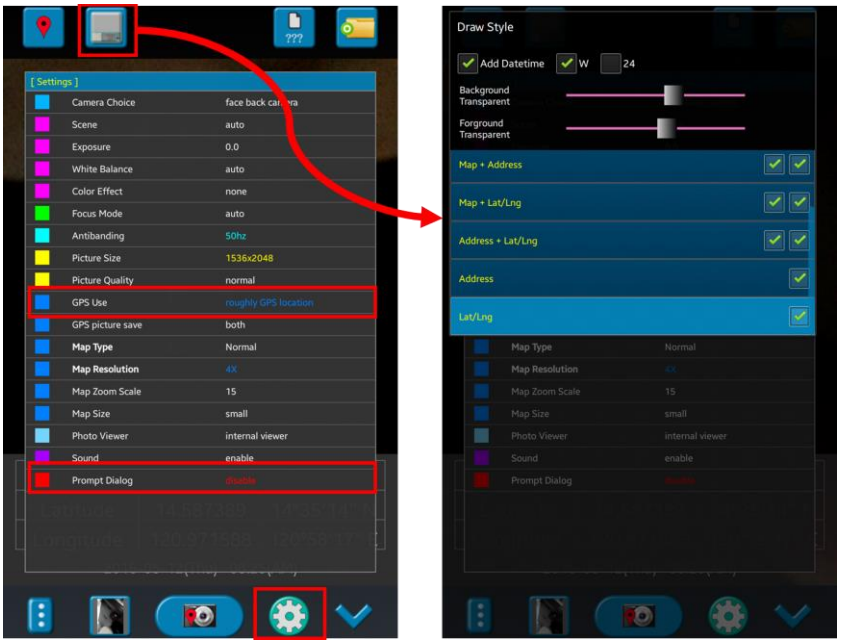



**Photo 16: Setting-up the GPS Map Camera App**

- The user should wait for the coordinates to appear on top of the photo before capturing and saving the photo.

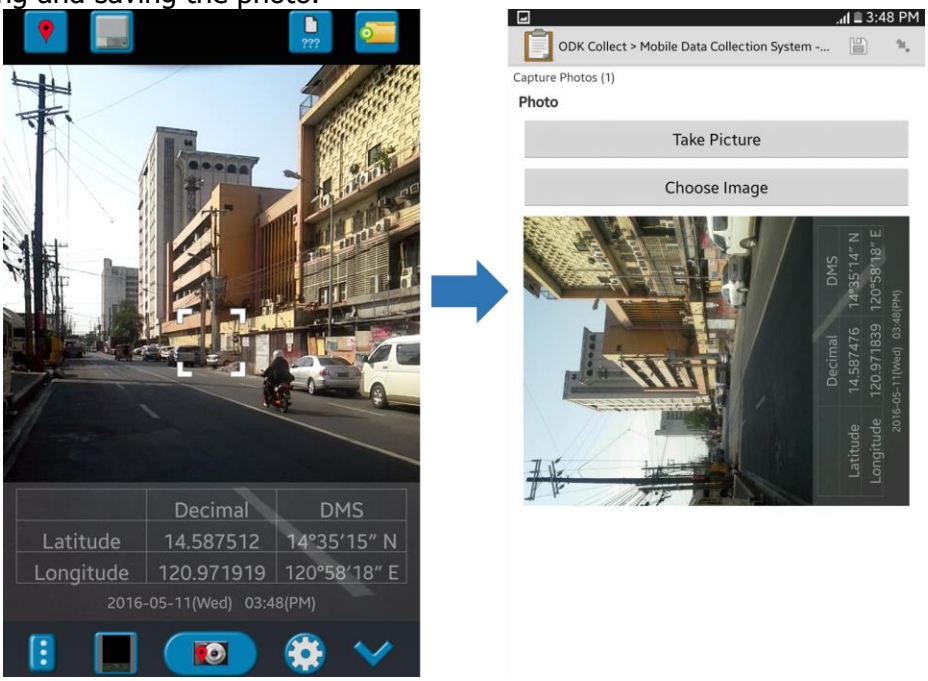



**Photo 17: Geotagging Photos**

## *9.11 Enter Landmark Visible in the Photo*

Once the photo has been taken, the user shall enter the **Landmark** visible in the photo.

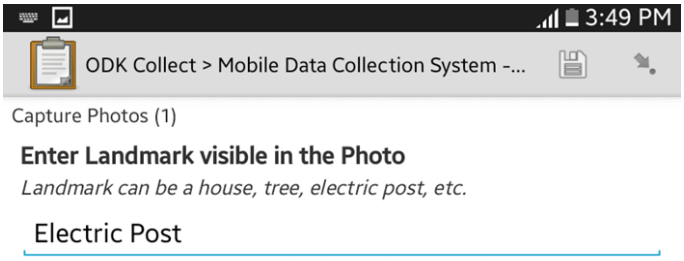



**Photo 18: Priority Level of Damages**

## *9.12 Type of Photo*

The user shall then classify each photo that s/he will capture. For every infrastructure type, there is a corresponding list of types of photo. In the case of dredging, an additional entry Description of Progress Photos will appear.

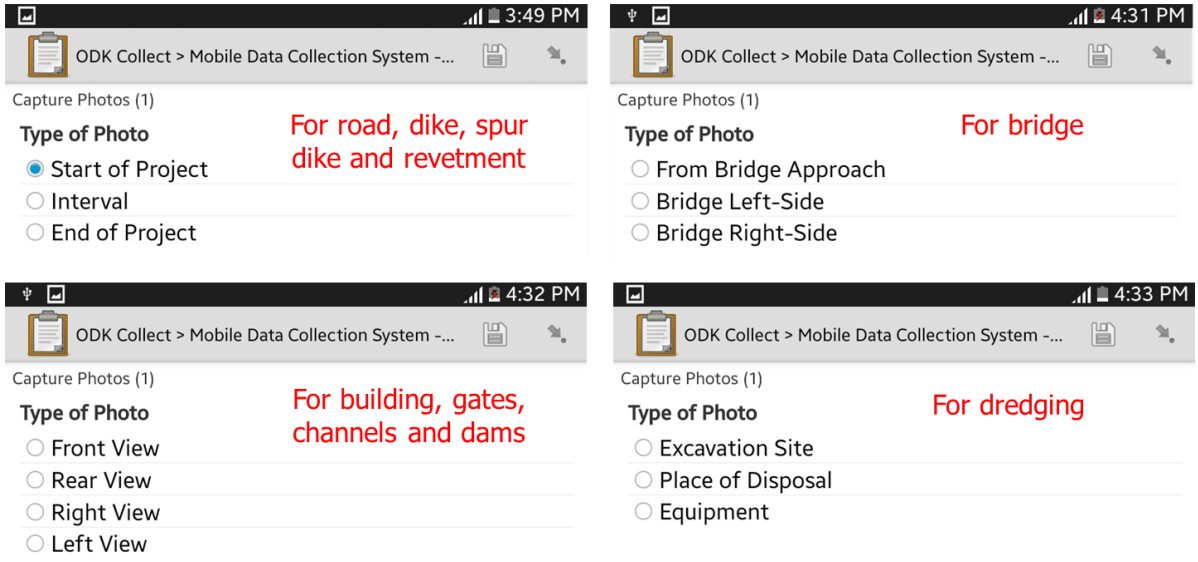



**Photo 19: Type of Photos**

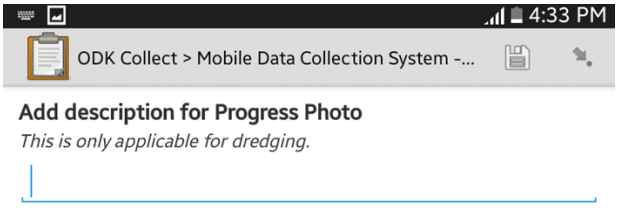



**Photo 20: Progress Photos**

- After this, the **Do Not Add Group – Add Group** will appear again. If the user wishes to get more photos, s/he can select **Add Group** and follow the previous steps. Once the user has finished capturing photos, s/he can select **Do Not Add** and proceed to the next step.

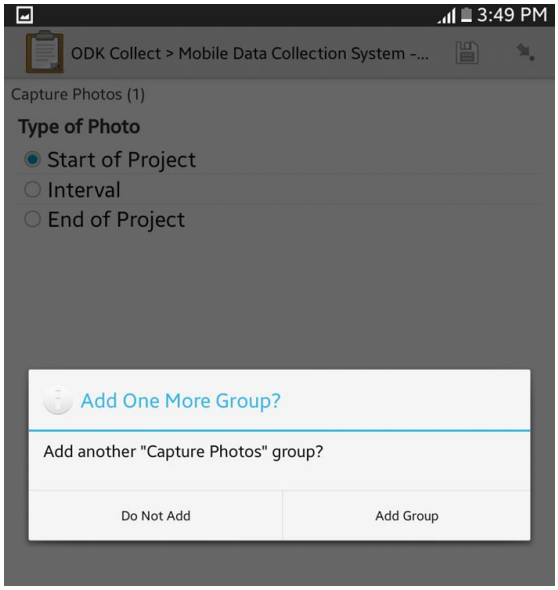



**Photo 21: Add/Do Not Add More Photos**

## *9.13 Record End Location (for road, dike, spur dike and revetment projects only)*

The user shall record the end location for line projects including road, dike, spur dike and revetment.

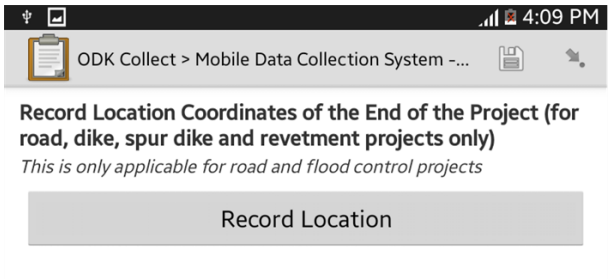



**Photo 22: Record End Location**

## *9.14 Accomplished by*

The user shall enter his/her name, position and office following this format: First Name Last Name, Position, Office.

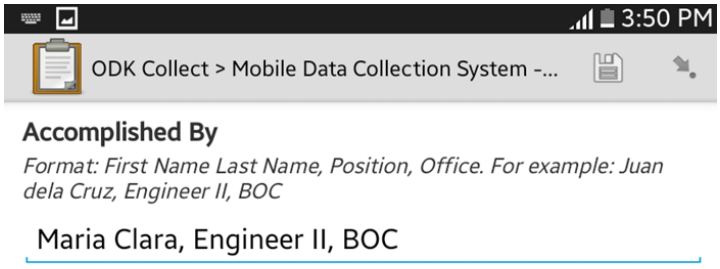



**Photo 23: Accomplished By**

## *9.15 Save Form and Exit*

After completing the form, the user can save it and exit to start a new form for another project component. Note that the form name is automatically formatted to Project Component ID and Project Description.

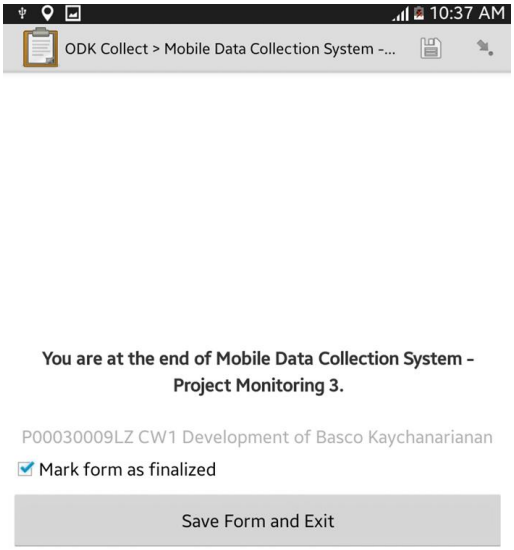



**Photo 24: Save Form and Exit**

# 10 Mobile Data Collection System

Given the current structure and limitations of ODK tools, the GIS Consultants formulated a process flow that will facilitate the submission and backing-up of data from PEs to to ROs to BOC.

## *10.1 Process Flow*

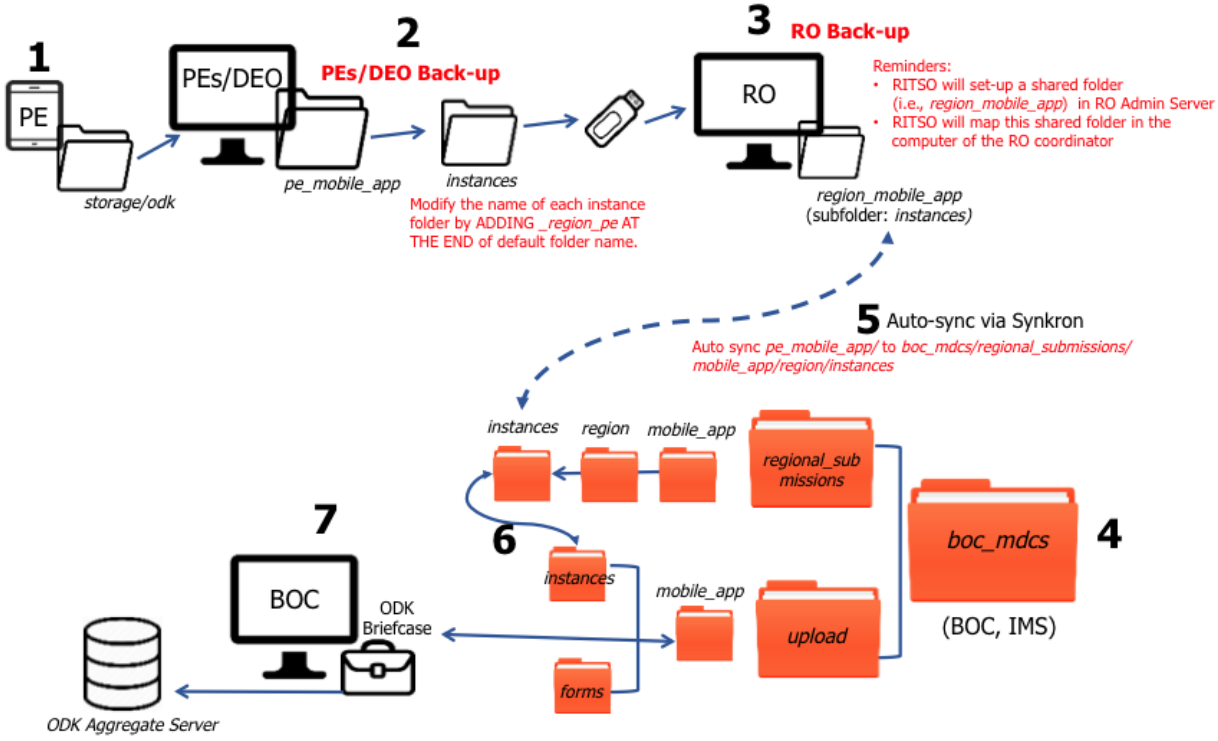



**Figure 3: Mobile Data Collection Process**

**Table 2: Summary of Mobile Dat Collection Process**

| Process | Assigned | Details |
|---|---|---|
| 1. Gather data using the mobile app for project monitoring (MDCS-PM) | PE/DEO | • Refer to the step-by-step procedures for using the mobile app. |
| 2. Once all project components under a PE have been surveyed, the *odk* folder from the mobile device will be copied to the designated desktop computer in the PE | PE/DEO | • The designated desktop computer of PE must have at least 250 GB of hard drive storage (to be expanded as the need arises).<br>• PE shall create a folder inside Drive C of its desktop computer (e.g., *pe_mobile_app* folder)<br>• PE must copy the ENTIRE *odk* folder from its mobile device to the desktop computer.<br>• PE should **NEVER** delete the contents of this *pe_mobile_app* folder. This serves as the data back up at PE level.<br>• PE will open the *instances* folder* inside the *odk* folder (check below the folder structures for details on which folder to open/copy)<br>• PE shall modify the name of the folders inside the instances folder by **ADDING** _region_pe (e.g., _ncr_sm for South Manila) **AT THE END** of the default folder name. **DO NOT REMOVE/MODIFY** the folder's default name. |
| 3. Copy the *instances* folder (from the previous step) to a flash drive/ external hard drive (EHD) and hand-carry it to the regional office. | RO, PE | • The RO shall assign a contact person for all mobile app matters. RO shall provide the name and contact details of this personnel to BOC and IMS.<br>• The Regional IT Support Officer (RITSO) shall set up a shared folder (i.e., *region_mobile_app*) inside RO Admin Server<br>• Inside shared folder, RITSO will create a folder with a default name *region_mobile_app* (e.g., *ncr_mdcs_fc*).<br>• Inside this folder, a subfolder *instances* will be created. Inside the *instances* folder, each PE |

| | | |
|---|---|---|
| | | under that RO will have its own subfolder (i.e., *pe_mobile_app*)<br>• The RITSO will then map the shared folder (i.e., *region_mobile_app*) in a dedicated computer (with at least a storage of 250GB, to be expanded as the need arises) of designated RO user.<br>• RO shall notify BOC as soon as the instances folder is ready for copying based on agreed schedule among RO, BOC and IMS. |
| 4. Set up a shared folder in the DPWH Main Server to consolidate the regional submissions | BOC, IMS | • BOC in close coordination with IMS shall create a shared folder (i.e., *boc_mdcs*) inside the DPWH Main Server.<br>• This shared folder has the *regional_submissions* folder, which will consolidate all the submissions from the regions.<br>• This shared folder will also have the *upload* folder, which will be connected to ODK Briefcase (located inside the BOC desktop computer). Using ODK Briefcase, the submissions of all regions will be uploaded to the DPWH ODK Aggregate Server more seamlessly. |
| 5. Auto sync the instances folder of each RO to a shared folder housed in the DPWH server. | BOC, IMS, RO (RITSO) | • Based on an agreed schedule, the IMS in close coordination with BOC and RO-RITSO shall automatically copy the contents of *instances* folder per region (inside *regional_submissions/ mobile_app / region / instances*) on a per batch basis to control the bandwidth consumption of the Department.<br>• Auto sync shall commence from the moment BOC notify IMS that the instances are ready for copying. |
| 6. Copy the contents of *instances* folder (per region) to the *instances* folder (inside *upload/ mobile_app*) | BOC | • BOC shall (manually) consolidate all the regional submissions by copying these files into *upload/ mobile_ app/* |

| | | |
|---|---|---|
| | | *instances*. At this point, the *instances* folder will contain submissions from different regions (not sorted by region anymore). |
| 7. Connect the *upload/ mobile_app* folder to ODK Briefcase. | BOC | • Detailed step-by-step procedures on how to use ODK Briefcase are provided below. |

**Table 3: Folder Structure**

| Main Folder | Sub-folder 1 | Sub-folder 2/ file | Sub-folder 3/file | Sub-folder 4/file |
|---|---|---|---|---|
| *odk* (This is the folder that will be copied by PE to its desktop computer) | *forms* | blank form (.xml) | | |
| | | media | | |
| | *instances* (PE shall copy this folder to a flash drive/ EHD to a designated desktop computer in the RO) | *submissions* (PE shall modify the name of this folder by ADDING _region_pe AT THE END of the default name | accomplished forms (.xml) | |
| | | | photos (.jpeg) | |
| | metadata | | | |
| *boc_apps* (shared folder inside the DPWH Server) | *regional_submissions* | *mobile_app* (e.g. MAFS) | *region* (e.g. ncr, region i, car, etc.) | *instances* (this folder is auto sync to the contents of instances folder at the RO level) |
| | *upload* (this folder is connected to the ODK Briefcase located inside the BOC designated desktop computer) | *mobile_app* (e.g. MAFS) | *instances* | |
| | | | *forms* (BOC and IMS shall provide the contents of this subfolder) | |

## *10.2 GeoSetter*

GeoSetter is a free desktop tool, which the PE and RO engineers can use in validating the coordinates/location for their geotagged photos. This desktop tool shall allow the user to double check his/her geotagged photos before submitting to BOC.

- The user shall ask RITSO to install GeoSetter in his/her desktop computer
- Once installed, the user shall click GeoSetter icon 

- The GeoSetter main page has two main areas: the left side shows the area for files/photos while the right side shows the map.

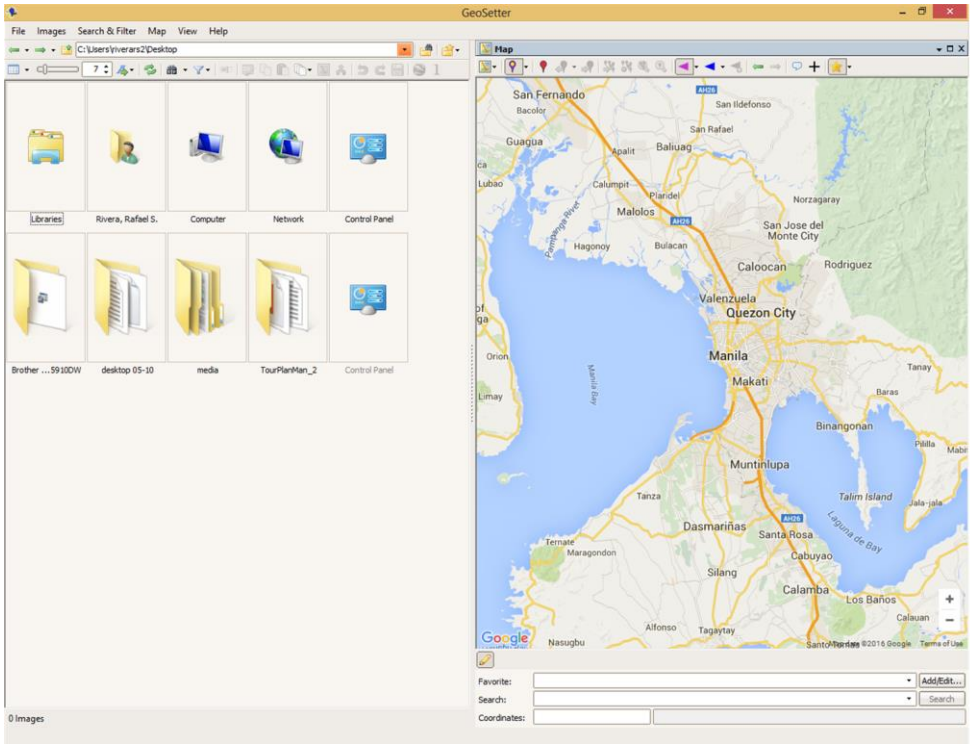



**Photo 25: GeoSetter Main Page**

- Drag the *instance* folder (where the photos are located) to the file area (left side) of GeoSetter.

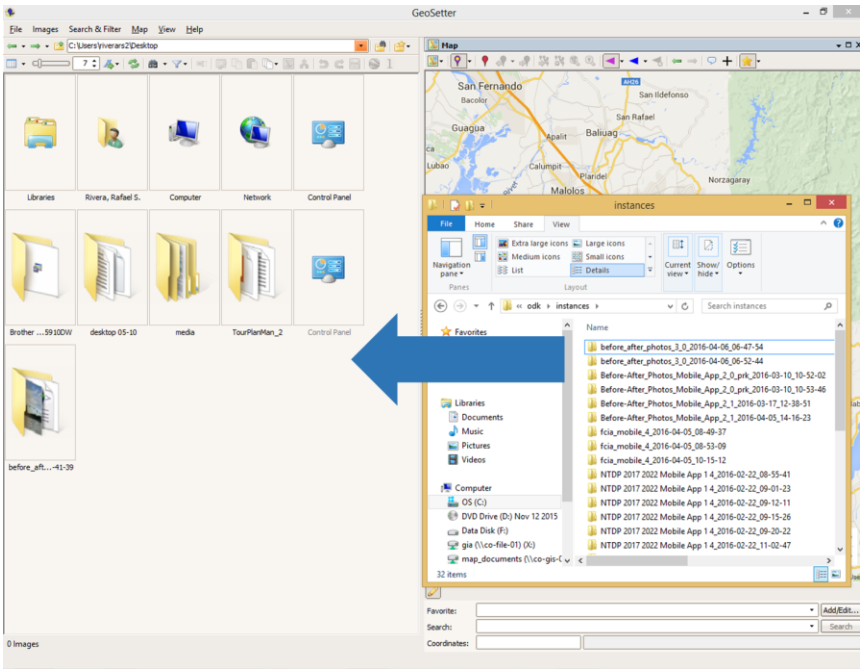



**Photo 26: Drag Photos in the File Area**

- Filter the images with coordinates. If there are photos that have no coordinates, the user were not able to capture geotagged photos properly and may have to repeat the data gathering process.

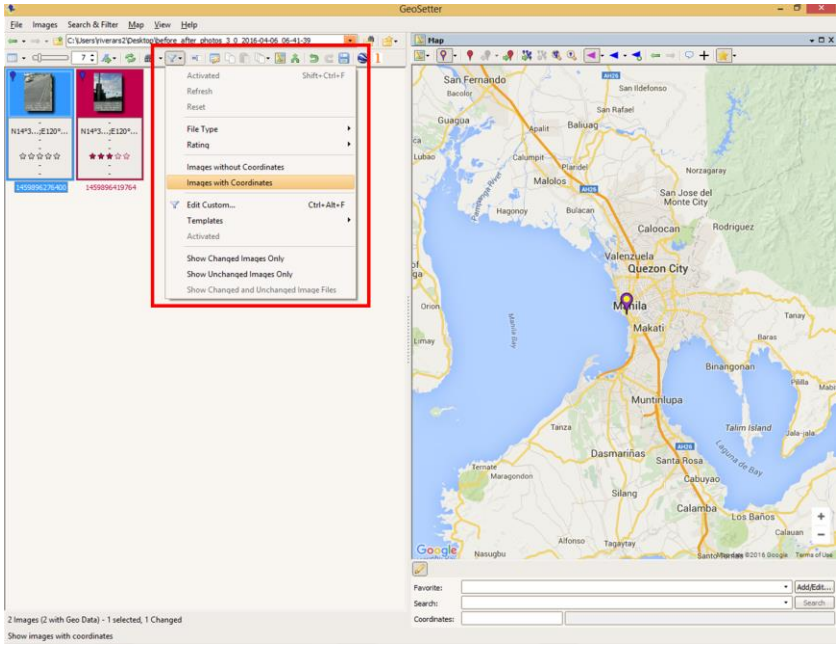



**Photo 27: Filter Images with Coordinates**

- The user can click on the photo (with coordinates) and will see the corresponding location icon in the map. The user can check if the location icon on the map indicates the right location for the photos.

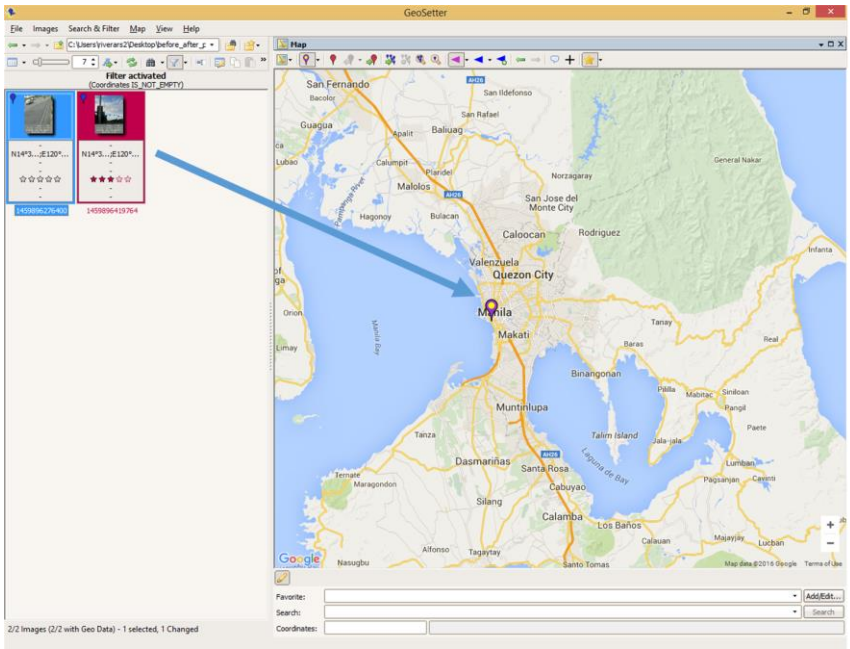



**Photo 28: Check the Location of the Photos**

## *10.3 ODK Briefcase*

Note: The next steps are primarily intended for BOC-Project Monitoring Division (PMD), which will use the ODK Briefcase.

The seventh step in the mobile data collection process discussed in 10.1 mentioned ODK Briefcase. This ODK tool facilitates consolidation of data gathered by different users and aggregate those data in a dedicated DPWH server.

- ODK Briefcase can do the following:
    - Pull blank forms and submissions (finalized forms) from ODK Collect or ODK Aggregate Server into a local ODK Briefcase Storage location.
    - Push blank forms and submissions from ODK Briefcase Storage location to ODK Aggregate Server.
    - Export submissions to a CSV file for processing by other applications.
- Download and Install ODK Briefcase to your desktop. BOC shall coordinate with IMS-SAS for setting up Java and ODK Briefcase on its designated computer.
    - Download and install Java 7 or higher to your computer: https://java.com/en/download/
    - Download ODK Briefcase: https://opendatakit.org/downloads/download-info/odk-briefcase/)
- BOC shall create a folder (e.g., *drive c/boc_mdcs/mobile_app*) in his/her desktop computer to serves as storage area for all ODK Briefcase-related files.

  IMPORTANT REMINDERS on the use of ODK Briefcase:

  ODK Briefcase does not discriminate between incomplete and finalized forms on the device. It will pull ALL data off of the device. This can cause problems during later pushes, and especially, if you are encrypting your finalized forms. To keep your data set clean, you **must ensure that all forms are complete before being pulled off of the device.**

  ODK Briefcase cannot discriminate between duplicates of the same filled-in form**. After you pull the data into ODK Briefcase, it is important that you delete it from ODK Collect**. Otherwise, the next time you follow this process, you will end up with two copies of the filled-in forms from the first pull.

## *10.4 Using ODK Briefcase*

### 10.4.1 Assigning a folder for ODK Briefcase Storage

- Open **ODK Briefcase** by double-clicking this icon: 

- On the right corner of ODK Briefcase Main Menu, click **Change**.
- The user should locate the folder previously created in his/her desktop computer to serves as ODK Briefcase Storage. All files that will be pulled/pushed to/from ODK Briefcase will be located in this folder.
- Once the folder has been selected, the user should press **OK**.

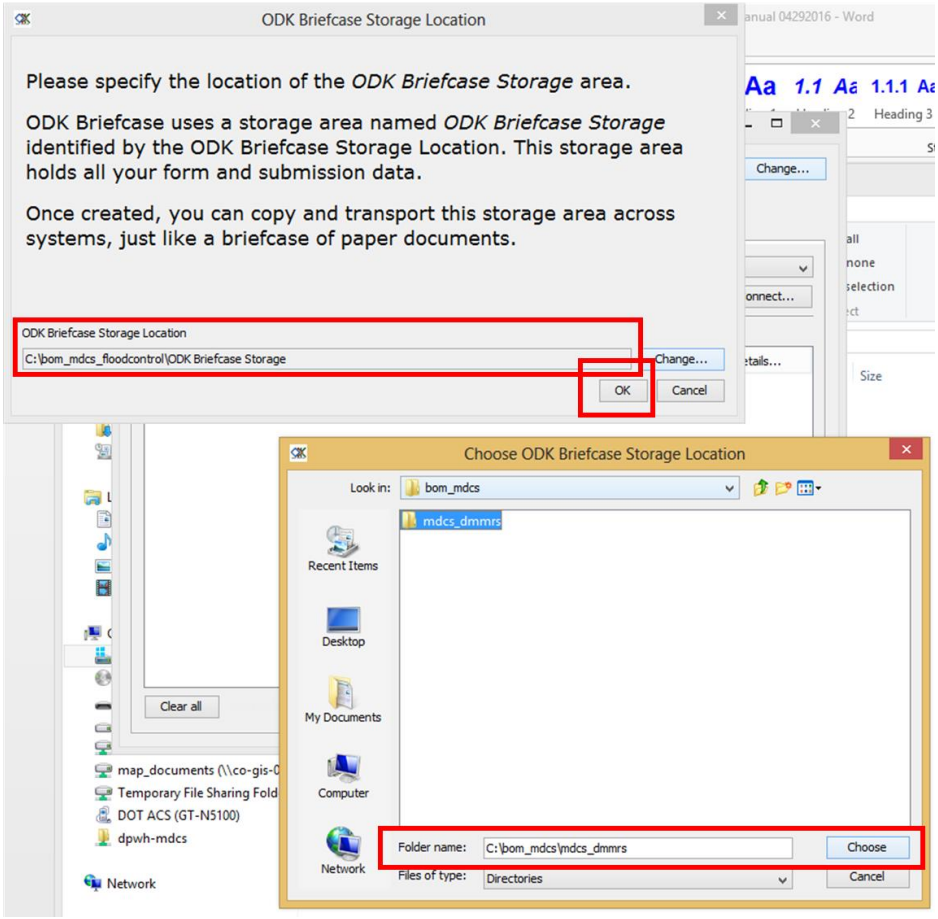



**Photo 29: Set-up Storage Folder for ODK Briefcase**

### 10.4.2 Pull Stage

The Pull Stage refers to extracting files from the shared folder (inside the DPWH Main Server) to a BOC's designated computer for mobile app data (i.e., *drive c/boC_mdcs/mobile_app*).

- Open **ODK Briefcase**.
- Select **Pull**.
- Under **Pull data from**, select **Custom Path to ODK Directory.**
- Under **ODK Directory**, select this folder *boC_mdcs/upload/mdcs_pm3* and click **Choose**. The list of forms located on this folder will appear.
- Under **Forms to Pull,** check **Mobile Data Collection System – Project Monitoring 3** and press **Pull**.
- The word **SUCCESS!** will appear once all data have been extracted from the shared folder to the local computer of BOC.

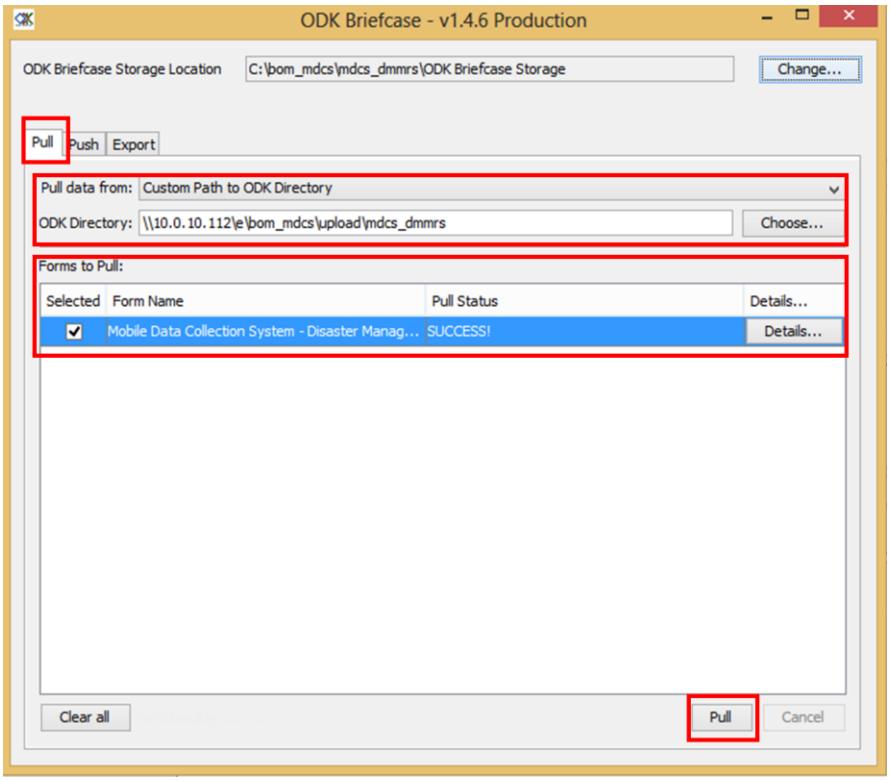



**Photo 30: ODK Briefcase Pull Stage**

### 10.4.3 Push Stage

The Push Stage refers to sending the submissions from desktop computer of BOC to DPWH dedicated server for mobile data: http://dpwh-mdcs/ODKAggregate/

- Open **ODK Briefcase**.
- Select **Push**.
- Under **Push data to:** select **Aggregate 1.0**
- Under **URL:** enter http://10.0.10.112/ODKAggregate/ and press **Connect**
- BOC shall coordinate with IMS-SAS for the user name and password.
- Under **Forms to Push**, check **Mobile Data Collection System – Project Monitoring 3** and click **Push**.
- The phrase **Successful Upload!** will appear to indicate successful upload of data to http://dpwh-mdcs/ODKAggregate/

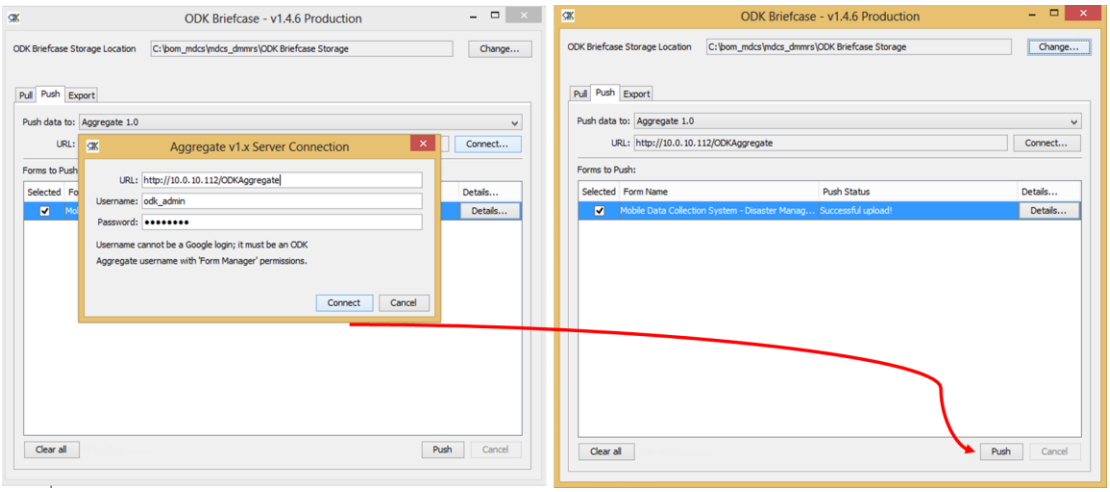



**Photo 31: ODK Briefcase Push Stage**

### 10.4.4 Exporting csv file

- Open **ODK Briefcase**.
- Select **Export.**
- Under **Form**, select **Mobile Data Collection System – Project Monitoring 3**.
- Under **Export Type**, it should be **.csv and media files**.
- Under **Export Directory**, user shall enter where the exported files will be stored.
- Select **Export** (lower right-corner)

- The word **SUCCEEDED!** will appear on the lower left-corner to indicate successful exporting of csv and media files.

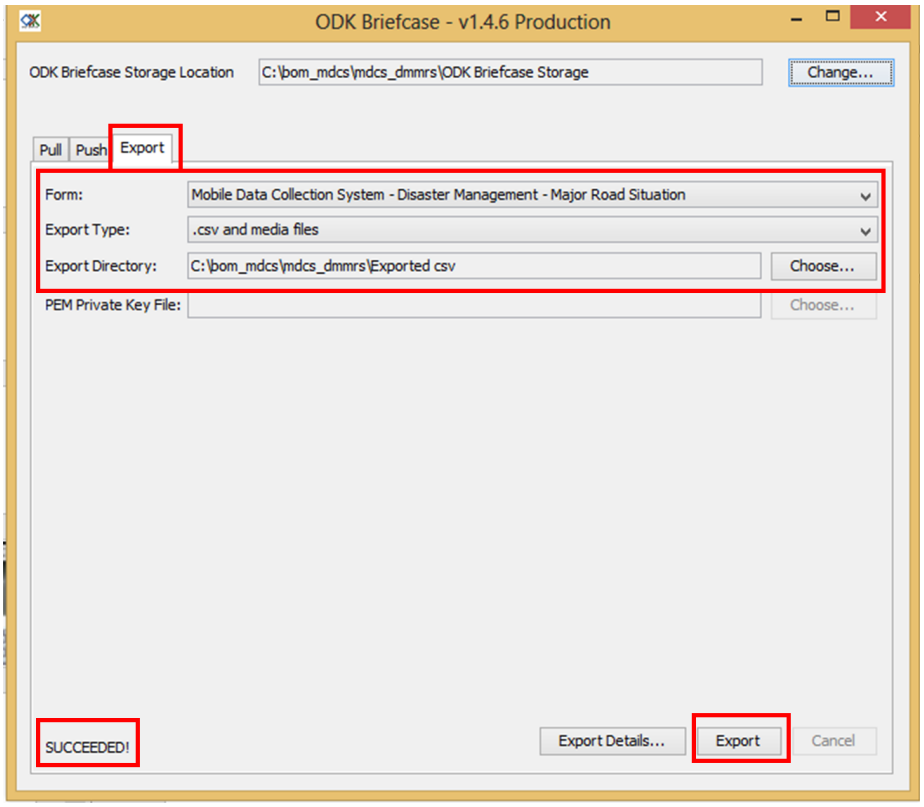



**Photo 32: Export csv file using ODK Briefcase**

# 11 Post-processing tools

Note: The next steps are primarily intended for BOC-PMD, which will use the Post-Processing Tools for data gathered by the district and regions.

## *11.1 Export csv file from ODK Aggregate Server*

Note: While ODK Briefcase allows user to export csv and media files, a more typical way of exporting csv file is by logging in the dpwh-mdcs server.

- This will only work using DPWH Intranet connection.
- Open the web browser and type http://dpwh-mdcs/ODKAggregate/
- BOC shall coordinate with IMS-SAS for the user name and password.
- Under **Form**, select **Mobile Data Collection System – Project Monitoring 3.**
- Click **Export** (upper right-corner)

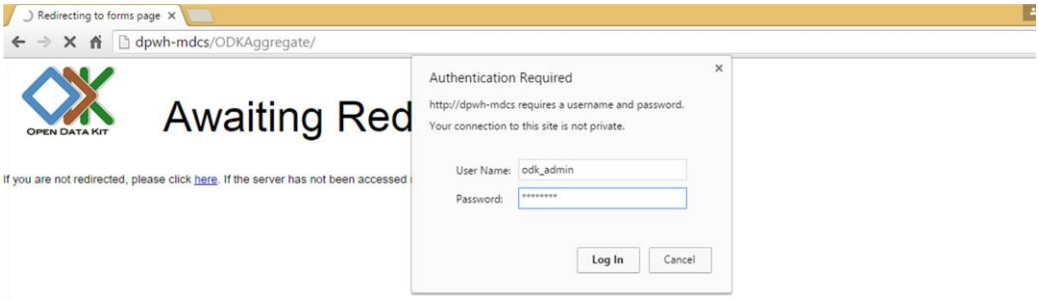



**Photo 33: Sign-in to DPWH-MDCS Server**

- A dialog box, click **Export** again.

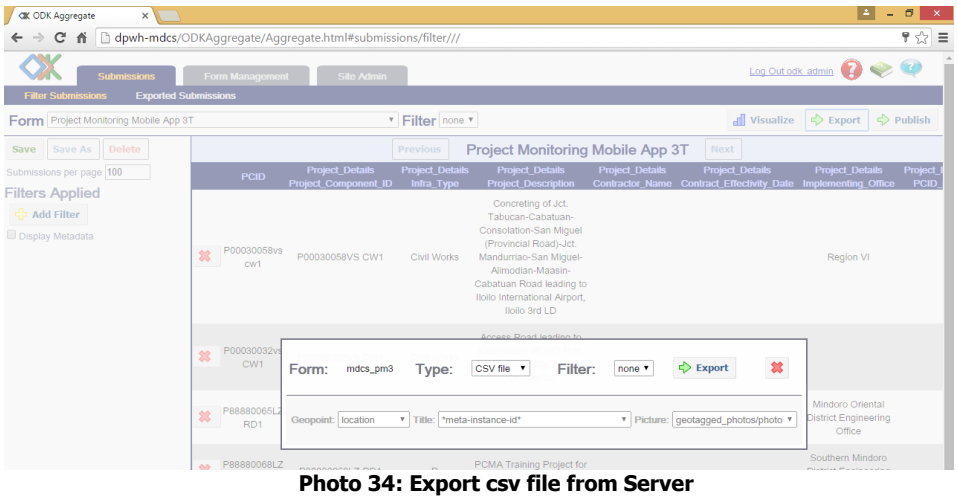



**Photo 34: Export csv file from Server**

- The most recent exported csv file will appear on top of the list of previously exported files. Click the file under **Download File** to download the csv file.

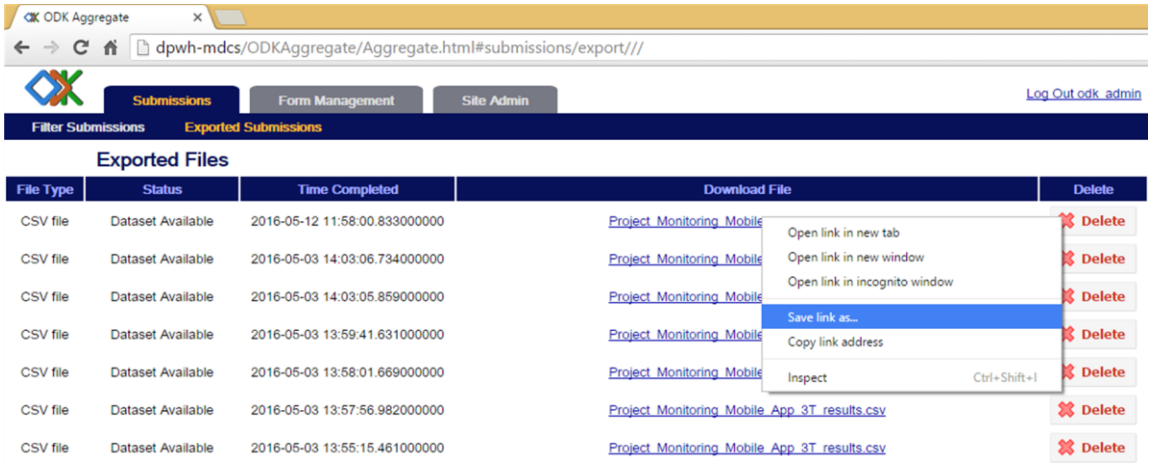



**Photo 35: Download csv file from Server**

## *11.2 Import csv file to a GIS web app*

### 11.2.1 Create three folders

For a more strategic and organized process in importing a csv file to a GIS web app, the users shall create first three folders that will have the following description:

**Table 4: Three Folders for Processing**

| Name of folder | Description |
|---|---|
| 1. *raw* | contains the raw files directly from the ODK Aggregate Server (reference: Step 11.1) |
| 2. *post_processed* | contains the files that have been edited/processed |
| 3. *publication* | contains the consolidated and edited file. The filename of csv file inside this folder should always remain the same |

### 11.2.2 Saving exported csv file

- Following the step-by-step procedures in 11.1 above, go to **Exported Submissions**.
- Right click on the top-most link under **Download File**.
- Press **Save link as** and save it inside **raw** folder the user previously created.
- For the file name, append the date of export using the format: *default_export_name_yyyy_mm_dd_time*.

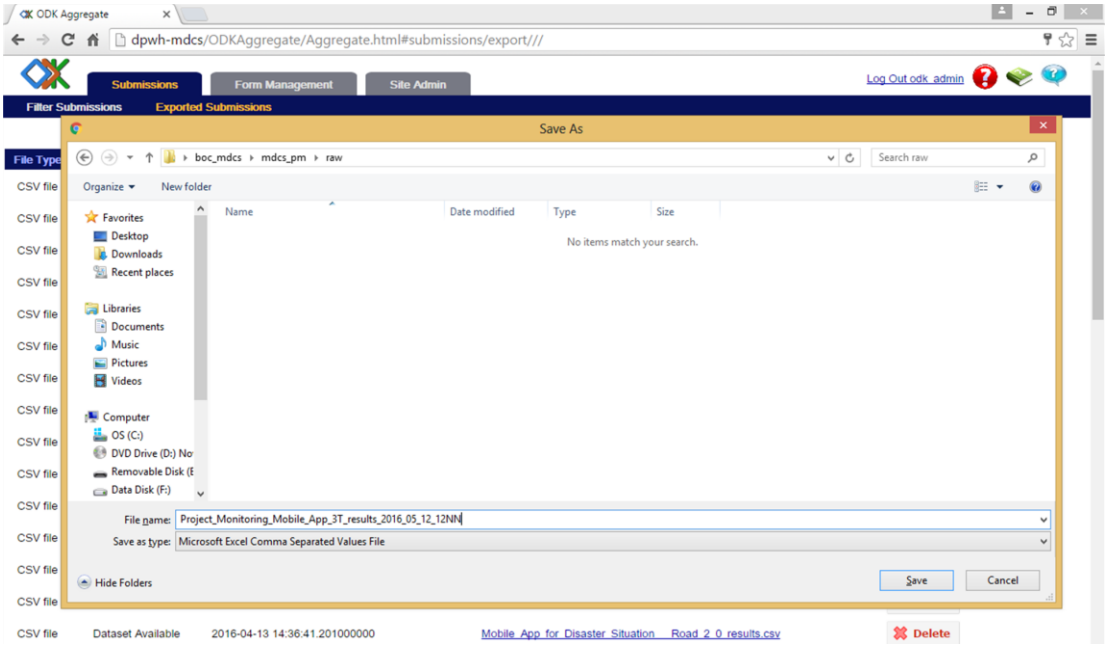



**Photo 36: Save CSV File to Raw Folder**

### 11.2.3 Post-process/edit raw csv file

- BOC shall designate engineers who will post-process the raw data. Post-processing includes, but not limited to, changing of date format, replacing underscores with spaces, etc.

- To be more efficient and strategic, BOC will assign post-processors for specific regions. Each post-processor shall ensure the accuracy of data or regions assigned to him/her. S/he shall not add/delete columns and/or rows to the csv file.

- Under the **post_processed** folder, there will be sub-folder for each region. Under each regional folder, there will be two sub-folders: line and point. Line refers to projects such as road, dike, spur dike and revetment that has start and end coordinates. Point, on the other hand, refers to projects such as buildings, gates, channels, dams, bridges and dredging that has only one coordinate. Each post-processor shall name the csv file the same way the raw csv file was named appending region name and line or point i.e. *default_export_name_yyyy_mm_dd_time_region*_line

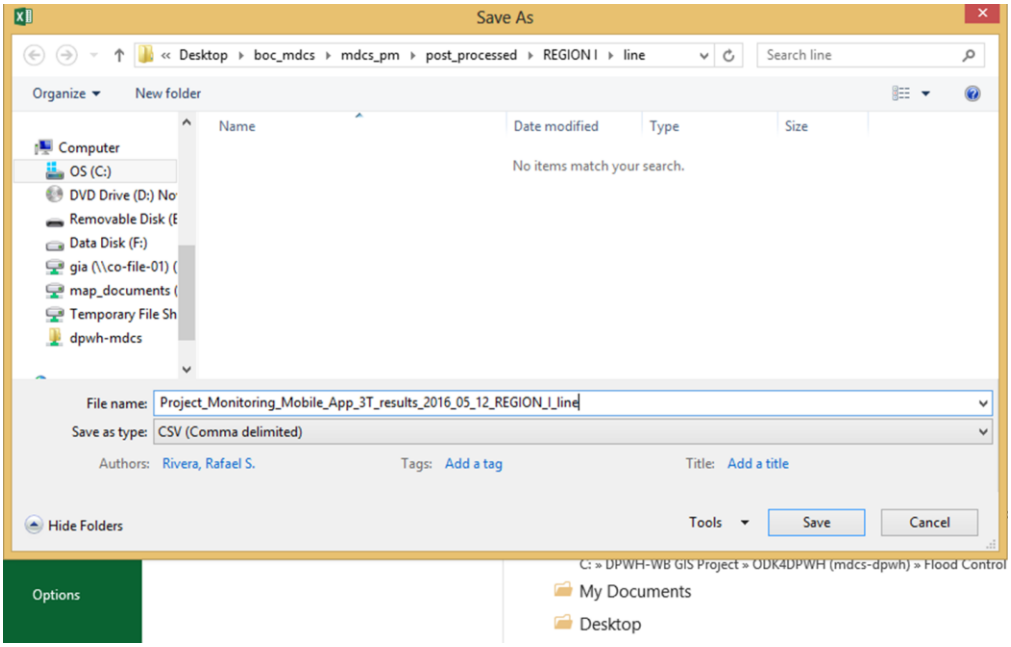



**Photo 37: Post-processing of CSV File: Line Folder**

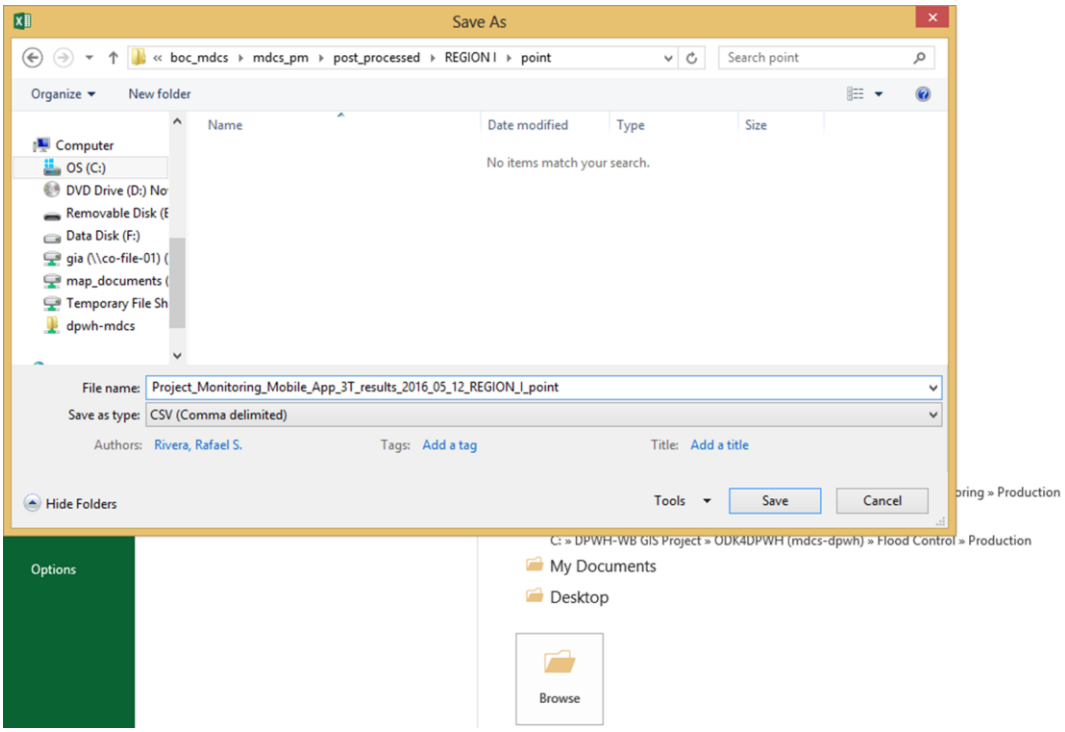



**Photo 38: Post-processing of CSV File: Point Folder**

### 11.2.4 Consolidate post-processed data for importing to a GIS web app

- BOC shall assign a consolidator responsible for consolidating the changes made by the post-processors.

- The consolidate csv file shall be saved inside the production folder using the name of mobile app as the default name (i.e., Project_Monitoring_Mobile_App3_results_2015_05_12_line.csv or Project_Monitoring_Mobile_App3_results_2015_05_12_point.csv). The name of the file inside the production folder should always remain the same.

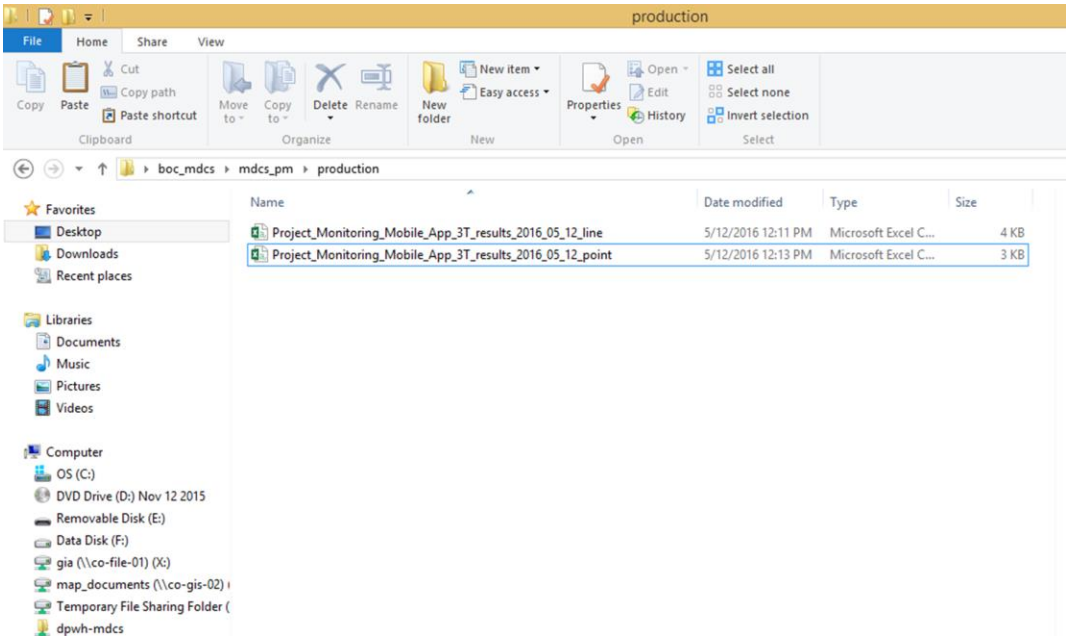



**Photo 39: Production Folder**

### 11.2.5 Import csv file to GIS web app

- Open web browser and copy and paste this link: http://dpwh.maps.arcgis.com/home/item.html?id=4be2402fe8254a499e0133fab2af86c8

- BOC shall coordinate with BID-DAS for the username and password of this web app.

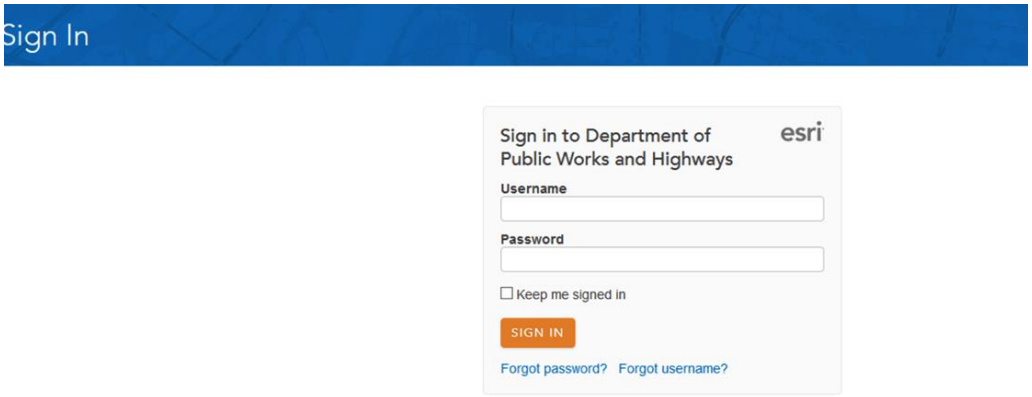



**Photo 40: Log-in to ArcGIS On-line**

- Open **Mapviewer**
- Select **Add layer from File**
- Choose the csv file inside the **production folder**
- Select **IMPORT LAYER**.

- Locate the features using **Latitude** and **Longitude**

- Select **ADD LAYER**.

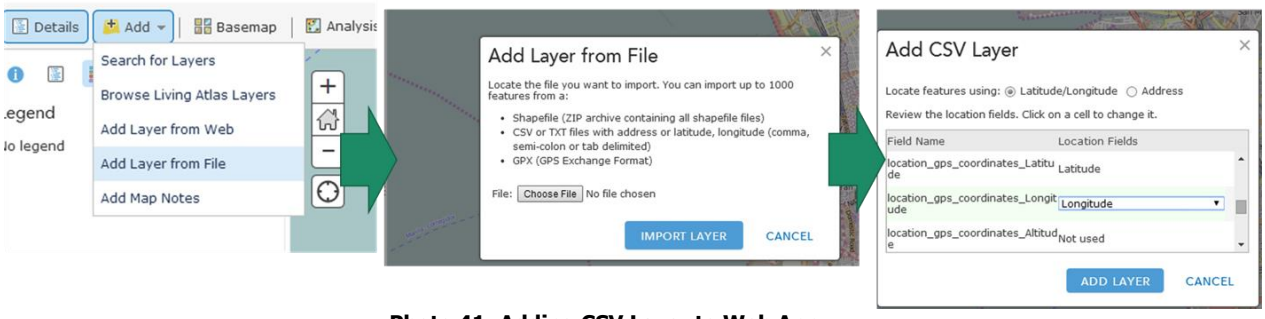


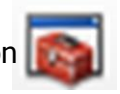

**Photo 41: Adding CSV Layer to Web App**

## *11.3 ArcGIS Tools*

### 11.3.1 Photos-to-Points-to-Lines (P2L)

Note: ArcMap must be installed in the desktop computer of the users for these tools to work. BOC shall coordinate with IMS-SAS regarding availability and installation of ArcMap.

- Open **ArcMap** 

and then open **ArcToolbox** by clicking this icon 
- Upon clicking the ArcToolbox, ArcMap display should appear like below:

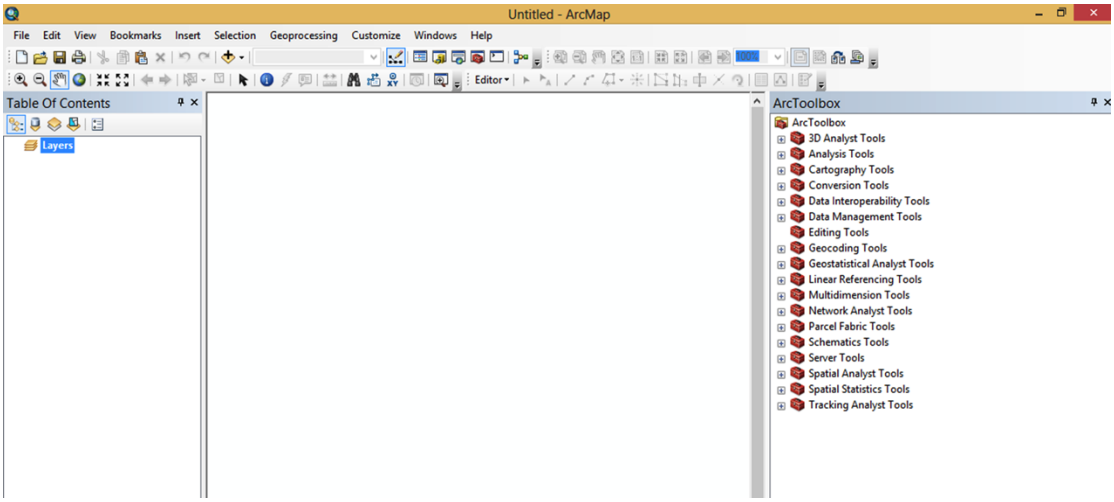



**Photo 42: ArcToolbox**

- Right-click on the **ArcToolbox** and then select **Add Toolbox**.

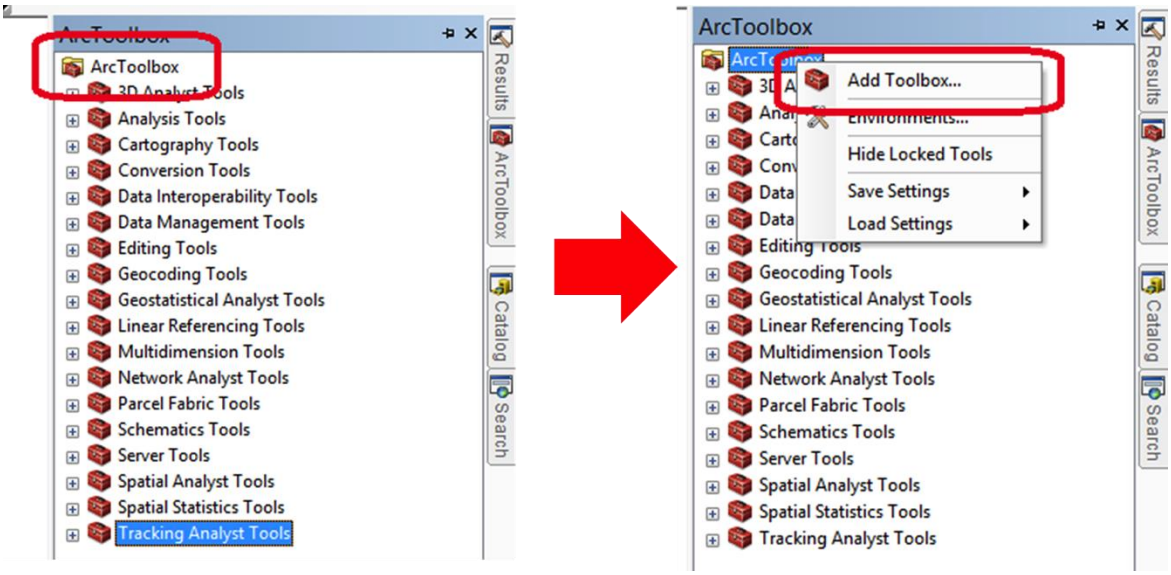



**Photo 43: Add tool in ArcToolbox**

- The Add Toolbox window will prompt. Open the folder where the P2L toolbox is located. Select the **P2L.tbx** and click **Open** to add the P2L Toolbox to the ArcTool.

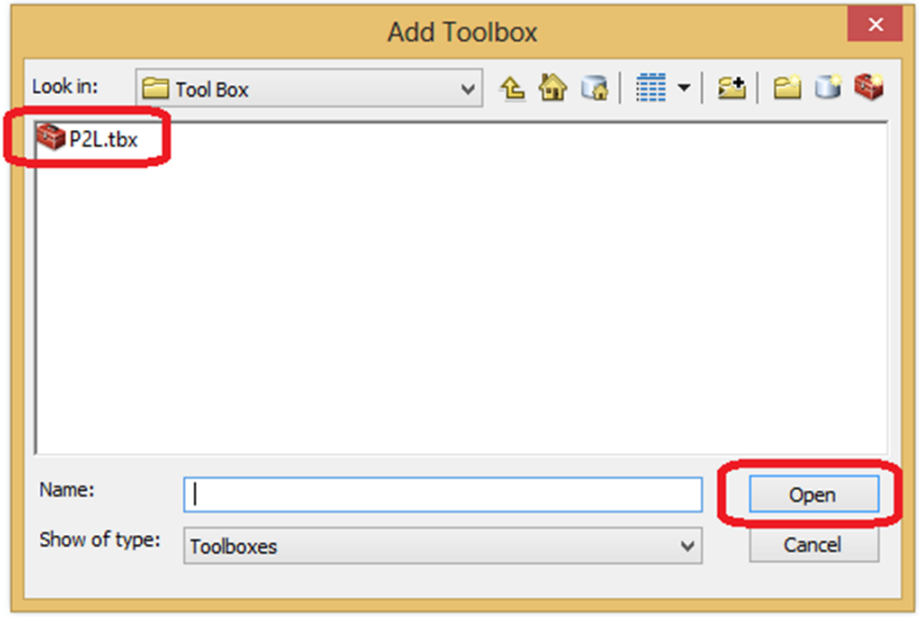
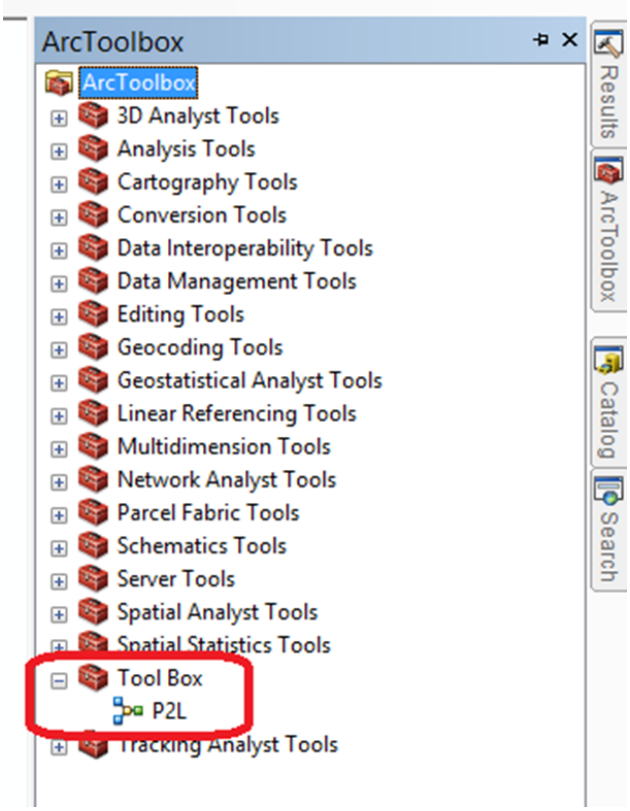
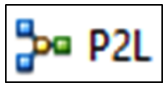



**Photo 44: Open ArcToolbox**

- Check if the P2L toolbox is added. The ArcToolbox should now have the Tool Box. Click the  icon on the left side of the Tool Box to see if the P2L tool is there.




- Double-click the P2L tool  to open it. The P2L window would prompt. It should look like this:

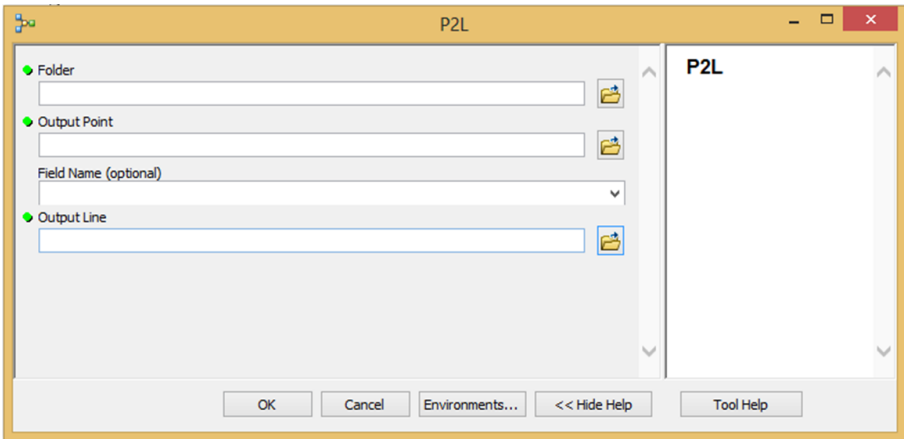



**Photo 45: P2L Window**

- The P2L tool has four (4) input requirements that the users need to accomplish before launching the tool.

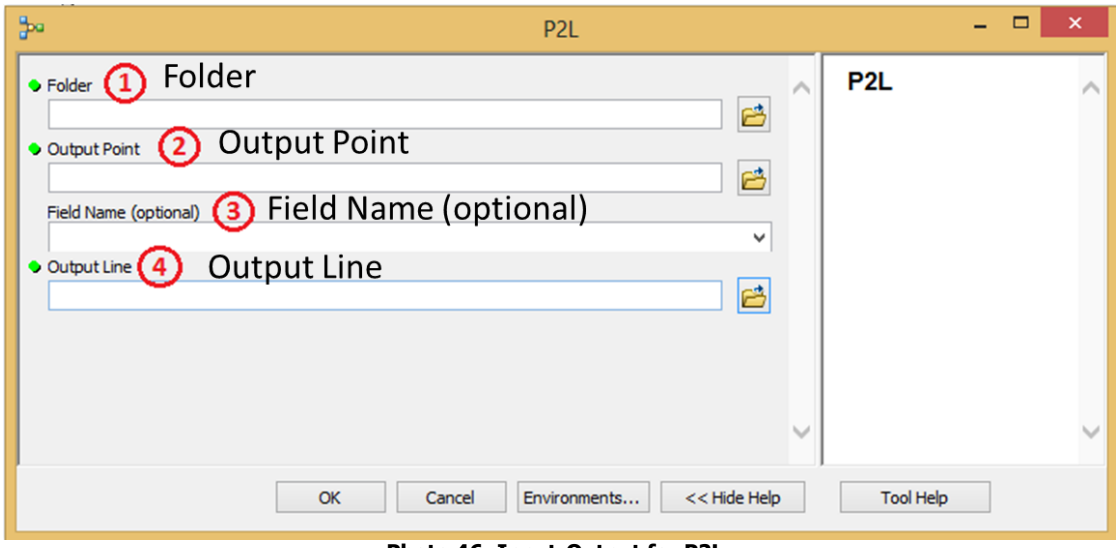



**Photo 46: Input-Output for P2L**

**Table 5: Input-Output for P2L**

| Input Requirement | Description |
|---|---|
| Folder | contains the geotagged photos the user wants to process |
| Output Point | users should identify the name and location of the output point shapefile that will be produced by the Geotagged Photos to point process |
| Field Name (optional) | field name of point shapefile used to sort the connection of each feature |
| Output Line | users should identify the name and location of the output line shapefile that will be produced by the points to line process |

- Click on the browse  icon to locate the folder of the geotagged photos. Select the folder of geotagged photos and click **Add**.

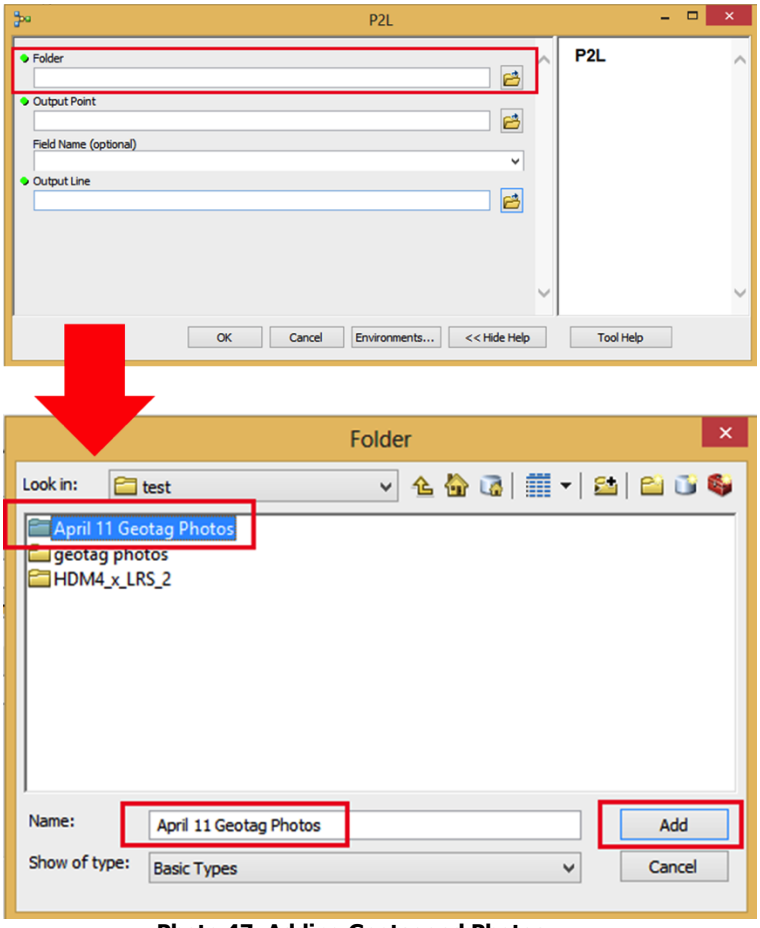



**Photo 47: Adding Geotagged Photos**

- Click on the browse  icon to assign the folder where the output points will be stored. Assign the name of the output points. Use the project component ID (PCID) of your geotagged photos. Click **Save** once users have finished naming their points.

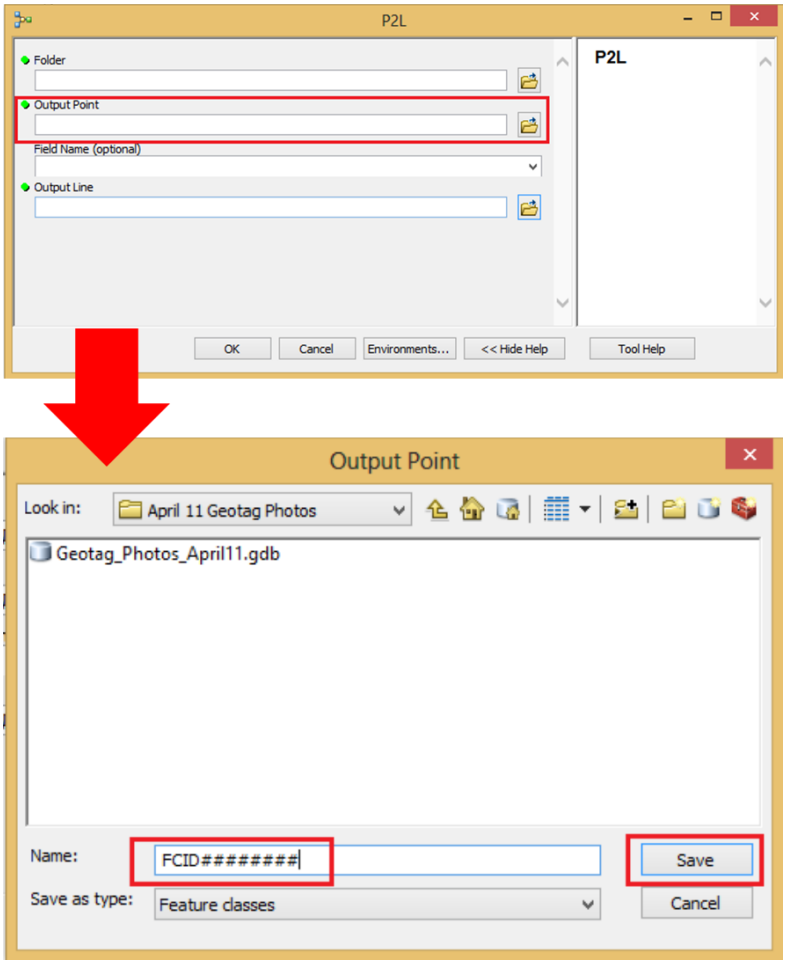



**Photo 48: Assigning Output Folder**

- Click the dropdown icon to see the different fields of your points. Select the **DateTime** field as your sorting field to properly connect the points.

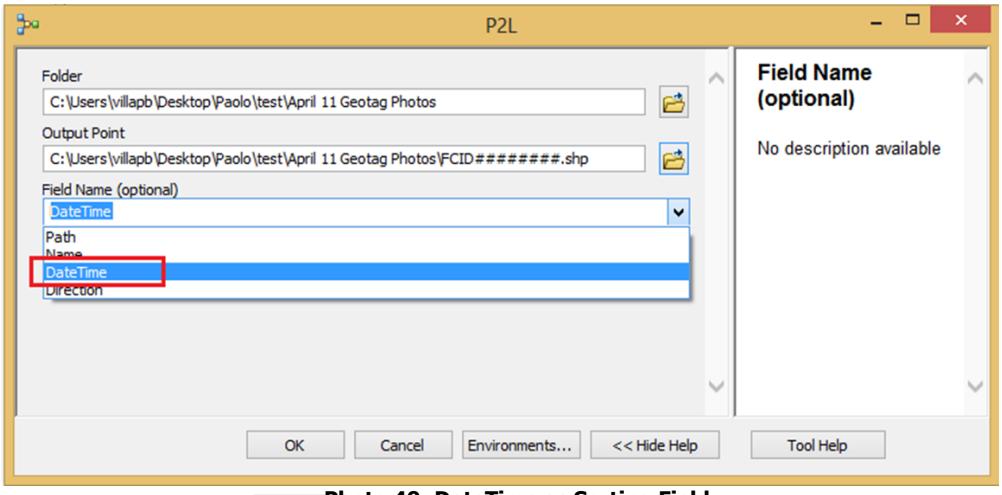



**Photo 49: DateTime as Sorting Field**

- Click on the browse  icon to assign the folder where the output Line will be stored. Assign the name of the output line. Use the FCID of your geotagged photos. Click **Save** once users have finished naming their line.

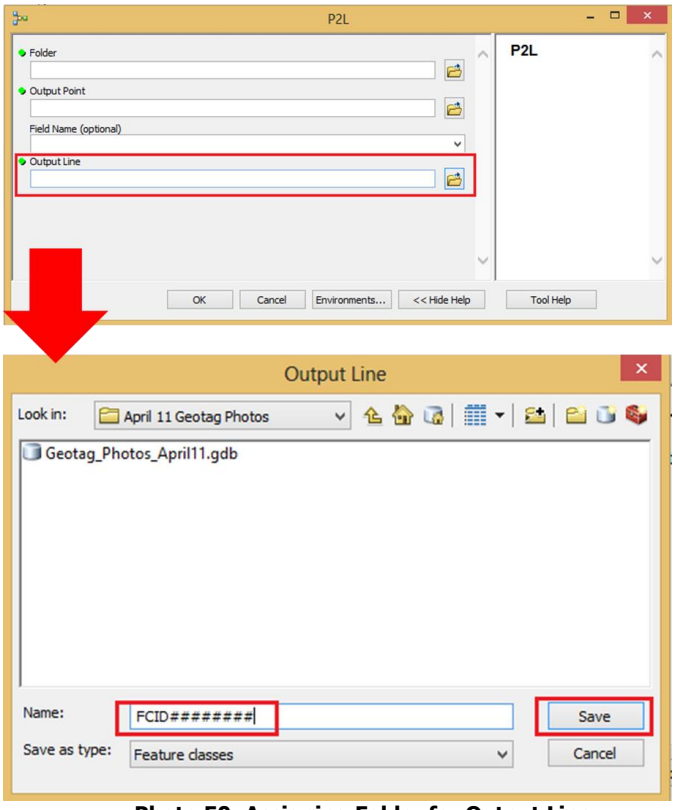



**Photo 50: Assigning Folder for Output Line**

- Once all of the input data requirements have been accomplished, users can now click **OK** to apply the conversion.

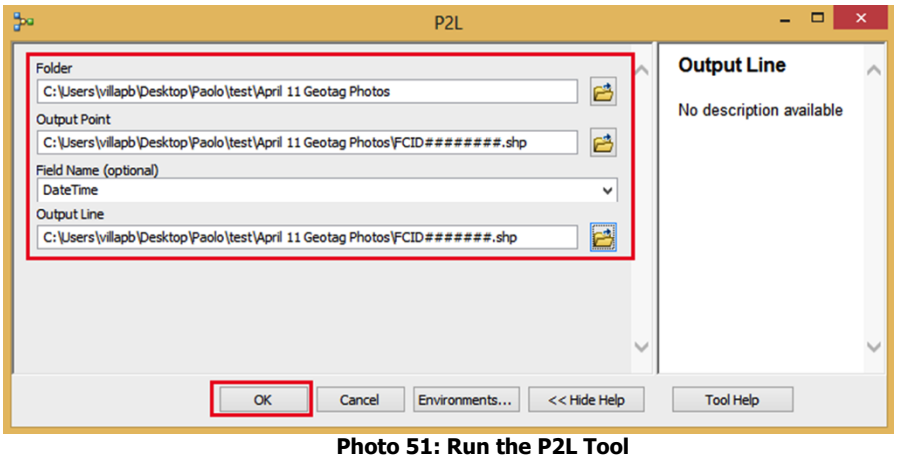



**Photo 51: Run the P2L Tool**

- The image below shows the sample output of the geotagged photos to line process.

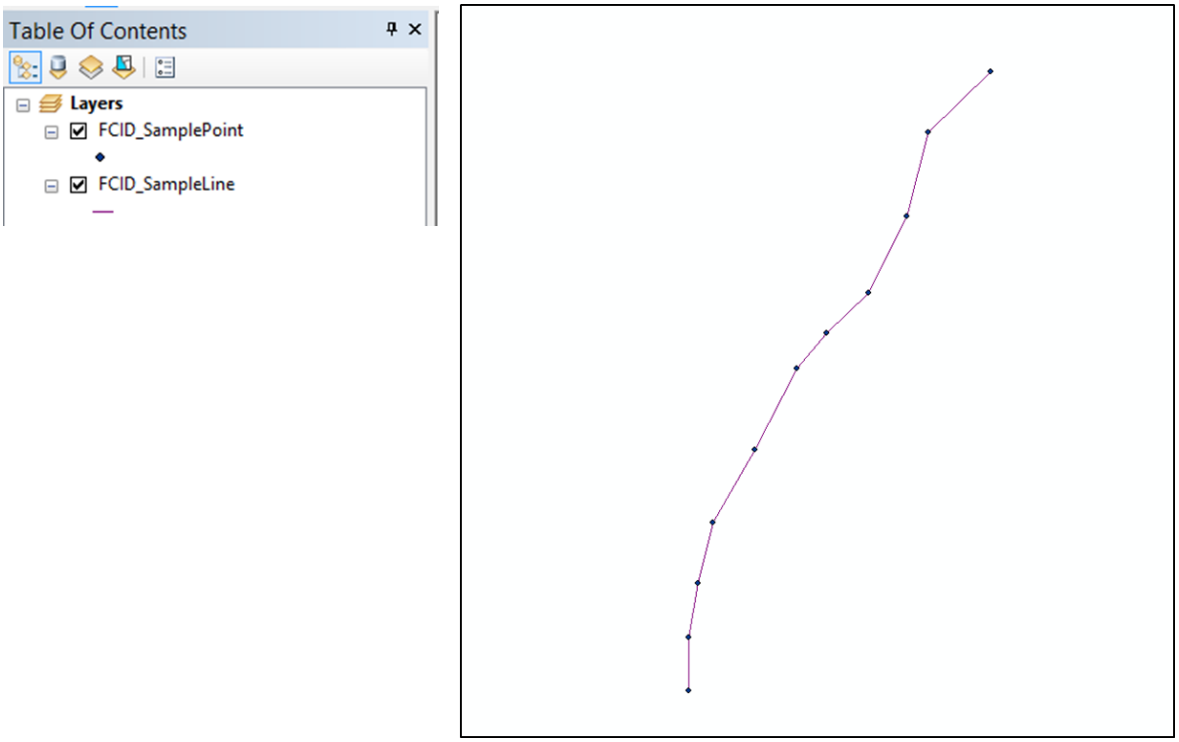



**Photo 52: Sample Output by P2L**

- To edit the attribute, right-click on the line layer found in the table of contents. Select **Open Attribute Table**.

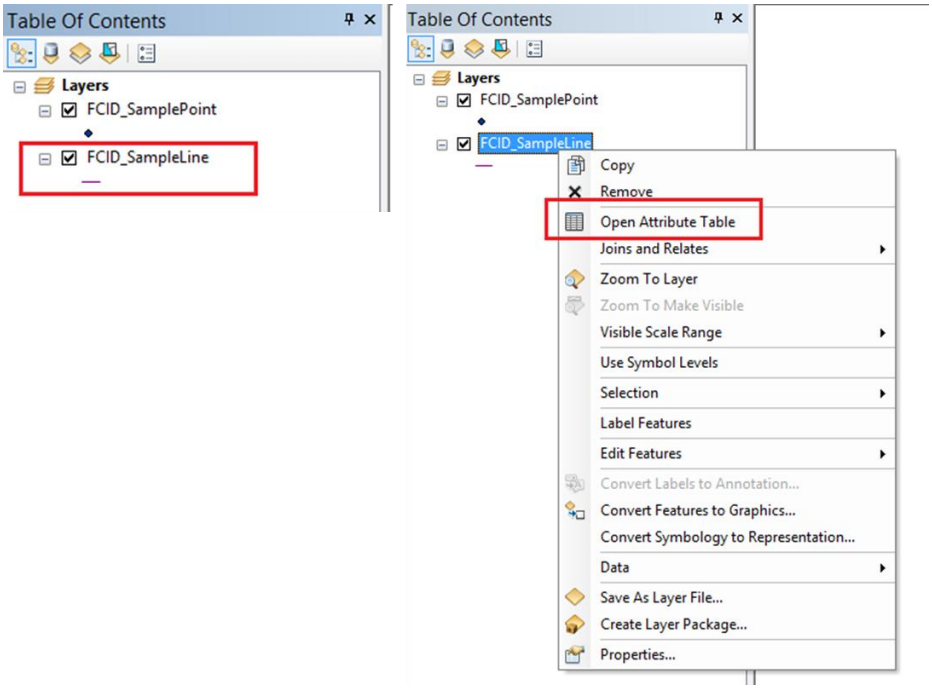



**Photo 53: Attribute Table**

- The attribute table of the line shapefile will prompt. The users should add a new field for identification. To add a new field, click on the menu  icon. Select **Add Field.**

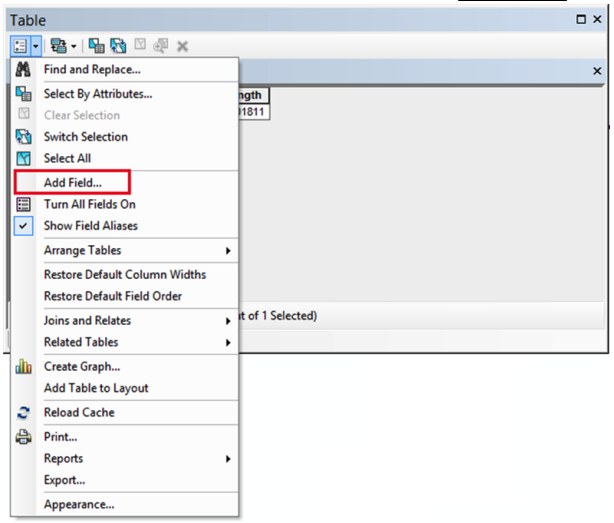



**Photo 54: Adding Field**

- The Add Field window will prompt. Use the following for input requirements and then click **OK** to add new field.
- Name: PCID
- Type: Text
- Length: 8

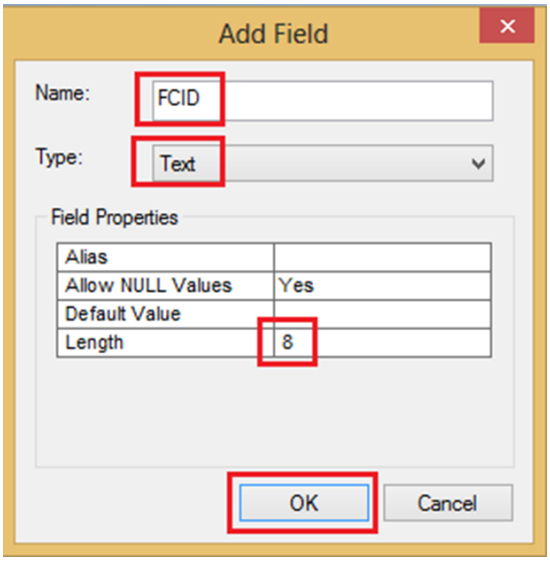



**Photo 55: Adding Field**

- The attribute table should now have a new field in it. Notice that the field do not have any information yet. The users should populate the field with the proper FCID.

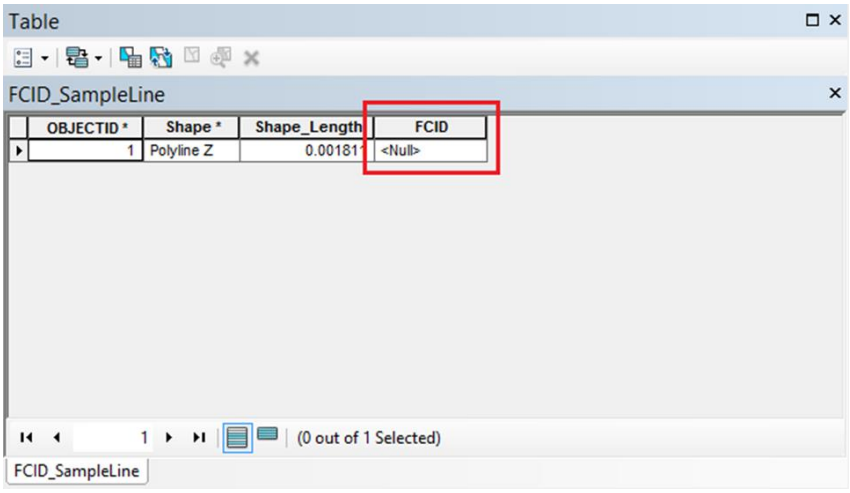



**Photo 56: Sample Attribute Table**

- To add the PCID, right-click on the PCID field name. Select the **Field Calculator**. A notification will prompt, click **Yes** to proceed.

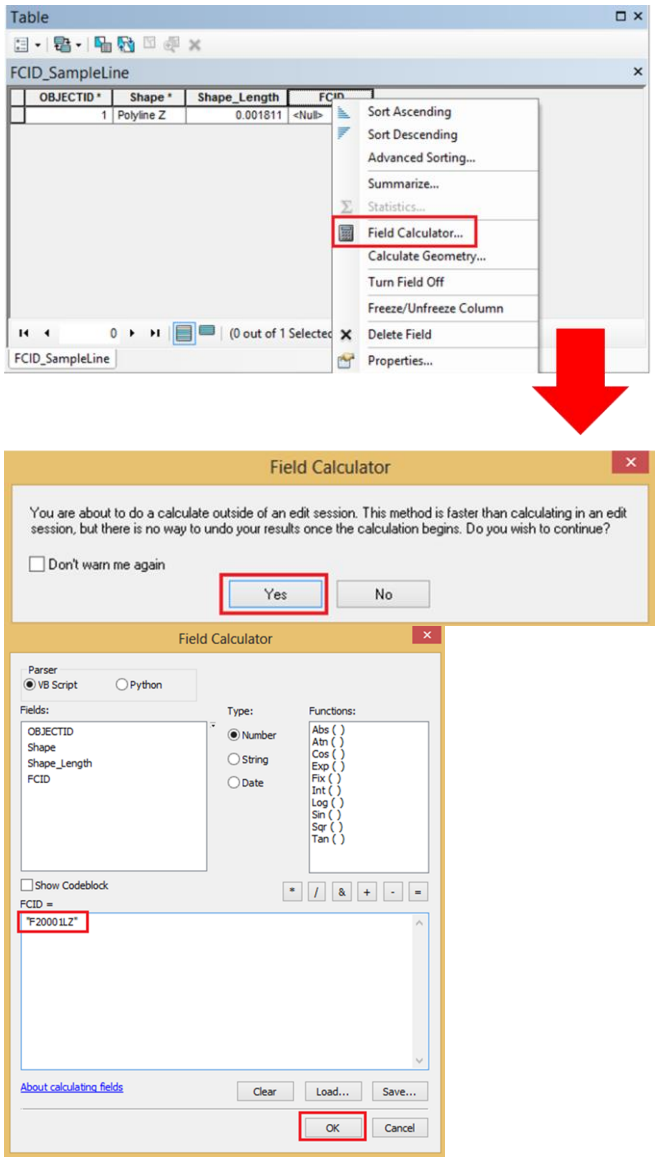



**Photo 57: Using Field Calculator**

- Type in the text box the FCID of the line (e.g., "F20001LZ"). Do not forget to **put text between " "**. Click **OK** to add the FCID to the attribute table.
- The attribute table should now look like this.

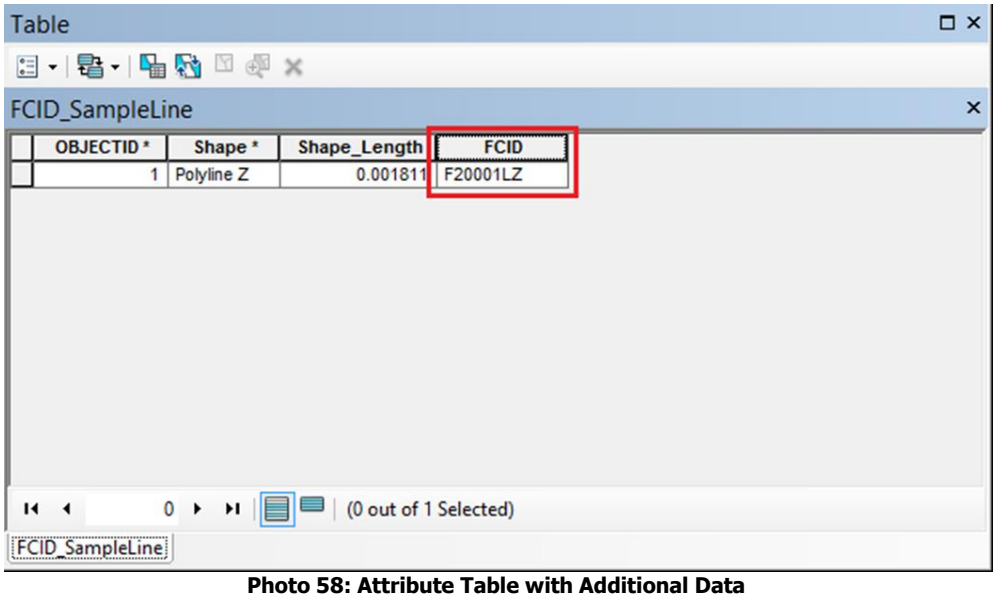



**Photo 58: Attribute Table with Additional Data**

# DPWH Mobile Data Collection System
# Project Monitoring

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