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Training Site for Surveyor and Project Manager

Welcome to the training site for surveyors and project managers. This site is developed under collaboration between Humanitarian OpenStreetMap Team (HOT) and Pacific Disaster Center (PDC) in the event of capacity development for data collection using OpenStreetMap to support InAWARE, a disaster management platform developed by Pacific Disaster Center (PDC).

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— title: OpenStreetMap Data Integration to InAWARE weight: 1 —

Objectives:

- Knowing to create an account in InAWARE
- Knowing Add OpenStreetMap Data into InAWARE

The main goal of HOT-PDC InAWARE Mapping Project is to to complete and provide spatial open data for public so it can be used for any disaster management sector by National Government (BNPB) and Local Disaster Management Agency (BPBD) in InAWARE, a platform that made by Pacific Disaster Center (PDC), an institution from *University of Hawaii*. A complete explanation about InAWARE can be seen in PDC modules. This module will only explain about how OpenStreetMap data can be added and used into InAWARE.

I. Create and Access InAWARE Account

InAWARE limit its access only to specific users such as National Disaster Management Agency (BNPB), Local Disaster Management Agency (BPBD), humanitarian worker and disaster expert / practitioner. This policy is to maintain and ensure InAWARE critical information and content access still clear and without any intervention during disaster management activities. You can send a request to create InAWARE account with these steps:

- Access InAWARE at **inaware.bnpb.go.id/**
- Click **Request InAWARE Access** in ***login*** page.

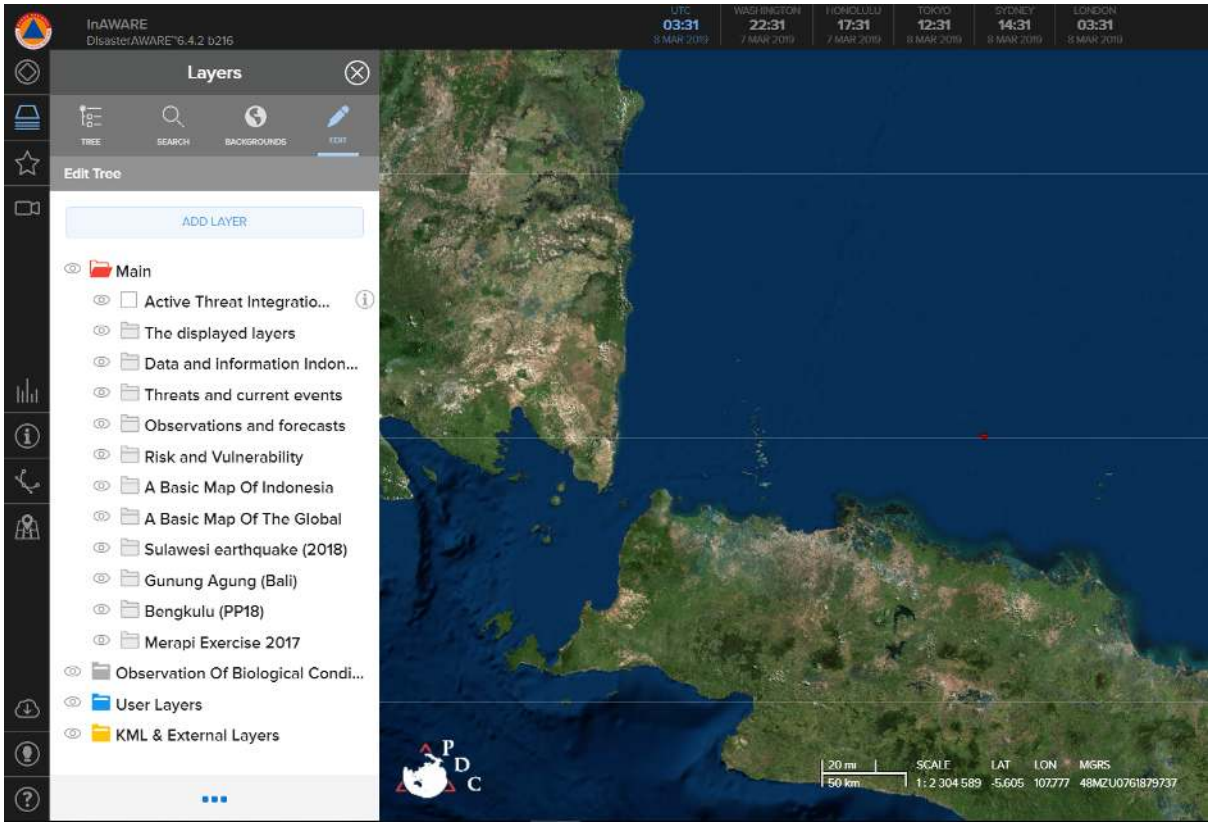
The process would take about 24 hours before your request being approved. It also depends on BNPB as approval of the request. When you account has been made, it will be sent to you by *e-mail*.

- Please ***login*** into system

II. Adding *OpenStreetMap* Data into InAWARE

After you know about InAWARE and the steps to create an account, you will learn about how to add your field survey data that have been uploaded on OpenStreetMap into InAWARE. Data spatial format which can be used in InAWARE is ***GeoJSON.*** You can see **Converting Shapefile to GeoJSON** module. These are steps how to add OpenStreetMap data into InAWARE:

- Please click ***Layers*** menu in InAWARE
- Click ***Edit*** and select ***Add Layer***

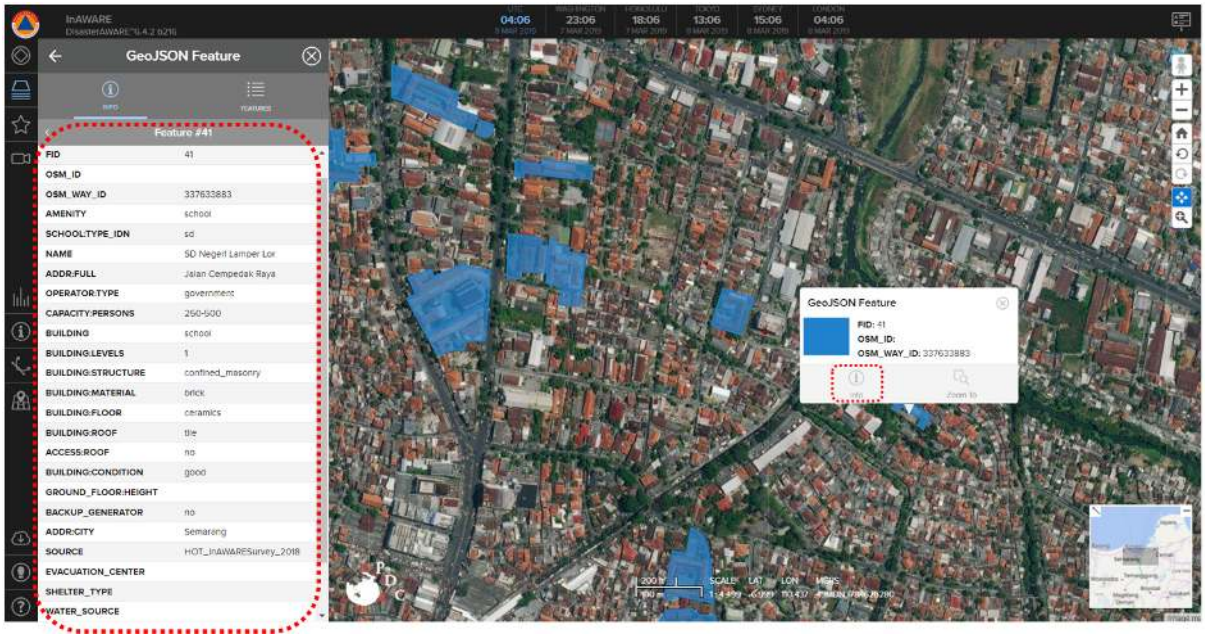


Add OpenStreetMap data as a New Layer

- Select ***File*** and click ***Please Choose the File***
- Search and find your OpenStreetMap Data that has been converted into GeoJSON format
- Your OSM data layer will appear in InAWARE and placed into ***KML & External Layers*** folderwith name ***GeoJSON Feature***

OpenStreetMap Data Layer in InAWARE

- You will see information of each feature / object from your OpenStreetMap data. You can select and click on the feature that you want to know its information and choose ***info*** option.



OpenStreetMap Feature Information in InAWARE

SUMMARY

Congratulations! You have understand about InAWARE and how to add you field survey data into it. For more advanced analysis, you can overlay others layer with your OpenStreetMap data in InAWARE. You can look at PDC modules that provided by *Pacific Disaster Center* (PDC) for more information about InAWARE.

Quality Assurance Concept

Learning Objectives:

- Understanding the definition of quality assurance
- Understanding the meaning of data quality assurance in OpenStreetMap

OpenStreetMap (OSM) is a free and open source map. OSM has a lot of data and information about various types of objects that exist on the surface of the earth. The data is collected and entered by OSM users spread all over the world. The variety of data entered and collected by OSM users often results in the quality of the data being different from one another and the lack of understanding of OSM users regarding data quality also affects the results of data available in OSM. Therefore, every *OpenStreetMap* user should not only add data, but also participate in maintaining data quality. In this discussion, you will learn what quality assurance is and the approach mechanism used to show how to maintain and improve the quality of OpenStreetMap data.

I. Definition of Data Quality Assurance

When you talk about data that comes to your mind it might be a series of related information about an event, object or phenomenon collected from a particular source. The more data available, the more need to checking the quality of the data before it can be processed. This aims to make the data to be processed free from *noise* or dirty data. Dirty data is data whose value shows an unnatural value compared to other data.

Data quality assurance is an activity to check the condition of the data in terms of accuracy, consistency, completeness, clarity, and anomalies. By paying attention to these aspects, a data can be said to be good if all aspects are met.

II. Quality Assurance Mechanisms

Since its launch in 2004 by *Steve Coast*, OSM has become an alternative and even the first choice for communities to complete spatial data in the areas they want. The ease, completeness, and flexibility of OSM allows the data available in OSM to be often reused for various purposes such as business, technology, social, even for humanitarian and disaster activities. This causes an increase in the amount of data available in OSM and will certainly affect the quality of the data itself. With its free and open nature, maintaining the quality of OSM data is very important so that later the use of OSM data for various needs especially those involving community interests such as humanity and disaster can be done in quality.

According to the book "*Assuring the quality of volunteered geographic information*" written by Goodchild and Li (2012), data quality assurance in participatory mapping activities can be done in broad terms with 3 mechanisms, namely:

1. Participatory Quality Assurance

Added by Surowiecki in his book entitled "*The Wisdom of Crowds*" (2004) the mechanisms of **data quality assurance** inmanner **a participatory** has several characteristics and advantages such as:

- multiple users can generate a collective agreement on a fault data found. This usually happens like misinformation or types of objects mapped in an area. Users who map the area can produce mutual agreement so that there are no more misinformation of the objects to be mapped.
- Some observations and experiences of an individual can strengthen the validity of observations and experiences of other individuals so as to reduce the risk of misunderstanding of a particular object.

- Together they can validate and check the quality of data and errors in certain areas so as to save time, energy and costs in conducting data quality assurance activities.

  This participatory quality assurance example has been carried out by the *Humanitarian OpenStreetMap Team* in collaboration with the *Resilience Network Initiative* (RNI) mapping the Purwodinatan Village, Central Semarang District, Semarang City. This activity involves elements of the community and is assisted by local students and surrounding committees in conducting mapping to inputting data mapped into *OpenStreetMap*.

2. Social Quality Assurance

Bit different but still related to quality assurance mechanisms in a participatory, **Social Quality Assurance** emphasizes the quality of the individual to do so. The more often a person validates and corrects the errors that exist in the data, then he will be more trusted to be able to guarantee data quality. Thus, someone who has a good reputation will be trusted to lead others to carry out quality assurance activities in an activity or project. In addition, social quality assurance can be carried out by forming a *working group* that becomes a media to notify and update activities related to data quality assurance. This can accelerate data quality assurance activities and make effective communication among members.

One example of this social quality assurance activity is that which has been carried out by the *OpenStreetMap Foundation* where they create several *working groups* that each group has a different discussion theme. For the quality of OpenStreetMap data discussed in the data discussion group (*Data Working Group*) where in the group discussed various matters related to the data in *OpenStreetMap* such as data licensing, data vandalism, disputes about data, as well as helping in determining usage policies for OpenStreetMap data. This data discussion group consists of members *OpenStreetMap foundation* who are contribute to *OpenStreetMap* and also some users who are recommended by members who are on the *OpenStreetMap foundation* itself. The activities from *Data Working Group* can be see by visit the wiki page for *Data Working Group*[1] and if you want to join to discuss, you can contact their members at data@osmfoundation.org.

3. Geographic Quality Assurance

The latest mechanism for **ensuring data quality** is by **geography**. This mechanism uses a geographic theory approach. Not all users can and may do quality assurance using geographic mechanisms. Only those who truly understand the geographic theory related to spatial data analysis such as *Spatial neighbors and auto-correlation (Moran Statistics)*, *Inferential Statistics and Analysis of Variance (ANOVA)*, and others. Therefore this mechanism is rarely used in participatory mapping activities, especially in *OpenStreetMap*. For example the documentation of data quality *OpenStreetMap* based on the geography approach in Indonesia was made by the Department of Geodesy and Geomatic Engineering, Faculty of Engineering, Gadjah Mada University in 2012, this documentation they sample data *OpenStreetMap* in several cities such as Jakarta, Surabaya, Bandung, Yogyakarta, Padang, and Dompu. These cities have been held mapping activities *OpenStreetMap* from 2011 to 2012 ranging from social mapping activities in the province of West Nusa Tenggara especially Dompu organized by ACCESS and the *Humanitarian OpenStreetMap Team* (HOT) to *Scenario Development for Contingency Planning*(SD4CP) conducted by *Humanitarian OpenStreetMap Team* (HOT) with *Australia Indonesia for Disaster Reduction* (AIFDR) and the National Disaster Management Agency (BNPB). Documentation on the quality of the data can be downloaded at: http://openstreetmap.id/docs/Final_Report-OSM_Evaluation_in_Indonesia_2012.pdf.

III. Data Quality Assurance in OpenStreetMap

The data quality assurance mechanism that has been described can be applied to the OpenStreetMap data quality assurance. Please note that quality assurance activities on *OpenStreetMap* are the responsibility of all users. Therefore, *OpenStreetMap* already has several technical guidelines in carrying out

[1] https://www.markdownguide.org/basic-syntax

these activities using the three mechanisms that have been described. There are 2 types of tools used in conducting data quality assurance in *OpenStreetMap*, namely:

- Data Monitoring *OpenStreetMap*
- Tool for Error Detection in *OpenStreetMap*

Data monitoring tool is a tool that can be used to **view quality data *OpenStreetMap*** that you have created or data *OpenStreetMap* that is around the area of the mapping activity that you are doing. **The error detection tool** will help **show errors** contained in **data *OpenStreetMap*** so it will be easier to find data errors than having to search one by one manually. Some of these tools are made by users who develop *OpenStreetMap* according to their needs. You will also learn some errors indata *OpenStreetMap* and tools related to data quality assurance in *OpenStreetMap*.

SUMMARY

Now you must already understand what a data quality assurance, data quality assurance mechanisms, and ensuring the quality of data in *OpenStreetMap.* With the guarantee of data quality in *OpenStreetMap*, data quality in *OpenStreetMap* can be maintained and of course the results of data *OpenStreetMap* can be used by everyone.

Membuat dan Mengelola Map Campaigner untuk Pemetaan

Learning Objectives:

- Knowing and understanding how to work with *Map Campaigners*
- Operating *Map Campaigners* to create mapping activities
- Operate *Map Campaigners* to monitor mapping activities

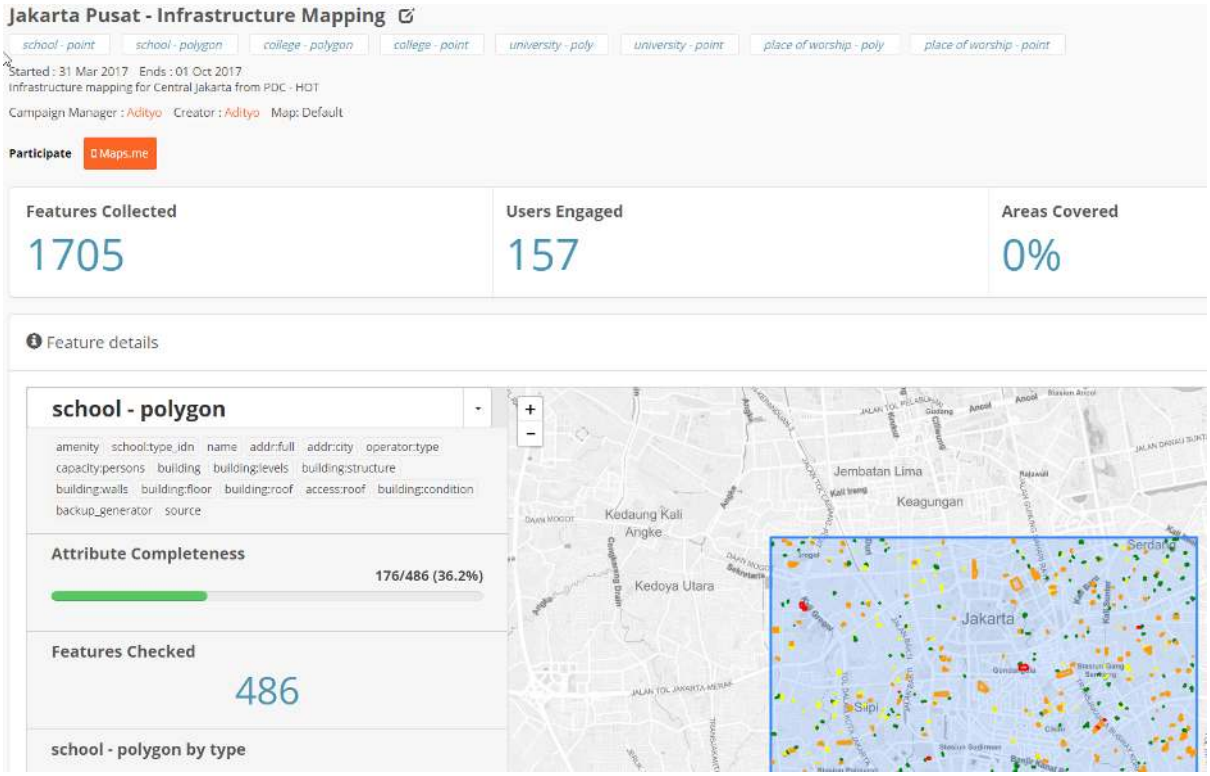
In implementing a mapping project you often need a report regarding the progress of the activity in a statistical data about how many objects have been mapped in the activity. There are several tools that can be used to obtain statistical data. One of the tools that we will learn today is *Map Campaigner.*

I. What is a *Map Campaigner*?

Map Campaigner is a tool that is intended to gather all project managers and also surveyors into one platform. Project manager can arrange activities with specific types according to their needs. Each mapping activity created by the project manager can be specifically regulated regarding the data and objects collected then will be presented in each mapping project.

II. Benefits and examples of using *Map Campaigner*

Map Campaigner aims to make it easier for project managers to monitor their mapping projects. For example here is a mapping activity carried out by the HOT team to map all places of worship, schools, universities and high schools in Central Jakarta. By using *Map Campaigner*, you can see how many total objects have been mapped in this project activity, then how many *OpenStreetMap* users are helping to participate in this mapping project, both voluntarily and incorporated into the mapping project team.

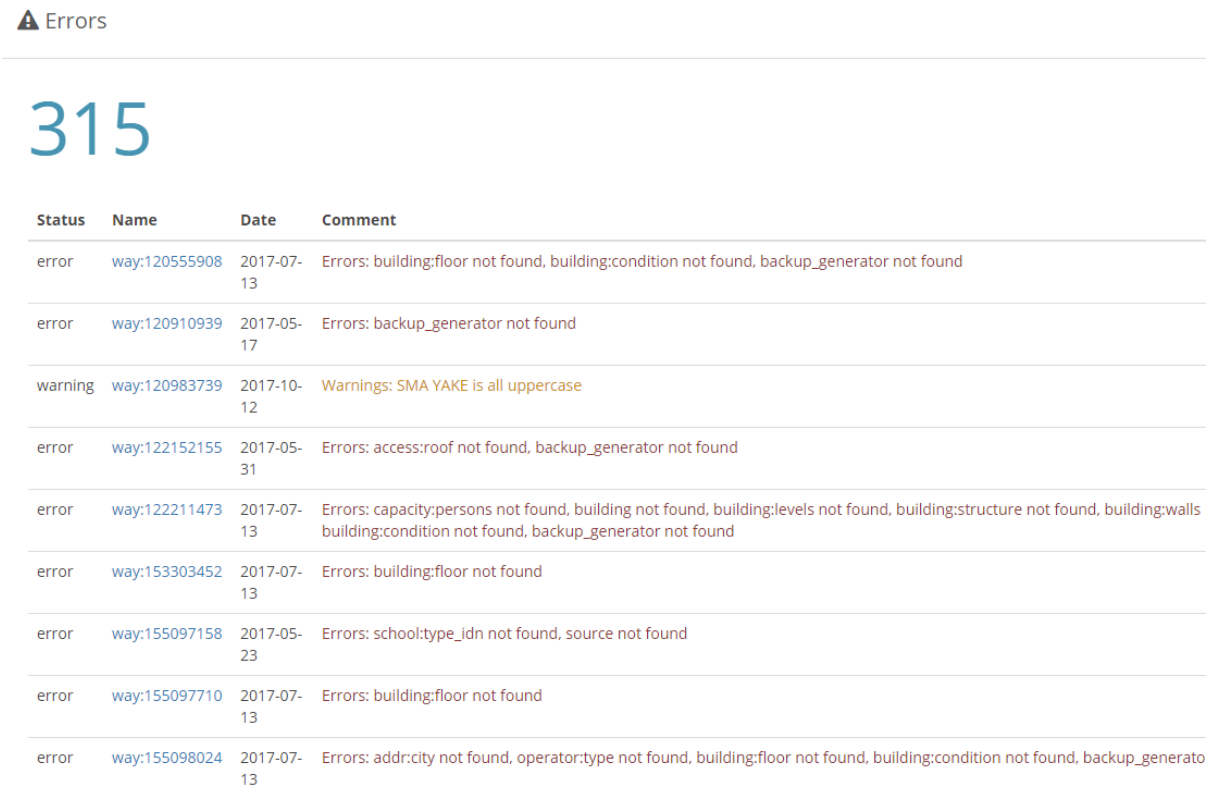


Example of using Map Campaigner for Central Jakarta

By using *Map Campaigner,* you can also find out how many objects that are complete by definition of *tags* or attributes needed. For example, in the picture above, it can be seen that from the activities of this mapping project successfully obtained 1,705 objects by reaching 157 users (both voluntary and

including surveyor team). *The Map Campaigner* also provides information on the completeness of all data collected, for example from 486 mapped school objects, only 36.2% of these school objects are completely mapped in terms of the information attributes needed for this mapping project.

The Campaigner Map also presents a quality assurance feature in terms of the completeness of the attributes of an object in OSM. With *Map Campaigner* you can see how many objects are still incomplete in terms of predetermined data attributes. You can download all of these objects and fix it using JOSM.



⚠ Errors

315

Status	Name	Date	Comment
error	way:120555908	2017-07-13	Errors: building:floor not found, building:condition not found, backup_generator not found
error	way:120910939	2017-05-17	Errors: backup_generator not found
warning	way:120983739	2017-10-12	Warnings: SMA YAKE is all uppercase
error	way:122152155	2017-05-31	Errors: access:roof not found, backup_generator not found
error	way:122211473	2017-07-13	Errors: capacity:persons not found, building not found, building:levels not found, building:structure not found, building:walls building:condition not found, backup_generator not found
error	way:153303452	2017-07-13	Errors: building:floor not found
error	way:155097158	2017-05-23	Errors: school:type_idn not found, source not found
error	way:155097710	2017-07-13	Errors: building:floor not found
error	way:155098024	2017-07-13	Errors: addr:city not found, operator:type not found, building:floor not found, building:condition not found, backup_generato

Example of checking attributes by Map Campaigner

III. Creating a New Mapping Project in the *Map Campaigner*

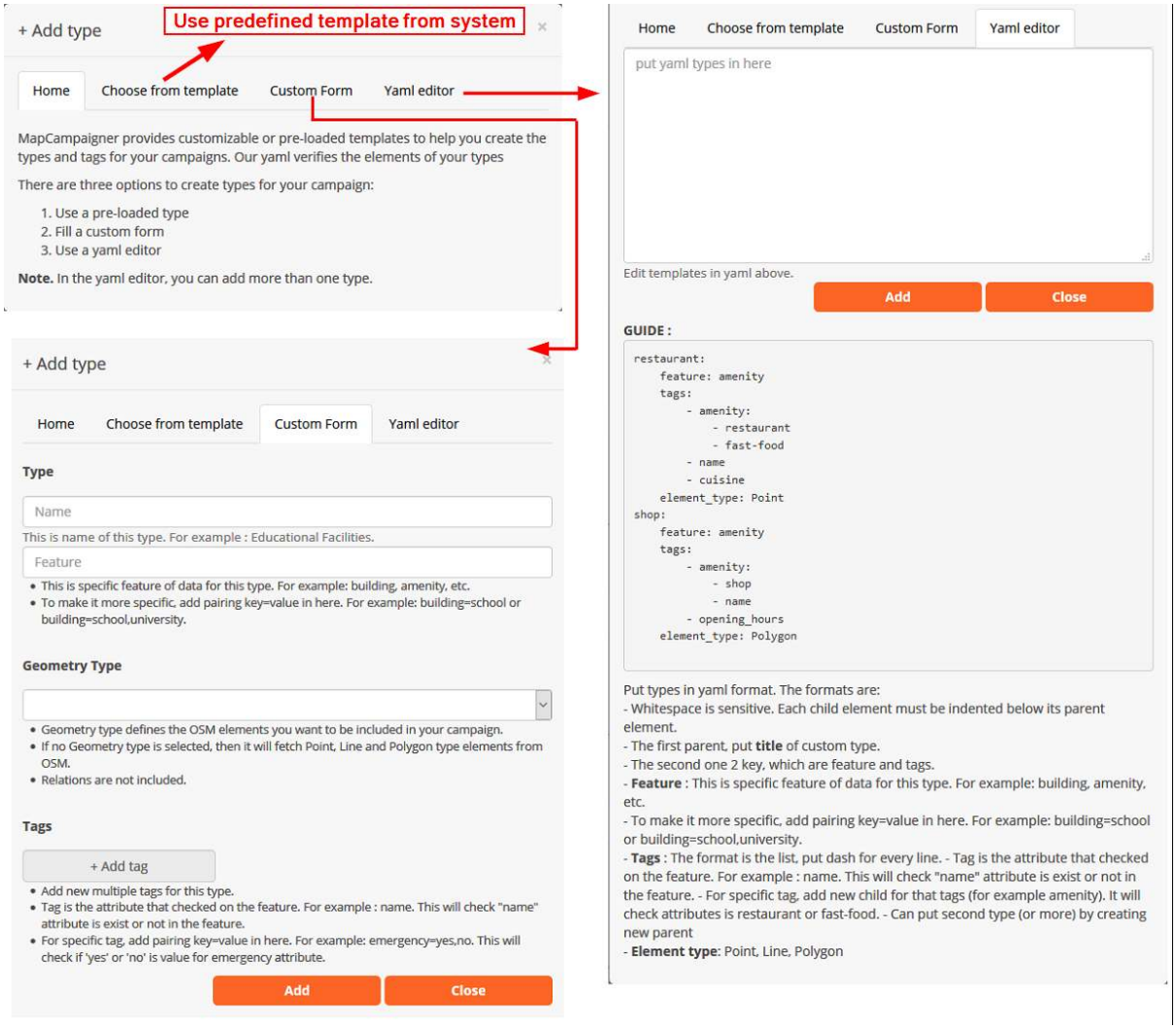
Until now you know what a *Map Campaigner is* and what are the benefits and examples of *Map Campaigners*. You might use *Map Campaigner* for your own mapping project. In order to create a new *project*, you must *log in* first with your *OpenStreetMap* account. After you have successfully *logged in* with your account, then you need to click on ***Create Campaign*** button. Next there are several steps after you have successfully *logged in* with *OpenStreetMap* account. After clicking ***Create Campaign*** button, you will be directed to project creation *campaign* page. On this page there are two stages: **managing basic information** and **organizing work areas**.

a. Organizing Basic Information for your Project *Campaign*

In this section, you will fill in basic information for your project. You must fill in some information on this page:

- **Project name.** In this section, you only need to fill in the name of the project that you are doing.
- **The duration of the project.** In this section, you will set the duration of the project in progress. You can provide a date in the past if the mapping project that you are doing is a mapping project that has already been completed.
- **Project Description.** In this section, you will fill in a description of the project activities.

- **Attributes /*tags* needed.** In this section you will provide the *OpenStreetMap* attributes needed during the mapping project. For *OpenStreetMap* attributes the required, you can refer to the Wikipedia page[2] [3] or to **Data Model *OpenStreetMap*** module. You can choose to use ***YAML*** (which you already learned in the module ***Using YAML on HOT Export***) or with an easy version already provided on this site.



Display when entering OSM attributes for Map Campaigner

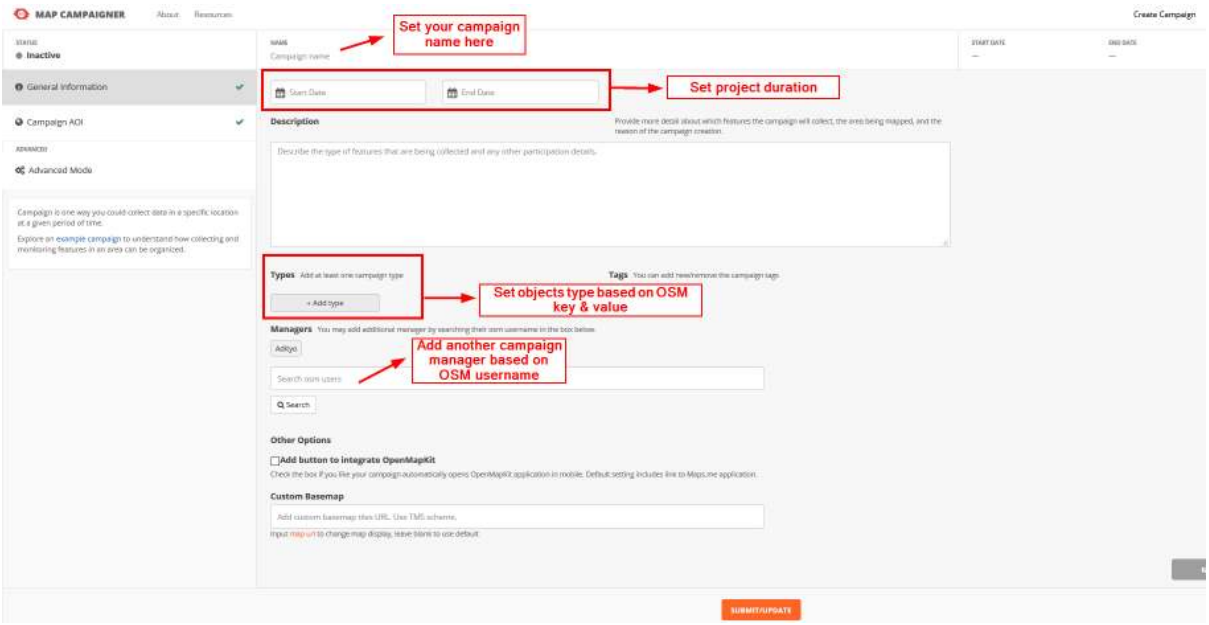
)

```
Note:
When entering tags / attributes informat YAML. There are a number of things to be aware of:
* Use of space is very sensitive here.
* One element consists of the main elements and supporting elements
* All elements under the main element (supporting elements) must be several spaces apart from the ma
* The contents of the supporting elements = features, tags, & element_type
* features are categories in OSM. For more details, you can see OSM wikipedia
* To be more specific, you can use sets key & value such as building = school or amenity = hospital
* tags are a collection of key & value that will be checked by the system. Please check wikipedia or
* element_type is the type of OSM object to be checked, such as point(point),line(line),or area(poly
```

- **Add another project manager (optional).** In this section you can add other OSM accounts as project *campaign* if the project that you are working on there is more than one project manager. The role of the project manager is that they can add new attributes to be calculated or change the

[2] https://www.markdownguide.org/basic-syntax
[3] https://wiki.openstreetmap.org/wiki/Id:Indonesian_Tagging_Guidelines

information that is in their project *campaign* .



Display on the basic information page

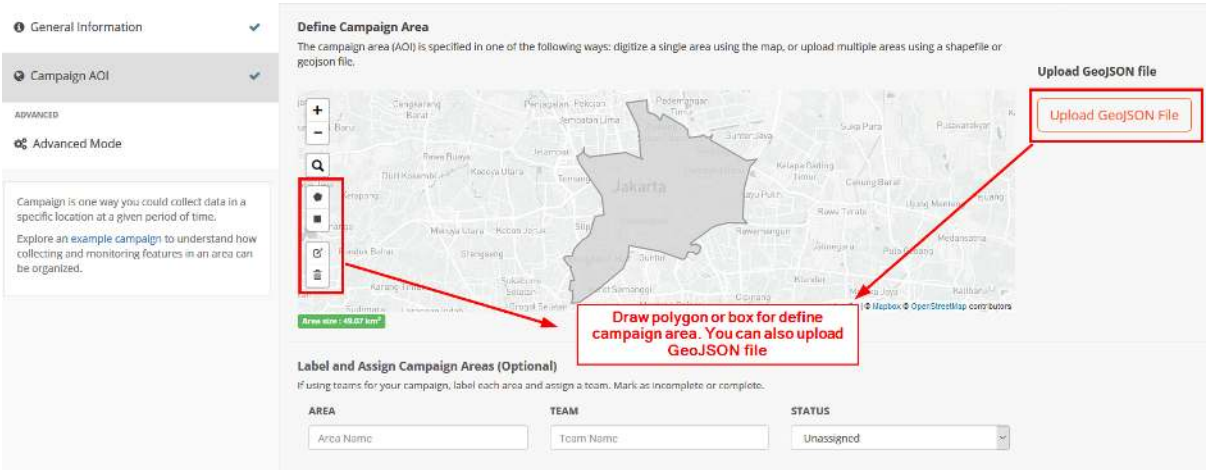
b. OrganizingWork for *Campaign Project* You

Once you have successfully set the basic information, the next step is you have to organize your project work area. In this section, there are two ways to organize your project work area.

The first way is to use the tools on the left side of the map. You can draw a box or draw freely using the tool. The thing to remember is that **the project campaign area should not exceed 315 km2.** If your mapping project has more area than mentioned, it is recommended to divide the mapping project area into several sections so that it can be created in the *Map Campaigner*.

The second way is to use administrative boundary data informat *GeoJSON*. Using this data, you can immediately see the work area of your project that has been divided into several sections.

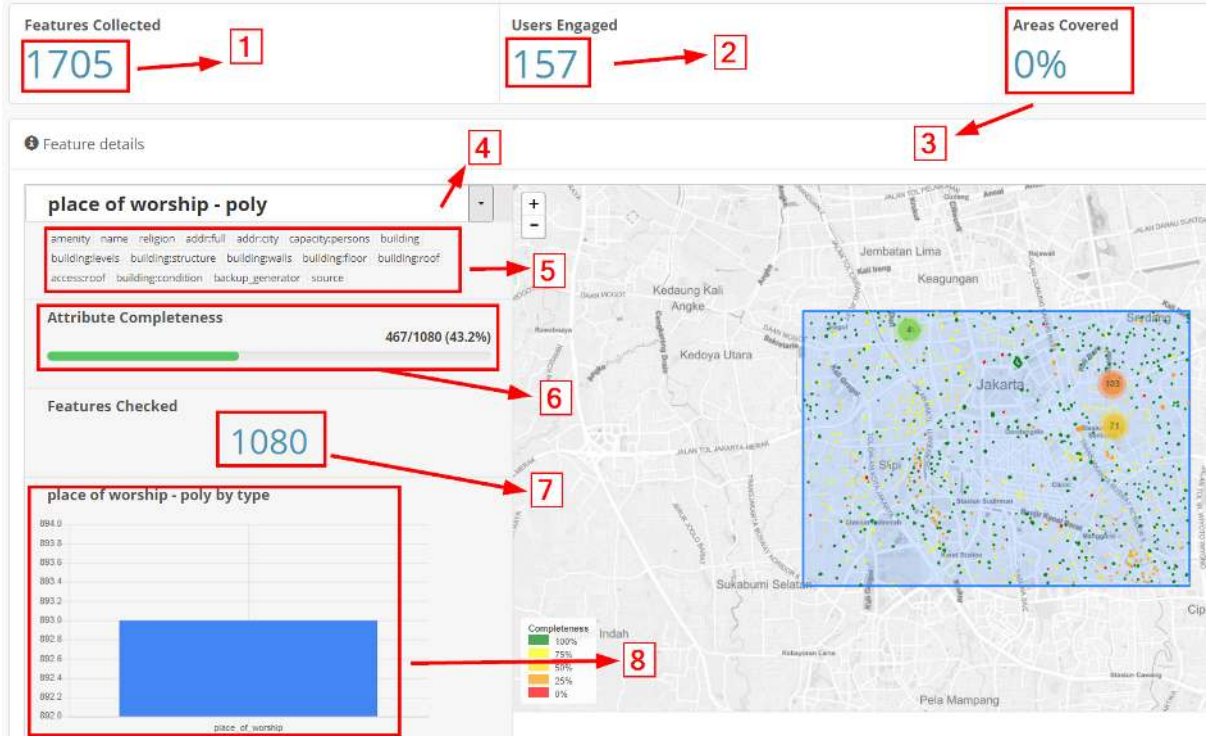
After setting the project work area, you can specify which team is assigned to the predetermined project area. This team setting is optional and aims to make it easier to monitor the progress of your team.



Display on work area settings page

IV. View Your Project Campaign Page

Having successfully made a campaign,you can go straight to the main page to see the project. When opening the mapping project, you will be presented with some information ranging from statistical data, a list of *errors*, and graphs of users who participated in the mapping.



Display page of Map Campaigner

1. ***Feature collected.*** This section explains how many total objects are collected in the work area.
2. ***User engaged*****.** Explain how many OSM users are participating in helping to map either voluntarily or not.
3. ***Area covered.*** Explain what percentage of the area that has been completely mapped.
4. ***Feature selection*****.** To select a predetermined OSM feature.
5. ***Selected attribute*****.** Explain some OSM attributes that must be checked by the system to determine the completeness of its attributes.
6. ***Attribute completeness*****.** Explain what percentage of complete OSM objects have the attributes as specified in thesection ***selected attribute***.
7. ***Feature checked.*** Explain the number of OSM objects that have been collected, specific to only one feature in accordance with thesection ***feature selection***.
8. ***Graph*****.** Explain about the graph of the number of objects in detail

In addition to some of the above, there is also an ***Errors*** section which explains the list of objects that have not been completed in terms of OSM attributes. In addition you can also see the ***User Enggagement*** section to see the list of OSM users who participated helped map the area along with the number of contributions from each OSM user.

V. Fixing an Incomplete Objects

Using *Map Campaigner*, you can directly fix OSM objects that are incomplete in terms of their data attributes. To fix it there are two ways.

- First is to fix OSM objects one by one by selecting the object id in thecolumn ***Name***. This way you will be directed to the *OpenStreetMap* webpage and then you can immediately change it using **JOSM** or **iD**.

- The second way is to click ***Download*** button at the bottom of *error* list. By using this, you will download *file*.osm and opened using JOSM. After the file has been downloaded successfully, you can immediately open it in JOSM to directly complete the attributes.

SUMMARY

Congratulations! You have now successfully learned how to use the *Map Campaigner* for the purposes of your mapping project. By using *Map Campaigner* you will find it easier to find out how many objects have been successfully mapped easily and see which OSM objects do not have complete attributes that are suitable for your project.

Creating and Managing Tasking Manager

Objectives:

- Explain the functions of *Tasking Manager* in the context of participatory mapping
- Able to explain how to make *Tasking Manager*
- Able to explain how to manage existing *Tasking Manager*

You must already know how to use *tasking manager* to perform mapping activities together. When you use a tasking manager that doesn't suit the area you want, then you might want to make a tasking manager for your own area. In this module, you will learn how to make tasking manager. Making tasking manager requires the person responsible for the tasking, so that the resulting OSM data has good data quality. Also this is because the initial tasking manager was made for mapping needs as a disaster response in an area.

I. What is a The Tasking Manager

a. Definition of a *Tasking Manager*

Tasking Manager is a tool specifically created for mapping collaborative and participatory. *The Tasking Manager* allows you to map in an area together with other OSM users by dividing the mapping in the targeted area. The aim of the *Tasking Manager* is to divide the mapping work into several different grids/ boxes so that everyone can choose a grid/box to be done. In addition, the *Tasking Manager* can also make it easier for you to monitor the progress of mapping so you can find out which areas still need to be mapped and which areas have been mapped.

Imagine if you want to map in a certain area where you have to map together with 20 other people. If there is no division of tasks and mapping area, there will be a possibility that some people will map in the same area. With the *Tasking Manager*, things like this can be avoided and mapping work will be completed more quickly and effectively.

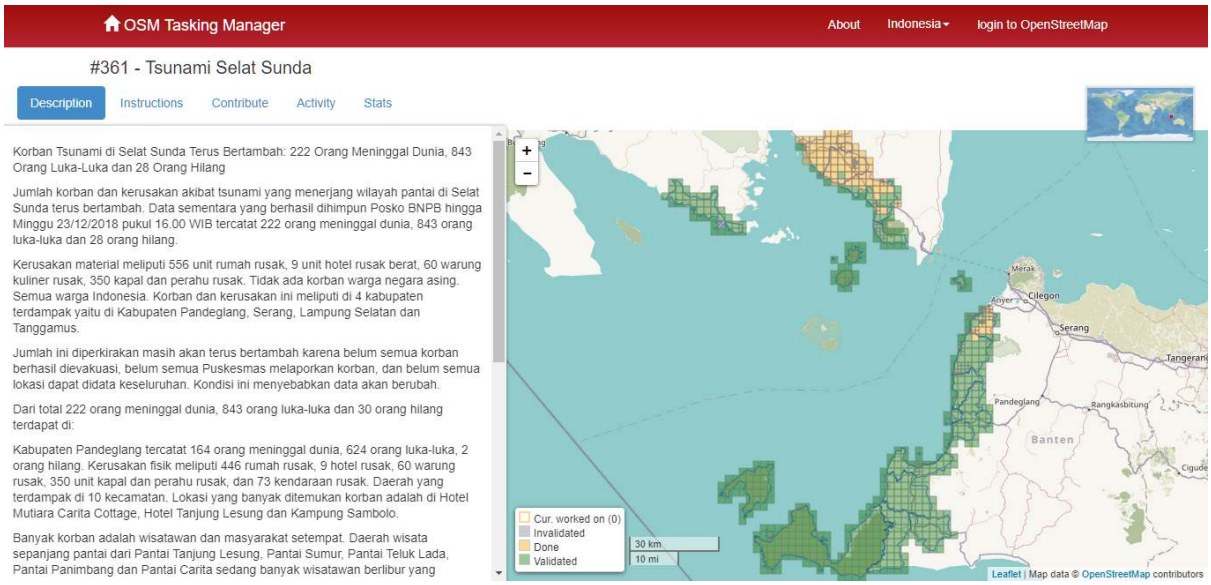
b. The example of the use of the *Tasking Manager*

Tasking Manager first used was under a response when the Typhoon Haiyan disaster occurred in the Philippines on November 8, 2013. Mapping using the *Tasking Manager was* conducted in Tacloban City, one of the cities that was severely affected when the disaster occurred. Within 24 hours after the project was created in *Tasking Manager*, as many as 10,000 buildings had been mapped or around 25% of the total number of buildings in Tacloban City. All of this mapping was carried out by 33 volunteers.

“The condition of the building before and after being mapped with the Tasking Manager”

The condition of the building before and after being mapped with the Tasking Manager

In Indonesia, the Tasking Manager also use to respond when a disaster occurred. One example is when the earthquake and tsunami struck in the Sunda Strait in December 2018. Within a month, all the affected area were mapped by 60 people.

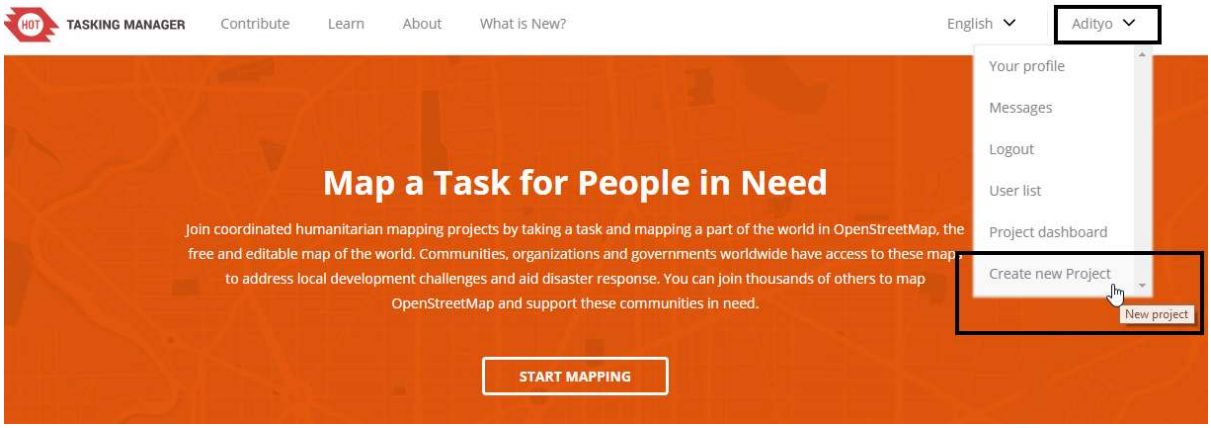


“The Tasking Manager was created as a disaster response in the Sunda Strait”

The Tasking Manager was created as a disaster response in the Sunda Strait

II. Makes New Project

To create new tasking in tasking manager, you must first have access as a project manager. If you do not have access, then you can request the access by sending *e-mail* to team.id@hotosm.org for a *tasking manager* specific to Indonesia or mapper-support@hotosm.org for global *tasking manager*. After you have managed to get access to tasking, you can look at the top right of the tasking front page and click ***Create New Project*** button.



"How to make a new project in the tasking manager"

How to make a new project in the tasking manager

There are several steps that must be done when creating new task:

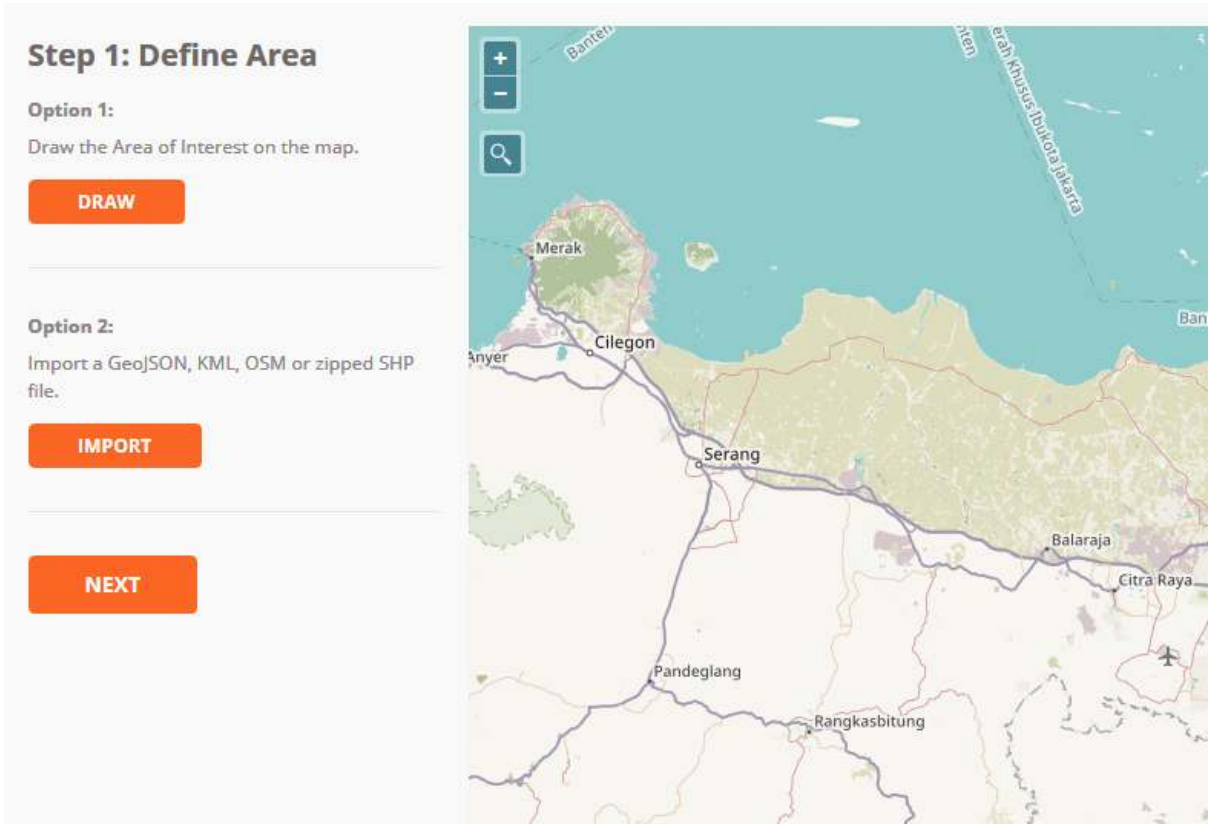
a. Define the project area

Step 1: *Define Area* = set your task area

After you press ***Create New Project***, you will be directed to the first setup page, which is to set the area of your mapping project. There are two ways to set the mapping of the project area:

- ***Draw***= with freely draw the area of interest
- ***Import***= using spatial data format such as *GeoJSON, KML, OSM* or *SHP* compressed in *zip*.

Click ***Next*** when you have finished managing your work area.

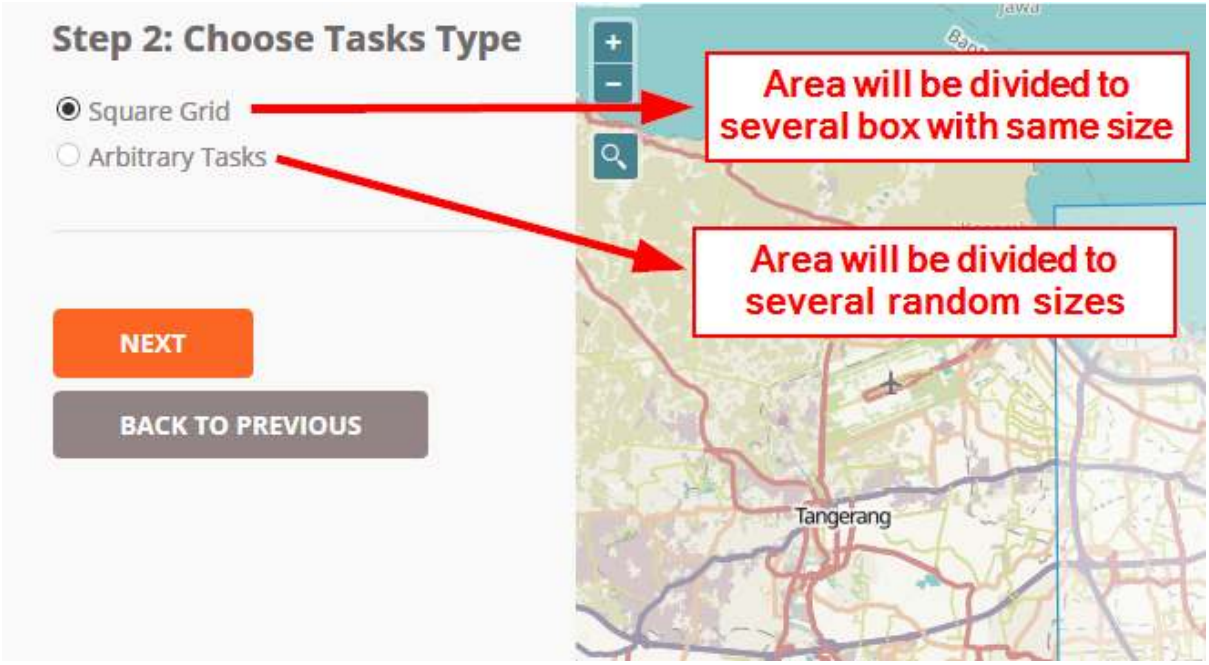


"Options for setting work area"

Options for setting work area

Step 2: Choose Tasks Step = adjust the type of division for mapping area

After you have set up the work area, the next stage is that you are asked to set up the form of division of your work area. There are two types of division of work areas: square (***square grid***) and free (***Arbitary Tasks***). If you choose the shape of the box, your work area will be divided into several square boxes of the same size. Meanwhile if you choose the free form. Your work area will be divided into several random sizes. Click **Next** to go to the next stage.

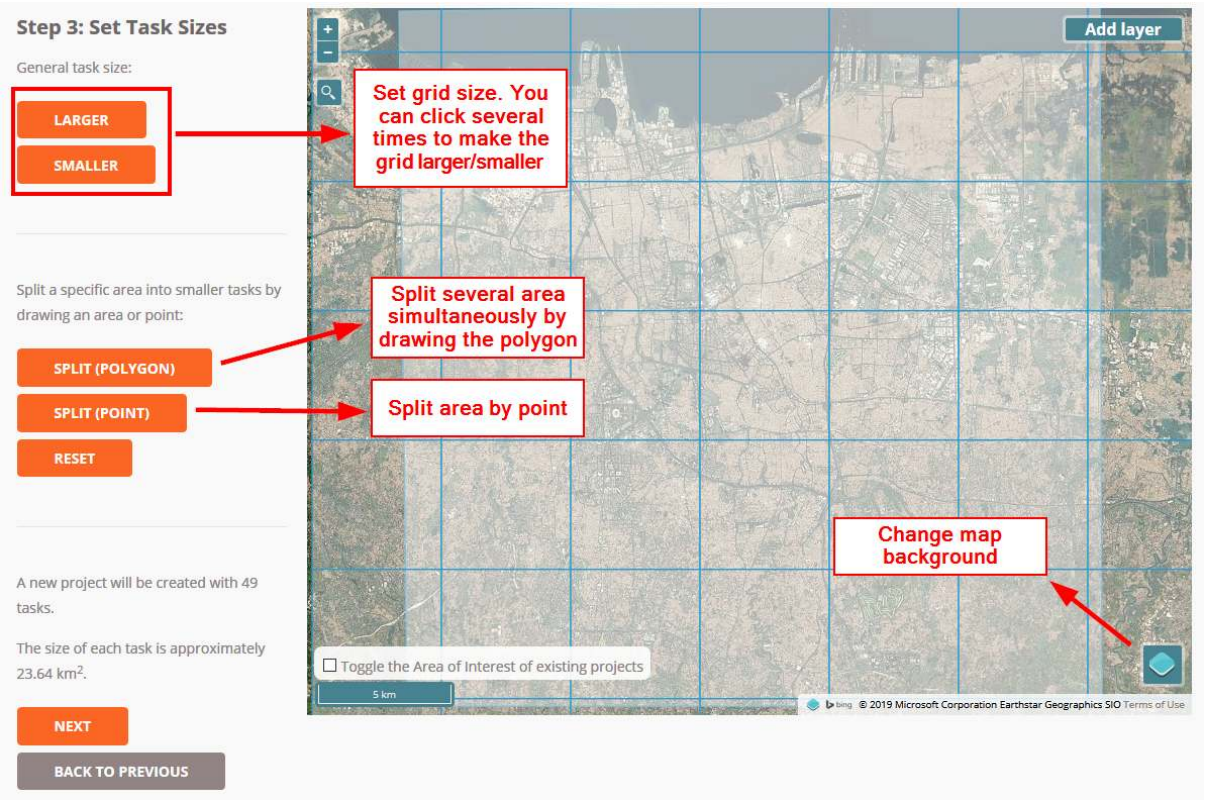


“Options set the task type”

Options set the task type

Step 3: Set Task Sizes = Set size of the box

At this step, you will set the size of the grid. It is assumed that in the previous step you chose to divide the work area into boxes and at this step you will determine the number of boxes in the area that you specify. The bigger the size of the work box, the less the number of task area. However, this also means that mapping volunteers who participate in mapping your area may get a very large size of the mapping area and vice versa.



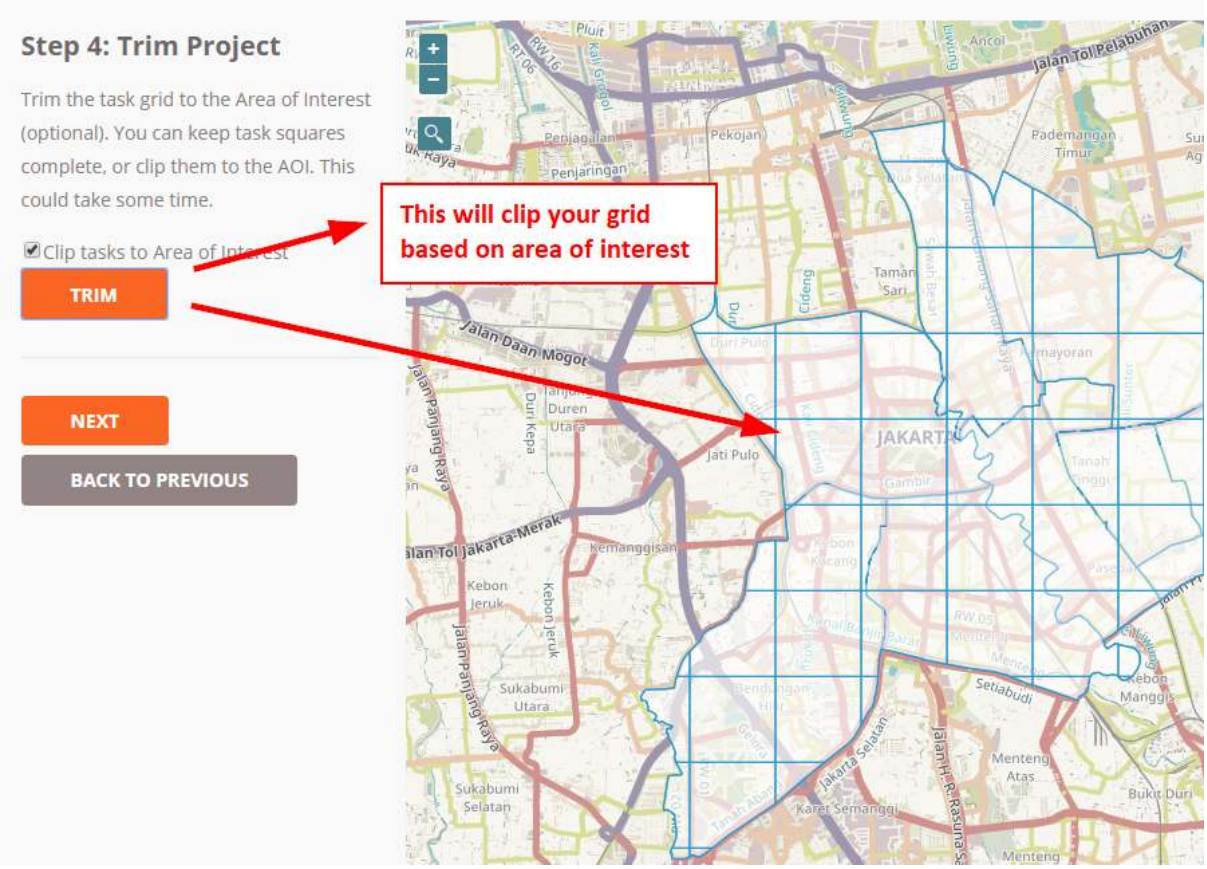
“Description of tools at step 3”

Description of tools at step three

```
Note:
A few tips in determining the size of the task size, you certainly want to make a work box that is n
```

Step 4: Trim Project = Cutting grid boxes that are not needed

After you set the size of the grid, in the next step you will be asekd whether you want to cut the grid specific to your project area or not. By using this feature, you can delete a grid that is outside the task area and leaves only a grid that matches the boundary area of your area of interest.



"Using the trim to cut the work area"

Using the trim to cut the work area

Step 5: Review = Give the project name

The next step is that you give a name to your mapping project. At this step you should give a name that is easy to find by other users. In this section there is also a description of the number of grids / boxes that you will work on, as shown below, there are 56 *grids* /boxes. Click ***Create*** to make your *tasking manager*.

"The final stage before the project is made"

The final stage before the project is made

b. Setting Project Descriptions

After completing the project, you will be directed to additional settings where you will enter project descriptions, instructions, priority areas, etc. You must enter the project description and data mapped instructions, while others are optional.

- **Description**= Provide a project description

  There are a number of things you do in this section.

  1. You will set the status of your *tasking*(***Draft, Published, Archived***).

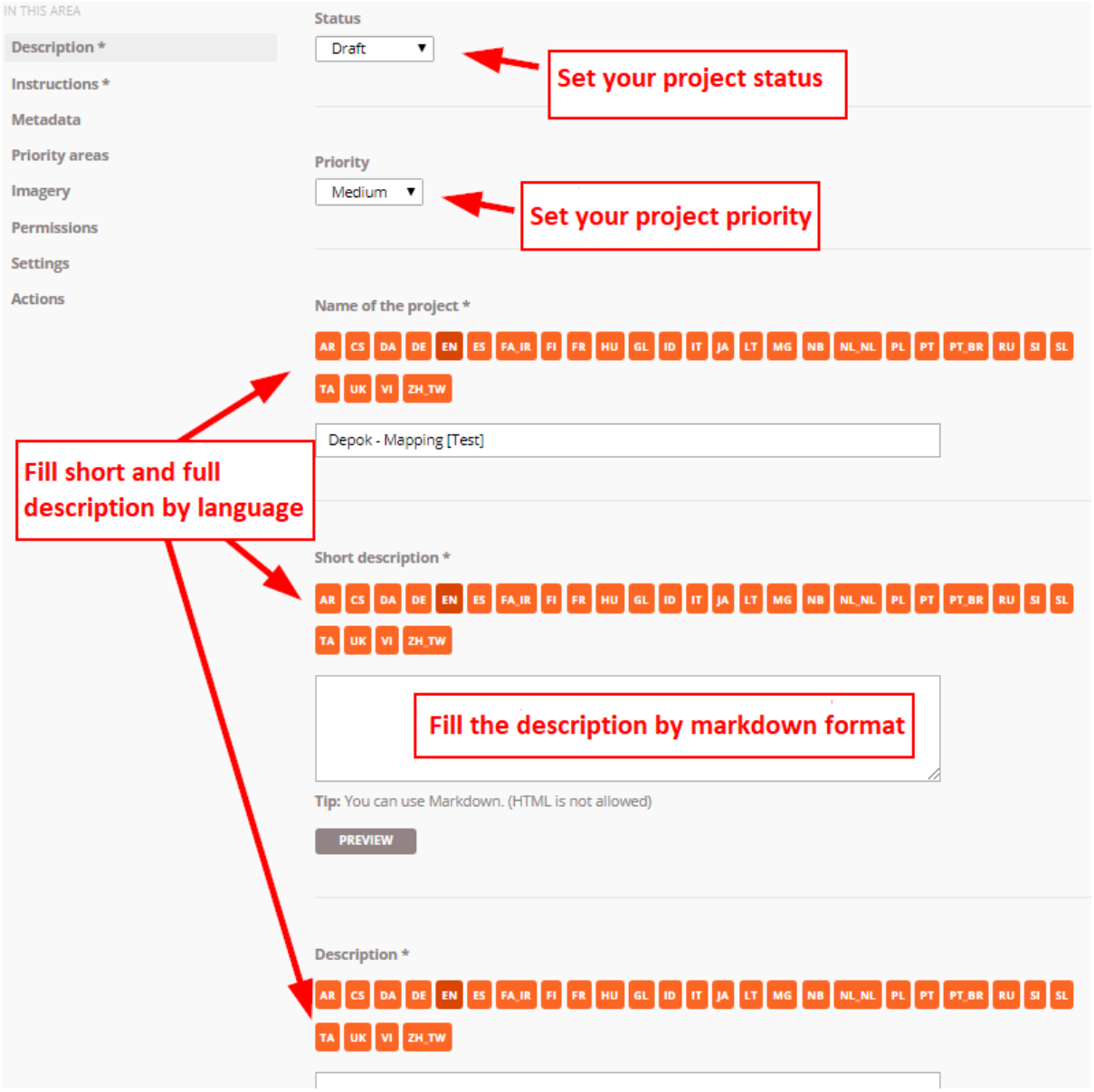
     1. ***Draft***is the default setting when the project was first created. If aproject is _tasking _still *drafted*, mapping volunteers will not be able to help map your *tasking*.
     2. ***Published*** means your project _tasking _has been published so that other people can see and help map your _tasking _your.
     3. ***Archived*** means your tasking project has been archived because it's finished or there is a new tasking project with the same area.

     Select ***Published*** so that volunteers and your team can see your *task*.

  2. You will set priorities of your *tasking*. In the *tasking manager*, you will be given three priority choices, such as urgent, high, medium, and low where each level has different meanings. You can set your tasking to an ***urgent level*** if the project *tasking* created by you aims to be mapped immediately like mapping responses when a disaster occurs so your tasking project will be displayed at the top of the *tasking* list. Set priority to ***high*** if your mapping is the mapping for disaster response but the disaster has passed the emergency response phase. Set priority to ***medium*** if your mapping project is not too urgent to map but is included in the scope of mapping for disaster. Set priority to ***low*** if your project activities are not urgent and not an activities for disaster mapping.

  3. You will set a summary (***Short description***) and a full description of your *tasking manager*. In providing a summary (*short description*) and a description for your tasking, there is a choice of languages from English (**EN**) and Indonesian (**ID**). The choice of language will appear when the users change the language of *tasking manager* to the language they want. If you want to enter Indonesian only, select **ID** as a language choice and then fill in the brief description in format *markdown*. *Markdown* is the same format as *html* with simpler writing. For writing guidelines with *markdown*, you can see it on the *Markdown Guide*[4].

[4]https://www.markdownguide.org/basic-syntax



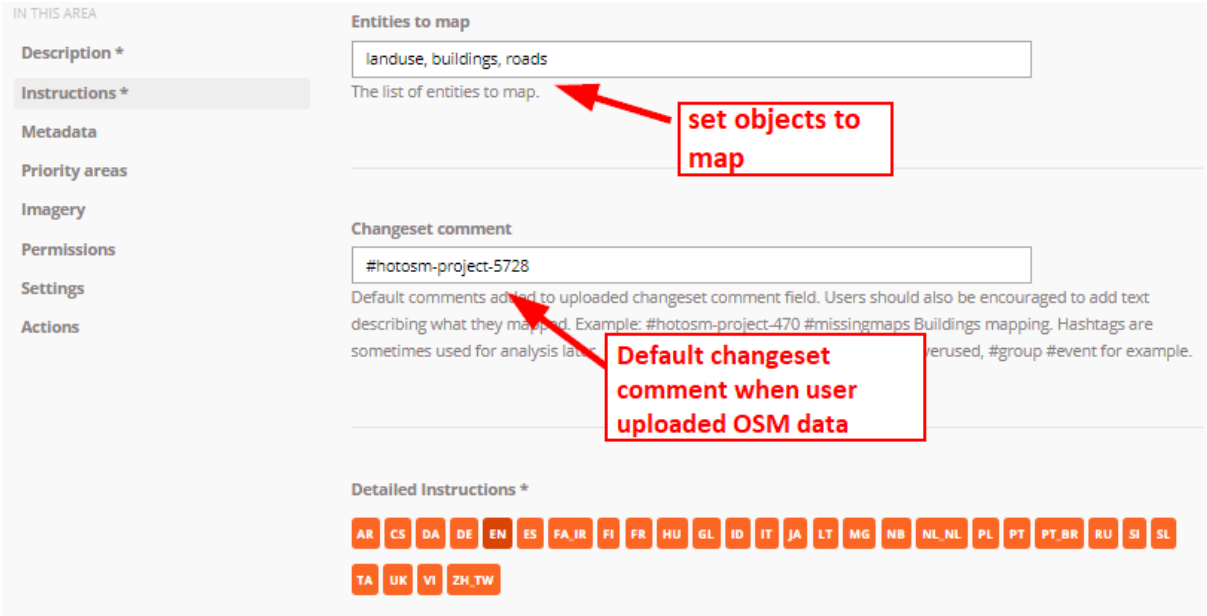
"Explanation for the Section Description of Your Mapping Project"

Explanation for the Section Description of Your Mapping Project

- ***Instructions***= Provide mapping instructions

  In this section you will provide information about objects that should be mapped to the *Tasking Manager* that you have created.

  1. In the section ***Entitles to map,*** you can describe what objects you need from this project *tasking*. Suppose you need data on road, building and river networks. So in this section, you can describe these objects.
  2. In the section ***Changeset comment,*** you can set the default changeset comments that will appear automatically when users upload their edits to *OpenStreetMap*.
  3. In the section ***Detailed Instruction,*** You can enter mapping instructions in detail. This explanation is very helpful for volunteers who want to contribute to your tasking project but do not have experience in mapping either the *Tasking Manager* or OpenStreetMap. You can provide detailed instructions in this section.



“TDisplay in the instruction section”

Display in the instruction section

- ***Metadata*** = Set project metadata (optional)

1. **Mapper Level**

   In this section, you can set the difficulty of the mapping project and arrange it based on your own perceptions. For example, if the mapping area is a densely populated residential area with poor satellite imagery and the data needs to be mapped are public building data, you can adjust the level of difficulty in mapping the area such as beginner, intermediate, or advanced.

2. **Type (s) of Mapping**

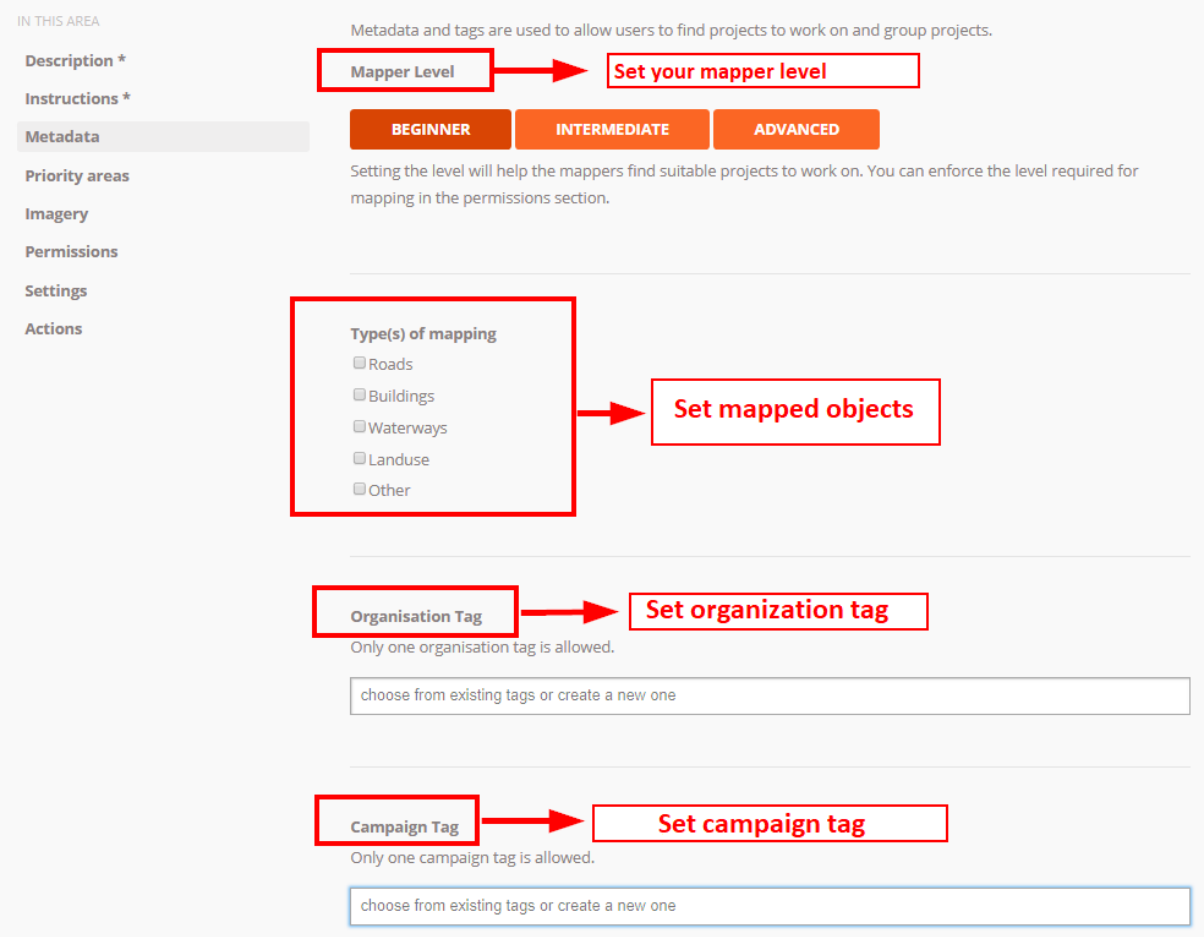
   You can identify objects that will be mapped on your tasking project by checking the list of objects in the ***Type (s) of Mapping*** section.

3. **Organization Tag**

   In this section you can write your organization tag to make it easier to find *tasking* project in the search column.

4. **Campaign Tag**

   Just like an *organization tag* in this section you can add *tags* that match your mapping project to make searching easier.



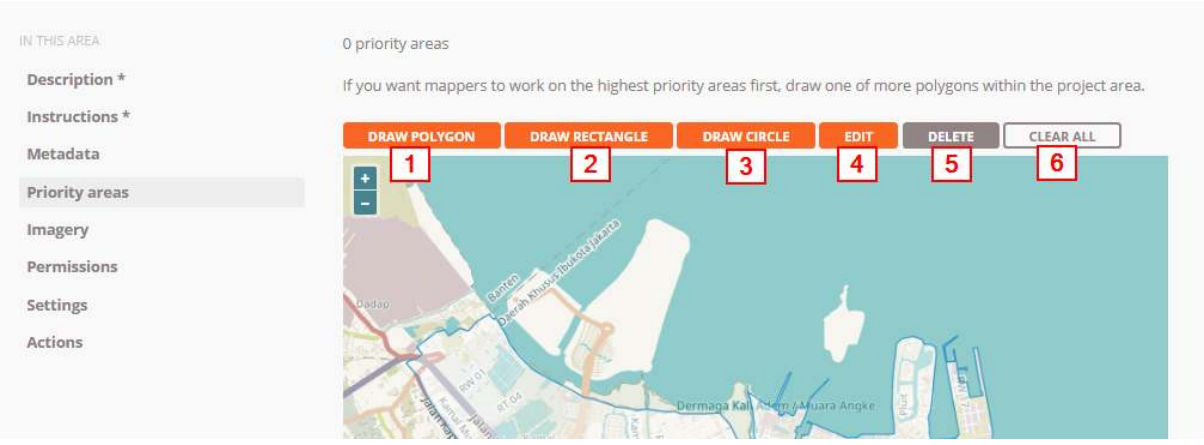
“Display metadata page”

Display metadata page

- **Priority Areas** = Set priority area (optional)

  In this menu you can draw priority areas for your _taski_ng in several ways:

  1. Draw area using ***DRAW POLYGON***
  2. Draw a box-shaped area using ***DRAW RECTANGLE***
  3. Draw a circle using ***DRAW CIRCLE***
  4. Change the priority area that has been drawn using ***EDIT***
  5. Delete the priority area by using ***DELETE***, and
  6. Delete all priority areas by using ***CLEAR ALL***

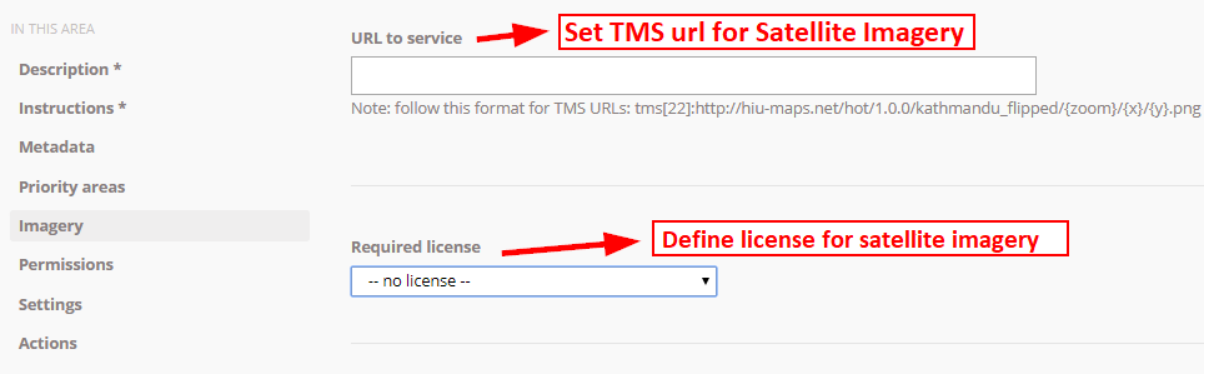


“Priority Areas page display”

Priority Areas page display

- ***Imagery*** = Provides additional satellite imagery (optional)

  If you have additional satellite imagery in the TMS (*Tile Map Service*) format. You can enter the _url _in this section. Besides that you also need to set a license from the satellite image you are using. You must ensure that the satellite imagery you use has a license that can be used for mapping in OpenStreetMap.



“Imagery page view”

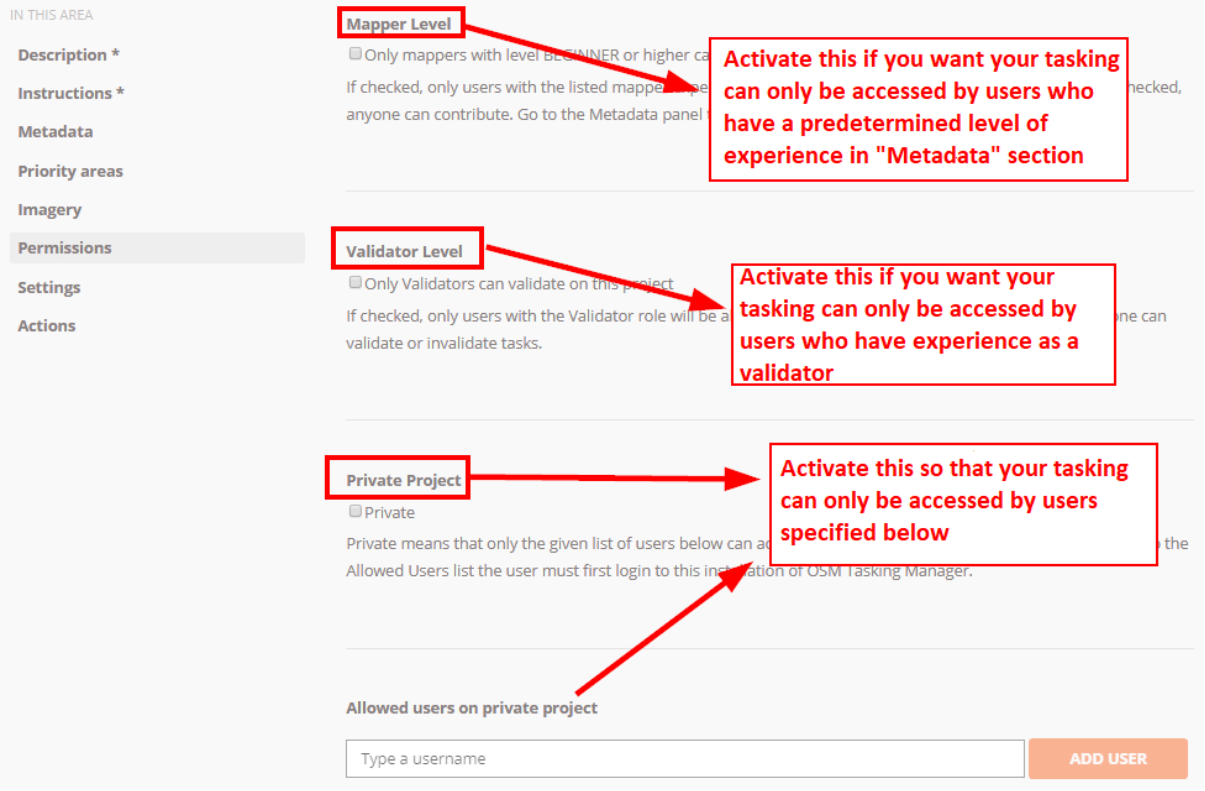
Imagery page view

- ***Permissions*** = Set project permission level (optional)

  In this section you can manage your project tasking only accessible to users with skill levels from beginner to advanced level. By activating thefeature ***Mapper Level***, your tasking project can only be done by users with the level you have specified.

  If you activate the ***Level Validator*** , the user who can access your tasking to do data validation is a user with alevel *validator*.

  If you activate ***Private Project*** then your tasking will only be accessible by the user whose name (*user* OSM) you have specified before. Other people outside the set name cannot see the tasking made by you.



“Display page Permissions”

Display page Permissions

After completion with additional settings. You can save your tasking project by clicking **SAVE CHANGES** at the bottom.

“Click the button to save the modified tasking project”

Click the button to save the modified tasking project

III. Tasking Project Management

a. Changing Instructions and Descriptions

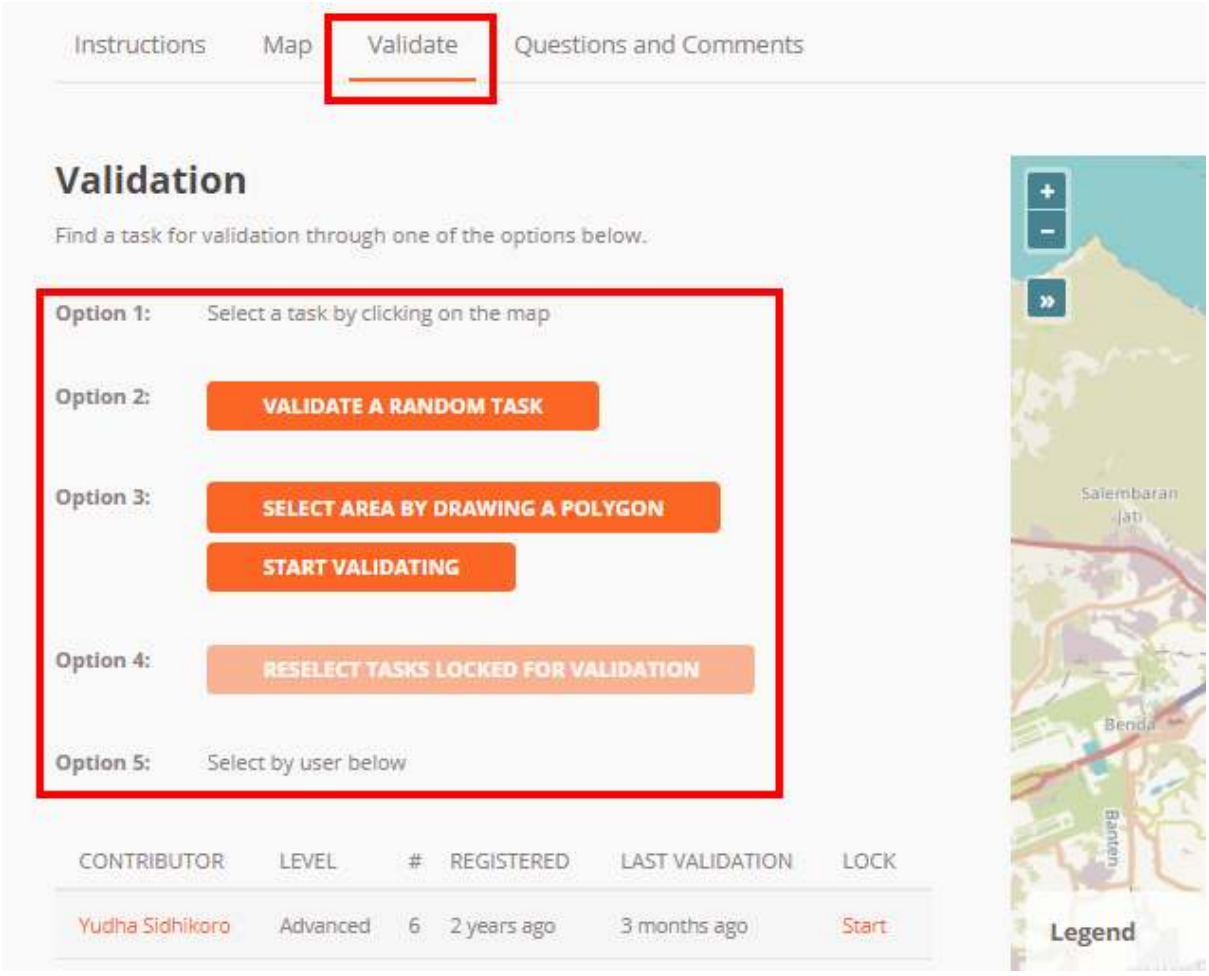
If you want to add a few sentences of new instructions or want to change the description of your project as the mapping progresses in your *tasking*, you can choose ***Edit Project*** on your tasking page_ _. After that you can immediately change the description and instructions for your tasking.

“Click EDIT PROJECT to change the description of your tasking project”

Click EDIT PROJECT to change the description of your tasking projecta

b. Validation

As your tasking progresses and the data increases in the area you are working on, some volunteers may be unfamiliar with digitizing with OSM so you need validation activities to improve the data quality. For more details, you can read **Data Quality Assurance with *Tasking Manager***. Please click button ***Validate*** to switch to the validation page for your tasking project.



"Tasking manager validation page"

Tasking manager validation page

There are 5 options on the validation page results in *tasking manager*: 1. Select the box on the map yourself. This way you can simply select the grid/box available on the map to start validation. 2. Choose boxes randomly. This way you will be helped to choose the box. 3. Choose a box by drawing a *polygon*. By using this feature. You can choose several boxes to validate by drawing a *polygon* or area. 4. Select the box that has been locked before. If you have already got the box validated but don't remember choosing the box, you can use this feature. By clicking this button, you will be directed to the previously selected box. 5. Choose according to username. You can also validate a box by choosing based on the name of the participating user to map it on your tasking project.

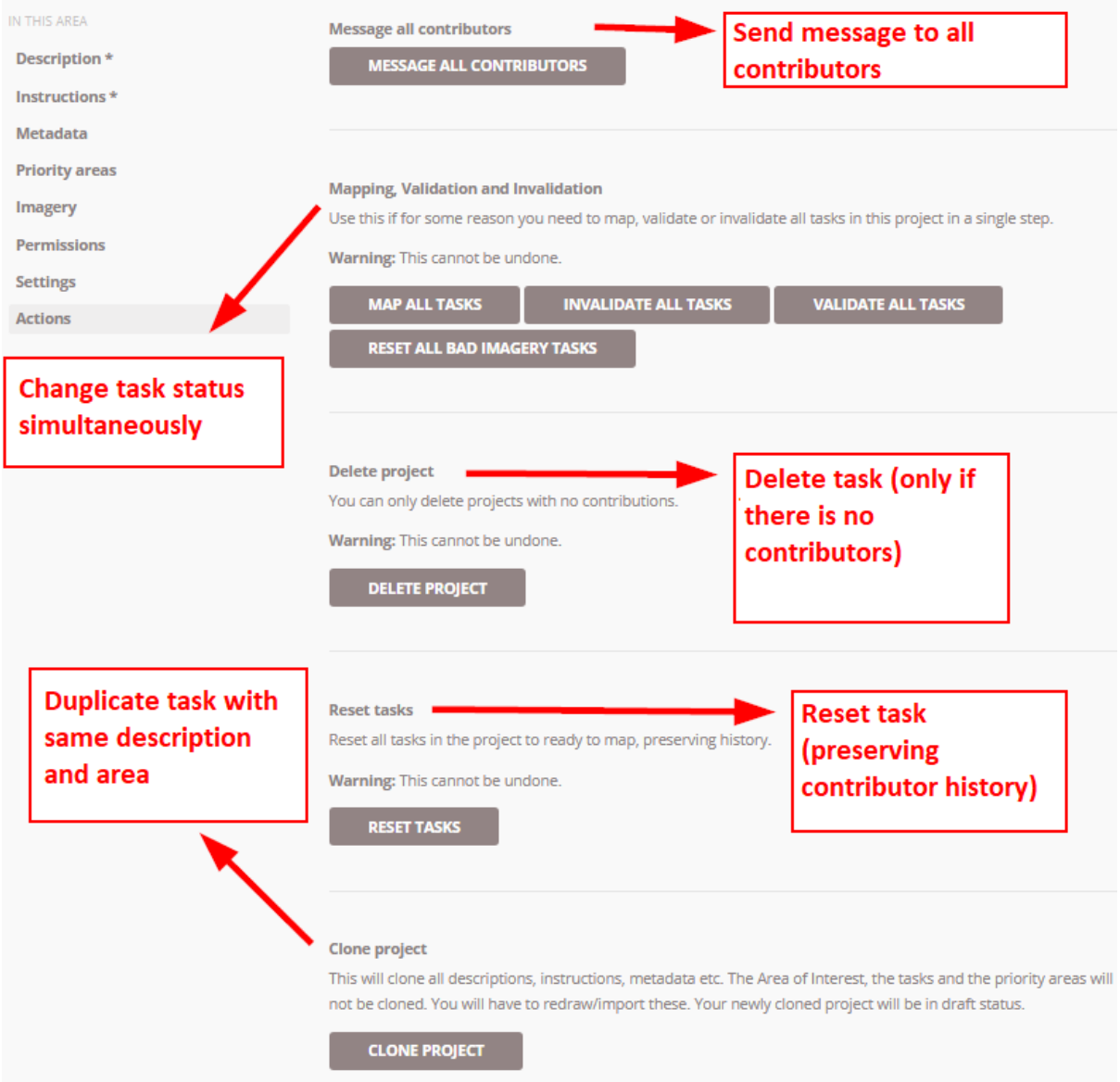
c. Changing Priority Areas.

You can specify priority areas to map first. The trick is to click ***Edit Project*** first and after that you go to ***Priority areas.*** Change and add your priority area using the method described in the previous section.

d. Some Action Features in *Tasking Manager*.

In your *tasking manager* management menu, there are several action buttons: * Send a message to the contributors to your tasking project. By using the button_ **Message All Contributors.** _You can send messages that will be read by all contributors to your tasking project. This is certainly very useful if there are changes to the object being mapped or changes in priority areas. * Manage all tasking simultaneously. There is a tool that you can use to manage all the tasks simultaneously. * ***Map All Tasks*** used to indicate that all the boxes on your tasking have all been mapped. * ***Invalidate All Tasks***

used to cancel all the validated boxes * ***Validate All Tasks*** used to validate all boxes that have been mapped * ***Reset All Bad Imagery Tasks is*** used to reset all boxes that have information that the satellite image in the box cannot be used. * Removing tasking projects. Using ***Delete Project*** button **You** can immediately delete your tasking project with a note that there are no contributors participating in your tasking. * Reset the tasking project. With ***Reset Tasks*** button you will reset your tasking but can still keep a history of contributors who participated in mapping your tasking project. * Duplicate tasking. With ***Clone Project*** button You can duplicate your tasking and create new tasking with the same description and work area as previous tasking. The different thing is your *tasking* will in status *Draft* and for the area to be mapped, the number of boxes and priority areas will not be duplicated so you have to make further arrangements.

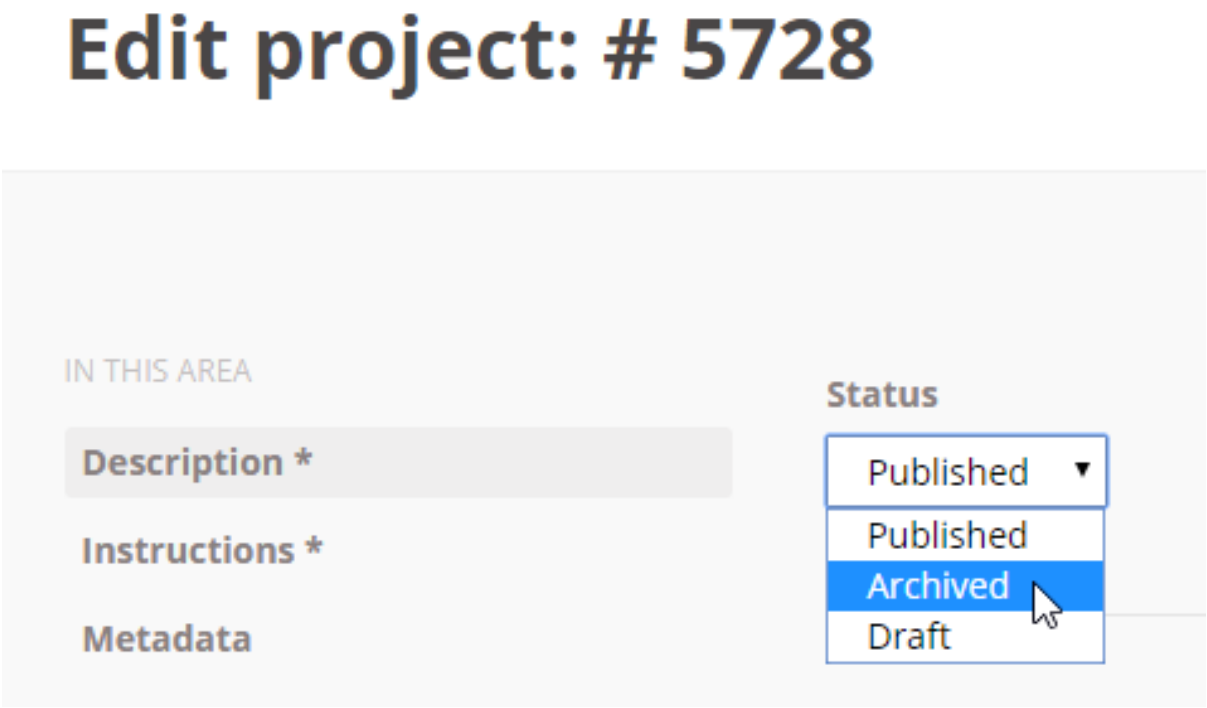


"Display of the features contained on the Action page"

Display of the features contained on the Action page

e. Archives the Tasking Project

If the tasking project is complete, you are advised to archive the tasking project that you have created. This aims to avoid contributors from mapping your_tasking_ that is. To archive a tasking project, click ***Edit Project*** and select ***Description***. On the status menu, change from ***Published*** to ***Archived***. Click ***Save Changes*** to save changes.



“Change project status from Published to Archived”

Change project status from Published to Archived

SUMMARY

Congratulations! You have now successfully learned how to create and manage projects in *tasking managers*. By using *tasking manager*, your mapping project will become more organized. Things that must be considered, when you make a *tasking manager*, the project must be completed and considered not only the quantity of data but also the quality of the data.

— title: Download OSM Data using Export Tool weight: 1 —

Objectives:

- To be able to explain the definition and function of Export Tools
- To be able to operate Export Tools

In this chapter, we can learn about how to download the OSM data that we have added and uploaded into OSM. The data can be used to analysis, customize with data symbology, create maps, and others depend on your necessary.

I. Export Tool Concept

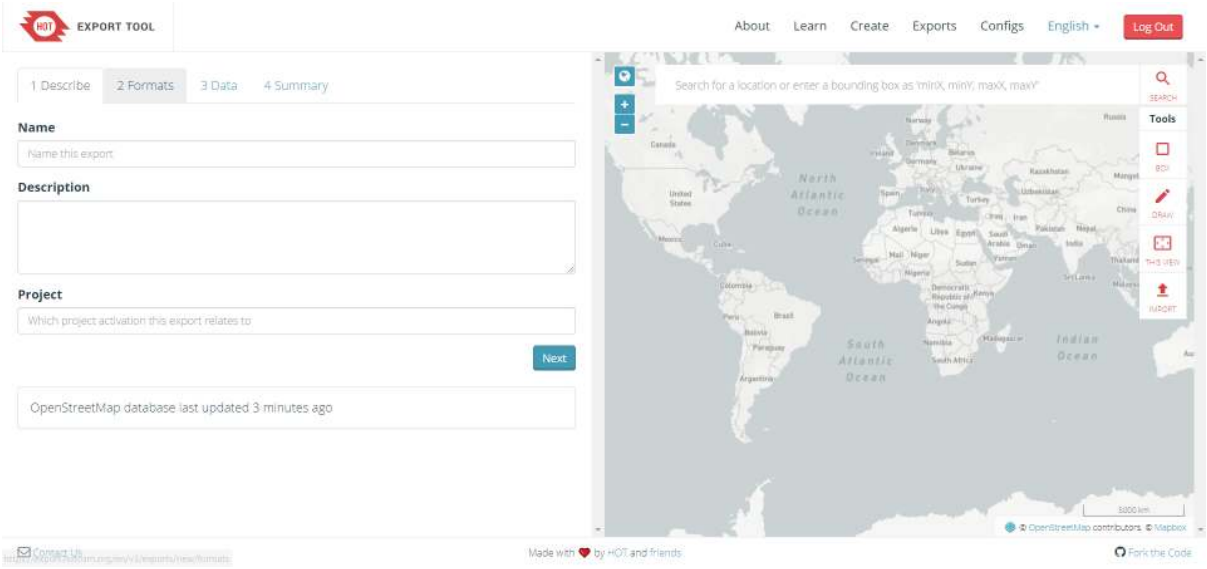
The Export Tool is an open service that creates customized extracts of up-to-date OSM data in various file formats, such as ESRI shapefiles (.shapefile), google KML (.kml), GeoPackage (.gpkg) dan MBTiles (.mbtiles). We can select the area and specific categories that we necessary. Download and use the data simply by crediting the © **OpenStreetMap contributors**. Anyone can create a custom OpenStreetMap export with the Export Tool - just register an account. You can register with an OpenStreetMap account from OpenStreetMap.org and a valid email address.

II. How to using Export Tool

a. Login with OSM account * Open your browser, and type this link https://export.hotosm.org

The interface of Export Tool

- The first we have login with your OSM account to using Export Tool. Click on **Login** in the right corner. The next click on 'Authorize access to your account' → **Grant Access**.
- To create a new project in Export Tool click on **Start Exporting**
- The Export Tool window will be displayed like the image below



The fill from Export Tool

b. Defining an area of interest

There are 5 ways to define an Area of Interest for your export:

1. **Bounding Box:** Use the “Box” tool to the right to click and drag a rectangle, or use the “Current View” tool to match the map’s viewport.

Bounding box

2. **Draw Polygon:** Draw a freeform polygon. This must be a simple (not multi-) polygon.

Manually edit

3. **Upload:** By uploading a GeoJSON polygon in WGS84 (geographic) coordinates. If you have not the GeoJSON data, you can refer to this chapter **Using GeoJSON**.

Import the administrative boundary

4. **Search Bar:** input a minX,minY,maxX,maxY string into the search bar. This will define a rectangular area of interest.
5. **Current View:** Use “Current View” to match the map’s viewport.

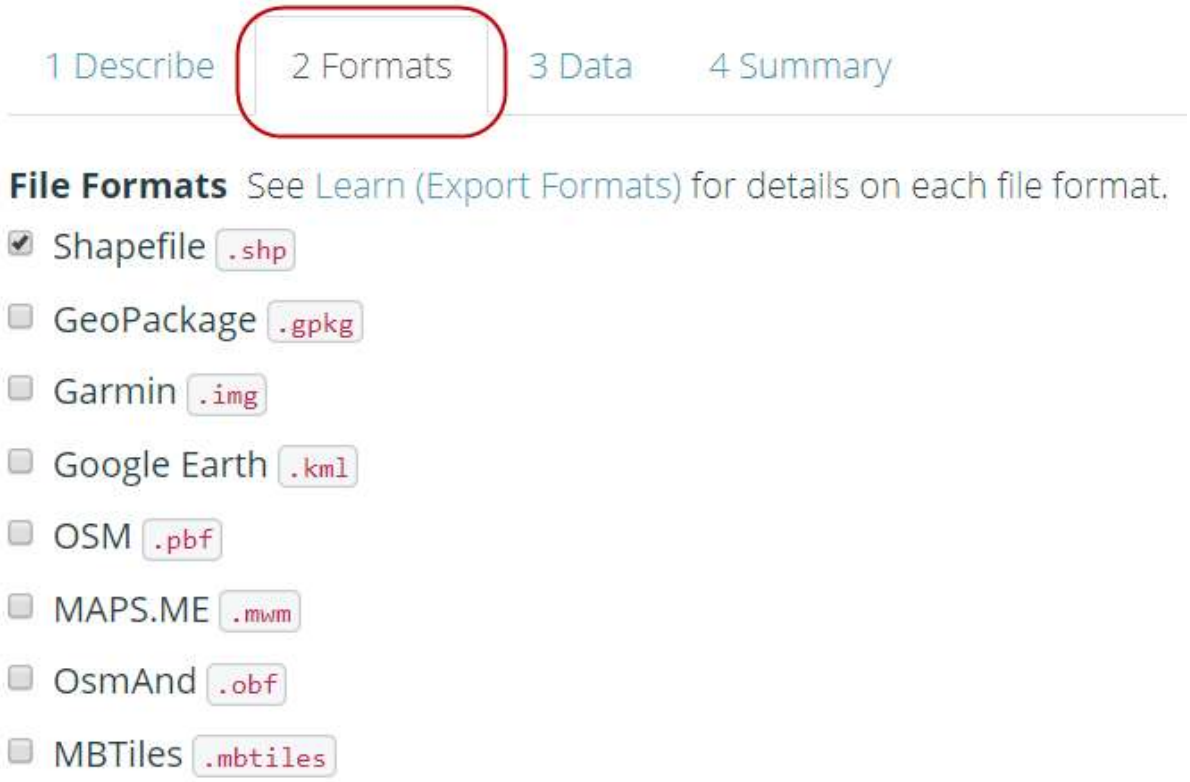
The maximum extent of export on the Export Tool is determined by the density of OSM data in the defined area. **The bounding box of the area can contain at most 10,000,000 OSM nodes.** This limitation means that a 10,000 square kilometer box over a heavily mapped area like Western Europe or North America will likely be rejected, but an equal-sized box over a sparsely mapped area will be accepted by the Export Tool. If you need larger exports, please Contact Us or use an alternative resource such as downloads from Geofabrik or Mapzen.

c. Naming and Describing your Export

- **Name (required):** choose a short, descriptive name.
- **Description:** a long text body, perhaps describing what relevant features the export includes.
- **Project:** Helps to group together exports particular to a project, e.g. “PDC InAWARE Indonesia”

d. Choosing File Format

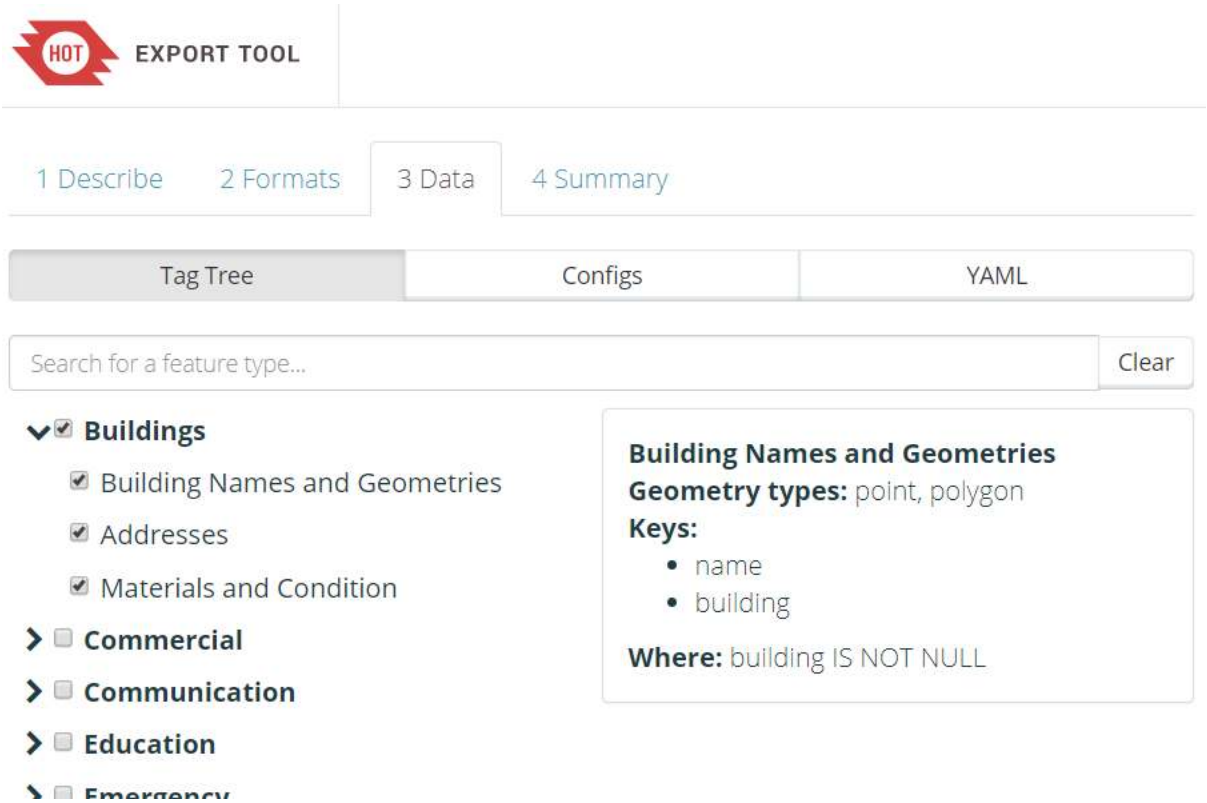
- Check at least one file format to export. To learn more about each individual format, read the documentation: Export Formats



Spatial data

e. Choosing Map Features

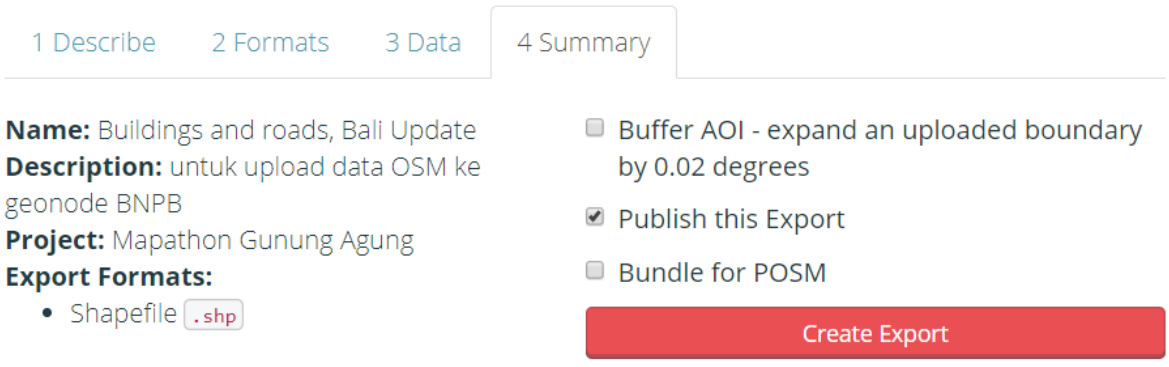
- For your first time using the export tool, it’s recommended to use the Tag Tree, which curates a set of filters and tags for common map features. As an example, check the box “**Buildings and Transportation → Roads**” to create an export of all building geometries, as well as related data such as name and address keys.



Select the object in export Tool

f. Downloading your File

- The last step is the Summary Menu that will be displayed about the projects. Click the **Create Export** to starting the process



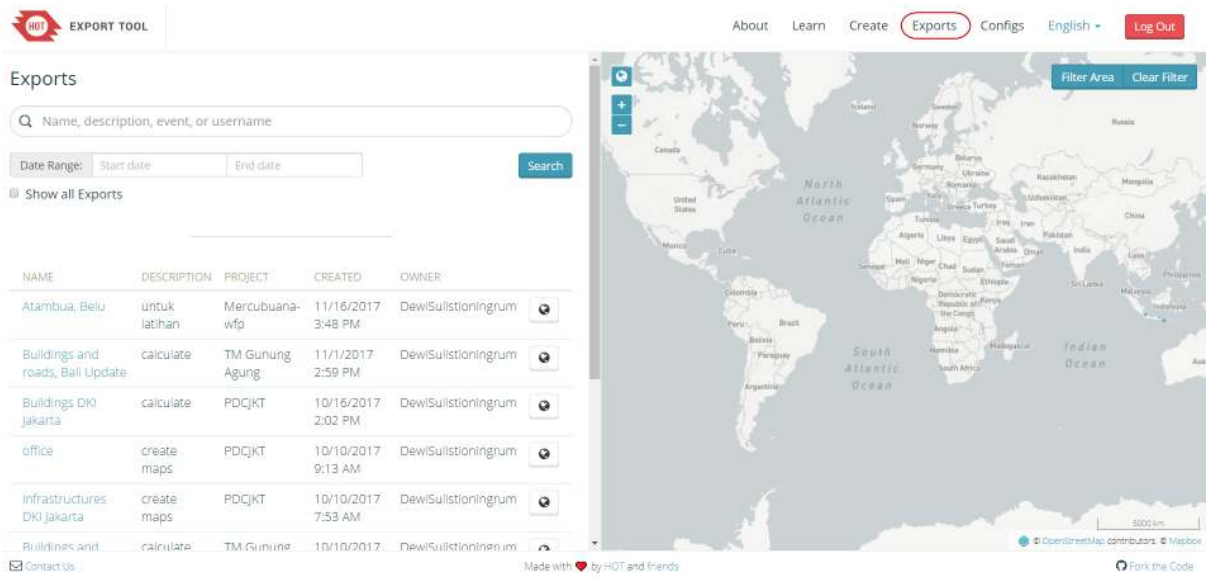
Menu Summary

- After you submit your export using **Create Export**, you will be redirected to the **Export Detail Page**, which shows a list of **Export Runs**. You will see the first run at the top of the page. It will be in one of the following states:

  Submitted: The export is waiting to be processed. This should be brief, depending on the server load.

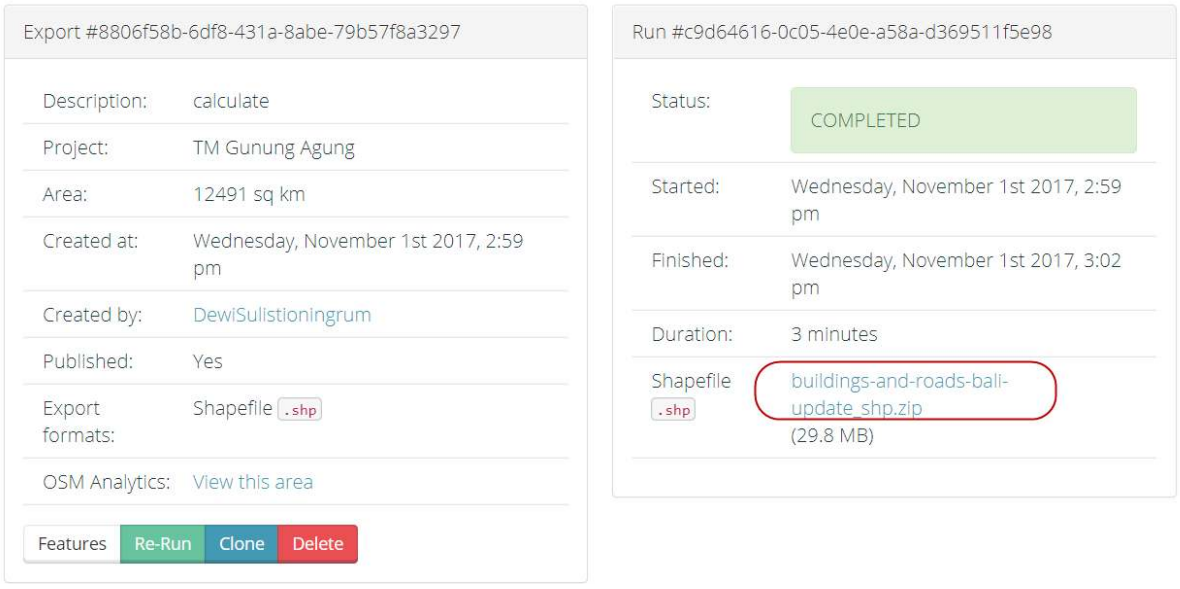
  Running: The export is waiting to be processed. City-sized regions should be a few minutes - larger regions can take upwards of 20 minutes, depending on the density of OSM data.

  Completed: Your export files are available for download. Each export format has a separate download link for its ZIP archive.



Menu Exports

- If the status will be **COMPLETED**, we can download the data with a click on **buildings_and-roads-bali-upate.shp.zip** and save in your directory.



Completed Process

SUMMARY

We have learned about how to download the OSM data using Export Tool. We can open the data in the mapping software as for example QGIS (www.qgis.org). You also can use the data to calculate the quantities of infrastructures.

— title: The Mapping Methodology with OpenStreetMap weight: 1 —

Objectives:

- To be able to explain how to create a timeline for mapping activity
- To be able to explain how to create a folder for each team mapping
- To be able to explain how to divide the survey area based on the administrative boundary
- To be able to explain how to create team mapping effectively

Planning a mapping project requires an appropriate and efficient survey methodology to achieve the target and purpose. Indicators that need to be considered in making survey methodologies include: survey area, number of team mapping, number of objects collected, and project funding. If the area is larger and the number of objects collected is increasing, the funding of the project will also increase.

The mapping project will be carried out by a team mapping divided into 3 (three) roles:

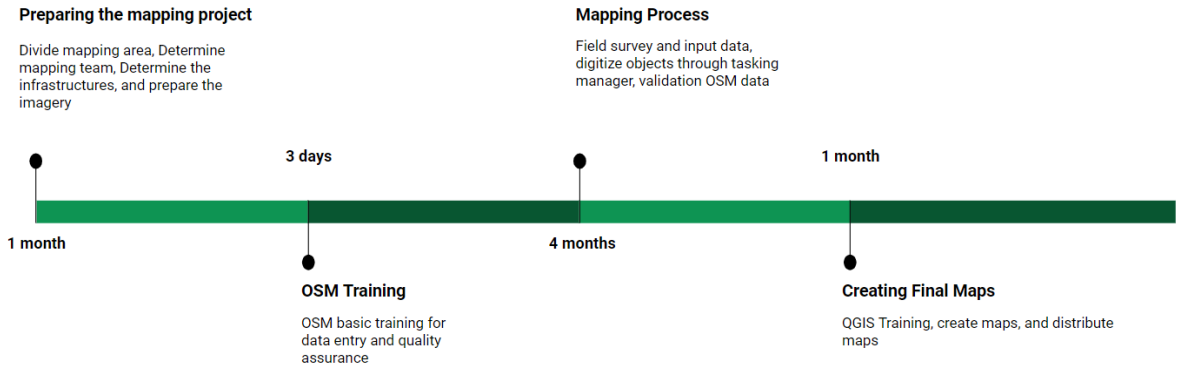
- Mapping Supervisor = organize, manage and supervise mapping projects, prepare equipment field surveys, create a report the survey progress, and check the quality and the quantity of data that validated by Quality Assurance
- Quality Assurance = Validate the quality and the quantity of data from data entry and manage a team of data entry
- Data Entry = Collect the object from field survey and entry the data to OSM. Also, digitize the buildings and roads

I. Create a Framework for Mapping Activity

We will create a framework for a mapping project that integrates with indicators. The framework can reference in the implementation of the mapping project that will be monitored by Mapping Supervisor and Quality Assurance. These are the guideline of the framework:

- Preparing the mapping projects
- Determine the team mapping of data entry and quality assurance
- OSM Training to team mapping
- Mapping process and mapathon activity
- QGIS Training for the staff mapping
- Creating the final maps

An example, this image below is arranged as a framework for mapping in Semarang City. Semarang City has 373,8 km2 area with 16 data entry and 4 quality assurance. The infrastructures were collected 58 categories consists of roads, rivers, embankment, and public facilities. The mapping project has finished for 6 months.



The mapping framework

a. OSM and QGIS Training for Team Mapping

The training to explain about mapping methodology, using tools of field survey, and creating final maps. These are training material that you have to prepare before starting the project:

- OSM Basic Training for Data Entry and Quality Assurance

  The training was held for three days with the purpose to use tools of field survey and how to input OSM data.

  These are the training material:

1. Getting started with OSM
2. Using JOSM
3. Using Tools Field Survey
4. Field Survey Mapping
5. Using Tasking Manager
6. Adding OSM Data using JOSM
7. Creating the administrative boundary using JOSM
8. Download OSM Data with Export Tool

- Quality Data Training for Quality Assurance

  The training was held for two days that the purpose of validated OSM data by results data entry. The training material in lists below:

1. Validation OSM Data using JOSM
2. Validation OSM Data using Tasking Manager

- QGIS Training for Data Entry and Quality Assurance

  The training was held for one day that the purpose to create the final maps. The training material in lists below:

1. Download dan Install QGIS
2. Preparing the data
3. Create Final Map Using Map Composer

b. Preparing the Mapathon Activity

A mapathon is a coordinated mapping event using a Tasking Manager. The public is invited to make online map improvements in their local area to improve coverage and to help disaster risk assessment and energy management. Mapathons use an online site for storing map data, for example, OpenStreetMap. A mapathon is organized by a respective organization or a non-profit organization or local government.

Mapathons are often held inside (armchair mapping) in a room with strong Wi-Fi for simultaneous access, assisted by satellite imagery. We can collaborate with local universities to conduct the mapathon. We are usually conducting the mapathon in three days, involve one-day training and two days mapping.

II. Create a Timeline for Mapping Activity

Mapping timeline is different from the framework, in this section you will be focused on manage and oversee the implementation of a field survey. In outline, mapping timeline divide into three-part:

a. Before Field Survey

In this part, the mapping supervisor has to prepare survey equipment. The survey equipment consists of GPS, smartphone, and maps. Each smartphone will be installed by open source android application, there are ODK Collect, OpenMapKit (OMK), and OSMTrackers. The lists task of mapping activities before field survey that mapping supervisor do:

- Create the MBTiles with base map imagery
- Create maps with administrative boundary
- Create guideline to mapping activity

Example Table for monitory the mapping activities before field survey

No	Timeline	Data Entry	Municipality	Total of Villages	Village Name	Total RW	MBTiles	Maps (imagery)	Maps (OSM)
1	Feb - Mar	A	Candisari	3	Candi	11	v	v	v
			100% Dipetakan		Jatingaleh	10	v	v	v
			100% Divalidasi		Jomblang	10	v	v	v
2	Feb - Mar	B	Banyumanik	3	Sumurboto	5	v	v	v
			100% Dipetakan		Ngesrep	11	v	v	v
			100% Divalidasi		Gedawang	10	v	v	v

*Filled by Mapping Supervisor

b. Mapping

Every mapping staff has a role in the implementation field survey. There are parts of roles:

- Data Entry = prepare the smartphone, collect the objects, input the survey data, and upload in OSM, digitize buildings and roads, and create the final maps.
- Quality Assurance = ensure and manage the quality of data uploaded by data entry, monitory mapping activity in field, and manage the mapping strategy with data entry.
- Mapping Supervisor = ensure the quality and quantity of survey data, monitory whole implementation the mapping activity adjusted to timeline.

Example Table on Mapping Process

mbtiles	clear file manager	Survey	Getting RW Boundary	Survey Infrastructure	Shelters	Route	Upload track	Send form	Objects	RW	Shelters and Route	Validation
v	v	1,5-6 Mar 2018	1 Mar 2018	v	v	x	v	v	v	v	v	26 Mar 2018
v	v	12 Feb 2018	12 Feb 2018	v	v	x	v	v	v	v	v	14, 19 Feb 2018
v	v	8,12-14 Mar 2018	12 Mar 2018	v	v	x	v	v	v	v	v	27-28 Mar 2018

c. After Mapping Activity

If the mapping activities have finished, mapping supervisor and quality assurance have to ensure whole the survey data will be uploaded into OSM and validated. The next step is to create and prepare final maps for feedback to the government that involved in the mapping process.

Example of the table after mapping activity

Validate the admin boundary	**Data Quantity**	**Data Quality**	**Print and Distribute the final maps**
v	v	v	v
v	v	v	v

Validate the admin boundary	Data Quantity	Data Quality	Print and Distribute the final maps
v	v	v	v

You can download the complete table in this link https://tinyurl.com/timeline-pemetaan

III. Save and Share the Survey Data

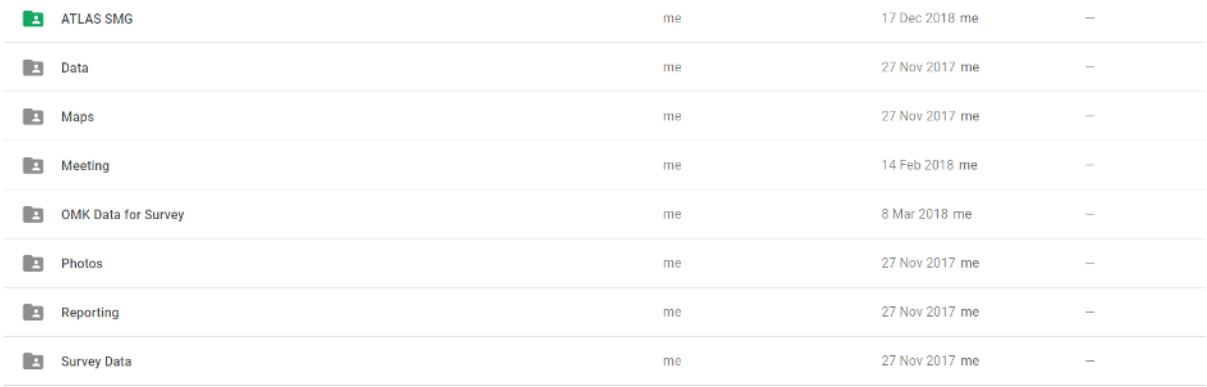
We need the folder directory to save and share the data that folder will be organized and easy to share. The results of the mapping project are spatial data uploaded in OpenStreetMap. The data can be downloaded and saved in other format spatial data with your necessary.

We can upload and publish the data using Google Drive because everyone has a Gmail account and we usually use Google Drive in working. There is the example folder that we can use to save the data:

Example Folder in Google Drive

Folder Name	Description
Timeline	Framework and table of the timeline the mapping activity
Training	Training agenda and training material
Staff Mapping	Profile of staff mapping (data entry, quality assurance, and mapping supervisor)
Data Survey	The results of mapping consist of OMK Data, ODK Collect Data, GPS Tracks, and final data
Documentation	Photos and videos of mapping activity
Maps	Maps of survey, progress, final results
Report	The monthly report to mapping activities
Data Quality	The results of calculating the data quality
Data Quantity	The results of calculating the data quantity
OMK Equipment	MBTiles of base map imagery

The digital data will be uploaded in each folder according to the mapping process so that we get the backup data and avoid losing the data.



The folder in Google Drive

IV. Divide the Area Survey based on the Administrative Boundary

We will determine the factors that affect in divide the area survey it was related to characteristics area. The characteristics are an area, topography, and land use. We can divide the area based on village-level

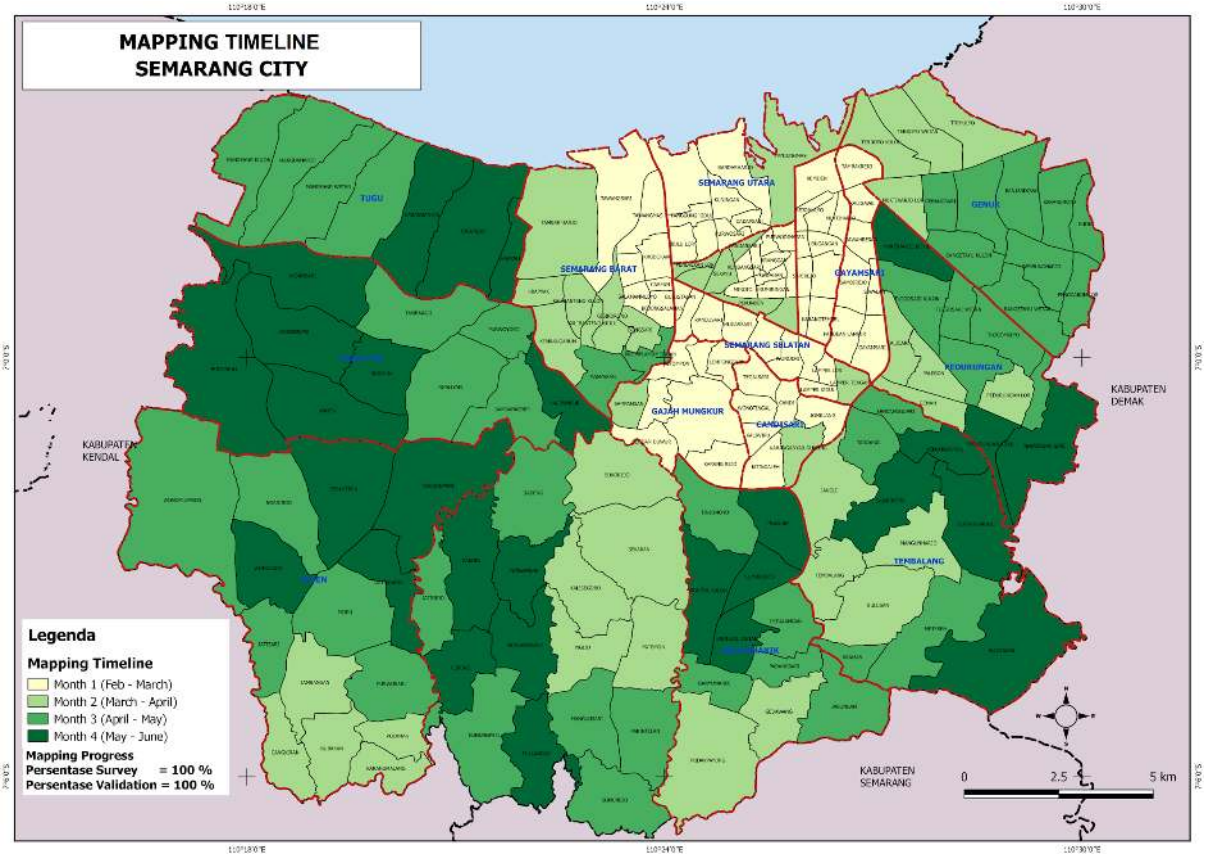
the administrative boundary. In the next step, we can start the analysis to divide the area by identifying the characteristics of the village-level.

In this case, mapping in Semarang City has 373,8 km2 area in 16 sub-districts and 177 villages. Semarang City has a unique topography, it is a hill in South Semarang and coastal area in North Semarang. The North area is the central government, business, and residential area. While the south Semarang is the development of residential, education, and farmland. Therefore, the north Semarang has many infrastructures and a high density than the south Semarang area.

The analysis topography can affect route the field survey because each region has obstacles area. The other factor is the weather on the implementation field survey, rain season can be a challenge in flood areas. If heavy rain, we can directive the data entry to survey in a location not flood affected or they can digitize buildings and roads in the office.

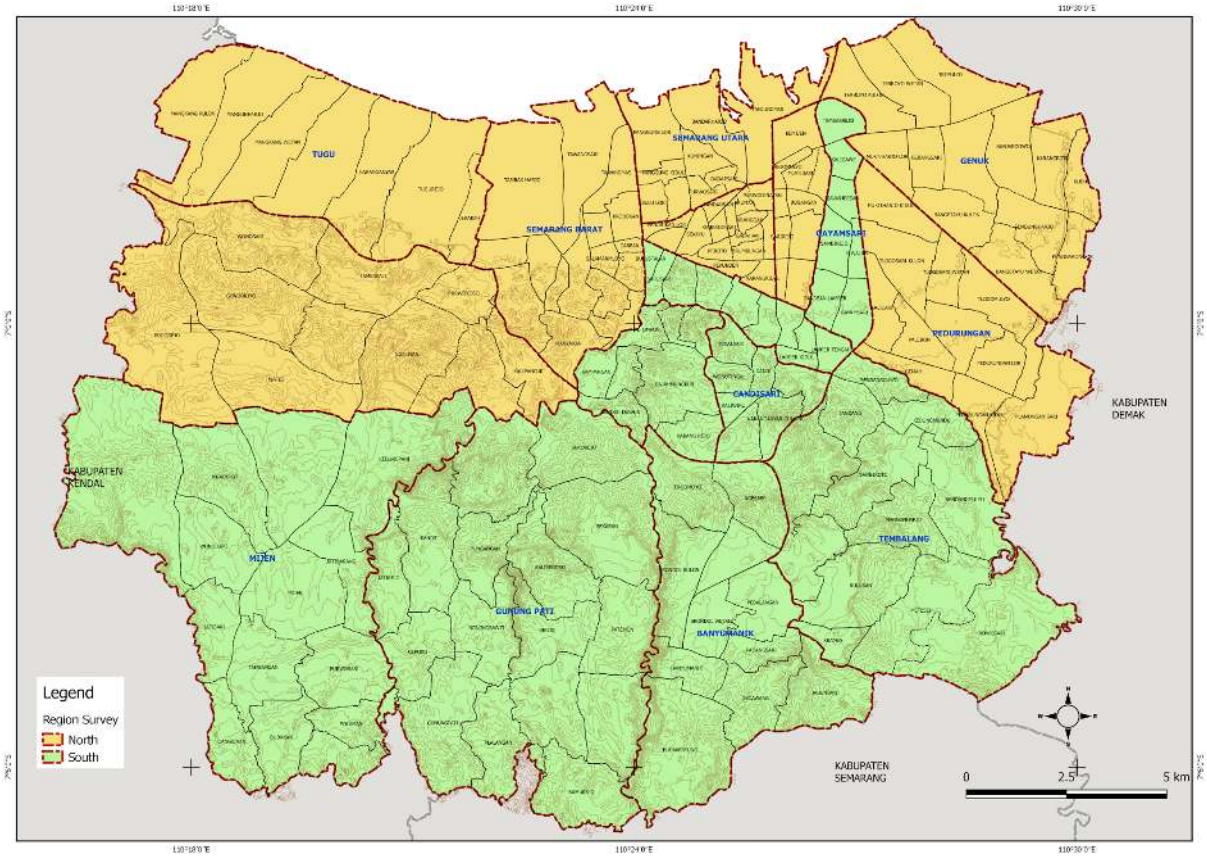
If we already know about the factors that impact the mapping timeline, we can divide the area survey based on the administrative boundary. For example, one sub-district can be finished in a month by one team data entry. Based on the analysis, the mapping project in Semarang City has finished in four-month with 16 data entry.

We can start the mapping area with nearby form the office because it is easy to coordinate between data entry and quality assurance about field survey. If data entry found the problem in the field likely problem with their smartphone or permission letter in the village office, they can ask the quality assurance or back to the office and resolve the problem with the team.



Mapping Timeline in Semarang City

In the map below, we can divide the area into two sections based on characteristics area, so that we need two mapping supervisor to manage and monitory the mapping activities



Divide Area in Mapping Project

Example Table of Divide Area Survey

Timeline	Sub-District	Mapping Supervisor North	Mapping Supervisor South
Stage 1 (1,5 Months)	Near from the office less distance 20 km	Semarang Barat	Candisari
		Semarang Tengah	Semarang Selatan
		Semarang Timur	Gayamsari
		Semarang Utara	Gajah Mungkur
Stage 2 (2,5 Months)	The distance more than 20 km from the office	Ngaliyan	Banyumanik
		Pedurungan	Tembalang
		Tugu	Mijen
		Genuk	Gunung Pati

V. Create Team Mapping

We will choose the team data entry based on their knowledge about the area, it is a strategy to quickly in the understanding survey area. We can give the list question about the area in the recruitment process data entry.

Team Mapping

Example table of Team Mapping based on Survey Area

Mapping Supervisor	Quality Assurance	Data Entry	Sub-districts	Village	Total Villages
Mapping Supervisor 1	QA1	DE1	Candisari	7	21
		DE2	Mijen	14	
		DE3	Semarang Selatan	10	
		DE4	Banyumanik	11	
	QA2	DE5	Gayamsari	7	23
		DE6	Gunung Pati	16	
		DE7	Gajah Mungkur	8	20
		DE8	Tembalang	12	

Mapping Supervisor	Quality Assurance	Data Entry	Sub-districts	Village	Total Villages
Mapping Supervisor 2	QA3	DE9	Semarang Barat	16	23
		DE10	Tugu	7	
		DE11	Semarang Tengah	15	25
		DE12	Ngaliyan	10	
	QA4	DE13	Semarang Timur	10	23
		DE14	Genuk	13	
		DE15	Semarang Utara	9	21
		DE16	Pedurungan	12	

SUMMARY

If you can follow the instructions whole the process in this chapter, you have succeeded in creating the planning of mapping projects, create the methodology, divide the area, and create the team mapping. You can implement this process into your mapping project. If we can create appropriate methodology in the mapping project, you can reach the best results in good qualities and quantities of data.

Data Collection Methodology

Objectives:

- Understand Data Collection Preparation
- Understand Data Collection Workflow
- Knowing Tools that used in Data Collection
- Understand How to Collect Data in the Field

Data collecting or commonly known as field survey is an important aspect in mapping activity especially in disaster management. Even though technology advancement nowadays such as aerial and satellite imagery is capable to help us to map remotely, there are some information that only can get by going to the mapping area. Therefore, field survey is the only option which can help us to get some specific information that we need.

When doing field survey, you need to know the proper methodology to do it. This is an important thing as it will help you to complete your field survey efficiently and effectively. Moreover, a good data collecting will gives you good output both from quality and quantity aspect. In this chapter, you will learn about the methodology and workflow when doing field survey particularly in HOT-PDC InAWARE project.

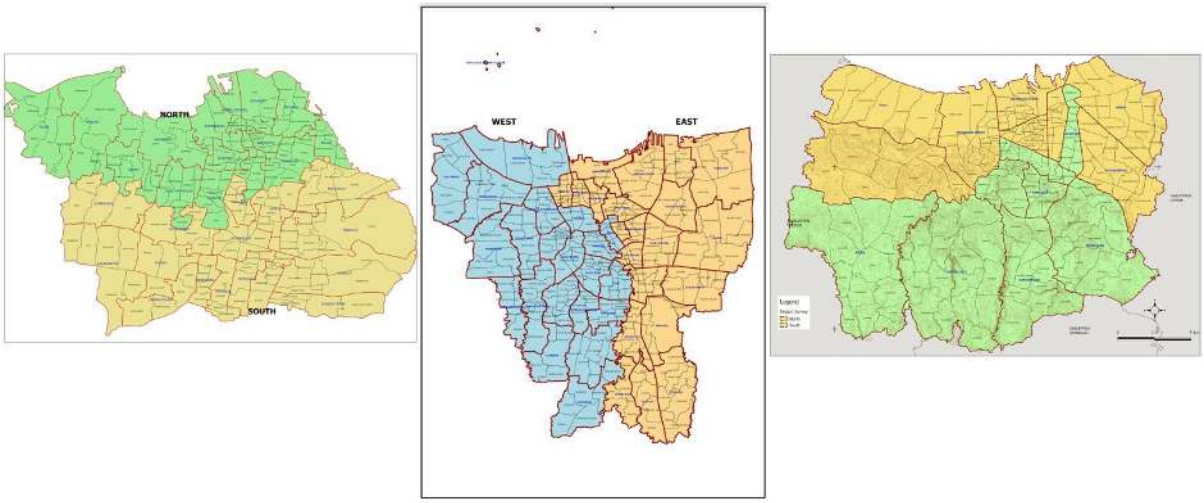
I. Data Collection Preparation

Before doing mapping activity for HOT-PDC InAWARE, *Humanitarian OpenStreetMap Team* (HOT) Indonesia have made organized and systematic plan. This needs to be done so the mapping activity can be run efficiently and effectively and also to maintain data quality. There are some preparation activities before going to the field as follows:

- **Divide Survey Area and Survey Team**

Dividing survey area means to narrow the focus for each survey team whereas they will responsible for certain areas, as explained further in **Survey Methodology for OpenStreetMap** module, that lead by 2 (two) *Mapping Supervisor* who is responsible for all mapping areas in his/her zone. Moreover, determining field survey team need to consider both technical aspect and local knowledge of the mapping area for each member of the team.

The importance of technical aspect such as have good understanding to use the survey tools while local knowledge such as know the mapping area well and can speak in local language will become a benefit that can help them to get information from people and community in their survey area.



Divided Area in HOT PDC InAWARE Project Cities

- **Manage The Survey Permit Letter**

In an activity that involves multi-stakeholder and organizations and has wider scope of mapping area, survey permit letter is a important thing to have before going to the field. This letter usually issued by Local Government or Local Disaster Management Agency (BPBD) and relatively more trusted by the local people rather than permit letter from HOT. Therefore, you can get the information easily from the people and local community if you bring the permit letter when doing field survey because they already know and understand your mission coming to their area.

- **Determine Mapping Objects**

Before doing field survey, it would be better if you discuss with the local government about what information and object they need to be collected in their area. Thus, this will lead you to determine what objects that should become priority to be mapped. Each city / mapping area will has their own identity in many aspects such as topography, types of hazard, and social-economic. Those aspects will be considered to determine priority objects and information that need to collected in the field. For instance, place of worship, HOT only mapped big mosque and church in DKI Jakarta while in Semarang, any mosque and church have to be mapped regardless its size. According to local disaster management agency in DKI Jakarta, if the flood happened, they only use big mosque as evacuation shelter because it can accommodate many affected people while Semarang use all of their place of worship including mosque and musala (small mosque) as evacuation shelter because there always small scale hazard happen and they do not need a big mosque as a shelter for affected people but instead they use any mosque closest to hazard area.

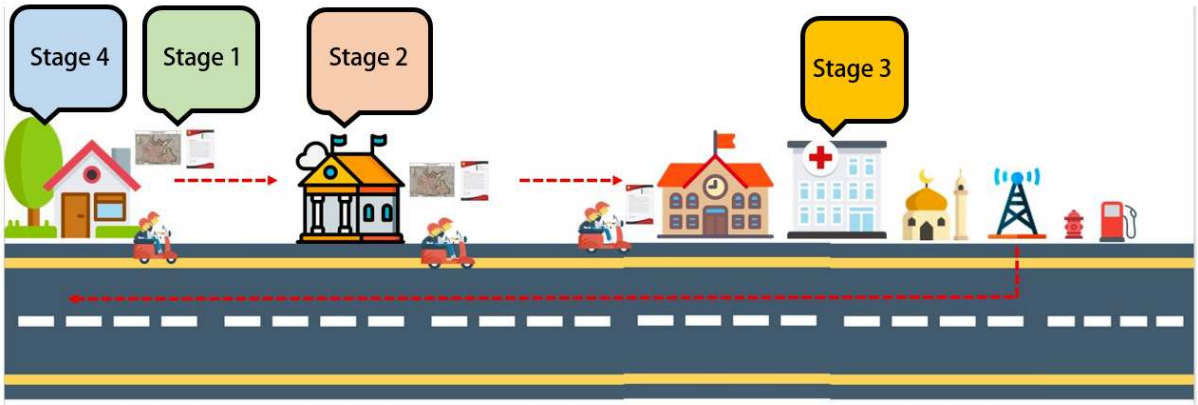
Generally, the purpose to determine priority mapping objects based on need of the local government is to make sure the output of this mapping can be used for them and also local people and communities. Thus, it will make the output become more sustainable.

- **Mapathon and Survey Team Training**

Survey team training is an internal activity where *Quality Assurance* and *Data Entry* will be taught about technical things that they have to know during the mapping activity such as using survey application in their smartphone, using survey map, upload survey data to the server, input survey data into OSM using JOSM, validate the survey data, etc. Moreover, conducting mapathon, a remote mapping activity, with local universities could help to complete the baseline data such as roads and building footprint before the survey teams hit the field.

II. Data Collection Workflow

Field survey activity does not begin in mapping area, instead it started from *basecamp* until come back to *basecamp* before doing data input. The picture below shows the data collection workflow:



Data Collection Workflow

- **Stage 1**

The survey team, consisted with 2 (two) *Data Entry* riding a motorbike from basecamp to their mapping area village office. They bring **A Survey Permit Letter** which issued by the BPBD and **Survey Map** with them.

- **Stage 2**

First stop is the village office. Then, they will meet with the village office representative to **asking permission** doing field survey in the village for couple days ahead. They also discuss with the representative to **update the village boundary administration** up to sub-village level (RW) using the survey map.

- **Stage 3**

After finished updating village boundary, the survey team continue their field survey to **collect and map** all the priority objects and critical infrastructures in the village. They use survey application in their *smartphone* to collect the information for the objects. The survey team will be doing this activity for 2-4 days in one village.

- **Stage 4**

After they finished, they have to ***upload*** their survey data into the server (ona.io) then back to the office to **input** all **field survey data** using JOSM dan *upload* them to the *OpenStreetMap*.

The next step is *Quality Assurance* (QA) will *download* the data and check its quality based on topology and information (tag). After that, the Mapping Supervisor will re-check the validated data from Quality Assurance. Therefore, the data quality keep maintained before re-upload back to the *OpenStreetMap* and can be used by other users. The material and explanation related to OpenStreetMap data quality assurance will explained further in other modules.

III. Data collection Tools

When doing field survey, the survey team need to know all the tools that they use in the field. Availability of the tools is a vital factor that can decide the field survey process and output. These are the tools that we use when doing field survey in the field:

- ***Smartphone***

This is the most important tools when doing field survey. Please note when choosing smartphones that will be used, you need to see its specification such as storage capacity, RAM capacity, GPS location service and more importantly its system has to be an Android. Moreover application that need to be installed such as *OpenMapKit*, *ODK Collect* dan *OSM Tracker.*

- ***Power Bank***

This tools also support tools in field survey activity. When doing field survey, the team always activate GPS location and internet connection in their *Smartphone*. Therefore the battery capacity will decreasing fast. Power bank is a solution for the problem and make sure the survey team can finish their survey without run of battery problem.

- **Stationery**

This tool will help the survey team to write any information in the field. Moreover, it will help them to draw administration boundary of their mapping village on survey map. The stationery such as color pen, ruler, and notes.

- **Survey Map**

Survey map can help the survey team to identify their mapping area. Thus, it used as a media to update boundary administration of the mapping area. How to make a map for field survey explained further in **Make Survey Map using QGIS** module.

- **Survey Permit Letter**

As mentioned before, the survey permit letter is a vital thing to have before doing field survey. This letter should be issued by local government such as village office or local disaster management agency (BPBD) so could be help the survey team to asking permission and communicate with the local people and get the information that need to be collected in the field.

- **GPS**

GPS is an alternative tool if your smartphone has trouble and can not be used to colleting data. Moreover, GPS can be used as a validation tool to re-check the data from the field.

IV. Field Data Collection

1. Infrastructure Data Collection

When doing data collection in the field, the survey team have to use *android smartphone* which has installed applications as follows:

- ***ODK Collect***

This application is used to gathering information of objects that the survey team collection in the field. You won't need to print dozen of paper for survey form. Moreover, this application allows you to take pictures and coordinate location of your object.

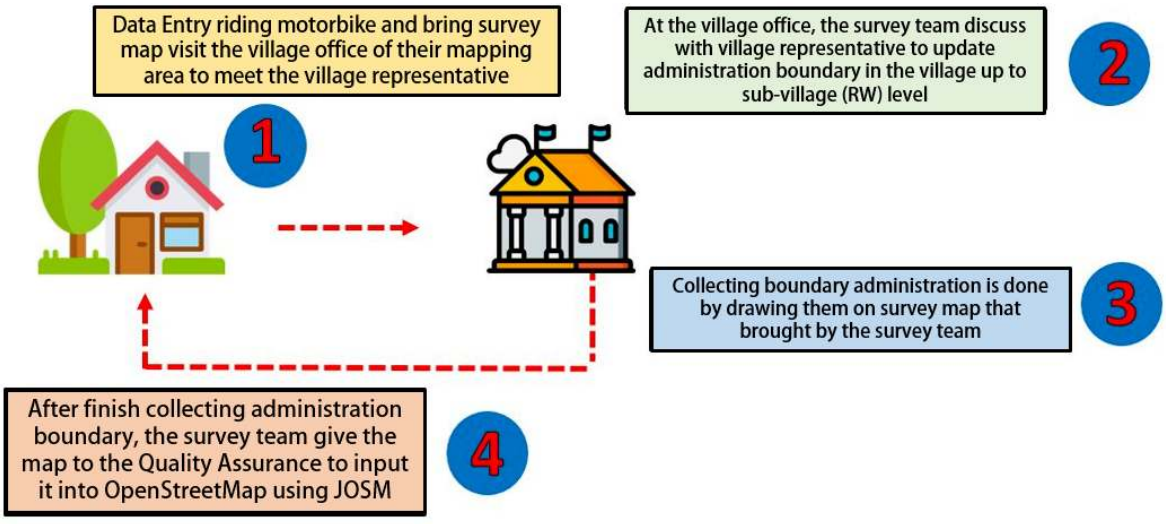
- ***OpenMapKit* (OMK)**

OMK is an extension application for *ODK Collect* where allow the survey team to give information based on OpenStreetMap tag standard. This application also can allow you to add nodes of object on satellite imagery that have been added before in OMK. Those information will be saved into ODK Collect and later being uploaded into server such as ona.io or others.

- ***OSMTracker***

This application help the survey team to record field survey progress and coverage of their mapping area. OSMTracker also has function to record survey track similar with conventional GPS and show it on OpenStreetMap background map. OSM Tracker also can take pictures, notes, or short video to mark your objects.

Overall, collecting data for infrastructure is done by tracking all area of the team survey village are and collect all priority objects and its essential information in the survey area both by visual assessment and interact with local people. After that, the field survey will be uploaded to *google drive folder* that has been made before by *Quality Assurance* and to *ona.io* server as a *backup* data if there is something happened with the data such as accidentally removed or deleted. Last step, input all the field survey data using JOSM. Below is a workflow for doing data collection for infrastructure:



Workflow of Infrastructure Data collection

Notes :

1. Infrastructure Data collection usually takes 2-4 days to be finished for 1 village.
2. Duration of field survey depends on area size and data density in the mapping area.

3. All field data survey MUST BE UPLOADED daily every day to ke google drive dan ona.io server and deleted in the smartphone after that. This need to be done to anticipate smartphone memory running of capacity and as a report to Quality Assurance who will be doing validation to the data.
4. If there is rejection from the local people, the survey team should ask help from local government or BPBD to escort them in the field.


Documentation of Infrastructure Data Collection

3. **Administration Boundary Data Collection**

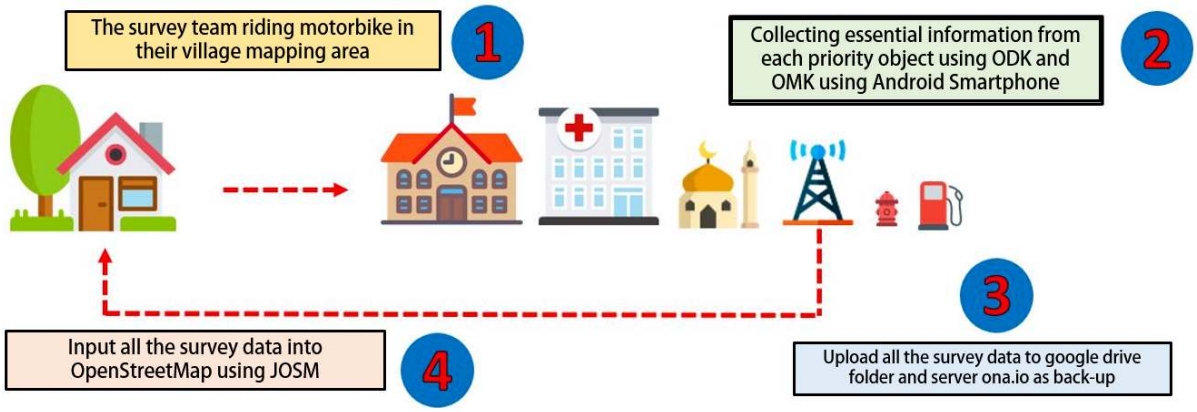
Collecting administration boundary data is slightly different than infrastructure. If the infrastructure data is collected using *ODK Collect* and OMK application in *smartphone*, collecting administration boundary use survey map that made by *Mapping Supervisor*.

Collecting administration boundary need communication skill and personal approach to village representative and local people. Generally, collecting administration boundary is done by coming to the village office with bring survey map and discuss it with village representative up to sub-village (RW) boundary. The village representative review the survey map and help the team survey by drawing the administration boundary on the map.

Documentation of Administration Boundary Data Collection

After the administration boundary have been updated, the survey team give the map survey to the *Quality Assurance* to input into *OpenStreetMap* using JOSM. For further explanation about how to input administration boundary using JOSM can be seen in **Drawing Administration Boundary using JOSM** module.

The picture below describes workflow about collecting data for administration boundary:



Workflow of Administration Boundary Data collection

> Notes : Collecting data of administration boundary have to involve village representative. If the village representative does not know the boundary, please ask the local head of mapping area (RW) to come to the village office. If the local head of mapping area can not come to the village office, the survey team HAVE TO visit his/her house and bring the survey map to discuss about the administration boundary in their area. If the local head refuse to help, the survey team should ask local disaster management agency (BPBD) to help them collecting administration boundary in that area.

SUMMARY

You have finished workflow and methodology of data collection when doing the field survey. Knowing all the steps and methodology, you can do the field survey effectively and efficiently so the result can get as expected and have good quality and quantity based on OpenStreetMap standard.

Getting started with OpenStreetMap

Objective:

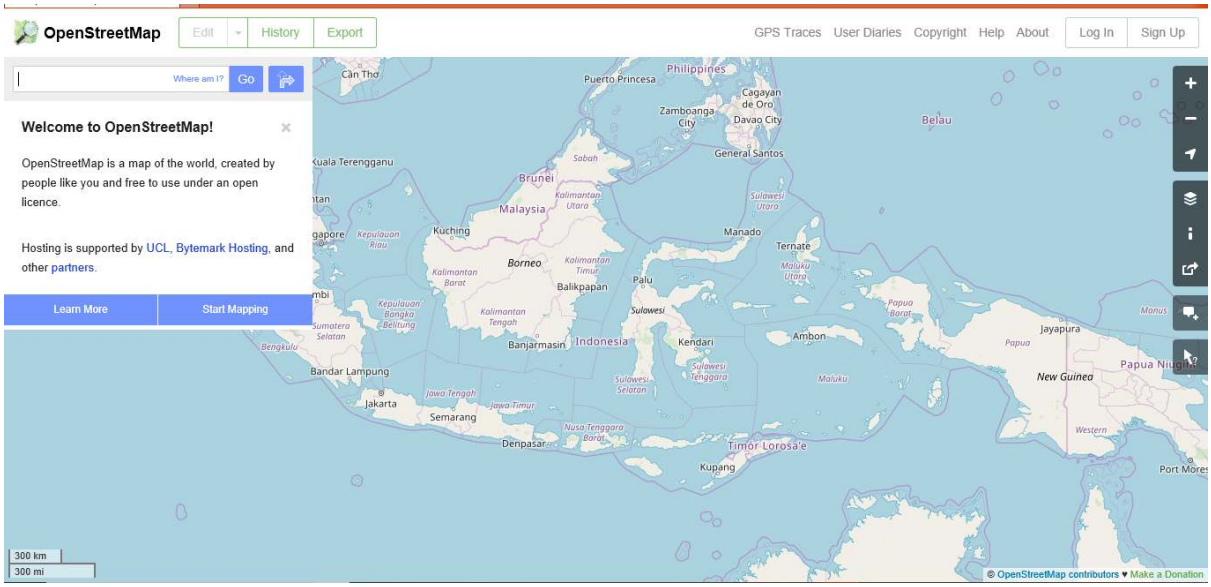
- To be able to operate and navigate the OpenStreetMap website
- To be able to see object information in OpenStreetMap
- To be able to create share link in OpenStreetMap
- To be able to save images from OpenStreetMap
- To be able to create user account in OpenStreetMap
- To be able to understand the basic concept of attribute in OpenStreetMap
- To be able to understand history in OpenStreetMap

After you understand the basic of OpenStreetMap in the previous module, you can immediately start using OpenStreetMap. In this module you will start to get to know the OpenStreetMap site, create an OSM account, and find out the menu buttons and how to use them.

I. Visit the OpenStreetMap website

To be able to visit OpenStreetMap (OSM) site, make sure your computer is connected to the internet network. The steps to visit OpenStreetMap site are as follows:

- Open the web browser in your computer such as **Mozilla Firefox**, **Google Chrome**, **Internet Explorer**, **Safari**, etc.
- Type www.openstreetmap.org in the address bar at the top of the window and press Enter.
- When the page has finished loading, you should see the page below:

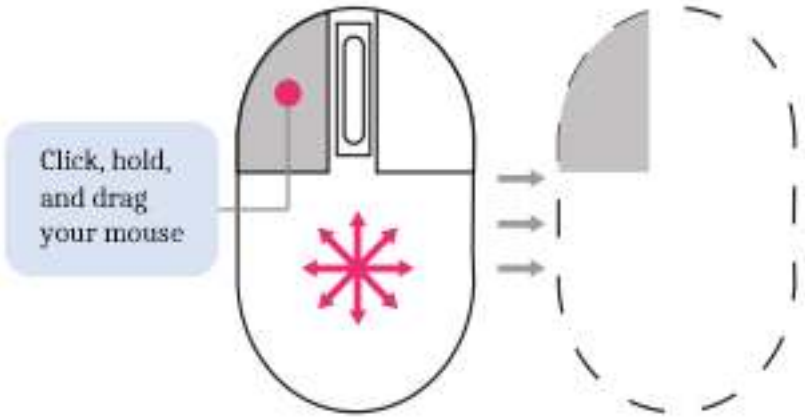


OpenStreetMap website (openstreetmap.org)

II. Navigate the map

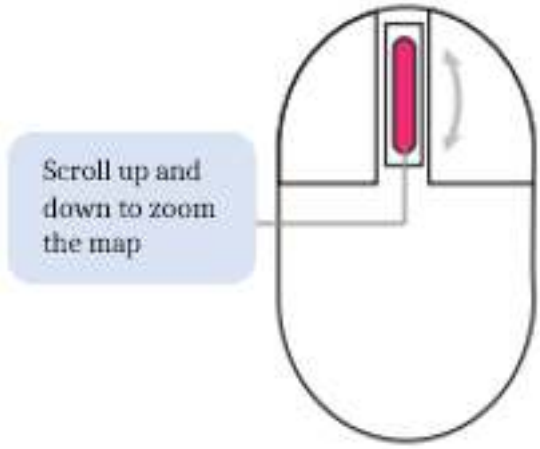
In the main view of the OpenStreetMap website, you will see a large map in it. You must be able to navigate the map so you can go to a location that you want. Here are the ways to navigate the map on OpenStreetMap:

- Use the left mouse to drag the map view. Left-click on your mouse, then hold and drag the map to the location that you want. If you don't have a mouse, you can press and hold the right touchpad and then move the cursor.



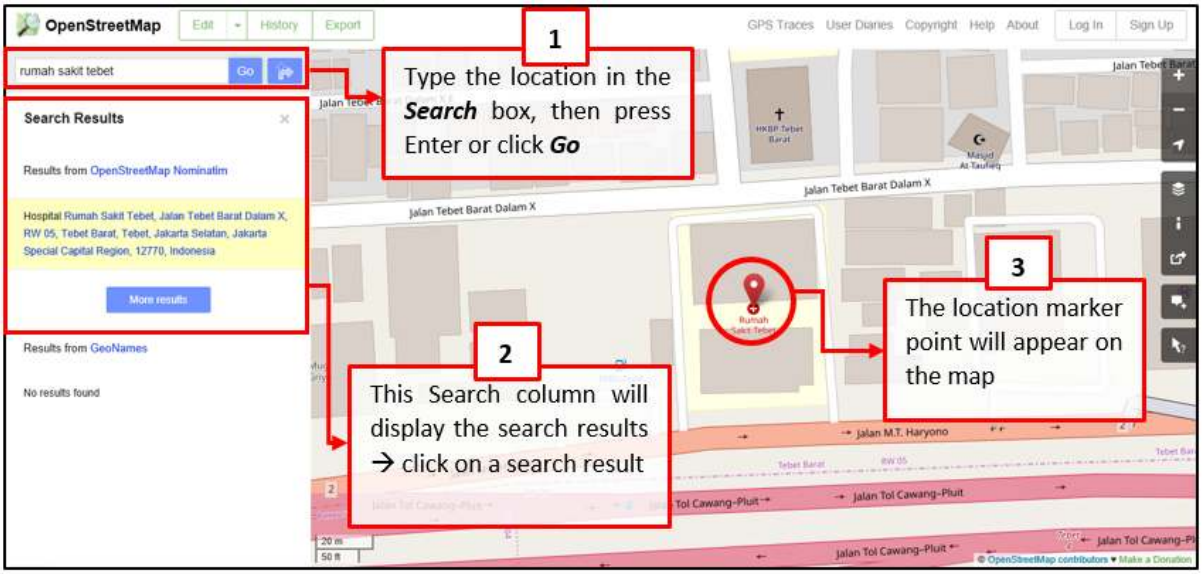
How to drag the map view

- Use **(+)** and **(-)** button in the upper right corner of the map to zoom in and zoom out the map view. You also can use your mouse scroll-wheel to zoom your map. Scroll your mouse up to zoom in, while scroll down to zoom out.



How to zoom in and out the map view

- To search the location based on the name, type the location name on the **Search** box in the upper left side on the screen. You can type it in the search column, then press **Enter** or click **Go**. After that a **Search Results** box will appear below the search column, then you can choose and click on the search. The map will automatically move to the location you chose.



Steps to find location using Search box

- To display your current location, you can go to the map panel to the right of the map and click **Show My Location** button. Then, the map will automatically display your current location point (blue dot). Make sure to enable the GPS on your laptop or computer to allow OSM to get your current location.

The display of Show My Location feature

III. Change different style options for the map

OpenStreetMap contains geographic data from all over the world. Although stored in one database, the data can be displayed in several styles. The steps to change style map in OSM are as follows:

- Click **Layers** button in the right panel on the map.

The Layers button to change background layer

OSM has four types of layers with different functions, namely:

- *Standard*: This layer shows all the objects on the OSM map.

Standard Layer

- *Cycle Map* : This layer emphasizes cycling routes and pedestrian roads.

Cycle Map layer

- *Transport Map*: This layer emphasizes transportation routes on the map such as highways and bus stop.

Transport Map Layer

- *Humanitarian*: This layer emphasizes important objects or amenities on the map such as school, hospital, etc.

Humanitarian Layer

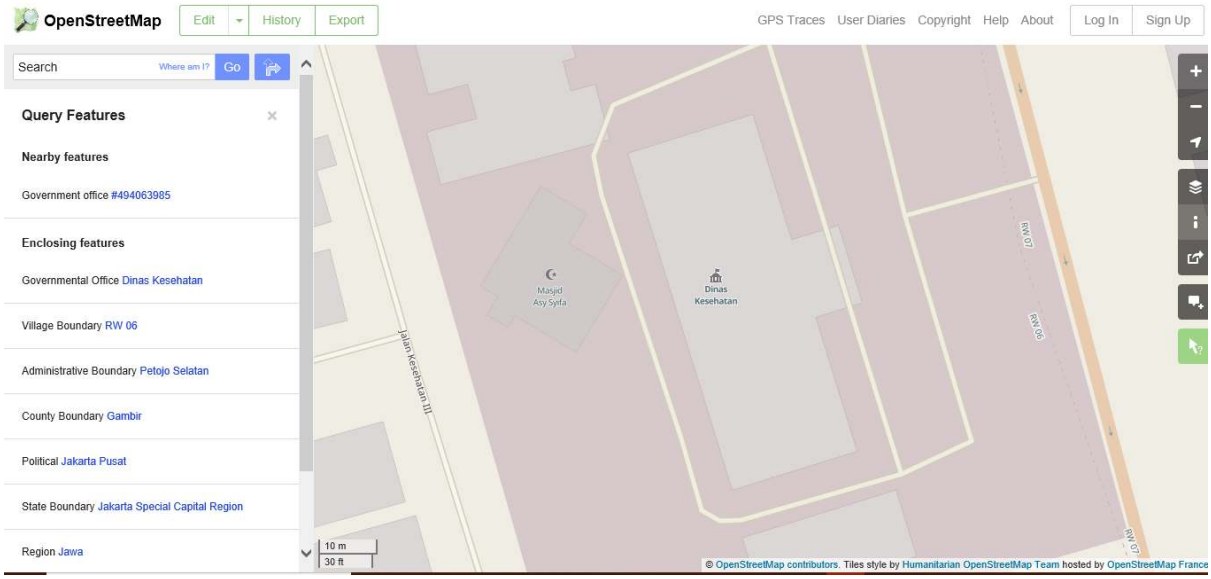
IV. See the object information in OpenStreetMap

In the OpenStreetMap page, besides see the current location and navigate the map, you also can see the feature information using Query Features. The steps to use Query Features are below:

- Click on ***Query Features*** button on the panel in the right. After you clicked it, you should see the question mark on your cursor. This indicates that the query features function is activated.

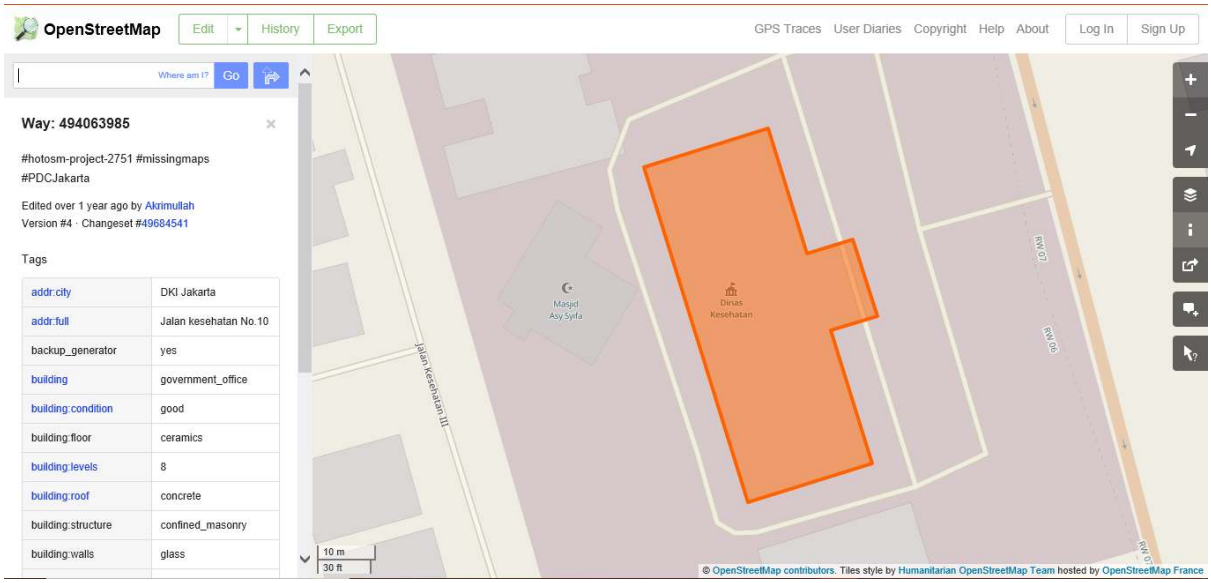
Query Features button

- Now you can choose an object or location that you want to identify. For this example, we click on a governmental office building (Dinas Kesehatan) in Jakarta.
- You should see a box appears in left corner that displays **Nearby Features** and **Enclosing Features** options. Nearby Features shows the description of any object that is closest to the location of your chosen point, while Enclosing features shows all the object information that have a close range location with your chosen point. Try to click one feature in the Nearby Features, click ***Governmental office*** **Dinas Kesehatan** for this example.



Nearby features dan Enclosing features in Query Features

- After you clicked it, the information detail about Dinas Kesehatan building will appear in the left box. The information displayed is a tag or object attribute regarding general information objects such as object names, addresses, building levels, and others.



Query Features result

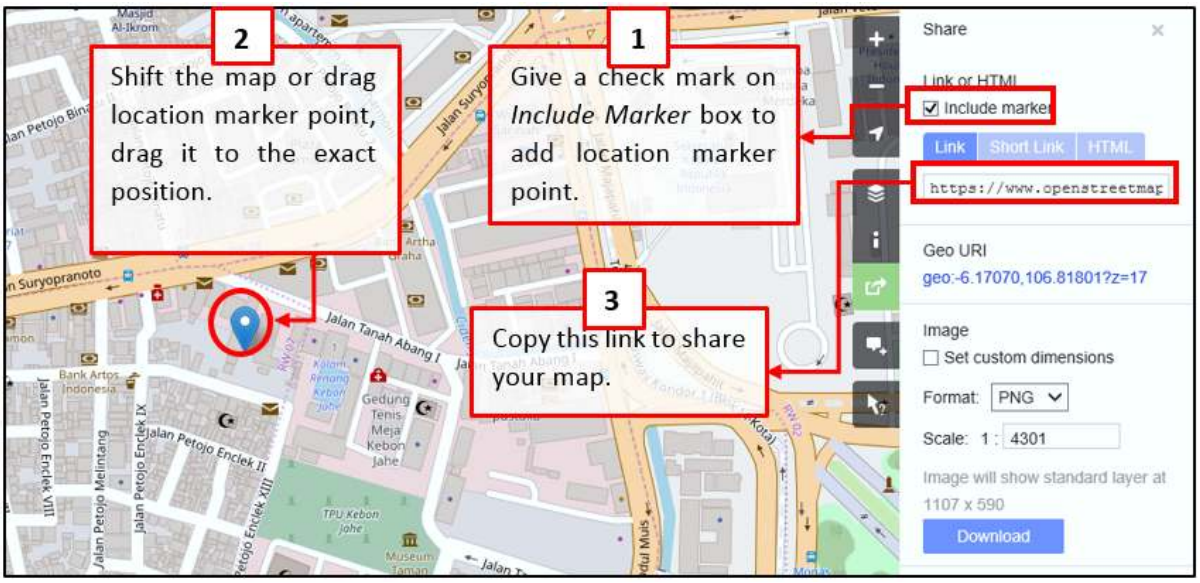
V. Share with link in OpenStreetMap

You can share links of your OpenStreetMap maps to others for various purposes, such as sharing the location of your current position with your colleagues and so on. To be able to share OpenStreetMap maps, the steps are as follows:

- Click the **Share** button on the right panel, then the Share column will appear.
- Check the **Include marker** to add the location marker point. You can move or drag the marker point to the desired location. Just click and hold the location marker then you drag to the desired location point. Another way is to shift the map so that the location marker is in the position you want.

Add marker point

- Once the marker position has fixed, you can copy the link in the **Link** box and share the link according to your needs. You can also copy a shorter version of the link in the **Short Link box** or copy the HTML code in the **HTML** box.

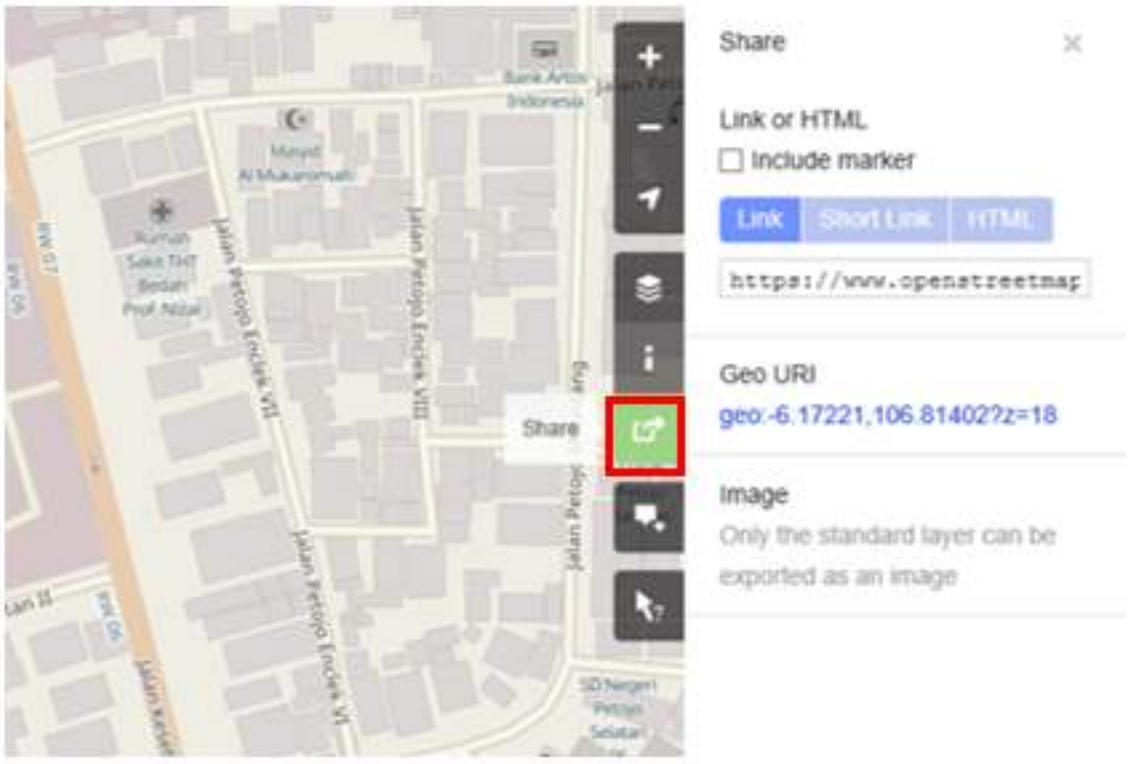


Share the link of the map in OpenStreetMap

VI. Export map as an image

Besides changing the layer map, you also can export the map as an image and choose the various format file such as *.png*, *.jpg*, *.svg*, and *.pdf*. The steps to export the map are as follows:

- Click on the **Share** icon in the right of your map. Then the Share column will appear on the right side of your screen.



Share button to export the map

- After that, specify the area on the map that you want to export as an image. Give a check mark on the **Set custom dimensions** box in the **Image** section, then adjust the size of the box or adjust the scale in the **Scale** section.

Note : You can only export map as image if you set the Standard Layer view. If your map does not use the Standard Layer, you need to change it first on the Layers menu.

- You can choose the format of the export image in the **Format** dropdown menu. After that, click **Download** button to download the image and save the image to your folder location.

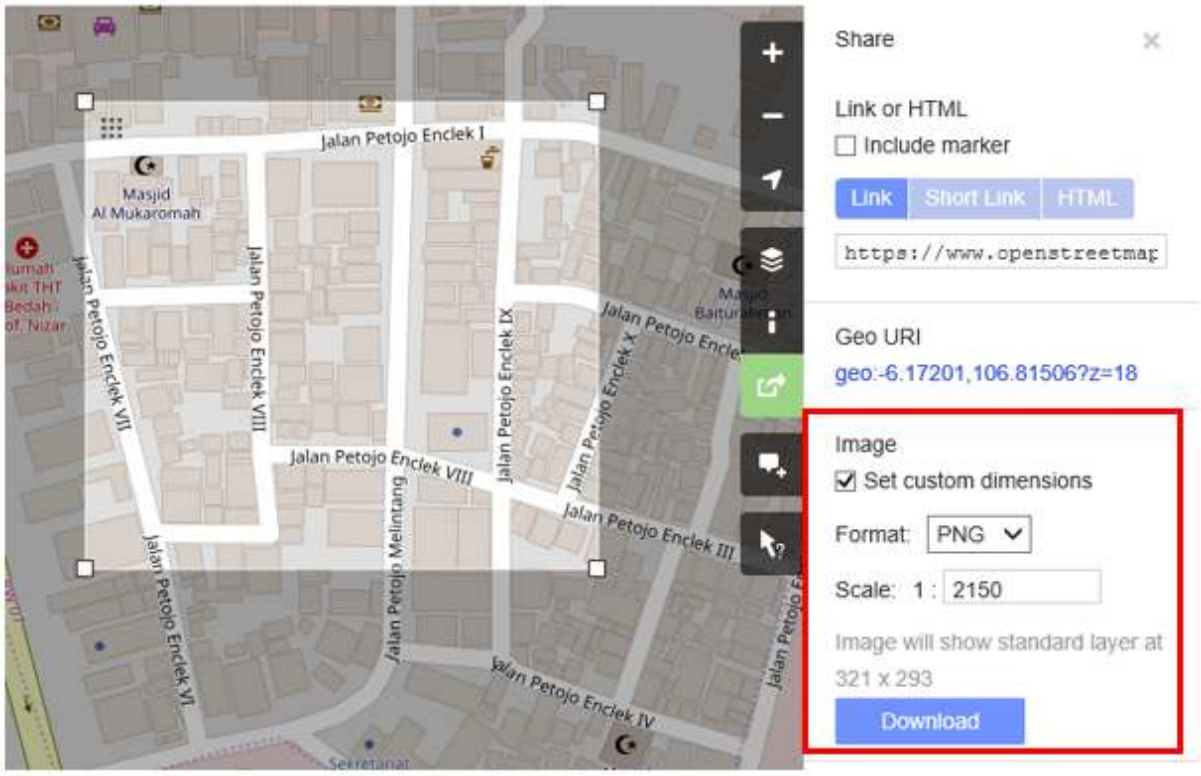


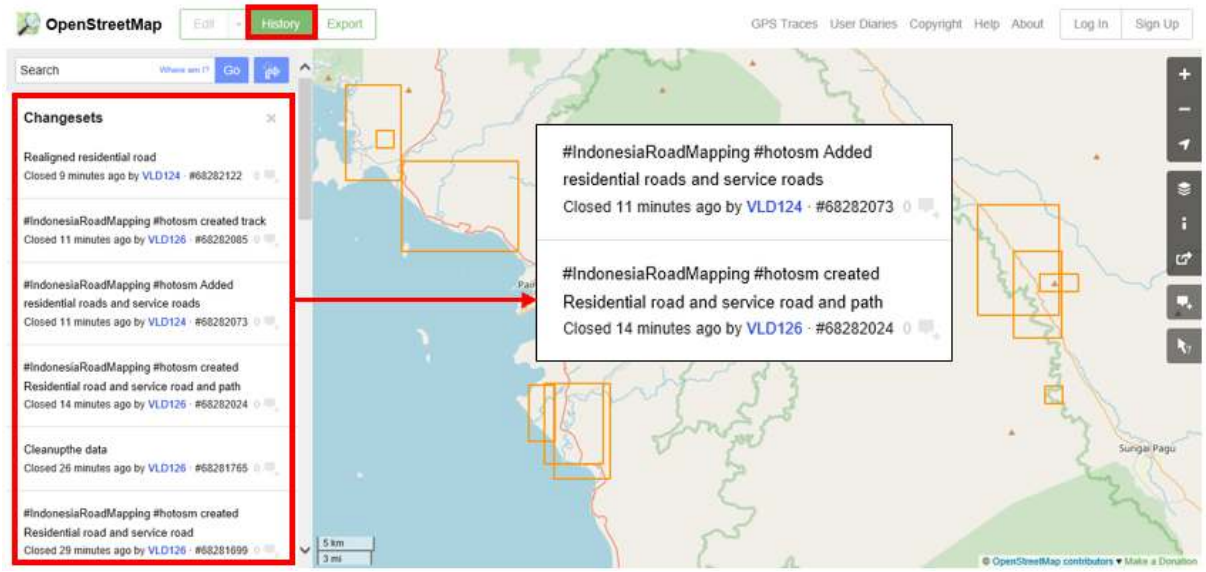
Image section to export the map

VII. See the editing history in OpenStreetMap

When you edit objects or make changes to OpenStreetMap, you can see the editing history of objects in that area. The steps to see editing history are as follows:

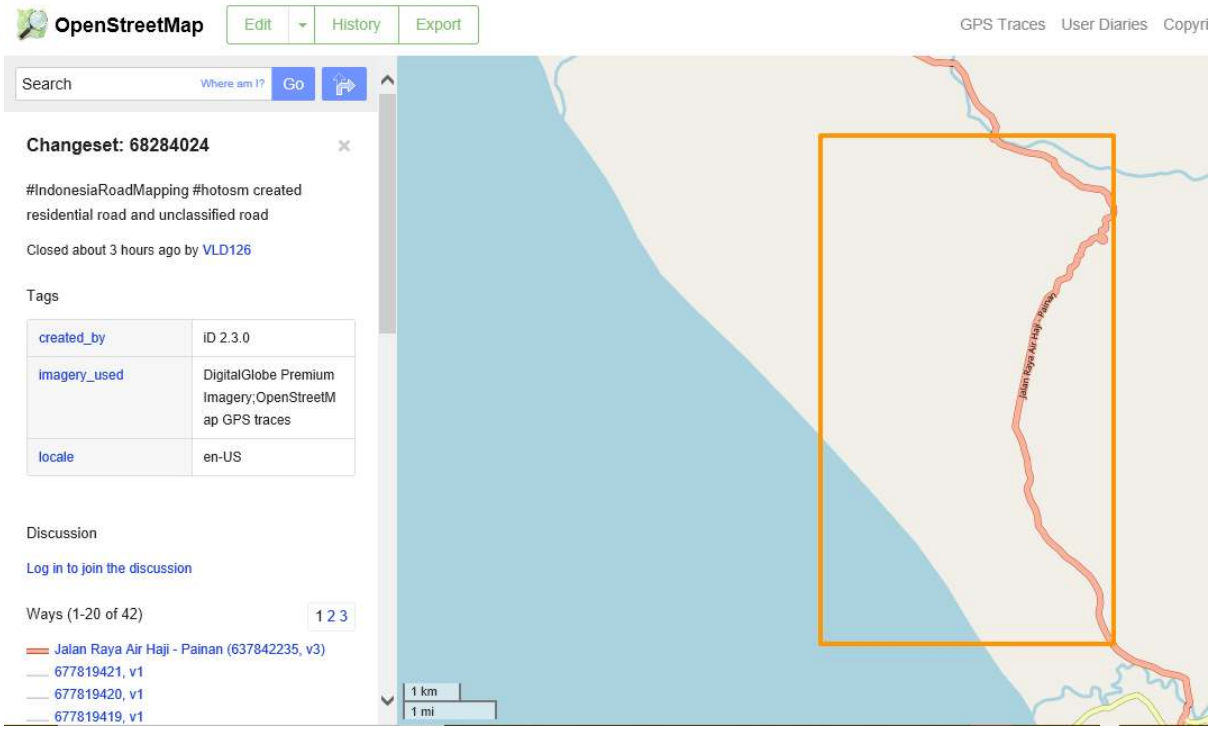
- You can see the information by clicking on the **History** menu button on the top left of the map.
- After that, the **Changesets** column will appear at the bottom of the Search box and orange boxes will appear on the map that indicates which areas have just been edited. Changeset is a version of every change uploaded by OSM users. The information that we can see in the Changesets column is as follows:

1. Changeset comment. It is recommended that you write the short comment when uploading changes or changeset. Comments can contain information about any changes that you made or specific hashtags.
2. Upload time information.
3. OSM username.
4. Changeset number. This number is a unique number as the changeset identity.



Changeset history in OpenStreetMap

- You can click one of the changeset on the changeset list or you can immediately select the orange box on the map. After you select one of the changeset, you will get details about the changeset.

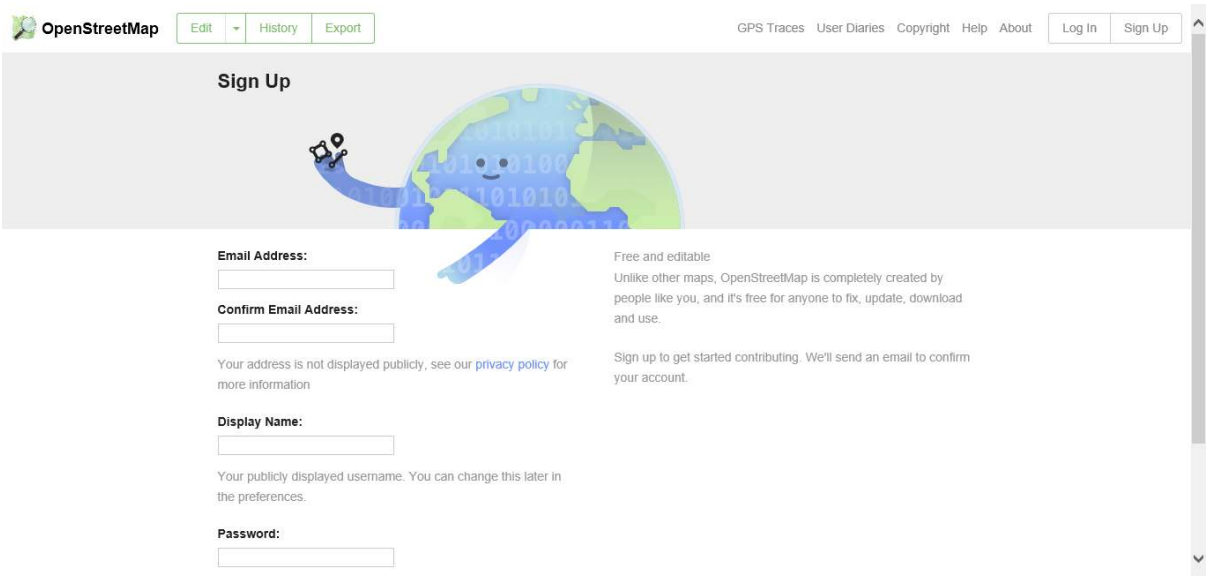


The changeset details

VIII. Create an OpenStreetMap Account

You have seen the display and main menus from the OpenStreetMap website, now you will learn how to create an account at OpenStreetMap and make the first contribution on OpenStreetMap. The steps are:

- Click **Sign Up** on the OpenStreetMap page. You should see a new page that look like this:

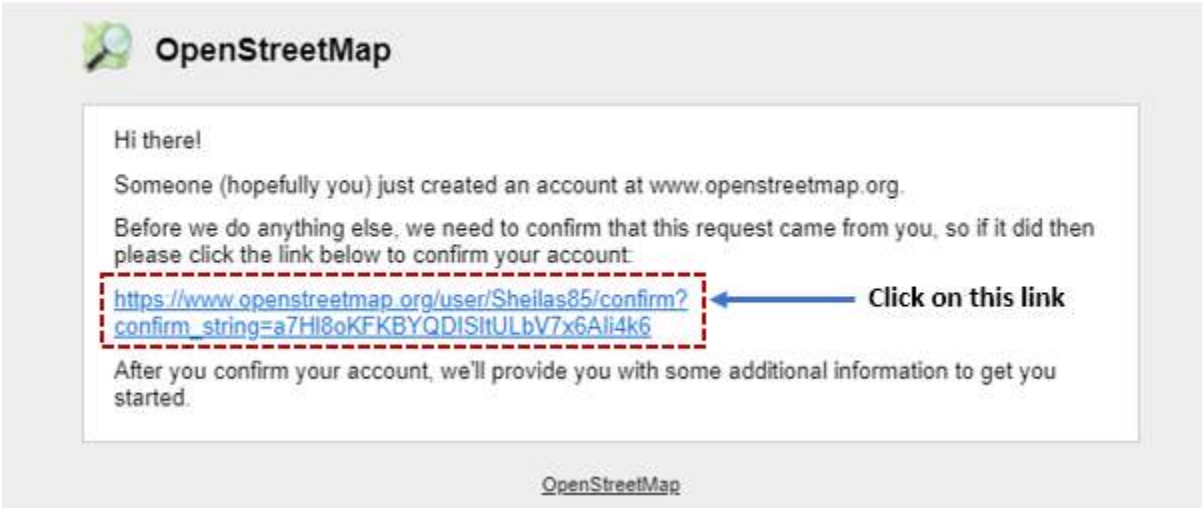


Sign up page

- There are five boxes on this page that you need to fill in to register an account with OSM. Firstly, enter your **email address** in the first two boxes. You should enter the same email address in both boxes. Later, you will need to open your email to confirm your account with OpenStreetMap.
- In the third box, enter the username that you would like to have. If you try to use a simple name, it is likely that someone has already claimed the name. You will not be able to choose a username that someone else has chosen before, so pick the available name for your username.
- Enter a new password in the fourth and fifth boxes. You should enter the same password in both boxes and the password. You should not use an important one such as the password for your email. After you have completed all the boxes, click **Sign Up** at the bottom of the page.

At this stage, you have successfully registered yourself on the OpenStreetMap site, but your account is still not active yet. To activate it, the steps that must be taken are as follows:

- Open the new tab on your browser and open your email.
- If everything was successful with your registration, you should see an email from OpenStreetMap in your inbox.
- Open the email. Click on the link that is identified below:



Notification of OSM registered account

- After that, a new tab of OSM page will appear in your browser. If everything went well, congratulations you already have an OSM account!

Note : If a problem occurs, a problem message will appear. Make sure that the email you entered is the same as in the first two boxes and your password. If the box for the user name is red then someone else has already used the name and you have to look for another name.

- On the OpenStreetMap page, click **Log In** in the upper right corner. Enter your OpenStreetMap username and password then press **Enter**. You should now be logged in and you will see your username on the top right of the OpenStreetMap site.

Congratulations! If you have done all the steps in this section, you already have an OpenStreetMap account and already know how to navigate the OpenStreetMap website.

VIII. The basic concept of OpenStreetMap attribute

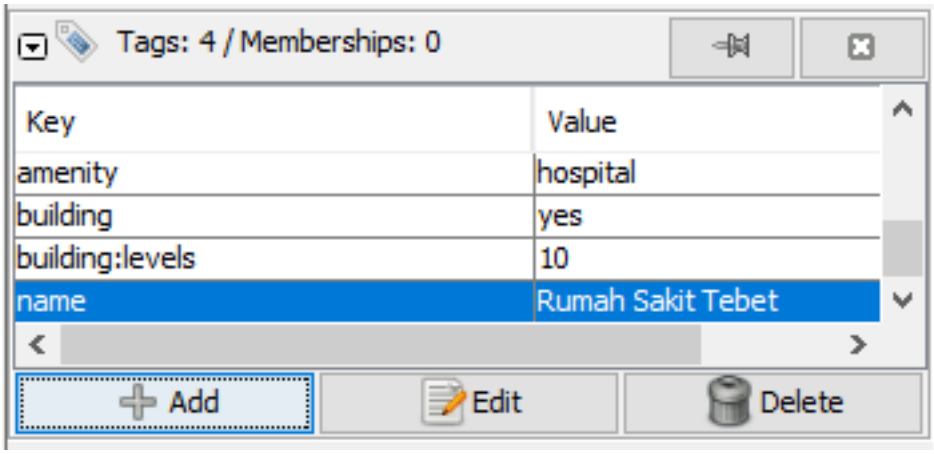
1. **The attribute concept on object**

When you draw an object as a point, line, or polygon in OSM, you still need to add information about the object such as object name, address, or other supporting information. This information will help other users when using OSM data for various purposes. Information provided by users on OSM objects is called an **attribute** or **tag**.

An attribute/tag is like a label that you can place on an object. For example, if you draw a square, this is only a square without any object information. But you can add attributes to describe that object, for example you draw a square that is is a building; the name of the building is “Tebet Hospital”; 10 level building.

2. **Components in OpenStreetMap attribute data**

You can add as many attributes / tags as you want to an object. Attributes are stored as a pair of text, named **Key** and **Value**. *Key* is general information that explains the function of an object. In one key, it can consist of many values. For example schools, mosques, and hospitals have key=amenities (important facilities). Although the three objects have different types of functions, but all three objects have the same key. Whereas *Value* is information that more specifically explains the type of an object. Because this value describes specific information about an object, so that one type of value can only describes the type of the object itself. Not the same as a key that can explain general information about the object. In OpenStreetMap, an attribute is added by formatting a key-value pair that represents physical features on the ground, for example:



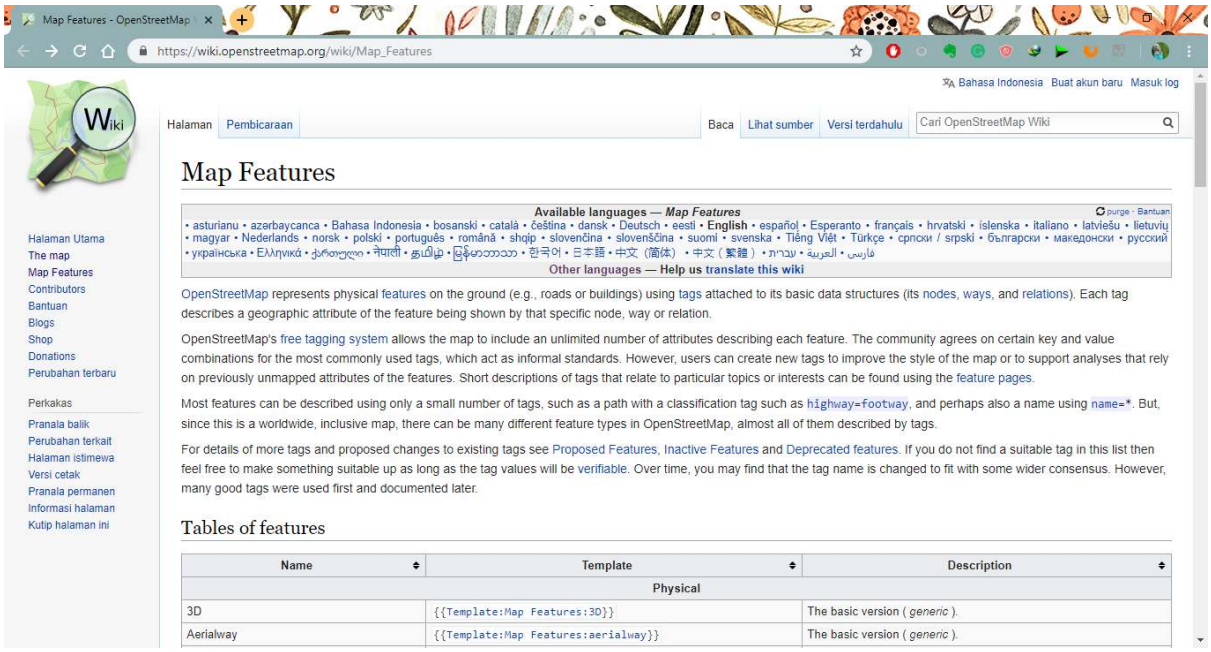
The example of object attributes

In the example above, there are four kinds of key & value attributes, including object amenities for hospital (amenity = hospital), building objects (building = yes), building level 10 (building:levels = 10) and object name Tebet Hospital’ (name = Tebet Hospital).

3. **World and Indonesian OpenStreetMap tagging guidelines**

For providing information on the object that you mapped, you need to ensure that the information is correct and suitable with OpenStreetMap rules. You need to make sure the reference is correct if you

want to describe features by tag. OpenStreetMap has provided a special Wikipedia page that you can refer to. You can see the page on the Map Features Wiki page at https://wiki.openstreetmap.org/wiki/Map_Features.



Main page of Wiki Map Features and list of feature table

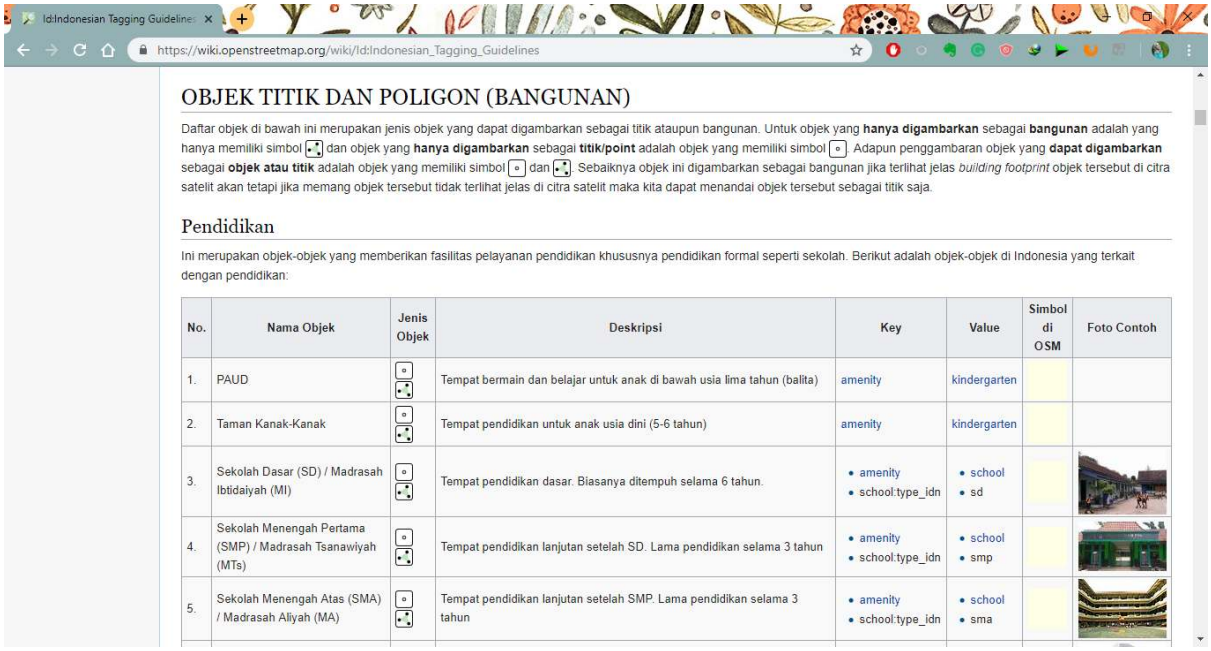
Pages from Map Features that contain inforation about objects in OpenStreetMap are considered not enough to help especially for specific objects that usually only exist in a certain country, including Indonesia. Sometimes users do not get enough information about the object tag and they end up skipping the object because of different names.

Usually objects in Indonesia have their own local names such as Posyandu (health service for children and infants), Pesantren (islamic boarding school), and others. You do not need to be confused in searching for and memorizing attribute lists because you can see a list of object attributes that you can see on the Wikipedia page https://wiki.openstreetmap.org/wiki/Id:Indonesian_Tagging_Guidelines

Indonesia Wiki OSM Tagging Guideline

The Wikipedia page was specifically created to provide references to OSM objects attributes in Indonesia.

On that page, the objects will be divided into several categories which will be adapted from the objects in Indonesia.



https://wiki.openstreetmap.org/wiki/Id:Indonesian_Tagging_Guidelines

OBJEK TITIK DAN POLIGON (BANGUNAN)

Daftar objek di bawah ini merupakan jenis objek yang dapat digambarkan sebagai titik ataupun bangunan. Untuk objek yang **hanya digambarkan** sebagai **bangunan** adalah yang hanya memiliki simbol dan objek yang **hanya digambarkan** sebagai **titik/point** adalah objek yang memiliki simbol . Adapun penggambaran objek yang **dapat digambarkan** sebagai **objek atau titik** adalah objek yang memiliki simbol dan . Sebaiknya objek ini digambarkan sebagai bangunan jika terlihat jelas *building footprint* objek tersebut di citra satelit akan tetapi jika memang objek tersebut tidak terlihat jelas di citra satelit maka kita dapat menandai objek tersebut sebagai titik saja.

Pendidikan

Ini merupakan objek-objek yang memberikan fasilitas pelayanan pendidikan khususnya pendidikan formal seperti sekolah. Berikut adalah objek-objek di Indonesia yang terkait dengan pendidikan:

No.	Nama Objek	Jenis Objek	Deskripsi	Key	Value	Simbol di OSM	Foto Contoh
1.	PAUD		Tempat bermain dan belajar untuk anak di bawah usia lima tahun (balita)	amenity	kindergarten		
2.	Taman Kanak-Kanak		Tempat pendidikan untuk anak usia dini (5-6 tahun)	amenity	kindergarten		
3.	Sekolah Dasar (SD) / Madrasah Ibtidaiyah (MI)		Tempat pendidikan dasar. Biasanya ditempuh selama 6 tahun.	• amenity • school:type_idn	• school • sd		
4.	Sekolah Menengah Pertama (SMP) / Madrasah Tsanawiyah (MTs)		Tempat pendidikan lanjutan setelah SD. Lama pendidikan selama 3 tahun	• amenity • school:type_idn	• school • smp		
5.	Sekolah Menengah Atas (SMA) / Madrasah Aliyah (MA)		Tempat pendidikan lanjutan setelah SMP. Lama pendidikan selama 3 tahun	• amenity • school:type_idn	• school • sma		

List of Indonesia object attributes

SUMMARY

If you can follow and practice all the sections in this chapter, then you have succeeded in creating an OSM account, operating and navigating the OpenStreetMap website. In addition, you have also successfully shared OSM map images and shared links to other people. In the next chapter you will learn how to use Java OpenStreetMap (JOSM).

— title: Using ODK Collect weight: 2 —

Objective:

- Able to explain ODK Collect as one of the tools to collect infrastructure data
- Able to set the initial setup for ODK Collect
- Able to apply how to use ODK Collect for data collection survey

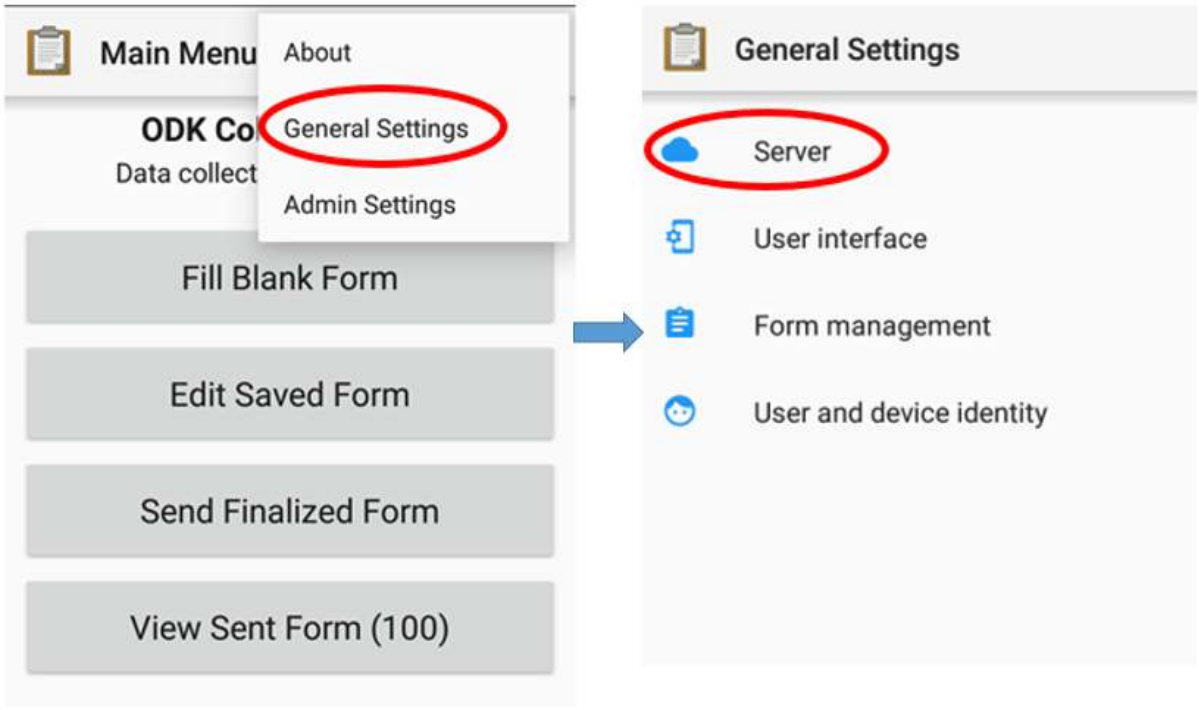
I. What is ODK Collect?

Open Data Kit Collect (ODK Collect) is a data collection application on Android. ODK Collect can replace form survey from paper to digital. Therefore, this application will help the mapping and data collection activities in the field which also allow to save the location and photo information at once.

II. Initial Setup for ODK Collect

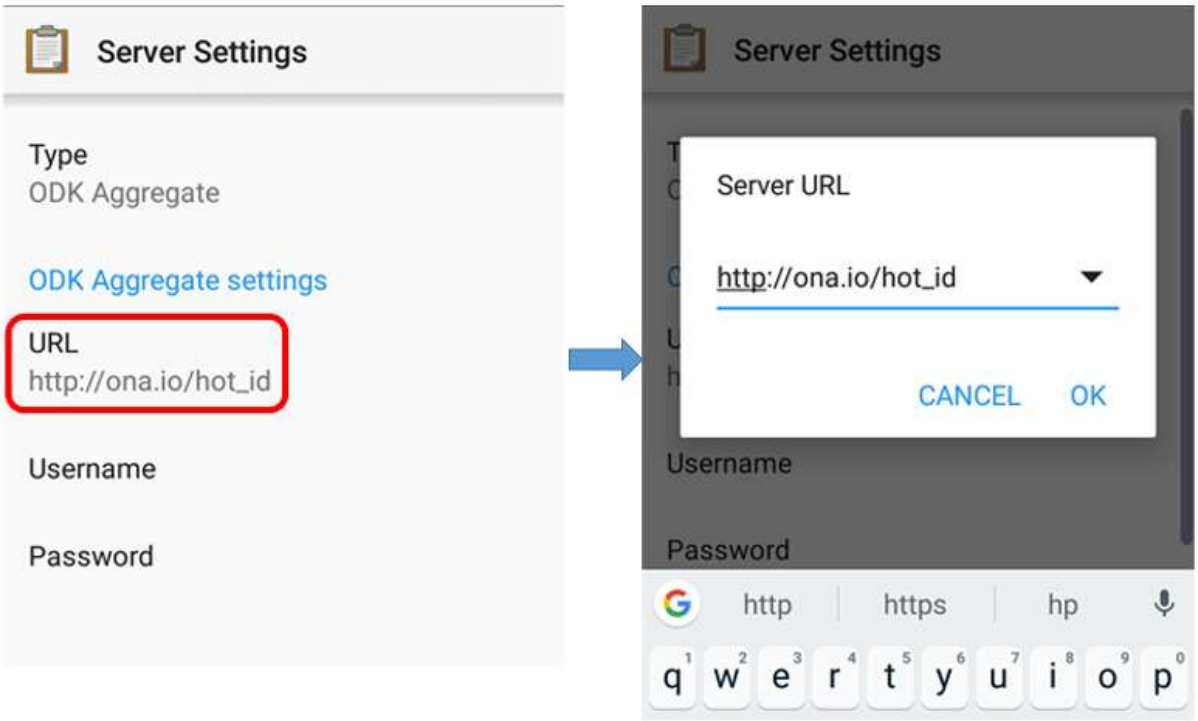
1. Set the URL Server To take the form survey from the server for the first time, the user needs to set the URL server. There are the steps:

- Open ODK Collect and press the three point button in the upper right corner, select **General Settings → Server**



Option to fill the URL address menu in ODK Collect

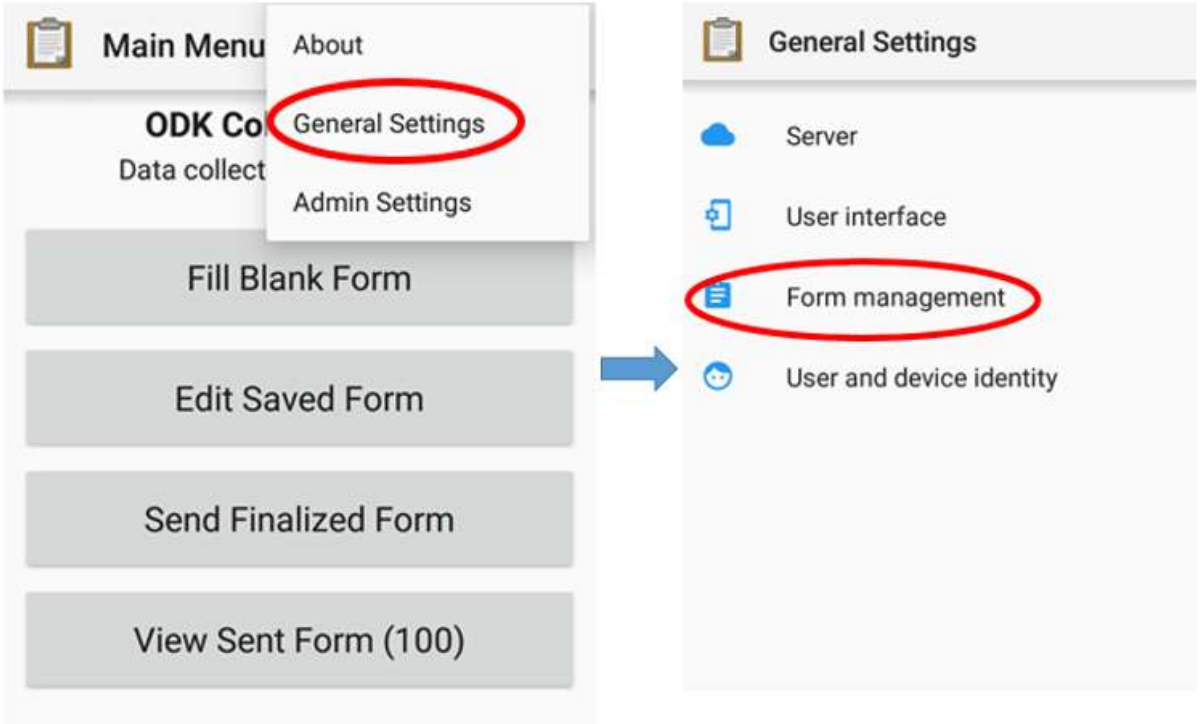
- Type the URL address server in **URL → OK**



Step to fill the URL address in ODK Collect

2. Set the Image Size In addition to the location point, you can also take a picture as additional information. You can set the picture resolution as desired. But, the picture resolution will also affect the amount of your phone memory or file which will be uploaded to the server later. It is recommended that you choose the smallest resolution of the image during initial setup. You can follow this step:

- Open ODK Collect and press the three point button in the upper right corner, select **General Settings → Form Management**.



Option menu to set image resolution

- Select **Image Size** then select the **Very Small (640px)** option.

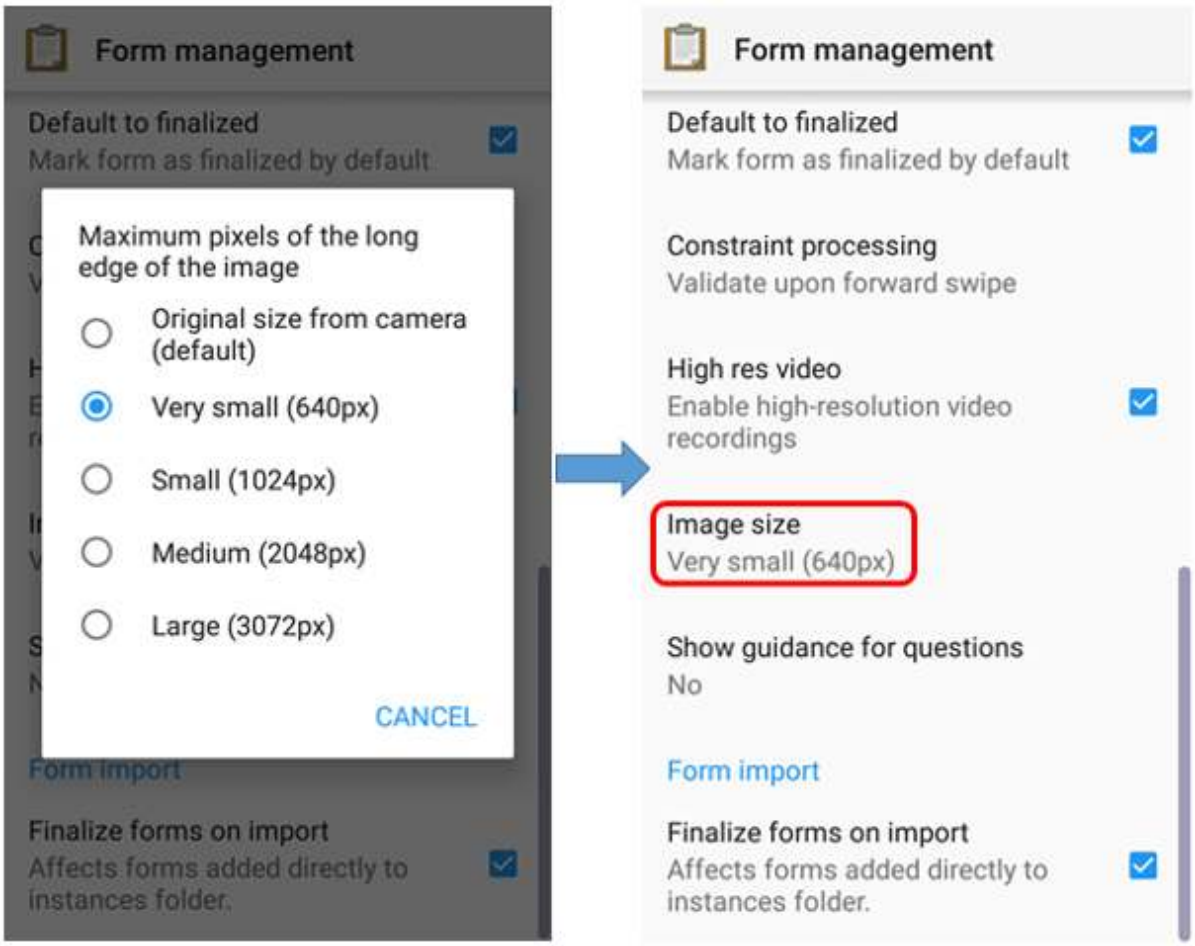
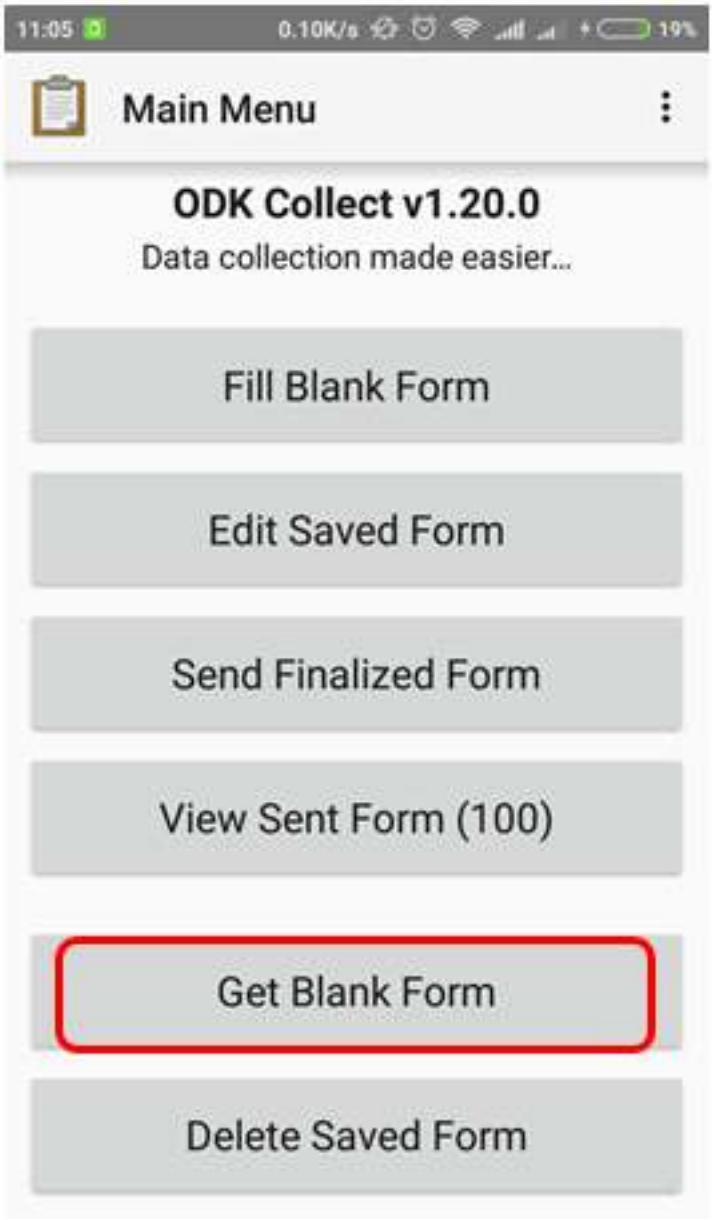


Image Size menu to set the image resolution

III. ODK Collect basic operations

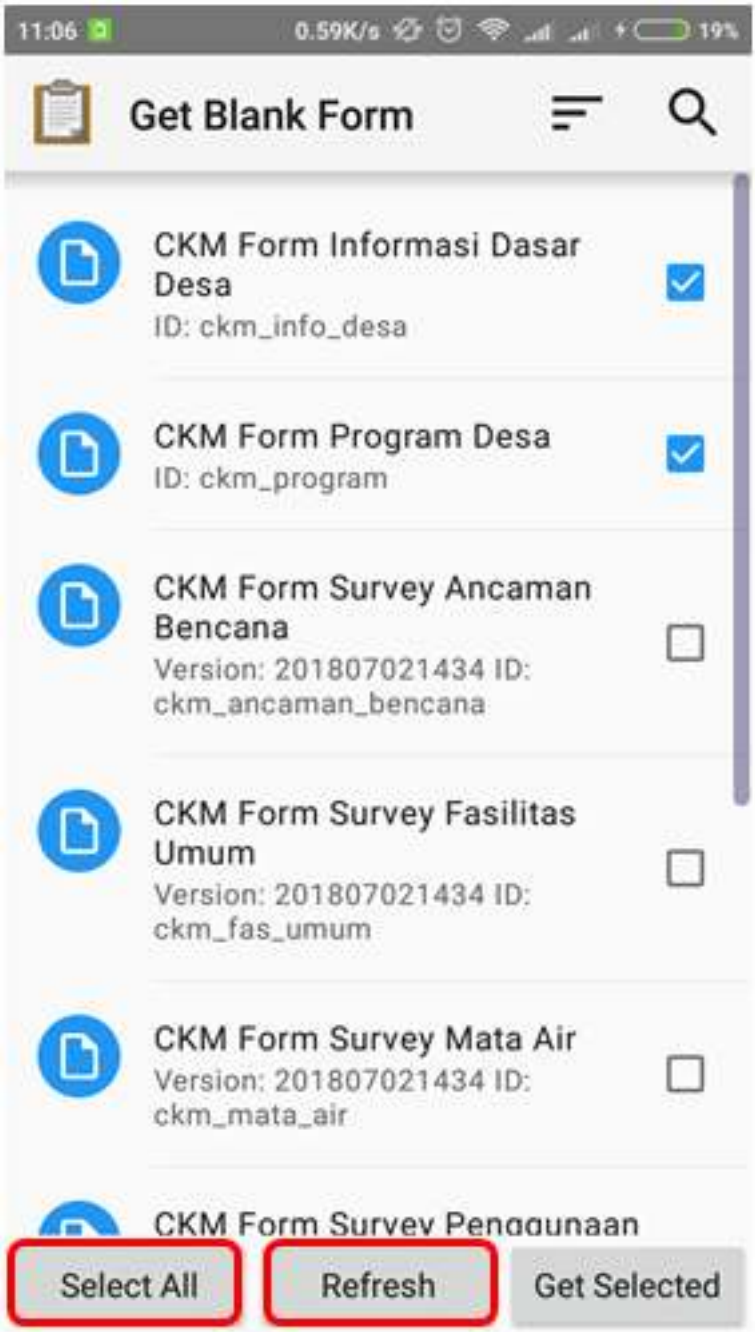
1. How To Get a Blank Form Survey From Server Before you fill-out the form survey that you made before, you need to download the blank survey form from specified server. For further explanation about create a survey form in ODK, you can learn in **Making Survey Form for ODK & OMK applications** module. You can follow this step to take a blank survey from the server:

- Press **Get Blank Form** and wait for the form to download from the server and make sure your internet is active.



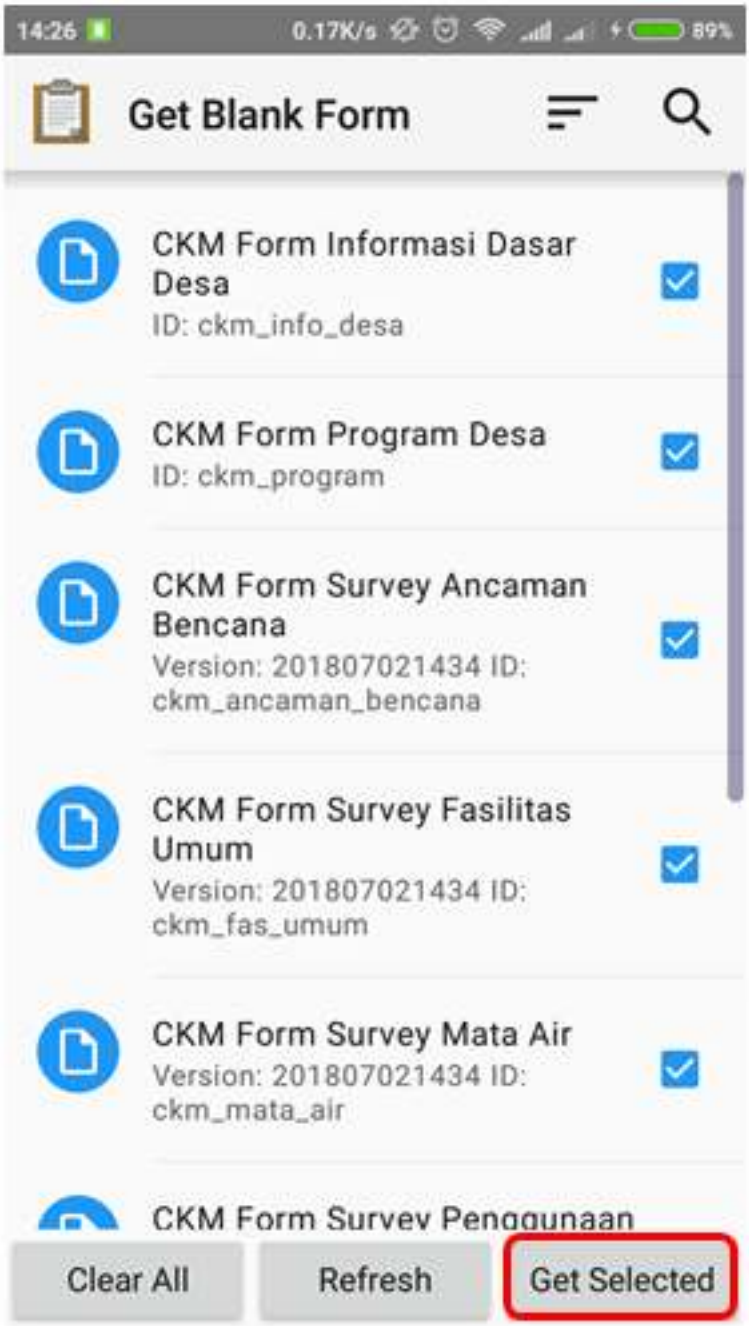
Get blank form options to take form on a server

- Select the available form, tick the check box or if you want to select all the form, you can **Select All**. If your form does not appear, can press **Refresh** to reload the page.



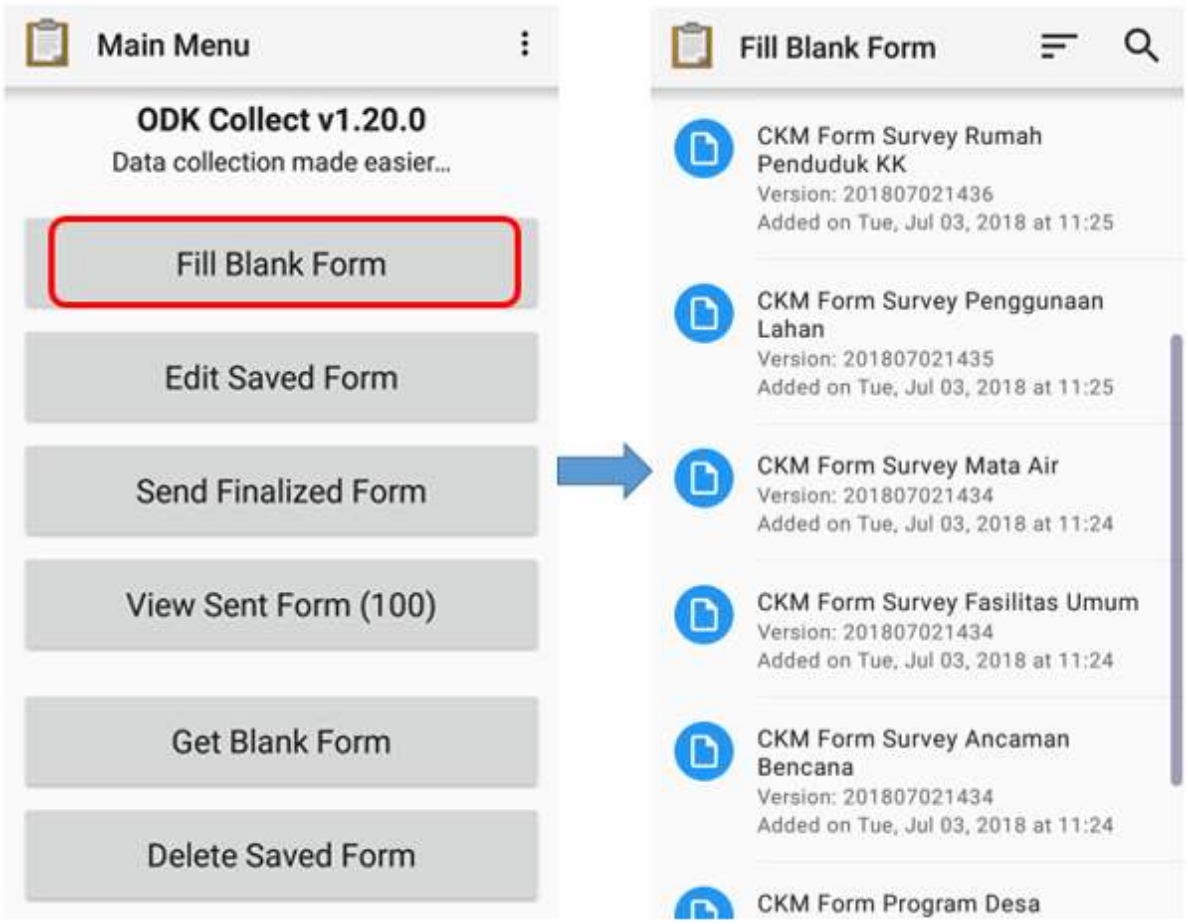
Page display on Get Blank Form menu

- After select the form, you can press **Get Selected** to download the selected form.



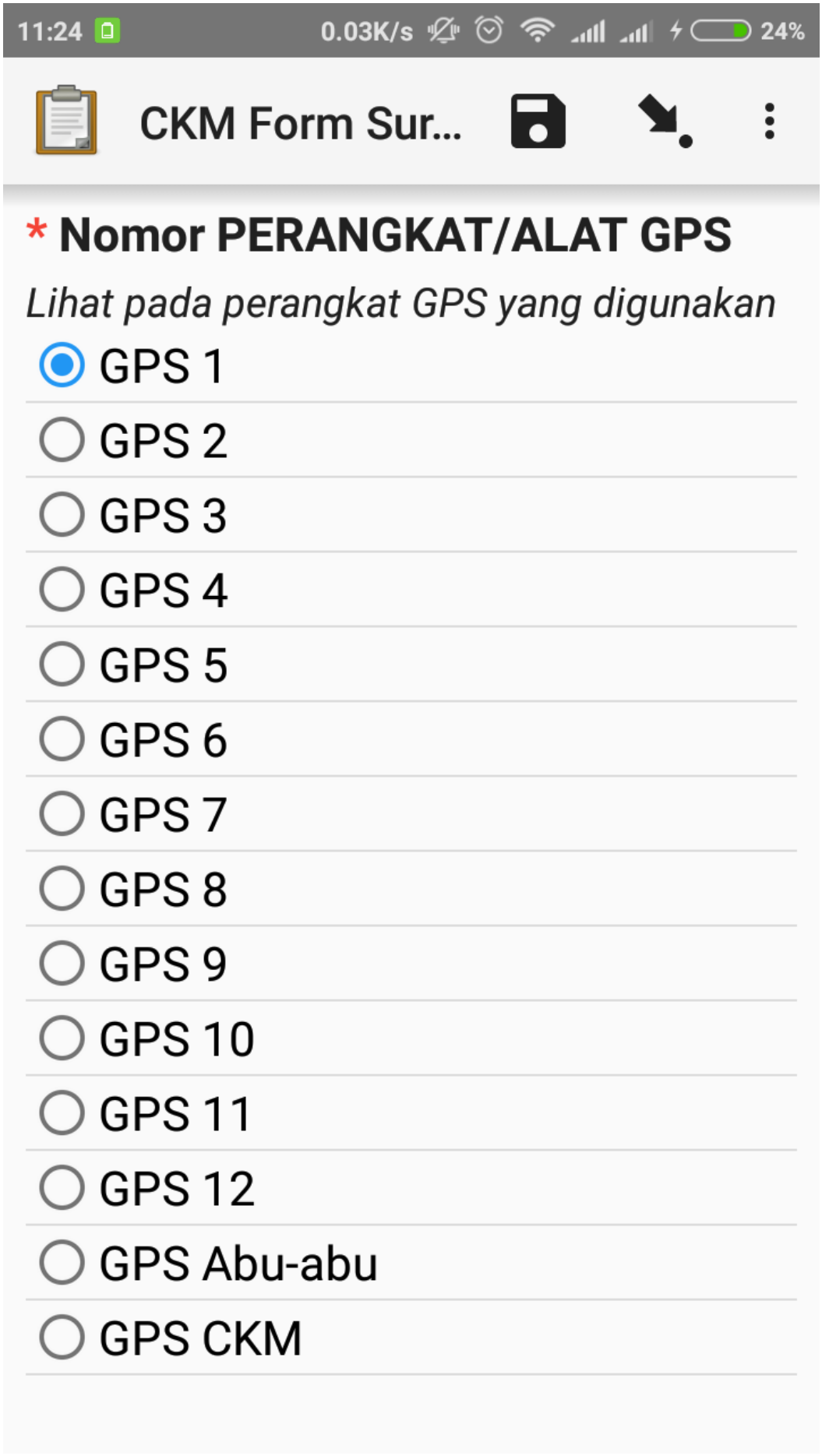
Page display on the Get Blank Form to get the survey form

2. Fill the Survey Form * To fill the form, back to the start page and select **Fill Blank Form** menu. And then select one form blank that you want to fill in the survey form list.



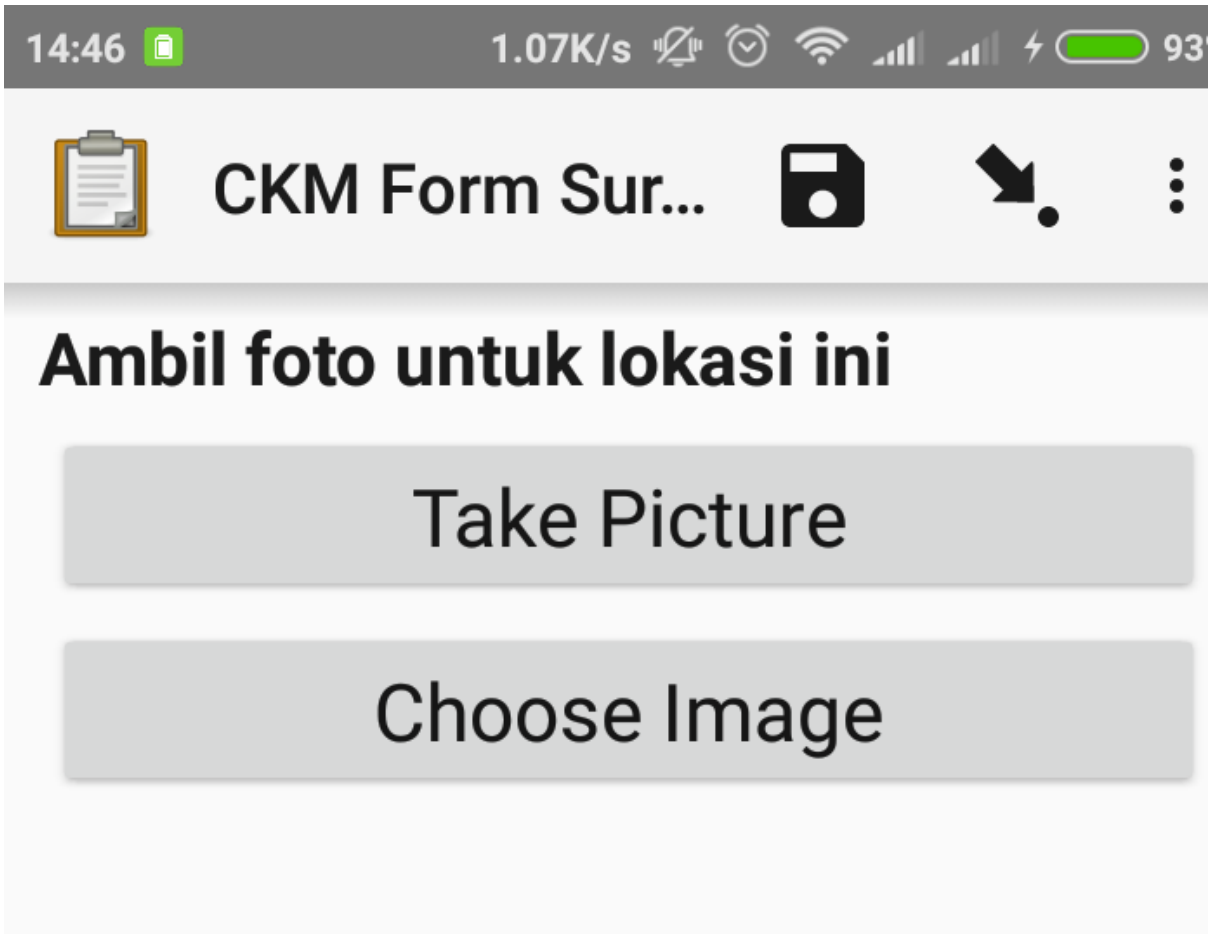
Fill Blank Form options for filling out the survey form and blank survey form list

- Swipe to right or left on the screen to move the next/previous page. Questions that have a red star in the top left are required and you can not go to next question if the answer is empty.


11:24
0.03K/s
24%
CKM Form Sur...
* Nomor PERANGKAT/ALAT GPS
Lihat pada perangkat GPS yang digunakan
GPS 1
GPS 2
GPS 3
GPS 4
GPS 5
GPS 6
GPS 7
GPS 8
GPS 9
GPS 10
GPS 11
GPS 12
GPS Abu-abu
GPS CKM

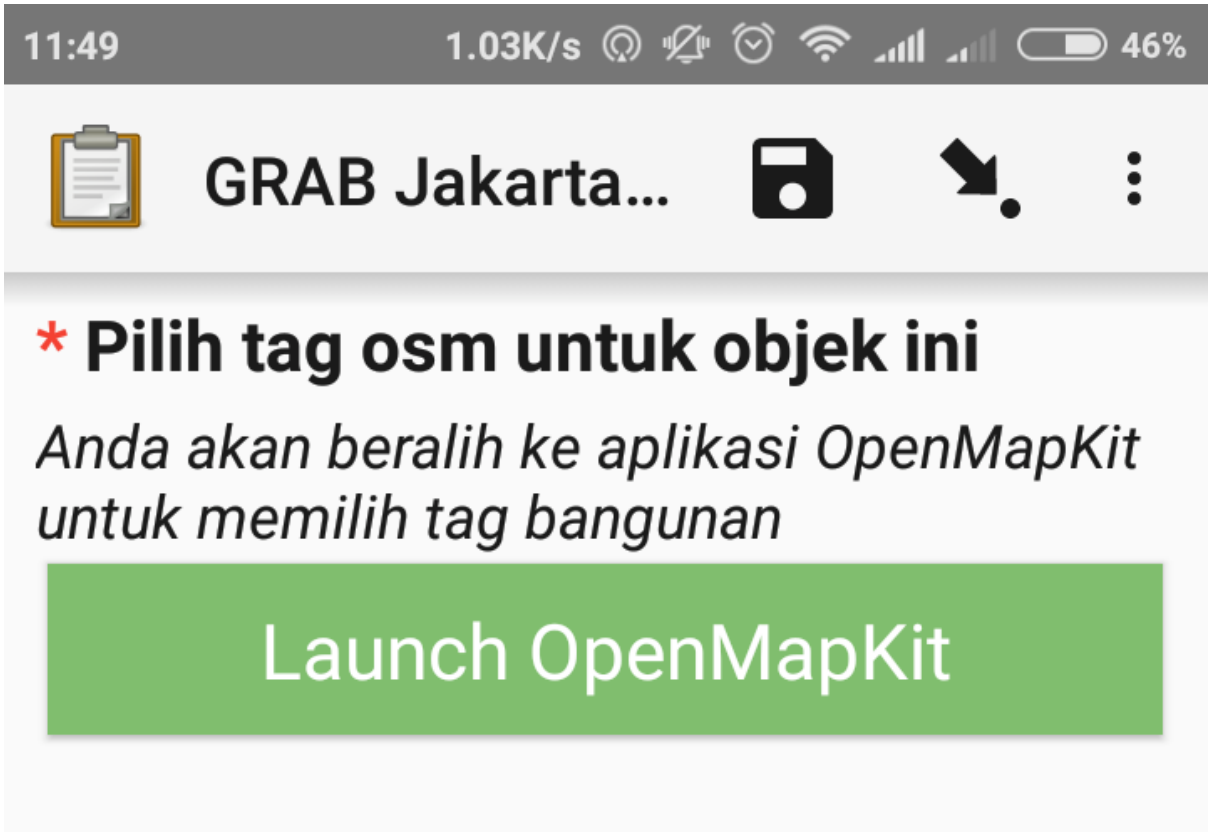
Examples of mandatory question (red star)

- You can take photos directly by choose **Take Picture** option or select a photo from your photo gallery by select ***Choose Image***.



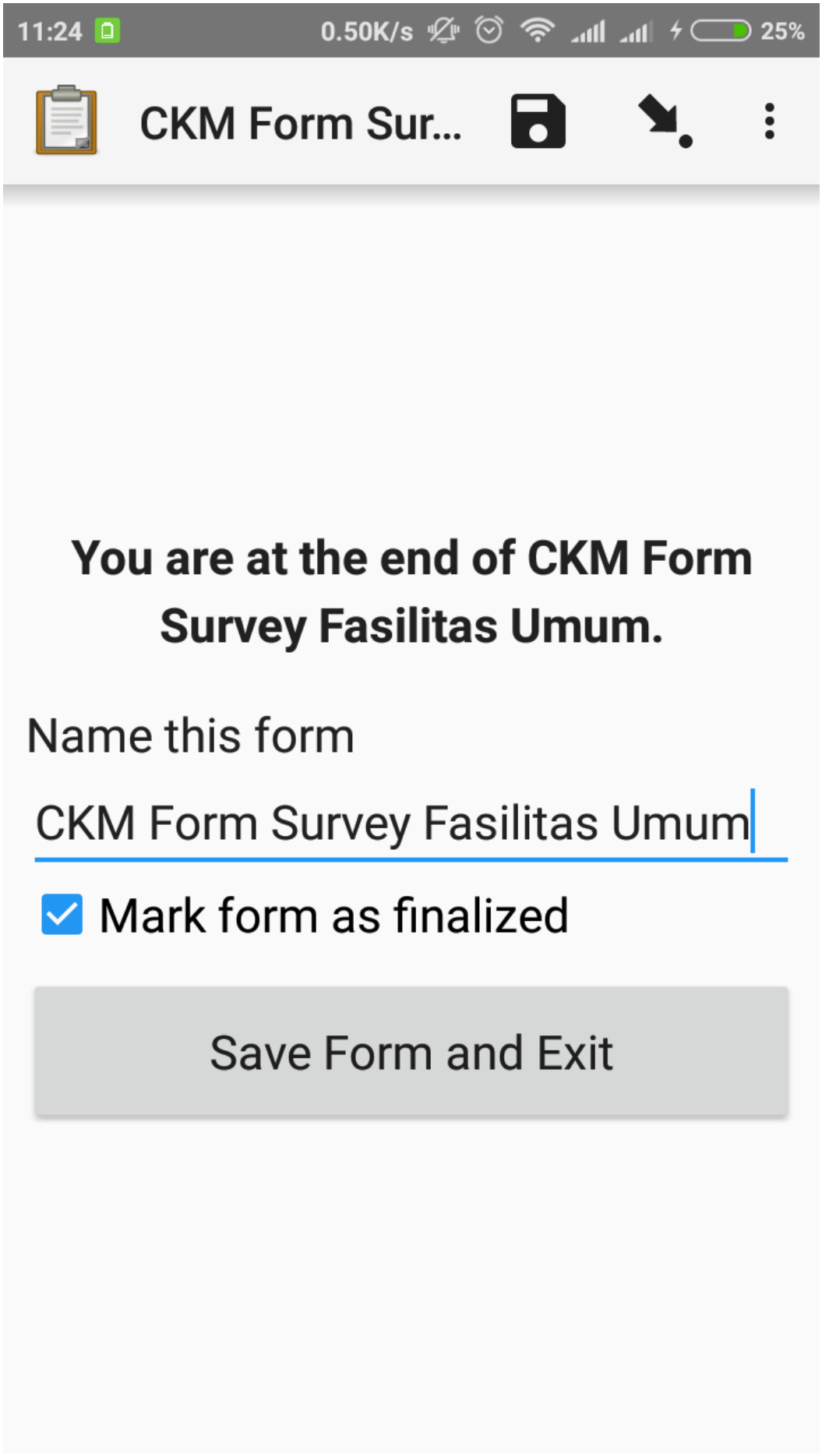
Take photo display in ODK Form

- To add object location points include OSM object tag, you can use additional application, that is OpenMapKit (OMK). You can immediately switch to OMK application by press **Launch OpenMapKit** on the form. You can learn about using OMK application in the module **Using the OpenMapKit**.



Launch OpenMapKit button on the survey form

- At the end, you can name the form, tick check **Mark form as finalized** and at the end choose **Save Form and Exit** to finalize the final form survey.


11:24
0.50K/s
25%
CKM Form Sur...
You are at the end of CKM Form Survey Fasilitas Umum.
Name this form
CKM Form Survey Fasilitas Umum
Mark form as finalized
Save Form and Exit

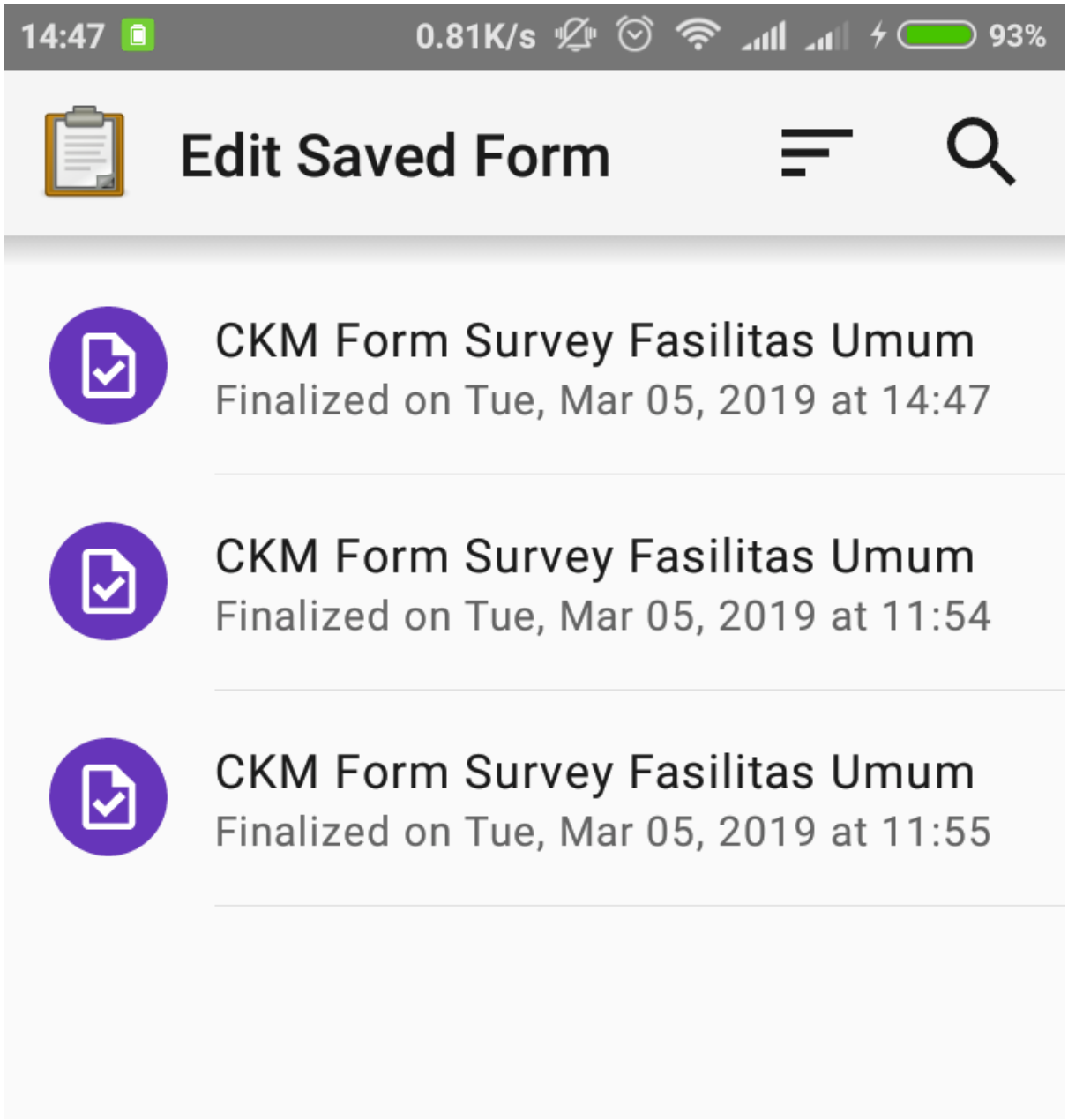
Finalization of page views on the survey form

3. Edit the Completed Survey Form The saved form automatically save in ODK Collect. If you want to edit the completed form, you can follow this step:

- You can back to start page and choose **Edit Saved Form**.

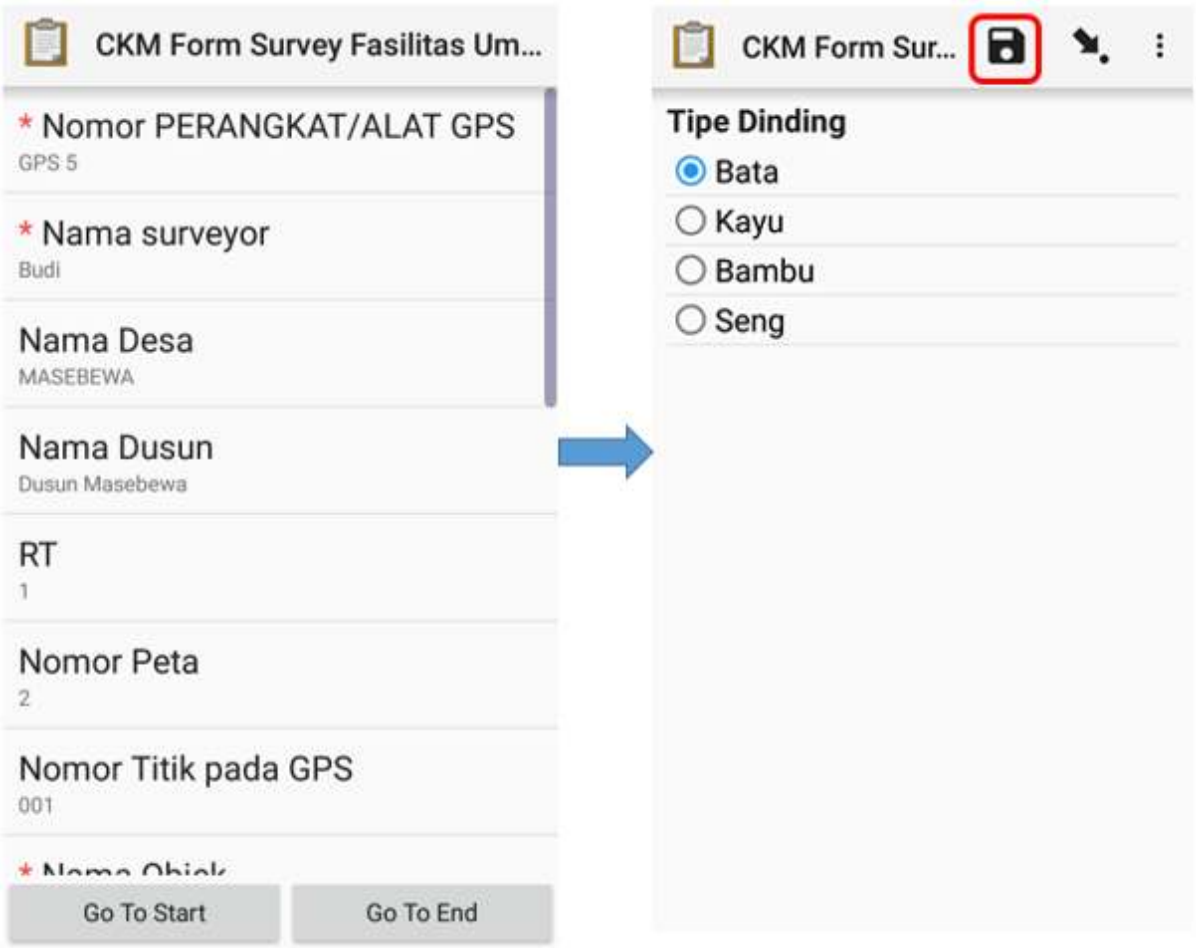
Edit Saved Form for edit the saved form

- Select the form that you want to edit by press the form and you can edit the form.



Edit save form page to select the form that you want to edit

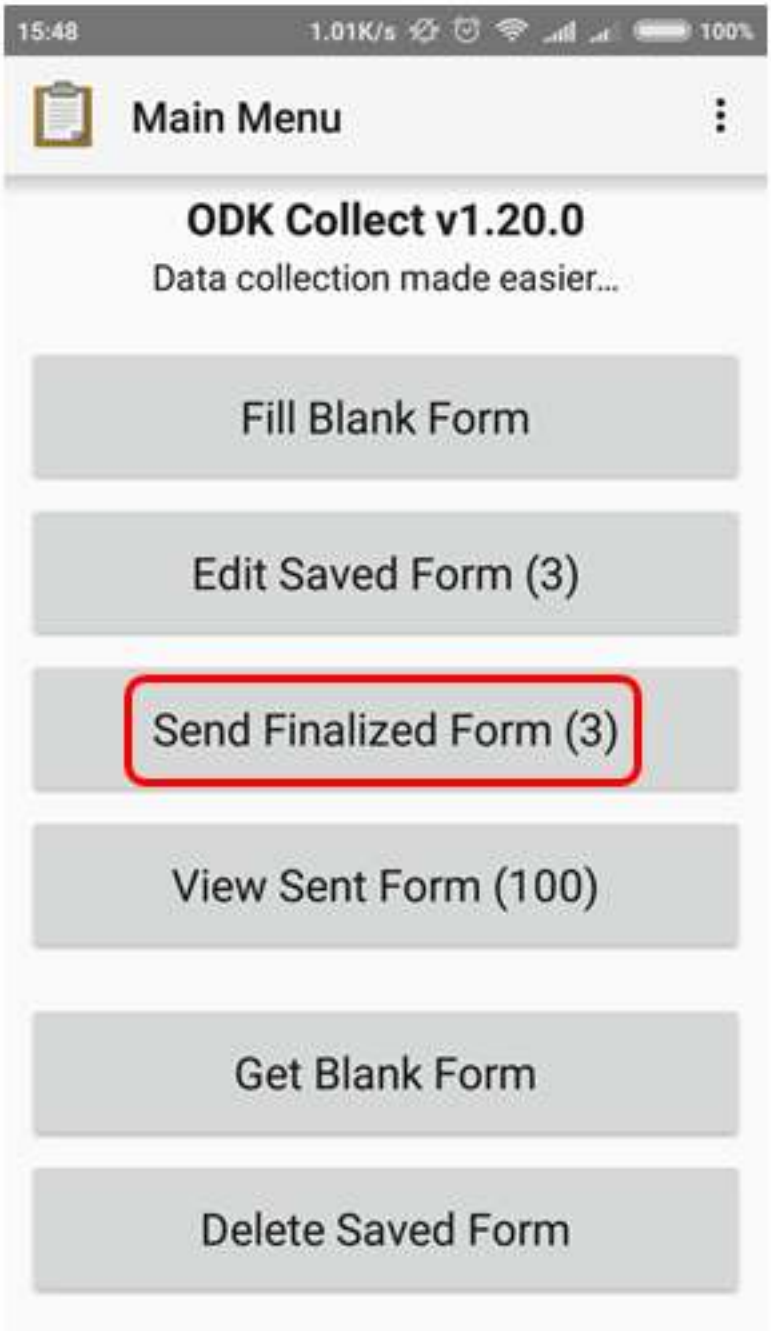
- Then, press floppy disk icon



Edit save form page to select the form that you want to edit

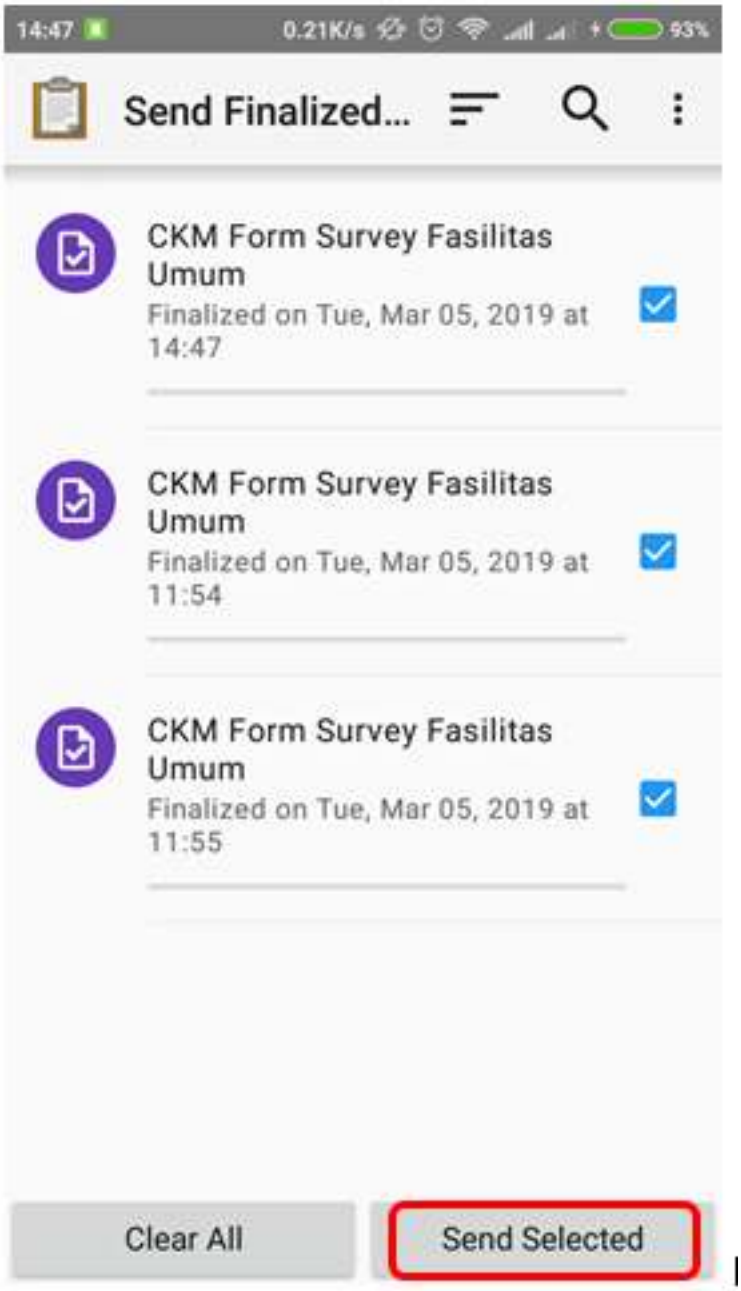
4. Upload Survey Forms to Server After you fill and save the form, the next step is upload form survey to server. You can follow this step to upload form to server:

- To upload the form return to the server, you can choose **Send Finalized Form**.



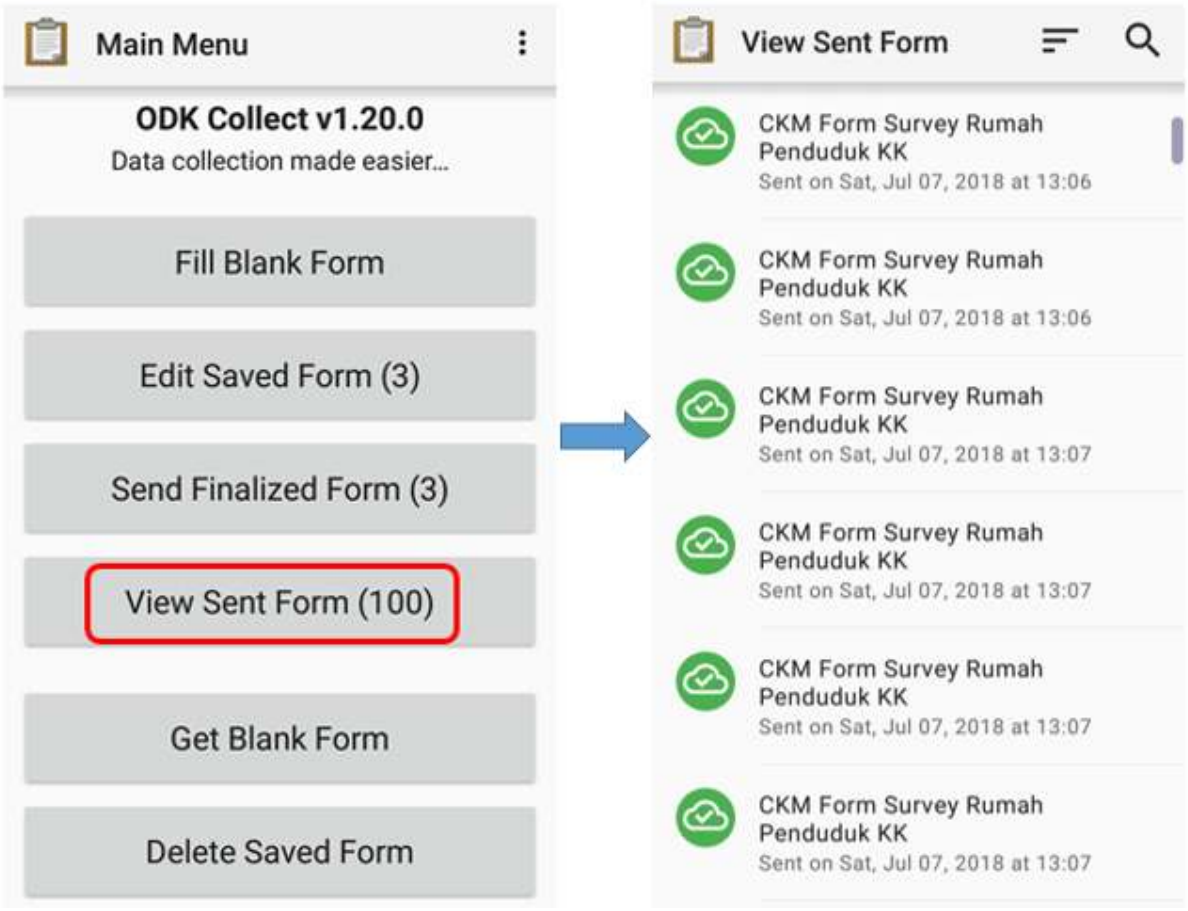
Send Finalized Form to upload a survey form to the server

- Form survey is saved on that page and ready to send. You can choose **Select All** to select all forms first.
- Make sure you are connected on the internet. Then press **Send Selected** and wait until the process_ upload_ the form is complete.



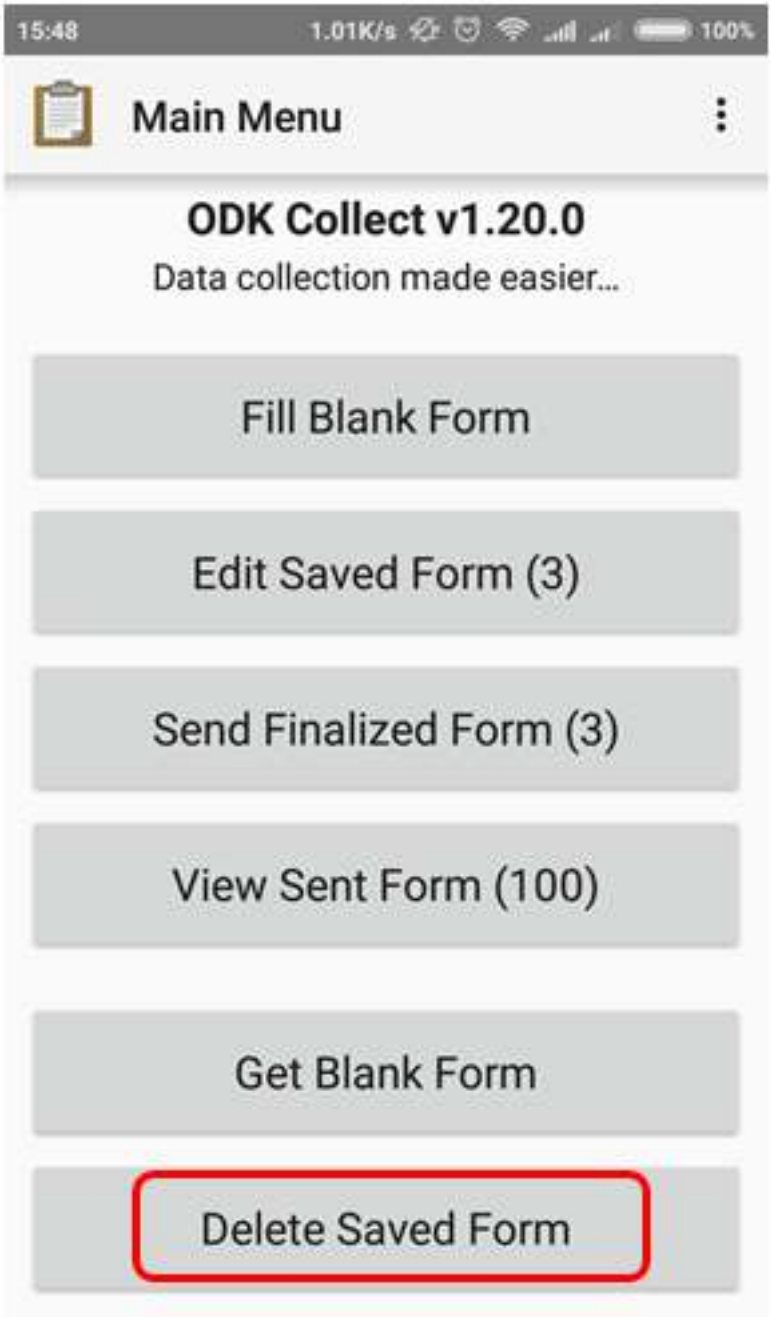
Survey forms that are ready to send in the Send Finalized Form

- All forms that have been successfully uploaded will be stored in **View Sent Form** menu and the icon turn into green.



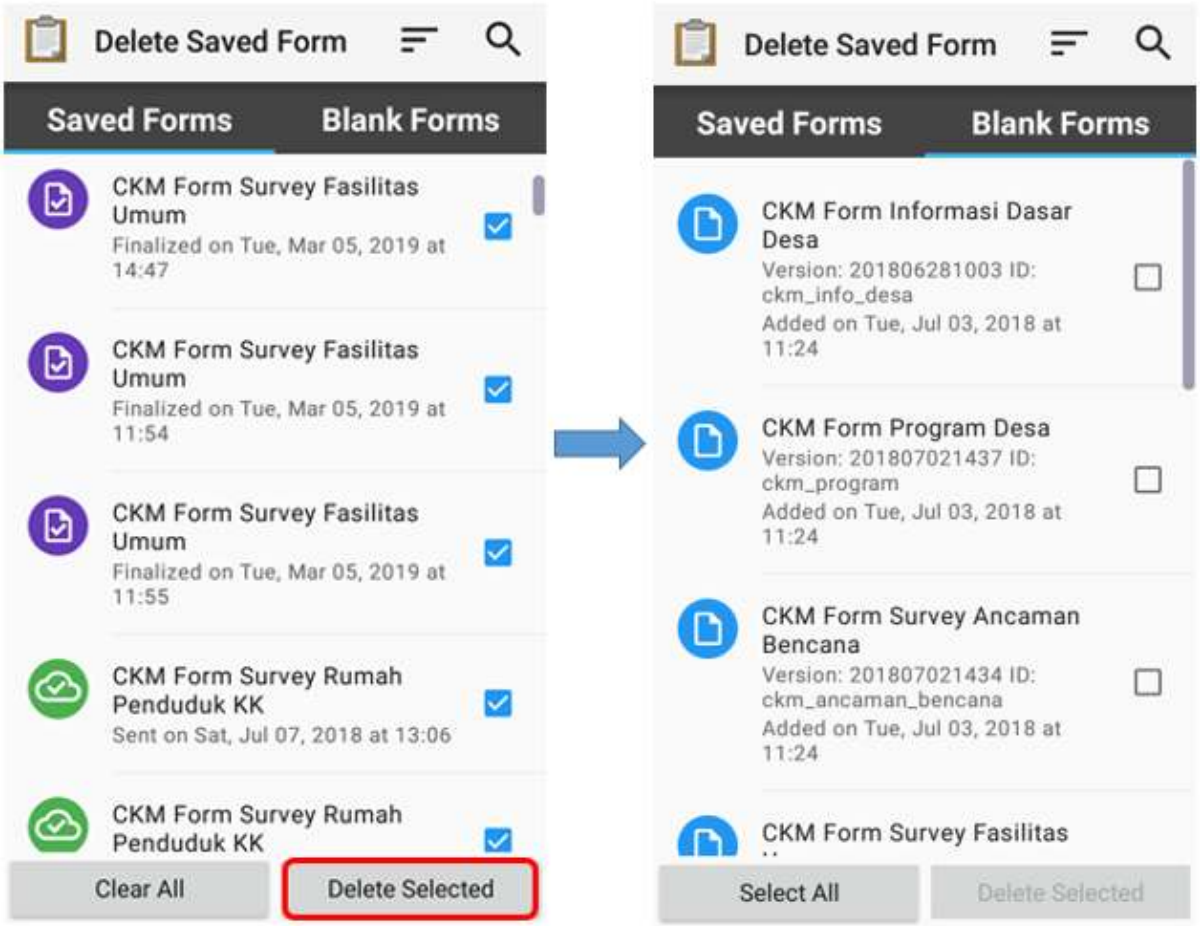
View Sent Form and survey form that have been successfully uploaded to the server

- After upload the form, you can delete the form in ***Delete Saved Form*** menu.



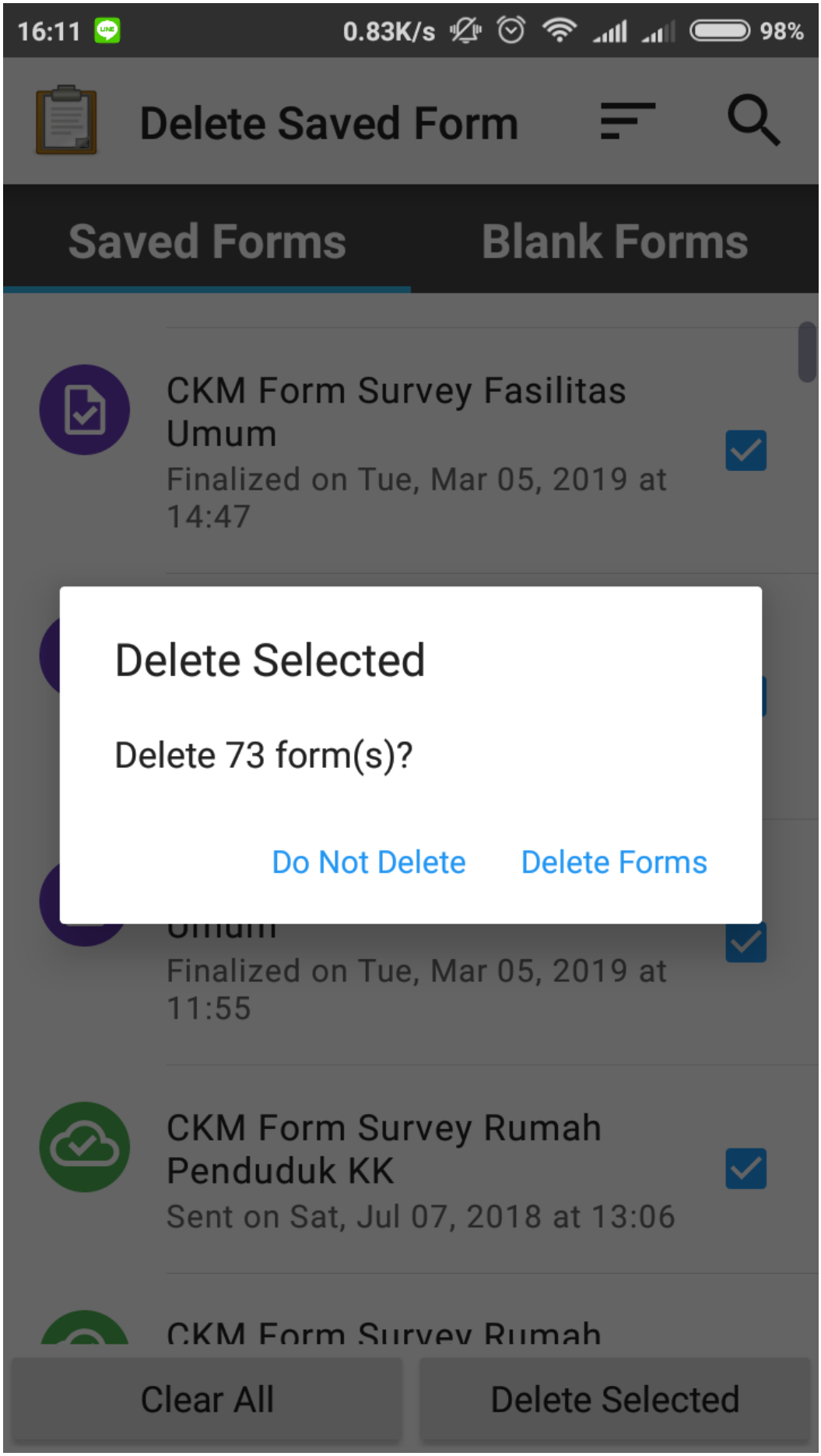
Delete Saved Form menu for delete the form

- You can delete the the filled form in **Saved Forms** option and delete the blank form in **Blank Forms** option. You should choose the form that you want to delete or **Select All** for delete all form.



Delete Saved Form option

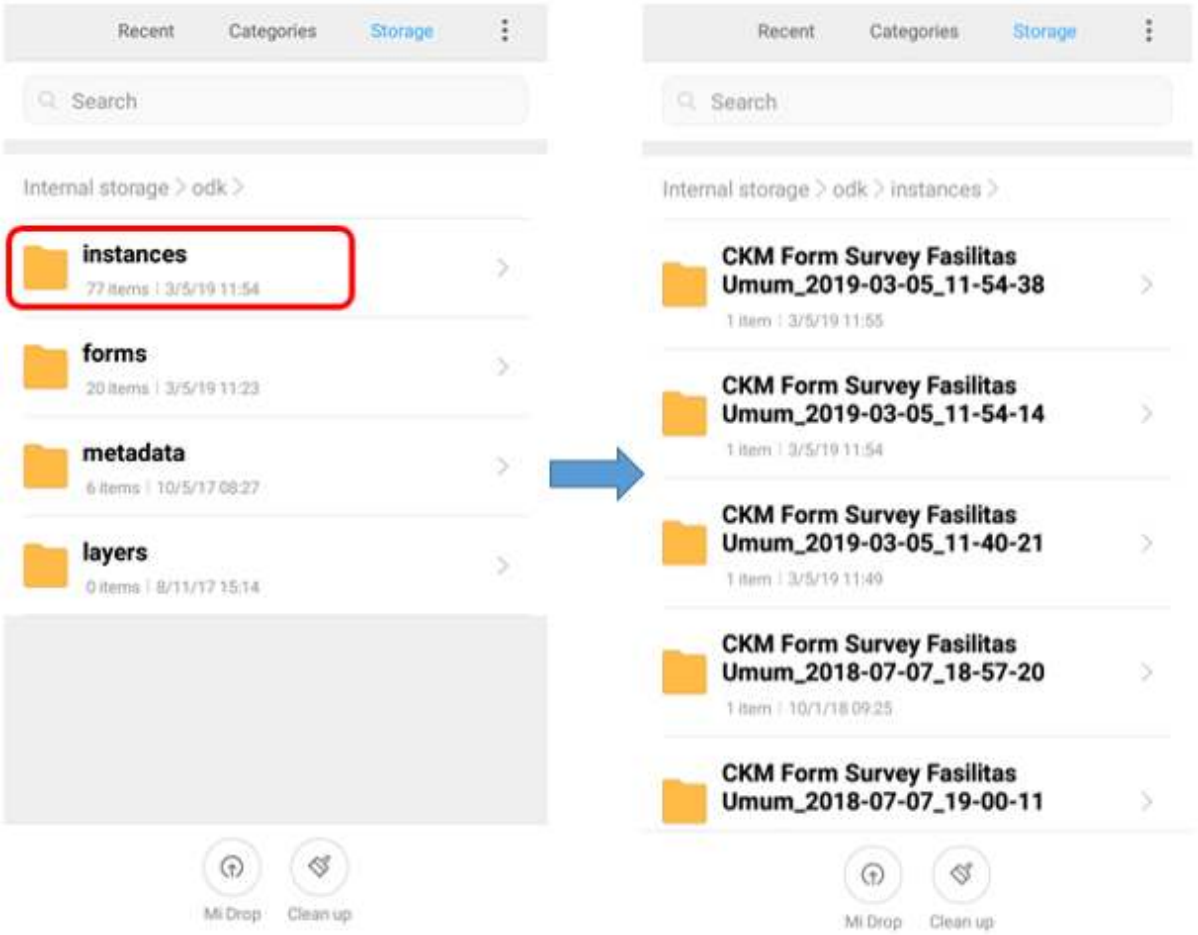
- You need to confirm to delete the survey form by choose **Delete Forms**


16:11
0.83K/s
98%
Delete Saved Form
Saved Forms
Blank Forms
CKM Form Survey Fasilitas Umum
Finalized on Tue, Mar 05, 2019 at 14:47
Delete Selected
Delete 73 form(s)?
Do Not Delete
Delete Forms
Finalized on Tue, Mar 05, 2019 at 11:55
CKM Form Survey Rumah Penduduk KK
Sent on Sat, Jul 07, 2018 at 13:06
Clear All
Delete Selected

Delete confirmation dialog box

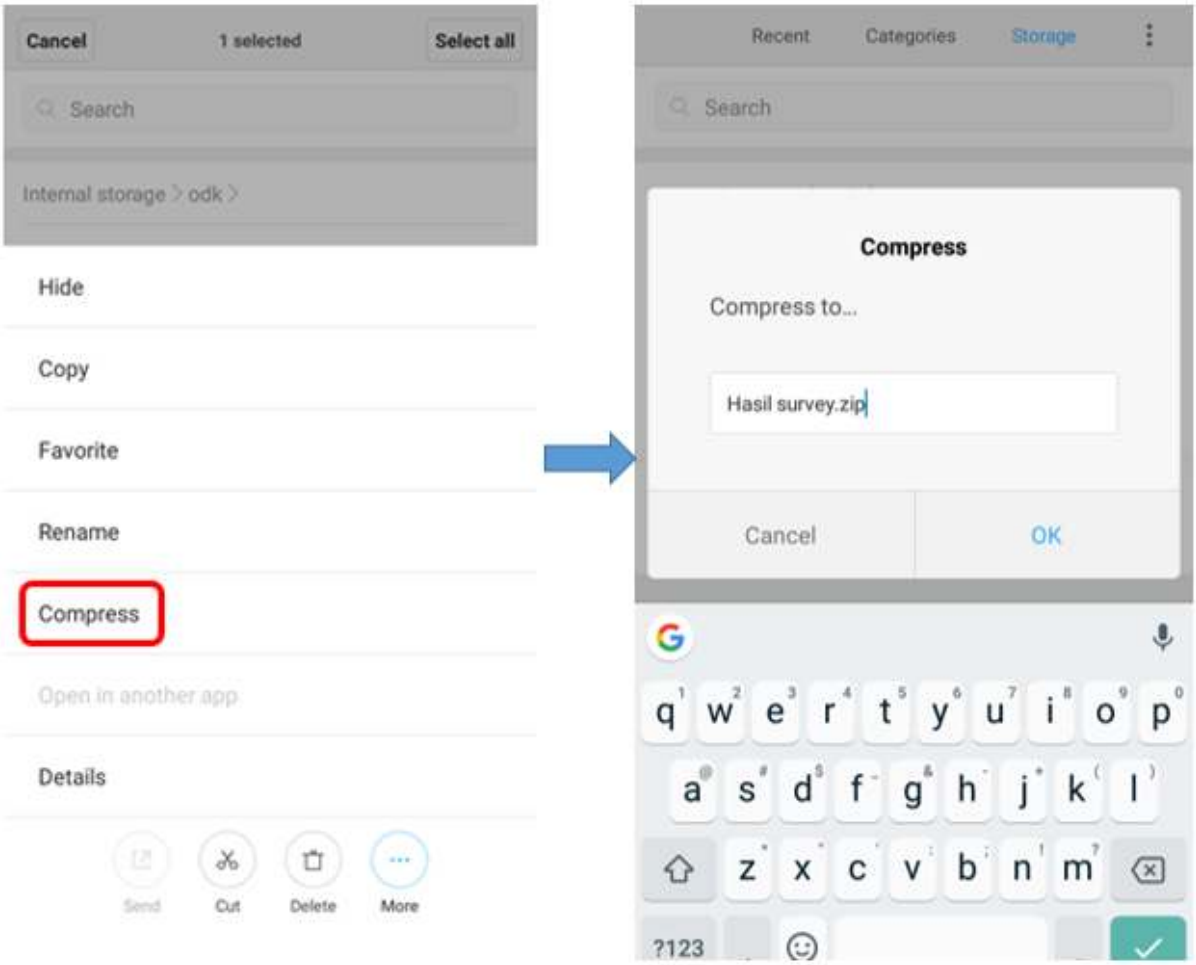
5. Upload Survey Form to Google Drive After you upload all the survey form to server, you need to save and upload the survey result file in .zip format in Google Drive folder that was created by your mapping supervisor. This is the step:

- Go File Manager or File Explorer on your smartphone and open your internal storage. Then open ODK folder. This folder contains all the survey result file which stored on ODK Collect application. Then select instances folder which contains *.osm file from object survey result.



Instances folder in ODK folder and the survey result in instances folder

- Before you move **instances** folder to your computer, you need to convert the folder to .zip format by pressing the **instances** folder and select **Compress**. You can change the .zip file name.

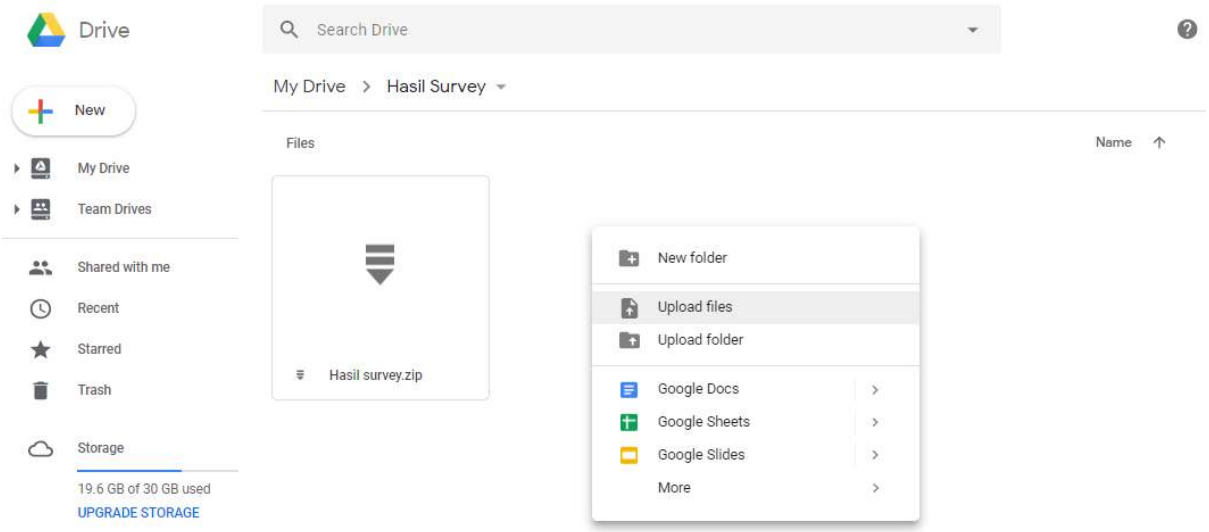


The step for convert to .zip format

- After you move .zip file to your computer, you can upload the file to Google Drive that already set by your mapping supervisor.

The .zip file that ready to move to computer

- You can upload the file to Survey Result folder (or another name that your mapping supervisor made) by click right on your mouse then choose **Upload Files** and choose the file that you want to upload.



The folder on Google Drive for upload .zip file

SUMMARY

If you can follow all the stages in this module, you already then you have successfully understood the use of ODK Collect as a tool for collecting data in the field. In addition, you have also successfully implemented the operation of the initial settings in ODK Collect and how to use ODK Collect to retrieve field data. Later, you will learn about other data collection tools in the field, OpenMapKit (OMK) application.

— title: OpenStreetMap Data Model weight: 2 —

Objectives:

- Understanding Concept of *tag*, *key,* dan *value* in *OpenStreetMap*
- Knowing *OpenStreetMap* wiki page as a guideline for *key* and *value*
- Understanding Objects which can be mapped into *OpenStreetMap*
- Knowing and Understanding data model as a part of mapping preparation plan
- Checking specific *key* and *value* in *TagInfo* website

In this module, you will learn about *key* and *value* concept in *OpenStreetMap* (OSM) as well as data model in OSM objects. Knowing about data model will help you to prepare your mapping activity plan efficiently start from planning, field survey and input the field survey data. You also learn some websites which can help you to find specific information key and value that you need based on OpenStreetMap standard.

I. *Tag*, *Key*, dan *Value* Concept

In *OpenStreetMap* there are 3 types of object. They are: *Nodes*, *Ways*, and *Polygon/Closedways*. Each type of data has information that can represent the object. That information called *Tag* which structured by *key* and *value*.

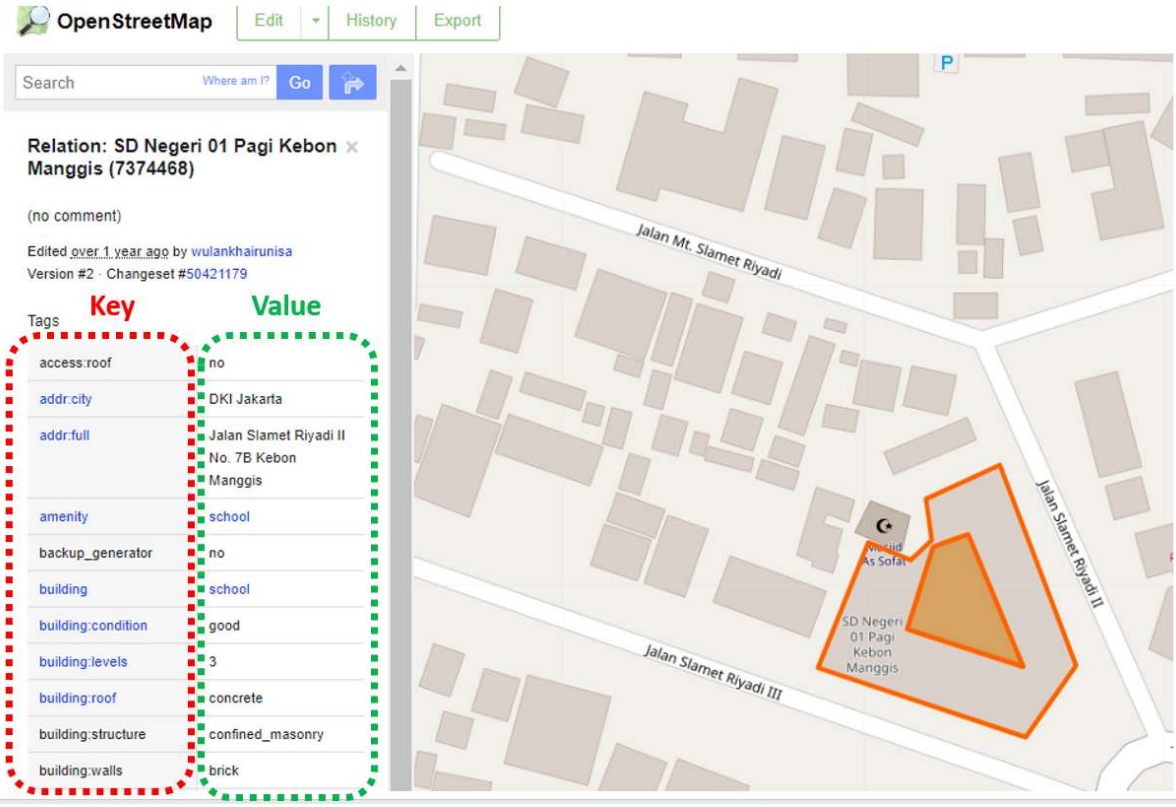
For instance, there is a school in your area. Therefore, the school should be **Tagged** as a school in OpenStreetMap. The school's tag has some details information that make the school being different from other schools. Those information such as name, address, building level, school type, etc. In OpenStreetMap, they are ***Key*** while each information of them called ***Value***.

Example of School *Tag*:

name=SDN Kebon Manggis 11 Pagi

address= Jalan Slamet Riyadi II.

In the example above, "name and address" are ***Key*** while "SDN Kebon Manggis 11 Pagi and Jalan Slamet Riyadi II" are ***Value***. See the image below to see the explanation in OpenStreetMap website:



Key and value of an object on OpenStreetMap

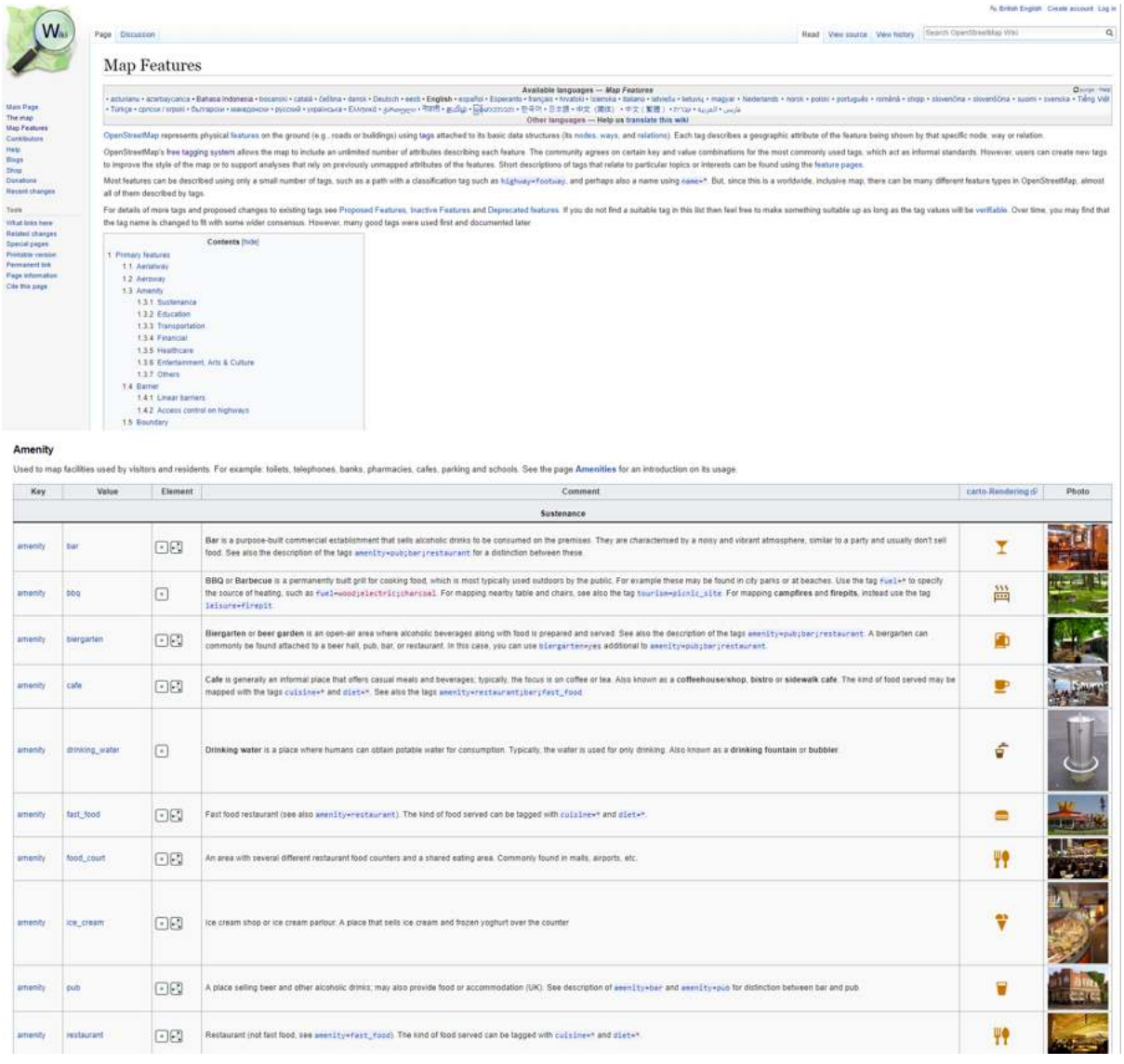
As you can see on the picture above, key and value always written in english according to the OpenStreetMap standard. You do not need to remember all key and value in OpenStreetMap because you can find them in wikipedia *OpenStreetMap* website which will be explained in this module.

II. Wikipedia *OpenStreetMap* to see Key and Value

As a one of mapping participatory platform, OpenStreetMap has millions of contributors all around the globe. Therefore to produce and ensure a good quality data and information in OpenStreetMap, the contributors together established rules and standardization guidelines and put into one open-source platform site called wikipedia.

a. Global Wikipedia *OpenStreetMap*

Further explanation and list of key and value in OpenStreetMap have been made and put into specific OSM wikipedia page called *Map Feature*. In this page, you can search and find any key and value that used in OpenStreetMap globally. To access this page please visit at: https://wiki.openstreetmap.org/wiki/Map_Features



Interface of Map Features Website Page

Every key and value in this page is absolute and has been standard information for any object that you

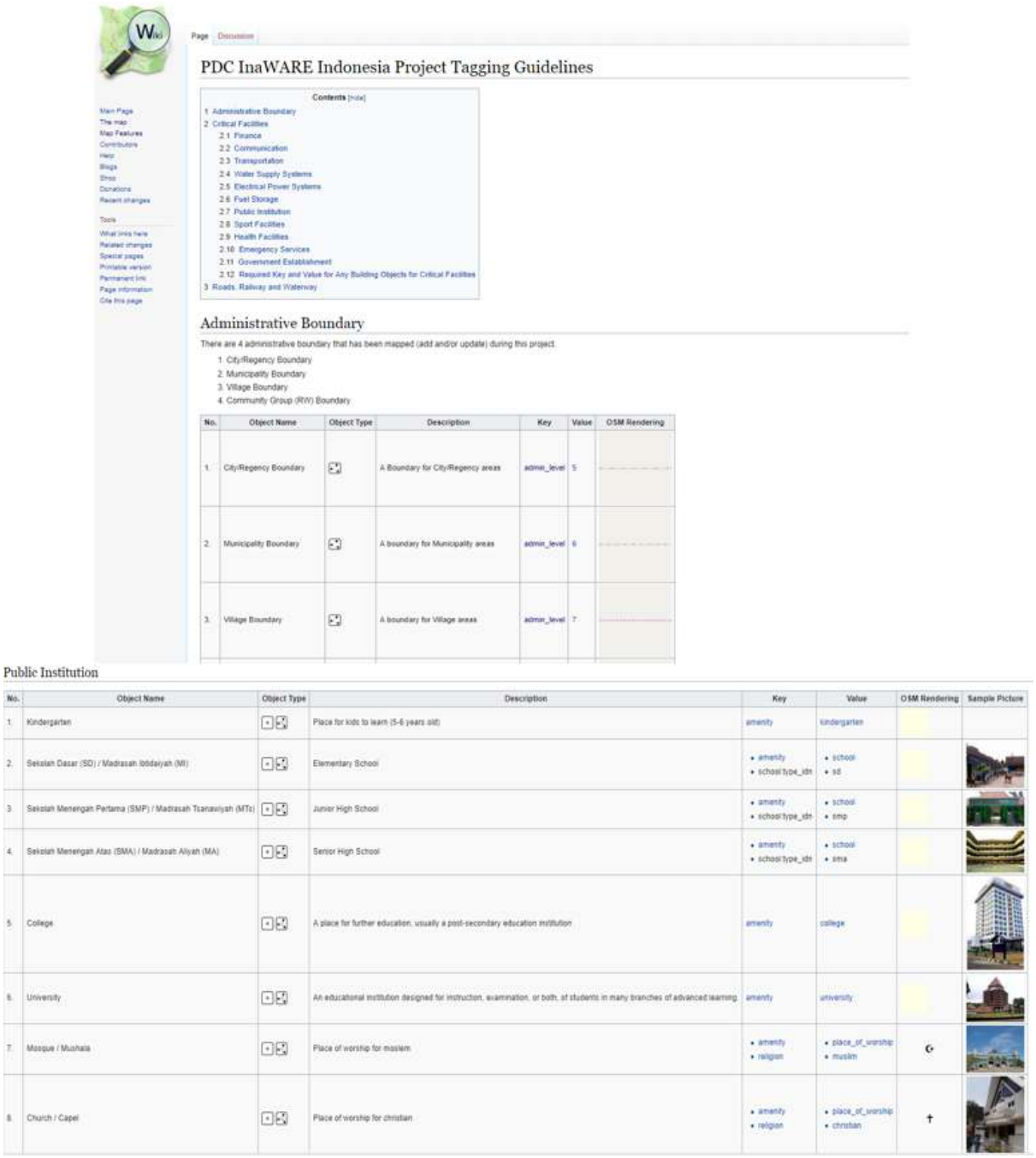
want to map in OpenStreetMap and cannot be changed or modified as you want. Therefore, this page is a guideline for all OSM contributors all over the world to find any information about their mapping object in OpenStreetMap.

b. Indonesia OpenStreetMap Wikipedia

Number of OSM Contributors in Indonesia has been increasing in recent years. As one of biggest OSM contributors in the world, Indonesia OSM contributors need a guideline about key and value information especially particular information for objects in Indonesia. However, they are usually difficult to find a tag that match with the mapping object. There are so many information in the Map Feature page yet sadly most of them are unneeded or unnecessary for objects in Indonesia. Moreover, object's name in Map Feature often can not be recognized by OSM contributors in Indonesia because it is using global name while Indonesia using local name. Therefore, Humanitarian *OpenStreetMap* Team (HOT) Indonesia made another page in OSM wikipedia that shows specific information about key and value mapping objects in Indonesia as a guideline for Indonesia OSM contributors.

Main difference between *Map Features* and Indonesia OSM Wikipedia page is list of the mapping objects. While Map Features shows all information for mapping objects all over the world, Indonesia OSM Wikipedia only showing information about objects in Indonesia and some of them do not available in the map feature. For instance, schools in Indonesia have various information including types of school start usually called SD (elementary school), SMP (junior high school) and SMA (senior high school). Health facilities also has various type depending of its type such as Rumah Sakit (Hospital), Puskesmas (hospital in village level) , Posyandu (hospital in rural area). These information are essential in Indonesia therefore they have been placed in Indonesia OpenStreetMap Wikipedia page. Another example is you only can find name kiosk as a name and key of small store in Map Feature while the name is not familiar and known by most of Indonesian in Indonesia OpenStreetMap Wikipedia page this small store has been given a local name called "warung" even though still has key=kiosk for its tag in OpenStreetMap.

You can see list of objects information in Indonesia OpenStreetMap Wikipedia page by click this link: https://wiki.openstreetmap.org/wiki/Id:Indonesian_Tagging_Guidelines



PDC InaWARE Indonesia Project Tagging Guidelines

Contents [hide]

1 Administrative Boundary
2 Critical Facilities
2.1 Finance
2.2 Communication
2.3 Transportation
2.4 Water Supply Systems
2.5 Electrical Power Systems
2.6 Fuel Storage
2.7 Public Institution
2.8 Sport Facilities
2.9 Health Facilities
2.10 Emergency Services
2.11 Government Establishment
2.12 Required Key and Value for Any Building Objects for Critical Facilities
3 Roads, Railway and Waterway

Administrative Boundary

There are 4 administrative boundary that has been mapped (add and/or update) during this project.

1. City/Regency Boundary
2. Municipality Boundary
3. Village Boundary
4. Community Group (RW) Boundary

No.	Object Name	Object Type	Description	Key	Value	OSM Rendering
1.	City/Regency Boundary		A Boundary for City/Regency areas	admin_level	5	
2.	Municipality Boundary		A boundary for Municipality areas	admin_level	6	
3.	Village Boundary		A boundary for Village areas	admin_level	7	

Public Institution

No.	Object Name	Object Type	Description	Key	Value	OSM Rendering	Sample Picture
1.	Kindergarten		Place for kids to learn (5-6 years old)	amenity	kindergarten		
2.	Sekolah Dasar (SD) / Madrasah Ibtidaiyah (MI)		Elementary School	• amenity • school:type_idn	• school • sd		
3.	Sekolah Menengah Pertama (SMP) / Madrasah Tsanawiyah (MTs)		Junior High School	• amenity • school:type_idn	• school • smp		
4.	Sekolah Menengah Atas (SMA) / Madrasah Aliyah (MA)		Senior High School	• amenity • school:type_idn	• school • sma		
5.	College		A place for further education, usually a post-secondary education institution	amenity	college		
6.	University		An educational institution designed for instruction, examination, or both, of students in many branches of advanced learning	amenity	university		
7.	Mosque / Musholla		Place of worship for moslem	• amenity • religion	• place_of_worship • muslim	☪	
8.	Church / Capel		Place of worship for christian	• amenity • religion	• place_of_worship • christian	✝	

Page of Indonesia OpenStreetMap Wikipedia Page

III. Mapping Objects in *OpenStreetMap*

a. Data types in *OpenStreetMap*

In this module, you have been explained about data types in OpenStreetMap: point (*Nodes*), line (*Ways*) and area (*Polygon/Relation*). These are further explanation of each data type in OpenStreetMap.

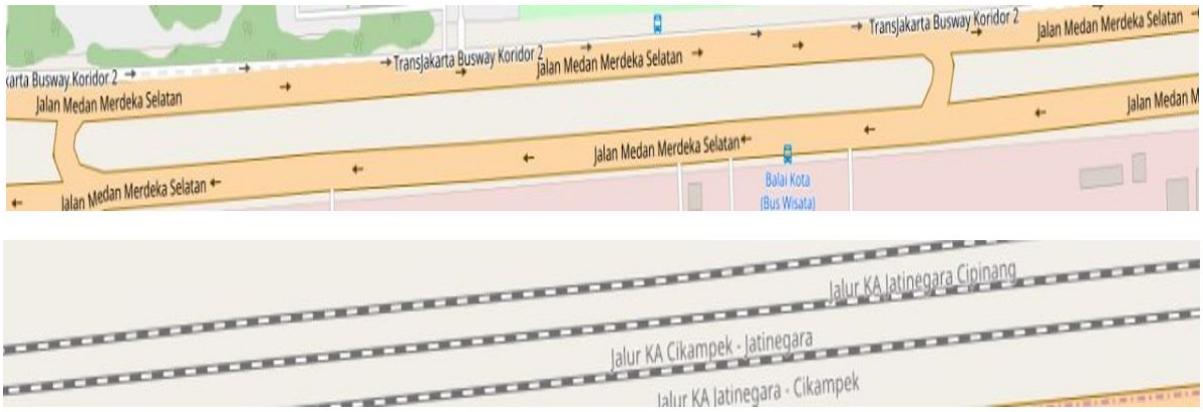
- **Point (*Nodes*)**

Point usually being used to represent position or location of certain object. For instance, objects which drawn as a point (nodes) in OpenStreetMap such as traffic light, gas station or restaurant in a mall or shopping center.

Example of Points in OpenStreetMap

- **Line (*Ways*)**

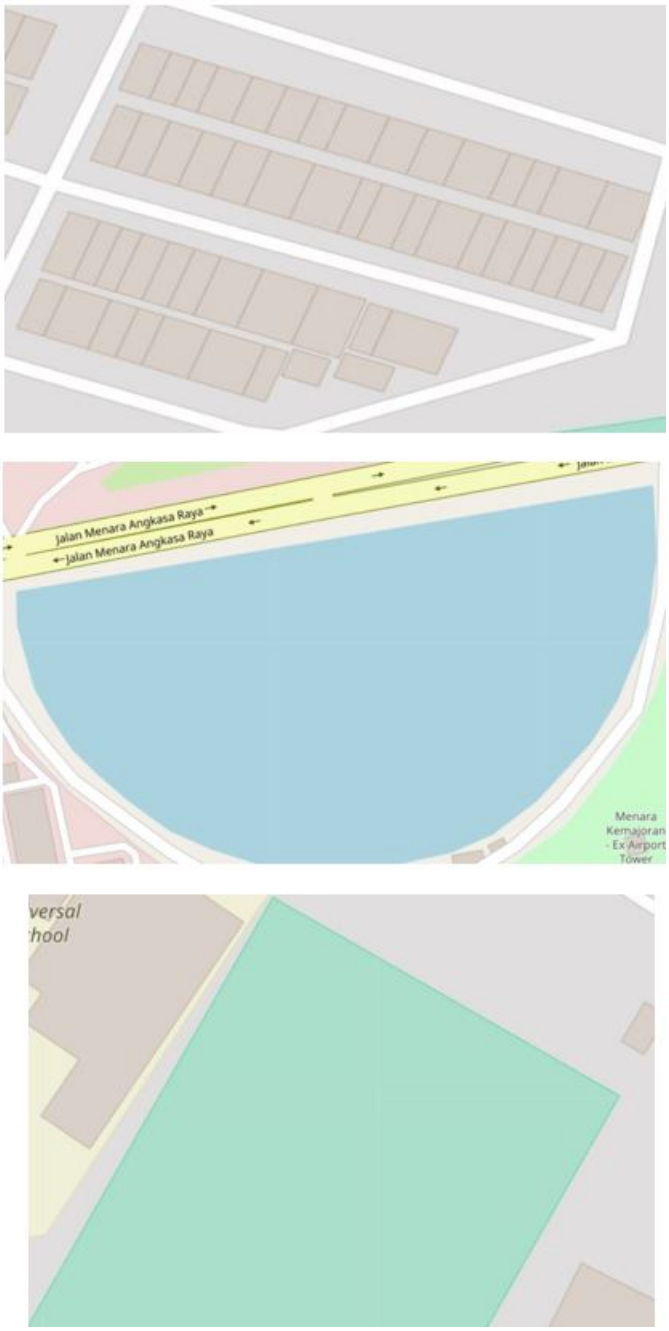
Line is an object that is formed by sequence of points (*nodes*) which connect one to another. Some objects which usually drawn as a line in OpenStreetMap such as road, river, railway and administration boundary.



Example of lines in OpenStreetMap

- **Area (*Polygon*)**

Area is formed by sequence of lines (*ways*) which connect one to another. Some objects in OpenStreetMap such as building, park, land use and lake are drawn as area.



Example of area (polygon) in OpenStreetMap

b. Mapping Objects in HOT-PDC Project

In *OpenStreetMap*, you can map any object on earth surface as long as it is real and permanent. Real means that the object has physical form and can be seen such as building and roads whereas non-real object such as high level or population density. Permanent means the object has specific location and not moving in particular time.

Choosing what objects that we want to map in OpenStreetMap depends on the purposes of the mapping project itself. In HOT-PDC InAWARE, the purpose is to collecting critical infrastructures which can be used for disaster management. These are list of objects that has been mapped into OpenStreetMap in HOT-PDC InAWARE project:

1.Economic Facilities

- Traditional Market
- Supermarket
- Bank

2. **Education Facilities**
   - University
   - College
   - School (SD, SMP, SMA)
   - Kindergarten
3. **Health Facilities**
   - Hospital
   - Clinic
4. **Communication**
   - Communication Tower
5. **Emergency Service**
   - Police Office
   - Fire Station
   - Evacuation Center
   - Hydrant
6. **Government**
   - Government Office (Governor, Mayor, District, Sub-district, village and sub-village office)
   - Embassy
   - Government Institution (Ministry)
7. **Electricity**
   - Power tower
   - Power substation
   - Power Plant
8. **Transportation**
   - Airport
   - Bus Station
   - Train Station
   - Harbour / Dock
9. **Public Facilities**
   - Place of Worship (Mosque, Church, Temple)
   - Sport Facility (Sport Center, Stadium, Sports Field)
   - Public Spaces
10. **Water**
    - Water Tower
    - Water Gate
    - Pump House
    - Embankment
    - River
    - Lake / Dam
11. **Gas Station**
12. **Administration Boundary**
    - City / District Boundary
    - Sub-district boundary
    - Village boundary
    - Sub-village boundary

13. Road Network

IV. Data Mapping Model in *OpenStreetMap*

Data model is a compilation of some information for an object where consisted from key and value in OpenStreetMap. A data model does not have a standard for what information that should be put in an object. The model should be followed the purposes of mapping project. For instance, if you want to map school in you area and you need information of **school name**, **address**, **school type**, **school operator**, and **building level** then your data model should be like this:

School Tag Information Table

key	(possible) values
amenity	school
building	school
school:type_idn	sd [SD/MI (Elementary School)], smp [SMP/MTs (Junior High School)], sma [SMA/SMK/MA (Senior High School)]
name	(building name)
addr:full	(address)
operator:type	government, private, community
building:levels	(number of building floor)

amenity=school is a compulsory tag for the school information. *Key* and *value* in this tag are main information that identify the object as a school.

building=school is a tag that show the school has its own building. Some schools are located in another building such as government office area therefore if that was the case then this tag is unnecessary.

a. HOT-PDC InAWARE Data Model

The purpose of HOT-PDC InAWARE mapping project is to gather information of critical infrastructures in context of disaster management. Therefore, you need to create data model that can help the survey team to collect the information in the field and upload them into OpenStreetMap. These are data model for each priority object in HOT-PDC InaWARE mapping project:

Color Information:

- Warna biru the *key* and *value* are compulsory for the object.
- Warna merah the _key _and _value _are information for building of the object. This tag /information only collected if the object has its own building. Otherwise, the tag is unnecessary.
- Warna hitam artinya *key* dan *value* tersebut **sebaiknya** dimasukkan ke dalam objek pemetaan baik objek tersebut memiliki bangunan sendiri ataupun menumpang di bangunan yang lain.
- Black color means the *key* and *value* **should be** added regardless the object has its own building or not.

1.Economic Facilities

- Table of Traditional Market Data Model

key

possible values

amenity

marketplace

building

marketplace

name

addr:full

addr:city

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

ground_floor:height

building ground floor to the surface in metre

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

- Table of Supermarket Data Model

key

possible values

shop

supermarket

building

supermarket

name

addr:full

addr:city

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass
building:floor
ground, wood, cement, tekhel, ceramics
building:roof
tile, tin, asbestos, concrete
access:roof
yes, no
ground_floor:height
poor, good
building: condition
building ground floor to the surface in metre
backup_generator
yes, no
source
HOT_InAWARESurvey_2018

- Table of Bank Data Model

key
possible values
amenity
bank
building
bank
name
addr:full
addr:city
capacity:persons
<50, 50-100, 100-250, 250-500, >500
building:levels
building:structure
confined_masonry, steel_frame, wood_frame, bamboo_frame
building:material
brick , concrete, wood, bamboo, glass
building:floor
ground, wood, cement, tekhel, ceramics
building:roof
tile, tin, asbestos, concrete
access:roof
yes, no
building: condition

poor, good

ground_floor:height=

building ground floor to the surface in metre

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

2. Education Facilities

- Table of University Data Model

key

possible values

amenity

university

building

university

name

addr:full

addr:city

operator:type

government, private, community

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

ground_floor:height=

building ground floor to the surface in metre

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

evacuation_center

yes, no

shelter_type

tent, building

water_source

water_works, manual_pump, powered_pump

kitchen:facilities

yes, no

toilet:facilities

yes, no

toilets:number

- Table of College Data Model

key

possible values

amenity

college

building

college

name

addr:full

addr:city

operator:type

government, private, community

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

ground_floor:height=

building ground floor to the surface in metre

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

evacuation_center

yes, no

shelter_type

tent, building

water_source

water_works, manual_pump, powered_pump

kitchen:facilities

yes, no

toilet:facilities

yes, no

toilets:number

- Table of School Data Model (SD, SMP, SMA)

key

possible values

school:type_idn

sd [SD/MI (Elementary School)], smp [SMP/MTs (Junior High School)], sma [SMA/SMK/MA (Senior High School)]

amenity

school

building

school

name

addr:full

addr:city

operator:type

government, private, community

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

ground_floor:height=

building ground floor to the surface in metre

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

evacuation_center

yes, no

shelter_type

tent, building

water_source

water_works, manual_pump, powered_pump

kitchen:facilities

yes, no

toilet:facilities

yes, no

toilets:number

- Table of Kindergarten Data Model

key

possible values

amenity

Kindergarten [PAUD/ Play Group / TK (Early education / Play group / Kindergarten)]

building

kindergarten

name

addr:full

addr:city

operator:type

government, private, community

capacity:persons

<50, 50-100, 100-250, 250-500, >500
building:levels
building:structure
confined_masonry, steel_frame, wood_frame, bamboo_frame
building:material
brick , concrete, wood, bamboo, glass
building:floor
ground, wood, cement, tekhel, ceramics
building:roof
tile, tin, asbestos, concrete
access:roof
yes, no
building: condition
poor, good
ground_floor:height=
building ground floor to the surface in metre
backup_generator
yes, no
source
HOT_InAWARESurvey_2018

3. Health Facilities

- Table of Hospital Data Model

key
possible values
amenity
hospital
name
addr:full
addr:city
operator:type
government, private, community
building
hospital
capacity:persons
<50, 50-100, 100-250, 250-500, >500
building:levels
building:structure
confined_masonry, steel_frame, wood_frame, bamboo_frame
building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

ground_floor:height

building ground floor to the surface in metre

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

evacuation_center

yes, no

shelter_type

tent, building

water_source

water_works, manual_pump, powered_pump

kitchen:facilities

yes, no

toilet:facilities

yes, no

toilets:number

- Table of Clinic Data Model

key

possible values

amenity

clinic

name

addr:full

addr:city

operator:type

government, private, community

building

clinic

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

ground_floor:height

building ground floor to the surface in metre

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

evacuation_center

yes, no

shelter_type

tent, building

water_source

water_works, manual_pump, powered_pump

kitchen:facilities

yes, no

toilet:facilities

yes, no

toilets:number

4. Communication

- Table of Communication Tower Data Model

key

possible values

man_made

tower

tower:type

communication

name

height

operator

Telkomsel, Indosat, XL, Tri, Smartfren

communication:mobile

yes,no

communication:radio

yes,no

addr:city

source

HOT_InAWARESurvey_2018

5. Emergency Services

- Table of Police Office Data Model

key

possible values

amenity

police

building

police

name

addr:full

addr:city

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

ground_floor:height

building ground floor to the surface in metre

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

- Table of Fire Station Data Model

key

possible values

amenity

fire_station

building

fire_station

name

addr:full

addr:city

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

ground_floor:height

building ground floor to the surface in metre

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

- Table of Hydrant Data Model

key

possible values

emergency

fire_hydrant

fire_hydrant:type

underground, pillar, wall, pond

name

operator

addr:city

source

HOT_InAWARESurvey_2018

6. Government

- Table of Government Office Data Model Model (Governor, Mayor, District, Sub-district, village and sub-village office)

key

possible values

office

government

building

governor_office, townhall, subdistrict_office, village_office , community_group_office

admin_level

4 (governor office), 5 (town hall), 6 (subdistrict office), 7 (village office), 9 (subvillage office)

name

addr:full

addr:city

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

ground_floor:height

building ground floor to the surface in metre

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

evacuation_center

yes, no

shelter_type

tent, building

water_source

water_works, manual_pump, powered_pump

kitchen:facilities

yes, no

toilet:facilities

yes, no

toilets:number

- Table of Government Institution Data Model (Ministry)

key

possible values

office

government

building

government_office

name

addr:full

addr:city

admin_level

7 (village level), 6 (sub district level), 5 (city level), 4 (Province level)

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

7. Electricity

- Table of Power Tower Data Model

key

possible values

power

tower

name

addr:city

operator

source

HOT_InAWARESurvey_2018

- Table of Power Sub Station Data Model

key

possible values

power

substation

substation

transmission (Main substation), distribution (Distribution sub station)

building

power_substation

name

<power substation name>

addr:city

rating

<user define>

operator

source

HOT_InAWARESurvey_2018

- Table of Power Plant Data Model

key

possible values

power

plant

building

power_plant

name

operator

addr:full

addr:city

operator

source

HOT_InAWARESurvey_2018

8. Transportation

- Table of Airport Data Model

key

possible values

aeroway

aerodrome

building

aerodrome

Name

addr:full

addr:city

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

- Table of Bus Station Data Model

key

possible values

amenity

bus_station

name

addr:full

addr:city

source

HOT_InAWARESurvey_2018

- Table of Train Station Data Model

key

possible values

railway

station

name

ele

operator

addr:full

addr:city

source

HOT_InAWARESurvey_2018

- Table of Harbour / Dock Data Model

key

possible values

amenity

ferry_terminal

building

ferry_terminal

name

addr:full

addr:city

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

9. Public Facilities

- Table of Place of Worship Data Model

key

possible values

amenity

place_of_worship

religion

muslim, christian, hindu, buddhist, confucian

name

addr:full

addr:city

building

mosque, church, temple

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry (Rangka beton bertulang), steel_frame (Rangka baja), wood_frame (Rangka kayu), bamboo_frame (Rangka bambu)

building:material

brick (Bata), concrete (Beton), wood (Papan kayu), bamboo (Bambu), glass (Kaca)

building:floor

ground (Tanah), wood (Papan kayu), cement (Plester / Semen), tekhel (Tegel), ceramics (Keramik)

building:roof

tile (Genteng), tin (Seng), asbestos (Asbes), concrete (Beton)

access:roof

yes (Ada), no (Tidak ada)

building: condition

poor (Buruk), good (Baik)

ground_floor:height=

Tinggi bangunan dari jalan dalam satuan meter

backup_generator

yes (Ada), no (Tidak ada)

source

HOT_InAWARESurvey_2018

evacuation_center

yes (Ya), no (Bukan)

shelter_type

tent (Tenda), building (Bangunan)

water_source

water_works (PDAM), manual_pump (Pompa Tangan), powered_pump (Mesin Pompa)

kitchen:facilities

yes (Ada), no (Tidak ada)

toilet:facilities

yes (Ada), no (Tidak ada)

toilets:number

- Tabel Model Data Fasilitas Olahraga (GOR,Lapangan Olahraga, Stadium)

key

possible values

leisure

stadium (Stadion), sports_centre (Pusat Kegiatan Olahraga / GOR), pitch (Lapangan Olahraga)

building

stadium, sports_centre, yes (futsal field)

name

addr:full

addr:city

sport

soccer,futsal,basketball,badminton,tennis,volleyball,swimming,athletics,

baseball,cycling,multi

capacity:persons

<50, 50-100, 100-250, 250-500, >500

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

ground_floor:height

building ground floor to the surface in metre

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

evacuation_center

yes, no

shelter_type

tent, building

water_source

water_works, manual_pump, powered_pump

kitchen:facilities

yes, no

toilet:facilities

yes, no

toilets:number

- Table of Park Data Model

key

possible values

leisure

park

name

addr:full

addr:city

source

HOT_InAWARESurvey_2018

evacuation_center

yes, no

shelter_type

tent, building

water_source

water_works, manual_pump, powered_pump

kitchen:facilities

yes, no

toilet:facilities

yes, no

toilets:number

10. Sarana Perairan

- Table of Water Tower Data Model

key

possible values

man_made

water_tower

name

operator

addr:city

source

HOT_InAWARESurvey_2018

- Table of Flood Gate Data Model

key

possible values

waterway

floodgate

name

operator

floodgate:unit

elevation

condition

good , poor

addr:city

source

HOT_InAWARESurvey_2018

- Tabel Model Data Rumah Pompa

key

possible values

man_made

pumping_station

building

pumping_station

name

addr:full

addr:city

operator

pump:unit

elevation

capacity:pump

<pump capacity (l/s)>

building:levels

building:structure

confined_masonry, steel_frame, wood_frame, bamboo_frame

building:material

brick , concrete, wood, bamboo, glass

building:floor

ground, wood, cement, tekhel, ceramics

building:roof

tile, tin, asbestos, concrete

access:roof

yes, no

building: condition

poor, good

backup_generator

yes, no

source

HOT_InAWARESurvey_2018

- Table of Embankment Data Model

key

possible values

man_made

embankment

name

material

concrete, stone, soil, sand

source

HOT_InAWARESurvey_2018

- Table of River Data Model

key

possible values

waterway

river, riverbank, canal

name

width

source

HOT_InAWARESurvey_2018

- Table of Reservoir Data Model

key

possible values

landuse

reservoir

name

operator

addr:city

source

HOT_InAWARESurvey_2018

11. Gas Station

- Table of Gas Station Data Model

key

possible values

amenity

fuel

name

addr:full

addr:city

operator

<PT Pertamina, Shell, etc>

source

HOT_InAWARESurvey_2018

12. Administration Boundary

key

possible values

type

boundary

boundary

administrative

name

admin_level

4 (Province), 5 (City / District), 6 (Sub-district), 7 (Village), 8 (Hamlet), 9 (Sub-Village), 10 (Sub-sub Village)

is_in:province

is_in:city (City)

is_in:town (District)

is_in:municipality

is_in:village

is_in:RW

flood_prone

[*only for sub village relation]

yes,no

landslide_prone

[*only for sub village relation]

yes,no

source

HOT_InAWARESurvey_2018

13. Road Network

key

possible values

highway

motorway , trunk , primary , secondary , tertiary , service , residential , pedestrian, path , living_street, track

name

layer

5,4,3,2,1,-1,-2,-3,-4,-5

width

lanes

surface

asphalt , concrete, metal, wood, grass, ground, gravel, mud, sand, paving_stones

smoothness

good, intermediate, bad, impassable

motorcycle

yes,no

oneway

yes, no

ref

source

HOT_InAWARESurvey_2018

---

b. Data Type in OpenStreetMap Based on Object

After knowing data model based on object tag in OpenStreetMap particularly in HOT-PDC InAWARE Project, you also need to know data type based on the object itself. The table below shows you what type of data for each object that you can add into OpenStreetMap:

Color Information:

- Green Color means the object **allowed** to be mapped in that data type
- Red Color means the object **not allowed** and **prohibited** to be mapped in that data type

Table of Object and Its Data Type in *OpenStreetMap*

No	Infrastructure	Object	Data Type			
			Point (Nodes)	Polygon (Building)	Polygon (Area)	Line (*Ways*)
1	Economic Facilities	Traditional Market				
2		Supermarket				
3		Bank				
4	Education Facilities	University				
5		College				
6		School				
7		Kindergarten				
8	Health Facilities	Hospital				
9		Small Hospital, Clinic				
10	Communication	Communication Tower				
11	Emergency Services	Police Office				
12		Fire Station				
13		Hydrant				
14	Government	Government Office (Governor, Town Hall, Sub District, Village, Sub Village)				
15		Government Institution (Ministry)				
16	Electricity	Power Tower				
17		Power Sub Station				
18		Power Plant				
19	Transportation	Airport				
20		Bus Station				
21		Train Station				
22		Harbour / Dock				
23	Public Facilities	Place of Worship (Mosque, Church, Temple)				
24		Sport Facilities (Stadium, Sports Field, Sport Center)				
25		Park				
26		Gas Station				
27	Water	Water Tower				
28		Water Gate				
29		Pump House				
30		Embankment				
31		River				
32		Lake / Dam				
33	Administration Boundary	Administration Boundary (City, Sub-District, Village, Sub-Village)				
34	Road Network	Road Network				

Figure 1: Object Data Type Table

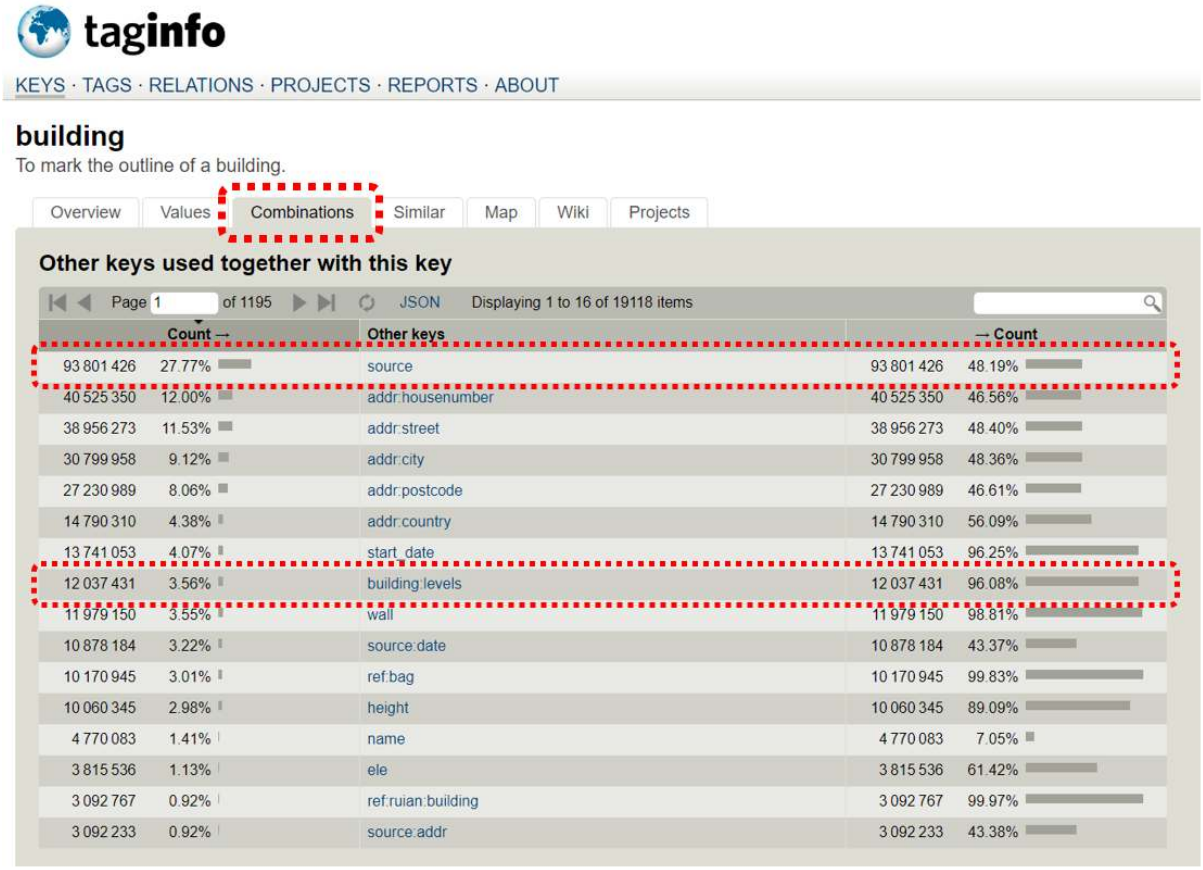
V. Search *key* and *value* in *Tag Info* Website

On previous subchapter, you have been explained about a guideline to see key and value in *OpenStreetMap* using *Map Features* and Indonesia OpenStreetMap Wikipedia page. However, there are certain *key* and *value* that do not explained in the page especially detail and specific information of certain object. For instance, for **building capacity** or **building floor material**. To see the information (*tag*) you can visit a website called tag info: https://taginfo.openstreetmap.org/

Tag Info Website Interface

The picture above shows *KEYS* colom where showing some most searched keys by OpenStreetMap contributor such as *building, highway, name, source*, etc. Moreover, you also can see combination between certain *key* and *value* (tag) which quite common such as *building=yes* and *highway=residential* *TAGS* colom or you can search your key manually in search box at the top right corner on the website page.

For example, if you want to search information about **how to put your mapping activity as a source of the object** or **Level of Certain Building**, you can click building option in *Keys* colom and you will see this:



Example Combination of tag and value in Tag Info

You can choose *Combinations* tab and you will see some combinations for *building* key that commonly used by *OpenStreetMap* contributor. For instance, if you are looking for information about source of building and building level, you can use ***source*** and ***building:levels***. Moreover, you can see another combination for key and value related to building. You can see how often the key have been used in OpenStreetMap by look at *Count* colom. The bigger the number means the key more often and commonly used by OpenStreetMap contributors all over the world.

> Notes : key and value in OpenStreetMap HAVE TO BE WRITTEN in English key and value in OpenStreetMap HAVE TO BE WRITTEN in lower case Information interface can be set to show in Bahasa Indonesia on JOSM by editing / make special presets Make new presets will be explained in other module called Making OpenStreetMap Presets

SUMMARY

Congratulation! You have learned about data model in *OpenStreetMap* . This material is important and really to be understand by OpenStreetMap contributors so you can do your mapping based on international standard from OpenStreetMap community guidelines. Moreover, you also have known about certain websites which can help you to find the information (tag) for you mapping objects such as OSM wiki *Map Feature* Indonesia, OpenStreetMap Wikipedia page, and *Tag Info*.

Using the OpenMapKit Application

Objectives:

- Able to explain *OpenMapkit* as one of the tools for collecting infrastructure data
- Able to operate the initial setup for *OpenMapKit*
- Able to operate how to enter offline basemap for *OpenMapKit*
- Able to operate *OpenMapKit*

Previously you already learn the *ODK (OpenDataKit) Collect,* an android-based application to replace paper form for surveys. *ODK Collect* has extension called *OpenMapKit (OMK)*. This extension is used to add information on the position or location of the object surveyed.

I. What is *OpenMapKit*

(OMK) OpenMapKit is an additional application that is used to support *ODK Collect* in determining the position of objects found during precise and precise field surveys. *OpenMapKit* can be run through *ODK Collect*, after you open and select one of the available forms. In determining the location of an object, *OpenMapKit* requires a map background in the form of a satellite imagery or OSM map. If you use the OSM as the map background, the thing to note is that the data must be available on the OSM server. Currently *OpenMapKit* only available on Android. You can download *OpenMapKit* for free through the *Play Store*.

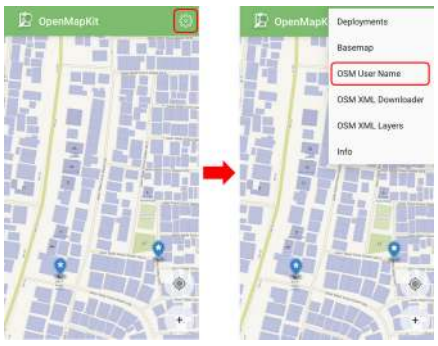
OpenMapKit application on the Play Store

> Note: To be able to use OpenMapKit You have to install latest version of ODK (OpenDataKit) Collect, because the form filled in OpenMapKit is sourced from ODK Collect.

II.Initial settings *OpenMapKit*

Before you use *OpenMapKit*, you must first make initial setup. The following are step by steps of the initial *OpenMapKit setup*:

- On the home page of *OpenMapKit*, press **the settings button** located in the upper right corner.
- Select **OSM *User name*** OSM and enter your *User Name*



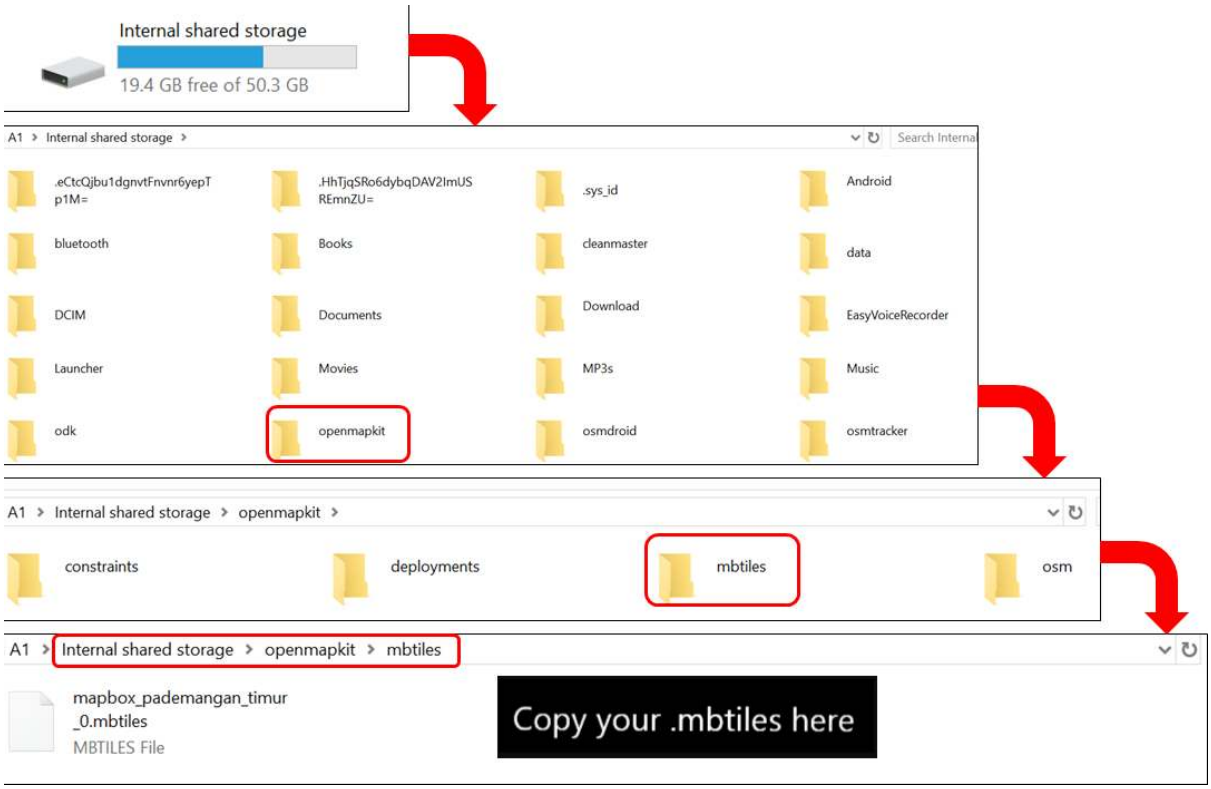
Display settings menu OpenMapKit

- By default, *OpenMapKit* will display the *Online Humanitarian OpenStreetMap*.

III. Import the offline *basemap* for *OpenMapKit*

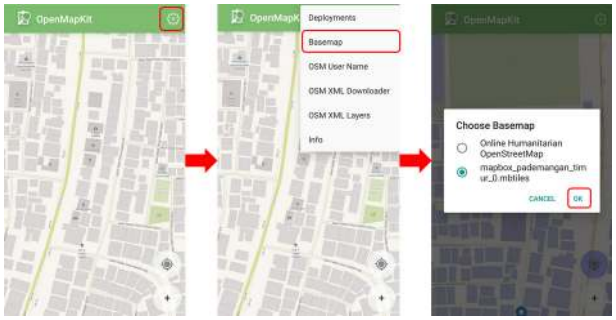
OpenMapKit provides an OSM map as a *basemap* that must be accessed using an internet connection. But don't worry, you can also enter offline basemap into *OpenMapKit* which is a map that can be opened without an internet connection. An offline basemap can make it easier for you to add information right at the location you are surveying. Here's how to add offline basemap:

- The format of the data used as a offline basemap in the application *OpenMapKit* should be formatted as .mbtiles. To create *.mbtiles* can be seen in the module **Make Mbtiles for OMK (*OpenMapKit*).** After you have the *.mbtiles* file, connect your *smartphone* to your computer / laptop. Open the folder containing *the .mbtiles* file that will be copied to your smartphone. Select the *.mbtiles* file then copy it to **openmapkit → mbtiles** folder your internal storage.



Process of adding .mbtiles files to OpenMapKit

- If you have successfully copied *.mbtiles*, you can change the *OpenMapKit basemap* by pressing **the settings button** located in the top right corner and pressing ***Basemap*** then select the *.mbtiles* that you just entered. Then press ***OK***.



Display basemap settings in OpenMapKit

IV. Basic Operation *OpenMapKit*

1. **Download OSM data in *OpenMapKit***

   Existing OSM data can be easier for you to add information about the building because you can choose the building directly and start adding an information based on the field. Therefore, you should download OSM first data before adding new information. Here's how to download OSM data in *OpenMapKit*:

   - Navigate the map to your current location (for example, you are already on the survey location) by pressing **the round button** in the lower right corner of the screen until the round button is colored blue. A black dot will appear at your current location.

   Navigate to the current location in OpenMapKit

   - Press the **settings button** in the top right corner
   - Select ***OSM XML Downloader*** to start download OSM data according to the view on the screen of your smartphone (the duration depends on the size of the area). Make sure you are connected to an internet connection when downloading OSM data. Note the color of the building, the building on the OSM _basemap _have brown color and the building from ***OSM XML Downloader*** is purple.

   Building color on the OSM basemap (left) and downloaded building color (right)

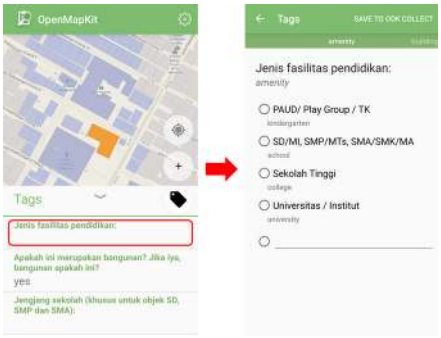
   - Your new downloaded OSM data will be saved in the format *.osm* which can be activated or deactivated via **the settings button → *OSM XML Layer***.

OSM XML Downloader menu and OSM XML Layers menu

2. **Add building information in *OpenMapKit***

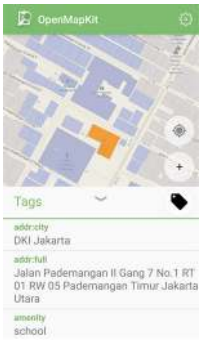
   If you have successfully downloaded building data from OSM, you can add the building information by:

   - Select the building to which the information will be added. Make sure the building is purple which indicates that the building has been downloaded from OSM. If the building is selected, the color will change to orange.
   - You can fill the building information in accordance with the form you have chosen before in the *ODK Collect* application, with press the information tag in the first row located below.



Fill out building information using a form from ODK Collect.

   - When done, at the end of the page select ***Save*** to save the form to *ODK Collect*. If you have completed filling in the form, the building that you fill in the information will look like this:



Building that has been filled in the information

If the building data for location of your survey is not yet available in the OSM, you can map the building before conducting the survey. If you don't have time to do the mapping, you can use points to mark the object in the *OpenMapKit* by:

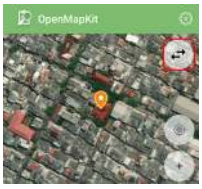
   - Use *.mbtiles* you have entered previously to help mark the object accurately click **Settings → *Basemap***
   - Press **the plus (+) icon** in the lower right corner of your screen until it turns green. It will appear green marker with the words *Add Node* on it. Slide the map until the location of the marker is accurate with the object in the field.

Add markers using the plus (+) icon

- Press ***Add Node*** if the point is accurate

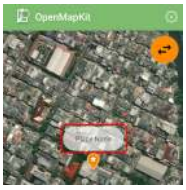
Add note button when add point

- If the point you add turns out to be in a position that is not in represent with the object in the field, you can move the point that has been added by clicking on the point to move then press the two arrow icon in the top right corner. The color of the point will turn orange and above it will be appear *Place Node*.



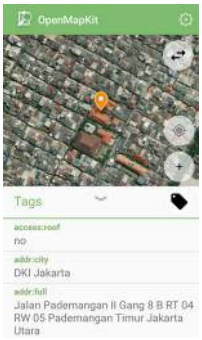
Swipe points that have been added

- Slide the map to the accurate point position, then press ***Place Node***.



Place node button when shifting a point

- After the position is accurate as the object in the field, you can fill out the form the same as the previous step.
- Enter information that matches the conditions in the field. Swipe the screen right or left to change thepage questionon the form.
- At the end of the page, select ***Save*** to save the form to *ODK Collect*. If you finished to fill in forms, the marker that you fill in the information will look like this:



Point of objects already loaded with informations

- Now you can see the form has been successfully saved on the *ODK Collect*.

SUMMARY

If you can follow and pay attention to all the stages in this chapter, you have successfully understood *OpenMapKit* as one of the field survey tools for collect infrastructure data. In addition, you have also successfully implemented the initial setup of *OpenMapKit*, how to enter offline *basemap* for *OpenMapKit* and how to use *OpenMapKit* to retrieve infrastructure data.

— title: Using YAML weight: 4 —

Objectives:

- To be able to explain about YAML concept
- To be able to create YAML for export data in Export Tool
- To be able to demonstrate how to get OSM data in Export Tool using YAML

As explained before, we have learned how to create a customized presets on OpenStreetMap and determine the OpenStreetMap data model to use in the mapping process. In the chapter Using Export Tool, we found the result data attributes only show the attribute from the OSM format. Therefore, you can use YAML to download the OSM data with the specific attribute that will be the same with the OpenStreetMap data model.

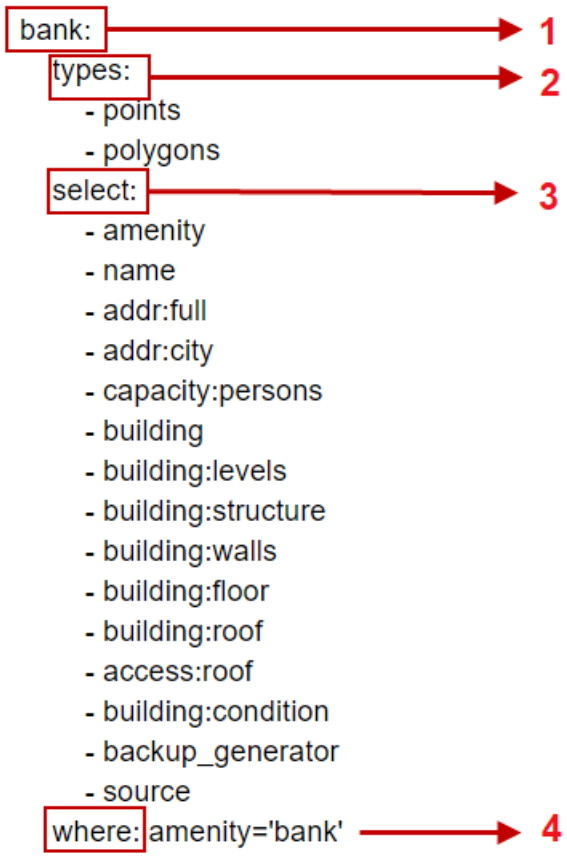
I. YAML Concept

YAML ("YAML Ain't Markup Language") is a human-readable data serialization language. It is commonly used for configuration files, but could be used in many applications where data is being stored (e.g. debugging output) or transmitted (e.g. document headers). We can use to create data structures in YAML format according to tag (key and value) in the OpenStreetMap data model.

II. Creating YAML to Data Filter in Export Tool

a. YAML Structure Data

There are 4 sections to define a YAML structure: 1. Title = define the name of file 2. Types = define the name of mapping, consist of points, lines, and polygons 3. Select = define key from OSM data 4. Where = define key and value by OSM data to pull up the data



YAML Structure for OSM data

b. Requirements to Creating YAML Structures Data

There are some requirements that important to create the YAML structure: * All formats are lowercase, Not allow the uppercase * The position of the title has to put at the beginning of the document. Using the (_) sign to separate the title, an example bank_points
* The position of all formats are equal, an example in the image above

c. Creating YAML

We will create the YAML structure form OpenStreetMap Data Model that you can open the chapter **OpenStreetMap data Model** to refer the lists of OSM data Models that the objects mapped in the project. There are steps to create the YAML:

- Open the lists OSM data model or you can create a table like below

Bank Tag Information Table

key	possible values
amenity	bank
building	bank
amenity	bank
name	fill the name of bank
addr:full	detail of address
capacity	<50, 50-100, 100-250, 250-500, >500
building:levels	number
building:structure	confined_masonry, steel_frame, wood_frame, bamboo_frame
building:walls	brick, concrete, wood, bamboo, glass
building:floor	ground, wood, cement, tekhel, ceramics
building:roof	tile, tin, asbestos, concrete
access:roof	yes, no
building:condition	poor, good
backup_generator	yes, no

- Open Notepad that already on your computer
- The first line, type the name of title, an example bank

```
bank:
```

- The second line, click enter + space four times and typing the **types:**, and click enter + space eight times + typing **- points/polygons/lines**, an example

```
types:
    - points
    - polygons
```

- Click enter on your keyboard and suitable the position with “types:”, and type **select:** → enter + space eight times and type the lists of the key in the Bank Tag Information Table.

```
    select:
- amenity
- name
- addr:full
- addr:city
- capacity:persons
- building
- building:levels
- building:structure
- building:walls
- building:floor
- building:roof
```

```
    - access:roof
    - building:condition
    - backup_generator
    - source
```

- The last step, click enter and suitable position types and select → type **where: key dan value**

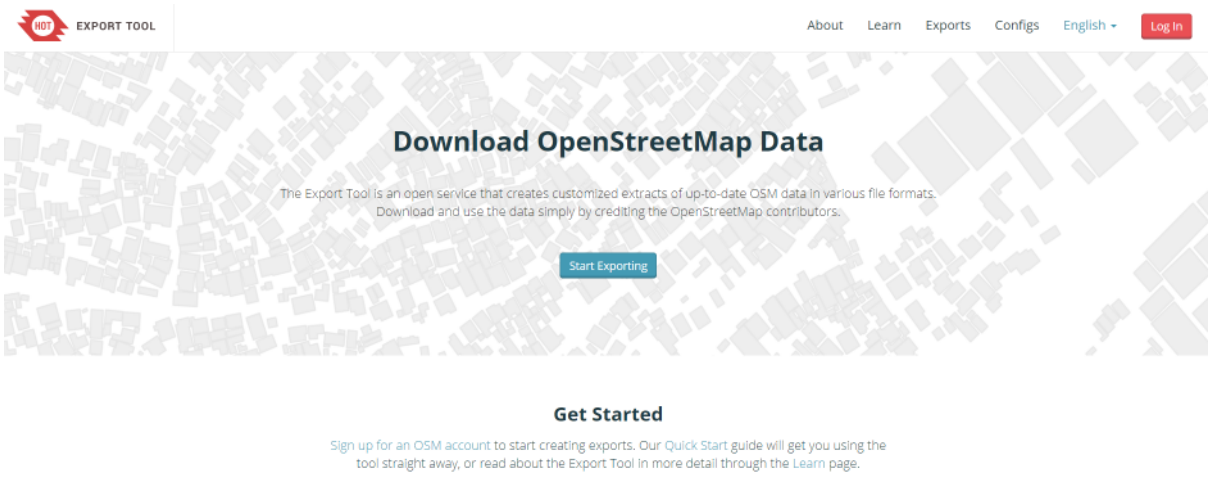
```
 where: amenity='bank'
```

- If the format was completed, you can save the format in .txt file in your computer.

```
bank:
    types:
        - points
        - polygons
    select:
        - amenity
        - name
        - addr:full
        - addr:city
        - capacity:persons
        - building
        - building:levels
        - building:structure
        - building:walls
        - building:floor
        - building:roof
        - access:roof
        - building:condition
        - backup_generator
        - source
```

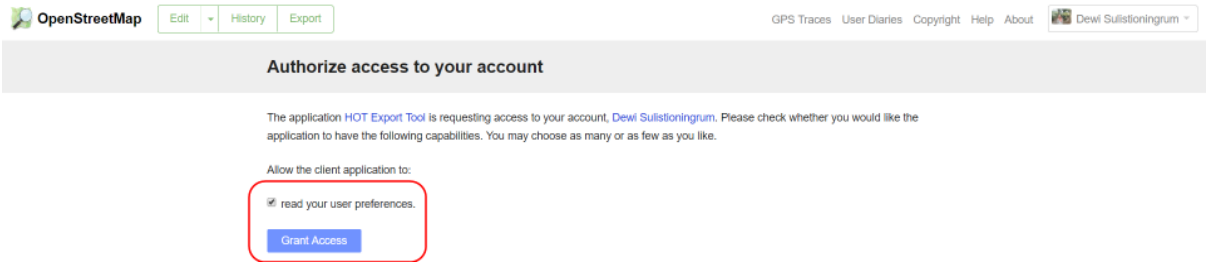
III. How to Using YAML in Export Tool

a. Login with OSM account * Open your browser, and type this link https://export.hotosm.org



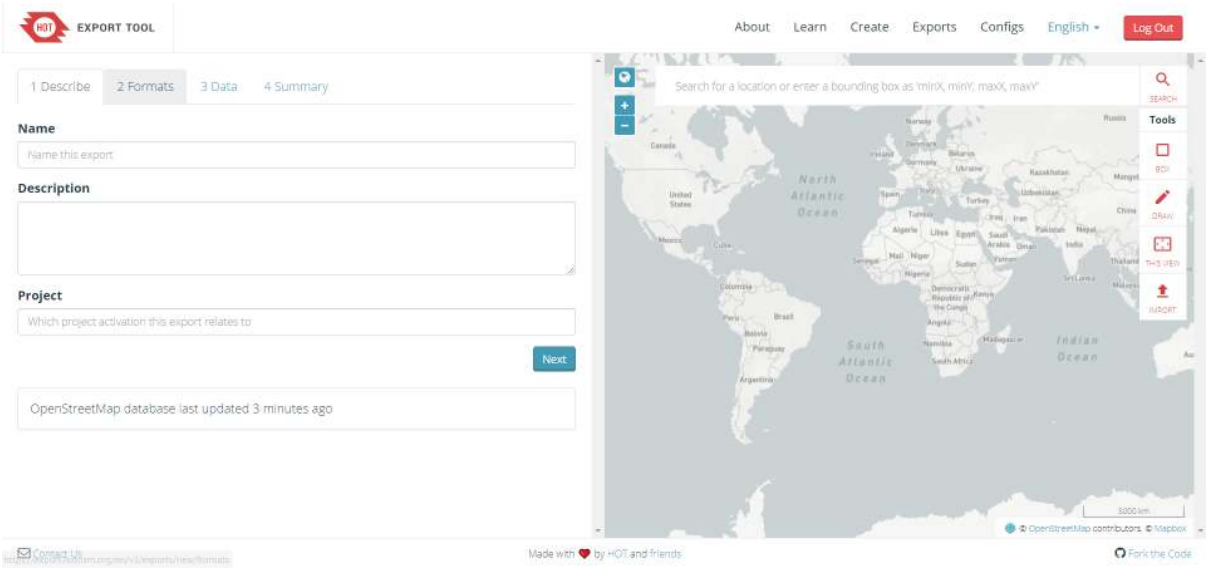
The interface of Export Tool

- The first we have login with your OSM account to using Export Tool. Click on **Login** in the right corner. The next click on 'Authorize access to your account' → **Grant Access**.



Login to Export Tool

- To create a new project in Export Tool click on **Start Exporting**
- The Export Tool window will be displayed like the image below

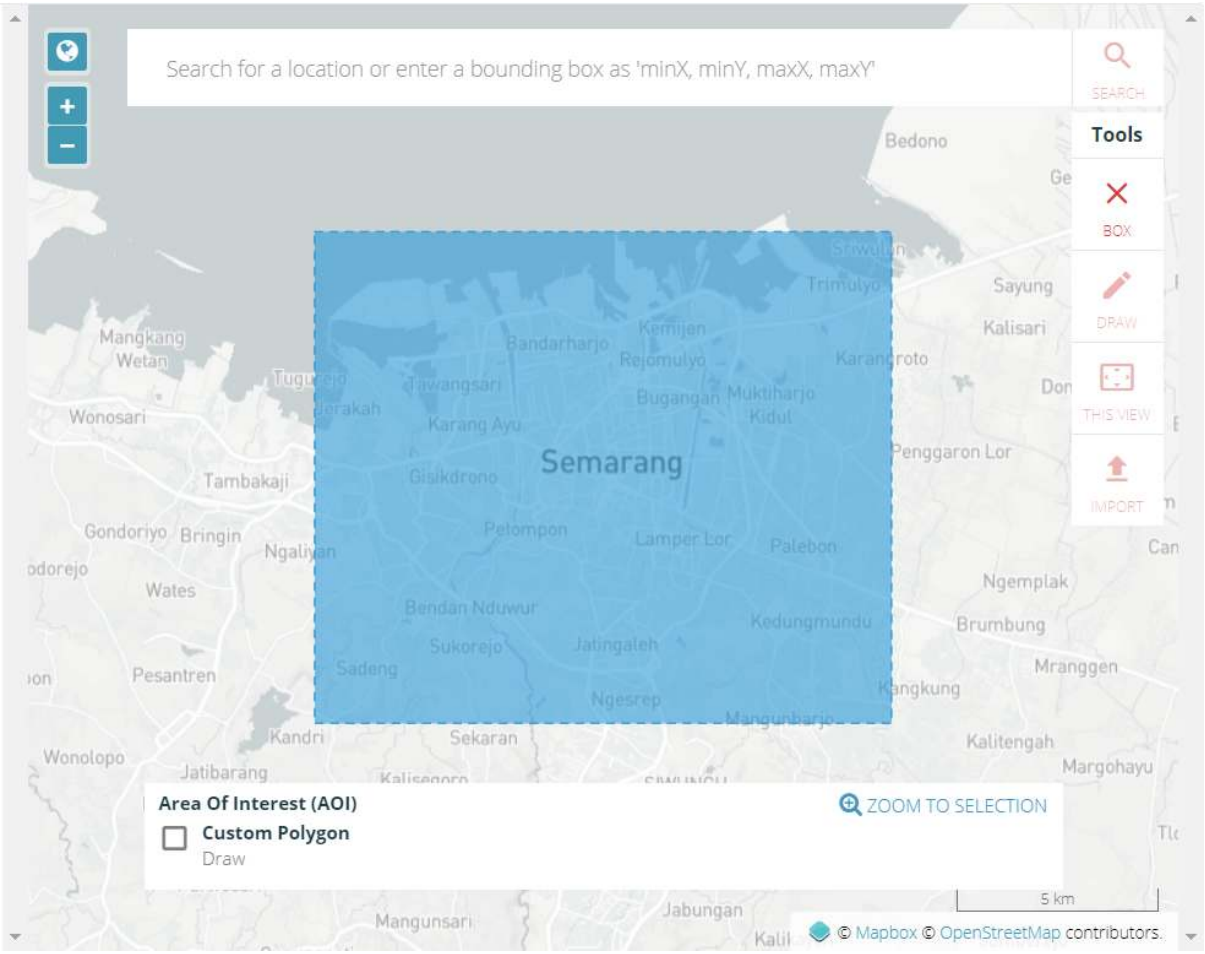


The fill from Export Tool

b. Defining an area of interest

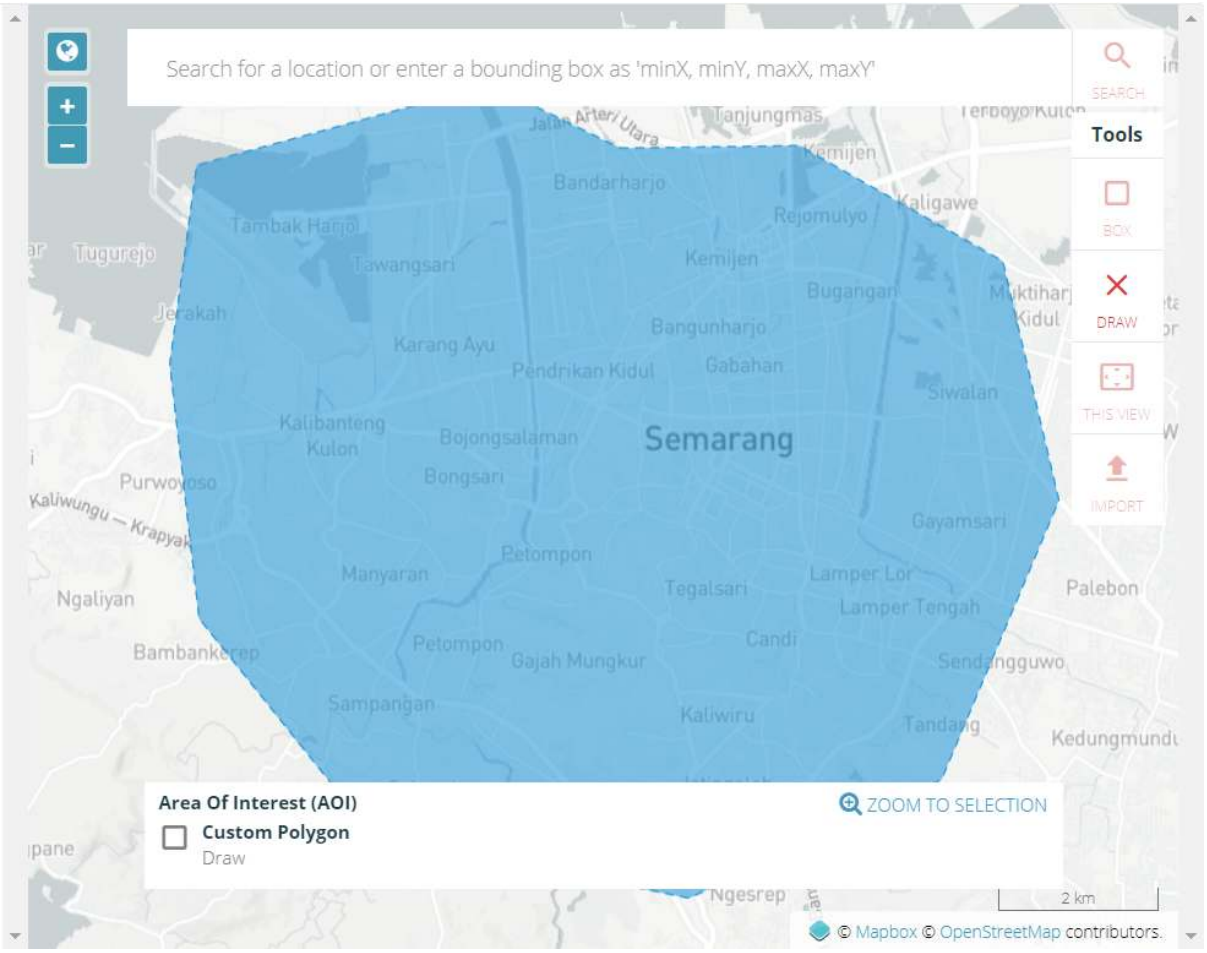
There are 5 ways to define an Area of Interest for your export:

1. **Bounding Box:** Use the “Box” tool to the right to click and drag a rectangle, or use the “Current View” tool to match the map’s viewport.



Bounding box

2. **Draw Polygon:** Draw a freeform polygon. This must be a simple (not multi-) polygon.



Manually edit

3. **Upload:** By uploading a GeoJSON polygon in WGS84 (geographic) coordinates. If you have not the GeoJSON data, you can refer to this chapter **Using GeoJSON**.

Import the administrative boundary

4. **Search Bar:** input a minX,minY,maxX,maxY string into the search bar. This will define a rectangular area of interest.

5. **Current View:** Use “Current View” to match the map’s viewport.

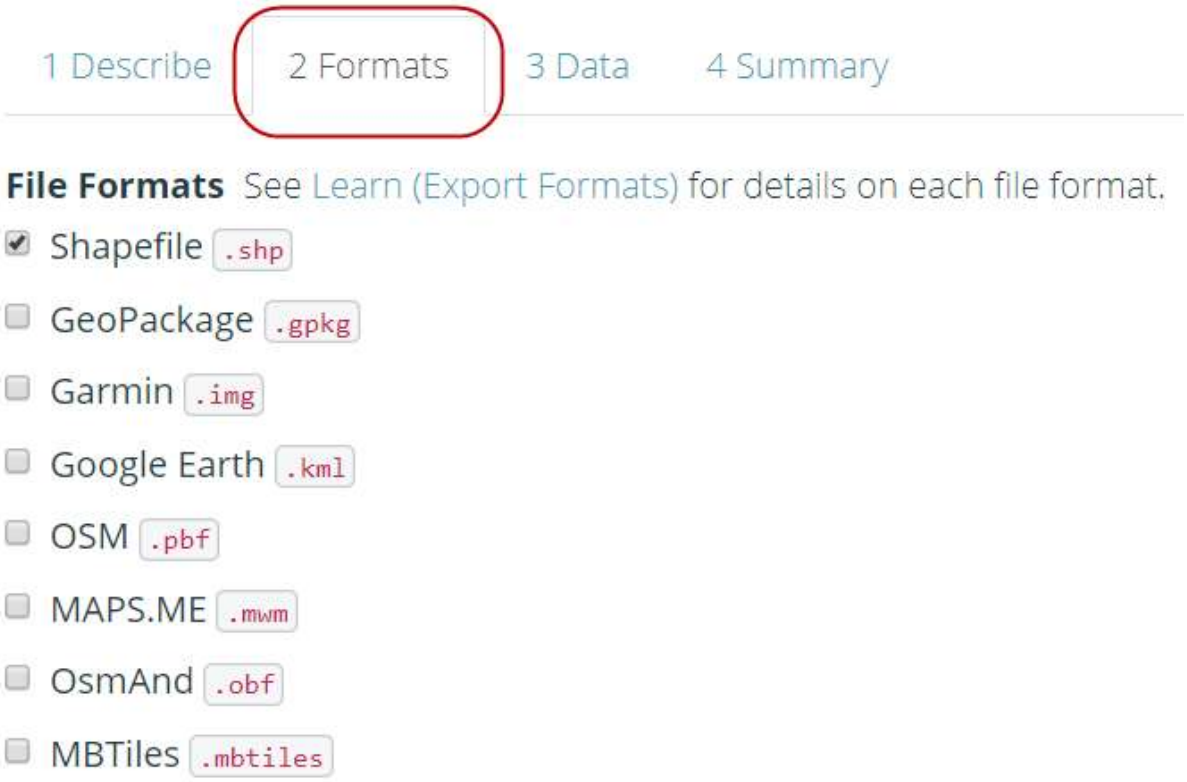
The maximum extent of export on the Export Tool is determined by the density of OSM data in the defined area. **The bounding box of the area can contain at most 10,000,000 OSM nodes.** This limitation means that a 10,000 square kilometer box over a heavily mapped area like Western Europe or North America will likely be rejected, but an equal-sized box over a sparsely mapped area will be accepted by the Export Tool. If you need larger exports, please Contact Us or use an alternative resource such as downloads from Geofabrik or Mapzen.

c. Naming and Describing your Export

- **Name (required):** choose a short, descriptive name.
- **Description:** a long text body, perhaps describing what relevant features the export includes.
- **Project:** Helps to group together exports particular to a project, e.g. “PDC InAWARE in Semarang City”

d. Choosing File Format

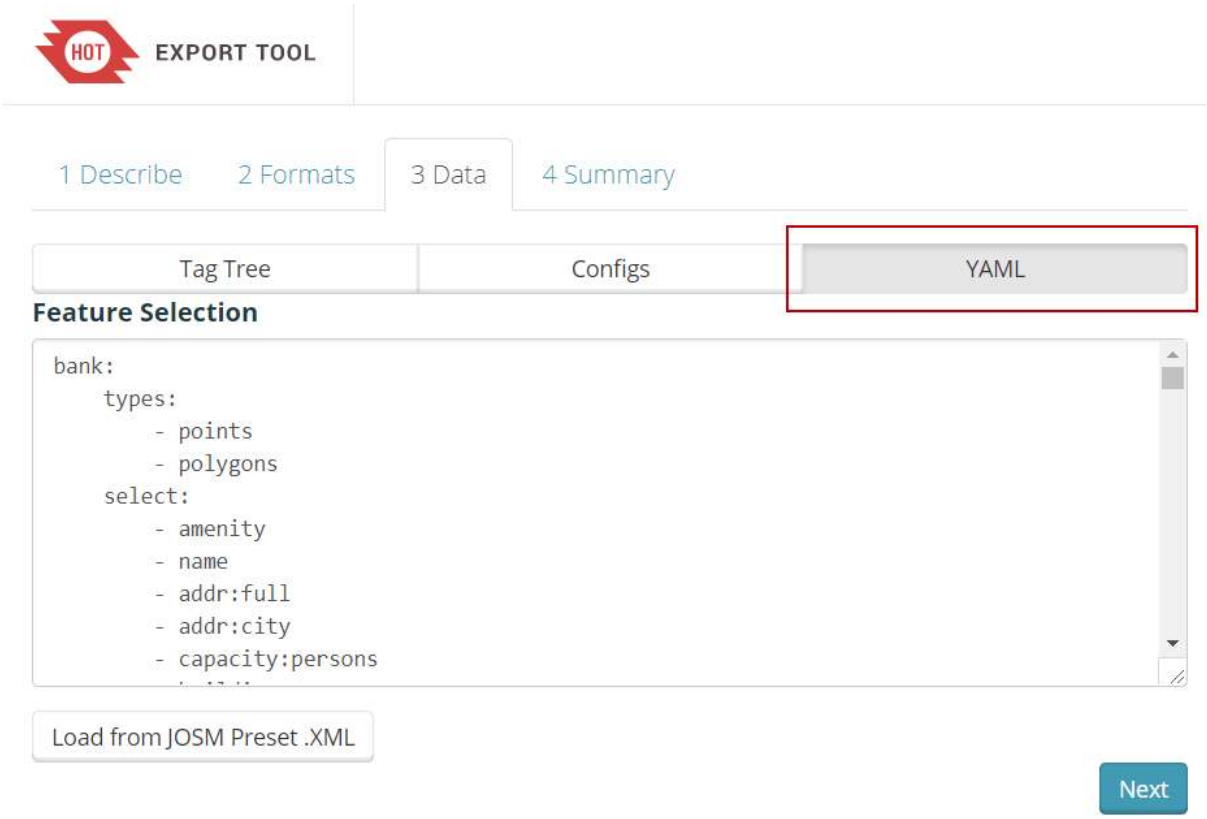
- Check at least one file format to export. To learn more about each individual format, read the documentation: Export Formats



Spatial data

e. Choosing Map Features

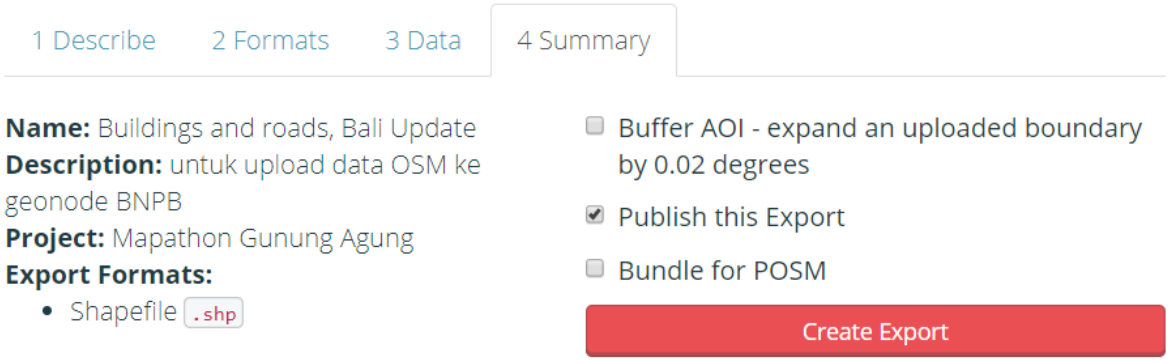
- Click on **Data Menu → YAML**. You can copy and paste the YAML from the section “Creating YAML” in the box.



Menu YAML

f. Downloading your File

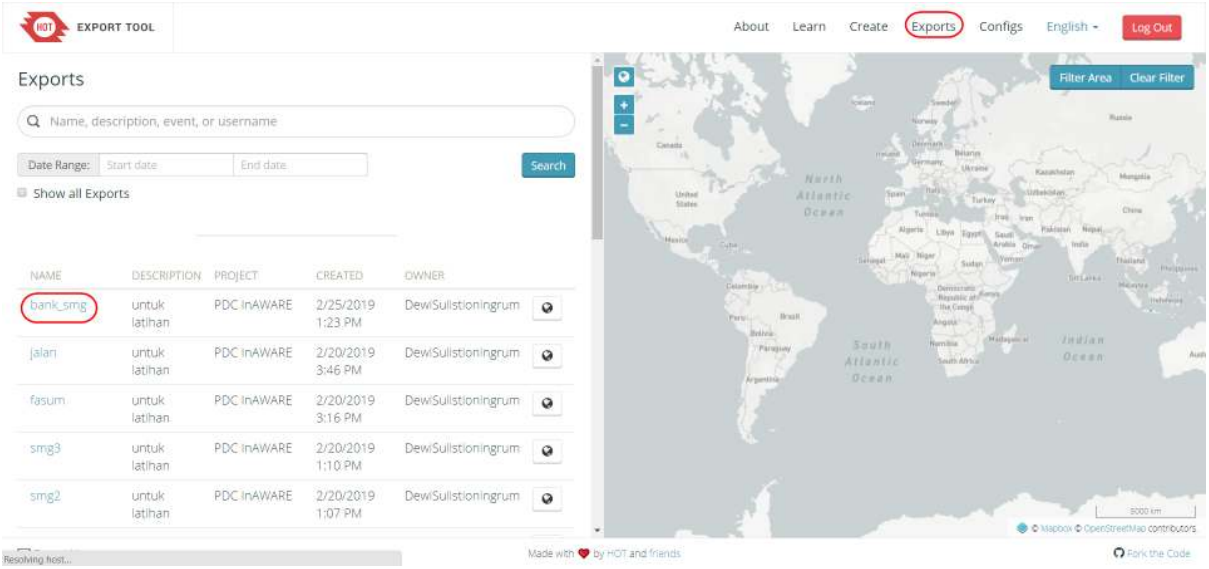
- The last step is the Summary Menu that will be displayed about the projects. Click the **Create Export** to starting the process



Menu summary

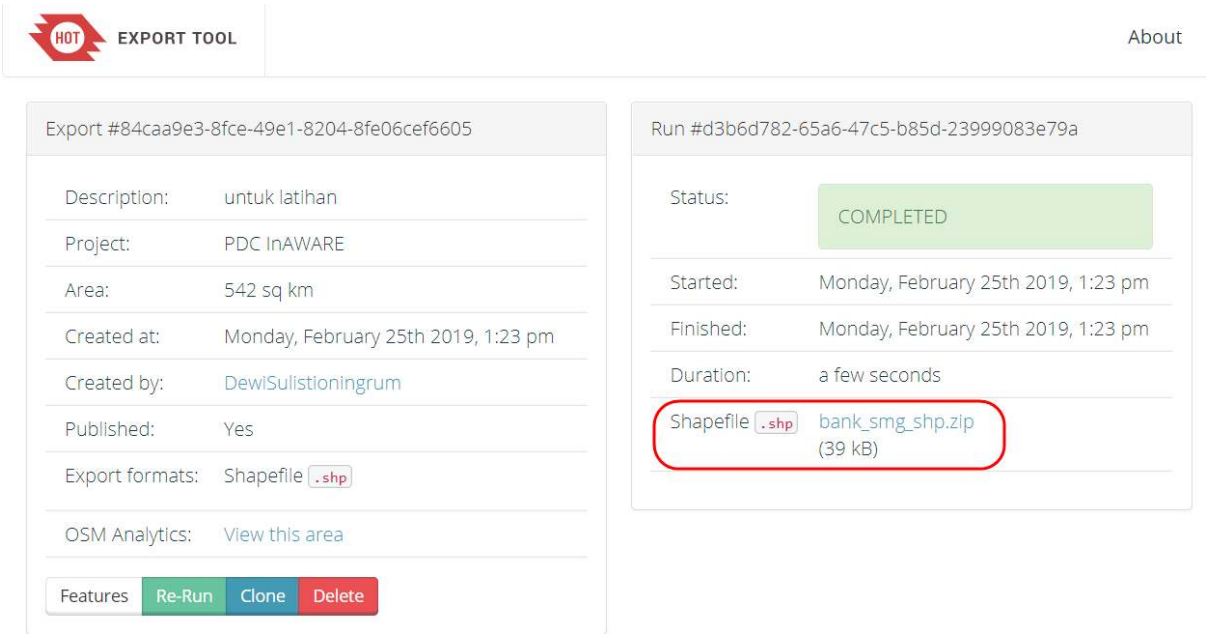
- After you submit your export using **Create Export**, you will be redirected to the **Export Detail Page**, which shows a list of **Export Runs**. You will see the first run at the top of the page. It will be in one of the following states:

  Submitted: The export is waiting to be processed. This should be brief, depending on the server load. **Running:** The export is waiting to be processed. City-sized regions should be a few minutes - larger regions can take upwards of 20 minutes, depending on the density of OSM data. **Completed:** Your export files are available for download. Each export format has a separate download link for its ZIP archive.



Menu Export

- If the status will be **COMPLETED**, we can download the data with a click on **bank_smg_shp.zip** and save in your directory.



Completed Process

Exercise!

- Create the new projects form this link https://tinyurl.com/group-stats.
- You can use the administrative boundary from Semarang City for Import in the project, download the admin in this link https://tinyurl.com/admin-semarang.
- The results will be used in the next chapter **Group Stats Plugin for Calculate The Objects**. If you have finished, the results consist of two shapefile (public facilities and highways).

SUMMARY

You have learned about how to download the spatial data using YAML in the Export Tool. The results data from YAML, the attributes table will be the same with the data in your mapping projects and the attributes table have organized. You can open the file in mapping software, like QGIS.

— title: JOSM for Data Quality weight: 4 —

Objectives:

- Understanding how to select and count numbers of objects in certain administration boundary
- Understanding how to count numbers of *error* and *warning* in certain administration boundary
- Understanding how to validate administration boundary

One of the expected results in doing mapping activity is to produce a good quality map. The quality including object information completeness and right topology. Using *OpenStreetMap* as a base map to show the result of field survey could help you to monitor the progress of your mapping activity result by counting objects and information from the field. In this module you will learn how to count your field survey data and administration boundary using *Java OpenStreetMap* (JOSM)

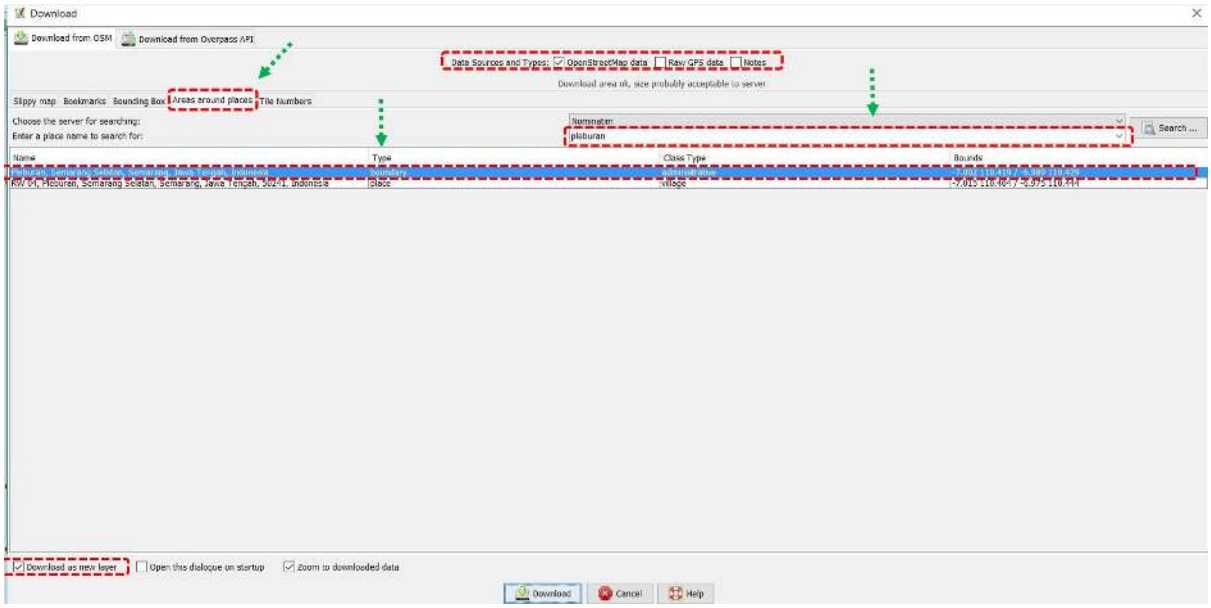
I. Counting Objects in Certain Administration Boundary

One of the stages of data quality monitoring is by counting the objects in your mapping area. The purpose is to know the progress of the mapping activity such as before and after the mapping started. Moreover, this activity can help you to validate the completeness of information for you mapping objects. You can use JOSM to count your mapping objects on your survey area. There are steps to count objects in certain administration boundary such as village level, as follows:

a. *Download* OpenStreetMap Data in Mapping Area

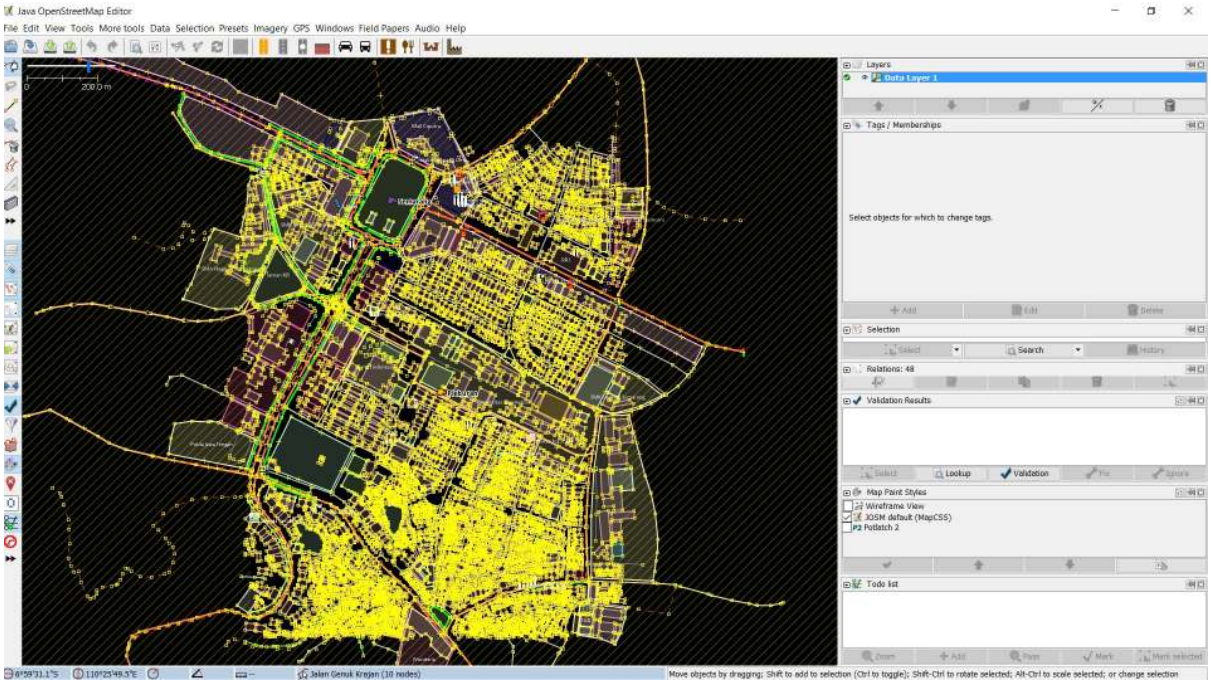
Before you start counting your mapping objects, you need to *download OpenStreetMap* data in your mapping area. When counting the objects, you can use you mapping area administration boundary such as village boundary. In this example, you will count the objects in **Pleburan Village**. These are the steps that you need to follow to *download OpenStreetMap* data:

- Open **JOSM** in your laptop / computer.
- Select ***File → Download Data*** menu, you will see a download box around your mapping area in *OpenStreetMap.*
- Select ***Areas around Places*** menu and type village name "**Pleburan**" in the search box and remember to check ***OpenStreetMap Data*** and ***Download as New Layer*** option
- If it has finished, please choose the most relevant result with your mapping area. You can look at the city location and has *boundary=administrative* tag. Your result will be in blue color



Download Area Searching Window in JOSM

- After set all the options like the picture above, you can click ***Download.***



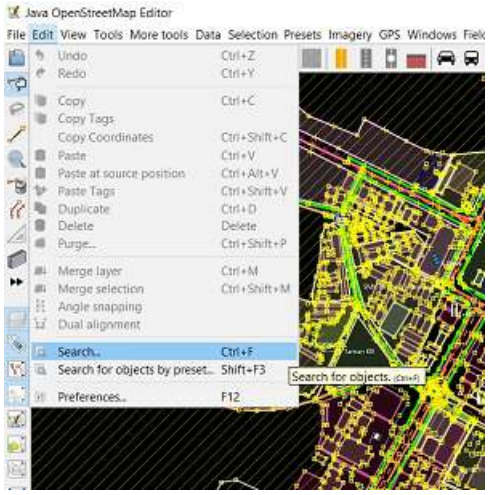
JOSM Download Data Result

Notes : If your mapping area size is too large, please download it periodically into JOSM

b. Counting Objects in Certain Administration Boundary Area

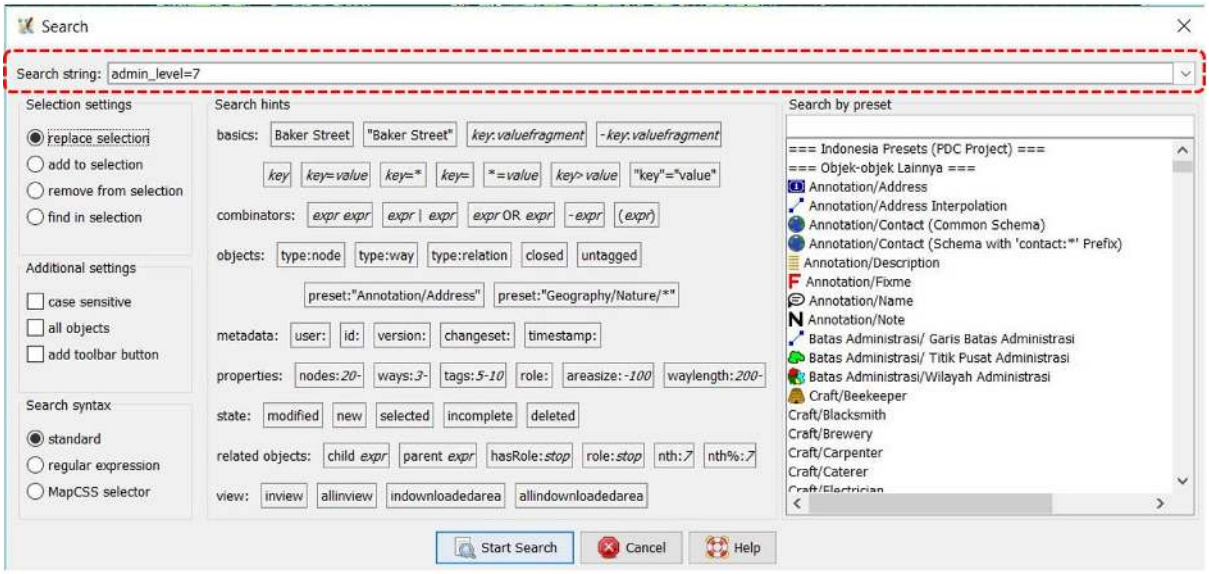
If you have successfully download data in your mapping area, the next step is counting total of objects in it. The steps to count numbers of objects in your mapping area as follows:

- Click ***Edit → Search*** menu to select administration boundary of **Pleburan Village**.



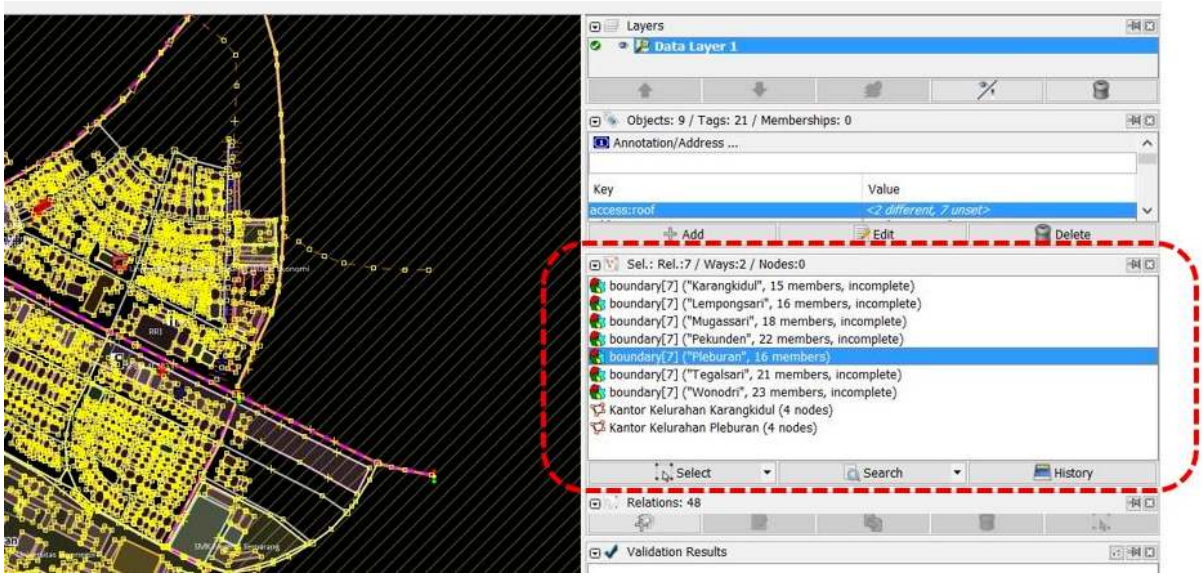
Data Search Menu in JOSM

- In search string, please type “**admin_level=7**” (village level) and click ***Start Search***



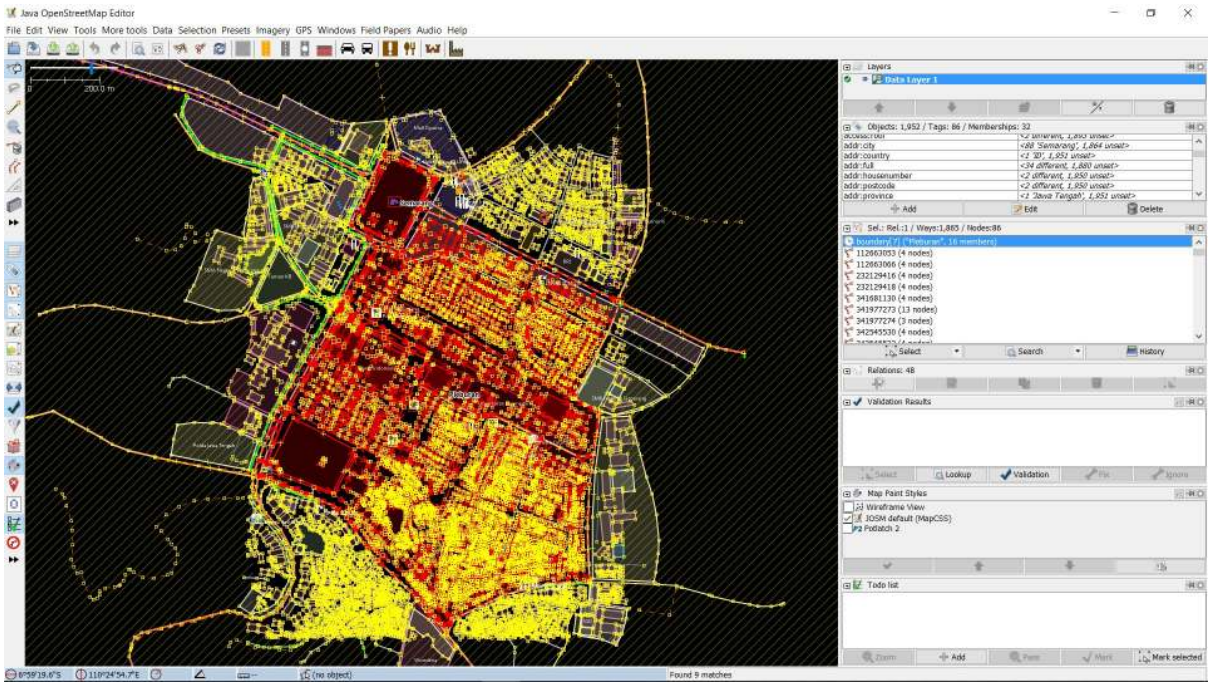
Searching Window to select certain area in JOSM

- You will see all objects that have _“admin_level=7_” tag will selected and listed in ***selection*** window. Then you can select **Pleburan Level** which you can count all object on it by **double click** it. You will see administration boundary of Pleburan Village will be shown in purple color in JOSM data layer which indicate that the village has been selected.



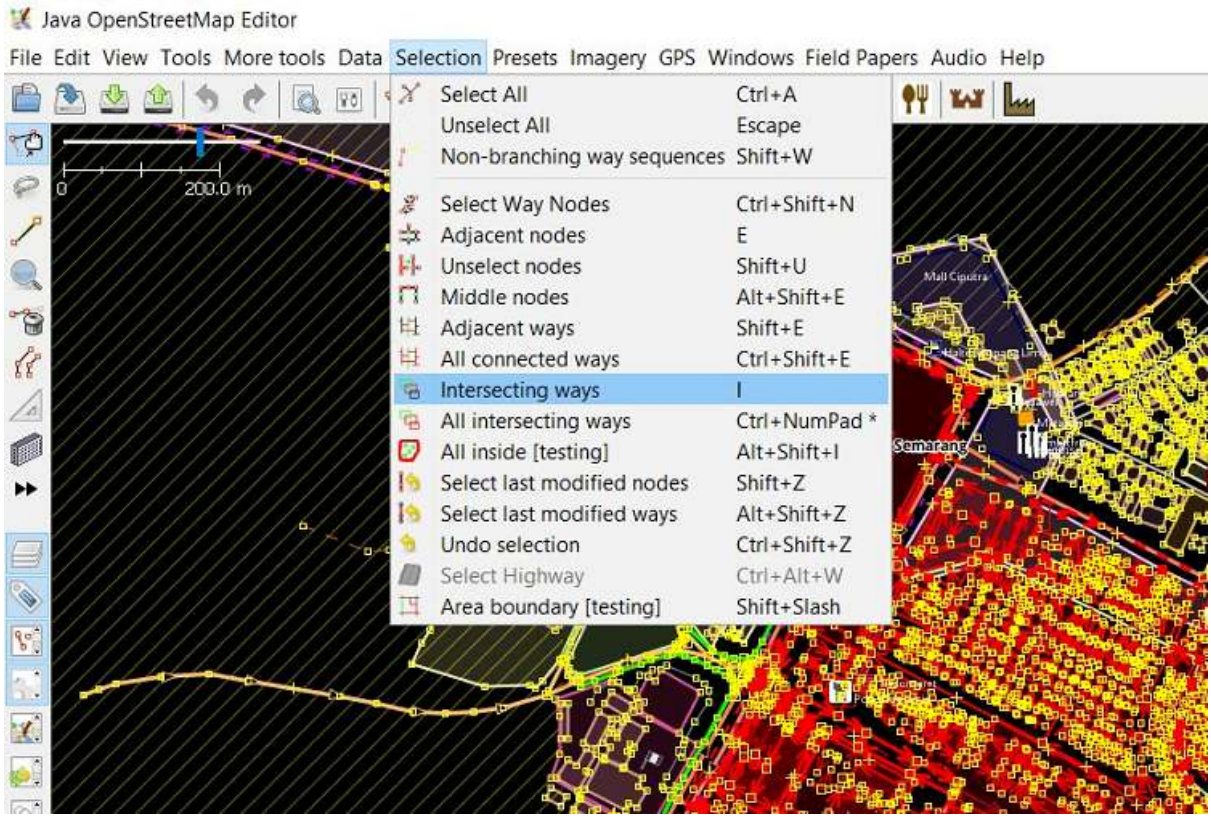
Selected Village Output in JOSM

- If your JOSM has not *Selection* menu, you have to install *utilsplugin* plugin in your JOSM. The explanation about how to install the plugin can be seen in **Adding OSM Data using JOSM** module. After that, please select **Selection → All inside [testing]** menu. You will see all objects inside Pleburan Village will be selected and have red color.



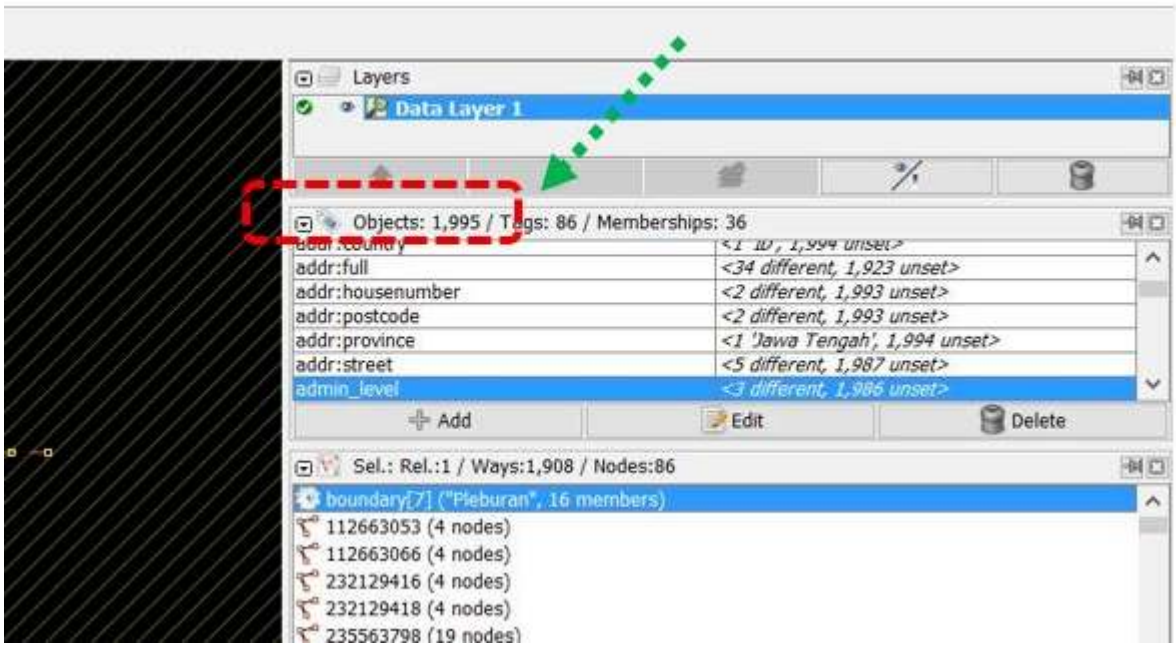
Data Selection Result in JOSM

- After that, please select ***Selection → Intersecting Ways*** menu to select all objects inside and intersected with Pleburan Village, such as road networks and river. Duration of this process depends on area size and number of objects inside the village.



All Selection Result on Certain Administration Boundary in JOSM

- You can see all the total number of objects in ***properties/membership*** window.



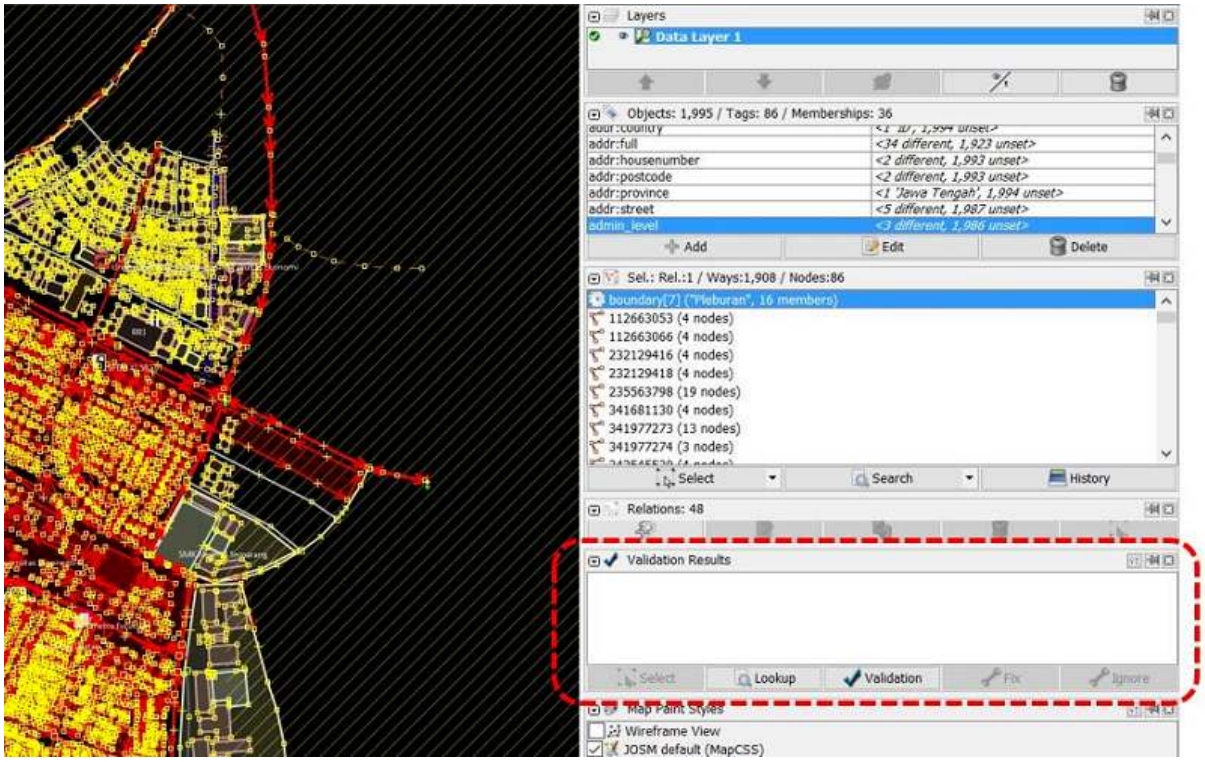
All Data Selection in Certain Area in JOSM

- As you can see in the image above, there are 1995 objects in Pleburan Village have been selected. Please keep in your mind, this result is **whole** selection result of objects. You do not need to count for each specific object in your mapping area using JOSM.

II. Count Number of *Error* and *Warning* in Certain Administration Boundary

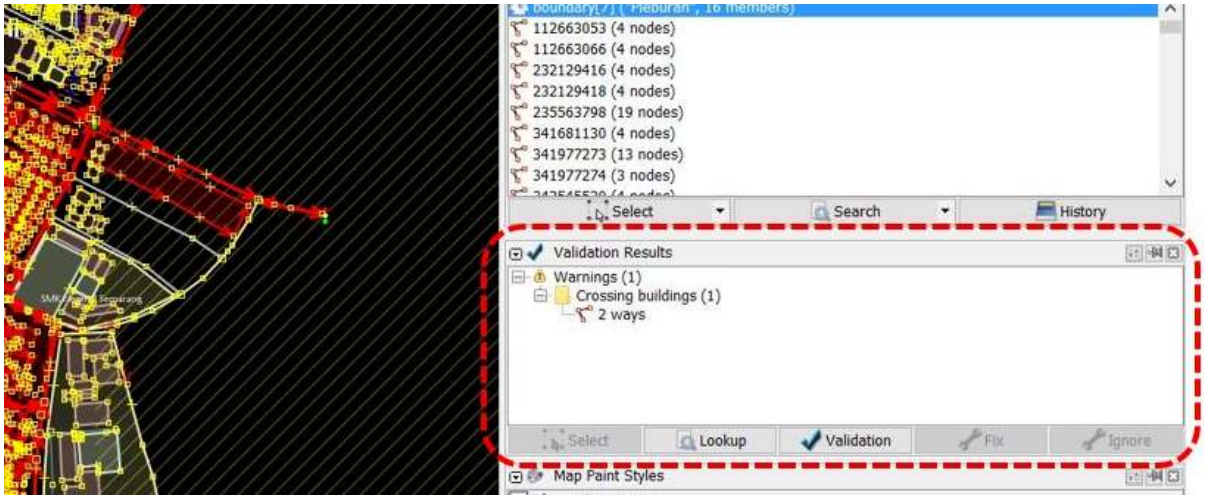
After successfully counting the total number of objects in your mapping area (in this module is Pleburan Village), you should continue to follow the steps to see and count number of *Error* and *Warning* on objects in the village:

- Click ***Validation*** in your validation window. Wait until JOSM finish to count the number of *Error* and *Warning* on your objects.



Data Validation Window in JOSM

- If your JOSM has finished, you will see the results in the validation window. You better write the number of *error* and *warning* then try to fix them all. For further explanation about how to validate and fix error and warning in JOSM can be seen in **JOSM for Survey Data Validation.**



Data Validation Result

- After you have fixed the *error* and *warning* , you can calculate data quality number in **Microsoft Excel or Google Sheet**. The result will show data quality comparison in the mapping area, before and after the mapping activity has done. *Error* and *Warning* types also need to be added into calculation table.

Table of Data Quality Recapitulation

As you can see on the table above, the number of objects in Pleburan Village before the mapping activity was 1.863 where there were 4 *warnings*. After the mapping activity and validation have done, the number of objects is increasing to 1.963 where there are no *error* and *warning* have been found. You can see the whole recapitulation table for Data Quality in Semarang in this link: http://bit.ly/tabeldatasemarang

Sub-Districts	No	Villages	BEFORE					AFTER				
			Object	Error	Error (%)	Warning	Warning (%)	Object	Error	Error (%)	Warning	Warning (%)
SEMARANG SELATAN	116	BULUSTALAN	1659	0	0.0%	0	0.0%	1628	0	0.0%	0	0.0%
	117	LAMPER KIDUL	1457	0	0.0%	3	0.2%	1557	0	0.0%	0	0.0%
	118	LAMPER LOR	1268	0	0.0%	8	0.6%	1577	0	0.0%	0	0.0%
	119	LAMPER TENGAH	3296	0	0.0%	17	0.5%	3658	0	0.0%	0	0.0%
	120	MUGASSARI	2693	0	0.0%	1	0.0%	2760	0	0.0%	0	0.0%
	121	PETERONGAN	1616	0	0.0%	12	0.7%	2010	0	0.0%	0	0.0%
	122	PLEBURAN	1863	0	0.0%	4	0.2%	1963	0	0.0%	0	0.0%
	123	RANDUSARI	2226	0	0.0%	1	0.0%	2458	0	0.0%	0	0.0%
	124	WONODRI	2949	0	0.0%	31	1.1%	3183	0	0.0%	0	0.0%

Figure 2: Data Validation Result

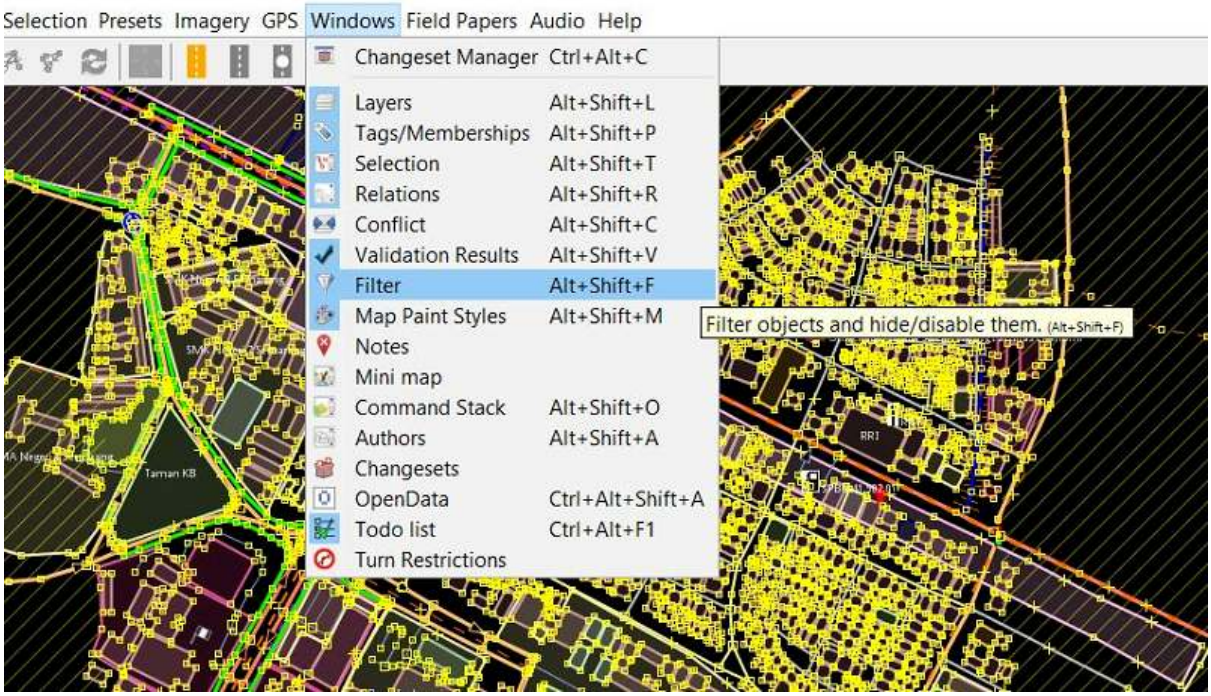
III. Administration Boundary Validation

After have finished to calculate the number of objects and data quality in your mapping area, you need to calculate and validate the administration boundary of your mapping area. In this calculation, you will validate of administration boundary such as village and sub-village boundary (RW) in your mapping area. You need to check number of sub-village in the mapping area, boundary information (tag) completeness, relations of village and sub village boundary and backup the boundary as an *.osm* file. We still use **Pleburan Village** as an example in this validation.

a. Counting Number of Sub-Village (RW)

These are steps that you have to do for counting number of sub-village (RW) in your mapping area:

- You have downloaded Pleburan Village in your JOSM. However, it also means you download all objects in the village and it could be difficult for you to see and edit the administration boundary because so many objects around it. Therefore, you have to filter the data. If you have not known about filter tools functions in JOSM, please look at **Menggunakan Alat Filter di JOSM** module
- Activate your _filter _tool in JOSM by click ***Windows → Filter***



Activate the filter tool in JOSM

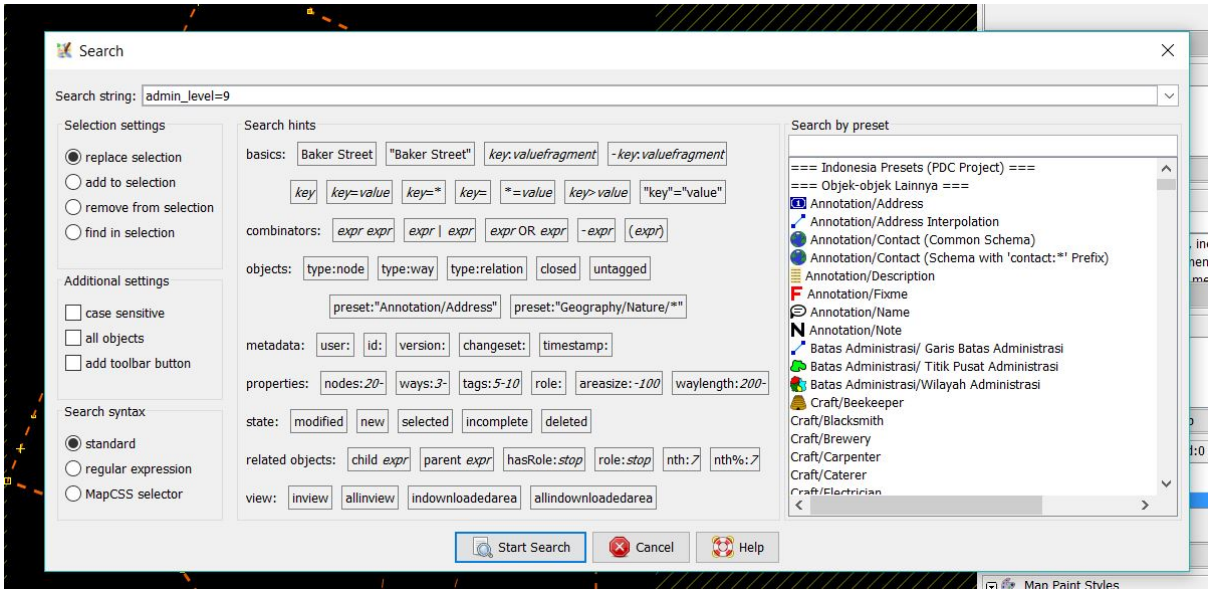
- ***Filter*** window will appear in JOSM. please click ***add*** and write ***query*** to filter the data show it only shows administration boundary. The query is "**is_in:village"="Pleburan**".

- You will see your data will change like the picture below:

Administration Boundary Filter in JOSM

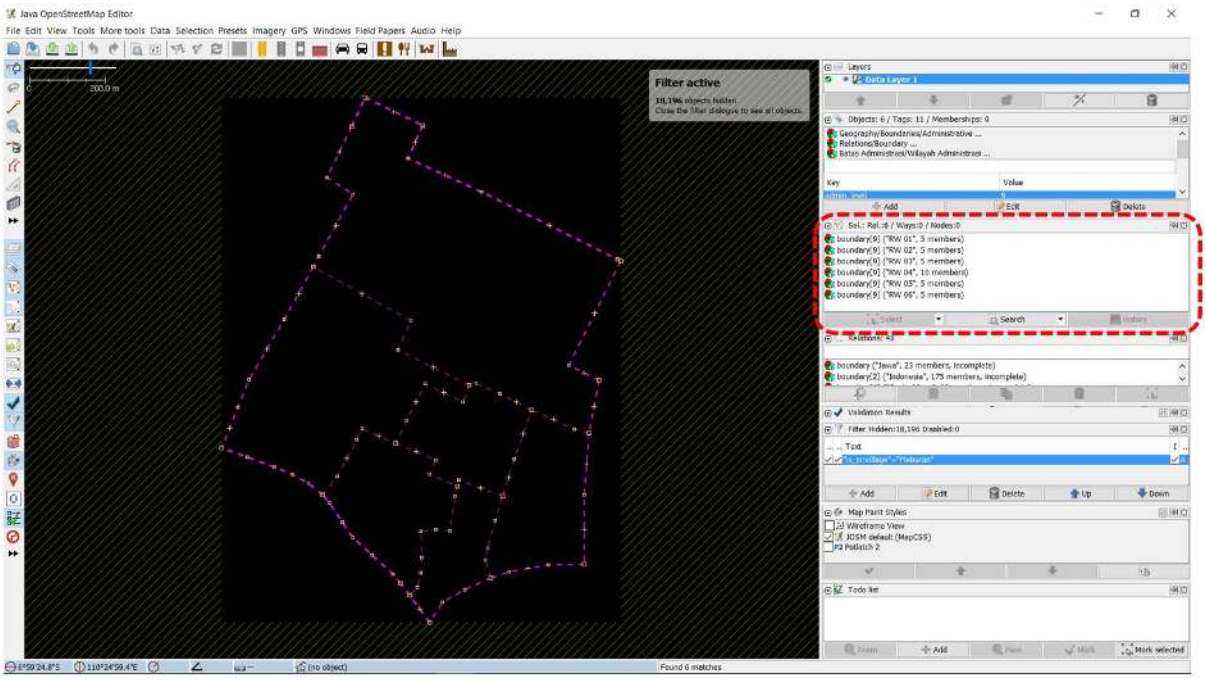
Administration Boundary Filter in JOSM

- Select all sub-village boundary in Pleburan Village with *search* function. Click ***Edit → Search***. You will see a search window and write *query* "**admin_level=9**" then click ***Start Search***.



Query for search sub-village boundary in JOSM

- You will sub-village boundary in your village be selected. It is shown by purple color in the boundaries. In ***selection*** window you will see all sub-village list in Pleburan Village.



Selection Result for Sub-Village Boundary in Pleburan Village

- You can compare number of sub-village (RW) in Pleburan Village which a result of selection function in JOSM in recapitulation table of field survey.

KECAMATAN	Jml. KEL	KELURAHAN	Jml. RW
SEMARANG SELATAN	10	BARUSARI	7
		BULUSTALAN	4
100% Mapped		LAMPER KIDUL	6
100% Validated		LAMPER LOR	5
		LAMPER TENGAH	8
		MUGASSARI	7
		PETERONGAN	8
		PLEBURAN	6
		RANDUSARI	7
		WONODRI	13

Table of Sub-Village Boundary Recapitulation

As you can see on the table above, the number of sub-village (RW) in Pleburan Village is 6 sub-villages. This number is same with the selection result in JOSM which also select 6 sub-villages boundaries starting from RW 01 to RW 06. Therefore, there is no error on number of sub-villages in your mapping area. You can continue to validate the tag and relation of boundary administration.

b. Counting Tag Completeness and Boundary Administration Relations

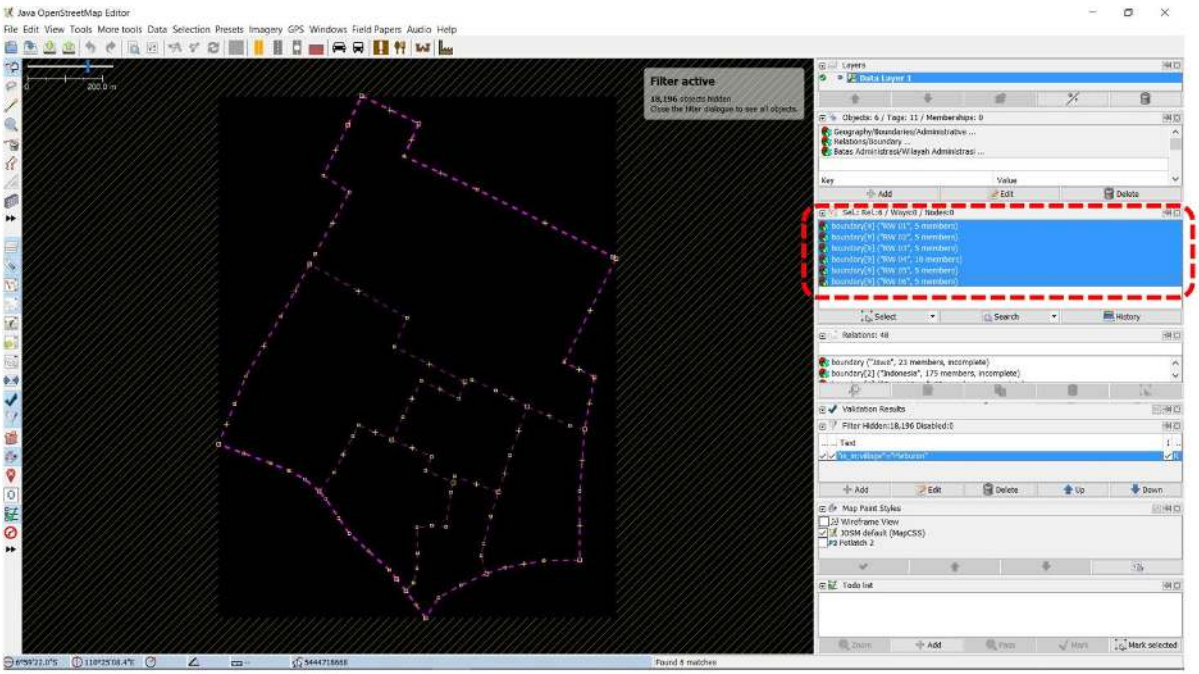
After counting number of sub-villages in Pleburan Village, now you need to validate the boundary administration tag completeness. These are the tags that need to have for each of sub-village (RW) boundary administration:

Table of Boundary Administrative (RW) Tag List

key	possible values
type	boundary
boundary	administrative
name	(RW name)
admin_level	9
is_in:province	(province name)
is_in:city (City) / is_in:town (District)	(city/district name)
is_in:municipality	(sub-district name)
is_in:village	(village name)
flood_prone *only for RW relation	yes, no
landslide_prone *only for RW relation	yes, no
source	HOT_InAWARESurvey_2018 **(Based on the mapping project name)**

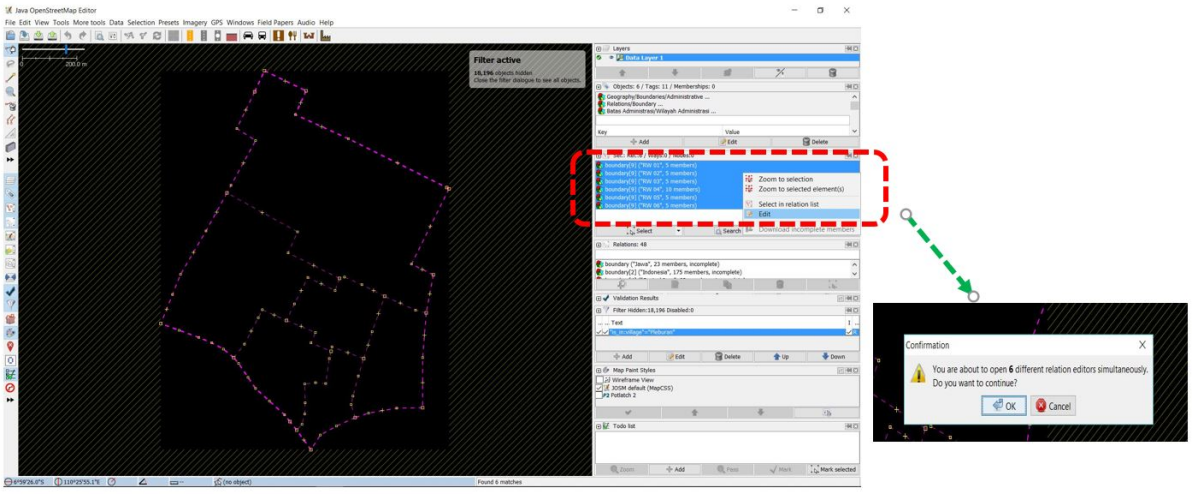
To validate tag of sub-village administration boundary, please follow these steps:

- Choose all sub-villages in ***selection*** list result from ***search*** feature in JOSM.



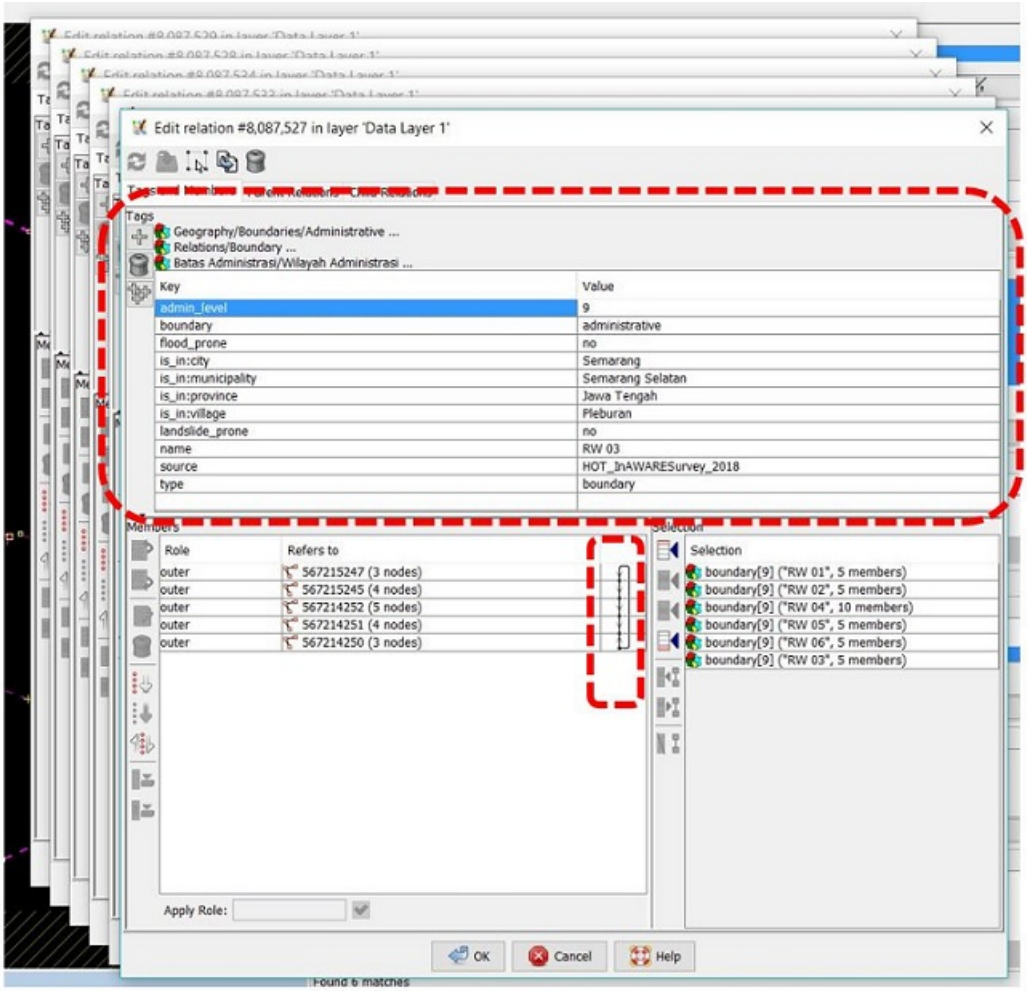
Select sub-villages in Pleburan Village

- **Right click** on sub-villages list and choose **Edit**. You will see a warning window that remind you where all information related the sub-village in Pleburan Village will be open in 6 windows. Clik **Ok.**



Notification to see Sub-Village Information

- After the window is open, you need to check the tag completeness **for each** sub-villages. Moreover, the boundary relation checking needs to be done by see the relation connection in ***member*** . You can see whether your relation is a good relation if connection between sub-village member all connected and creating *loop* or circle. If you want to know more details about connection between relation and how to add it, please see **Membuat Batas Administrasi di JOSM** module.



Relation Window and Information of Administration Boundary

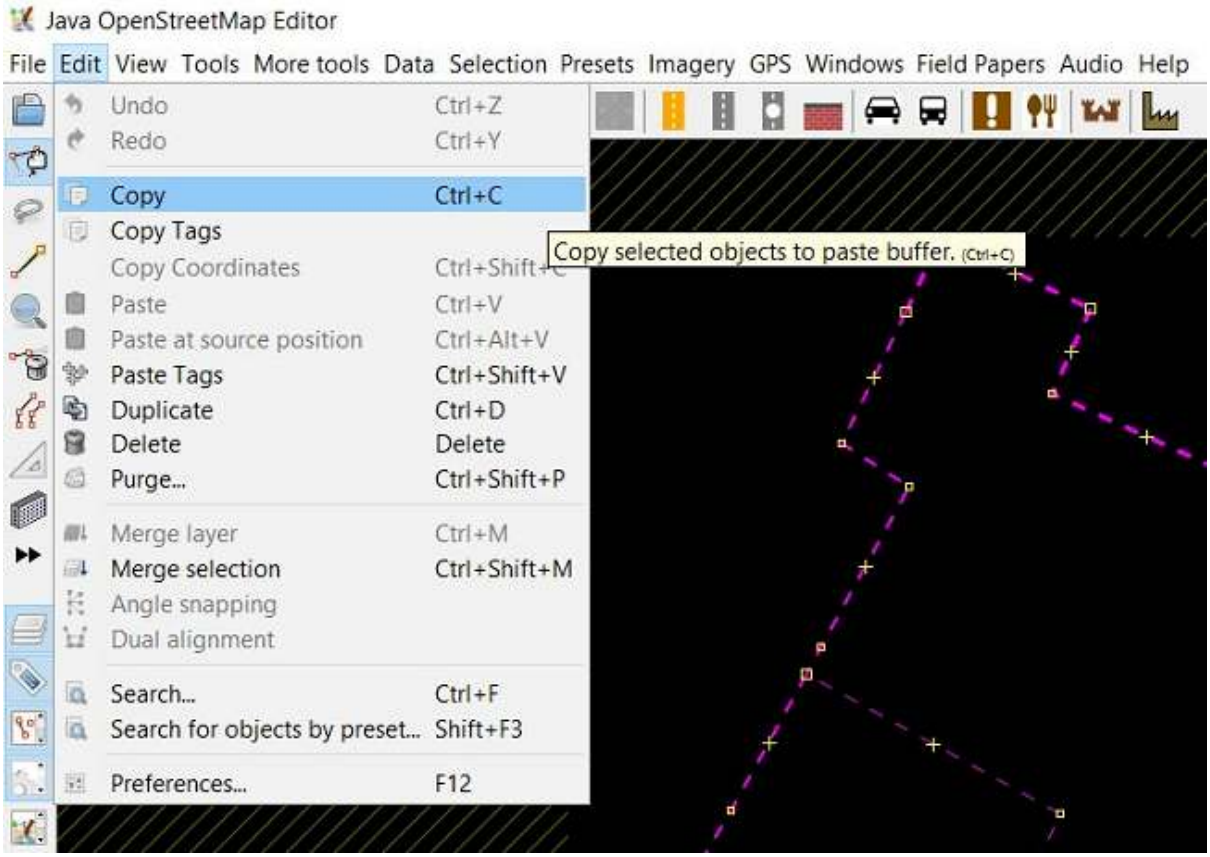
You can add another tag if there are some tag still not added in the sub-village based on tag list above. You also can fix the relation and member order and rules for each member.

> Note : If the number of sub-village does not same with the field survey (more or less), you need to discuss this problem with the Data Entry and Quality Assurance who survey and input all the boundary into OpenStreetMap. Do same validation steps for relation for sub-district ("admin_level=6") and village ("admin_level=7") administration boundary.

c. Administration Boundary Backup

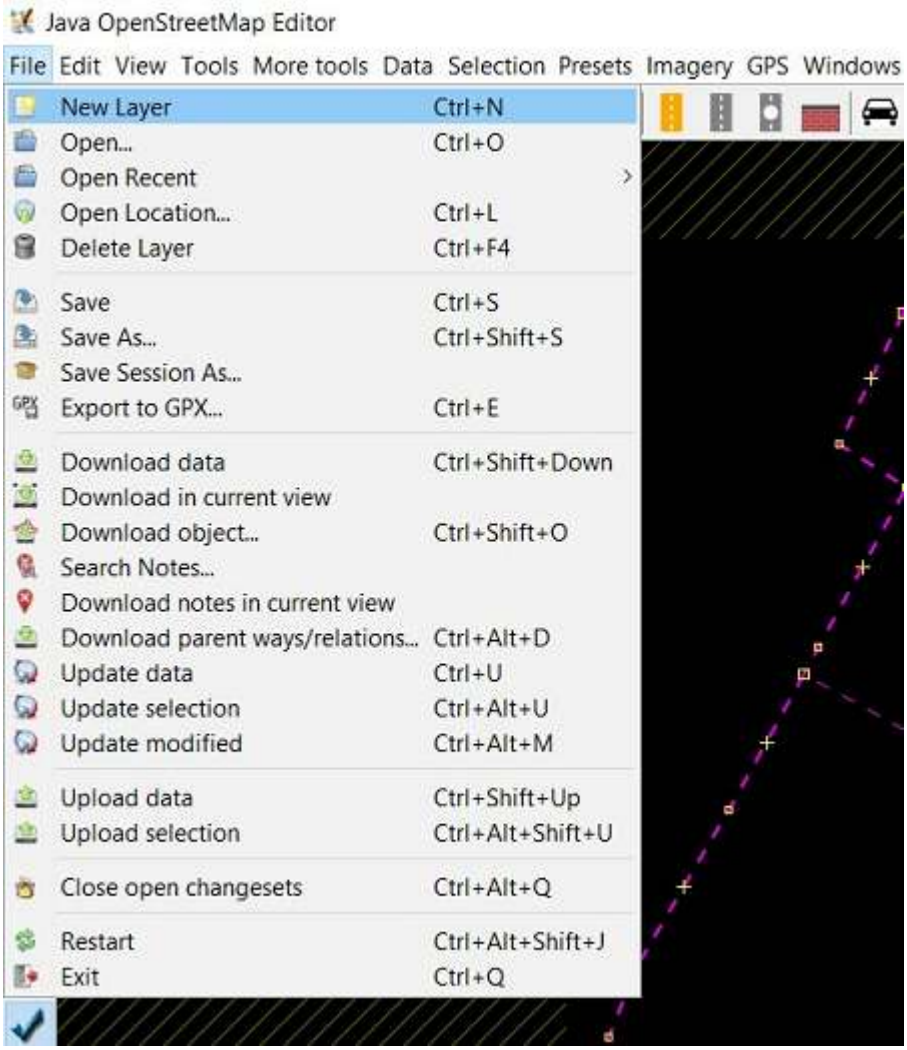
After doing recapitulation and validation for administrative boundary, you need to backup the administrative boundary. Thus, you will have a backup for your administration boundary when something unexpected events happen such as the boundary accidentally deleted or some users edit it wrong. To do so, the steps as follows:

- Click ***Edit → Copy***



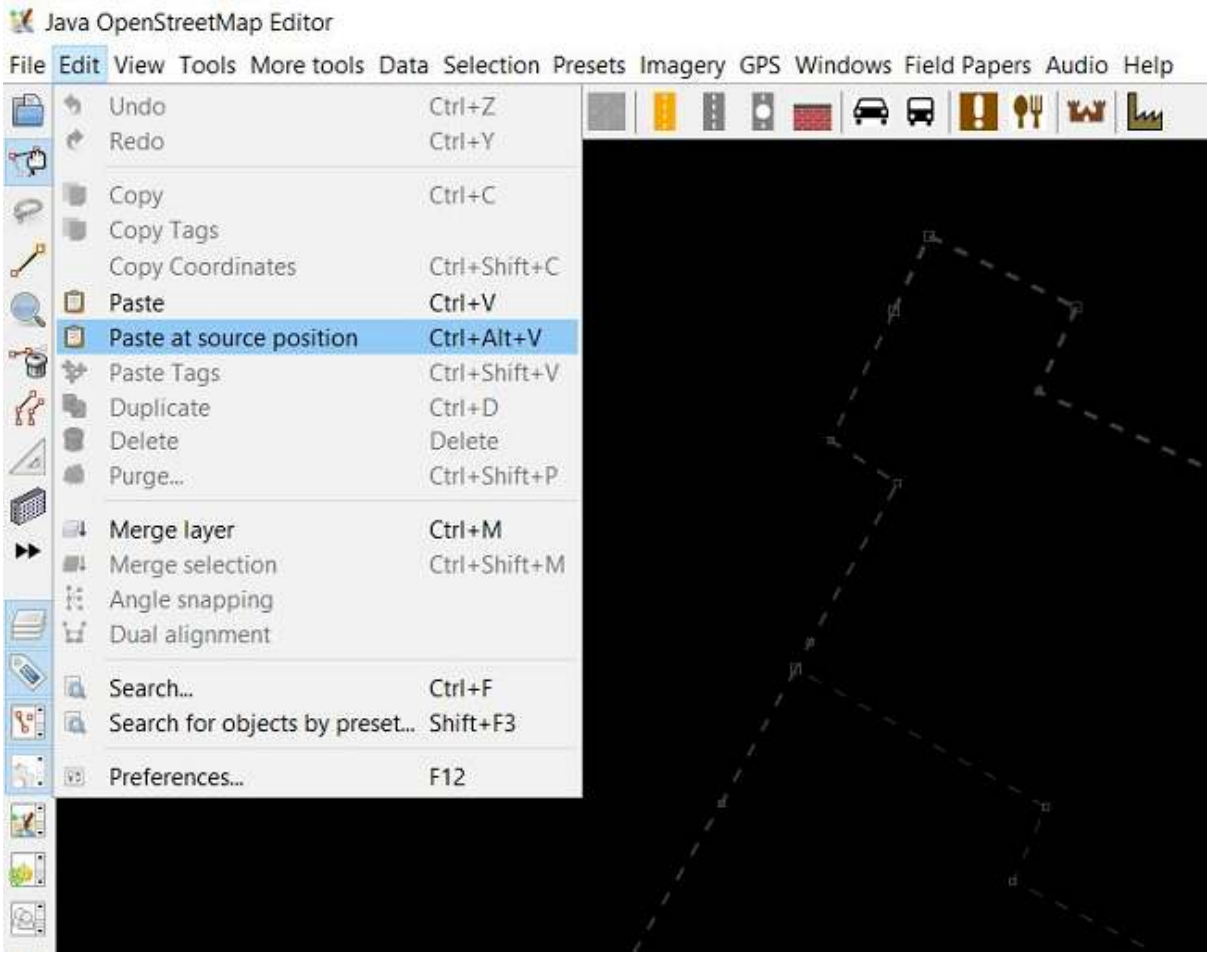
Copy Administration Boundary in JOSM

- Choose ***File → New Layer*** You will see new layer in JOSM.



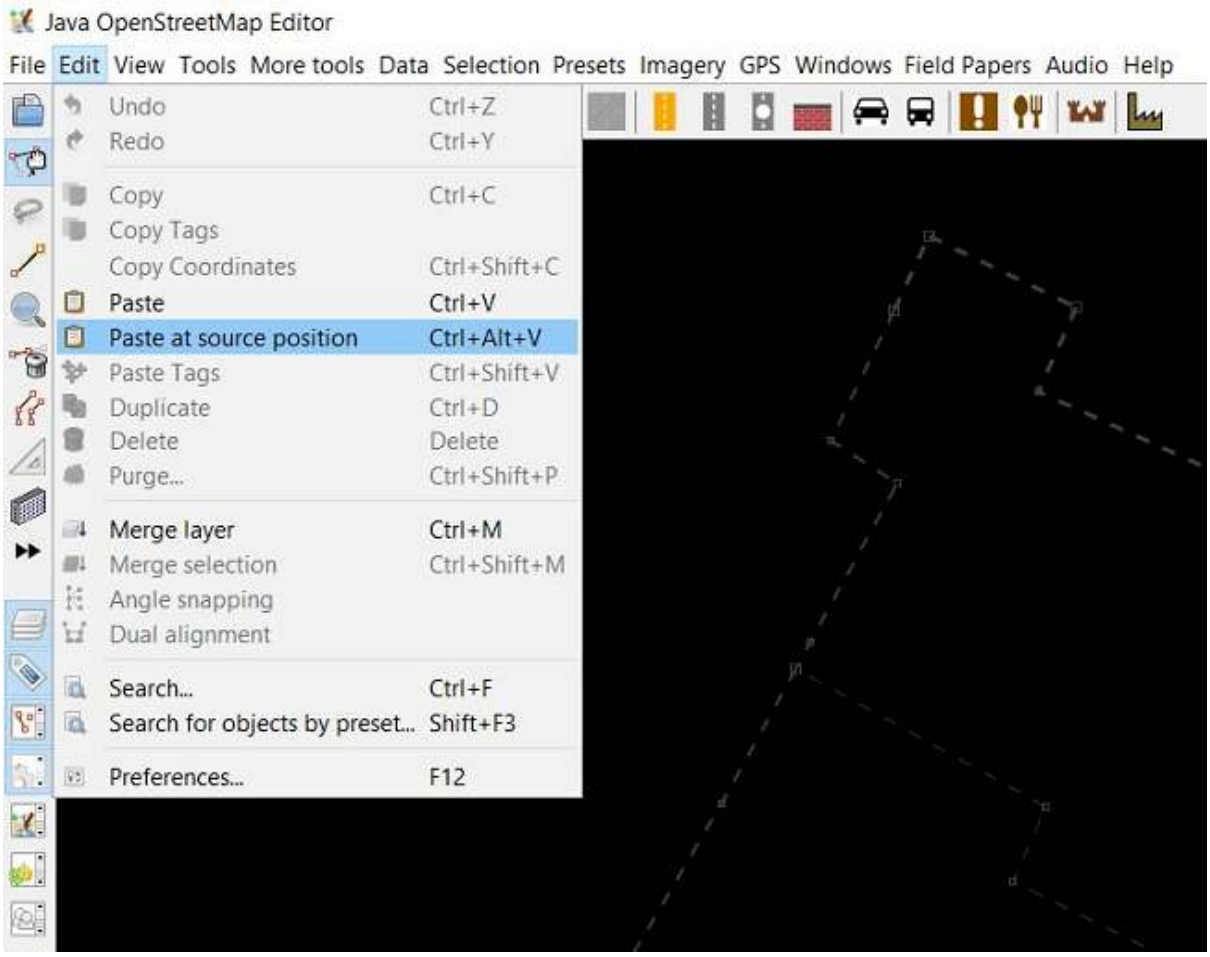
Create New Layer in JOSM

- Click ***Edit → Paste at source position***



Copy and Paste Administration Boundary in New Layer

- You now have a new layer that only show administration boundary of your mapping area. Please click **File → Save** and save it into *.osm* file format and give name based on your mapping area.



Save Adminstration Boundary Layer in JOSM

SUMMARY

You have learned about how to recapitulate data quality in JOSM. This activity is one of the validation activities for field survey data that has been added into *OpenStreetMap* ***by*** *Quality Assurance*. By doing this, your data quality will be assured and have better quality. These are details about what objectives that have learned in this module:

- Count number of objects in certain administration boundary (village)
- Count number of *error* and *warning* in certain administration boundary
- Doing Recapitulation to compare number of objects and *error*/ *warning*
- Validate administrative boundary including count number of sub-village in certain village, checking tag completeness and relation between administration boundary.
- Backup the administration boundary into .osm file format

Using OSMTrackers

Objectives:

- Explain OSMTracker as one of survey tools for recording tracks and photos
- How to set up the OSMTracker for the first time
- Learn how to use OSMTracker

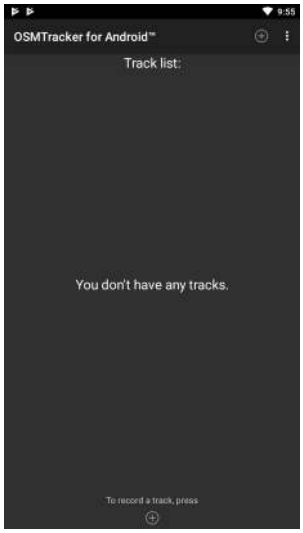
1. What is OSMTracker?

OSMTracker is an android application that allows us to record our survey data. Similar to GPS, OSMTracker is able to record waypoint and also track. If you want to learn more about GPS for field survey, you can see the **GPS Module**. What makes OSMTracker different with common GPS device is its capability to take pictures when you collect the survey data. With these images taken, it will make your mapping more easier because you can track back what object you have been taken and take a look into your pictures for more detail. Waypoint and track that you have collected can be converted into .gpx file so you can open your survey data using JOSM or you can directly upload your data into OpenStreetMap.

If you want to use OSMTracker you can download the application on your smartphone. Open your Google Playstore and search OSMTracker in search box.

You can download OSMTracker on Google Playstore

After the installation finished, open your OSMTracker application on your smartphone.



OSMTracker page display

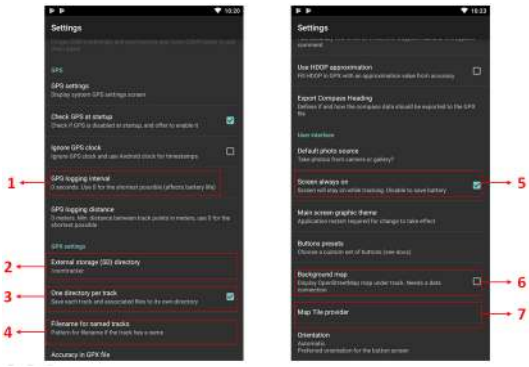
2. OSMTracker Setting

Before you can use the OSMTracker, there are few setting you have to do. Go to

⋮ button on the top right corner and then select **Settings**.

Select Settings menu on OSMTracker

On the settings page there are several things you have to look:



Several configurations on Settings menu

1. GPS logging interval

   This section will set how often your OSMTracker record the track. If you set the number smaller, OSMTracker will record the track more often. The default value for this setting is 0, which means that OSMTracker will always record your track. This will affect your battery life. You can change the number according to your need, for example 2 second.

2. External storage (SD) directory

   This section determine where you want to save all your survey data on your smartphone. By default, OSMTracker will create a new folder called “osmtracker” on your smartphone’s internal storage. If you don’t want to change this setting, you can ignore this section.

3. One directory per track

   If you activate this feature, each track you save will create a new folder in your internal storage.

4. Filename for named track

   This section will set the labelling of you survey data. By default, the labelling consists of track name, survey date, and survey time. You can ignore this setting if you don’t want to change it.

5. Screen always on

   If you activate this feature, you will let your smartphone always turn on when you use OSMTracker. When you using this setting, it will drain your smartphone’s battery fast. You can change it as you needed.

6. Background map

   Use this setting to show the background map on your track. Activate this setting so you can see your survey track with map as it’s background.

7. Map tile provider

   You can change your background map using this feature.

After all the setting is done, then you are ready to use your OSMTracker. Always remember to activate your GPS setting on your smartphone, then you can open your OSMTracker. If you are using OSM-Tracker for the first time, your home page will be empty. Later, all your survey data will show up on your home page.

3. OSMTracker Basic Operation

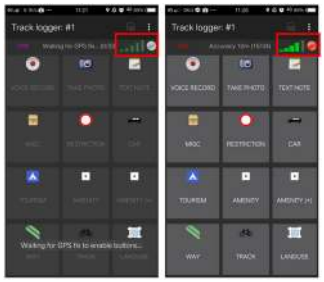
1. **Recording Survey Track**

   If you want to start your track recording, you can select the button + on your top right of your screen. You will see the Track Logger page.

   Use button to start recording

   Use + button to start recording your track

   Remember to always check your GPS accuracy. All feature on OSMTracker will not available if you are not receiving a good GPS signal. Try to get GPS accuracy as best as you can (below 10 meter) to prevent a mistake when recording your current position. You can see your GPS signal indicator on your top right corner of your screen (look at the picture). The signal bar color will change to green and become full when you receive a good signal. Make sure you are in a good position to receive signal. Locate yourself on the open field and make sure you are not under the roof or tree.



   Unable to activate track logger function because the GPS signal is not good enough (left); Track logger is activated if GPS signal is good enough (right)

   When the GPS accuracy is good enough, then you can start to record your track. When you press the + button and the GPS accuracy is good enough, OSMTracker will automatically record your track.

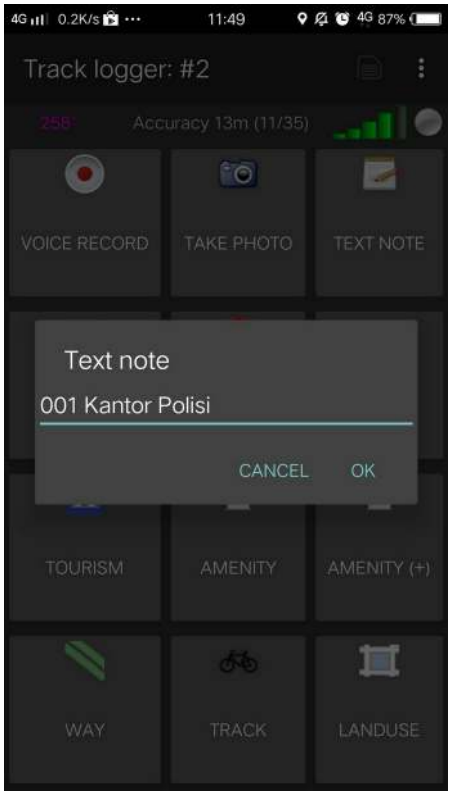
2. **Recording Object using Waypoints and Picture**

   When you open your Track Logger page, there are many buttons to access, but if you want to record waypoints and also picture, you only have to use this 2 button:

   Track logger page on OSMTracker

   1. Text Note

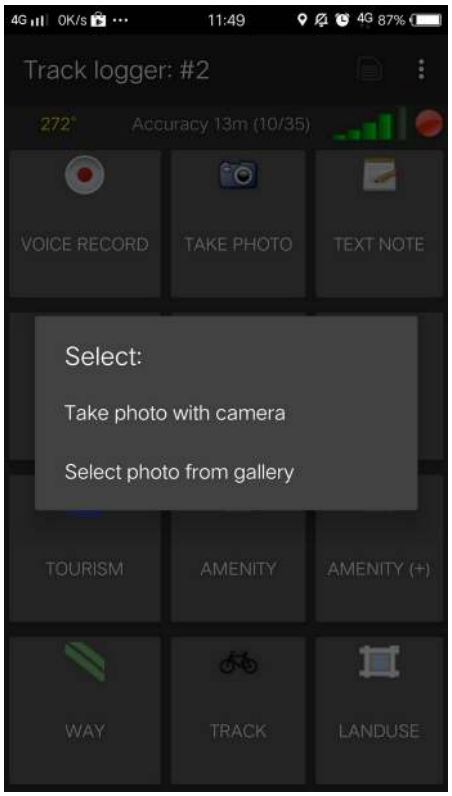
      Use **Text note** to mark your current position as a waypoint. Just press this button and then fill the information. For example, you can label your waypoint with number and then the name of your object.



Text note function to record waypoint on your survey

2. Take Photo

   Use **Take Photo** to take your object photos. You can straight use your smartphone camera or you can select the photo from your gallery.

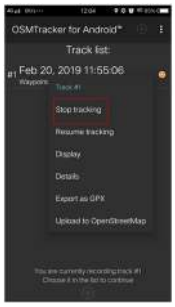


You can choose to take the photos straight from your camera or select from your smartphone's gallery

3. **Stop and Continue Track Recording**

   If you want to stop your recording, you can follow these steps:

   1. On the Track Logger page, please go back to your home page, then find one file track you have collected before. Press on that file for a while until additional menu is shows up.



   Option to set stop tracking

   2. Choose **Stop tracking.**
   3. You can also press ■ button on the top corner on your Track Logger page to stop the recording and save your record.

   If you want to continue your track record on your previous file, then you have to :

   1. Press on your previous file until additional menu is shows up. Select to resume tracking
   2. Then choose **Resume Tracking**

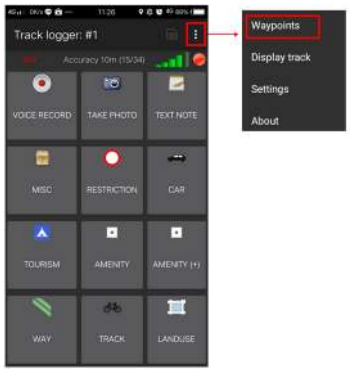
   Note :

   Figure 3: Ikon

   If your file has an orange color clock icon, it means that your file still on track recording mode. This icon will disappear after you stop and save your file.

1. **Showing List of Objects Collected**

   You can see list of objects you have collected. On Track Logger page, press the ⋮ button on the top right corner of your screen, then select **Waypoints**.



   “Tombol untuk menampilkan daftar waypoints yang telah

dikumpulkan”

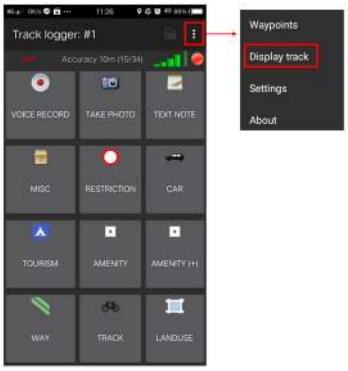
Button to show list of waypoints

You will see the list of objects and the photos you have collected on the Waypoint list.

Waypoint list to see list of objects you have collected

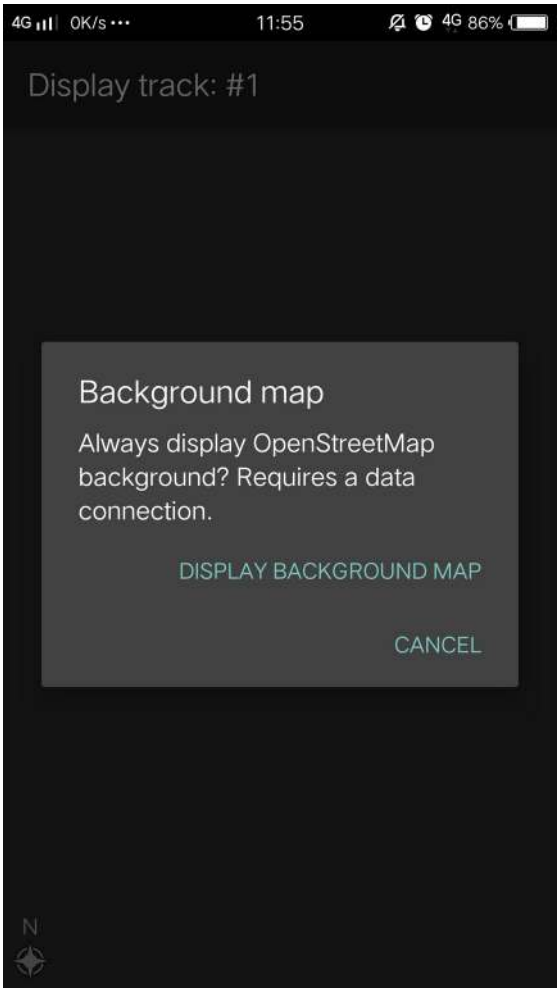
2. **Showing Track and Waypoint Collected**

   You can also see your track and waypoints you have collected. On your Track Logger page, choose menu ⋮ on the top right corner of your screen, then choose **Display Track**.



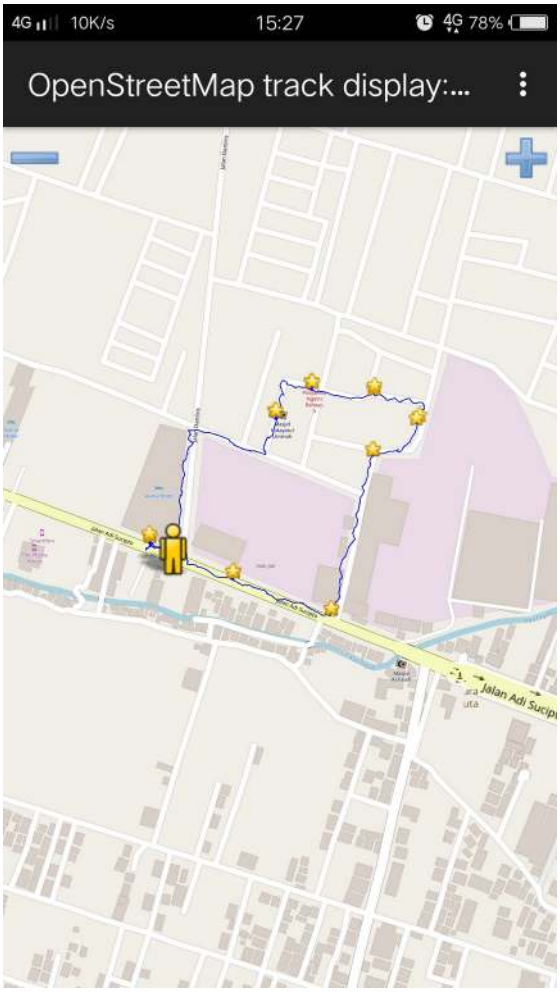
Display track button to see your track and objects you have collected

When you choose to display your track, OSMTracker will ask your permission to show the background map. Choose **Display Background Map**.



Option to display your background map

You will see the map with line, star, and people icon on the top of the map. The star icon represent the waypoints, the line represents the track you have collected, and the people icon shows where is your current position on the map.



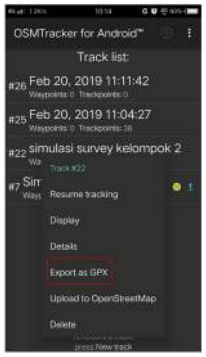
Track and object's collected on field survey

3. **Saving the OSMTracker Data**

   After you collecting the data, you can save your data and use it for your mapping guide. In order to do that, you need to save your survey data as a .gpx data format. After that, you can upload it to OpenStreetMap server or you can move the data to your laptop.

4. **Saving Track and Waypoints as .gpx Data**

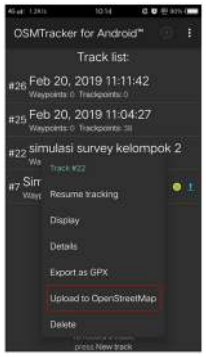
   You can save your track and waypoint into .gpx data. You can open .gpx data with mapping software like **QGIS** and **JOSM**. On your survey file, select and press the file for a while, then select **Export as GPX**. If the process is successful, you can see the green dot on the right side of the file name.



Menu to save your survey data into GPX

5. **Uploading Track to OpenStreetMap Server**

You can upload your survey data to OpenStreetMap server. On your survey file, press and hold it for a while, then select **Upload to OpenStreetMap**.



Menu to upload your survey data into OpenStreetMap

On OpenStreetMap Upload page, you need to fill the form like name and file description. You can ignore on Tags section. On the bottom section, you can set the track for :

1. Private

   Track will not shown up to the public. Trackpoints can be accessed on the time sequence using GPS API without time stamp.

2. Public

   Track will be shown to the public and available for download to the other user.

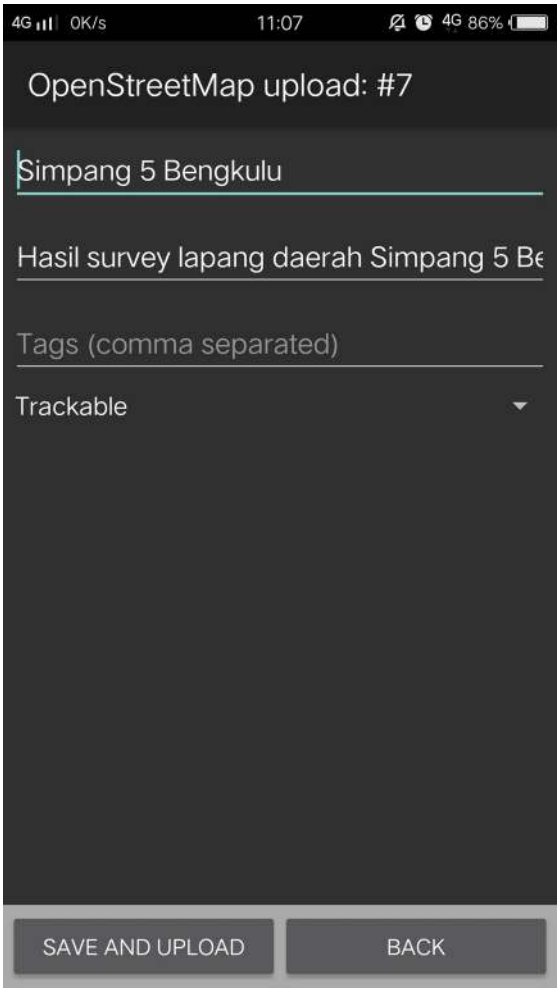
3. Trackable

   Track will be shown to the public, but trackpoints still can be accessed by public GPS API. Other user can download your data but it will not connected with you.

4. Identifiable

   Track will be shown to the public. Other user can download your data and can refer your OSM username.

For this option, you can choose Trackable or Public so another user can download your data.



Survey data is ready to upload into OpenStreetMap server

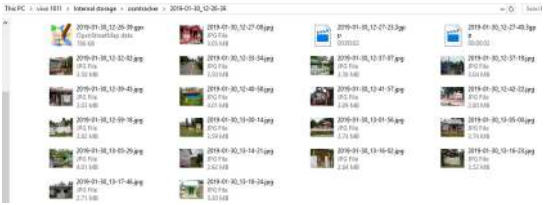
6. **Copying Track and Waypoint to Laptop/Computer**

   All the .gpx data stored in your internal storage of your smartphone. You can search the file using your file manager. To copy the data, you can follow the instruction:

   1. Connect your smartphone to your laptop using your smartphone cable and then find folder called “osmtracker” in your smartphone.

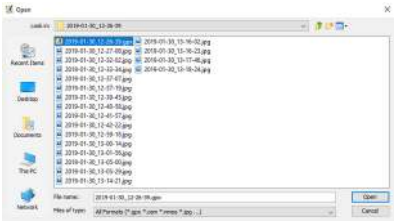
      OSMTracker folder on your smartphone’s storage

   2. Inside of your OSMTracker folder, you can find a folder containing a .gpx data and photos. Copy the entire folder into your laptop.

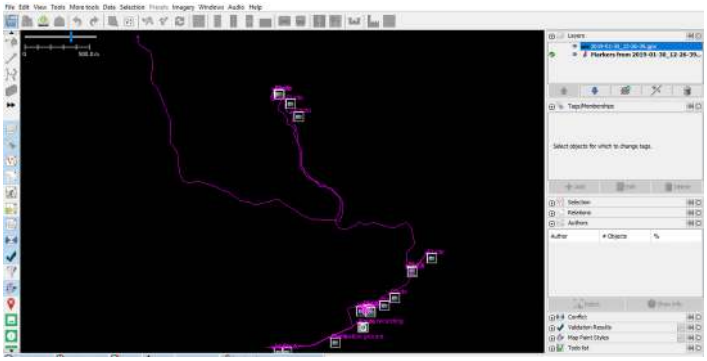
      Example of OSMTracker data consist of .gpx file data and survey photos

   3. Open your JOSM, and then open your gpx data. Select menu **File → Open** and then open the .gpx data format.



Open your file with .GPX format data on JOSM

4. When you open your .gpx file, JOSM will automatically shows track and waypoint along with the photo as well.



Field survey data when you open it on JOSM

You can use your survey result as a guidance for your mapping using JOSM. The photos taken will help you identify what object you should create in JOSM.

SUMMARY

In this chapter you have learned how to do a field survey using OSMTracker. OSMTracker allows you to record your track, waypoint, and take a picture of your survey object. You also have learned how to do an initial setting and how to operating your OSMTracker. You can use OSMTracker as your alternative tools for your survey in case if you don't have GPS.

Creating survey form for ODK Collect & OpenMapKit

Objectives:

- Explain the concept of XLSForm
- Operate the creation of an XLSForm for *ODK Collect*
- Operate the creation of an XLSForm for *OpenMapKit*

In field survey activities sometimes you need a survey form to collect the data. Imagine if you need a form survey with dozens of questions for each respondent, you will certainly experience difficulties when filling data and also when entering data into a laptop. In this material you will learn how to create a survey form in digital format which will later be entered into your mobile phone.

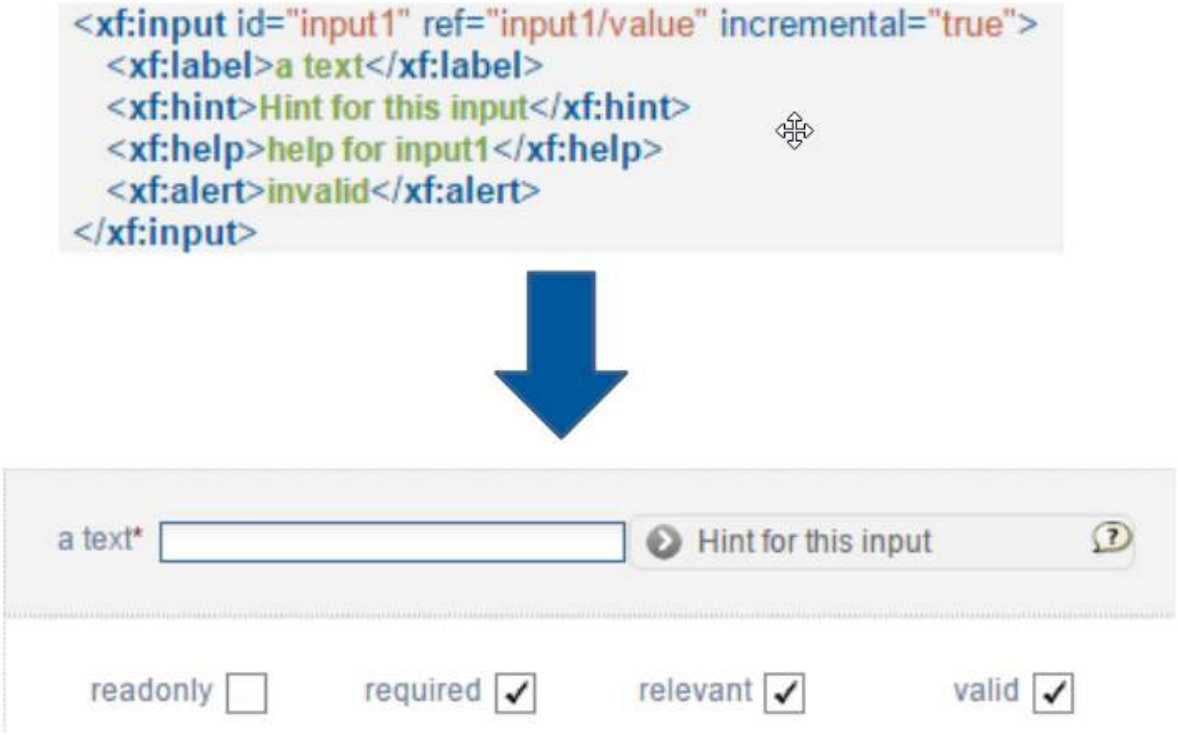
I. Understanding the concept of *XLSForm*

XLSForm is a standard form created to help speed up the process of creating survey forms in **Excel.** The creation of this survey form is done in an easy-to-read format and uses a familiar tool - **Excel** / **Google Sheets**. *XLSForm* produces standard standards for sharing and cooperating in making survey forms. *XLSForm* is very easy to use but can also be very complicated if you are familiar with making it.

	A	B	C	D
1	**type**	**name**	**label**	**required**
2	text	surveyor_name	Q. 1 Nama surveyor	yes
3	select_one yes_no	building	Q. 2 Apakah ini merupakan bangunan?	yes

Example of XLSForm

XLSForm will then be converted to *XForm*, an open standard format, where the format allows you to create a form with very complex functions, such as multilevel questions, into a format that has been recognized by both data collection tools or in the form of sites on the internet, as well as in mobile devices.



Examples of XForms format

The main requirement in making *XLSForm* is the final survey form must in this type of **Microsoft Excel** format (*.xls* or *.xls*).If you create survey forms using other applications such as **Google Sheets** or **Libre Office**, you must ensure that the final file is saved informat *.xls* or *.xlsx*.

II. Making XLSForm for ODK Collect applications

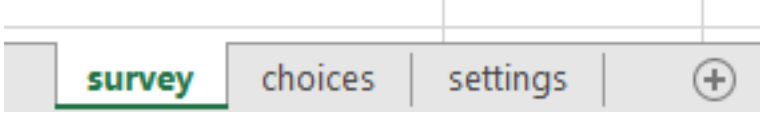
You certainly understand how to use *ODK Collect* described in the **Using the ODK Collect application**module. All questions that appear on *ODK Collect* made in format *XLSForm*. Now we will learn how to create forms survey so they can be displayed in *ODK Collect*.

1. Standard Format

In making survey forms, there are some conditions that you must follow so the survey forms that we make can be changed into format *XForm*. Some rules that must befollowed to create an appropriate survey form are:

a. Three main worksheets /*sheets* .

In the *spreadsheet* we create, it must consist of 3 main worksheets, the named worksheet ***survey, choices, settings.*** The naming of this worksheet must match and must not be mistaken because it will fail when *uploading* your survey form.



Three main worksheets in each XLSForm

The first worksheet is ***survey***. On this worksheet, all questions we make must be put on this worksheet. All questions that we make do not need to be included with the list of answers. All the list of answers we need will refer to the next worksheet.

The second worksheet is ***choices***. On this worksheet we include all of our answer lists for each question that requires answer choices.

The third worksheet is ***settings***. On this worksheet we can only enter the name of our form if the name of our form is different from the name of our file. For example, if our file name is *form_survei_air_bersih*.xls then in this worksheet we can name our form with the name we want, for example the *Water Condition Form*.

b. Three main column names.

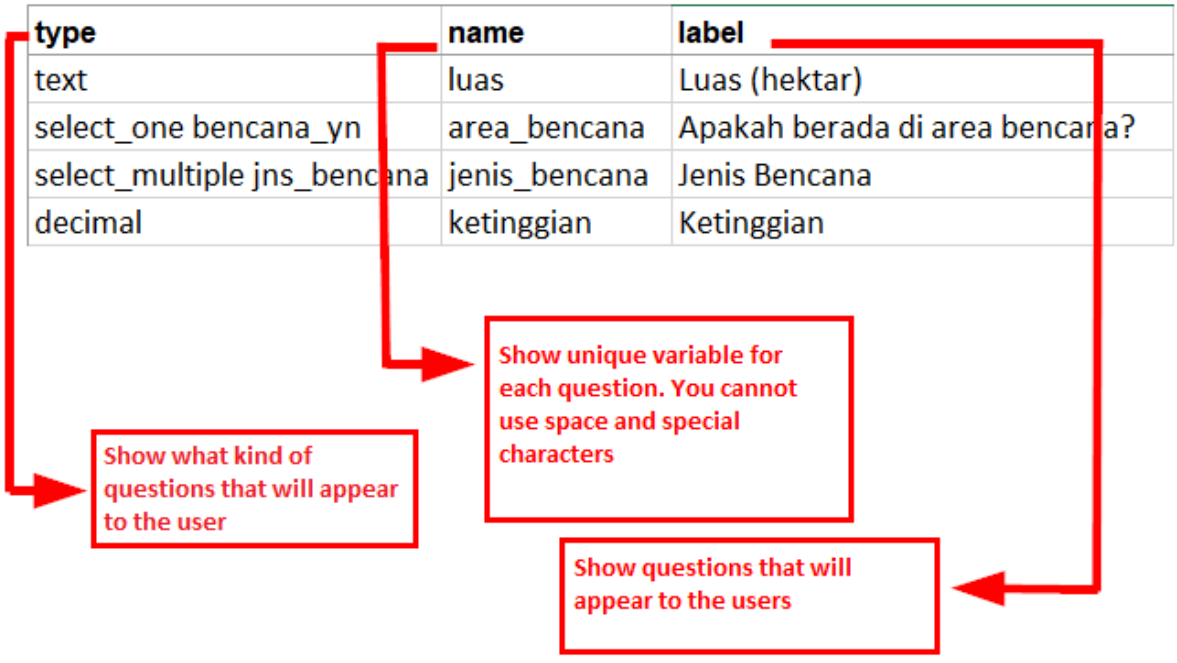
On each worksheet there must be two or three different column names on each worksheet. The column names for each of these worksheets are also different.

b.1. *Worksheet survey*

In **survey** worksheet we have to insert three columns name: **type, name,** and **label.** Column with name **type** indicates the type of question that will appear later, whether the question is in the form of choices, free entries or capture locations.

Column with **name** indicates the unique variable for each question list. These variables cannot be the same, do not use spaces, and are only numbers, letters or underscores.

Column **label** shows the question that will appear on the user's mobile device. There is no standard format for this column, you are free to use letters, numbers, and special characters in this column.



Examples of columns for survey worksheet

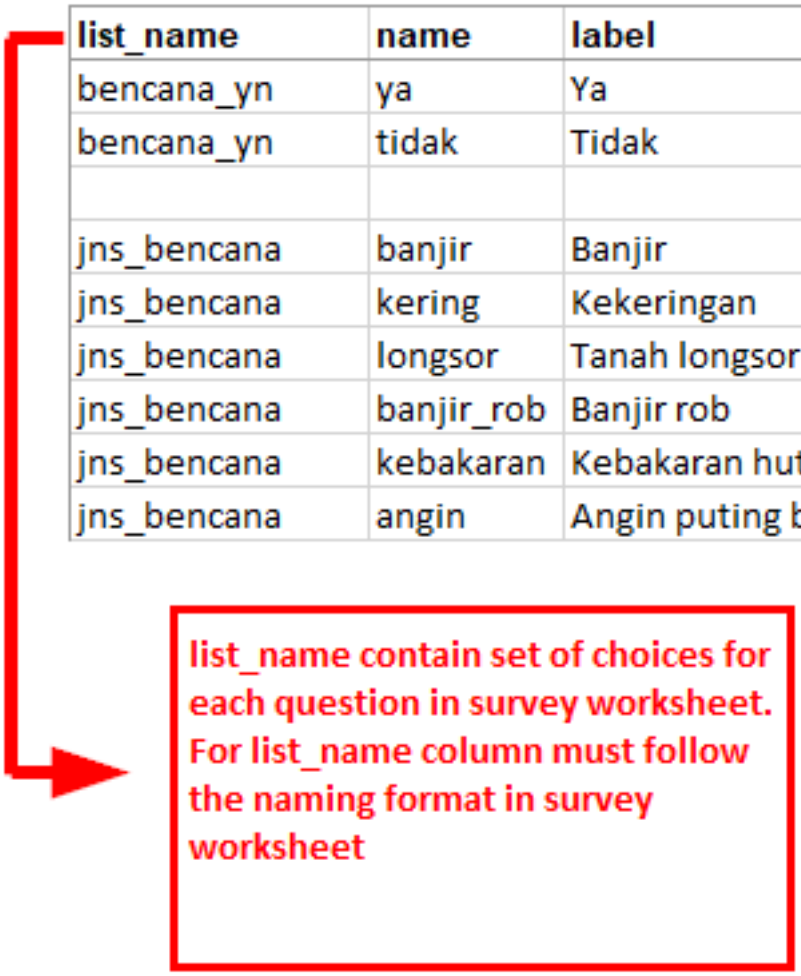
b.2. *Worksheet choices*

At the **choices** worksheet we have to insert three columns namely **name**, **list_name**, & **label.** Inc **list_name** you create a group that contains a set of answer choices. For example like a set of answer choices that will appear under multiple choice questions. For naming variable in ***list_name*** this must follow the naming provided in **survey** worksheet. For example on **survey** worksheet we enter a

multiple choice type with the name **select_one jns_bencana**. So on the **choices** worksheet we must fill ***list_name*** with name **jns_bencana**. This will be explained further in the next discussion.

Column **name** has the same rules as column **name** on the **survey** worksheet. All must be in unique variables that are not the same as the others both on the **survey** worksheet or **choices**; do not use spaces but are replaced by *underscores*; and do not use special characters such as question marks, exclamation marks, etc.

Column ***label*** has the same rules as column **label** on the **survey** worksheet. This column contains the answer text that will appear on the user's cellphone. You can freely use spaces, special characters or letters in this column.



list_name	name	label
bencana_yn	ya	Ya
bencana_yn	tidak	Tidak
jns_bencana	banjir	Banjir
jns_bencana	kering	Kekeringan
jns_bencana	longsor	Tanah longsor
jns_bencana	banjir_rob	Banjir rob
jns_bencana	kebakaran	Kebakaran hutan
jns_bencana	angin	Angin puting beliung

Examples naming column on the choice worksheet

b.3. *Worksheet settings*

Worksheet ***settings*** used when you want to make additional settings such as giving the name of your survey form, giving form a specific id, and version of your survey form. In order to use this feature, you must provide these three column names: **form_title, form_id,** & **version**.

Column **form_title,** you can provide free naming for your form. This naming will later appear on the user's cellphone.

Column **form_id**, you can provide your form id. The terms for naming this column are that you can't have the same id as the other forms, don't use spaces, and don't use special characters.

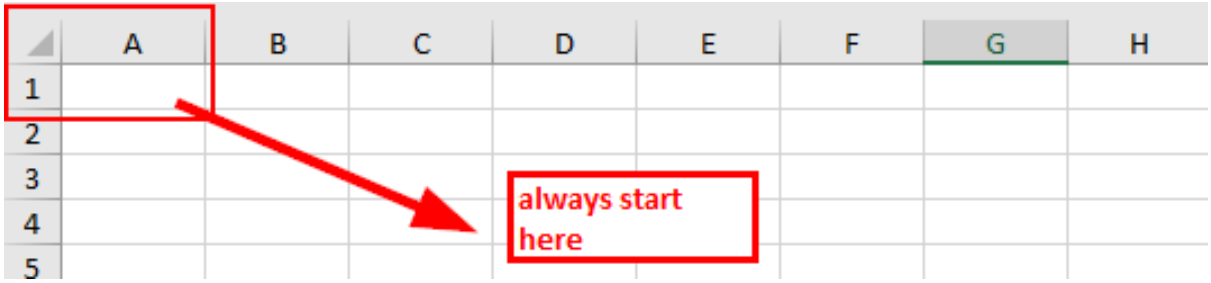
Column **version**, you can provide a version of your form. Adding column **version** is not mandatory. If you frequently add / change your survey forms, by providing column **version**, it will be easier for you to upload the forms on the server.

form_id	form_title	version
ckm_penggunaan_lahan	CKM Form Survey Penggunaan Lahan	ckm_001

Examples of settings on the worksheet settings

c. All entries must be in a standard format and starting from the first box.

One of the most important requirements is that when we make a survey form, everything must start in the *field /quadrant* ***A-1.***



Initial position of making survey forms

All entries form must start in those quadrant/*field* because the system will convert *spreadsheet* file to *XForm*, so if you do not start from that position, and error will occur in the system.

In addition, the other main requirement is that you cannot use table formats such as *merge, center, hide row / coloum, wrap text,etc*. Everything must be in a standard format. Settings that we can use are to add letters in bold, give color to columns or rows, and change the shape and size of letters.

2. Types of Standard Questions

In the paper survey form, we usually find several questions such as short answers, long answers, entering the date of birth, and multiple choices. Some of these questions, have different type questions, such as:

a. Question type *text*

This type will generate a type of question with a free response question format. Users can freely enter numbers, letters, and special characters if we use this type of question.

type	name	label
text	surveyor_name	Q. 1 Nama surveyor

Examples ofquestion text

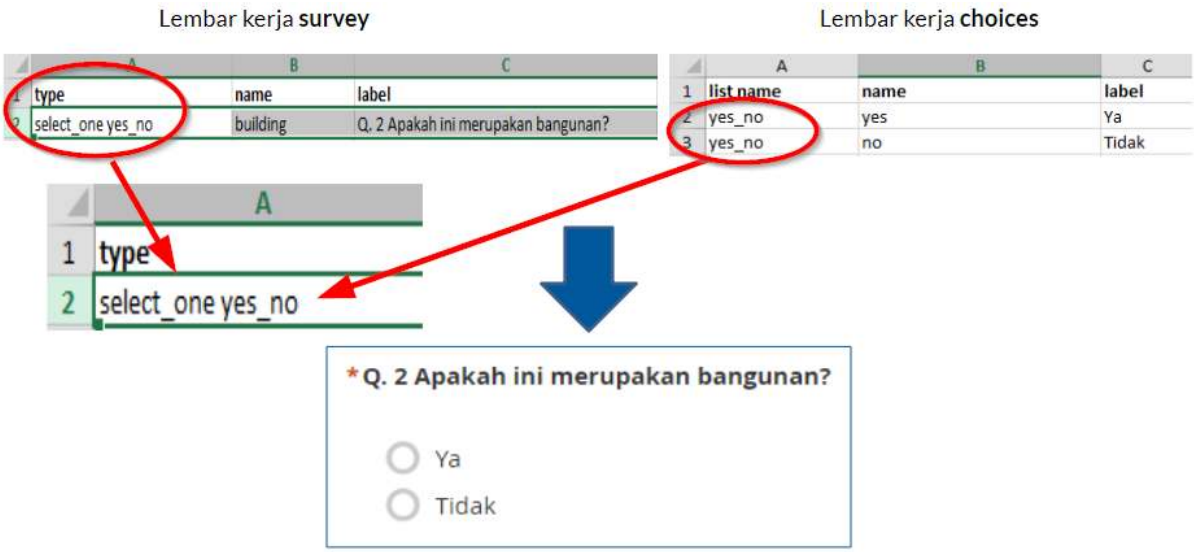
b. Question type *Integer / decimal*

This type of question will produce a question format with answers of integer numbers (specifically for **integer** type) or decimal numbers (specifically for **decimal** type). Users can only enter numbers with this type of question, a combination of numbers and letters cannot be entered if we use this type of question.

Example question for integer type

c. Question type *select_one*

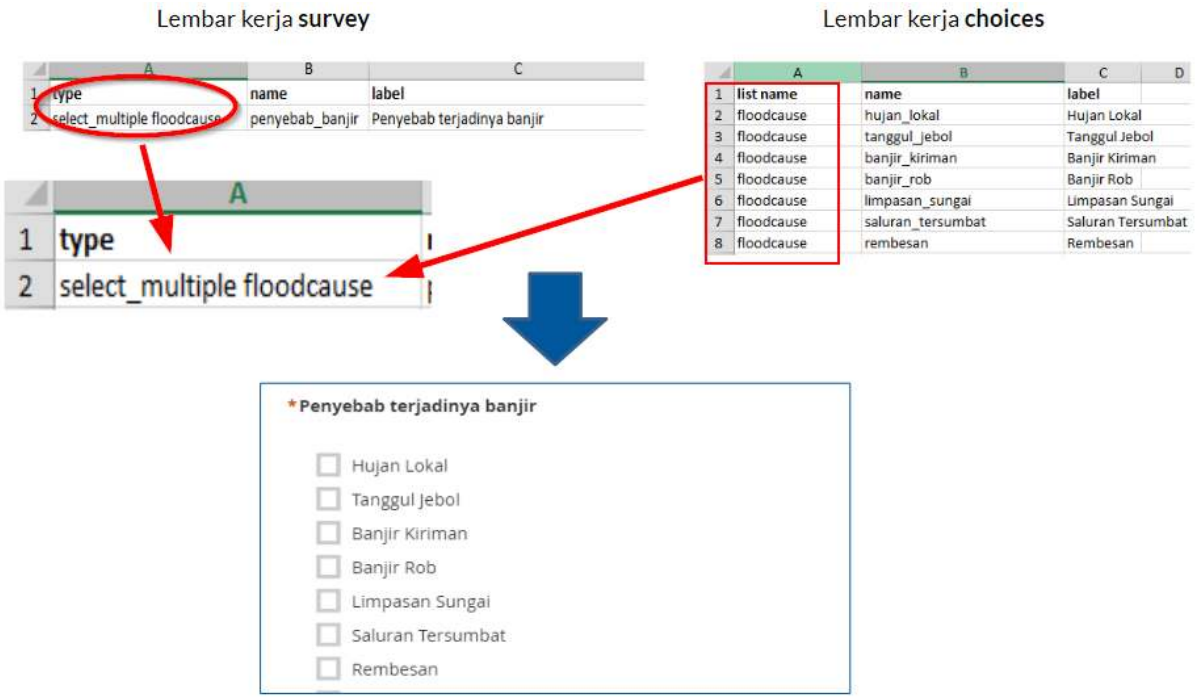
This type of question will give the user a choice of answers where the user may only choose one answer. In creating this type of question, you must use a format such as **select_one [options]**. Where **[option]** is a group variable that will be included in the **list_name** inside worksheet **choices**.



Example question type select_one [options]. Note that the list_name matches with [options] in survey worksheet.

d. Question type *select_multiple*

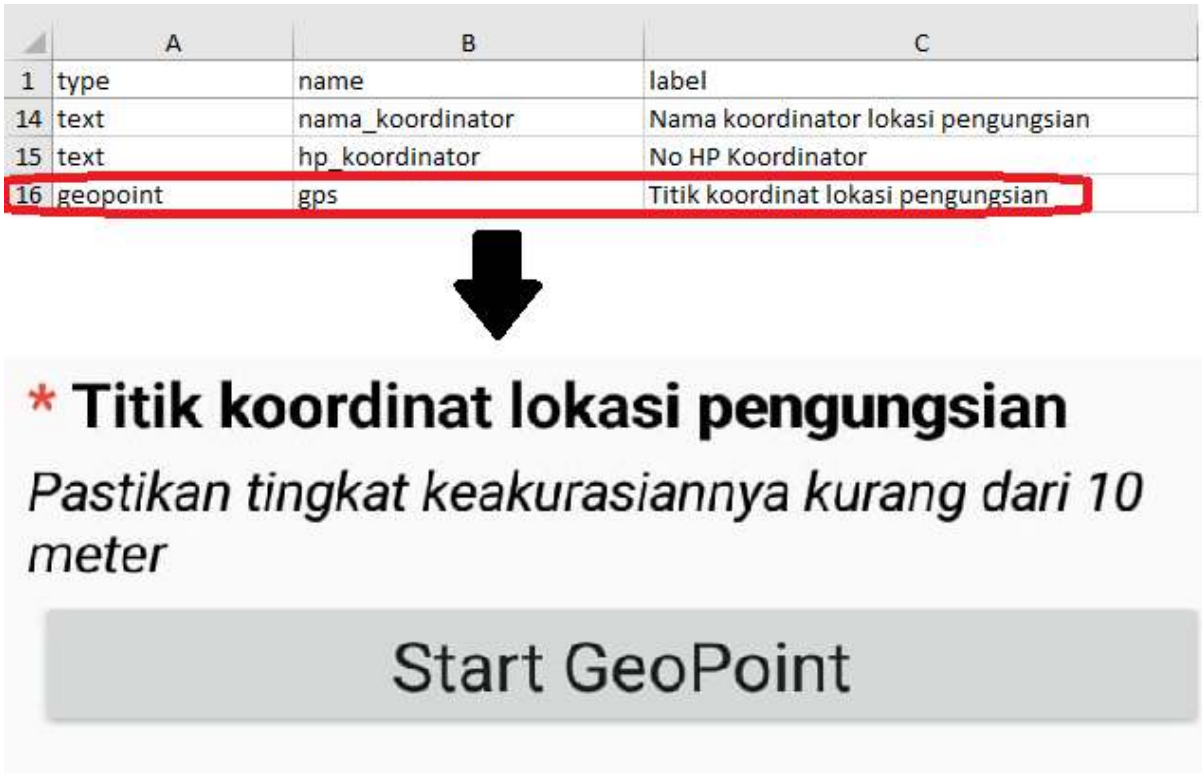
This question type is the same as the previous question type. The answers presented to the user are of several choices and the user may choose more than one answer. The rules for creating this type of question are the same as **select_one**. You must use a format such as **select_multiple [option]**, where **[option]** is a group variable that will be included in **choices** under **list_name**.



Example question type select_multiple [options]. The option in the picture above is the floodcause which also appears in the worksheet choices.

e. Type of *geopoint*

This type of question will ask the user to record the coordinates of their position and will produce data in the form of latitude and longitude coordinates.

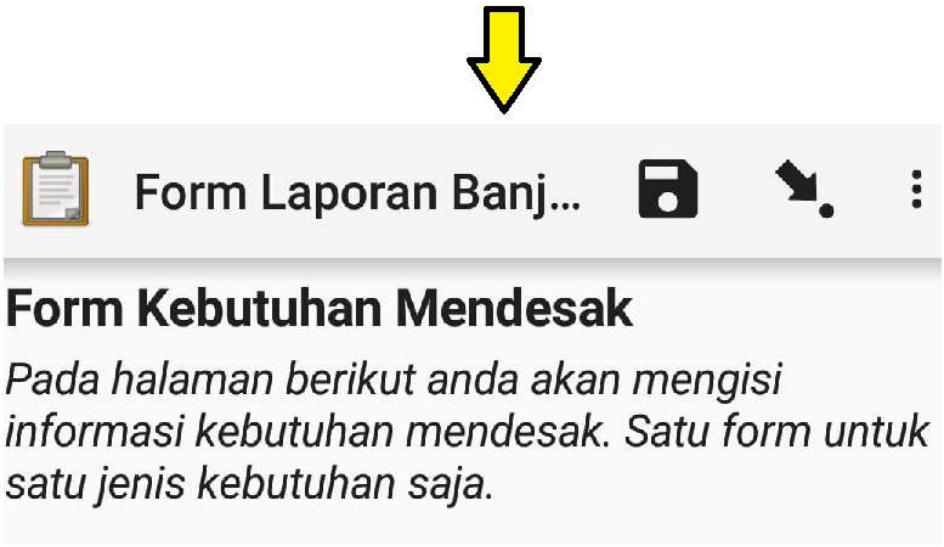


Example of question using geopoint

f. *Note*

This type is used to add a note or notification page. Users will be presented with a single page containing only the appearance of the text without having to fill in any information. For the writing format, it still follows the writing conventions in **label**, where we are free to give any writing format.

	A	B	C
1	**type**	**name**	**label**
33	note	display_note1	Form Kebutuhan Mendesak. Pada halaman berikut anda akan mengisi informasi kebutuhan mendesak. Satu form untuk satu jenis kebutuhan saja.



Examples of using note

g. *image, video or audio*

This type of question will ask the user to take a picture, sound or video.

	A	B	C
1	**type**	**name**	**label**
24	image	foto	Ambil foto untuk lokasi ini

Example of using image type

3. Additional Format

You can directly use your survey form by simply entering a number of standard question types that have been explained previously. The more you are good at creating *XLSForm*, you might ask if there are other types of questions that can make your survey forms easier to use and retrieve data according to your wishes. To see all types of questions that can be used in making *XLSForm*, you can go to the site http://xlsform.org. In this material, we will only discuss a few types of additional questions that you can use if you want to make your survey form more informative and easier to use.

a. *Hint*

Hint is one additional feature that we can add to our digital survey forms. By using this feature, we can provide additional information or instructions on how to fill in a question that we make. To create this feature, we must add a new column to **survey** worksheet called **hint**. By adding this column, for each type of question we make, we can add it with the information, such as instructions to filling the form, in column **hint**.

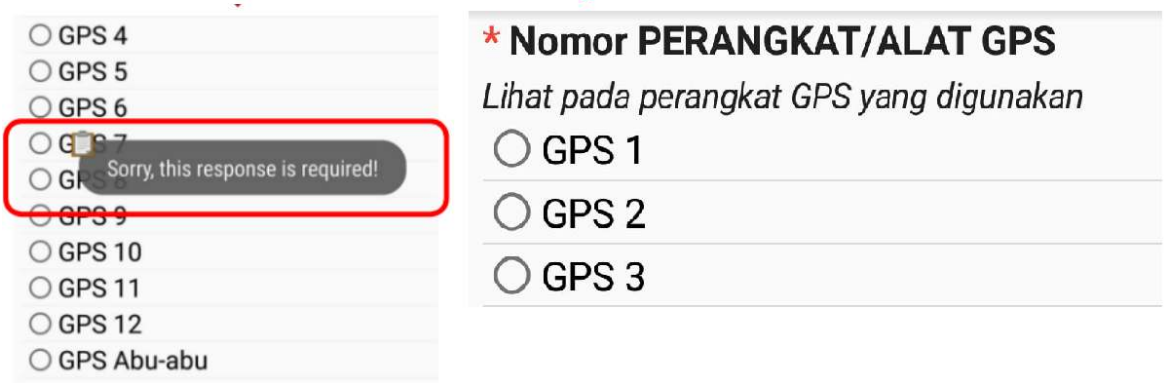
	A	B	C	H
1	**type**	**name**	**label**	**hint**
2	start	auto_survey_time		
3	begin group	group_surveyor	Informasi Surveyor	
4	text	organisasi	Nama Organisasi	Pastikan pengisian nama tidak memasukkan karakter spesial. Contoh : / < * & @ #
5	text	surveyor	Nama Surveyor	Pastikan pengisian nama tidak memasukkan karakter spesial. Contoh : / < * & @ #
6	end group			

Examples of using thecolumn hint

b. *Required*

This feature is needed if on your survey form, there are questions that must be answered. By using this feature, users will not be able to fill in further questions if they have not answered the question first. The types of questions that use this feature will also have a red asterisk when viewed on your phone. To use this feature, you only need to create a new column called **required** that is located on **survey** worksheet. In order to set questions becomes mandatory, you must add the value **yes** in this required column.

	A	B	C	D	E	F
1	**type**	**name**	**label**	**hint**	**relevant**	**required**
4	select_one perangkat_gps	no_gps	Nomor PERANGKAT/ALAT GPS	Lihat pada perangkat GPS yang digunakan		yes
5	text	surveyor	Nama surveyor			yes



Example of using required features. Any questions that activate this feature cannot be skipped by the user if they are not already filled in.

c. *Field-list*

The function of this feature is that users will be presented with a number of questions on just **one page** on the application screen. By default, each page will only be presented with one question. If we want all questions to appear on one page, then we must use this feature.

To enable this feature, you must make a number of settings:

1. You must insert format **begin_group** at the beginning of the question that you want to display on one page and **end_group** at the end of the question that you want to display on one page. These **begin_group** and **end_group** formats must be in the column **type**. By tucking in this format, the system will read that all questions that are after **begin_group** and before **end_group** format are one question group.
2. After you have created the question group, you must add column **appearance** and fill with **field-list** format. By adding this column, you inform the system that all groups of questions that you have created, will be included in a single page list.

	A	B	C	D	F
1	type	name	label	required	appearance
2	begin_group	info_awal	Informasi awal		field-list
3	text	nama_surveyor	Nama surveyor :	yes	
4	dateTime	waktu_survey	Tanggal dan waktu survey :		
5	end_group				

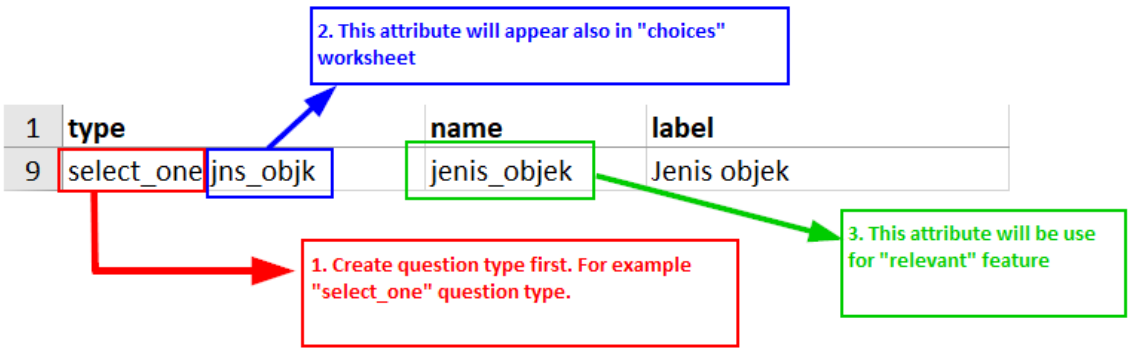
Example of using the field-list feature in several groups of questions

d. *Relevant*

This feature allows us to make a list of questions that follow the answers to the previous questions. Suppose we are asked a question about “What causes floods?” With the answer choices “A. Bad Drainage B. Garbage C. Others”. When we answer “C. Other”, then the next question will only relate to the previous (other) type of answer, such as “Because in the previous question you answered others, explain further about the causes of other floods”. The question will not appear if we answer with other answers such as “A. Bad Drainage”. How to enable this **relevant** consists of several stages:

1. Creating the initial question type

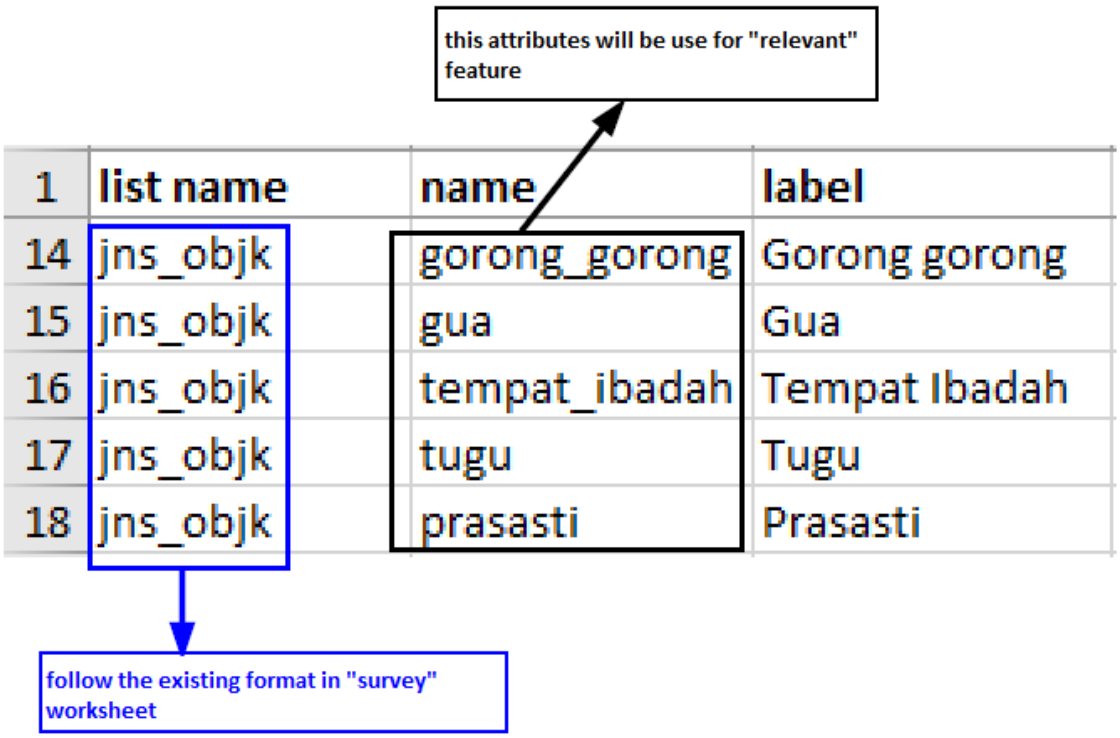
   Before using **relevant**, you must first create an Initial question that you will enter into format **relevant**. For example, by using the type question **select_one**:



   Example questions on survey worksheet

2. Making choices on **choices** worksheet

   After you make the initial question, the next step is you have to make the choice of answers on **choices** worksheet.



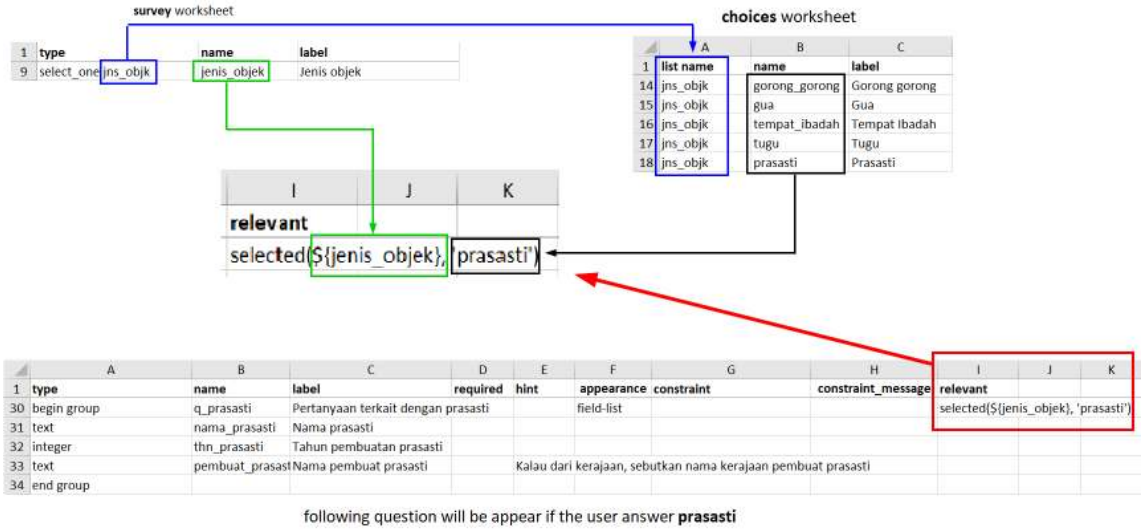
   Example answer choices on theworksheet choices

3. Insert **relevant** features in the next question

   After you make the initial question and answer choices, the next step is you will make the question that will appear in accordance with the answer choices selected in the previous question. For example, in the previous question, you chose the **prasasti** for the type of object in question, then the next question will be specific only about the **prasasti**. To enable this feature, you must enter an additional column named **relevant** on **survey** worksheet. After entering additional columns you can fill in the question rows that require **relevant** functions with the format:

Format	Deskripsi
$field_name =$ ‘$choice$’$\|For type select_one only\|\|selected($ {field_name}, ‘choice’)	For type select_multiple & select_one

For **field_name** refers to the variable that you specified earlier in the **name** column on the **survey** worksheet. Meanwhile, **choice** refers to the variable of choice of answers available on the **choices** worksheet.



Example of making relevant features

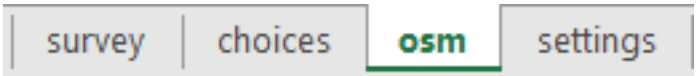
III. Creating survey forms for theapplication *OpenMapKit*

In addition to using *ODK Collect*, for data collection in the field we also use *OpenMapKit*. You certainly understand how to use *OpenMapKit* for data collection in the field. If you don't know it yet, you can read the **Using the OpenMapKit Application** module. Now we will learn how to create survey forms for use in *OpenMapKit*.

Generally, creating survey forms for *OpenMapKit* follows rules such as *ODK Collect* form. Making this survey form can also be done in the same file when making *ODK Collect*. There are a number of standard settings that we must follow so that the survey form we make can be used for *OpenMapKit*.

1. Four main worksheets

In general, to make *OpenMapKit* is not much different from the format ODKCollect. The worksheets needed by *ODK Collect* are **surveys, choices,** & **settings**. But for *OpenMapKit*, we have to **add a new worksheet named osm**.



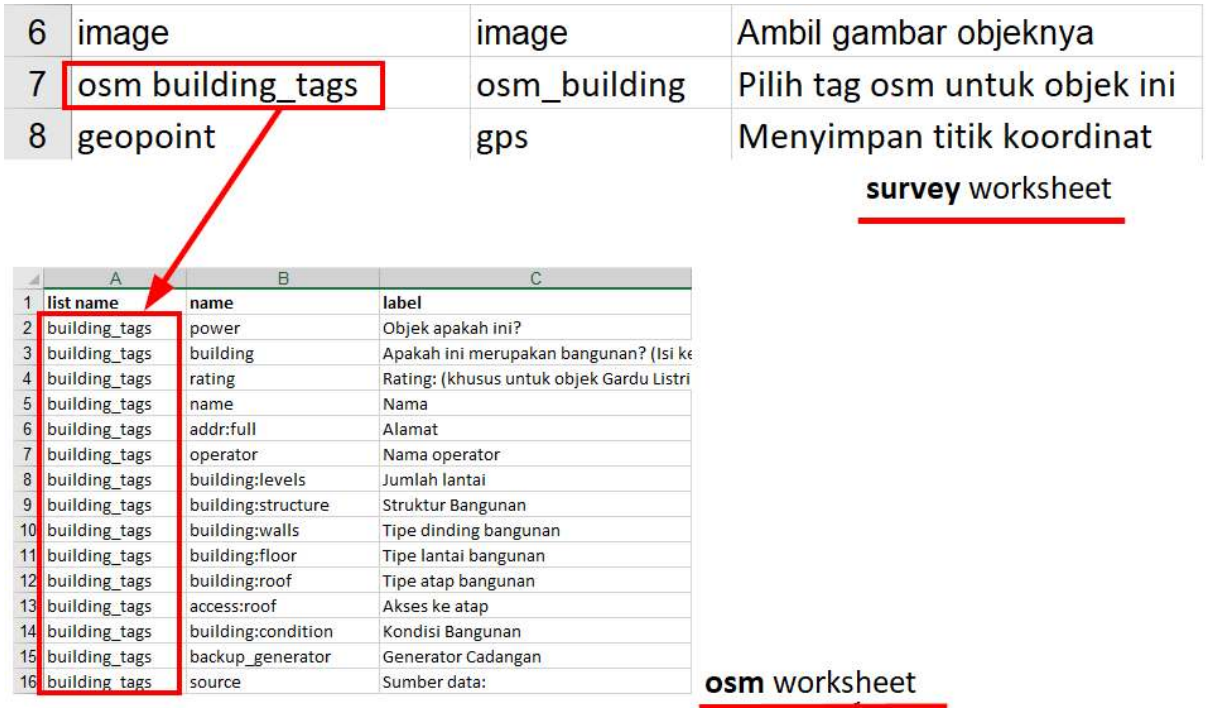
Main worksheet for OpenMapKit

osm worksheet contains questions and answer choices that will appear on *OpenMapKit*. It is on this worksheet that we must enter all the list of questions that will appear in *OpenMapKit*. Meanwhile, three other worksheets followed the rule when making *ODK Collect*.

2. Types of main questions

In order for the questions that we make successfully raised in *OpenMapKit*, we have to enter a special type of question, which is **osm**. By entering this question into **survey** worksheet, the system will bring up all the questions in *OpenMapKit* that we have created on **osm** worksheet.

This type of question must be followed by a variable that need to be linked to the variable in **list name** column on **osm** worksheet.



6	image	image	Ambil gambar objeknya
7	osm building_tags	osm_building	Pilih tag osm untuk objek ini
8	geopoint	gps	Menyimpan titik koordinat

survey worksheet

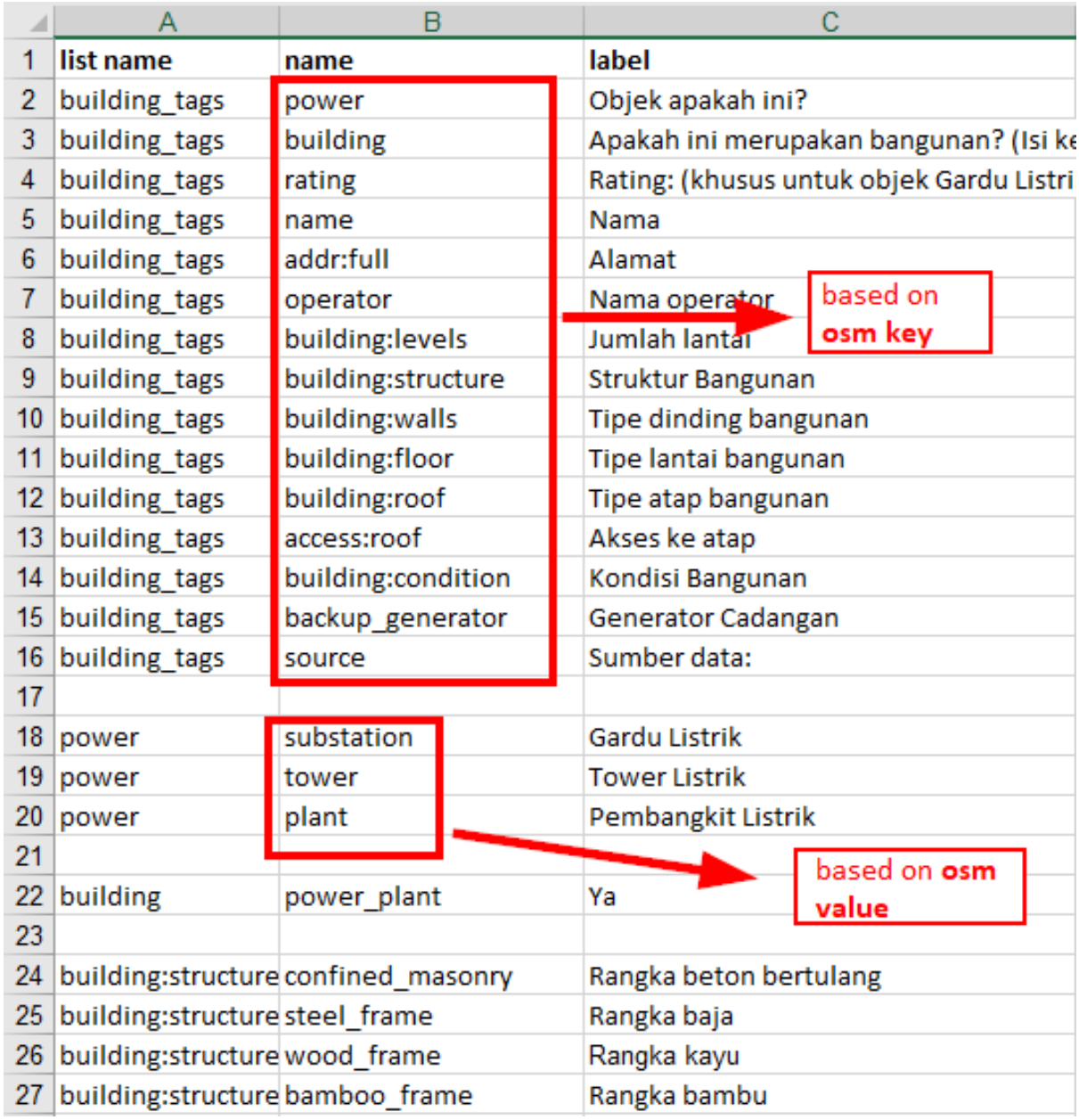
	A	B	C
1	**list name**	**name**	**label**
2	building_tags	power	Objek apakah ini?
3	building_tags	building	Apakah ini merupakan bangunan? (Isi ke
4	building_tags	rating	Rating: (khusus untuk objek Gardu Listri
5	building_tags	name	Nama
6	building_tags	addr:full	Alamat
7	building_tags	operator	Nama operator
8	building_tags	building:levels	Jumlah lantai
9	building_tags	building:structure	Struktur Bangunan
10	building_tags	building:walls	Tipe dinding bangunan
11	building_tags	building:floor	Tipe lantai bangunan
12	building_tags	building:roof	Tipe atap bangunan
13	building_tags	access:roof	Akses ke atap
14	building_tags	building:condition	Kondisi Bangunan
15	building_tags	backup_generator	Generator Cadangan
16	building_tags	source	Sumber data:

osm worksheet

Types osm question with the same variables on osm worksheet

3. Three main columns

On **osm** worksheet, we must enter three main columns, namely **list name**, **name**, and **label**. The **list name** column contains questions and answer choices. The **name** column contains the unique variables that follow thes tandards *key* and *value* of *OpenStreetMap.* For a list of *keys* and *values,* you can look at the **Data Model *OpenStreetMap*** module or you can go directly to the site https://wiki.openstreetmap.org/wiki/Map_Features and https://wiki.openstreetmap.org/wiki/Id:Indonesian_Tagging_Guidelines.



	A	B	C
1	**list name**	**name**	**label**
2	building_tags	power	Objek apakah ini?
3	building_tags	building	Apakah ini merupakan bangunan? (Isi ke
4	building_tags	rating	Rating: (khusus untuk objek Gardu Listri
5	building_tags	name	Nama
6	building_tags	addr:full	Alamat
7	building_tags	operator	Nama operator
8	building_tags	building:levels	Jumlah lantai
9	building_tags	building:structure	Struktur Bangunan
10	building_tags	building:walls	Tipe dinding bangunan
11	building_tags	building:floor	Tipe lantai bangunan
12	building_tags	building:roof	Tipe atap bangunan
13	building_tags	access:roof	Akses ke atap
14	building_tags	building:condition	Kondisi Bangunan
15	building_tags	backup_generator	Generator Cadangan
16	building_tags	source	Sumber data:
17			
18	power	substation	Gardu Listrik
19	power	tower	Tower Listrik
20	power	plant	Pembangkit Listrik
21			
22	building	power_plant	Ya
23			
24	building:structure	confined_masonry	Rangka beton bertulang
25	building:structure	steel_frame	Rangka baja
26	building:structure	wood_frame	Rangka kayu
27	building:structure	bamboo_frame	Rangka bambu

name column follows the key and value rules on OSM

4. Questions and answer choices in one worksheet

Unlike creating survey forms for *ODK Collect*, where each question and answer choices are separate on different worksheets, for creating survey form in *OpenMapKit* we must enter all questions and choices answers on one worksheet.

IV. Exercises to Create Survey Forms *ODK Collect* and *OpenMapKit*

Until now we have understood how to create survey forms for *ODK Collect* and *OpenMapKit*. Now we will try to make a survey form that can be used for both of these applications.

Imagine that you currently want to conduct data collection activities at a facility by using *ODK Collect* and *OpenMapKit*. Some data that you want to collect are:

- name *Surveyor*. (Required)

- To be at a disaster-prone location or not
- If at the disaster location, specify the type of disaster (can be more than one answer)
- Coordinates of the location of survey objects
- Name of place of amenity
- Type of amenities Amenity
- complete address of the

From the data above, you have successfully identified which types questions that go into survey forms *ODK Collect* and any kind of questions that go into survey *OpenMapKit* form. Questions that enter into *ODK Collect* are the **name of the surveyor, disaster-prone, type of disaster** & **coordinates of the location of the survey object**. Meanwhile the questions that go into *OpenMapKit* are the **name of the place** & **type of amenities, and full address**.

First of all, we have to make a survey form for *ODK Collect*. As the requirements you have learned before, in *spreadsheet* we have to make four worksheets, which are **survey, choices, settings** & **osm.**

After that, on the **survey** worksheet we must provide our main column, which is **type**, **name** & **label**. The types of questions we have to make for this survey form are **text, select_one, select_multiple,** & **geopoint**. Because surveyor questions are mandatory questions, we must use **required** on **survey** worksheet. Apart from that we also have to use **relevant** for disaster type questions. This **relevant** feature will make it easier for us to make a conditioned question.

	A	B	C	D	E	F	G
1	**type**	**name**	**label**	**required**	**relevant**		
2	text	surveyor_name	Nama Surveyor	yes			
3	select_one yes_no	bencana	Apakah objek ini berada di area bencana?				
4	select_multiple jns_bencana	jenis_bencana	Jika berada di area rawan bencana, sebutkan jenis bencananya.		selected(${bencana}, 'yes')		
5	geopoint	lokasi_obj	Rekam koordinat untuk objek survei ini.				

Type questions on the worksheet survey

On **choices** worksheet we put the answer choices for the type of questions **select_one** and **select_multiple** that we have created on the **survey** worksheet. Here we have to make three main columns namely **list_name, name,** & **label**.

	A	B	C
1	**list name**	**name**	**label**
2	yes_no	yes	Ya
3	yes_no	no	Tidak
4	jns_bencana	angin	Putting Beliung
5	jns_bencana	gempa	Gempa Bumi
6	jns_bencana	gunung_meletus	Gunung Meletus
7	jns_bencana	banjir	Banjir
8	jns_bencana	longsor	Longsor
9	jns_bencana	tsunami	Tsunami

The answer choices entered in worksheet choices

Because we want to use *OpenMapKit* for our field data collection, we have to add the type of questions

that will lead us to *OpenMapKit*, the type of questions we have to enter is **osm**. On **osm** worksheet, we include all questions related to *OpenMapKit*. In the variable **name** we must refer to the *key* and *value* on the *OpenStreetMap* wikipedia .

survey worksheet

	A	B	C
1	**type**	**name**	**label**
2	text	surveyor_name	Nama surveyor
3	select_one yes_no	bencana	Apakah obyek ini berada di area bencana?
4	geopoint	lokasi_obj	Rekam koordinat untuk obyek survey ini
5	osm survey_tags	obj_osm	Anda akan diarahkan ke aplikasi OpenMapKit

osm worksheet

	A	B	C	D	E	F	G
1	**list name**	**name**	**label**				
2	survey_tags	amenity	Apakah tempat ini merupakan tempat ibadah?				
3	survey_tags	name	Nama tempat ibadah				
4	survey_tags	religion	Jenis pemeluk agama untuk tempat ibadah ini				
5							
6	amenity	place_of_worship	Ya				
7							
8	religion	buddhist	Buddha				
9	religion	christian	Kristen				
10	religion	hindu	Hindu				
11	religion	muslim	Islam				

Fill in the survey and osm

Finally, in **settings** worksheet we enter our form id and the title of our form. On this worksheet, only two main columns are needed, namely **form_id** and **title.**

	A	B
1	**form_id**	**title**
2	01_Survey_Amenity	01. Survey Amenitas

Examples of settings on the worksheet settings

SUMMARY

Congratulations! Currently you have successfully created a survey form for *ODK Collect* and *OpenMap-Kit applications*. To find out more about the types of questions that can be made on *ODK Collect*, you

can directly access the page http://xlsform.org. Making the right form will make it easier for surveyors to collect data in the field.

— title: Adding Survey Data into OSM Using JOSM weight: 5 —

Objectives:

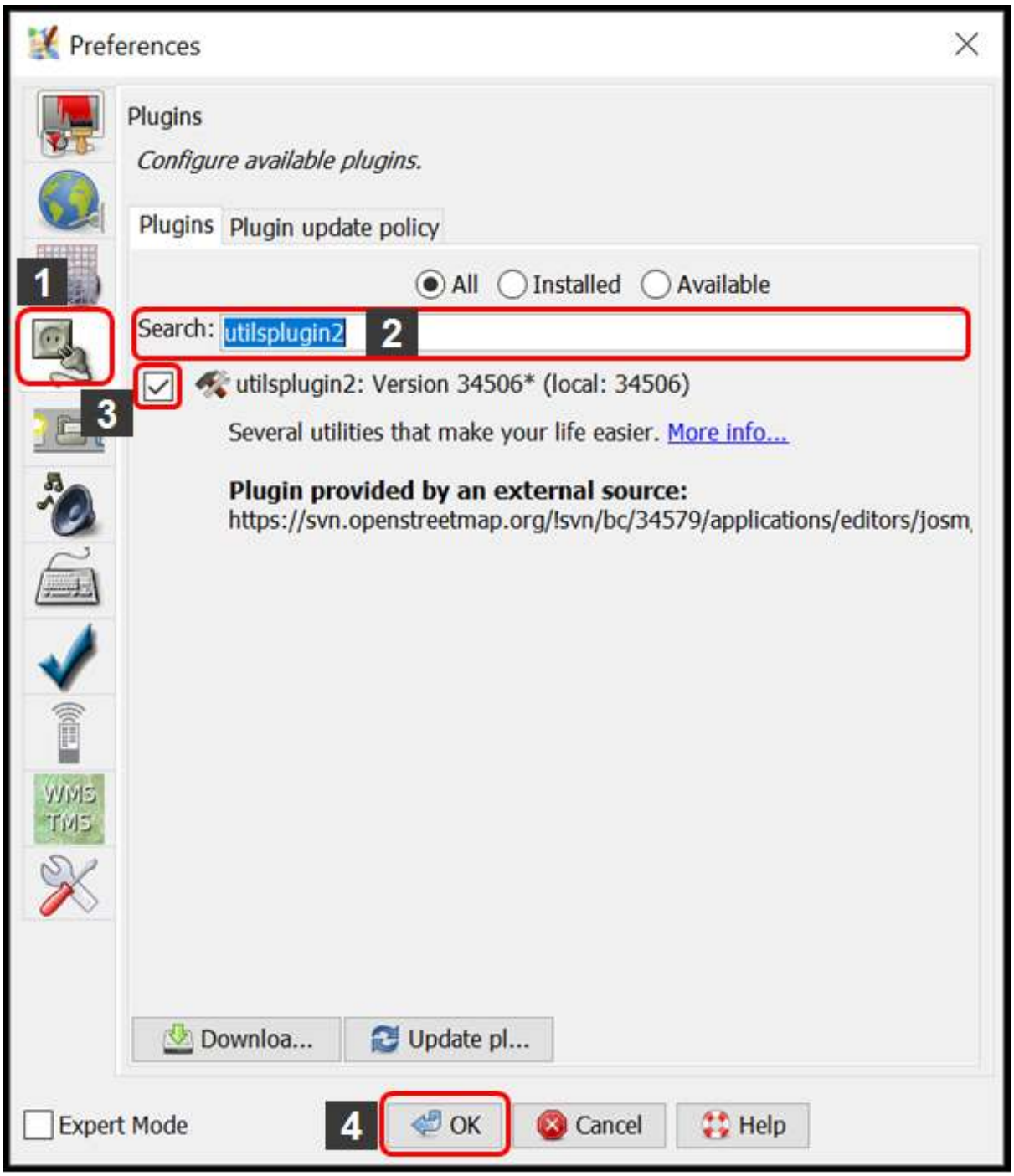
- To be able to install plugin Utilsplugin2
- To be able to merge all survey data
- To be able to save .osm file using JOSM
- To be able to download OSM data
- To be able to add satellite imagery layer on JOSM
- To be able to add and edit OSM data using JOSM
- To be able to upload changes into OSM
- To be able to view changes of OSM data in OSM website

Adding or mapping new objects in OSM is one way to enrich OSM data. Mapped object's information will be very limited when you add OSM data based on satellite imagery only. Field survey can be conducted to solve this problem. Field survey can help you add more information to the mapped object. You can learn more about survey toolkit in the **Field Data Collection Methodology** module. You need an OSM data editor to do the OSM mapping. There are a lot of OSM data editor available, but in this module the OSM data editor used is JOSM. JOSM has a lot of useful tools and plugins, making OSM mapping a lot easier.

I. Installing plugin Utilsplugin2

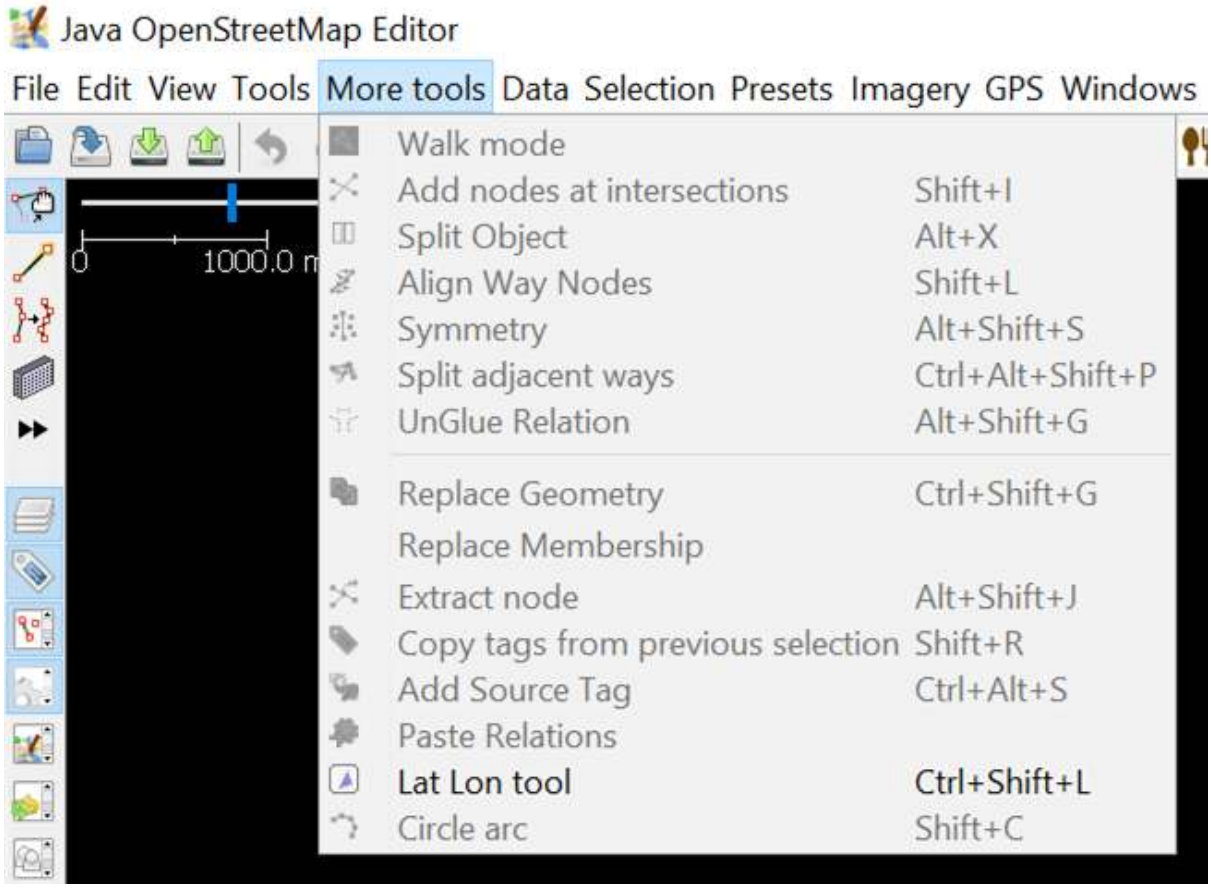
Before adding or editing OSM data using JOSM, install plugin you'll be using first. JOSM has a plugin called utilsplugin2 whose one of the functions is makes copying preset/tag easier. To use this plugin, you have to install the plugin first since it is not installed by default. These are the steps to install plugin utilsplugin2:

- Open **JOSM**
- Click menu **Edit → Preferences**
- Select menu **Plugins** to install new plugin. If you haven't downloaded available plugins, click **Download List** first to download it. Make sure that you are connected to the internet.
- After downloading plugins, search the **utlisplugin2** by typing it in the search box. After you found it, give a check on the checkbox next to utilsplugin2.



Installing plugin utilsplugin2

- Click **OK** and wait until the installation process is finished. If the plugin has successfully installed, there will be ***More tools*** menu on your JOSM.



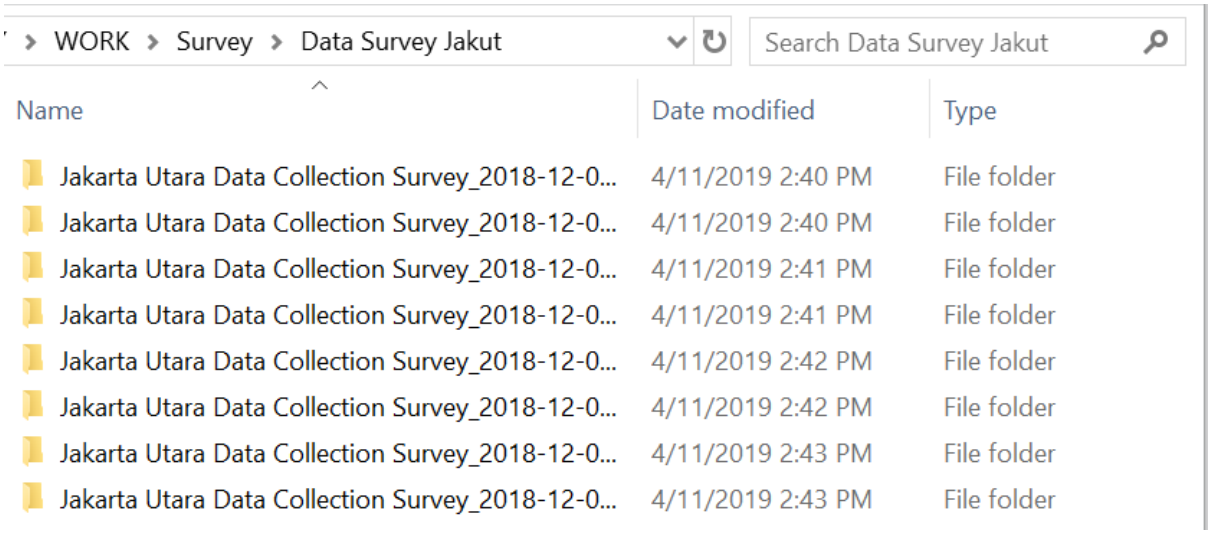
More tools menu on JOSM

> **Note:** Sometimes JOSM ask you to Restart JOSM after installing new plugin to apply newly installed plugins. However, not all newly installed plugin needs JOSM restarting to be used after installation process finished.

II. Merging All Survey Data

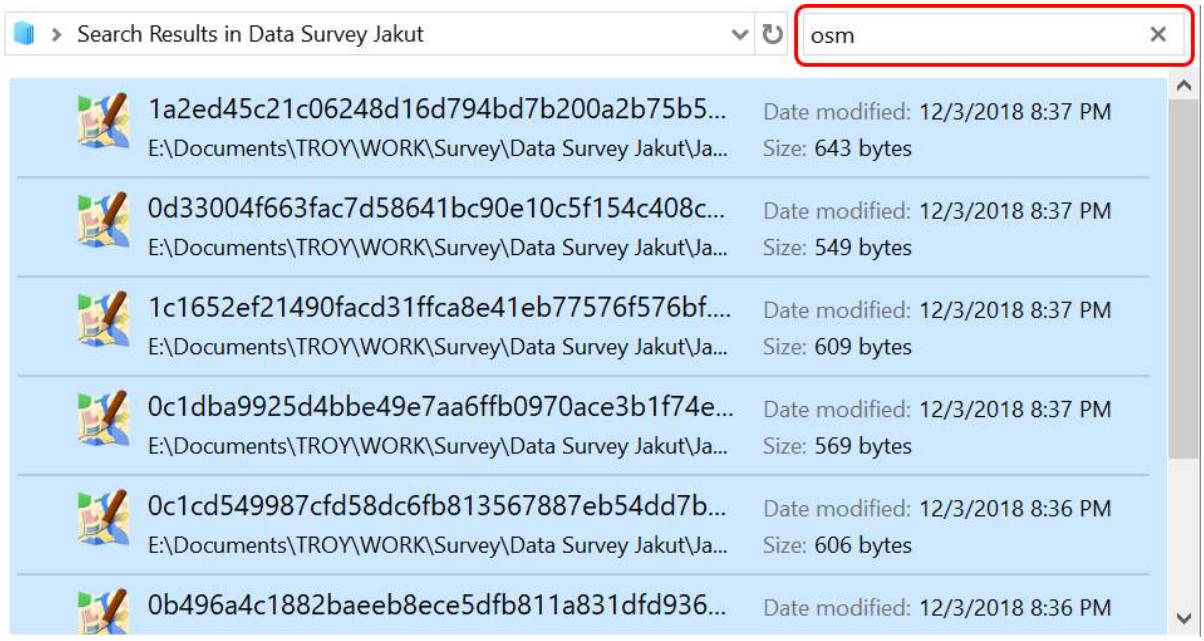
If you have finished conducting survey using field data collection toolkit such as ODK Collect and OpenMapKit, you can use the survey data as the reference to add object's information when mapping it in OSM. Survey data file format from ODK Collect and OpenMapKit is .osm. The amount of .osm file from ODK Collect and OpenMapKit will be the same amount as the surveyed objects since information of one object will be saved in one .osm file. Merge all .osm file to make it easier to use the survey data as mapping reference by following these steps:

- Go to **File Explorer** to where you save .osm file from **ODK Collect** and **OMK**.



File directory for .osm file from ODK Collect

- Search all .osm file by typing “osm” in the **Search** box. Select all .osm file from the search results.

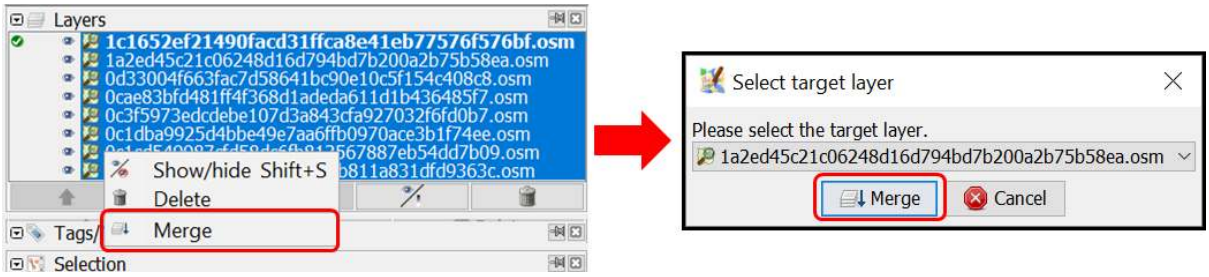


Search results for keyword “osm”

- Drag all selected .osm file to **JOSM**.

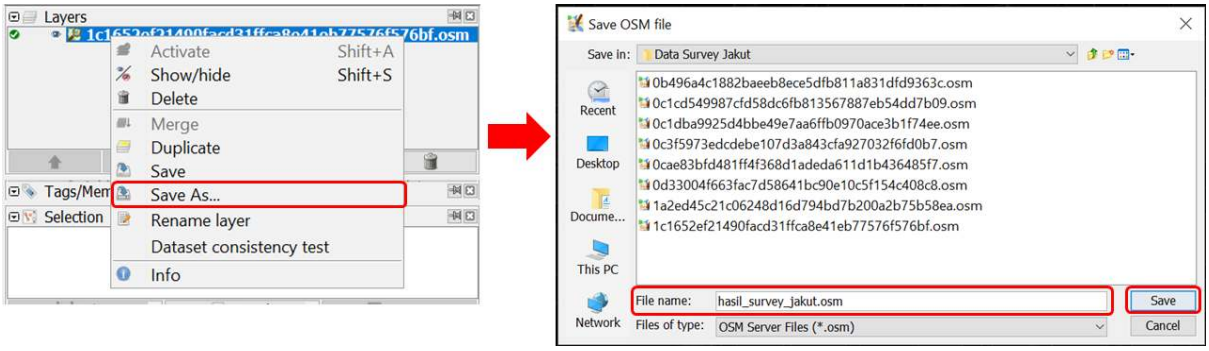
Layers Windows after .osm file from ODK and OMK dragged into JOSM

- Select all those *.osm* layer by **selecting the uppermost .osm layer, then pressing Shift and then selecting the lowermost .osm layer**
- **Right click on one of the .osm layer**, then click **Merge**. **Select target layer Windows** will appear, you do not have to change the target layer, click **Merge**.



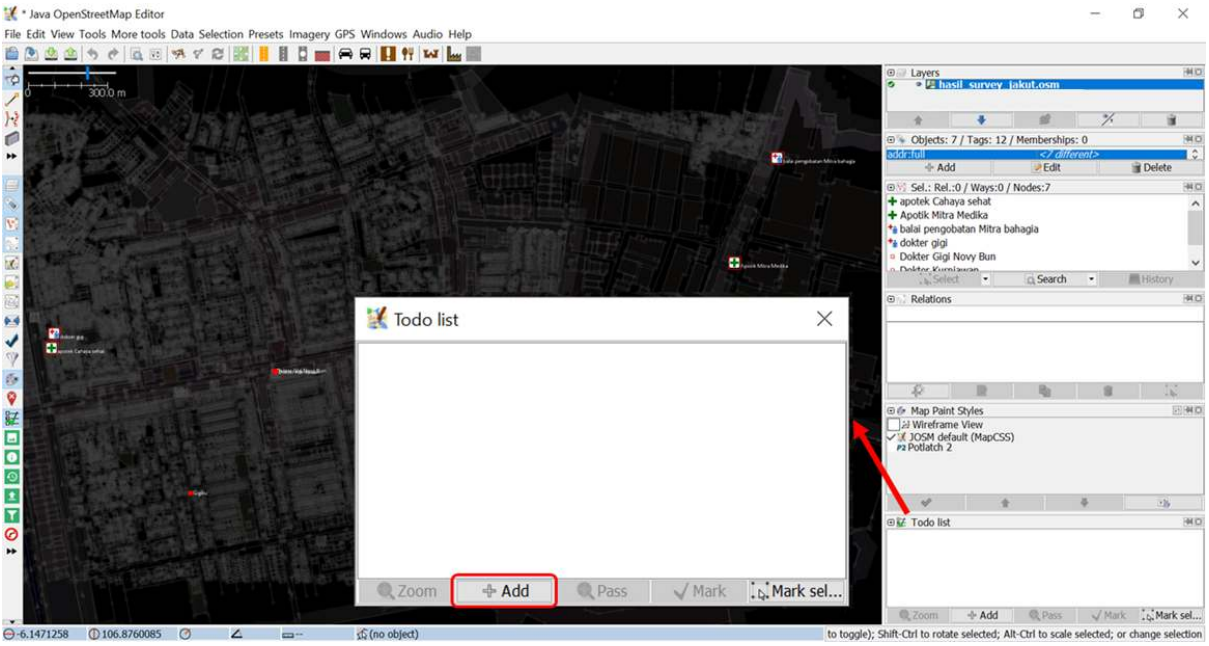
Merging all survey data layer

- Save the merged layer and change the name by **right-clicking on the merged layer**, select **Save As**, change the layer name and then click **Save**.



Saving the merged survey data layer

- JOSM provides a plugin named **to-do** to help you mark the mapped or unmapped object from the merged survey data layer. You can refer to **Using to-do list on JOSM** module to learn how to install and how to use **to-do** plugin in details. If you have already installed **to-do** plugin and activated Todo list Windows, select all objects nodes in the merged layer using **Select object icon**, then click **Add** on the Todo list Windows.

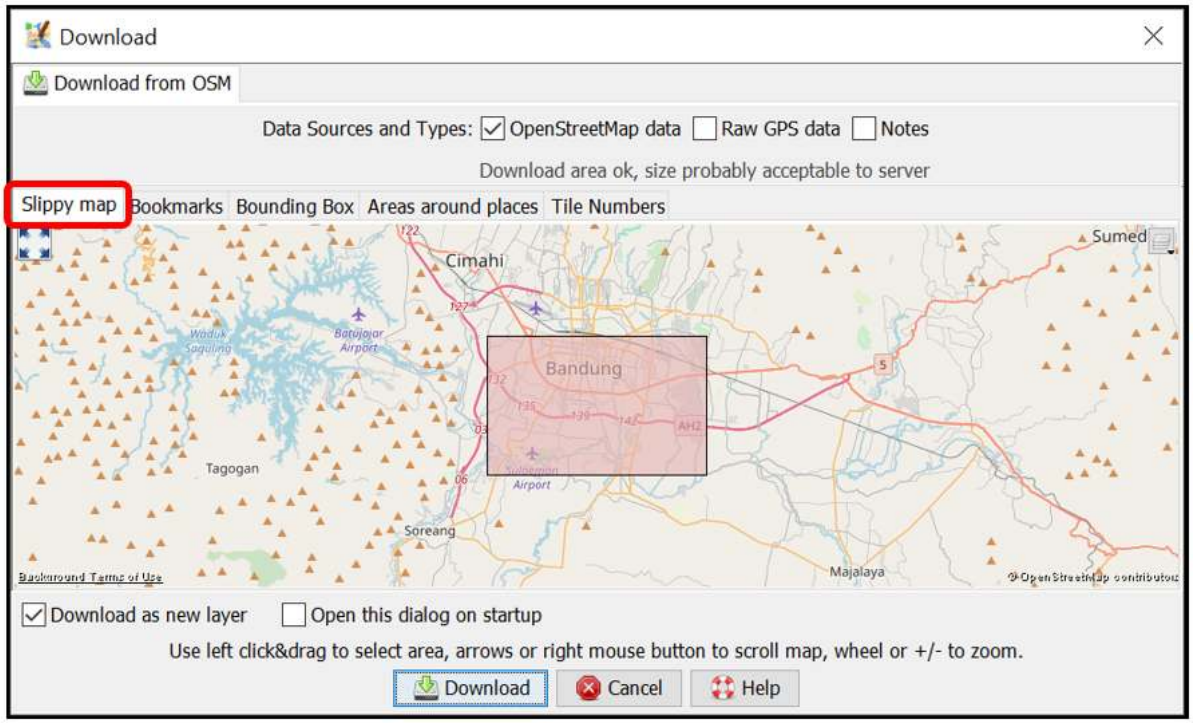


Adding objects into Todo list

III. Downloading OSM Data

After successfully merging all survey data, you need to download existing OSM data. Downloading OSM data aims to discover which objects already mapped and which objects have not already mapped on OSM. These are the steps to download OSM data using JOSM:

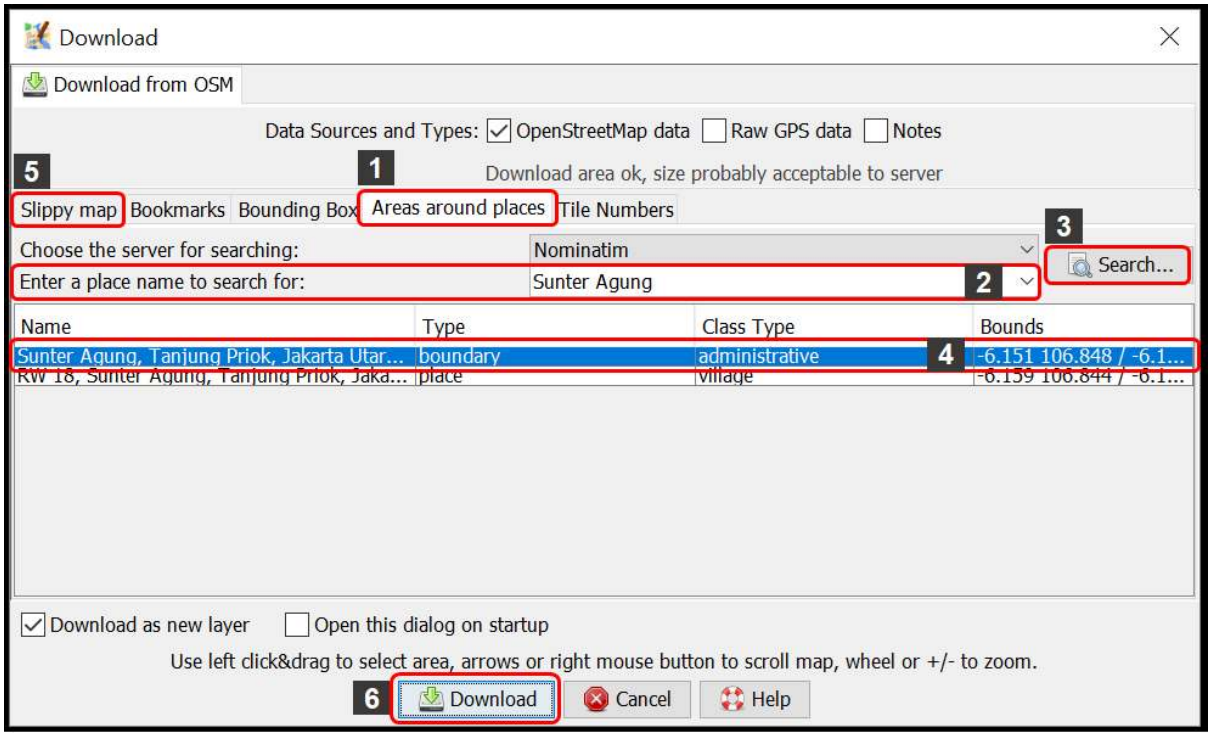
- Click menu **File → Download Data**
- **Download Windows** will appear. It will show you tab **Slippy Map** by default.



Download Windows on JOSM

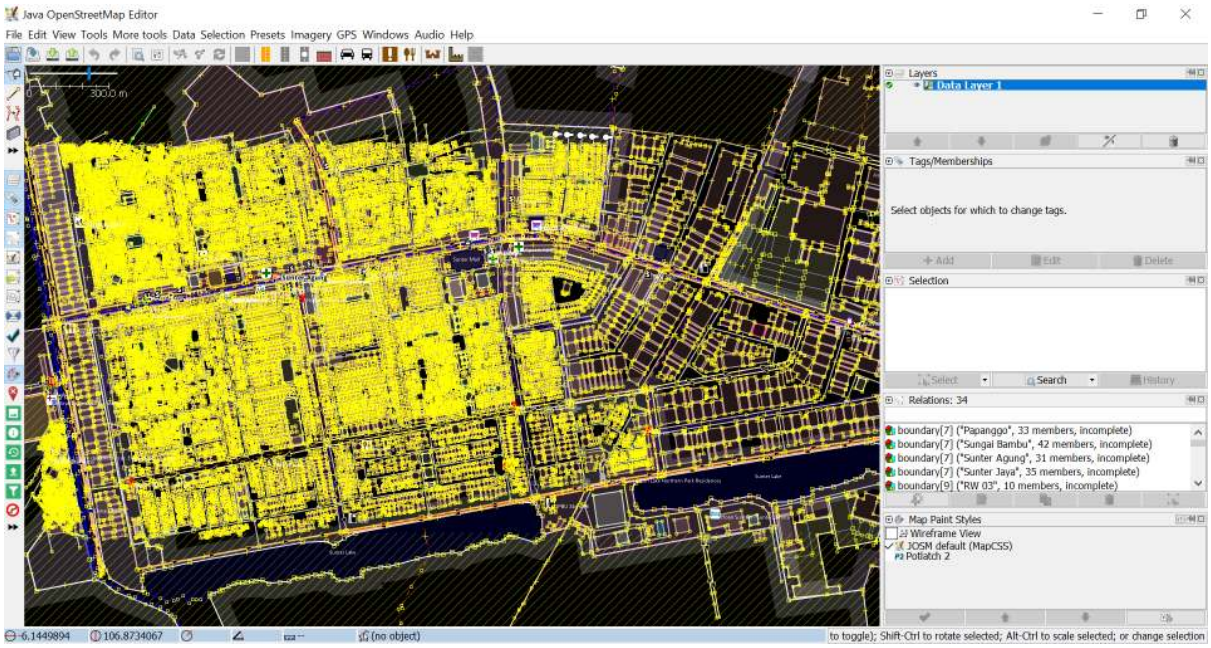
- If the map is not displaying your mapping area, slide the map by **right clicking and hold** your mouse and then **drag the map** to your mapping area. Draw a box at your mapping area by **left clicking and hold** your mouse and then **move** your mouse until a pink box cover the entire mapping area. Then click **Download**.
- If it is quite hard to find your mapping area by sliding the map, you can click tab **Areas around places** and type the name of your mapping area in the **Enter a place name to search for** box then click **Search**. The search result will show you names of your mapping area. **Click on one of the names** then **go back to tab Slippy Map**. The map on the tab **Slippy Map** will be directed to your mapping area. **Draw a box** covering your entire area of mapping, then click **Download**.

  Note: Do mind the amount of existing OSM data in your mapping area. If there is already a lot of existing data, you should download it part by part since JOSM can not download an enormous amount of data at once.



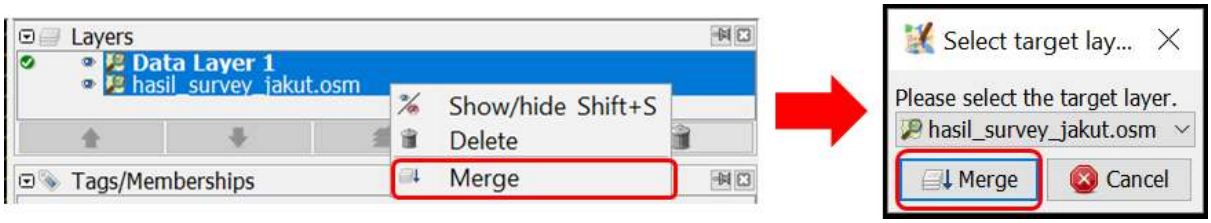
Tab “Areas around places” at Download Windows

- After finished downloading OSM data in your mapping area, there will be a new layer in the Layer Windows that will also be your editing layer to add or edit OSM data. Make sure that you **only add or edit data in the clear area, not in the shaded area**. The shaded area is not your downloaded area. And make sure your entire survey area is already downloaded. After downloading OSM data, your JOSM will look like this:



Tab “Downloading OSM data on JOSM” at Download Windows

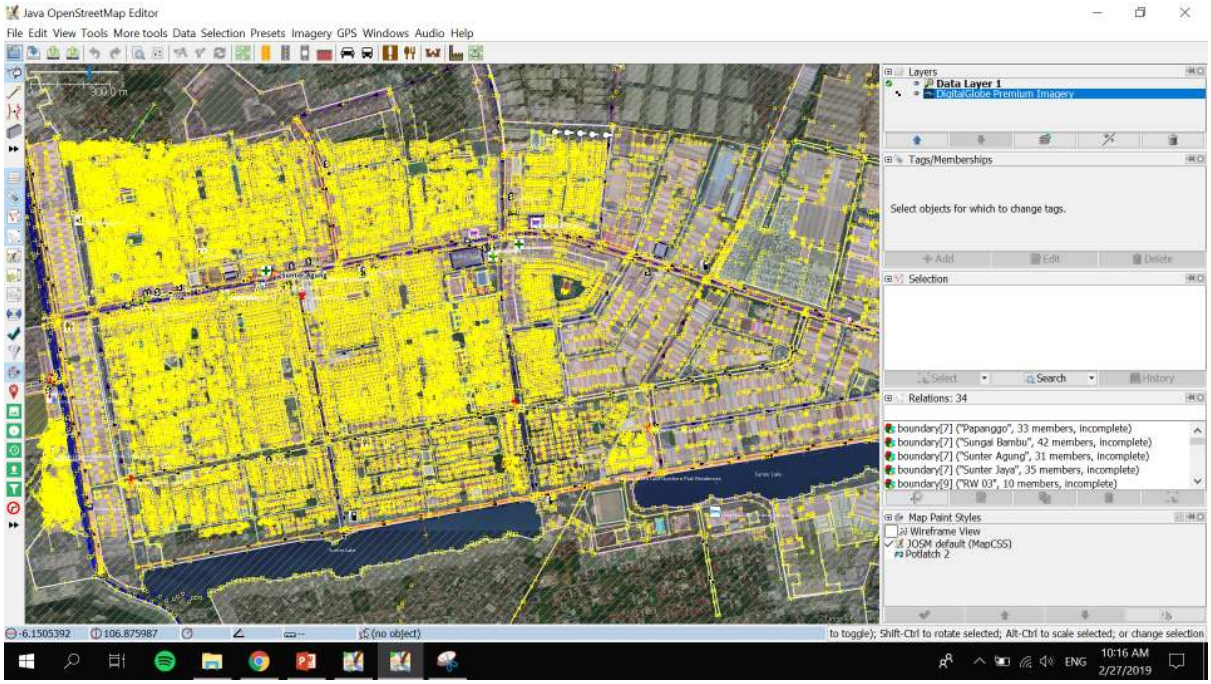
- If you already downloaded OSM data in all your area, merge your downloaded OSM data layer with your survey data layer. Select those **two layers** then **right click**, select **Merge**. Save on your survey data layer. Then click **Merge**.



Merging downloaded OSM data with survey data layer

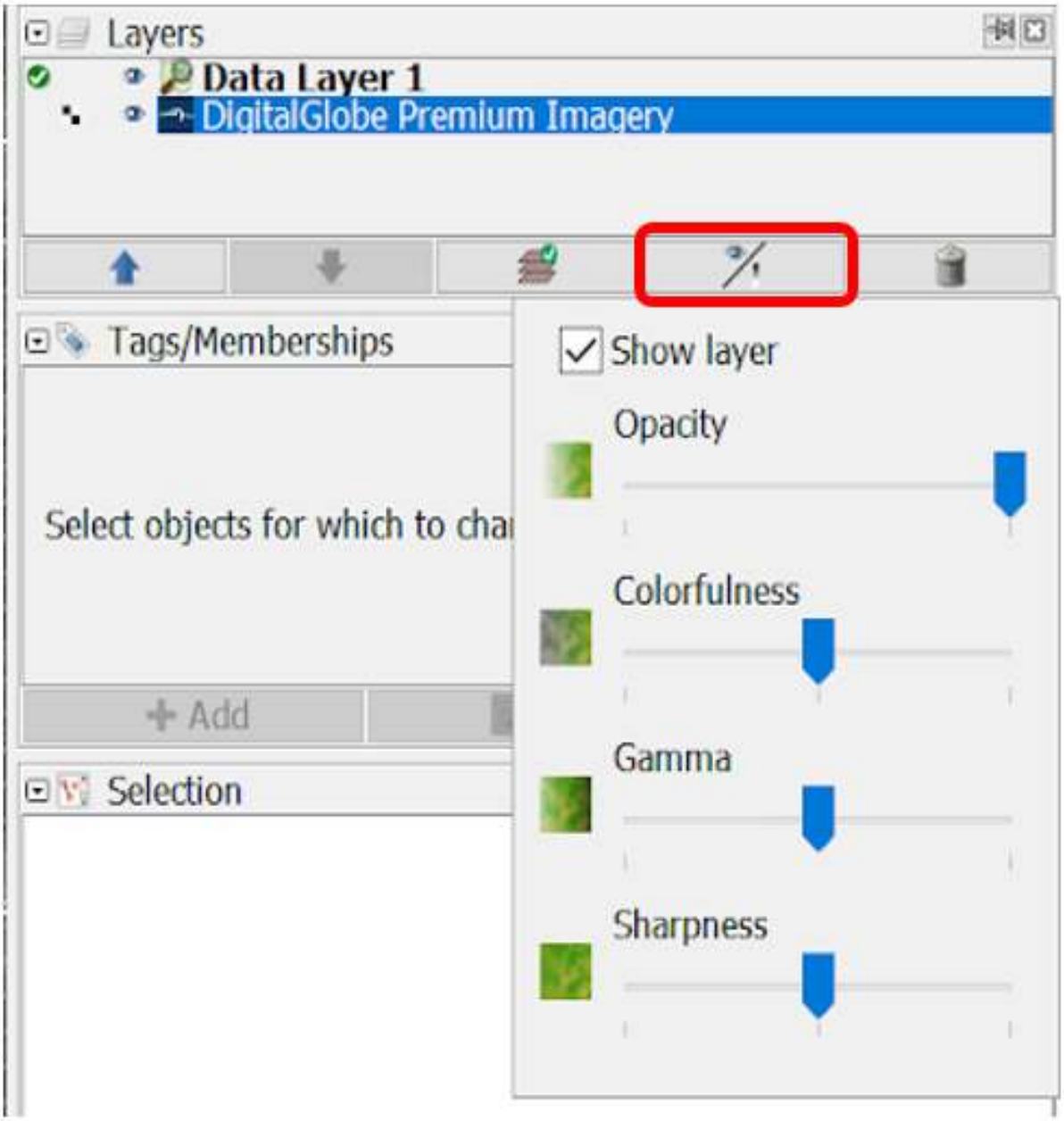
IV. Adding Satellite Imagery

- Add satellite imagery as another reference for mapping by clicking menu **Imagery → choose one of the available imagery you want to use, such as DigitalGlobe Premium Imagery.** After successfully adding satellite imagery, it is time to add OSM data. Your JOSM will look like this:



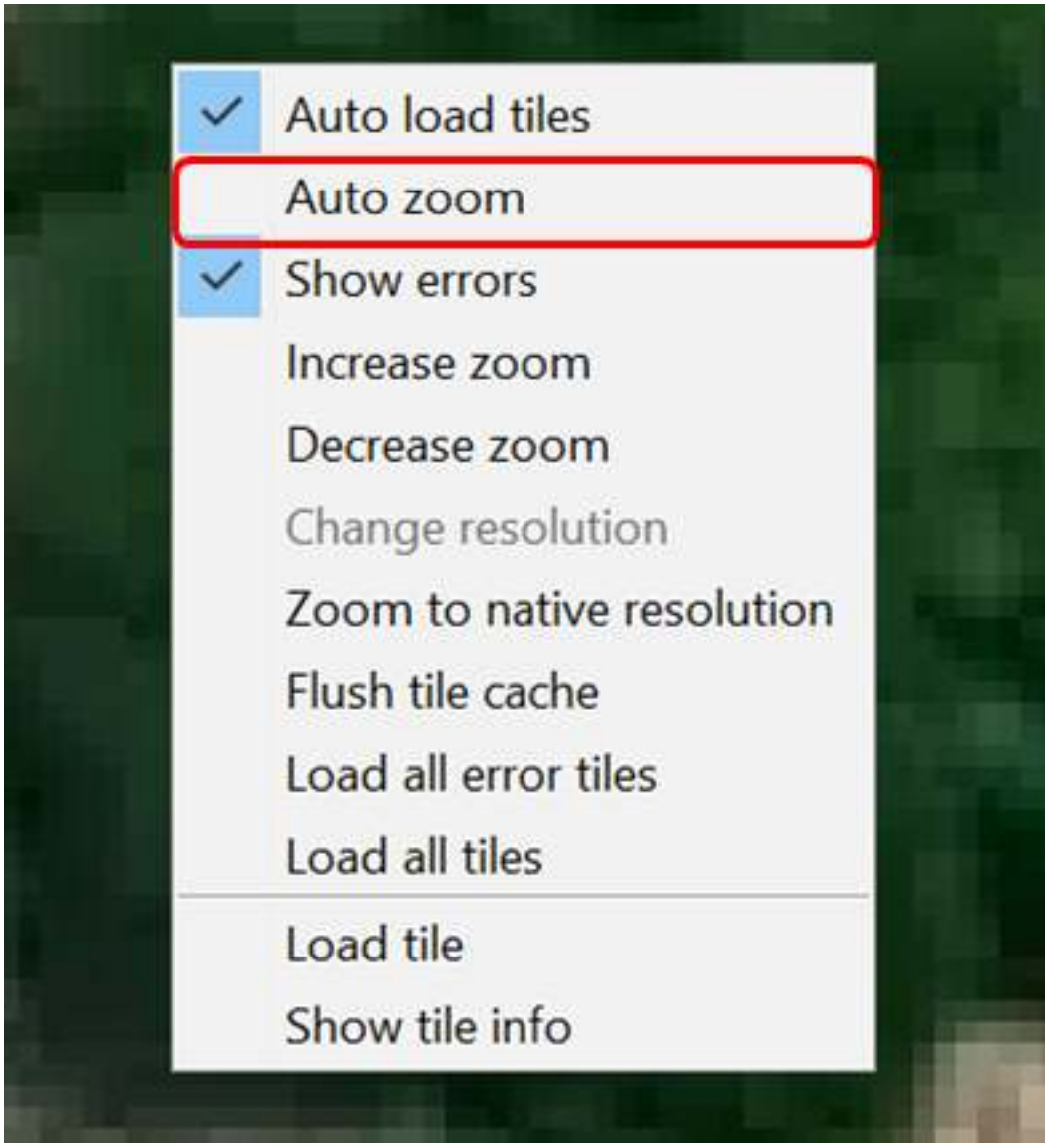
Adding satellite imagery on JOSM

- You can adjust the display of the satellite imagery. Select the satellite imagery layer, then click icon **Change visibility of selected layer** and adjust its display by sliding the blue button left or right.



Changing the display of satellite imagery

- If you use **DigitalGlobe Premium Imagery** as your reference, sometimes it has two versions of display when you zoom it in or zoom it out. Usually there is only one version of display aligned with the existing OSM data. Inactivate **Auto Zoom** feature so that the satellite imagery display won't change when you zoom it in or zoom it out. To inactivate Auto Zoom feature, **right click on the Satellite Imagery display → click Auto zoom** so that the checkmark next to Auto zoom disappear.

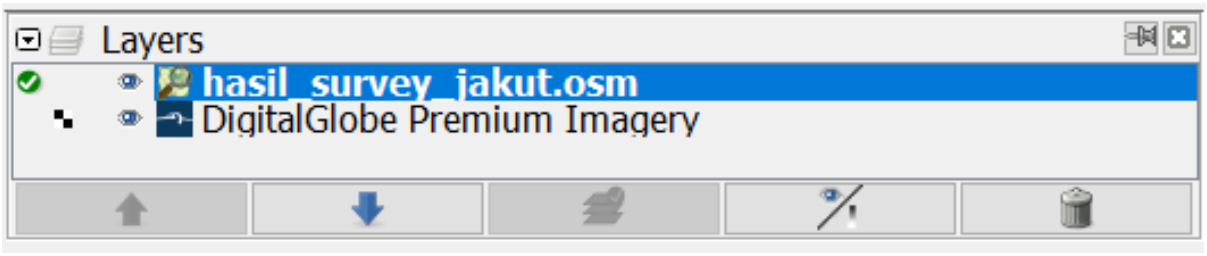


Inactivating Auto zoom for satellite imagery

V. Editing OSM Data Using JOSM

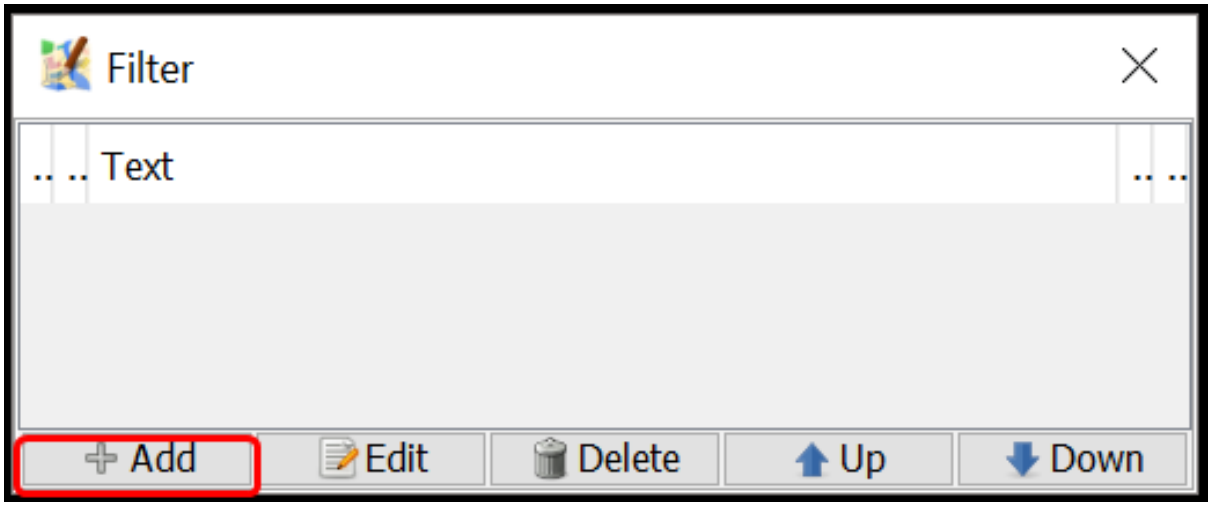
Now you are ready to add or to edit OSM data using JOSM. You can draw new objects or you can edit the existing objects using the tools mentioned in **Using JOSM** module. Here are the steps on how to add or edit OSM data using survey data, downloaded OSM data and satellite imagery that you already added before on JOSM:

- After successfully following the steps mentioned in the previous sections, there will be two layers on your JOSM: **satellite imagery layer** (in the picture below, the layer meant is DigitalGlobe Premium Imagery layer) and **merged survey data with downloaded OSM data layer** (in the picture below, the layer meant is *hasil_survey_jakut.osm* layer). It will look like this:

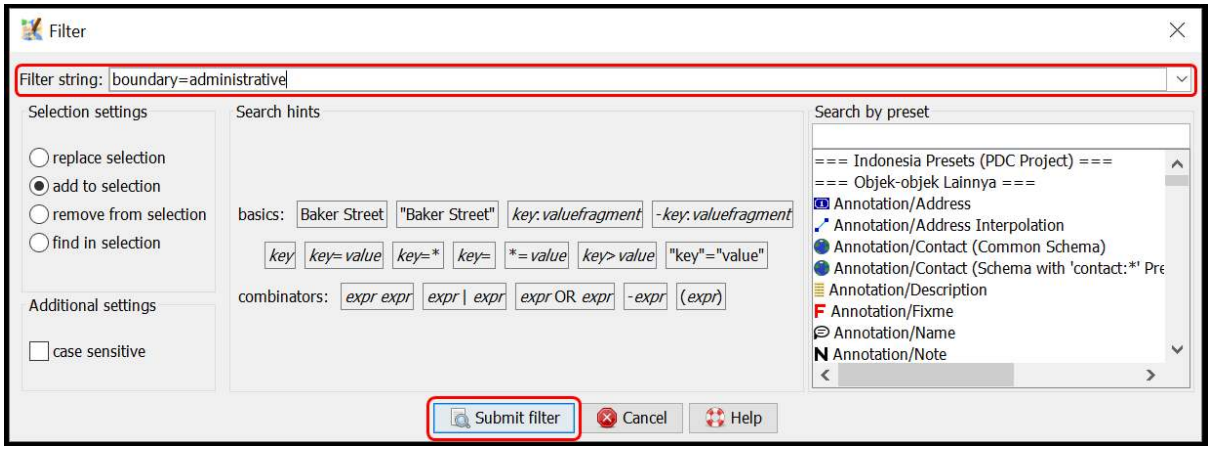


Satellite imagery layer and merged survey data with downloaded data layer

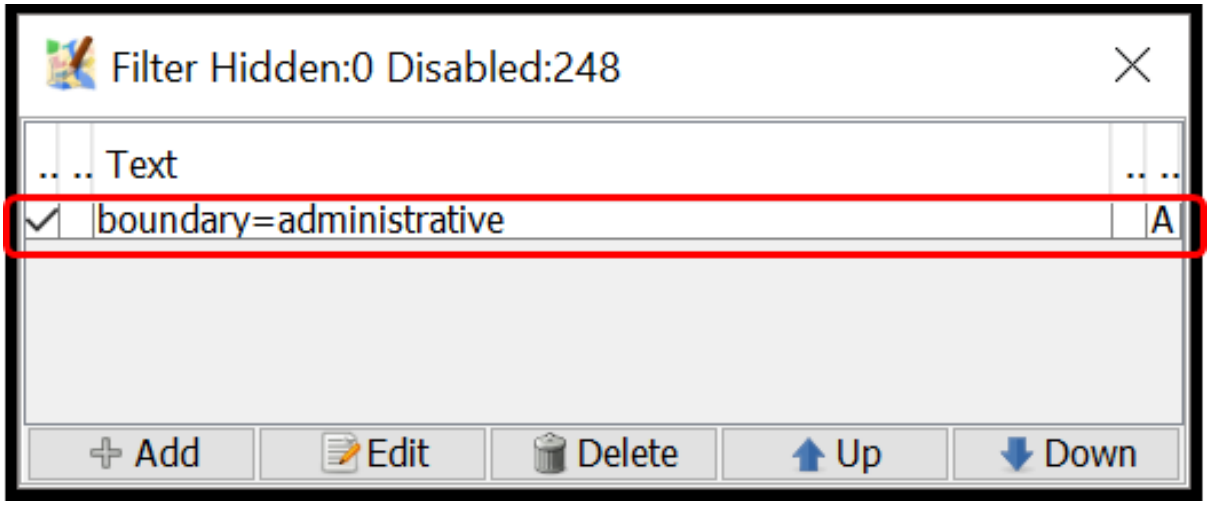
- You can use **Filter** feature on JOSM so that you don't accidentally make changes on other objects such as administrative boundaries. Administrative boundaries in OSM is a delicate objects, so if there are already administrative boundaries mapped on your mapping area then it is better to utilize the **Filter** feature. To use this **Filter** feature, activate the Filter Windows by clicking menu **Windows → Filter**. There will be Filter Windows in the right panel. Click **Add** in the Filter Windows, type **boundary=administrative** in the **Filter string** box and click **Submit Filter**. New filter will appear for the administrative boundaries. To turn off the filter, simply uncheck the checkmark on the left of the filter. You can find out more about **Filter** feature on JOSM in the **Using Filter on JOSM** module.



Filter Windows on JOSM

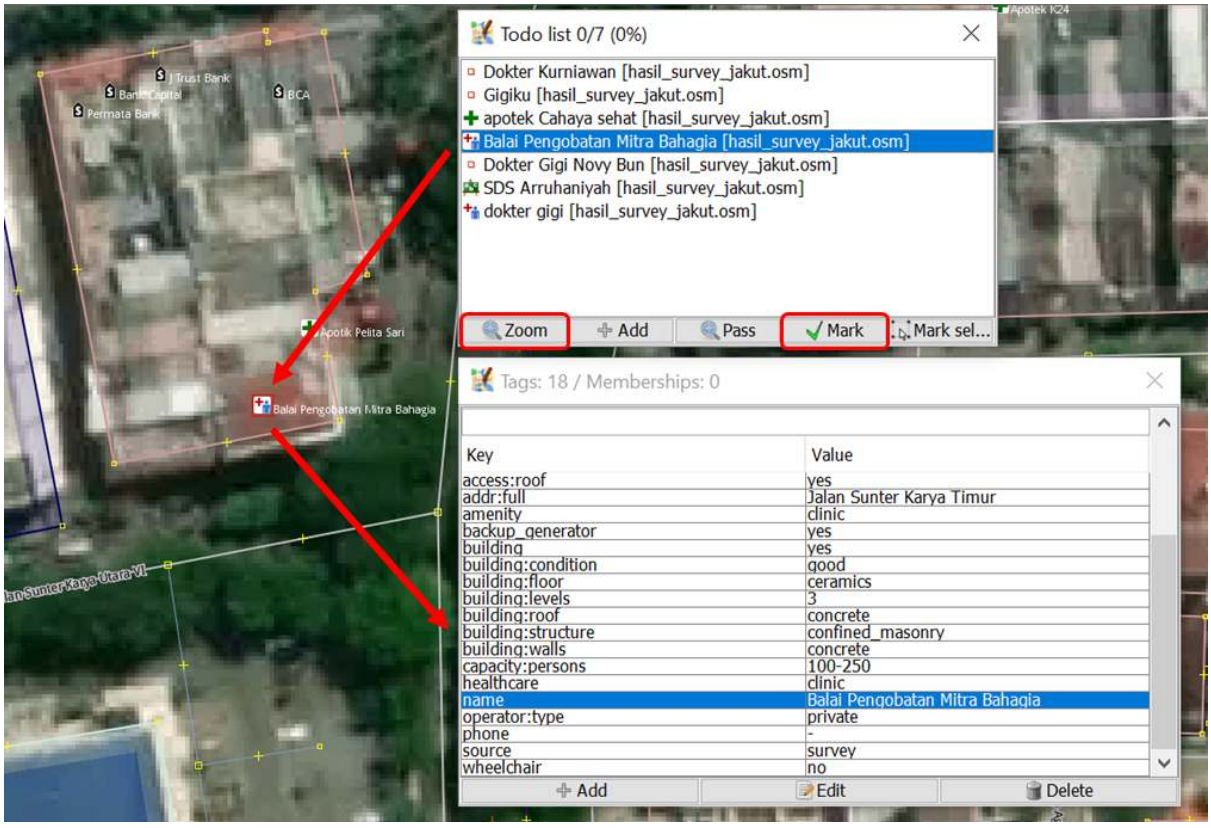


Adding filter string in the Filter Windows

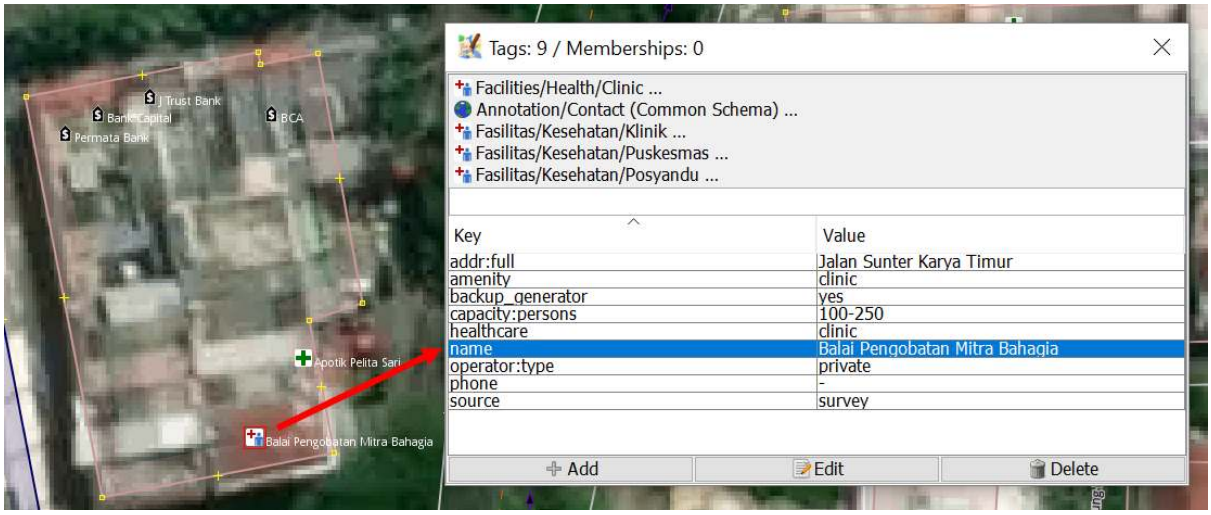


Newly added filter in the Filter Windows

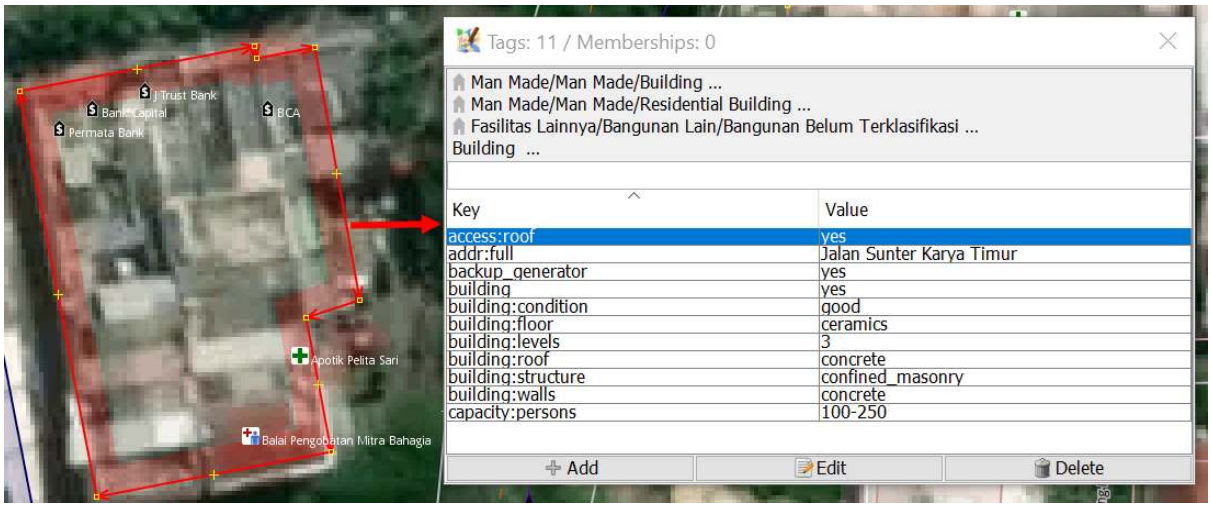
- Start mapping by zooming in to an object, select one object in the Todo list Windows and then click **Zoom**. After selecting and zooming in one object, you can copy the tag from the selected object to the downloaded OSM objects. Select the downloaded OSM object that aligns with the selected survey object, then click menu **More tools → Copy tags from previous selection** or press **Shift + R** on your keyboard. Make sure you selected the aligned survey object right before copying its tags to downloaded OSM object. Also make sure that the copied tags are consistent with OSM mapping guidelines and suitable for the object type. For example, in the picture below, a clinic located in a shophouse complex, mapped as a point and only have tags suitable for point object. While the building related tags added to the shophouse building where the clinic is located. When you finish copying tags for one object, click **Mark** to identify that it is just already mapped on OSM. Repeat until all of the objects mapped on OSM.



Using Zoom dan Mark feature on the Todo list Windows

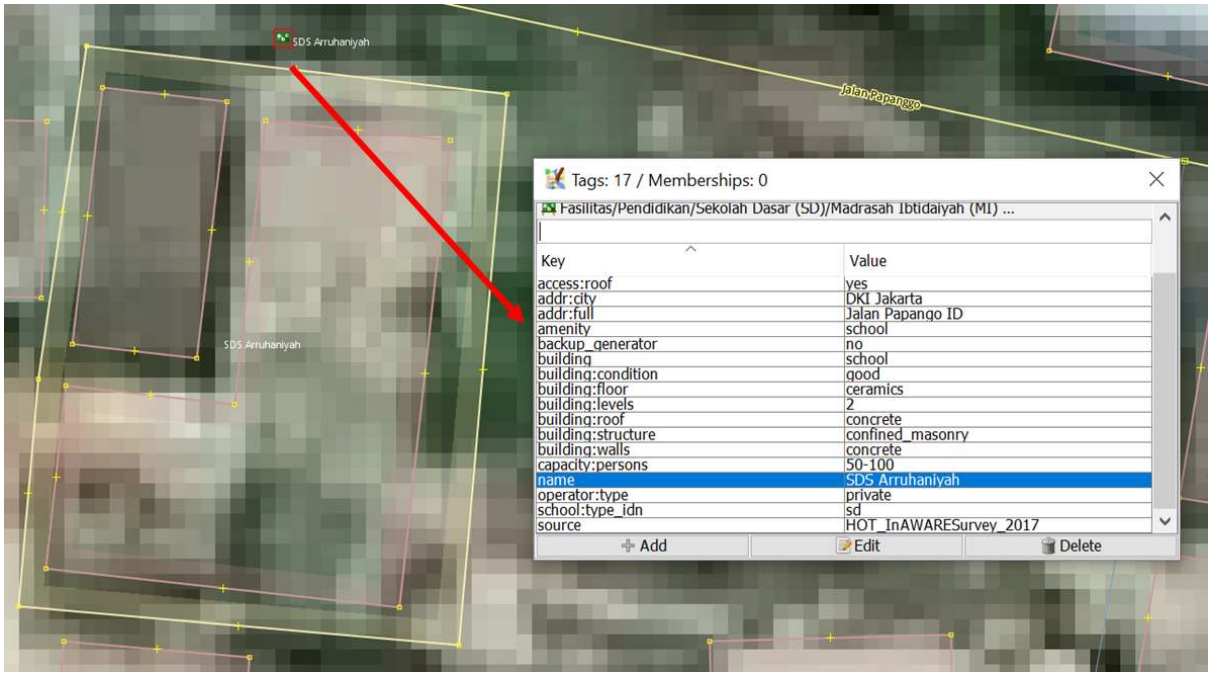


Tags suitable for point object

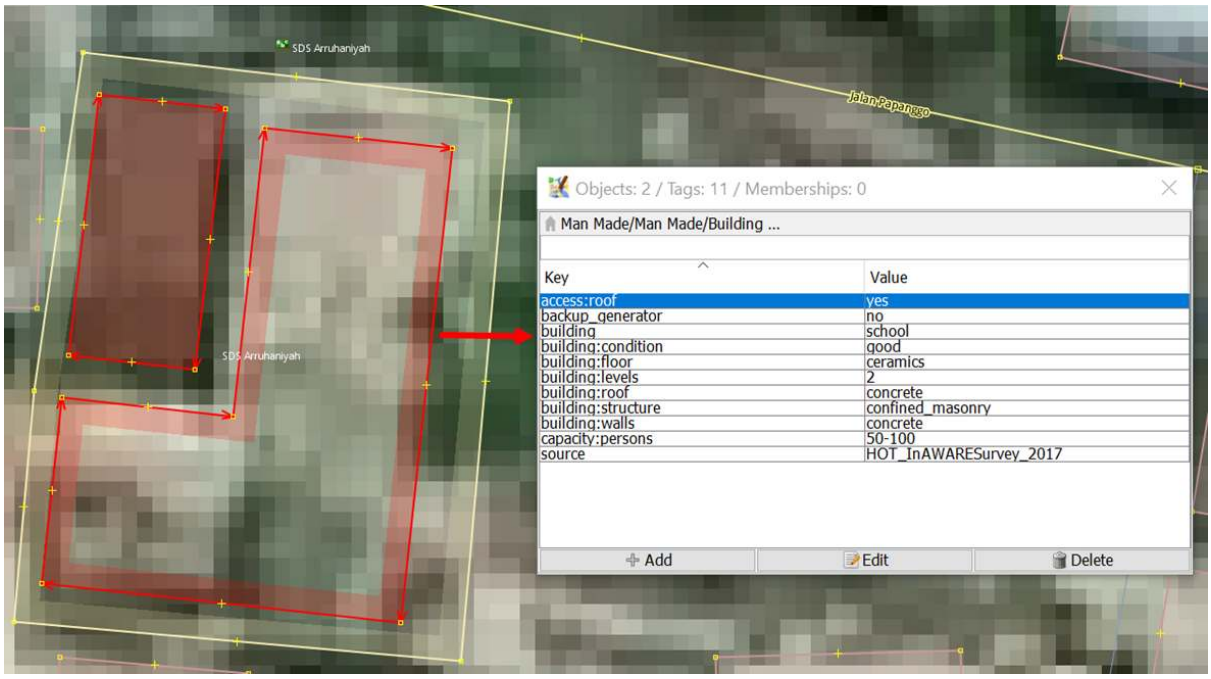


Copying building related tags using Shift + R

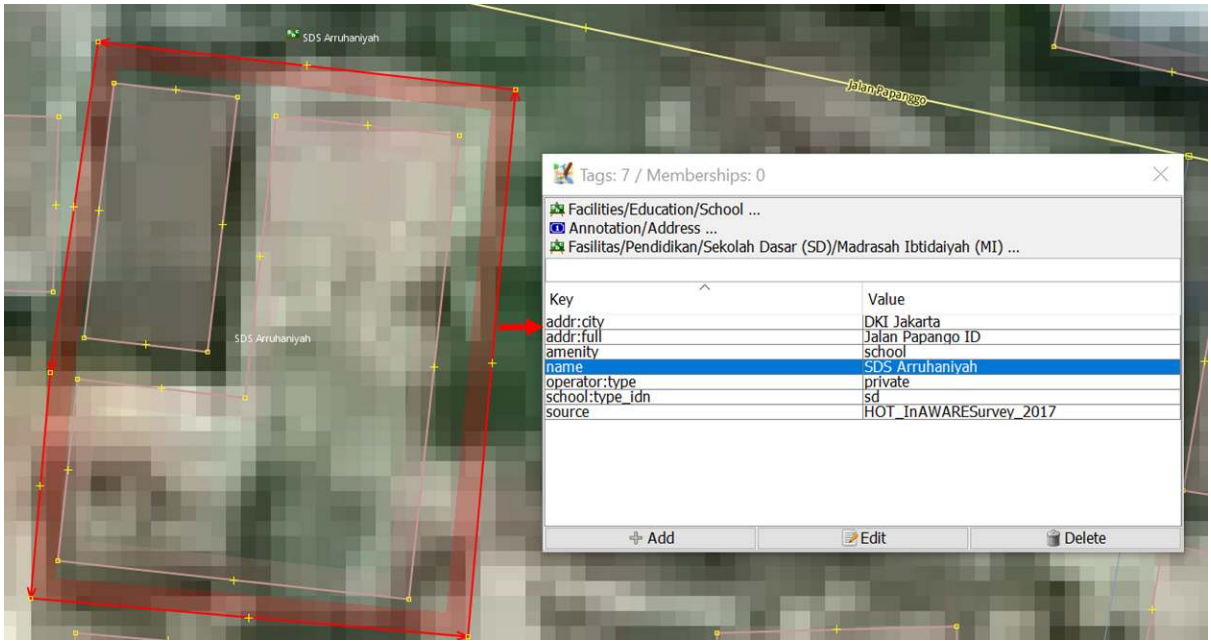
- Example given above is for point object. When you find an object that is supposed to map as a polygon, such as school complex which has more than one building inside, how to map it on OSM? Select the school object in the Todo list Windows and then click **Zoom**. Select the point object on the map. Copy the tag to the building polygon aligned with the point object by selecting the building polygon and then clicking menu **More tools → Copy tags from previous selection** or pressing **Shift + R** on keyboard. After copying the tags, delete tags that are not related to building and left only building related tags. Draw a polygon covering all school area using **Draw nodes**, then copy tags that are suitable for school area (tags that you deleted before in the building polygon) like amenity, name and addr:full. After that, delete the school point from the survey data since it has just been mapped as a school area polygon.



School point from survey data



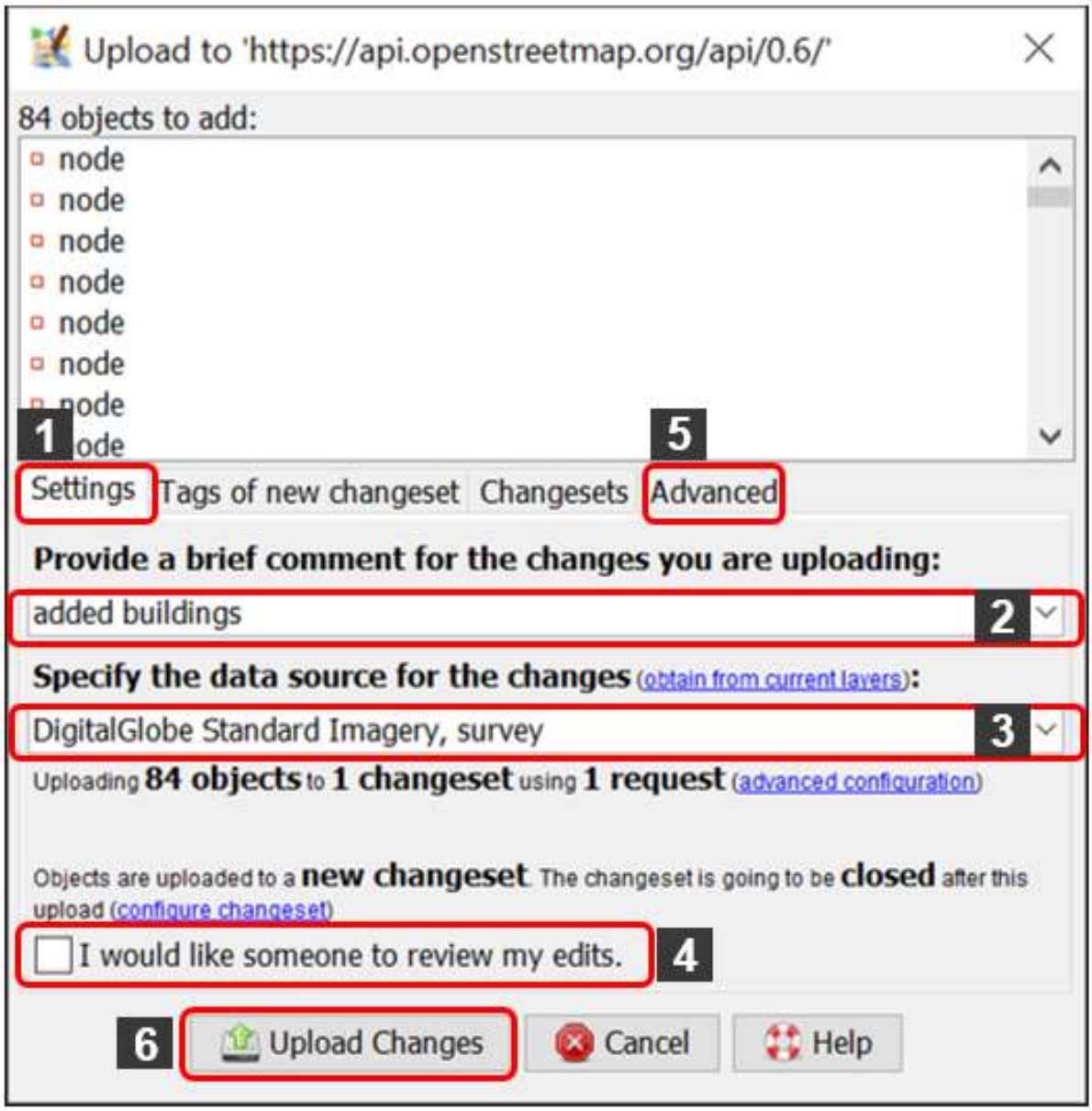
Tags suitable for school building



Tags suitable for school area

VI. Saving Changes

- If you have already done mapping using JOSM, save changes to OSM server because the newly added objects are saved only in your computer. To save the changes you've made, click menu **File → Upload Data**.
- If you encounter warning/error after clicking Upload Data, it is better to fix warning/error first. You can find out more about fixing warning/error and common warning/errors found in **Survey Data Validation Using JOSM** module. However, if you don't have the time to learn how to fix warning/error, you can just go ahead and click **Continue Upload**. Upload Windows will appear.
- If there is no warning/error, Upload Windows will appear. On the Upload Windows, type a brief comment for the changes you've done in the comment box and specify the source(s) in the source box. Type the name of the satellite imagery and survey in the source box. If you want other contributors to review your edits, give a checkmark next to **I would like someone to review my edits**. Then click **Upload Changes**.

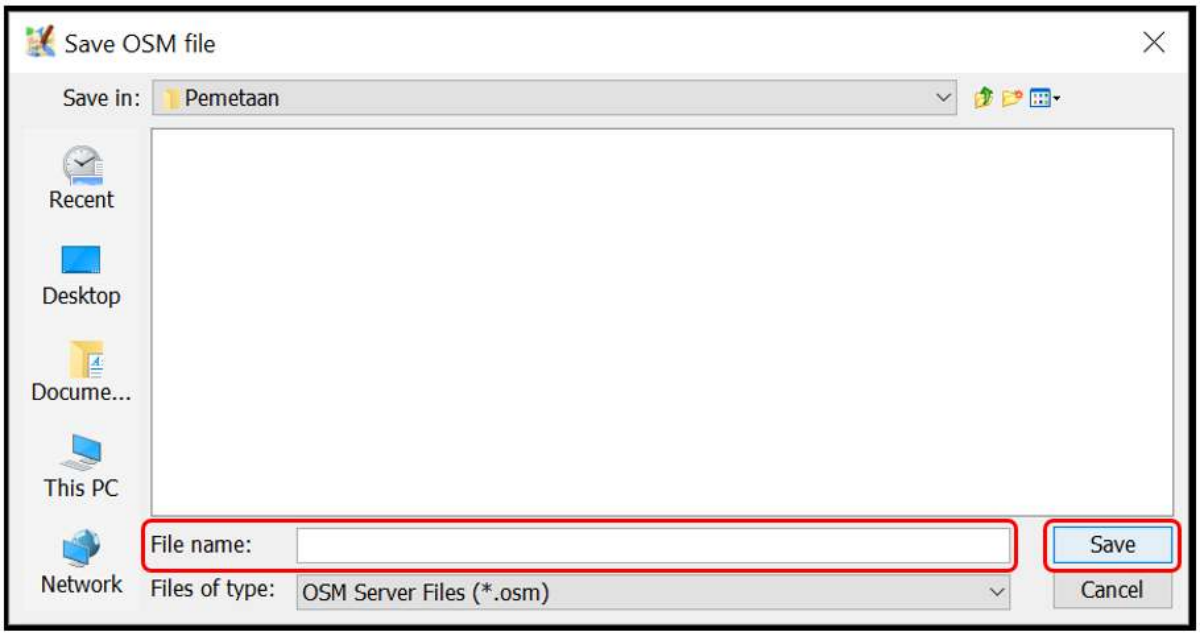


Upload Windows on JOSM

Note: You need to periodically upload your edits when mapping so that there won't be a hefty amount of edits to upload. The more edits you want to upload, the more time it takes to upload. If you already mapped a lot of edits and haven't done any upload, you can upload it by chunk. You can do it by clicking tab **Advanced** and select **Upload data in chunks of objects** in the Upload Windows. Type the **Chunk size** with how many changes you want to upload per chunk, such as 500. This can be done to avoid incomplete upload, especially when your internet connection is unstable that resulted in object duplication.

VII. Saving .osm File

- You can also save your editing layer by **right clicking** on your editing layer and click **Save**. **Save OSM file** WIndows shown below will appear. Type the name of your file, then click **Save**. Your file will be saved in .osm format.

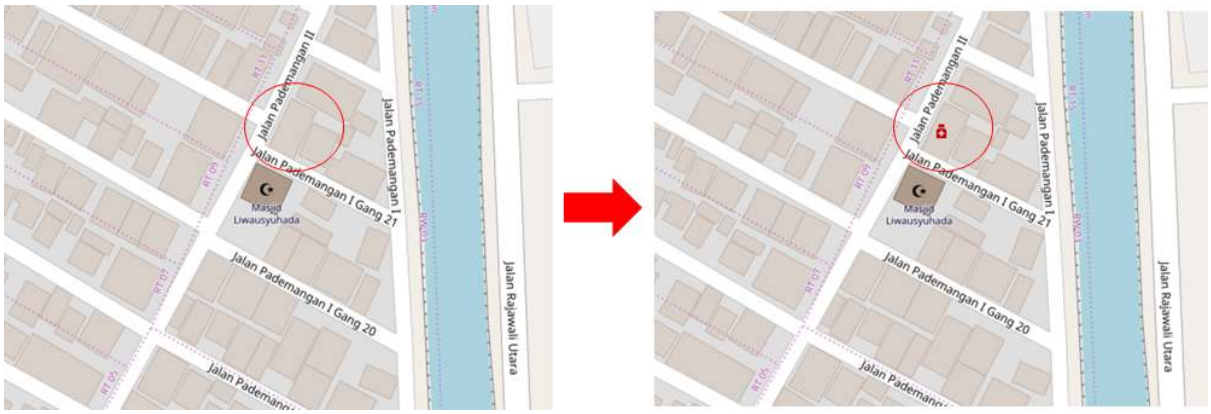


Save OSM File Windows on JOSM

> **Note:** If you haven't finished mapping your area and you want to continue mapping it later, you can save your work as .osm file then you can continue mapping it later. You can open your saved .osm file by clicking menu File → Open, choose the file you want to open and click Open. After opening it, update the OSM data first by clicking menu File → Update Data and you can go ahead to continue mapping.

VIII. Viewing Changes in the Map

- You can view your changes by checking it on OSM website and directing it to your mapping area. Keep in mind, new changes can be viewed a while after uploading it to OSM server.



OSM map before and after mapping process

SUMMARY

If you can apply and follow through to all of the steps mentioned in this module, then you are able to go through OSM mapping process using JOSM successfully. You are able to do OSM mapping process, such as downloading OSM data, adding satellite image, editing OSM data, uploading changes, saving OSM data as *.osm* file and viewing changes. You can upload your changes periodically, such as by region or by village. If you already have finished conducting survey in one region or in one village, you can upload it directly to OSM. This shall be done so that your survey data is not piled up and others can perform data validation for your edits.

Upload survey form to ona.io

Learning Objectives:

- Able to explain the benefits of using Ona.io
- Explain how to upload survey forms to the Ona.io server

After we have successfully created the survey forms that have been studied in the module **Making Survey Forms for the ODK Collect & OpenMapKit Application**, You will learn the platform used to upload survey forms to one of the platforms. The platform used in this material are Ona.io. Ona.io is a platform that can be used to place survey forms which will be used for field survey activities using *ODK Collect* or *OpenMapKit*. Here you will learn what can be done using *Ona.io* and how to upload the survey form into Ona.io.

I. Introduction to *Ona.io*

a. What is *Ona.io*

Ona.io is a social enterprise that builds infrastructure data for data collection needs in the field. They provide several platforms that can be used to assist data collection, one of which is a field data storage platform. You can upload your survey form to the server provided by *Ona.io* and then you use it for your field activities. *Ona.io* provides several capabilities that will assist data collection activities. One of them is:

- Statistics of the amount of data entered in the form of graphs and tables
- Location map of the distribution of data collected in the field
- Display of images that were successfully collected during data collection
- Ability to download data in several types of files such as *CSV, XLS, KML, Osm* or *Json*

b. Limitations in *Ona.io*

If you want to use the Ona.io platform you can create an account for free and then use the platform to upload survey forms. But there are some restrictions on using a free account on Ona.io:

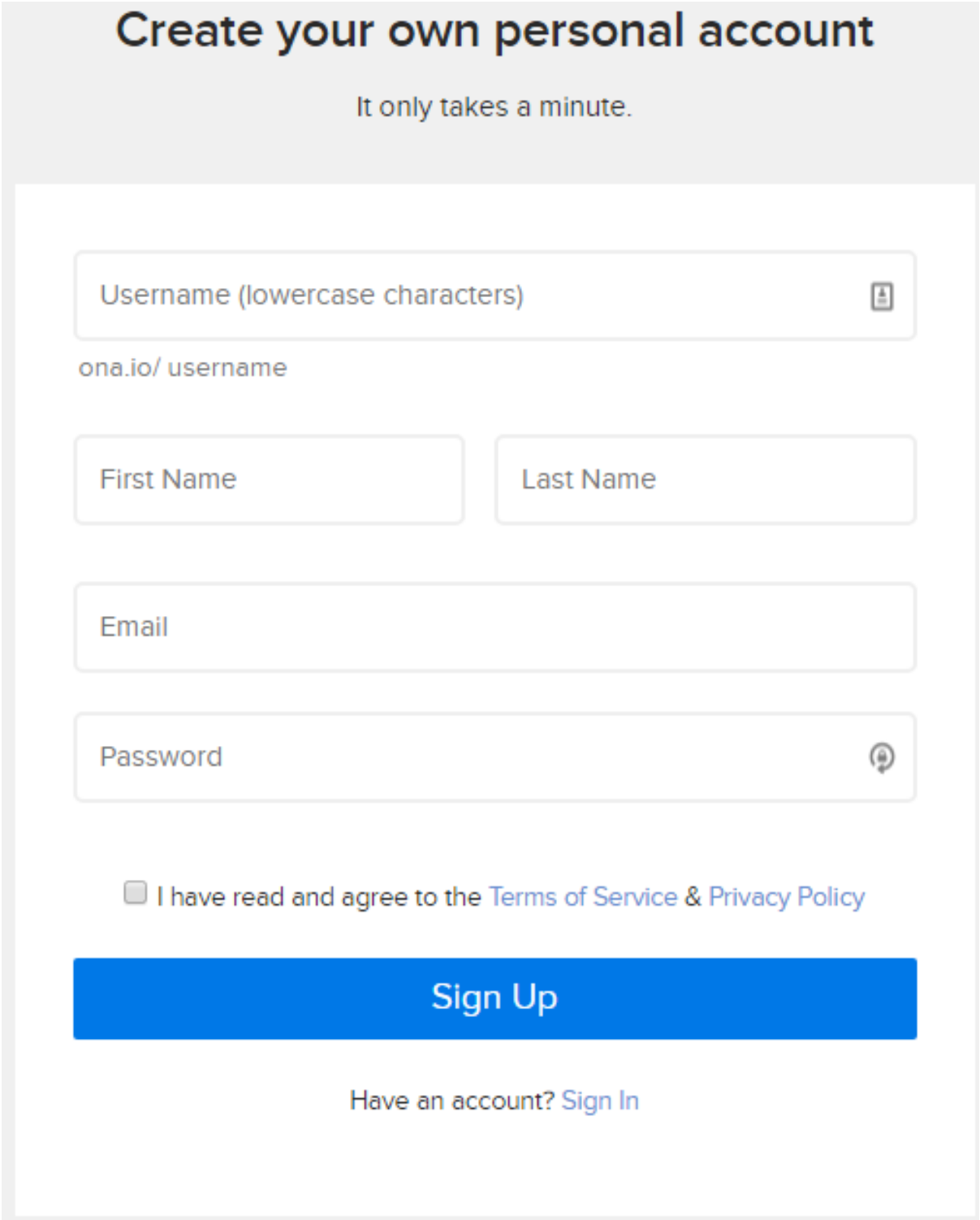
- Can only create one private project
- For a private project can only hold 500 data entry.
- In one private project can accommodate as many as 10 types of survey forms

II. Survey Form Management on *Ona.io*

Now that you know what is *Ona.io* and its limitations, in this module you will now try to upload the survey forms that you created earlier in the **Create Form Survey for ODK Collect and OpenMapKit** module. If you have not created a survey form, you can download a sample survey form by accessing the link: http://bit.ly/sample_form_survey.

a. Creating an account on *Ona.io*

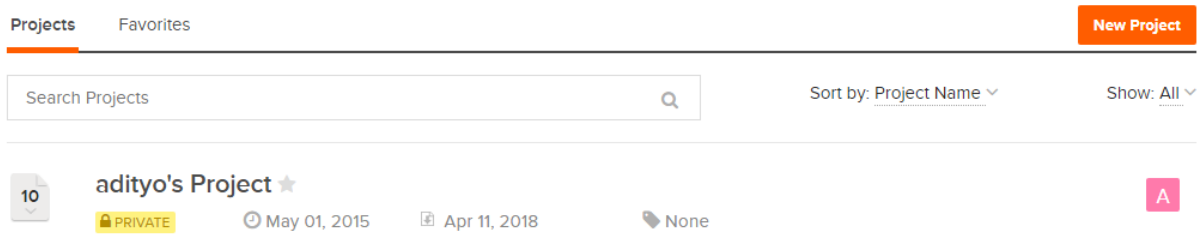
Before you *upload* your survey form, you must have an account on *Ona.io* first. To create an account on *Ona.io* click on the button **Get Free Account** and then enter your name (lowercase) which will be the *url* where you save the form and will later be used in the *ODK Collect.*



Display create account on Ona.io

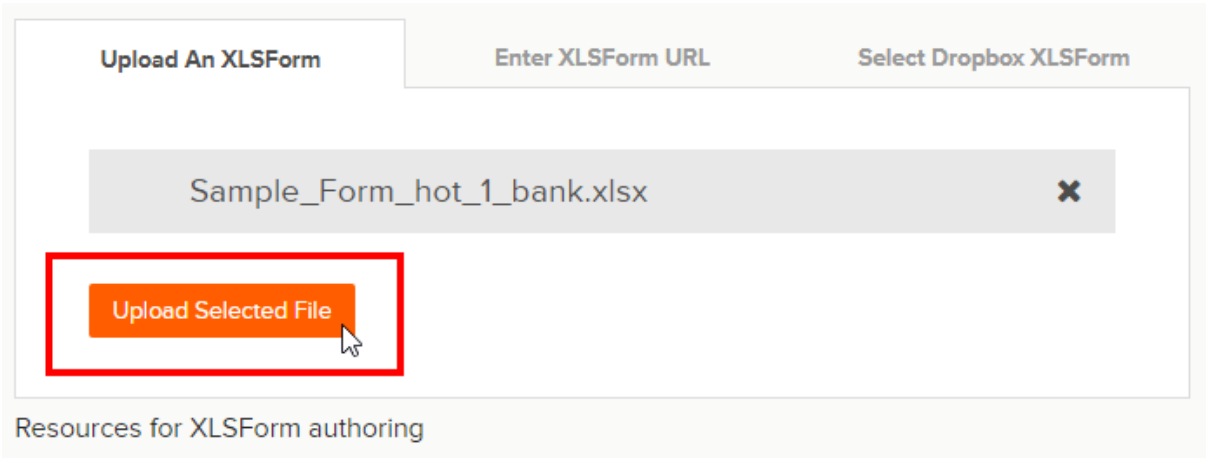
b. Upload Survey Form

First time you successfully create an account on *Ona.io,* you will automatically create a personal project with your own name.



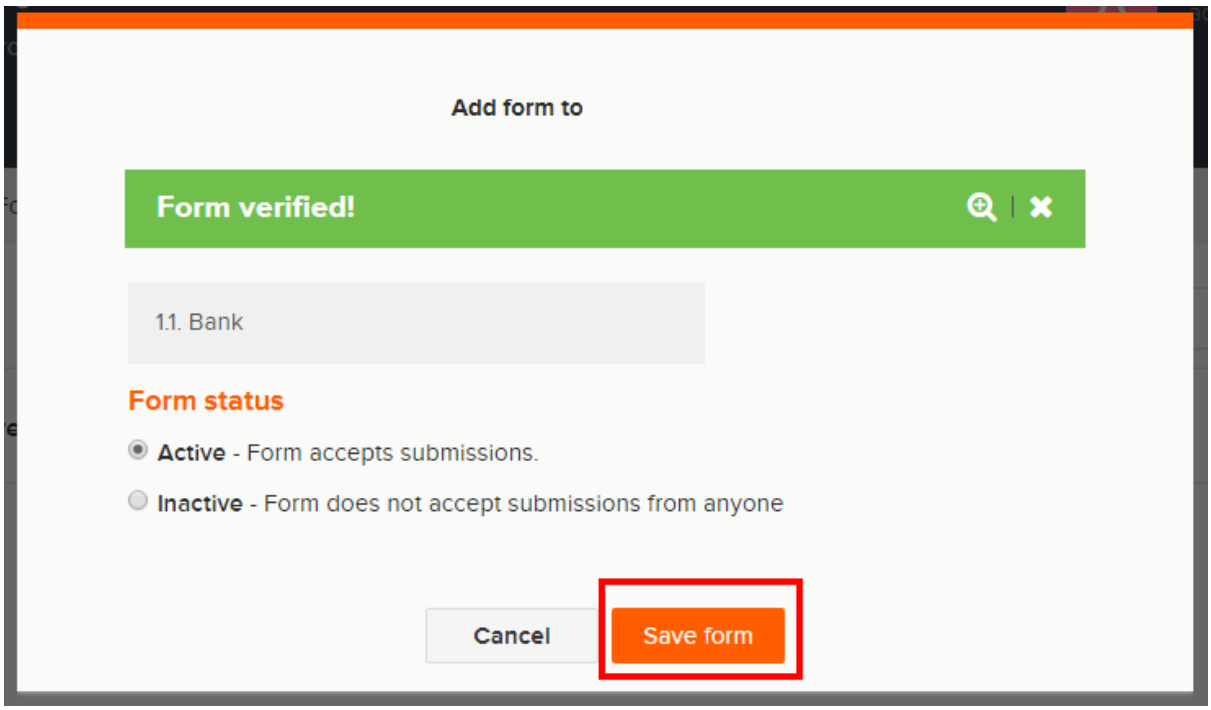
Private project with your own account name

To *upload* your form, click on the name of your own project. After successfully entering into your project. Click on the ***Add a form*** button and a new window will appear. Here you are asked to enter *the XLSForm file*. Select *file* your survey form. After you have successfully selected *file* your survey form, click on the ***Upload Selected File***. The system will check whether your form has errors or not.



Display window when uploading survey forms

If you have successfully uploaded survey forms, a pop up of will appear **Verified Form.** Click on the **Save form** button to immediately save the survey form.

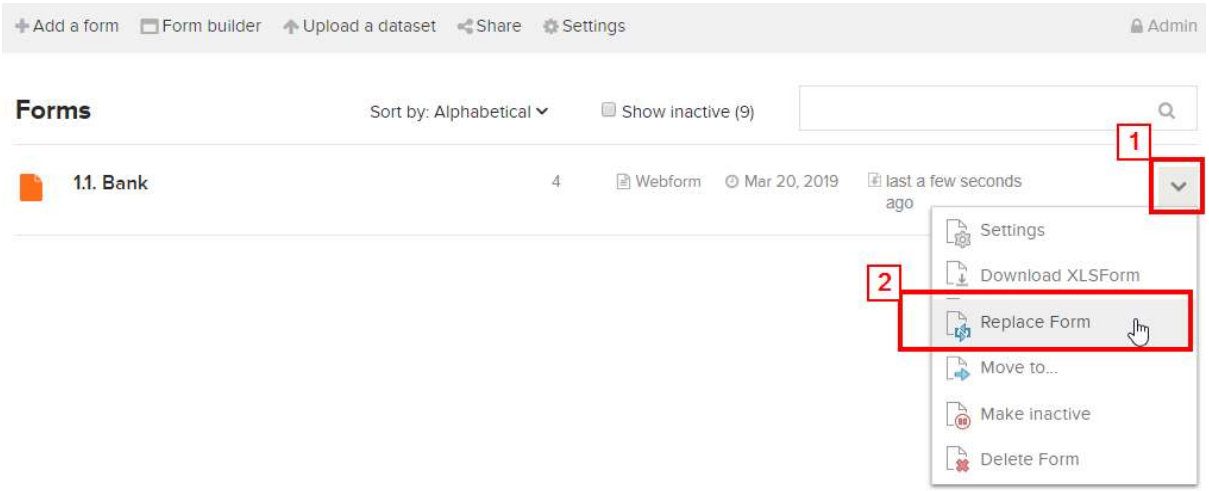


Select Save Form to save the verified form

c. Changing survey forms

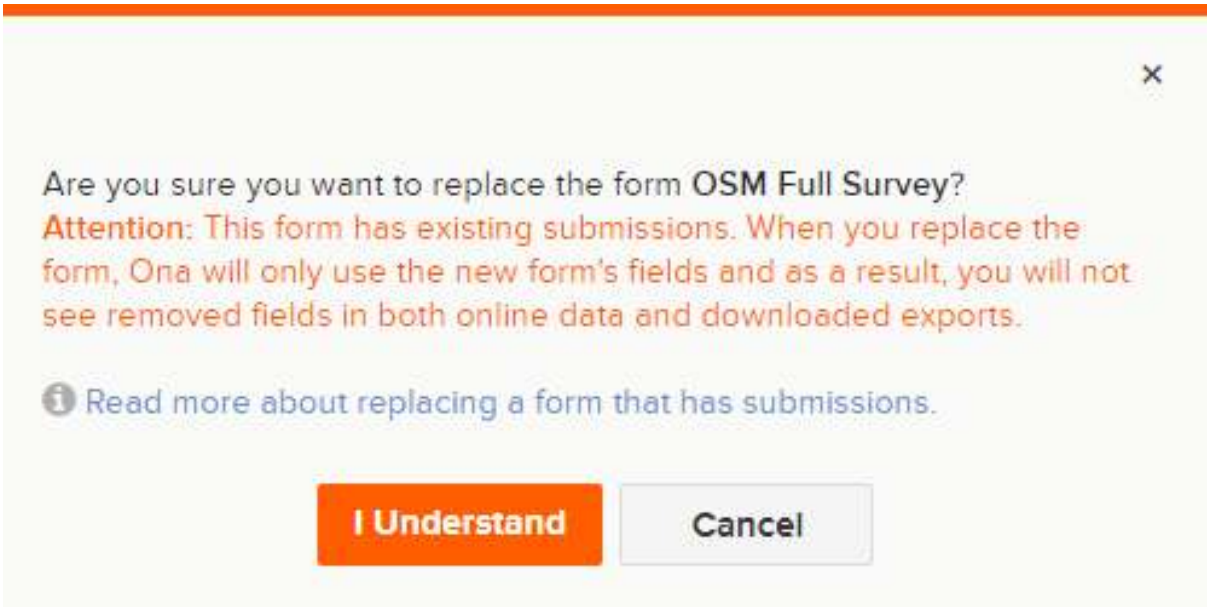
If you make changes in survey forms that have been successfully uploaded to your project, you can update the survey forms. But the thing to remember is that **when you update your survey form, if the form has already been filled out with some data, then there is a potential that the data already entered will be deleted**. Therefore, before you change survey forms, it is recommended to download your data first in case something goes wrong.

To replace your survey form, click on the down arrow located to the far right of your survey form. Then select ***Replace Form***.



Click on the right side of your survey form to bring up the Replace Form menu

If your survey form already contains some fields, a warning will appear so the users can understand the consequence when changing survey forms, especially replacing variables, *Ona.io* will use the new variables contained in the new survey form.

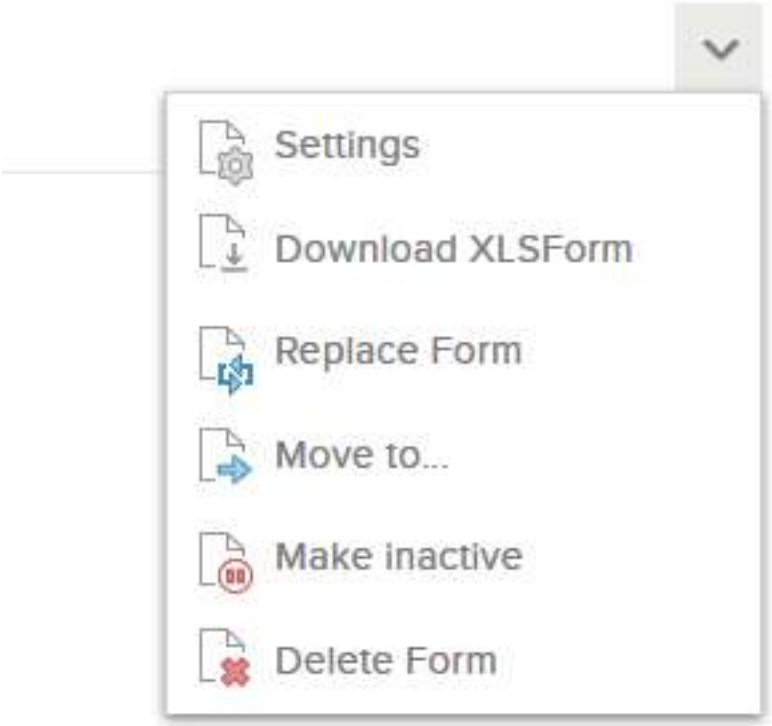


Warning When Changing the Survey Form

After you click thebutton ***I Understand***, you will be directed to a window to upload the survey form. Select your new survey form and click ***Upload Selected file***. After the form has been successfully validated, click on thebutton section **Save form**.

d. Delete / Deactivate Survey Forms

If you have survey forms that you want to delete / deactivate. You can do this by selecting the ↓ arrow located to the right of your survey form and then selecting ***Delete Form*** to erase or ***Make inactive*** to deactivate your form.



Display to delete or deactivate survey forms

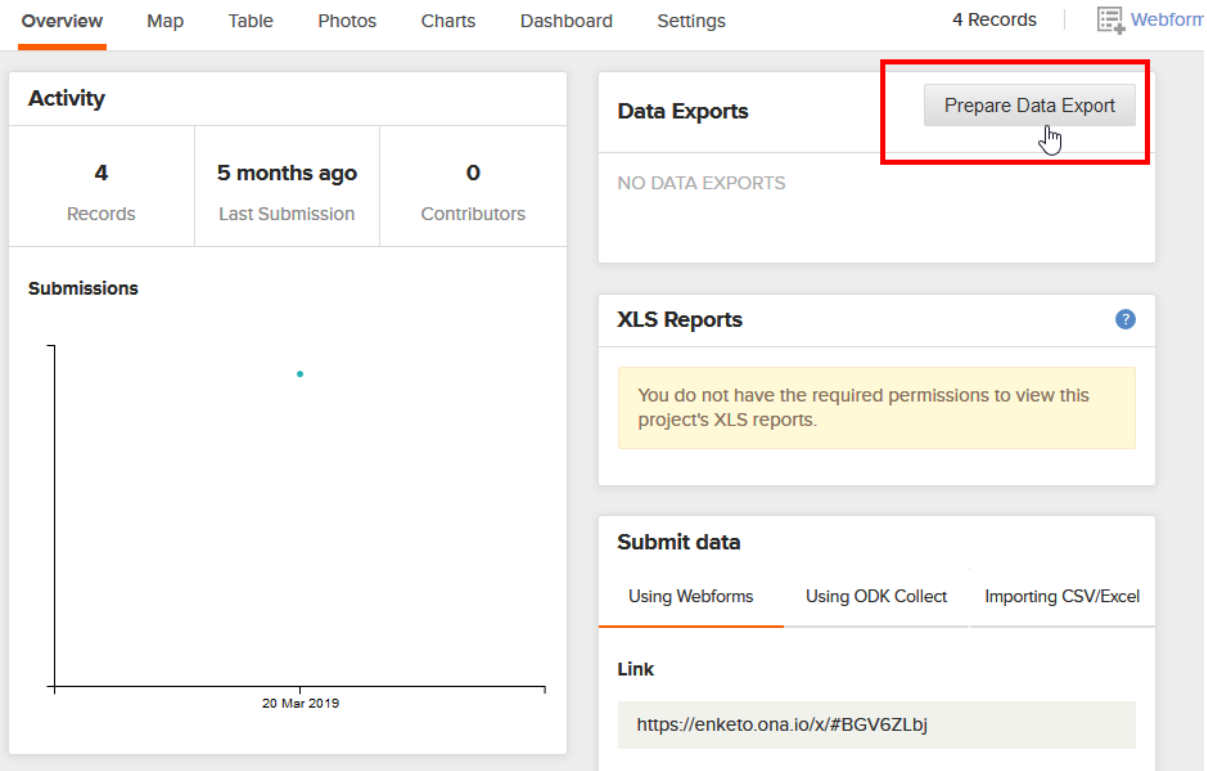
```
Note:
If you choose to Delete Form. You will be asked to rewrite the name of your survey form before you c
By selecting Make inactive, your survey form will not appear in ODK Collect during the stage of gett
```

e. *Downloading* XLSForm

You can download XLSForm format of the survey forms that you have created by clicking the arrow ↓ at the right part of your survey form and then select ***Download XLSForm***.

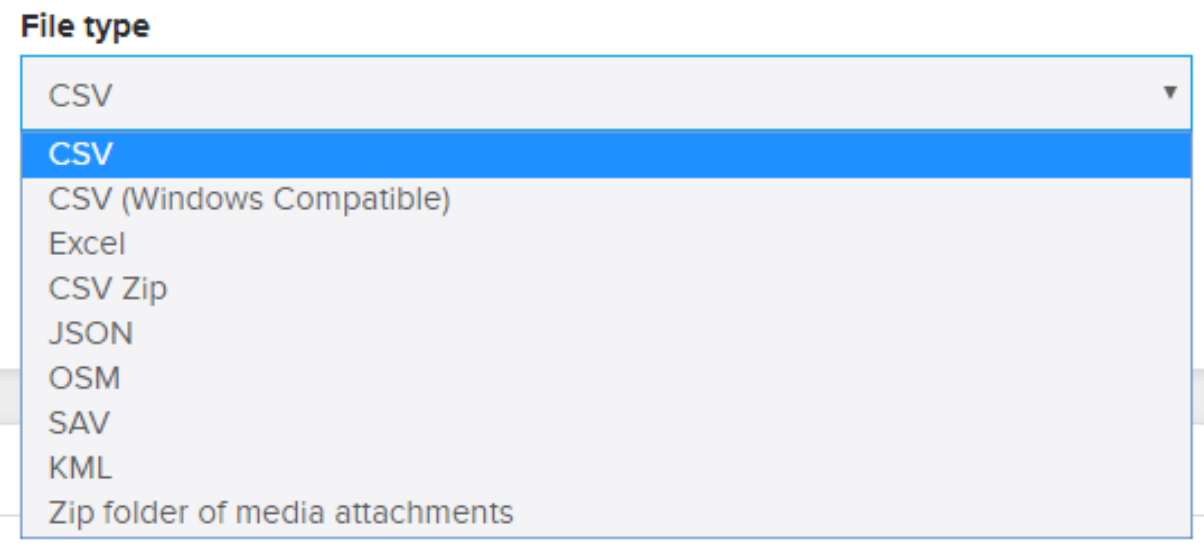
f. *Download* Survey Results

To download data from the survey. You must first choose your survey form. After you have successfully selected the survey form, you will be directed to the survey form management page.



View to download survey data

Click on thebutton ***Prepare Data Export*** to start downloading your survey form data. After that you will be directed to choose the type of *file* you want to download.



Choice of file types that you can download

If your survey form does not use photos, you can choose CSV. But if your survey form uses photos, you can choose ***Zip folder of media attachment.*** The process to download survey data depends on how much data you produce in the data collection activity.

The survey data from *Ona.io* can later be used for various mapping purposes for example ***KML*** you can open it with ***Google Earth***, with the ***OSM*** you can use ***JOSM*** application, and data with format ***CSV*** you can open with ***Spreadsheet*** or ***QGIS***.

SUMMARY

Congratulations! Now you understand how to upload files survey form into one of the platforms that can

be used to store survey forms online. There are several options you can use besides Ona.io to *upload* survey forms. Ona.io can be an option because it is very easy and free to use based on the terms previously explained.

— title: Creating Field Maps using QGIS weight: 7 —

Objectives:

- To be able to operate QGIS to install QuicMapServices Plugin
- To be able to operate QGIS to create a field survey map

Field maps are used to advise data entry in identifying the locations during the field survey. If data entries have gotten the administrative boundary with the government in the village office, a field map can be used to delineation the administrative boundary. Then we can bring the map to our office and input the boundary using JOSM. How to create the filed map? We can use QGIS version 2.14.22 in this chapter, QGIS is a professional GIS application that is built on top and proud to be itself Free and Open Source Software (FOSS). We can download the QGIS application on https://qgis.org/.

I. Download and Install QGIS

- Open the browser and go to http://qgis.org/
- The window will appear like the image below:

Website QGIS interface

- Click on **Download Now → All Releases →** click **here** on Older releases of QGIS are available to search and find QGIS version 2.14 or we can download in this link: http://download.osgeo.org/qgis/win64/QGIS-OSGeo4W-2.14.22-1-Setup-x86.exefor Windows 32 bit and http://download.osgeo.org/qgis/win64/QGIS-OSGeo4W-2.14.22-1-Setup-x86_64.exe for Windows 64 bit.

QGIS version

- If you using another operating system, choose the operating system with Index of QGIS

Index of /qgis

Name	Last modified	Size	Description
Parent Directory		-	
data/	22-Jun-2015 05:59	-	
debian_ppc/	10-Jan-2009 08:12	-	
doc/	01-Nov-2010 04:43	-	
linux/	09-Jul-2008 01:41	-	
mac/	02-Jan-2009 02:29	-	
src/	17-Jul-2010 05:26	-	
win32/	24-Feb-2019 15:30	-	
win64/	24-Feb-2019 15:30	-	
windows/	24-Feb-2019 15:30	-	

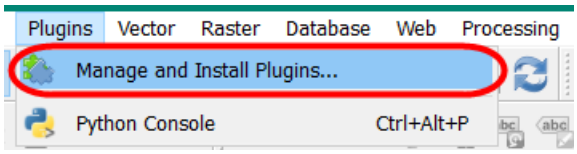
Index for other operating systems

- If you already have the QGIS application, you can directly install QGIS and follow the instructions.

II. Install the QuickMapServices Plugin on QGIS

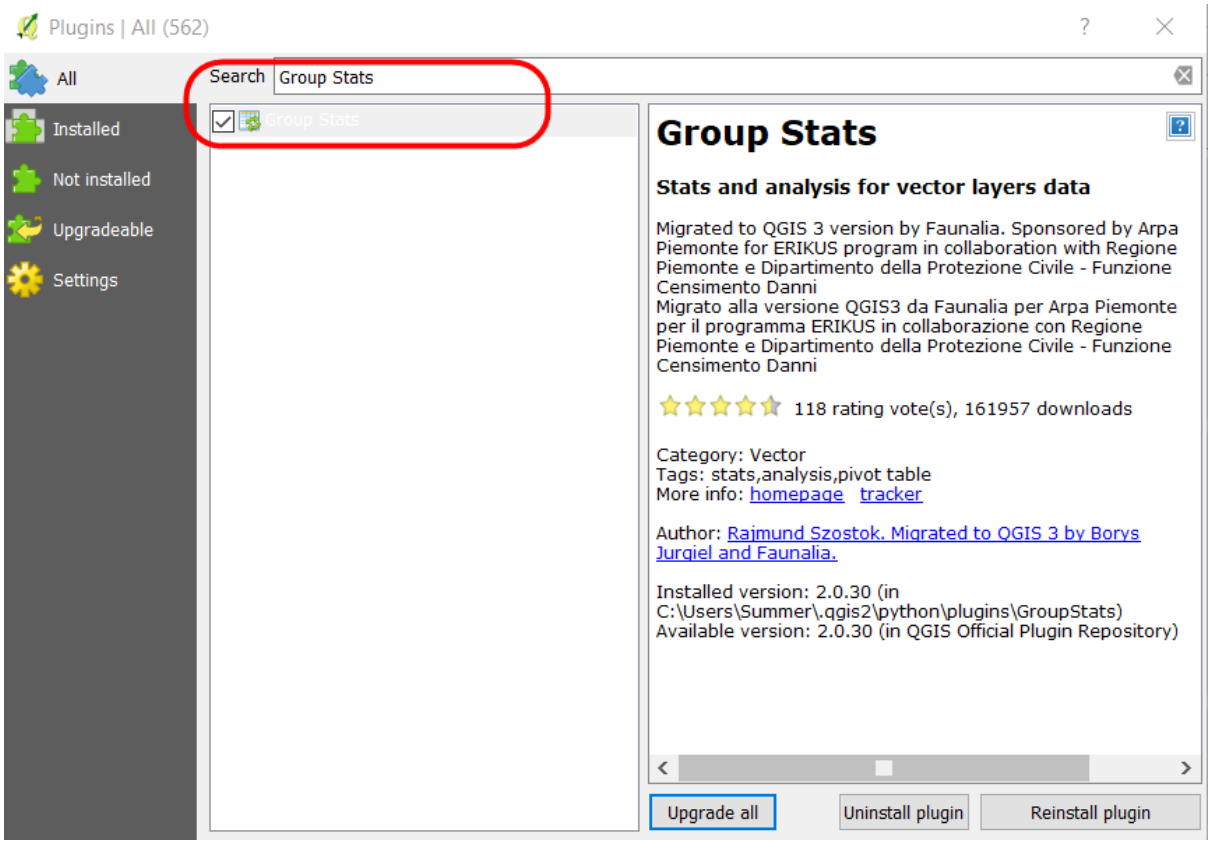
QuickMapServices is a plugin that makes work with web-based basemap easy. We need an internet connection to download this plugin in QGIS. These are the step by step to install the plugin:

- Open QGIS and ensure the internet connection is working. Click on **Plugins Menu → Manage and Install Plugins**



Menu Plugin

- Type **QuickMapServices** in the **Search** box and click on **Install Plugin**



Install the plugin

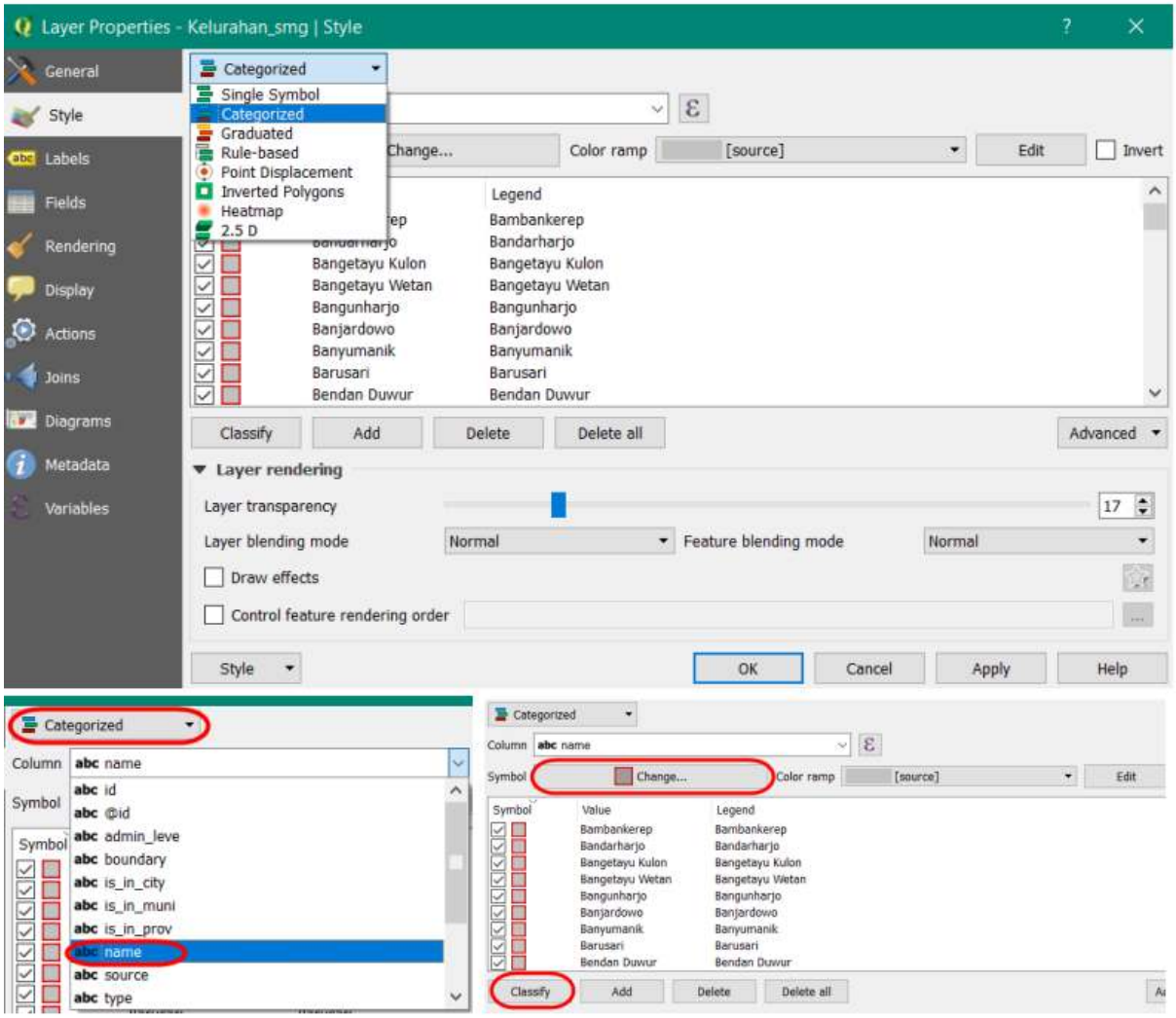
- If the installation has finished, the next step is creating the field map.

III. Preparing the Data

Before we start to create the field maps, we have to prepare the shapefile of the administrative boundary. If you have other spatial data such as roads, it will be useful to use the data in the field map. The steps to preparing the data:

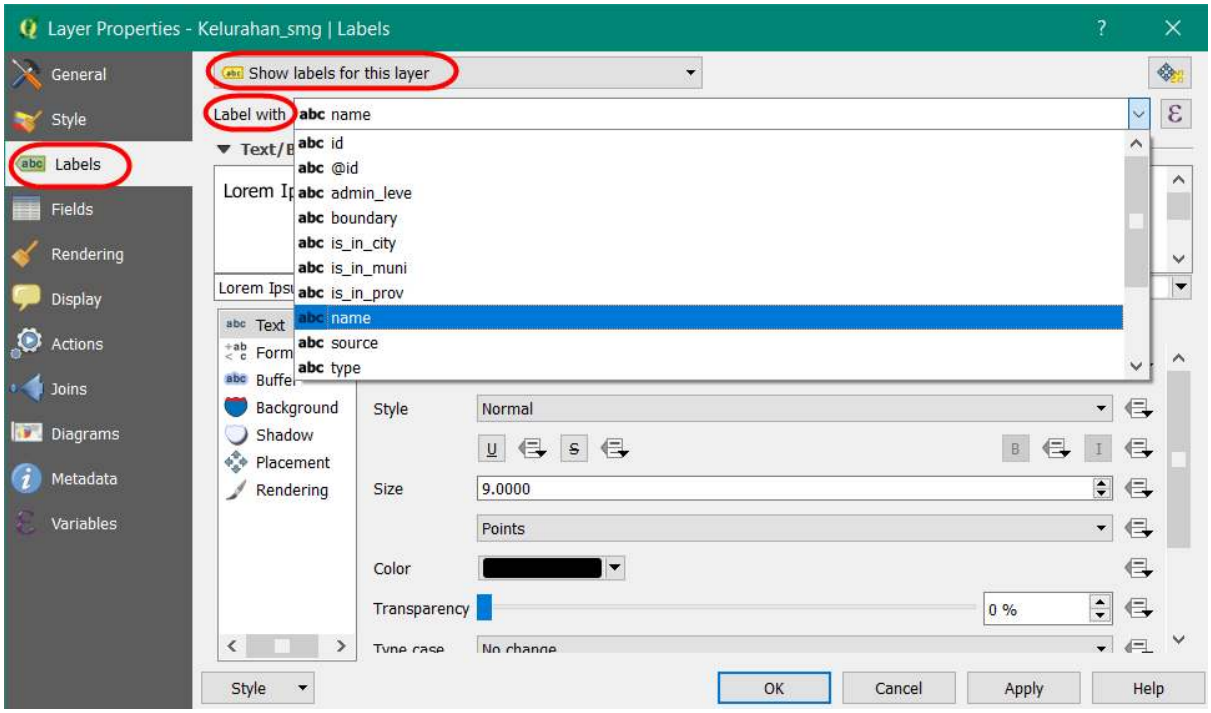
- Add the data layer in **QGIS** layer with click on **Add Vector Layer**

- We can change the style of the layer with symbology and labeling.
- To symbology, We can directly right click on **boundary layer → Properties → Style → Categorized.** Navigate the cursor to **Column → search the column name as village → Classify**. If we want to change the symbology, click on **Symbol → Change.**



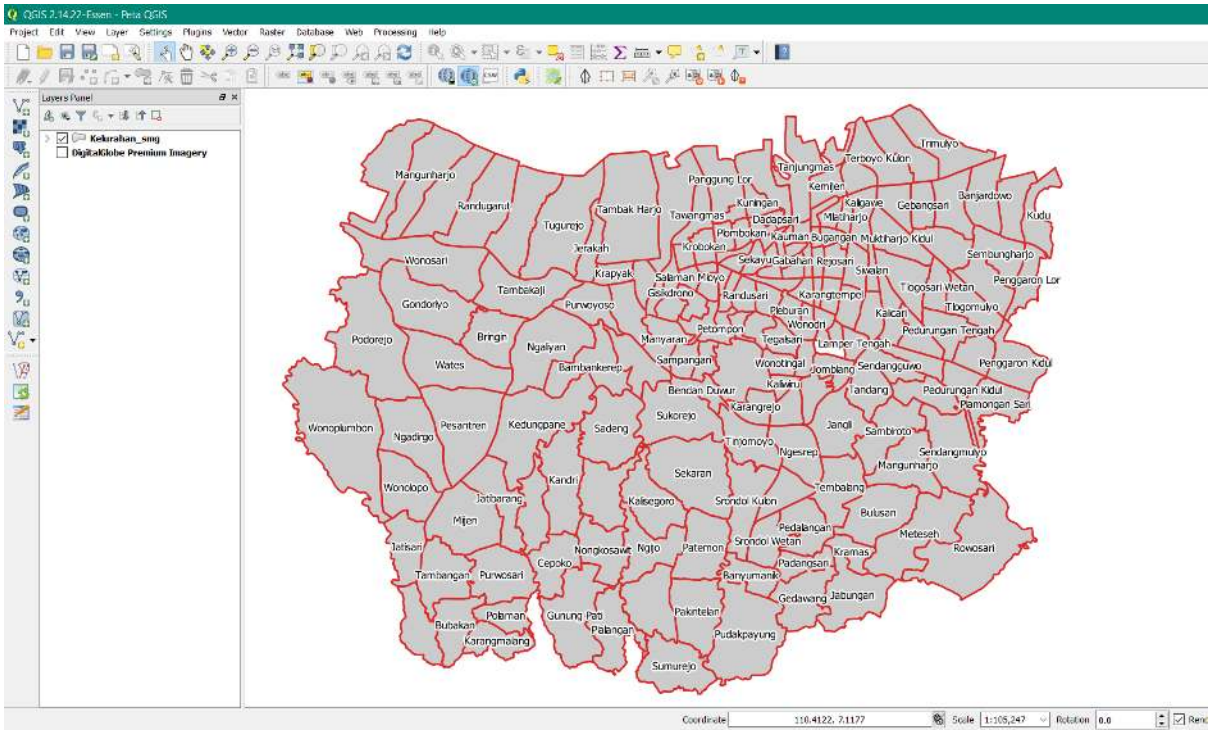
Symbology in QGIS Layer

- To add the labeling, open the layer properties window like before and click on **Labels → Show labels for this layer → search the column name as the village**. We can adjust the font label in Text Menu, adjust the shadow label in Buffer Menu, and setting the placement label in Placement Menu.



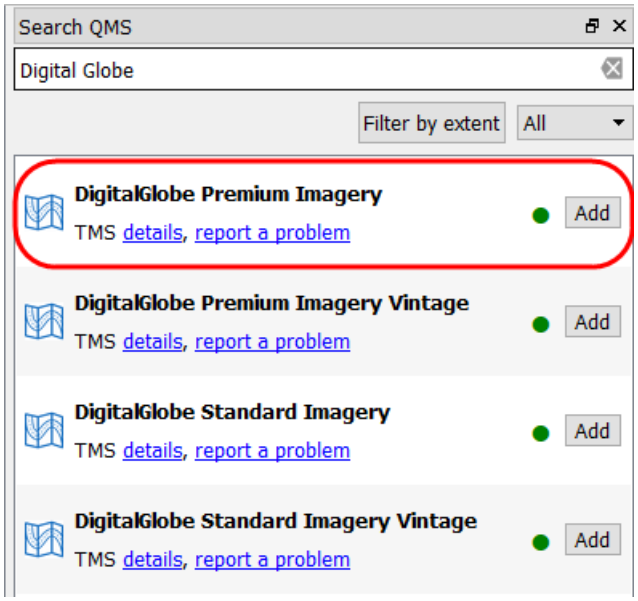
Labeling setting

- The result will show likely image below:



The result of the layer style

- To add the basemap on your maps, click on **Web Menu → QuickMapServices → Search QMS.** The plugin will show up in the right panel, we can type the name of available imagery, an example **DigitalGlobe Imagery**.

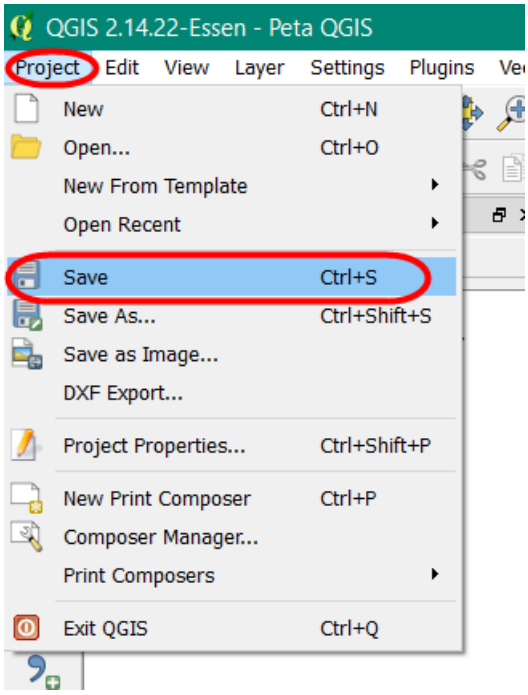


QuickMapServices Interface

- In the QMS window will appear to lists the imagery with the name, click **DigitalGlobe Premium Imagery**. Please wait for the moment until the imagery shows up in your map canvas.

The digital globe imagery as base map

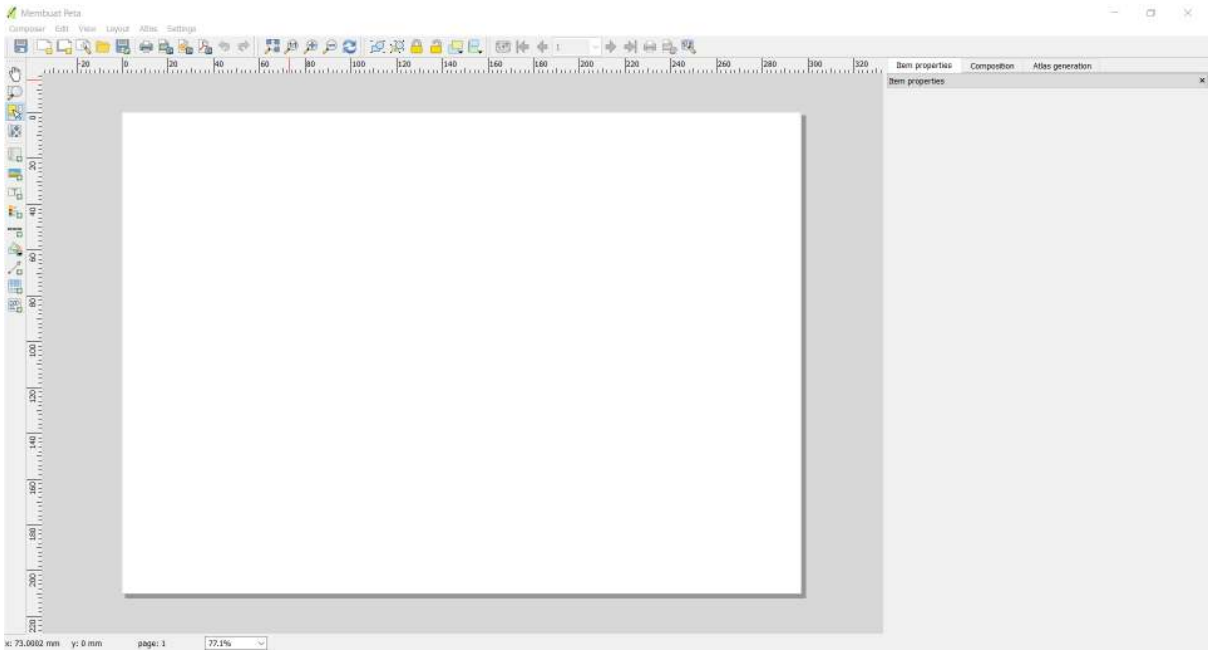
- Save your QGIS project by **Project Menu → Save → Type the name → Save**. An example, the name is Field Map.



Save project

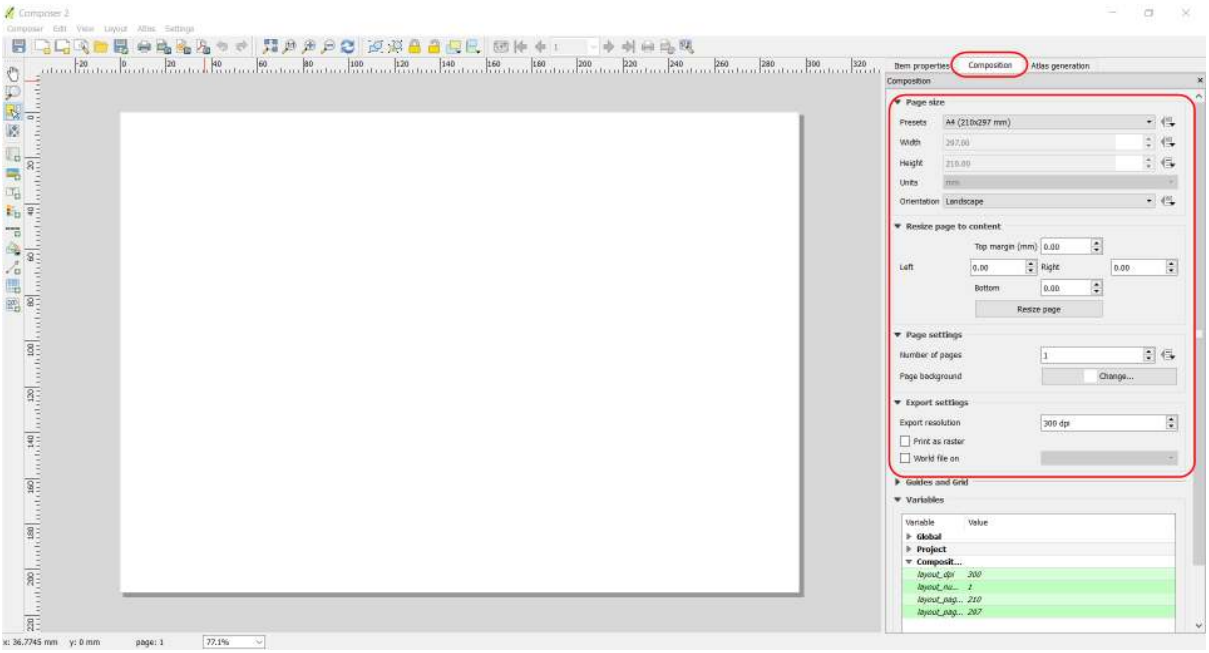
IV. Creating the Layout with Map Composer

- In the first step, we can create the new composer with **Project Menu → New Print Composer**. The composer window will show up in your QGIS project.



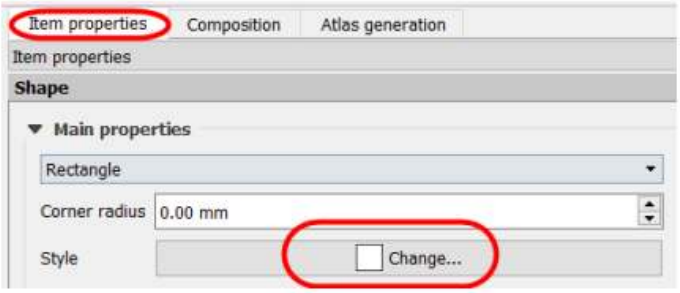
Map Composer

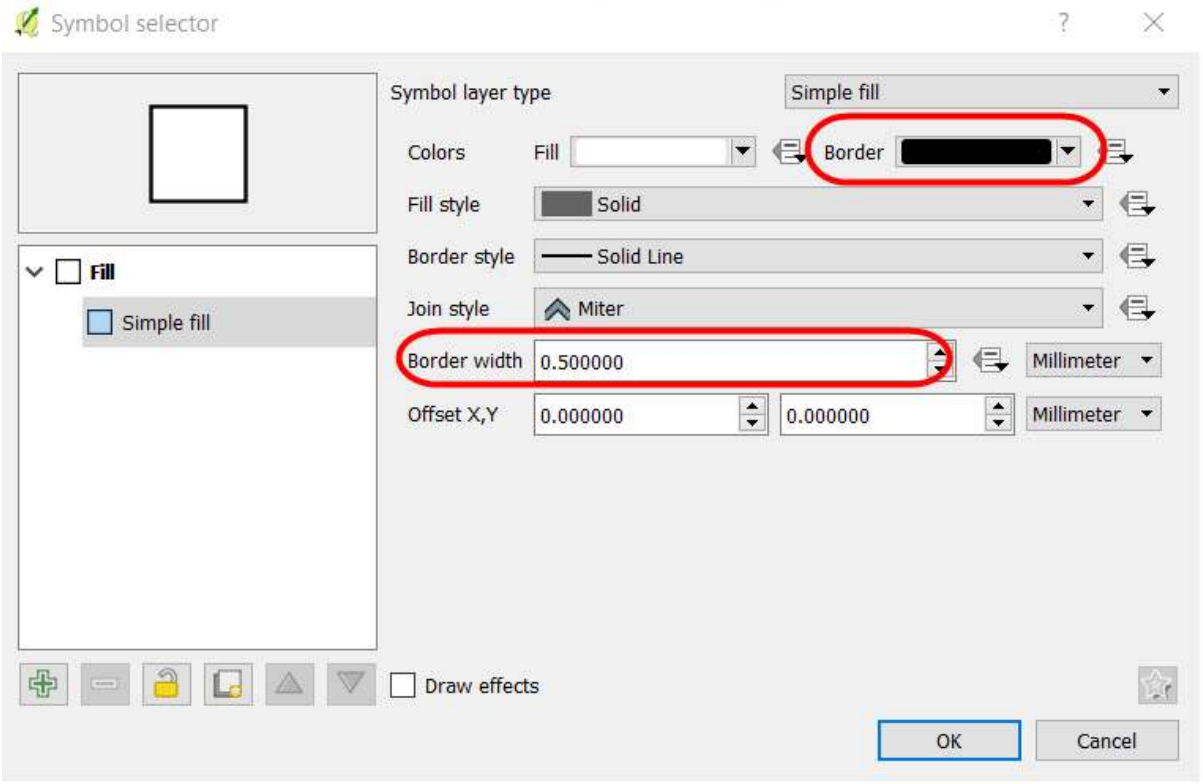
- The Composition Menu. The orientation map used to adjust the paper size, orientation, margin, and export resolution. You can do the setting in **Composition** on the right panel.



Menu composition

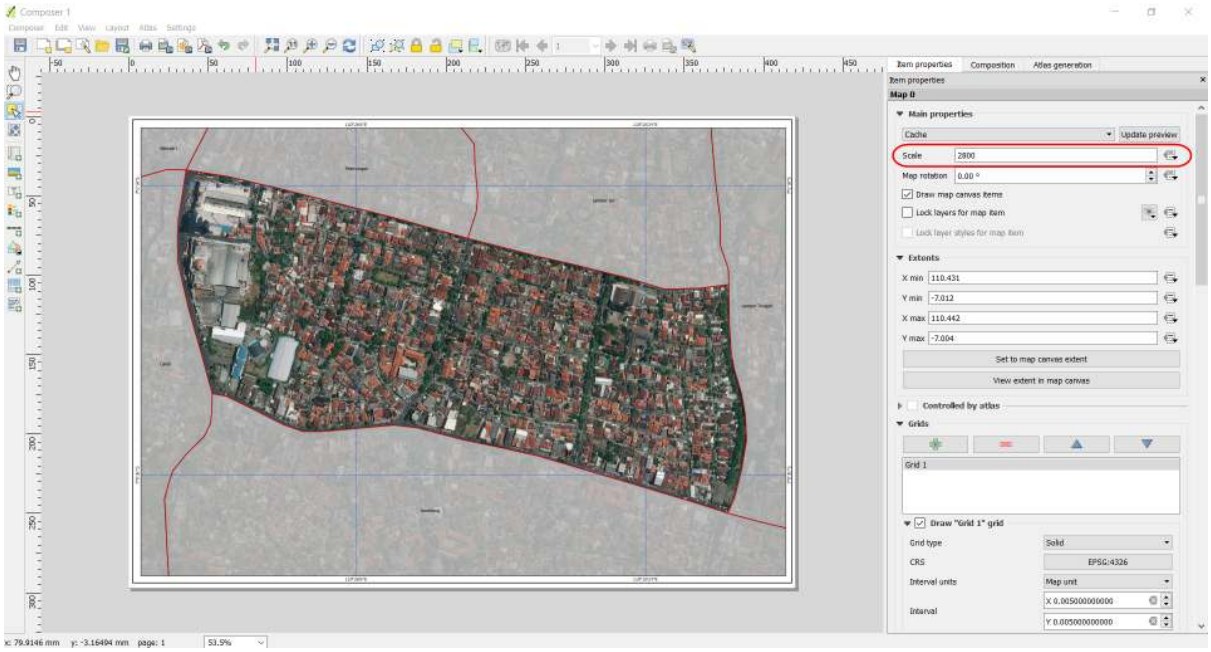
- **To add the outlines** in the layout with





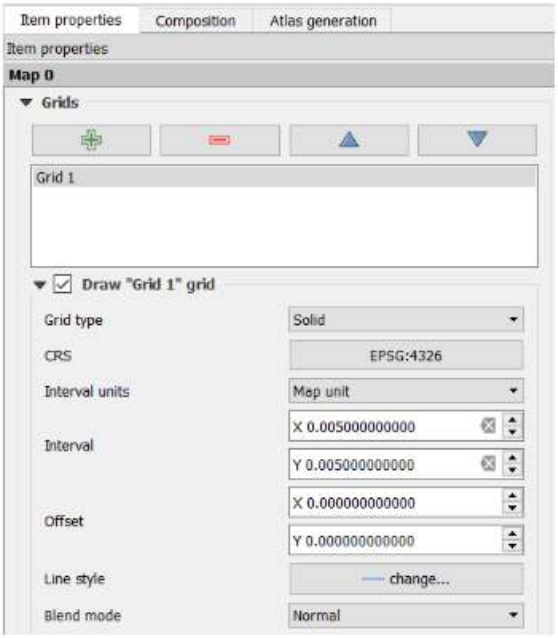
Symbology in Outlines

- To add the maps by **Add a new map**, and click on the layout → create the square. We can change the map scale and map view with the **Item Properties** in the right panel.



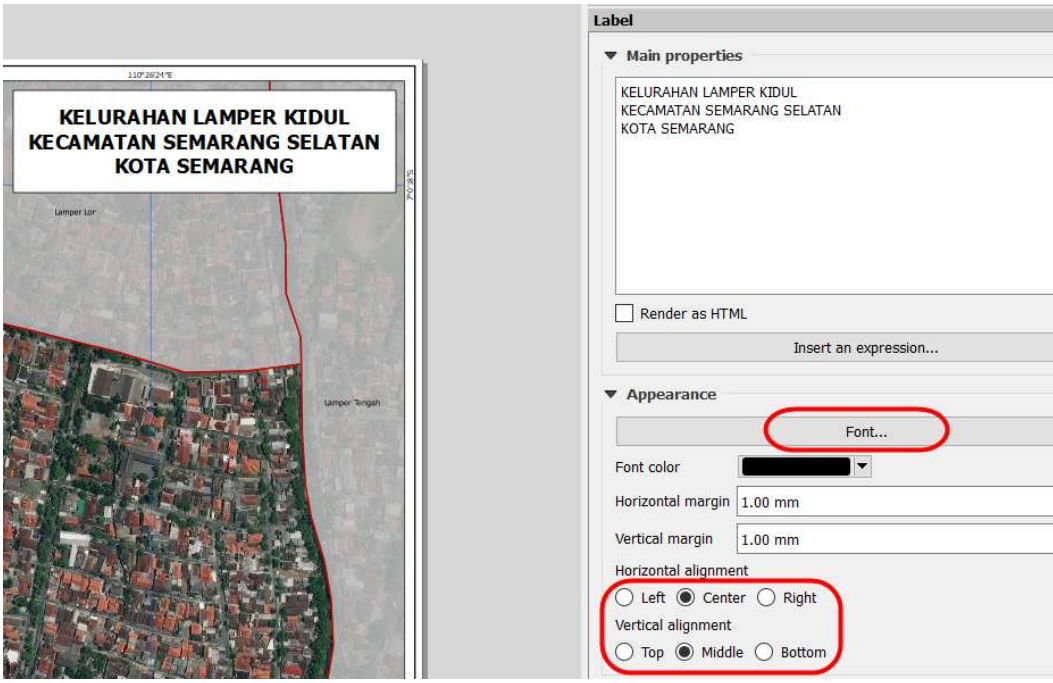
Scale map setting

- To add the grid with **Item Properties → Grids → Click the button + → Draw Grid**. The grid setting is a **grid type and interval**. The Interval based on a type of coordinate. To add the coordinate checklist on **Draw coordinate** and adjust the coordinate position in each grid.



Grid and coordinate setting

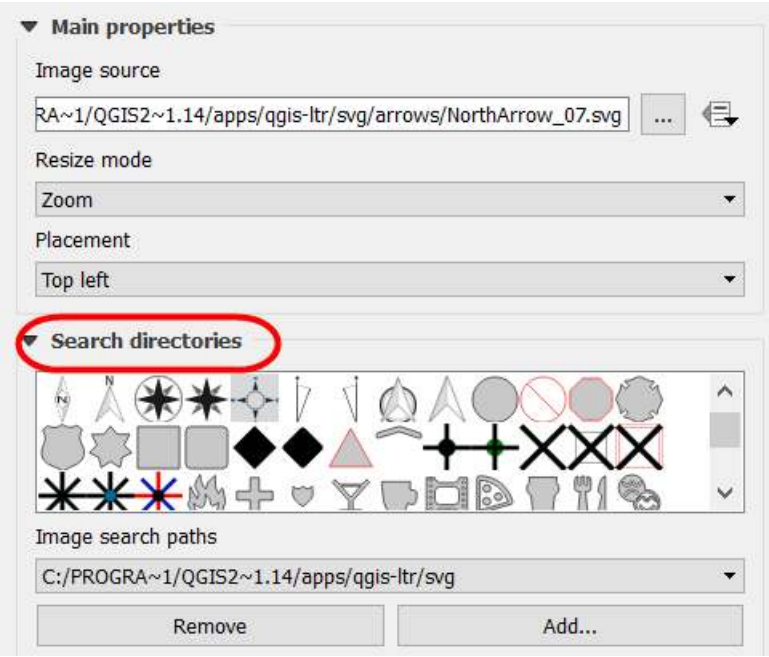
- To add map title click on **Add new label** → click in map layout the position the map title. The **Font** settings to change the appearance of the label, click the **Horizontal alignment → Center** to move the position in the center as horizontal and click **Vertical alignment → Middle** to move the position



in the center as vertical.

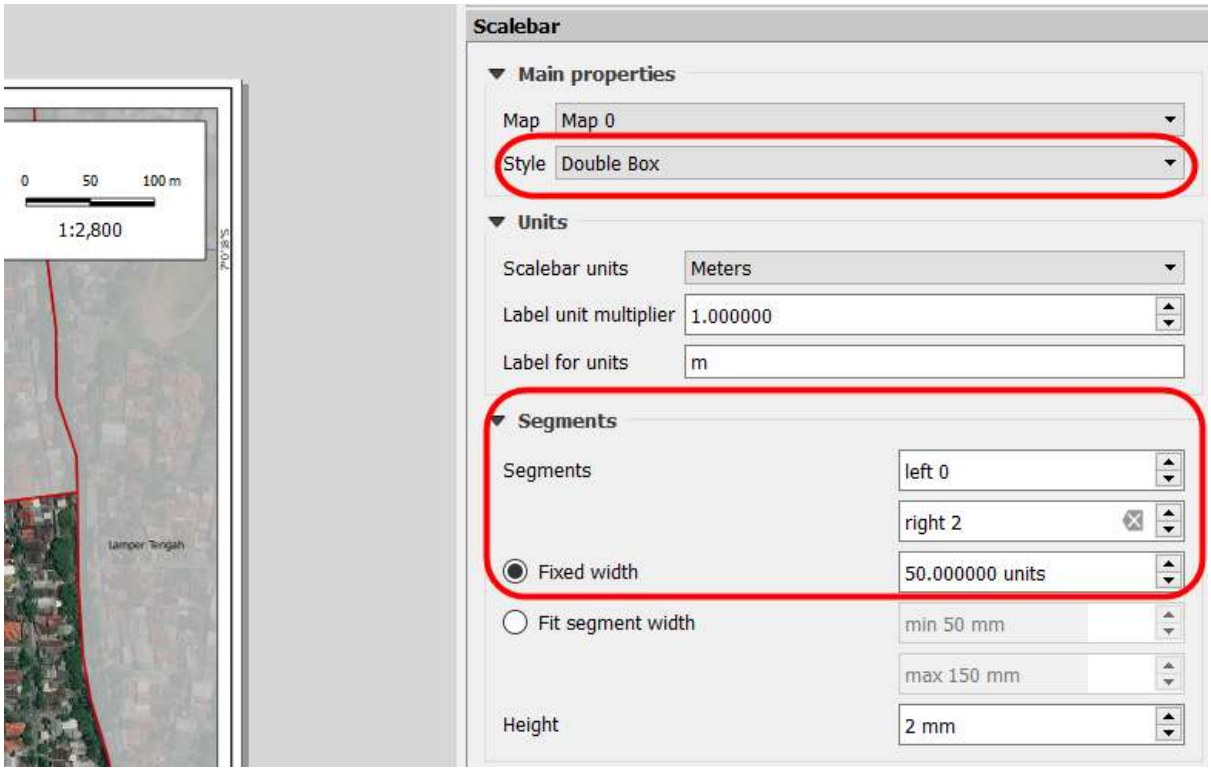
Font setting in Label

- To add the arrow for direction by tools **Add Image → Item Properties → Search Directories**. Click on the layout and draw the box and choose the image in search directories what is arrow symbol.



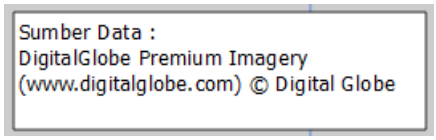
Symbol of arrow

- To add the scale bar by tools **Add new scalebar**. To add the scale map in numeric, change the **Style** in **Main Properties** with **numeric**. You can set the segments of scale bar in segments unit.



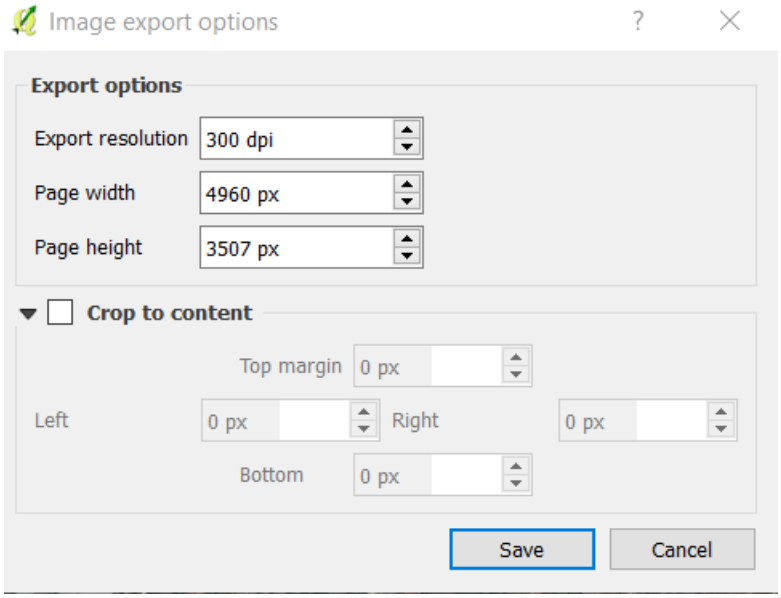
The setting of the scale bar

- To add the source of the data layer by tools **Add new label.** You can fill the information about data source with “DigitalGlobe Premium Imagery (www.digitalglobe.com) © **Digital Globe**”.



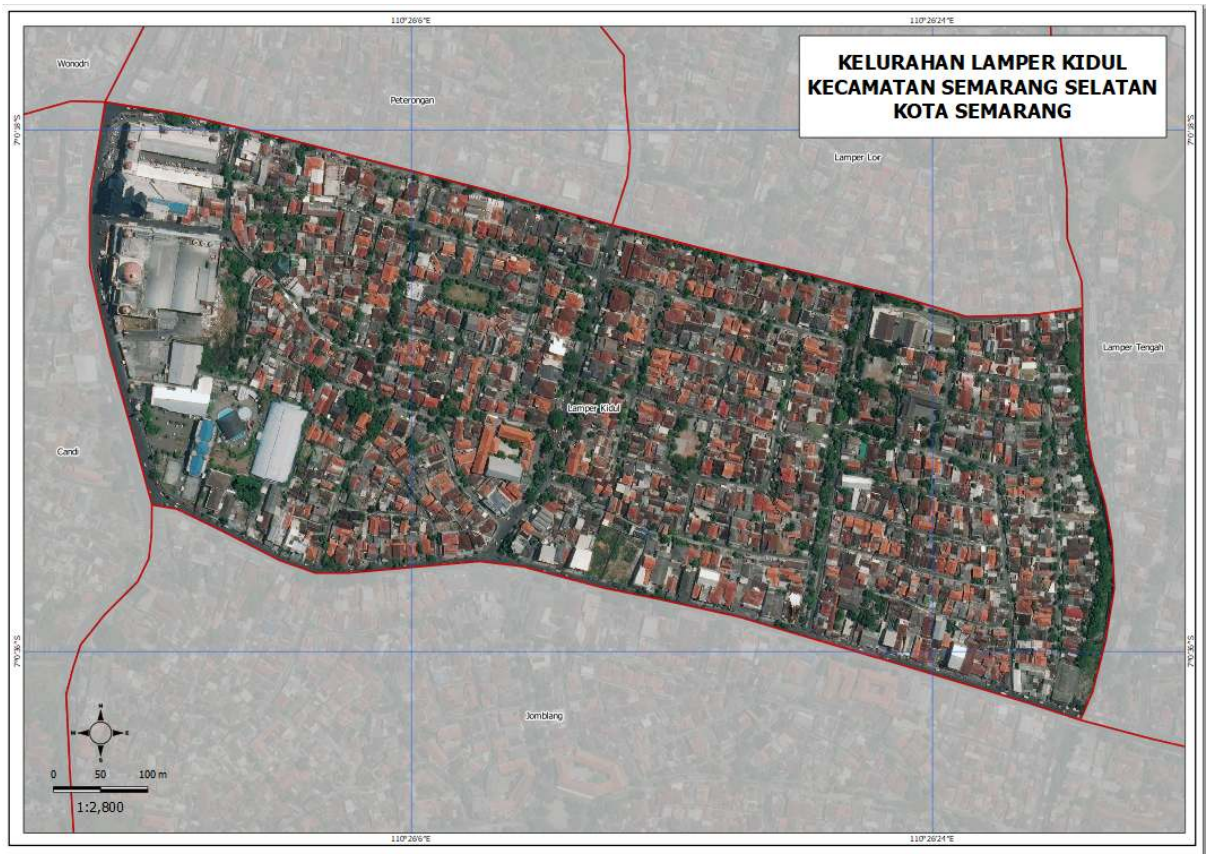
The license of Digital Globe Imagery

- If the map layout has finished, we can export the map as an image in jpg, png, pdf file. Click on **Export as Image** to start the export map to JPG, PNG, PDF, and SVG file. Before the exporting process, you can set the export resolutions to ensure the image resolution will result in the best image. Click on **Export resolutions** 300 dpi is the best result image.



Map resolution

- After the export has finished, the result will show up like the image below



The map result

SUMMARY

If you can follow the whole instructions in this chapter, you have learned and practiced how to create the field map using the QGIS. You can create the field maps based on village administrative level to easy on the printout and bring to the field. The field maps will be used by data entry to identify the location, digitize the boundary, and mark the objects.

— title: Group Stats Plugin for Calculate The Objects weight: 9 —

Objectives:

- To be able to demonstrate how to install a plugin for calculate number of object in QGIS
- To be able to operate the Group Stats plugin for calculate number of OSM Object

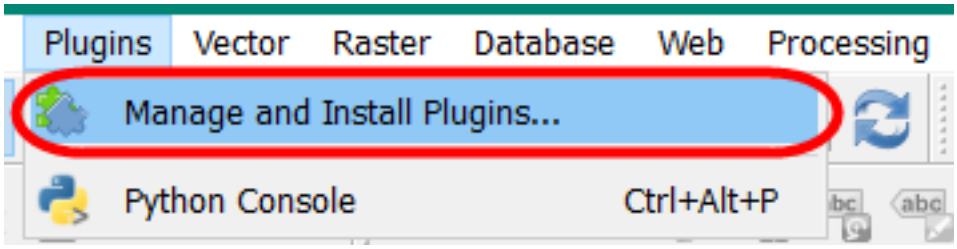
The calculation of the quantity of data can be an indicator of the achievement of mapping projects that can be poured into a mapping report. The process of calculating the quantity of OSM data can be done by installing the plugin group stats in QGIS for free, this plugin can use to count the number of objects based on categories.

I. Group Stats Installation

- If you haven't the QGIS application, you can download it in this link and install the QGIS.

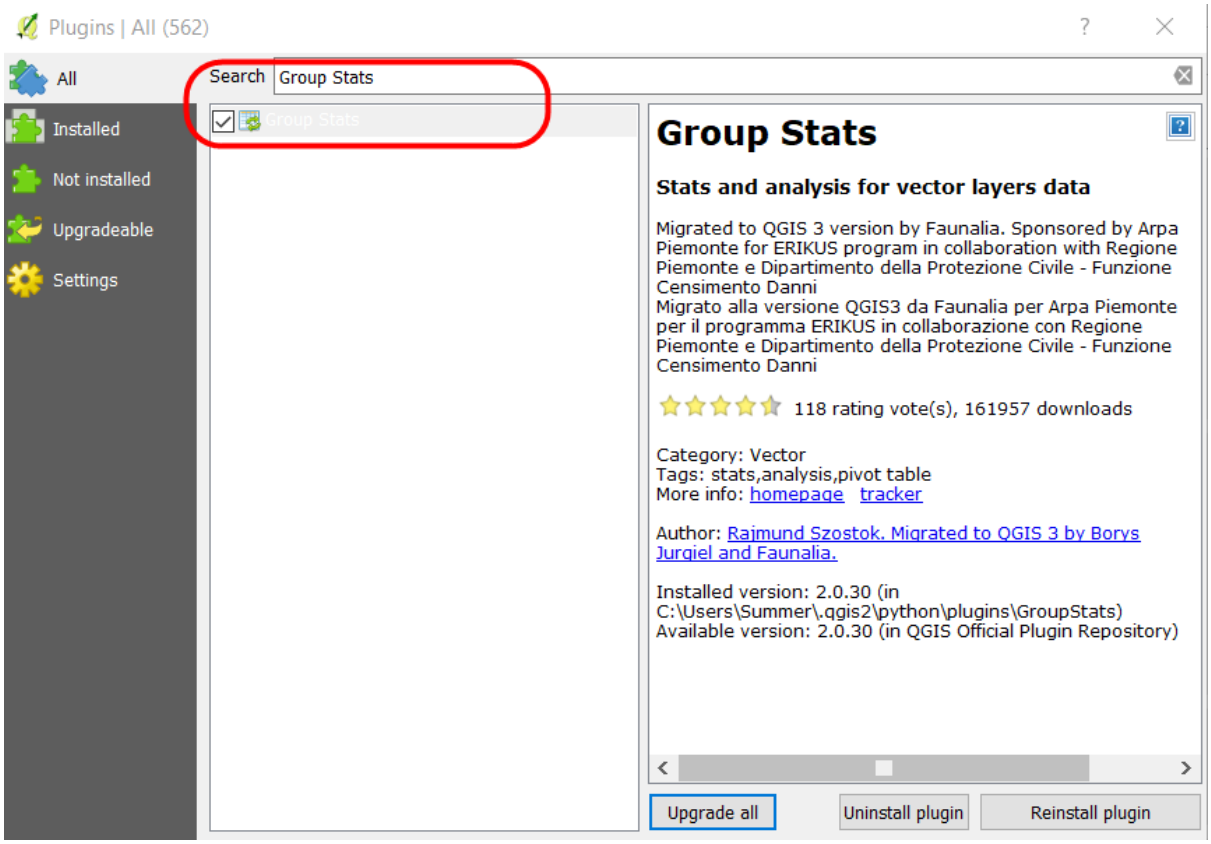
  http://download.osgeo.org/qgis/win64/QGIS-OSGeo4W-2.14.22-1-Setup-x86.exe for Windows 32 bit and http://download.osgeo.org/qgis/win64/QGIS-OSGeo4W-2.14.22-1-Setup-x86_64.exe for Windows 64 bit.

- Open QGIS and ensure the internet connection is working. Click on **Plugins Menu → Manage and Install Plugins**



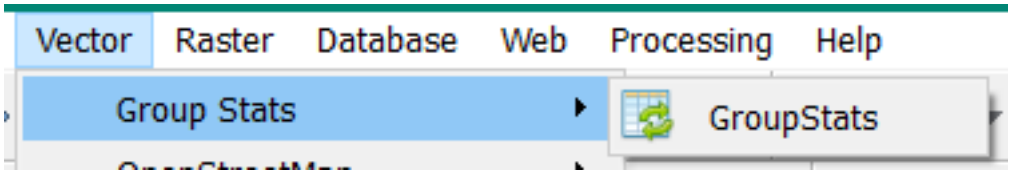
Plugins Menu Interface

- Type **Group Stats** in the **Search** box and click on **Install Plugin**



Install the plugin

- If the installation has finished, the plugin will show up in **Vector Menu → GroupStats**



GroupStats Interface

II. Calculate OSM Objects using Group Stats

We can overlay the administrative boundaries and the infrastructures to get the calculate of data quantity. The results of the calculation can be used to create a monthly report and monitory the mapping timeline. Before we starting to calculate the objects, we have to prepare the data in the shapefile format.

We can use the data form PDC InaWARE project in Semarang City in this chapter, getting the administrative boundary data in this link https://openstreetmap.id/data-semarang/ and the infrastructures data in https://export.hotosm.org/en/v3/exports (follow this chapter **04.Using YAML** to the instructions). The list of the objects in the shapefile:

- **Public Facilities: Points and Polygons**

1. All objects in amenity=*
2. Electrical Facility (power=*)
3. Park (leisure=*)
4. Government Office (office=*)
5. Supermarket (shop=supermarket)

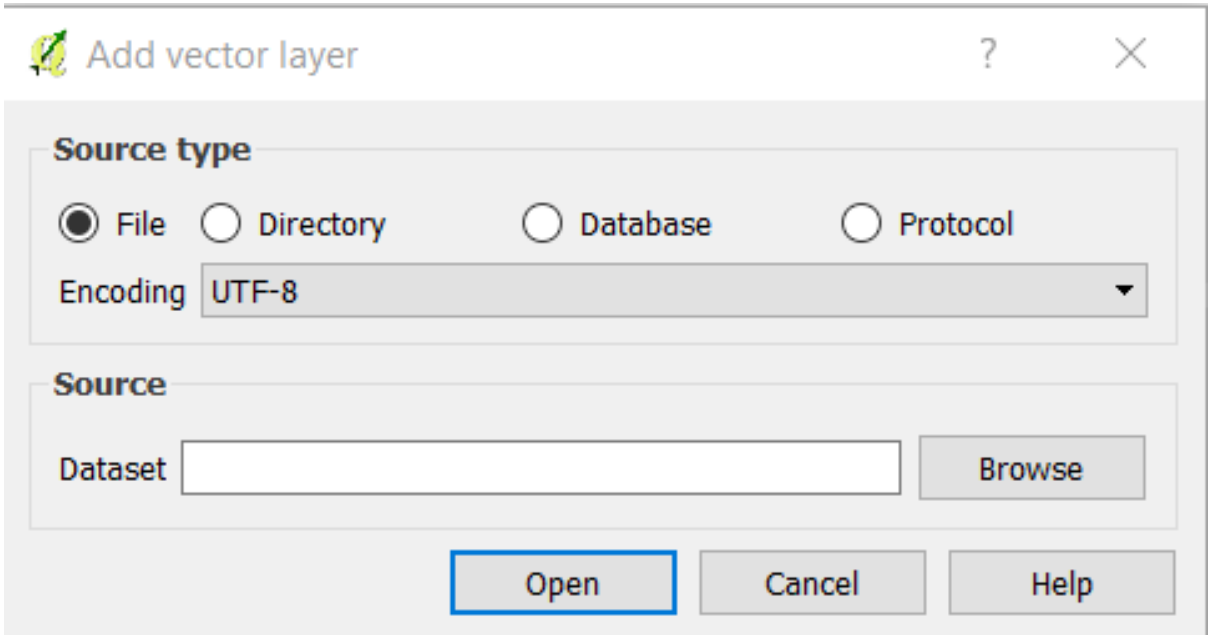
- **highways:** Lines

  highway=*

The next step we will start to calculate the objects:

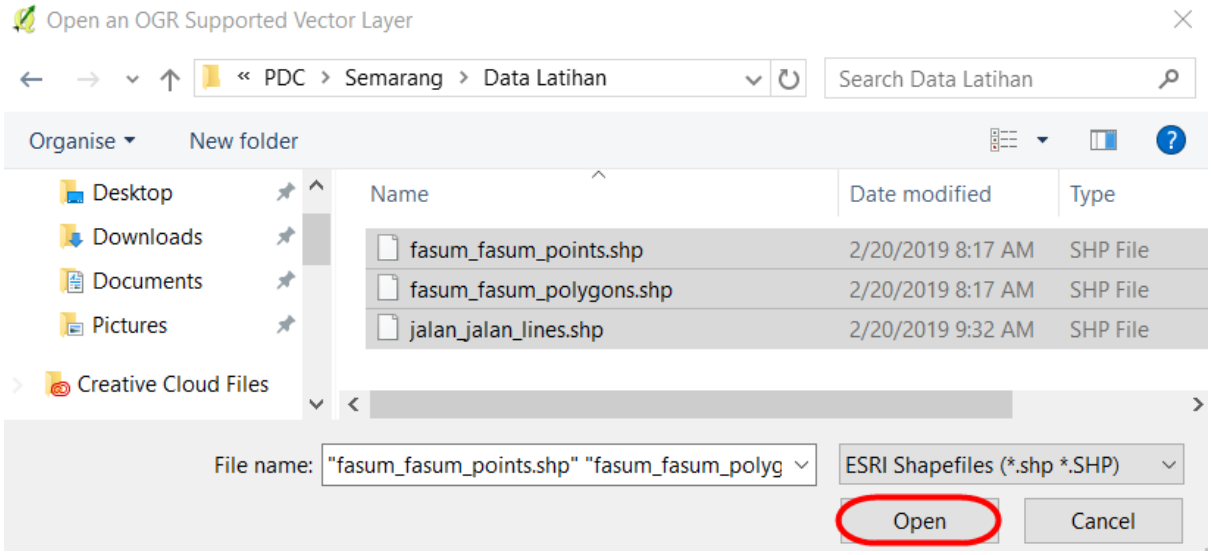
a. Preparing the Data

- Open the layer in QGIS with click on **Add Vector Layer → Browse** or click **Layer Menu → Add Layer → Add Vector Layer → Browse**.



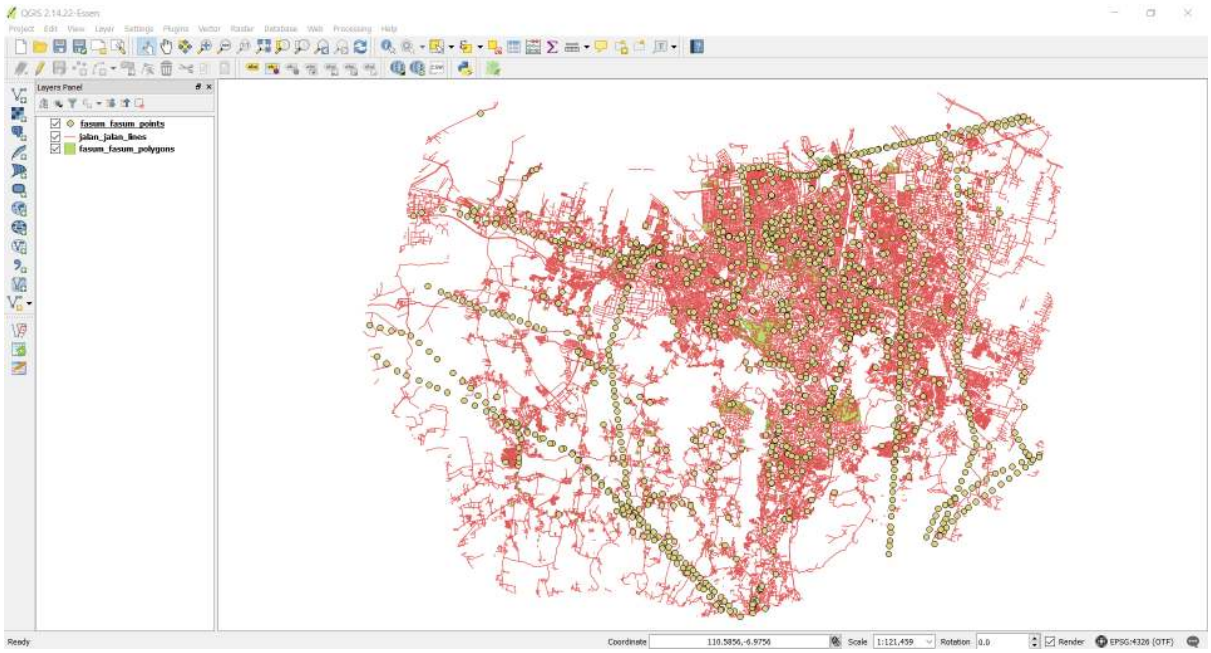
Add Vector Layer

- Choose your directory that the objects file is saved → **Select All → Open → Open**



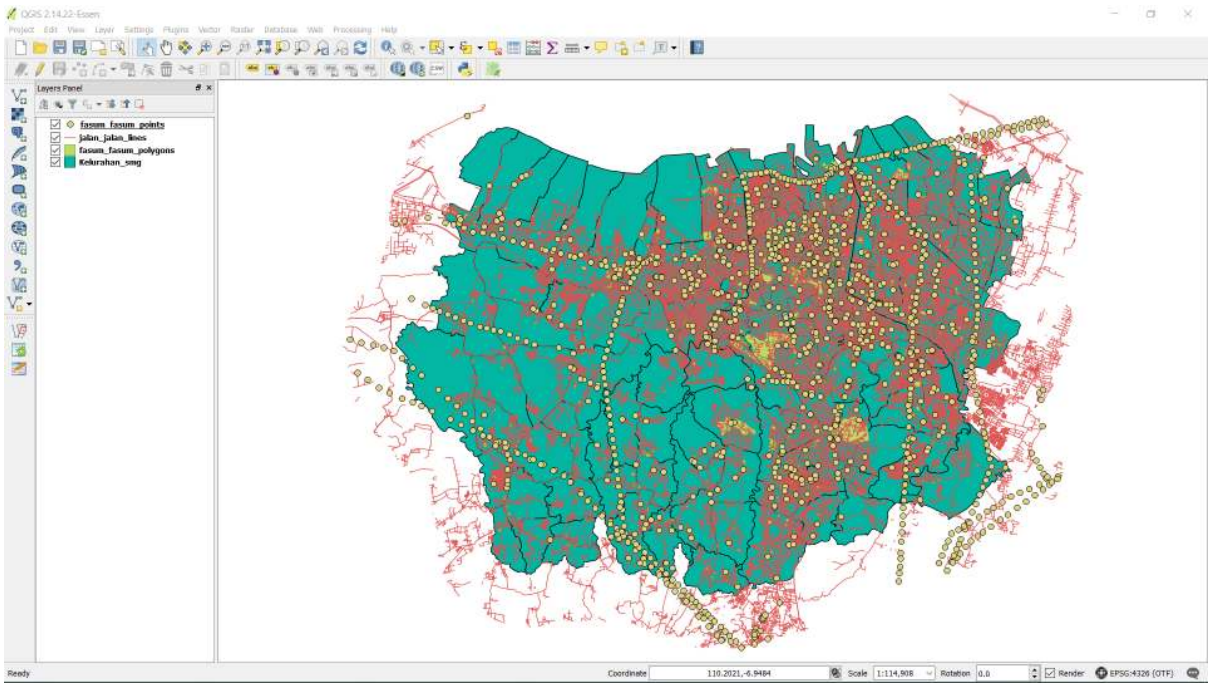
Open shapefile from directory

- The layers will appear on map canvas and **Layers Panel**



The Objects layer view on the map canvas

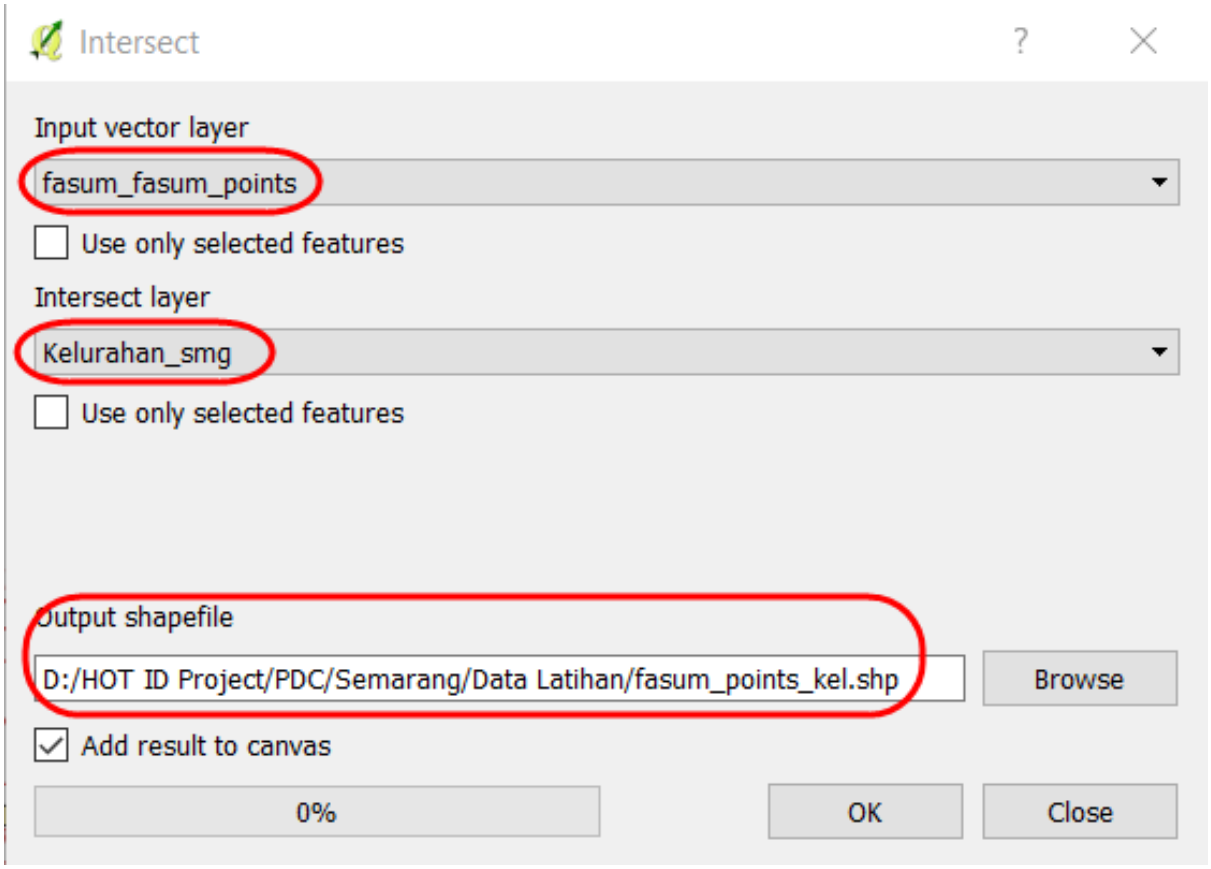
- Add the administrative boundary to QGIS with click on the **Add Vector Layer**



The layer view on the map canvas

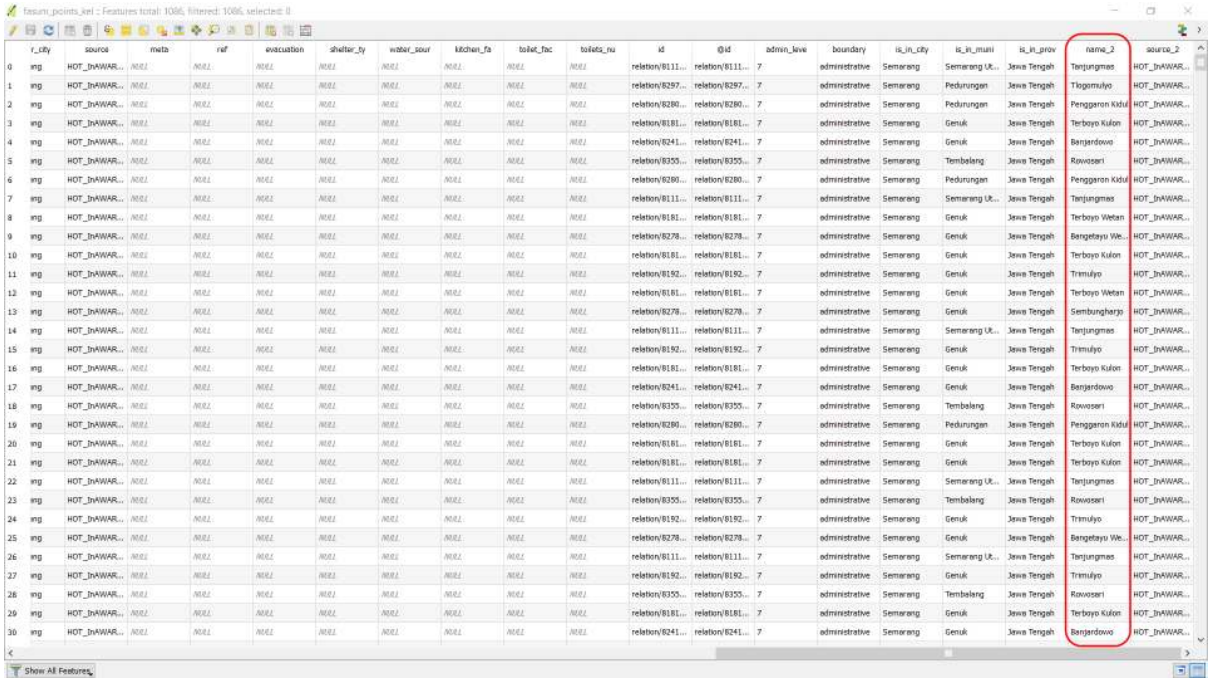
b. Merge the Objects Layer and Administrative Boundary

- Merge the layer between the objects and administrative boundary so that the objects have a new column from the administrative boundary. Click **Menu Vector → Geoprocessing Tool → Intersect** to merge the layer. In section,** input vector layer** selects the object layer with the **Intersect layer** (administrative boundary layer). Choose **Browse** to save the file **output shapefile** in your directory, and click **OK**.



Intersect layer

- The results will appear in your map canvas as a new layer. We can get the details of the attribute data form "**fasum_point_admin**" layer with right-click on the layer and click on **Open Attribute Table**. We found at the column **name_2** the name of a village in each object.



The attribute table of intersecting result

- We will repeat the process on the highways layer and the polygon public facilities layer. The intersecting results will be three-layer on the QGIS.

- Open the attribute table in each layer and check the column that it is a reference to calculate the OSM data. The list of the column in attribute table:

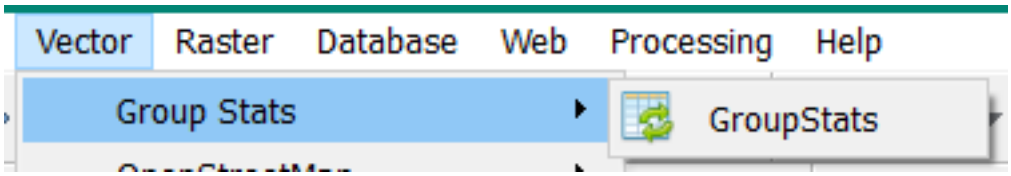
1. Point public facilities = amenity, power, office dan supermarket
2. Polygon public facilities = amenity, power, office, supermarket, dan leisure
3. highways = highway

c. Calculate the Objects using Group Stats Plugin

The mapping results are points, lines, and polygons so that we can calculate with a different formula in Group Stats plugin based on the type of data. OSM data in points and polygons will be calculated with the formula **"count"** that calculating the number of an attribute in the column. Although, OSM data in lines will be calculated with the formula **"sum"**, that calculating the number of length segments.

1. **The Calculating Points and Polygons**

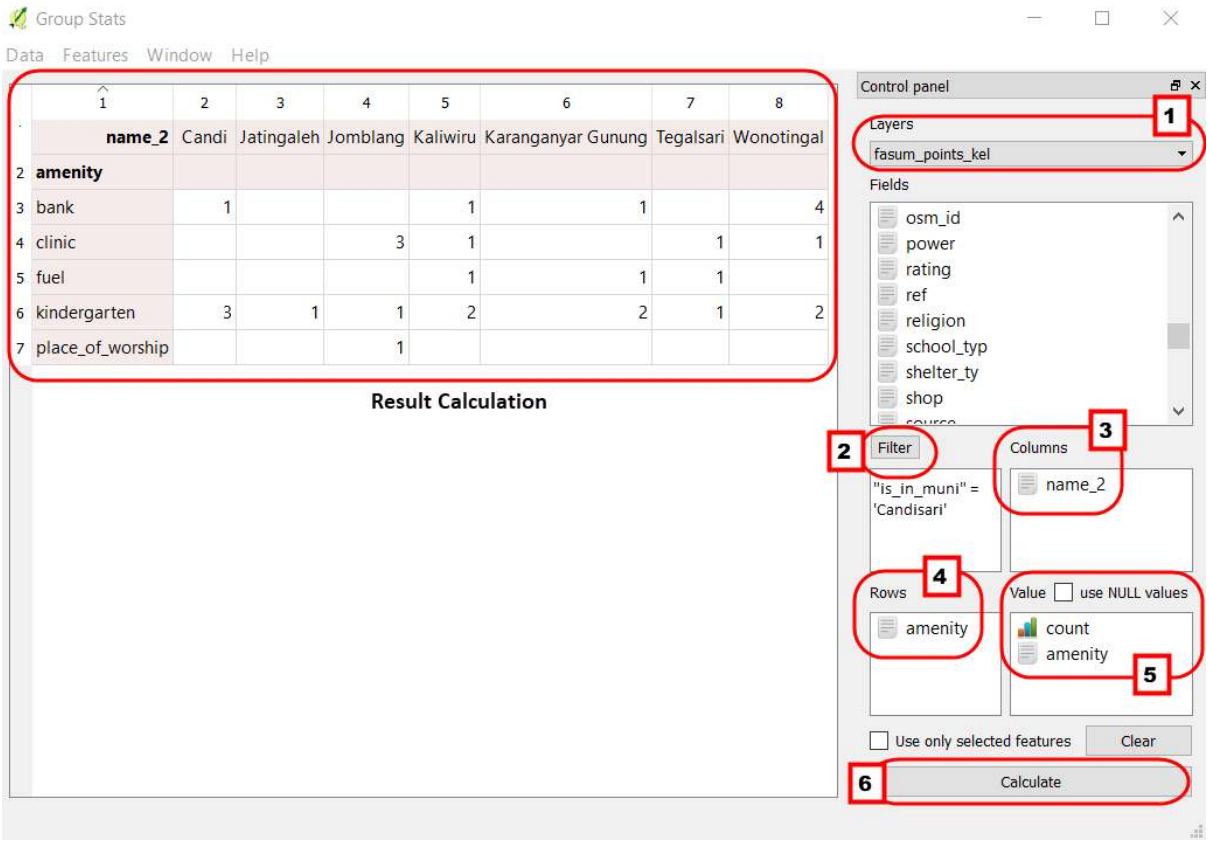
- Open the plugin with **Menu Vector → Group Stats → GroupStats**



Group Stats

- Follow the instructions as below:

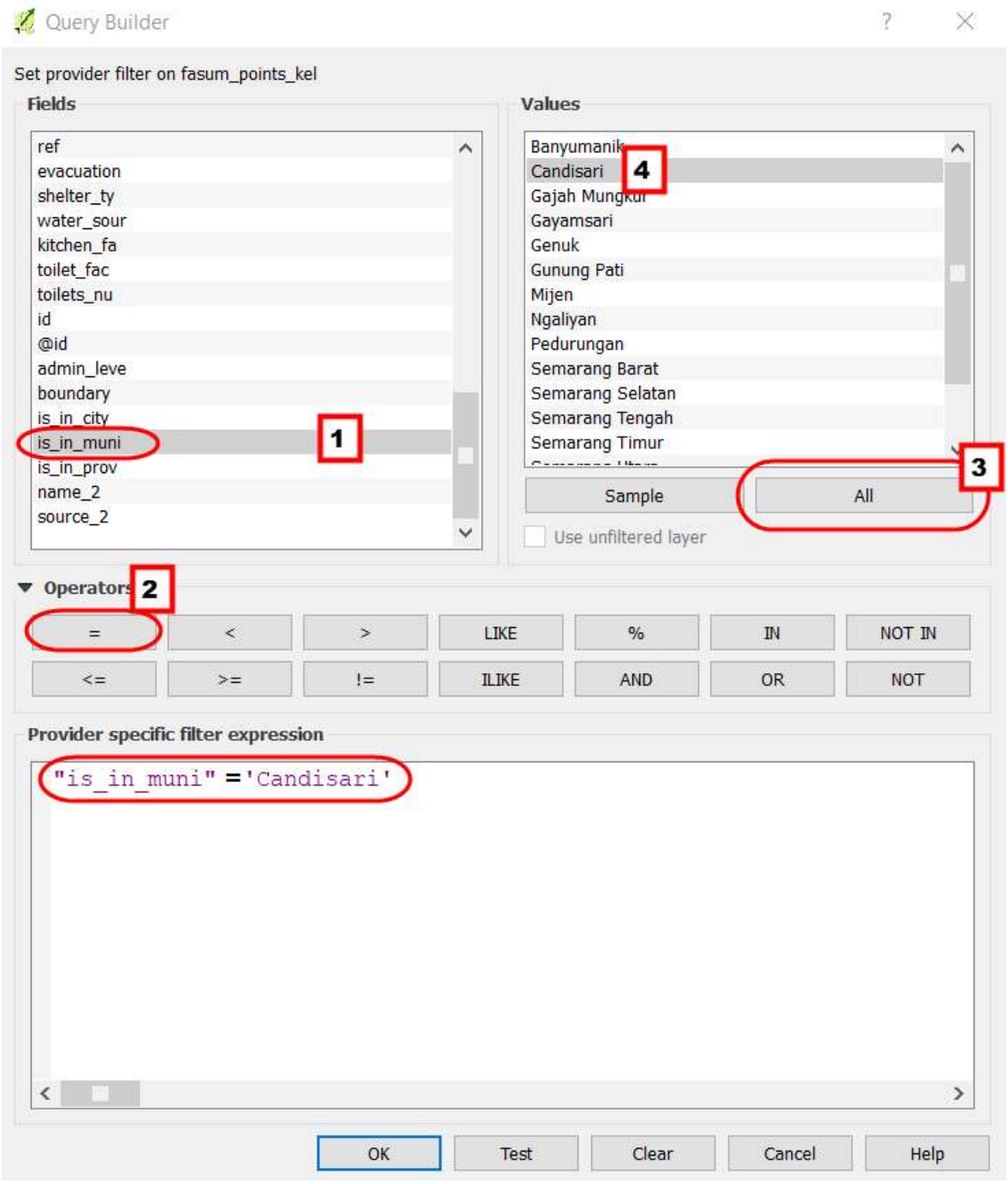
1. **Layers** (1)= show the layer will be calculated. **Fields** = an automatic show the column in attribute table that chooses
2. **Filter** (2) = use to show objects only in specific administrative boundary
3. **Columns** (3) = use to become column on the table, fill the column on the Fields, with a click and move the Columns box.
4. **Rows** (4) = use to become a row in the table, fill the column on the Fields, with a click and move the Row box.
5. **Value** (5)= use to select the formula
6. Click on **Calculate** (6) to starting the calculation



	1	2	3	4	5	6	7	8
	name_2	Candi	Jatingaleh	Jomblang	Kaliwiru	Karanganyar Gunung	Tegalsari	Wonotingal
2	**amenity**							
3	bank	1			1	1		4
4	clinic			3	1		1	1
5	fuel				1	1	1	
6	kindergarten	3	1	1	2	2	1	2
7	place_of_worship			1				

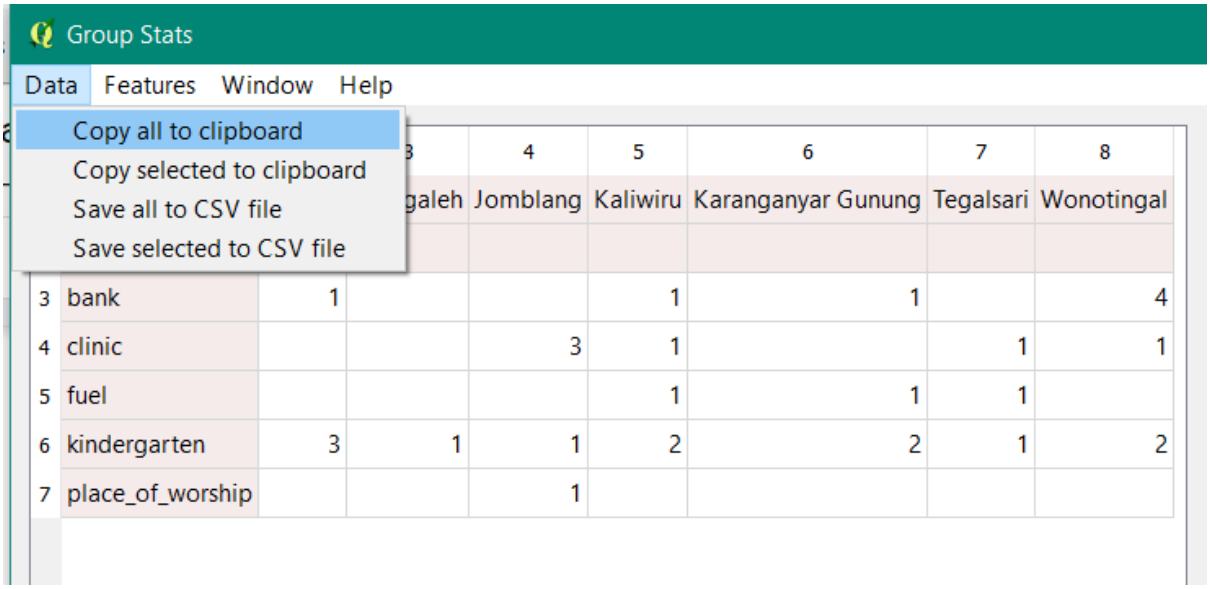
Step by step the Group Stats

- We will use the filter function to select the objects only in specific sub-district. Click on “**fasum_point_admin”**, so that the data only show for once sub-districts. Filter data on the “**fasum_point_admin”** layer, and click the **Filter in Group Stats**. The filter window will appear.



Filter data

- We will move the result table in group stats to other spreadsheet applications such as Ms.Excel or Google Sheets. So we can change the visual data to become a graph and a diagram. To start the process click on **Data → Copy all to clipboard**.



		3		4	5	6	7	8
			galeh	Jomblang	Kaliwiru	Karanganyar Gunung	Tegalsari	Wonotingal
3	bank	1			1	1		4
4	clinic			3	1		1	1
5	fuel				1	1	1	
6	kindergarten	3	1	1	2	2	1	2
7	place_of_worship			1				

Copy and paste the attribute table

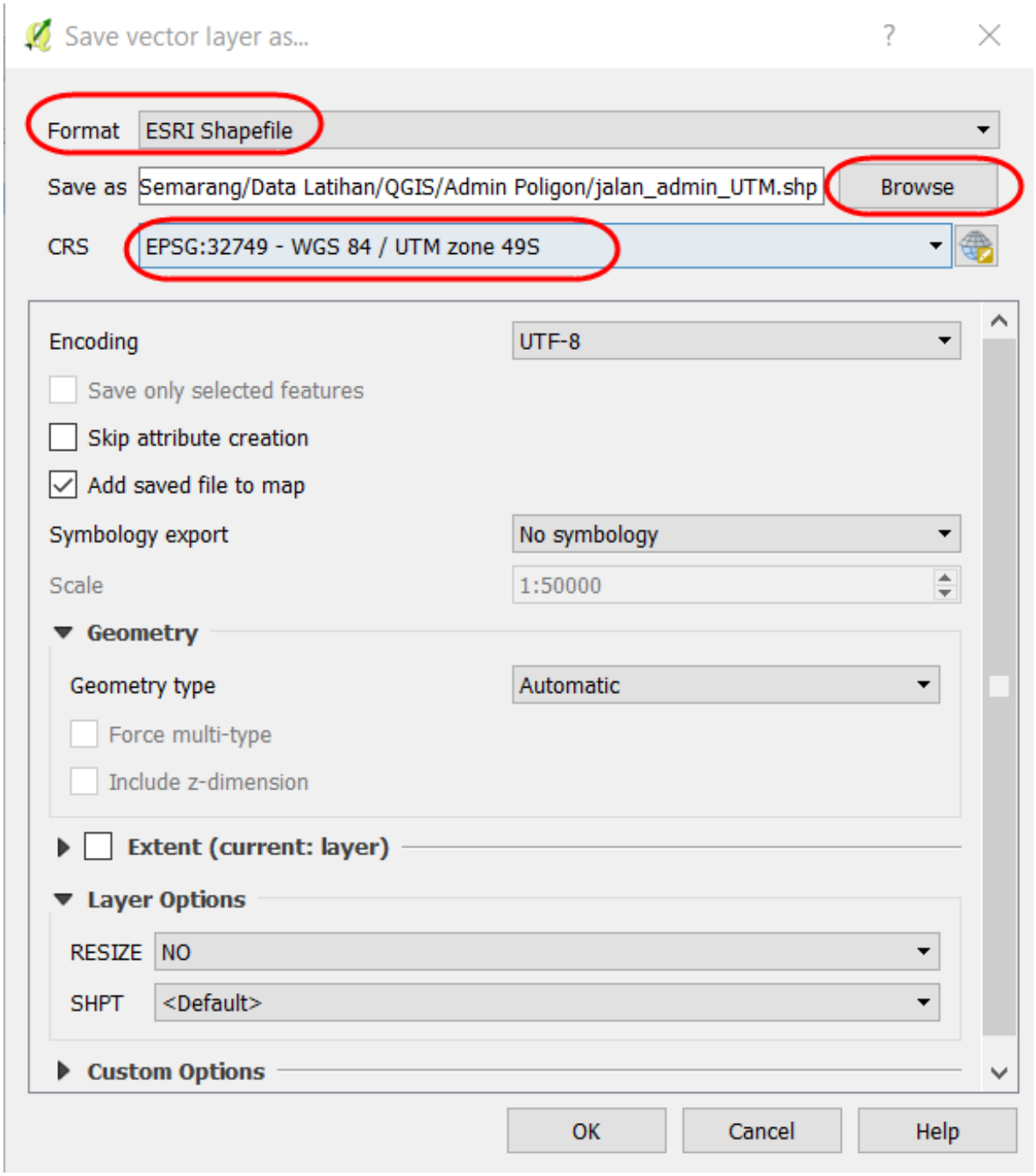
- Open the Microsoft Excel or Google Sheets to move the results table Group Stats.
- We can do the same instructions to calculate the other objects, see the example results from PDC Semarang City in this link http://tinyurl.com/kuantitas-data.

2. Calculate the Lines Object with Calculation Length Segments.

The Calculation a type of lines different with points and polygon. If we calculate the length segments of highways, the shapefile will be changed in Universal Transverse Mercator (UTM) coordinate system. The steps to calculate the length of the highways:

Change the Coordinate System

- Right-click on highways layer → **Save as → choose the Format ESRI Shapefile → Save as in your directory → CRS** choose the reference system on your UTM area.

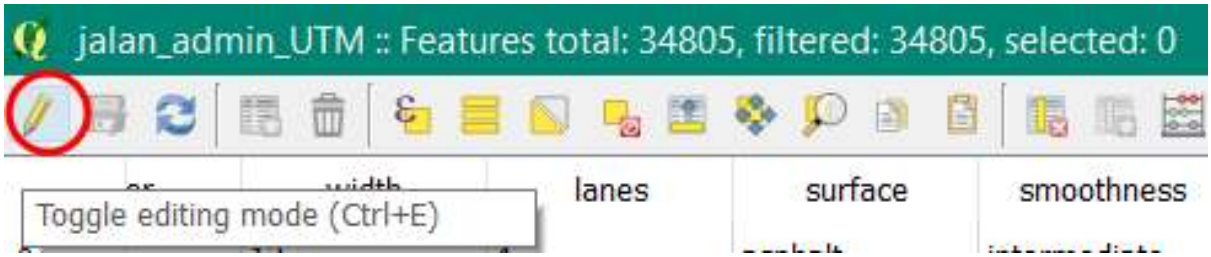


Save as with different CRS

- If you give the checkmark on the **Add saved the file to map**, the result will show up in the map canvas and **Layers Panel**.

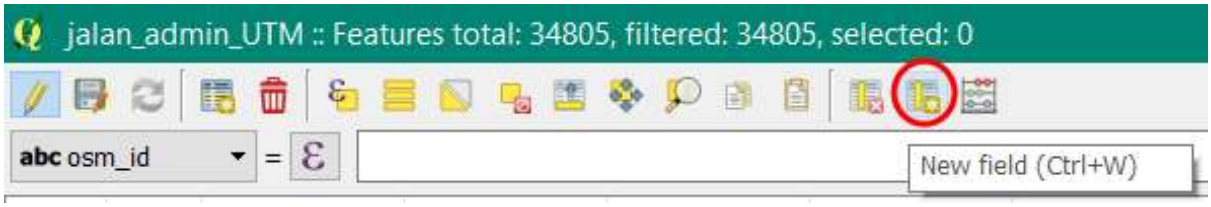
Create the New Column to Calculation Length of the highways

- Then right-click on the Layers **"Jalan_Admin_UTM" → Open Attribute Table**. Click on the **Toggle editing mode** to activate the attribute toolbar.



Toolbar Toggle editing mode

- To add a new column, click on the **New Field** in the toolbar.

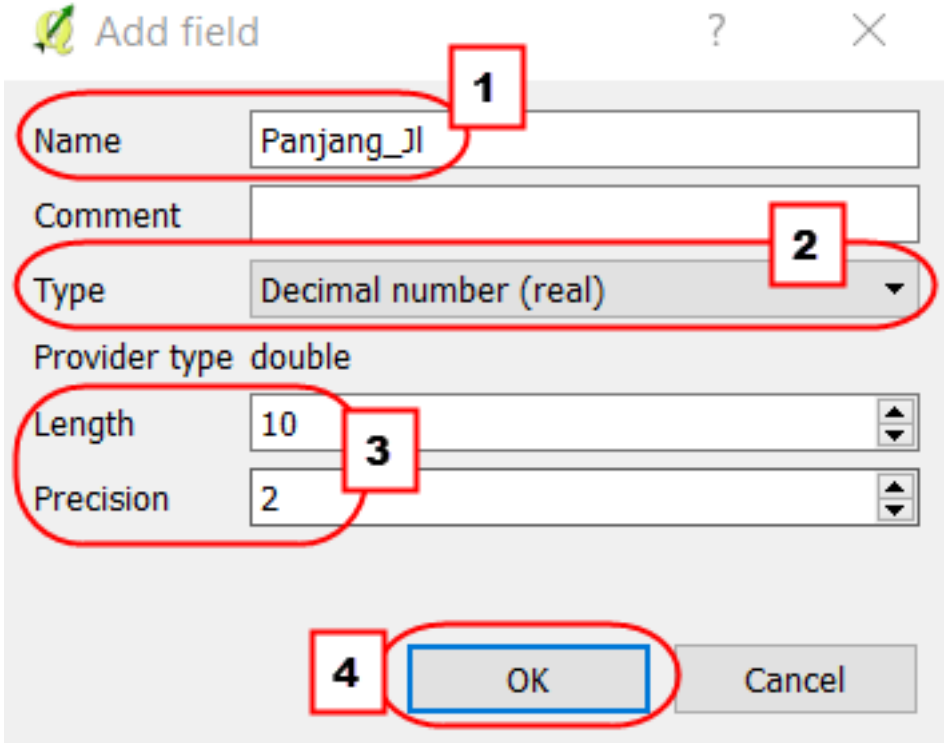


Toolbar New Field

- There are the filled form **Add field window**

1. **Name** = Title of the column (a maximum of 10 characters)
2. **Type** = Type of data that you need in the fill of the table. Select the Decimal number (real) to view the length of the segments

3. **Provider type double** = The length shows the maximum number of columns and precision shows the number of the decimal in behind comma.
4. Click OK

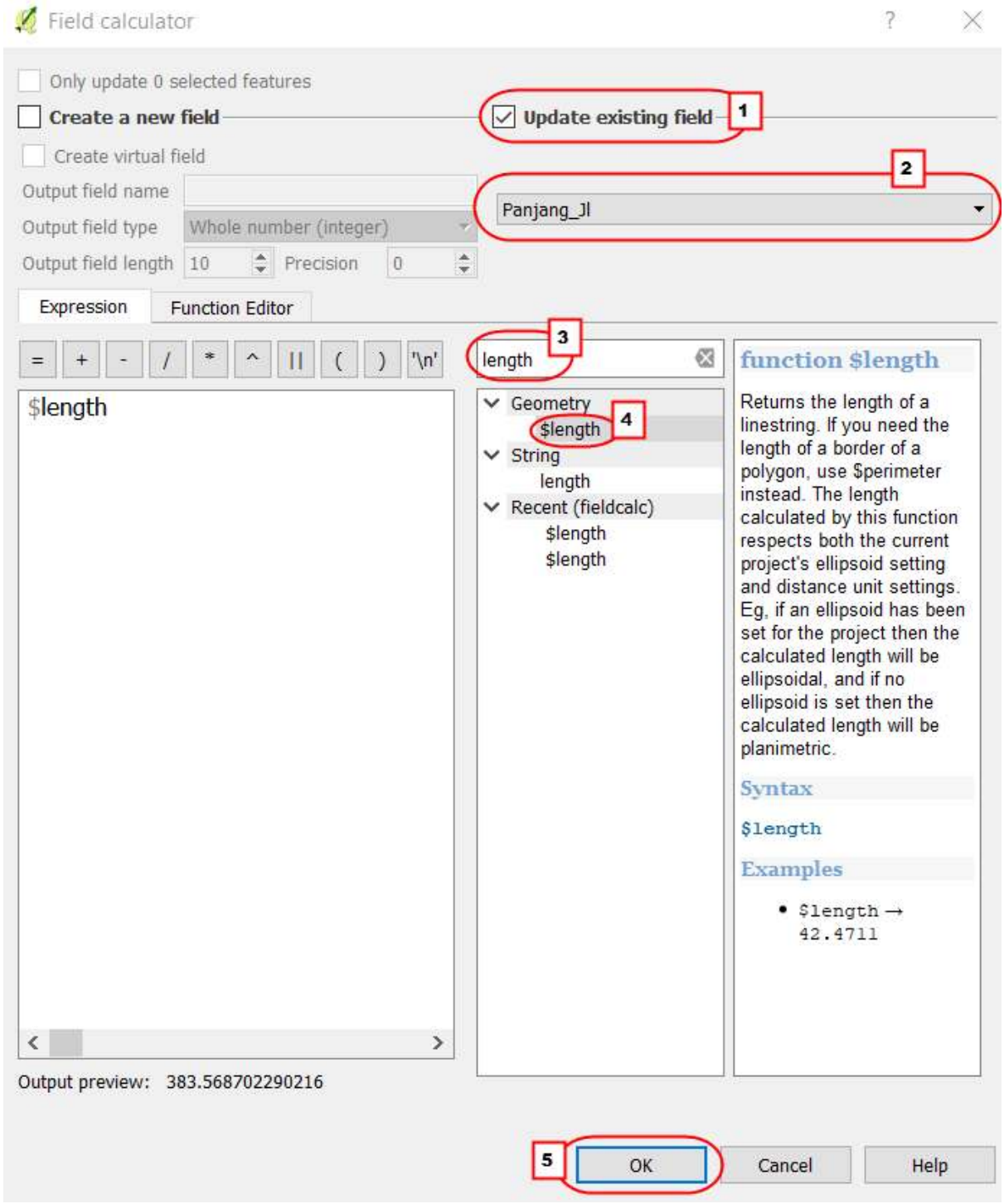


Add field setting

Calculation the Length (meter) with Field Calculator

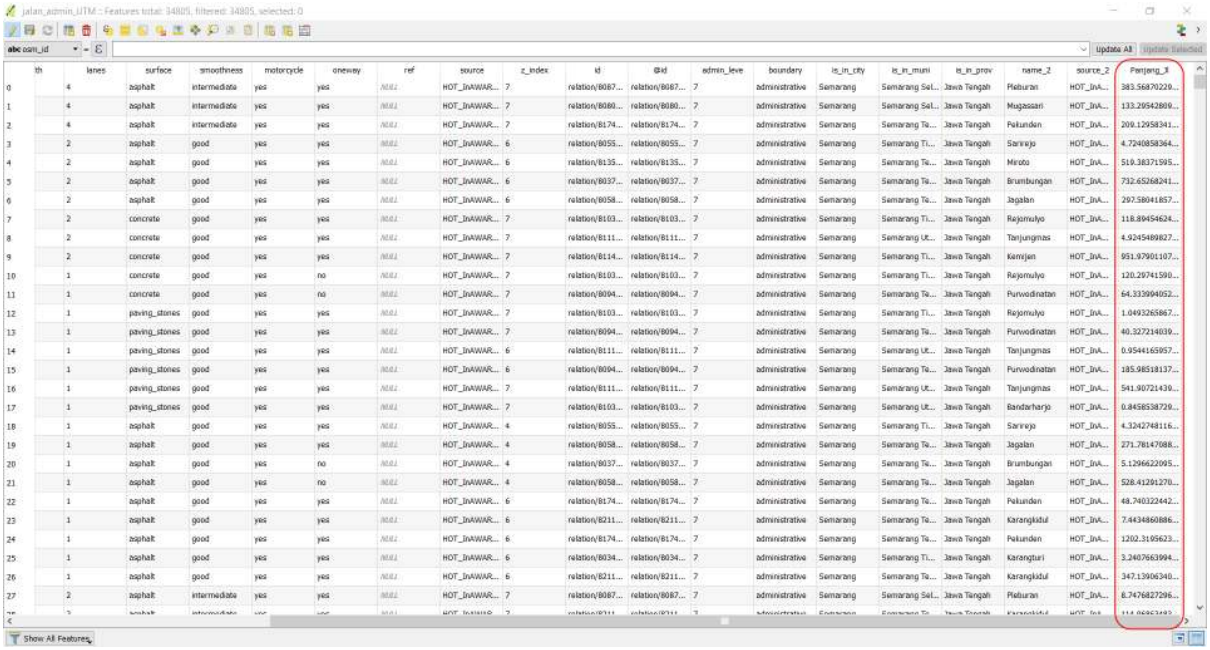
- To start the process click on **Open field calculator**
- The settings in the Open field calculator:

1. We can put the checkmark in **Update existing field** to update the existing column.
2. Choose the column that will be updated
3. We can type the **"length"** to calculate the length of the highway with the formula.
4. Double-click on **Geometry → $ length** is a formula to calculate the length of segments. After we clicked the formula, **$length** will appear in the Expression box in the right panel.
5. Click OK



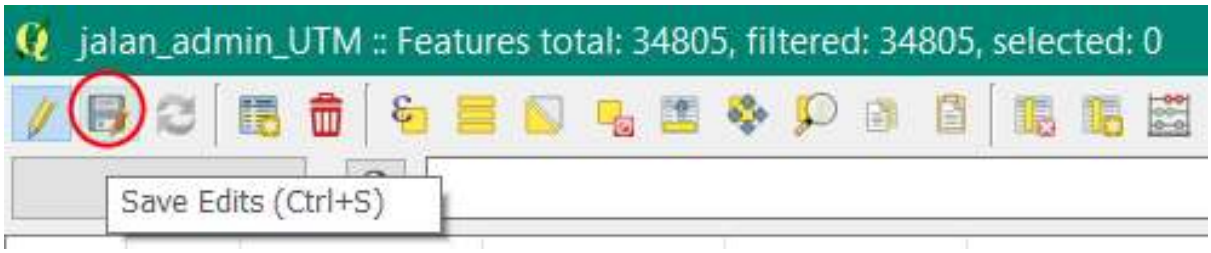
The setting of Field Calculator

- The results will be displayed in the last column.



The length of highways

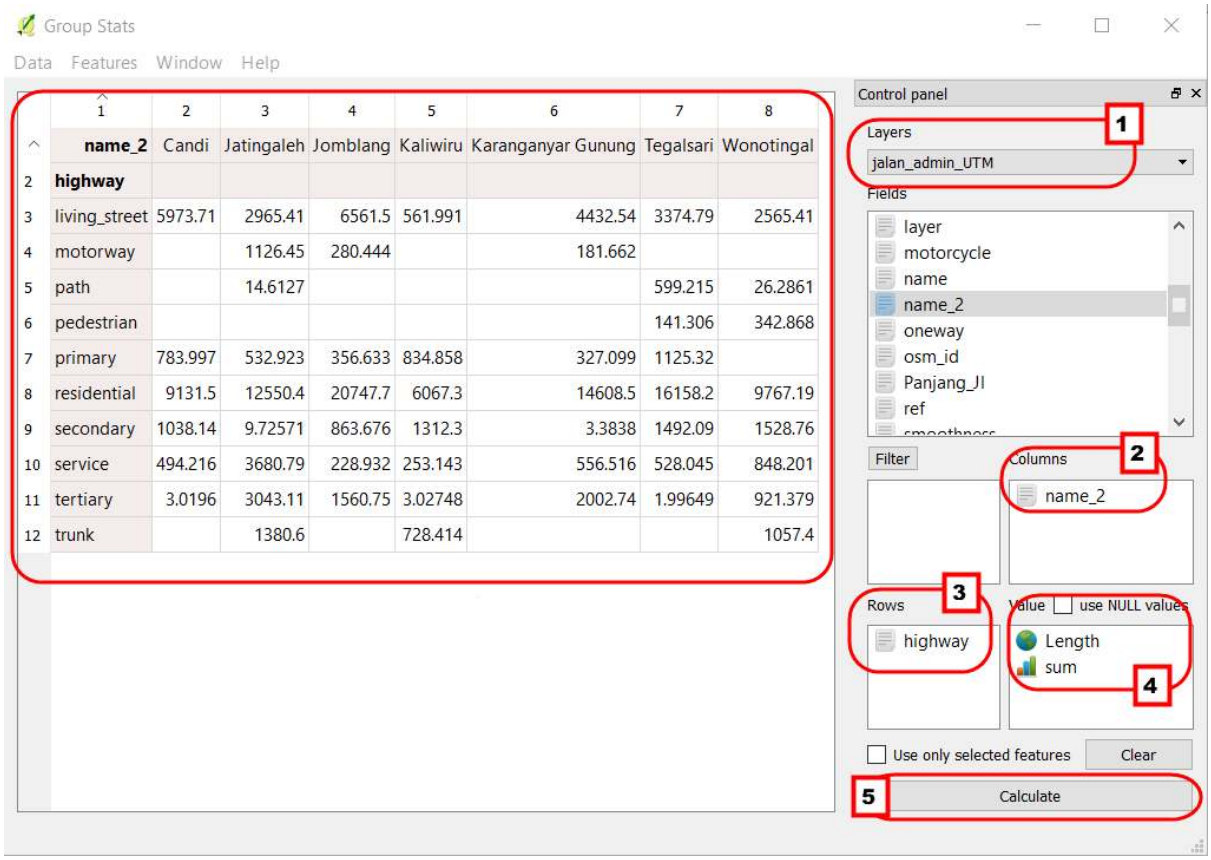
- Save your edit with **Save Edits** in the toolbar. To finish the process click **Toggle Editing**.



Save edits

Calculation the length of highways based on the type of highways with Group Stats

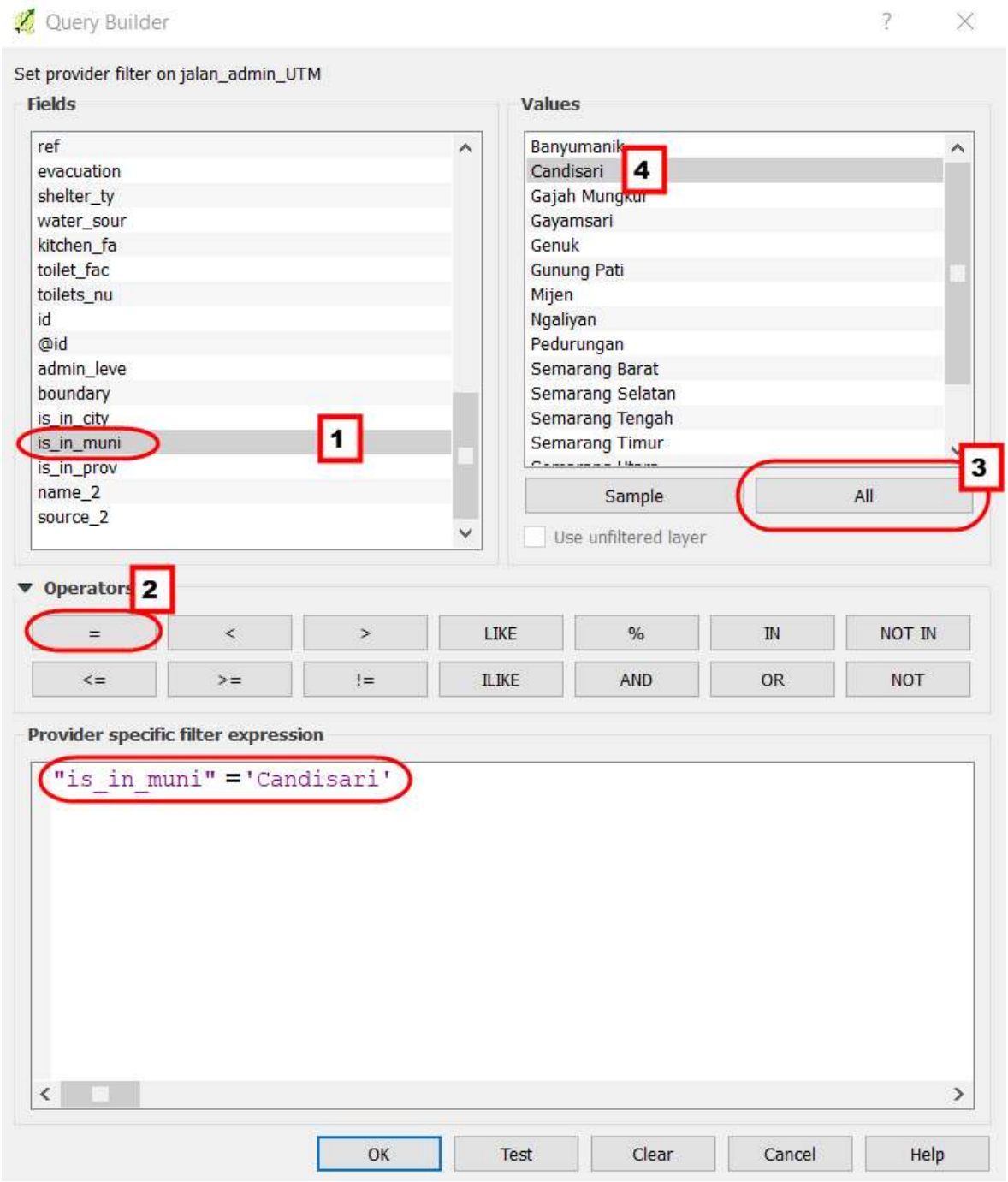
- Open **Group Stats** click on the **Menu Vector → Group Stats → Group Stats**.
- We can use the **"sum" and Length** formula to calculate the number of length on the **Value box**



	1	2	3	4	5	6	7	8
	name_2	Candi	Jatingaleh	Jomblang	Kaliwiru	Karanganyar Gunung	Tegalsari	Wonotingal
2	highway							
3	living_street	5973.71	2965.41	6561.5	561.991	4432.54	3374.79	2565.41
4	motorway		1126.45	280.444		181.662		
5	path		14.6127				599.215	26.2861
6	pedestrian						141.306	342.868
7	primary	783.997	532.923	356.633	834.858	327.099	1125.32	
8	residential	9131.5	12550.4	20747.7	6067.3	14608.5	16158.2	9767.19
9	secondary	1038.14	9.72571	863.676	1312.3	3.3838	1492.09	1528.76
10	service	494.216	3680.79	228.932	253.143	556.516	528.045	848.201
11	tertiary	3.0196	3043.11	1560.75	3.02748	2002.74	1.99649	921.379
12	trunk		1380.6		728.414			1057.4

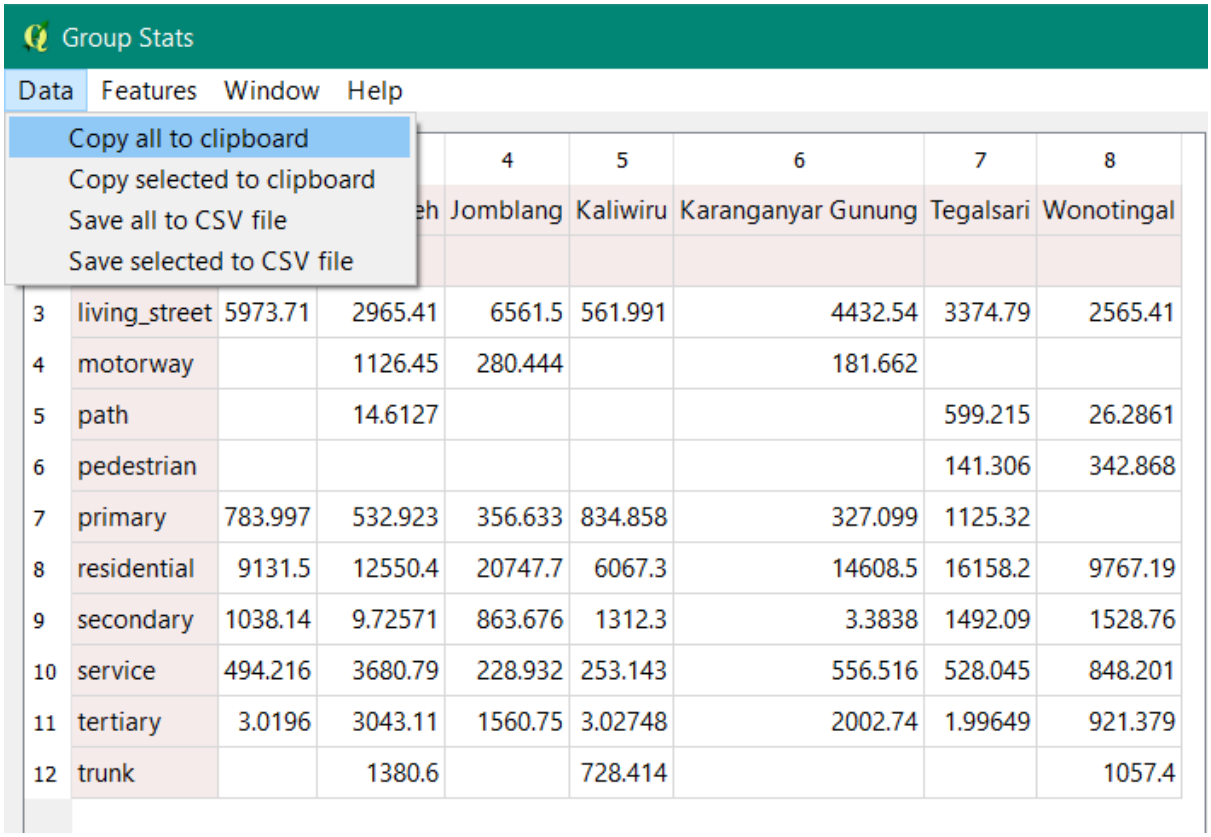
The setting of length segments

- If we want to calculate based on the administrative boundary, we can use the filter function in the Group Stats plugin. Click on Filter and follow the instructions.



Filter based on subdistricts

- As explained before, we can move the table to another spreadsheet to create a graph. Click on the **Data → Copy all to clipboard**.



				4	5	6	7	8
				eh Jomblang	Kaliwiru	Karanganyar Gunung	Tegalsari	Wonotingal
3	living_street	5973.71	2965.41	6561.5	561.991	4432.54	3374.79	2565.41
4	motorway		1126.45	280.444		181.662		
5	path		14.6127				599.215	26.2861
6	pedestrian						141.306	342.868
7	primary	783.997	532.923	356.633	834.858	327.099	1125.32	
8	residential	9131.5	12550.4	20747.7	6067.3	14608.5	16158.2	9767.19
9	secondary	1038.14	9.72571	863.676	1312.3	3.3838	1492.09	1528.76
10	service	494.216	3680.79	228.932	253.143	556.516	528.045	848.201
11	tertiary	3.0196	3043.11	1560.75	3.02748	2002.74	1.99649	921.379
12	trunk		1380.6		728.414			1057.4

Copy all the clipboard

- Open the spreadsheet and paste the table in there.

The example table of length the highways

Type of highway	Candi	Jatingaleh	Jomblang	Kaliwiru	Karang Gunung	Tegalsari	Wonotinggal
Motorway	-	1313.88	163.85	-	-	-	-
Trunk	-	1571.20	-	1602.19	-	-	-
Primary	-	1389.34	1264.54	-	206.96	-	-
Secondary	1065.13	-	24.17	2353.86	-	-	-
Tertiary	271.49	3920.71	1612.78	-	836.18	-	-
Service	500.24	2567.00	226.11	116.68	150.03	301.93	851.94
Residential	8486.45	14300.66	20972.41	5424.36	13322.03	15234.38	11635.03
Pedestrian	-	1313.88	163.85	-	-	141.93	344.38
Path	-	14.68	-	-	-	601.85	26.40
Living Street	5913.74	2841.22	6588.17	451.66	4401.59	3509.38	2576.71

- We can do the same instructions to calculate the other objects in lines, see the example results from PDC Semarang City in this link http://tinyurl.com/kuantitas-data.

SUMMARY

We have learned about how to calculate the quantities of OSM data using the Group Stats plugin. We can use the statistic data in the report to analysis, mapping progress, and mapping achievement. If you want to create the timeline from the results based on an admin level, we can calculate the data in each village that the village survey has finished.

— title: Creating the Administrative Boundaries in JOSM weight: 9 —

Objectives:

- To be able to explain the definition and example of relation in OpenStreetMap
- To be able to explain administrative boundary concept in OpenStreetMap
- To be able to explain term and condition to create an administrative boundary in OpenStreetMap
- To be able to create the administrative boundaries in OpenStreetMap

The mapping of administrative boundaries in OpenStreetMap was suggested to an advanced mapper or experienced user with regularly mapping in OpenStreetMap. You can obtain the administrative boundary by government which have authorized with the boundary. In the PDC InAWARE project, we are associated with village offices and university in the cities. Therefore, we can obtain the administrative boundaries data from village offices, they drawing the boundaries in the paper maps.

The data source very important in administrative boundaries, you can not decide the boundary by yourself. If the data source is unclear and does not have an Open Data Commons Open Database License (ODbL), the data is not allowed to be uploaded into OSM. This can cause problems when other users download and use administrative boundary data freely for their benefit.

I. Relation in OSM

A relation is a group of elements. To be more exact it is one of the core data elements that consists of one or more tags and also an ordered list of one or more nodes, ways and/or relations as members which is used to define logical or geographic relationships between other elements. A member of a relation can optionally have a role that describes the part that a particular feature plays within a relation. The types of relation the administrative boundary :

a. Relation Tags

Relation tags to the administrative boundary in Indonesia

Key	Value	Definition
admin_level	(1-11) Adjusted according to administrative boundaries	The admin_level key describes the administrative level of an object within a government hierarchy. A lower level means higher in the hierarchy. Besides others, this tag is used for the borders of territorial political entities (e.g. country, state, municipality) together with boundary=administrative. Due to cultural and political differences, admin levels of different countries only correspond approximately to each other.
boundary	administrative	An administrative boundary. Subdivisions of areas/territories/jurisdictions recognized by governments or other organizations for administrative purposes.
type	boundary	This tag to identify the object in administrative boundary

Key	Value	Definition
name	Name of administrative level	This tag to identify the name in administrative boundary, example: RW 03, Candisari Village
place	Example suburb, island	This optional tag, used to indicate that a particular location is known by a particular name, to indicate what sort of “place” it is. A place tag should exist for every significant human settlement (city, town, suburb, etc.) and also for notable unpopulated, named places. http://wiki.openstreetmap.org/wiki/Key:place
land_area	administrative	Tags to identify a land area boundary
is_in:province	Name of province	Tags to identify the name of the province. This tag must be included in lower-level administrative from (City/Town, Municipality, Village, Community group, Neighborhood Unit)
(City) is_in:city, **(Town)** is_in:town	Name of City/Town	Tags to identify the name of the city/town. This tag must be included in lower-level administrative from City/Town (Municipality, Village, Community group, Neighborhood Unit)
is_in:municipality	Name of Municipality	Tags to identify the name of the municipality. This tag must be included in lower-level administrative from Municipality (Village, Community group, Neighborhood Unit)
is_in:village	Name of Village	Tags to identify the name of the village. This tag must be included in administrative from Village (Community group, Neighborhood Unit)
is_in:RW	Name of Community group	Tags to identify the name of the community group. This tag must be included in lower-level administrative from Community group (Neighborhood Unit)

b. Relation Members

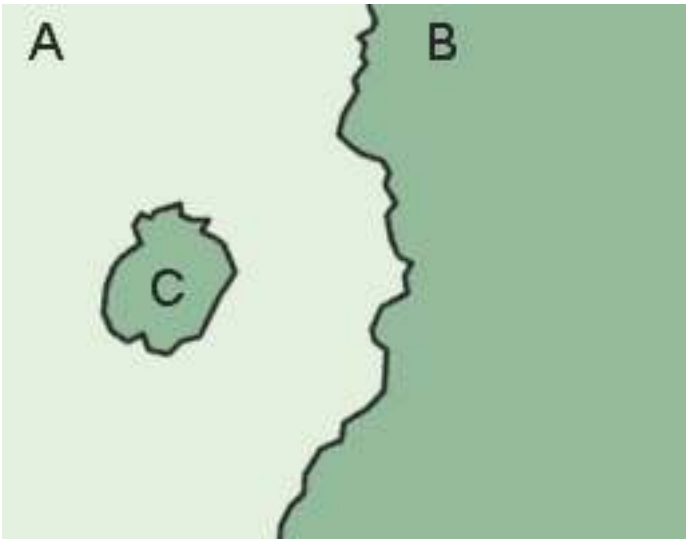
- Admin_centre

The point that represents the centre of administration in one area (a capital, county seat, etc.), usually a town, city or village (depending on the boundary level, see place=*).

- Outer

  The multiple ways that form the closed border
- Inner

  Enclaves of this border - the multiple ways that form the closed inner borders



Area C is inside Area A and Area C is identified as an inner of the relation members (https://wiki.openstreetmap.org/wiki/Ma

Area C is inside Area A and Area C is identified as an inner of the relation members (https://wiki.openstreetmap.org/wiki/Ma

II. Understanding Administrative Boundary in OSM

a. Definition of Administrative Boundary

An administrative boundary. Subdivisions of areas/territories/jurisdictions recognized by governments or other organizations for administrative purposes. These range from large groups of nation-states right down to small administrative districts and suburbs, as indicated by the 'admin_level=*' combo tag.

Boundary Administrative in Petamburan (openstreetmap.org)

b. Admin_level values for specific countries

Admin_level=1 to 10 has been introduced in order that different borders can be rendered consistently among countries (doing this based on border_type would require knowledge of their hierarchy in each country). The lists of admin-level boundary for specific countries: http://wiki.openstreetmap.org/wiki/Tag:

boundary%3Dadministrative or https://tinyurl.com/wiki-batasadm

c. Admin_level values for Indonesia

The division of administrative boundaries in Indonesia is adjusted to the division of regions and divisions in Indonesia which are managed by regional governments based on the principles of autonomy, deconcentration, decentralization and co-administration tasks. The types of administrative boundaries that exist in Indonesia are Provinces, City/Town, Municipality, Village, Hamlet (only rural area), Community group, Neighborhood Unit.

When the types of administrative boundaries in Indonesia are seen in OpenStreetMap, administrative boundaries have different values according to the level of administration. The levels of administration in Indonesia is as follows:

value	Admin Level	Example Rendering	Place
1	-	-	-
2	Country		-
3	-	-	-
4	Province		Province
5	City/Town		Big City=City, Small City=Town
6	Municipality		Municipality
7	Village		Village
8	Hamlet		Hamlet
9	Community Group		Community Group
10	Neighborhood Unit		Neighborhood Unit

III. Terms and Condition When Create Administrative Boundary in OSM

a. Term and Condition to Mapper

As mentioned above, administrative boundaries are a sensitive topic to map. In order to avoid issues in the future, there are specific requirements when it comes to mapping administrative boundaries on OpenStreetMap, they are:

- The mapper has learned the concept relation data in OSM especially for the relation of administrative boundary
- The mapper has learned about how to create the administrative boundary and concern the data source
- The mapper can explain the admin level of the administrative boundary in Indonesia

b. Term and Condition to Data Source

Term and condition to the data source of the administrative boundary in OSM:

- Data must come from a reliable source, for example the Geospatial Information Agency (BIG)

- Data used must have a permission to use license, to ensure it is legal to be used for public use.
- Data must have clear administration boundaries, as legally acknowledged and approved by the concerned authorities.

IV. Adding the Administrative Boundary in OSM

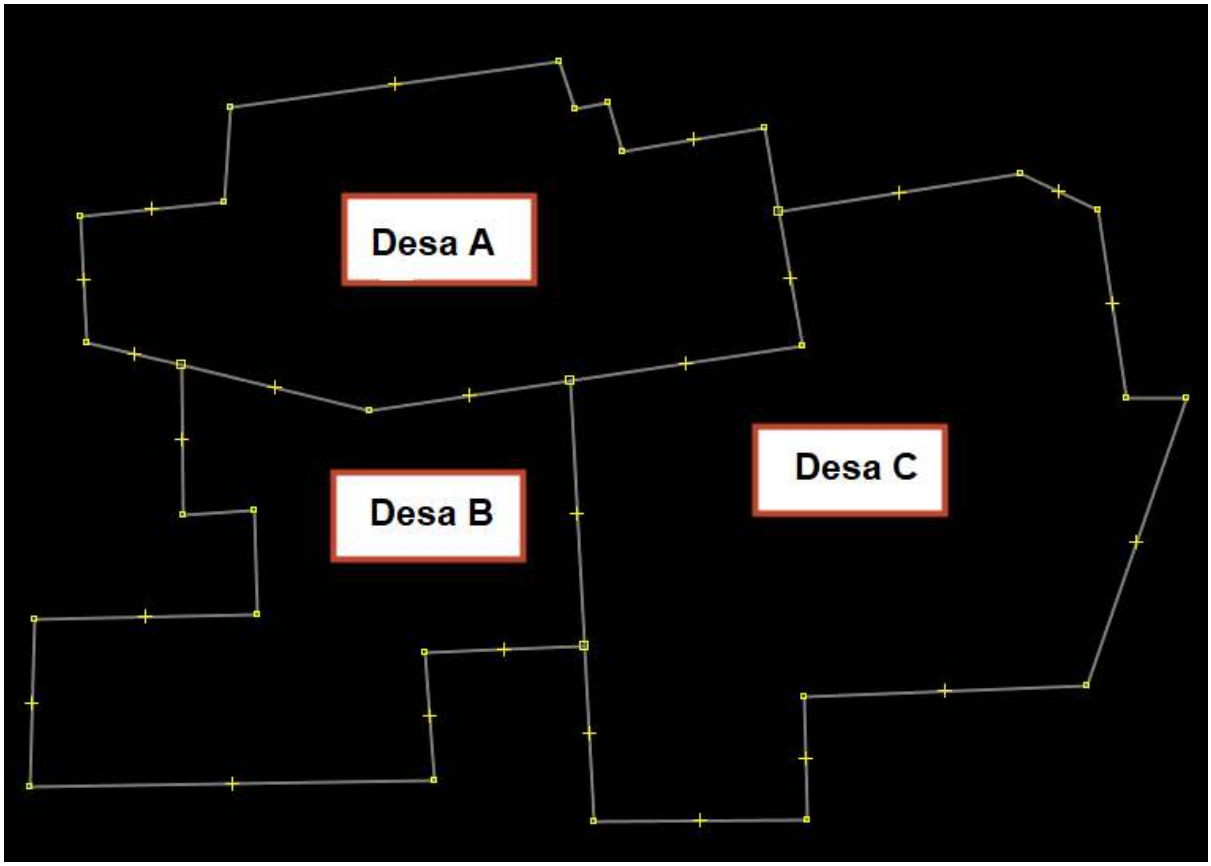
In making administrative borders, it is highly encouraged to use editor Java OpenStreetMap (JOSM) due to the complete tools available to edit and modify are much easier to use than other editors such as iD editor.

> **Note :** Data used in this tutorial are fictitious data to easily help understand and practice creating administrative borders.

Here are the steps in creating administrative boundaries on OpenStreetMap:

a. Drawing the Lines of Administrative Boundary * Open JOSM editor. * Then, select that you will make administrative boundaries in, by downloading the OSM data of the specified area. * If the OSM data has mapped such as buildings and roads, you can use the filter data in JOSM in referring to chapter **Using Filter in JOSM**. The tool filter helps to hide the building and road in OSM data. * Starting to digitize with **Draw Node**

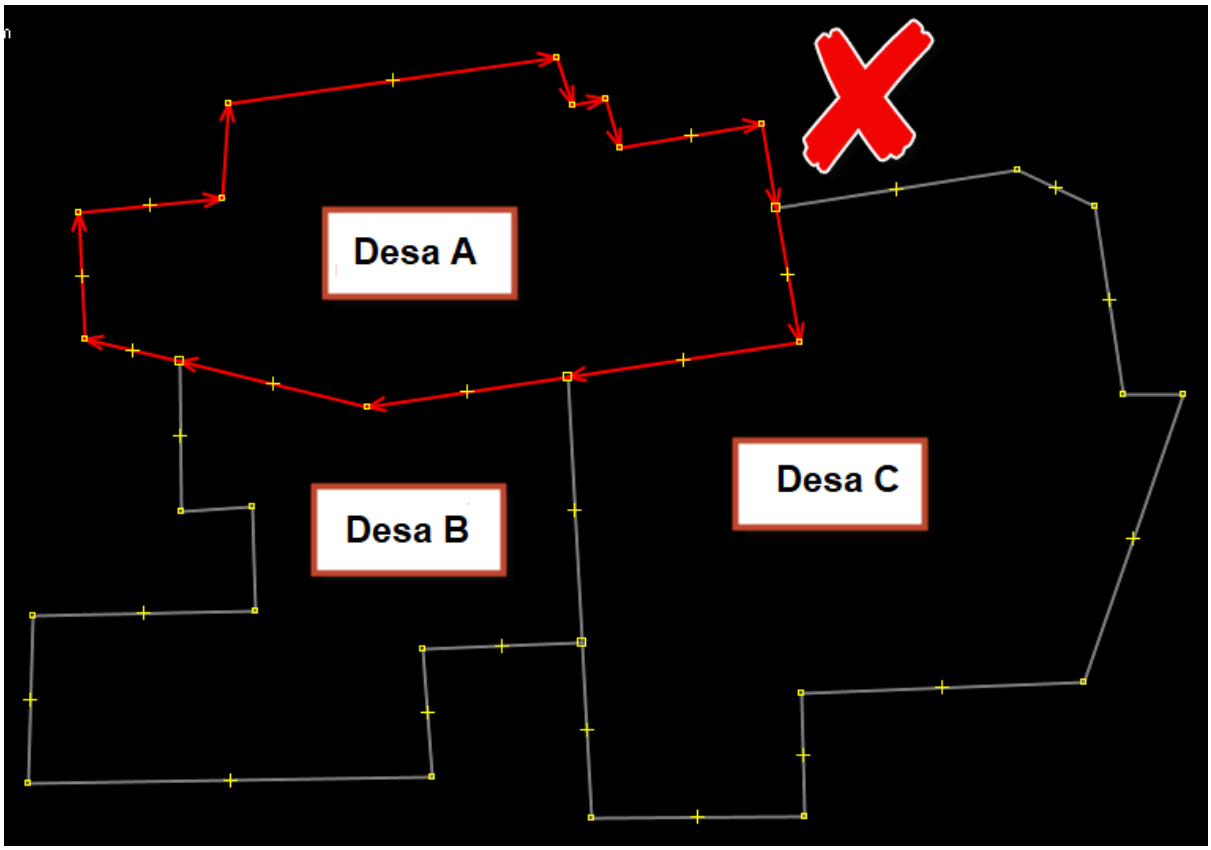
- The image below is an example of digitizing administrative boundaries. We will create three villages that connected in the administrative boundary, there are Desa A (Village A), Desa B (Village B), and Desa C (Village C).



Divide the area

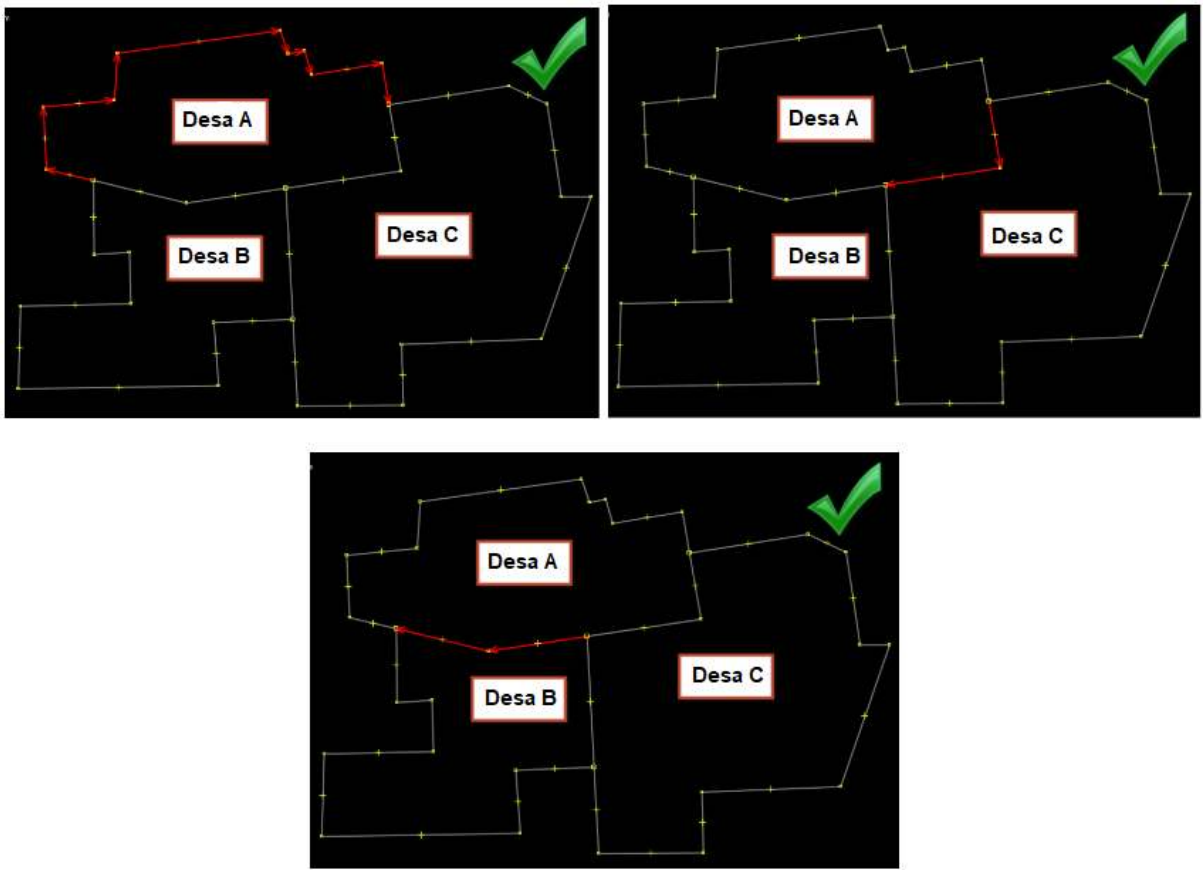
- When drawing administrative boundaries, please consider the following:
  - Drawing lines connects with other lines in administrative boundary

– Ensure that do not overlap lines in administrative boundary and drawn twice
– Ensure that every interconnected line is drawn its own separate line (in a different segment). If the lines look something like this:



The mistake of creating the relation

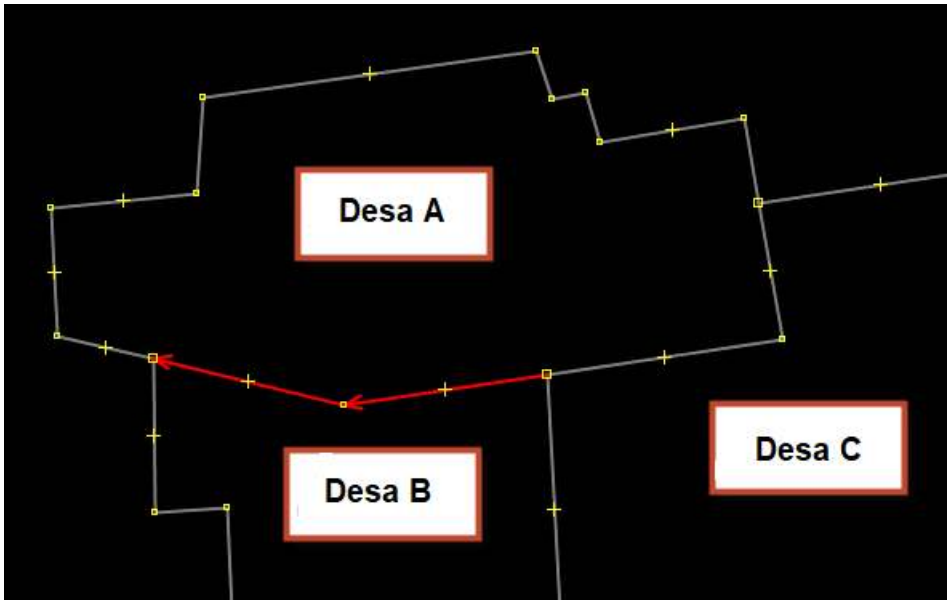
You can separate the lines use **Tools → Split Way** or use the shortcut **(P)** in your keyboard with choosing two-node between lines that separated like this:



The split way in lines administrative

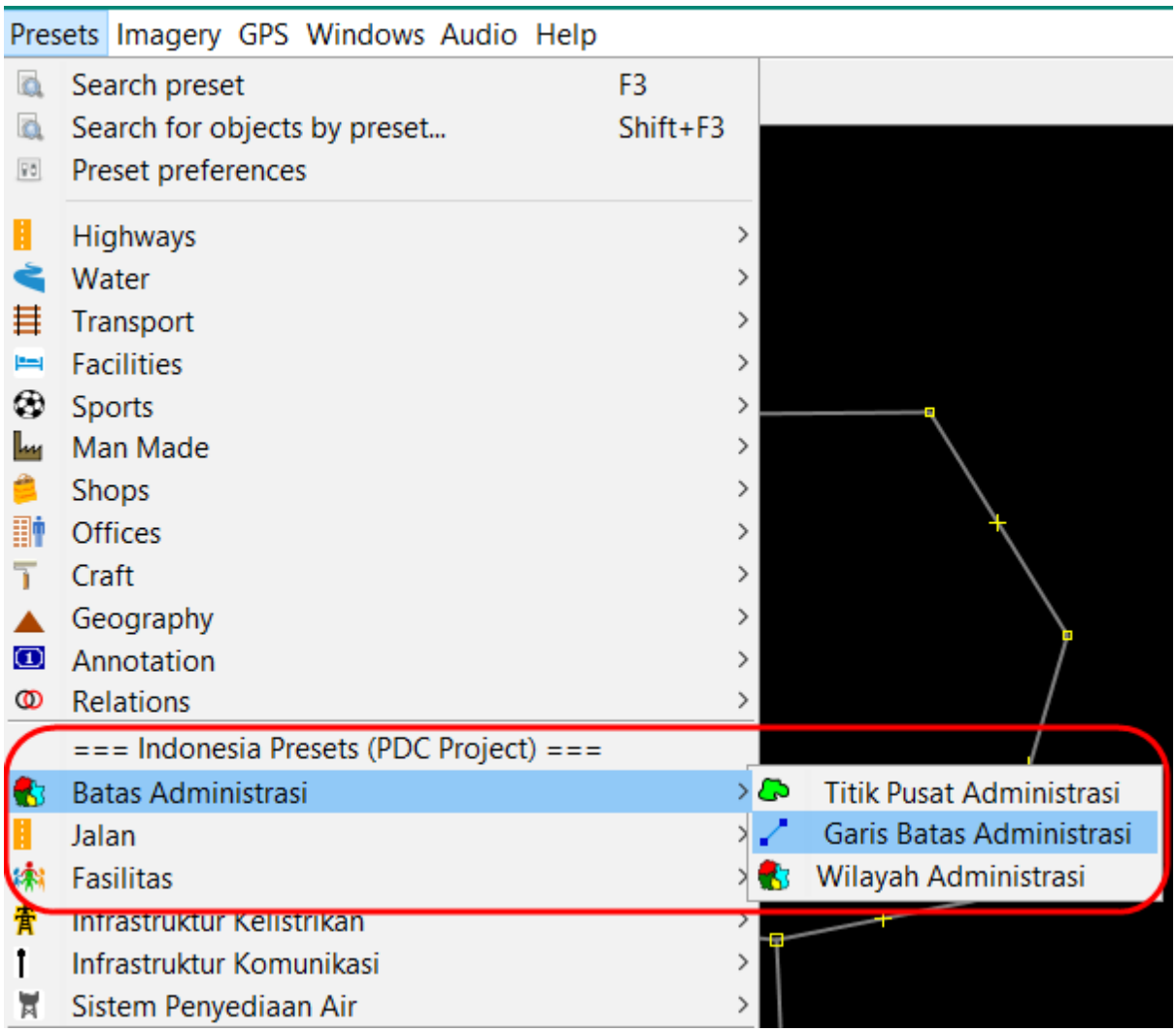
b. Assigning Tags on Administrative Boundary Lines

- The next step is to assign a tag on each boundary line made Select one line in a segment from the administrative boundary.



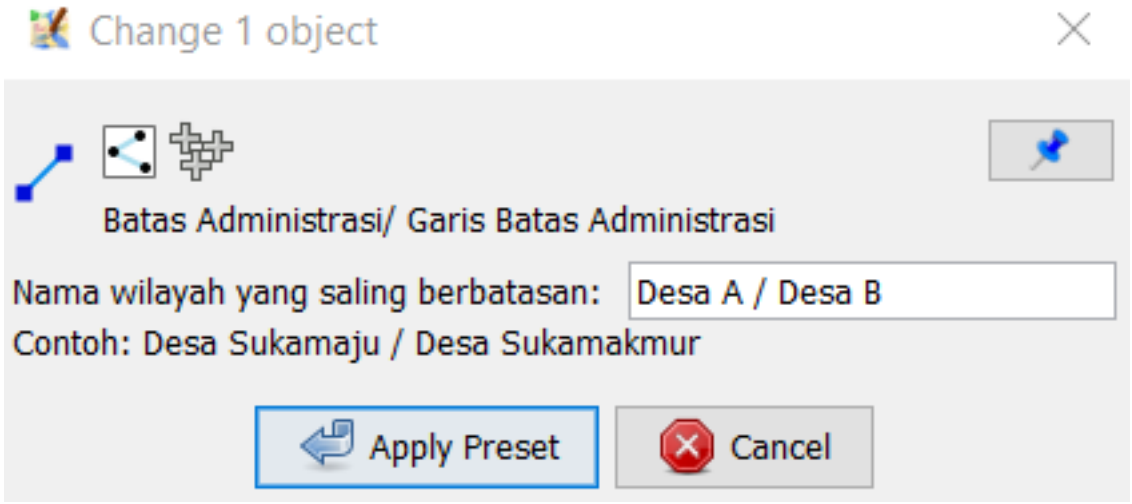
Choose line in administrative boundary

- Then, we will tag the lines with administrative boundary presets with click on **Presets Menu → Batas Administrasi → Garis Batas Administrasi**. If these presets not showing in your Menu Presets, please refer to the chapter **Using JOSM** for adding the “PDC InAWARE Indonesia preset”. It is only in Bahasa.



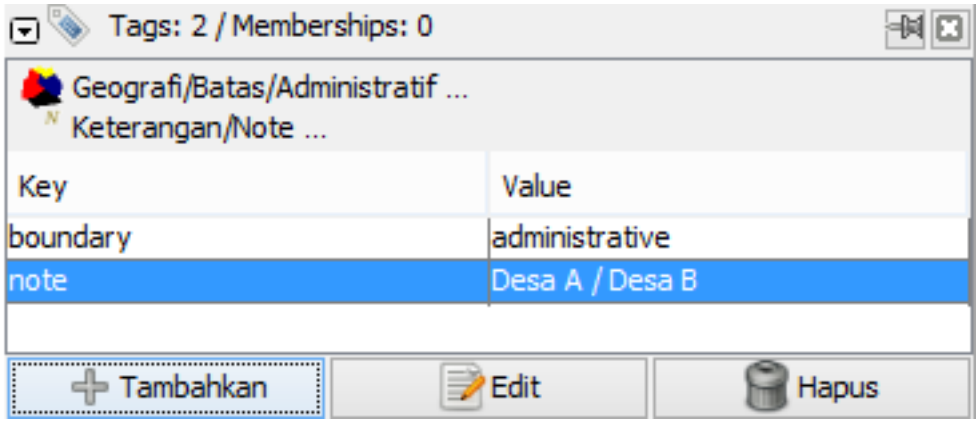
Menu Presets

- It will appear the dialog window that you can fill the name according to the name village between boundaries, such as Desa A / Desa B. This tag is intended to explain the line segments as administrative boundaries for Village A (Desa A) and Village B (Desa B). Then click on **Apply preset** to save the result.



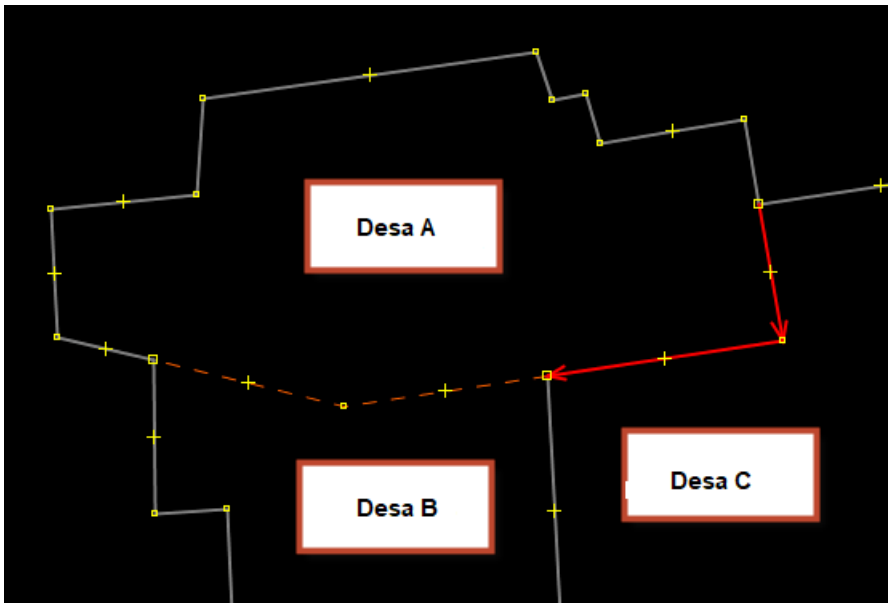
The presets form Administrative Line

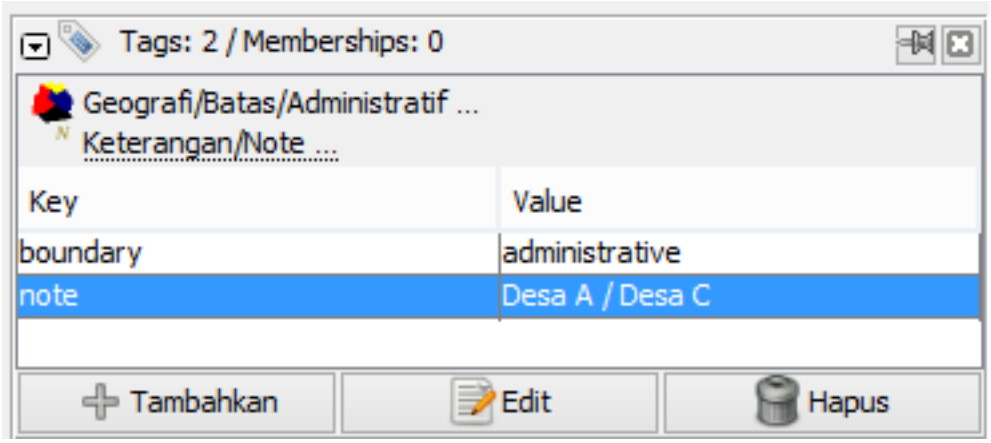
- You can see the properties of the tag in line with select the lines using **select tool** and see the information on the right side, like the image below:



Tagging in administrative line boundary

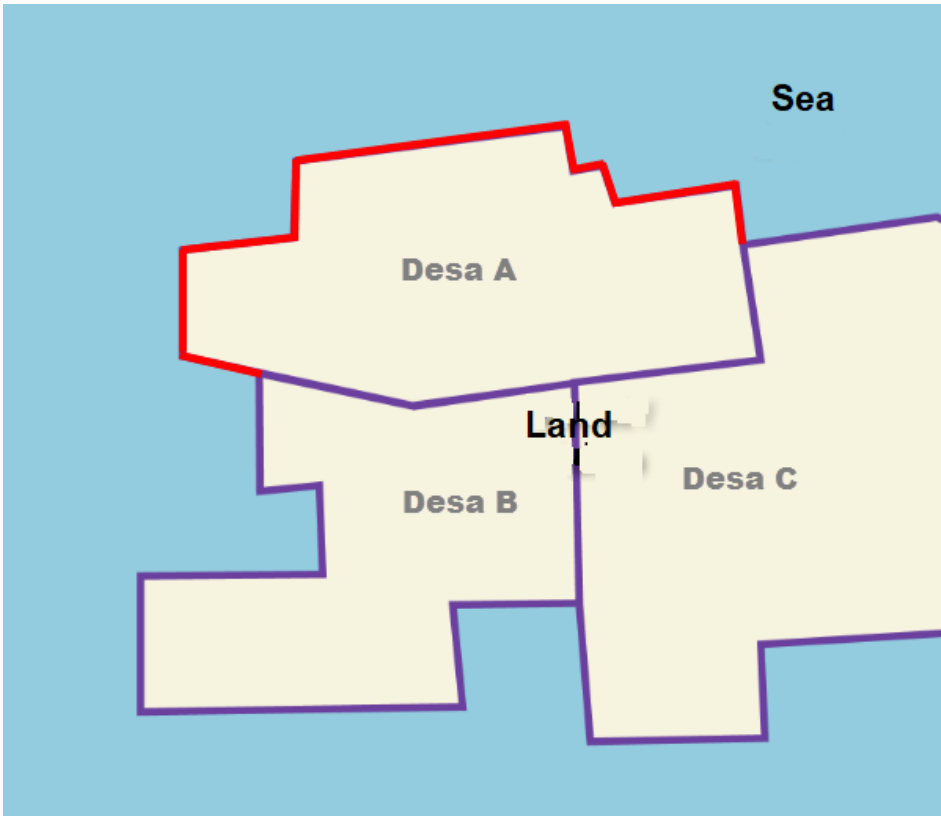
- In the next step, we will tag on the segments in line administrative boundary Desa A. Select the segment in line between Desa A and Desa C. Tagging in the same way as before.





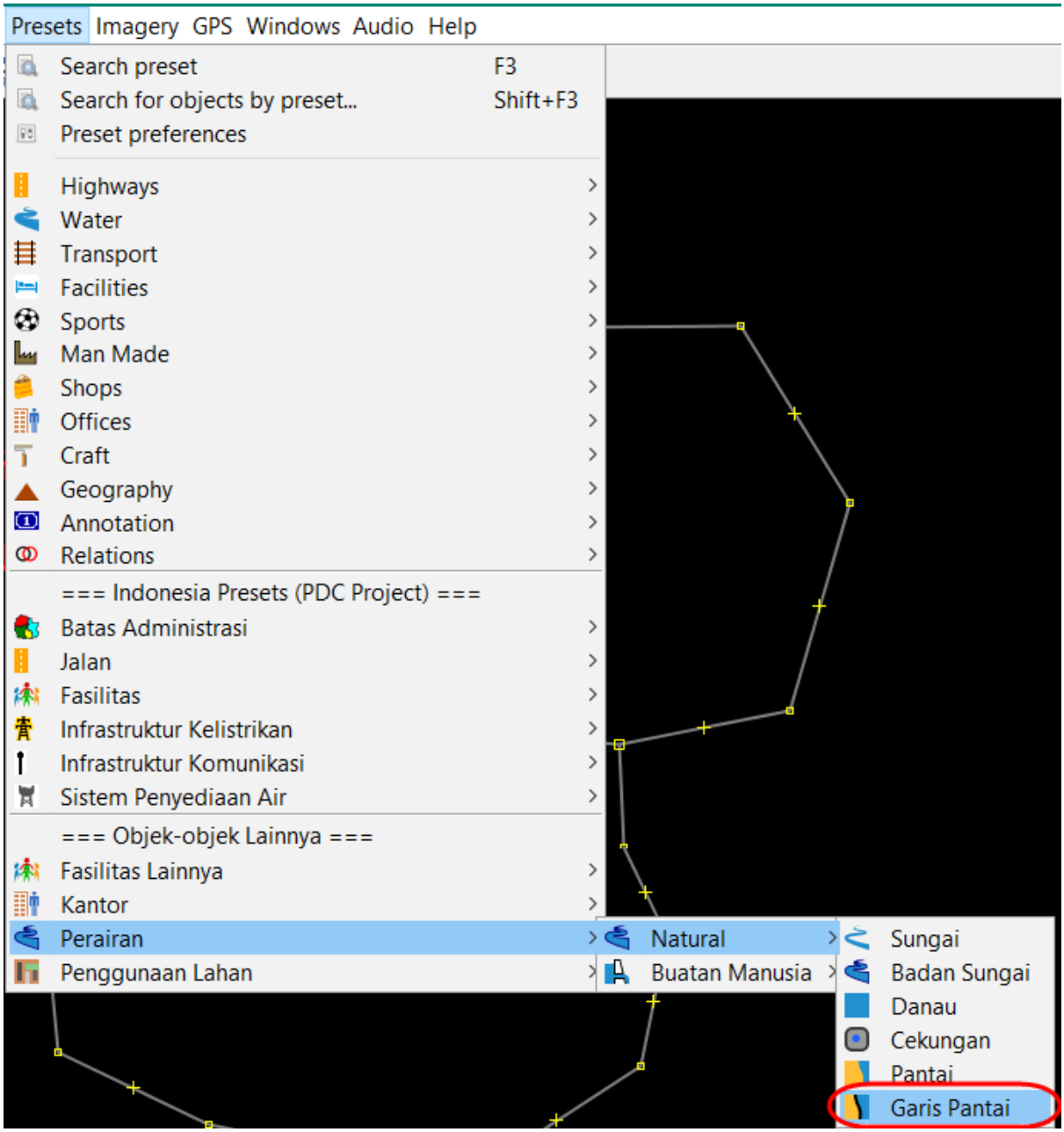
Tagging in administrative line boundary

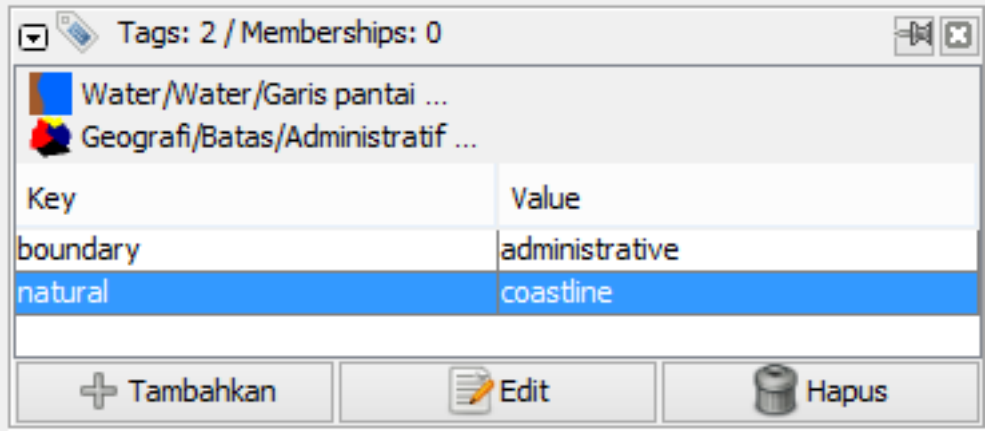
- This part of the tutorial will show how to make village/district administrative boundaries where the village/district are covers the entire mainland/island. In the image below, the red line is the boundary



between Village A and the ocean.
The boundary administrative with coastline

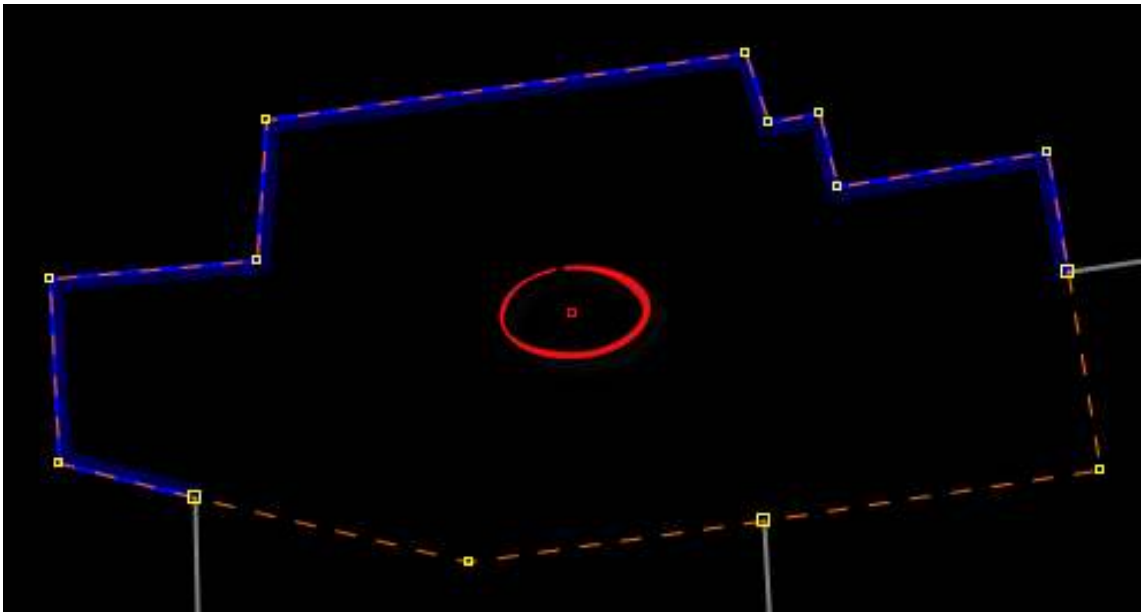
In this case, the tag given is different, where you need to add **key=natural** and **value=coastline**, then remove for tag **key=note**. To add the tagging, click on** Menu Presets → Perairan → Natural → Garis Pantai**.





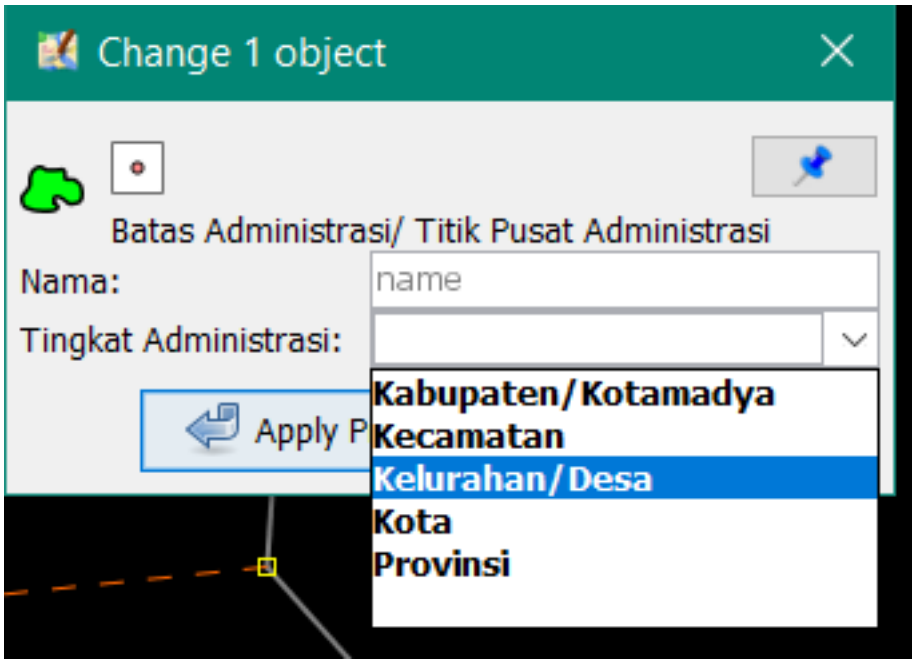
The boundary between line and coastline

- After the segments have tagged in Desa A. Let's draw a node as administrative centre from Desa A.



Digitize a node in Desa A

- Add the presets for the object with **Presets Menu → Batas Administrasi → Titik Pusat Administrasi**. Fill the properties with the village name according to the admin level.



Add tags in point of village

- The result should be like this:

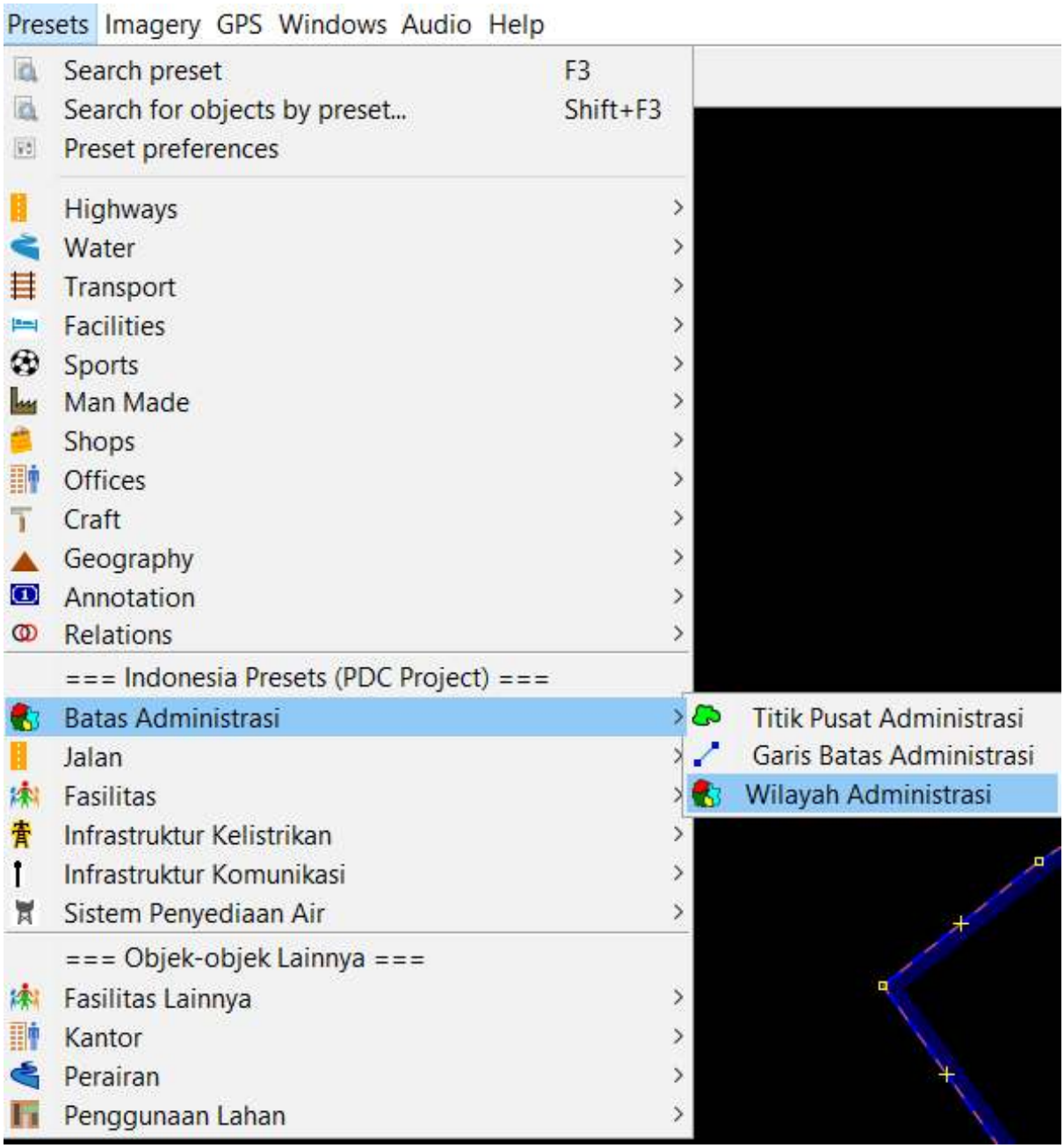
The result for the village name

c. Create Relations Administrative Boundary (example: Desa/Village)

- Next step we will create a relation to the administrative boundary in Desa A. Use the **Select Tool** to select all segments in lines and node in the area Desa A.

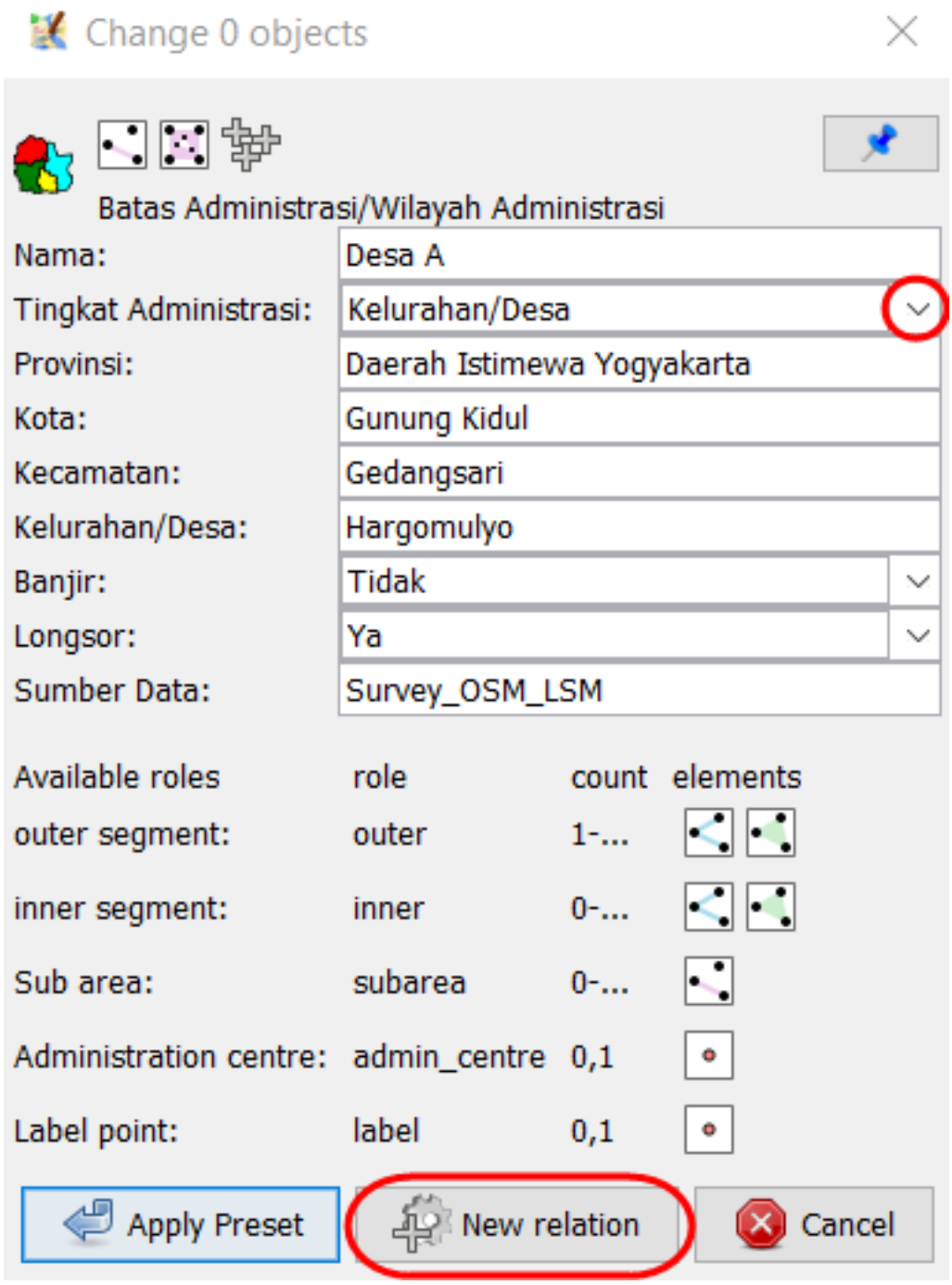
Select all lines and point in Desa A

- Add presets for the relations with click on **Presets Menu → Batas Administrasi → Wilayah Administrasi**



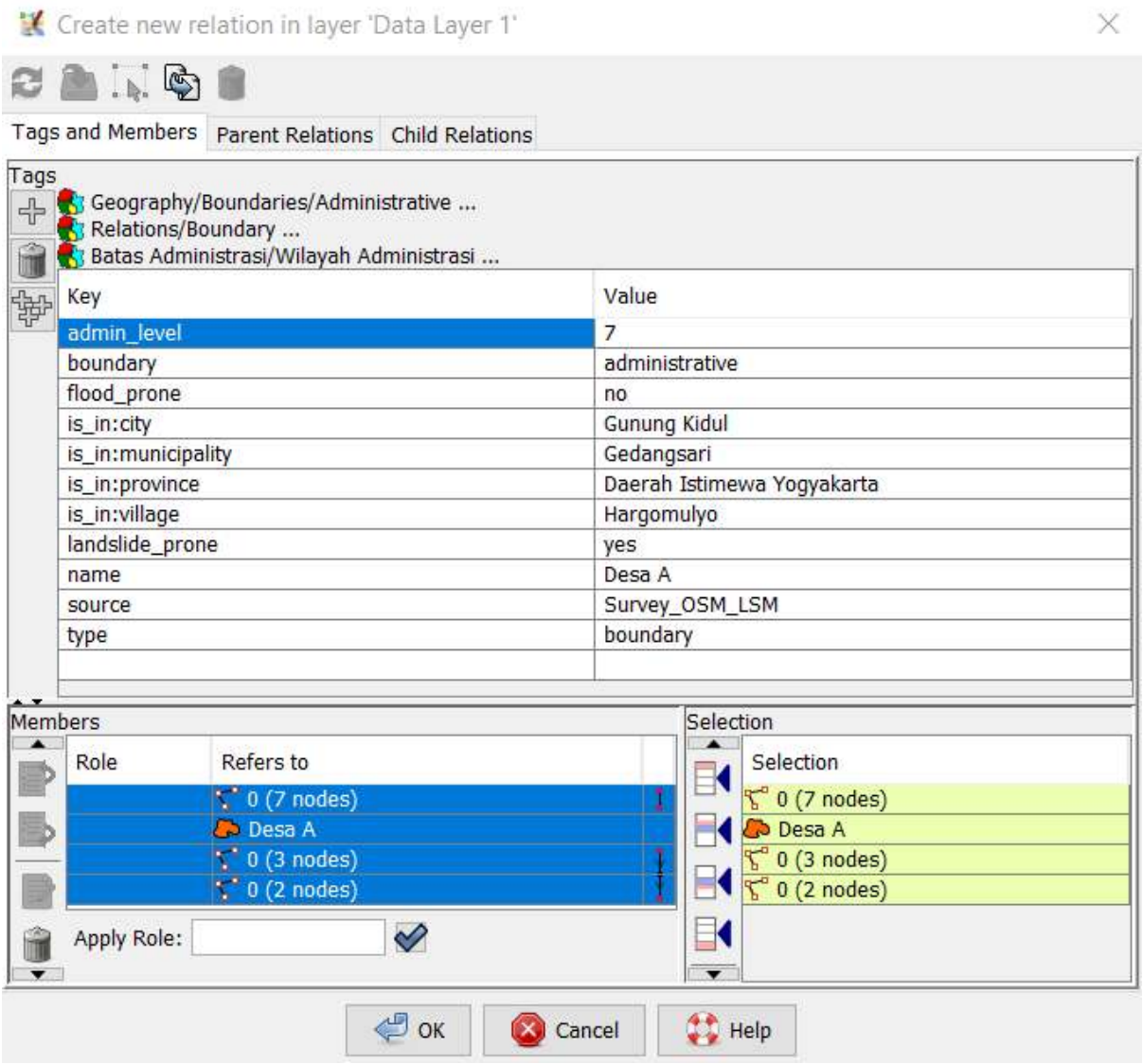
Presets for relation tag

- The preset window above should appear. Assign the administrative name (example: Village A), and on the boundary type column select Administrative, and on Administrative level column, select according to the level of administration (example: Village -. Level of Administration = 7). If you find the **sign v** in the row, please click on it and drop down the row. Click on **New relation** to create a new relation.



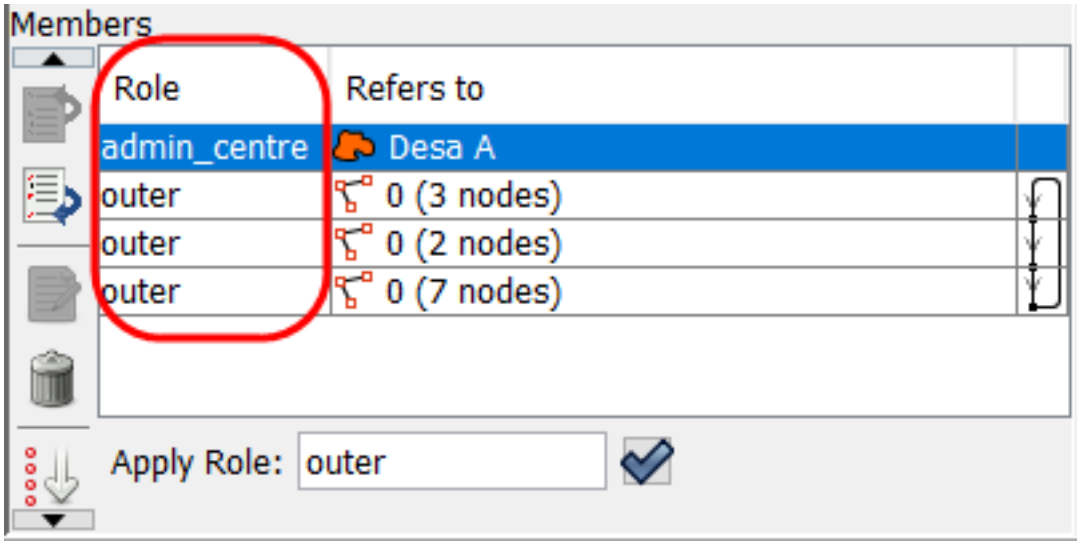
The list the relations tag administrative boundary

- A new relation window should appear:



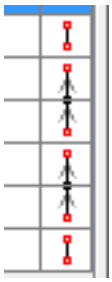
New relation window

- Check on the Role. After relation member Desa A is complete, we can determine the **role** of each member. The line segments Desa A have a role as **"outer"** or an outline from the administrative boundary. Also, add the role to node Desa A with **"admin_centre"**.



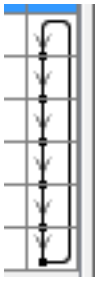
The role of each member

- Ensure the member list of the administrative boundary in order. If it is not ordered, it looks like here:



To organize the line segments, click the **Sort the relation members** icon 

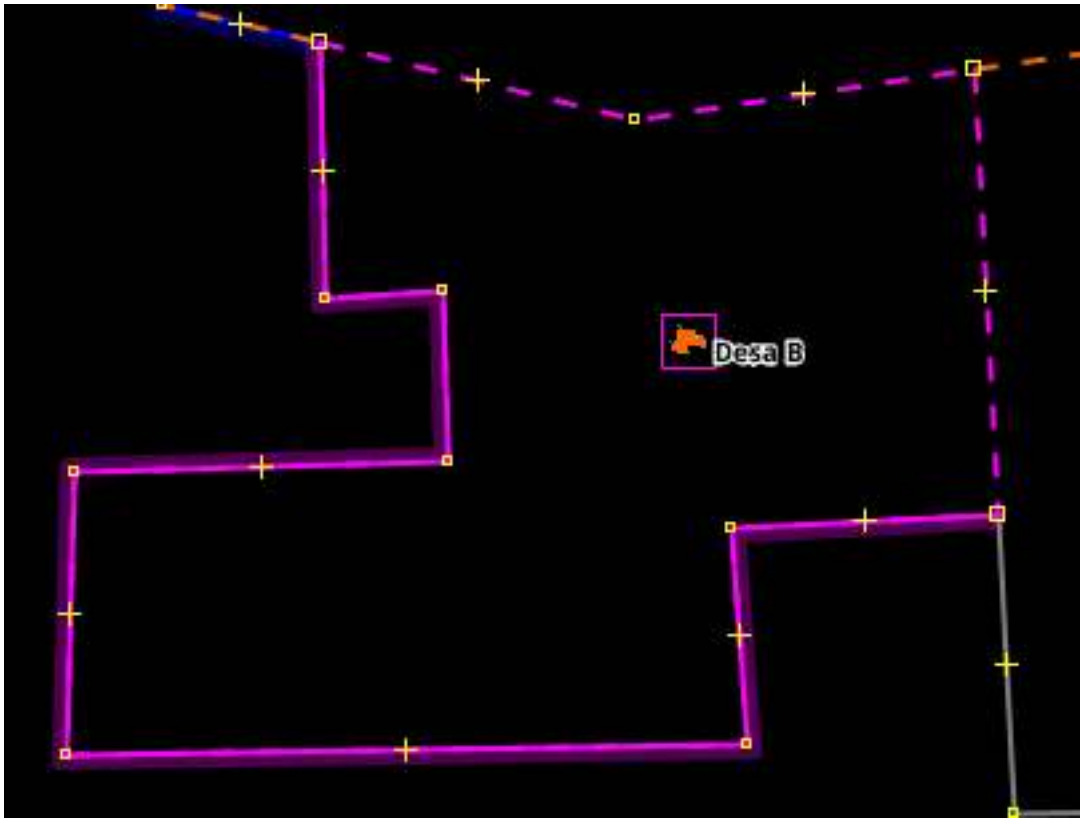
- After the line segments are in the correct order, the lines in the right hand side of the window should look like this:



- After assigning the role of each relation as well ensuring the list of administrative boundaries are in order, click **OK.**
- Check on the geometry relation in the data layer with a double-click on the area Desa A. The right relation will be shown in purple color.

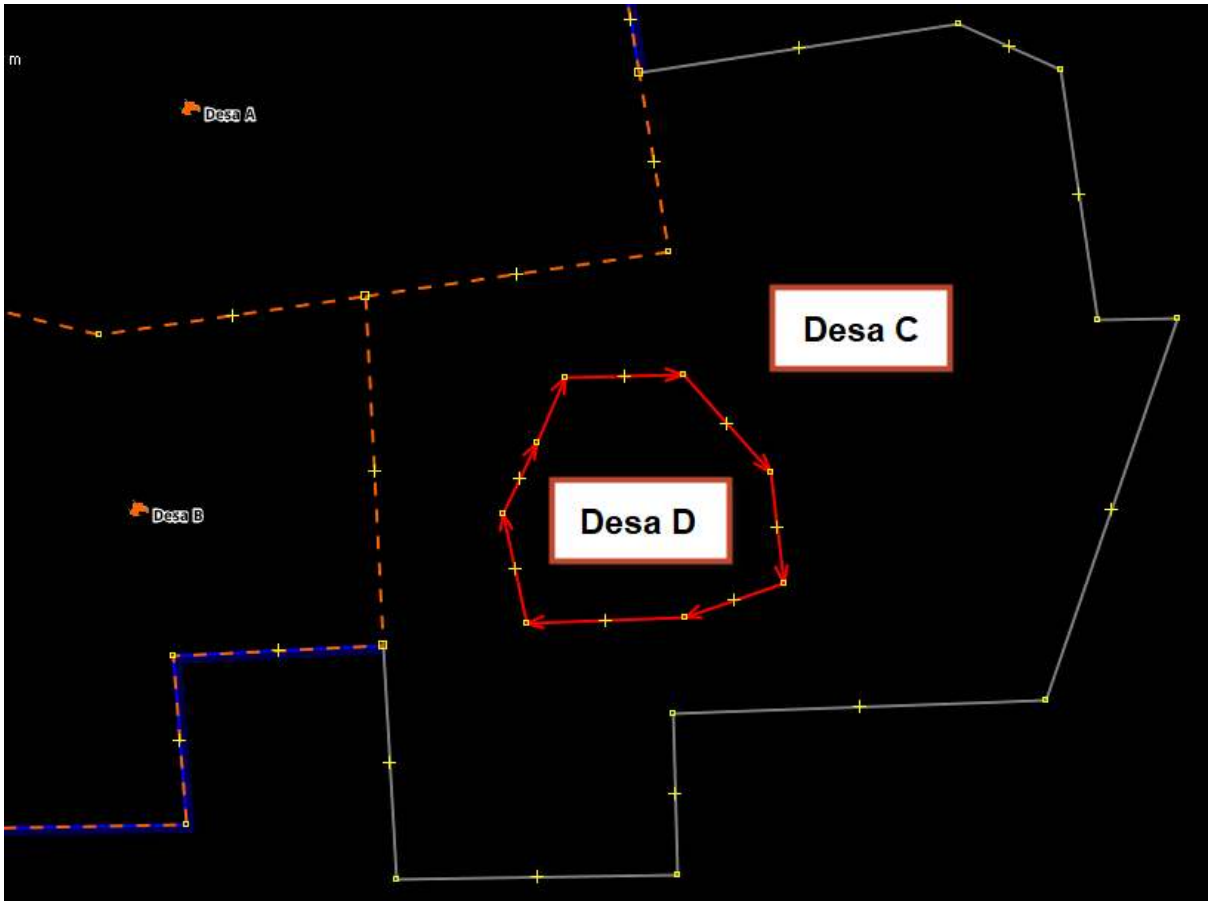
Relation of Desa A/Village A

- Please following step by step the same with before to create a relation of Desa B/Village B. If you are successful, the result like an image below:



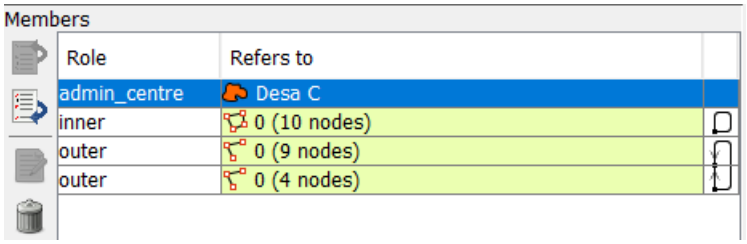
Desa B Area

- Add a new village in your relation boundary, we can named with Desa D/Village D. The village inside the area Desa C



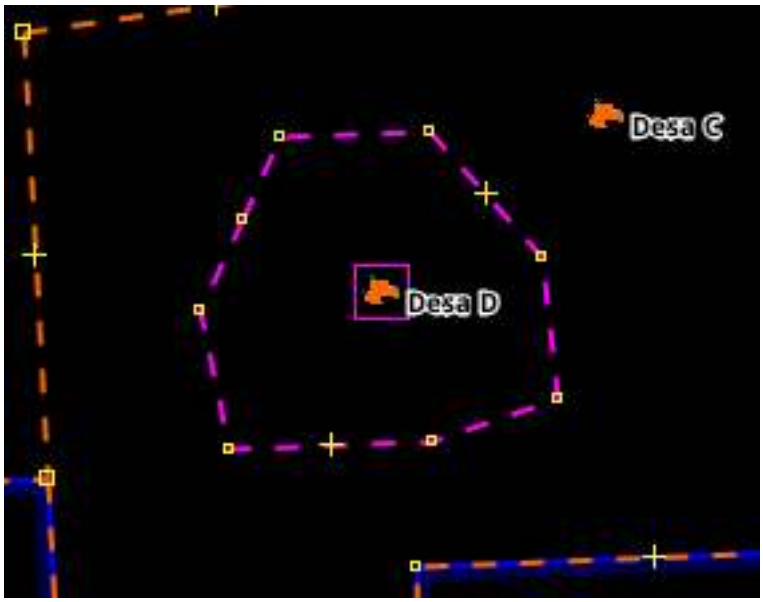
Add new administrative boundary Desa D

- After assigning relation members of Village C, assign the roles of each relation members.
- Line segments of **the outer layer** of Village C (boundary lines between Village C/A, boundary lines between VIllage C/B, and boundary lines between Village C/Ocean) -> acts as the **“outer”** boundaries of the administrative area.
- Line segments of the **inner layer** of Village C (boundary lines between Village C/D) -> acts as the **“inner”** boundaries of the administrative area.
- Centre point of Village C -> assign as **“admin_centre”**



The setting of relation Desa C

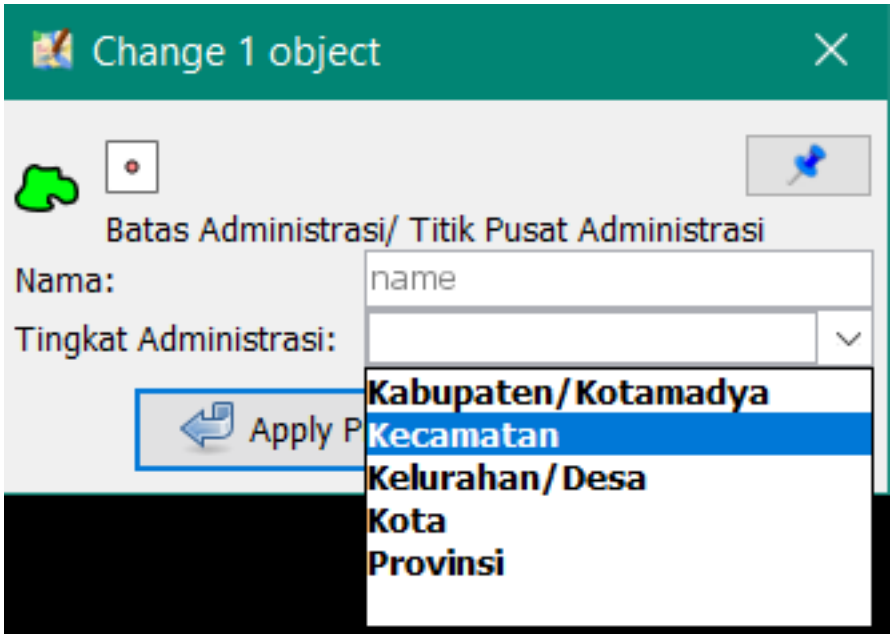
- Click on icon **Sort the relation members**, to ensure the list of relation members are in order
- Now Double-click in administrative boundary Desa C. If the relation has been made, the area of Desa C should appear purple color like below: The result of relation Desa C”
  The result of relation Desa C
- After creating administrative boundaries for Village C, continue creating boundaries for Village D. **Follow the same steps** from **Assigning Tags on Administrative Boundaries** until **Creating Relations of Administrative Boundaries.** The end result should look like this:



The result of relation Desa D

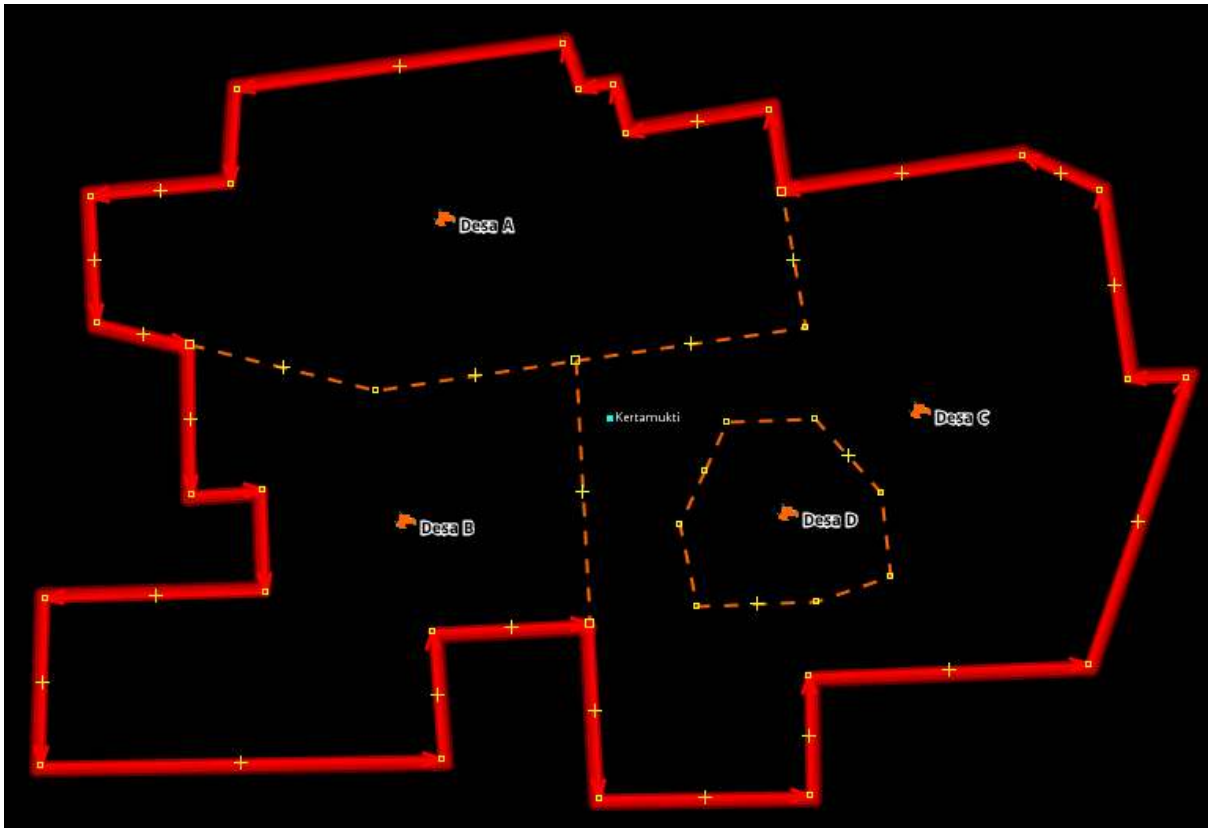
d. Creating the relation of the administrative boundaries (example: Municipality)

- In this section, we will create a boundary in the up-level from the village. The step will be the same to create the relation of the village boundary.
- Let’s create a point of administrative centre in Kecamatan Kertamukti, and assign a tag: Click on **Preset Menu → Batas Administrasi → Titik Batas Administrasi**



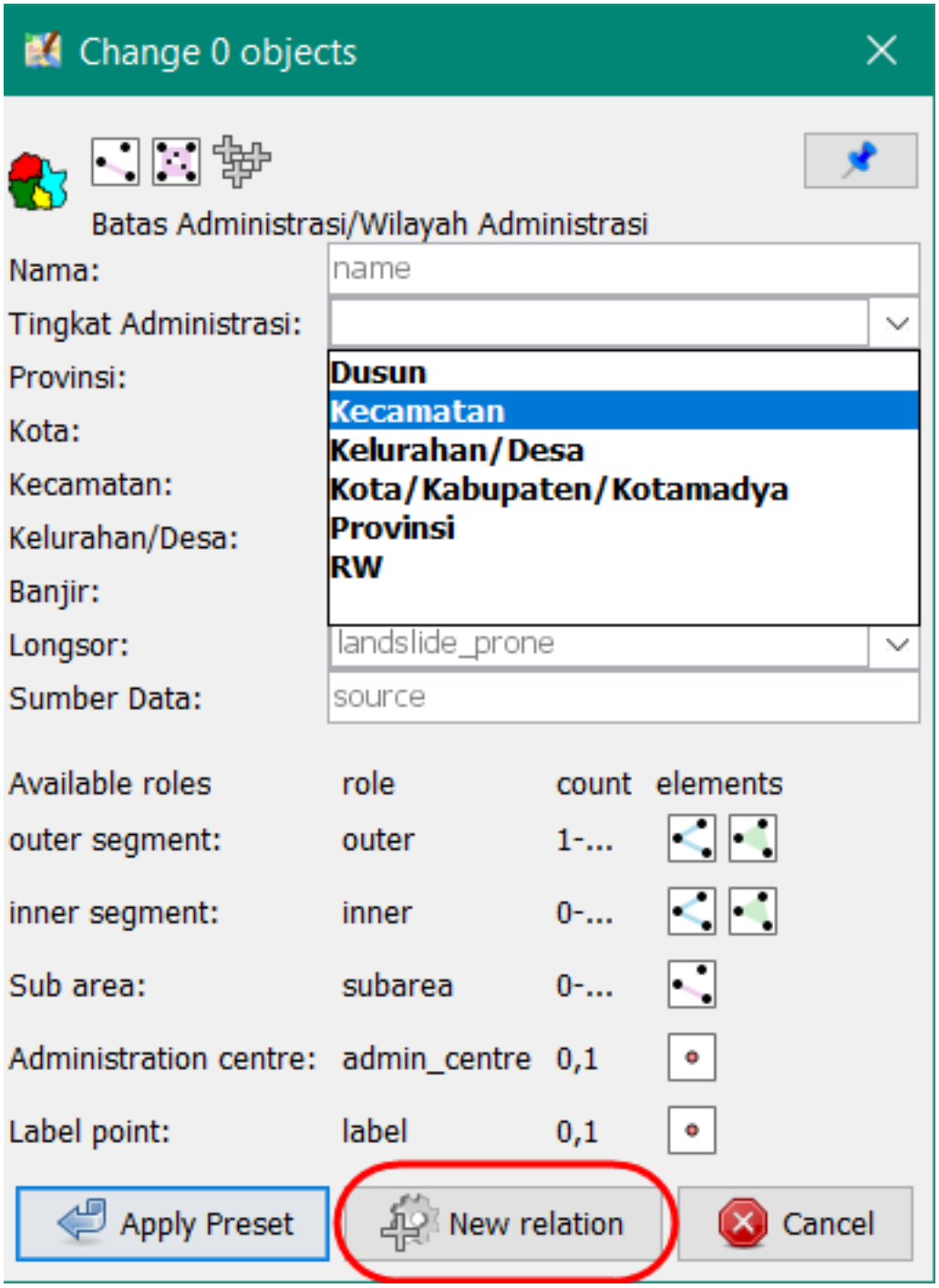
Tagging on admin centre municipality

- Select all segments in an administrative boundary to create a new relation.



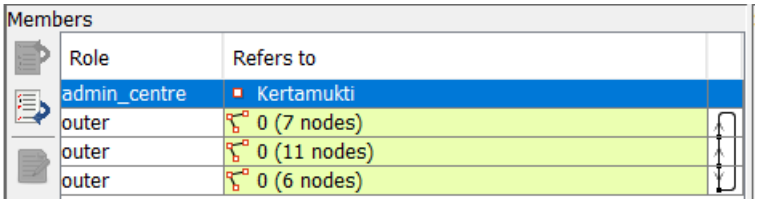
Select all lines outer and node of municipality boundary

- Add tagging with click on **Presets Menu → Batas Administrasi → Wilayah Administrasi**. Please fill the name of municipality, admin-level, and do not fill “Kecamatan”



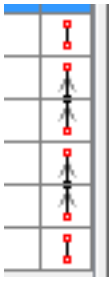
The lists preset of municipality boundary

- We will determine the role of relation members. All segments in Kertamukti municipality (Kecamatan Kertamukti) has a role as outer and the point of the municipality name has a role as admin_centre.



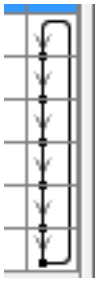
The role of relation member

- Ensure the member list of the administrative boundary in order. If it is not ordered, it looks like here:

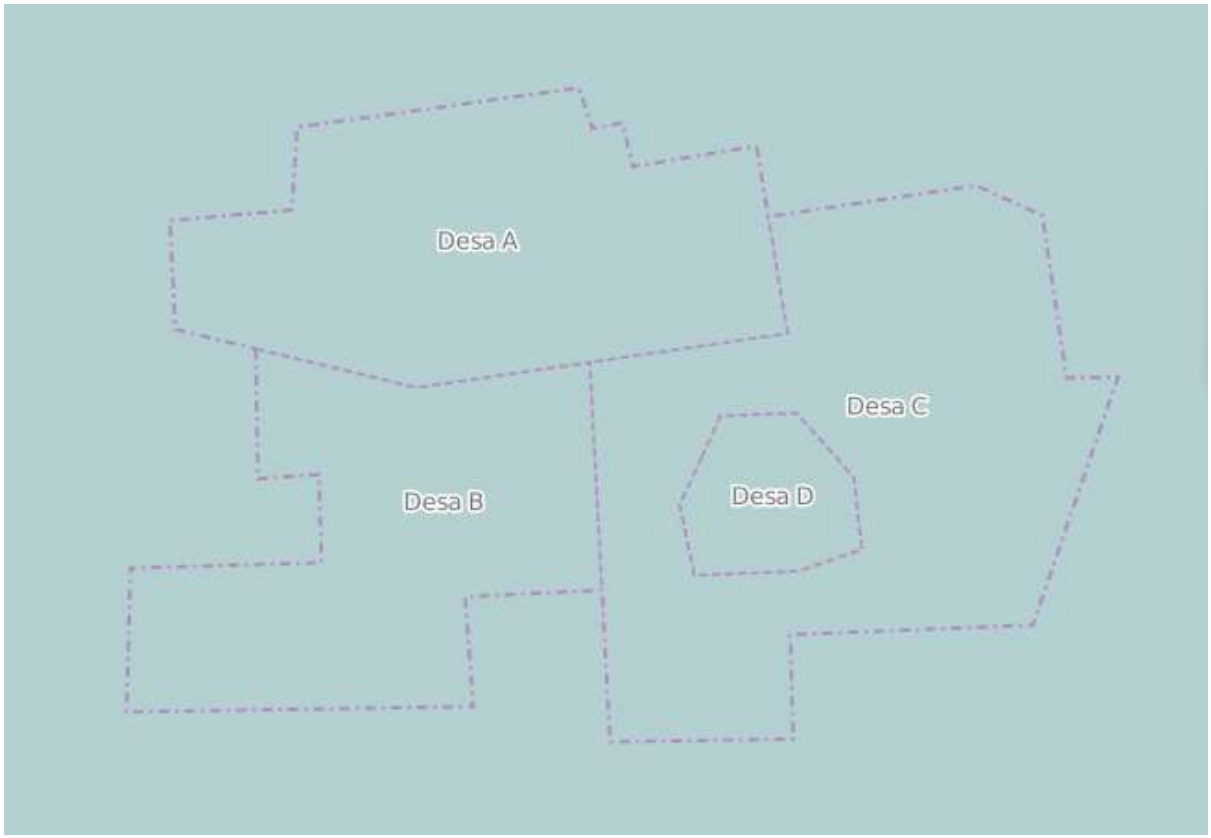


To create the segments in order, click on button **Sort the relation members**

- If the member list of the administrative boundary in order, it looks like here:



- Click **OK**.
- If you need to create the administrative boundary in up-level such as the city and province, you can do the same ways. The different way to add tags on relations and admin centre.
- The result will appear in www.openstreetmap.org



Example the administrative boundary in OSM

SUMMARY

You have learned about activities to create administrative boundaries with relation concepts in JOSM. A relation is a group of elements. To be more exact, it is one of the core data elements that consists of one or more tags and also an ordered list of one or more nodes, ways and/or relations as members which is used to define logical or geographic relationships between other elements. You can download the administrative boundary in polygons using the Export Tool.

Resolving Conflict on OpenStreetMap Data (OSM)

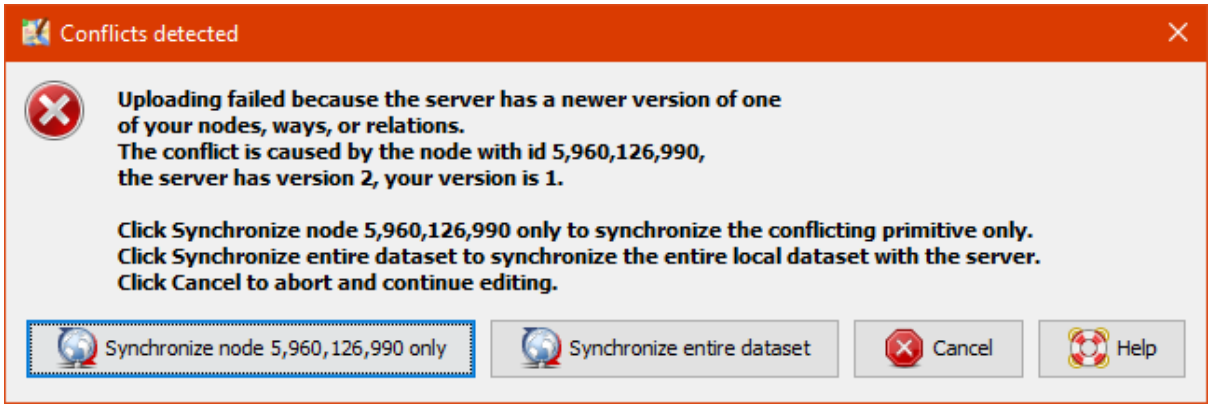
Objectives:

- Participants can explain what is data conflict on OpenStreetMap
- Participants knowing about types of conflict in JOSM
- Participants can fix data conflicts using JOSM
- Participants know to avoid data conflict in JOSM

When you are uploading your changes in JSOM, some contributors might also do editing in your area. This might occur data conflict in your uploading process. Therefore, in this module, you will learn about data conflict in OpenStreetMap, types of conflict, and how to fix it using JOSM.

I. Data Conflict on OpenStreetMap

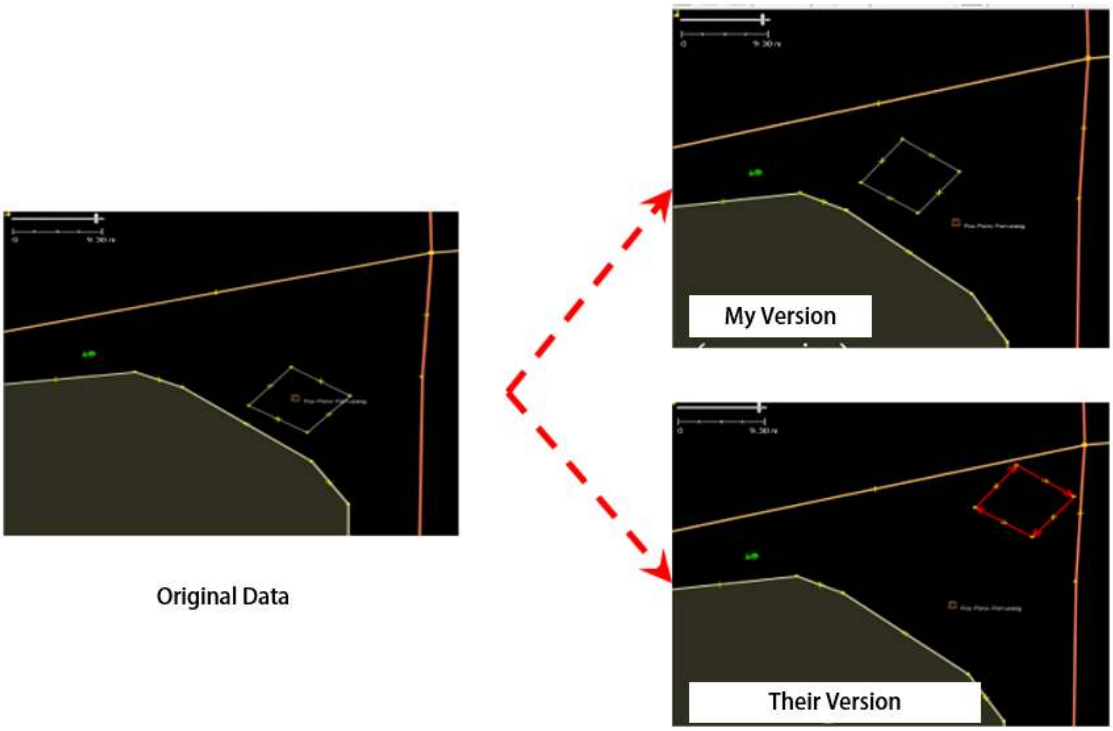
When you have edited your changes and were uploading them in JOSM (learn more about this in **Using JOSM** module), maybe you ever received a message like this:



Example of Conflict Detection Window in JOSM

The picture above shows data conflict in OSM. Why that could possibly happen? This conflict happens because when you edit your data in JOSM, you edit the same data/object(s) with the other contributor in the same time. Thus, the other contributor have uploaded the changes first and have received by OSM server. After that, you also want to upload the same data/object(s) with your own changes. Therefore, your changes will automatically rejected by the server because it causes confusion.

You will face with data conflict when you do changes in JOSM such as editing, adding, or delet some objects in OpenStreetMap, while the other contributor also do the same thing on the objects. The other contributor has uploaded their changes slightly before you. Therefore, when you try to upload your changes, it causes confusion for the OSM Server because it does not know which changes is correct and can be saved. If this happens, then the data conflict need to be fixed before you can continue to upload your changes into OSM server.



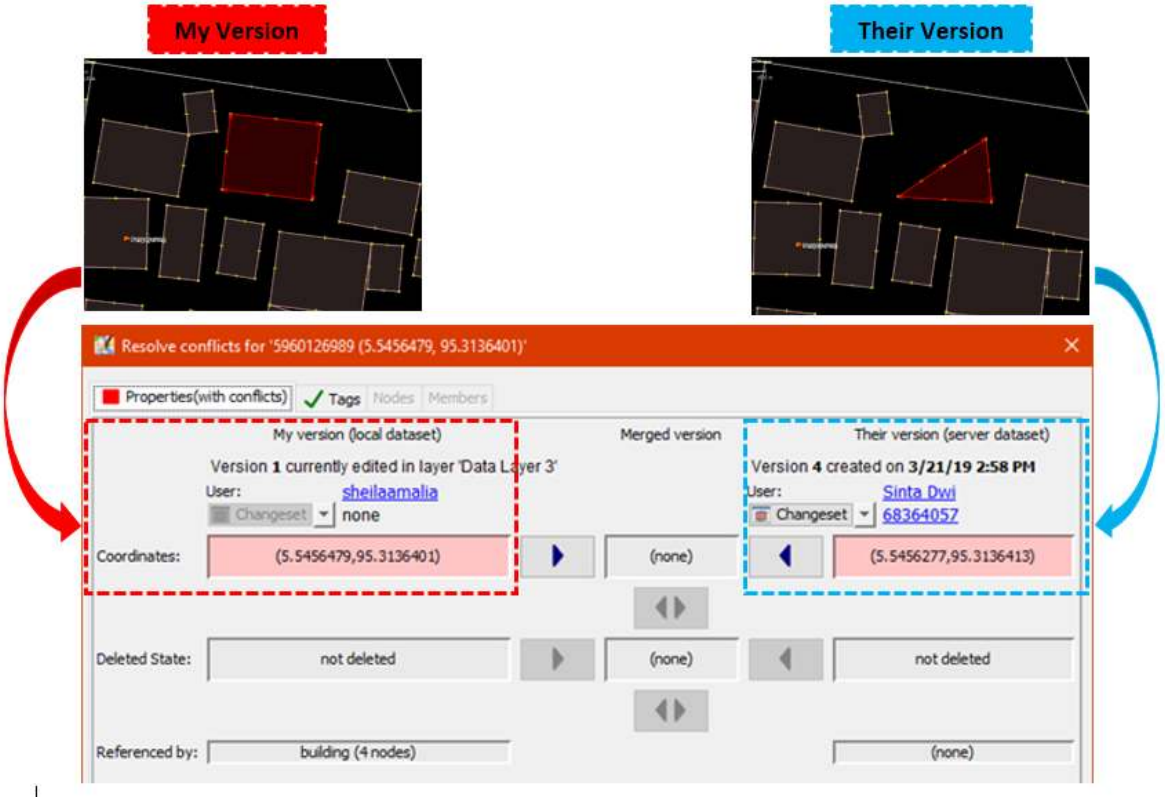
Example why conflict happens in JOSM

The picture above is example of conflict that could happen because of different position with the object between your version (my version) and version of the other contributor / have received by server (their version). To resolve this conflict, you have to choose one version between them (look chapter **III. Fixing Data Conflict in JOSM**).

II. Types of Data Conflict in JOSM

a. Conflict of Properties

Conflict of properties happens when an object(s) has been moved or deleted so one or more of its node has different location/position than the other version.

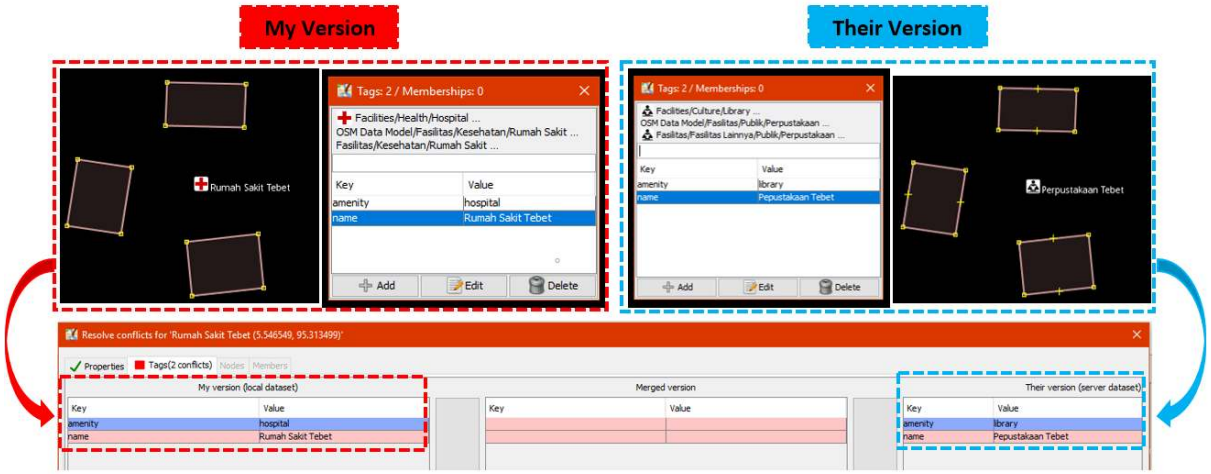


Conflict Property Window

The picture above is an example of conflict of properties in JOSM. As can be seen in the picture, in My Version the object has square shape and in the other version (their version) one of the node is deleted then change its shape become triangle. To fixed this, you need to choose which version that correct based on the location of the different nodes in both version.

b. Conflict of Tag

Conflict of tag happens because there are different information (tag) on on the object that has been edited by two or more contributors. The information could be deleted or changed on the other version.



Conflict of Tag in JOSM

The picture above shows differences between two versions on the same object in JOSM. ***My version*** has Rumah Sakit *tag* (*amenity = hospital*) with its name value is Rumah Sakit Tebet Raya while the other version (***Their version***) has tag klinik (*amenity = clinic*) with name RS Tebet Timur. You have to choose one of them that you think has correct information to fix it before upload it to the server.

c. Conflict of Node

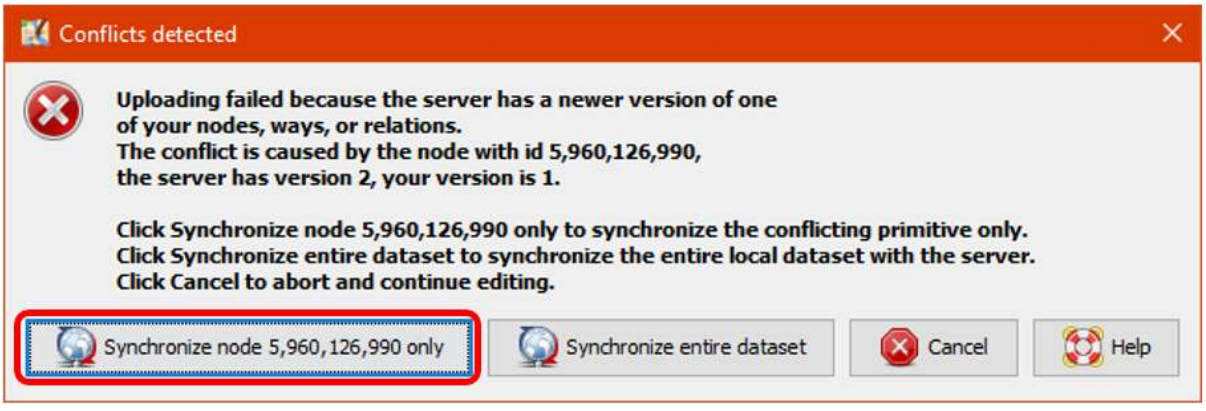
This conflict happens when there are differences order of the nodes in a way or closedway object(s) which have been removed or moved on one of the versions and has been uploaded to the OSM server.

Conflict of Nodes in JOSM

III. Fix Conflict Data in JOSM

Fixing conflict data in JOSM is quite simple, even though most OSM contributors would have some confusion to do it. Generally, every data conflict fixing in JOSM asks you to choose the correct changes between your version and the other version that have uploaded to the server (their version). You have to choose whether to **keep your version** or delete you version and **use their version**. Steps to fix conflict data in JOSM as follows:

- When the conflict window appears, you might be only want to select the **Synchronize node 5,960,126 only** option. However, this option will only fix conflict in one certain nodes. Instead, you should choose **Synchronize entire dataset** option so you can resolve all conflict nodes in one time.

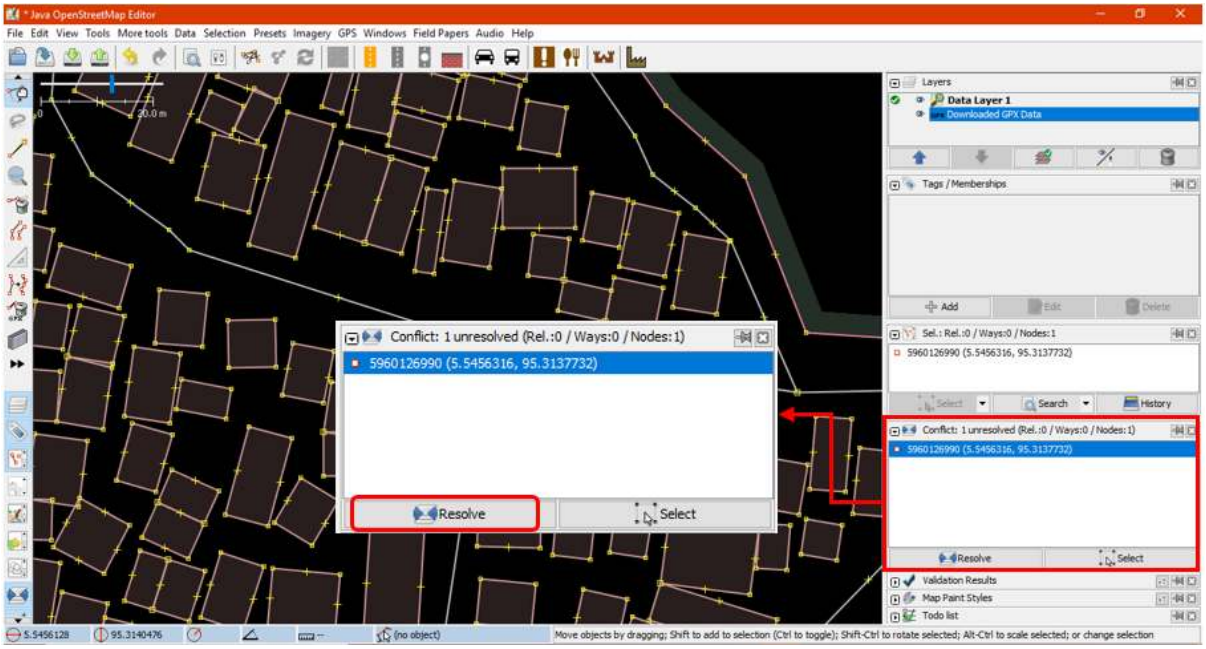


Conflict Detection Window in JOSM

- After that, JOSM will show how many conflicts that has been detected, Click ***OK***.

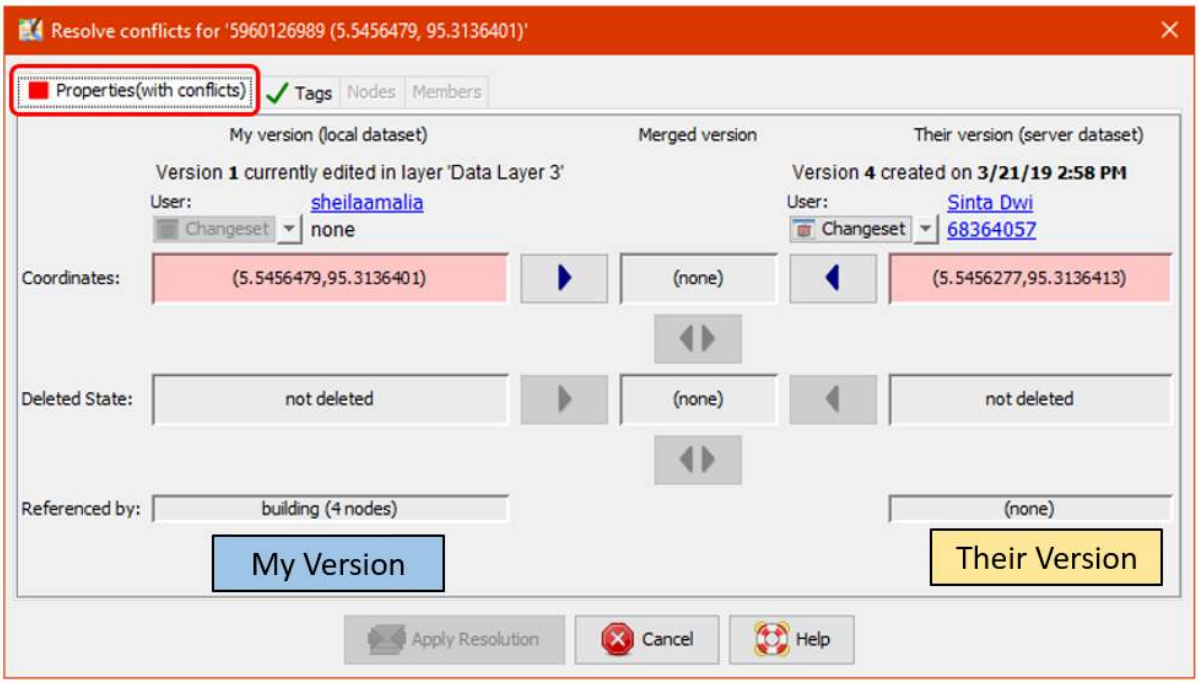
Number of detected conflict

- There is a list of conflicts in **Conflict** panel at bottom right corner in your JOSM. You can choose which conflict you want to fix and click ***Resolve***.



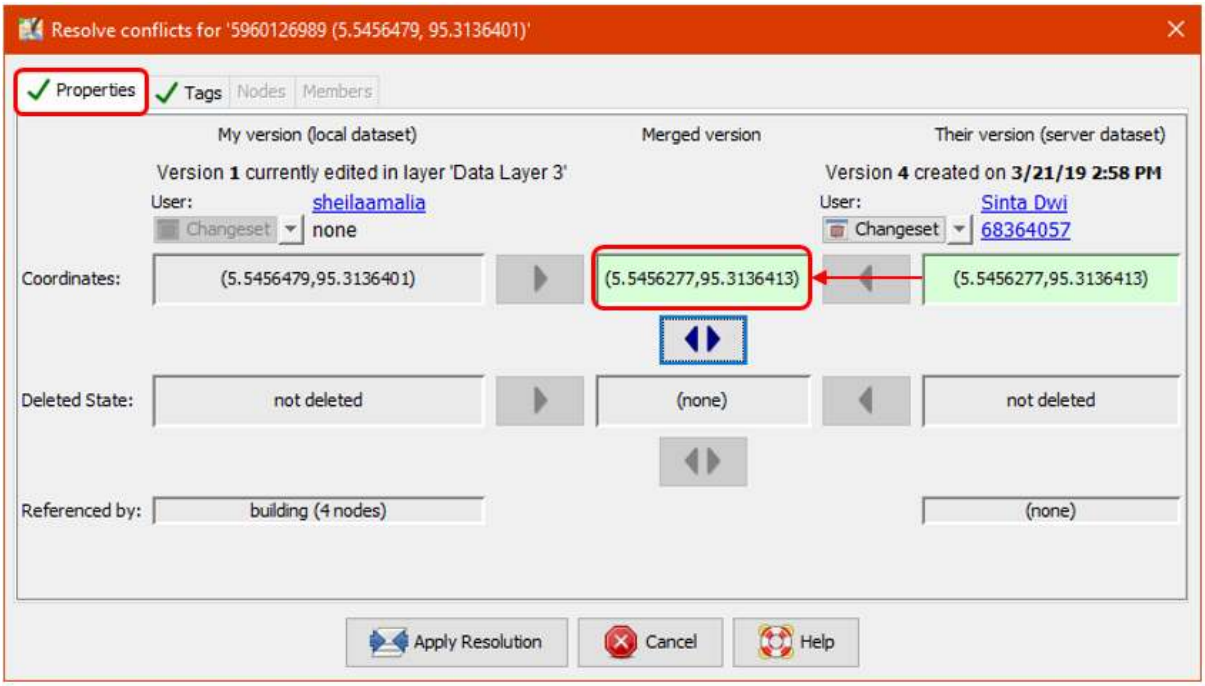
Conflict panel to fix detected conflict

- When you have click the ***Resolve*** button, the window will appears and shows detail about detected conflict. The message about conflict might be looks complicated but it actually has simple instruction. You will know about what type of conflict do you have by looking at  symbol. Therefore, the conflict in this example was caused by different coordinate location and position of object. You can look at a list of changed or moved coordinate as shown in picture below. Thus, conflict in this example was caused by one changed node.



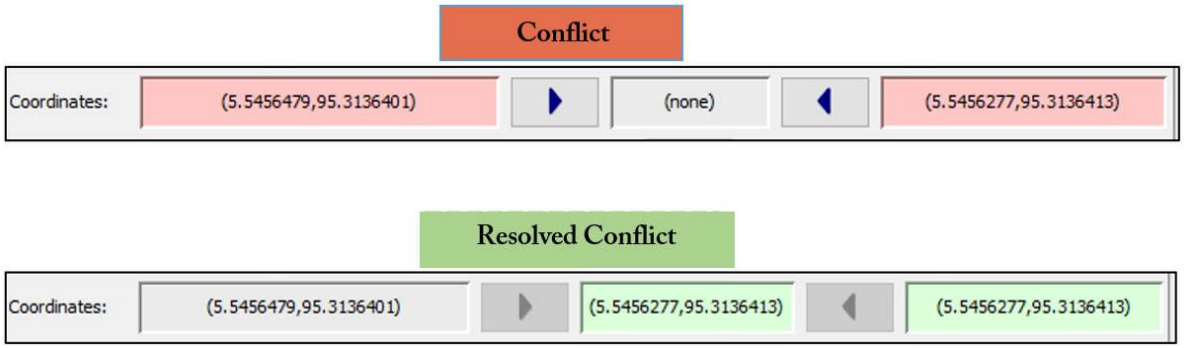
A Window to Resolve Conflict

- You only can resolve one conflicts at one time. You can choose which correct version between your version or their version in the server. If you sure that your version is the correct one (you edit / add the object based on your field survey mapping or you already know the object personally), then choose **My Version (local dataset)**. However, if you are not sure about your version and think that the other version more convincing then you can choose **Their version (server dataset)**. Click blue arrow symbol in the version that you choose. If the conflict has been fixed then the symbol will be going turn to green check mark ✓



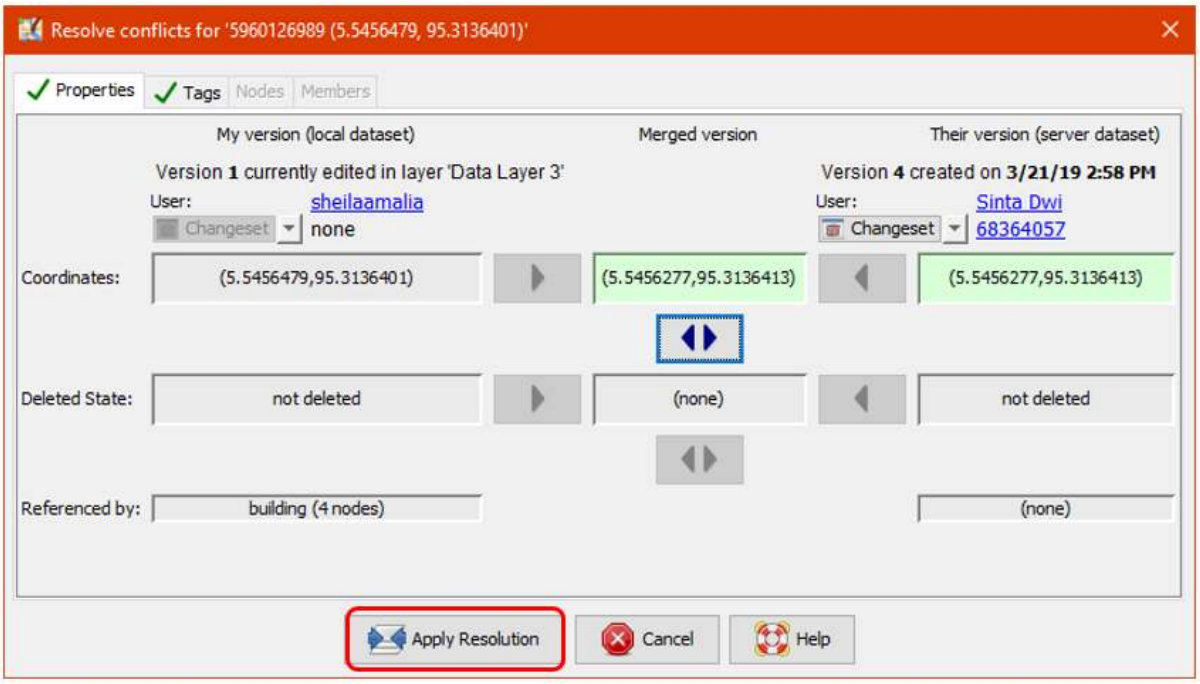
Choose one of the versions to resolve data conflict

- After you have select the right version, you have to make sure the color of conflict box has been changed from pink to green. This means you have successfully fixed the conflict.



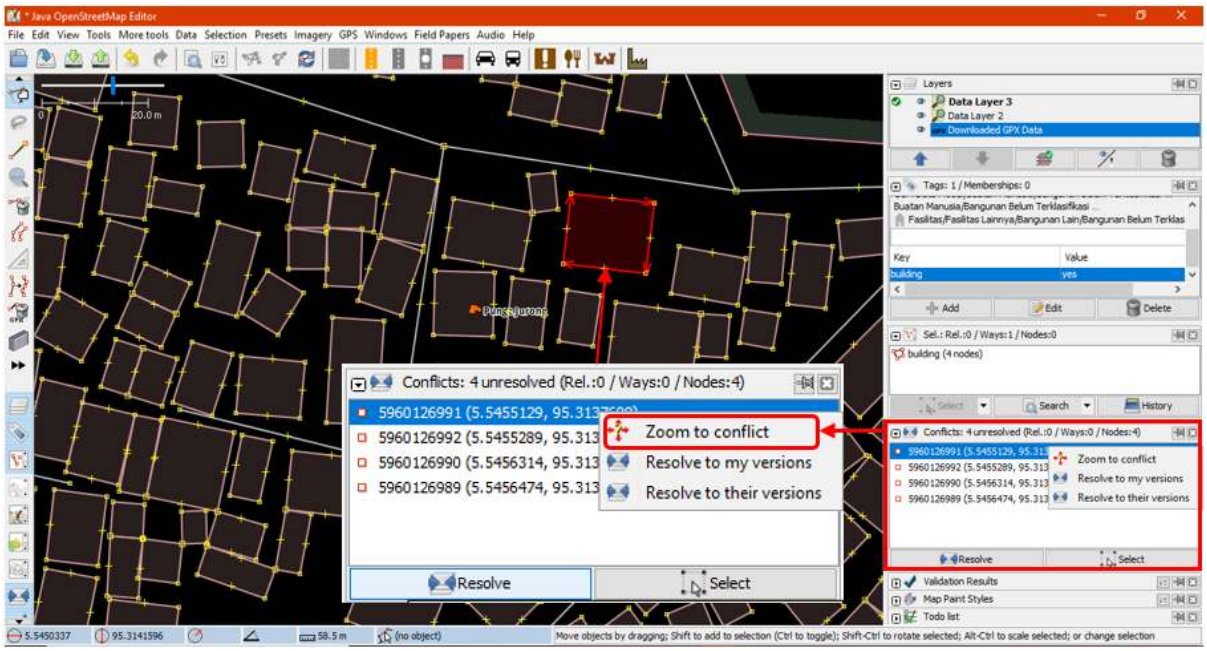
Difference color between original conflict and resolved conflict

- Then click ***Apply Resolution*** as shown in the picture above. After you have finished all of your conflict, you can start to upload your OSM changes.



Resolved conflict window

- In window menu, you can activate **Conflicts**  window. This window shows total number of conflict on all of your data when you click the ***Resolve*** button. You also can use another way by right click on one of the conflict and choose ***Resolve to my versions*** or ***Resolve to their versions.*** To find the object you can right click and click ***Zoom to Conflict***. This will be very useful if you have many conflicts and need to check and fix them one by one.



Window of list conflict on JOSM_

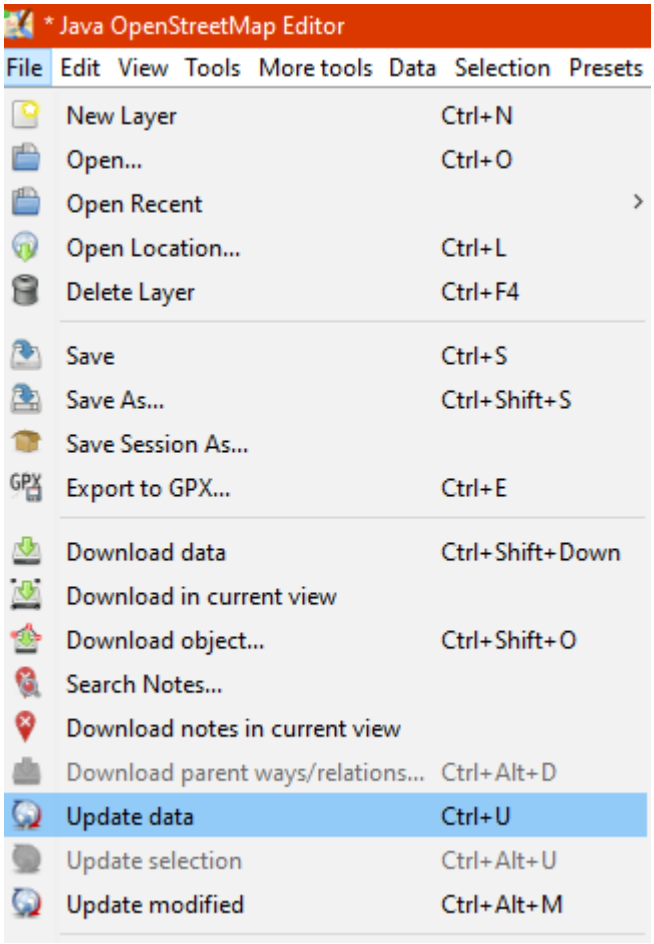
Note : You can not upload your changes until you have resolved all of your conflict and list of conflict in the conflict window has empty. Keep in mind, you need to be careful when resolving the conflict and need to check it one by one to make sure everything is correct as it should.

IV. Avoiding Data Conflict in JOSM

You can do some things to avoid conflict when uploading your data into OSM server, as follows:

a. Upload your changes continuously

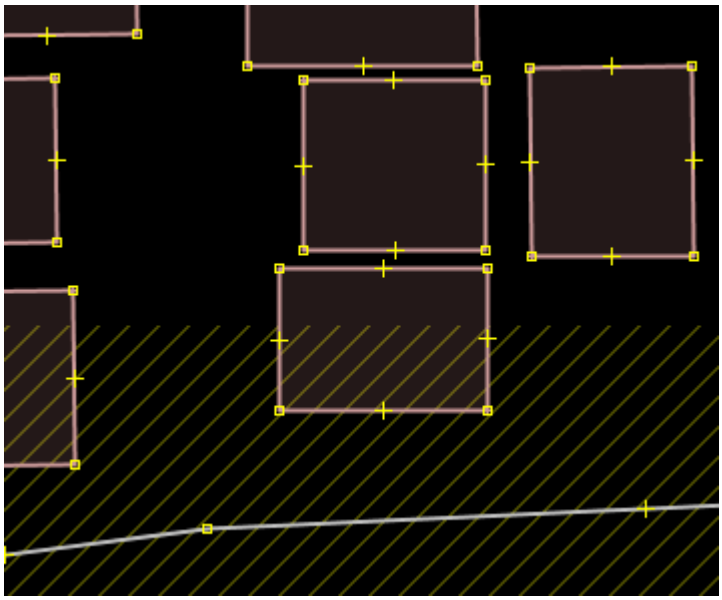
- To minimize conflict, you can upload your changes continuously. For instance, if you mapped 100 buildings but does not have a good internet connection, you should upload your changes for every 20 buildings or every 15 minutes. The reason for this is because the conflict would have bigger possibility to occur if you upload when it is finished. The longer you waiting to upload the more possibility the data could possibly have edited and uploaded to the server by other contributors. Therefore, the probability of conflict for your edit will increase.
- If you want to save your OSM data and upload it later, you can update your OSM data first before you upload it. This should be done so you can get the latest OSM data from the server before you upload it. You can do that by click ***File → Update data*** or ***Update Modified*** then waiting until the updating process is finished. After that, you can upload your changes with ***Upload data*** options ***File*** menu or just click  icon on *menu* bar.



Update data options in file menu

b. Edit Only in Downloaded Area

You can do mapping in specific area to minimize risk of conflict with avoid editing objects outside your downloaded area in JOSM. This can prevent two or more users editing in same area. Notice that diagonal lines around your downloaded area is an area you need to avoid to edit in JOSM.



Downloaded Area (black) dan Outside Downloaded Area (diagonal lines)

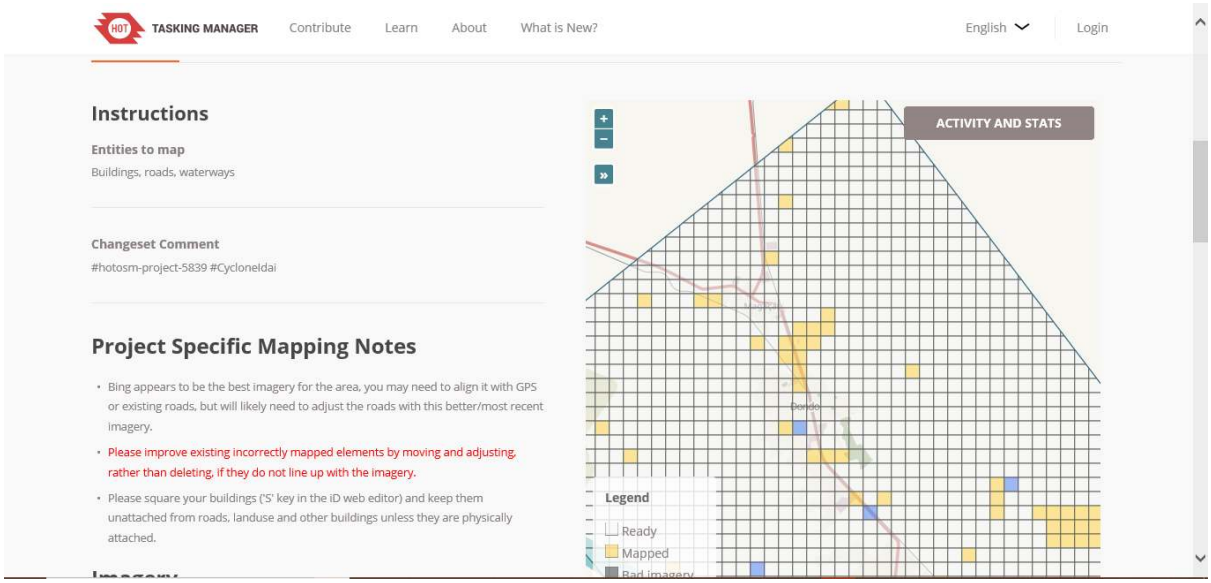
After you download the data, your editing area is only area inside which does not have diagonal lines.

The area outside you editing area most likely currently editing or have been edited by other contributors. Avoid edit in the area will reduce the risk of getting conflict in your data.

c. Using *Tasking Manager*

If you want to do collaborative mapping, you can use *Tasking Manager*. It will help you to divide your mapping area into task grids. Thus, you can choose your mapping area grid easily without worry getting same area with other OSM contributors because once you select certain grid, it will be locked and cannot choose by other contributors.

Any mapping volunteer in the area can choose one grid that they want and after finish they can mark the grid as completed mapped. This will allow a lot of people to map certain area in same time without getting worried to get conflict. You can read how to use *Tasking Manager* in **UsingTasking Manager** module.



Tasking Manager Interface (tasks.openstreetmap.id)

Summary

If you have followed and finished to practice all the steps in this chapter, You have successfully understand about data conflict in JOSM and how to fix it. Moreover, you also have learned about types of conflict and how to avoid them in JOSM. Congratulations!