Department of Town & Country Planning, Haryana

User Manual

Web Portal for Change Detection & Monitoring

Developed by **SkyMap Global Private Limited**

Background:

Accurate Change detection, monitoring system and correct Enforcement using high resolution imagery is a prerequisite in understanding the true urban growth development process. In this scenario, Geospatial technology plays a critical role in providing spatial information that is helpful for change detection and monitoring for different activities. The technology is able to provide insight information about the land, cultivated areas, and agriculture land, built up structures. Therefore a Geo-tagging mobile Application is developed to verify the actual situation from the information provided by the web portal, and to enforce necessary steps which need to be taken.

SkyMap has designed, build, and delivered a customized user-friendly web-enabled GIS based Change Detection application platform and mobile app system. The purpose of the system is to view and manage 2D (area) and 3D (height) change detection of urban construction activities in the areas of interest using high resolution Satellite imagery; it will provide storage, access, and visualization of legacy and future data, including analysis result, illegal building notices and building status etc.

Web Portal

Getting Started :

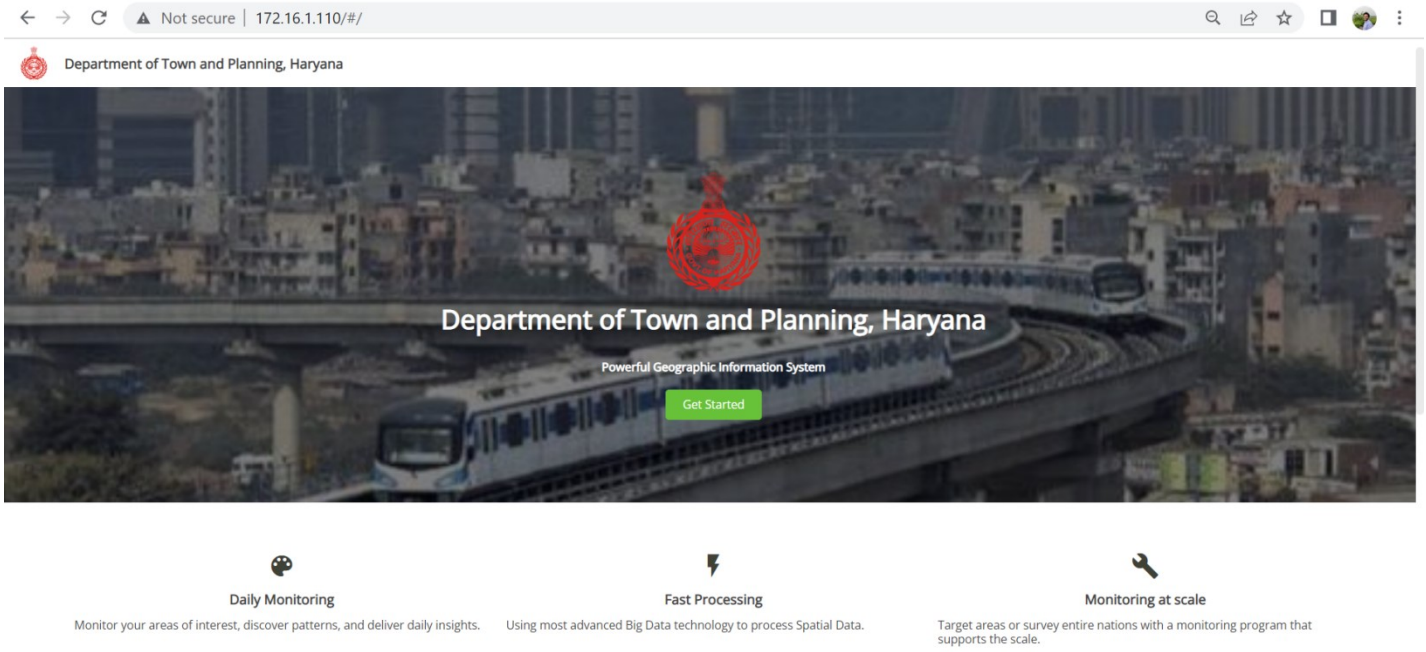


Image i : Getting Started

After Successfully login on Single Sign On (SSO) page you will find a transition page as shown in the image above.

Click on the Green Button which states “Get Started” and you will be able to enter the web portal.

The page has a department Name and logo to indicate that the application belongs to T&CP, Haryana.

Home Page :-

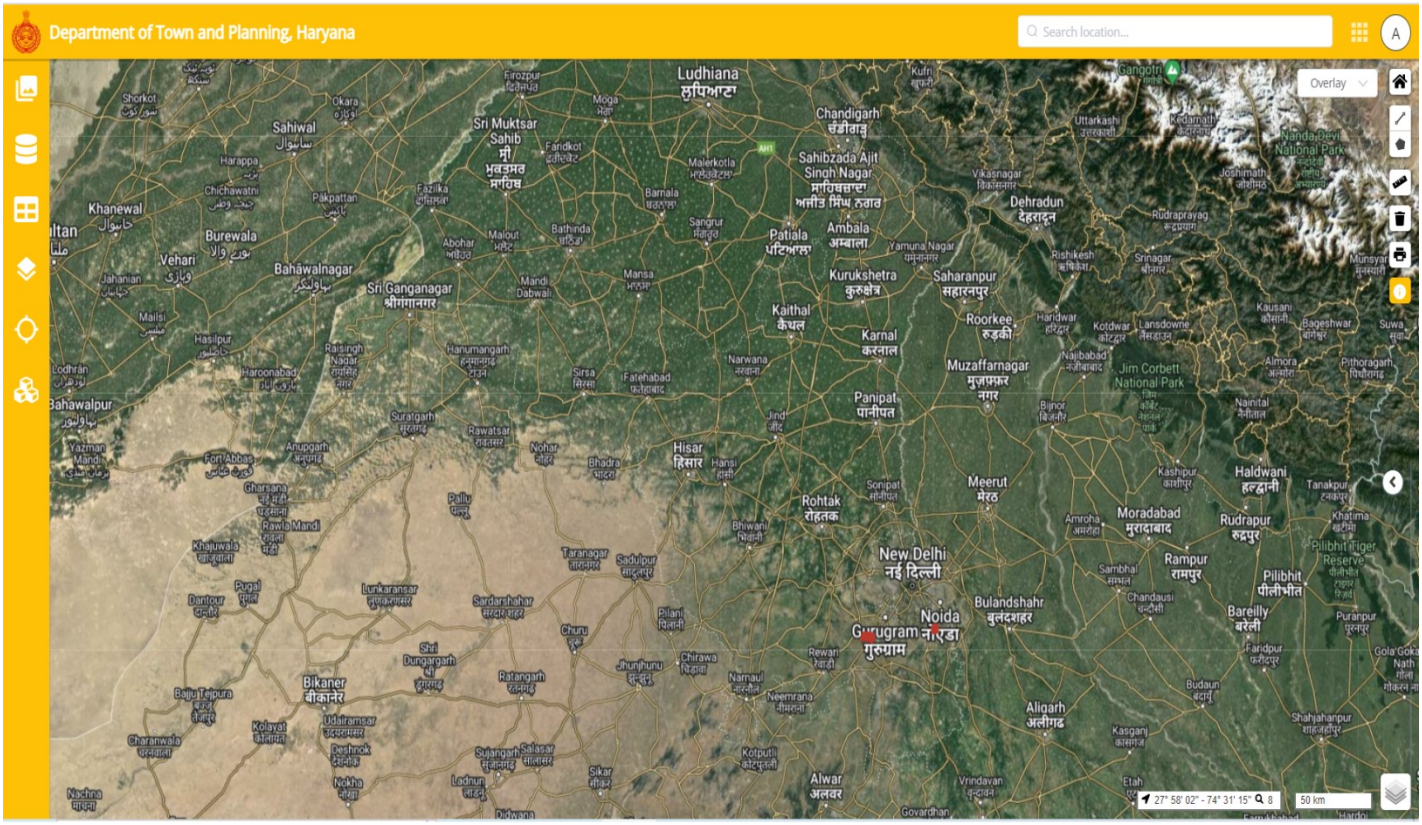


Image ii : Home Page

As you open the portal, a home page appears as shown in image ii. It has several features which includes :-

A. Imagery / Change Detection
B. Query Table
C. Enforcement Data
D. GIS Layers
E. GIS Query
F. Measurement Features
G. Map Viewing Layout
H. Layer Management Panel
I. Search Bar
J. Management
K. Map Features
L. 3-D Layer
M. Logout

A. Imagery/ Change Detection :-

As shown in image ii, on the top left corner below the Department logo you will find columns of modules, each module had a distinct feature and the first module is Imagery/ Change Detection. It includes 2 feature which are explained below.

Change Detection

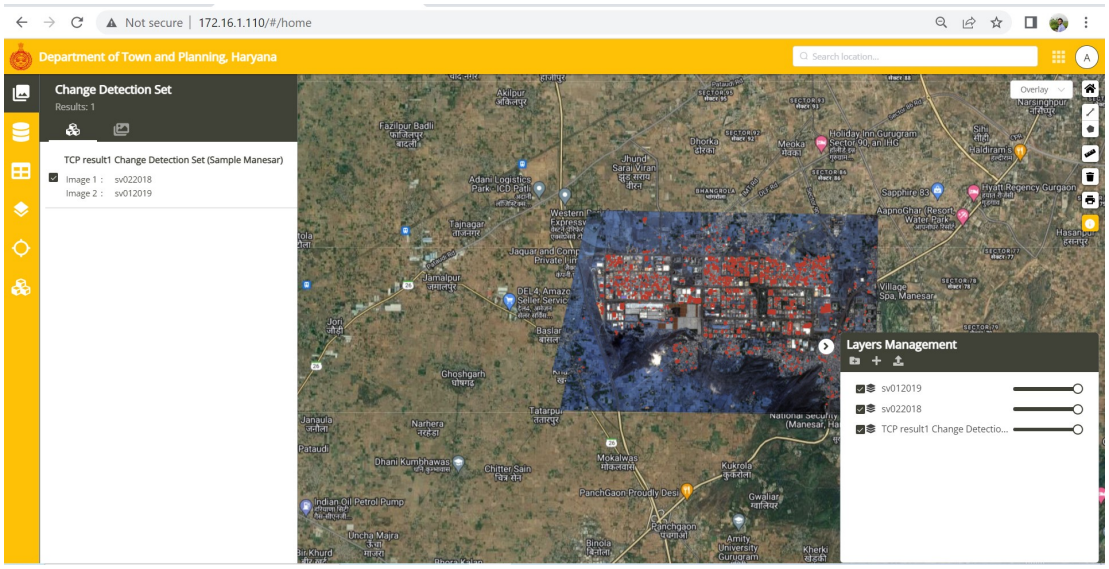


Image iii : Change Detection

As shown in image iii, on clicking the module, a panel will appear from left in which the first logo is for change detection. The logo is present below the label change detection set and it looks like  . On selecting this logo a list of data will appear with available change detection set. Select the desired set and visualize them on the Map present on the right side. Each set shows the digitized layer of the change occur between the two image. The name of the images from which this change is detected is mentioned in the check box, this make it easy to understand the time period of the change occurrence.

In this module you can also see total number of results present or we can say the total number of change detection set available for visualization can be viewed. It is marked as results and is located between the Change Detection Set label and the change detection button.

Satellite Image Layer

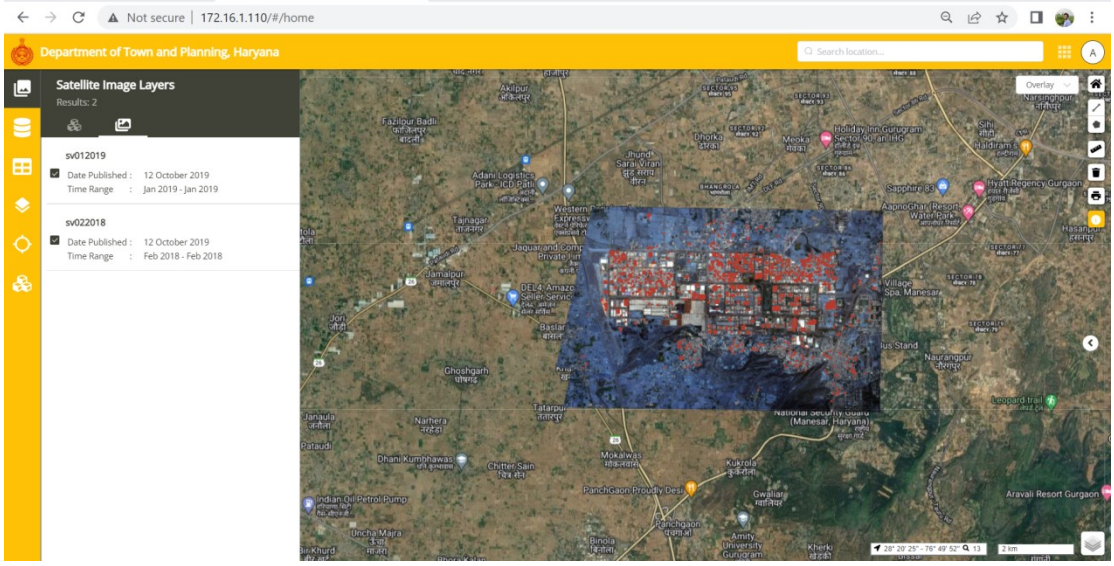


Image iv : Satellite Image

As shown in image iv, on clicking the module, a panel will appear from left in which the second logo is for Satellite Image Layer. The logo is present below the label Satellite Image Layer label and it looks like  . On selecting this logo a list of data will appear with available Satellite Images. Select the desired image and visualize them on the Map present on the right side. Each and every image contain two information which are Date of Publish, which means the date on which the image is incorporated on the portal. Secondly, the Time Range, which means the time frame in which the image is originally captured.

In this module you can also see total number of results present or we can say the total number of Satellite image layer available for visualization can be viewed. It is marked as results and is located between the Satellite Image Layer Label and the Satellite image button.

B. Query Table :-

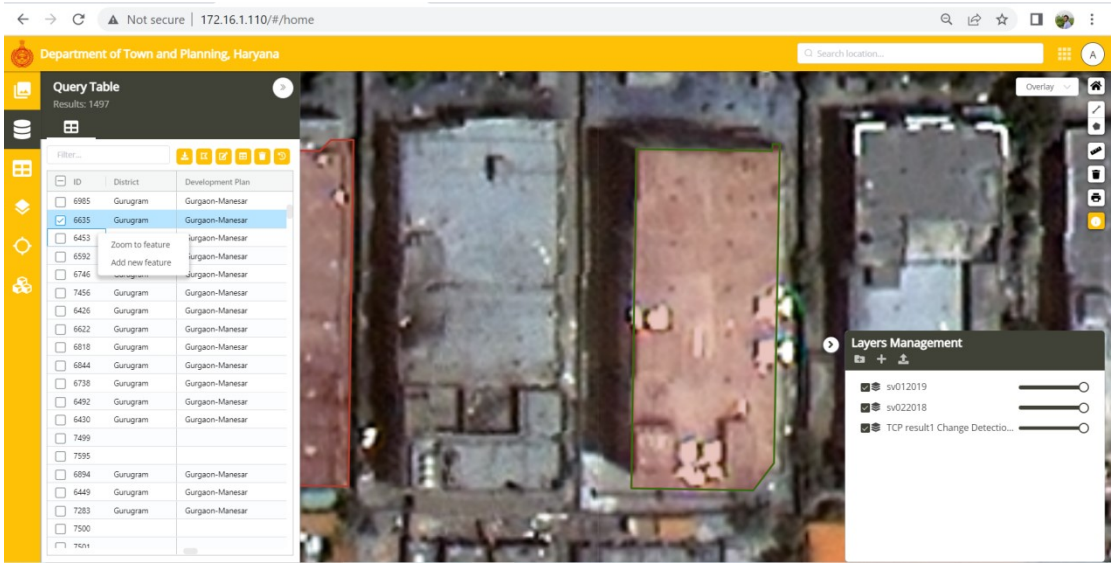
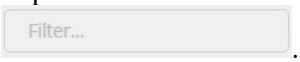


Image v : Query Table

As shown in image v, the second module is for Query Table and it looks like  . on clicking on this button a panel will appear from left. This panel contains various information about the various features which we will discuss. It contains mainly the information of features present in the Map.

Various features of this panel are :-

- **Toggle Table :-** This feature is used to show a more detailed view of the table. By clicking on this button the query table converts from vertical to horizontal panel and provides more details and may help in accessibility. The toggle button is present on top right corner of the panel and it looks like  .
- **Filter Bar :-** This feature is used to search or filter the table according to the user's requirement. It is located below the Query Table Label, and it look like 

.
- **Feature Editing :-** Just adjacent to the filter bar various buttons are present which looks like  . Each button has its function, moving left to right, first button is to download the table/ file in .csv format. Second button is for drawing new feature. Third is for updating one selected feature shape. Forth button is for updating selected feature properties. Fifth is for deleting the selected feature, and lastly sixth button is for resetting the filter.
- **Query Table :-** This is the table present in the image v. It contains the properties and information of the features. Each feature is individually places in a row and has a check box to show/hide the feature. First row of the table contains property and it also contains a check box to show/hide all the features at once. On right clicking the feature two options appears which are zoom to feature and add new feature. You can use those feature for easier navigation.

C. Enforcement Data :-

The third module in the left side vertical bar is for enforcement data. The findings from the change detection report and the data from the mobile application is displayed in this module in a dashboard forms, as shown in image vi, image vii and image viii. On selecting the range in the enforcement data date range selector you will get the data of the that period of time, just select the range and click on load data.

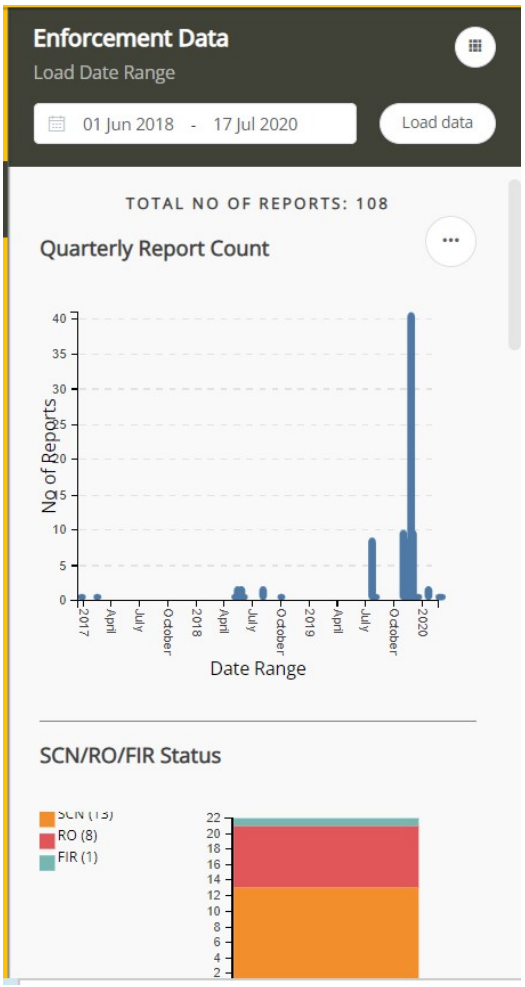


Image vi : Enforcement Data 1

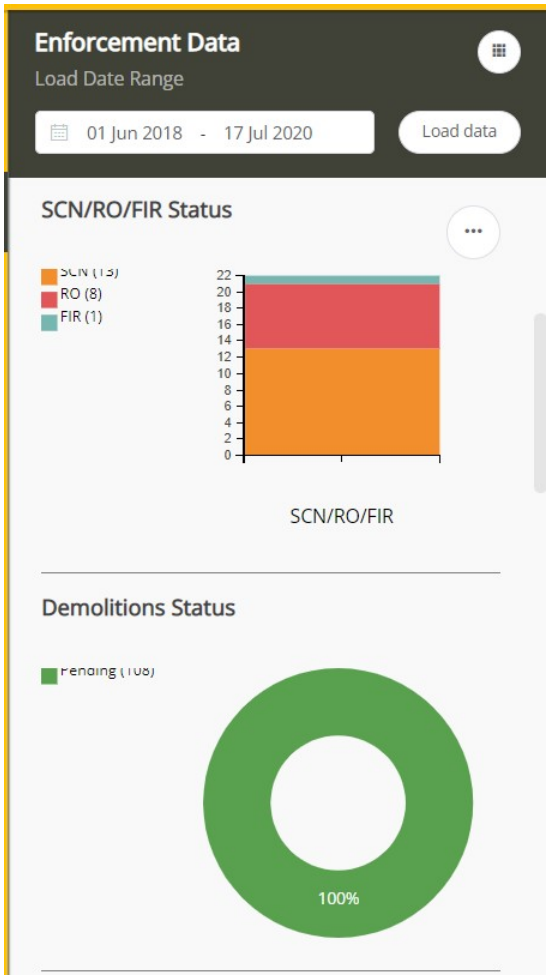


Image vii : Enforcement Data 2

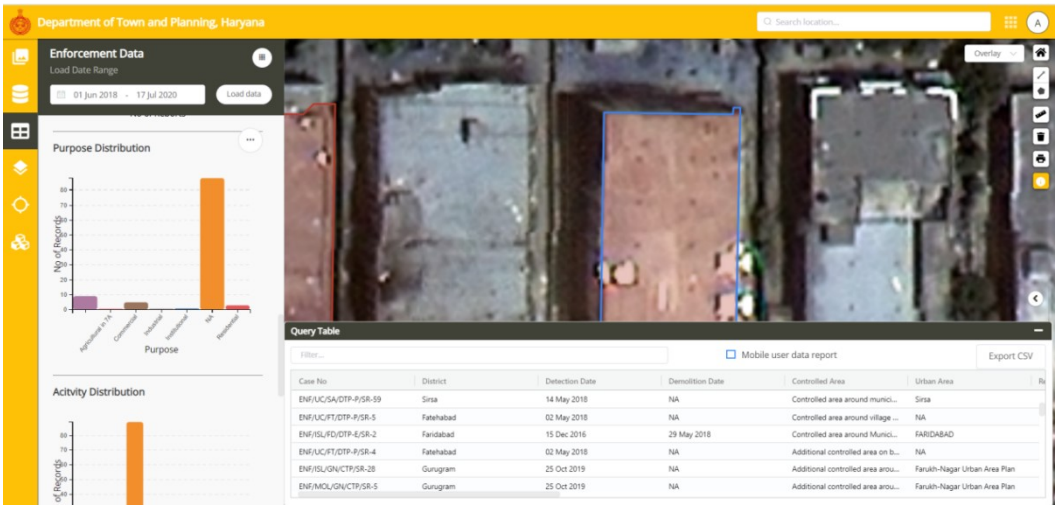


Image viii : Enforcement data 3

D. GIS Layers :-

The fourth module in the left side vertical bar is for GIS Layer. As shown in image ix. The purpose of this module is to add and visualize different layers to the results. There are various predefined layer present currently and New layers can also be added as per the needs, but the new layers can only be added by the administrator.
Currently there are various layers present like Building footprint, development plan layer, controlled area layer etc. Each of these layer has different features to it for example building footprint layer contains the footprint of the buildings, controlled area layer includes urban area boundary, khasra boundary, Revenue State boundary etc.

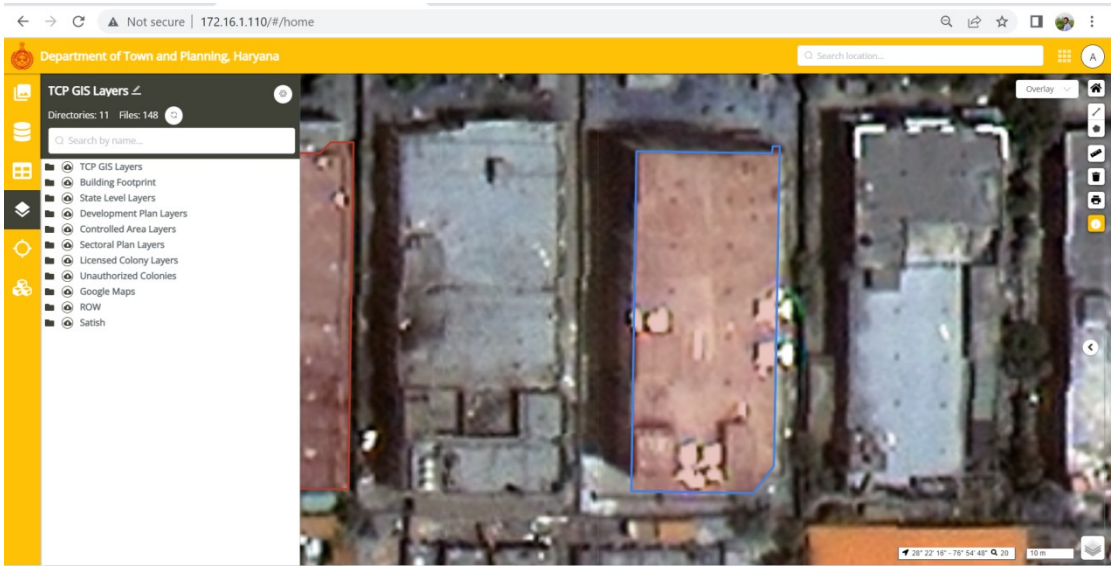
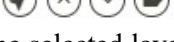


Image ix : GIS Layer 1

As you click on  , the panel will appear from the left. In this panel you will find the list of layer folders, search bar, total number of Folder/Directories, Module label, refresh button, setting button and total number of files/ layers.

On clicking  buttons (as shown in image x), the layer folder will expand and all the layers present in that folder will be made visible to hide the layers in the folder click on the folder button again.

On clicking  button (as shown in image x), present beside the layer folder and layer file, is a show/hide button. When clicked on this button on the folder layer all the layers present inside the folder will be made visible on the map. Similarly when clicked on this button on the layer it will show only the layer. This help in reading and visualization of a single layer more easy and convenient.

As you open a single directory or folder you will find various layer files present inside it, and each layer has some actions buttons present below the layer name (refer image x) to make the layer more accessible friendly. These are Zoom to layer, Move to top, Move to Bottom, Show/Hide Layer and these button looks like  . The first button from the left is Zoom to layer, it is used to zoom directly to the selected layer. Second button is Move to top, this is used when there are multiple layer on the same location and two or more layers overlap each other, in that case if the desired layer is below any other layer than this button will help in bringing the layer above all the layers. Third button is Move to bottom, this button is just

opposite of the move to top button, this button moves the layer to bottom of all the layer, And last but not the least, fourth button is Show/ Hide layer, this is used to show or hide any layer in the map.

Apart from all these button there are two more buttons present in this panel one of which is the refresh button, it is present just after the files count and looks like  . the purpose of this button is to refresh the layers after any editing have been made in the layer directory or layer files.

Another button is for settings, it is present on the top right corner of the panel. It includes a width bar, by which you can adjust the overall width of the layers. it looks like  . As you click on it a dialogue box appears which contains width bar, adjust it accordingly.

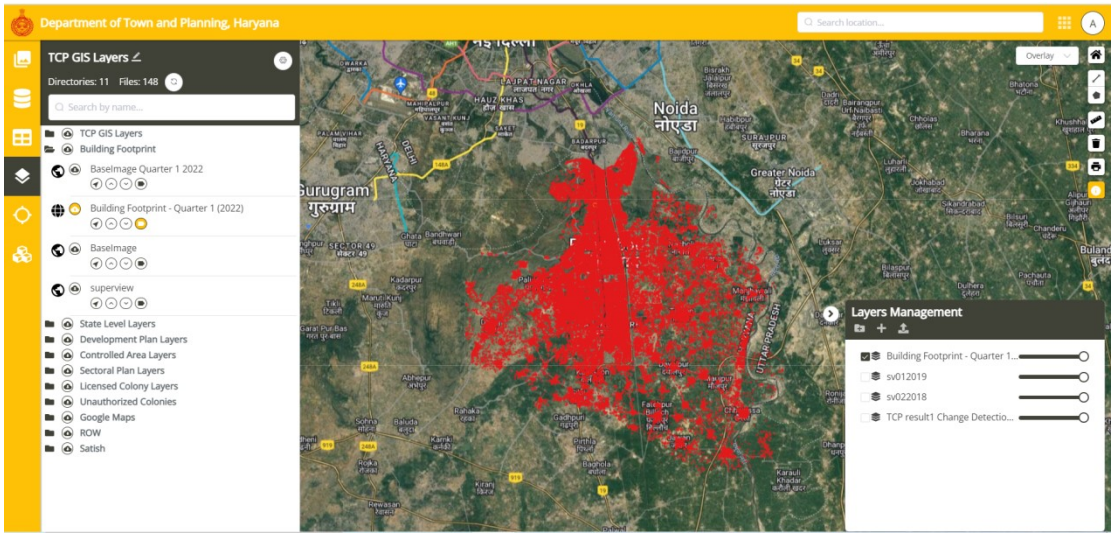


Image x : GIS Layer 2

E. GIS Query:-

The fifth module in the left side vertical bar is for GIS Query. As shown in image xi. The purpose of this module is to visualize or add a layer using various filtration like Controlled Area. Development Plan, Sectoral Plan, Licensed Colony, CLU Boundary as shown in image xi . Each of this filter has a sub category with drop down list as shown in image xii. Select the desired option from the drop down list and click on add layer as shown in image xiii.

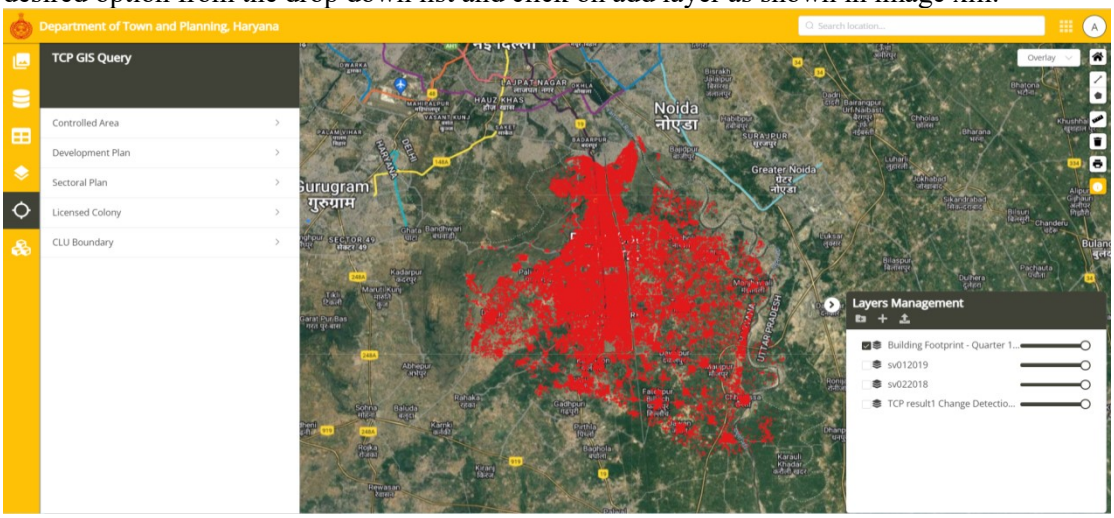


Image xi : GIS Query 1

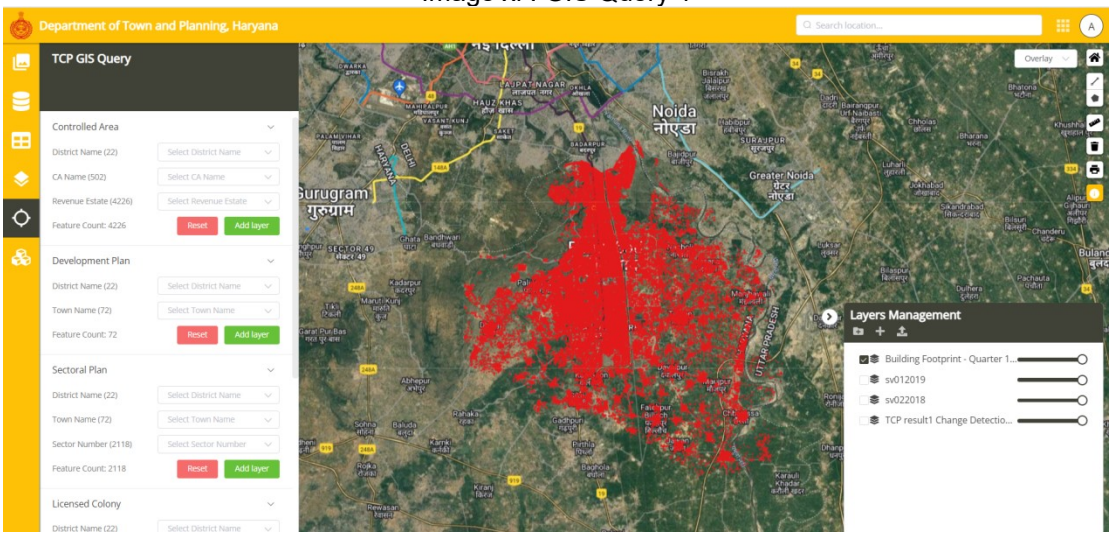


Image xii : GIS Query 2

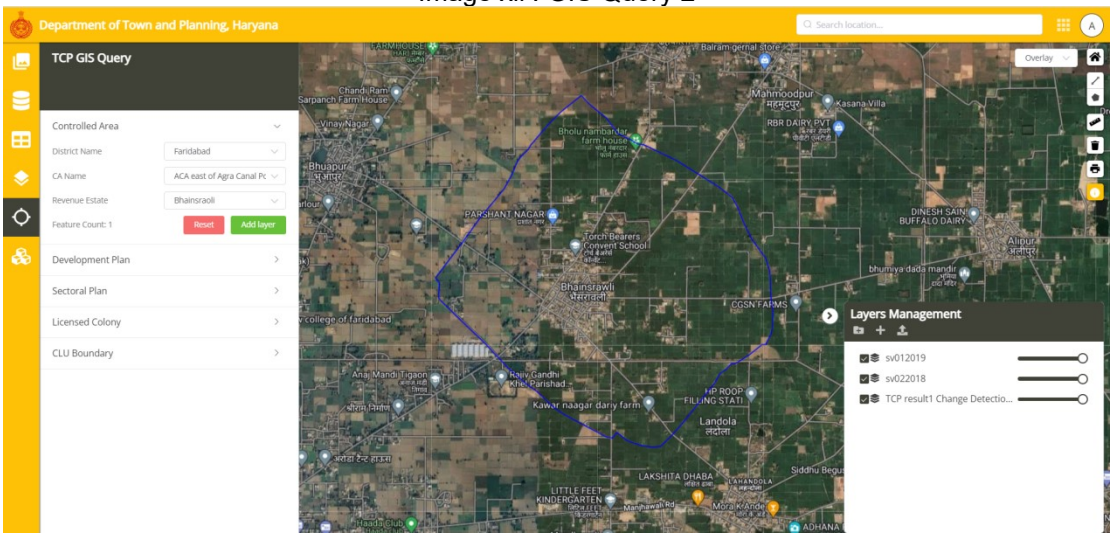


Image xiii : GIS Query 3

F. Measurement Features :-

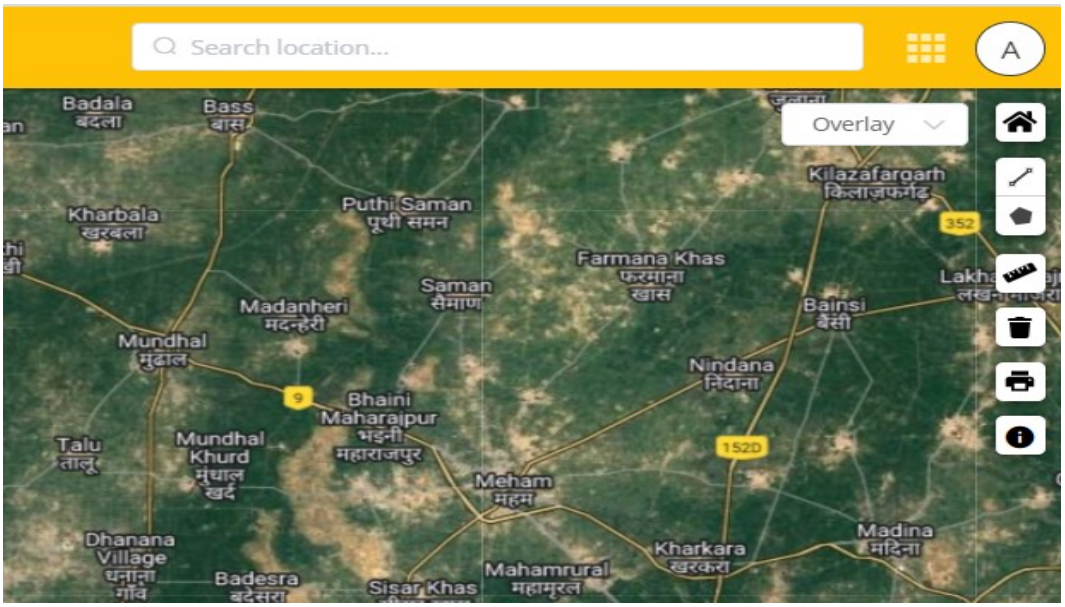


Image xiv : Measurement Features

As shown in the image xiv, on the top right side of the window you will find a columns with different buttons, these buttons are used to apply various features of the map :

- **Home :-** this button is present on the top of the column, it is denoted by . The function of this button is to bring the map to its home location or to bring the map to its original state.
- **Measure Distance :-** This button is present to the bottom of home button and is denoted by . the function of this button is to measure a distance from one point to another. On clicking this button you can select points on the map and find out the actual distance between the points.
- **Measure Area :-** This button is present to the bottom of home Measure distance and is denoted by . the function of this button is to measure area. On clicking this button you can draw a polygon on the map and find out the actual area of the polygon, it also denotes the measurement of the sides of polygon drawn.
- **Unit of Measure :-** This button is present to the bottom of home Measure Area and is denoted by . the function of this button is to change/ select the unit of distance and area according to the users convenience.
- **Clear Measurement :-** This button is present to the bottom of Unit of measurement and is denoted by . the function of this button is to clear all the distance and area drawn on the map.
- **Print Map :-** This button is present to the bottom of Clear measurement and is denoted by .. This button is used to Print a Map in PNG or PDF Format.

G. Map Layout :-

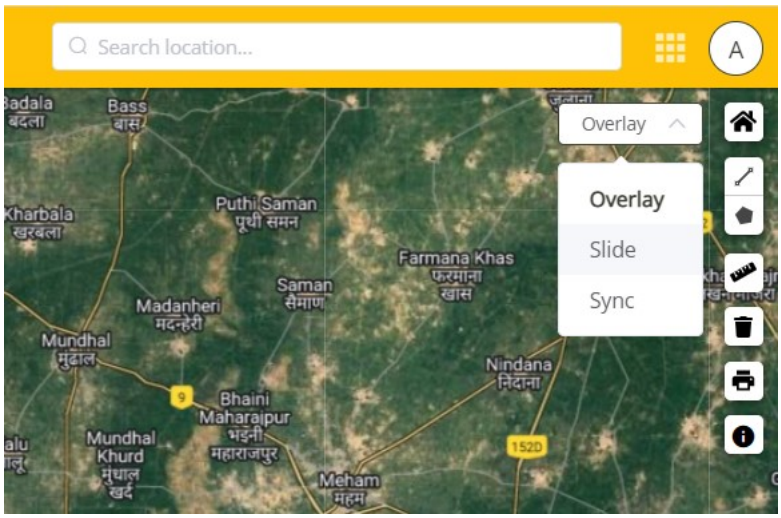


Image xv : Map Layout

As shown in the image xv,on the top right side corner below the search bar and adjacent to the measurement tools you will find a drop down list. This help in accessing the map in various layouts for better comparison between the maps. There are mainly three layouts available with overlay as a default layout.

- **Overlay:-** This is the default layout as shown in image ii, this helps in providing the overview of the whole map and help in better understanding of all the layers applied on the map in a wholesome way.
- **Slide :-** On selection of this layout, the map is divides and a slider is introduced in the map. You can select two different images simultaneous divided by a slider. As you move the slider the two images respond accordingly and give a sense of comparison between the two images, as shown in image xvi.

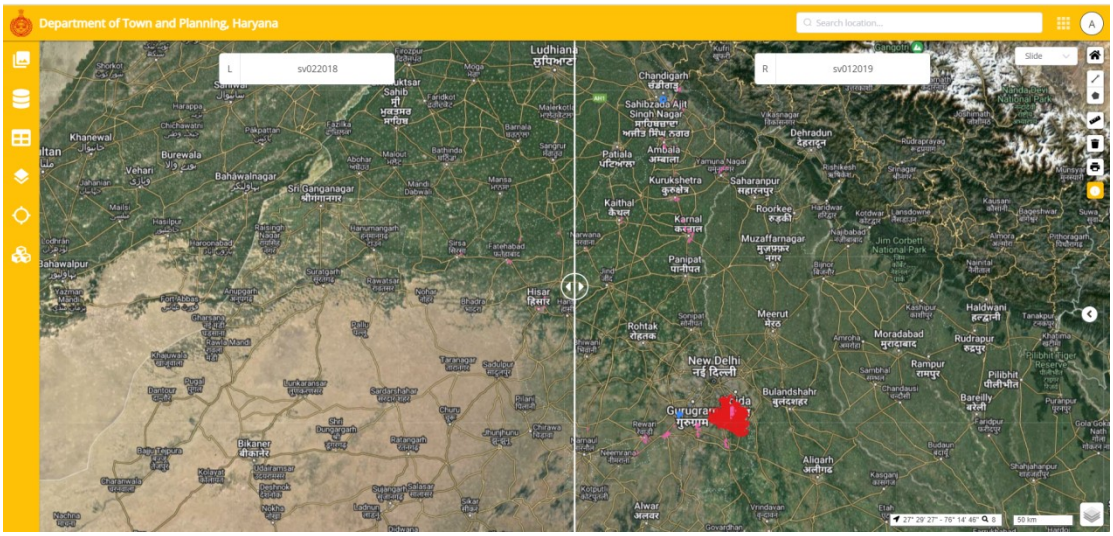


Image xvi : Map Layout Slide

- **Sync :-** On selection of this layout, the map is divides into equal parts. You can select two different images simultaneous which are divided by a straight vertical line. Unlike slide, here you need to drag the images and a same level of displacement takes place on both the maps it gives a sense of comparison between the two images, as shown in image xvii.

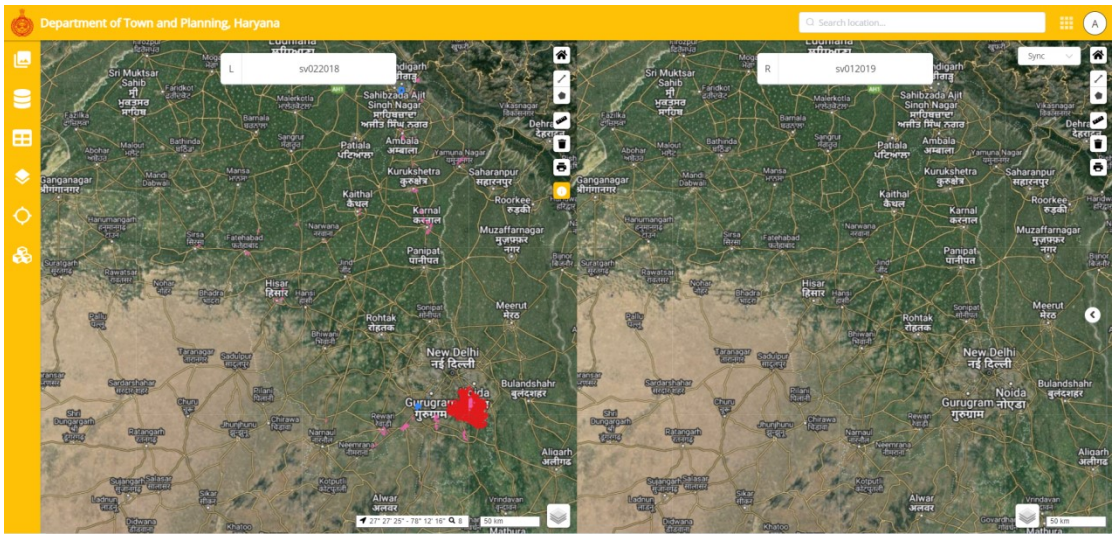


Image xvii : Map Layout Sync

H. Layer Management Panel :-

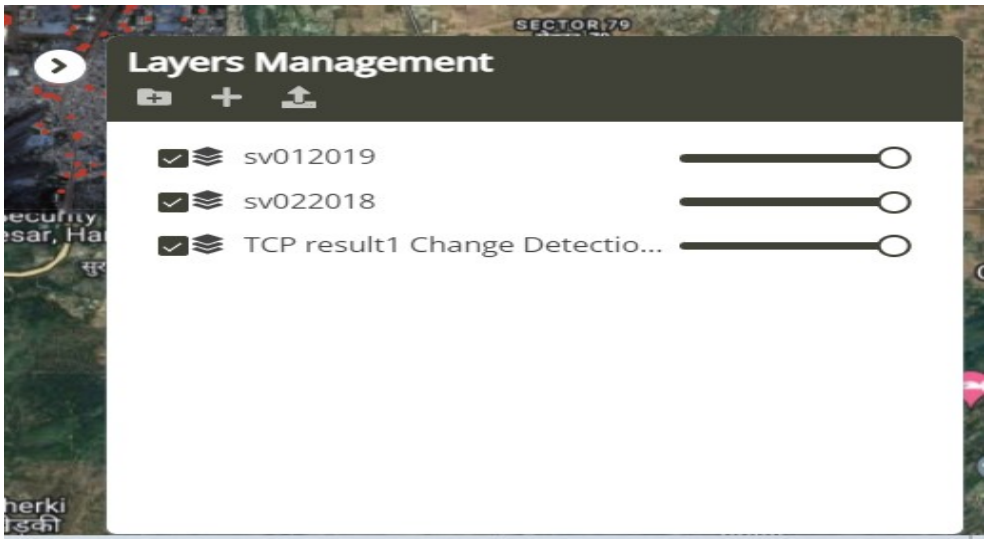


Image xviii : Layer Management Panel

As shown in image xviii on the bottom Right side you will find a small arrow button on clicking it a panel will appear with layer management.
Here you can manage the layers that are opened from the GIS layers, and change detection module.

Features of this panel :-

- **Folder Addition -** You can add a folder by clicking on the first button present on the top left corner of the panel.
- **Layer addition -** you can add/create layer by clicking on the second button present on the top left of the panel
- **Upload Layer -** You can upload a layer file in the format .shp, .geojson, .json, .kml, .kmz and .zip
- **Layers -** You can manage each layer present in the layer by making them appear and disappear using the check box present on the left side of the layer and also you can fade or manage the level of appearance by toggling the bar present on the right side of the layer name.

I. Management :-

As shown in image xix, you will find a symbol which appears like , and present just right to the search bar. The purpose of this function is for the admin to control the access and other make necessary changes according to the department requirements. This feature has three function, which are User Management, Roles Management and Layer Management.

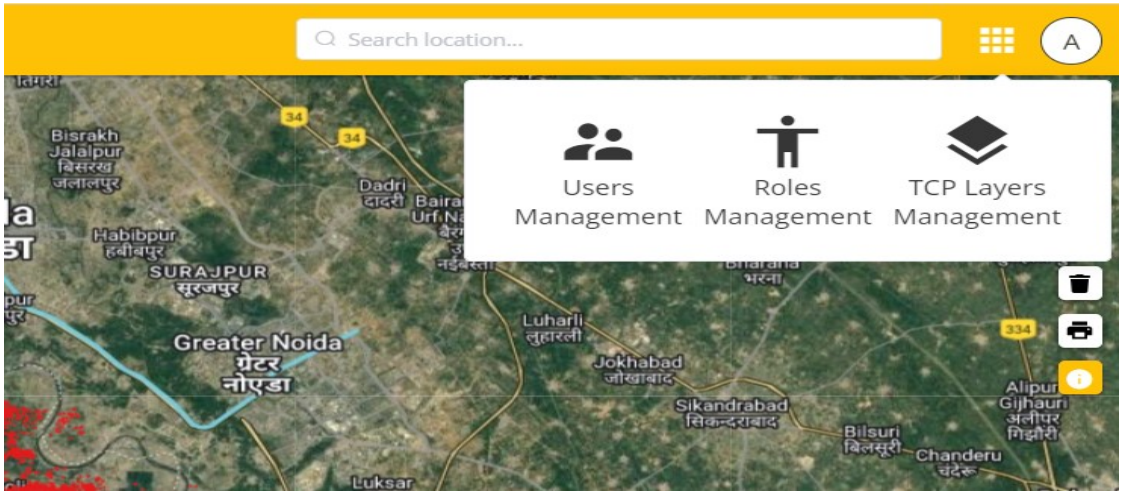


Image xix : Access Management

- **User Management :-**

As you click on the User Management a separate page will appear on the screen as shown in the image xx. This page includes the table for all the users registered. The administrator perform various function like

a) Add a new user by clicking on New User, and filling up the details like name, email id, password, role etc. of the user.

b) Delete the user by clicking on , present in the right column of each row. On clicking on this you will get a warning box, click ok if you want to delete the user.

c) Edit the details of the user by clicking on , present in the right column of each row. As you click on the button a form will appear, edit the form according to the requirements and click update.

Apart from these functions administrator can search any detail in the search bar, sort the table by different fields like First name, last name, Email, Created and Last updated.

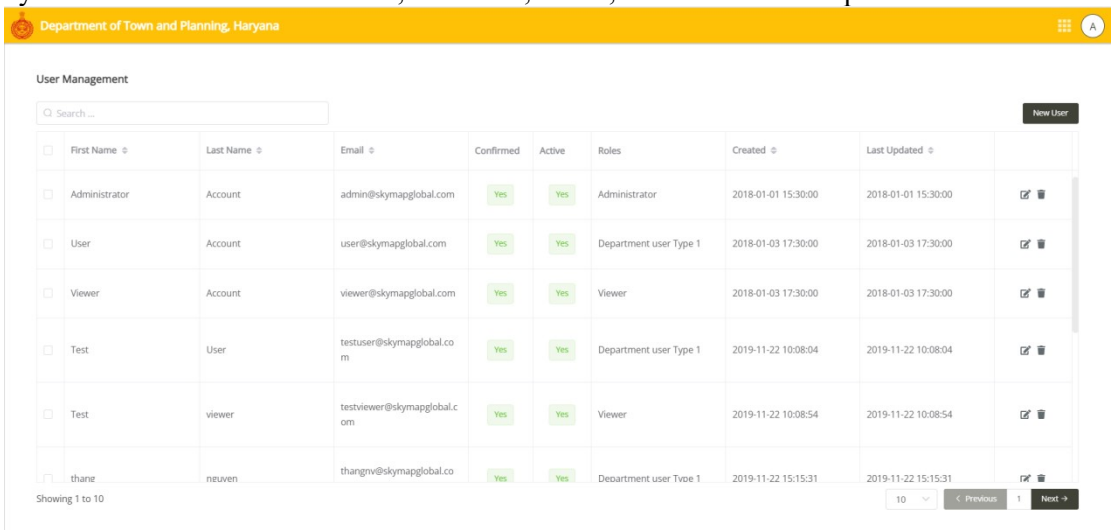


Image xx : User Management

- **Role Management:-**

As you click on the Role Management a separate page will appear on the screen as shown in the image xxi. This page includes the table for the types Roles available and the feature which a user can access.

Administrator can select the check box for what type of feature access can a user with a particular role access. As you select on the check box the permission will be granted as you deselect the permission can be denied. Administrator has access to all the features for obvious reasons.

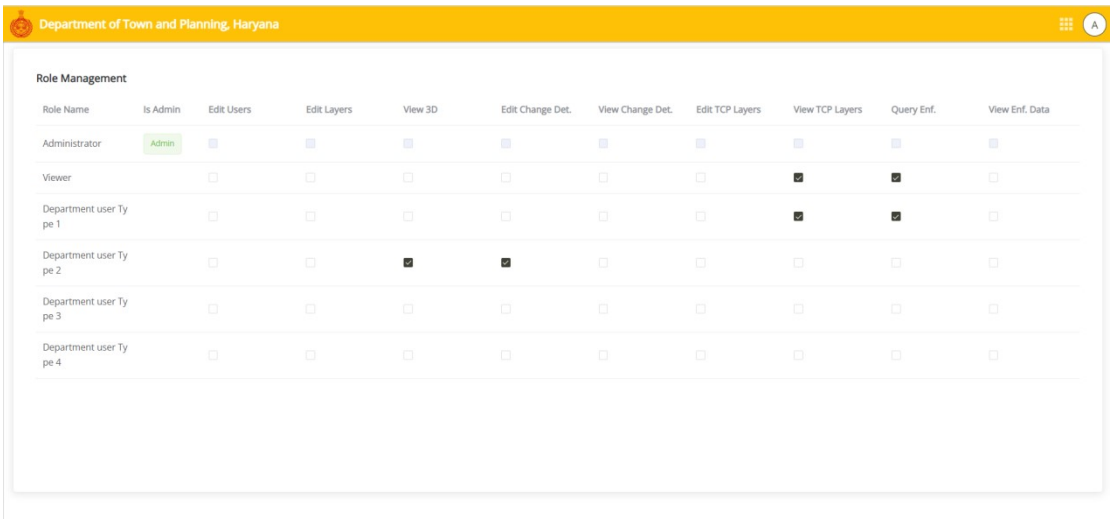


Image xxi : Role Management

- **Layer Management :-**

As you click on the Layer Management a separate Tab will appear will open as shown in the image xxii. After Login, Admin can check all the layers present and can make changes according to the requirement. Admin can,

a) Add or remove layer by clicking on  . Here by clicking on the green plus button admin can add a new layer, and by clicking on the red minus button admin can remove/delete any existing layer.

b) Edit Layer Properties, Layer Attributes and Layer Styling. This can be done by clicking on  . Here first button from the left is for making changes in the layer properties like title, format etc., second button is for making changes to attributes of the layer and third is for providing the suitable styling to the layer.

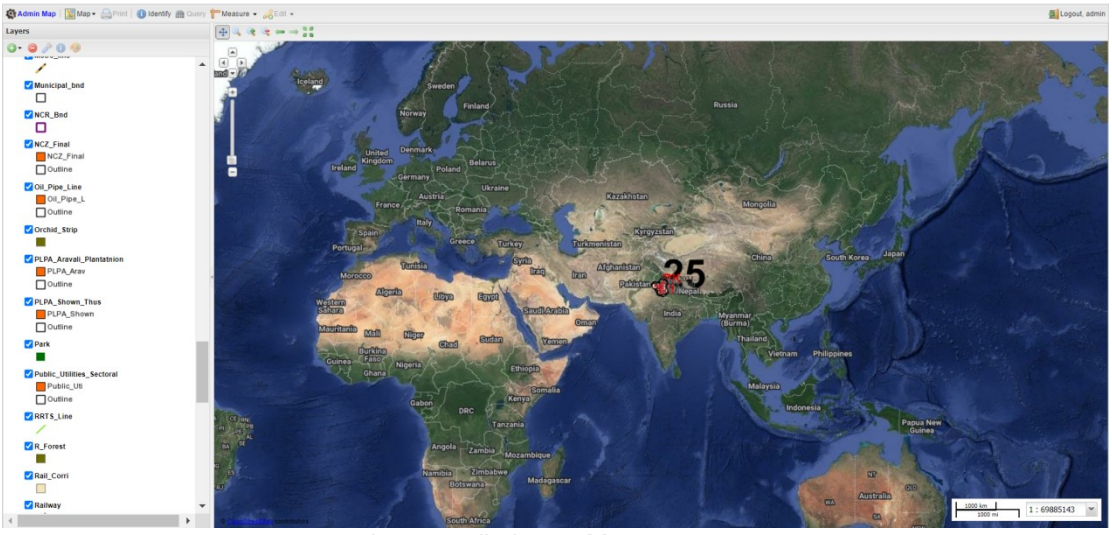


Image xxii : Layer Management

J. Map Features :-

Image xxiii : Map Features

As shown in the image xxiii this feature is present t the bottom right corner of the window. Is contains the information related to BaseMap on which all the related information is present and displayed. These features are as follows :-

- **Map -** This is the base layer of the display area, which helps in displaying valuable information with more ease.
- **Map Selection Checkbox -** This is the check box which appears when clicking on . Map options will appear, tick on the maps you want to use as a base map currently there are 3 options available, which are OpenStreet Map Basemap, Google Satellite Image and Camera Target Bound
- **Zoom Level -** As you zoom in or zoom out on the map the value of distance changes which can be seen in the bar present immediate Left to Map selection button.
- **Map Coordinate -** It is a bar present immediate left to the zoom level bar, it shows the coordinates of the mouse pointer location on the map.

K. 3-D Layer :-

The sixth module in the left side vertical bar is for 3-D layer. It looks like  . On clicking on this button a different Browser Tab will open, as shown in the image xxiv.

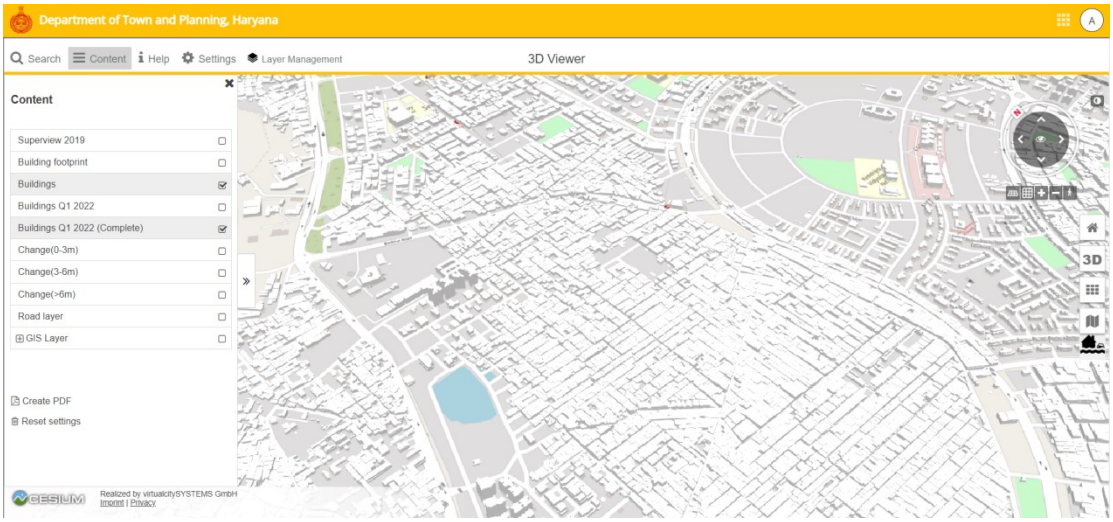


Image xxiv : 3-D Layer

This page has several feature but first and foremost function of this page is to view the 3-D of buildings. The various features are :-

a. **Content Panel :-** On the left side of the window you will find a panel with list of layers present in it and a check box is present besides the layer name. Click on the layer checkbox to enable or disable the layer as per your needs. Example Building Q1 2022 (complete) contains all the 3-D layer of the proposed AOI.

b. **Information Panel :-** On the top, you will find a bar, present just below the department name. The bar contains various options, first is search bar option, on clicking it a search bar appears on the screen and the user can search for the required results. Second is content panel, user can show/hide the content panel using this option. Third is help, this option contains a detail explanation or a detailed "how to" of the 3-D page. Fourth is settings, with the help of this option user can adjust the rendering settings, adjust various filters, and adjust various effects like blur. Night vision etc. Fifth is layer management, the purpose of this option is to manage the layer like adjusting the layer colour, Styling etc.

c. **Map Navigation :-** on the top right corner of the window you will find a circle that looks like  with direction arrow and an outer ring, the direction arrows a uses to move on the map and the outer ring is to denote the direction of movement. Below the circle few feature are present which looks like  . From left to right they are, Tilt down for tilting the map downwards, Tilt Upward for tilting the map upwards, Zoom in for zooming in of the map, Zoom out for zooming out of the map and Pedestrian view for providing the pedestrian perspective of the map.

d. **Home :-** This button looks like  . It is present below the map navigation on the left side of the window. Its purpose is to bring the map to its original view.

e. **Map Menu :-** This button looks like  . It is present below the home button on the left side of the window. Its purpose is to toggle the map between 2-D and 3-D view.

f. **Widget Menu :-** This button looks like  . It is present below the Map Menu on the left side of the window. It includes various functions like Advance Pedestrian view, Measurement, Drawing, PDF Export and Query widget.

g. **Overview Map :-** This button looks like . It is present below the widget menu on the left side of the window. Its purpose is to toggle the overview of the map.

h. **Flood Modelling :-** This button looks like . It is present below the Overview map on the left side of the window. Its purpose is to simulate flooding scenario. On clicking on this button a new window opens as shown in image xxxv.Just adjust the water height present on the top left corner of the map and the results will appear.

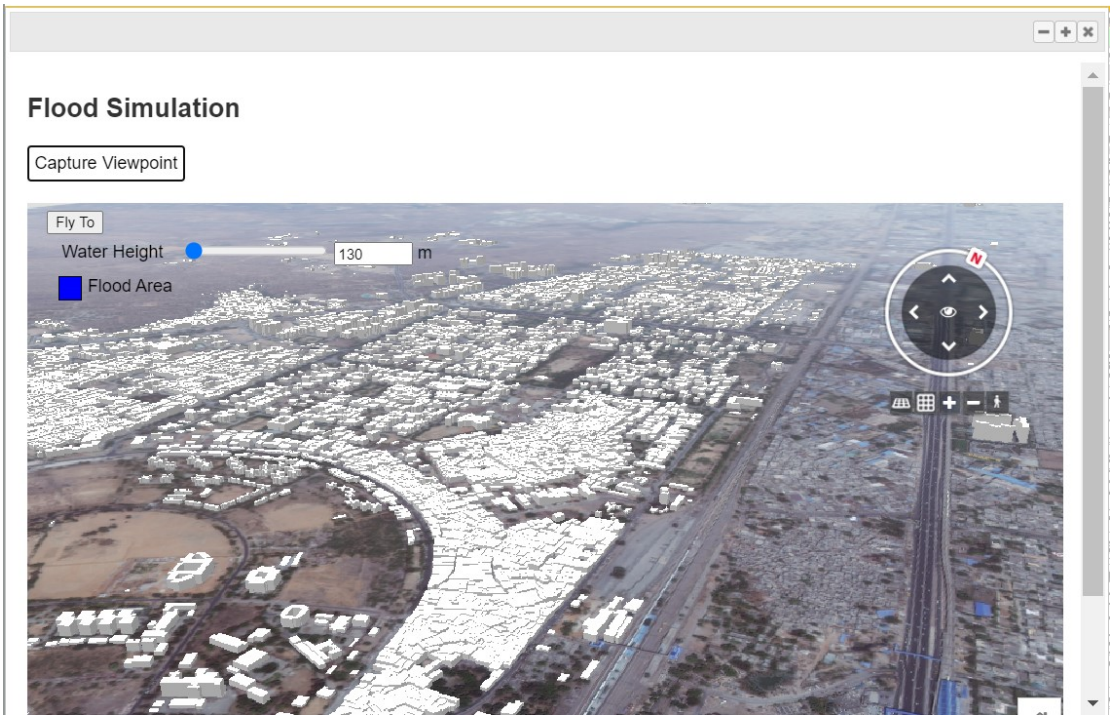


Image xxv : Flood Simulation

Image xxvi : 3-D Sample

L. Login/ Logout Options

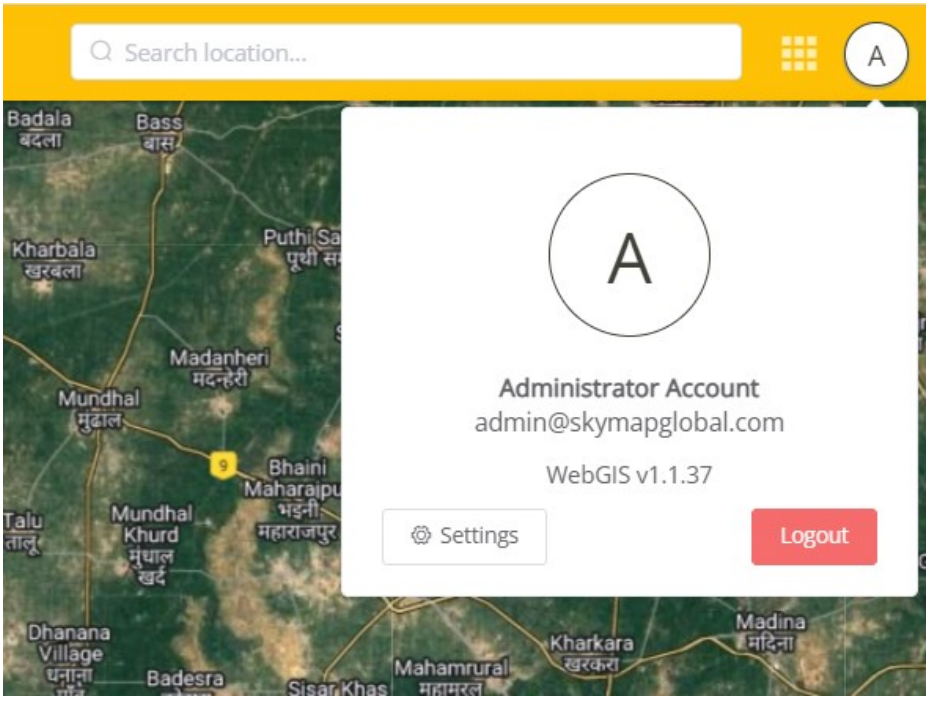


Image xxvii : Logout Option

As shown in Image xxvii a profile round button is placed on the top right corner of the window andon clicking on it a small panel appears which shows which reflects the account holder's name and email id. Also it shows the version currently used.

The panel contains two button :

- Logout - on clicking this button you will be logged out from the portal and will be redirected to the SSO page.
- Settings -On clicking this button and new page will appear as shown in image xxiii. Here you can see the user Information.

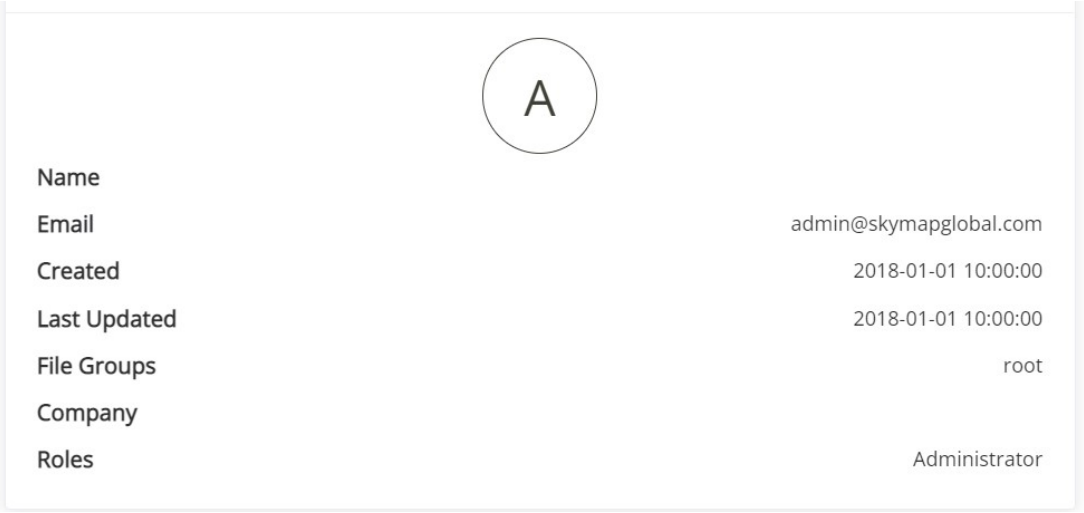


Image xxviii : User Profile