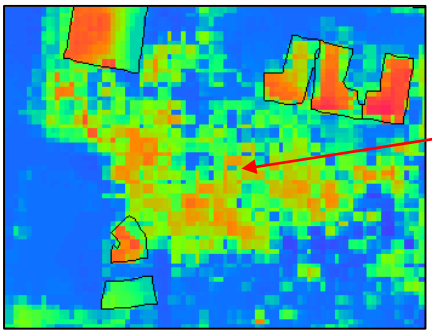
Exercise 4b: Generating a database of elements at risk

Generating a database of elements at risk using existing data

In this page and in the next page are represented some of the most common case of difference in the height between a DTM and a DSM, that are not classified in the building map. For example the vegetation is not represented in the DTM but is sampled by the Lidar image. For this reason we mask the buildings, in order to remove the other object.



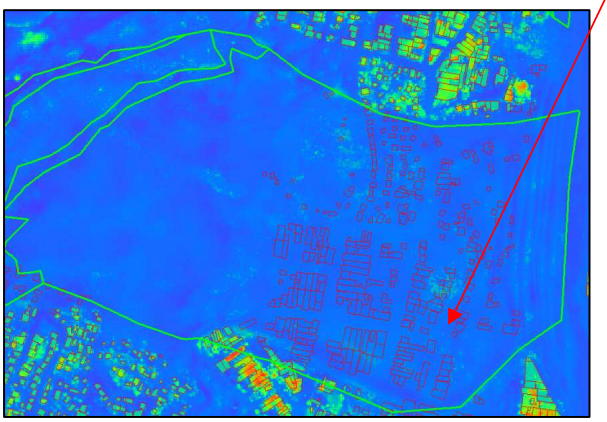
Altitude_dif.

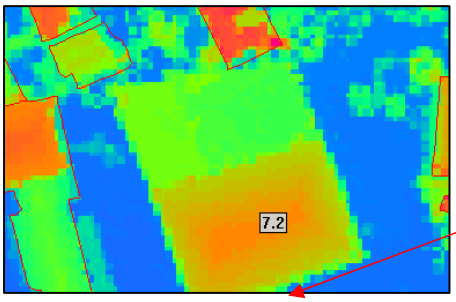
Vegetation

High resolution image and buildings segment.

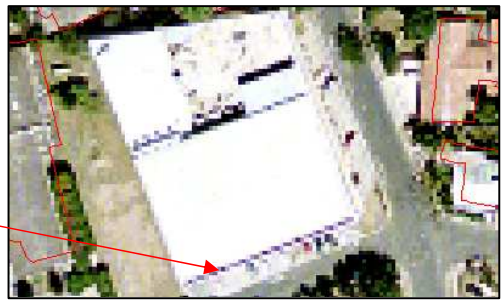
High resolution image, landslide map and building map.

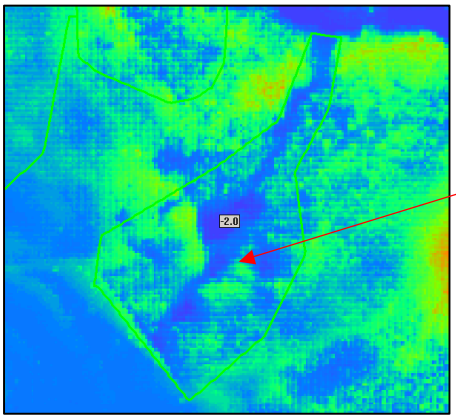
In this case you can see some buildings destroyed after the reactivation of the landslide (1998).



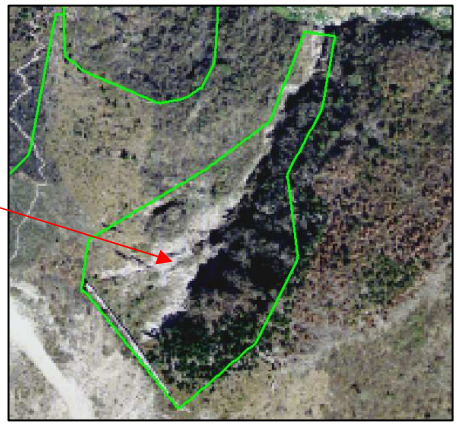


Altitude_dif, landslide map and building_map
You can see the building of new construction.

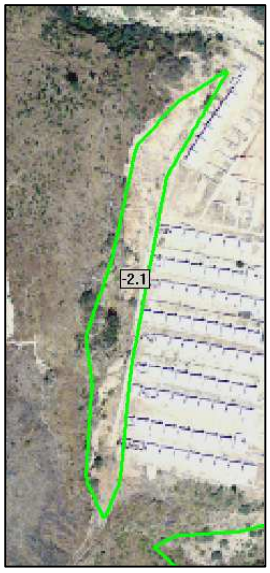




Landslide

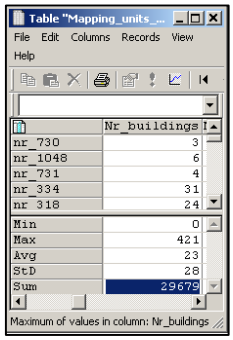


X	Y	How much Difference?	Possible reason
478037	1558840	1	Building destroyed by floods
476814	1559954	-1.5	landslide scarp
476593	1561467	9.9	Vegetation
477391	1559095	8.7	Bridge
479047	1558249	7.2	New building
478183	1558158	-2.8	Landslide scarp
476323	1560542	-2.1	Landslide scarp



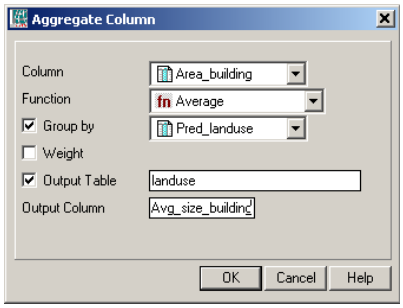
4b.2.1 Estimating the number of buildings using a building footprint map

If you open the **Mapping_units_attribute**, you are able to read that there are 29679 buildings.



Building size	Answer
Number of buildings in total area using the building footprint map (building map)	29679
Number of buildings in total area using the rough estimation made in exercise 3.1.3	26551
Difference	3128

For experienced ILWIS users:



Calculate the average building size for each of the land use classes.

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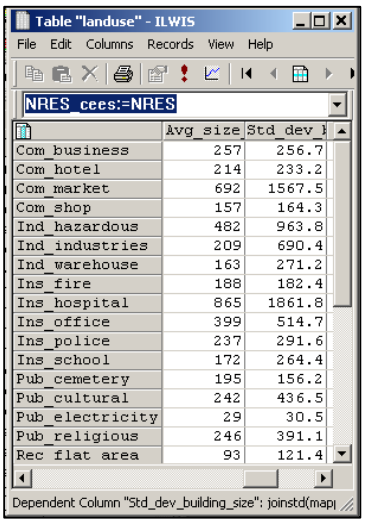
- Open the **mapping_units_building** and join with the **Mapping_units** table. Read in the **Pred_landuse** column.
- Go to *columns, aggregation*, select the column **Area_building**, the **Average function** and aggregate by **Pred_landuse**. Type in the output table "**landuse**" and call the output column **Avg_size_building**. See the image left.
- Go to *columns, aggregation*, select the column **Area_building**, the **Std_deviation**_function, and group by **Pred_landuse**. Store the new column **Std_dev_building** in the **landuse** table.

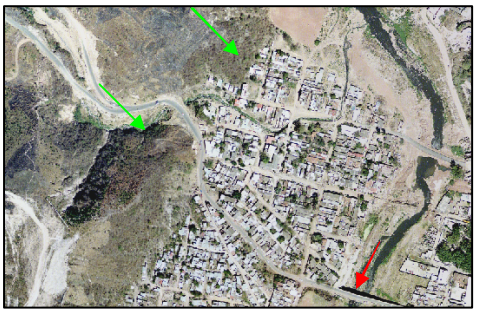
Table "landuse". You can see the two columns created: Avg_size_building and Std_deviation_building.



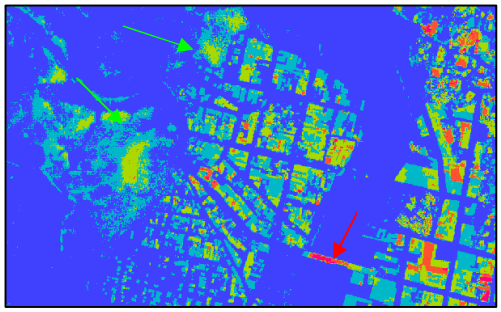
4b.2.2 Calculate building heights and total floorspace per mapping unit.

After the calculation of Nr_Floor, some areas have been masked (all the area and the object with value of altitude_diff less then 0). Now every pixel is expressed in number of floor, but is important mask with the buildings map, because are still present some areas with number of floors expressed as well they are not buildings (ex: bridge, high vegetation, etc).

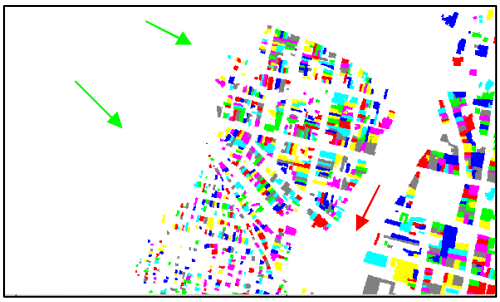
→Bridge
→Vegetation



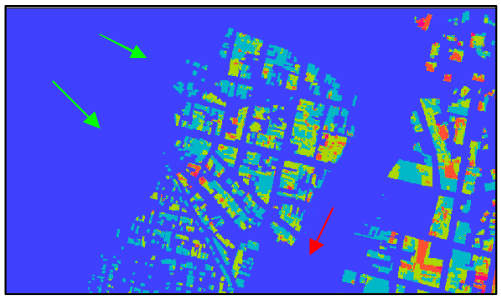
High resolution image



Nr_floors



Building map



Floors

Total buildings= 29238

Building height	Number	Percentage of total
1 floor	5878	20.10
2 floors	11681	39.95
3 floors	7644	26.14
3-10 floors	3543	12.12
>10 floors	29	0.10
Maximum height	…18…….. floors	

As you can see, the total number of buildings is slightly less than the value in the exercise 3.2.1. This is happens because the building with height less than 3 meter are not included.

Why do we use Average for number of floors and Sum for the floorspace?

- We are considering that every mapping unit has a unique landuse type. So is useful to know the average height of the different kind of buildings and so in every mapping unit.
- We use also the sum function to know the total floorspace per Mapping units.

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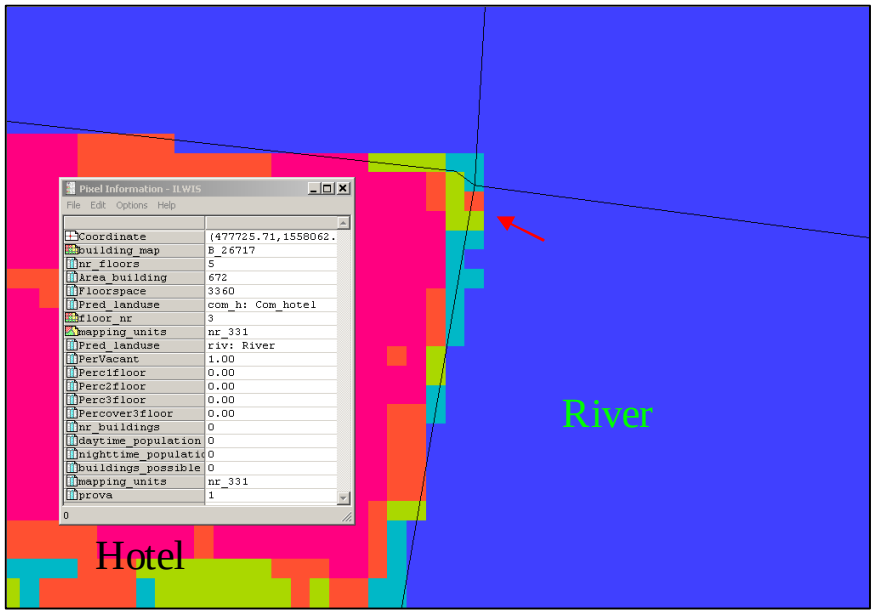
These two parameters could be useful for a more accurate distribution of the population per landuse type and mapping units.

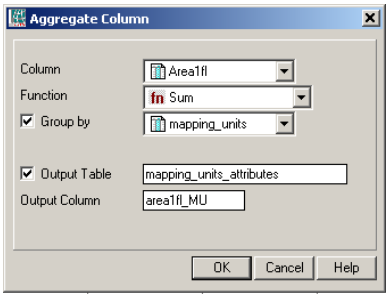
This misleading of the results is done because when we have evaluated the **Floors** (number of floor per building), we used the sum function in the aggregation.
In the following table are shown some example where this is a wrong assumption and not corresponding to the reality.

Mapping unit ID	Average nr of floors	Total floorspace	Why is this not correct?
Nr_1115 (stadium)	13	371514	This is an overestimation of the Avg Nr of floors.
Nr_1061 (flat_park)	4	10784	This is a park, without buildings and without floor.
Nr_717 (pub_cemetery)	2	1212	These are burial niche.
Nr_331 (river)	3	6971	This value cam from the building close to the river

The pixel belonging to the hotel is more then half in the mapping units Nr_331. This mapping unit is classified as "River" in the landuse type.
This determines a positive value of number of floor and floorspace (not admissible for a river).



For experienced ILWIS users:



If in your table there is not yet evaluated the total area per mapping units you can evaluate it creating a histogram by mapping_units and than joining the table mapping_units_attributes with the histogram (read in the Area).

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- After evaluate the **Area1fl, Area2fl, Area3fl** and **Areaoverfl** in the **Mapping_units_buildings** table, go to *column, aggreagate* and select **Area1fl**, the **sum** function and group by **mapping_units**. Store the results in the **Mapping_units_attributes** and call the output column **Area1fl_MU**. See the image left.
- Do the same for **Area1fl, Area2fl, Area3fl** and **Areaover3fl.**
- Open the **Mapping_units_Attributes** and type the following formulas:

perc_area1fl:=area1fl_MU/Total_Area*100

perc_area2fl:=area2fl_MU/Total_Area*100

perc_area3fl:=area3fl_MU/Total_Area*100

perc_areaover3fl:=areaover3fl_MU/Total_Area*100

Use a precision of 0.01