Measurement IN GIS

GEOSPATIAL DELHI LIMITED

Geospatial DELHI LIMITED
A Geo-knowledge Company (A Govt. of NCT of Delhi Company)

MAPS:-

- A **map** is a visual representation of an area – a symbolic depiction highlighting relationships between elements of that space such as objects, region, themes.

- The details represented in the map depends mostly on the scale at which the map is designed.

- Therefore Scale constitutes an integral element of the map.

Map Scale In Geography:-

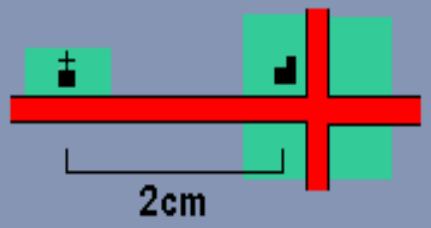
- "**SCALE**" which indicates the relationship between a certain distance on the map and the distance on the ground.
- Selecting the appropriate scale depends on the size of the sheet of paper and the accurate placement of features.
- **Scaling** is the process of measuring or ordering entities with respect to quantitative attributes or traits.

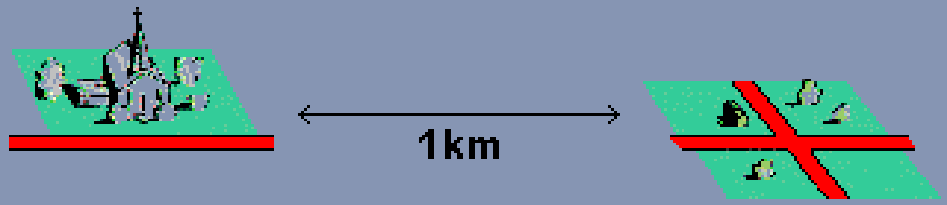
Why We Need Scale?

- A Map must by necessity be small enough to be handled by an individual.
- A full-size map of the Earth would not only be too large to be useful, but it would also be impractical to make.
- Hence Maps are scaled down so that they fit on the available paper or screen.
- To be most useful, a map must show locations and distances accurately on a sheet of paper of convenient size. This means that everything included in the map—ground area of rivers, lakes, roads & distances between any two features like trees, building and so on—must be shown proportionately smaller than they really are. The proportion chosen for a particular map is its scale.

How to Make A Map With Scale:-

- Maps are made to scale. In each case, the scale represents the ratio of a distance on the map to the actual distance on the ground.
- For example, if 2 cm on a map ...
- Represents 1 km on the ground





- The scale would be **2 cm = 1 km**, or

$$\frac{\text{Distance on the Map}}{\text{Distance on the Ground}} = \frac{2\,\text{cm}}{1\,\text{km}} = \frac{2\,\text{cm}}{100\,000\,\text{cm}} = \frac{1}{50\,000}$$

= 1/50 000 Scale

Representing Map Scale:

It is important that we recognize how to read, understand, and utilize scale as we examine the various maps that we encounter. There are three common approaches used by map makers to depict scale.

- The Representative Fraction Approach
- The Verbal Approach
- The Graphical Approach

The Representative Fractional Approach:

- The Fractional approach for portraying the scale of a map uses a representative fraction to describe the ratio between the map and the real world. This can be shown as 1:50,000 or 1/50,000.

  In this example, 1 unit of distance on the map represents 50,000 of the same units of distance in the real world. This means that 1 inch on the map represents 50,000 inches in the real world, 1 foot on the map represents 50,000 feet on the map, and so forth.

1:50,000

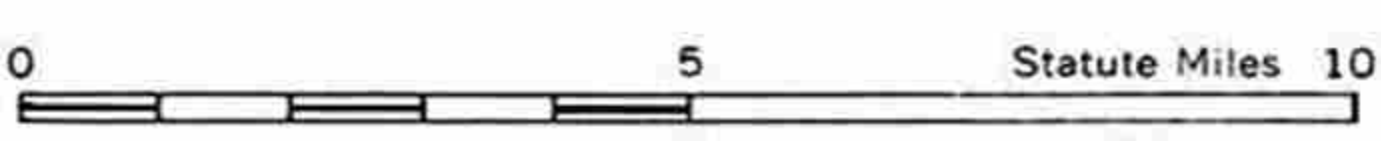
The Word Statement or Verbal Approach:

- The verbal approach of depicting scale simply uses words to describe the ratio between the map's scale and the real world. For example, a map might say something like, “Three inch equals 10 miles” or "One centimeter equals ten kilometers.

1 INCHES= 1MILES

The Graphic Approach :-

- A Graphical Scale Or Bar Scale depicts scale using a line, with separations marked by smaller intersecting lines, similar to a ruler. One side of the scale represents the distance on the map, while the other side represents the true distances of objects in real life. By measuring the distance between two objects on a map and then referring to the graphical scale, it is easy to calculate the actual distance between those same items.



- Here is an example of a Bar Scale found on a map. The scale shows that about 2 cm on the map represent 1 km on the ground.

- 1 km = 1*100000 cm
  =100 000 cm

$$\frac{\text{Distance on the Map}}{\text{Distance on the Ground}} = \frac{2\text{ cm}}{1\text{ km}} = \frac{2\text{ cm}}{100\,000\text{ cm}} = \frac{1}{50\,000}$$

= **1/50 000 Scale**

LARGE SCALE MAPS:-

1. Large scale maps show a small area in greater details.
2. Large scale refers to maps on which objects are relatively large
3. Maps with details of cities/towns/villages in general terms are called large scale maps.
4. The scale may be 1 cm = 50 m or 1 km

1:1250 scale-- Large Scale Map:

- Maps at a scale of 1:1250 are large-scale maps. One centimeter is equal to 1250 centimeters (or 12.5 meters) on the ground; four centimeters on the map, therefore, represents 50 meters on the ground (80cm = 1000 meters or 1 km).

- At this scale, roads, buildings, fences and landscape features are shown in detail. The shapes of individual buildings are accurately represented as well as being named or numbered.

- Mapping at 1:1250 and 1:2500 scales is used by central and local government, utilities (gas, electricity, water and telecommunications companies) and other organizations wanting highly detailed mapping for planning or business management purposes.

SMALL SCALE MAPS:-

1. Small scale maps show a larger area in less detail.
2. Small Scale are maps on which features are relatively small.
3. Wall maps or atlas maps representing features like mountains, plateaus, continents and countries are generally small scale maps.
4. Scale may be 1 cm = 100 km.

1:1 000 000 scale:- Small Scale Map:

- Maps at a scale of 1:1 000 000 (1:1 million) are extremely small-scale maps. One centimeter on a 1:1 000 000 scale map is equal to 1 000 000 centimeters (or 10 000 meters – 10 kilometers) on the ground; four centimeters on the map therefore represents 40 kilometers on the ground (10cm = 100km). Alternatively, one inch on the map is equal to 16 miles on the ground.

- Maps at 1:1 000 000 scale only show cities and major towns together with the motorway and primary route network. Country boundaries are shown and are sometimes colour coded to make their shape and location clearly distinguishable.

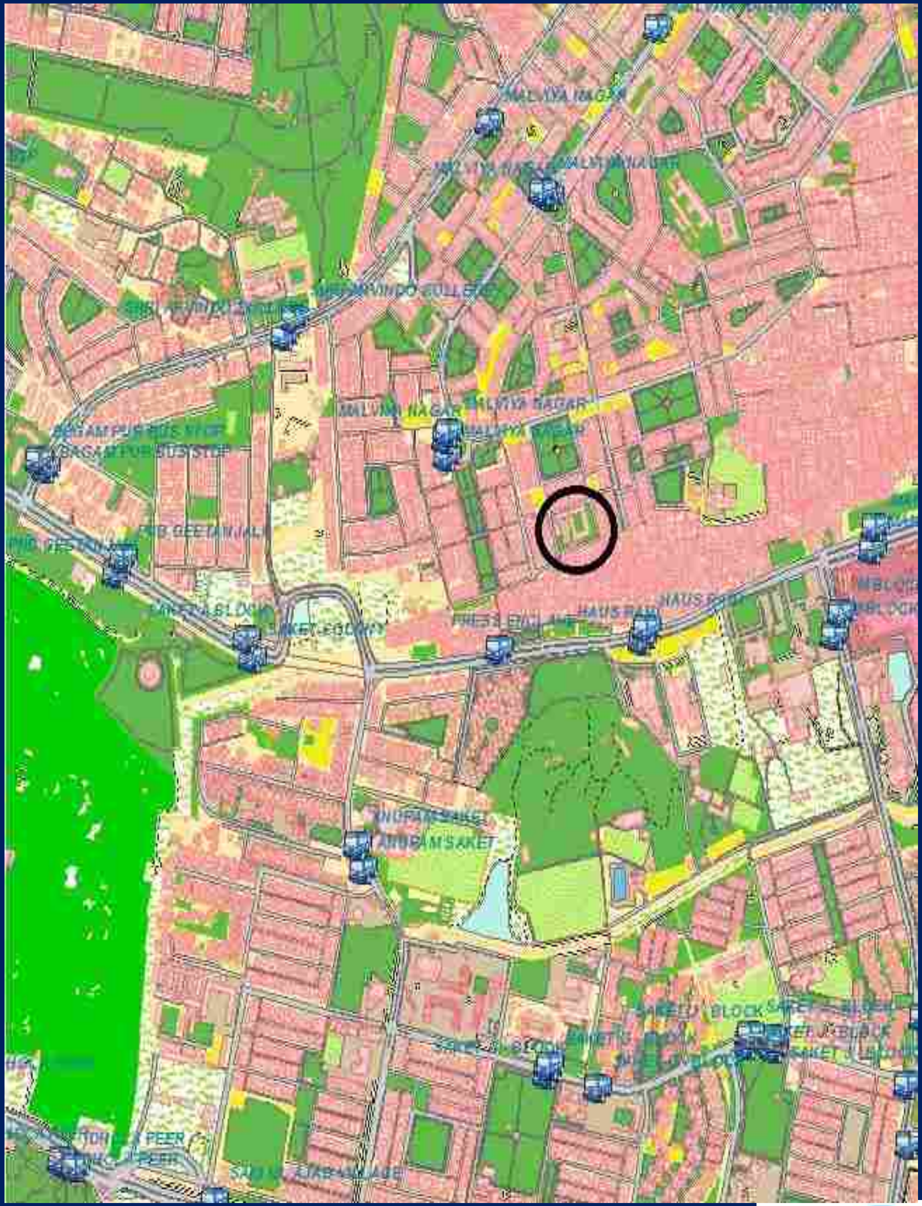
1:2000

Geospatial DELHI LIMITED
A Geo-knowledge Company (A Govt. of NCT of Delhi Company)

1:5000

Geospatial DELHI LIMITED
A Geo-knowledge Company (A Govt. of NCT of Delhi Company)

1:10,000



Geospatial DELHI LIMITED

A Geo-knowledge Company (A Govt. of NCT of Delhi Company)

1:25,000

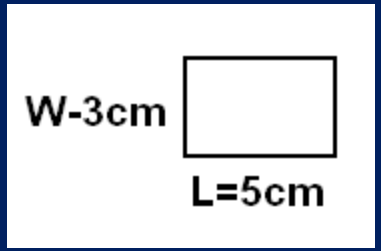
Geospatial DELHI LIMITED
A Geo-knowledge Company (A Govt. of NCT of Delhi Company)

- Large scale and small scale are subjective terms.
- For example a town planner who is used to working with plans at 1:1000, may consider 1:25 000 a small scale map.
- While an atlas compiler commonly working with maps of scales 1:5 000 000 would consider 1:25 000 a large scale map.

Example Of Scale:

Typical RF	1:1000 1:5,000 1:10,000	1:20,000 1:50,000 1:100,000	1:1,000,000 1:2,500,000
Description	LARGE-SCALE	MEDIUM-SCALE	SMALL-SCALE
Characteristics	• Depict small features • Show geometric shapes	• Small features disappear • Generalize geometric shapes • Good compromise between map detail and extent of map coverage	• Symbolize features, e.g., areas represented by point or line symbols • Show macro features, e.g., climatic zones

Method of Area calculation On map:



Scale is 1:4000

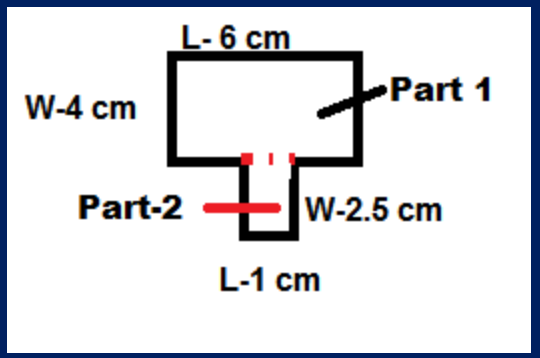
Length of the building on the ground= 5*4000cm
=20 000 cm or
=20 000/100=200 m

Width of the building on the ground=3*4000 cm
= 12 000 cm or
=12 000/100=120 m

Area of the Building = L* W sq m
=200*120 sq m
= 24000 sq m

Geospatial DELHI LIMITED
A Geo-knowledge Company (A Govt. of NCT of Delhi Company)

Method of Area calculation On map:



Scale is 1:6000

PART- 1 Shows--

Length of the building on the ground= 6*6000 cm

=36000 cm or

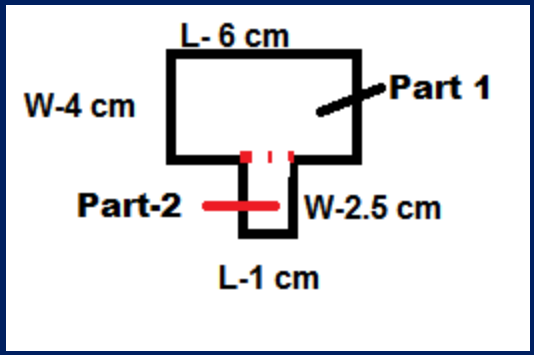
=36000/100=360 m

Width of the building on the ground=4*6000 cm

= 24 000 cm or

=24 000/100=240 m

Method of Area calculation On map:-



PART- 2 shows--

Length of the building on the ground= 1*6000 cm
=6000 cm or
=6000/100=60 m

Width of the building on the ground=2.5*6000 cm
= 15 000 cm or
=15000/100=150 m

Total Length On the ground=360+60 = 420 m
Total Width on the ground = 240+150=390 m

Area of the Building = L* W sq m
=420*390 sq m
= 163800 sq m

Geospatial DELHI LIMITED
A Geo-knowledge Company (A Govt. of NCT of Delhi Company)

THANK YOU

Geospatial DELHI LIMITED
A Geo-knowledge Company (A Govt. of NCT of Delhi Company)