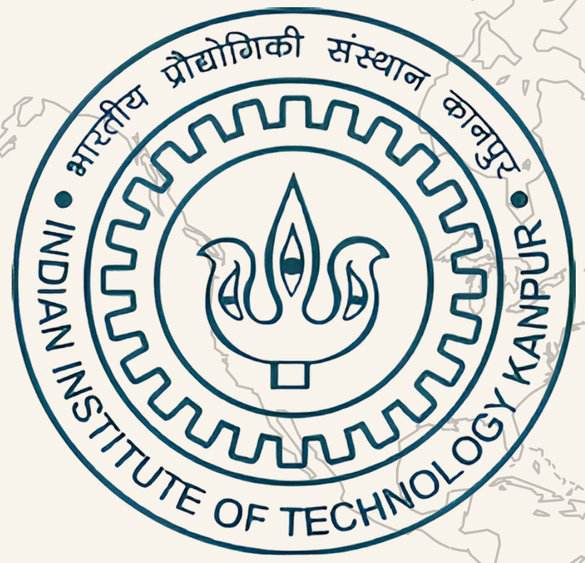

Department of Civil Engineering
IIT Kanpur

CE331 | PRINCIPLES OF GEOINFORMATICS

Project Presentation :

Thursday Group 3

Instructor: Dr. Salil Goel

GROUP MEMBERS

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INTRODUCTION

For our 331 lab project, our group undertook a comprehensive mapping exercise focused on the L-20 ground and parts of the Lecture Hall Complex. Over a period of six weeks, we established intervisible control points across the area and determined elevations for these points using an auto level. Additionally, we conducted precise measurements of internal angles and distances to complete a closed traverse. By employing GNSS, we obtained global coordinates for two control points and transferred them to other locations. Finally, we used QGIS software to map the area's features and produce a detailed map of our assigned region. This project enabled us to apply various surveying techniques and integrate geospatial data into a cohesive map.

OBJECTIVES

- To Establish a closed traverse such that for every point, the adjacent two points and visible.
- Find out the height of all the control points by levelling process.
- Find out the local coordinates of the control points by measuring all the sides and angles.a
- Using GNSS, to transfer the global coordinates to the local coordinates.
- To map the features of the area around each of the control point, using a total station.
- To prepare a map, using all of the data collected by QGIS Software

METHODOLOGY

Reconnaisance Survey

We conducted a reconnaissance survey of the designated area, establishing a network of eight control points in a closed traverse. Each point was positioned to ensure visibility to the two adjacent points. To maintain consistency and for future reference, we marked each control point with paint.

Control Points

Levelling

Next, we performed the leveling process using an auto level, transferring the benchmark height from the GI lab to our designated area. This benchmark height was referenced from sea level, allowing us to determine the elevations of the control points relative to mean sea level.

Traversing

Using a total station, we measured the side lengths and internal angles between each pair of control points in the network. These measurements allowed us to calculate the local coordinates of each control point, creating a detailed spatial map of the surveyed area. We applied Bowditch's rule to adjust any minor errors in the data, ensuring that the network is geometrically consistent and balanced.

Feature Mapping

We positioned our total station at each control point and mapped all surrounding features, including trees, electric poles, buildings, ground surfaces, roads, and manholes. Additionally, we collected contour point data to create contour lines on our map, enhancing the topographical detail.

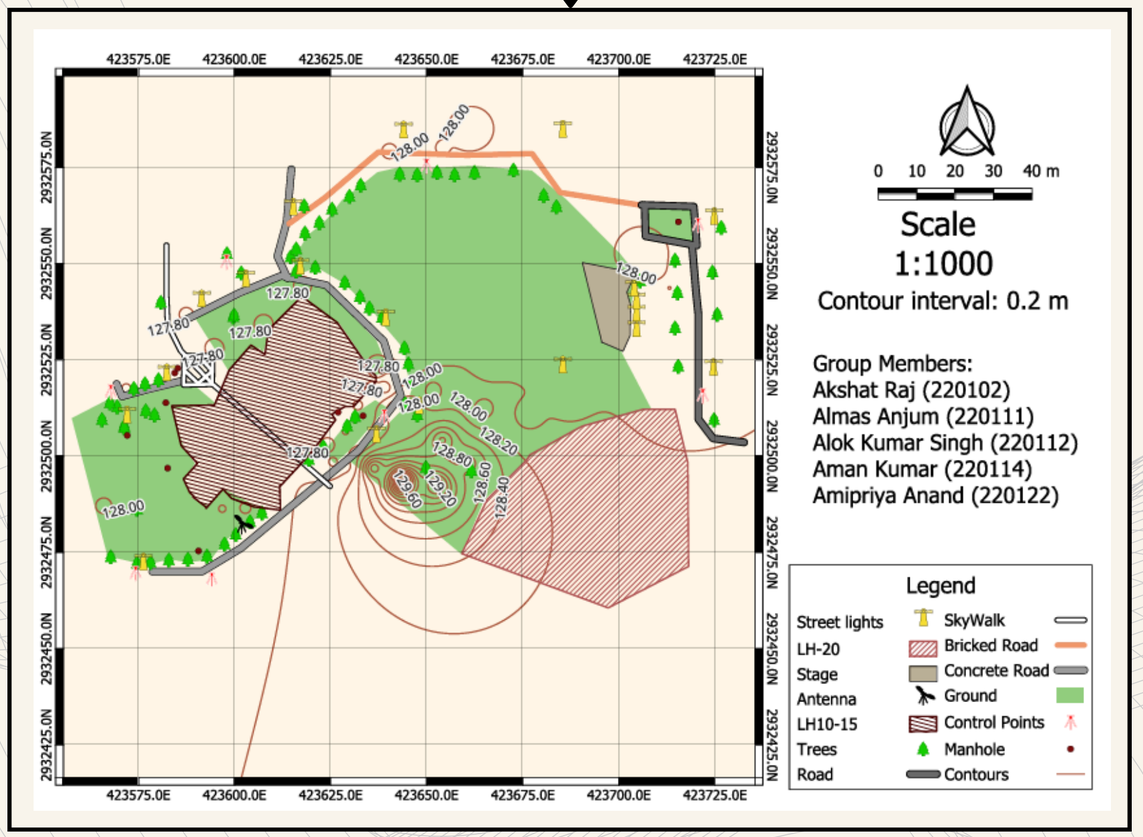
RL and Global Coordinates calculation

We employed a GNSS receiver to acquire global coordinates for two control points in our network. By using Affine transformation, we then adjusted and transformed the local coordinates of the remaining control points to align with the global system.

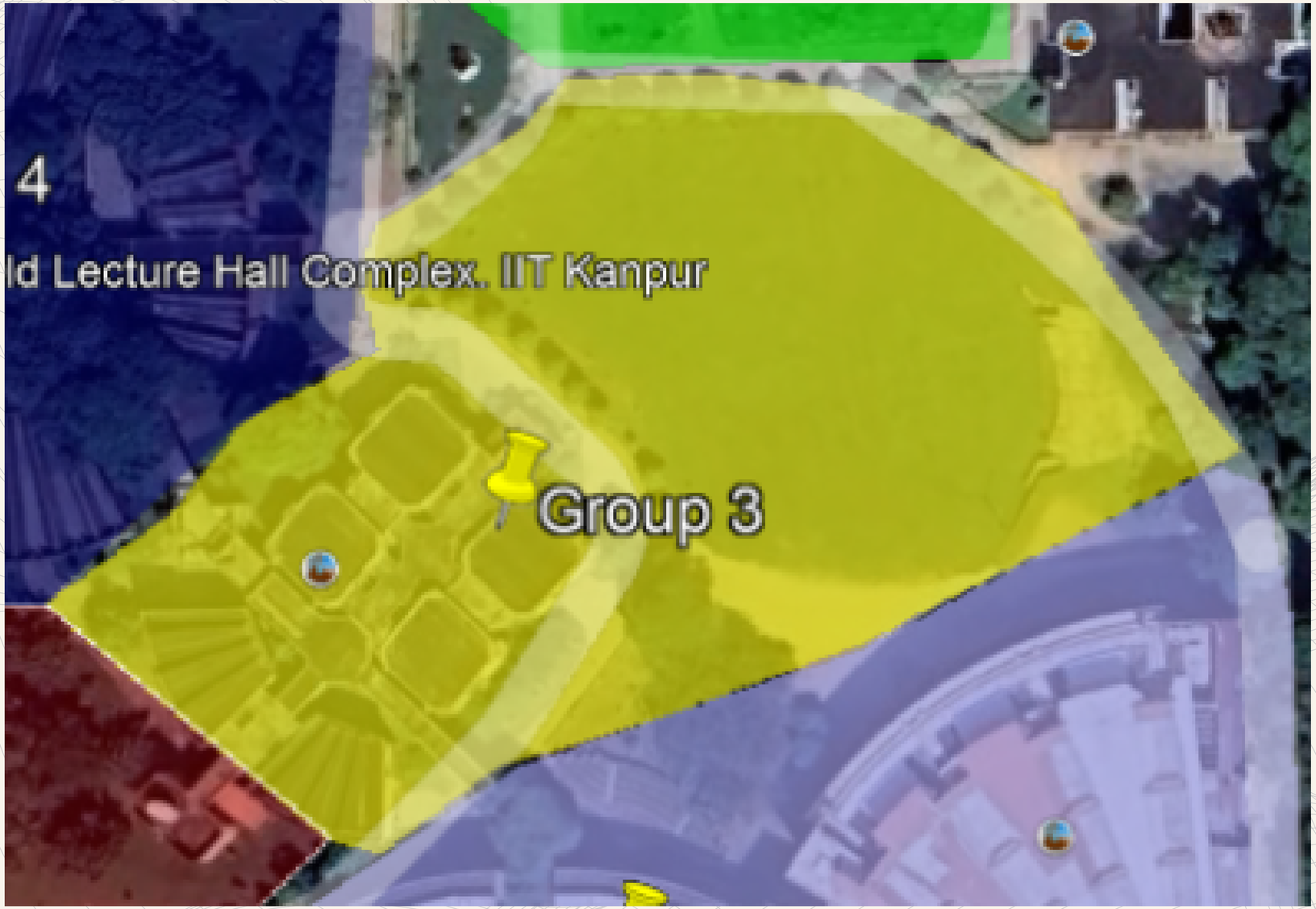
Map Making

After collecting all the data, we used QGIS software to create a detailed map of the alloted area. We integrated our collected data to accurately represent features such as trees, electric poles, buildings, ground surfaces, roads, and manholes and contours. This resulted in a clear and detailed map that effectively captures the spatial layout of the area.

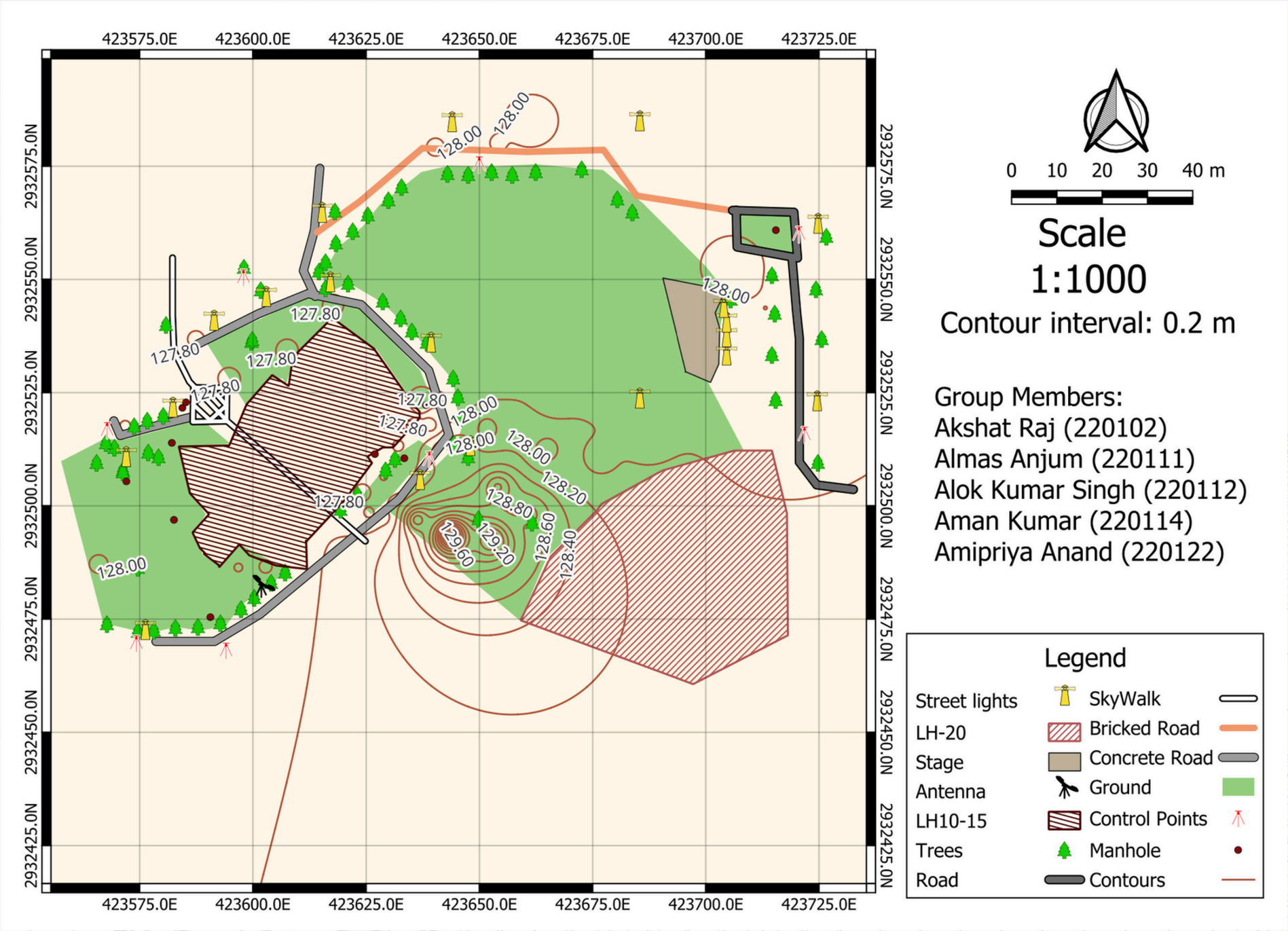
Prepared Map



AREA ALLOCATED



MAP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128.00
127.80
128.20
128.80
128.60
129.60
129.20
128.40
0 10 20 30 40 m
Scale
1:1000
Contour interval: 0.2 m
Group Members:
Akshat Raj (220102)
Almas Anjum (220111)
Alok Kumar Singh (220112)
Aman Kumar (220114)
Amipriya Anand (220122)
Legend
Street lights
LH-20
Stage
Antenna
LH10-15
Trees
Road
SkyWalk
Bricked Road
Concrete Road
Ground
Control Points
Manhole
Contours

CONCLUSION

- Gained hands-on experience with reconnaissance surveys, establishing control points, and creating a closed traverse network.
- Learned how to use an auto level and Total Station to measure distances and angles
- Acquired skills in using GNSS receivers to obtain global coordinates and align the local network with global positioning systems.
- Learned about various kinds of error adjustments.
- Developed skills in using QGIS software to create detailed maps, incorporating features and contour data for accurate spatial representation.
- Enhanced teamwork skills by coordinating tasks and managing data to complete the project effectively.