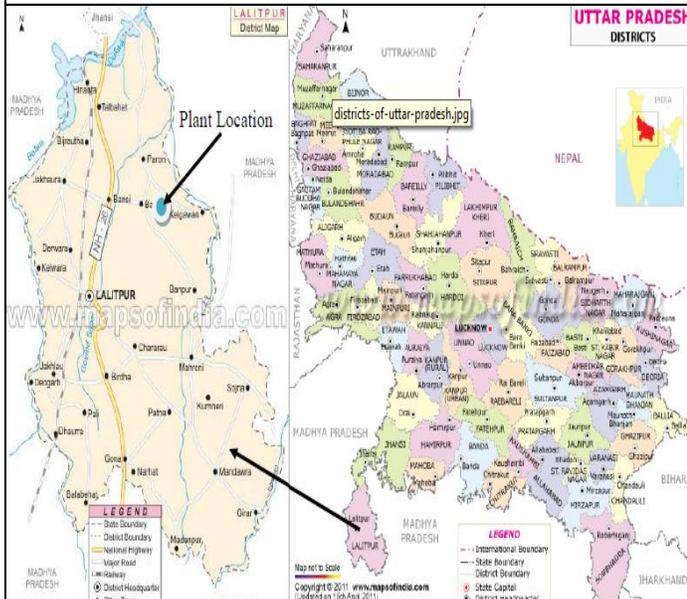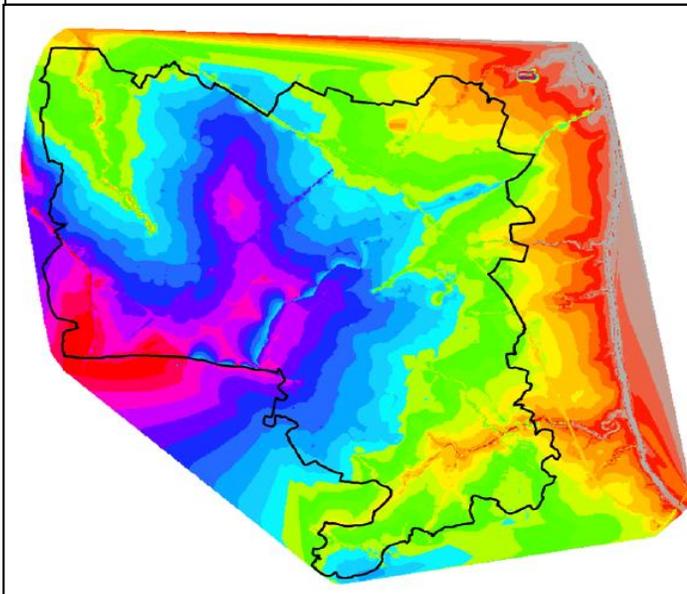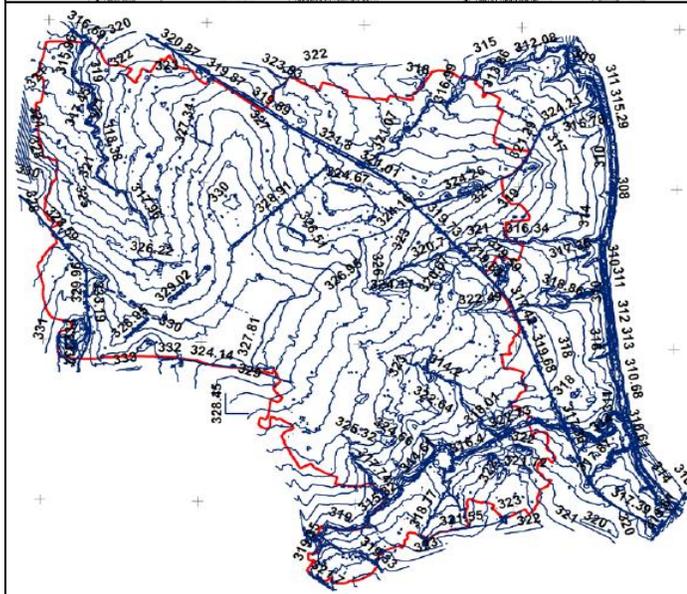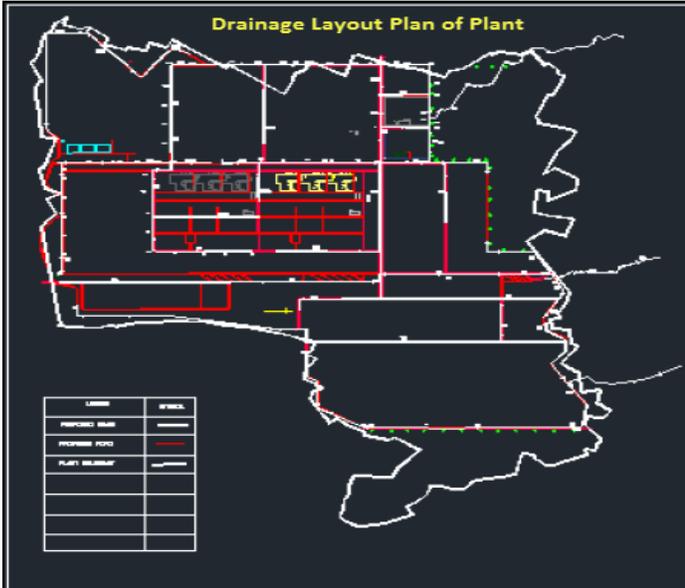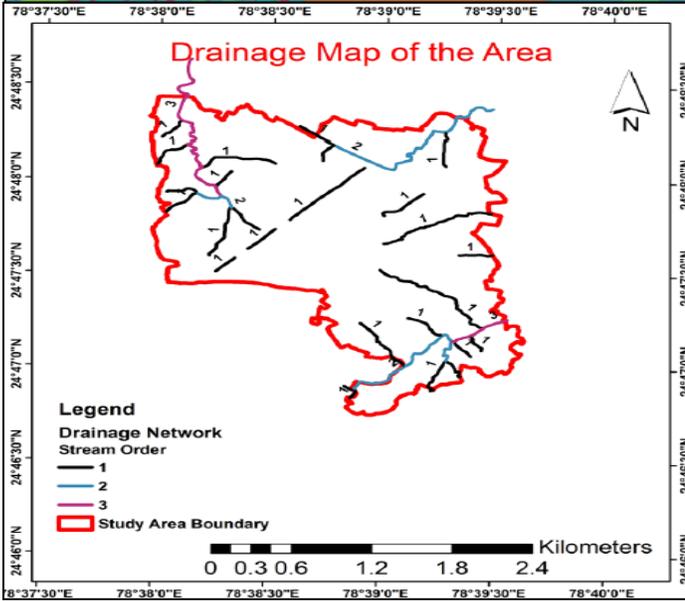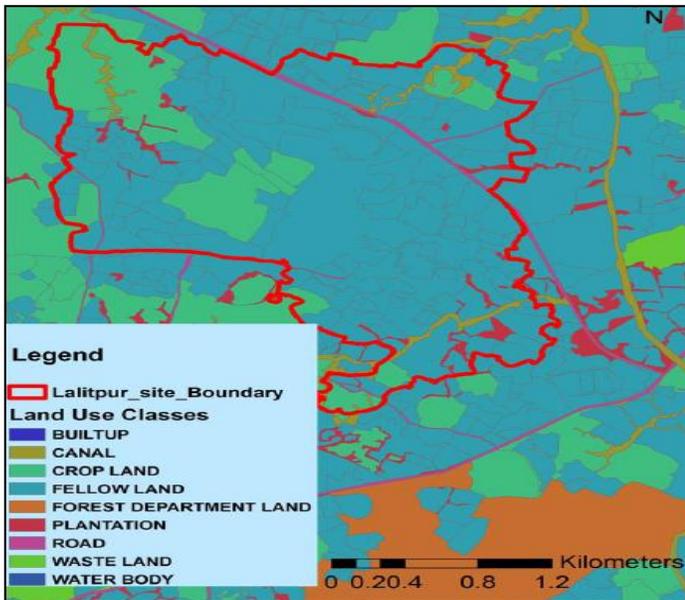# Area Drainage Study using Remote Sensing & GIS

Spatial Analysis Techniques like Remote Sensing, GPS and GIS are used in this study to arrive at different types of hydrological and hydraulic analysis. For spatial analysis, RS & GIS are effectively used for deriving conclusions.

Scope of work

- Study of existing data available for rainfall, soil and other necessary information for the area drainage study.

- Analysis of rainfall data for the last 20 years near the project site for relevant area to analyses the rainfall trend

- Delineation of watershed and drainage patterns of the study area and its surroundings and its elevation, including the present drainage capacity of the existing natural drains and their condition, on the basis of available field survey data.

- Study land use pattern, soil characteristics.

- Review the possibility of rain water harvesting and details for implementation.

- Design flood estimation & flow pattern & water availability.

- Review the present drainage capacity of the existing natural steam inside the plant boundary and suggest diversion plan of stream.

- Drainage pattern, flood hydrograph considering pre-project and post project scenarios.

Legend
Lalitpur_site_Boundary
Land Use Classes
BUILTUP
CANAL
CROP LAND
FELLOW LAND
FOREST DEPARTMENT LAND
PLANTATION
ROAD
WASTE LAND
WATER BODY
Kilometers
0 0.20.4   0.8   1.2

Drainage Map of the Area

Legend
Drainage Network
Stream Order
—— 1
—— 2
—— 3
Study Area Boundary
Kilometers
0 0.3 0.6   1.2   1.8   2.4

Drainage Layout Plan of Plant

Method for design flood estimation

For estimating the design flood for any basin, the following procedure is adopted:-

- The basin characteristics are observed
- From the basin characteristics, synthetic unit hydrograph for the basin is obtained.
- The design storm duration is estimated.
- The values of point rainfall for the design duration are obtained from the isopleths maps of different duration of 50-years return period and appropriate multiplier.
- The area reduction factor corresponding to the area of the basin and the duration of the design storm is calculated and the areal rainfall is obtained by multiplying this area reduction factor to the point rainfall.
- Hourly break-up of the rainfall is calculated by applying the percentages obtaining from the time distribution graph.
- The excess rainfall per hour is calculated by subtracting the design loss rate for this sub-zone.
- The surface runoff hydrograph is computed for the basin by applying the hourly rainfall excess.
- Determine the base flow for the basin and add it to the surface runoff to get the total flow.
- The peak discharge of the flood hydrograph gives the design flood peak for the basin.