March, 2016

# अमृत
## Atal Mission for Rejuvenation and Urban Transformation

# FORMULATION OF GIS BASED MASTER PLAN FOR AMRUT CITIES

## Design & Standards

**Town & Country Planning Organisation**
**Ministry of Urban Development**
**Government of India**

March, 2016

# FORMULATION OF GIS BASED MASTER PLANS FOR AMRUT CITIES

## Design and Standards

Town & Country Planning Organisation
Ministry of Urban Development
Government of India
&
National Remote Sensing Centre
Deptt. Of Space
Government of India

**March 2016**

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# ACRONYMS

| | |
|---|---|
| AMRUT | Atal Mission for Rejuvenation and Urban Transformation |
| Admin | Adminstrative |
| AOI | Area of Interest |
| ASPRS | American Society for Photogrammetry and Remote Sensing |
| ATM | Automated Teller Machine |
| BOD | Biological Oxygen Demand |
| BPL | Below Poverty Level |
| BRTS | Bus Rapid Transit System |
| CBR | Crude Birth Rate |
| CE | Circular Error |
| CFL | Compact fluorescent lamp |
| CGWB | Central Ground Water Board |
| CHC | Community Health Centre |
| Cline | Central Line |
| CNG | Compressed Natural Gas |
| CO | Carbon Monoxide |
| D.P | Development Plan |
| DD | Date |
| DEM | Digital Elevation Model |
| DGPS | Differential Global Positioning System |
| Dia | Diameter |
| DIC | District Industries Centre |
| DoS | Department of Space |
| Drain | Drainage |
| DTM | Digital Terrain Model |
| DU | Dwelling Unit |
| EB | Enumeration Block |
| EO | Earth Observation |
| GCP | Ground Control Point |
| GDOP | Geometric Dilution of Precision |
| GIS | Geographic Information System |
| GLR | Ground Level Reservoir |
| GoI | Government of India |
| GPS | Global Positioning System |
| GSI | Geological Survey of India |
| HH | Household |
| HHI | Household Industry |

| | |
|---|---|
| HP | Horse Power |
| HPMV | High Pressure Mercury Vapour |
| HQ | Head quarters |
| HRIDAY | Heritage City Development and Augmentation Yojana |
| hrs | Hours |
| HT | High Tension |
| ID | Identification Number |
| IGS | International Ground Station |
| IMR | Infant Mortality Rate |
| IR | Infra-red |
| IRC | Indian Roads Congress |
| ISO | International Organization for Standardization |
| ISRO | Indian Space Research Organisation |
| IT | Information Technology |
| ITRF | International Terrestrial Reference Frame |
| LE | Linear Error |
| LFDC | Large Format Digital Camera |
| LISS | Linear Imaging Self-Scanner |
| LPCD | Litre per Capita per Day |
| LPG | Liquefied Petroleum Gas |
| LT | Low Tension |
| Mat | Material |
| mg/L | Milligrams per Litre |
| MILMA | Brand household name of The Kerala Co-operative Milk Marketing Federation |
| MKWH | Million KiloWatt per Hour |
| MLD | Mega Litter per Day = 10*6 L/day (unit of water storage in dams and reservoirs) |
| MMTS | Multi-Modal Transport System |
| MoUD | Ministry of Urban Development |
| MRTS | Metro Rapid Transit System |
| MSL | Mean Sea Level |
| MW | MegaWatt |
| NAS | Network Attached Storage |
| NCC | Natural Colour Composite |
| NDMA | National Disaster Management Authority |
| NGO | Non-Government Organization |
| NHAI | National Highway Authority of India |
| NMP | National Map Policy |
| NNRMS | National Natural Resource Management System |

| | |
|---|---|
| NO | Nitric Oxide also known as Nitrogen Monoxide |
| NRSC | National Remote Sensing Centre |
| NSDI | National Spatial Data Infrastructure |
| NSSO | National Sample Survey Organisation |
| NUIS | National Urban Information System |
| OGC | Open Geospatial Consortium |
| PAN | Panchromatic |
| pH | Potential of Hydrogen |
| PHC | Primary Health Care |
| PPP | Public Private Partership |
| QA | Quality Assurance |
| QC | Quality Check |
| R & B Dept. | Roads and Buildings Department |
| RGI | Registrar General of India |
| RMSE | Root Mean Square Error |
| RPC | Rational Polynomial Coefficient |
| RWA | Resident Welfare Association |
| SEZ | Special Economic Zone |
| $SO_2$ | Sulphur di-oxide |
| SPM | Suspended Particulate Matter |
| STPD | State Town Planning Department |
| TCPO | Town & Country Planning Organisation |
| TV | Telivision |
| UA | Urban Agglomeration |
| UFS | Urban Framework Survey |
| ULB | Urban Local Body |
| ULU | Urban landuse/landcover |
| URDPFI | Urban and Regional Development Plans Formulation and Implementation |
| UT | Union Territory |
| UTM | Universal Transverse Mercator |
| VHRS | Very High Resolution Satellite |
| WBM | Water Bound Macadam |
| WFPR | Workforce Participaticate Rate |
| WGS84 | World Geodetic System (WGS) established in 1984 |
| SHG | Self Help Group |
| LCS | Low Cost Sanitation |
| WTP | Water Treatment Plant |

## 1.0.0    INTRODUCTION

The urban settlements of the country have experienced relatively rapid population growth and the percentage of India's population living in urban areas has more than doubled from 14% at the time of independence to 31.8 % in 2011 (Census of India).  This is expected to increase even further to nearly 40% by 2026 and is expected to be more than 50% by 2051. The class-wise distribution of statutory towns/cities as per Census 2011 is as follows.

| S.No | Class | Population Range | No. of Statutory Towns 2011 Census |
|------|-------|-----------------|------------------------------------|
| 1 | Metro | 10 lakh plus | 53 |
| 2 | Class I | 1-9.99  lakhs | 430 |
| 3 | Class II | 50,000- 99,999 | 546 |
| 4 | Class III | 20,000- 49,999 | 1321 |
| 5 | Class IV | 10,000-19,999 | 1091 |
| 6 | Class V | 5000-9,999 | 474 |
| 7 | Class VI | Below 5000 | 133 |
| | **Total** | | **4041** |

Most of the urban settlements, especially smaller urban settlements, are characterized by haphazard and unplanned growth, non-conforming land uses, mushrooming unauthorized colonies, and land conversion from agriculture to urban resulting in environmental degradation and poor quality of life. The proper management of urban areas calls for accurate and vital information to be available on a regular basis.

Master Plan/Development Plan is the major tool for urban land management, providing detailed landuse allocation for the sustainable development of city/town. Most master/development plans are made for 20-year periods, in phases of five years for periodic review and revision. Formulation of master plans start with base map preparation, existing land use surveys and collection of socio-economic data necessary for reviewing the existing situation and proposing the future land use plan. With the advances in remote sensing and geographic information system, the plan making process can be expedited with integration of both spatial and attribute data, which enables detailed assessment of spatial growth of towns/cities, landuse status, physical infrastructure facilities, etc. in anticipation of the projected population growth.

The most crucial information for formulation of Master Plan is an accurate and updated Base Map of the planning area, showing roads and building layouts, spatial extent of development and information on the use of each parcel of land etc.  Preparation of base maps from Very High Resolution Satellite (VHRS) Images and Geographic Information System (GIS) technology can be time and cost effective solution. Under the National Urban Information System (NUIS) Scheme, urban GIS database for 152 towns was prepared using 2.5m

(Cartosat-1+LISS-IV) remote sensing images. This GIS database has been hosted on ISRO's geo-spatial platform Bhuvan and a web-based GIS (Bhuvan-NUIS) for accessing, editing and managing the database was developed. NUIS Scheme has provided the basic foundation for understanding and experiencing the utilisation of remote sensing & GIS technologies for urban base and thematic mapping and GIS database creation.

## 2.0.0 NEED FOR REVISION OF EXISTING NUIS DESIGN AND STANDARDS

Although State Town and Country Planning Departments (STPDs) had initiated the utilisation of NUIS database at 1:10000 scale for Master Plan formulation on Bhuvan, it was felt that 1:10000 scale database content and accuracy was inadequate for this purpose. During an Interactive Workshop with Chief Town Planners/Directors of the States/UTs conducted by Town & Country Planning Organisation/Ministry of Urban Development (TCPO/MoUD) on 17th February 2015, the following technical criteria were suggested for generation of comprehensive GIS database for Master Plan formulation:

1. Utilisation of Very High Resolution Satellite (VHRS) Data for preparing large scale urban base map at 1: 4000 scale or better.
2. Use of GIS based Master Plan formulation approach as per URDPFI, 2014 Guidelines.
3. Existing NUIS Design and Standards are pertinent to 1:10000 scale mapping. This may not be appropriate for large scale mapping in terms of the input satellite data, map content, geometry, accuracy, etc.
4. It was also observed that various Town & Country Planning Organisation/Departments are following different methods and procedures for base map preparation and GIS database generation using remote sensing & GIS technology which calls for national standards.
5. Hence, the existing NUIS Design and Standards are to be revised to support generation of comprehensive GIS databases to meet the requirements of mapping under National flagship schemes like Smart Cities, AMRUT, HRIDAY and also other State level urban development projects.

### 2.1.0 Formulation of GIS based Master Plan for AMRUT Cities

Government of India launched Atal Mission for Rejuvenation and Urban Transformation (AMRUT) in 2015 as Centrally Sponsored Scheme with the objectives to (i) ensure that every household has access to a tap with assured supply of water and a sewerage connection; (ii) increase the amenity value of cities by developing greenery and well maintained open spaces (e.g. parks); and (iii) reduce pollution by switching to public transport or constructing facilities for non-motorized transport (e.g. walking and cycling). One purpose of the Mission is to improve governance through a set of Reforms. During the Mission period, 11 reforms are being implemented.

Formulation of GIS-based Master/Development Plans for 500 AMRUT Cities is one of the important reforms under AMRUT, which has been approved as a 100% centrally funded sub-scheme with budget outlay of Rs. 515.00 crores.

The major objectives of the sub-scheme are:
•   To develop common digital geo-referenced base maps and land use maps using Geographical Information System (GIS) and
•   Master Plan Formulation for 500 cities that are selected as AMRUT Cities.

In order to develop national level Design and Standards, Ministry of Urban Development constituted a Committee with the members from ISRO, central and STPDs (Annexure I). The Committee held detailed deliberations and interactions with Central and State Town Planning departments and experts and recommended that mapping at 1:4000 scale is ideal for formulation of Master Plans/Development Plans as per currently available satellite data. The Design & Standards has been prepared for geo-spatial database creation as per the requirement.The approval of the Design and Standards document from the Chairman of the Committee for Revision of NUIS Guidelines and Design Standards and Ministry of Urban Development is at Annexure II A&B.

Since base map preparation and master plan formulation is to be done by different States as per their respective acts, for a wide variety of cities and towns, if required, State Governments may add to the Design and Standards as per their requirements under intimation to Chief Planner, TCPO.

## 3.0.0    ELEMENTS OF STANDARD

Remote Sensing data, Base map & Urban Land use GIS database including spatially linked socio-economic attribute information and administrative boundaries are important datasets for the formulation of Master Plans. Development of uniform design and standards is necessary to enable the central and state level departments to adopt the implementation of national/state urban schemes. The main elements of Standards are given below.
1. Remote Sensing Image Standards
2. Spatial Reference Standards
3. Geo-spatial Data Content  and GIS Database Standards
4. Quality Assurance/Quality Check
5. GIS database dissemination to ULBs for Master Plan formulation
6. Metadata standards

### 3.1.0      Remote Sensing Image Standards

Very High Resolution satellite images or Aerial Large Format Digital Camera (LFDC) multi-spectral photography data are the best input sources for large scale mapping. The following tables describe the input image standards-
1. Raw image standards- required for satellite data procurement

2. Ground Control Points (GCPs) – for geo-referencing/ortho-rectification of satellite image
3. Geo-referenced/Ortho-rectified image – the final image used for feature extraction.

### 3.1.1 Raw Image Standards

**Table 1: Raw Image Standards**

| S. No | Description | Value | Remarks |
|---|---|---|---|
| 1 | Spatial Resolution | 0.5 metres or Better | |
| 2 | Spectral Resolution | PAN Sharpened (Bands: Panchromatic, Red, Green, Blue and Near Infrared) | IR band is optional |
| 3 | Band to Band registration | Less than 1/4th of pixel size | |
| 4 | Radiometry | 10 bit or better | |
| 5 | Image Resampling | Nearest Neighbourhood | |
| 6 | a. Monoscopic/Stereoscopic | Plain Areas: Monoscopic Highly Hilly areas: Stereoscopic | Need of Stereoscopic to be reviewed case by case. If the city is built on the terrain slope more than 15 degrees. |
| | b. Monoscopic data View angle | Less than 10 degree from nadir | In specific cases, maximum upto 15 degrees view angle shall be allowed |
| | c. Stereoscopic | One of the stereo image view angle should be less than 10 degrees from nadir | Base to Height(B/H) ratio: 0.6<B/H< 0.8 |
| 7 | Vantage imaging | Fresh acquisition: Within 6 months Archived Data: Less than 1 year | If one town/city is covered by multiple scenes, the time difference among the scenes should be less than 3 months. |
| 8 | Product type | Image data should be associated with corresponding Rational Polynomial Coefficients (RPCs) Format: 1. image data: Geo-tiff | Ortho-kit data with RPCs |

| S. No | Description | Value | Remarks |
|---|---|---|---|
| | | 2. RPCs    : Open standards | |
| 9 | Spatial Reference | Datum    : WGS84<br>Projection : UTM | |
| 10 | Cloud Coverage | Zero % in the core town/city,<br>Less than 10% in the periphery of town/city limits | Cloud free data is preferable |

### 3.1.2 *Ground Control Points (GCPs) Standards required for Photogrammetric Block Adjustment and Ortho-rectification of satellite data*

**Table 2: Ground Control Points (GCPs) Standards**

| S. No | Description | Value | Remarks |
|---|---|---|---|
| 1 | Survey method used for GCPs | Differential GPS Survey (DGPS) | DGPS survey points should be processed using closed network traverse. The reference station coordinate shall be computed using ITRF (International Terrestrial Reference Frame) |
| 2 | Accuracy | Positional accuracy (X,Y):<br> better than 0.5mts<br>Height accuracy (Z) :  better than 0.5mts | With reference to absolute accuracy of Reference station coordinates in ITRF |
| 3 | Spatial reference | Horizontal<br>Datum    : WGS84<br>Projection : UTM<br><br>Vertical<br>Datum    : WGS84 or MSL<br>Units    : Meters | Towns for which Stereo data is selected: The GCPs vertical Datum must be MSL. |
| 4 | No. of GCPs | a. Uniform Distribution for the entire city/town planning area<br>b. At least one GCP for every 5 sq. km.<br>c. At the overlap of images GCPs should be available<br>d. The position of GCPs should be on the non-variable features | GCPs must be clearly visible in the Satellite image.<br><br>GPS reference station shall be a monument in Cement concrete and embedded brass-plate to ensure station revisit, whenever the need arises. |

*(Brief DGPS survey method is given Annexure-II)*

### 3.1.3    *Ortho-rectification of Satellite data Standards*

**Table 3:  Ortho-rectification of Satellite data Standards**

| S. No | Description | Value | Remarks |
|---|---|---|---|
| 1 | Procedure/Methodology | Photogrammetric Bundle block adjustment for monoscopic or stereoscopic data using Control points | Photogrammetric Bundle Block level accuracy better than one pixel |
| 2 | Ortho-rectification | DEM Source: Monoscopic data: Carto DEM or open source DEMs<br><br>Stereoscopic data: DEM/DTM generated from the stereo pair | |
| **Ortho-rectified image Output Format** | | | |
| 4 | Spatial Reference | Datum: WGS 84<br>Projection : UTM/Geographic | |
| 5 | Spatial Resolution | 0.5 meters or better | |
| 6 | Spectral resolution | PAN sharpened Natural Color Composite (NCC) | |
| 7 | Radiometry | Input Data radiometric resolution | |
| 8 | Planimetric Accuracy | • RMSE (Root Mean Square Error) = better than 1mts<br>• CE 90 (Circular error) = 2.4 X $RMSE_{XY}$<br>• LE 90 (Linear error) = 2.4 X $RMSE_{Z}$ | CE 90 & LE 90 means 90% of samples fall within that range. |
| 9 | Resampling | Nearest Neighbourhood | While interpretation of image online resampling may be changed to bi-linear or cubic as per interpreter's choice. |
| 10 | Format | Town/city mosaic in Geo-tiff | |

## 3.2.0    Spatial Reference Standards

Spatial reference standards define the coordinate system, geographic extent of city level GIS databases.

### 3.2.1    Coordinate System

Spatial reference is selected as per National Map Policy (NMP) 2006, accordingly spatial reference standards are given below:

**Table 4:  Spatial Reference Standards**

| S. No | Description | Value | Remarks |
|---|---|---|---|
| 1 | Datum | WGS84 | |
| 2 | Projection | ➤ For mapping/printing maps/publishing =UTM, if city falls in more than one UTM zone, the maximum covered zone will be considered.<br><br>➤ For GIS database, storing &management = Geographic | Data will be stored in Geographic co-ordinate system and will be projected to UTM online for mapping/interpretation, analysis & printing. |
| 3 | Extent | Extent of each town =  Minimum bounding box to Planning area boundary with 5 km. buffer | Additional 5 km. buffer is selected to cater to accommodate the near future increase in Planning Area. |

### 3.2.2    Map sheet frame for hardcopy prints

With the advancements in GIS, the utilisation of hard copy maps is limited to the field work and field verification of data. The digital GIS environment can be used for spatial and attribute data analysis and GIS based Master plan formulation.  The proposed 1:4000 scale under this scheme is not compatible to National Scheme of Map series. In view of this, it is proposed to use the existing National Map Scheme which was developed and adopted in NUIS Scheme.

Whenever required hard copy maps can be printed for visualisation purpose at different scale for example at 1: 10000 for town/city map; 1:2000 or 1:1000 for field verification and data collection purpose. The Schematic Representation of Map Frame and Tie Points is given in Figure 1.

To enable the compatibility of cadastral map scales, it is proposed to adopt State specific cadastral map sheet series at 1:4000 scale, 1:8000 scale or any other specific scale. The extent of the Map sheet, Map sheet number and size shall be according to the scale adopted by the respective State/UT.

# Figure 1: Schematic Representation of Map Frame and Tie Points
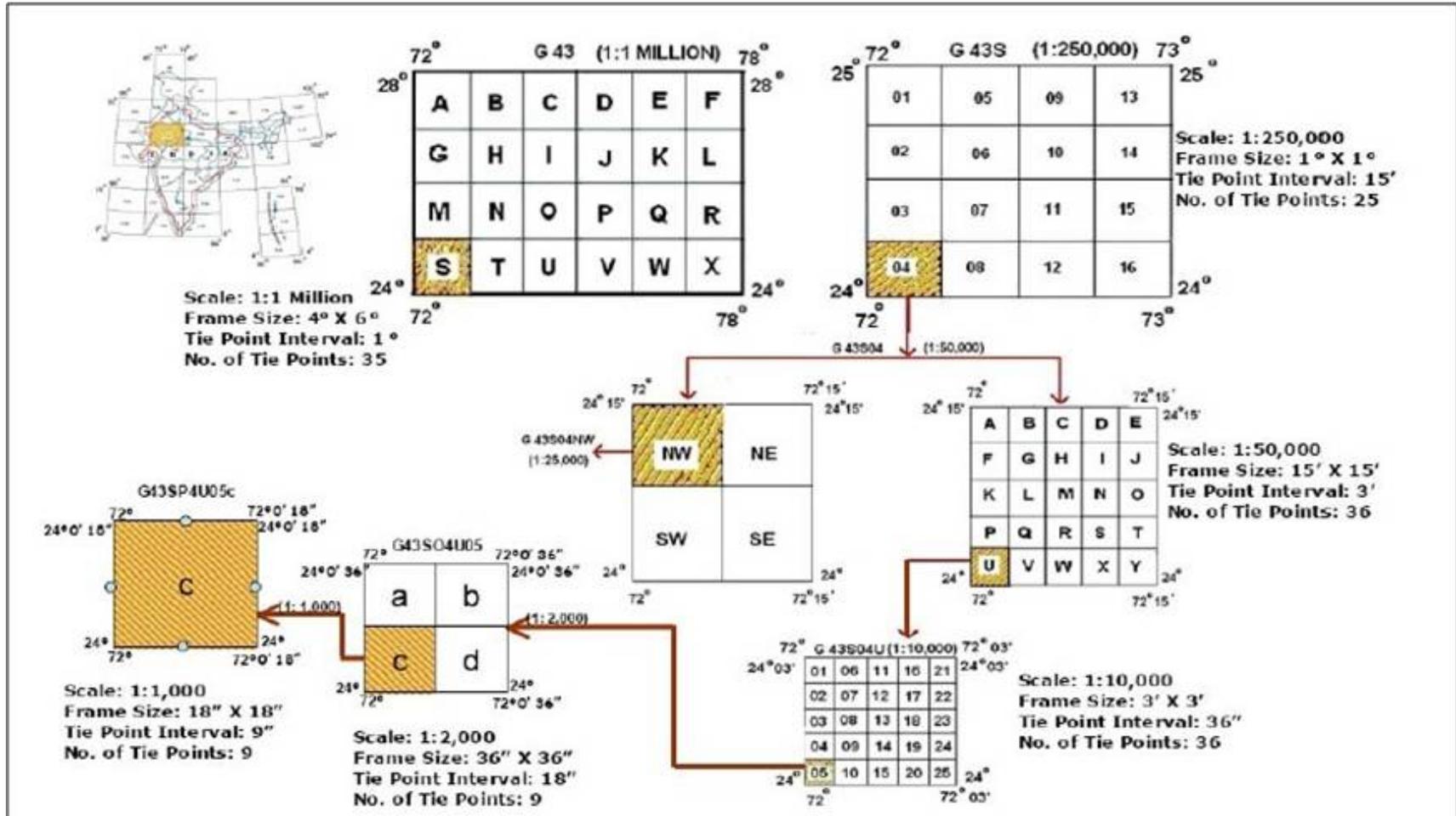
### 3.3.0 Geo-Spatial Data Content and GIS Data Structure Standards

#### 3.3.1. *Geo-Spatial Data Content*

Existing Urban Land use/Land cover, base map and utilities network data at 1: 4000 scale and city local data in GIS format are the important inputs for formulation of GIS based Master Plan and Infrastructure Development Plan. These geo-spatial data layers and their basic source are given in Table - 5.

**Table 5: Geo-Spatial Data Content**

| Sl No. | Spatial Layers | Source for Spatial data generation | Classification based on Use & Attributes | |
|---|---|---|---|---|
| | | | Classes | Sub Classes |
| I | **Base layers** | Very High Resolution satellite data | 5 | 46 |
| | 1. Road | | | |
| | 2. Rail | | | |
| | 3. Bridges | | | |
| | 4. Flyovers | | | |
| | 5. Water bodies | | | |
| II | **Urban Land Use/Land cover** | Very High Resolution satellite data | 28 | 220 |
| III | **Building Footprints** | Very High Resolution satellite data | 22 | 144 |
| IV | **Utilities** | | | |
| | 1. Water Supply Network | Urban Local Bodies | 1 | 12 |
| | 2. Storm Water Drainage Network | | 1 | 2 |
| | 3. Sewerage Network | | 1 | 8 |
| | 4. Power Supply Network | | 1 | 8 |
| | 5. Gas Distribution Network | | 1 | 6 |
| V | **Hypsography** | | | |
| | 1. Digital Elevation Model(DEM) Type : Digital Terrain Model (DTM) | Topographic Survey; existing DEMs or contour maps. | 1 | 1 |
| | 2. Contour | | 1 | 1 |
| | 3. Ground Control Points | | 1 | 2 |
| VI | **Cadastral Layer** | Urban Local Bodies /State Revenue Department | 1 | - |

| Sl No. | Spatial Layers | Source for Spatial data generation | Classification based on Use & Attributes | |
|---|---|---|---|---|
| | | | Classes | Sub Classes |
| VII | **Boundaries** | | | |
| | 1. Administrative boundaries | State Revenue Department | 1 | 7 |
| | 2. Planning boundaries | Urban Local Bodies | 1 | 8 |
| | 3. Municipal boundaries | Urban Local Bodies | 1 | 4 |
| | 4. Other Boundaries – Enumeration Block(EB), Urban Framework Survey(UFS) & Mining Area | EB from Registrar General Of India (RGI), UFS from National Sample Survey Organisation (NSSO) & Mining area boundary from concerned State Departments. | 1 | 3 |
| VIII | **Hazard Prone Areas** | Information from NRSC, ISRO, GSI, NDMA, Other State & Central Government Dept. | 1 | 3 |

Totally there are 69 major classes and 475 sub-classes for 1:4000 scale urban geo-spatial data for GIS based Master Plan formulation under AMRUT scheme. Details of classification and sub-classification are given in the subsequent Tables 6 to 25.

### 3.3.2. Feature Geometry

The size, shape and scale at which the geo-spatial feature is mapped define its geometric representation in GIS. Area features like water bodies are represented in polygon geometry; line features like water supply network are represented in line geometry; point features like Electric Pole are represented in point geometry. Some of the area features like roads are represented in both polygon and line geometry. For example, the width of road is represented in polygon and road centreline is represented in line geometry. In such cases attributes are associated with line feature. The basic criteria to define the geometry of geo-spatial features are given below:

- Features having an area more than of 5 pixels by 5 pixels (as per image standards 6.25 sq. mt.) shall be represented as polygons. Inother cases, where the features have area less than 5 pixels by 5 pixels, defined as point or line based on the feature type.

- In the Road layer, Roads having width of 7.5m and more will be captured as polygon and the road centre as line. Roads having width of less than 7.5m will be captured only as line.
- Rail feature, shall be captured as line. Railway track area shall be captured as polygon.
- All utility network layers are defined as lines and the nodes (starting point, intersections, valves, end points etc.) defined as points.
- Features such as garbage collection point, electric poles, cell towers etc., are defined as point.

### 3.3.3. GIS Data Structure

Geographic/urban feature is classified and further sub-classified based on its use & attributes. Cities in plain terrain or rolling terrain, ortho-rectified satellite image is used to capture the features in 2-dimention. As mentioned in image standards (Table 1), the cities in high relief hilly areas, the stereo data is used to capture the features in 3-dimension. In 3D mapping, x,y,z of the each vertex is stored in the feature geometry. According to the feature dimensionality (2D or 3D), the GIS data structure of polygon, line or point features can be 2 dimension or 3-dimension. OGC compliant GIS database models like shape file, geodatabase, oracle spatial data model, Postgres data model etc., may be implemented for generation of GIS layer data structure for storing spatial & attribute data.

### 3.3.4. Coding Scheme

Each GIS feature is assigned with a unique four character alphanumeric code. The code is unique with respect to the feature, irrespective of its geometry and layer. The first two characters of the code represent the Class and next two characters represent the Sub Class. For example, **Code: 01-02**; 01 represents Road Class; 02 represents the Road Sub-class State Highway.

### 3.3.5. Layer wise Data content, Classification and GIS data Structure

Table 6 to Table 25 describes Layer wise geo-spatial data content with class & sub-class and GIS data structure with nomenclature of the geo-spatial layer, attributes, fields and field properties to be implemented using OGC compliant GIS software. *For example, Table 6 gives the Road: Geo-spatial data content, Table 6a & 6b gives the GIS Data Structure for Road centreline and Road polygon respectively.*

### I.    BASE LAYERS:

*The road feature will be captured as both Polygon and Line. Road area is represented as polygon and Road centreline as Line.*

**Table 6: Road: Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|------|------|-------|-----------|----------|--------|
| 1 | 01-01 | Road | *National Highway* | Polygon / Line | |
| | 01-02 | | *State Highway* | Polygon / Line | |
| | 01-03 | | *Major District Road* | Polygon / Line | |
| | 01-04 | | *Other District Road* | Polygon / Line | |
| | 01-05 | | *Expressway* | Polygon / Line | |
| | 01-06 | | *Bypass* | Polygon / Line | |
| | 01-07 | | *Ring Road* | Polygon / Line | |
| | 01-08 | | *Service Road* | Polygon / Line | |
| | 01-09 | | *Major City Road#* | Polygon / Line | |
| | 01-10 | | *Minor City Road#* | Polygon / Line | |
| | 01-11 | | *Other Public Road* | Polygon / Line | |
| | 01-12 | | *Other Private Road* | Polygon / Line | |
| | 01-13 | | *BRTS* | Polygon / Line | |
| | 01-14 | | *Cycle Track* | Polygon / Line | |
| | 01-15 | | *Village road* | Polygon / Line | |
| | 01-16 | | *Foot path* | Line | |
| | 01-17 | | *Cart track* | Line | |
| | 01-18 | | *Ropeway* | Line | |
| | 01-19 | | *Carriageway\** | Line | |
| | 01-20 | | *Right of way\** | Line | |

#*Roads having width of 10.5m/11m and more will be called Major City Road and less than 10.5m/11m as Minor City Road (for information, the road widths mentioned are as per IRC standards)*

**\****Source for Carriageway and Right of way: Revenue records.*

**Table 6a: Road Line GIS Data Structure**
***Geo-spatial Layer Name: Road_CLine***

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|----------------|----------------------|----------------------|-----------------------|-------------------|
| **Road Id** | **Rd_ID** | Alphanumeric | 15 | Unique Id |
| **Code** | **Code** | Alphanumeric | 10 | Code as given in Table 6 |
| **Sub-Class** | **Sub_Class** | Text | 20 | Sub Class as given in Table 6 |
| **Length in km.** | **Length_km.** | Double | 10 Up to 4 decimals | Length (in km.) |
| **Ward Number** | **Ward_No** | Alphanumeric | 10 | Ward Number |
| **Road Name** | **Rd_Name** | Text | 30 | Specific Name of the feature, if any |

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Road Construction Material | **Cons_Mat** | Text | 10 | Concrete/Asphalt/WBM/Any Other |
| Carriage Width (in mt.) | **CW_Width** | Double | 10 Up to 4 decimals | Carriage Width in metres |
| Right of Way Width (in mt.) | **ROW_Width** | Double | 10 Up to 4 decimals | Right of Way Width in metres |
| Maintained By | **Maintain** | Text | 15 | Municipal body/NHAI/R & B Dept./Other |
| Foot Path | **FP** | Text | 3 | Yes/No |
| Foot path width (in mt. in case Yes) | **FP_Width** | Double | 10 Up to 2 decimals | Footpath Width in metres |
| Foot Path Construction material | **FP_Cons_Ma** | Text | 15 | Shabad/Tiles/Concrete/Other Stone |

**Table 6b: Road Polygon GIS Data Structure**
*Geo-spatial Layer Name: Road_Poly*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| **Code** | **Code** | Alphanumeric | 10 | Code as given in Table 6 |
| **Sub-Class** | **Sub_Class** | Text | 50 | Sub Class as given in Table 6 |
| **Road Name** | **Rd_Name** | Text | 30 | Specific Name of the road, if any |

**Table 7: Rail – Geo-Spatial Data Content**

*All the railway lines will be captured as lines in Base layer and the railway track area shall be captured as polygon in Urban Land Use layer.*

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| **2** | 02-01 | **Rail** | *Broad Gauge* | Line | |
| | 02-02 | | *Narrow Gauge* | Line | |
| | 02-03 | | *Meter Gauge* | Line | |
| | 02-04 | | *Metro/MRTS* | Line | |
| | 02-05 | | *MMTS* | Line | |

## Table 7a: Rail Line GIS Data Structure
### Geo-spatial Layer Name: Rail_Line

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Rail Id | Rail_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 7 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 7 |
| Railway Line Name | Rly_Name | Text | 30 | Specific Name of the railway line, if any |

## Table 8: Bridges/Flyovers –Geo-Spatial Data Content

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| 3 | 03-01 | Bridges | *Culvert* | Line | |
| | 03-02 | | *Tunnel* | Line | |
| | 03-03 | | *Bridge across river* | Line | |
| | 03-04 | | *Over Bridge* | Line | |
| | 03-05 | | *Under Pass* | Line | |
| | 03-06 | | *Road Bridge across Rail* | Line | |
| | 03-07 | | *Subway* | Line | |
| | 03-08 | | *Foot over bridge* | Line | |
| | 03-09 | | *Rope bridge* | Line | |
| 4 | 04-01 | **Flyovers** | *Flyover* | Line | |
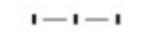
## Table 8a: Bridges & Flyovers GIS Data Structure
### Geo-spatial Layer Name: Bridge_Flyover_Line

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Bridge & Flyover ID | Br_Fly_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 8 |
| Sub-Class | Sub_Class | Text | 20 | Sub Class as given in Table 8 |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_C Line |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_C Line |
| Rail Id | Rail_ID | Alphanumeric | 15 | Rail ID same as in Rail_Line |
| Railway Line Name | Rly_Name | Text | 30 | Railway Line Name same as in Rail_Line |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Locality Name | Locality | Text | 50 | Locality Name |
| Bridge/Flyover Width (in mt.) | Width | Double | 10 Upto 2 decimals | Width in metres |
| Bridge/Flyover Length (in mt.) | Length | Double | 10 Upto 2 decimals | Length in metres |
| Construction Material | Cons_Mat | Text | 15 | Iron/Masonry/Concrete/Any Other |
| Construction Year | Cons_Yr | Text | 4 | Year of Construction |

**Table 9: Water bodies – Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| 5 | 05-01 | Water Bodies | River | Polygon | |
| | 05-02 | | Stream | Polygon / Line | |
| | 05-03 | | Canal | Polygon / Line | |
| | 05-04 | | Drain | Polygon / Line | |
| | 05-05 | | Ponds | Polygon | |
| | 05-06 | | Lake | Polygon | |
| | 05-07 | | Tank | Polygon | |
| | 05-08 | | Island (River/Lake) | Polygon | |
| | 05-09 | | Reservoir | Polygon | |
| | 05-10 | | Back Water | Polygon | |
| | 05-11 | | Sea | Polygon | |

**Table 9a: Water bodies Line** (Stream, Canal, Drain) **GIS Data Structure**
*Geo-spatial Layer Name: Waterbodies_Line*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Code | Code | Alphanumeric | 10 | Code as given in Table 9 |
| Sub-Class | Sub_Class | Text | 20 | Sub Class as given in Table 9 |
| Name of the Waterbody | Name | Text | 50 | Specific Name of the Stream, Canal, Drain, if any |

**Table 9b: Water bodies Polygon GIS Data Structure**
*Geo-spatial Layer Name: Waterbodies_Poly*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| **Code** | **Code** | Alphanumeric | 10 | Code as given in Table 9 |
| **Sub-Class** | **Sub_Class** | Text | 20 | Sub Class as given in Table 9 |
| **Name of the Waterbody** | **Name** | Text | 50 | Specific Name of the waterbody, if any |

## II. URBAN LAND USE/LAND COVER:

### Table 10: Urban Land use/Land cover - Geo-Spatial Data Content

*All the urban land uses are extracted as polygons, except a few, such as Community Toilet, Fire Station, Garbage Collection points, Landfill sites & Dumping yard, Cell towers, Slums, Bus Stops, Trees etc, which are extracted as points. Out of these urban land use point features, some of them have feature specific attributes which are provided in the following respective attribute and GIS structure tables.*

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| 1 | 06-01 | **Residential** | *Residential Area/Colony* | Polygon | |
| | 06-02 | | *Township* | Polygon | |
| | 06-03 | | *Housing scheme* | Polygon | |
| 2 | 07-01 | **Commercial** | *Retail* | Polygon | |
| | 07-02 | | *Wholesale* | Polygon | |
| | 07-03 | | *General Business* | Polygon | |
| | 07-04 | | *Hotel / Lodge / Restaurant* | Polygon | |
| | 07-05 | | *Shopping Centre / Mall* | Polygon | |
| | 07-06 | | *Multiplex / Cinema* | Polygon | |
| | 07-07 | | *Function Hall / Marriage Garden* | Polygon | |
| | 07-08 | | *Warehouse* | Polygon | |
| | 07-09 | | *Storage Godown* | Polygon | |
| | 07-10 | | *Resort* | Polygon | |
| | 07-11 | | *Petrol Pump / LPG filling station* | Polygon | |
| | 07-12 | | *Informal Shop* | Polygon | |

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|------|------|-------|-----------|----------|--------|
|      | 07-13 |      | *Hostel* | Polygon | |
|      | 07-14 |      | *Market (Daily & Weekly) / Mandi* | Polygon | |
| **3** | 08-01 | **Industrial** | *Manufacturing* | Polygon | |
|      | 08-02 |      | *Service* | Polygon | |
|      | 08-03 |      | *Chemical* | Polygon | |
|      | 08-04 |      | *Pharmaceutical* | Polygon | |
|      | 08-05 |      | *Textile* | Polygon | |
|      | 08-06 |      | *IT Parks* | Polygon | |
|      | 08-07 |      | *Industrial Estate / SEZ* | Polygon | |
|      | 08-08 |      | *Agro based & Food Processing* | Polygon | |
|      | 08-09 |      | *Obnoxious* | Polygon | |
|      | 08-10 |      | *Cottage and Household* | Polygon | |
|      | 08-11 |      | *Other Industries* | Polygon | |
| **4** | 09-01 | **Mixed** | *Residential & Commercial* | Polygon | |
|      | 09-02 |      | *Residential & Household Industry* | Polygon | |
|      | 09-03 |      | *Residential & Educational* | Polygon | |
|      | 09-04 |      | *Residential & Health Services* | Polygon | |
|      | 09-05 |      | *Commercial & Industrial* | Polygon | |
|      | 09-06 |      | *Commercial & Health Services* | Polygon | |
|      | 09-07 |      | *Commercial & Educational* | Polygon | |
|      | 09-08 |      | *Commercial & Recreational* | Polygon | |
|      | 09-09 |      | *Residential & Commercial & Institutional* | Polygon | |
| **5** | 10-01 | **Educational** | *School* | Polygon | |
|      | 10-02 |      | *College* | Polygon | |
|      | 10-03 |      | *University* | Polygon | |
|      | 10-04 |      | *Vocational Institute* | Polygon | |

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| | 10-05 | | *Anganwari* | Polygon | |
| | 10-06 | | *Training Institute* | Polygon | |
| 6 | 11-01 | **Health Services** | *Govt. Hospital* | Polygon | |
| | 11-02 | | *Private Hospital* | Polygon | |
| | 11-03 | | *Diagnostic Centre* | Polygon | |
| | 11-04 | | *Clinic/Dispensary* | Polygon | |
| | 11-05 | | *Nursing Home* | Polygon | |
| | 11-06 | | *Primary/Community Health Centre* | Polygon | |
| 7 | 12-01 | **Central Govt. Property** | *Office* | Polygon | |
| | 12-02 | | *Quarter* | Polygon | |
| 8 | 13-01 | **State Govt. Property** | *Office* | Polygon | |
| | 13-02 | | *Quarter* | Polygon | |
| 9 | 14-01 | **Railway** | *Railway Property*[@] | Polygon | |
| 10 | 15-01 | **Public& Semi-public** | *Private Office* | Polygon | |
| | 15-02 | | *Banks* | Polygon | |
| | 15-03 | | *Credit Society* | Polygon | |
| | 15-04 | | *Foreign Establishment* | Polygon | |
| | 15-05 | | *Police Station* | Polygon | |
| | 15-06 | | *Cantonment/Battalion* | Polygon | |
| | 15-07 | | *Jail* | Polygon | |
| | 15-08 | | *Crematorium Burial Groun /Grave Yard* | Polygon | |
| | 15-09 | | *Guesthouse* | Polygon | |
| | 15-10 | | *Community hall* | Polygon | |
| | 15-11 | | *Dharmashala* | Polygon | |
| | 15-12 | | *Tourist Facility Centre* | Polygon | |
| | 15-13 | | *Auditorium* | Polygon | |
| | 15-14 | | *Convention Centre* | Polygon | |
| | 15-15 | | *Museum* | Polygon | |
| | 15-16 | | *Public Library* | Polygon | |
| | 15-17 | | *Art Gallery & Cultural Centre* | Polygon | |
| | 15-18 | | *LPG/CNG Gas Booking Office* | Polygon | |
| | 15-19 | | *Ticket Booking & Reservation Office* | Polygon | |
| | 15-20 | | *Stock Exchange* | Polygon | |
| | 15-21 | | *Disaster Management Centre* | Polygon | |

[@]*includes Office, Quarters, Recreational Space, Institutions etc. under Railways*

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| | 15-22 | | *Metrological Station* | Point | |
| | 15-23 | | *Dhobi Ghat* | Polygon | |
| | 15-24 | | *Crech/Day Care* | Polygon | |
| | 15-25 | | *Public/Community Toilet* | Polygon | |
| | 15-26 | | *Social Welfare Centre* | Polygon | |
| | 15-27 | | *Orphanage* | Polygon | |
| | 15-28 | | *Old Age Home* | Polygon | |
| | 15-29 | | *Night Shelter* | Polygon | |
| | 15-30 | | *Fire Station* | Polygon | |
| | 15-31 | | *ATM* | Point | |
| 11 | 16-01 | **Religious** | *Temple* | Polygon | |
| | 16-02 | | *Mosque* | Polygon | |
| | 16-03 | | *Idgah* | Polygon | |
| | 16-04 | | *Church* | Polygon | |
| | 16-05 | | *Gurudwara* | Polygon | |
| | 16-06 | | *Monastery* | Polygon | |
| | 16-07 | | *Synagogue* | Polygon | |
| | 16-08 | | *Chhatri* | Polygon | |
| 12 | 17-01 | **Recreational** | *Garden* | Polygon | |
| | 17-02 | | *Park* | Polygon | |
| | 17-03 | | *Play Ground* | Polygon | |
| | 17-04 | | *Club* | Polygon | |
| | 17-05 | | *Sports Centre* | Polygon | |
| | 17-06 | | *Gymnasium* | Polygon | |
| | 17-07 | | *Swimming Pool* | Polygon | |
| | 17-08 | | *Stadium* | Polygon | |
| | 17-09 | | *Planetarium* | Polygon | |
| | 17-10 | | *Aquarium* | Polygon | |
| | 17-11 | | *Open Air Theatre* | Polygon | |
| | 17-12 | | *Golf Course* | Polygon | |
| | 17-13 | | *Race Course* | Polygon | |
| | 17-14 | | *Exhibition Ground* | Polygon | |
| | 17-15 | | *Amusement /Theme Park* | Polygon | |
| 13 | 18-01-01 | **Public Utilities** | *Water Treatment Plant* | Polygon | |
| | 18-01-02 | | *Water Pumping Station* | Polygon | |
| | 18-01-03 | | *Ground Level Reservoir* | Polygon | |

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|------|------|-------|-----------|----------|--------|
| | 18-03-01 | | *Sewage Treatment Plant* | Polygon | |
| | 18-03-02 | | *Sewage Pumping Station* | Polygon | |
| | 18-04-01 | | *Electric Power Plant* | Polygon | |
| | 18-04-02 | | *Electric Sub-Station* | Polygon | |
| | 18-05-01 | | *City Gate Metering Stations* | Polygon | |
| | 18-05-02 | | *Area Regulator Stations* | Polygon | |
| | 18-06 | | *Rain Water Harvesting System* | Polygon | |
| | 18-07 | | *Effluent Treatment Plant* | Polygon | |
| 14 | 19-01 | **Solid Waste Management** | *Land Fill Site* | Polygon | |
| | 19-02 | | *Dumping Yard* | Polygon | |
| | 19-03 | | *Recycling Plant* | Polygon | |
| | 19-04 | | *Garbage Collection Point/Dumper* | Point | |
| 15 | 20-01 | **Communication** | *Telephone exchange* | Polygon | |
| | 20-02 | | *Post/Telegraph Office* | Polygon | |
| | 20-03 | | *Radio/TV Station* | Polygon | |
| | 20-04 | | *Satellite & Telecommunication Centre* | Polygon | |
| | 20-05 | | *Public Telephone Booth* | Point | |
| | 20-06 | | *Cell Tower* | Point | |
| | 20-07 | | *WiFi Hotspot* | Point | |
| 16 | 21-01 | **Heritage** | *Monument* | Polygon | |
| | 21-02 | | *Fort* | Polygon | |
| | 21-03 | | *Archaeological Site* | Polygon | |
| 17 | 22-01 | **Slum** | *Notified Slum* | Polygon | |
| | 22-02 | | *Non- notified Slum* | Polygon | |
| | 22-03 | | *Squatter / Kachibasti* | Polygon | |
| 18 | 23-01 | **Vacant Land** | *Private Vacant* | Polygon | |
| | 23-02 | | *Municipal Asset* | Polygon | |
| | 23-03 | | *Government Asset* | Polygon | |
| | 23-04 | | *Reclaimed Land* | Polygon | |
| | 23-05 | | *Layout / Plotted* | Polygon | |
| 19 | 24-01 | **Transportation** | *Bus stand /Terminus* | Polygon | |

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|------|------|-------|-----------|----------|--------|
| | 24-02 | | *Railway Station* | Polygon | |
| | 24-03 | | *Railway Yard / Siding* | Polygon | |
| | 24-04 | | *Railway Track Area* | Polygon | |
| | 24-05 | | *Airport / Airstrip* | Polygon | |
| | 24-06 | | *Helipad* | Polygon | |
| | 24-07 | | *Port* | Polygon | |
| | 24-08 | | *Harbour* | Polygon | |
| | 24-09 | | *Jetty* | Polygon | |
| | 24-10 | | *Truck Terminus* | Polygon | |
| | 24-11 | | *Freight Complex* | Polygon | |
| | 24-12 | | *Taxi Stand* | Polygon | |
| | 24-13 | | *Auto Stand* | Polygon | |
| | 24-14 | | *Cycle rickshaw/Cycle /Cart stand* | Polygon | |
| | 24-15 | | *Bus Bay* | Polygon | |
| | 24-16 | | *Bus Stop* | Polygon/Point | |
| | 24-17 | | *Transport Nagar* | Polygon | |
| 20 | 25-01 | **Traffic related** | *Traffic Island* | Polygon | |
| | 25-02 | | *Median / Divider* | Polygon | |
| | 25-03 | | *Parking Space / Area* | Polygon | |
| 21 | 26-01 | **Rural** | *Village / Abadi Area* | Polygon | |
| 22 | 27-01 | **Green Areas** | *Reserved Forest* | Polygon | |
| | 27-02 | | *Protected Forest / Notified Forest* | Polygon | |
| | 27-03 | | *Social* | Polygon | |
| | | | *Green belt* | Polygon | |
| | 27-04 | | *Tree Clad Area* | Polygon | |
| | 27-05 | | *Tree* | Point | |
| 23 | 28-01 | **Agricultural Land** | *Cropland* | Polygon | |
| | 28-02 | | *Fallow land* | Polygon | |
| | 28-03 | | *Plantations* | Polygon | |
| | 28-04 | | *Orchard* | Polygon | |
| | 28-05 | | *Horticulture* | Polygon | |
| | 28-06 | | *Plant nursery* | Polygon | |
| 24 | 29-01 | **Wetlands** | *Waterlogged* | Polygon | |
| | 29-02 | | *Low lying area* | Polygon | |
| | 29-03 | | *Marshy* | Polygon | |
| | 29-04 | | *Swampy* | Polygon | |
| | 29-05 | | *Mudflat* | Polygon | |
| | 29-06 | | *Creek* | Polygon | |

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|------|------|-------|-----------|----------|--------|
| 25 | 30-01 | Wastelands | Scrubland | Polygon | |
| | 30-02 | | Barren | Polygon | |
| | 30-03 | | Rocky | Polygon | |
| | 30-04 | | Sandy area | Polygon | |
| | 30-05 | | Salt affected | Polygon | |
| | 30-06 | | Gullied | Polygon | |
| 26 | 31-01 | Specific Land Use | Hill / Mountain | Polygon | |
| | 31-02 | | Snow covered area | Polygon | |
| | 31-03 | | Mining Area | Polygon | |
| | 31-04 | | Grazing land | Polygon | |
| | 31-05 | | Pastures | Polygon | |
| | 31-06 | | Meadows | Polygon | |
| | 31-07 | | Tea/Coffee Garden | Polygon | |
| | 31-08 | | Ghats | Polygon | |
| | 31-09 | | Coral Reef | Polygon | |
| | 31-10 | | Sand Dunes | Polygon | |
| 27 | 32-01 | Eco-Sensitive Areas | Bird Sanctuary | Polygon | |
| | 32-02 | | Bio-diversity Park | Polygon | |
| | 32-03 | | Botanical Garden | Polygon | |
| | 32-04 | | Zoo | Polygon | |
| | 32-05 | | National Park | Polygon | |
| | 32-06 | | Mangrove | Polygon | |
| | 32-07 | | Oxbow Lakes | Polygon | |
| | 32-08 | | Paleo channels | Polygon | |
| 28 | 33-01 | Others | Salt pan | Polygon | |
| | 33-02 | | Aquaculture | Polygon | |
| | 33-03 | | Brick kiln | Polygon | |
| | 33-04 | | Quarry | Polygon | |
| | 33-05 | | Dam | Polygon | |
| | 33-06 | | Barrage | Polygon | |
| | 33-07 | | Aqueduct | Polygon | |
| | 33-08 | | Weir | Polygon | |
| | 33-09 | | Farm house | Polygon | |
| | 33-10 | | Dairy farm | Polygon | |
| | 33-11 | | Poultry farm | Polygon | |
| | 33-12 | | Nursery | Polygon | |
| | 33-13 | | Slaughter House | Polygon | |
| | 33-14 | | Dairy Booth | Polygon/Point | |
| | 33-15 | | Lighthouse | Point | |
| | 33-16 | | Beach | Polygon | |

**Table 10a: Urban Land use/Landcover Polygon GIS Data Structure**
*Geo-spatial Layer Name: ULU_Poly*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Code | Code | Alphanumeric | 10 | Code as given in Table 10 |
| Class | Class | Text | 25 | Class as given in Table 10 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 10 |
| Area in sq. mt. | Area | Double | 10 Up to 4 decimals | Area of corresponding feature in sq. mt. |
| Name | Name | Text | 50 | Name of the Landmark |

**Table 10b: Community Toilet GIS Data Structure**
*Geo-spatial Layer Name: Community_toilet*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Toilet ID | CT_Pnt_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 10 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_C Line |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_C Line |
| Locality Name | Locality | Text | 50 | Locality Name |
| Toilet Status | Status | Text | 15 | Working/Not working |
| Toilet Type | Type | Text | 15 | Eco-friendly/General |
| Mode of Construction | Mode | Text | 5 | Public/PPP |

**Table 10c: Fire Station GIS Data Structure**
*Geo-spatial Layer Name: Fire_Station*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| **Fire Station ID** | **FS_Pnt_ID** | Alphanumeric | 15 | Unique Id |
| **Code** | **Code** | Alphanumeric | 10 | Code as given in Table 10 |
| **Ward Number** | **Ward_No** | Alphanumeric | 10 | Ward Number |
| **Road ID** | **Rd_ID** | Alphanumeric | 15 | Road ID same as in Road_C Line |
| **Road Name** | **Rd_Name** | Text | 30 | Road Name same as in Road_C Line |
| **Locality Name** | **Locality** | Text | 50 | Locality Name |
| **Fire Station Status** | **Status** | Text | 15 | Working/Not working |

**Table 10d: Garbage Collection Points/Dumper GIS Data Structure**
*Geo-spatial Layer Name: Garb_Coll_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| **Garbage collection point ID** | **GC_Pnt_ID** | Alphanumeric | 15 | Unique Id |
| **Code** | **Code** | Alphanumeric | 10 | Code as given in Table 10 |
| **Ward Number** | **Ward_No** | Alphanumeric | 10 | Ward Number |
| **Road ID** | **Rd_ID** | Alphanumeric | 15 | Road ID same as in Road_C line |
| **Road Name** | **Rd_Name** | Text | 30 | Road Name same as in Road_C line |
| **Locality Name** | **Locality** | Text | 50 | Locality Name |
| **Type of garbage** | **Garb_Type** | Text | 30 | Domestic/Biomedical/Kitchen/Construction/Mixed |
| **Status of Garbage collection point** | **Status** | Text | 30 | Temporary/Permanent and Collection point/Transfer point |
| **Coverage area of a collection point** | **Cov_area** | Double | 10 Up to 4 decimals | Coverage area (No of houses or colonies covered by a point) |

**Table 10e: Landfill Sites and Dumping Yard GIS Data Structure**
*Geo-spatial Layer Name: Landfill_Dumpyard_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Landfill site/Dumping Yard point ID | LD_Pnt_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 10 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 10 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_CLine |
| Locality Name | Locality | Text | 50 | Locality Name |
| Name of the Landfill site/Dumping Yard | Name | Text | 30 | Specific Name of the landfill site or dumping yard, if any |

**Table 10f: Cell Towers, Wi-Fi Hotspots & Public Telephone Booth GIS Data Structure**
*Geo-spatial Layer Name: Communication_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Communication Point ID | Com_Pnt_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 10 |
| Sub-Class | Sub_Class | Text | 20 | Sub Class as given in Table 10 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_CLine |
| Locality Name | Locality | Text | 50 | Locality Name |
| Description | Descr | Text | 15 | On Building/On ground |

**Table 10g: Slums GIS Data Structure**
*Geo-spatial Layer Name: Slum_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Slum ID | Slum_Pnt_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code  as given in Table  10 |
| Sub-Class | Sub_Class | Text | 20 | Sub Class as given in Table 10 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Slum Number | Slum_Num | Text | 10 | Slum Number (from ULBs) |
| Name of the Slum | Slum_ Name | Text | 30 | Name of the Slum |
| Locality Name | Locality | Text | 50 | Locality Name |
| Notified Area | Notfd_Area | Double | 10 upto 4 Decimals | Notified Area if any, from ULBs |

**Table 10h: Bus Stop GIS Data Structure**
*Geo-spatial Layer Name: Bus_Stop_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Bus stop ID | BS_Pnt_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code  as given in Table  10 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_CLine |
| Locality Name | Locality | Text | 50 | Locality Name |

**Table 10i: Tree GIS Data Structure**
*Geo-spatial Layer Name: Tree*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Code | Code | Alphanumeric | 10 | Code  as given in Table  10 |

**Table 10j: Other Urban Landuse Points:** ATM, Meteorological Station, Dairy Booth, Light House and Other if any **GIS Data Structure**

*Geo-spatial Layer Name: ULU_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| **Point ID** | **Pnt_ID** | Alphanumeric | 15 | Unique Id |
| **Code** | **Code** | Alphanumeric | 10 | Code as given in Table 10 |
| **Class** | **Class** | Text | 25 | Class as given in Table 10 |
| **Sub-Class** | **Sub_Class** | Text | 50 | Sub Class as given in Table 10 |
| **Ward Number** | **Ward_No** | Alphanumeric | 10 | Ward Number |
| **Road ID** | **Rd_ID** | Alphanumeric | 15 | Road ID same as in Road_CLine |
| **Road Name** | **Rd_Name** | Text | 30 | Road Name same as in Road_CLine |
| **Locality Name** | **Locality** | Text | 50 | Locality Name |

## II.   BUILDING FOOTPRINT:

*Buildings falling within each of the Class/Sub-class of urban land use/land cover shall be represented in the same Sub-class of Building Footprint Layer. For example, buildings falling within 'Commercial Retail' urban landuse/land cover area will be represented as 'Commercial Retail' buildings. The building footprints shall overlap with urban landuse/land cover.*

*A single symbol [    ] shall be used for representation of all buildings. The Sub-Class details for each building will be provided as an attribute.*

**Table 11: Building Footprint – Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY |
|---|---|---|---|---|
| **1** | 06-04 | **Residential** | *House* | Polygon |
|  | 06-05 |  | *Group of Houses* | Polygon |
|  | 06-06 |  | *Apartment* | Polygon |
| **2** | 07-01 | **Commercial** | *Retail* | Polygon |
|  | 07-02 |  | *Wholesale* | Polygon |
|  | 07-03 |  | *General Business* | Polygon |
|  | 07-04 |  | *Hotel/Lodge/Restaurant* | Polygon |
|  | 07-05 |  | *Shopping Centre/Mall* | Polygon |
|  | 07-06 |  | *Multiplex/Cinema* | Polygon |

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY |
|------|------|-------|-----------|----------|
| | 07-07 | | *Function Hall/ Marriage Garden* | Polygon |
| | 07-08 | | *Warehouse* | Polygon |
| | 07-09 | | *Storage Godown* | Polygon |
| | 07-10 | | *Resort* | Polygon |
| | 07-11 | | *Petrol Pump/LPG filling station* | Polygon |
| | 07-12 | | *Informal Shop* | Polygon |
| | 07-13 | | *Hostel* | Polygon |
| 3 | 08-01 | **Industrial** | *Manufacturing* | Polygon |
| | 08-02 | | *Service* | Polygon |
| | 08-03 | | *Chemical* | Polygon |
| | 08-04 | | *Pharmaceutical* | Polygon |
| | 08-05 | | *Textile* | Polygon |
| | 08-06 | | *IT Parks* | Polygon |
| | 08-07 | | *Industrial Estate/SEZ* | Polygon |
| | 08-08 | | *Agro based & Food Processing* | Polygon |
| | 08-09 | | *Obnoxious* | Polygon |
| | 08-10 | | *Cottage & Household* | Polygon |
| | 08-11 | | *Other Industries* | Polygon |
| 4 | 09-01 | **Mixed** | *Residential & Commercial* | Polygon |
| | 09-02 | | *Residential & Household Industry* | Polygon |
| | 09-03 | | *Residential & Educational* | Polygon |
| | 09-04 | | *Residential & Health Services* | Polygon |
| | 09-05 | | *Commercial & Industrial* | Polygon |
| | 09-06 | | *Commercial & Health Services* | Polygon |
| | 09-07 | | *Commercial and Educational* | Polygon |
| | 09-08 | | *Commercial and Recreational* | Polygon |
| | 09-09 | | *Residential & Commercial & Institutional* | Polygon |
| 5 | 10-01 | **Educational** | *School* | Polygon |
| | 10-02 | | *College* | Polygon |
| | 10-03 | | *University* | Polygon |
| | 10-04 | | *Vocational Institute* | Polygon |
| | 10-05 | | *Anganwari* | Polygon |
| | 10-06 | | *Training Institute* | Polygon |
| 6 | 11-01 | **Health Services** | *Govt. Hospital* | Polygon |
| | 11-02 | | *Private Hospital* | Polygon |

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY |
|------|------|-------|-----------|----------|
| | 11-03 | | *Diagnostic Centre* | Polygon |
| | 11-04 | | *Clinic/Dispensary* | Polygon |
| | 11-05 | | *Nursing Home* | Polygon |
| | 11-06 | | *Primary/Community Health Centre* | Polygon |
| 7 | 12-01 | **Central Govt. Property** | *Office* | Polygon |
| | 12-02 | | *Quarter* | Polygon |
| 8 | 13-01 | **State Govt. Property** | *Office* | Polygon |
| | 13-02 | | *Quarter* | Polygon |
| 9 | 14-01 | **Railway** | *Railway Property[@]* | Polygon |
| 10 | 15-01 | **Public & Semi-public** | *Private Office* | Polygon |
| | 15-02 | | *Banks* | Polygon |
| | 15-03 | | *Credit Society* | Polygon |
| | 15-04 | | *Foreign Establishment* | Polygon |
| | 15-05 | | *Police Station* | Polygon |
| | 15-06 | | *Cantonment /Battalion* | Polygon |
| | 15-07 | | *Jail* | Polygon |
| | 15-08 | | *Crematorium/Burial Ground/Grave Yard* | Polygon |
| | 15-09 | | *Guesthouse* | Polygon |
| | 15-10 | | *Community hall* | Polygon |
| | 15-11 | | *Dharmashala* | Polygon |
| | 15-12 | | *Tourist Facility Centre* | Polygon |
| | 15-13 | | *Auditorium* | Polygon |
| | 15-14 | | *Convention Centre* | Polygon |
| | 15-15 | | *Museum* | Polygon |
| | 15-16 | | *Public Library* | Polygon |
| | 15-17 | | *Art Gallery & Cultural Centre* | Polygon |
| | 15-18 | | *LPG/ CNG Gas Booking Office* | Polygon |
| | 15-19 | | *Ticket Booking & Reservation Office* | Polygon |
| | 15-20 | | *Stock Exchange* | Polygon |
| | 15-21 | | *Disaster Management Centre* | Polygon |
| | 15-24 | | *Crech/Day Care* | Polygon |
| | 15-25 | | *Public/Community Toilet* | Polygon |
| | 15-26 | | *Social Welfare Centre* | Polygon |
| | 15-27 | | *Orphanage* | Polygon |
| | 15-28 | | *Old Age Home* | Polygon |
| | 15-29 | | *Night Shelter* | Polygon |
| | 15-30 | | *Fire Station* | Polygon |

[@]*includes Office, Quarters, Recreational Space, Institutions etc. under Railways*

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY |
|------|------|-------|-----------|----------|
| 11 | 16-01 | **Religious** | *Temple* | Polygon |
| | 16-02 | | *Mosque* | Polygon |
| | 16-03 | | *Idgah* | Polygon |
| | 16-04 | | *Church* | Polygon |
| | 16-05 | | *Gurudwara* | Polygon |
| | 16-06 | | *Monastery* | Polygon |
| | 16-07 | | *Synagogue* | Polygon |
| | 16-08 | | *Chhatri* | Polygon |
| 12 | 17-01 | **Recreational** | *Garden* | Polygon |
| | 17-02 | | *Park* | Polygon |
| | 17-04 | | *Club* | Polygon |
| | 17-05 | | *Sports Centre* | Polygon |
| | 17-06 | | *Gymnasium* | Polygon |
| | 17-07 | | *Swimming Pool* | Polygon |
| | 17-08 | | *Stadium* | Polygon |
| | 17-09 | | *Planetarium* | Polygon |
| | 17-10 | | *Aquarium* | Polygon |
| | 17-11 | | *Open Air Theatre* | Polygon |
| | 17-12 | | *Golf Course* | Polygon |
| | 17-13 | | *Race Course* | Polygon |
| | 17-14 | | *Exhibition Ground* | Polygon |
| | 17-15 | | *Amusement /Theme Park* | Polygon |
| 13 | 18-01-01 | **Public Utilities** | *Water Treatment Plant* | Polygon |
| | 18-01-02 | | *Water Pumping Station* | Polygon |
| | 18-01-03 | | *Ground Level Reservoir* | Polygon |
| | 18-03-01 | | *Sewage Treatment Plant* | Polygon |
| | 18-03-02 | | *Sewage Pumping Station* | Polygon |
| | 18-04-01 | | *Electric Power Plant* | Polygon |
| | 18-04-02 | | *Electric Sub Station* | Polygon |
| | 18-07 | | *Effluent Treatment Plant* | Polygon |
| 14 | 19-03 | **Solid Waste Management** | *Recycling Plant* | Polygon |
| 15 | 20-01 | **Communication** | *Telephone Exchange* | Polygon |
| | 20-02 | | *Post /Telegraph Office* | Polygon |
| | 20-03 | | *Radio/TV Station* | Polygon |
| | 20-04 | | *Satellite & Telecommunication Centre* | Polygon |
| 16 | 21-01 | **Heritage** | *Monument* | Polygon |
| | 21-02 | | *Fort* | Polygon |
| | 21-03 | | *Archaeological Site* | Polygon |
| | 24-01 | | *Bus stand /Terminus* | Polygon |
| 17 | 24-02 | **Transportation** | *Railway Station* | Polygon |
| | 24-03 | | *Railway Yard / Sliding* | Polygon |

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY |
|------|------|-------|-----------|----------|
|  | 24-05 |  | *Airport / Airstrip* | Polygon |
|  | 24-07 |  | *Port* | Polygon |
|  | 24-08 |  | *Harbour* | Polygon |
|  | 24-10 |  | *Truck Terminus* | Polygon |
|  | 24-11 |  | *Freight Complex* | Polygon |
|  | 24-17 |  | *Transport Nagar* | Polygon |
| 18 | 25-04 | **Traffic related** | *Multi-level Parking* | Polygon |
| 19 | 26-02 | **Rural** | *House* | Polygon |
|  | 26-03 |  | *Group of Houses* | Polygon |
|  | 26-04 |  | *Apartment* | Polygon |
| 20 | 31-07 | **Specific Land use** | *Tea/Coffee Garden* | Polygon |
| 21 | 32-01 | **Eco-Sensitive Areas** | *Bird Sanctuary* | Polygon |
|  | 32-02 |  | *Bio-diversity Park* | Polygon |
|  | 32-03 |  | *Botanical Garden* | Polygon |
|  | 32-04 |  | *Zoo* | Polygon |
|  | 32-05 |  | *National Park* | Polygon |
| 22 | 33-09 | **Others** | *Farm house* | Polygon |
|  | 33-10 |  | *Dairy farm* | Polygon |
|  | 33-11 |  | *Poultry farm* | Polygon |
|  | 33-13 |  | *Slaughter House* | Polygon |
|  | 33-14 |  | *Dairy Booth* | Polygon |

**Table 11a: Buildings GIS Data Structure**

*Geo-spatial Layer Name: Building_footprint*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|----------------|----------------------|----------------------|-----------------------|-------------------|
| **Code** | **Code** | Alphanumeric | 10 | Code as given in Table 11 |
| **Class** | **Class** | Text | 25 | Class as given in Table 11 |
| **Sub-Class** | **Sub_Class** | Text | 50 | Sub Class as given in Table 11 |
| **Ward Number** | **Ward_No** | Alphanumeric | 10 | Ward Number |
| **Road ID** | **Rd_ID** | Alphanumeric | 15 | Road ID same as in Road_CLine |
| **Road Name** | **Rd_Name** | Text | 30 | Road Name same as in Road_CLine |
| **Locality Name** | **Locality** | Text | 50 | Locality Name |

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Colony Name | Colony | Text | 50 | Colony Name |
| Number of floors | No_floors | Numeric | 5 | Number of floors in a building |
| Construction Type | Cons_type | Text | 15 | Pucca/Semi Pucca/Kutcha |
| Area in sq. mt. | Area | Double | 10 Up to 4 decimals | Area of corresponding building footprint |
| Description | Descr | Text | 50 | Name of building and Details, if any |

## IV. UTILITIES:

*Utility Layers:*

*All utility layers like Water Supply Network, Drainage Network, Sewage Network, Electricity Supply Network, Natural Gas Distribution Network database will be prepared from the data collected by ULBs from the concerned engineering and line departments.*

*All network lines are represented as lines and the nodes (starting point, intersections, valves, end points etc.) are represented as points.*

**Table 12: Water Supply Network – Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| 1 | 18-01-01 | Water Supply Network | *Water Treatment Plant* | Point | |
| | 18-01-02 | | *Water Pumping Station* | Point | |
| | 18-01-03 | | *Ground Level Reservoir* | Point | |
| | 18-01-04 | | *Raw Water Main Pipeline* | Line | |
| | 18-01-05 | | *Pumping Line* | Line | |
| | 18-01-06 | | *Distribution Pipeline* | Line | |
| | 18-01-07 | | *Service Pipeline* | Line | |
| | 18-01-08 | | *Supply Valve* | Point | |
| | 18-01-09 | | *Over Head Tank* | Point | |
| | 18-01-10 | | *Public Stand Post* | Point | |
| | 18-01-11 | | *Tube Well* | Point | |
| | 18-01-12 | | *Hand Pump* | Point | |

**Table 12a: Water Supply Network Line GIS Data Structure**
*Geo-spatial Layer Name: Water_NW_Line*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Water Supply ID | WS_Line_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 12 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 12 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_CLine |
| Locality Name | Locality | Text | 50 | Locality Name |
| Distance from road (in mt.) | Dis_frm_rd | Double | 10 Upto 2 Decimals | Distance from road in meters |
| Construction Material | Cons_Mat | Text | 10 | PSC/DI/HDPE/MS/RCC/Others/GI/AC/CI/PVC |
| Pipe Dia in mt. | Pipe_Dia | Numeric | 5 | Pipe Diameter in meters |

**Table 12b: Water Supply Network Points GIS Data Structure**
*Geo-spatial Layer Name: Water_NW_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Water Supply ID | WS_Pnt_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 12 |
| Sub_Class | Sub_Class | Text | 50 | Sub Class as given in Table 12 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_CLine |

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Locality Name | Locality | Text | 50 | Locality Name |
| Capacity | Capacity | Text | 10 | Capacity of Treatment plant, Pumping station, GLR, overhead tank in the respective units |

**Table 13: Storm Water Drainage Network – Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| 2 | 18-02-01 | Storm water Drainage | *Storm Water Drain* | Line | |
| | 18-02-02 | | *Storm Water Vent* | Point | |

**Table 13a: Storm water Drainage Network Line GIS Data Structure**
*Geo-spatial Layer Name: Str_Drain_NW_Line*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Storm Water Drainage ID | Dr_Line_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 13 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 13 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_CLine |
| Locality Name | Locality | Text | 50 | Locality Name |
| Distance from road (in mt.) | Dis_frm_rd | Double | 10 Upto 2 Decimals | Distance from road in meters |
| Depth in mt. | Depth | Double | 10 Upto 2 Decimals | Depth of Drainage in meters |
| Construction Type | Cons_Type | Text | 10 | Box/Open Channel |
| Network Line Type | NW_Type | Text | 15 | Mainline/Service/Pumping |

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Name of the Storm water drain | Name | Text | 50 | Specific Name if any |

**Table 13b: Storm water Drainage Network Points GIS Data Structure**
*Geo-spatial Layer Name: Str_Drain_NW_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Storm Water Drainage ID | **Dr_Pnt_ID** | Alphanumeric | 15 | Unique Id |
| Code | **Code** | Alphanumeric | 10 | Code as given in Table 13 |
| Sub-Class | **Sub_Class** | Text | 50 | Sub Class as given in Table 13 |
| Ward Number | **Ward_No** | Alphanumeric | 10 | Ward Number |
| Road ID | **Rd_ID** | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | **Rd_Name** | Text | 30 | Road Name same as in Road_CLine |
| Locality Name | **Locality** | Text | 50 | Locality Name |
| Distance from road(in mt.) | **Dis_frm_rd** | Double | 10 Upto 2 Decimals | Distance from road in meters |

**Table 14: Sewerage Network – Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| 1 | 18-03-01 | Sewerage Network | *Sewage Treatment Plant* | Point | |
| | 18-03-02 | | *Sewage Pumping Station* | Point | |
| | 18-03-03 | | *Pumping Line* | Line | |
| | 18-03-04 | | *Main Sewer Line* | Line | |
| | 18-03-05 | | *Branch Sewer Line* | Line | |
| | 18-03-06 | | *Service Sewer Line* | Line | |
| | 18-03-07 | | *Manhole* | Point | |
| | 18-03-08 | | *Vent Valve* | Point | |

**Table 14a: Sewerage Network Line GIS Data Structure**

*Geo-spatial Layer Name: Sew_NW_Line*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Sewerage ID | SW_Line_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 14 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 14 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_CLine |
| Locality Name | Locality | Text | 50 | Locality Name |
| Distance from road (in mt.) | Dis_frm_rd | Double | 10 Upto 2 Decimals | Distance from road in meters |
| Depth in mt. | Depth | Double | 10 Upto 2 Decimals | Depth of Sewer line in meters |
| Pipe Dia in mm. | Pipe_Dia | Double | 10 Upto 2 Decimals | Pipe Diameter in millimeters |
| Construction Material | Cons_Mat | Text | 10 | RCC/CI/SWG/PVC/GI/AC/Others |

**Table 14b: Sewerage Network Points GIS Data Structure**

*Geo-spatial Layer Name: Sew_NW_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Sewerage ID | SW_Pnt_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 14 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 14 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_CLine |
| Locality Name | Locality | Text | 50 | Locality Name |

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| **Distance from road (in mt.)** | **Dis_frm_rd** | Double | 10 Upto 2 Decimals | Distance from road in meters |

**Table 15: Power Supply Network – Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| **1** | **18-04-01** | **Power** | *Electric Power Plant* | Point | |
| | **18-04-02** | | *Electric Sub-Station* | Point | |
| | **18-04-03** | | *Transmission Tower* | Point | |
| | **18-04-04** | | *Transformer* | Point | |
| | **18-04-05** | | *33 Kv Line* | Line | |
| | **18-04-06** | | *11 Kv Line* | Line | |
| | **18-04-07** | | *Pole* | Point | |
| | **18-04-08** | | *Street Light* | Point | |
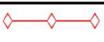
**Table 15a: Power Supply Network Line GIS Data Structure**
*Geo-spatial Layer Name: Power_NW_Line*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| **Power Supply ID** | **PS_Line_ID** | Alphanumeric | 15 | Unique Id |
| **Code** | **Code** | Alphanumeric | 10 | Code as given in Table 15 |
| **Sub-Class** | **Sub_Class** | Text | 50 | Sub Class as given in Table 15 |
| **Ward Number** | **Ward_No** | Alphanumeric | 10 | Ward Number |
| **Road ID** | **Rd_ID** | Alphanumeric | 15 | Road ID same as in Road_CLine |
| **Road Name** | **Rd_Name** | Text | 30 | Road Name same as in Road_CLine |
| **Locality Name** | **Locality** | Text | 50 | Locality Name |
| **Name of Power Line** | **Pow_Name** | Text | 30 | Power Line Name if any |

**Table 15b: Power Supply Network Points GIS Data Structure**
*Geo-spatial Layer Name: Power_NW_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Power Supply ID | PS_Pnt_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 15 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 15 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_CLine |
| Locality Name | Locality | Text | 50 | Locality Name |
| Capacity | Capacity | Text | 10 | Capacity of Power Plant, Sub-station and Transformer, in the respective units |
| Street Light-ID | St_Lt_ID | Alphanumeric | 5 | Unique Id for Street Light |
| Type of Street Light Pole | Pole_Type | Text | 15 | Iron/Concrete/Other |
| Type of Street Light | St_Lt_Ty | Text | 15 | HPMV/Sodium/Tube Light/CFL/High Mast/Others |
| Source of Energy | Sou_ Energy | Text | 15 | Electricity/Others/Solar |

**Table 16: Gas Distribution Network- Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| 1 | 18-05-01 | Natural Gas | *City Gate Metering Station* | Point | |
| | 18-05-02 | | *Area Regulator Station* | Point | |
| | 18-05-03 | | *Main Distribution Line* | Line | |
| | 18-05-04 | | *Branch Distribution Line* | Line | |
| | 18-05-05 | | *Regulator* | Point | |
| | 18-05-06 | | *Flow Meter* | Point | |

**Table 16a: Gas Distribution Network Line GIS Data Structure**
*Geo-spatial Layer Name: Natural_Gas_NW_Line*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Gas Distribution ID | GD_Line_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 16 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 16 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_CLine |
| Locality Name | Locality | Text | 50 | Locality Name |

**Table 16b: Gas Distribution Network Points GIS Data Structure**
*Geo-spatial Layer Name: Natural_Gas_NW_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Gas Distribution ID | GD_Pnt_ID | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 16 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 16 |
| Ward Number | Ward_No | Alphanumeric | 10 | Ward Number |
| Road ID | Rd_ID | Alphanumeric | 15 | Road ID same as in Road_CLine |
| Road Name | Rd_Name | Text | 30 | Road Name same as in Road_CLine |
| Locality Name | Locality | Text | 50 | Locality Name |

## V. HYPSOGRAPHY:

### Table 17: DEM Layer

Towers for which monoscopic data is selected, the DEM shall be generated by Total Station survey and Towns for which stereo data is selected, the DEM shall be generated from stereo data. The DEM is a DTM which represent bare earth surface.

| S.No | CLASS | ACCURACY | PIXEL VALUE | GEOMETRY |
|------|-------|----------|-------------|----------|
| 1 | **Digital Terrain Model (DTM)** | *0.5 m* | Height in metres | Raster |

### Table 18: Contour- Geo-Spatial Data Content

*Contour shall be generated from the DTM.*

| S.No | CODE | CLASS | CONTOUR INTERVAL | GEOMETRY | SYMBOL |
|------|------|-------|------------------|----------|--------|
| 1 | 34-01 | **Contour** | *1 m* | Line | ——— |

### Table 18a: Contour Layer GIS Data Structure
### *Geo-spatial Layer Name: Contour_Line*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|----------------|---------------------|---------------------|----------------------|-------------------|
| **Code** | **Code** | Alphanumeric | 10 | Code as given in Table 18 |
| **Contour Value** | **Cntr_Val** | Numeric | 5 | Height in metres |

### Table 19: Ground Control Points (GCPs) Layer- Geo-Spatial Data Content

DGPS survey is used for generation of GCPs. DGPS survey data shall be processed using closed network traverse and the reference station coordinate shall be computed using ITRF reference frame.

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|------|------|-------|-----------|----------|--------|
| 1 | 35-01 | **GCP** | *Reference station* | Point (X,Y,Z) | ⊥ |
| | 35-02 | | *Rover Station* | Point (X,Y,Z) | ⊥ |

---

**Table 19a: Ground Control Points GIS Data Structure**
*Geo-spatial Layer Name: GCP_Pnt*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Ground Control point ID | GCP_Id | Alphanumeric | 15 | Unique Id |
| Code | Code | Alphanumeric | 10 | Code as given in Table 19 |
| Sub-Class | Sub_Class | Text | 25 | Sub Class as given in Table 19 |
| X Coordinate | X | Double | Up to 8 decimals | X Coordinate |
| Y Coordinate | Y | Double | Up to 8 decimals | Y Coordinate |
| Z Coordinate | Z | Double | Up to 8 decimals | Z Coordinate |
| Description of the Ground Control point | Descr | Text | 250 | Description |
| Monument | Monument | Text | 5 | Yes/No |
| Sketch Map or Image | Sketch | Blob | | Sketch Map or Image to be attached |
| Ground Photo | Gr_Photo | Blob | | Ground Photo to be attached |

## VI. CADASTRAL LAYER:

### Table 20: Cadastral Layer- Geo-Spatial Data Content

*Cadastral layer will be prepared from the data collected by ULBs from the line departments.*

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| 1 | 36-01 | Cadastre | - | Polygon |  |

**Table 20a: Cadastral Layer GIS Data Structure**
*Geo-spatial Layer Name: Cadastre_Poly*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Code | Code | Alphanumeric | 10 | Code as given in Table 20 |
| Survey Number | Survey_Num | Alphanumeric | 15 | Khasra Number/Survey Number |
| Area | Area | Double | Up to 4 decimals | Area of Village Cadastre or Parcel |

### VII. BOUNDARIES:

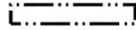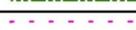**Table 21: Administrative Boundaries – Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|------|------|-------|-----------|----------|--------|
| 1 | 37-01 | Administrative Boundaries | *International Boundary* | Polygon | |
| | 37-02 | | *State Boundary* | Polygon | |
| | 37-03 | | *District Boundary* | Polygon | |
| | 37-04 | | *Tehsil / Mandal / Block Boundary* | Polygon | |
| | 37-05 | | *Village Boundary* | Polygon | |
| | 37-06 | | *Forest Boundary* | Polygon | |
| | 37-07 | | *Revenue Boundary* | Polygon | |

**Table 21a: Administrative Boundaries GIS Data Structure**
*Geo-spatial Layer Name: Admin_Bnd_Poly*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|----------------|---------------------|---------------------|----------------------|-------------------|
| **Code** | **Code** | Alphanumeric | 10 | Code as given in Table 21 |
| **Sub-Class** | **Sub_Class** | Text | 50 | Sub Class as given in Table 21 |
| **Area in sq. km.** | **Area** | Double | Up to 4 decimals | Area of corresponding Admin boundary |
| **Name** | **Name** | Text | 50 | Name of the Admin Boundary |

**Table 22: Planning Boundaries – Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|------|------|-------|-----------|----------|--------|
| 2 | 38-01 | Planning Boundaries | *Planning Area Boundary* | Polygon | |
| | 38-02 | | *Highway Corridor Development Zone* | Polygon | |
| | 38-03 | | *Peripheral Control belt boundary* | Polygon | |
| | 38-04 | | *Controlled Area boundary* | Polygon | |
| | 38-05 | | *Urbanisable Area Boundary* | Polygon | |
| | 38-06 | | *Industrial Zone / Area* | Polygon | |
| | 38-07 | | *Special Economic Zone* | Polygon | |
| | 38-08 | | *National Park / Sanctuary / Conservation Area* | Polygon | |
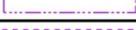
**Table 22a: Planning Boundaries GIS Data Structure**
*Geo-spatial Layer Name: Planning_Bnd_Poly*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Code | Code | Alphanumeric | 10 | Code as given in Table 22 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 22 |
| Area in sq. km. | Area | Double | Up to 4 decimals | Area of corresponding Planning boundary |
| Name | Name | Text | 50 | Name of the Planning Boundary |

**Table 23: Municipal Boundaries – Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| 3 | 39-01 | Municipal Boundaries | *Municipal Boundary* | Polygon | |
| | 39-02 | | *Zone Boundary* | Polygon | |
| | 39-03 | | *Ward Boundary* | Polygon | |
| | 39-04 | | *Taxzone Boundary* | Polygon | |

**Table 23a:Municipal Boundaries GIS Data Structure**
*Geo-spatial Layer Name: Municipal_Bnd_Poly*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Code | Code | Alphanumeric | 10 | Code as given in Table 23 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 23 |
| Area in sq. km. | Area | Double | Up to 4 decimals | Area of corresponding Municipal boundary |
| Name | Name | Text | 50 | Name of the Municipal Boundary |
| Ward Number | Ward_No | Numeric | 5 | Ward Number in case of Ward boundary |
| Taxzone Number | Taxzone_No | Numeric | 5 | Tax zone Number in case of Tax zone boundary |

**Table 24: Other Boundaries (EB, UFS, Mining area) – Geo-Spatial Data Content**

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| 4 | 40-01 | Other Boundaries | *Urban Frame Survey Boundary* | Polygon | |
| | 40-02 | | *Enumeration Block Boundary* | Polygon | |
| | 40-03 | | *Mining Area Boundary* | Polygon | |

**Table 24a: Boundaries (EB, UFS, Mining area) GIS Data Structure**

*Geo-spatial Layer Name: Other_Bnd_Poly*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Code | Code | Alphanumeric | 10 | Code as given in Table 24 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 24 |
| Area in sq. km. | Area | Double | Up to 4 decimals | Area of corresponding Admin boundary |
| Enumeration Block Number | EB_No | Numeric | 5 | Enumeration Block Number |
| Urban Frame Survey Number | UFS_No | Numeric | 5 | Urban Frame Survey Number |

**Table 25: Hazard Prone Areas – Geo-Spatial Data Content**

*Database available with NRSC/ISRO, GSI, NDMA, Other State & Central Government Departments will be incorporated into the final database.*

| S.No | CODE | CLASS | SUB-CLASS | GEOMETRY | SYMBOL |
|---|---|---|---|---|---|
| 1 | 41-01 | Hazard | Flood | Polygon | |
| | 41-02 | | Earthquake | Polygon | |
| | 41-03 | | Landslide | Polygon | |

**Table 25a: Hazard prone Areas - GIS Data Structure**

*Geo-spatial Layer Name: Hazard_poly*

| Attribute Name | Attribute Field Name | Attribute Field Type | Attribute Field Width | Description/Value |
|---|---|---|---|---|
| Code | Code | Alphanumeric | 10 | Code as given in Table 25 |
| Sub-Class | Sub_Class | Text | 50 | Sub Class as given in Table 25 |

### 3.3.6. Accuracy Standards

The geo-spatial data has to meet the feature's Planimetric accuracy and thematic accuracy in compliance to the 1:4000 scale databases.

**Planimetric Accuracy**
Large scale Base maps and thematic databases, at 1:4000 scale, shall be incompliance to 0.25mm of the scale (as per ASPRS, NNRMS standards).

**Thematic Accuracy of Classification**
Urban Landuse classification is based on attribute data and therefore it has to be done based on the latest attribute data.

## 3.4.0    Quality Assurance/Quality Check

Quality Assurance and Quality Check (QA/QC) shall be carried out at all levels of project execution. The main products covered under QA/QC are (i) Input high resolution satellite data (ii) Geo-referenced/Ortho-rectified satellite data (iii) GIS Feature extraction from high resolution data (iv) Final GIS database (v) Supply of the GIS database to the respective ULBs for Master Plan formulation.
QA/QC is carried out at two different stages - (1) In-progress/Internal QA/QC and (2) External QA/QC for each of the product.

(1) **In-progress/Internal QA/QC:** In-progress QA/QC shall be carried out during the generation of the product by the product generation team. The Internal quality check is carried out for each product as per the prescribed product specifications/standards, by the identified QA/QC expert of the product generation team.  In-progress/Internal QA/QC shall ensure 100% quality check and accord certification.

(2) **External QA/QC:** Expert in the respective product domain and outside the product generation team shall carry out the random quality check, up to maximum of 15% of product quantity and accord certification. The non-compliance products as per the specifications shall be rejected. Rejected products will be regenerated by the product generation team within the stipulated time.

Apart from the product specifications and standards the following parameters are important in assuring the final GIS database product quality.

      a. *Completeness:* Entire study area should be covered – (i) There should not be any gaps within the study area/AOI (ii) Ensure that all features are mapped, as per the feature content, which are present in the study area/AOI.

**b. *Correctness :*** (i) Feature extraction should ensure correct interpretation, shape of the feature as per the image and feature geometry definition (ii) The feature classification as per the ground truth and attribute data.

**c. *Conformity:*** GIS database should conform to the specifications i.e. Classification of the features should conform to the Geo-Spatial Data content and GIS Data Structure tables given in the Section 3.3.5 (Table 6 - 25). Also, the classification of features should be as per the Attribute data, verified and certified by the ULBs.

**d. *Consistency:*** Interpretation, feature extraction/digitization, its geometry should be consistent in all parts of the Study area.

**e. *GIS Compatibility:*** The Geo-Spatial Data should conform to the co-ordinate system and extent as given in section 3.2.1 (Table 4) and conform to the GIS data structures given in section 3.3.5 (Table 6 - 25). It should be topological clean, free from errors such as sliver polygons, duplicates, overlaps and gaps.

**Attribute Data Quality Check:** Attribute data is collected from field and line departments and shall be verified and certified by the respective Urban Local Bodies with the Time stamp.

**Note:** *Each product specification and standards are given in the respective sections of the document. The project execution team may design appropriate QA/QC forms for carrying out the In-progress/Internal, External QA/QC and certification.*

## 3.5.0    GIS database Dissemination to ULBs for Master Plan Formulation

Maintenance of GIS database at ULBs for GIS based Master Plan formulation demands the basic pre-requisites such as computer hardware infrastructure like workstations and error resistance storage like NAS, GIS software packages and IT experts at ULB level. In view of this, NRSC/ISRO and TCPO/MOUD has developed web based application "Bhuvan-NUIS for GIS based Master Plan formulation" and imparted the nationwide training & capacity building for Town Planning personnel. The main features/advantages of Bhuvan-NUIS are:

**Databases**
- Ortho-rectified Satellite image
- Existing Urban GIS database (Layer wise) including attribute information, Admin boundaries.
- Older versions of databases
- 1:4000 Scale GIS database for Formulation of Master Plan
- Meta data

**GIS Tools for Master Plan formulation for the ULBs**
- GIS data can be edited/modified and updated with latest Satellite images/ground information

---

- Local attribute data can be updated or new attributes can be added

- GIS analysis (both Spatial and attribute) tools required for Master Plan formulation

- On line approval and governance for creation, updating database within the ULB according to the approval procedure

**Access control and Management**

- Authorised personnel at ULB level can only access the specific city data

- Authorised personnel at State Town Planning Directorate level can view and read the status of cities within the particular state

- Authorised personnel at TCPO/MoUD level can view and read the status of all the cities.

**Advantages**
- No need of maintaining any spatial computer systems and commercial software for Remote Sensing data processing and GIS analysis**.** Complete database storage, management including backup at Bhuvan-NUIS server. No cost to ULBs.

- Only desktop system with internet facility can enable GIS database creation, updating and GIS based Master Plan preparation at ULB.

- Avoid the database redundancy, duplicate work in different divisions of State and Central government departments

- Data can be shared with line departments; which would enable updating of database in near real time.

- Enable the investment protection and facilitate cost & time effective revision of Master plans periodically.

**Figure 2: Bhuvan-NUIS based architecture for GIS database dissemination to ULBs in compliance to OGC standards**
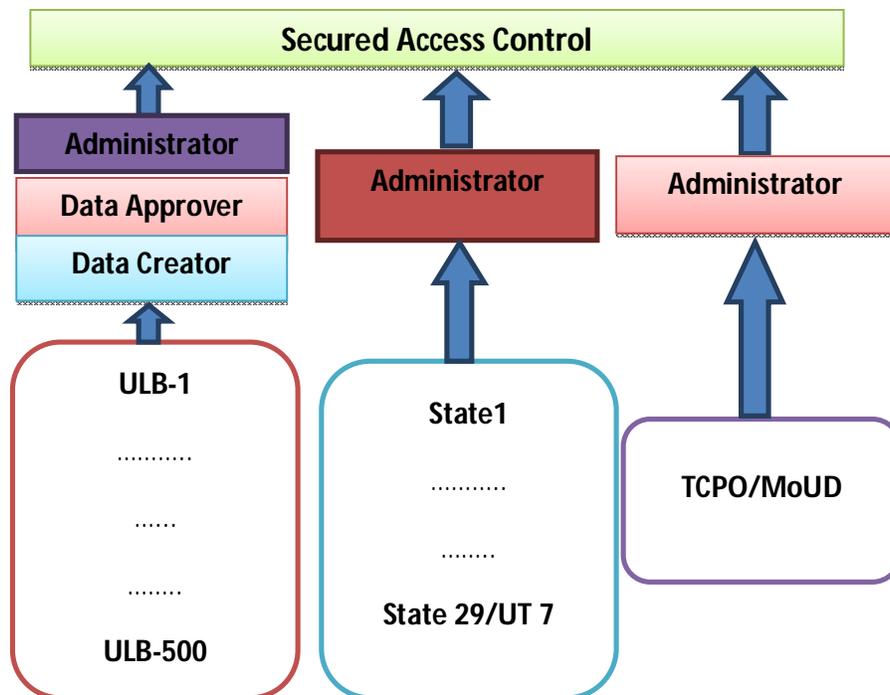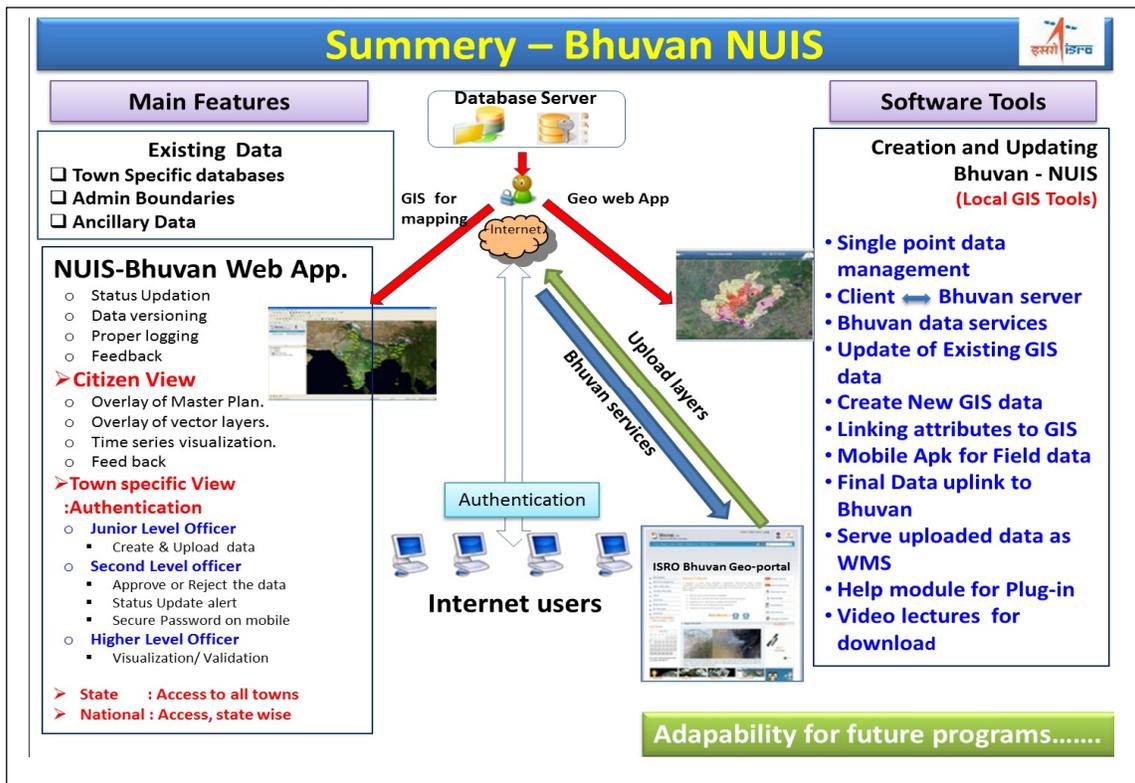


Each city GIS data would be maintained as individual database unit and respective town ULB shall own the responsibility of secured access control and updating data for Master Plan formulation.

## 3.6.0      Metadata Standards

Meta data describes data characteristics of content, quality, access, format, scale, when, who, where, how data generated and availability of the data. Meta data standard is required to enable the users to be aware of method, accuracy, exchange of data and limitations of the data for the intended purpose.

NSDI ver 2.0 Metadata standards are proposed to be adopted. The following are main Metadata Elements as per OGC compliance standard.

**I. Data Identification Information**

| S. No. | NAME OF THE ELEMENT | FORMAT | WIDTH |
|---|---|---|---|
| 1 | Name of the Dataset | Text | 250 |
| 2 | Theme | Text | 250 |
| 3 | Keywords | Text | 250 |
| 4 | Access Constraints | Text | 250 |
| 5 | Use Constraints | Text | 250 |
| 6 | Purpose of creating data | Text | 250 |
| 7 | Data Type | Text | 128 |
| 8 | Edition | Text | 128 |
| 9 | Status | Text | 250 |

**II. Contact Information**

| S. No. | NAME OF THE ELEMENT | VALUE | WIDTH |
|---|---|---|---|
| 1 | Contact Person | Text | 250 |
| 2 | Organisation | Text | 250 |
| 3 | Mailing Address | Text | 250 |
| 4 | City/Locality | Text | 250 |
| 5 | Country | Text | 250 |
| 6 | Contact Telephone | Text | 250 |
| 7 | Contact Fax | Text | 250 |
| 8 | Contact Email | Text | 250 |

**III. Geographic Location**

| S.No | NAME OF THE ELEMENT | VALUE | WIDTH |
|---|---|---|---|
| 1 | Datum | Text | 128 |

**IV. Coverage**

| S.No | NAME OF THE ELEMENT | VALUE | WIDTH |
|------|---------------------|-------|-------|
| 1 | Upper left | Double | 128 |
| 2 | Upper right | Double | 128 |
| 3 | Lower right | Double | 128 |
| 4 | Lower left | Double | 128 |

**V. Citation**

| S.No | NAME OF THE ELEMENT | VALUE | WIDTH |
|------|---------------------|-------|-------|
| 1 | Data Prepared by | Text | 250 |
| 2 | Original Source | Text | 250 |
| 3 | Source Date | Text | 250 |
| 4 | Lineage<br>State:<br>City:<br>Area of Interest (sq. km.):<br>Scale: | <br>Text<br>Text<br>Double<br>Text | 250 |

**VI. Metadata Stamp**

| S.No | NAME OF THE ELEMENT | VALUE |
|------|---------------------|-------|
| 1 | Metadata Date Stamp | Date (DD/MM/YYYY) |

**VII. Dataset Topic Category**

| S.No | NAME OF THE ELEMENT | VALUE | WIDTH |
|------|---------------------|-------|-------|
| 1 | Data Identification topic category | Text | 250 |

**VIII. Language**

| S.No | NAME OF THE ELEMENT | VALUE | WIDTH |
|------|---------------------|-------|-------|
| 1 | Language ISO 0639-2Bsh | Text | 250 |

**IX. Abstract describing the data**

| S.No | NAME OF THE ELEMENT | VALUE | WIDTH |
|------|---------------------|-------|-------|
| 1 | Data Identification abstract | Text | 250 |

## 4.0.0 MAP SYMBOLOGY

For cartographic representation/visualisation of the GIS database or to generate a hard copy/soft copy maps, appropriate symbols have to be used. In urban applications, it is also important to choose appropriate symbols as a statutory requirement in the States/UTs Town Planning Act. To facilitate uniform symbology across all the cities of different States/UTs, this section provides proposed symbols for the feature data content given in the Tables 6 to 25. However, the symbols can be customised as per the States/UTs Town Planning Act and can be adopted accordingly for representation/visualisation of maps.

## 5.0.0 INDICATIVE FORMAT FOR URBAN DATA COLLECTION

Master Plan formulation requires a variety of data at different stages of the planning process as a diagnostic tool for the health of the city, assessment of existing conditions in a settlement, spatial variations within the city, time series information, etc. as well as analysis and projections for future requirements in respect of various activities. While primary data collection involves time-consuming surveys, most socio-economic data may be obtained from published or un-published secondary sources. In order to streamline the process and diminish delays in the plan preparation process, a standardized data collection format has been provided as an effort to simplify and speed up the process. Most of data collection can be taken up as a separate research/survey before plan formulation to provide processed data inputs.

This format for urban data collection at town/ward level consists of 25 tables which cover key areas such as demography, physical & locational aspects, physical and social infrastructure, environment, housing and slums, governance, etc. which are vital for study of existing situation and framing of proposals for master plan formulation.

The format is an indicative format. Town planning is a State subject and a great variety of legislations exist which specify requirements for master/development plan formulation, and different State Town Planning Acts may specify different requirements of data to be collected. Further, since the cities vary in size from megalopolitan to Class VI cities, with a great variety of topographic settings, functional specializations, etc., the data requirement for plan formulation cannot be uniform. Therefore, the format may be modified suitably by the State Nodal Agencies as per their requirement depending on size and other characteristics of the urban settlement.

The indicative format for urban data collection is given at Annexure-III. Guidelines to fill the proforma are at Appendix-1.

**REFERENCES**

1. NNRMS Standards: A National Standard for EO images, Thematic & Cartographic Maps, GIS Databases and Spatial Outputs, July 2005, ISRO: NNRMS: TR: 112: 2005 committee report.

2. NUIS Design & Standards, July 2006, TCPO/MoUD, New Delhi.

3. Urban And Regional Development Plans Formulation And Implementation (URDPFI) Guidelines, January 2015, MoUD, New Delhi.

4. Andhra Pradesh Municipal Development Project (APMDP), Terms of Reference, 2013, Govt. of AP.

5. For more details on AMRUT may visit Mission website http://amrut.gov.in/

K-14011/2/2012-UCD(Pt.)
Government of India
Ministry of Urban Development
UCD/LSG Section

Room No.202-C, Nirman Bhawan, New Delhi,
the 13th February, 2015.

**Office Memorandum**

Sub:     **Constitution of Committee for Revision of NUIS Guidelines & Design Standards – Reg.**

As per the directions of Hon'ble Prime Minister of India Chief Planner, TCPO appointed as Nodal Officer for Ministry of Urban Development for leveraging tools of space technology in efficient governance, held interactions with Department of Space, NRSC and SAC to identify and formulate programmes/ scheme for urban and regional planning and development. Accordingly, Ministry of Urban Development has proposed to develop GIS databases for formulation of master plans for 4041 cities/ towns as per Census 2011 using very high resolution satellite images at 1:5000 scale or higher. The design standards and guidelines of NUIS Phase-I are to be revised accordingly. The same databases can also be used for programmes such as Smart Cities as well as National Urban Renewal Mission.

The Ministry of Urban Development has constituted a Committee for Revision of NUIS Scheme Guidelines and NUIS Design Standards. The terms and conditions and composition of the Committee are as under:

**Terms and Conditions**
- Review and suggest modifications in the methodologies in database development of NUIS Phase-II, in view of changing technologies and as well as the lessons learnt
- Evaluate /review of NUIS Design and Standards Document
- Review and Modify NUIS Scheme Guidelines, 2006
- The Committee will submit its report in two months from the date of its first meeting.

The composition of the Committee is as under:

| | | |
|---|---|---|
| 1. | Dr. P.G. Diwakar, Deputy Director (Applications), National Remote Sensing Centre, Dept. of Space, Balanagar, Hyderabad – 500625 | Chairman |
| 2. | Shri S.V. Singh, Director, GIS & RS, Indian Institute of Survey and Management, Uppal, Hyderabad – 500039 | Member |
| 3 | Prof. Mahavir, School of Planning & Architecture, 4-A, I.P. Estate, Vikas Marg, New Delhi – 110002. | Member |
| 4 | Dr. K. Venugopala Rao, Group Head, Urban Studies & Geo-informatics Division, National Remote Sensing Center (NRSC), ISRO, Dept. of Space, Balanagar, Hyderabad – 500625 | Member |
| 5 | Dr. Vinod M Bothale, Scientist/ Engineer 'G', Bhuvan, National Remote Sensing Center (NRSC), ISRO, Dept. of Space, Balanagar, Hyderabad – 500625 | Member |
| 6 | Dr. Rajeev Kumar Jaiswal, Scientist/Engineer, Earth Observation Systems Programme Office/ NNRMS Secretariat, ISRO, Department of Space, Government of India, Antariksh Bhavan, New B.E.L. Road, Bangalore – 560231. | Member |
| 7 | Shri B.D. Bharat, Scientist-SE, Indian Institute of Remote Sensing, 4, Kalidas Road, Dehradun – 240 001, Uttarakhand | Member |
| 8 | Dr. Vivek Katare, Sr. Scientist, Incharge, Landuse & Urban Studies, M.P Council of Science & Technology, Remote Sensing Application Centre, Vigyan Bhavan, Nehru Nagar, Bhopal – 462 003 | Member |
| 9 | Shri Iftikhar Ahmed Hakim, Chief Town Planner, Town Planning Organisation, Habitat Complex, NH By-Pass, Bemina (Near SDA), Srinagar, Kashmir – 190017. | Member |

| 10 | Smt Anjali Goswami, Director, Town & Country Planning Deptt., Govt. of Assam, Dispur, Post Sachivalaya, Guwahati – 781006, Assam | Member |
|----|---|---|
| 11 | Shri P. Thimma Reddy, Director, Town & Country Planning Deptt., Govt. of Andhra Pradesh, 2nd Floor Mithri Vihar, Ameerpeth, Hyderabad – 500038, Andhra Pradesh | Member |
| 12 | Shri S. Surendra, Town & Country Planner, Town & Country Planning Organisation, New Delhi. | Member |
| 13 | Mohd. Monis Khan, Town & Country Planner, Town & Country Planning Organisation, New Delhi. | Member-Convener |

The Committee may co-opt any other member if required.

(Sunil Kumar Pal)
Under Secretary to Govt. of India
Telefax:011-23061072

To:
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3. Prof. Mahavir, School of Planning & Architecture, 4-A, I.P. Estate, Vikas Marg, New Delhi – 110002.
4. Dr. K. Venugopala Rao, Group Head, Urban Studies & Geo-informatics Division, National Remote Sensing Center (NRSC), ISRO, Dept. of Space, Balanagar, Hyderabad – 500625.
5. Dr. Vinod M Bothale, Scientist/ Engineer 'G', Bhuvan, National Remote Sensing Center (NRSC), ISRO, Dept. of Space, Balanagar, Hyderabad – 500625.
6. Dr. Rajeev Kumar Jaiswal, Scientist/Engineer, Earth Observation Systems Programme Office/ NNRMS Secretariat, ISRO, Department of Space, Government of India, Antariksh Bhavan, New B.E.L. Road, Bangalore – 560231.
7. Shri B.D. Bharat, Scientist-SE, Indian Institute of Remote Sensing, 4, Kalidas Road, Dehradun – 240 001, Uttarakhand.
8. Dr. Vivek Katare, Sr. Scientist, Incharge, Landuse & Urban Studies, M.P Council of Science & Technology, Remote Sensing Application Centre, Vigyan Bhavan, Nehru Nagar, Bhopal – 462 003.
9. Shri Iftikhar Ahmed Hakim, Chief Town Planner, Town Planning Organisation, Habitat Complex, NH By-Pass, Bemina (Near SDA), Srinagar, Kashmir – 190017.
10. Smt Anjali Goswami, Director, Town & Country Planning Deptt., Govt. of Assam, Dispur, Post Sachivalaya, Guwahati – 781006, Assam.
11. Shri P. Thimma Reddy, Director, Town & Country Planning Deptt., Govt. of Andhra Pradesh, 2nd Floor Mithri Vihar, Ameerpeth, Hyderabad – 500038, Andhra Pradesh.
12. Shri S. Surendra, Town & Country Planner, Town & Country Planning Organisation, New Delhi.
13. Mohd. Monis Khan, Town & Country Planner, Town & Country Planning Organisation, New Delhi.

Copy to:
1. Chief Planner, TCPO, New Delhi.
2. PS to JS(UD).
3. PS to Secretary(UD).
4. PS to UDM.

(Sunil Kumar Pal)
Under Secretary to Govt. of India
Telefax:011-23061072

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NRSC:RSAA:12/2018

March 24, 2016

Dear Shri Neeraj Mandloi,

Sub: Design & Standards for 'Formulation of GIS based Master Plan for AMRUT Cities'. Reg.

Ref: MoUD Office Order No. K-14011/2/2012-UCD (Pt.) dated 13th February, 2015.

A Committee was constituted by Ministry of Urban Development, Government of India for Revision of NUIS Guidelines & Design Standards, vide reference as cited above. The committee met several times and deliberated on the subject in detail, which resulted in generation of a detailed Technical Document. On behalf of the Committee, I am happy to forward the final version of the document "Design & Standards for Formulation of GIS based Master Plan for AMRUT Cities". I would like to personally thank all the Members of the Committee and invited experts for their significant contributions in bringing out this report in its final form. I am sure that this document will play an important role in the realization of AMRUT Mission in the country.

With kind regards,

Yours sincerely

(P.G. Diwakar)
Chairman of the Committee

Shri Neeraj Mandloi, IAS
Joint Secretary
Ministry of Urban Development
Nirman Bhawan
C - Wing, Dr. Maulana Azad Road
New Delhi - 110 011.

cc: Shri Munis Khan, Town & Country Planner and Member Secretary of the Committee, TCPO, E-Block, Vikas Bhavan, IP Estate, New Delhi – 110 002.

भारतीय अन्तरिक्ष अनुसंधान संगठन **Indian Space Research Organisation**

K-14011/2/2012-UCD(Part)
Government of India
Ministry of Urban Development
LSG Section
*****

202C, Nirman Bhawan, New Delhi,
Dated 26th April, 2016.

To,

i. The Chief Planner,
TCPO, E-Block,
Vikas Bhawan, IP Estate,
New Delhi-110002.
Fax: 011-23379197.

Sub: Design & Standards for "Formulation of GIS-based Master Plans for AMRUT Cities" –
Reg.

Sir,

The undersigned is directed to refer to letter No. 2-
11/143/2015/Guidelines/URIS/TCPO dated 8.4.2016 on the subject cited above and to say that
the competent authority has approved the final version of **the Design & Standards Document.**

2. It is, therefore, requested to take necessary action in the matter.

Encl:- As above.

Yours faithfully,

(Sunil Kumar Pal)
Under Secretary to the Govt. of India
Tel: 23061072

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**DGPS Survey for GPS points for**
**Geo-referencing/ortho-rectification of Satellite Image**

**ESTABLISHING GEODETIC REFERENCE FRAME FOR ULBS USING**
**GNSS TECHNIQUES**

GPS provides accurate and uniform reference frame for the geospatial data. DGPS techniques are required for geo-referencing of high resolution image data which essentially needs positional accuracy that matches the spatial resolution.

The satellite image shall cover the entire ULB area and sufficient no of GCPs shall be planned to geo-referenced the satellite image data as well as to check the accuracy parameters of the corrected image datasets with the aid of check points.

The GCP configuration and density of the GCPs are key parameters to be implemented suitably to achieve high quality data product after for geo-referencing process. Spatial distribution of the GCPs over the study area and type of features that are being selected as GCPs, play an important role in this process.

The DGPS survey procedure involves:

- o Establishment of Monumented Reference station

- o Data collection and processing procedures

- o Upkeep of the reference station for future surveys

A permanent station shall be established which can be used as a reference station for the GPS surveys. A location, preferably in the central part of the ULB area, which is clear to sky without obstructions like tree canopy, high-raised building, HT electrical lines, shall be identified, either on ground or on the top of a building for constructing the reference station.

A cement concrete structure of 2 ft x 2 ft x 2ft shall be made and a brass plate marked with dot and circle shall be embedded on the top of the monument. A survey-grade dual frequency GPS receiver shall be operated with Tripod in static mode at this reference monument for a period of 3 consecutive days with a minimum of 12 hrs per day with 15 sec epoch rate and the 3 days data shall be processed with Single Point Positioning or Precise Point Positioning technique to derive the geodetic coordinates of the reference station in ITRF reference frame.

Establishing reference station coordinates in ITRF reference frame serves multiple benefits to the geospatial data in terms of maintaining uniform reference frame in future updates and also to use other datasets in GIS environment. ITRF reference frame can be implemented in two ways either linking the reference station to a IGS station nearby or processing using Precise Point Positioning technique using IGS data precise ephemeris and clock files. The derived Reference station geodetic coordinate shall be recorded properly and is documented in the records for future use by the ULB authorities.

Each GCP shall be identified with suitable permanent feature which is seen on the ground as well as on the image data. The location where GPS is being operated shall be clear to sky without obstruction to track GPS signals. Geodetic survey grade GPS receivers shall be

employed to collect the data. Base station and rover stations shall be operated at 15 sec epoch rate and observation period of min. 1 hr shall be adopted for base line length of 10 km. Baseline distances of 10 km. - 20 km. shall be observed with minimum of 2 hrs time period.

Survey parameters like Receiver and Antenna make and model no., Antenna height, Observation time session, GDOP value, epoch time, Making of Sketches, filed photographs in all direction shall be documented properly on the field log sheet for every GCP location. Geometric Dilution of Precision (GDOP) shall be monitored and recorded, and should not exceed 2.5 nominally.

Observations shall be made using dual-frequency GPS receivers and L1/L2 geodetic ground plane antennas tripods with bubble levels shall be used to minimize setup errors. Post processing of the data shall be carried out on daily basis using broadcast ephemeris and post-processing software. Validity checks shall be documented with analysis of base line vector solutions and loop closure errors. All the data produced shall pass ambiguity resolved vector solutions and loop closure exceeding one part per million relative positioning accuracy.

GPS antenna shall be mounted on tripod during survey for reference station as well at GCP location during data collection. The GCP location shall be marked with paint to ensure relocation at later data and it shall be post-pointed on the image. A detailed description of the GCP location shall be written in the field log sheet with a neat sketch.

Data quality parameters like cycle slips, no of satellite tracked, observed GDOP values shall be checked soon after the survey to ensure good quality of the data collected at reference station as well as at rover stations before data processing.

Data processing shall be carried out with baseline processing for each session and network adjustment for all the sessions and ensure that loop closure accuracy results shall be better than 1 on 50000 which is the geodetic standard for static surveys. The final adjusted coordinates shall be in Geographic coordinate system and also in WGS-84 coordinate system and UTM projection.

A project report shall be submitted with the details about GCP planning diagram, GPS equipment details and manuals, reference station details and its geodetic coordinate in ITRF latest epoch, data collection parameters, field photographs of all the locations, processing results, GCP network diagram and list of adjusted coordinates.

\*\*\*\*\*\*\*\*\*\*\*

**Formulation of GIS-based Master Plan**

**INDICATIVE FORMAT FOR URBANDATA COLLECTION**
(Proforma may be modified as per the requirement of State governments)

**TABLE 1:    PHYSICAL ASPECTS AND LOCATIONAL PARTICULARS**

1.1.    **Name of City/Town**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

1.2.    **Civic  Status**

| |
|---|
| |

2.3    **Name  of Tehsil/Mandal/Block**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

2.4    **Name of District**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

2.5    **Name of State/UT**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

1.6    **Area of City/Town**

| Ward | Area (sq. km.) | | |
|---|---|---|---|
| | 1991 | 2001 | 2011 |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| … | | | |
| Total | | | |

Source: _____

Extent as per various authorities may be specified as under:

Area as per Census of India _____

Extent of Local Planning Area _____

Municipal Area _____

Extent as per Urban Development Authority/Planning Authority

Urbanisable Area _____

Controlled Area _____

## 1.7    Distance from Town

| S. No. | Description | Name | Distance (km.) |
|---|---|---|---|
| i | State Head Quarters | | |
| ii | District Headquarters | | |
| iii | Tahsil/Taluk/Mandal Headquarters | | |
| iv | Nearest city (having 1 lakh & above population) | | |
| v | Nearest Railway Station/s | | |
| vi | Nearest Airport/Air strip | | |
| vii | Nearest Port | | |
| viii | Nearest Bus Stand (govt/private) | | |

Source: _____

## 1.8    Nearness/Distance of Major River/Canal/coastline from Town

| S. No. | River name & distance (km.) | Canal name & distance (km.) | Distance of Big Drains | Distance of major Dams & Reservoirs | Distance from Coast lines | Indicate High/Low Flood Levels (meters) | Indicate high/Low tide Lines (meters) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

Source: _____

## TABLE 2:    DEMOGRAPHIC & BASIC SOCIO-ECONOMIC DATA

**Note: Please attach Primary Census Abstract 2011, District Census Handbook (for whichever Census it is available), Housing Tables, Slum Tables and Economic Tables of Census of India. Also any Report by Bureau of Economics and Statistics or any other State Government Report**

## 2.1    Population and Growth Rates

| | 1961 | 1971 | 1981 | 1991 | 2001 | 2011 |
|---|---|---|---|---|---|---|
| Total population | | | | | | |
| Decadal Growth rate | | | | | | |

Source: _____

**2.2     Primary Census Abstract 2011**

| Ward | Population | | | Child Pop (0-6) | | | SC Pop. | | | ST Pop. | | | Literates | | |
|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | T | M | F | M | F | T | M | F | T | M | F | T | M | F | T |
| 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| … |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Total |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Source: _____


**2.3     Housing Data**(For Ward/Town)

| Ward | Population 2011 | No. of Households | Occupied residential houses | Houseless population |
|------|---|---|---|---|
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| … |  |  |  |  |
| Total |  |  |  |  |

Source: _____


**2.4     Vital Statistics (Townwise)          Year: _____**

| S. No. | Vital Statistics | Male | Female | Total |
|--------|---|---|---|---|
| 1 | Birth rate (%) |  |  |  |
| 2 | Death Rate (%) |  |  |  |
| 3 | Infant Mortality (%) |  |  |  |
| 4 | Life Expectancy at birth (years) |  |  |  |

Source: _____


**2.5     Persons below Poverty Line          Year _____**

| Ward | No. of BPL | |
|------|---|---|
|  | Families | Population |
| 1 |  |  |
| 2 |  |  |
| … |  |  |
| Total |  |  |

Source: _____
Note: Poverty Line defined as: _____

**TABLE 3:     OCCUPATIONAL CLASSIFICATION**

**3.1.1    Workforce 2001 – 2011**

| Ward | Main Workers | | | Marginal Workers | | | Other workers | | | Total Workers | | | Non-workers | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | F | T | M | F | T | M | F | T | M | F | T | M | F | T |
| 1 | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | |
| … | | | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | |

Source: _____

Note: Separate Table can be made for 2001 and 2011

Workforce Participation Rate (WFPR) 2001: _____

Workforce Participation Rate (WFPR) 2011: _____

### 3.2  Occupational Classification of Main Workers, 2001

| Ward | A, B, C | | | | | | | | | D | | | | | | E | | | F | | | G | | | H | | | I | | | J&K | | | L to Q | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cultivators | | | Agricultural labourers | | | Plantation, Livestock, Forestry, Fishing, Hunting & allied activities | | | HHI | | | Non HHI | | | Electricity, Gas and Water Supply | | | Construction | | | Wholesale and Retail Trade | | | Hotels and Restaurants | | | Transport, Storage and Communications | | | Financial Intermediation, Real Estate, Renting & | | | | | |
| | M | F | T | M | F | T | M | F | T | M | F | T | M | F | T | M | F | T | M | F | T | M | F | T | M | F | T | M | F | T | M | F | T | M | F | T |
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| … | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Source: _____

Note: Separate Table can be made for 2001 and 2011

**Industrial Categories as per Census 2001**
INDUSTRIAL CATEGORIES: A – Agriculture, Hunting and Forestry; B – Fishing; C – Mining and Quarrying; D – Manufacturing ; E – Electricity, Gas and Water Supply; F – Construction; G – Wholesale and Retail Trade; H – Hotels and Restaurants; I – Transport, Storage and Communications; J – Financial Intermediation;  K – Real Estate, Renting and Business Activities; L – Public Administration and Defence, Compulsory Social Security;    M – Education; N – Health and Social Work; O – Other Community, Social and Personal Service Activities; P – Private Households with Employed Persons; Q – Extra-Territorial Organisations and Bodies.
**Industrial Categories as per Census 2011**
If data is available in above categories, please provide. If not, then provide in 4 categories for which it is available: cultivators, agricultural workers, household industry and other services.

**Table 4:  INDUSTRIAL ASPECTS** (Town level)

| S. No. | Type of Industries | Up to 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|--------|--------------------|-----------|------|------|------|------|------|------|
| 1 | Large | | | | | | | |
| 2 | Medium | | | | | | | |
| 3 | Small | | | | | | | |
| 4 | Household | | | | | | | |
| 5 | Hazardous | | | | | | | |

Source: _____

Definitions:

(as per ------------------------ Act)

**4.1:  Industries details          Year: _____**

| S. No. | Types of Industries | No. of units | No. of workers | Run by Manual/HP | H.P |
|--------|---------------------|--------------|----------------|------------------|-----|
| 1 | Large | | | | |
| 2 | Medium | | | | |
| 3 | Small | | | | |
| 4 | House hold | | | | |
| 5 | Hazardous | | | | |

Source: _____

**4.2:  TRADITIONAL INDUSTRIES (Year _____)**

| S. No. | Type of Traditional Industries | No. of units associated with each industry | No. of employees associated with each industry | Raw materials used | Commodities manufactured |
|--------|-------------------------------|--------------------------------------------|------------------------------------------------|--------------------|--------------------------|
| 1 | Handicrafts | | | | |
| 2 | Pottery | | | | |
| … | | | | | |

Source: _____

**4.3.**  Most important commodities imported
**4.4**  Most important commodities manufactured
**4.5**  Most important commodities exported
**4.6**  Most Important agricultural produce

**Note: Please attach Lead Bank Report, DIC Report, and any other industrial report**

**TABLE 5:    LAND USE (in Hectares)**

| S. No. | Type of Land | 1991 | 2001 | 2011 | Proposed 2021 |
|---|---|---|---|---|---|
| 1 | Residential | | | | |
| 2 | Commercial | | | | |
| 3 | Industrial | | | | |
| 4 | Recreational | | | | |
| 5 | Public and semipublic | | | | |
| 6 | Transportation | | | | |
| 7 | Public Utilities | | | | |
| 8 | Reclaimed land | | | | |
| 9 | Vacant land | | | | |
| 10 | Agricultural land | | | | |
| 11 | Built Up area (Rural) | | | | |
| 12 | Forest | | | | |
| 13 | Wastelands | | | | |
| 14 | Wetlands | | | | |
| 15 | Water bodies | | | | |
| 16 | Others | | | | |
| Present Land use Notified ------------------ on date ----------------------------- | | | | | |

Source: _____

**TABLE 6:   AVAILABILITY OF DRINKING WATER**

**6.1      Important sources of drinking water      Year _____**

| Ward | No. of Households covered by | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Tap water | | Well | Hand Pump | Tube well | Tanks/ Ponds/Lake | Spring | River/canal | Others |
| | from treated source | from un-treated source | | | | | | | |
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |
| … | | | | | | | | | |
| Total | | | | | | | | | |

Main source of drinking water _____

Distance from source _____

Treatment Plant (nos & names) _____

Source: _____

**6.2    Water Supply Details          Year _____**

| Ward | Quantity of Water Supplied (MLD) | Times/Hours of supply per day | No. of Connections | Per Capita Consumption (LPCD) | Area Covered (sq. km.) | Metering Achieved (%) | Efficiency in collection of charges |
|------|------|------|------|------|------|------|------|
| 1 | | | | | | | |
| 2 | | | | | | | |
| … | | | | | | | |
| Total | | | | | | | |

Source: _____

**6.3    Supply Infrastructure:**

| Ward | No of Over Head Tanks/Reservoirs & Capacity | Capacity of WTPs | Treated supply as % of total water supplied |
|------|------|------|------|
| | | | |

Source: _____

6.3.1   Is there any scheme for recycling of waste water in the town?          | Yes | No |

6.3.2   Is the ground water table receding in the city?          | Yes | No |
        If yes, please give present water table
        (Please attach any available report of CGWB/State Govt)

6.3.3   Is there any separate water supply line for non-drinking purposes such as industry, parks etc.
        If yes, give area covered under the scheme.

6.3.4   Details of ongoing and committed projects under water supply with agency

**TABLE 7:    ELECTRICITY   (Town wise)          Year _____**

| Source of Power | Distance (km.) | Total Electricity Demand (MW) | Total electricity Supply (MW) | Total Consumption (MKWH) |
|------|------|------|------|------|
| | | | | |

Source: _____

---

| Type | Residential | Commercial | Industrial | Agricultural | Others | Total |
|---|---|---|---|---|---|---|
| No. of Electric Connections | | | | | | |
| Electric Consumption (KWH) | | | | | | |

Source: _____

Proposed power projects to be taken up in the city

**TABLE 8:  POST &TELECOMMUNICATIONS (Town wise)  Year_____**

| | |
|---|---|
| No. of  telephone Exchanges | |
| No. of telephone connections (land line) | |
| No. of Public Telephone booths | |
| No. of Mobile Connections | |
| No of Mobile Towers | |
| No. of Post/telegraph office | |
| No of Internet Connections | |
| No. of Wi-fi hotspots | |

Source: _____

**TABLE 9:  EDUCATIONAL FACILITIES  Year_____**

| Type of Institutions | No. of Institutions | | No.  of Class Rooms | | Enrolment | | No. of teachers | |
|---|---|---|---|---|---|---|---|---|
| Educational Institution | Govt. | Private | Govt. | Private | Govt. | Private | Govt. | Private |
| Anganwadi | | | | | | | | |
| Primary | | | | | | | | |
| Middle | | | | | | | | |
| Secondary | | | | | | | | |
| Senior Secondary | | | | | | | | |
| School for Special Needs | | | | | | | | |
| Colleges | | | | | | | | |
| General | | | | | | | | |
| Medical | | | | | | | | |
| Engineering | | | | | | | | |
| Law | | | | | | | | |
| Others | | | | | | | | |
| Vocational Training | | | | | | | | |
| Adult Education program | | | | | | | | |
| Others | | | | | | | | |

Source: _____

**TABLE 10:  MEDICAL FACILITIES          Year_____**

**10.1    Number of hospitals, dispensaries, etc., doctors, nurses, paramedical staff and total number of beds available therein**

| Type of Hospital | No. of Units | | No. of Beds | | No. of Doctors | | No. of Nurses | | No. of Paramedical staff | | Patients Treated | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hospital | Govt | Pvt | Govt | Pvt | Govt | Pvt | Govt | Pvt | Govt | Pvt | Govt | Pvt |
| Allopathic | | | | | | | | | | | | |
| Ayurvedic | | | | | | | | | | | | |
| Homeopathic | | | | | | | | | | | | |
| Unani | | | | | | | | | | | | |
| Family welfare & maternity center | | | | | | | | | | | | |
| Others | | | | | | | | | | | | |
| Dispensary | | | | | | | | | | | | |
| Allopathic | | | | | | | | | | | | |
| Ayurvedic | | | | | | | | | | | | |
| Unani | | | | | | | | | | | | |
| Homeopathic | | | | | | | | | | | | |
| Others | | | | | | | | | | | | |
| Primary Health Centres | | | | | | | | | | | | |
| Nursing Home | | | | | | | | | | | | |

Source: _____

Note: Please follow standard classification if specified by Govt/Local Authority and give data in that format, namely Sub-Centre, PHC, CHC, District Hospital, Super Specialty Hospital, Nursing Home, etc.

**10.2   Epidemiological Details    (Period from _____ to _____)**

| Name of Predominant Diseases | No. of persons Affected |
|---|---|
| Leprosy | |
| Phylaria | |
| Tuberculosis | |
| Cholera | |
| Dengue | |
| Chikungunya | |
| Malaria | |
| Others (Specify) | |

Source: _____

## TABLE 11:   AVAILABILITY OF SANITARY FACILITIES

What is the major sanitary system in the town:  Sewerage/Septic Tank/LCS (please tick)

Does the Town have a sewerage system: _____

If yes, Combined or Separate: _____

Length (km.) _____

Area Covered: _____sq. km. _____%

Population covered _____(nos) _____ %

**11.1   Household Sanitary Facilities (Town/Ward wise) Year _____**

| Ward | Households having following sanitary facility (%) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Water Closet | | | Pit Latrine | Other Latrine | No Latrine within the premises | |
| | Piped sewer system | Septic tank | Other system | | | Public latrine | Open |
| 1 | | | | | | | |
| 2 | | | | | | | |
| … | | | | | | | |
| Total | | | | | | | |

Source: _____(Please attach relevant Census Reports)

**11.2   Network Details    Year _____**

| | Open surface drains | Covered drains | Underground sewerage | Others |
|---|---|---|---|---|
| Length in km. | | | | |
| Area served (sq. km.) | | | | |

Source: _____

**11.3**   Estimated quantity of sewage generated (MLD) _____

**11.4**   Quantity treated (MLD) _____

**11.5**   No. of sewage treatment plants (with capacity) _____

**11.6**   Disposal of treated sewage (river, nala, open land)   _____

**11.7**   Disposal of untreated sewage (river, nala, open land)_____

**11.8**   Disposal   Industrial   wastewater   (treated/untreated)   (river,   nala,   open land)_____

**11.9   Public Toilets**

| | |
|---|---|
| Public toilets (in no.) | |
| No of Toilets  Pay & Use | |
| Users per toilet daily (in No) | |
| Average User Charge | |
| Average yearly expenditure on maintenance (Rs. in Lakh) | |

Source: _____

**11.10:  Major Storm Water Drains**

| S. No. | Name of the Drain | Wards coverage | Length (km.) | Capacity | Open/Covered |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
| … | | | | | |
| Total | | | | | |

Source: _____

**TABLE 12:   SOLID WASTE MANAGEMENT** (Ward/Town wise data)

**Is there door to door collection system: _____**
**Is there municipal disposal of waste: _____**

**12.1   Solid waste generation       Year _____**

| Ward | Average generation (Tons/day) | Average collection (Tons/day) | No. of Houses covered for House to House Collection | Total Area Used for Sanitary Land Fill (sq. km.) | Manpower deployed | No. of Sites used for Land Fill |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| 2 | | | | | | |
| … | | | | | | |
| Total | | | | | | |

Source: _____

**12.2  Disposal method of solid waste (Put a tick mark on appropriate column) Year __**

| Sanitary land fill | Incinerated | Open dump | Recycled | Burned openly | Others |
|---|---|---|---|---|---|
|  |  |  |  |  |  |

Source: _____

**12.3  Vehicles deployed for Collection and Disposal of Solid waste, Year _____**

| Type of Vehicles deployed | Trucks/Lorry | Tippers | Dumpers/Placers | Tricycle | Others |
|---|---|---|---|---|---|
|  |  |  |  |  |  |

Source: _____

**12.4  Employees details                    Year _____**

| No. of Sanitary supervisors | No. of Health Assistant | No. of Health workers | Others |
|---|---|---|---|
|  |  |  |  |

Source: _____

**12.5**  Is there any system of segregation of solid waste?

| Yes | No |
|---|---|

If yes, please furnish following details (% age of quantum)

| Degradable | Biodegradable | Hospital waste | Others |
|---|---|---|---|
|  |  |  |  |

Source: _____

**12.6**  Details of ongoing and committed projects under solid waste disposal management

---

**TABLE 13: AVAILABILITY OF RECREATIONAL, CULTURAL, BANKING AND CREDIT FACILITIES**

**13.1    Community & other Facilities                Year_____**

| S. No. | Facilities | Numbers |
|---|---|---|
| 1 | Corporation Gardens | |
| 2 | Community Hall | |
| 3 | Swimming Pool | |
| 4 | Corporation Playgrounds | |
| 5 | Gymnasia | |
| 6 | Corporation Stadium | |
| 7 | Cinemas | |
| 8 | Open Air Theatres | |
| 9 | Zoo | |
| 10 | Public libraries | |
| 11 | Art Galleries | |
| 12 | Museum | |
| 13 | Other (specify) | |
| 14 | Fire Services | |
| | No. of Fire stations | |
| | No. of fire tenders | |
| | Personnel | |
| 15 | Cremation/Burial Ground | |
| 16 | Petrol/Gas Station | |
| 17 | Hotels and Eating Places | |
| 18 | Others | |

Source: _____

**13.2    Number of banks and credit societies        Year_____**

| No. of Banks | No of ATMs | Agricultural credit societies | Non-agricultural credit societies |
|---|---|---|---|
| | | | |

Source: _____

_____

**13.3  Details of Self Help Groups (SHG) & NGOs  Year** _____

|  | No. of Self Help Group | No. of Members | No. of NGOs | No. of  Resident Welfare Associations (RWAs) |
|---|---|---|---|---|
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Source: _____

**TABLE 14:    LAW AND ORDER – CRIMES REPORTED (No.)**
**Year wise for Last Five Years**

| Type | 2012 | 2011 | 2010 | 2009 | 2008 |
|---|---|---|---|---|---|
| Theft |  |  |  |  |  |
| Burglary |  |  |  |  |  |
| Kidnapping |  |  |  |  |  |
| Robbery |  |  |  |  |  |
| Riots |  |  |  |  |  |
| Murder |  |  |  |  |  |
| Crimes against women |  |  |  |  |  |
| Fatal Accidents |  |  |  |  |  |
| Non-fatal Accidents |  |  |  |  |  |
| Cyber crimes |  |  |  |  |  |

Source: _____

No. of CCTVs installed _____

**TABLE 15:   HOUSING**

**15.1        Distribution of House Holds (HHs.), No. of persons and Tenure, Year_____**

| Tenure Status | Number of | |
|---|---|---|
|  | HHs | Persons |
| Owned |  |  |
| Rental |  |  |
| Sub-letting |  |  |
| Rent free |  |  |
| Squatter without Rent |  |  |
| Squatter with Rent |  |  |
| Others |  |  |
| Total |  |  |

Source: _____

---

| Distribution of Persons by living rooms | Number of | |
|---|---|---|
| | HHs | Persons |
| One room | | |
| Two rooms | | |
| Three rooms | | |
| Four rooms | | |
| Five & above | | |
| Total | | |

Source: _____

## 15.2    Categories of Houses

| Type of Houses | No. of Houses | Age of Building |
|---|---|---|
| Pucca with RCC Roof and flooring | | |
| Pucca with Tiles Roof and Kaccha floor | | |
| Semi pucca | | |
| Kaccha | | |
| Others | | |
| Total | | |

Source: _____

Note: For Housing Data, please attach relevant abstract of Housing Tables

## TABLE 16:   LAND OWNERSHIP AND COST (Ward wise)
## 16.1              Land Ownership Pattern          Year_____

| Type of ownership | | No. of Dwelling Units (DU) | Area covered (sq. km.) | Average cost of DU per sq. mt (Rs.) |
|---|---|---|---|---|
| Public | | | | |
| Private | Developers & Promoters | | | |
| | Authorized Individuals | | | |
| | Unauthorized Individuals | | | |
| Others (Specify) | | | | |
| Total | | | | |

Source: _____

**16.2   Land Prices**  (Ward wise), Year _____

| Ward | Land Price in Planned Area (Rs./sq. mt.) | Land Price in Unplanned Area (Rs./sq. mt.) | Annual Rent of Dwelling Unit (Rs.) |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| … | | | |
| Total | | | |

Source: _____

## TABLE 17:  DISASTERS

Are there any structures which have been damaged by disaster during last ten years?  Yes/No
If yes, please give following details

(Year _____)

| Type of Disaster | Year of disaster | No. of Houses damaged | Persons affected | Property Loss (Rs. Lakhs) | Action Taken |
|---|---|---|---|---|---|
| Earthquake | | | | | |
| Floods | | | | | |
| Cyclone | | | | | |
| Landslides | | | | | |
| Tsunami | | | | | |
| Fire | | | | | |
| Others (specify) | | | | | |

Source: _____

**TABLE 18:    PUBLIC-PRIVATE-PARTNERSHIPPROJECTS IMPLEMENTED IN THE TOWN (PPP)**

| Agency | No. of Housing units (area in sq. km.) | Water supply (MLD) | Solid Waste (area covered in sq. km.) | Sewerage (km.) | Roads (km.) | Electricity | | | Community Development | | City Beautification & Park maintenance (Area in sq. km.) | Others |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Generation (MW) | Distribution | Maintenance (Rs.) | Improvement of Slum (Area in sq. km.) | Slums and Squatters resettlement (Area in sq. km.) | | |
| Public | | | | | | | | | | | | |
| Private | | | | | | | | | | | | |
| PPP | | | | | | | | | | | | |

Source: _____

**TABLE 19:   SLUMS**

**19.1    Slum Concentration, Year _____**

| | Notified Slum | | Non-notified Slum | | Squatters | | Total land | |
|---|---|---|---|---|---|---|---|---|
| | Public | Private | Public | Private | Public | Private | Public | Private |
| No. of Slum HH units | | | | | | | | |
| Population | | | | | | | | |
| Area covered (sq. km.) | | | | | | | | |

Source: _____

**19.2    Availability of Basic Amenities in Slums Ward wise**

| Type of Amenity | No. of  HHs covered |
|---|---|
| Water Supply | |
| Electricity | |
| Community toilets | |
| Other (specify) | |

Source: _____

Note: Please attach relevant extract of Slum Tables of Census of India with year.

**19.3    Houseless Population**

Is there any scheme functioning for promotion of housing for houseless population?

| Yes | No |
|---|---|

If yes, please give details as under

| Name of Scheme | Dwellings constructed during last five years | Size of the dwelling unit in sq. mt. | Price of house | Mode of payment | No. of households benefited |
|---|---|---|---|---|---|
| | | | | | |

Source: _____

Note: Please attach relevant extract of Houseless Tables of Census of India with year.

**TABLE 20:    TRAFFIC & TRANSPORTATION- Time Series Yearly Data**

**20.1    Registered Vehicles**

| Type of Vehicles | | No. of Vehicles |
|---|---|---|
| Heavy vehicles: | Trucks<br>      Public<br>      Private<br>Buses<br>      Public<br>      Private | |
| Light Vehicles: | Two wheeler<br>Car<br>Jeep<br>Three wheeler<br>Omni Buses<br>Taxies/Cabs | |
| Non-motorized | Cycle<br>Rickshaw<br>Tonga<br>Others | |

Source: _____

## 20.2 Work Trips Undertaken from Residence to Work Place

| Type of vehicles | No. of Work Trips per day | Average Time taken for one way trip (in minutes/per day) |
|---|---|---|
| Private motorized <br> • Private cars <br> • Two wheelers <br> • Buses/cabs/mini car | | |
| Sub-Total | | |
| Public Transport <br> • Trains <br> • Trams/metro <br> • Bus/mini bus | | |
| Sub-Total | | |
| Non-motorised <br> • Cycle/Rickshaw <br> • Walking <br> • Others | | |
| Sub-Total | | |
| Total | | |

Source: _____

## 20.3 Road length and Footpath (in km.)

| Surfaced road (km.) | Un-surfaced road (km.) | Total road length (km.) | Foot paths (km.) | Cycle Tracks (km.) |
|---|---|---|---|---|
| | | | | |

Source: _____

## 20.4 Railway

| Items | No. |
|---|---|
| No of railway Stations | |
| Types of rail gauge; viz broad, narrow and meter gauge | |
| Length of rail network (in km.) | |
| No of platforms | |
| No of yards | |

Source: _____

**20.5  Inland Water ways**

| Items | No. |
|---|---|
| No. of major and  minor ports | |
| Length of the coastline (in km.) | |
| No. of navigable rivers and  canals | |
| Total no. of  boats | |
| Ships | |
| Oil tankers | |
| Vessels | |
| Total tonnage of goods carried by ships/tankers etc | |
| No. of shipping yards | |

Source: _____

**20.6  Air**

| Items | No. |
|---|---|
| No. of Airports (Domestic & International) | |
| Traffic volume and passenger data | |

Source: _____

**TABLE 21:   ENVIRONMENT**

Does the town have Air Quality Monitoring Station _____

**21.1    Air Pollution Concentration ($\mu g/m3$)  (Date _____)**

| Type of pollutant | Area | | | |
|---|---|---|---|---|
| | Residential | Industrial | Commercial | Others |
| SO2 | | | | |
| NO | | | | |
| SPM | | | | |
| CO | | | | |

Source: _____

**21.2    Level of Noise Pollution (Db) (Date _____)**

| Residential | Commercial | Industrial | Silence zone |
|---|---|---|---|
| | | | |

Source: _____

---

**21.3    Water Pollution (Mg/l) (Date _____)**

| BOD level | Coliform level | PH value |
|-----------|----------------|----------|
|           |                |          |

Source: _____

Please attach any report of Pollution Control Board, etc. if available.

**TABLE22:    Animal Husbandry details        Year _____**

| S. No. | Description | Number |
|--------|-------------|--------|
| 1 | No. of Veterinary Hospital or dispensary or clinic | |
| 2 | No. of Dairy outlets & collection centers ( Milk Co- Operative Societies) (MILMA) | |
| 3 | No. of Dairy Farm | |
| 4 | No. of Poultry Farm | |
| 5 | No. of Slaughter Houses | |
| 6 | No. of Hatcheries | |
| 7 | No. of Broiler Farm | |
| 8 | Others ( Specify) | |

Source: _____

**Table 23:        TRAVEL AND TOURISM        Year _____**

| S. No. | Description | No. of Units |
|--------|-------------|--------------|
| 1 | Tourism  Destination Centers | |
| 2 | Tourism Information Centers | |
| 3 | Tourism Season | |
| 4 | Average No. of Foreign Tourist | |
| 5 | Average No. of Domestic Tourist | |
| 6 | No. of Star hotels | |
| 7 | No. of House boats | |
| 8 | No. of Travel Agencies | |
| 9 | No. of Tourism Promotion Councils | |
| 10 | Other institutions promoting Tourism | |

Source: _____

**TABLE 24:   GOVERNANCE**

**24.1    Civic Status of the Town:**
**24.2    Size & Class of the Town:**
**24.3     Status of Master Plan/Development Plan**

**Whether town has a statutory Master/Development Plan? Details**

| 1st D.P. & Date | Date of latest revision D.P | D.P implementation percentage |
|---|---|---|
|  |  |  |
|  |  |  |

Source: _____

**24.4    Name & Address (with Phone, Fax & e-mail) of Commissioner/Executive Officer of ULB:**

| S. No. | Name (with Designation) | Address (with Phone, Fax & e-mail) |
|---|---|---|
|  |  |  |

Source: _____

**24.5    Name & Address (with Phone, Fax & e-mail) of Mayor/Chairperson of ULB:**

| S. No. | Name (with Designation) | Address (with Phone, Fax & e-mail) |
|---|---|---|
|  |  |  |

Source: _____

**24.6    Total Staff Strength of ULB (in Nos.)        :**

---

**24.7** **Division-wise breakup of Staff Strength:**

| S. No. | Name of Division | Sanctioned Post | No. of Posts filled | Posts Vacant |
|---|---|---|---|---|
| 1. | Administration | | | |
| 2. | Education | | | |
| 3. | Finance | | | |
| 4. | Engineering | | | |
| 5. | Agriculture/Horticulture | | | |
| 6. | Environment/Conservation | | | |
| 7. | Housing | | | |
| 8. | Public Health & Utilities | | | |
| 9. | Social Services | | | |
| 10. | Transportation | | | |
| 11. | Security including Fire Services | | | |
| 12 | Other, if any | | | |

Source: _____

**24.8** Is the local body elected?

| Yes | No |
|---|---|

If yes, state the year of last election.

**24.9** Functions entrusted to local bodies as per 12<sup>th</sup> Schedule appended to 74<sup>th</sup> Constitutional Amendment Act, 1992.

**24.10** List of Government Offices

**25:** **Revenue and Receipt of Local Body:** Year_____

(Rs. in Lakh)

| | |
|---|---|
| Revenue Receipt | |
| Revenue Expenditure | |
| Revenue less expenditure | |
| Resource Mobilization | |
| Debt service charges | |
| Revenue and Receipt of Local Body or Department of state Government | |
| Detailed Revenue Receipt heads | |

Source: _____

**25.1** **Proposed Large Projects**

| Proposed Capital Projects | Source of Finance | Investment | Project period |
|---|---|---|---|
| Upgradation | | | |
| New Infrastructure | | | |
| Expansion/Diversification | | | |

Source: _____

---

**Guidelines for Filling the Format**

**Introduction**

The format for collection of town level data consists of 25tables which cover key areas such as demography, physical & locational aspects, physical and social infrastructure, environment, housing and slums, governance, etc. This data is to be collected by the Nodal Agency at city/town level, in most cases the Urban Local Bodies.

**Census Town**
As per the Census definition, Towns comprise the following:

(a)  All statutory towns, i.e., all places with a municipality, corporation, cantonment board, or a notified town area committee, etc.
(b)  All other places which satisfy the following criteria:
  - a minimum population of 5,000 ;
  - at least 75% of the male working population engaged in non-agricultural activities; and
  - a density of population of at least 400 persons per sq. km.

The city/town which do not have an urban local body as per (a) above, but satisfy conditions given in (b), are called by Census of India as Census Towns.

**Urban Agglomerations**
Urban Agglomerations represent a continuous urban spread constituting a town and its adjoining urban outgrowths or two or more physically contiguous towns having a common boundary together with continuous well-recognised urban outgrowths, if any, of such towns. Very often, around a core city or statutory town, there are come up fairly large well recognized railway colonies, university campuses, etc. Even though these places lie outside the precincts of a statutory city or town or within the revenue limits of the village(s) which (are) contiguous to the town, such areas may not be themselves qualify to be treated as towns. But if they form a continuous spread with the town, they are outgrowths of the town and deserve to be treated as urban. Such towns, together with their outgrowths, have been treated as one urban unit called `Urban Agglomeration'. Thus, an urban agglomeration may constitute:
(a)  A city or a town with continuous outgrowth, the outgrowth being outside  the statutory limits but falling within the boundaries of the adjoining village or  villages;  or
(b)  Two or more adjoining towns with their outgrowths, if any, or
(c)  A city and one or more adjoining towns with or without outgrowths all of which form a continuous spread

Definitions, explanations of the parameters (including abbreviations) used in different Tables of the Proforma are as follows:

**TABLE 1: PHYSICAL ASPECTS AND LOCATIONAL PARTICULARS**

### 1.1 Name of City/Town
Names of the city/town selected under the Scheme

### 1.2 Civic Status
The civic administration status is a determinant for categorization of a place as urban which is to be indicated using the following abbreviations:

| Civic Status | Abbreviation |
|---|---|
| Municipal Corporation/Corporation | M.Corp. |
| Municipal Committee/Municipal Town Committee | MC |
| Municipality | M |
| Municipal Board | MB |
| Municipal Council/Town Municipal Council/ City Municipal Council | M Cl |
| Cantonment Board/Cantonment | CB |
| Notified Area/Notified Area Committee/ Notified Committee/Notified Town Area Committee | NAC |
| Industrial Notified Area | INA |
| Town Committee/Town Area Committee | TC |
| Town Area | TA |
| Municipal Township | MTS |
| Township | TS |
| Town Board | TB |
| Panchayat Township | PTS |
| Gram Panchayat/Village Panchayat | GP |
| Mandal Panchayat | MP |
| Nagar Panchayat/Town Panchayat | NP |
| Panchayat | P |
| Sanitary Board | SB |
| Special Area | SA |
| Special Area Development Authority | SADA |
| Estate Office | EO |
| Census Town/Non-Municipal Census Town | CT |
| Non-Municipal/Non-Municipal Area | NM |

### 1.3 Name of the Tehsil/Mandal/Block

### 1.4 Name of the District
Name of the district where the city/town is located

### 1.5 Name of the State
State name

---

## 1.6 Area of the City/town

The area figures of statutorily notified towns are given by the civic bodies/municipal committees based on available records.

Area figures are also given in the Census Town Directory/District Census Handbook is the municipal/UA area. However, the Planning Area of the city/town may be much larger. Further, for purposes of planning, urbanisable and controlled areas may have been defined by the development authorities. These are vital, because master plan is to be prepared for the urbanisable area.

## 1.7 Distance from Town in km.

*State HQs., District HQs., Tahsil/Taluk/Mandal HQs., nearest city (having 1 lakh and above population) and nearest Railway Station along with distances*

These columns provide details on locational particulars of the town with reference to names of the State Hqs., District Hqs., Tahsil/Taluk/Mandal Hqs., nearest city (having 1 lakh and above population) and nearest Railway Station, indicating their distances in km., from the town. In case the nearest city or the railway station is situated in a state other than the state to which the town belongs, name of the nearest city or nearest railway station alongwith the name of the state may be indicated.

In some north-eastern states, namely, Arunachal Pradesh, Assam and Nagaland where `Circle' is equivalent to Tahsil, etc., names of Circle Hqs., have to be reported whereas in Manipur and Sikkim, Sub-Division is the equivalent to Tahsil, names of Sub-Division Hqs., have to be indicated. Apart from these in some states, Community Block/Rural Development Block is the equivalent of Tahsil, in both cases Block of Police Station may be indicated as Tahsil.

## 1.8 Nearness/Distance of Major River/Canal
This column provides details of navigable river/canal passing nearby (within a distance of 10 km.), or through the town.

## TABLE 2:   DEMOGRAPHIC DATA& BASIC SOCIO-ECONOMIC DATA

## 2.1 Population and Growth Rates

Population of the City/town in time series from Census of India. This is available in Town Directory published by Census of India. Growth rates may be given or calculated.

---

**2.2 Primary Census Abstract 2011**
This information may be derived from PCA and extract from PCA could also be provided for the city/town and if the plan formulation is to be done for planning/urbanisable area, then other administrative units covered. For example, the planning area for a particular city may cover one or more revenue villages, census towns, outgrowths, etc.

**2.3 Housing Data**
This table covers basic housing data from Housing (H-series) Tables from Census of India.

Number of households: In Census, a household is defined as a group of persons who commonly live together and take their meals from a common kitchen.

Number of occupied residential houses: This Table gives the number of occupied residential houses in respect of each town. A Census house is a building or a part of building having a separate main entrance from the road or common courtyard or staircase etc., used or recognized as a separate unit.

**2.4 Vital Statistics**

- *Crude Birth Rate:* The Crude Birth Rate (CBR) is defined as the number of live births in a year per 1,000 of the midyear population.
- *Infant Mortality Rate* : Infant Mortality Rate (or IMR) is defined as the number of infant deaths in a year per 1,000 live births during the year
- *Life expectancy at birth* = *Total child births - death of Children at the time of birth*.

**2.6 Persons below Poverty line**

Households whose total income is below the poverty line as defined by the national/state/local standards. Poverty line is defined by the State Governments and records will be available with State Departments of Economics & Statistics or other sources.

**TABLE 3: OCCUPATIONAL CLASSIFICATION**

**3.1 Workforce 2001-2011 – Definitions as per Census of India**

**Workers and Non-workers**
A 'worker' is a person who mainly participates in any economically productive activity either physically or mentally. Work not only involves actual work but effective supervision and direction of work as well.

**Total workers**
Total workers = Main workers + Marginal workers

**Main workers**

Main workers were those who had worked for the major part of the year preceding the date of enumeration i.e., those who were engaged in any economically productive activity for 183 days or six months or more during the year.

**Marginal workers**

Those who worked any time in the year preceding the date of enumeration but did not work for a major part of the year i.e., those who worked for less than 183 days or six months were classified as Marginal workers.

**Non-workers**

Those who had not worked any time at all during the year preceding the date of enumeration are non-workers. Non-workers include (i) those engaged in household duties at home, (ii) students, (iii) dependents, (iv) retired persons (v) beggars, (vi) inmates of institutions and (vii) other non-workers.

**3.2 Occupational Classification of Main Workers**

Main workers classified into 9 major categories are given in Census of India B-series tables. This is called the Functional Classification and helps in understanding the functional classification of the city/town. This data may be provided for the Census year for which it is available.

**TABLE 4:INDUSTRIAL ASPECTS**

Number of units of different type of industrial units (Large, Medium, Small House Hold, Hazardous etc) of the town/ward for the last five years to be furnished.

**4.1 Industries –** provide latest details for the year available.

**4.2 Traditional Industries:** details may be provided for the types of traditional industries found in the city/town. Some towns specialize in certain traditional industry, often at household level, for which special provisions are to be made in Master Plan.

**4.3 Most important commodities imported**

The names of the most important commodities decided in terms of estimated volume of commodities imported are to be indicated.

**4.4 Most important commodities manufactured**

The names of the most important commodities manufactured are to be indicated. This is decided in terms of the volume of total output of the commodities concerned.

**4.5 Most important commodities exported**

The names of the most important commodities decided in terms of estimated volume of commodities exported are to be indicated.

**4.6 Most important agricultural produce**

The region surrounding the city/town may be rich in a particular type of produce, for which markets/mandis, processing industry etc. may be located in the city.

**TABLE 5:    LAND USE   (in Hectares)**

The area under different landuses in 1991,2001, 2011 to be furnished. Details regarding landuse classes, etc. is given elsewhere in the Design Standards document. The table may be modified as per requirements.

**TABLE 6:    AVAILABILITY OF DRINKING WATER**

**6.1 Important sources of drinking water**

Indicate the important sources of drinking water and also indicate the distance in km. from the main source, and number of households covered from different sources. Refer HH-series tables (Tables on Houses, Household Amenities and Assets) from Census of India.

**6.2 Water Supply details**

Ward wise details of the quantity of water supplied (MLD), No. of Connections, Per Capita Consumption (LPCD), Area Covered (sq. km.), Capacity of WTPs, percentage of treated water recycling, etc. to be furnished.

**TABLE 7:    ELECTRICITY**

The information on electric supply to the town is presented in the form of number of connections under different consumption groups viz., domestic, industrial, commercial, and others which includes electricity for agricultural purpose, proposed projects requiring land in the city/town.

**TABLE 8:    COMMUNICATIONS &TELECOMMUNICATIONS**

Details of number of telephone connections (land line), mobile connections, Post Office etc. to be furnished here.

**TABLE 9:    EDUCATIONAL FACILITIES**

Pre-primary schools have been treated as Anganwadi, Schools upto Class IV have been treated as Primary, schools upto Class VIII as Junior secondary or middle schools, schools upto Class X as Secondary schools and schools or colleges upto XII as Senior secondary schools or at places Intermediate and Junior college.

If there are composite schools like middle schools with primary classes, or secondary schools with middle classes, these have been included in the number of primary and middle schools respectively. For example, if in a town, there are two primary schools and one middle school with primary classes, the number of primary schools in the town will be given as three and that of middle schools as one even though there are only three educational institutions. Same is the case with secondary or senior secondary schools.

**Number of vocational training institutions**
This includes vocational institutions like Applied Art/Painting College, Pharmacy College, B.Ed. College, Teachers Training Institutions, Govt./recognized polytechnics, Shorthand, Typewriting, Music/Dance Schools, etc.

**Number of colleges**
The number of different types of colleges offering various courses in the town is to be indicated under following sub-heads:

    (1) General
    (2) Medical
    (3) Engineering
    (4) Law

A general college means Arts, Science and Commerce colleges.

**TABLE 7:    NUMBER OF ADULT EDUCATION CENTERS**
This aspect was first introduced in the Town Directory of 1981 Census keeping in view the Minimum Needs Programme of the Planning Commission. In this column the number of adult education centres conducting regular classes are to be indicated.

**TABLE 10:    MEDICAL FACILITIES**
**10.1    Number of hospitals, dispensaries, etc., doctors, nurses, paramedical staff and total number of beds available therein**

The particulars of various type of medical institutions in various system of medicines like Allopathic, Ayurvedic, Unani, Homeopaththic etc. and their numbers viz., Hospitals, Dispensaries, Health Centres, Family Planning Centres, Nursing Homes and other medical institutions and the capacity with reference to total beds, doctors, nurses, paramedical staff available is to be given. The data is to be provided for both Govt./Private institutions.

**10.2 Epidemiological Details**
No. of persons affected by diseases like Leprosy, Phylaria, Tuberculosis, Cholera etc.

## TABLE 11:   AVAILABILITY OF SANITARY FACILITIES

The sanitation facilities in a city/town could be based on septic tanks or sewerage system or low cost sanitation. Studies have shown that proper sewerage systems cover less than 20% of Indian Cities. Therefore, the correct data has to be filled in here so that planning could be undertaken accordingly.

**Sewerage System**
Sewerage system implies the network of mains and branches of underground conduits for the conveyance of sewage to the point of disposal. Sewers that carry only household and industrial wastage are called separate sewers; those that carry storm water from roofs, streets and other surfaces are known as storm water drains, while those carrying both sewage and storm water are called combined sewers. However, towns which are not provided with such underground sewerage system normally have open surface drain, covered drains, etc.

**11.2 Network Details**
The details about the sewerage/drainage network to be provided.

**11.3 to 11.8 Details of sewage generation, treatment and disposal**

**11.9 Public Toilets**

**11.10 Major Storm Water Drains**

## TABLE 12:   SOLID WASTE MANAGEMENT
There are three major steps involved in the management of solid waste viz. collection, transportation and disposal. Disposal of solid waste is generally done through land filling.

**Municipal solid waste** includes commercial and residential waste generated by a community
**Collection** means collection and removal of solid waste from different collection points
**Disposal** means final disposal of solid waste;

**Recycling** means the process by which waste is transformed into new products in such a manner that the original products lose their identity;

**Land fill:** Means disposal of solid waste by spreading it in layers over a lined surface or land, compacting it to the smallest volume and covering it by impervious soil layer at the end of the day or more frequently. A landfill is operated to prevent leachate for contaminating ground water and maintaining ambient air quality;

**Incineration:** Incineration is a process of controlled combustion for burning of waste and residue, containing material, Carbon dioxide, water vapour, ash and non-combustible end products.

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**Biodegradable substance** means a substance that can be degraded by micro-organisms.

**Hospital Waste:** Waste generating from the hospitals is called hospital waste

## TABLE 13: AVAILABILITY OF RECREATIONAL, CULTURAL, BANKING AND CREDIT FACILITIES

### 13.1 Community Facilities

The particulars of recreational facilities such as stadia, museum, cinema halls and auditoria/drama/community halls and their number in the town are to be recorded. The availability of cultural facilities in the form of the number of public libraries and reading rooms, if any, available in the town is to be indicated. If fire fighting facility is not available in the town, the name of the nearest place where this facility is available is to be indicated and the distance of the same is given in column.

### 13.2 Number of banks and credit societies

**Banks**
Number of banks, commercial as well as co-operative functioning in the town has to be indicated. It gives the number of banks both the head as well as branch offices of banks in each town, which actually transact banking business. The head or branch offices not actually transacting any banking business are not to be taken into account.

**Credit Societies**
The information on Agricultural Credit Societies and Non-Agricultural Credit Societies are to be furnished.

The agricultural credit societies include service, multipurpose, agricultural produce, marketing cooperative societies, etc. The non-agricultural credit societies include consumer cooperative societies and also credit co-operative societies of certain categories of persons like teachers, postal-workers, etc.

## TABLE 14: LAW AND ORDER/CRIMES
## TABLE 15: HOUSING

## TABLE 16: LAND OWNERSHIP AND COST

### 16.3 Mortgage to credit ratio for housing (Rs. in Lakh)

**Mortgage/loans**
Percentage of dwellings purchased during the past year that are covered by mortgage and percentage of dwellings that are covered by non-mortgage.

**TABLE 17:   DISASTERS**

**TABLE 18:   PUBLIC PRIVATE PARTNERSHIP PROJECTS IMPLEMENTED IN THE TOWN (PPP)**

**TABLE 19:   SLUMS**

All the inhabitants of the areas, which have been notified as slums by the state governments under any legal provisions or even recognized by them, are to be accordingly considered as slum population. Besides areas in cities/towns, which satisfy the usual criteria for declaring an area as slum have also been included.

As per Census of India, the slum areas broadly consist of:-

1. All specified areas notified as 'Slum' by State/Local Government and UT Administration under any Act;
2. All areas recognized as 'Slum' by State/Local Government and UT Administration which may not have been formally notified as slum under any Act;
3. A compact area of at least 300 population or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities.

**Houseless Population:** As per Census of India 2011, households which do not live in buildings or Census houses but live in the open or roadside, pavements, in hume-pipes, under fly-overs and staircases, or in the open in places of worship, mandaps, railway platforms, etc., are to be treated as Houseless households

**TABLE 20:   TRAFFIC & TRANSPORTATION**

**20.3 Road length and Footpath (in km.)**
The road length to be shown in these columns pertains to Surfaced i.e., Pucca and Un-surfaced i.e., Kutcha roads and its total road length.

**TABLE 21: ENVIRONMENT**
Environmental pollutant means any solid, liquid or gaseous substance present in such concentration as may be or tend to be, injurious to environment and environmental pollution means the presence in the environment of any environmental pollutant.

**21.1 Air pollution**
Air pollution is the excessive concentration of foreign matter in the air, which adversely affects the well being of the individual or cause damage to property. The important air contaminants are SO2, NO, Suspended Particulate Matter (SPM), CO. Air pollutants are measures in µg/m3.

> **Sulfur dioxide ($SO_2$):**$SO_2$ is an irritant colourless gas, which affects the mucous membranes when inhaled. Exposure at low level can cause increased upper respiratory symptoms such as cough, sore throat and affects lung function.

**Oxides of Nitrogen (NO):** Of the seven oxides of nitrogen known to exist in the ambient air, Nitrogen dioxide is the main oxides affecting human health. Oxides of nitrogen are released in all the types of combustion as they are formed by the oxidation of atmospheric nitrogen at high temperature. Exposure to excessive $NO_2$ affects the defense mechanism of human body.

**Suspended Particulate Matters (SPM)**: Particulate is a term given to the minute particle of solid or semi solid material dispersed in the atmosphere. SPM presence in the air cause respiratory diseases.

**Carbon Monoxide (CO):** Carbon monoxide is a colourless, odourless gas with relatively poor solubility in water. CO emission is due to incomplete combustion of fuel of vehicles. CO affects the central nervous system and also responsible for heart attacks and a high mortality rate.

**21.2 Noise Pollution:** Noise is an unwanted sound without agreeable musical quality. Noise levels are measured in decibels. One decibel is the threshold of hearing.

**21.3 Water pollution:** Water pollution is any physical or chemical change in water that can adversely affect organisms

**Biochemical oxygen demand, or BOD**
The amount of organic material that can decompose in the sewage is measured by the biochemical oxygen demand. BOD is the amount of oxygen required by micro-organisms to decompose the organic substances in sewage. Therefore, the more organic material there is in the sewage, the higher the BOD. Dissolved oxygen is an important factor that determines the quality of water in lakes and rivers. The higher the concentration of dissolved oxygen, the better the water quality. BOD level measured in mg/l.

**Coliform level:** Coliform level is an important index to measure pollution by human waste. Water pollution due to human excreta is caused mainly by the lack of proper municipal sewerage.

**pH Value:** A number used to express degrees of acidity or alkalinity in solution.

## TABLE 22:   ANIMAL HUSBANDARY DETAILS

Animal husbandry continues to be an important activity in most Indian cities/towns, most often found in urban villages and peri-urban areas. Details are essential for master plan formulation.

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**TABLE 23: TRAVEL & TOURISM**

Aspects related to travel and tourism closely affect demand for facilities, demand for land and economic activity generated such as hotels, parking, eateries, water demand, electricity demand, etc.

**TABLE 24: GOVERNANCE**

**Civic Status of town:** see para 1.2.

**Status of Master/Development Plan:** Many cities/towns will have at least some kind of pre-existing plan document. The details such as date of sanction of the Ist Plan, plan revision are to be furnished.

**Revenue and Receipt of Local Body** (Rs. in Lakh)

The actual revenue receipt and revenue expenditure figures of the administrative body governing the town are to be filled. Data is to be presented not only in respect of statutory bodies but also in respect of non-statutory bodies managing the civic administration of the towns if they have separate budgets and accounts of their own pertaining to the town.

**City Product**

Total product of the city as defined in national accounts procedures. It may either be taken as the total income or value-added (wages plus business surplus plus taxes plus imports), or the total final demand (consumption plus investment plus exports).

City Product = (GNP) x (number of households in the city) x (average household income in the city) (Total national household income, from national accounts)